EA02-027

FORD 8/5/03
LETTER TO ODI

APPENDIX A

5 BOXES
BOX 2 OF 5

PART 4 OF 4

From: Champion, Stephanie (S.R.)
Sent: Monday, September 10, 2001 12:56 PM
To: Watkins, Todd (T.P.)
Cc: Taylor, Beverly (B.N.)
Subject: Customer Demand Letter Case#0517802910 MaryAnn Reimer Mkt. Area D2

Case ID: 0517802910
CSM ID: twatkin5
Customer Name: MaryAnn Reimer
Market Area: D
MktNumber: 2
MktNumber2: 0
OOS ID: btaylor6


Scan583, ptember 10, 2001.jp


Scan584, tember 10, 2001.jp


Scan585, tember 10, 2001.jp


Scan586, tember 10, 2001.jp


Scan587, tember 10, 2001.jp


Scan588, tember 10, 2001.jp


Scan589, tember 10, 2001.jp

Attached is a new Customer Demand Letter for your market. Please review and handle as you deem appropriate.

Please do not reply to this message.

From: Watkins, Todd (T.P.)
Sent: Wednesday, September 19, 2001 11:34 AM
To: Myers, Dan (D.P.)
Cc: Watkins, Todd (T.P.); Robertson, William (W.T.)
Subject: Lemon Law at Mike Finnin Ford

I have a lemon law demand letter at M. Finnin Ford in Dubuque, IA. The concern is for a stalling at about 30 miles per hour with a 2001 Escape. The customer alleges this has happened three times. The dealership has never been able to duplicate but has attempted two repairs. I am unable to send you the file I received from legal on this - to large and my computer just froze when I attempted.

The VIN # is 1FMYU04111KD91106. The customer's name is [redacted] The vehicle has about 14,000 miles on it and it has not acted up since the last repair attempt on 8/20.

Dave Ruden is the P&S Director at Finnin and their phone number is 319-556-1010 and Dave's extension is 250. The customer does not wish to deal with the Service Manager, Rick Stumpf, any further so Dave will need to get involved. The customer's phone numbers are [redacted] at home and [redacted] at work. Thanks for your help. I also talked to Troy on this but he could not get out until 9/27.

From:	Myers, Dan (D.P.)
Sent:	Monday, September 24, 2001 9:20 AM
To:	Bhojwani, Kamal (K.)
Cc:	Lovelace, Marla (M.E.); Vecchio, Anne Marie (A.); Watkins, Todd (T.P.)
Subject:	Escape Stalls Survey Assignment 01-56

Attached is a completed survey from the vehicle I am supposed to see this week. I am waiting for the parts to arrive at the Dealer before I schedule the repair visit. The customer says the issue hasn't happened since the last repair (replacement of DPFE 8/20/2001).

Thanks,

Dan Myers

Field Quality Engineer - Iowa
Enhanced Concern Identification

dmyers4@ford.com

Cell	563-505-9002
Office	563-289-9991
Fax	563-289-1364

req01-56ques_891106.doc

Customer Questionnaire for Vehicle Concerns

Customer name: [redacted]

City, State: Dubuque, IA

Phone #:

Tribute or Escape: Escape

VIN: 1FMYU04111KB91106

1. How many times did vehicle concern occur? 3
   a. Able to restart immediately? YES
2. Outside temperature (approximate)? 90-100 ONCE 70-80 OTHER TWO TIMES.
3. Weather (dry, rainy, cloudy, sunny)? DRY
4. Type of fuel used? PHILLIPS 66 REGULAR
5. Fuel level when concern occurred? DON'T KNOW
6. Daytime or nighttime? DAYTIME
7. Shift lever position (1,2, D, or R)? D
8. 4WD (on or off)? OFF
9. Approximate time from engine start to when concern occurs? 10-15 MINUTES, 8-10 MILES
10. Vehicle speed when concern(s) occurred? 30-35 MPH
11. Vehicle mode (cruise, coast, accel, idle) at time when concern occurred? COAST
12. Location where concern occurred (different every time or same general area)? ONCE IN TURN OTHER TWO TIMES AT BOTTOM OF SAME HILL.
13. Road condition (flat, uphill, downhill, or on a hill)? AFTER DOWNHILL AND FLAT.
14. Power steering (during right turn, left turn, or straight)? RIGHT
15. Brake pedal depressed or free? FREE
16. Cruise control (on or off)? OFF
17. What caused you to realize that the concern had occurred? CROSSED CENTER LINE BECAUSE OF INCREASED STEERING EFFORT AND WAS ALMOST REAR-ENDED WHEN NO THROTTLE RESPONSE.
18. Which indicators (if any) were lit after the concern occurred? OIL LIGHT

19. Accessory load **before** concern (see below)....

- Climate control (a/c on or off, blower speed 1, 2, 3, or 4)? **A/C ON BLOWER SPEED 1 OR 2**
- Exterior lighting (headlights on or off, low or high beam)? **OFF**
- Radio ON before concern? **YES**
- Wipers (on or off)? Rear wipers (on or off)? **BOTH OFF**
- Rear Defrost (on or off)? **OFF**

20. Accessory load **after** concern (see below)....

- Climate control (a/c on or off, blower speed 1, 2, 3, or 4)? **A/C ON BLOWER SPEED 1 OR 2**
- Exterior lighting (headlights on or off, low or high beam)? **OFF**
- Radio ON before concern? **YES**
- Wipers (on or off)? Rear wipers (on or off)? **BOTH OFF**
- Rear Defrost (on or off)? **OFF**

21. Number of keys (or other weights) generally on the key-chain? **3 KEYS ONLY**
22. Load of the vehicle (cargo, occupants) at time of concern? **2 CHILDREN 43 AND 63 POUNDS. DRIVER IS 115 POUNDS.**
23. Any non-factory installed electronic devices (2-way radio, cell-phone, laptop) Used in the vehicle? **NO**
24. If the vehicle needed to be restarted, was the key (ignition) turned off and then turned back on to restart, or was the vehicle restarted without turning off the key. **THE KEY WAS TURNED OFF IN ALL 3 OCCASIONS.**
25. What gear what the vehicle in when restarting (P,R, N, D, 1, 2)? **P**
26. Did the vehicle stumble at any time before or after the concern? **NO**

Comments: **HAS NOT HAPPENED AGAIN SINCE REPLACEMENT OF DPFE SENSOR 8/20/2001. CUSTOMER STATES THAT SHE WILL NOT OWN THIS VEHICLE BECAUSE IT SCARES HER AND SHE DOESN'T WANT TO HAVE TO SELL IT BECAUSE SHE WILL NEVER BE CONVINCED IT IS FIXED. HER NEXT VEHICLE WILL NOT BE A FORD PRODUCT BECAUSE OF THE WAY SHE WAS TREATED BY THE DEALER AND BECAUSE SHE SAYS FORD HAS NOTHING SHE IS INTERESTED IN.**

CR hotline #: 800-222-6500

From:	Williams, Les (LHW.)
Sent:	Tuesday, February 26, 2002 9:51 AM
To:	Altoonian, Don (D.J.); Amanda, Harry (H.F.); Badgley, Joel (J.K.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); Cary Powell; Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); De Pena, Juan (J.E.); Diez, Timothy (T.P.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Hurley, Robert (R.E.); Ichikawa, Jiyunichiro (J.); Jensen, Tad (T.E.); John McDonald (E-mail); Jones, Andy; Jordan, Donald (D.E.); Kanal, Shinji (S.); King, Robert (R.F.); Klostermann, Eric (E.); Kwon, Soon (S.K.); Limilaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Luehrsen, Eric (E.A.); Marck, Edmond (E.C.); Matasa, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); Morgan, Tom; Morishima, Shigeki (S.); Naveed Khan; Nematollahi, Sonya (S.); Nikolai, Bernie; Noteboom, Jim (J.E.); Ortman, James (J.W.); Powell, Cary; Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Rothweiler, Daniel (D.); Sanders, Muriel (M.S.); Shah, Kiran (K.C.); Shiraishi, Maseru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhee (R.); Sullivan, Jamie (J.P.); Takasawa, Keith (K.D.); Takubo, Hirokhi (H.); Vecchio, Anne Marie (A.); Wakenell, Ray (R.A.); Williams, Les (LHW.); Williamson, David (D.E.); Yeung, Lem (.)
Cc:	'cpowell3@visteon.com'
Subject:	Stall meeting 2/28/02 moved to 2 PM EST

I will be out of the office this Thursday morning 2/28/02 , therefore the stalls meeting is moved to 2 PM EST. Thank you, this message was sent in addition to a calendar update as a precaution.

Regards,
Les Williams
For More, Count on Les
U204 3.0L Powertrain Calibration
Truck Engine Engineering, Suite 1AE20
Phone: (313)33-72503
Fax: (313) 32-31786

Subject:	Updated: Update: U204 Phantom Stall Meeting
Location:	TEE COnference Rm 2
Start:	Thu 2/28/2002 2:00 PM
End:	Thu 2/28/2002 3:00 PM
Show Time As:	Tentative
Recurrence:	Weekly
Recurrence Pattern:	every Thursday from 2:00 PM to 3:00 PM
Meeting Status:	Not yet responded
Required Attendees:	Williams, Lee (LHW.); Aftoonian, Don (D.J.); Amende, Harry (H.F.); Badgley, Joel (J.K.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); 'Cary Powell'; Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); De Pena, Juan (J.E.); Diez, Timothy (T.P.); Fascetti, Bob (R.J.); Fourmelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); John McDonald (E-mail); 'Jones, Andy'; Jordan, Donald (D.E.); Kanal, Shinji (S.); King, Robert (R.F.); Klostermann, Eric (E.); Kosko, Jeff (J.R.); Kwon, Soon (S.K.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Luehrsen, Eric (E.A.); Merck, Edmond (E.C.); Matese, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); 'Morgan, Tom'; Morishima, Shigeki (S.); 'Naveed Khan'; Namatollahi, Sonya (S.); 'Nikolai, Bernie'; Noteboom, Jim (J.E.); Ortman, James (J.W.); 'Powell, Cary'; Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Rothweiler, Daniel (D.); Sanders, Muriel (M.S.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Siligenbauer, Jeffrey (J.R.); Suarez, Rhae (R.); Sullivan, Jamie (J.P.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Vecchio, Anne Marie (A.); Wakenell, Ray (R.A.); Weltach, Bill (B.); Williams, Lee (LHW.); Williamson, David (D.E.); Young, Lem (.)
Optional Attendees:	Klostermann, Eric (E.); Williamson, David (D.E.)

Dial in: 1-866-250-3175 or Fordnet: 9-1-954-1163
International Participants # 1 (630) 827-6733
Passcode: 7354080#

Subject:	Updated: Update: U204 Phantom Stall Meeting
Location:	TEE COnference Rm 2
Start:	Thu 1/17/2002 2:00 PM
End:	Thu 1/17/2002 3:00 PM
Show Time As:	Tentative
Recurrence:	Weekly
Recurrence Pattern:	every Thursday from 2:00 PM to 3:00 PM
Meeting Status:	Not yet responded
Required Attendees:	Williams, Les (LHW.); Altoonian, Don (D.J.); Amende, Harry (H.F.); Badgley, Joel (J.K.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); 'Cary Powell'; Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); De Pena, Juan (J.E.); Diaz, Timothy (T.P.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Ichikawa, Jyunichiro (J.); Jensen, Ted (T.E.); John McDonald (E-mail); 'Jones, Andy'; Jordan, Donald (D.E.); Kanal, Shinji (S.); King, Robert (R.F.); Klostermann, Eric (E.); Kosko, Jeff (J.R.); Kwon, Soon (S.K.); Limtieco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Luehrsen, Eric (E.A.); Marck, Edmond (E.C.); Matese, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); 'Morgan, Tom'; Morishima, Shigeki (S.); 'Naveed Khan'; Nematollahi, Sonya (S.); 'Nikolai, Bernie'; Noteboom, Jim (J.E.); Ortman, James (J.W.); 'Powell, Cary'; Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Rothweiler, Daniel (D.); Sanders, Muriel (M.S.); Shah, Kiran (K.C.); Shiralahi, Maseru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhea (R.); Sullivan, Jamie (J.P.); Takasawa, Keith (K.D.); Takubo, Hirokhi (H.); Vecchio, Anne Marie (A.); Wakenell, Ray (R.A.); Wettach, Bill (B.); Williams, Les (LHW.); Williamson, David (D.E.); Yeung, Lam (.)
Optional Attendees:	Klostermann, Eric (E.); Williamson, David (D.E.)

Dial in: 1-866-250-3175 or Fordnet: 9-1-954-1163
International Participants # 1 (630) 827-6733
Passcode: 7354080#

From: Williams, Les (LHW.)
Sent: Tuesday, March 05, 2002 9:25 AM
To: Altoonian, Don (D.J.); Amanda, Harry (H.F.); Badgley, Joel (J.K.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); Cary Powell; Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); De Pena, Juan (J.E.); Diez, Timothy (T.P.); Fascetti, Bob (R.J.); Fourmells, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Ishikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); John McDonald (E-mail); Jones, Andy; Jordan, Donald (D.E.); Kanal, Shinji (S.); King, Robert (R.F.); Klostermann, Eric (E.); Kosko, Jeff (J.R.); Kwon, Soon (S.K.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Luehrsen, Eric (E.A.); Marck, Edmond (E.C.); Mateas, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); Morgan, Tom; Morishima, Shigeki (S.); Naveed Khan; Nematollahi, Sonya (S.); Nikolai, Bernie; Notsboom, Jim (J.E.); Ortman, James (J.W.); Powell, Cary; Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Rothweiler, Daniel (D.); Sanders, Muriel (M.S.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhas (R.); Sullivan, Jamie (J.P.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Vecchio, Anne Marie (A.); Wakenell, Ray (R.A.); Weitach, Bill (B.); Williams, Les (LHW.); Williamson, David (D.E.); Yeung, Lam (.)
Subject: U204 Stall Meeting moved to 2-3 PM on Thursdays

Hello Team:

My last day on this assignment is 3/15/02. The Stalls meetings have been moved to 2-3 PM EST on Thursdays. Muriel Sanders will be taking over the stalls issue after I am departed. Thanks!

Regards,
Les Williams
For More, Count on Les
U204 3.0L Powertrain Calibration
Truck Engine Engineering, Suite 1AE20
Phone: (313)33-72503
Fax: (313) 32-31786

From: Schmidt, Gregory (G.A.)
Sent: Thursday, May 16, 2002 4:11 PM
To: Davis, Alice (A.J.); Anderson, Jeff (J.W.); Coffey, Dan (D.C.); Conroy, Jerry (J.R.); Corbett, Sandra (S.M.); Dakhlallah, Hassan (H.A.); Froney, Jayne (J.R.); Fullerton, Lisa (L.M.); Giordano, Mike (M.A.); Glowacz, Gary (G.J.); Godlewski, Ed (E.V.); Grewal, Bill (B.S.); Hanley, James (J.); Hansen, George (G.C.); Hein, Burk (B.); Heller, Michael (M.D.); Hollister, Dave (D.); Jorgensen, Glenn (G.B.); Kramer, Michael (M.T.); McNamara, Patrick (P.S.); Miller, Cary (C.D.); Miller, Karen (K.A.); Neutgens, Kurt (K.J.); Sloan, Burt (B.E.); Thompson, Greg (G.J.); Wetzler, Mitchell (Mitch.); Whitworth, Rudy (A.R.)
Subject: RE: Meeting Minutes - 050302

Rudy Whitworth has asked for additional time to prepare for his QRT forum presentation. Given that request - I proposed cancellation of tomorrow morning's meeting. Alice is out of the office and Rudy was our sole presenter. Apologies for the late notice.

---Original Message---
From: Davis, Alice (A.J.)
Sent: Friday, May 03, 2002 10:17 AM
To: Anderson, Jeff (J.W.); Coffey, Dan (D.C.); Conroy, Jerry (J.R.); Corbett, Sandra (S.M.); Dakhlallah, Hassan (H.A.); Davis, Alice (A.J.); Froney, Jayne (J.R.); Fullerton, Lisa (L.M.); Giordano, Mike (M.A.); Glowacz, Gary (G.J.); Godlewski, Ed (E.V.); Grewal, Bill (B.S.); Hanley, James (J.); Hansen, George (G.C.); Hein, Burk (B.); Heller, Michael (M.D.); Hollister, Dave (D.); Jorgensen, Glenn (G.B.); Kramer, Michael (M.T.); McNamara, Patrick (P.S.); Miller, Cary (C.D.); Miller, Karen (K.A.); Neutgens, Kurt (K.J.); Schmidt, Gregory (G.A.); Sloan, Burt (B.E.); Thompson, Greg (G.J.); Wetzler, Mitchell (Mitch.); Whitworth, Rudy (A.R.)
Subject: Meeting Minutes - 050302

P/T QRT Forum
Minutes
Friday, May 3, 2002
PDC 1J-D69
7:00-8:00

Early Warning System (Used in the F-150 PTQRT)

Mike Heller explained the "Early Warning System" developed to show emerging issues two (2) to three (3) months ahead of R/1000 warranty.

Charts were presented that:

- Captured the association of the customer concern code to the causal part
- Gave the ambient level of the part and its increase from report to report
- Showed claims sent out for the delta between reports

Warranty Classification Code

Greg Schmidt confirmed the warranty classification codes by organization for Powertrain.

Next Meeting:

Friday, May 17, 2000
Agenda: Rudy Whitworth

Sincerely,

Alice J.Davis

PROGRAM COORDINATOR
NORTH AMERICA TRUCK
TOUGH TRUCK POWERTRAIN
PHONE: 313-84-53301; PDC 2G-F10
FAX: 313-39-00526
adavis3@ford.com

From: Schmidt, Gregory (G.A.)
Sent: Thursday, May 16, 2002 4:12 PM
To: Davis, Alice (A.J.); Anderson, Jeff (J.W.); Conroy, Jerry (J.R.); Corbett, Sandra (S.M.); Dakhlallah, Hassan (H.A.); Froney, Jayne (J.R.); Fullerton, Lisa (L.M.); Giordano, Mike (M.A.); Godlewski, Ed (E.V.); Grewal, Bill (B.S.); Hanley, James (J.); Hansen, George (G.C.); Hollister, Dave (D.); Kramer, Michael (M.T.); Miller, Cary (C.D.); Neutgens, Kurt (K.J.); Thompson, Greg (G.J.); Wetzler, Mitchell (Mitch.)
Subject: RE: P/T QRT Forum

The Friday, May 17, 2002 meeting is cancelled.

-----Original Appointment-----
From: Davis, Alice (A.J.)
Sent: Thursday, January 10, 2002 11:36 AM
To: Davis, Alice (A.J.); Anderson, Jeff (J.W.); Conroy, Jerry (J.R.); Corbett, Sandra (S.M.); Dakhlallah, Hassan (H.A.); Davis, Alice (A.J.); Froney, Jayne (J.R.); Fullerton, Lisa (L.M.); Giordano, Mike (M.A.); Godlewski, Ed (E.V.); Grewal, Bill (B.S.); Hanley, James (J.); Hansen, George (G.C.); Hollister, Dave (D.); Kramer, Michael (M.T.); Miller, Cary (C.D.); Neutgens, Kurt (K.J.); Schmidt, Gregory (G.A.); Thompson, Greg (G.); Wetzler, Mitchell (Mitch.)
Subject: P/T QRT Forum
When: Occurs the third Friday of every 1 month(s) effective 1/18/02 until 12/20/02 from 7:00 AM to 8:00 AM (GMT-05:00) Eastern Time (US & Canada).
Where: POC 1J-D69

PLEASE MAKE NOTE OF NEW DAY AND TIME.

From:	Sanders, Muriel (M.S.)
Sent:	Monday, March 18, 2002 10:14 AM
To:	Altoonian, Don (D.J.); Amende, Harry (H.F.); Badgley, Joel (J.K.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); Cary Powell; Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); Dan Rothweiler; De Pena, Juan (J.E.); Diez, Timothy (T.P.); Fescetti, Bob (R.J.); Fournelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); John McDonald; Jones, Andy; Jordan, Donald (D.E.); Kanai, Shinji (S.); King, Robert (R.F.); Klostermann, Eric (E.); Kosko, Jeff (J.R.); Kwon, Soon (S.K.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Luehrsen, Eric (E.A.); Marok, Edmond (E.C.); Matesa, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); Morgan, Tom; Morishima, Shigeki (S.); Naveed Khan; Nematollahi, Sonya (S.); Nikolai, Bernie; Noteboom, Jim (J.E.); Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Sanders, Muriel (M.S.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhae (R.); Sullivan, Jamie (J.P.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Vecchio, Anne Marie (A.); Wakenell, Ray (R.A.); Wattach, Bill (B.); Williams, Lee (LHW.); Williamson, David (D.E.); Young, Lem (.)
Subject:	U204 Phantom Stall Meeting 3/21/02

Here is the updated meeting information for this week. A meeting notice will follow.

New dial-in information.
Dial in: 1-877-870-3431 or Fordnet: 9-1-954-1143
International Participants # 1 (630) 693-1703
Passcode: 7865386#

For 3/21/2002 Only:
Location is TEE Conference Rm 1

Meeting time remains the same as Thursdays, 2-3pm.

Have a good day.

Muriel Sanders
U204 3.0L Calibration
Ford Motor Company
Phone: 313-32-27307
Fax: 313-32-31786
E-mail: msander6@ford.com

Subject:	Updated: U204 Phantom Stall Meeting
Location:	TEE Conf. Rm. 2
Start:	Thu 3/21/2002 2:00 PM
End:	Thu 3/21/2002 3:00 PM
Show Time As:	Tentative
Recurrence:	Weekly
Recurrence Pattern:	every Thursday from 2:00 PM to 3:00 PM
Meeting Status:	Not yet responded
Required Attendees:	Sanders, Muriel (M.S.); Altoonian, Don (D.J.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); 'Cary Powell'; Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); Rothweiler, Daniel (D.); De Pena, Juan (J.E.); Diez, Timothy (T.P.); Duvall, Allen (A.W.); Fascetti, Bob (R.J.); Foumelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Goodwin, William (W.R.); Grewal, Bill (B.S.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Hoshino, Jun (J.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); 'John McDonald'; 'Jones, Andy'; Jordan, Donald (D.E.); Kanal, Shinji (S.); King, Robert (R.F.); Kosko, Jeff (J.R.); Kwon, Soon (S.K.); Le, Dzung (D.H.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Mandziuk, Roger (R.); Marck, Edmond (E.C.); Matesa, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); McGee, Brett (B.L.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); 'Morgan, Tom'; Morishima, Shigeki (S.); 'Naveed Khan'; Nematollahi, Sonya (S.); 'Nikolai, Bernie'; Noteboom, Jim (J.E.); Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Requepau, Alden (A.P.); Sanders, Muriel (M.S.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhae (R.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Veenstra, Tim (T.W.); Wakenell, Ray (R.A.); Wettach, Bill (B.); Williams, Les (LHW.); Yeung, Lam (.)

I extended the meeting notice a couple of more weeks. All other information remains the same.

Dial in: 1-877-870-3529 or Fordnet: 9-1-954-1144
International Participants # 1 (630) 693-1704
Passcode: 7673538#

From: Sanders, Muriel (M.S.)
Sent: Monday, March 18, 2002 1:52 PM
To: Hansen, George (G.C.)
Subject: Escape VIN #'s

Hi George,

I am working with the 3.0L Escape Calibration group. My supervisor, Bob Dalbo suggested I contact you to get the VIN numbers of vehicles that have stalled and have had the DPFE sensor repaired/replaced. We are trying to investigate what role, if any, the DPFE sensor has had on stalls. Is it possible to get this information? Please contact me with any questions or if you need further information. Thank you in advance for your help.

Regards,

Muriel Sanders
U204 3.0L Calibration
Ford Motor Company
Phone: 313-32-27307
Fax: 313-32-31786
E-mail: msander6@ford.com

From: Sanders, Muriel (M.S.)
Sent: Thursday, March 21, 2002 4:19 PM
To: Hansen, George (G.C.)
Subject: RE: Escape VIN #'s

Hi George,

I've looked over the warranty data you sent me. I'm not sure I fully understand how to read it and would like to get together with you to discuss it sometime before next Thursday if possible. Please let me know when would be a good time to meet.

Thanks,

Muriel Sanders
U204 3.0L Calibration
Ford Motor Company
Phone: 313-32-27307
Fax: 313-32-31786
E-mail: msander6@ford.com

----Original Message----
From: Hansen, George (G.C.)
Sent: Monday, March 18, 2002 2:01 PM
To: Sanders, Muriel (M.S.)
Subject: RE: Escape VIN #'s

<< File: Multiple Repair.xls >>

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George Hansen
Escape, PTQRT
2H-D63, PDC
(313) 84-61800
ghansen4

----Original Message----
From: Sanders, Muriel (M.S.)
Sent: Monday, March 18, 2002 1:52 PM
To: Hansen, George (G.C.)
Subject: Escape VIN #'s

Hi George,

I am working with the 3.0L Escape Calibration group. My supervisor, Bob Dalbo suggested I contact you to get the VIN numbers of vehicles that have stalled and have had the DPFE sensor repaired/replaced. We are trying to investigate what role, if any, the DPFE sensor has had on stalls. Is it possible to get this information? Please contact me with any questions or if you need further information. Thank you in advance for your help.

Regards,

Muriel Sanders
U204 3.0L Calibration
Ford Motor Company
Phone: 313-32-27307
Fax: 313-32-31786

E-mail: msander6@ford.com

Subject:	Updated: Discuss Escape Warranty Data
Location:	2H-D63, PDC
Start:	Tue 3/26/2002 3:15 PM
End:	Tue 3/26/2002 3:45 PM
Show Time As:	Tentative
Recurrence:	(none)
Meeting Status:	Not yet responded
Required Attendees:	Sanders, Muriel (M.S.); Hansen, George (G.C.)

I had another meeting moved to 2-3pm so I need to change ours to 3:15-3:45pm to give me travel time. If this is a problem let me know or change to a better time. Thanks.

George,

I assumed your desk might be better since you have all the information there. Let me know if you would rather meet here at the TEE building.

Muriel Sanders

Subject:	Updated: Discuss Escape Warranty Data
Location:	2H-D63, PDC
Start:	Tue 3/26/2002 3:15 PM
End:	Tue 3/26/2002 3:45 PM
Show Time As:	Tentative
Recurrence:	(none)
Meeting Status:	Not yet responded
Required Attendees:	Sanders, Muriel (M.S.); Hansen, George (G.C.)

I had another meeting moved to 2-3pm so I need to change ours to 3:15-3:45pm to give me travel time. If this is a problem let me know or change to a better time. Thanks.

George,

I assumed your desk might be better since you have all the information there. Let me know if you would rather meet here at the TEB building.

Muriel Sanders

From: Sanders, Muriel (M.S.)
Sent: Wednesday, April 17, 2002 1:36 PM
To: Hansen, George (G.C.)
Subject: RE: U204 NO STALLS

Thanks George!

Muriel Sanders
U204 3.0L Calibration
Ford Motor Company
Phone: 313-32-27307
Fax: 313-32-31786
E-mail: msander6@ford.com

-----Original Message-----
From: Hansen, George (G.C.)
Sent: Wednesday, April 17, 2002 1:03 PM
To: Sanders, Muriel (M.S.)
Subject: U204 NO STALLS

Here is the file you requested.

<< File: D-21 STALLS.xls >>

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George Hansen
Escape, PTQRT
2H-D63, PDC
(313) 64-51800

From:	Sanders, Muriel (M.S.)
Sent:	Friday, May 03, 2002 1:30 PM
To:	Altoonian, Don (D.J.); Badgley, Joel (J.K.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); Cary Powell; Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Delbo, Bob (R.J.); Dan Rothweiler; De Pena, Juan (J.E.); Diez, Timothy (T.P.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Freeland, Mark (M.); Glee, Stuart (S.); Gokhale, Renuka (R.V.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); John McDonald; Jones, Andy; Jordan, Donald (D.E.); Kanal, Shinji (S.); King, Robert (R.F.); Klostermann, Eric (E.); Kosko, Jeff (J.R.); Kwon, Soon (S.K.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Marck, Edmond (E.C.); Mateos, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); Morgan, Tom; Morishima, Shigeki (S.); Naveed Khan; Nematollahi, Sonya (S.); Nikolai, Bernie; Noteboom, Jim (J.E.); Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Sanders, Muriel (M.S.); Shah, Kiran (K.C.); Shiralahi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhae (R.); Sullivan, Jamie (J.P.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Vecchio, Anne Marie (A.); Wakenell, Ray (R.A.); Wettach, Bill (B.); Williams, Les (L.HW.); Williamson, David (D.E.); Yeung, Lem (.)
Subject:	New Dial-In No. for Stalls Meeting

The dial-in information has changed for the weekly stalls meeting. Please note the new information below. This will be effective next Thursday (May 9, 2002).

<u>New Dial-in Numbers & Passcode</u>
Dial in: 1-877-870-3529 or Fordnet: 9-1-954-1144
International Participants # 1 (630) 693-1704
Passcode: 7673538#

Muriel Sanders
U204 3.0L Calibration
Ford Motor Company
Phone: 313-32-27307
Fax: 313-32-31786
E-mail: msander6@ford.com

Subject:	Updated: U204 Phantom Stall Meeting
Location:	TEE Conf. Rm. 2
Start:	Thu 3/21/2002 2:00 PM
End:	Thu 3/21/2002 3:00 PM
Show Time As:	Tentative
Recurrence:	Weekly
Recurrence Pattern:	every Thursday from 2:00 PM to 3:00 PM
Meeting Status:	Not yet responded
Required Attendees:	Sanders, Muriel (M.S.); Altoonian, Don (D.J.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); 'Cary Powell'; Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); Rothweiler, Daniel (D.); De Pena, Juan (J.E.); Diaz, Timothy (T.P.); Duvall, Allen (A.W.); Fascetti, Bob (R.J.); Fourmile, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Goodwin, William (W.R.); Grewal, Bill (B.S.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Hoshino, Jun (J.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); 'John McDonald'; 'Jones, Andy'; Jordan, Donald (D.E.); Kanai, Shinji (S.); King, Robert (R.F.); Kosko, Jeff (J.R.); Kwon, Soon (S.K.); La, Dzung (D.H.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Mandziuk, Roger (R.); Marck, Edmond (E.C.); Mateos, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); McGee, Brett (B.L.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); 'Morgan, Tom'; Morishima, Shigeki (S.); 'Naveed Khan'; Nematollahi, Sonya (S.); 'Nikolai, Bernie'; Noteboom, Jim (J.E.); Ortman, James (J.W.); Powers, Ken (K.W.); Price, Marlin (M.); Raquepau, Alden (A.P.); Sanders, Muriel (M.S.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhea (R.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Veenstra, Tim (T.W.); Wakenell, Ray (R.A.); Wettach, Bill (B.); Williams, Les (LHW.); Yeung, Lem (.)

I extended the meeting notice a couple of more weeks. All other information remains the same.

Dial in: 1-877-870-3529 or Fordnet: 9-1-954-1144
International Participants # 1 (630) 693-1704
Passcode: 7673538#

From: Sanders, Muriel (M.S.)
Sent: Thursday, May 09, 2002 6:19 AM
To: Dalbo, Bob (R.J.)
Cc: Hansen, George (G.C.); Jordan, Donald (D.E.)
Subject: RE: Stalls Action Chart

Here's the PDB information that Don sent me for the NHTSA response.

"Muriel, In response to question from todays meeting for NHTSA report out; PDB pin push-out, Lears containment action which involved 1-tooling adjustment and 2-Process changes was dated 08/01/01 with 8-D addressing Pin Push-out completed 08/20/01.
Anything else. please give me a call."

Muriel Sanders
U204 3.0L Calibration
Ford Motor Company
Phone: 313-32-27307
Fax: 313-32-31786
E-mail: msander6@ford.com

----Original Message----
From: Dalbo, Bob (R.J.)
Sent: Wednesday, May 08, 2002 4:33 PM
To: Jordan, Donald (D.E.)
Cc: Sanders, Muriel (M.S.); Hansen, George (G.C.)
Subject: FW: Stalls Action Chart

Don,
Do you remember when the PDB terminal insertion issue was resolved? I believe there was an 8D done by Lear on it. I'd like to add it to George's chart, if you could provide the implementation date tomorrow AM.

Thanks,

Bob Dalbo
3.0L Calibration Supervisor
Outfitters Calibration, NAT
Phone: (313) 24-84947 Fax: (313) 32-31786
Pager: (313) 795-2859 Email: *rdalbo@ford.com*

----Original Message----
From: Hansen, George (G.C.)
Sent: Wednesday, May 08, 2002 3:57 PM
To: Dalbo, Bob (R.J.); Corbett, Sandra (S.M.)
Subject: Stalls Action Chart

Bob,
Here is the graph that I was referring to in the phone message.

Please review this to make sure that it is accurate and up to date. If you know of any further actions please let me know so that I can make the appropriate changes.

<< File: STALLS ACTION CHART.xls >>

George Hansen
Escape, PTQRT
2H-D83, PDC
(313) 84-51800
ghansen4

From: Sanders, Muriel (M.S.)
Sent: Thursday, June 13, 2002 5:01 PM
To: Corbett, Sandra (S.M.); Hansen, George (G.C.); Moorhouse, Scott (S.R.)
Subject: Updated Warranty

Hi. We would like updated stall warranty information (3 MIS) for the meeting with Tim Davis (the latest I have is from 2/28/02). Will one of you please get that information for me. We would like to have the data by COB on Monday. Give me a call if you have any questions. Thanks.

Muriel Sanders
U204 3.0L Calibration
Ford Motor Company
Phone: 313-32-27307
Fax: 313-32-31786
E-mail: msander6@ford.com

From: Sanders, Muriel (M.S.)
Sent: Tuesday, June 18, 2002 2:11 PM
To: Corbett, Sandra (S.M.); Hansen, George (G.C.); Moorhouse, Scott (S.R.)
Cc: Dalbo, Bob (R.J.)
Subject: RE: Updated Warranty

We need the stall R/1000 information for the meeting with Tim Davis. Please provide this ASAP so we can prepare the report.

Muriel Sanders
U204 3.0L Calibration
Ford Motor Company
Phone: 313-32-27307
Fax: 313-32-31786
E-mail: msander6@ford.com

-----Original Message-----
From: Corbett, Sandra (S.M.)
Sent: Friday, June 14, 2002 7:47 AM
To: Sanders, Muriel (M.S.); Hansen, George (G.C.); Moorhouse, Scott (S.R.)
Subject: RE: Updated Warranty

George,
Please provide the stalls info in the 6 panel format. Also, pull GQRS on D21 and include if significant.

Sandy Corbett
Escape Powertrain QRT
Phone/Fax: (313)59-44351
Product Development Center 2H-E66

-----Original Message-----
From: Sanders, Muriel (M.S.)
Sent: Thursday, June 13, 2002 5:01 PM
To: Corbett, Sandra (S.M.); Hansen, George (G.C.); Moorhouse, Scott (S.R.)
Subject: Updated Warranty

Hi. We would like updated stall warranty information (3 MIS) for the meeting with Tim Davis (the latest I have is from 2/28/02). Will one of you please get that information for me. We would like to have the data by COB on Monday. Give me a call if you have any questions. Thanks.

Muriel Sanders
U204 3.0L Calibration
Ford Motor Company
Phone: 313-32-27307
Fax: 313-32-31786
E-mail: msander6@ford.com

Subject:	Updated: U204 Phantom Stall Meeting
Location:	TEE Conf. Rm. 2
Start:	Thu 3/21/2002 2:00 PM
End:	Thu 3/21/2002 3:00 PM
Show Time As:	Tentative
Recurrence:	Weekly
Recurrence Pattern:	every Thursday from 2:00 PM to 3:00 PM
Meeting Status:	Not yet responded
Required Attendees:	Sanders, Muriel (M.S.); Altoonian, Don (D.J.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); 'Cary Powell'; Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); Rothweiler, Daniel (D.); De Pena, Juan (J.E.); Diaz, Timothy (T.P.); Duvall, Allan (A.W.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Goodwin, William (W.R.); Grewal, Bill (B.S.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Hoshino, Jun (J.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); 'John McDonald'; 'Jones, Andy'; Jordan, Donald (D.E.); Kanai, Shinji (S.); King, Robert (R.F.); Kosko, Jeff (J.R.); Kwon, Soon (S.K.); Le, Dzung (D.H.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Mandziuk, Roger (R.); Marck, Edmond (E.C.); Matesa, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); McGee, Brett (B.L.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); 'Morgan, Tom'; Morishima, Shigeki (S.); 'Naveed Khan'; Nematollahi, Sonya (S.); 'Nikolai, Semie'; Noteboom, Jim (J.E.); Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Aiden (A.P.); Sanders, Muriel (M.S.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stigenbauer, Jeffrey (J.R.); Suarez, Rhea (R.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Veenstra, Tim (T.W.); Wakenell, Ray (R.A.); Wettach, Bill (B.); Williams, Lee (LHW.); Yeung, Lem (.)

I extended the meeting notice a couple of more weeks. All other information remains the same.

Dial in: 1-877-870-3529 or Fordnet: 9-1-954-1144
International Participants # 1 (630) 693-1704
Passcode: 7673538#

Subject:	Updated: U204 Phantom Stall Meeting
Location:	TEE Conf. Rm. 2
Start:	Thu 3/21/2002 2:00 PM
End:	Thu 3/21/2002 3:00 PM
Show Time As:	Tentative
Recurrence:	Weekly
Recurrence Pattern:	every Thursday from 2:00 PM to 3:00 PM
Meeting Status:	Not yet responded
Required Attendees:	Sanders, Muriel (M.S.); Altoonian, Don (D.J.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); 'Cary Powell'; Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); Rothweiler, Daniel (D.); De Pena, Juan (J.E.); Diez, Timothy (T.P.); Duvall, Allen (A.W.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Goodwin, William (W.R.); Grewal, Bill (B.S.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Hoshino, Jun (J.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); 'John McDonald'; 'Jones, Andy'; Jordan, Donald (D.E.); Kanai, Shinji (S.); King, Robert (R.F.); Kosko, Jeff (J.R.); Kwon, Soon (S.K.); Le, Dzung (D.H.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Mandziuk, Roger (R.); Merck, Edmond (E.C.); Matsea, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); McGee, Brett (B.L.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); 'Morgan, Tom'; Morishima, Shigeki (S.); 'Naveed Khan'; Nematollahi, Sonya (S.); 'Nikolai, Bernie'; Noteboom, Jim (J.E.); Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Sanders, Muriel (M.S.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhea (R.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Veenstra, Tim (T.W.); Wakeneil, Ray (R.A.); Wettach, Bill (B.); Williams, Lee (LHW.); Yeung, Lem (.)

I extended the meeting notice a couple of more weeks. All other information remains the same.

Dial in: 1-877-870-3529 or Fordnet: 9-1-954-1144
International Participants # 1 (630) 693-1704
Passcode: 7673538#

From: Noteboom, Jim (J.E.)
Sent: Thursday, May 09, 2002 3:48 PM
To: Sanders, Muriel (M.S.); Altoonian, Don (D.J.); Badgley, Joel (J.K.); Bauer, Scott (S.C.); Shojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogeme, John (P.); 'Cary Powell'; Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); 'Dan Rothweiler'; De Pena, Juan (J.E.); Diez, Timothy (T.P.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Freeland, Mark (M.); Glee, Stuart (S.); Gokhale, Renuka (R.V.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); 'John McDonald'; 'Jones, Andy'; Jordan, Donald (D.E.); Kanai, Shinji (S.); King, Robert (R.F.); Klostermann, Eric (E.); Kosko, Jeff (J.R.); Kwon, Soon (S.K.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Marck, Edmond (E.C.); Mateos, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); 'Morgan, Tom'; Morishima, Shigeki (S.); 'Nawaad Khan'; Nematollahi, Sonya (S.); 'Nikolai, Bernie'; Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhae (R.); Sullivan, Jamie (J.P.); Takasawa, Keith (K.D.); Takubo, Hirokhi (H.); Vecchio, Anne Marie (A.); Wakenell, Ray (R.A.); Wetsch, Bill (B.); Williams, Les (LHW.); Williamson, David (D.E.); Yeung, Lem (.)
Subject: RE: U204 Stall Meeting Agenda - 5/9/02

Inspection results of '02 Escape VIN: 1FMYU04141KC19492

LOCATION: John Elway West, Denver
OWNER: [redacted]
MILEAGE: 3342
BUILD DATE: 1-29-02
COMPLAINT: Stalled while driving approx. 50 mph. Noticed dash lights came on and steering became stiff; coasted to side of
road, went to crank (did not turn key off) and the engine restarted. Occured at around 2500 miles and has not
happened since.
DIAGNOSTICS: Went through the latest TSB/ISM draft; no concerns were found except for the following:

- There was battery acid in the batt. tray that had seeped down onto grounds G-104 and 105; some corrosion was evident.
- The customer's key chain contained several oz. of additional weight.

Jim Noteboom
Powertrain Field Quality Specialist/Denver
Phone: 303.674.4015 FAX: 303.674.5730
Page: 1.888.375.1980

From: Noteboom, Jim (J.E.)
Sent: Tuesday, July 30, 2002 11:27 AM
To: Sanders, Muriel (M.S.); Altoonian, Don (D.J.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); 'Cary Powell'; Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); 'Dan Rothwaller'; De Pena, Juan (J.E.); Diez, Timothy (T.P.); Duvall, Allen (A.W.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Goodwin, William (W.R.); Grewal, Bill (B.S.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Hoshino, Jun (J.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); 'John McDonald'; 'Jones, Andy'; Jordan, Donald (D.E.); Kanal, Shinji (S.); King, Robert (R.F.); Kosko, Jeff (J.R.); Kwon, Soon (S.K.); Le, Dzung (D.H.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Mandziuk, Roger (R.S.); Marck, Edmond (E.C.); Metesa, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); McGee, Brett (B.L.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); 'Morgan, Tom'; Morishima, Shigeki (S.); 'Naveed Khan'; Nematolahi, Sonya (S.); 'Nikolai, Bernie'; Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhae (R.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Veenstra, Tim (T.W.); Wakenell, Ray (R.A.); Wettach, Bill (B.); Williams, Les (LHW.); Yeung, Lem (.)
Subject: RE: U204 Stall Investigation, 7-26-02

VEH: '02 Escape VIN: 1FMCU04112KD11749 BUILT: 4-11-02 MILES: 1650
CUSTOMER: Carol Segety / 303-252-8278 (home) LOCATION: Northglenn, Colo.
COMPLAINT: Stalls in slow traffic. Note: the stall occures in the same location (80th between Wadsworth and 36) as the previous vehicle; checked this out and there are high tension lines crossing the road there.

TSB and SSM results:

- IAC=34%
- EVAP system passed.
- DPFE and EEC relay are the latest.
- Keys do not have excessive weight.
- All related grounds were secure.

Based on the stall location and the possibility of RFI, the MAF was updated to a 1L2Z-BA.

Also on this vehicle the battery was leaking from the seam on the corner opposite the negative post (see photos). The customer stated that when the vehicle was purchased, the original batt. was dead and was replaced. This batt. was not a service piece but looked like original equipment so it's history is in question. A new service batt. was installed.

MVC-039F.JPG

Serial no.

MVC-040F.JPG

Acid drip from seam.

Jim Noteboom
Powertrain Field Quality Specialist/Denver
Phone: 303.674.4015 FAX: 303.674.5730
Cell: 303.921.2076

From: Moorhouse, Scott (S.R.)
Sent: Tuesday, July 30, 2002 11:58 AM
To: Notebaum, Jim (J.E.)
Cc: Stilgenbauer, Jeffrey (J.R.); Nematollahi, Sonya (S.); Hansen, George (G.C.)
Subject: RE: U204 Stall Investigation, 7-26-02

Jim, In regards to the leaking battery....If KCAP installed a battery tray for a 2.0L in a 3.0L vehicle....there are two small tabs
that would put stress on the larger battery. This could be the reason why the same vehicle had two leaking batteries (potentially).
This was just recently identified as a potential concern here by our Electrical PVT Resident, Jeff Stilgenbauer. It may be worth
review.

KCAP is pursuing a method to pokayoke this issue at present.

Scott Moorhouse
U204 PTSE Resident Engineer
Kansas City Assembly Plant
(ph) 816-459-1965 (fax) 816-459-1728
smoorhou@ford.com

----Original Message----
From: Notebaum, Jim (J.E.)
Sent: Tuesday, July 30, 2002 10:27 AM
To: Sanders, Muriel (M.S.); Akpanlan, Don (D.J.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); 'Cary Powell'; Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); 'Dan Rothwaller'; De Pena, Juan (J.E.); Diaz, Timothy (T.P.); Duvall, Allen (A.W.); Fascetti, Bob (R.J.); Fourmelle, Gilbert (G.); Freeland, Mark (M.); Glies, Stuart (S.); Gokhale, Ranuka (R.V.); Goodwin, William (W.R.); Grewal, Bill (B.S.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Hoshino, Jun (J.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); 'John McDonald'; 'Jonas, Andy'; Jordan, Donald (D.E.); Kanal, Shinji (S.); King, Robert (R.F.); Kosko, Jeff (J.R.); Kwon, Soon (S.K.); Le, Dzung (D.H.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Mandziuk, Roger (R.S.); Marck, Edmond (E.C.); Matesa, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); McGee, Brett (B.L.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); 'Morgan, Tom'; Mortshima, Shigeki (S.); 'Naveed Khan'; Nematollahi, Sonya (S.); 'Nikolai, Bernie'; Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Shah, Kiran (K.C.); Shirahhi, Haseru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhae (R.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Veenstra, Tim (T.W.); Wakenell, Ray (R.A.); Weltach, Bill (B.); Williams, Les (LHW.); Yeung, Lam (.)
Subject: RE: U204 Stall Investigation, 7-26-02

VEH: '02 Escape VIN: 1FMCU04112KD11749 BUILT: 4-11-02 MILES: 1650
CUSTOMER: Carol Segety / 303-252-8278 (home) LOCATION: Northglenn, Colo.
COMPLAINT: Stalls in slow traffic. Note: the stall occures in the same location (80th between Wadsworth and 36) as the previous vehicle; checked this out and there are high tension lines crossing the road there.

TSB and SSM results:

- IAC=34%
- EVAP system passed.
- DPFE and EEC relay are the latest.
- Keys do not have excessive weight.
- All related grounds were secure.

Based on the stall location and the possibility of RFI, the MAF was updated to a 1L2Z-BA.

Also on this vehicle the battery was leaking from the seam on the corner opposite the negative post (see photos). The customer stated that when the vehicle was purchased, the original batt. was dead and was

replaced. This batt. was not a service piece but looked like original equipment so it's history is in question. A new service batt. was installed.

<< File: MVC-039F.JPG >>
Serial no.

<< File: MVC-040F.JPG >>
Acid drip from seam.

Jim Noteboom
Powertrain Field Quality Specialist/Denver
Phone: 303.674.4015 FAX: 303.674.5730
Cell: 303.921.2076

From: Jenuwine, Pat (P.M.)
Sent: Thursday, April 04, 2002 12:12 AM
To: Hansen, George (G.C.)
Subject: HELP

Follow Up Flag: Follow up
Due By: Thursday, April 04, 2002 3:30 PM
Flag Status: Flagged

I believe you are on the ESCAPE team and I need some help with my sister's escape. She had a Fathom stall with her 3.0L Duratec Automatic, going down a hill in Ohio and everything just shut down, OBD light came on and stayed on, but no record indicated on dio. No flashers, nothing, but it did start back up. Got any ideas that I can give to the service department in Ohio??? Thanks. Do you miss us??

Pat Jenuwine
PT Quality Office
PH 313-24-86988
Fax 313-337-8349

From: Jenuwine, Pat (P.M.)
Sent: Thursday, April 25, 2002 7:02 PM
To: Hansen, George (G.C.)
Subject: Escape stall

Anything new on the escape stall issue after today's meeting? Thanks

Pat Jenuwine
PT Quality Office
PH 313-24-86888
Fax 313-337-8349

From: Hermann, Thomas (T.J.)
Sent: Wednesday, February 20, 2002 1:03 PM
To: Williams, Les (LHW.); Altoonian, Don (D.J.); Amanda, Harry (H.F.); Badgley, Joel (J.K.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); 'Cary Powell'; Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); De Pena, Juan (J.E.); Diez, Timothy (T.P.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Hurley, Robert (R.E.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); John McDonald (E-mail); 'Jones, Andy'; Jordan, Donald (D.E.); Kanal, Shinji (S.); King, Robert (R.F.); Klostermann, Eric (E.); Kwon, Soon (S.K.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Luehrsen, Eric (E.A.); Marck, Edmond (E.C.); Matese, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); 'Morgan, Tom'; Morishima, Shigeki (S.); 'Naveed Khan'; Nematollahi, Sonya (S.); 'Nikolai, Bernie'; Noteboom, Jim (J.E.); Ortman, James (J.W.); 'Powell, Cary'; Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Rothweiler, Daniel (D.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhae (R.); Sullivan, Jamie (J.P.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Vecchio, Anne Marie (A.); Wakenell, Ray (R.A.); Williamson, David (D.E.); Yeung, Lam (.)
Cc: Diez, Timothy (T.P.)
Subject: RE: Meeting Minutes: EMC PSW Results for current production Kavlico DPFE

Les, to further clarify what I said.

Current production Kavlico DPFE sensor should not contribute to U204 stalling in the field due to RFI.

On the issue of coupled noise from the wiring harness, the component EMC PSW data does not indicate any issues that would contribute to stalls (it passes the tests) however that does not mean a conducted issue could not exist from an unusual circumstance (such as ignition secondary breakdown or static build up on ungrounded parts).

-----Original Message-----
From: Williams, Les (LHW.)
Sent: Wednesday, February 20, 2002 12:06 PM
To: Altoonian, Don (D.J.); Amanda, Harry (H.F.); Badgley, Joel (J.K.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); Cary Powell; Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); De Pena, Juan (J.E.); Diez, Timothy (T.P.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Hurley, Robert (R.E.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); John McDonald (E-mail); Jones, Andy; Jordan, Donald (D.E.); Kanal, Shinji (S.); King, Robert (R.F.); Klostermann, Eric (E.); Kwon, Soon (S.K.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Luehrsen, Eric (E.A.); Marck, Edmond (E.C.); Matese, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); Morgan, Tom; Morishima, Shigeki (S.); Naveed Khan; Nematollahi, Sonya (S.); Nikolai, Bernie; Noteboom, Jim (J.E.); Ortman, James (J.W.); Powell, Cary; Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Rothweiler, Daniel (D.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhae (R.); Sullivan, Jamie (J.P.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Vecchio, Anne Marie (A.); Wakenell, Ray (R.A.); Williams, Les (LHW.); Williamson, David (D.E.); Yeung, Lam (.)
Cc: Hermann, Thomas (T.J.); Diez, Timothy (T.P.)
Subject: Meeting Minutes: EMC PSW Results for current production Kavlico DPFE

Meeting Minutes

Attendees:
Bob Dalbo (U204 V6 Calibration Supervisor)
Gilbert Fournelle (U204 V6 Calibration)
Les Williams (U204 Calibration)
Tom Hermann (EMC Supervisor)
Tim Diez (EMC)

On Friday February 15, 2002 EMC PSW test data for current production Kavlico DPFE sensor was reviewed.

Thomas Hermann has independently investigated the behavior of this sensor. Based on his investigations and this data, he concluded that the current production Kavlico DPFE sensor should not contribute to U204 stalling in the field due to RFI and coupled noise from the wiring harness.

Regards,
Les Williams
For More, Count on Les
U204 3.0L Powertrain Calibration
Truck Engine Engineering, Suite 1AE20
Phone: (313)33-72503
Fax: (313) 32-31786

From: Fournelle, Gilbert (G.)
Sent: Thursday, August 22, 2002 10:02 AM
To: Afoonian, Don (D.J.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); Cary Powell (E-mail); Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); De Pena, Juan (J.E.); Diaz, Timothy (T.P.); Duvall, Allen (A.W.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Freeland, Mark (M.); Gilles, Stuart (S.); Gokhale, Renuka (R.V.); Goodwin, William (W.R.); Grewal, Bill (B.S.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Hoshino, Jun (J.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); Jones, Andy; Jordan, Donald (D.E.); Kanal, Shinji (S.); Khan, Naveed; King, Robert (R.F.); Kosko, Jeff (J.R.); Kwon, Soon (S.K.); Le, Dzung (D.H.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Marck, Edmond (E.C.); Mateos, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mcdonald, John; McGee, Brett (B.L.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); Morgan, Tomiko (T.T.); Morishima, Shigeki (S.); Nematollahi, Sonya (S.); Nikolai, bernie; Noteboom, Jim (J.E.); Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Rothweiler, Daniel (D.); Sanders, Muriel (M.S.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhae (R.); Takasawa, Keith (K.D.); Takubo, Hirokhi (H.); Veenstra, Tim (T.W.); Wakenell, Ray (R.A.); Wettach, Bill (B.); Williams, Les (LHW.)
Subject: 2:00 PM staff meeting

There will be no staff meeting at 2:00 pm today. The next meeting will be scheduled next week Thursday at 2:00pm. I will send the updated call in info and a meeting notice as soon as it is available.

Sincerely,

Gilbert Fournelle
V6 U204 Calibration Engineering
1AE27 Truck Engine Engineering (TEE)
Phone:(313)3904968 Fax:(313)3231786

From: Fournelle, Gilbert (G.)
Sent: Monday, September 09, 2002 4:56 PM
To: Hansen, George (G.C.)
Subject: Out of Office AutoReply: Stalls Claims

I am currently out of the office until 9/9/02. I will return to my desk on 9/10/02. For urgent issues please contact my supervisor Bob Dalbo (rdalbo (313) 24-84947).

Subject:	3.0L U204 Phantom stall meeting
Location:	TEE CR#1
Start:	Thu 10/3/2002 2:00 PM
End:	Thu 10/3/2002 3:00 PM
Show Time As:	Tentative
Recurrence:	(none)
Meeting Status:	Not yet responded
Required Attendees:	Fournelle, Gilbert (G.); Altoonian, Don (D.J.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); Cary Powell (E-mail); Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); De Pena, Juan (J.E.); Diez, Timothy (T.P.); Duvall, Allen (A.W.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Freeland, Mark (M.); Glee, Stuart (S.); Gokhale, Renuka (R.V.); Goodwin, William (W.R.); Grewal, Bill (B.S.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Hoshino, Jun (J.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); 'Jones, Andy'; Jordan, Donald (D.E.); Kanai, Shinji (S.); 'Khan, Naveed'; Koeko, Jeff (J.R.); Kwon, Soon (S.K.); Lawler, Dave (D.A.); Le, Dzung (D.H.); Limtaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Marck, Edmond (E.C.); Marlenee, Tom (T.E.); Mateos, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); 'Mcdonald, John'; McGee, Brett (B.L.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); TMORGA43 was deleted 20021118; Morishima, Shigeki (S.); Nakano, Hideki (H.); Nematollahi, Sonya (S.); 'Nikolai, bernie'; Noteboom, Jim (J.E.); Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Rothweiler, Daniel (D.); Sanders, Muriel (M.S.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhee (R.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Veenstra, Tim (T.W.); Wakenell, Ray (R.A.); Wettach, Bill (B.); Williams, Lee (LHW.)

Meeting agenda and meeting minutes will be send separately on a weekly basis.

toll free: 1-866-227-7015
Ford net: 954-1206
International: 1-630-693-6145

pass code: 8402370#
moderator code: 3457370

From:	Fournelle, Gilbert (G.)
Sent:	Wednesday, October 16, 2002 11:06 AM
To:	Altoonian, Don (D.J.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); Cary Powell (E-mail); Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); De Pena, Juan (J.E.); Diez, Timothy (T.P.); Duvall, Allen (A.W.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Goodwin, William (W.R.); Grewal, Bill (B.S.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Hoshino, Jun (J.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); Jones, Andy; Jordan, Donald (D.E.); Kanal, Shinji (S.); Khan, Naveed; Koeko, Jeff (J.R.); Kwon, Soon (S.K.); Lawler, Dave (D.A.); Le, Dzung (D.H.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Marck, Edmond (E.C.); Marianos, Tom (T.E.); Mateos, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mcdonald, John; McGee, Brett (B.L.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); Morgan, Tomiko (T.T.); Moriahima, Shigeki (S.); Nakano, Hideki (H.); Nematollahi, Sonya (S.); Nikolai, bernie; Noteboom, Jim (J.E.); Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Rothweiler, Daniel (D.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhea (R.); Takasawa, Keith (K.D.); Takubo, Hirokhi (H.); Veenstra, Tim (T.W.); Wakenell, Ray (R.A.); Wettach, Bill (B.); Williams, Les (LHW.)
Subject:	Phantom stall meeting for 10/17/02 cancelled

The phantom stall meeting is cancelled for tomorrow 10/17/02 due to the fact that the calibration group is on a hot weather test trip. Meeting notices will be sent out next week for future stall meetings.

Regards,

Gilbert Fournelle
V6 U204 Calibration Engineering
1AE27 Truck Engine Engineering (TEE)
Phone:(313)3904968 Fax:(313)3231766

Subject:	Canceled: 3.0L U204 Phantom stall meeting
Location:	TEE CR#1
Start:	Thu 11/7/2002 2:00 PM
End:	Thu 11/7/2002 3:00 PM
Show Time As:	Free
Recurrence:	Weekly
Recurrence Pattern:	every Thursday from 2:00 PM to 3:00 PM
Meeting Status:	Not yet responded
Required Attendees:	Fournelle, Gilbert (G.); Altoonian, Don (D.J.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); Cary Powell (E-mail); Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); De Pena, Juan (J.E.); Diez, Timothy (T.P.); Duvall, Allen (A.W.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Goodwin, William (W.R.); Grewal, Bit (B.S.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Hoshino, Jun (J.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); 'Jones, Andy'; Jordan, Donald (D.E.); Kanai, Shinji (S.); 'Khan, Naveed'; Kosko, Jeff (J.R.); Lawler, Dave (D.A.); Le, Dzung (D.H.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Marck, Edmond (E.C.); Marianos, Tom (T.E.); Metesa, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); McCarthy, Fran (F.); 'Mcdonald, John'; McGee, Brett (B.L.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); TMORGA43 was deleted 20021116; Morishima, Shigeki (S.); Nakano, Hideki (H.); Nematollahi, Sonya (S.); 'Nikolai, bernie'; Noteboom, Jim (J.E.); Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Rothweiler, Daniel (D.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhas (R.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Veenstra, Tim (T.W.); Wakerell, Ray (R.A.); Wettach, Bill (B.); Williams, Les (LHW.)
Optional Attendees:	Hofman, Michael (M.V.); Nakano, Hideki (H.); Lawler, Dave (D.A.); Grimes, Jeff (J.R.); Price, Martin (M.); Moorhouse, Scott (S.R.); Hoshino, Jun (J.); Blackburn, Thomas (T.J.)
Importance:	High

This meeting is cancelled due to a U204 test trip. The next meeting will be held at the regular scheduled time on 11/14/02 at 2:00pm

Meeting agenda and meeting minutes will be send separately on a weekly basis.

toll free: 1-866-227-7016
Ford net: 954-1208
International: 1-630-693-6145

pass code: 8402370#
moderator code: 3457370

From: Foumalle, Gilbert (G.)
Sent: Tuesday, November 26, 2002 10:47 AM
To: Hansen, George (G.C.)
Subject: Out of Office AutoReply: 3.0L Stalling Claims

I am on vacation until December 2nd. I will be on a U204 test trip to Colorado from December 2nd -> 13th, during which I will have limited access to e-mail.

From: Fascetti, Bob (R.J.)
Sent: Tuesday, November 26, 2002 10:49 AM
To: Hansen, George (G.C.); Corbett, Sandra (S.M.); Hofman, Michael (M.V.); Delbo, Bob (R.J.); Fournelle, Gilbert (G.)
Cc: Altoonian, Don (D.J.); Moorhouse, Scott (S.R.)
Subject: RE: 3.0L Stalling Claims

Relative to our problem, this is actually good news. Our issue has never been one of infant mortality.

-----Original Message-----
From: Hansen, George (G.C.)
Sent: Tuesday, November 26, 2002 10:47 AM
To: Corbett, Sandra (S.M.); Hofman, Michael (M.V.); Delbo, Bob (R.J.); Fournelle, Gilbert (G.); Fascetti, Bob (R.J.)
Cc: Altoonian, Don (D.J.); Moorhouse, Scott (S.R.)
Subject: 3.0L Stalling Claims

There are 5 Stalling Claims since 9/11/02.

- VIN 1FMYU93183KA90308 / 10/14/02 Build Date; 10/16/02 Repair Date; 10 Miles on Vehicle; Customer Comment: "ON TEST DRIVE BEFORE PDI VEHICLE LOST POWER AND DIED RESTARTED BUT RAN ROUGH AND HAD NO POWER", Technician Diagnosed a Faulty Mass Air Sensor. No further repairs on Vehicle.

- VIN 1FMYU03173KA90389 / 10/2/02 Build Date; 10/11/02 Repair Date; 52 Miles on Vehicle; Customer Comment: "CHECK ENGINE STALL", Technician Diagnosed a Fuel Sender Circuit Fault. Second Repair on 10/17/02 for a PATS issue.

-VIN 1FMYU03143KA91418 / 10/3/02 Build Date; 10/16/02 Repair Date; 220 Miles on Vehicle; Customer Comment: "CUSTOMER STATES TRUCK CUT OFF AT STOP LIGHT, NOW IT IS RUNNING ROUGH AND SMELLS LIKE SOMETHING IS BURNING.", Technician Diagnosed an EGR Valve Stuck Open. No further repairs on Vehicle.

- VIN 1FMYU93163KA78660 / 9/24/02 Build Date; 9/27/02 Repair Date; 4 Miles on Vehicle; Customer Comment: "CHECK FOR STALLING 12A660 42 D21 12650D 0.2 12660D66 0.3", Technician Comment: "PERFORM DIAG; LITE ON N; CODES ALL PASS; CLEANED AND TIGHTEN CONNECTORS". Don Altoonian will follow up with Dealership on Monday 12/2/02.

- VIN 1FMCU03143KA80342 / 9/24/02 Build Date; 10/7/02 Repair Date; 12 Miles on Vehicle; Customer Comment: "CK VEHICLE STALLS", Technician Comment: "CHECK VEHICLE FOR STALLING CONCERN.WDS EEC TEST,KOEO,KOER PASS.DCL DISPLAY CHECK ALL PIDS.CHK IAC 32 PERC,TP OK,EVAP SYSTEM OK,ALL GROUNDS OK,DPFE OK,PCM CALIBRATION OK.ROADTEST OK." Don Altoonian will follow up with Dealership on Monday 12/2/02.

Don can update the Team after he has contacted the dealerships.

George Hansen
Escape, PTQRT
2H-D63, PDC
(313) 84-51800
ghansen4

From: Hansen, George (G.C.)
Sent: Tuesday, November 26, 2002 10:47 AM
To: Corbett, Sandra (S.M.); Hofman, Michael (M.V.); Dalbo, Bob (R.J.); Fourneile, Gilbert (G.); Fascetti, Bob (R.J.)
Cc: Altoonian, Don (D.J.); Moorhouse, Scott (S.R.)
Subject: 3.0L Stalling Claims

There are 5 Stalling Claims since 9/11/02.

- VIN 1FMYU93163KA90308 / 10/14/02 Build Date; 10/16/02 Repair Date; 10 Miles on Vehicle; Customer Comment: "ON TEST DRIVE BEFORE PDI VEHICLE LOST POWER AND DIED RESTARTED BUT RAN ROUGH AND HAD NO POWER", Technician Diagnosed a Faulty Mass Air Sensor. No further repairs on Vehicle.

- VIN 1FMYU03173KA90389 / 10/2/02 Build Date; 10/11/02 Repair Date; 52 Miles on Vehicle; Customer Comment: "CHECK ENGINE STALL", Technician Diagnosed a Fuel Sender Circuit Fault. Second Repair on 10/17/02 for a PATS issue.

-VIN 1FMYU03143KA91418 / 10/3/02 Build Date; 10/18/02 Repair Date; 220 Miles on Vehicle; Customer Comment: "CUSTOMER STATES TRUCK CUT OFF AT STOP LIGHT, NOW IT IS RUNNING ROUGH AND SMELLS LIKE SOMETHING IS BURNING.", Technician Diagnosed an EGR Valve Stuck Open. No further repairs on Vehicle.

- VIN 1FMYU93163KA78660 / 9/24/02 Build Date; 9/27/02 Repair Date; 4 Miles on Vehicle; Customer Comment: "CHECK FOR STALLING 12A650 42 D21 12650D 0.2 12650D55 0.3", Technician Comment: "PERFORM DIAG; LITE ON N; CODES ALL PASS; CLEANED AND TIGHTEN CONNECTORS". Don Altoonian will follow up with Dealership on Monday 12/2/02.

- VIN 1FMCU03143KA60342 / 9/24/02 Build Date; 10/7/02 Repair Date; 12 Miles on Vehicle; Customer Comment: "CK VEHICLE STALLS", Technician Comment: "CHECK VEHICLE FOR STALLING CONCERN.WDS EEC TEST,KOEO,KOER PASS.DCL DISPLAY CHECK ALL PIDS.CHK IAC 32 PERC,TP OK,EVAP SYSTEM OK,ALL GROUNDS OK,DPFE OK,PCM CALIBRATION OK.ROADTEST OK." Don Altoonian will follow up with Dealership on Monday 12/2/02.

Don can update the Team after he has contacted the dealerships.

--

George Hansen
Escape, PTQRT
2H-D63, PDC
(313) 84-51800
ghansen4

From:	Williams, Les (LHW.)
Sent:	Wednesday, February 20, 2002 12:08 PM
To:	Altoonian, Don (D.J.); Amenda, Harry (H.F.); Badgley, Joel (J.K.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); Cary Powell; Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darnel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); De Pena, Juan (J.E.); Diez, Timothy (T.P.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Gilas, Stuart (S.); Gokhale, Renuka (R.V.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Hurley, Robert (R.E.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); John McDonald (E-mail); Jones, Andy; Jordan, Donald (D.E.); Kanal, Shinji (S.); King, Robert (R.F.); Klostermann, Eric (E.); Kwon, Soon (S.K.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Luehrsen, Eric (E.A.); Marck, Edmond (E.C.); Matasa, John (J.); Maurer, James (J.S.); Mazzella, Gary (G.R.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); Morgan, Tom; Morishima, Shigeki (S.); Naveed Khan; Nematollahi, Sonya (S.); Nikolai, Bernie; Noteboom, Jim (J.E.); Ortman, James (J.W.); Powell, Cary; Powers, Ken (K.W.); Price, Martin (M.); Requapau, Alden (A.P.); Rothweiler, Daniel (D.); Shah, Kiran (K.C.); Shiraishi, Maseru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhae (R.); Sullivan, Jamie (J.P.); Takasawa, Keith (K.D.); Takubo, Hirokhi (H.); Vecchio, Anne Marie (A.); Wakenell, Ray (R.A.); Williams, Les (LHW.); Williamson, David (D.E.); Yeung, Lem (.)
Cc:	Hermann, Thomas (T.J.); Diez, Timothy (T.P.)
Subject:	Meeting Minutes: EMC PSW Results for current production Kavlico DPFE

Meeting Minutes

Attendees:
Bob Dalbo (U204 V6 Calibration Supervisor)
Gilbert Fournelle (U204 V6 Calibration)
Les Williams (U204 Calibration)
Tom Hermann (EMC Supervisor)
Tim Diez (EMC)

On Friday February 15, 2002 EMC PSW test data for current production Kavlico DPFE sensor was reviewed. Thomas Hermann has independently investigated the behavior of this sensor. Based on his investigations and this data, he concluded that the current production Kavlico DPFE sensor should not contribute to U204 stalling in the field due to RFI and coupled noise from the wiring harness.

Regards,
Les Williams
For More, Count on Les
U204 3.0L Powertrain Calibration
Truck Engine Engineering, Suite 1AE20
Phone: (313)33-72503
Fax: (313) 32-31786

From: Hansen, George (G.C.)
Sent: Tuesday, November 26, 2002 10:55 AM
To: Fascetti, Bob (R.J.); Corbett, Sandra (S.M.); Hofman, Michael (M.V.); Dalbo, Bob (R.J.); Fournelle, Gilbert (G.)
Cc: Altoonian, Don (D.J.); Moorhouse, Scott (S.R.)
Subject: RE: 3.0L Stalling Claims

I talked with Scott. One of the unknown vehicles is in Missouri, he will be contacting the dealership and update when he knows more.

–
George Hansen
Escape, PTQRT
2H-D63, PDC
(313) 64-51600
ghansen4

—Original Message—
From: Fascetti, Bob (R.J.)
Sent: Tuesday, November 26, 2002 10:49 AM
To: Hansen, George (G.C.); Corbett, Sandra (S.M.); Hofman, Michael (M.V.); Dalbo, Bob (R.J.); Fournelle, Gilbert (G.)
Cc: Altoonian, Don (D.J.); Moorhouse, Scott (S.R.)
Subject: RE: 3.0L Stalling Claims

Relative to our problem, this is actually good news. Our issue has never been one of infant mortality.

—Original Message—
From: Hansen, George (G.C.)
Sent: Tuesday, November 26, 2002 10:47 AM
To: Corbett, Sandra (S.M.); Hofman, Michael (M.V.); Dalbo, Bob (R.J.); Fournelle, Gilbert (G.); Fascetti, Bob (R.J.)
Cc: Altoonian, Don (D.J.); Moorhouse, Scott (S.R.)
Subject: 3.0L Stalling Claims

There are 5 Stalling Claims since 9/11/02.

- VIN 1FMYU93163KA90306 / 10/14/02 Build Date; 10/16/02 Repair Date; 10 Miles on Vehicle; Customer Comment: "ON TEST DRIVE BEFORE PDI VEHICLE LOST POWER AND DIED RESTARTED BUT RAN ROUGH AND HAD NO POWER", Technician Diagnosed a Faulty Mass Air Sensor. No further repairs on Vehicle.

- VIN 1FMYU03173KA90369 / 10/2/02 Build Date; 10/11/02 Repair Date; 52 Miles on Vehicle; Customer Comment: "CHECK ENGINE STALL", Technician Diagnosed a Fuel Sender Circuit Fault. Second Repair on 10/17/02 for a PATS Issue.

-VIN 1FMYU03143KA91416 / 10/3/02 Build Date; 10/16/02 Repair Date; 220 Miles on Vehicle; Customer Comment: "CUSTOMER STATES TRUCK CUT OFF AT STOP LIGHT, NOW IT IS RUNNING ROUGH AND SMELLS LIKE SOMETHING IS BURNING.", Technician Diagnosed an EGR Valve Stuck Open. No further repairs on Vehicle.

- VIN 1FMYU93163KA76660 / 9/24/02 Build Date; 9/27/02 Repair Date; 4 Miles on Vehicle; Customer Comment: "CHECK FOR STALLING 12A650 42 D21 12650D 0.2 12650D55 0.3", Technician Comment: "PERFORM DIAG; LITE ON N; CODES ALL PASS; CLEANED AND TIGHTEN CONNECTORS". Don Altoonian will follow up with Dealership on Monday 12/2/02.

- VIN 1FMCU03143KA80342 / 9/24/02 Build Date; 10/7/02 Repair Date; 12 Miles on Vehicle; Customer Comment: "CK VEHICLE STALLS", Technician Comment: "CHECK VEHICLE FOR STALLING CONCERN.WDS EEC TEST,KOEO,KOER PASS.DCL DISPLAY CHECK ALL PIDS.CHK IAC 32 PERC,TP OK,EVAP SYSTEM OK,ALL GROUNDS OK,DPFE OK,PCM CALIBRATION OK.ROADTEST OK." Don Altoonian will follow up with Dealership on Monday 12/2/02.

Don can update the Team after he has contacted the dealerships.

George Hansen
Escape, PTQRT
2H-D63, PDC
(313) 84-61800
ghansen4

From: Uy, Deirene (D.)
Sent: Friday, December 14, 2001 11:32 AM
To: Kotwicki, Allan (A.J.)
Subject: formate and acetate

Al,

Just want to let you know that formic and acetic acids are weak acids compared to say, hydrochloric or nitric. A strong acid will *dissociate* in water to release the H+ ion, e.g. HCl (hydrochloric acid) becomes H+ + Cl-. In a dilute solution of acetic acid (HCH3COO) at **room temperature**, only a few % of the molecules will dissociate.

Deirene

From: Plante, Paul (P.G.)
Sent: Tuesday, April 30, 2002 9:51 AM
To: Gates, Freeman (F.C.); Johnson, Joe (J.H.); Klomp, Karl (K.R.); Maurer, James (J.B.)
Cc: Kotwicki, Allan (A.J.); Plante, Paul (P.G.); Verner, Carol (C.J.); Panaretos, Christine (C.M.)
Subject: FRL Acid Test for DPFE Sensor

Freeman, Jim and I talked with Allan at FRL yesterday.He informed us that a DOE is required for his testing. Can you call Allan and take the lead on this. If you need help, maybe Carol can assist. Should we discuss at 14D T/Th meeting?

Chris, add this to the open issues assignment list if not already there.

Due to illness, his workload is backed up, but he appeared willing to give DPFE high priority. Jim will will send a priority note to Allan's manager, Vance Zanardelli.

Paul Plante
V Engine Campaign Prevention Specialist
POEE Building, Drop 20, Cube BG049, Pillar D5
Tele. 313-84-84138; Fax 39-02513
Text Pager: 734-296-1905
E Mail: pplante@ford.cm (CDS ID PPLANTE)

From: Siegel, David (D.T.)
Sent: Wednesday, November 14, 2001 8:56 AM
To: Kotwicki, Allan (A.J.)
Subject: Regarding Your Wiring Request

Al,

Please see me regarding the material you dropped off yesterday afternoon.

Regards,

Dave Siegel
Test Engineering Dept. Electronics & PCB Design, SRL
Phone (313)594-3686 FAX (313)322-2974
dsiegel@ford.com

From: Kotwicki, Allan (A.J.)
Sent: Friday, December 07, 2001 4:40 PM
To: Siegel, David (D.T.)
Cc: Kotwicki, Allan (A.J.)
Subject: RE: Sensor test harness status

the "dogs of war" were on me, nad I had to clean my Rm. 1615 lab bench up today.

Thanks for your help

Allan Kotwicki
MD 3619 SRL
(313)-59-41277
FAX (313)-33-75571
AKOTWICK
akotwick@ford.com

----Original Message----
From: Siegel, David (D.T.)
Sent: Friday, December 07, 2001 2:25 PM
To: Kotwicki, Allan (A.J.)
Cc: Fisher, Hugh (H.O.)
Subject: Sensor test harness status

Al,
The cabling for your sensor acid test is ready to install in the chamber upstairs. The connection of the 20 sensor cables and the power supply connections should take about one hour. I wired and tested the harness for the data logger and it is ready to go. Let me know when you are ready and I can do this.

Regards,

Dave Siegel
Test Engineering Dept. Electronics & PCB Design, SRL
Phone (313)594-3686 FAX (313)322-2974
dsiegel@ford.com

From: Kotwicki, Allan (A.J.)
Sent: Monday, November 19, 2001 2:04 PM
To: Kotwicki, Allan (A.J.)
Subject: FW: Prof. Heywood Consulting Visit

add self next time

—Original Message—
From: Kotwicki, Allan (A.J.)
Sent: Monday, November 19, 2001 2:03 PM
To: Hoard, John (J.W.)
Cc: Gates, Freeman (F.C.); Klomp, Karl (K.R.)
Subject: RE: Prof. Heywood Consulting Visit

John: following up on my earlier phonecall, can you send Prof. Heywood a question about available literature or information about corrosive or acludic contents of automotive exhaust? We'd b content to discuss it at lunch if it can't go on the regular agenda.

Thanks in advance for your help

Allan Kotwicki
MD 3619 SRL
(313)-59-41277
FAX (313)-33-75571
AKOTWICK
akotwick@ford.com

—Original Message—
From: Hoard, John (J.W.)
Sent: Thursday, November 15, 2001 8:55 AM
Subject: Prof. Heywood Consulting Visit

Attached is the agenda for Professor Heywood's next consulting visit, Wednesday December 5, 2001.

The meetings are in conference room FPCB-23. Video links may be available to other locations; contact John Hoard to make arrangements. A room has already been reserved at Jaguar Research for the morning (US time) sessions.
<< File: Agenda.doc >>
Thanks,

John Hoard
Staff Technical Specialist
Phone (313) 59-41316
FAX (313) 594-2923
email jhoard@ford.com

From: Kotwicki, Allan (A.J.)
Sent: Friday, December 14, 2001 12:22 PM
To: Gates, Freeman (F.C.)
Cc: Kotwicki, Allan (A.J.)
Subject: FW: ingredients of condensate

Freeman: any suggestions?

Thanks in advance for your help

Allan Kotwicki
MD 3619 SRL
(313)-59-41277
FAX (313)-33-75571
AKOTWICK
akotwick@ford.com

—Original Message—
From: Uy, Dalrene (D.)
Sent: Friday, December 14, 2001 10:46 AM
To: Kotwicki, Allan (A.J.)
Subject: Ingredients of condensate

Al,

I'm looking over the sheet of condensate ingredients, and I notice that the "Collecting point" for Vehicle A says "sensor". What is this sensor and is this in the EGR area?

Dalrene

Dalrene Uy
Physics Dept.
Ford Research Laboratory
Mail Drop 3028/SRL, PO Box 2053
Dearborn, MI 48121

Phone: 313-594-1649
Fax: 313-322-7044
Email: duy@ford.com

From:	Kotwicki, Allan (A.J.)
Sent:	Friday, December 14, 2001 8:42 AM
To:	Hoard, John (J.W.); Gates, Freeman (F.C.)
Cc:	Kotwicki, Allan (A.J.)
Subject:	FW: Prof. Heywood Consulting Visit

I do not have the electronic originals. They belong to Freeman Gates, who will also receive a copy of your message with this reply. Some of the material - as I mentioned in the discussion - is Company and supplier sensitive, so I leave it to Freeman and you to decide what should be put into general circulation minutes for possible outside leakage release.

Additional data we are now developing (Freeman via 'Denso, me via Kaiser) may provide actual data about corrosive components in engine exhaust.

Thanks for your help in getting us on the agenda

Allan Kotwicki
MD 3619 SRL
(313)-59-41277
FAX (313)-33-75571
AKOTWICK
akotwick@ford.com

----Original Message----

From:	**Sent:** Thursday, December 13, 2001 5:14 PM
To:	Kotwicki, Allan (A.J.)
Subject:	RE: Prof. Heywood Consulting Visit

Can you please e-mail me the handouts you used with Heywood, for posting to the web?

Thanks,

John Hoard
Staff Technical Specialist
Phone (313) 59-41316
FAX (313) 594-2923
email jhoard@ford.com

----Original Message----

From:	Kotwicki, Allan (A.J.)
Sent:	Monday, November 19, 2001 2:03 PM
To:	Hoard, John (J.W.)
Cc:	Gates, Freeman (F.C.); Klomp, Karl (K.R.)
Subject:	RE: Prof. Heywood Consulting Visit

John: following up on my earlier phonecall, can you send Prof. Heywood a question about available literature or information about corrosive or acludic contents of automotive exhaust? We'd b content to discuss it at lunch if it can't go on the regular agenda.

Thanks in advance for your help

Allan Kotwicki
MD 3619 SRL
(313)-59-41277
FAX (313)-33-75571
AKOTWICK
akotwick@ford.com

-----Original Message-----
From: Hoard, John (J.W.)
Sent: Thursday, November 15, 2001 8:55 AM
Subject: Prof. Heywood Consulting Visit

Attached is the agenda for Professor Heywood's next consulting visit, Wednesday December 5, 2001.

The meetings are in conference room FPCB-23. Video links may be available to other locations; contact John Hoard to make arrangements. A room has already been reserved at Jaguar Research for the morning (US time) sessions.
<< File: Agenda.doc >>
Thanks,

John Hoard
Staff Technical Specialist
Phone (313) 59-41316
FAX (313) 594-2923
email jhoard@ford.com

From: Kotwicki, Allan (A.J.)
Sent: Thursday, December 13, 2001 2:54 PM
To: Gates, Freeman (F.C.)
Cc: Kotwicki, Allan (A.J.)
Subject: got the fax, what are the concentration units?

got the fax, what are the concentration units? micromoles per ton, grams per cc, ... A minor detail. The vehicles were not fueled with alcohols. Perhaps you could check them while I check with Bill Kaiser here.

Thanks in advance for your help

Allan Kotwicki
MD 3619 SRL
(313)-59-41277
FAX (313)-33-75571
AKOTWICK
akotwick@ford.com

From: Kotwicki, Allan (A.J.)
Sent: Thursday, December 13, 2001 2:01 PM
To: Kotwicki, Allan (A.J.)
Subject: names for fully specisted exhaust

Walter O. Siegel
Edward W. Kaiser
Gary Crosble

Thanks in advance for your help

Allan Kotwicki
MD 3619 SRL
(313)-59-41277
FAX (313)-33-75571
AKOTWICK
akotwick@ford.com

From: Kotwicki, Allan (A.J.)
Sent: Thursday, December 13, 2001 1:24 PM
To: Gates, Freeman (F.C.); Klomp, Karl (K.R.)
Cc: Kotwicki, Allan (A.J.)
Subject: I didn't get a fax

I didn't get a fax of the exhaust chemical analysis. I called Roberto Naghibi, but haven't gotten an answer. I spoke to Dalrene Yu, who is also awaiting the FAX, and a bottle of fluid from Roberto. She will be checking what is inside the bubbles in the SilGel The test is almost ready to go, pending Karl coming over to help move the equipment into 3314, deciding the acid loadings based on the 'Denso ana.lysis, help do the DOE, and test the data logger to make sure it can be programmed and run successfully for 80+ hours.

I have cleared the testing with Ben Wong (SRL Safety) and John Hoard (who owns the lab), but only have 3 working days next week (which is 72 consecutive hours for the logger test). I think we must run a dummy logger test before starting the actual test and time is short. Please advise when you can assist in getting this over the top so we can get here next year with everything set to go.

Thanks in advance for your help

Allan Kotwicki
MD 3619 SRL
(313)-59-41277
FAX (313)-33-75571
AKOTWICK
akotwick@ford.com

From: Kotwicki, Allen (A.J.)
Sent: Monday, July 29, 2002 12:56 PM
To: Gates, Freeman (F.C.)
Cc: Kotwicki, Allen (A.J.)
Subject: FW: EGR Data

he's generated data that I will now examine, and it seems to show that there's some sort of impedance difference or change between his old and new devices. PS. I'm back from my vacation.

Thanks in advance for your help,

Allen J. Kotwicki
59-41277
akotwicki@ford.com
MD 3619 SRL

—Original Message—
From: Giangrande, Mike (M.R.)
Sent: Monday, July 22, 2002 3:50 PM
To: Kotwicki, Allen (A.J.)
Subject: EGR Data

Al,
I finally got a chance to compile all of the RCON data that I took with the different DPFE samples. Sorry for the delay. You can associate the data files with each piece of hardware by looking at the 3 data packets from the meeting. If it doesn't make sense, give me a call.

It looks like I did put the parameter fEGR into my acquisition window, but not until the last few data files. It appears that fEGR mimics the DELPR signal. If you have any questions, please let me know.


EGR.ZIP

Mike Giangrande
4.2L F150 Powertrain Calibration
phone: 32-30227 pager: (313) 795-2888

From: Kotwicki, Allan (A.J.)
Sent: Monday, July 29, 2002 12:58 PM
To: Gatea, Freeman (F.C.)
Cc: Kotwicki, Allan (A.J.)
Subject: FW: EGR Data

he's generated data that I will now examine, and it seems to show that there's some sort of impedance difference or change between his old and new devices. PS. I'm back from my vacation.

Thanks in advance for your help,

Allan J. Kotwicki
59-41277
akotwicki@ford.com
MD 3619 SRL

—Original Message—
From: Glangrande, Mike (M.R.)
Sent: Monday, July 22, 2002 3:50 PM
To: Kotwicki, Allan (A.J.)
Subject: EGR Data

Al,
I finally got a chance to compile all of the RCON data that I took with the different DPFE samples. Sorry for the delay. You can associate the data files with each piece of hardware by looking at the 3 data packets from the meeting. If it doesn't make sense, give me a call.

It looks like I did put the parameter IEGR into my acquisition window, but not until the last few data files. It appears that IEGR mimics the DELPR signal. If you have any questions, please let me know.


EGR.ZIP

Mike Glangrande
4.2L F150 Powertrain Calibration
phone: 32-30227 pager: (313) 795-2668

From: Kotwicki, Allan (A.J.)
Sent: Monday, July 29, 2002 1:04 PM
To: Glengrande, Mike (M.R.)
Cc: Gates, Freeman (F.C.); Kotwicki, Allan (A.J.)
Subject: delay in responding

If you thought I was just disregarding you, you were wrong. I just got back from vacation. Sorry about the delay.

Thanks in advance for your help,

Allan J. Kotwicki
59-41277
akotwicki@ford.com
MD 3619 SRL

From: Giangrande, Mike (M.R.)
Sent: Monday, July 22, 2002 3:50 PM
To: Kotwicki, Allan (A.J.)
Subject: EGR Data

Al,
I finally got a chance to compile all of the RCON data that I took with the different DPFE samples. Sorry for the delay. You can associate the data files with each piece of hardware by looking at the 3 data packets from the meeting. If it doesn't make sense, give me a call.

It looks like I did put the parameter IEGR into my acquisition window, but not until the last few data files. It appears that IEGR mimics the DELPR signal. If you have any questions, please let me know.


EGR.ZIP

Mike Giangrande
4.2L F150 Powertrain Calibration
phone: 32-30227 pager: (313) 795-2668

From: Haghgoole, Mohammad (M.)
Sent: Tuesday, December 18, 2001 12:33 PM
To: Kotwicki, Allan (A.J.)
Subject: Out of Office AutoReply: Inadvertant request for Gary Crosbie consultation

I will return January 2nd 2002, but occasionally I'll check my e-mail and will respond if I can. Have a merry Christmas and/or happy holidays

From: Giangrande, Mike (M.R.)
Sent: Monday, July 29, 2002 1:22 PM
To: Kotwicki, Allen (A.J.)
Subject: RE: delay in responding

No problem, I wasn't thinking that at all. Heck, it took me a whole week just to gather the data files and get them sent to you...

Mike Giangrande
4.2L F150 Powertrain Calibration
phone: 32-30227 pager: (313) 796-2668

-----Original Message-----
From: Kotwicki, Allen (A.J.)
Sent: Monday, July 29, 2002 1:04 PM
To: Giangrande, Mike (M.R.)
Cc: Gabas, Freeman (F.C.); Kotwicki, Allen (A.J.)
Subject: delay in responding

If you thought I was just disregarding you, you were wrong. I just got back from vacation. Sorry about the delay.

Thanks in advance for your help,

Allan J. Kotwicki
59-41277
akotwicki@ford.com
MD 3619 SRL

From:	Gates, Freeman (F.C.)
Sent:	Tuesday, December 03, 2002 10:29 AM
To:	Freeland, Mark (M.); Maurer, James (J.B.); McCoy, James (J.D.)
Cc:	Kotwicki, Allan (A.J.); Alles, Sheran (S.A.); O'Neill, Jim (J.D.); Crawley, Ian (I.A.); Williamson, Richard (E.); Jefford, Bob (R.D.)
Subject:	RE: DPFE Sensor stalls

This vehicle will have the ESM. This sounds like it may even be an EVR concern i.e. vacuum on EGR valve continually. We have seen this on some EVR applications if the filter is not installed correctly or contamination exists on the disc (internal to EVR). We have seen this at least 1 time this year. When you disconnect the DPFE, you also disconnect, EVR and MAP sensor through the common connector.

Thanks Mark/Richard.

Anyway the answer is YES , we want the part !

-----Original Message-----

From:	Freeland, Mark (M.)
Sent:	Tuesday, December 03, 2002 10:14 AM
To:	Gates, Freeman (F.C.); Maurer, James (J.B.); McCoy, James (J.D.)
Cc:	Kotwicki, Allan (A.J.); Alles, Sheran (S.A.); O'Neill, Jim (J.D.)
Subject:	FW: DPFE Sensor stalls
Importance:	High

Freeman, Jim & Jim,

Please read the attached from Rick Williamson of ECI. I will ask Rick to obtain the part if he can.

A couple of questions:
1) Which dPFE sensor will this vehicle have, Kavlico TM, Motorola Dash Mount or Siemens (Kavlico) ECM?
2) What current draw does it take to shut down a 2003 MY Town Car?

Regards

Mark Freeland

6-Sigma Black Belt
Engine Research Department
Ford Research Laboratory
P.O. Box 2053
MD 2629 - SRL - Room 1517
Dearborn, MI 48121-2053 USA
email: mfreela1@ford.com
Tel.: (313) 594-7645

-----Original Message-----

From:	Williamson, Richard (E.)
Sent:	Wednesday, November 27, 2002 7:57 AM
To:	Freeland, Mark (M.)
Subject:	DPFE Sensor stalls
Importance:	High

Hi Mark,
How have you been?
Are you still interested in the DPFE sensor?
I have a CQIS report that you might be interested in:

CSQI002 CQIS Indicator Summary 11/27/02 07:50:39
==> 1 of 1
Rpt#: 2KTAC415 EDSR --or-- Q 200200039171 Rpt: 11/21/2002 Odom: 3,439 M
Rvwd: File: _ Folder: _____ Attchmnts: 0 Print Smy/Disp Detail(P/D): _
Vehicle: 2003 TOWN CAR,EXEC ,SEDAN 1LNHM81W73Y626638 Bld: 07/29/2002
Engine: 4.6L ROM B Calb: Trans: Axle: A/C:
Dealer Id: 08910 Columbia Ford Lincoln-Mercury Ph#: (860) 228-2886
State: Connecticut City: Columbia Orig/Caller: PAUL DANIELUK
Symptom: 6 07 6 93 DRVABL,STALL/QUITS,AT CRUISE,ALL ENGINE TEMP
Addl Sym: St: CCRG/EPRC: S Rvwd: A Dt: 11/25/2002
Fix: Y Caus. Comp: EGR ASSEMBLY – RPL Condition Code:

Region Code: 11 Region Name: Boston -11

CONCER VEHICLE STALLS WHILE DRIVING SOMETIMES, SOMETIMES IT RESTARTS AND SOMETIMES IT WON'T CRANK AFTER IT STALLS.
TECH/C NGS SELF TEST NO CODES, WHEN CAR WON'T CRANK YOU LOSE COMMUNICATION WITH PCM, THEFT LIGHT DOES NOT PROVE OUT WHEN KEY IS TURNED ON, UNPLUGGED DPFE AND CONCERN IS CORRECTED. REPLACED SHORTED DPFE ERG VALVE ASSEMBLY AND RETEST.

I am going to try and get the part back, let me know if you would like it .....

Take care,

RICK WILLIAMSON
Product Concern Analyst
Enhanced Concern Identification
313-248-6348
rwill110@ford.com

From: Gates, Freeman (F.C.)
Sent: Monday, October 07, 2002 9:33 AM
To: Freeland, Mark (M.); Kotwicki, Allan (A.J.)
Subject: FW: Zener Diode voltage rating

FYI...

-----Original Message-----
From: Hueniken Peter [mailto:Peter.Hueniken@at.siemens.ca]
Sent: Sunday, October 06, 2002 8:49 AM
To: 'icrawley@ford.com'; 'fgates@ford.com'
Cc: Jefford Bob
Subject: FW: Zener Diode voltage rating

Hello Freeman

Per your request; the Zener Diode incorporated with the Transient Voltage Suppresion is rated at 9.1 volts nominal.
Note from Don Ayers is attached below.

Regards

Peter Hueniken

-----Original Message-----
From: Ayers, Don [mailto:DAyers@kavlico.com]
Sent: Friday, October 04, 2002 6:14 PM
To: Hueniken Peter
Cc: Bugaj, Barry; makins@ford.com
Subject: Zener Diode voltage rating

Per Freeman's request via you, the diode used on EBM is rated at 9.1 volts nominal. I've requested the warranty data that you wanted on TBD's. I hope to get that out to you later.

Regards,
Don

Subject: FW: Kavlico TM dPFE Sensor UPAD Root Cause Investigation
Location: SRL Rm. 1133

Start: Fri 3/22/2002 9:00 AM
End: Fri 3/22/2002 12:45 PM
Show Time As: Tentative

Recurrence: (none)

Meeting Status: Not yet responded

Required Attendees: Freeland, Mark (M.); Kotwicki, Allan (A.J.)

Al,

Sorry I forgot to add you to the initial send of this meeting notice. I hope you can attend, as I would welcome you're input.

Regards

Mark Freeland

-----Original Appointment-----
From: Freeland, Mark (M.)
Sent: Wednesday, March 20, 2002 2:56 PM
To: Hangas, Jon (.); Simko, Steven (S.J.); Uy, Dairene (D.); Potter, Timothy (T.J.); Harris, Stephen (S.J.); Carter, Roscoe (R.O.); Holubka, Joe (J.W.); Drews, Andy (A.R.); Visser, Jaco (J.H.); Soltis, Richard (R.E.); Donlon, William (W.T.); Bauer, David (D.R.); Stephan, Craig (C.H.); Zanini-Fisher, Margherita (M.); Gates, Freeman (F.C.); Maurer, James (J.B.); Gonzalez, Leroy (L.); Ed Sickafus (E-mail)
Cc: Helms, Jeffrey (J.H.); Hess, Kenneth (K.C.); Plante, Paul (P.G.); Akins, Mary (M.); O'Neal, Jim (J.D.)
Subject: Kavlico TM dPFE Sensor UPAD Root Cause Investigation
When: Friday, March 22, 2002 9:00 AM-12:45 PM (GMT-05:00) Eastern Time (US & Canada).
Where: SRL Rm. 1133

You're participation is requested to learn about this high warranty issue, and to solicit you're assistance and technical expertise in getting to the root cause of "Unprotected Area Damage".

Some key team members will also be required to work with Dr. Ed Sickafus during the afternoon.

From: Freeland, Mark (M.)
Sent: Monday, September 30, 2002 2:38 PM
To: Kotwicki, Allan (A.J.)
Cc: Alles, Sheran (S.A.)
Subject: Latest design thoughts

Al,

Can you please pdf this one and send it back to me, and also copy Sheran, so that he has a hard copy.

Filter15

Thanks

Regards

Mark Freeland

6-Sigma Black Belt
Engine Research Department
Ford Research Laboratory
P.O. Box 2053
MD 2629 - SRL - Room 1517
Dearborn, MI 48121-2053 USA
email: mfreela1@ford.com
Tel.: (313) 594-7645

From: Freeland, Mark (M.)
Sent: Monday, September 30, 2002 1:29 PM
To: Kotwicki, Allan (A.J.)
Subject: Drawing

Filter14

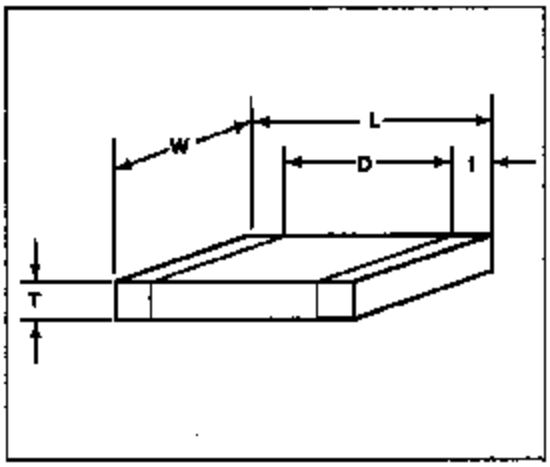
Regards

Mark Freeland

6-Sigma Black Belt
Engine Research Department
Ford Research Laboratory
P.O. Box 2053
MD 2629 - SRL - Room 1517
Dearborn, MI 48121-2053 USA
email: mfreela1@ford.com
Tel.: (313) 594-7645

MIL-PRF-55681/Chips

Part Number Example
CDR31 thru CDR35



MILITARY DESIGNATION PER MIL-PRF-55681

Part Number Example

(example)	CDR31	BP	101	B	K	S	M

- MIL Style
- Voltage-temperature Limits
- Capacitance
- Rated Voltage
- Capacitance Tolerance
- Termination Finish
- Failure Rate

MIL Style: CDR31, CDR32, CDR33, CDR34, CDR35

Voltage Temperature Limits:
BP = 0 ± 30 ppm/°C without voltage; 0 ± 30 ppm/°C with rated voltage from -55°C to +125°C

BX = ±15% without voltage; +15 –25% with rated voltage from -55°C to +125°C

Capacitance: Two digit figures followed by multiplier (number of zeros to be added) e.g., 101 = 100 pF

Rated Voltage: A = 50V, B = 100V

Capacitance Tolerance: C ± .25 pF, D ± .5 pF, F ± 1%
J ± 5%, K ± 10%, M ± 20%

Termination Finish:
M = Palladium Silver
N = Silver Nickel Gold
S = Solder-coated
U = Base Metallization/Barrier Metal/Solder Coated*
W = Base Metallization/Barrier Metal/Tinned (Tin or Tin/Lead Alloy)

*Solder shall have a melting point of 200°C or less.

Failure Rate Level: M = 1.0%, P = .1%, R = .01%, S = .001%

Packaging: Bulk is standard packaging. Tape and reel per RS481 is available upon request.

CROSS REFERENCE: AVX/MIL-PRF-55681/CDR31 THRU CDR35

Per MIL-PRF-55681 (Metric Sizes)	AVX Style	Length (L) (mm)	Width (W) (mm)	Thickness (T)	D	Termination Band (t)	
				Max. (mm)	Min. (mm)	Max. (mm)	Min. (mm)
CDR31	0805	2.00	1.25	1.3	.50	.70	.30
CDR32	1206	3.20	1.60	1.3	—	.70	.30
CDR33	1210	3.20	2.50	1.5	—	.70	.30
CDR34	1812	4.50	3.20	1.5	—	.70	.30
CDR35	1825	4.50	6.40	1.5	—	.70	.30

MIL-PRF-55681/Chips

Military Part Number Identification CDR31

CDR31 to MIL-PRF-55681/7

Military Type Designation 1/	Capacitance in pF	Capacitance tolerance	Rated temperature and voltage-temperature limits	WVDC
AVX Style 0805/CDR31 (BP)				
CDR31BP1R0B---	1.0	B,C	BP	100
CDR31BP1R1B---	1.1	B,C	BP	100
CDR31BP1R2B---	1.2	B,C	BP	100
CDR31BP1R3B---	1.3	B,C	BP	100
CDR31BP1R5B---	1.5	B,C	BP	100
CDR31BP1R8B---	1.8	B,C	BP	100
CDR31BP1R9B---	1.9	B,C	BP	100
CDR31BP2R0B---	2.0	B,C	BP	100
CDR31BP2R2B---	2.2	B,C	BP	100
CDR31BP2R4B---	2.4	B,C	BP	100
CDR31BP2R7B---	2.7	B,C,D	BP	100
CDR31BP3R0B---	3.0	B,C,D	BP	100
CDR31BP3R3B---	3.3	B,C,D	BP	100
CDR31BP3R6B---	3.6	B,C,D	BP	100
CDR31BP3R9B---	3.9	B,C,D	BP	100
CDR31BP4R3B---	4.3	B,C,D	BP	100
CDR31BP4R7B---	4.7	B,C,D	BP	100
CDR31BP5R1B---	5.1	B,C,D	BP	100
CDR31BP5R6B---	5.6	B,C,D	BP	100
CDR31BP6R2B---	6.2	B,C,D	BP	100
CDR31BP6R8B---	6.8	B,C,D	BP	100
CDR31BP7R5B---	7.5	B,C,D	BP	100
CDR31BP8R2B---	8.2	B,C,D	BP	100
CDR31BP9R1B---	9.1	B,C,D	BP	100
CDR31BP100B---	10	F,J,K	BP	100
CDR31BP110B---	11	F,J,K	BP	100
CDR31BP120B---	12	F,J,K	BP	100
CDR31BP130B---	13	F,J,K	BP	100
CDR31BP150B---	15	F,J,K	BP	100
CDR31BP160B---	16	F,J,K	BP	100
CDR31BP180B---	18	F,J,K	BP	100
CDR31BP200B---	20	F,J,K	BP	100
CDR31BP220B---	22	F,J,K	BP	100
CDR31BP240B---	24	F,J,K	BP	100
CDR31BP270B---	27	F,J,K	BP	100
CDR31BP300B---	30	F,J,K	BP	100
CDR31BP330B---	33	F,J,K	BP	100
CDR31BP360B---	36	F,J,K	BP	100
CDR31BP390B---	39	F,J,K	BP	100
CDR31BP430B---	43	F,J,K	BP	100
CDR31BP470B---	47	F,J,K	BP	100
CDR31BP510B---	51	F,J,K	BP	100
CDR31BP560B---	56	F,J,K	BP	100
CDR31BP620B---	62	F,J,K	BP	100
CDR31BP680B---	68	F,J,K	BP	100
CDR31BP750B---	75	F,J,K	BP	100
CDR31BP820B---	82	F,J,K	BP	100
CDR31BP910B---	91	F,J,K	BP	100

Add appropriate failure rate

Add appropriate termination finish

Capacitance Tolerance

Military Type Designation 1/	Capacitance in pF	Capacitance tolerance	Rated temperature and voltage-temperature limits	WVDC
AVX Style 0805/CDR31 (BP) cont'd				
CDR31BP101B---	100	F,J,K	BP	100
CDR31BP111B---	110	F,J,K	BP	100
CDR31BP121B---	120	F,J,K	BP	100
CDR31BP131B---	130	F,J,K	BP	100
CDR31BP151B---	150	F,J,K	BP	100
CDR31BP161B---	160	F,J,K	BP	100
CDR31BP181B---	180	F,J,K	BP	100
CDR31BP201B---	200	F,J,K	BP	100
CDR31BP221B---	220	F,J,K	BP	100
CDR31BP241B---	240	F,J,K	BP	100
CDR31BP271B---	270	F,J,K	BP	100
CDR31BP301B---	300	F,J,K	BP	100
CDR31BP331B---	330	F,J,K	BP	100
CDR31BP361B---	360	F,J,K	BP	100
CDR31BP391B---	390	F,J,K	BP	100
CDR31BP431B---	430	F,J,K	BP	100
CDR31BP471B---	470	F,J,K	BP	100
CDR31BP511A---	510	F,J,K	BP	50
CDR31BP561A---	560	F,J,K	BP	50
CDR31BP621A---	620	F,J,K	BP	50
CDR31BP681A---	680	F,J,K	BP	50
AVX Style 0805/CDR31 (BX)				
CDR31BX471B---	470	K,M	BX	100
CDR31BX681B---	680	K,M	BX	100
CDR31BX681B---	680	K,M	BX	100
CDR31BX821B---	820	K,M	BX	100
CDR31BX102B---	1,000	K,M	BX	100
CDR31BX122B---	1,200	K,M	BX	100
CDR31BX162B---	1,600	K,M	BX	100
CDR31BX182B---	1,800	K,M	BX	100
CDR31BX222B---	2,200	K,M	BX	100
CDR31BX272B---	2,700	K,M	BX	100
CDR31BX332B---	3,300	K,M	BX	100
CDR31BX392B---	3,900	K,M	BX	100
CDR31BX472B---	4,700	K,M	BX	100
CDR31BX562A---	5,600	K,M	BX	50
CDR31BX682A---	6,800	K,M	BX	50
CDR31BX822A---	8,200	K,M	BX	50
CDR31BX103A---	10,000	K,M	BX	50
CDR31BX123A---	12,000	K,M	BX	50
CDR31BX153A---	15,000	K,M	BX	50
CDR31BX183A---	18,000	K,M	BX	50

Add appropriate failure rate

Add appropriate termination finish

Capacitance Tolerance

1/ The complete part number will include additional symbols to indicate capacitance tolerance, termination and failure rate level.

MIL-PRF-55681/Chips

Military Part Number Identification CDR32

CDR32 to MIL-PRF-55681/8

Military Type Designation 1/	Capacitance in pF	Capacitance tolerance	Rated temperature and voltage-temperature limits	WVDC
AVX Style 1206/CDR32 (BP)				
CDR32BP1R0B---	1.0	B,C	BP	100
CDR32BP1R1B---	1.1	B,C	BP	100
CDR32BP1R2B---	1.2	B,C	BP	100
CDR32BP1R3B---	1.3	B,C	BP	100
CDR32BP1R5B---	1.5	B,C	BP	100
CDR32BP1R6B---	1.6	B,C	BP	100
CDR32BP1R8B---	1.8	B,C	BP	100
CDR32BP2R0B---	2.0	B,C	BP	100
CDR32BP2R2B---	2.2	B,C	BP	100
CDR32BP2R4B---	2.4	B,C	BP	100
CDR32BP2R7B---	2.7	B,C,D	BP	100
CDR32BP3R0B---	3.0	B,C,D	BP	100
CDR32BP3R3B---	3.3	B,C,D	BP	100
CDR32BP3R6B---	3.6	B,C,D	BP	100
CDR32BP3R9B---	3.9	B,C,D	BP	100
CDR32BP4R3B---	4.3	B,C,D	BP	100
CDR32BP4R7B---	4.7	B,C,D	BP	100
CDR32BP5R1B---	5.1	B,C,D	BP	100
CDR32BP5R6B---	5.6	B,C,D	BP	100
CDR32BP6R2B---	6.2	B,C,D	BP	100
CDR32BP6R8B---	6.8	B,C,D	BP	100
CDR32BP7R5B---	7.5	B,C,D	BP	100
CDR32BP8R2B---	8.2	B,C,D	BP	100
CDR32BP8R1B---	8.1	B,C,D	BP	100
CDR32BP100B---	10	F,J,K	BP	100
CDR32BP110B---	11	F,J,K	BP	100
CDR32BP120B---	12	F,J,K	BP	100
CDR32BP130B---	13	F,J,K	BP	100
CDR32BP150B---	15	F,J,K	BP	100
CDR32BP160B---	16	F,J,K	BP	100
CDR32BP180B---	18	F,J,K	BP	100
CDR32BP200B---	20	F,J,K	BP	100
CDR32BP220B---	22	F,J,K	BP	100
CDR32BP240B---	24	F,J,K	BP	100
CDR32BP270B---	27	F,J,K	BP	100
CDR32BP300B---	30	F,J,K	BP	100
CDR32BP330B---	33	F,J,K	BP	100
CDR32BP360B---	36	F,J,K	BP	100
CDR32BP390B---	39	F,J,K	BP	100
CDR32BP430B---	43	F,J,K	BP	100
CDR32BP470B---	47	F,J,K	BP	100
CDR32BP510B---	51	F,J,K	BP	100
CDR32BP560B---	56	F,J,K	BP	100
CDR32BP620B---	62	F,J,K	BP	100
CDR32BP680B---	68	F,J,K	BP	100
CDR32BP750B---	75	F,J,K	BP	100
CDR32BP820B---	82	F,J,K	BP	100
CDR32BP910B---	91	F,J,K	BP	100

Add appropriate failure rate
Add appropriate termination finish
Capacitance Tolerance

Military Type Designation 1/	Capacitance in pF	Capacitance tolerance	Rated temperature and voltage-temperature limits	WVDC
AVX Style 1206/CDR32 (BP) cont'd				
CDR32BP101B---	100	F,J,K	BP	100
CDR32BP111B---	110	F,J,K	BP	100
CDR32BP121B---	120	F,J,K	BP	100
CDR32BP131B---	130	F,J,K	BP	100
CDR32BP151B---	150	F,J,K	BP	100
CDR32BP161B---	160	F,J,K	BP	100
CDR32BP181B---	180	F,J,K	BP	100
CDR32BP201B---	200	F,J,K	BP	100
CDR32BP221B---	220	F,J,K	BP	100
CDR32BP241B---	240	F,J,K	BP	100
CDR32BP271B---	270	F,J,K	BP	100
CDR32BP301B---	300	F,J,K	BP	100
CDR32BP331B---	330	F,J,K	BP	100
CDR32BP361B---	360	F,J,K	BP	100
CDR32BP391B---	390	F,J,K	BP	100
CDR32BP431B---	430	F,J,K	BP	100
CDR32BP471B---	470	F,J,K	BP	100
CDR32BP511B---	510	F,J,K	BP	100
CDR32BP561B---	560	F,J,K	BP	100
CDR32BP621B---	620	F,J,K	BP	100
CDR32BP681B---	680	F,J,K	BP	100
CDR32BP751B---	750	F,J,K	BP	100
CDR32BP821B---	820	F,J,K	BP	100
CDR32BP911B---	910	F,J,K	BP	100
CDR32BP102B---	1,000	F,J,K	BP	100
CDR32BP112A---	1,100	F,J,K	BP	50
CDR32BP122A---	1,200	F,J,K	BP	50
CDR32BP132A---	1,300	F,J,K	BP	50
CDR32BP152A---	1,500	F,J,K	BP	50
CDR32BP162A---	1,600	F,J,K	BP	50
CDR32BP182A---	1,800	F,J,K	BP	50
CDR32BP202A---	2,000	F,J,K	BP	50
CDR32BP222A---	2,200	F,J,K	BP	50
AVX Style 1206/CDR32 (BX)				
CDR32BX472B---	4,700	K,M	BX	100
CDR32BX682B---	6,800	K,M	BX	100
CDR32BX683B---	6,800	K,M	BX	100
CDR32BX822B---	8,200	K,M	BX	100
CDR32BX103B---	10,000	K,M	BX	100
CDR32BX123B---	12,000	K,M	BX	100
CDR32BX153B---	15,000	K,M	BX	100
CDR32BX153A---	15,000	K,M	BX	50
CDR32BX223A---	22,000	K,M	BX	50
CDR32BX273A---	27,000	K,M	BX	50
CDR32BX333A---	33,000	K,M	BX	50
CDR32BX393A---	39,000	K,M	BX	50

Add appropriate failure rate
Add appropriate termination finish
Capacitance Tolerance

1/ The complete part number will include additional symbols to indicate capacitance tolerance, termination and failure rate level.

MIL-PRF-55681/Chips

Military Part Number Identification CDR33/34/35

CDR33/34/35 to MIL-PRF-55681/9/10/11

Military Type Designation 1/	Capacitance in pF	Capacitance tolerance	Rated temperature and voltage-temperature limits	WVDC
AVX Style 1210/CDR33 (BP)				
CDR33BP102B···	1,000	F,J,K	BP	100
CDR33BP112B···	1,100	F,J,K	BP	100
CDR33BP122B···	1,200	F,J,K	BP	100
CDR33BP132B···	1,300	F,J,K	BP	100
CDR33BP162B···	1,600	F,J,K	BP	100
CDR33BP182B···	1,800	F,J,K	BP	100
CDR33BP182B···	1,800	F,J,K	BP	100
CDR33BP202B···	2,000	F,J,K	BP	100
CDR33BP222B···	2,200	F,J,K	BP	100
CDR33BP242A···	2,400	F,J,K	BP	50
CDR33BP272A···	2,700	F,J,K	BP	50
CDR33BP302A···	3,000	F,J,K	BP	50
CDR33BP332A···	3,300	F,J,K	BP	50
AVX Style 1210/CDR33 (BX)				
CDR33BX156B···	15,000	K,M	BX	100
CDR33BX186B···	18,000	K,M	BX	100
CDR33BX226B···	22,000	K,M	BX	100
CDR33BX276B···	27,000	K,M	BX	100
CDR33BX396A···	39,000	K,M	BX	50
CDR33BX476A···	47,000	K,M	BX	50
CDR33BX566A···	56,000	K,M	BX	50
CDR33BX686A···	68,000	K,M	BX	50
CDR33BX823A···	82,000	K,M	BX	50
CDR33BX104A···	100,000	K,M	BX	50
AVX Style 1812/CDR34 (BP)				
CDR34BP222B···	2,200	F,J,K	BP	100
CDR34BP242B···	2,400	F,J,K	BP	100
CDR34BP272B···	2,700	F,J,K	BP	100
CDR34BP302B···	3,000	F,J,K	BP	100
CDR34BP332B···	3,300	F,J,K	BP	100
CDR34BP362B···	3,600	F,J,K	BP	100
CDR34BP392B···	3,900	F,J,K	BP	100
CDR34BP432B···	4,300	F,J,K	BP	100
CDR34BP472B···	4,700	F,J,K	BP	100
CDR34BP512A···	5,100	F,J,K	BP	50
CDR34BP562A···	5,600	F,J,K	BP	50
CDR34BP622A···	6,200	F,J,K	BP	50
CDR34BP682A···	6,800	F,J,K	BP	50
CDR34BP752A···	7,500	F,J,K	BP	50
CDR34BP822A···	8,200	F,J,K	BP	50
CDR34BP912A···	9,100	F,J,K	BP	50
CDR34BP103A···	10,000	F,J,K	BP	50

Military Type Designation 1/	Capacitance in pF	Capacitance tolerance	Rated temperature and voltage-temperature limits	WVDC
AVX Style 1812/CDR34 (BX)				
CDR34BX276B···	27,000	K,M	BX	100
CDR34BX336B···	33,000	K,M	BX	100
CDR34BX396B···	39,000	K,M	BX	100
CDR34BX473B···	47,000	K,M	BX	100
CDR34BX563B···	56,000	K,M	BX	100
CDR34BX104A···	100,000	K,M	BX	50
CDR34BX124A···	120,000	K,M	BX	50
CDR34BX154A···	150,000	K,M	BX	50
CDR34BX184A···	180,000	K,M	BX	50
AVX Style 1825/CDR35 (BP)				
CDR35BP472B···	4,700	F,J,K	BP	100
CDR35BP512B···	5,100	F,J,K	BP	100
CDR35BP562B···	5,600	F,J,K	BP	100
CDR35BP622B···	6,200	F,J,K	BP	100
CDR35BP682B···	6,800	F,J,K	BP	100
CDR35BP752B···	7,500	F,J,K	BP	100
CDR35BP822B···	8,200	F,J,K	BP	100
CDR35BP912B···	9,100	F,J,K	BP	100
CDR35BP103B···	10,000	F,J,K	BP	100
CDR35BP113A···	11,000	F,J,K	BP	50
CDR35BP123A···	12,000	F,J,K	BP	50
CDR35BP133A···	13,000	F,J,K	BP	50
CDR35BP153A···	15,000	F,J,K	BP	50
CDR35BP163A···	16,000	F,J,K	BP	50
CDR35BP183A···	18,000	F,J,K	BP	50
CDR35BP203A···	20,000	F,J,K	BP	50
CDR35BP223A···	22,000	F,J,K	BP	50
AVX Style 1825/CDR35 (BX)				
CDR35BX563B···	56,000	K,M	BX	100
CDR35BX683B···	68,000	K,M	BX	100
CDR35BX823B···	82,000	K,M	BX	100
CDR35BX104B···	100,000	K,M	BX	100
CDR35BX124B···	120,000	K,M	BX	100
CDR35BX154B···	150,000	K,M	BX	100
CDR35BX164A···	160,000	K,M	BX	50
CDR35BX184A···	180,000	K,M	BX	50
CDR35BX224A···	220,000	K,M	BX	50
CDR35BX274A···	270,000	K,M	BX	50
CDR35BX334A···	330,000	K,M	BX	50
CDR35BX394A···	390,000	K,M	BX	50
CDR35BX474A···	470,000	K,M	BX	50

Add appropriate failure rate
Add appropriate termination finish
Capacitance Tolerance

1/ The complete part number will include additional symbols to indicate capacitance tolerance, termination and failure rate level.

Packaging of Chip Components

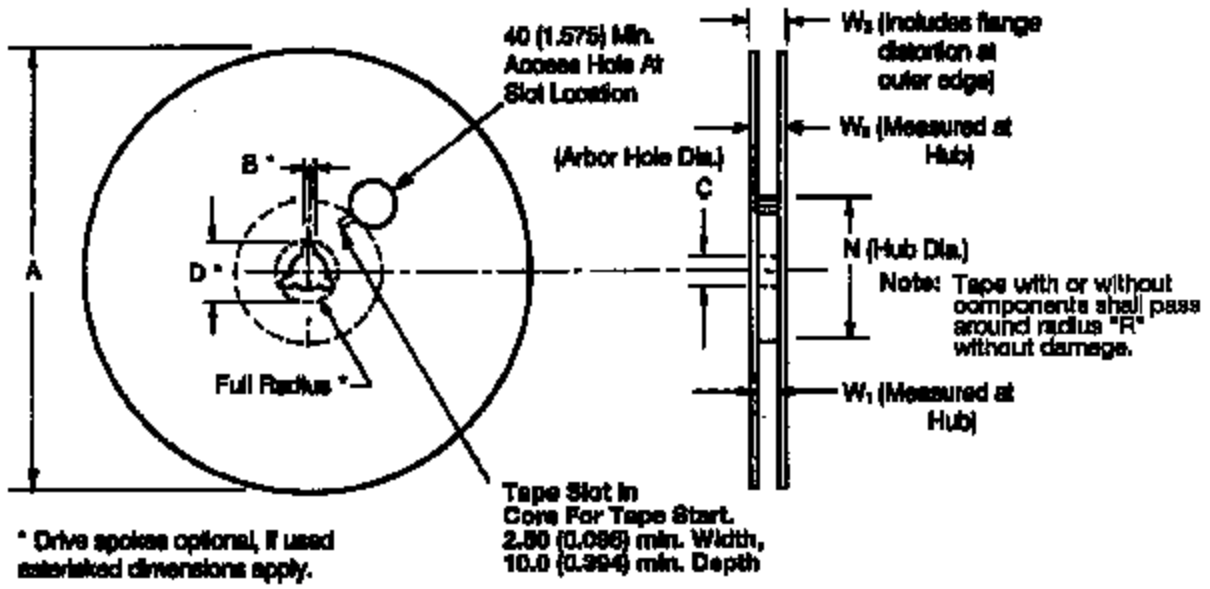
Automatic Insertion Packaging

TAPE & REEL QUANTITIES

All tape and reel specifications are in compliance with RS481.

	8mm	12mm	
Paper or Embossed Carrier	0612, 0508, 0805, 1206, 1210		
Embossed Only	0306	1808	1812, 1825 2220, 2225
Paper Only	0201, 0402, 0603		
Qty. per Reel/7" Reel	2,000, 3,000 or 4,000, 10,000, 15,000 Contact factory for exact quantity	3,000	500, 1,000 Contact factory for exact quantity
Qty. per Reel/13" Reel	5,000, 10,000, 50,000 Contact factory for exact quantity	10,000	4,000

REEL DIMENSIONS

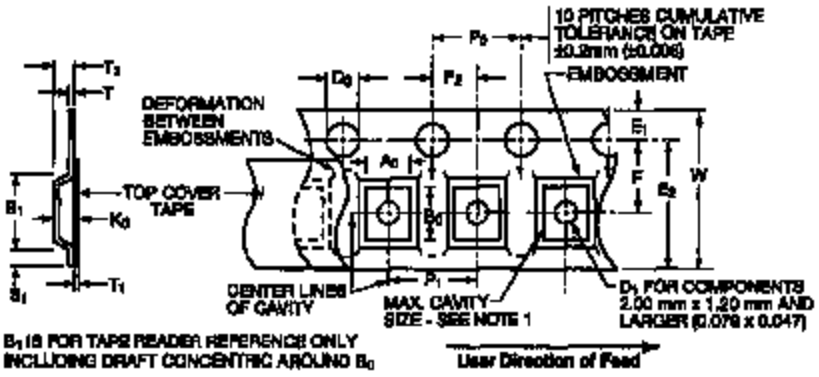


Tape Size[1]	A Max.	B* Min.	C	D* Min.	N Min.	W_1	W_2 Max.	W_3
8mm	330 (12.992)	1.5 (0.059)	13.0 ±0.5 (0.512 ±.020)	20.2 (0.795)	60.0 (1.969)	8.40 +1.5 −0.0 (0.331 +.059 −0.000)	14.4 (0.567)	7.90 Min. (0.311) 10.9 Max. (0.429)
12mm						12.4 +2.0 −0.0 (0.488 +.079 −0.000)	18.4 (0.724)	11.9 Min. (0.469) 15.4 Max. (0.607)

Metric dimensions will govern.
English measurements rounded and for reference only.
(1) For tape sizes 16mm and 24mm (used with chip size 1640) consult EIA RS-481 latest revision.

Embossed Carrier Configuration

8 & 12mm Tape Only



8 & 12mm Embossed Tape
Metric Dimensions Will Govern

CONSTANT DIMENSIONS

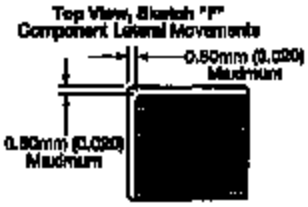
Tape Size	D_0	E	P_0	P_2	S_1 Min.	T Max.	T_1
8mm and 12mm	1.60 +0.1 −0.0 (0.059 +0.004 −0.000)	1.75 ± 0.10 (0.069 ± 0.004)	4.0 ± 0.10 (0.157 ± 0.004)	2.0 ± 0.05 (0.079 ± 0.002)	0.60 (0.024)	0.60 (0.024)	0.10 (0.004) Max.

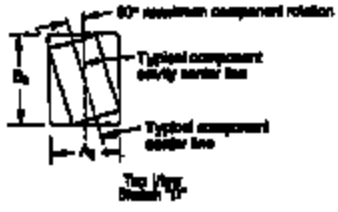
VARIABLE DIMENSIONS

Tape Size	B_1 Max.	D_1 Min.	E_2 Min.	F	P_1 See Note 5	R Min. See Note 2	T_2	W Max.	A_0 B_0 K_0
8mm	4.35 (0.171)	1.00 (0.039)	6.25 (0.246)	3.50 ± 0.05 (0.138 ± 0.002)	4.00 ± 0.10 (0.157 ± 0.004)	25.0 (0.984)	2.50 Max. (0.098)	8.30 (0.327)	See Note 1
12mm	8.20 (0.323)	1.50 (0.059)	10.25 (0.404)	5.50 ± 0.05 (0.217 ± 0.002)	4.00 ± 0.10 (0.157 ± 0.004)	30.0 (1.181)	6.50 Max. (0.256)	12.3 (0.484)	See Note 1
8mm 1/2 Pitch	4.35 (0.171)	1.00 (0.039)	6.25 (0.246)	3.50 ± 0.05 (0.138 ± 0.002)	2.00 ± 0.10 (0.079 ± 0.004)	25.0 (0.984)	2.50 Max. (0.098)	8.30 (0.327)	See Note 1
12mm Double Pitch	8.20 (0.323)	1.50 (0.059)	10.25 (0.404)	5.50 ± 0.05 (0.217 ± 0.002)	8.00 ± 0.10 (0.315 ± 0.004)	30.0 (1.181)	6.50 Max. (0.256)	12.3 (0.484)	See Note 1

NOTES:

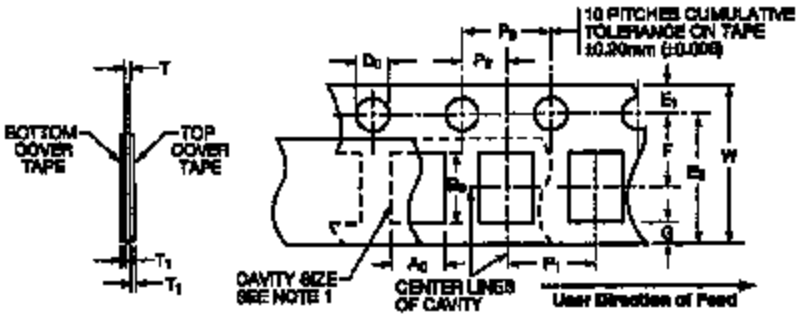
1. The cavity defined by A_0, B_0, and K_0 shall be configured to provide the following:
   Surround the component with sufficient clearance such that:
   a) the component does not protrude beyond the sealing plane of the cover tape.
   b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the cover tape has been removed.
   c) rotation of the component is limited to 20° maximum (see Sketches D & E).
   d) lateral movement of the component is restricted to 0.5mm maximum (see Sketch F).
2. Tape with or without components shall pass around radius "R" without damage.
3. Bar code labeling (if required) shall be on the side of the reel opposite the round sprocket hole. Refer to EIA-556.
4. B_1 dimension is a reference dimension for tape feeder clearance only.
5. If P_1 = 2.0mm, the tape may not properly index in all tape feeders.





Paper Carrier Configuration

8 & 12mm Tape Only



8 & 12mm Paper Tape Metric Dimensions Will Govern

CONSTANT DIMENSIONS

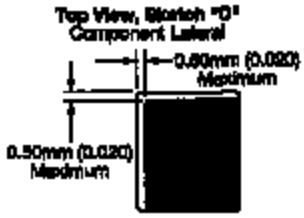
Tape Size	D_0	E	P_0	P_2	T_1	G. Min.	R Min.
8mm and 12mm	1.50 +0.10 −0.00 (0.059 +0.004 −0.000)	1.75 ± 0.10 (0.069 ± 0.004)	4.00 ± 0.10 (0.157 ± 0.004)	2.00 ± 0.05 (0.079 ± 0.002)	0.10 (0.004) Max.	0.75 (0.030) Min.	25.0 (0.984) See Note 2 Min.

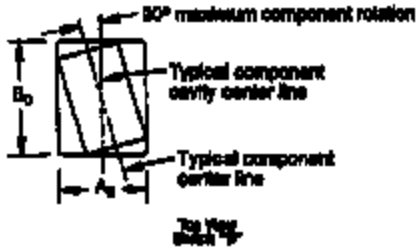
VARIABLE DIMENSIONS

Tape Size	P_1 See Note 4	E_2 Min.	F	W	A_o B_o	T
8mm	4.00 ± 0.10 (0.157 ± 0.004)	6.25 (0.246)	3.50 ± 0.05 (0.138 ± 0.002)	8.00 +0.30 −0.10 (0.315 +0.012 −0.004)	See Note 1	1.10mm (0.043) Max. for Paper Base Tape and 1.60mm (0.063) Max. for Non-Paper Base Compositions
12mm	4.00 ± 0.010 (0.157 ± 0.004)	10.25 (0.404)	5.50 ± 0.05 (0.217 ± 0.002)	12.0 ± 0.30 (0.472 ± 0.012)		
8mm 1/2 Pitch	2.00 ± 0.05 (0.079 ± 0.002)	6.25 (0.246)	3.50 ± 0.05 (0.138 ± 0.002)	8.00 +0.30 −0.10 (0.315 +0.012 −0.004)		
12mm Double Pitch	8.00 ± 0.10 (0.315 ± 0.004)	10.25 (0.404)	5.50 ± 0.05 (0.217 ± 0.002)	12.0 ± 0.30 (0.472 ± 0.012)		

NOTES

1. The cavity defined by A_o, B_o, and T shall be configured to provide sufficient clearance surrounding the component so that:
   a) the component does not protrude beyond either surface of the carrier tape;
   b) the component can be removed from the cavity in a vertical direction without mechanical restriction after the top cover tape has been removed;
   c) rotation of the component is limited to 20° maximum (see Sketches A & B);
   d) lateral movement of the component is restricted to 0.5mm maximum (see Sketch C).
2. Tape with or without components shall pass around radius "R" without damage.
3. Bar code labeling (if required) shall be on the side of the reel opposite the sprocket holes. Refer to EIA-556.
4. If P_1 = 2.0mm, the tape may not properly index in all tape feeders.





Bar Code Labeling Standard

AVX bar code labeling is available and follows latest version of EIA-556

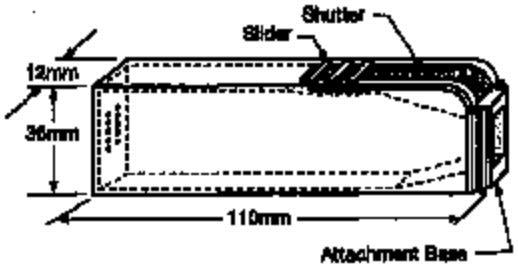
SR02-627-A 18258

Bulk Case Packaging

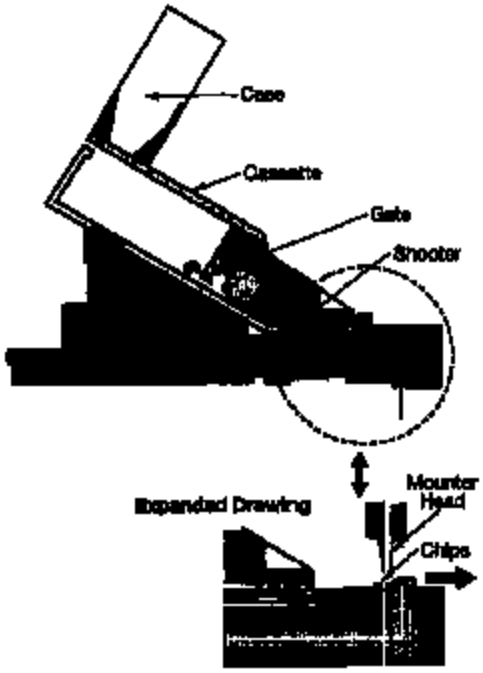
BENEFITS

- Easier handling
- Smaller packaging volume
  (1/20 of T/R packaging)
- Easier inventory control
- Flexibility
- Recyclable

CASE DIMENSIONS



BULK FEEDER



CASE QUANTITIES

Part Size	0402	0603	0805	1206
Qty. (pcs / cassette)	50,000	15,000	10,000 (T=.023") 8,000 (T=.031") 6,000 (T=.043")	5,000 (T=.023") 4,000 (T=.032") 3,000 (T=.044")

Basic Capacitor Formulas

I. Capacitance (farads)

English: $C = \frac{224\,KA}{T_D}$

Metric: $C = \frac{.0884\,KA}{T_D}$

II. Energy stored in capacitors (Joules, watt - sec)

$E = \frac{1}{2}CV^2$

III. Linear charge of a capacitor (Amperes)

$I = C\frac{dV}{dt}$

IV. Total Impedance of a capacitor (ohms)

$Z = \sqrt{R_S^2 + (X_C - X_L)^2}$

V. Capacitive Reactance (ohms)

$X_C = \frac{1}{2\pi fC}$

VI. Inductive Reactance (ohms)

$X_L = 2\pi fL$

VII. Phase Angles:

Ideal Capacitors: Current leads voltage 90°
Ideal Inductors: Current lags voltage 90°
Ideal Resistors: Current in phase with voltage

VIII. Dissipation Factor (%)

D.F. = tan δ (loss angle) $= \frac{E.S.R.}{X_C} = (2\pi fC)(E.S.R.)$

IX. Power Factor (%)

P.F. = Sine δ (loss angle) = Cos ϕ (phase angle)
P.F. = (when less than 10%) = DF

X. Quality Factor (dimensionless)

Q = Cotan δ (loss angle) $= \frac{1}{D.F.}$

XI. Equivalent Series Resistance (ohms)

E.S.R. = (D.F.) (X_C) = (D.F.) / ($2\pi fC$)

XII. Power Loss (watts)

Power Loss = $(2\pi fCV^2)$ (D.F.)

XIII. KVA (Kilowatts)

KVA = $2\pi fCV^2 \times 10^{-6}$

XIV. Temperature Characteristic (ppm/°C)

$T.C. = \frac{Ct - C_{25}}{C_{25}(T_t - 25)} \times 10^6$

XV. Cap Drift (%)

$C.D. = \frac{C_1 - C_2}{C_1} \times 100$

XVI. Reliability of Ceramic Capacitors

$\frac{L_o}{L_t} = \left(\frac{V_t}{V_o}\right)^X \left(\frac{T_t}{T_o}\right)^Y$

XVII. Capacitors in Series (current the same)

Any Number: $\frac{1}{C_T} = \frac{1}{C_1} + \frac{1}{C_2} \cdots \frac{1}{C_N}$

Two: $C_T = \frac{C_1 C_2}{C_1 + C_2}$

XVIII. Capacitors in Parallel (voltage the same)

$C_T = C_1 + C_2 \cdots + C_N$

XIX. Aging Rate

A.R. = %Δ C/decade of time

XX. Decibels

$db = 20 \log \frac{V_1}{V_2}$

METRIC PREFIXES

Pico	$X\,10^{-12}$
Nano	$X\,10^{-9}$
Micro	$X\,10^{-6}$
Milli	$X\,10^{-3}$
Deci	$X\,10^{-1}$
Deca	$X\,10^{+1}$
Kilo	$X\,10^{+3}$
Mega	$X\,10^{+6}$
Giga	$X\,10^{+9}$
Tera	$X\,10^{+12}$

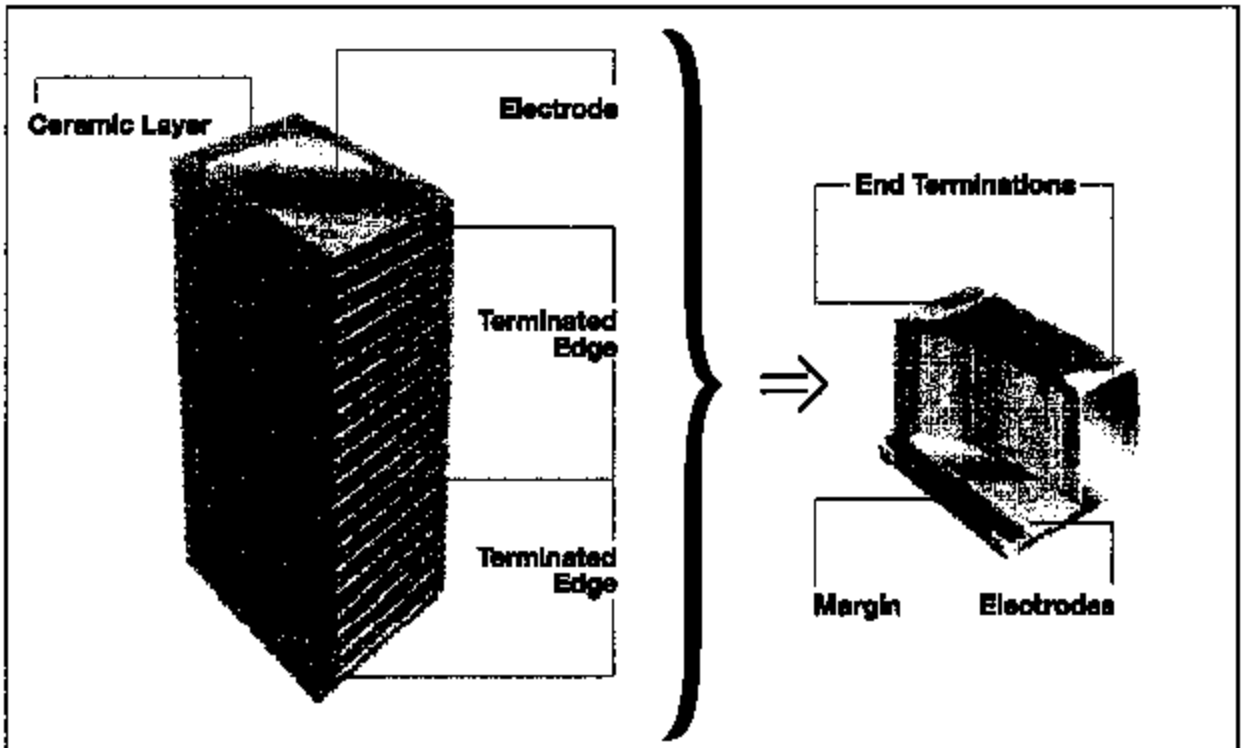
SYMBOLS

K	= Dielectric Constant	f	= frequency	L_t	= Test life
A	= Area	L	= Inductance	V_t	= Test voltage
T_D	= Dielectric thickness	δ	= Loss angle	V_o	= Operating voltage
V	= Voltage	ϕ	= Phase angle	T_t	= Test temperature
t	= time	X & Y	= exponent effect of voltage and temp.	T_o	= Operating temperature
R_S	= Series Resistance	L_o	= Operating life		

ER82-627-A 10252

General Description

Basic Construction – A multilayer ceramic (MLC) capacitor is a monolithic block of ceramic containing two sets of offset, interleaved planar electrodes that extend to two opposite surfaces of the ceramic dielectric. This simple structure requires a considerable amount of sophistication, both in material and manufacture, to produce it in the quality and quantities needed in today's electronic equipment.



Multilayer Ceramic Capacitor

Figure 1

Formulations – Multilayer ceramic capacitors are available in both Class 1 and Class 2 formulations. Temperature compensating formulation are Class 1 and temperature stable and general application formulations are classified as Class 2.

Class 1 – Class 1 capacitors or temperature compensating capacitors are usually made from mixtures of titanates where barium titanate is normally not a major part of the mix. They have predictable temperature coefficients and in general, do not have an aging characteristic. Thus they are the most stable capacitor available. The most popular Class 1 multilayer ceramic capacitors are C0G (NP0) temperature compensating capacitors (negative-positive 0 ppm/°C).

Class 2 – EIA Class 2 capacitors typically are based on the chemistry of barium titanate and provide a wide range of capacitance values and temperature stability. The most commonly used Class 2 dielectrics are X7R and Y5V. The X7R provides intermediate capacitance values which vary only ±15% over the temperature range of -55°C to 125°C. It finds applications where stability over a wide temperature range is required.

The Y5V provides the highest capacitance values and is used in applications where limited temperature changes are expected. The capacitance value for Y5V can vary from 22% to -82% over the -30°C to 85°C temperature range. The Z5U dielectric is between X7R and Y5V in both stability and capacitance range.

All Class 2 capacitors vary in capacitance value under the influence of temperature, operating voltage (both AC and DC), and frequency. For additional information on performance changes with operating conditions, consult AVX's software, SpiCap.

Table 1: EIA and MIL Temperature Stable and General Application Codes

EIA CODE *Percent Capacity Change Over Temperature Range*	
RS198	**Temperature Range**
X7	-55°C to +125°C
X5	-55°C to +85°C
Y5	-30°C to +85°C
Z5	+10°C to +85°C
Code	**Percent Capacity Change**
D	±3.3%
E	±4.7%
F	±7.5%
P	±10%
R	±15%
S	±22%
T	+22%, -33%
U	+22%, - 56%
V	+22%, -82%

EXAMPLE – A capacitor is desired with the capacitance value at 25°C to increase no more than 7.5% or decrease no more than 7.5% from -30°C to +85°C. EIA Code will be Y5F.

MIL CODE		
Symbol	**Temperature Range**	
A	-55°C to +85°C	
B	-55°C to +125°C	
C	-55°C to +150°C	
Symbol	**Cap. Change Zero Volts**	**Cap. Change Rated Volts**
R	+15%, -15%	+15%, -40%
W	+22%, -56%	+22%, -66%
X	+15%, -15%	+15%, -25%
Y	+30%, -70%	+30%, -80%
Z	+20%, -20%	+20%, -30%

Temperature characteristic is specified by combining range and change symbols, for example BR or AW. Specification slash sheets indicate the characteristic applicable to a given style of capacitor.

In specifying capacitance change with temperature for Class 2 materials, EIA expresses the capacitance change over an operating temperature range by a 3 symbol code. The first symbol represents the cold temperature end of the temperature range, the second represents the upper limit of the operating temperature range and the third symbol represents the capacitance change allowed over the operating temperature range. Table 1 provides a detailed explanation of the EIA system.

Effects of Voltage – Variations in voltage have little effect on Class 1 dielectric but does affect the capacitance and dissipation factor of Class 2 dielectrics. The application of DC voltage reduces both the capacitance and dissipation factor while the application of an AC voltage within a reasonable range tends to increase both capacitance and dissipation factor readings. If a high enough AC voltage is applied, eventually it will reduce capacitance just as a DC voltage will. Figure 2 shows the effects of AC voltage.

Cap. Change vs. A.C. Volts
X7R

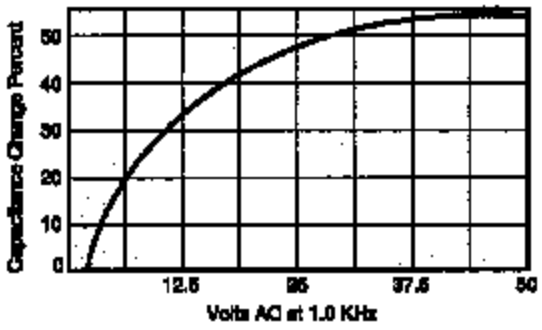


Figure 2

Capacitor specifications specify the AC voltage at which to measure (normally 0.5 or 1 VAC) and application of the wrong voltage can cause spurious readings. Figure 3 gives the voltage coefficient of dissipation factor for various AC voltages at 1 kilohertz. Applications of different frequencies will affect the percentage changes versus voltages.

D.F. vs. A.C. Measurement Volts
X7R

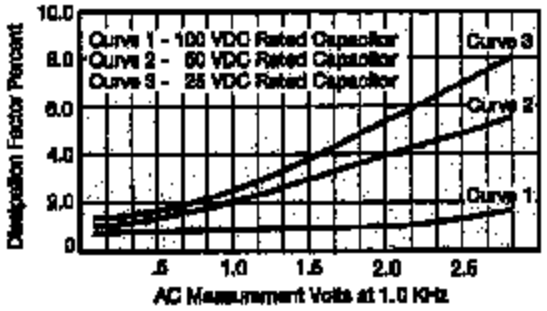


Figure 3

Typical effect of the application of DC voltage is shown in Figure 4. The voltage coefficient is more pronounced for higher K dielectrics. These figures are shown for room temperature conditions. The combination characteristic known as voltage temperature limits which shows the effects of rated voltage over the operating temperature range is shown in Figure 5 for the military BX characteristic.

Typical Cap. Change vs. D.C. Volts
X7R

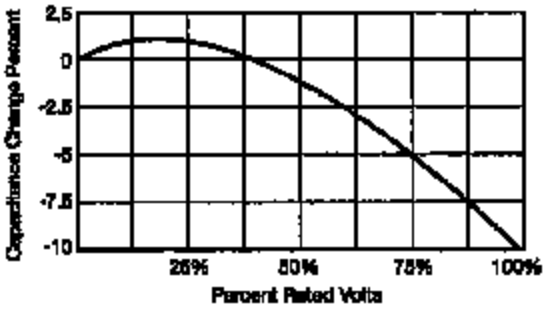


Figure 4

Typical Cap. Change vs. Temperature
X7R

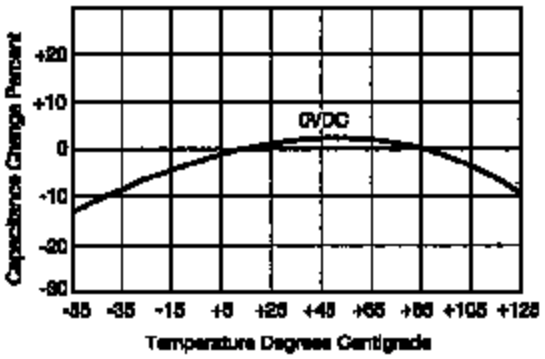
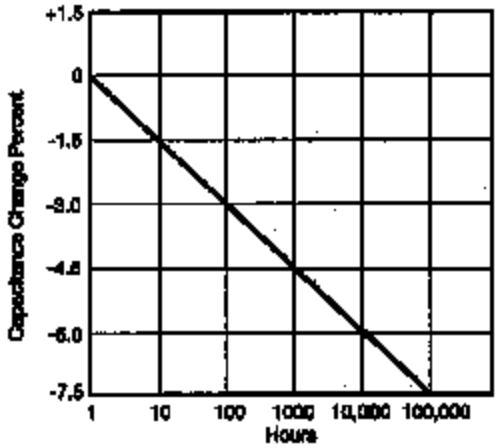


Figure 5

Effects of Time – Class 2 ceramic capacitors change capacitance and dissipation factor with time as well as temperature, voltage and frequency. This change with time is known as aging. Aging is caused by a gradual re-alignment of the crystalline structure of the ceramic and produces an exponential loss in capacitance and decrease in dissipation factor versus time. A typical curve of aging rate for semi-stable ceramics is shown in Figure 6.

If a Class 2 ceramic capacitor that has been sitting on the shelf for a period of time, is heated above its curie point, (125°C for 4 hours or 150°C for ½ hour will suffice) the part will de-age and return to its initial capacitance and dissipation factor readings. Because the capacitance changes rapidly, immediately after de-aging, the basic capacitance measurements are normally referred to a time period sometime after the de-aging process. Various manufacturers use different time bases but the most popular one is one day or twenty-four hours after "last heat." Change in the aging curve can be caused by the application of voltage and other stresses. The possible changes in capacitance due to de-aging by heating the unit explain why capacitance changes are allowed after test, such as temperature cycling, moisture resistance, etc., in MIL specs. The application of high voltages such as dielectric withstanding voltages also tends to de-age capacitors and is why re-reading of capacitance after 12 or 24 hours is allowed in military specifications after dielectric strength tests have been performed.

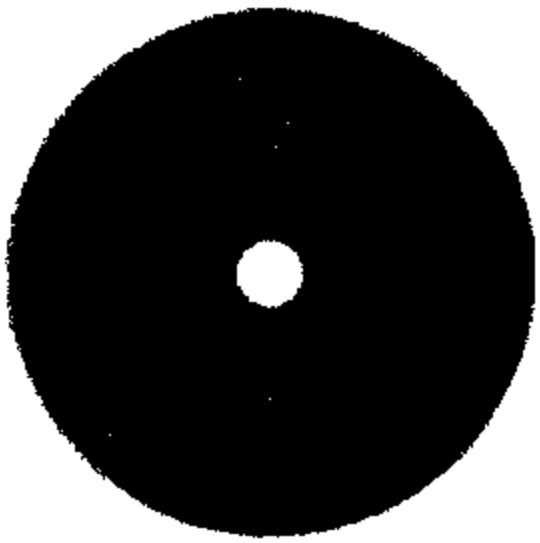
Typical Curve of Aging Rate
X7R



Characteristic	Max. Aging Rate %/Decade
C0G (NP0)	None
X7R, X5R	2
Y5V	7

Figure 6

Effects of Frequency – Frequency affects capacitance and impedance characteristics of capacitors. This effect is much more pronounced in high dielectric constant ceramic formulation that is low K formulations. AVX's SpiCap software generates impedance, ESR, series inductance, series resonant frequency and capacitance all as functions of frequency, temperature and DC bias for standard chip sizes and styles. It is available free from AVX and can be downloaded for free from AVX website: www.avxcorp.com.



Effects of Mechanical Stress – High "K" dielectric ceramic capacitors exhibit some low level piezoelectric reactions under mechanical stress. As a general statement, the piezoelectric output is higher, the higher the dielectric constant of the ceramic. It is desirable to investigate this effect before using high "K" dielectrics as coupling capacitors in extremely low level applications.

Reliability – Historically ceramic capacitors have been one of the most reliable types of capacitors in use today. The approximate formula for the reliability of a ceramic capacitor is:

$$\frac{L_o}{L_t} = \left(\frac{V_t}{V_o}\right)^X \left(\frac{T_t}{T_o}\right)^Y$$

where

L_o = operating life
L_t = test life
V_t = test voltage
V_o = operating voltage
T_t = test temperature and
T_o = operating temperature in °C
X,Y = see text

Historically for ceramic capacitors exponent X has been considered as 3. The exponent Y for temperature effects typically tends to run about 8.

A capacitor is a component which is capable of storing electrical energy. It consists of two conductive plates (electrodes) separated by insulating material which is called the dielectric. A typical formula for determining capacitance is:

$$C = \frac{.224\,KA}{t}$$

C = capacitance (picofarads)
K = dielectric constant (Vacuum = 1)
A = area in square inches
t = separation between the plates in inches (thickness of dielectric)
.224 = conversion constant (.0884 for metric system in cm)

Capacitance – The standard unit of capacitance is the farad. A capacitor has a capacitance of 1 farad when 1 coulomb charges it to 1 volt. One farad is a very large unit and most capacitors have values in the micro (10^{-6}), nano (10^{-9}) or pico (10^{-12}) farad level.

Dielectric Constant – In the formula for capacitance given above the dielectric constant of a vacuum is arbitrarily chosen as the number 1. Dielectric constants of other materials are then compared to the dielectric constant of a vacuum.

Dielectric Thickness – Capacitance is indirectly proportional to the separation between electrodes. Lower voltage requirements mean thinner dielectrics and greater capacitance per volume.

Area – Capacitance is directly proportional to the area of the electrodes. Since the other variables in the equation are usually set by the performance desired, area is the easiest parameter to modify to obtain a specific capacitance within a material group.

Energy Stored – The energy which can be stored in a capacitor is given by the formula:

$$E = \tfrac{1}{2}CV^2$$

E = energy in joules (watts-sec)
V = applied voltage
C = capacitance in farads

Potential Change – A capacitor is a reactive component which reacts against a change in potential across it. This is shown by the equation for the linear charge of a capacitor:

$$I_{max} = C\frac{dV}{dt}$$

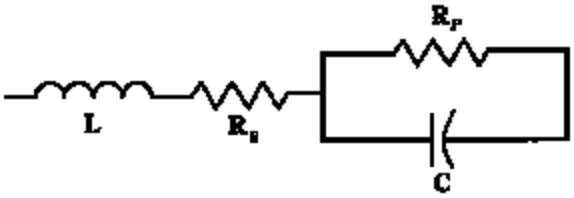
where

I = Current
C = Capacitance
dV/dt = Slope of voltage transition across capacitor

Thus an infinite current would be required to instantly change the potential across a capacitor. The amount of current a capacitor can "sink" is determined by the above equation.

Equivalent Circuit – A capacitor, as a practical device, exhibits not only capacitance but also resistance and inductance. A simplified schematic for the equivalent circuit is:

C = Capacitance
L = Inductance
R_s = Series Resistance
R_p = Parallel Resistance



Reactance – Since the insulation resistance (R_p) is normally very high, the total impedance of a capacitor is:

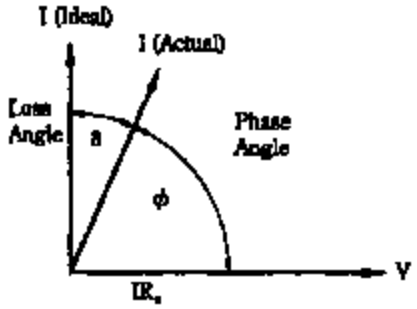
$$Z = \sqrt{R_s^2 + (X_c - X_L)^2}$$

where

Z = Total Impedance
R_s = Series Resistance
X_c = Capacitive Reactance = $\frac{1}{2\pi fC}$
X_L = Inductive Reactance = $2\pi fL$

The variation of a capacitor's impedance with frequency determines its effectiveness in many applications.

Phase Angle – Power Factor and Dissipation Factor are often confused since they are both measures of the loss in a capacitor under AC application and are often almost identical in value. In a "perfect" capacitor the current in the capacitor will lead the voltage by 90°.

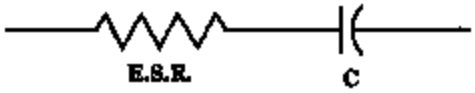


In practice the current leads the voltage by some other phase angle due to the series resistance R_s. The complement of this angle is called the loss angle and:

Power Factor (P.F.) = Cos ϕ or Sine δ
Dissipation Factor (D.F.) = tan δ

for small values of δ the tan and sine are essentially equal which has led to the common interchangeability of the two terms in the industry.

Equivalent Series Resistance – The term E.S.R. or Equivalent Series Resistance combines all losses both series and parallel in a capacitor at a given frequency so that the equivalent circuit is reduced to a simple R-C series connection.



Dissipation Factor – The DF/PF of a capacitor tells what percent of the apparent power input will turn to heat in the capacitor.

$$\text{Dissipation Factor} = \frac{\text{E.S.R.}}{X_c} = (2 \times fC)\,(\text{E.S.R.})$$

The watts loss are:

$$\text{Watts loss} = (2 \times fCV^2)\,(\text{D.F.})$$

Very low values of dissipation factor are expressed as their reciprocal for convenience. These are called the "Q" or Quality factor of capacitors.

Parasitic Inductance – The parasitic inductance of capacitors is becoming more and more important in the decoupling of today's high speed digital systems. The relationship between the inductance and the ripple voltage induced on the DC voltage line can be seen from the simple inductance equation:

$$V = L\frac{dI}{dt}$$

The $\frac{dI}{dt}$ seen in current microprocessors can be as high as 0.3 A/ns, and up to 10A/ns. At 0.3 A/ns, 100pH of parasitic inductance can cause a voltage spike of 30mV. While this does not sound very drastic, with the Vcc for microprocessors decreasing at the current rate, this can be a fairly large percentage.

Another important, often overlooked, reason for knowing the parasitic inductance is the calculation of the resonant frequency. This can be important for high frequency, bypass capacitors, as the resonant point will give the most signal attenuation. The resonant frequency is calculated from the simple equation:

$$f_{res} = \frac{1}{2\pi\sqrt{LC}}$$

Insulation Resistance – Insulation Resistance is the resistance measured across the terminals of a capacitor and consists principally of the parallel resistance R_P shown in the equivalent circuit. As capacitance values and hence the area of dielectric increases, the I.R. decreases and hence the product (C x IR or RC) is often specified in ohm farads or more commonly megohm-microfarads. Leakage current is determined by dividing the rated voltage by IR (Ohm's Law).

Dielectric Strength – Dielectric Strength is an expression of the ability of a material to withstand an electrical stress. Although dielectric strength is ordinarily expressed in volts, it is actually dependent on the thickness of the dielectric and thus is also more generically a function of volts/mil.

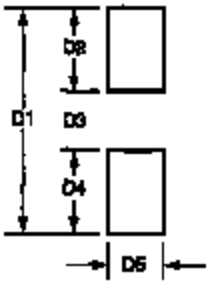
Dielectric Absorption – A capacitor does not discharge instantaneously upon application of a short circuit, but drains gradually after the capacitance proper has been discharged. It is common practice to measure the dielectric absorption by determining the "reappearing voltage" which appears across a capacitor at some point in time after it has been fully discharged under short circuit conditions.

Corona – Corona is the ionization of air or other vapors which causes them to conduct current. It is especially prevalent in high voltage units but can occur with low voltages as well where high voltage gradients occur. The energy discharged degrades the performance of the capacitor and can in time cause catastrophic failures.

Surface Mounting Guide

MLC Chip Capacitors

REFLOW SOLDERING



Dimensions in millimeters (inches)

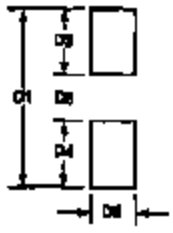
Case Size	D1	D2	D3	D4	D5
0402	1.70 (0.07)	0.80 (0.02)	0.50 (0.02)	0.80 (0.02)	0.60 (0.02)
0603	2.30 (0.09)	0.80 (0.03)	0.70 (0.03)	0.80 (0.03)	0.75 (0.03)
0805	3.00 (0.12)	1.00 (0.04)	1.00 (0.04)	1.00 (0.04)	1.25 (0.05)
1206	4.00 (0.16)	1.00 (0.04)	2.00 (0.08)	1.00 (0.04)	1.60 (0.06)
1210	4.00 (0.16)	1.00 (0.04)	2.00 (0.08)	1.00 (0.04)	2.50 (0.10)
1808	5.60 (0.22)	1.00 (0.04)	3.60 (0.14)	1.00 (0.04)	2.00 (0.08)
1812	5.60 (0.22)	1.00 (0.04)	3.60 (0.14)	1.00 (0.04)	3.00 (0.12)
1825	5.60 (0.22)	1.00 (0.04)	3.60 (0.14)	1.00 (0.04)	6.35 (0.25)
2220	6.60 (0.26)	1.00 (0.04)	4.60 (0.18)	1.00 (0.04)	5.00 (0.20)
2225	6.60 (0.26)	1.00 (0.04)	4.60 (0.18)	1.00 (0.04)	6.35 (0.25)

Component Pad Design

Component pads should be designed to achieve good solder fillets and minimize component movement during reflow soldering. Pad designs are given below for the most common sizes of multilayer ceramic capacitors for both wave and reflow soldering. The basis of these designs is:

- Pad width equal to component width. It is permissible to decrease this to as low as 85% of component width but it is not advisable to go below this.
- Pad overlap 0.5mm beneath component.
- Pad extension 0.5mm beyond components for reflow and 1.0mm for wave soldering.

WAVE SOLDERING

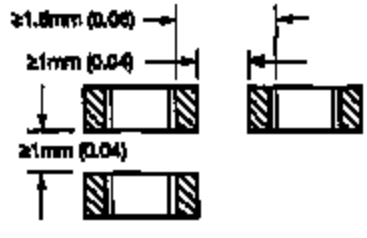


Case Size	D1	D2	D3	D4	D5
0603	3.10 (0.12)	1.20 (0.05)	0.70 (0.03)	1.20 (0.05)	0.75 (0.03)
0805	4.00 (0.16)	1.50 (0.06)	1.00 (0.04)	1.50 (0.06)	1.25 (0.05)
1206	5.00 (0.19)	1.50 (0.06)	2.00 (0.08)	1.50 (0.06)	1.60 (0.06)
1210	5.00 (0.19)	1.50 (0.06)	2.00 (0.08)	1.50 (0.06)	2.50 (0.10)

Dimensions in millimeters (inches)

Component Spacing

For wave soldering components, must be spaced sufficiently far apart to avoid bridging or shadowing (inability of solder to penetrate properly into small spaces). This is less important for reflow soldering but sufficient space must be allowed to enable rework should it be required.



Preheat & Soldering

The rate of preheat should not exceed 4°C/second to prevent thermal shock. A better maximum figure is about 2°C/second.

For capacitors size 1206 and below, with a maximum thickness of 1.25mm, it is generally permissible to allow a temperature differential from preheat to soldering of 150°C. In all other cases this differential should not exceed 100°C.

For further specific application or process advice, please consult AVX.

Cleaning

Care should be taken to ensure that the capacitors are thoroughly cleaned of flux residues especially the space beneath the capacitor. Such residues may otherwise become conductive and effectively offer a low resistance bypass to the capacitor.

Ultrasonic cleaning is permissible, the recommended conditions being 9 Watts/litre at 20-45 kHz, with a process cycle of 2 minutes vapor rinse, 2 minutes immersion in the ultrasonic solvent bath and finally 2 minutes vapor rinse.

SR62-627-A 10/98

Surface Mounting Guide

MLC Chip Capacitors

APPLICATION NOTES

Storage
Good solderability is maintained for at least twelve months, provided the components are stored in their "as received" packaging at less than 40°C and 70% RH.

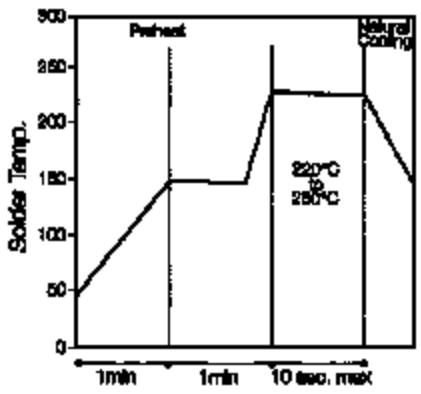
Solderability
Terminations to be well soldered after immersion in a 60/40 tin/lead solder bath at 235 ± 5°C for 2 ± 1 seconds.

Leaching
Terminations will resist leaching for at least the immersion times and conditions shown below.

Termination Type	Solder Tin/Lead/Silver	Solder Temp. °C	Immersion Time Seconds
Nickel Barrier	60/40/0	260 ± 5	30 ± 1

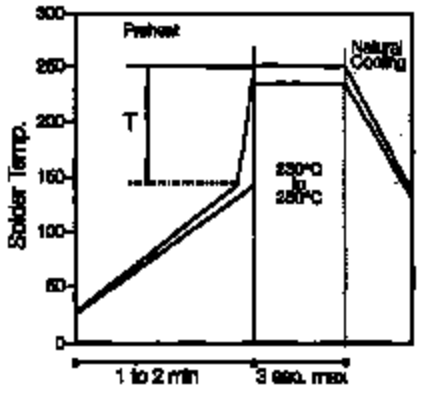
Recommended Soldering Profiles

Reflow



(Minimize soldering time)

Wave



(Preheat chips before soldering)
T/maximum 150°C

General
Surface mounting chip multilayer ceramic capacitors are designed for soldering to printed circuit boards or other substrates. The construction of the components is such that they will withstand the time/temperature profiles used in both wave and reflow soldering methods.

Handling
Chip multilayer ceramic capacitors should be handled with care to avoid damage or contamination from perspiration and skin oils. The use of tweezers or vacuum pick ups is strongly recommended for individual components. Bulk handling should ensure that abrasion and mechanical shock are minimized. Taped and reeled components provides the ideal medium for direct presentation to the placement machine. Any mechanical shock should be minimized during handling chip multilayer ceramic capacitors.

Preheat
It is important to avoid the possibility of thermal shock during soldering and carefully controlled preheat is therefore required. The rate of preheat should not exceed 4°C/second and a target figure 2°C/second is recommended. Although an 80°C to 120°C temperature differential is preferred, recent developments allow a temperature differential between the component surface and the soldering temperature of 150°C (Maximum) for capacitors of 1210 size and below with a maximum thickness of 1.25mm. The user is cautioned that the risk of thermal shock increases as chip size or temperature differential increases.

Soldering
Mildly activated rosin fluxes are preferred. The minimum amount of solder to give a good joint should be used. Excessive solder can lead to damage from the stresses caused by the difference in coefficients of expansion between solder, chip and substrate. AVX terminations are suitable for all wave and reflow soldering systems. If hand soldering cannot be avoided, the preferred technique is the utilization of hot air soldering tools.

Cooling
Natural cooling in air is preferred, as this minimizes stresses within the soldered joint. When forced air cooling is used, cooling rate should not exceed 4°C/second. Quenching is not recommended but if used, maximum temperature differentials should be observed according to the preheat conditions above.

Cleaning
Flux residues may be hygroscopic or acidic and must be removed. AVX MLC capacitors are acceptable for use with all of the solvents described in the specifications MIL-STD-202 and EIA-RS-198. Alcohol based solvents are acceptable and properly controlled water cleaning systems are also acceptable. Many other solvents have been proven successful, and most solvents that are acceptable to other components on circuit assemblies are equally acceptable for use with ceramic capacitors.

POST SOLDER HANDLING

Once SMP components are soldered to the board, any bending or flexure of the PCB applies stresses to the soldered joints of the components. For leaded devices, the stresses are absorbed by the compliancy of the metal leads and generally don't result in problems unless the stress is large enough to fracture the soldered connection.

Ceramic capacitors are more susceptible to such stress because they don't have compliant leads and are brittle in nature. The most frequent failure mode is low DC resistance or short circuit. The second failure mode is significant loss of capacitance due to severing of contact between sets of the internal electrodes.

Cracks caused by mechanical flexure are very easily identified and generally take one of the following two general forms:

Type A:
Angled crack between bottom of device to top of solder joint.

Type B:
Fracture from top of device to bottom of device.

Mechanical cracks are often hidden underneath the termination and are difficult to see externally. However, if one end termination falls off during the removal process from PCB, this is one indication that the cause of failure was excessive mechanical stress due to board warping.

COMMON CAUSES OF MECHANICAL CRACKING

The most common source for mechanical stress is board depanelization equipment, such as manual breakapart, v-cutters and shear presses. Improperly aligned or dull cutters may cause torquing of the PCB resulting in flex stresses being transmitted to components near the board edge. Another common source of flexural stress is contact during parametric testing when test points are probed. If the PCB is allowed to flex during the test cycle, nearby ceramic capacitors may be broken.

A third common source is board to board connections at vertical connectors where cables or other PCBs are connected to the PCB. If the board is not supported during the plug/unplug cycle, it may flex and cause damage to nearby components.

Special care should also be taken when handling large (>6" on a side) PCBs since they more easily flex or warp than smaller boards.

REWORKING OF MLCs

Thermal shock is common in MLCs that are manually attached or reworked with a soldering iron. *AVX strongly recommends that any reworking of MLCs be done with hot air reflow rather than soldering irons.* It is practically impossible to cause any thermal shock in ceramic capacitors when using hot air reflow.

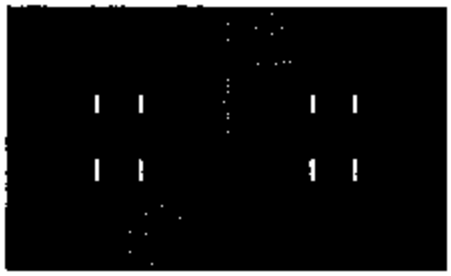
However direct contact by the soldering iron tip often causes thermal cracks that may fail at a later date. If rework by soldering iron is absolutely necessary, it is recommended that the wattage of the iron be less than 30 watts and the tip temperature be <300°C. *Rework should be performed by applying the solder iron tip to the pad and not directly contacting any part of the ceramic capacitor.*

Preferred Method - No Direct Part Contact

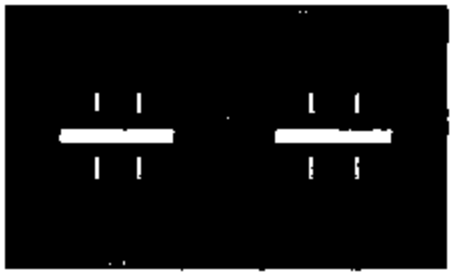
Poor Method - Direct Contact with Part

PCB BOARD DESIGN

To avoid many of the handling problems, AVX recommends that MLCs be located at least .2" away form nearest edge of board. However when this is not possible, AVX recommends that the panel be routed along the cut line, adjacent to where the MLC is located.



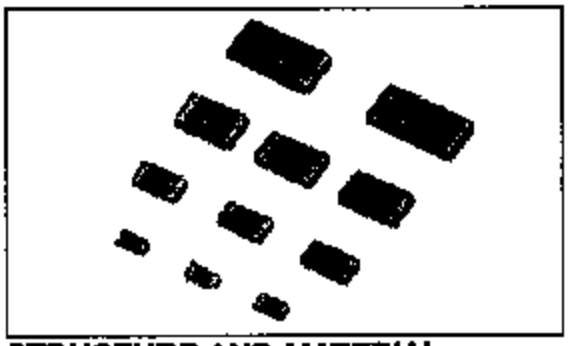
No Stress Relief for MLCs



Routed Cut Line Relieves Stress on MLC

Thick Film Chip Resistors

CR, CJ Series



FEATURES

- Low Noise
- Nickel Barrier Terminations

APPLICATION

- General Purpose

HOW TO ORDER

CR 05 - 472 J - H

Packaging
T = 7" Reel/Punched Paper Tape (5,000 pcs/reel) except CR05
H = 7" Reel/Punched Paper Tape (10,000 pcs/reel, 2mm pitch taping) CR03 and CR05
D = 10" Reel/Punched Paper Tape (10,000 pcs/reel) CR32, CR21, CR10

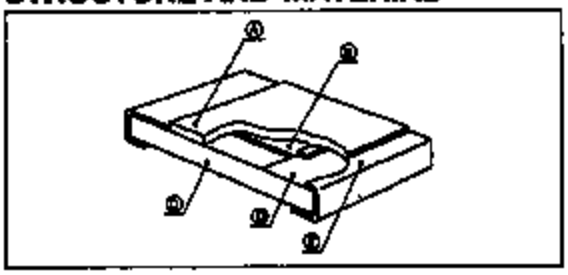
Resistance Tolerance
D = ±0.5% J = ±5%
F = ±1% Blank = Chip Jumper

Resistance Value (3 digits or 4 digits)
Example: 2 significant figures and 1 multiplier
R Indicator decimal or values <10Ω
Chip Jumper = 000

Size (EIA)
03 = 0201 21 = 0805
05 = 0402 32 = 1206
10 = 0603

Series
CR = Resistor
CJ = Jumper

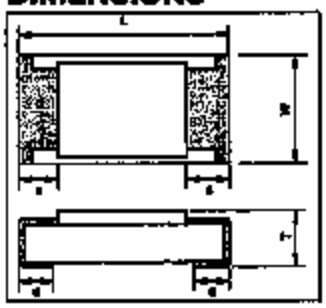
STRUCTURE AND MATERIAL



Code	Structure	Material
A	Coating	Glass or Epoxy
B	Resistor	RuO_2 Resistor (The same material of Termination for chip jumper)
C	Substrate	96% Alumina
D	Termination	Silver
E	Plating	(Ni, Sn-Pb) Plating

DIMENSIONS

millimeters (inches)



	CR03, CJ03 (0201)	CR05, CJ05 (0402)	CR10, CJ10 (0603)	CR21, CJ21 (0805)	CR32, CJ32 (1206)
W	0.30±0.03 (0.012±0.001)	0.50±0.05 (0.020±0.002)	0.80 [illegible] (0.031 [illegible])	1.25±0.[illegible] (0.050 [illegible])	1.55 [illegible] (0.061 [illegible])
L	0.60±0.03 (0.024±0.001)	1.00±0.05 (0.039±0.002)	1.60±0.10 (0.063±0.004)	2.00±0.10 (0.080±0.004)	3.10±0.10 (0.122±0.004)
O	0.15±0.10 (0.006±0.004)	0.20±0.15 (0.008±0.006)	0.25±0.20 (0.010±0.008)	0.35±0.20 (0.014±0.008)	0.45±0.20 (0.018±0.008)
d	0.15±0.05 (0.006±0.002)	0.20±0.10 (0.008±0.004)	0.20 [illegible] (0.008 [illegible])	0.40±0.20 (0.016±0.008)	0.45±0.20 (0.018±0.008)
T	0.25±0.05 (0.009±0.002)	0.35±0.05 (0.014±0.002)	0.50±0.10 (0.020±0.004)	0.55±0.10 (0.022±0.004)	0.55 [illegible] (0.022 [illegible])

SPECIFICATIONS

Series	CR03 (0201)	CR05 (0402)	CR10 (0603)	CR21 (0805)	CR32 (1206)
Rated Power	0.050 (1/20) W	0.0625 (1/16) W	0.10 (1/10) W	0.125 (1/8) W	0.25 (1/4) W
Max. Working Voltage	15V	50V	50V	100V	200V
Resistance Tolerance	J = ±5%	F = ±1% J = ±5%	D = ±0.5% F = ±1% J = ±5%	D = ±0.5% F = ±1% J = ±5%	D = ±0.5% F = ±1% J = ±5%
Resistance Value Range	10Ω to 1MΩ	10Ω to 1MΩ : F 1.0Ω to 10MΩ : J	10Ω to 1MΩ : D 10Ω to 1MΩ : F 1.0Ω to 10MΩ : J	10Ω to 1MΩ : D 10Ω to 1MΩ : F 1.0Ω to 10MΩ : J	10Ω to 1MΩ : D 10Ω to 1MΩ : F 1.0Ω to 10MΩ : J
Working Temperature	-55 to +125°C	-55 to +125°C	-55 to +125°C	-55 to +125°C	-55 to +125°C

KYOCERA

Thick Film Chip Resistors

CR, CJ Series

SPECIFICATIONS

CJ Series

Part Number	CJ03	CJ05, CJ10, CJ21 (0402, 0603, 0805 Type)	CJ32 (1206 Type)
Rated Current	0.5A (70°C)	1A (70°C)	2A (70°C)
Resistivity	50mΩ max.	50mΩ max.	50mΩ max.
Working Temperature	-55 to +125°C	-55 to +125°C	-55 to +125°C

HOW TO CALCULATE RATED VOLTAGE

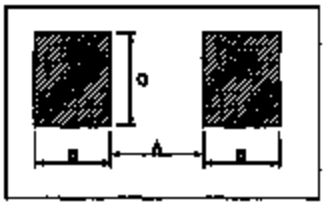
$E = \sqrt{P \cdot R}$

E = Rated Voltage (V)
P = Rated Power (W)
R = Standard Resistance Value (Ω)

Rated voltage should be lower than max. working voltage.

RECOMMENDED LAND PATTERN

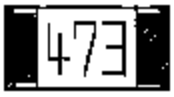
millimeters (inches)



EIA Size	0201	0402	0603	0805	1206
A	0.25 (0.010)	0.50 (0.020)	0.80 (0.031)	1.00 (0.039)	2.00 (0.079)
B	0.225 (0.009)	0.40 (0.016)	0.70 (0.028)	0.80 (0.031)	0.80 (0.031)
C	0.30 (0.012)	0.50 (0.020)	0.80 (0.031)	1.20 (0.047)	1.50 (0.059)

MARKING

Marking available as follows:
Series: CR32, CJ32, CR21, CJ21, CR10, CJ10
3 digit indication
Example: 473=47x10³ = 47000 Ω = 47 kΩ
0 = 0 Ω (Jumper)
100 = 10 Ω
102 = 1 kΩ
105 = 1 MΩ



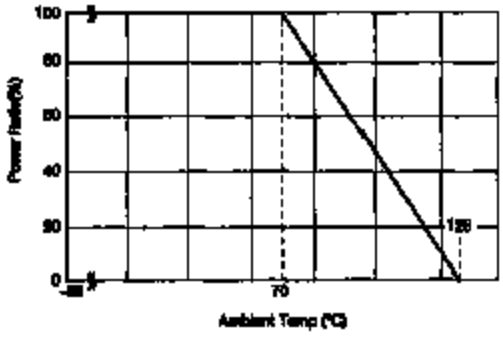
Series: CR03, CJ03, CR05 and CJ05 - No marking

Note: On CR32 4 digit marking is standard for ±1% and ±0.5% tolerances.

DERATING CURVE

Rated power should be reduced as below when temperature become higher.

Under high temperature, power derated as follows:



STANDARD RESISTANCE VALUE

E24	1.0	1.1	1.2	1.3	1.5	1.6	1.8	2.0	2.2
	2.4	2.7	3.0	3.3	3.6	3.9	4.3	4.7	5.1
	5.6	6.2	6.8	7.5	8.2	9.1			

For ±1% and ±.5% Tolerance

E96	10.0	10.2	10.5	10.7	11.0	11.3	11.5	11.8	12.1	12.4
	12.7	13.0	13.3	13.7	14.0	14.3	14.7	15.0	15.4	15.8
	16.2	16.5	16.9	17.4	17.8	18.2	18.7	19.1	19.6	20.0
	20.5	21.0	21.5	22.1	22.6	23.2	23.7	24.3	24.9	25.5
	26.1	26.7	27.4	28.0	28.7	29.4	30.1	30.9	31.6	32.4
	33.2	34.0	34.8	35.7	36.5	37.4	38.3	39.2	40.2	41.2
	42.2	43.2	44.2	45.3	46.4	47.5	48.7	49.9	51.1	52.3
	53.6	54.9	56.2	57.6	59.0	60.4	61.9	63.4	64.9	66.5
	68.1	69.8	71.5	73.2	75.0	76.8	78.7	80.6	82.5	84.5
	86.6	88.7	90.9	93.1	95.3	97.6				

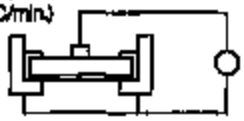
TEMPERATURE CHARACTERISTICS

Resistance (Ω)	TCR (ppm/°C)
D, F 10≤ R ≤1M	-100 to +100
J R <10 10≤ R ≤1M 1M< R	-100 to +600 -200 to +800 -500 to +500

Chip Resistor Arrays

CR, CJ, CRA, CRB, CRC Series - Test Conditions

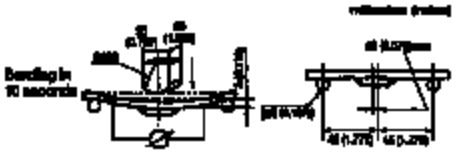
ELECTRICAL CHARACTERISTICS

Item		Standard		Test Conditions	
		Resistor	Jumper	Resistor	Jumper
DC Resistance		Within Initial Tolerance	50mΩ max.	Power Condition A (20°C, 65% RH)	
Temperature Characteristics		Resistance (Ω) / TCR (ppm/°C): 10, F: 10≤ R ≤1M: −100 to +100; J, CR05 = F: R <10: −100 to +800; 10≤ R ≤1M: −250 to +250; 1M< R: −500 to +800		Test Temperature: 25, 125(°C) $\Delta R/R=R_2-R_1/R_1 \times 1/T_2-T_1 \times 10^6$ ΔR/R = Temp. Coefficient (ppm/°C) T_1 = 25(°C) T_2 = 125(°C) R_1 = T_1 Resistance at (Ω) R_2 = T_2 Resistance at (Ω)	
Short-time Overload	ΔR/R	±(2.0%+0.1Ω) max. of the initial value	50mΩ max.	(1) Apply 2.0 x rated voltage for 5 sec. (2.5 x rated voltage for Arrays) (2) Wait 30 minutes (3) Measure resistance CR03 = 30V max. CR05 = 60V max. CR10 = 100V max. CR21 = 200V max. CR32 = 400V max. CRA3A, CRB3A, CRC3A = 100V max.	(1) 2A for 5 sec. (CJ03 = 1A) (2) Wait 30 minutes (3) Measure resistance
	Visual	No evidence of mechanical damage Intermittent overload			
Intermittent Overload	ΔR/R	±(5%+0.1Ω) max. of the initial value	50mΩ max.	(1) Perform 10,000 voltage cycles as follows: ON (2.0 x rated voltage, 2.5 x for Arrays) 1 sec. OFF 25 sec. (2) Stabilization time 30 min. without loading (3) Measure resistance CR03 = 30V max. CR05 = 60V max. CR10 = 150V max. CR21 = 200V max. CR32 = 400V max. CRA, CRB, CRC = 100V max.	(1) Perform 10,000 current cycles as follows: ON (2A) 1 sec. OFF 25 sec. (2) Wait 30 minutes (3) Measure resistance CJ03 = 1A max.
	Visual	No evidence of mechanical damage			
Dielectric Withstanding Voltage		No evidence of mechanical damage		Apply 500 VAC for 1 min. (CR10 300 VAC) (CR05, CRA3A, CRB3A, CRC3A 300 VAC/1 sec. CR03 50 VAC/min.) 	
Insulation Resistance		• CR03, CJ03 = 10^3Ω min. • CR05, CJ05 = 10^3Ω min. • CR10, CJ10 = 10^3Ω min. • CR21, CJ21 = 10^{10}Ω min. • CR32, CJ32 = 10^{10}Ω min. • CRA3A, CRB3A, CRC3A = 10^9Ω min.		Apply 500V DC (CR05, CRA3A, CRB3A, CRC3A 100V DC CR03 50 VDC)	

Chip Resistor Arrays

CR, CJ, CRA, CRB, CRC Series - Test Conditions

MECHANICAL CHARACTERISTICS

Item		Standard		Test Conditions	
		Resistor	Jumper	Resistor	Jumper
Terminal Strength	ΔR/R	±(1%+0.05Ω) max. of the initial value	50mΩ max.	Apply the load as shown: Measure resistance during load application	
	Visual	No evidence of mechanical damage after testing		 PC Board = Glass epoxy t = 1.60 [0.063]	
Soldering Heat Resistance	ΔR/R	±(1%+0.05Ω) max. of the initial value	50mΩ max.	Immerse into molten solder at 260±5°C for 10±1 sec. Stabilize component at room temperature for 1 hr. Measure resistance.	
	Visual	No evidence of leaching			
Solderability		Coverage ≥95% each termination end		Immerse in Rogin Flux for 2±0.5 sec. and in SN62 solder at 235±5°C for 2±0.5 sec.	
Anti-Vibration Test	ΔR/R	±(1%+0.1Ω) max. of the initial value	50mΩ max.	2 hrs. each in X, Y and Z axis. (TTL 6 hrs.) 10 to 55 Hz sweep in 1 min. at 1.5mm amplitude.	
	Visual	No evidence of mechanical damage			
Solvent Resistance	ΔR/R	±(0.5%+0.05Ω) max. of the initial value	50mΩ max.	Immerse in static state butyl acetate at 20°C to 25°C for 30±5 sec. Stabilize component at room temperature for 30 min. then measure value.	
	Visual	No evidence of mechanical damage			

ENVIRONMENTAL CHARACTERISTICS

Item		Standard		Test Conditions	
		Resistor	Jumper	Resistor	Jumper
Temperature Cycle	ΔR/R	±(1%+0.05Ω) max. of the initial value	50mΩ max.	(1) Run 5 cycles as follows: -55±3°C for 30 min. 125±3°C for 30 min. Room temp. for 10-15 min. (2) Stabilize component at room temperature for 1 hr. then measure value.	
	Visual	No evidence of mechanical damage			
Low Temperature Storage	ΔR/R	±(2%+0.1Ω) max. of the initial value	50mΩ max.	(1) Dwell in -55°C chamber without loading for 1000 +48 hrs. (2) Stabilize component at room temperature for 1 hr. then measure value.	
	Visual	No evidence of mechanical damage			
High Temperature Storage	ΔR/R	±(3%+0.1Ω) max. of the initial value	50mΩ max.	(1) Dwell in 125°C chamber without loading for 1000 +48 hrs. (2) Stabilize component at room temperature for 1 hr. then measure value.	
	Visual	No evidence of mechanical damage			
Moisture Resistance	ΔR/R	±(3%+0.1Ω) max. of the initial value	50mΩ max.	(1) Dwell in temp.: 85°C RH:80 to 95% RH chamber without loading for 1000 +48 hrs. (2) Stabilize component at room temperature for 1 hr. then measure value.	
	Visual	No evidence of mechanical damage			
Life Test	ΔR/R	±(3%+0.1Ω) max. of the initial value	50mΩ max.	(1) Temp.: 70±3°C Voltage: (rated voltage) on 90 min. off 30 min. Duration: 1000 +48 hrs. (2) Stabilize component at room temperature for 1 hr. then measure value.	
	Visual	No evidence of mechanical damage			
Loading Life in Moisture	ΔR/R	±(3%+0.1Ω) max. of the initial value	50mΩ max.	(1) Temp.: 40±2°C RH: 90-95% Voltage Cycle: on 90 min. (rated voltage) off 30 min. Duration: 1000 +48 hrs. (2) Stabilize component at room temperature for 1 hr. then measure value.	
	Visual	No evidence of mechanical damage			

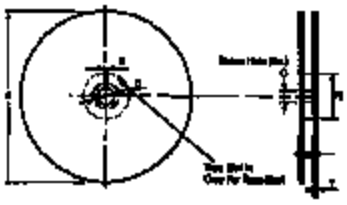
Packaging of Chip Component

Automatic Insertion Packaging

TAPE AND REEL

REEL DIMENSIONS

millimeters (inches)



Tape Size	A Max.	B Min.	C	D Min.	N Min.	W	T Max.
8mm	178 (7)	1.50 (0.059)	13.0±0.50 (0.512±0.020)	20.2 (0.795)	60 (1.969)	10.0±1.50 (0.984±0.059)	2.50 (0.098)
	330 (13)						

Metric dimensions will govern.
English measurements rounded and for reference only.

millimeters (inches)

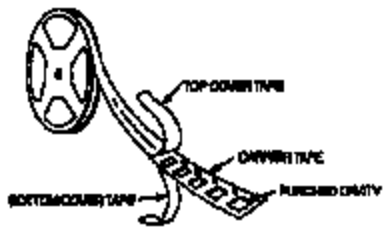
PUNCHED TAPE CONFIGURATION 8MM TAPE ONLY

Tape Size	D_0	E	P_0	P_2	W	F
8mm	1.50 +0.10 -0.00 (0.059 +0.004 -0.000)	1.75±0.10 (0.069±0.004)	4.0±0.10 (0.157±0.004)	2.00±0.05 (0.079±0.002)	8.00±0.20 (0.138±0.008)	3.50±0.05 (0.138±0.002)

VARIABLE DIMENSIONS

Style	P_1	A_0	B_0	T max.
CR/CJ05 CR/CJ06	2.00±0.10 (0.079±0.004)	0.65±0.10 (0.026±0.004)	1.16±0.10 (0.046±0.004)	0.60 (0.024)
CR/CJ/FR10	4.00±0.10 (0.157±0.004) or 2.00±0.10 (0.079±0.004)	1.10±0.20 (0.043±0.008)	1.90±0.20 (0.075±0.008)	1.10 (0.043)
CR/CJ/FR21	4.00±0.10 (0.157±0.004)	1.55±0.20 (0.055±0.008)	2.40±0.20 (0.094±0.008)	
CR/CJ/FR22		2.00±0.20 (0.079±0.008)	3.60±0.20 (0.142±0.008)	
CR/S1A		1.90±0.20 (0.075±0.008)	1.90±0.20 (0.075±0.008)	
CR/S2A CR/S3A CR/C3A		2.00±0.20 (0.079±0.008)	3.60±0.20 (0.142±0.008)	
CR/S2A	2.00±0.10 (0.079±0.004)	1.20±0.20 (0.049±0.008)	2.80±0.20 (0.095±0.008)	

PUNCHED CARRIER

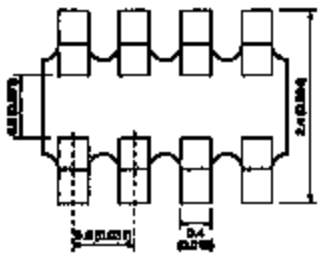


Recommended Land Patterns

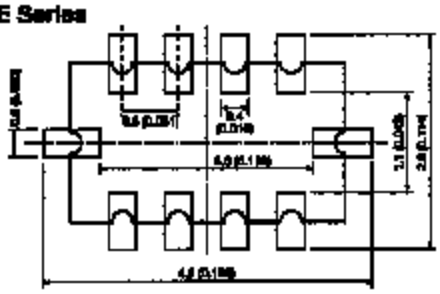
RECOMMENDED LAND PATTERNS IS REFERRED THE FOLLOWING FOR EXAMPLE

millimeters (inches)

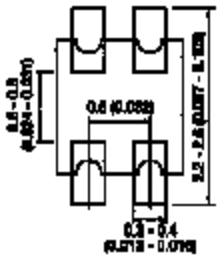
CRA3A4E Series



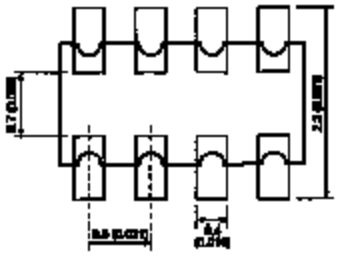
RNA4A8E Series



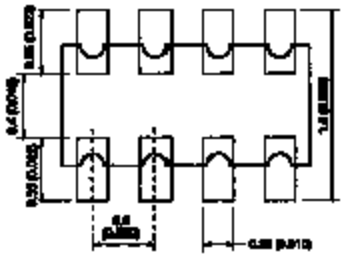
CRB1A2E Series



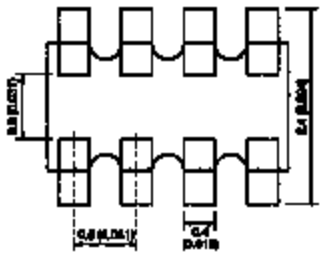
CRB3A4E Series



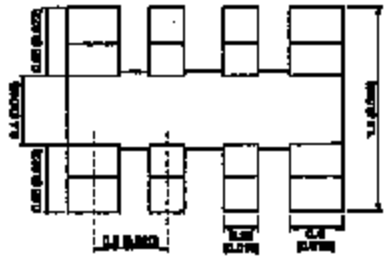
CRB2A4E Series



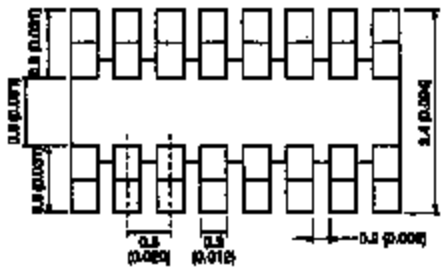
CRC3A4E Series



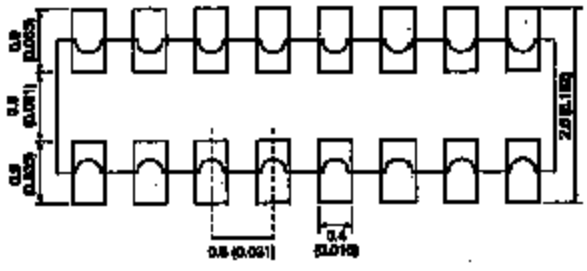
CRC2A4E Series



CRC4A8E Series



CRB6A8E Series



KYOCERA

Chip Resistor and Array Kits

SAMPLE KIT PART NUMBERS

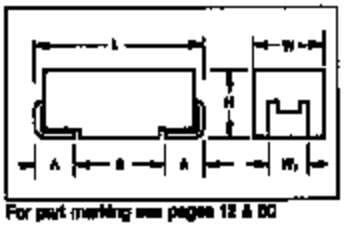
Part Number	Description
CRJ-E6-Kit	Combination 0603, 0805, 1206, 5% parts 21 values per case size 100 pcs. per value (approx.)
CR05-E12-Kit	0402, 5% parts 63 values 100 pcs. per value
CR10J-E12-Kit	0603, 5% parts 63 values 100 pcs. per value (approx.)
CR21J-E12-Kit	0805, 5% parts 63 values 100 pcs. per value (approx.)
CR32J-E12-Kit	1206, 5% parts 63 values 100 pcs. per value (approx.)
CR05F-E24-Kit	0402, 1% parts 63 values 100 pcs. per value
CR10F-E24-Kit	0603, 1% parts 63 values 100 pcs. per value
CR-ARRAY-E6-Kit	Arrays, Various styles, CRA, CRB, CRC, RNA, 5% 13 values per style (approx.) 20 pcs. per value

E982-627-R 19286

TPS Series

Low ESR

The TPS surface mount products have inherently low ESR (equivalent series resistance) and are capable of higher ripple current handling, producing lower ripple voltages, less power and heat dissipation than standard product for the most efficient use of circuit power. TPS has been designed, manufactured, and preconditioned for optimum performance in typical power supply applications. By combining the latest improvements in tantalum powder technology, improved manufacturing processes, and application specific preconditioning tests, AVX is able to provide a technologically superior alternative to the standard range.



For part marking see pages 12 & 80

CASE DIMENSIONS: millimeters (inches)

Code	EIA Code	L±0.2 (0.008)	W+0.1 (0.004) -0.1 (0.004)	H±0.2 (0.008) -0.1 (0.004)	W1±0.2 (0.008)	A±0.3 (0.012) -0.2 (0.008)	S Min.
A	3216	3.2 (0.126)	1.6 (0.063)	1.6 (0.063)	1.2 (0.047)	0.8 (0.031)	1.1 (0.043)
B	3528	3.5 (0.138)	2.8 (0.110)	1.9 (0.075)	2.2 (0.087)	0.8 (0.031)	1.4 (0.055)
C	6032	6.0 (0.236)	3.2 (0.126)	2.6 (0.102)	2.2 (0.087)	1.3 (0.051)	2.5 (0.114)
D	7343	7.3 (0.287)	4.3 (0.169)	2.9 (0.114)	2.4 (0.094)	1.3 (0.051)	4.4 (0.173)
E	7343H	7.3 (0.287)	4.3 (0.169)	4.1 (0.162)	2.4 (0.094)	1.3 (0.051)	4.4 (0.173)
V	7361	7.3 (0.287)	6.1 (0.240)	3.45 ±0.3 (0.136±0.012)	3.1 (0.122)	1.4 (0.055)	4.4 (0.173)
W*	6032L	6.0 (0.236)	3.2 (0.126)	1.5 (0.059) max.	2.2 (0.087)	1.3 (0.051)	2.5 (0.114)
Y**	7343L	7.3 (0.287)	4.3 (0.169)	2.0 (0.079) max.	2.4 (0.094)	1.3 (0.051)	4.4 (0.173)

W1 dimension applies to the termination width for A dimensional area only.

* Low Profile Version of C Case (max. height 1.8mm)
** Low Profile Version of D Case (max. height 2mm)

HOW TO ORDER

TPS	C	107	M	010	R	100
Type	Case Size See table above	Capacitor Code pF code: 1st two digits represent significant figures, 3rd digit represents multiplier (number of zeros to follow)	Tolerance K=±10% M=±20%	Rated DC Voltage 006=6.3Vdc 010=10Vdc 016=16Vdc 020=20Vdc 025=25Vdc 035=35Vdc 050=50Vdc	Packaging See Tape and Reel Packaging R=7" T/R S=13" T/R (see page 48)	Maximum ESR in Milliohms See note below

NOTE: The EIA & CECC standards for low ESR Solid Tantalum Capacitors allow an ESR movement to 1.25 times catalog limit post mounting.

TECHNICAL SPECIFICATIONS

Technical Data:		All technical data relate to an ambient temperature of +25°C						
Capacitance Range:		1.0µF to 470µF						
Capacitance Tolerance:		±10%; ±20%						
Rated Voltage (V_R)	≤ +85°C:	6.3	10	16	20	25	35	50
Category Voltage (V_C)	≤ +125°C:	4	7	10	13	17	23	33
Surge Voltage (V_S)	≤ +85°C:	8	13	20	26	32	46	65
Surge Voltage (V_S)	≤ +125°C:	5	8	12	16	20	28	40
Temperature Range:		-55°C to +125°C						
Environmental Classification:		55/125/56 (IEC 68-2)						
Reliability:		1% per 1000 hours at 85°C with 0.1Ω/V series impedance, 60% confidence level.						

TPS Series

Low ESR

CAPACITANCE AND RATED VOLTAGE, V_R (VOLTAGE CODE) RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Rated voltage (V_R) to 85°C							
µF	Code	4V (G)	6.3V (J)	10V (A)	16V (C)	20V (D)	25V (E)	35V (V)	50V (T)
1	105							A(3000) B(2000)	C(2500)
1.5	155						A(3000) B(1800)	B(2500)	C(1500-2000)
2.2	225			A(1800)	A(3500) A(1800)	A(3000)	B(2500)	B(2000) C(1000)	D(1200)
3.3	335				A(3500)	A(2500) B(1300)	B(2000)	C(700)	D(800)
4.7	475			A(1400)	A(2000) B(900-1600)	A(1800)	B(1500)	B(1500) C(800)	D(300-700)
6.8	685		A(1800)	A(1800)	B(1200)	B(1000) C(700)	C(500-700)	D(500)	D(500-600)
10	106		A(1500) F(1000-3000)	A(900-1800)	B(800) C(500) W(800)	B(1000) C(500-700)	C(300-600)	D(125-300) E(200)	E(400-600)
15	156		A(1800)	A(1000)	B(800)	C(400-450)	C(300) D(100-300)	C(450) D(100-300)	
22	226		A(800) B(800)	B(500-700)	B(800) C(300-875) W(500)	C(150-400) D(300)	D(100-300)	D(125-400) E(200-300)	
33	336		A(800) B(500)	W(850) B(425-650) C(150-500)	C(225-300) W(175-500) Y(300-400)	D(200)	D(100-300) E(175-300)	D(200-300)	
47	476	A(500)	B(250-500) C(300)	B(500-650) C(350) D(100) W(150-250)	C(350) W(90-200) Y(250)	D(100-200) E(125-250)	D(150-250) E(100-125)	E(200-250)	
68	686		B(500) C(150-200) W(125-250)	C(200-300) D(100-150) Y(100-200)	C(200) D(70-150) Y(200-250)	D(70-300) E(125-150)	E(125-200) V(95-200)		
100	107		B(400) C(75-150) Y(100)	C(75-200) D(50-150) E(125) Y(100-200)	D(60-150) E(100-150) Y(100-200)	E(150-200) V(60-200)			
150	157		C(150-250) D(50-125)	D(50-100) Y(100-200)	D(125-150)				
220	227	D(50-100)	C(125-250) D(50-125) E(100) Y(100-150)	D(50-150) E(50-150) Y(150-200)	E(100-150) V(50-150)				
330	337	D(45-100)	D(46-100) E(100-150)	D(100-150) E(50-150) V(50-100)					
470	477	D(45-100) E(100)	D(100-200) E(45-200) V(55-100)	E(45-200) V(50-100)					
680	687	D(100) E(40-100)	E(45-100) V(35-80)						
1000	108	V(35-50)							

For TPS series and the case sizes C, D and E the ESR limits are printed on capacitors in the following format:
T x x x - where x x x is ESR limit in milliohms i.e. T100 represents max. ESR of 100 milliohms.

ESR limits quoted in brackets are in milliohms

NOTE: The EIA & CECC standards for low ESR Solid Tantalum Capacitors allow an ESR movement to 1.25 times catalog limit post reworking.

rel = new released

TPS Series

Low ESR

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance µF	Rated Voltage (Voltage Code)	DCL (µA) Max.	DF % Max.	ESR Max. (mΩ) @100kHz	100kHz Ripple Current (Amp) Ratings 25°C	85°C	125°C
Voltage/Code	4 volt @ 85°C (2.5 volt @ 125°C) / G								
TPSE687*004#0100	E	680	4	27.2	14	100	1.264	1.169	0.513
Voltage/Code	6.3 volt @ 85°C (4 volt @ 125°C) / J								
TPSA685*006#1800	A	6.8	6.3	0.5	8	1800	0.204	0.164	0.082
TPSA106*006#1500	A	10	6.3	0.6	6	1500	0.224	0.200	0.089
TPSA156*006#1500	A	15	6.3	0.9	6	1500	0.224	0.200	0.089
TPSA226*006#0900	A	22	6.3	1.4	6	900	0.289	0.260	0.115
TPSB226*006#0800	B	22	6.3	1.4	6	800	0.378	0.339	0.151
TPSA336*006R0800	A	33	6.3	2.1	6	800	0.353	0.316	0.141
TPSB336*006#0800	B	33	6.3	2.1	6	800	0.376	0.337	0.151
TPSW336*006#0400	W	33	6.3	2.1	6	400	0.474	0.427	0.190
TPSB476*006#0500	B	47	6.3	3.0	6	500	0.412	0.371	0.165
TPSC476*006#0300	C	47	6.3	3.0	6	300	0.606	0.546	0.242
TPSB686*006#0500	B	68	6.3	4.3	6	500	0.412	0.371	0.165
TPSC686*006#0200	C	68	6.3	4.3	6	200	0.742	0.667	0.297
TPSC686*006#0150	C	68	6.3	4.3	6	150	0.856	0.766	0.343
TPSW686*006#0250	W	68	6.3	4.3	6	250	0.600	0.540	0.240
TPSC107*006#0150	C	100	6.3	6.3	6	150	0.856	0.766	0.343
TPSC157*006#0250	C	150	6.3	9.5	6	250	0.663	0.597	0.265
TPSC157*006#0150	C	150	6.3	9.5	6	150	0.856	0.771	0.343
TPSD157*006#0125	D	150	6.3	9.5	6	125	1.095	0.980	0.438
TPSC227*006#0250	C	220	6.3	13.9	10	250	0.663	0.597	0.265
TPSC227*006#0125	C	220	6.3	13.9	10	125	0.938	0.844	0.375
TPSD227*006#0100	D	220	6.3	13.9	8	100	1.125	1.102	0.490
TPSE227*006#0100	E	220	6.3	13.9	8	100	1.285	1.156	0.514
TPSD337M006#0100	D	330	6.3	20.8	8	100	1.125	1.102	0.490
TPSE337*006#0150	E	330	6.3	20.8	8	150	1.049	0.938	0.420
TPSE337*006#0100	E	330	6.3	20.8	8	100	1.285	1.149	0.514
TPSD477M006#0200	D	470	6.3	29.6	12	200	0.866	0.779	0.346
TPSD477M006#0100	D	470	6.3	29.6	12	100	1.225	1.102	0.490
TPSE477M006#0100	E	470	6.3	29.6	10	100	1.285	1.156	0.514
TPSE477M006#0050	E	470	6.3	29.6	10	50	1.817	1.635	0.727
TPSV477*006#0100	V	470	6.3	29.6	10	100	1.581	1.414	0.632
TPSV477*006#0055	V	470	6.3	29.6	10	55	2.132	1.907	0.853
Voltage/Code	10 volt @ 85°C (6.3 volt @ 125°C) / A								
TPSA225*010#1800	A	2.2	10	0.5	8	1800	0.204	0.164	0.082
TPSA475*010#1400	A	4.7	10	0.5	6	1400	0.231	0.206	0.093
TPSA685*010#1800	A	6.8	10	0.7	8	1800	0.204	0.164	0.082
TPSA106*010#1800	A	10	10	1.0	8	1800	0.204	0.163	0.082
TPSA156*010#1000	A	15	10	1.5	8	1000	0.274	0.245	0.110
TPSB226*010#0700	B	22	10	2.2	6	700	0.348	0.312	0.139
TPSB226*010#0500	B	22	10	2.2	8	500	0.412	0.371	0.165
TPSB336*010#0650	B	33	10	3.3	6	650	0.362	0.325	0.145
TPSB336*010#0500	B	33	10	3.3	6	500	0.412	0.371	0.165
TPSC336*010#0600	C	33	10	3.3	8	600	0.469	0.420	0.188
TPSC336*010#0575	C	33	10	3.3	6	575	0.542	0.484	0.217
TPSW336*010#0350	W	33	10	3.3	6	350	0.507	0.456	0.203
TPSB476*010#0650	B	47	10	4.7	8	650	0.362	0.325	0.145
TPSB476*010#0500	B	47	10	4.7	8	500	0.412	0.371	0.165
TPSC476*010#0350	C	47	10	4.7	6	350	0.561	0.501	0.224
TPSD686*010#0150	D	68	10	6.8	6	150	1.000	0.900	0.400
TPSD686*010#0100	D	68	10	6.8	6	100	1.225	1.102	0.490
TPSY686*010#0200	Y	68	10	6.8	6	200	0.791	0.712	0.316
TPSY686*010#0150	Y	68	10	6.8	6	150	0.913	0.821	0.365
TPSC107*010#0200	C	100	10	10.0	8	200	0.742	0.667	0.297
TPSC107*010#0150	C	100	10	10.0	6	150	0.856	0.771	0.343
TPSD107*010#0150	D	100	10	10.0	6	150	1.049	0.944	0.420
TPSD107*010#0100	D	100	10	10.0	6	100	1.225	1.095	0.490
TPSD107*010#0080	D	100	10	10.0	6	80	1.369	1.225	0.546
TPSD107*010#0065	D	100	10	10.0	6	65	1.519	1.367	0.607

E962-627-A 10271

TPS Series

Low ESR

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance µF	Rated Voltage (Voltage Code)	DCL (µA) Max.	DF % Max.	ESR Max. (mΩ) @100kHz	100kHz Ripple Current (Amp) Ratings 25°C	85°C	125°C
Voltage/Code			10 volt @ 85°C (6.3 volt @ 125°C) / A						
TPSY107*010#0200	Y	100	10	10.0	6	200	0.791	0.712	0.316
TPSY107*010#0150	Y	100	10	10.0	6	150	0.913	0.822	0.365
TPSD157*010#0150	D	150	10	15.0	6	150	1.000	0.900	0.400
TPSD157*010#0100	D	150	10	15.0	6	100	1.225	1.095	0.490
TPSY157*010#0200	Y	150	10	15.0	6	200	0.791	0.712	0.316
TPSY157*010#0150	Y	150	10	15.0	6	150	0.913	0.822	0.365
TPSD227M010#0150	D	220	10	22.0	8	150	1.000	0.900	0.400
TPSD227M010#0100	D	220	10	22.0	8	100	1.225	1.102	0.490
TPSE227*010#0100	E	220	10	22.0	8	100	1.285	1.149	0.514
TPSD337M010#0150	D	330	10	33.0	8	150	1.000	0.900	0.400
TPSD337M010#0100	D	330	10	33.0	8	100	1.225	1.102	0.490
TPSE337*010#0100	E	330	10	33.0	8	100	1.285	1.149	0.514
TPSE337*010#0060	E	330	10	33.0	8	60	1.658	1.483	0.663
TPSV337*010#0100	V	330	10	33.0	10	100	1.581	1.414	0.632
TPSV337*010#0060	V	330	10	33.0	10	60	2.041	1.826	0.816
TPSE477M010#0100	E	470	10	47.0	10	100	1.285	1.149	0.574
TPSE477M010#0060	E	470	10	47.0	10	60	1.658	1.482	0.663
TPSV477*010#0100	V	470	10	47.0	10	100	1.581	1.429	0.632
TPSV477*010#0060	V	470	10	47.0	10	60	2.041	1.826	0.816
Voltage/Code			16 volt @ 85°C (10 volt @ 125°C) / C						
TPSA225*016#3500	A	2.2	16	0.5	6	3500	0.148	0.131	0.059
TPSA335*016#3500	A	3.3	16	0.5	6	3500	0.145	0.131	0.059
TPSA475*016#2000	A	4.7	16	0.8	6	2000	0.194	0.174	0.077
TPSB685*016#1200	B	6.8	16	1.1	6	1200	0.268	0.240	0.106
TPSB106*016#0800	B	10	16	1.6	6	800	0.328	0.293	0.130
TPSW106*016#0500	W	10	16	1.6	6	500	0.387	0.349	0.155
TPSB156*016#0800	B	15	16	2.4	6	800	0.328	0.292	0.130
TPSB226*016#0600	B	22	16	3.5	6	600	0.376	0.336	0.150
TPSC226*016#0375	C	22	16	3.5	6	375	0.542	0.494	0.217
TPSC336*016#0300	C	33	16	5.3	6	300	0.606	0.545	0.242
TPSW336*016#0500	W	33	16	5.3	6	500	0.424	0.381	0.169
TPSW336*016#0400	W	33	16	5.3	6	400	0.474	0.427	0.189
TPSC476*016#0360	C	47	16	7.5	6	360	0.661	0.601	0.224
TPSD476*016#0200	D	47	16	7.5	6	200	0.866	0.775	0.346
TPSD476*016#0150	D	47	16	7.5	6	150	1.000	0.894	0.400
TPSC686*016#0200	C	68	16	10.9	6	200	0.741	0.667	0.296
TPSD686*016#0150	D	68	16	10.8	6	150	1.000	0.894	0.400
TPSY686*016#0250	Y	68	16	10.8	6	250	0.707	0.636	0.283
TPSY686*016#0200	Y	68	16	10.8	6	200	0.791	0.712	0.316
TPSD107*016#0150	D	100	16	16.0	6	150	1.000	0.894	0.400
TPSD107*016#0125	D	100	16	16.0	6	125	1.095	0.980	0.438
TPSE107*016#0150	E	100	16	16.0	6	150	1.049	0.938	0.420
TPSE107*016#0125	E	100	16	16.0	6	125	1.149	1.028	0.460
TPSE107*016#0100	E	100	16	16.0	6	100	1.285	1.149	0.514
TPSD157M016#0150	D	150	16	24.0	6	150	1.000	0.900	0.400
TPSD157M016#0125	D	150	16	24.0	6	125	1.095	0.986	0.438
TPSE227M016#0150	E	220	16	35.2	10	150	1.049	0.944	0.420
TPSE227M016#0100	E	220	16	35.2	10	100	1.285	1.156	0.514
TPSV227*016#0150	V	220	16	35.2	8	150	1.290	1.162	0.516
TPSV227*016#0075	V	220	16	35.2	8	75	1.826	1.645	0.730
Voltage/Code			20 volt @ 85°C (13 volt @ 125°C) / D						
TPSA225*020#3000	A	2.2	20	0.5	6	3000	0.158	0.142	0.063
TPSA335*020#2500	A	3.3	20	0.7	6	2500	0.173	0.156	0.069
TPSA475*020#1800	A	4.7	20	0.9	6	1800	0.204	0.183	0.082
TPSC685*020#0700	C	6.8	20	1.4	6	700	0.395	0.357	0.159
TPSB106*020#1000	B	10	20	2.0	6	1000	0.292	0.261	0.117
TPSC106*020#0700	C	10	20	2.0	6	700	0.395	0.357	0.159
TPSC156*020#0450	C	15	20	3.0	6	450	0.494	0.442	0.198
TPSC226*020#0400	C	22	20	4.4	6	400	0.524	0.472	0.210
TPSD226*020#0300	D	22	20	4.4	6	300	0.707	0.636	0.283
TPSD336*020#0200	D	33	20	6.6	6	200	0.866	0.775	0.346
TPSD476*020#0200	D	47	20	9.4	6	200	0.866	0.779	0.349
TPSE476*020#0250	E	47	20	9.4	8	250	0.812	0.731	0.325

TPS Series

Low ESR

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance µF	Rated Voltage (Voltage Code)	DCL (µA) Max.	DF % Max.	ESR Max. (mΩ) @100kHz	100kHz Ripple Current (Amp) Ratings 25°C	85°C	125°C
Voltage/Code			20 volt @ 85°C (13 volt @ 125°C) / D						
TPSE476*020#0150	E	47	20	9.4	6	150	1.049	0.936	0.420
TPSE476*020#0125	E	47	20	9.4	6	125	1.149	1.034	0.460
TPSD686*020#0300	D	68	20	13.6	6	300	0.707	0.636	0.285
TPSD686*020#0200	D	68	20	13.6	6	200	0.866	0.779	0.346
TPSE686*020#0200	E	68	20	13.6	6	200	0.909	0.817	0.363
TPSE686*020#0150	E	68	20	13.6	6	150	1.049	0.936	0.420
TPSE686*020#0125	E	68	20	13.6	6	125	1.149	1.035	0.460
TPSE107M020#0200	E	100	20	20.0	6	200	0.909	0.817	0.363
TPSE107M020#0150	E	100	20	20.0	6	150	1.049	0.944	0.420
TPSV107*020#0200	V	100	20	20.0	6	200	1.118	1.006	0.447
TPSV107*020#0085	V	100	20	20.0	6	85	1.715	1.543	0.686
Voltage/Code			25 volt @ 85°C (16 volt @ 125°C) / E						
TPSA155*025#3000	A	1.5	25	0.4	6	3000	0.158	0.141	0.063
TPSB225*025#2500	B	2.2	25	0.6	6	2500	0.184	0.166	0.074
TPSB335*025#2000	B	3.3	25	0.8	6	2000	0.206	0.186	0.082
TPSB475*025#1500	B	4.7	25	1.2	6	1600	0.236	0.215	0.095
TPSC685*025#0700	C	6.8	25	1.7	6	700	0.396	0.357	0.159
TPSC685*025#0600	C	6.8	25	1.7	6	600	0.426	0.385	0.171
TPSC106*025#0500	C	10	25	2.5	6	500	0.469	0.420	0.188
TPSD156*025#0300	D	15	25	3.8	6	300	0.707	0.636	0.283
TPSD226*025#0200	D	22	25	5.5	6	200	0.866	0.775	0.346
TPSD336*025#0300	D	33	25	8.3	6	300	0.707	0.636	0.283
TPSE336*025#0300	E	33	25	8.3	6	300	0.742	0.663	0.297
TPSE336*025#0200	E	33	25	8.3	6	200	0.906	0.812	0.363
TPSE336*025#0175	E	33	25	8.3	6	175	0.971	0.868	0.388
TPSD476M025#0250	D	47	25	8.8	6	250	0.775	0.697	0.310
TPSE686M025#0200	E	68	25	17.0	6	200	0.906	0.817	0.363
TPSE686M025#0125	E	68	25	17.0	6	125	1.149	1.034	0.459
TPSV686*025#0150	V	68	25	17.0	6	150	1.291	1.162	0.515
TPSV686*025#0095	V	68	25	17.0	6	95	1.622	1.460	0.649
Voltage/Code			35 volt @ 85°C (23 volt @ 125°C) / V						
TPSA106*035#3000	A	1.0	35	0.5	4	3000	0.158	0.142	0.063
TPSB105*035#2000	B	1.0	35	0.5	4	2000	0.206	0.186	0.082
TPSB155*035#2500	B	1.5	35	0.5	6	2500	0.184	0.166	0.074
TPSB225*035#2000	B	2.2	35	0.8	6	2000	0.206	0.186	0.082
TPSC335*035#0700	C	3.3	35	1.2	6	700	0.396	0.357	0.159
TPSC475*035#0600	C	4.7	35	1.6	6	600	0.426	0.383	0.171
TPSD685*035#0500	D	6.8	35	2.4	6	500	0.548	0.493	0.219
TPSD106*035#0300	D	10	35	3.5	6	300	0.707	0.632	0.283
TPSE106*035#0200	E	10	35	3.5	6	200	0.909	0.817	0.363
TPSC156*035#0450	C	15	35	5.3	6	450	0.494	0.445	0.198
TPSD156*035#0300	D	15	35	5.3	6	300	0.707	0.632	0.283
TPSD226M035#0400	D	22	35	7.7	6	400	0.612	0.548	0.245
TPSE226*035#0300	E	22	35	7.7	6	300	0.742	0.663	0.297
TPSE226*035#0200	E	22	35	7.7	6	200	0.906	0.812	0.363
TPSD336M035#0300	D	33	35	11.6	6	300	0.707	0.636	0.283
TPSE476M035#0250	E	47	35	16.5	6	250	0.812	0.781	0.325
TPSE476M035#0200	E	47	35	16.5	6	200	0.906	0.817	0.363
Voltage/Code			50 volt @ 85°C (33 volt @ 125°C) / T						
TPSD475*050#0700	D	4.7	50	2.4	6	700	0.463	0.417	0.185
TPSD685*050#0600	D	6.8	50	3.4	6	600	0.500	0.450	0.200

All technical data relates to an ambient temperature of +25°C measured at 120Hz, 0.5V RMS unless otherwise stated.

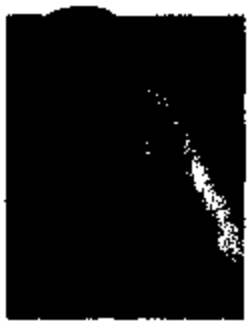
* Insert K for ±10% and M for ±20%
# Insert R for 7" reel and S for 13" reel

NOTE: AVX reserves the right to supply a higher voltage rating or tighter tolerance part in the same case size, to the same reliability standards.

Introduction

AVX Tantalum

APPLICATIONS



2-16 Volt	50 Volt @ 85°C	2-35 Volt
Low ESR	33 Volt @ 125°C	Low ESR
Low Profile Case	Automotive Range	Low Profile Case
0603 available	High Reliability	0603 available
Low Failure Rate	Temperature Stability	Low Failure Rate
High Volumetric Efficiency	QS9000 Approved	High Volumetric Efficiency
Temperature Stability	Up to 150°C	Temperature Stability
Stable over Time		Stable over Time

QUALITY STATEMENTS

AVX's focus is CUSTOMER satisfaction - customer satisfaction in the broadest sense: product quality, technical support, product availability and all at a competitive price.

In pursuance of the established goals of our corporate wide QV2000 program, it is the stated objective of AVX Tantalum to supply our customers with a world class service in the manufacturing and supplying of electronic components which will result in an adequate return on investment.

This world class service shall be defined as consistently supplying product and services of the highest quality and reliability.

This should encompass, but not be restricted to all aspects of the customer supply chain.

In addition any new or changed products, processes or services will be qualified to established standards of quality and reliability.

The objectives and guidelines listed above shall be achieved by the following codes of practice:

1. Continual objective evaluation of customer needs and expectations for the future and the leverage of all AVX resources to meet this challenge.

2. By continually fostering and promoting culture of continuous improvement through ongoing training and empowered participation of employees at all levels of the company.

3. By Continuous Process Improvement using sound engineering principles to enhance existing equipment, material and processes. This includes the application of the science of S.P.C. focused on improving the Process Capability Index, Cpk.

All AVX Tantalum manufacturing locations are approved to ISO9001/ISO9002 and QS9000 - Automotive Quality System Requirements.

Introduction

AVX Tantalum

AVX Paignton is the Divisional Headquarters for the Tantalum division which has manufacturing locations in Paignton in the UK, Biddeford in Maine, USA, Juarez in Mexico, Lanskroun in the Czech Republic and El Salvador.

The Division takes its name from the raw material used to make its main products, Tantalum Capacitors. Tantalum is an element extracted from ores found alongside tin and niobium deposits; the major sources of supply are Canada, Brazil and Australasia.

So for high volume tantalum capacitors with leading edge technology call us first - ***AVX your global partner.***

TECHNOLOGY TRENDS

The amount of capacitance possible in a tantalum capacitor is directly related to the type of tantalum powder used to manufacture the anode.

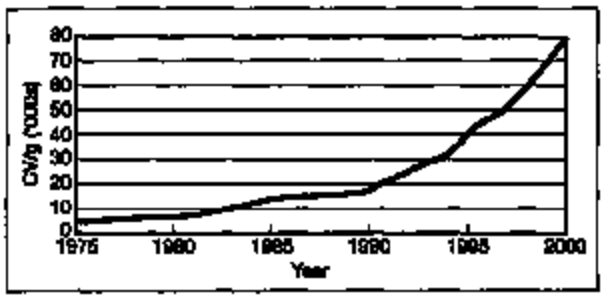
The graph following shows how the (capacitance) x (voltage) per gram (CV/g) has steadily increased over time, thus allowing the production of larger and larger capacitances with the same physical volume. CV/g is the measure used to define the volumetric efficiency of a powder, a high CV/g means a higher capacitance from the same volume.

These improvements in the powder have been achieved through close development with the material suppliers.

AVX Tantalum is committed to driving the available technology forwards as is clearly identified by the new TACmicrochip technology and the standard codes under development.

If you have any specific requirements, please contact your local AVX sales office for details on how AVX Tantalum can assist you in addressing your future requirements.

Tantalum Powder CV/gm



WORKING WITH THE CUSTOMER - ONE STOP SHOPPING

In line with our desire to become the number one supplier in the world for passive and interconnection components, AVX is constantly looking forward and innovating.

It is not good enough to market the best products; the customer must have access to a service system which suits their needs and benefits their business.

The AVX 'one stop shopping' concept is already beneficial in meeting the needs of major OEMs while worldwide partnerships with only the premier division of distributors aids the smaller user.

Helping to market the breadth and depth of our electronic component line card and support our customers are a dedicated team of commercial sales people, applications engineers and product marketing managers. Their qualifications are hopefully always appropriate to your commercial need, but as higher levels of technical expertise are required, access directly to the appropriate department is seamless and transparent.

Total quality starts and finishes with our customer service, and where cost and quality are perceived as given quantities the AVX service invariably has us selected as the preferred supplier.

Facilities are equipped with instant worldwide computer and telecommunication links connected to every sales and production site worldwide. That ensures that our customers delivery requirements are consistently met wherever in the world they may be.

Technical Summary and Application Guidelines

INTRODUCTION

Tantalum capacitors are manufactured from a powder of pure tantalum metal. The typical particle size is between 2 and 10 μm.

Figure below shows typical powders. Note the very great difference in particle size between the powder CVs.

4000μFV 20000μFV 50000μFV

Figure 1.

The powder is compressed under high pressure around a Tantalum wire (known as the Riser Wire) to form a "pellet". The riser wire is the anode connection to the capacitor.

This is subsequently vacuum sintered at high temperature (typically 1400 - 1800°C). This helps to drive off any impurities within the powder by migration to the surface.

During sintering the powder becomes a sponge like structure with all the particles interconnected in a huge lattice.

This structure is of high mechanical strength and density, but is also highly porous giving a large internal surface area (see Figure 2).

The larger the surface area the larger the capacitance. Thus high CV (capacitance/voltage product) powders, which have a low average particle size, are used for low voltage, high capacitance parts.

By choosing which powder is used to produce each capacitance/voltage rating the surface area can be controlled.

The following example uses a 220μF 10V capacitor to illustrate the point.

$$C = \frac{\varepsilon_0 \varepsilon_r A}{d}$$

where ε_0 is the dielectric constant of free space (8.855×10^{-12} Farads/m)

ε_r is the relative dielectric constant for Tantalum Pentoxide (27)

d is the dielectric thickness in meters

C is the capacitance in Farads

and A is the surface area in meters

Rearranging this equation gives:

$$A = \frac{Cd}{\varepsilon_0 \varepsilon_r}$$

thus for a 220μF 10V capacitor the surface area is 550 square centimeters, or nearly twice the size of this page.

The dielectric is then formed over all the tantalum surfaces by the electrochemical process of anodization. To achieve this, the "pellet" is dipped into a very weak solution of phosphoric acid.

The dielectric thickness is controlled by the voltage applied during the forming process. Initially the power supply is kept in a constant current mode until the correct thickness of dielectric has been reached (that is the voltage reaches the 'forming voltage'). It then switches to constant voltage mode and the current decays to close to zero.

Figure 2. Sintered Tantalum

The chemical equations describing the process are as follows:

Anode: $2\,Ta \rightarrow 2\,Ta^{5+} + 10\,e^-$

$2\,Ta^{5+} + 10\,OH^- \rightarrow Ta_2O_5 + 5\,H_2O$

Cathode: $10\,H_2O - 10\,e^- \rightarrow 5H_2\uparrow + 10\,OH^-$

The oxide forms on the surface of the Tantalum but it also grows into the metal. For each unit of oxide two thirds grows out and one third grows in. It is for this reason that there is a limit on the maximum voltage rating of Tantalum capacitors with present technology powders (see Figure 3).

The dielectric operates under high electrical stress. Consider a 220μF 10V part:

Formation voltage = Formation Ratio x Working Voltage
= 3.5 x 10
= 35 Volts

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The pentoxide (Ta_2O_5) dielectric grows at a rate of 1.7 x 10^{-3} m/V

Dielectric thickness (d) = 35 x 1.7 x 10^{-3}
= 0.06 µm

Electric Field strength = Working Voltage / d
= 167 KV/mm

Figure 3. Dielectric Layer

The next stage is the production of the cathode plate. This is achieved by pyrolysis of Manganese Nitrate into Manganese Dioxide.

The "pellet" is dipped into an aqueous solution of nitrate and then baked in an oven at approximately 250°C to produce the dioxide coat. The chemical equation is:

$$Mn(NO_3)_2 \rightarrow MnO_2 + 2NO_2\uparrow$$

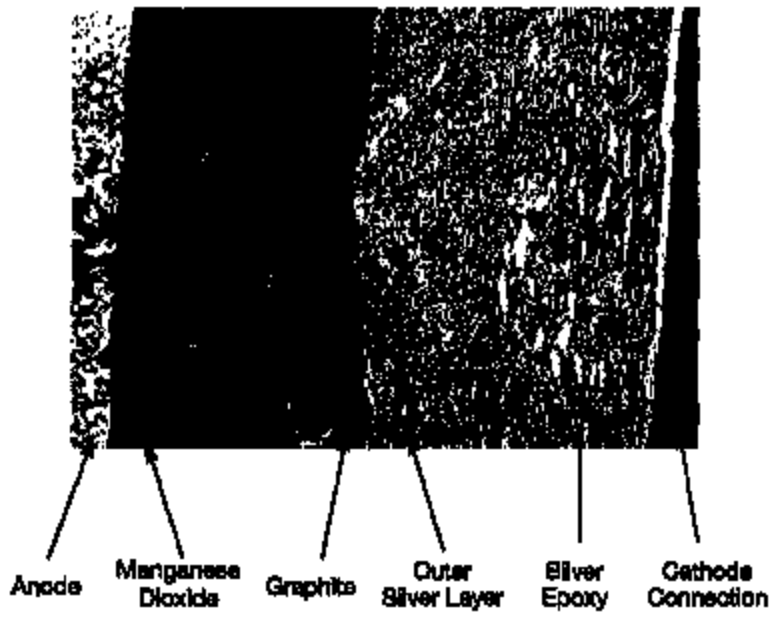
Figure 4. Manganese Dioxide Layer

This process is repeated several times through varying specific densities of nitrate to build up a thick coat over all internal and external surfaces of the "pellet", as shown in Figure 4.

The "pellet" is then dipped into graphite and silver to provide a good connection to the Manganese Dioxide cathode plate. Electrical contact is established by deposition of carbon onto the surface of the cathode. The carbon is then coated with a conductive material to facilitate connection to the cathode termination (see Figure 5). Packaging is carried out to meet individual specifications and customer requirements. This manufacturing technique is adhered to for the whole range of AVX tantalum capacitors, which can be sub-divided into four basic groups: Chip / Resin dipped / Rectangular boxed / Axial.

Further information on the production of Tantalum Capacitors can be obtained from the technical paper "Basic Tantalum Technology", by John Gill, available from your local AVX representative.

Figure 5.



Technical Summary and Application Guidelines

SECTION 1
ELECTRICAL CHARACTERISTICS AND EXPLANATION OF TERMS

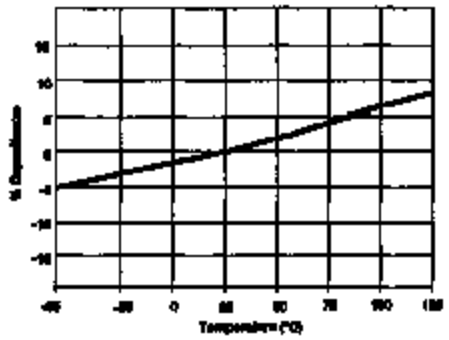
1.1 CAPACITANCE

1.1.1 Rated capacitance (C_R).
This is the nominal rated capacitance. For tantalum capacitors it is measured as the capacitance of the equivalent series circuit at 20°C using a measuring bridge supplied by a 0.5Vpk-pk 120Hz sinusoidal signal, free of harmonics with a maximum bias of 2.2Vd.c.

1.1.2 Capacitance tolerance.
This is the permissible variation of the actual value of the capacitance from the rated value. For additional reading, please consult the AVX technical publication "Capacitance Tolerances for Solid Tantalum Capacitors".

1.1.3 Temperature dependence of capacitance.
The capacitance of a tantalum capacitor varies with temperature. This variation itself is dependent to a small extent on the rated voltage and capacitor size.

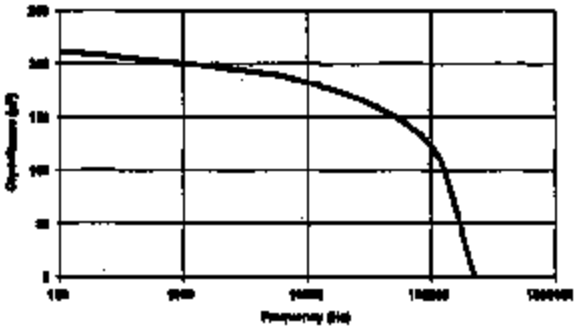
TYPICAL CAPACITANCE vs. TEMPERATURE



1.1.4 Frequency dependence of the capacitance.
The effective capacitance decreases as frequency increases. Beyond 100KHz the capacitance continues to drop until resonance is reached (typically between 0.5 - 5MHz depending on the rating). Beyond the resonant frequency the device becomes inductive.

TAJE227K010

CAPACITANCE vs. FREQUENCY

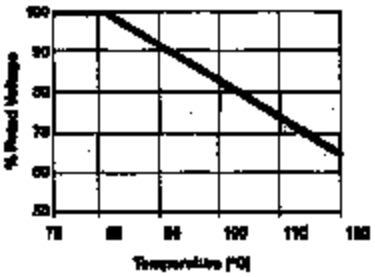


1.2 VOLTAGE

1.2.1 Rated d.c. voltage (V_R)
This is the rated d.c. voltage for continuous operation at 85°C.

1.2.2 Category voltage (V_C)
This is the maximum voltage that may be applied continuously to a capacitor. It is equal to the rated voltage up to +85°C, beyond which it is subject to a linear derating, to 2/3 V_R at 125°C.

MAXIMUM CATEGORY VOLTAGE vs. TEMPERATURE



1.2.3 Surge voltage (V_S)
This is the highest voltage that may be applied to a capacitor for short periods of time in circuits with minimum series resistance of 1Kohm. The surge voltage may be applied up to 10 times in an hour for periods of up to 30 seconds at a time. The surge voltage must not be used as a parameter in the design of circuits in which, in the normal course of operation, the capacitor is periodically charged and discharged.

85°C		125°C	
Rated Voltage (Vdc)	Surge Voltage (Vdc)	Category Voltage (Vdc)	Surge Voltage (Vdc)
4	5.2	2.7	3.2
6.3	8	4	5
10	13	7.0	8
16	20	10	12
20	26	13	16
25	32	17	20
35	46	23	28
50	65	33	40

1.2.4 Effect of surges
The solid Tantalum capacitor has a limited ability to withstand voltage and current surges. This is in common with all other electrolytic capacitors and is due to the fact that they operate under very high electrical stress across the dielectric. For example a 25 volt capacitor has an Electrical Field of 147 KV/mm when operated at rated voltage.

It is important to ensure that the voltage across the terminals of the capacitor never exceeds the specified surge voltage rating.

Solid tantalum capacitors have a self healing ability provided by the Manganese Dioxide semiconducting layer used as the negative plate. However, this is limited in low impedance applications.

In the case of low impedance circuits, the capacitor is likely to be stressed by current surges. Derating the capacitor by 50% or more increases the reliability of the component. (See Figure 2 page 45). The "AVX Recommended Derating Table" (page 46) summarizes voltage rating for use on common voltage rails, in low impedance applications.

In circuits which undergo rapid charge or discharge a protective resistor of 1Ω/V is recommended. If this is impossible, a derating factor of up to 70% should be used.

In such situations a higher voltage may be needed than is available as a single capacitor. A series combination should be used to increase the working voltage of the equivalent capacitor. For example two 22µF 25V parts in series is equivalent to one 11µF 50V part. For further details refer to J.A. Gill's paper "Investigation into the effects of connecting Tantalum capacitors in series", available from AVX offices worldwide.

NOTE:
While testing a circuit (e.g. at ICT or functional) it is likely that the capacitors will be subjected to large voltage and current transients, which will not be seen in normal use. These conditions should be borne in mind when considering the capacitor's rated voltage for use. These can be controlled by ensuring a correct test resistance is used.

1.2.5 Reverse voltage and Non-Polar operation.
The values quoted are the maximum levels of reverse voltage which should appear on the capacitors at any time. These limits are based on the assumption that the capacitors are polarized in the correct direction for the majority of their working life. They are intended to cover short term reversals of polarity such as those occurring during switching transients or during a minor portion of an impressed waveform. Continuous application of reverse voltage without normal polarization will result in a degradation of leakage current. In conditions under which continuous application of a reverse voltage could occur two similar capacitors should be used in a back-to-back configuration with the negative terminations connected together. Under most conditions this combination will have a capacitance one half of the nominal capacitance of either capacitor. Under conditions of isolated pulses or during the first few cycles, the capacitance may approach the full nominal value.

The reverse voltage ratings are designed to cover exceptional conditions of small level excursions into incorrect polarity. The values quoted are not intended to cover continuous reverse operation.

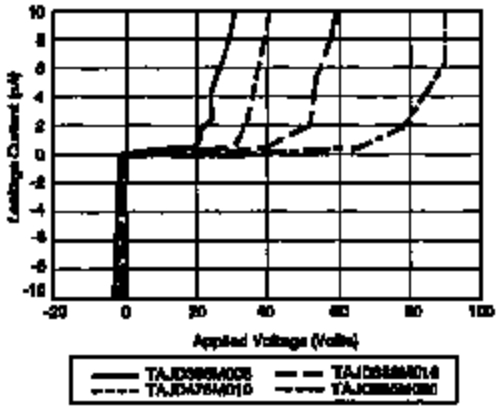
The peak reverse voltage applied to the capacitor must not exceed:

10% of the rated d.c. working voltage to a maximum of 1.0v at 25°C

3% of the rated d.c. working voltage to a maximum of 0.5v at 85°C

1% of the category d.c. working voltage to a maximum of 0.1v at 125°C

LEAKAGE CURRENT vs. BIAS VOLTAGE



1.2.6 Superimposed A.C. Voltage (Vr.m.s.) - Ripple Voltage.
This is the maximum r.m.s. alternating voltage, superimposed on a d.c. voltage, that may be applied to a capacitor. The sum of the d.c. voltage and peak value of the superimposed a.c. voltage must not exceed the category voltage, Vc.

Full details are given in Section 2.

1.2.7 Forming voltage.
This is the voltage at which the anode oxide is formed. The thickness of this oxide layer is proportional to the formation voltage for a tantalum capacitor and is a factor in setting the rated voltage.

1.3 DISSIPATION FACTOR AND TANGENT OF LOSS ANGLE (TAN δ)

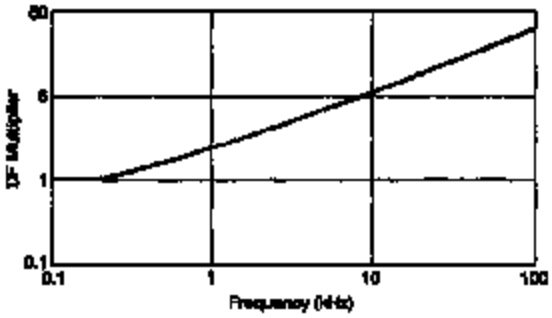
1.3.1 Dissipation factor (D.F.).
Dissipation factor is the measurement of the tangent of the loss angle (tan δ) expressed as a percentage. The measurement of DF is carried out using a measuring bridge which supplies a 0.5Vpk-pk 120Hz sinusoidal signal, free of harmonics with a maximum bias of 2.2Vdc. The value of DF is temperature and frequency dependent.

Note: For surface mounted products the maximum allowed DF values are indicated in the ratings table and it is important to note that these are the limits met by the component AFTER soldering onto the substrate.

1.3.2 Tangent of Loss Angle (tan δ).
This is a measurement of the energy loss in the capacitor. It is expressed as tan δ and is the power loss of the capacitor divided by its reactive power at a sinusoidal voltage of specified frequency. Terms also used are power factor, loss factor and dielectric loss. Cos (90 - δ) is the true power factor. The measurement of tan δ is carried out using a measuring bridge which supplies a 0.5Vpk-pk 120Hz sinusoidal signal, free of harmonics with a maximum bias of 2.2Vdc.

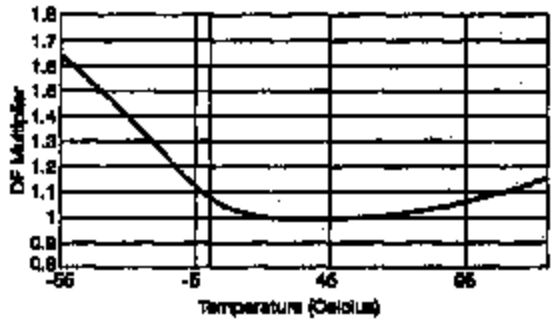
1.3.3 Frequency dependence of Dissipation Factor.
Dissipation Factor increases with frequency as shown in the typical curves:

Typical DF vs Frequency



1.3.4 Temperature dependence of Dissipation Factor.
Dissipation factor varies with temperature as the typical curves show. For maximum limits please refer to ratings tables.

Typical DF vs Temperature



1.4 IMPEDANCE, (Z) AND EQUIVALENT SERIES RESISTANCE (ESR)

1.4.1 Impedance, Z.
This is the ratio of voltage to current at a specified frequency. Three factors contribute to the impedance of a tantalum capacitor; the resistance of the semiconductor layer; the capacitance value and the inductance of the electrodes and leads.

At high frequencies the inductance of the leads becomes a limiting factor. The temperature and frequency behavior of these three factors of impedance determine the behavior of the impedance Z. The impedance is measured at 20°C and 100kHz.

1.4.2 Equivalent Series Resistance, ESR.
Resistance losses occur in all practical forms of capacitors. These are made up from several different mechanisms, including resistance in components and contacts, viscous forces within the dielectric and defects producing bypass current paths. To express the effect of these losses they are considered as the ESR of the capacitor. The ESR is frequency dependent and can be found by using the relationship:

$$ESR = \frac{\tan \delta}{2\pi fC}$$

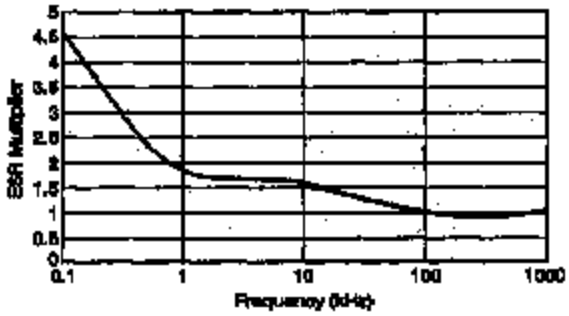
Where f is the frequency in Hz, and C is the capacitance in farads.

The ESR is measured at 20°C and 100kHz.

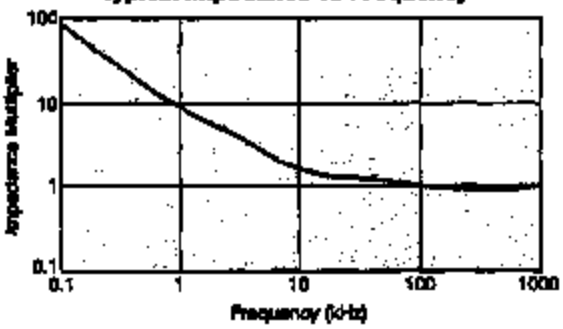
ESR is one of the contributing factors to impedance, and at high frequencies (100kHz and above) it becomes the dominant factor. Thus ESR and impedance become almost identical, impedance being only marginally higher.

1.4.3 Frequency dependance of Impedance and ESR.
ESR and impedance both increase with decreasing frequency. At lower frequencies the values diverge as the extra contributions to impedance (due to the reactance of the capacitor) become more significant. Beyond 1MHz (and beyond the resonant point of the capacitor) impedance again increases due to the inductance of the capacitor.

Typical ESR vs Frequency



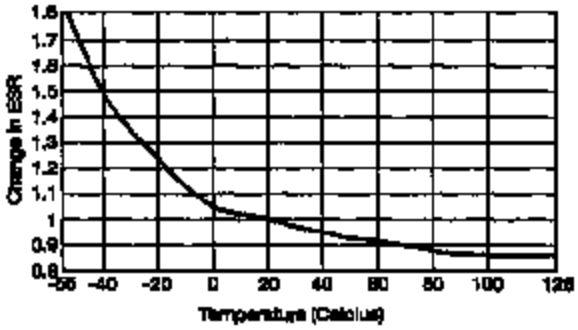
Typical Impedance vs Frequency



1.4.4 Temperature dependence of the impedance and ESR.

At 100kHz, impedance and ESR behave identically and decrease with increasing temperature as the typical curves show.

Typical 100kHz ESR vs Temperature



1.5 D.C. LEAKAGE CURRENT

1.5.1 Leakage current.

The leakage current is dependent on the voltage applied, the elapsed time since the voltage was applied and the component temperature. It is measured at +20°C with the rated voltage applied. A protective resistance of 1000Ω is connected in series with the capacitor in the measuring circuit. Three to five minutes after application of the rated voltage the leakage current must not exceed the maximum values indicated in the ratings table. These are based on the formulae 0.01CV or 0.5μA (whichever is the greater).

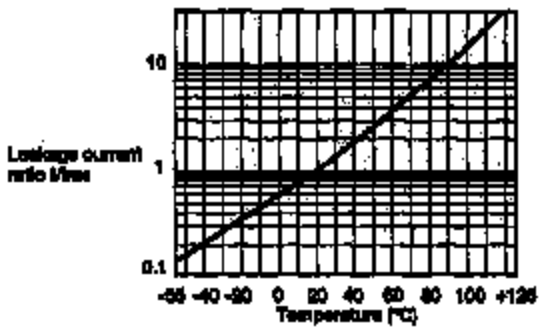
Reforming of tantalum capacitors is unnecessary even after prolonged storage periods without the application of voltage.

1.5.2 Temperature dependence of the leakage current.

The leakage current increases with higher temperatures, typical values are shown in the graph. For operation between 85°C and 125°C, the maximum working voltage must be derated and can be found from the following formula.

$V_{max} = \left(1 - \frac{(T - 85)}{125}\right) \times V_R$ volts, where T is the required operating temperature.

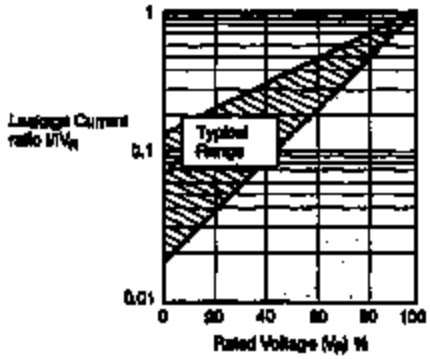
LEAKAGE CURRENT vs. TEMPERATURE



1.5.3 Voltage dependence of the leakage current.

The leakage current drops rapidly below the value corresponding to the rated voltage V_R when reduced voltages are applied. The effect of voltage derating on the leakage current is shown in the graph. This will also give a significant increase in the reliability for any application. See Section 3.1 for details.

LEAKAGE CURRENT vs. RATED VOLTAGE



For additional information on Leakage Current, please consult the AVX technical publication "Analysis of Solid Tantalum Capacitor Leakage Current" by R. W. Franklin.

1.5.4 Ripple current.

The maximum ripple current allowed is derived from the power dissipation limits for a given temperature rise above ambient temperature (please refer to Section 2).

SECTION 2
A.C. OPERATION, RIPPLE VOLTAGE AND RIPPLE CURRENT

2.1 RIPPLE RATINGS (A.C.)

In an a.c. application heat is generated within the capacitor by both the a.c. component of the signal (which will depend upon the signal form, amplitude and frequency), and by the d.c. leakage. For practical purposes the second factor is insignificant. The actual power dissipated in the capacitor is calculated using the formula:

$$P = I^2R$$

and rearranged to $I = \sqrt{(P/R)}$ .....(Eq. 1)

and substituting $P = \frac{E^2 R}{Z^2}$

where I = rms ripple current, amperes
R = equivalent series resistance, ohms
E = rms ripple voltage, volts
P = power dissipated, watts
Z = impedance, ohms, at frequency under consideration

Maximum a.c. ripple voltage (E_{max}).

From the previous equation:

$$E_{max} = Z\sqrt{(P/R)} \quad .....(Eq.\ 2)$$

Where P is the maximum permissible power dissipated as listed for the product under consideration (see tables). However care must be taken to ensure that:

1. The d.c. working voltage of the capacitor must not be exceeded by the sum of the positive peak of the applied a.c. voltage and the d.c. bias voltage.

2. The sum of the applied d.c. bias voltage and the negative peak of the a.c. voltage must not allow a voltage reversal in excess of the "Reverse Voltage".

Historical ripple calculations.
Previous ripple current and voltage values were calculated using an empirically derived power dissipation required to give a 10°C rise of the capacitors body temperature from room temperature, usually in free air. These values are shown in Table I. Equation 1 then allows the maximum ripple current to be established, and Equation 2, the maximum ripple voltage. But as has been shown in the AVX article on thermal management by I. Salisbury, the thermal conductivity of a Tantalum chip capacitor varies considerably depending upon how it is mounted.

Table I: Power Dissipation Ratings (In Free Air)

TAJ/TPS/CWR11/THJ Series Molded Chip

Case size	Max. power dissipation (W)
A	0.075
B	0.085
C	0.110
D	0.160
E	0.185
R	0.085
S	0.095
T	0.090
V	0.250
W	0.200
Y	0.125

TAZ/CWR09 Series Molded Chip

Case size	Max. power dissipation (W)
A	0.060
B	0.070
C	0.075
D	0.060
E	0.090
F	0.100
G	0.120
H	0.160

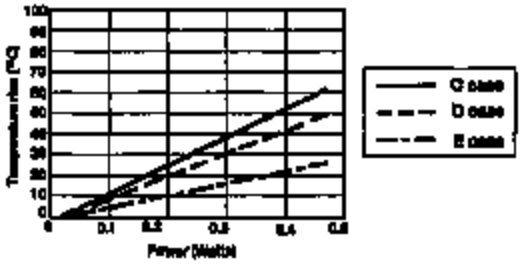
TAJ/TPS/CWR11/THJ TAZ/CWR09 Series Molded Chip

Temperature correction factor for ripple current	
Temp. °C	Factor
+25	1.0
+55	0.98
+85	0.90
+125	0.40

Technical Summary and Application Guidelines

A piece of equipment was designed which would pass sine and square wave currents of varying amplitudes through a biased capacitor. The temperature rise seen on the body for the capacitor was then measured using an infra-red probe. This ensured that there was no heat loss through any thermocouple attached to the capacitor's surface.

Results for the C, D and E case sizes



Several capacitors were tested and the combined results are shown above. All these capacitors were measured on FR4 board, with no other heatsinking. The ripple was supplied at various frequencies from 1KHz to 1MHz.

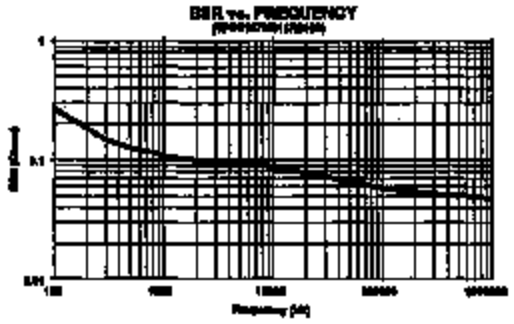
As can be seen in the figure above, the average P_{max} value for the C case capacitors was 0.11 Watts. This is the same as that quoted in Table I.

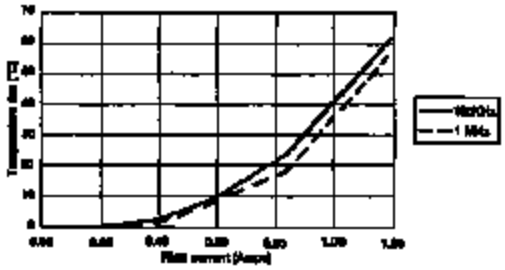
The D case capacitors gave an average P_{max} value 0.125 Watts. This is lower than the value quoted in the Table I by 0.025 Watts.

The E case capacitors gave an average P_{max} of 0.200 Watts which was much higher than the 0.165 Watts from Table I.

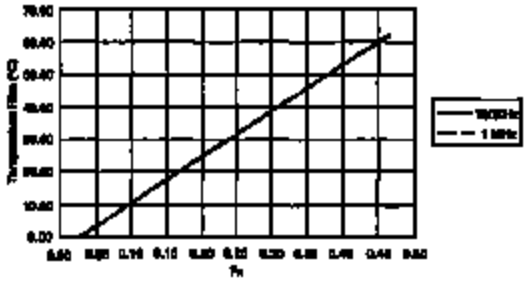
If a typical capacitor's ESR with frequency is considered, e.g. figure below, it can be seen that there is variation. Thus for a set ripple current, the amount of power to be dissipated by the capacitor will vary with frequency. This is clearly shown in figure in top of next column, which shows that the surface temperature of the unit rises less for a given value of ripple current at 1MHz than at 100KHz.

The graph below shows a typical ESR variation with frequency. Typical ripple current versus temperature rise for 100KHz and 1MHz sine wave inputs.





If PR is then plotted it can be seen that the two lines are in fact coincident, as shown in figure below.



Example

A Tantalum capacitor is being used in a filtering application, where it will be required to handle a 2 Amp peak-to-peak, 200KHz square wave current.

A square wave is the sum of an infinite series of sine waves at all the odd harmonics of the square waves fundamental frequency. The equation which relates is:

$I_{square} = I_{pk} \sin(2\pi f) + I_{pk} \sin(6\pi f) + I_{pk} \sin(10\pi f) + I_{pk} \sin(14\pi f) + \ldots$

Thus the special components are:

Frequency	Peak-to-peak current (Amps)	RMS current (Amps)
200 KHz	2.000	0.707
600 KHz	0.667	0.235
1 MHz	0.400	0.141
1.4 MHz	0.286	0.101

Let us assume the capacitor is a TAJD686M006
Typical ESR measurements would yield:

Frequency	Typical ESR (Ohms)	Power (Watts) $I_{rms}^2 \times ESR$
200 KHz	0.120	0.060
600 KHz	0.115	0.008
1 MHz	0.090	0.002
1.4 MHz	0.100	0.001

Thus the total power dissipation would be 0.069 Watts.

From the D case results shown in figure top of previous column, it can be seen that this power would cause the capacitors surface temperature to rise by about 5°C. For additional information, please refer to the AVX technical publication "Ripple Rating of Tantalum Chip Capacitors" by R.W. Franklin.

2.2 Thermal Management

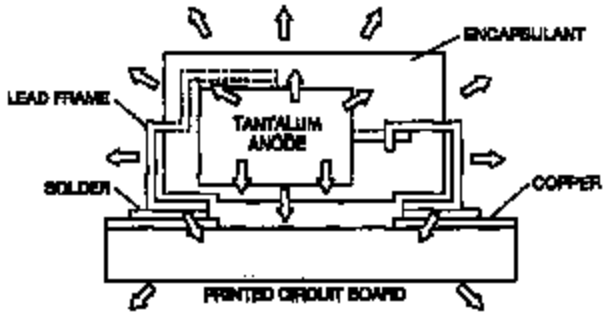
The heat generated inside a tantalum capacitor in a.c. operation comes from the power dissipation due to ripple current. It is equal to I^2R, where I is the rms value of the current at a given frequency, and R is the ESR at the same frequency with an additional contribution due to the leakage current. The heat will be transferred from the outer surface by conduction. How efficiently it is transferred from this point is dependent on the thermal management of the board.

The power dissipation ratings given in Section 2.1 are based on free-air calculations. These ratings can be approached if efficient heat sinking and/or forced cooling is used.

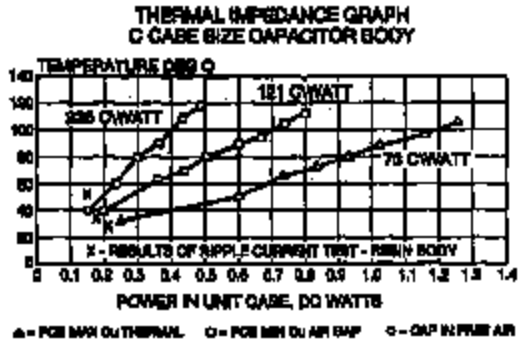
In practice, in a high density assembly with no specific thermal management, the power dissipation required to give a 10°C rise above ambient may be up to a factor of 10 less. In these cases, the actual capacitor temperature should be established (either by thermocouple probe or infra-red scanner) and if it is seen to be above this limit it may be necessary to specify a lower ESR part or a higher voltage rating.

Please contact application engineering for details or contact the AVX technical publication entitled "Thermal Management of Surface Mounted Tantalum Capacitors" by Ian Salisbury.

Thermal Dissipation from the Mounted Chip



Thermal Impedance Graph with Ripple Current

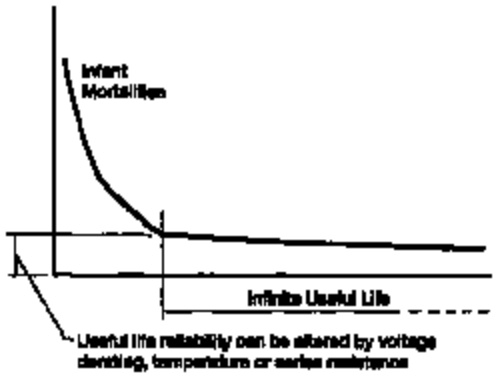


SECTION 3
RELIABILITY AND CALCULATION OF FAILURE RATE

3.1 STEADY-STATE

Tantalum Dielectric has essentially no wear out mechanism and in certain circumstances is capable of limited self healing. However, random failures can occur in operation. The failure rate of Tantalum capacitors will decrease with time and not increase as with other electrolytic capacitors and other electronic components.

Figure 1. Tantalum Reliability Curve



The useful life reliability of the Tantalum capacitor is effected by three factors. The equation from which the failure rate can be calculated is:

$$F = FU \times FT \times FR \times FB$$

where FU is a correction factor due to operating voltage/voltage derating
FT is a correction factor due to operating temperature
FR is a correction factor due to circuit series resistance
FB is the basic failure rate level. For standard Tantalum product this is 1%/1000 hours

Base failure rate.
Standard tantalum product conforms to Level M reliability (i.e., 1%/1000 hrs.) at rated voltage, rated temperature, and 0.1Ω/volt circuit impedance. This is known as the base failure rate, FB, which is used for calculating operating reliability. The effect of varying the operating conditions on failure rate is shown on this page.

Operating voltage/voltage derating.
If a capacitor with a higher voltage rating than the maximum line voltage is used, then the operating reliability will be improved. This is known as voltage derating.

The graph, Figure 2a, shows the relationship between voltage derating (the ratio between applied and rated voltage) and the failure rate. The graph gives the correction factor FU for any operating voltage.

Figure 2a. Correction factor to failure rate F for voltage derating of a typical component (60% con. level).

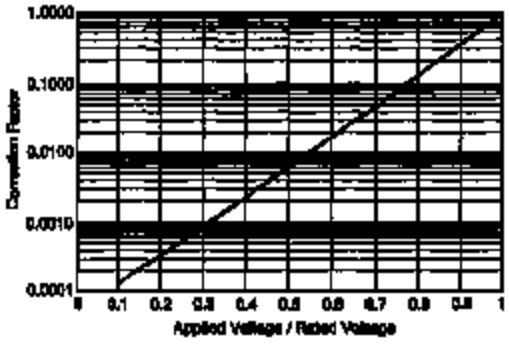


Figure 2b. Gives our recommendation for voltage derating to be used in typical applications.

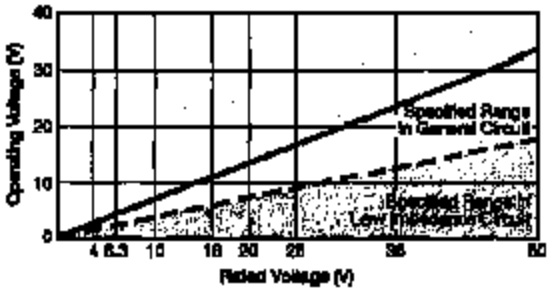
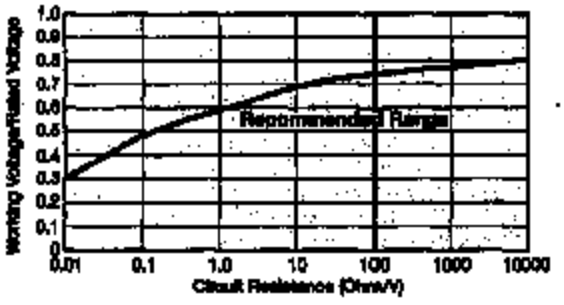


Figure 2c. Gives voltage derating recommendations as a function of circuit impedance.

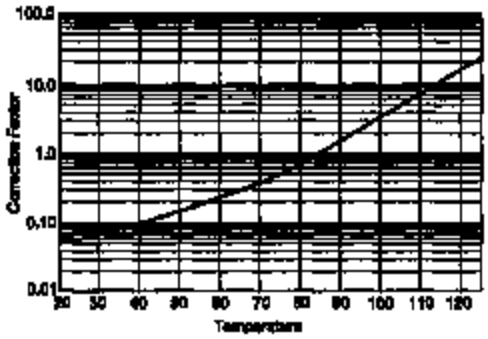


Technical Summary and Application Guidelines

Operating Temperature.

If the operating temperature is below the rated temperature for the capacitor then the operating reliability will be improved as shown in Figure 3. This graph gives a correction factor FT for any temperature of operation.

Figure 3: Correction factor to failure rate F for ambient temperature T for typical component (60% con. level).



Circuit Impedance.

All solid tantalum capacitors require current limiting resistance to protect the dielectric from surges. A series resistor is recommended for this purpose. A lower circuit impedance may cause an increase in failure rate, especially at temperatures higher than 20°C. An inductive low impedance circuit may apply voltage surges to the capacitor and similarly a non-inductive circuit may apply current surges to the capacitor, causing localized over-heating and failure. The recommended impedance is 1 Ω per volt. Where this is not feasible, equivalent voltage derating should be used (See MIL HANDBOOK 217E). The graph, Figure 4, shows the correction factor, FR, for increasing series resistance.

Figure 4. Correction factor to failure rate F for series resistance R on basic failure rate FB for a typical component (60% con. level).

Circuit resistance ohms/volt	FR
3.0	0.07
2.0	0.1
1.0	0.2
0.8	0.3
0.6	0.4
0.4	0.6
0.2	0.8
0.1	1.0

For circuit impedances below 0.1 ohms per volt, or for any mission critical application, circuit protection should be considered. An ideal solution would be to employ an AVX SMT thin-film fuse in series.

Example calculation

Consider a 12 volt power line. The designer needs about 10µF of capacitance to act as a decoupling capacitor near a video bandwidth amplifier. Thus the circuit impedance will be limited only by the output impedence of the board's power unit and the track resistance. Let us assume it to be about 2 Ohms minimum, i.e. 0.167 Ohms/Volt. The operating temperature range is -25°C to +85°C. If a 10µF 16 Volt capacitor was designed in the operating failure rate would be as follows.

a) FT = 1.0 @ 85°C
b) FR = 0.85 @ 0.167 Ohms/Volt
c) FU = 0.08 @ applied voltage/rated voltage = 75%
d) FB = 1%/1000 hours, basic failure rate level

Thus F = 1.0 x 0.85 x 0.08 x 1 = 0.068%/1000 Hours

If the capacitor was changed for a 20 volt capacitor, the operating failure rate will change as shown.

FU = 0.018 @ applied voltage/rated voltage = 60%

F = 1.0 x 0.85 x 0.018 x 1 = 0.0153%/1000 Hours

3.2 Dynamic.

As stated in Section 1.2.4, the solid Tantalum capacitor has a limited ability to withstand voltage and current surges. Such current surges can cause a capacitor to fail. The expected failure rate cannot be calculated by a simple formula as in the case of steady-state reliability. The two parameters under the control of the circuit design engineer known to reduce the incidence of failures are derating and series resistance.

The table below summarizes the results of trials carried out at AVX with a piece of equipment which has very low series resistance with no voltage derating applied. That is the capacitor was tested at its rated voltage.

Results of production scale derating experiment

Capacitance and Voltage	Number of units tested	50% derating applied	No derating applied
47µF 16V	1,647,587	0.08%	1.1%
100µF 10V	832,876	0.01%	0.5%
22µF 25V	2,256,256	0.05%	0.9%

As can clearly be seen from the results of this experiment, the more derating applied by the user, the less likely the probability of a surge failure occurring.

It must be remembered that these results were derived from a highly accelerated surge test machine, and failure rates in the low ppm are more likely with the end customer.

A commonly held misconception is that the leakage current of a Tantalum capacitor can predict the number of failures which will be seen on a surge screen. This can be disproved by the results of an experiment carried out at AVX on 47µF 10V surface mount capacitors with different leakage currents. The results are summarized in the table on the following page.

E962-627-A 10/96

Leakage current vs number of surge failures

	Number tested	Number failed surge
Standard leakage range 0.1 µA to 1µA	10,000	25
Over Catalog limit 5µA to 50µA	10,000	26
Classified Short Circuit 50µA to 500µA	10,000	25

Again, it must be remembered that these results were derived from a highly accelerated surge test machine, and failure rates in the low ppm are more likely with the end customer.

AVX recommended derating table

Voltage Rail	Working Cap Voltage
3.3	6.3
5	10
10	20
12	25
15	35
224	Series Combinations (11)

For further details on surge in Tantalum capacitors refer to J.A. Gill's paper "Surge in solid Tantalum capacitors", available from AVX offices worldwide.

An added bonus of increasing the derating applied in a circuit, to improve the ability of the capacitor to withstand surge conditions, is that the steady-state reliability is improved by up to an order. Consider the example of a 6.3 volt capacitor being used on a 5 volt rail.

The steady-state reliability of a Tantalum capacitor is affected by three parameters; temperature, series resistance and voltage derating. Assume 40°C operation and 0.1 Ohms/Volt series resistance.

The capacitors reliability will therefore be:

Failure rate = $F_U \times F_T \times F_R \times 1\%/1000$ hours
= $0.16 \times 0.1 \times 1 \times 1\%/1000$ hours
= 0.015%/1000 hours

If a 10 volt capacitor was used instead, the new scaling factor would be 0.006, thus the steady-state reliability would be:

Failure rate = $F_U \times F_T \times F_R \times 1\%/1000$ hours
= $0.006 \times 0.1 \times 1 \times 1\%/1000$ hours
= 6×10^{-4} %/1000 hours

SECTION 4
APPLICATION GUIDELINES FOR TANTALUM CAPACITORS

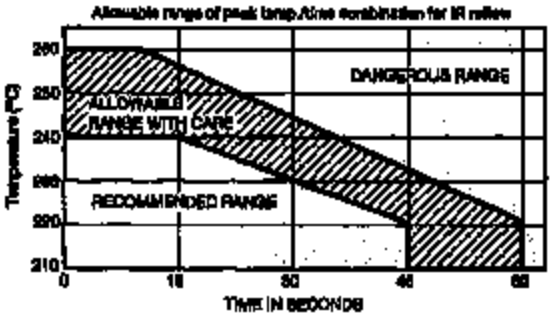
So there is an order improvement in the capacitors steady-state reliability.

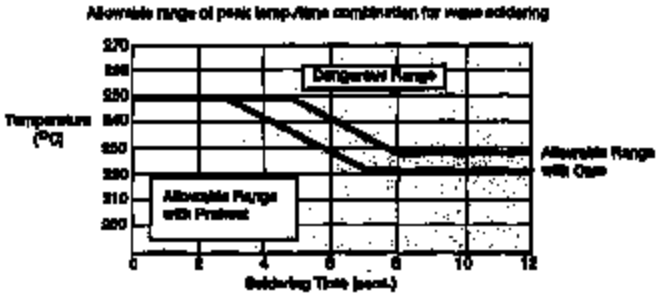
Soldering Conditions and Board Attachment.
The soldering temperature and time should be the minimum for a good connection.

A suitable combination for wavesoldering is 230 - 260°C for 3 - 5 seconds.

For vapor phase or Infra-red reflow soldering the profile below shows allowable and dangerous time/temperature combinations. The profile refers to the peak reflow temperature and is designed to ensure that the temperature of the internal construction of the capacitor does not exceed 220°C. Preheat conditions vary according to the reflow system used, maximum time and temperature would be 10 minutes at 150°C. Small parametric shifts may be noted immediately after reflow, components should be allowed to stabilize at room temperature prior to electrical testing.

Both TAJ and TAZ series are designed for reflow and wave soldering operations. In addition TAZ is available with gold terminations compatible with conductive epoxy or gold wire bonding for hybrid assemblies.





Under the CECC 00 802 International Specification, AVX Tantalum capacitors are a Class A component.

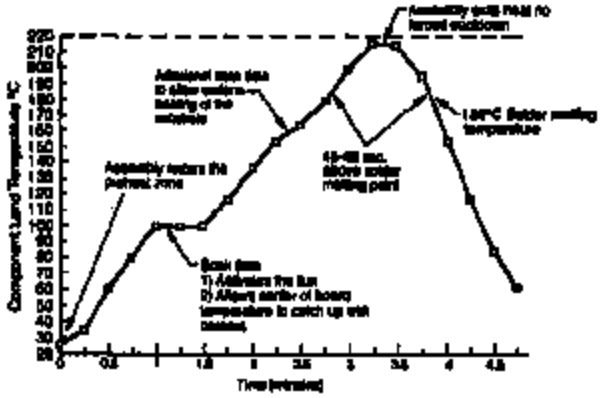
The capacitors can therefore be subjected to one IR reflow, one wave solder and one soldering iron cycle.

If more aggressive mounting techniques are to be used please consult AVX Tantalum for guidance.

SECTION 4
APPLICATION GUIDELINES FOR TANTALUM CAPACITORS

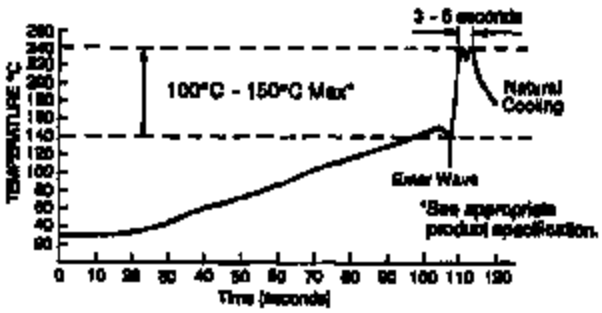
Recommended soldering profiles for surface mounting of tantalum capacitors is provided in figure below.

IR REFLOW



Recommended Ramp Rate Less than 2°C/sec.

WAVE SOLDERING



LEAD FREE PROGRAM

AVX will implement a change to the termination finish on its TAJ, THJ and TPS series surface mount tantalum capacitors effective January 1, 2001.

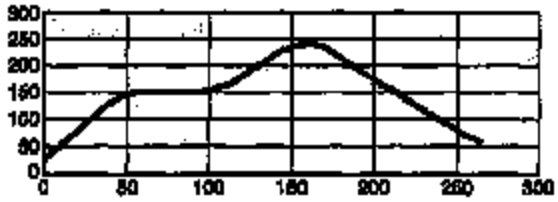
After that date all products manufactured will utilize lead free terminations.

The termination is compatible with the following lead free solder pastes; SnCu, SnCuAg and SnCuAgBi.

It is also compatible with existing SnPb solder pastes / systems in use today.

The recommended IR reflow profile is shown below.

LEAD FREE REFLOW PROFILE



- Pre-heating: 160 ±15C / 60-90s
- Max. Peak Gradient 2.5C/s
- Peak Temperature: 240 ±5C
- Time at >230C: 40s Max.

The following should be noted by customers changing from lead based systems to the new lead free pastes.

a) The visual standards used for evaluation of solder joints will need to be modified as lead free joints are not as bright as with tin-lead pastes and the fillet may not be as large.

b) Resin color may darken slightly due to the increase in temperature required for the new pastes.

c) Lead free solder pastes do not allow the same self alignment as lead containing systems. Standard mounting pads are acceptable, but machine set up may need to be modified.

SECTION 5
MECHANICAL AND THERMAL PROPERTIES OF CAPACITORS

5.1 Acceleration
98.1m/s² (10g)

5.2 Vibration Severity
10 to 2000Hz, 0.75mm or 98.1m/s² (10g)

5.3 Shock
Trapezoidal Pulse, 98.1m/s² for 6ms.

5.4 Adhesion to Substrate
IEC 384-3, minimum of 5N.

5.5 Resistance to Substrate Bending
The component has compliant leads which reduces the risk of stress on the capacitor due to substrate bending.

5.6 Soldering Conditions
Dip soldering is permissible provided the solder bath temperature is ≤ 270°C, the solder time < 3 seconds and the circuit board thickness ≥ 1.0mm.

5.7 Installation Instructions
The upper temperature limit (maximum capacitor surface temperature) must not be exceeded even under the most unfavorable conditions when the capacitor is installed. This must be considered particularly when it is positioned near components which radiate heat strongly (e.g. valves and power transistors). Furthermore, care must be taken, when bending the wires, that the bending forces do not strain the capacitor housing.

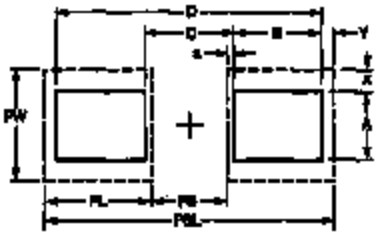
5.8 Installation Position
No restriction.

5.9 Soldering Instructions
Fluxes containing acids must not be used.

5.9.1 Guidelines for Surface Mount Footprints
Component footprint and reflow pad design for AVX capacitors.

The component footprint is defined as the maximum board area taken up by the terminators. The footprint dimensions are given by A, B, C and D in the diagram, which corresponds to W, max., A max., S min. and L max. for the component. The footprint is symmetric about the center lines.

The dimensions x, y and z should be kept to a minimum to reduce rotational tendencies while allowing for visual inspection of the component and its solder fillet.



Dimensions PS (Pad Separation) and PW (Pad Width) are calculated using dimensions x and z. Dimension y may vary, depending on whether reflow or wave soldering is to be performed.

For reflow soldering, dimensions PL (Pad Length), PW (Pad Width), and PSL (Pad Set Length) have been calculated. For wave soldering the pad width (PWw) is reduced to less than the termination width to minimize the amount of solder pick up while ensuring that a good joint can be produced.

NOTE: These recommendations (also in compliance with EIA) are guidelines only. With care and control, smaller footprints may be considered for reflow soldering.

Nominal footprint and pad dimensions for each case size are given in the following tables:

PAD DIMENSIONS: millimeters (inches)

CASE		PSL	PL	PS	PW	PWw
TAJ	A	4.0 (0.157)	1.4 (0.055)	1.2 (0.047)	1.8 (0.071)	0.9 (0.035)
	B	4.0 (0.157)	1.4 (0.055)	1.8 (0.071)	2.8 (0.110)	1.6 (0.063)
	C	5.8 (0.228)	2.0 (0.079)	2.6 (0.102)	2.8 (0.110)	1.6 (0.063)
	D	5.0 (0.197)	2.0 (0.079)	2.0 (0.079)	3.0 (0.118)	1.7 (0.067)
	V	5.8 (0.228)	2.5 (0.098)	2.7 (0.106)	3.2 (0.126)	1.7 (0.067)
	E	5.0 (0.197)	2.5 (0.098)	2.0 (0.079)	3.0 (0.118)	1.7 (0.067)
	R	2.7 (0.106)	1.0 (0.039)	1.0 (0.039)	1.4 (0.055)	0.8 (0.031)
	S	4.0 (0.157)	1.4 (0.055)	1.0 (0.039)	1.8 (0.071)	0.8 (0.031)
	T	4.0 (0.157)	1.4 (0.055)	1.0 (0.039)	2.8 (0.110)	0.8 (0.031)
	W	5.8 (0.228)	2.0 (0.079)	2.6 (0.102)	2.8 (0.110)	1.6 (0.063)
	Y	5.0 (0.197)	2.0 (0.079)	2.0 (0.079)	3.0 (0.118)	1.7 (0.067)
TAC		2.4 (0.094)	0.7 (0.027)	0.8 (0.031)	1.0 (0.039)	-
	S	3.0 (0.120)	0.7 (0.027)	1.4 (0.055)	1.8 (0.071)	-
TAE	A	4.0 (0.157)	1.4 (0.055)	1.2 (0.047)	1.8 (0.071)	1.0 (0.039)
	B	4.0 (0.157)	1.4 (0.055)	1.8 (0.071)	2.8 (0.110)	1.6 (0.063)
	D	5.0 (0.197)	1.4 (0.055)	1.8 (0.071)	3.0 (0.118)	2.0 (0.079)
	E	5.0 (0.197)	1.4 (0.055)	3.0 (0.118)	3.0 (0.118)	2.0 (0.079)
	F	5.0 (0.197)	1.4 (0.055)	3.0 (0.118)	4.5 (0.177)	3.0 (0.118)
	S	7.4 (0.291)	1.9 (0.075)	3.7 (0.146)	4.0 (0.157)	2.4 (0.094)
	R	6.0 (0.236)	1.9 (0.075)	4.3 (0.169)	5.0 (0.197)	3.4 (0.134)

5.10 PCB Cleaning
Ta chip capacitors are compatible with most PCB board cleaning systems.

If aqueous cleaning is performed, parts must be allowed to dry prior to test. In the event ultrasonics are used power levels should be less than 10 watts per/litre, and care must be taken to avoid vibrational nodes in the cleaning bath.

SECTION 6
EPOXY FLAMMABILITY

EPOXY	UL RATING	OXYGEN INDEX
TAJ	UL94 V-0	35%
TPS	UL94 V-0	35%
TAZ	UL94 V-0	35%
THJ	UL94 V-0	35%

SECTION 7
QUALIFICATION APPROVAL STATUS

DESCRIPTION	STYLE	SPECIFICATION
Surface mount capacitors	TAJ	CECC 30801 - 005 Issue 2 CECC 30801 - 011 Issue 1 MIL-C-55365/8 (CWR11)
	TAZ	MIL-C-55365/4 (CWR09)

TAJ, TPS, THJ & TAC Series

Tape and Reel Packaging

Tape and reel packaging for automatic component placement.
Please enter required Suffix on order. Bulk packaging is not available.

TAJ, TPS AND TAC TAPING SUFFIX TABLE

Case Size reference	Tape width mm	P mm	180mm (7") reel		180mm (7") reel		330mm (13") reel	
			Suffix	Qty.	Suffix	Qty.	Suffix	Qty.
A	8	4			R	2000	S	8000
B	8	4			R	2000	S	8000
C	12	8			R	500	S	3000
D	12	8			R	500	S	2500
E	12	8			R	400	S	1500
V	12	8			R	400	S	1500
R	8	4			R	2500	S	10000
S	8	4			R	2500	S	10000
T	8	4			R	2500	S	10000
W	12	8			R	1000	S	4000
Y	12	8			R	1000	S	4000
X	12	8			R	1000	S	3000
TACR	8	4	X	500	R	2500		
TACL	8	4	X	500	R	3500		

TAPE SPECIFICATION

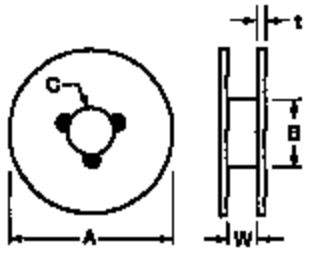
Tape dimensions comply to EIA 481-1

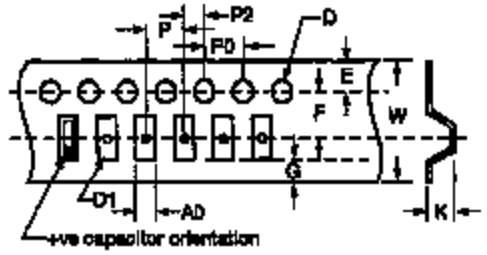
Dimensions A_o and B_o of the pocket and the tape thickness, K, are dependent on the component size.

Tape materials do not affect component solderability during storage. Carrier Tape Thickness <0.4mm.

PLASTIC TAPE DIMENSIONS

Code	Ao	Bo	K	W	E	F	G	P	P2	Po	D	D1
A	1.85±0.1	3.57±0.1	1.87±0.1	8±0.3	1.75±0.1	3.5±0.05	0.75 min	4±0.1	2±0.05	4±0.1	1.5+0.2-0.0	1+0.2-0.0
B	5.16±0.1	3.77±0.1	2.22±0.1	8±0.3	1.75±0.1	3.5±0.05	0.75 min	4±0.1	2±0.05	4±0.1	1.5+0.2-0.0	1+0.2-0.0
C	3.45±0.1	6.4±0.1	2.92±0.1	12±0.3	1.75±0.1	5.5±0.05	0.75 min	8±0.1	2±0.05	4±0.1	1.5+0.2-0.0	1.5+0.2-0.0
D	4.45±0.1	7.82±0.1	3.22±0.1	12±0.3	1.75±0.1	5.5±0.05	0.75 min	8±0.1	2±0.05	4±0.1	1.5+0.2-0.0	1.5+0.2-0.0
E	4.50±0.1	7.5±0.1	4.5±0.1	12±0.3	1.75±0.1	5.5±0.05	0.75 min	8±0.1	2±0.05	4±0.1	1.5+0.2-0.0	1.5+0.2-0.0
V	6.43±0.1	7.44±0.1	3.84±0.1	12±0.3	1.75±0.1	5.5±0.05	0.75 min	8±0.1	2±0.05	4±0.1	1.5+0.2-0.0	1.5+0.2-0.0
W	3.57±0.1	6.4±0.1	1.85±0.1	12±0.3	1.75±0.1	5.5±0.05	0.75 min	8±0.1	2±0.05	4±0.1	1.5+0.2-0.0	1.5+0.2-0.0
X	4.57±0.1	7.62±0.1	1.85±0.1	12±0.3	1.75±0.1	5.5±0.05	0.75 min	8±0.1	2±0.05	4±0.1	1.5+0.2-0.0	1.5+0.2-0.0
Y	4.57±0.1	7.62±0.1	2.15±0.1	12±0.3	1.75±0.1	5.5±0.05	0.75 min	8±0.1	2±0.05	4±0.1	1.5+0.2-0.0	1.5+0.2-0.0
R	1.65±0.1	2.45±0.1	1.3±0.1	8±0.3	1.75±0.1	3.5±0.05	0.75 min	4±0.1	2±0.05	4±0.1	1.5+0.2-0.0	1+0.2-0.0
S	1.95±0.1	3.65±0.1	1.3±0.1	8±0.3	1.75±0.1	3.5±0.05	0.75 min	4±0.1	2±0.05	4±0.1	1.5+0.2-0.0	1+0.2-0.0
T	3.20±0.1	3.6±0.1	1.35±0.1	8±0.3	1.75±0.1	3.5±0.05	0.75 min	4±0.1	2±0.05	4±0.1	1.5+0.2-0.0	1+0.2-0.0
TACR	1.65±0.1	2.45±0.1	1.3±0.1	8±0.3	1.75±0.1	3.5±0.05	0.75 min	4±0.1	2±0.05	4±0.1	1.5+0.2-0.0	1+0.2-0.0
TACL	1.10±0.1	2±0.1	1.1±0.1	8±0.3	1.75±0.1	3.5±0.05	0.75 min	4±0.1	2±0.05	4±0.1	1.5+0.2-0.0	1+0.2-0.0





REEL DIMENSIONS

Code	Tape	A	B	C	W	t
R	12mm	180±2.0	50 min	13±0.5	12.4+1.5,-0	1.5±0.5
R	8mm	180±2.0	50 min	13±0.5	8.4+1.5,-0	1.5±0.5
S	12mm	330±2.0	50 min	13±0.5	12.4+1.5,-0	1.5±0.5
S	8mm	330±2.0	50 min	13±0.5	8.4+1.5,-0	1.5±0.5
X	8mm	100±2.0		13±0.5	8.4+1.5,-0	1.5±0.5

Cover Tape Dimensions
Thickness: 75±25µm
Width of tape:
5.5mm + 0.2mm (8mm tape)
9.5mm + 0.2mm (12mm tape)

ER82-627-R 10200

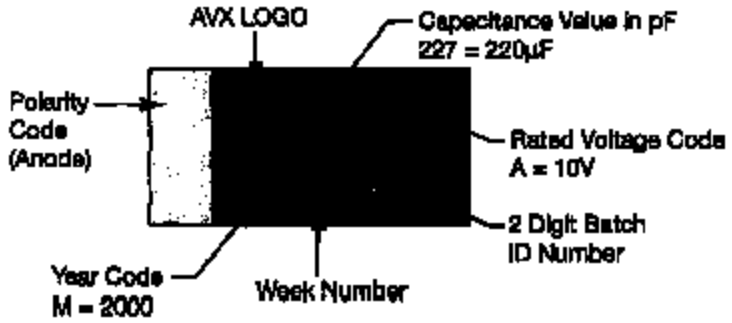
TAJ, THJ & TPS Marking

For TAJ & TPS & THJ, the positive end of body has vidacon readable polarity marking as shown in the diagram. Bodies are marked by indelible laser marking on top surface with capacitance value, voltage and date of manufacture and batch ID number. R case is an exception due to the small size in which only the voltage and capacitance values are printed.

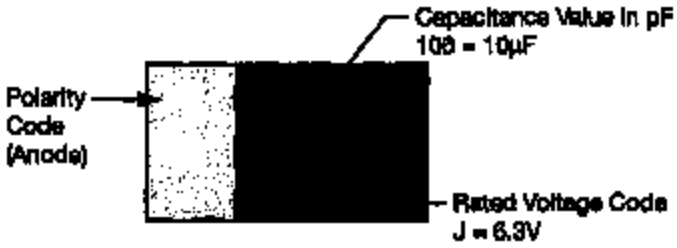
Year	Year Code
1999	L
2000	M
2001	N
2002	P

Voltage Code	Rated Voltage @ 85°C
F	2
G	4
J	6.3
A	10
C	16
D	20
E	25
V	35
T	50

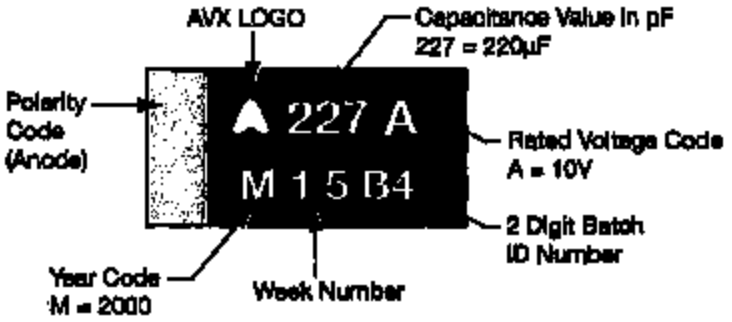
TAJ & TPS - A, B, C, D, E, S, T, V, W, Y AND X CASE:



TAJ - R CASE:



THJ - A, B, C, D AND E CASE:



TAZ, CWR09, CWR11 Series

Tape and Reel Packaging

Solid Tantalum Chip TAZ Tape and reel packaging for automatic component placement.
Please enter required Suffix on order. Bulk packaging is standard.

TAZ TAPING SUFFIX TABLE

Case Size reference	Tape width mm	P mm	7" (180mm) reel Suffix	7" (180mm) reel Qty.	13" reel (330mm) reel Suffix	13" reel (330mm) reel Qty.
A	8	4	R	2000	S	8000
B	12	4	R	2000	S	8000
D	12	4	R	2500	S	8000
E	12	4	R	2000	S	4000
P	16	8	R	1000	S	5000
G	12	8	R	500	S	2500
H	12	8	R	500	S	2500

Total Tape Thickness — K max	
TAZ	
Case size reference	Millimeters (inches) Dim
A	2.8 (0.070)
B	4.8 (0.187)
D	4.0 (0.157)
E	4.0 (0.157)
P	4.0 (0.157)
G	4.0 (0.157)
H	4.0 (0.157)

Code	8mm Tape		12mm Tape	
P*	4±0.1 or 8±0.1	(0.157±0.004) (0.315±0.004)	4±0.1 or 8±0.1	(0.157±0.004) (0.315±0.004)
G	0.75 min	(0.03 min)	0.75 min	(0.03 min)
F	3.5±0.05	(0.138±0.002)	5.5±0.05	(0.22±0.002)
E	1.75±0.1	(0.069±0.004)	1.75±0.1	(0.069±0.004)
W	8±0.3	(0.315±0.012)	12±0.3	(0.472±0.012)
P_2	2±0.05	(0.079±0.002)	2±0.05	(0.079±0.002)
P_0	4±0.1	(0.157±0.004)	4±0.1	(0.157±0.004)
D	1.5±0.1 -0	(0.059±0.004) (-0)	1.5±0.1 -0	(0.059±0.004) (-0)
D_1	1.0 min	(0.039 min)	1.5 min	(0.059 min)

*See taping suffix tables for actual P dimension (component pitch).

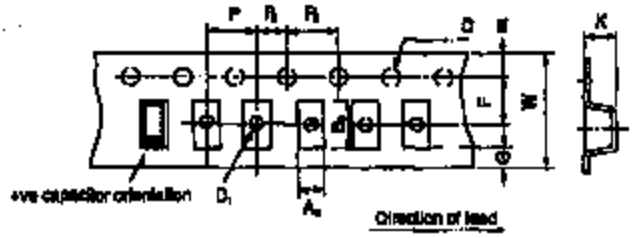
TAPE SPECIFICATION

Tape dimensions comply to EIA RS 481 A

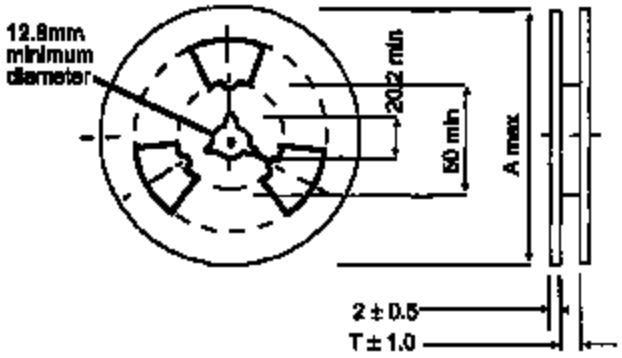
Dimensions A_0 and B_0 of the pocket and the tape thickness, K, are dependent on the component size.

Tape materials do not affect component solderability during storage.

Carrier Tape Thickness <0.4mm



PLASTIC TAPE REEL DIMENSIONS

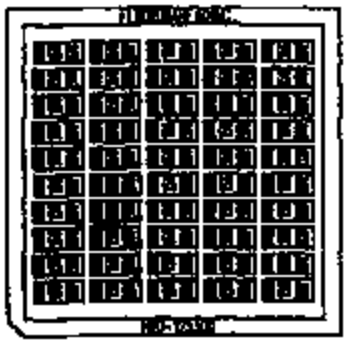


Standard Dimensions mm
T: 8.5mm (8mm tape)
13.0mm (12mm tape)
A: See page 49

Cover Tape Dimensions
Thickness: 75±25µ
Width of tape:
5.5mm + 0.2mm (8mm tape)
9.5mm + 0.2mm (12mm tape)

Waffle Packaging - 2" x 2" hard plastic waffle trays. To order Waffle packaging use a "W" in part numbers packaging position.

Case Size	Maximum Quantity Per Waffle
TAZ A	160
TAZ B	112
TAZ D	88
TAZ E	60
TAZ F	48
TAZ G	50
TAZ H	25
CWR11 A	96
CWR11 B	72
CWR11 C	54
CWR11 D	28



NOTE: Orientation of parts in waffle packs varies by case size.

Product Safety Information Sheet

Material Data and Handling

This should be read in conjunction with the Product Data Sheet. Failure to observe the ratings and the information on this sheet may result in a safety hazard.

1. Material Content

Solid tantalum capacitors do not contain liquid hazardous materials.

The operating section contains:

Tantalum	Graphite/carbon
Tantalum oxide	Conducting paint/resins
Manganese dioxide	Fluoropolymers (not TAC)

The encapsulation contains:

TAA - solder, metal case, solder coated terminal wires, glass seal and plastic sleeve

TAC - epoxy molding compound, tin coated terminal pads

TAJ - epoxy molding compound, solder coated terminal pads

TAP - solder, solder coated terminal wires, epoxy dipped resin

THJ - epoxy molding compound, solder coated terminal pads

TPS - epoxy molding compound, solder coated terminal pads

The epoxy resins may contain Antimony trioxide and Bromine compounds as fire retardants. The capacitors do not contain PBB or PBBO/PBBE. The solder alloys may contain lead.

2. Physical Form

These capacitors are physically small and are either rectangular with solderable terminal pads, or cylindrical or bead shaped with solderable terminal wires.

3. Intrinsic Properties

Operating

Solid tantalum capacitors are polarized devices and operate satisfactorily in the correct d.c. mode. They will withstand a limited application of reverse voltage as stated in the data sheets. However, a reverse application of the rated voltage will result in early short circuit failure and may result in fire or explosion. Consequential failure of other associated components in the circuit e.g. diodes, transformers, etc. may also occur. When operated in the correct polarity, a long period of satisfactory operation will be obtained but failure may occur for any of the following reasons:

- normal failure rate
- surge voltage exceeded
- reverse voltage exceeded
- temperature too high
- ripple rating exceeded

If this failure mode is a short circuit, the previous conditions apply. If the adjacent circuit impedance is low, voltage or current surges may exceed the power handling capability of the capacitor. For this reason capacitors in circuits of below 3Ω/V should be derated by 50% and precautions taken to prevent reverse voltage spikes. Where capacitors may be subjected to fast switched, low impedance source voltages, the manufacturers advice should be sought to determine the most suitable capacitors for such applications.

Non-operating

Solid tantalum capacitors contain no liquids or noxious gases to leak out. However, cracking or damage to the encapsulation may lead to premature failure due to ingress of material such as cleaning fluids or to stresses transmitted to the tantalum anode.

4. Fire Characteristics

Primary

Any component subject to abnormal power dissipation may

- self ignite
- become red hot
- break open or explode emitting flaming or red hot material, solid, molten or gaseous.

Fumes from burning components will vary in composition depending on the temperature, and should be considered to be hazardous, although fumes from a single component in a well ventilated area are unlikely to cause problems.

Secondary

Induced ignition may occur from an adjacent burning or red hot component. Epoxy resins used in the manufacture of capacitors give off noxious fumes when burning as stated above. Wherever possible, capacitors comply with the following: BS EN 60065
UL 492.60A/260
LOI (ASTM D2863-70) as stated in the data sheets.

5. Storage

Solid tantalum capacitors exhibit a very low random failure rate after long periods of storage and apart from this there are no known modes of failure under normal storage conditions. All capacitors will withstand any environmental conditions within their ratings for the periods given in the detail specifications. Storage for longer periods under high humidity conditions may affect the leakage current of resin protected capacitors. Solderability of solder coated surfaces may be affected by storage of excess of one year under high temperatures (>40°C) or humidity (>80%RH).

6. Disposal

Incineration of epoxy coated capacitors will cause emission of noxious fumes and metal cased capacitors may explode due to build up of internal gas pressure. Disposal by any other means normally involves no special hazards. Large quantities may have salvage value.

7. Unsafe Use

Most failures are of a passive nature and do not represent a safety hazard. A hazard may, however, arise if this failure causes a dangerous malfunction of the equipment in which the capacitor is employed. Circuits should be designed to fail safe under the normal modes of failure. The usual failure mode is an increase in leakage current or short circuit. Other possible modes are decrease of capacitance, increase in dissipation factor (and impedance) or an open-circuit. Operations outside the ratings quoted in the data sheets represents unsafe use.

8. Handling

Careless handling of the cut terminal leads could result in scratches and/or skin punctures. Hands should be washed after handling solder coated terminals before eating or smoking, to avoid ingestion of lead. Capacitors must be kept out of the reach of small children. Care must be taken to discharge capacitors before handling as capacitors may retain a residual charge even after equipment in which they are being used has been switched off. Sparks from the discharge could ignite a flammable vapor.

ER02-627-A 10294

Product Safety Information Sheet

Environmental Information

AVX has always sought to minimize the environmental impact of its manufacturing operations and of its tantalum capacitors supplied to customers throughout the world.

We have a policy of preventing and minimizing waste streams during manufacture, and recycling materials wherever possible. We actively avoid or minimize environmentally hazardous materials in our production processes.

1. Material Content

For customers wishing to assess the environmental impact of AVX's capacitors contained in waste electrical and electronic equipment, the following information is provided:

Surface mount tantalum capacitors contain:

- Tantalum and Tantalum oxide
- Manganese dioxide
- Carbon/graphite
- Silver
- Nickel-iron alloy or Copper alloy depending on design (consult factory for details)
- Tin-lead alloy plating
- Polymers including fluorinated polymers
- Epoxide resin encapsulant

The encapsulant is made fire retardant to UL 94 V-0 by the inclusion of inert mineral filler, antimony trioxide and an organic bromine compound.

2. AVX capacitors do not contain any Poly Brominated Biphenyl (PBB) or PBBE/PBBO.

The approximate content of some materials is given in the table below:

Case Size	Typical Weight mg	Lead %	Antimony Trioxide %	Organic Bromine Compound %
A	25	0.13	1.7	2.5
B	58	0.11	1.4	2.1
C	137	0.04	2.3	3.4
D	330	0.023	1.5	2.2
E	480	0.017	1.2	1.8

The specific weight of other materials contained in the various case sizes is available on written request.

The component packing tape is either recyclable Polycarbonate or PVC (depending on case size), and the sealing tape is a laminate of halogen-free polymers. The reels are recyclable polystyrene, and marked with the recycling symbol. The reels are over-packed in recyclable fiber board boxes. None of the packing contains heavy metals.

3. Future Proposals

Lead

TAJ, TPS and THJ series supplied today are electroplated over the terminal contact area with 90:10 tin:lead alloy. Although the lead comprises much less than 0.2% of the component weight, TAC series currently have lead free (100% tin) terminations. Parts will be converted to 100% tin in 2001.

4. Fire Retardants

Currently the only known way of supplying a fire retardant encapsulant which meets all our performance requirements, is to incorporate antimony trioxide and an organic bromine compound. These materials are commonly used in many plastic items in the home and industry. We expect to be able to offer an alternative fire retardant encapsulant, free of these materials, by 2004. A combustible encapsulant free of these materials could be supplied today, but AVX believes that the health and safety benefits of using these materials to provide fire retardancy during the life of the product, far outweigh the possible risks to the environment and human health.

5. Nickel alloy

It is intended that all case sizes will be made with a high copper alloy termination. Some case sizes are supplied now with this termination, and other sizes may be available. Please contact AVX if you prefer this.

6. Recycling

Surface mount tantalum capacitors have a very long service life with no known wear-out mechanism, and a low failure rate. However, parts contained in equipment which is of no further use will have some residual value mainly because of the tantalum metal contained. This can be recovered and recycled by specialist companies. The silver and nickel or copper alloy will also have some value. Please contact AVX if you require assistance with the disposal of parts. Packaging can by recycled as described above.

7. Disposal

Surface mount tantalum capacitors do not contain any liquids and no part of the devices is normally soluble in water at neutral pH values. Incineration will cause the emission of noxious fumes and is not recommended except by specialists. Land fill may be considered for disposal, bearing in mind the small lead content.

Questions & Answers

Some commonly asked questions regarding Tantalum Capacitors:

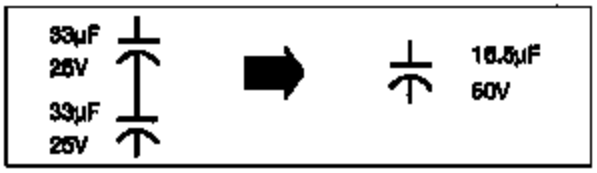
Question: If I use several tantalum capacitors in serial/parallel combinations, how can I ensure equal current and voltage sharing?

Answer: Connecting two or more capacitors in series and parallel combinations allows almost any value and rating to be constructed for use in an application. For example, a capacitance of more than 60µF is required in a circuit for stable operation. The working voltage rail is 24 volts dc with a superimposed ripple of 1.5 volts at 120 Hz.

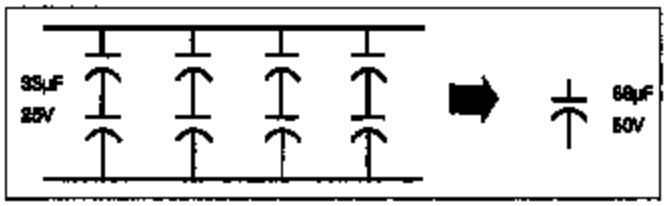
The maximum voltage seen by the capacitor is V_{dc} + V_{ac}=25.5V

Applying the 50% derating rule tells us that a 50V capacitor is required.

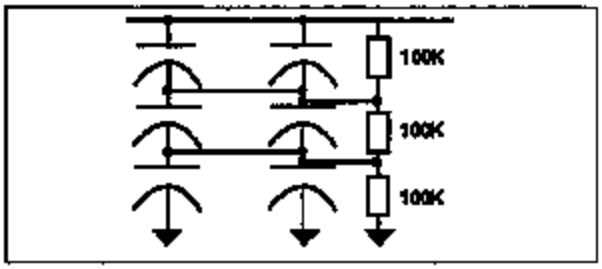
Connecting two 25V rated capacitors in series will give the required capacitance voltage rating, but the



effective capacitance will be halved, so for greater than 60µF, four such series combinations are required, as shown.



In order to ensure reliable operation, the capacitors should be connected as shown below to allow current sharing of the ac noise and ripple signals. This prevents any one capacitor heating more than its neighbors and thus being the weak link in the chain.



The two resistors are used to ensure that the leakage currents of the capacitors does not effect the circuit reliability, by ensuring that all the capacitors have half the working voltage across them.

Question: What are the advantages of tantalum over other capacitor technologies?

Answer:

1. Tantalum capacitors have high volumetric efficiency.
2. Electrical performance over temperature is very stable.
3. They have a wide operating temperature range -55 degrees C to +125 degrees C.
4. They have better frequency characteristics than aluminum electrolytics.
5. No wear out mechanism. Because of their construction, solid tantalum capacitors do not degrade in performance or reliability over time.

Question: How does TPS differ from your standard product?

Answer: TPS has been designed from the initial anode production stages for power supply applications. Special manufacturing processes provide the most robust capacitor dielectric by maximizing the volumetric efficiency of the package. After manufacturing, parts are conditioned by being subjected to elevated temperature overvoltage burn in applied for a minimum of two hours. Parts are monitored on a 100% basis for their direct current leakage performance at elevated temperatures. Parts are then subjected to a low impedance current surge. This current surge is performed on a 100% basis with each capacitor individually monitored. At this stage, the capacitor undergoes 100% test for capacitance, Dissipation Factor, leakage current, and 100 KHz ESR to TPS requirements.

Question: If the part is rated as a 25 volt part and you have current surged it, why can't I use it at 25 volts in a low impedance circuit?

Answer: The high volumetric efficiency obtained using tantalum technology is accomplished by using an extremely thin film of tantalum pentoxide as the dielectric. Even an application of the relatively low voltage of 25 volts will produce a large field strength as seen by the dielectric. As a result of this, derating has a significant impact on reliability as described under the reliability section. The following example uses a 22 microfarad capacitor rated at 25 volts to illustrate the point. The equation for determining the amount of surface area for a capacitor is as follows:

$C = ((E) (E_o) (A)) / d$

$A = ((C) (d)) / ((E_o)(E))$

$A = ((22 \times 10^{-9}) (170 \times 10^{-6})) / ((8.85 \times 10^{-12}) (27))$

$A = 0.015$ square meters (150 square centimeters)

Where

C = Capacitance in farads

A = Dielectric (Electrode) Surface Area (m^2)

d = Dielectric thickness (Space between dielectric) (m)

E = Dielectric constant (27 for tantalum)

E_o = Dielectric Constant relative to a vacuum (8.855×10^{-12} Farads x m^{-1})

To compute the field voltage potential felt by the dielectric we use the following logic.

Dielectric formation potential = Formation Ratio x Working Voltage

= 4 x 25

Formation Potential = 100 volts

Dielectric (Ta_2O_5) Thickness (d) is 1.7×10^{-6} Meters Per Volt

d = 0.17 µ meters

Electric Field Strength = Working Voltage / d

= (25 / 0.17 µ meters)

= 147 Kilovolts per millimeter

= 147 Megavolts per meter

No matter how pure the raw tantalum powder or the precision of processing, there will always be impurity sites in the dielectric. We attempt to stress these sites in the factory with overvoltage surges, and elevated temperature burn in so that components will fail in the factory and not in your product. Unfortunately, within this large area of tantalum pentoxide, impurity sites will exist in all capacitors. To minimize the possibility of providing enough activation energy for these impurity sites to turn from an amorphous state to a crystalline state that will conduct energy, series resistance and derating is recommended. By reducing the electric field within the anode at these sites, the tantalum capacitor has increased reliability. Tantalums differ from other electrolytics in that charge transients are carried by electronic conduction rather than absorption of ions.

Question: What negative transients can Solid Tantalum Capacitors operate under?

Answer: The reverse voltage ratings are designed to cover exceptional conditions of small level excursions into incorrect polarity. The values quoted are not intended to cover continuous reverse operation. The peak reverse voltage applied to the capacitor must not exceed:

10% of rated DC working voltage to a maximum of 1 volt at 25°C.

3% of rated DC working voltage to a maximum of 0.5 volt at 85°C.

1% of category DC working voltage to a maximum of 0.1 volt at 125°C.

Question: I have read that manufacturers recommend a series resistance of 0.1 ohm per working volt. You suggest we use 1 ohm per volt in a low impedance circuit. Why?

Answer: We are talking about two very different sets of circuit conditions for those recommendations. The 0.1 ohm per volt recommendation is for steady-state conditions. This level of resistance is used as a basis for the series resistance variable in a 1% / 1000 hours 60% confidence level reference. This is what steady-state life tests are based on. The 1 ohm per volt is recommended for dynamic conditions which include current in-rush applications such as inputs to power supply circuits. In many power supply topologies where the dI/dt through the capacitor(s) is limited, (such as most implementations of buck (current mode), forward converter, and flyback), the requirement for series resistance is decreased.

Question: How long is the shelf life for a tantalum capacitor?

Answer: Solid tantalum capacitors have no limitation on shelf life. The dielectric is stable and no reformation is required. The only factors that affect future performance of the capacitors would be high humidity conditions and extreme storage temperatures. Solderability of solder coated surfaces may be affected by storage in excess of one year under temperatures greater than 40°C or humidities greater than 60% relative humidity. Terminations should be checked for solderability in the event an oxidation develops on the solder plating.

Question: Do you recommend the use of tantalum capacitors on the input side of DC-DC converters?

Answer: No. Typically the input side of a converter is fed from the voltage source which are not regulated and are of nominally low impedance. Examples would be Nickel-Metal-Hydride batteries, Nickel-Cadmium batteries, etc., whose internal resistance is typically in the low milliohm range.

From: Crawley, Ian (I.A.)
Sent: Wednesday, December 04, 2002 8:51 AM
To: Freeland, Mark (M.); Gates, Freeman (F.C.); Maurer, James (J.B.); McCoy, James (J.D.)
Cc: Kotwicki, Allan (A.J.); Alles, Sheran (S.A.); O'Neill, Jim (J.D.); Williamson, Richard (E.); Jefford, Bob (R.D.)
Subject: RE: DPFE Sensor stalls

Chances are this part has the resistor, based on a production date 29-JUL-2002. You can tell by the part number if the resistor was incorporated or not. The latest part number is 3W7E-9Y456-B3C. We have a Town Car in our department to evaluate this part, once it is returned.

Thank you,

Ian Crawley
EGR Systems
FMEI Dept.
Phone: 313-390-5576
Fax: 313-390-4084
email: icrawley@ford.com
text pager: 313-796-7261 or
3137967261@alphapage.airtouch.com
V-Engine Engineering - Ford Motor Co.

----Original Message----
From: Freeland, Mark (M.)
Sent: Tuesday, December 03, 2002 6:36 PM
To: Gates, Freeman (F.C.); Maurer, James (J.B.); McCoy, James (J.D.)
Cc: Kotwicki, Allan (A.J.); Alles, Sheran (S.A.); O'Neill, Jim (J.D.); Crawley, Ian (I.A.); Williamson, Richard (E.); Jefford, Bob (R.D.)
Subject: FW: DPFE Sensor stalls

Info from Rick Williamson

Freeman,

How does one ascertain from part number or other markings if a specific ESM module was manufactured before or after the 10 ohm resistor was incorporated, or did the 10 ohms go in before Job 1?

Regards

Mark Freeland

6-Sigma Black Belt
Engine Research Department
Ford Research Laboratory
P.O. Box 2053
MD 2629 - SRL - Room 1517
Dearborn, MI 48121-2053 USA
email: mfreela1@ford.com
Tel.: (313) 594-7645

----Original Message----
From: Williamson, Richard (E.)
Sent: Tuesday, December 03, 2002 3:28 PM
To: Freeland, Mark (M.)

Subject: RE: DPFE Sensor stalls

Mark,
I personnaly talked to the shop foreman. He was assigned the vehicle after the first tech couldn't fix it. He stated that he let the vehicle idle in his stall and eventually the vehicle would stall. He would try to start it and the vehicle would not start and there was no check engine light on the dash. He would unplug the DPFE and cycle the key, the MIL would be on and the vehicle would start. He repeated this twice and then replaced the part. He has promised to ship me the part and I will bring it to you. If I haven't recieved the part by the end of the week I will call him back.
Rick

---Original Message---
From: Freeland, Mark (M.)
Sent: Tuesday, December 03, 2002 10:33 AM
To: Gates, Freeman (F.C.); Maurer, James (J.B.); McCoy, James (J.D.)
Cc: Kotwicki, Allan (A.J.); Alles, Sheran (S.A.); O'Neall, Jim (J.D.); Crowley, Ian (I.A.); Williamson, Richard (E.); Jefford, Bob (R.D.)
Subject: RE: DPFE Sensor stalls

For Info:

I just looked up the vehicle in AWS. It was also in for stalls on 9/9/02 and had the ignition coils replaced, the PCM replaces and one injector replaced on that visit.

Tech. Comments: EXSTENCIVE TIME R R TRIM PANLES TO OPEN AND INSPECT WIRRING HARNESS.REPLACE ALL EIGHT COIL PACKS PER HOTLINE.

Customer Comments: CUSTOMER STATES VECH WANTS TO STALL OUT AT STOPS

Regards

Mark Freeland

6-Sigma Black Belt
Engine Research Department
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MD 2629 - SRL - Room 1517
Dearborn, MI 48121-2053 USA
email: mfreela1@ford.com
Tel.: (313) 594-7645

---Original Message---
From: Gates, Freeman (F.C.)
Sent: Tuesday, December 03, 2002 10:29 AM
To: Freeland, Mark (M.); Maurer, James (J.B.); McCoy, James (J.D.)
Cc: Kotwicki, Allan (A.J.); Alles, Sheran (S.A.); O'Neall, Jim (J.D.); Crowley, Ian (I.A.); Williamson, Richard (E.); Jefford, Bob (R.D.)
Subject: RE: DPFE Sensor stalls

This vehicle will have the ESM. This sounds like it may even be an EVR concern i.e. vacuum on EGR valve continually. We have seen this on some EVR applications if the filter is not installed correctly or contamination exists on the disc (internal to EVR). We have seen this at least 1 time this year. When you disconnect the DPFE, you also disconnect, EVR and MAP sensor through the common connector.

Thanks Mark/Richard.

Anyway the answer is **YES** , we want the part !

---Original Message---
From: Freeland, Mark (M.)
Sent: Tuesday, December 03, 2002 10:14 AM
To: Gates, Freeman (F.C.); Maurer, James (J.B.); McCoy, James (J.D.)
Cc: Kotwicki, Allan (A.J.); Alles, Sheran (S.A.); O'Neill, Jim (J.D.)
Subject: FW: DPFE Sensor stalls
Importance: High

Freeman, Jim & Jim,

Please read the attached from Rick Williamson of ECI. I will ask Rick to obtain the part if he can.

A couple of questions:
1) Which dPFE sensor will this vehicle have, Kavlico TM, Motorola Dash Mount or Siemens (Kavlico) ECM?
2) What current draw does it take to shut down a 2003 MY Town Car?

Regards

Mark Freeland

6-Sigma Black Belt
Engine Research Department
Ford Research Laboratory
P.O. Box 2053
MD 2629 - SRL - Room 1517
Dearborn, MI 48121-2053 USA
email: mfreela1@ford.com
Tel.: (313) 594-7645

---Original Message---
From: Williamson, Richard (E.)
Sent: Wednesday, November 27, 2002 7:57 AM
To: Freeland, Mark (M.)
Subject: DPFE Sensor stalls
Importance: High

HI Mark,
How have you been?
Are you still interested in the DPFE sensor?
I have a CQIS report that you might be interested in:

CSQI002 CQIS Indicator Summary 11/27/02 07:50:39
==>_____ 1 of 1
Rpt#: 2KTAC415 EDSR --or-- Q 200200039171 Rpt: 11/21/2002 Odom: 3,439 M
Rvwd: File: _ Folder: _____ Attchmnts: 0 Print Smy/Disp Detail(P/D): _
Vehicle: 2003 TOWN CAR,EXEC ,SEDAN 1LNHM81W73Y626638 Bld: 07/29/2002
Engine: 4.6L ROM B Calb: Trans: Axle: A/C:
Dealer Id: 08910 Columbia Ford Lincoln-Mercury Ph#: (860) 228-2886
State: Connecticut City: Columbia Orig/Caller: PAUL DANIELUK
Symptom: 6 07 6 93 DRVABL,STALL/QUITS,AT CRUISE,ALL ENGINE TEMP
Addl Sym: St: CCRG/EPRC: S Rvwd: A Dt: 11/25/2002
Fix: Y Caus. Comp: EGR ASSEMBLY -- RPL Condition Code:

Region Code: 11 Region Name: Boston -11

CONCER VEHICLE STALLS WHILE DRIVING SOMETIMES, SOMETIMES IT RESTARTS AND SOMETIMES IT WON'T CRANK AFTER IT STALLS.
TECH/C NGS SELF TEST NO CODES, WHEN CAR WON'T CRANK YOU LOSE COMMUNICATION WITH PCM, THEFT LIGHT DOES NOT PROVE OUT WHEN KEY IS TURNED ON,

UNPLUGGED DPFE AND CONCERN IS CORRECTED. REPLACED SHORTED DPFE ERG VALVE ASSEMBLY AND RETEST.

I am going to try and get the part back, let me know if you would like it .....

Take care,

RICK WILLIAMSON
Product Concern Analyst
Enhanced Concern Identification
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LINEAR TECHNOLOGY

DESIGN NOTES

Number 39 in a series from Linear Technology Corporation *September, 1990*

Low Power CMOS RS485 Transceiver

Robert Reay

Introduction

The EIA RS485 data transmission standard has become popular because it allows for balanced data transmission in a party line configuration. Users are able to configure inexpensive local area networks and multi-drop communication links using twisted pair wire and the protocol of their choice.

Previous RS485 transceivers have been designed using bipolar technology because the common mode range of the device must extend beyond the supplies and be immune to ESD damage and latchup. Unfortunately, the bipolar devices draw a large amount of supply current and are unacceptable for low power applications. The LTC485 is the first CMOS RS485 transceiver featuring ultra low power consumption (I_{CC} = 500µA max.) without sacrificing ESD and latchup immunity.

Proprietary Output Stage

The LTC485 driver output stage of Figure 1 features a common mode range that extends beyond the supplies while virtually eliminating latchup and providing excellent ESD protection. Two Schottky diodes SD3 and SD4 are added to a conventional CMOS inverter output stage. The Schottky diodes are fabricated by a proprietary modification to a standard N-well CMOS process. When the output stage is operating normally, the Schottky diodes are forward biased and have a small voltage drop across them. When the output is in the high impedance state and is driven above V_{CC} or below ground by another driver on the party line, the parasitic diode D1 or D2 will forward bias, but SD3 or SD4 will reverse bias and prevent current from flowing into the N-well or substrate. Thus, the high impedance state is maintained even with the output voltage beyond the supplies. With no current flow into the N-well or substrate, latchup is virtually eliminated.

Propagation Delay

Using the test circuit of Figure 4 with only one foot of twisted pair wire, Figures 2 and 3 show the typical propagation delays.

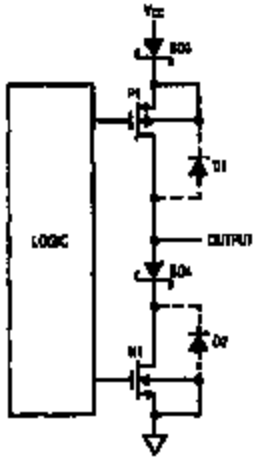

Figure 1. LTC485 Output Stage

Figure 2. LTC485 System Waveforms

Figure 3. LTC485 System Waveforms

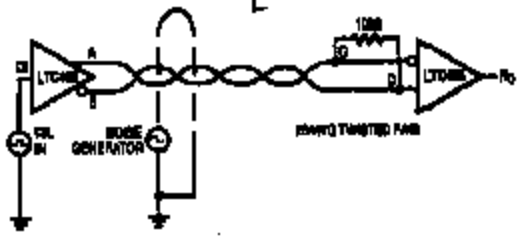

Figure 4. LTC485 System Test Circuit

BA82-027-R 10362

LTC486 Line Length vs Data Rate

The maximum line length allowable for the RS422/RS485 standard is 4000 feet. Using the test circuit of Figure 4 with 4000 feet of twisted pair wire, Figure 5 and 6 show that with ±20Vp-p common mode noise injected on the line, the LTC486 is able to reconstruct the data stream at the end of the wire.

Figures 7 and 8 show that the LTC486 is able to comfortably drive 4000 feet of wire at 110kHz.

When specifying line length vs maximum data rate the curve in Figure 8 should be used:

Figure 5. System Common Mode Voltage @ 15.2kHz

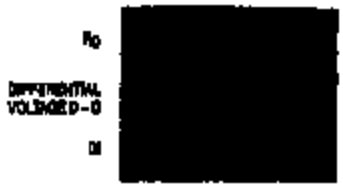

Figure 6. System Differential Voltage @ 15.2kHz

Figure 7. System Common Mode Voltage @ 110kHz

Figure 8. System Differential Voltage @ 110kHz

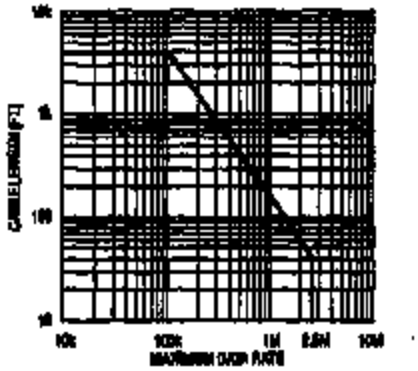

Figure 9. Cable Length vs Maximum Data Rate

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DN39-027-0 10383

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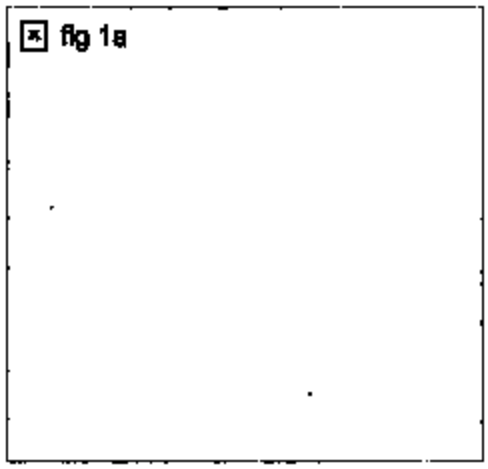
Winning the Battle Against Latchup In CMOS Analog Switches

by Catherine Redmond (catherine.redmond@analog.com)

This article will briefly describe the causes, mechanism, and consequences of latchup and discuss available prevention methods. Although our aim is to give an understanding of latchup as it occurs in CMOS switches, similar principles apply to many other CMOS devices. *Latchup* may be defined as the creation of a low-impedance path between power supply rails as a result of triggering a parasitic device. In this condition, excessive current flow is possible, and a potentially destructive situation exists. After even a very short period of time in this condition, the device in which it occurs can be destroyed or weakened; and potential damage can occur to other components in the system. Latchup may be caused by a number of triggering factors, to be discussed below—including overvoltage spikes or transients, exceeding maximum ratings, and incorrect power sequencing.

CAUSE

For an understanding of latchup, it is desirable to briefly review the basics and understand the participating components. As already stated, latch-up occurs as a result of triggering a parasitic device—in effect an SCR (silicon controlled rectifier), a four-layer pnpn device formed by at least one pnp and at least one npn transistor connected as shown in Figure 1.



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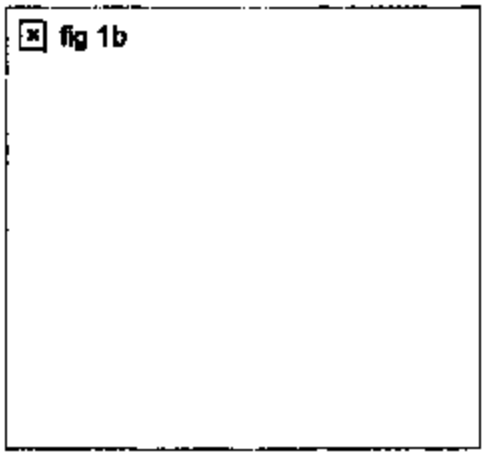

b) Current- voltage characteristic of an SCR.

Figure 1.

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When thus latched, and no longer dependent on the trigger source applied to the gate (G), a continual low-impedance path exists between anode and cathode. Since the triggering source does need not be constant, it could simply be a spike or a glitch; removing it will not turn off the SCR. As long as the current through the SCR is sufficiently large, it will remain in its latched state. If, however, the current can be reduced to a point where it falls below a holding-current value, I_H, the SCR switches off. Figure 1b shows the current-to-voltage transfer function for an SCR. In order to bring the device out of its conductive state, either the voltage applied across the SCR must be reduced to a value where each transistor turns off, or the current through the SCR must be reduced below its holding current.

A CMOS switch channel effectively consists of PMOS and NMOS devices connected in parallel; control signals to turn it off and on are applied via drivers. Since all these MOS devices are located close together on the die, it is possible that, with appropriate excitation, parasitic SCR devices may conduct — a form of behavior possible with any CMOS circuit. Figure 2 illustrates a simplified cross section showing two CMOS structures, one PMOS and one NMOS; these could be connected together as an inverter or as the switch channel. The parasitic transistors responsible for latch-up behavior, Q1 (vertical PNP) and Q2 (lateral NPN) are also shown.

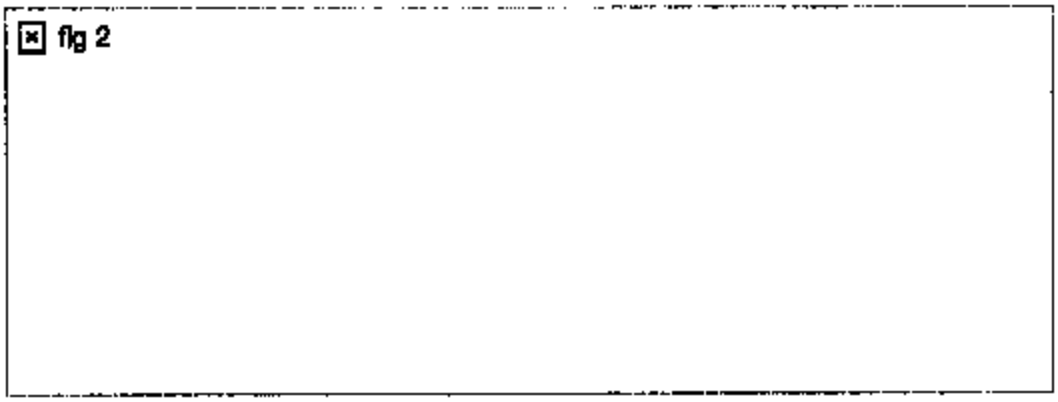


Figure 2. Cross-section of PMOS and NMOS devices, showing parasitic transistors Q1 and Q2.

P- substrate is used in devices from the ADG7xx family of switches and multiplexers, while devices from ADG4xx and ADG5xx families use N+ substrate. From Figure 2, it can be seen that a reinterpretation of the silicon configuration shows that the inherent parasitic bipolar transistors, Q1 & Q2, produce the parasitic SCR structure discussed above (Figure 3).

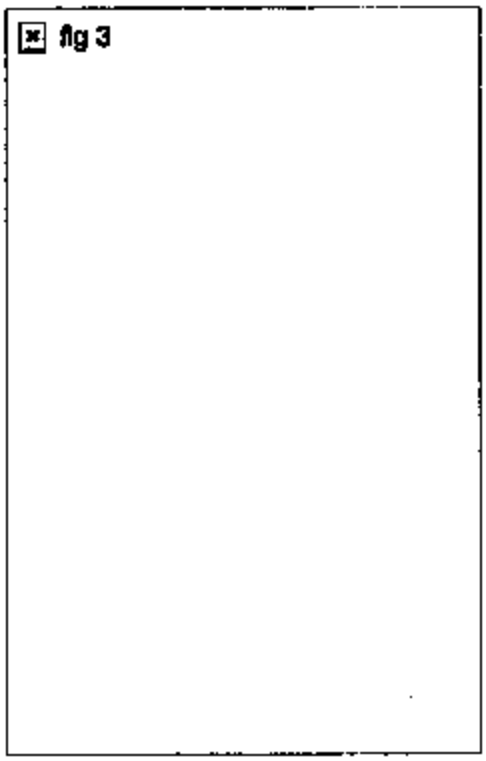


Figure 3. Rearrangement of the way we view the parasitic bipolars of Figure 2 shows an SCR structure.

Triggering mechanisms

Having described the architecture that makes latchup possible, we now discuss the events that can trigger such behavior. SCR latchup can occur through one of the following mechanisms.

- *Supply voltages exceeding the absolute maximum ratings.* These ratings in the data sheet are an indication of the maximum voltage that can safely be applied to the switch. Anything in excess may result in breakdown of an internal junction and hence damage to the device. In addition, operation of the switch under conditions close to the maximum ratings may degrade long-term reliability. It is important to note that these ratings apply at all times, including when the switch is being powered on and off. The triggering mode could result from transients on supply rails.
- *Input/output pin voltage exceeding either supply rail by more than a diode drop.* This could occur as a result of a fault on a channel or input—if a part of the system is powered on prior to the supplies being present at the switch (or similar CMOS components in the system). The powered part of the circuit would be sending signals to other devices in the design which may not be able to handle the voltage levels presented. The resulting voltage levels could exceed the maximum rating of the device, and possibly result in latchup. Again, this could occur as a result of spikes or glitches on input or output channels.
- *Poorly managed multiple power supplies.* Switches that have multiple power supplies tend to be more susceptible to latchup resulting from improper power-supply sequencing. Such switches usually have two analog supplies, V_{DD} and V_{SS}, and a digital supply, V_L. In some cases, when the digital supply is applied prior to the other supplies, it may be possible for maximum ratings to be exceeded and the device to enter a latchup state. In general, for those devices that require an external digital supply, V_L, we recommend that when power is being applied to and removed from the device, care should be taken to ensure the maximum ratings are not exceeded.

When any of the triggering mechanism described above occur, the parasitic SCR structure of Figure 1a may begin to conduct, producing a low impedance state between power supply rails. If there is no current limit mechanism on the supplies, excessive current will flow through this SCR structure and through the switch. This could destroy the switch and other components if allowed to persist. With high current levels, a device would not have to remain in a latch-up state for very long; even very brief latchup can result in permanent damage if current is not limited.

Protection and prevention

But such a fate is not inevitable in CMOS circuitry. The simplest way of preventing latch-up occurring is to adhere to the absolute maximum ratings. But if this is not always possible, there are other methods of designing a latch-up-proof system.

Here are some options for protecting against and preventing latchup: Where it is possible for digital or analog inputs to exceed the V_{DD} supply—either while power is being applied or during operation—the addition of a diode connected in series with V_{DD} prevents base current from flowing, thus avoiding SCR triggering and hence latchup. While Figure 4 shows the case where the *digital* input is exceeding the supply of the switch, IC#2, the diode also protects against overvoltages applied to the switch's *analog* signal path.

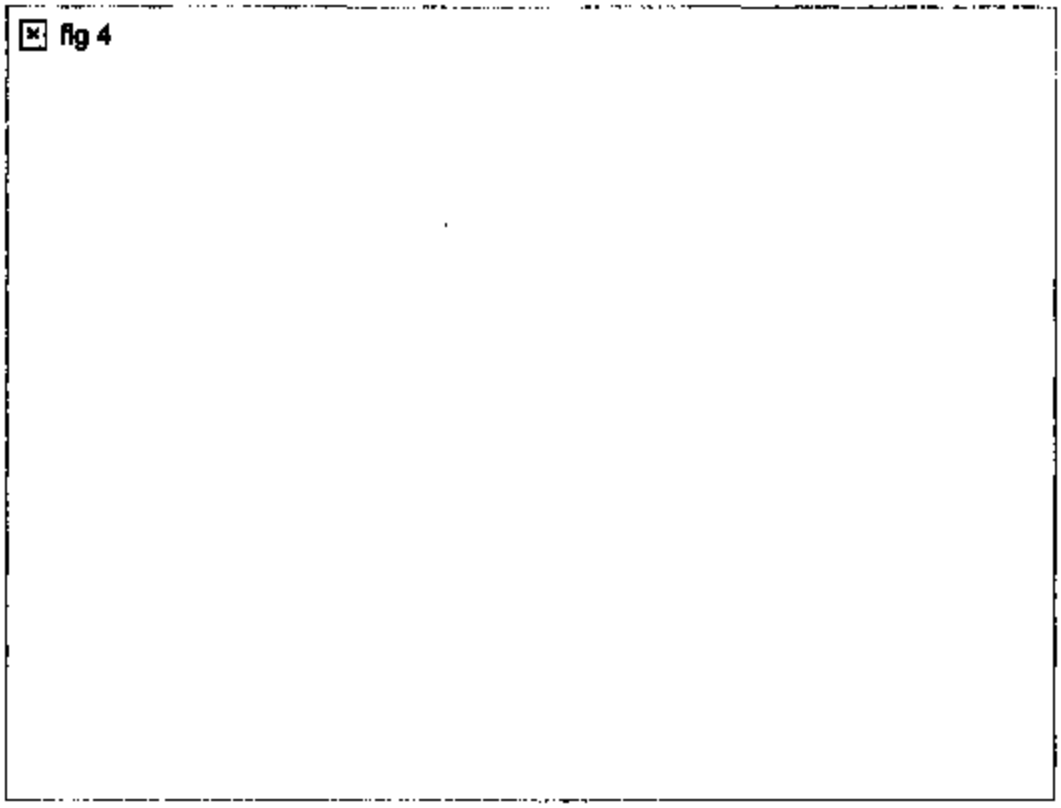
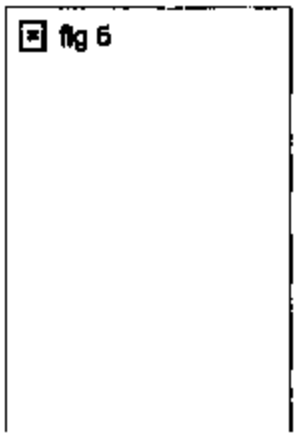


Figure 4. Addition of a diode in series with V_{DD} prevents SCR triggering.

Now, consider a switch with multiple supplies, where for example, the digital supply, V_L, may be applied to the device prior to other supplies, exceeding the maximum ratings and exposing the circuit to the potential for latch-up. Internal ESD (electrostatic-discharge-limiting) diodes may get turned on, so the simple addition of a Schottky diode, connected between V_L and V_{DD} (Figure 5) will adequately prevent SCR conduction and subsequent latch-up. This works very well; it ensures that when V_L and V_{DD} are applied to the switch, V_{DD} is always within a diode drop (0.3 V for Schottky) of V_L, so the maximum ratings are not exceeded.



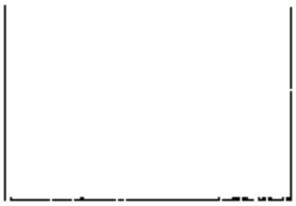


Figure 5. Addition of a Schottky diode from V_L to V_{DD} ensures max ratings are not exceeded.

Where the addition of an extra component is not a viable option, due to cost or limited board space, switches are available that have been manufactured on a process ensuring they are latch-up proof. The process uses an insulating oxide layer (trench) between the NMOS and PMOS devices of each switch. This oxide layer is both horizontal and vertical, producing complete isolation between MOS devices as shown in Figure 6.

Figure 6. Cross-section of switch manufactured with trench processing.

This eliminates the parasitic bipolar devices between transistors, resulting in a latch-up proof switch. "Latchup-proof" means that no matter what way the power is sequenced to the device, latchup cannot occur.

Table 1 lists Analog Devices switches, multiplexers and channel protectors that have such processing. [For more information on Analog Devices switch products (including high-speed crosspoint switches), click here.] Although all the devices listed are latchup proof, not all are designed to handle *overvoltages* outside the supply rails, as the table indicates. In addition to these latchup proof switches, there are other devices that can tolerate under- and overvoltages, with power applied, of +40 V/—5 V in excess of supplies and +55 V/—40 V with power not applied to the device. These devices are specifically designed to ensure that they can handle faults in the event of power-on or -off conditions. They also employ the insulating oxide layer to protect against latchup. They are available for use as either multiplexers or as *channel protectors*.

Table 1. Latchup proof Analog Devices switches, multiplexers and channel protectors.

Part Number	Function	Latchup Proof	Over/Under-voltage Capability	Package[1]
ADG431A	Quad SPST (NC)	YES	NO	R-16
ADG432A	Quad SPST (NO)	YES	NO	R-16
ADG433A	Quad SPST (2NC, 2NO)	YES	NO	R-16
ADG441	Quad SPST (NC)	YES	NO	R-16, N-16
ADG442	Quad SPST (NO)	YES	NO	R-16, N-16
ADG444	Quad SPST (2NC, 2NO)	YES	NO	R-16, N-16
ADG511A	Quad SPST (±5 V, 5 V, 3 V)	YES	NO	R-16
ADG512A	Quad SPST (±5 V, 5 V, 3 V)	YES	NO	R-16
ADG513A	Quad SPST (±5 V, 5 V, 3 V)	YES	NO	R-16
ADG438F	Octal 8-1 Channel Multiplexer	YES	YES	R-16, N-16
ADG508F	Octal 8-1 Channel Multiplexer	YES	YES	RN-16, RW-16, N-16
ADG439F	Differential 4-1 Channel Mux	YES	YES	R-16, N-16
ADG509F	Differential 4-1 Channel Mux	YES	YES	RN-16, RW-16, N-16
ADG465	Single Channel Protector	YES	YES	RT-6, RM-8
ADG466	Triple Channel Protector	YES	YES	RM-8, R-8, N-8
ADG467	Octal Channel Protector	YES	YES	RS-20, R-18

1 N = DIP, R/RN = 0.15" SOIC, RW = 0.3" SOIC, RS = SSOP, RM=microSOIC, RT = SOT-23

The multiplexers use a structure having n-channel, p-channel, and n-channel MOSFETs in series (Figure 7) to provide both device- and signal-source protection in the event of an overvoltage or power loss. The multiplexer can withstand continuous overvoltage inputs from –40 V to +55 V. When one of the analog inputs or outputs exceeds the power supplies, one of its MOSFETs will switch off, the multiplexer input (or output) appears as an open circuit, and the output is clamped to within the supply rail, thereby preventing the overvoltage from damaging any circuitry following the multiplexer. This protects the multiplexer, the circuitry it drives, and the sensors or signal sources which drive the multiplexer. Figure 7 shows what happens on one channel of the ADG438F in the event of a positive overvoltage. Because the

fault protection works regardless of the presence of supplies, the muxes are also ideal for use in applications where power sequencing cannot always be guaranteed to protect analog inputs, (e.g., hot-insertion rack systems).

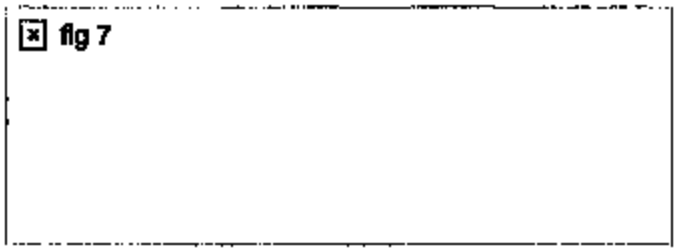


Figure 7. +55 V overvoltage applied to the input channel of ADG438F/ADG439F multiplexer in ON state.

Similarly, *channel protectors* are used to protect sensitive components from voltage transients in the signal path, whether or not the power supplies are present. They are built like the fault-protected muxes described above. When powered, the channel is always in the ON condition, but in the event of a fault, it clamps the output to within the supply rails, as shown in Figure 8.

Figure 8. Channel protector clamps overvoltages to within power supply rail voltage and protects sensitive components.

Channel protectors are generally placed in series with the signal path ahead of standard CMOS-processed devices to ensure that potential faults can be tolerated without damage to components in the system. A common way of protecting a channel from potential faults, in either a powered or non-powered condition, is to connect diodes and current limiting resistors between the channel and the supplies. While it is an effective solution, it requires three extra components per channel, plus the board space to accommodate them. A channel protector would be an equally effective but simpler solution in a single small package.

For example, a channel protector could be used in conjunction with an ADC, switch, multiplexer or other device to ensure that all the channels are protected, both in the event of an over- or undervoltage, and a fault when the system is unpowered. These devices can

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withstand continuous voltage inputs from -40 V to +40 V. Because the channel protection works regardless of the presence of supplies, channel protectors are also ideal for use in applications where power sequencing cannot always be guaranteed to protect analog inputs, (a familiar example is hot-insertion rack systems).

CONCLUSION

Inasmuch as no application can tolerate latchup, it is necessary to be aware of its possibility, understand it, protect against it, and take measures to prevent it from happening. Given some thought and the use of available methods and components, it is indeed possible to assemble a latchup-proof system. While discrete solutions—such as diodes—could be used, devices like latchup proof switches, fault protected multiplexers and channel protectors may provide a simpler, more-compact, and more generally suitable solution, resulting in a robust system likely to give fewer problems in the field.

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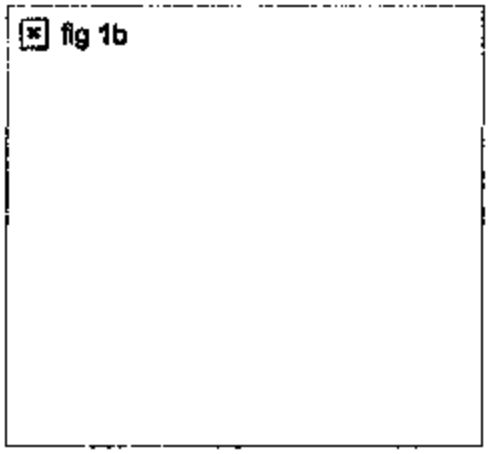
CAUSE

For an understanding of latchup, it is desirable to briefly review the basics and understand the participating components. As already stated, latch-up occurs as a result of triggering a parasitic device—in effect an SCR (silicon controlled rectifier), a four-layer pnpn device formed by at least one pnp and at least one npn transistor connected as shown in Figure 1.

fig 1a

a) Transistor equivalent of an SCR.



b) Current- voltage characteristic of an SCR.

Figure 1.

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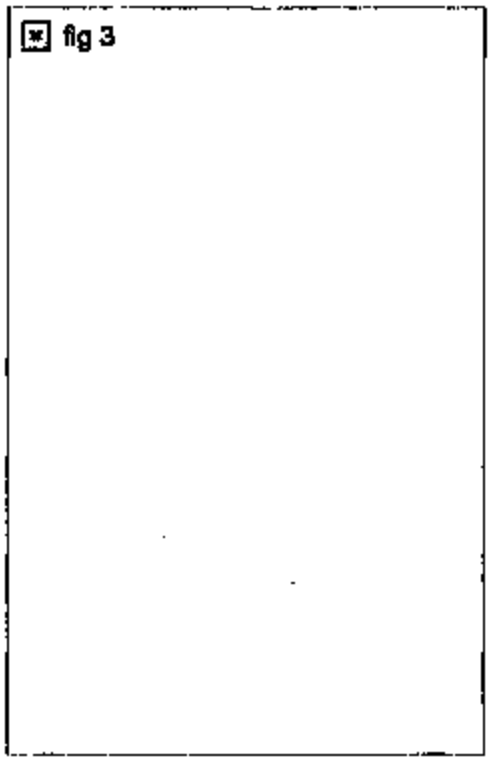

Figure 3. Rearrangement of the way we view the parasitic bipolars of Figure 2 shows an SCR structure.

Triggering mechanisms

Having described the architecture that makes latchup possible, we now discuss the events that can trigger such behavior. SCR latchup can occur through one of the following mechanisms.

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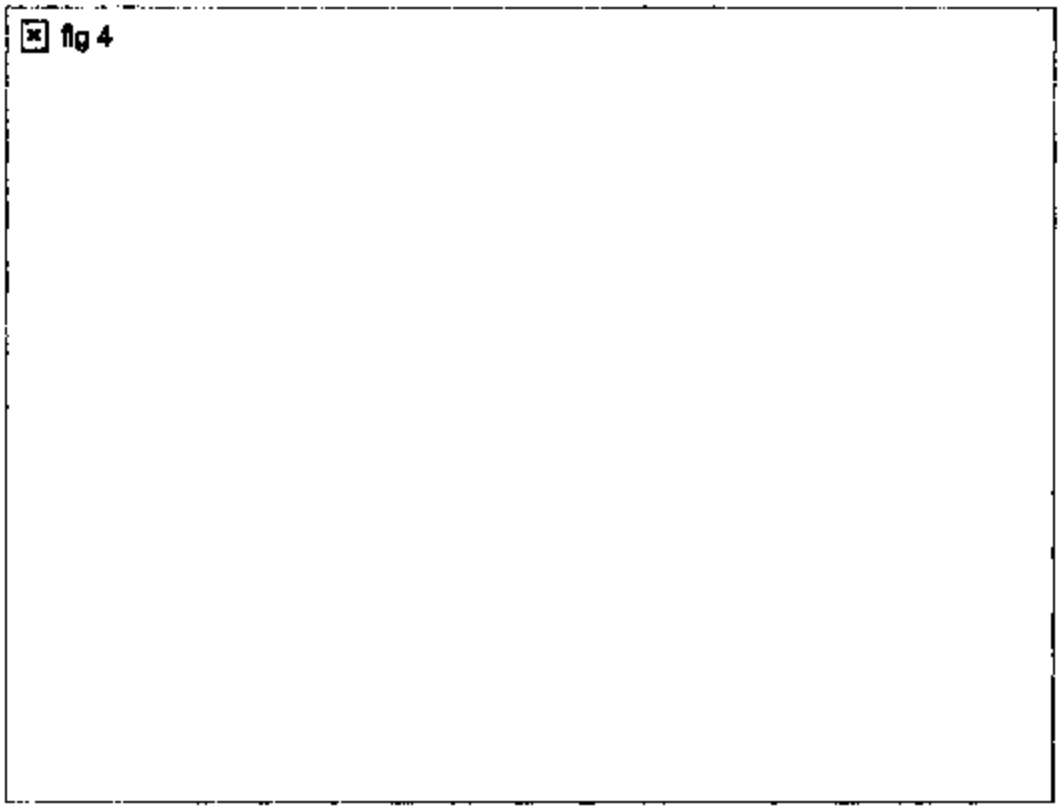


Figure 4. Addition of a diode in series with V_{DD} prevents SCR triggering.

Now, consider a switch with multiple supplies, where for example, the digital supply, V_L, may be applied to the device prior to other supplies, exceeding the maximum ratings and exposing the circuit to the potential for latch-up. Internal ESD (electrostatic-discharge-limiting) diodes may get turned on, so the simple addition of a Schottky diode, connected between V_L and V_{DD} (Figure 5) will adequately prevent SCR conduction and subsequent latch-up. This works very well; it ensures that when V_L and V_{DD} are applied to the switch, V_{DD} is always within a diode drop (0.3 V for Schottky) of V_L, so the maximum ratings are not exceeded.

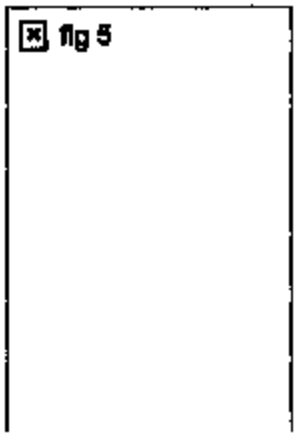


Figure 5. Addition of a Schottky diode from V_L to V_{DD} ensures max ratings are not exceeded.

Where the addition of an extra component is not a viable option, due to cost or limited board space, switches are available that have been manufactured on a process ensuring they are latch-up proof. The process uses an insulating oxide layer (trench) between the NMOS and PMOS devices of each switch. This oxide layer is both horizontal and vertical, producing complete isolation between MOS devices as shown in Figure 6.

Figure 6. Cross-section of switch manufactured with trench processing.

This eliminates the parasitic bipolar devices between transistors, resulting in a latch-up proof switch. "Latchup-proof" means that no matter what way the power is sequenced to the device, latchup cannot occur.

Table 1 lists Analog Devices switches, multiplexers and channel protectors that have such processing. [For more information on Analog Devices switch products (including high-speed crosspoint switches), click here.] Although all the devices listed are latchup proof, not all are designed to handle *overvoltages* outside the supply rails, as the table indicates. In addition to these latchup proof switches, there are other devices that can tolerate under- and overvoltages, with power applied, of +40 V/—5 V in excess of supplies and +55 V/–40 V with power not applied to the device. These devices are specifically designed to ensure that they can handle faults in the event of power-on or -off conditions. They also employ the insulating oxide layer to protect against latchup. They are available for use as either multiplexers or as *channel protectors*.

Table 1. Latchup proof Analog Devices switches, multiplexers and channel protectors.

Part Number	Function	Latchup Proof	Over/Under-voltage Capability	Package[1]
ADG431A	Quad SPST (NC)	YES	NO	R-16
ADG432A	Quad SPST (NO)	YES	NO	R-16
ADG433A	Quad SPST (2NC, 2NO)	YES	NO	R-16
ADG441	Quad SPST (NC)	YES	NO	R-16, N-16
ADG442	Quad SPST (NO)	YES	NO	R-16, N-16
ADG444	Quad SPST (2NC, 2NO)	YES	NO	R-16, N-16
ADG511A	Quad SPST (±5 V, 5 V, 3 V)	YES	NO	R-16
ADG512A	Quad SPST (±5 V, 5 V, 3 V)	YES	NO	R-16
ADG513A	Quad SPST (±5 V, 5 V, 3 V)	YES	NO	R-16
ADG438F	Octal 8-1 Channel Multiplexer	YES	YES	R-16, N-16
ADG508F	Octal 8-1 Channel Multiplexer	YES	YES	RN-16, RW-16, N-16
ADG439F	Differential 4-1 Channel Mux	YES	YES	R-16, N-16
ADG509F	Differential 4-1 Channel Mux	YES	YES	RN-16, RW-16, N-16
ADG465	Single Channel Protector	YES	YES	RT-6, RM-8
ADG466	Triple Channel Protector	YES	YES	RM-8, R-8, N-8
ADG467	Octal Channel Protector	YES	YES	RS-20, R-18

1 N = DIP, R/RN = 0.15" SOIC, RW = 0.3" SOIC, RS = SSOP, RM=microSOIC, RT = SOT-23

The multiplexers use a structure having n-channel, p-channel, and n-channel MOSFETs in series (Figure 7) to provide both device- and signal-source protection in the event of an overvoltage or power loss. The multiplexer can withstand continuous overvoltage inputs from –40 V to +55 V. When one of the analog inputs or outputs exceeds the power supplies, one of its MOSFETs will switch off, the multiplexer input (or output) appears as an open circuit, and the output is clamped to within the supply rail, thereby preventing the overvoltage from damaging any circuitry following the multiplexer. This protects the multiplexer, the circuitry it drives, and the sensors or signal sources which drive the multiplexer. Figure 7 shows what happens on one channel of the ADG438F in the event of a positive overvoltage. Because the

fault protection works regardless of the presence of supplies, the muxes are also ideal for use in applications where power sequencing cannot always be guaranteed to protect analog inputs, (e.g., hot-insertion rack systems).

Figure 7. +55 V overvoltage applied to the input channel of ADG438F/ADG439F multiplexer in ON state.

Similarly, *channel protectors* are used to protect sensitive components from voltage transients in the signal path, whether or not the power supplies are present. They are built like the fault-protected muxes described above. When powered, the channel is always in the ON condition, but in the event of a fault, it clamps the output to within the supply rails, as shown in Figure 8.

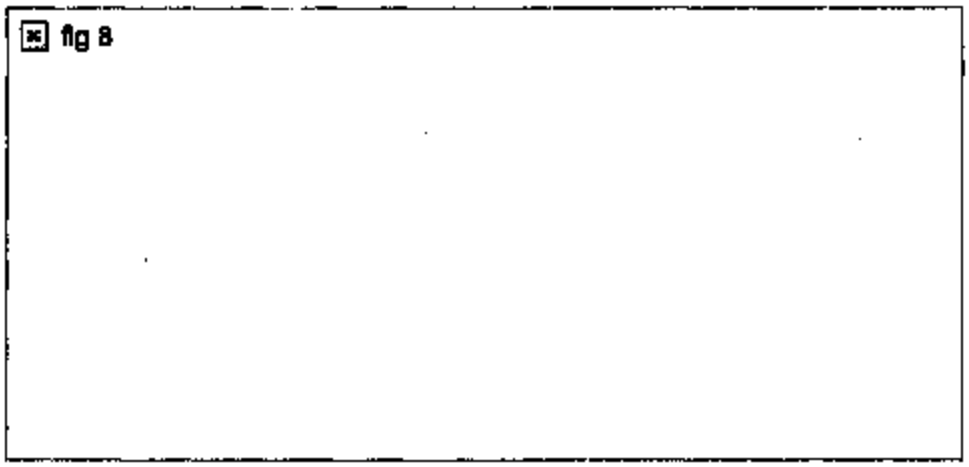


Figure 8. Channel protector clamps overvoltages to within power supply rail voltage and protects sensitive components.

Channel protectors are generally placed in series with the signal path ahead of standard CMOS-processed devices to ensure that potential faults can be tolerated without damage to components in the system. A common way of protecting a channel from potential faults, in either a powered or non-powered condition, is to connect diodes and current limiting resistors between the channel and the supplies. While it is an effective solution, it requires three extra components per channel, plus the board space to accommodate them. A channel protector would be an equally effective but simpler solution in a single small package.

For example, a channel protector could be used in conjunction with an ADC, switch, multiplexer or other device to ensure that all the channels are protected, both in the event of an over- or undervoltage, and a fault when the system is unpowered. These devices can

withstand continuous voltage inputs from -40 V to +40 V. Because the channel protection works regardless of the presence of supplies, channel protectors are also ideal for use in applications where power sequencing cannot always be guaranteed to protect analog inputs, (a familiar example is hot-insertion rack systems).

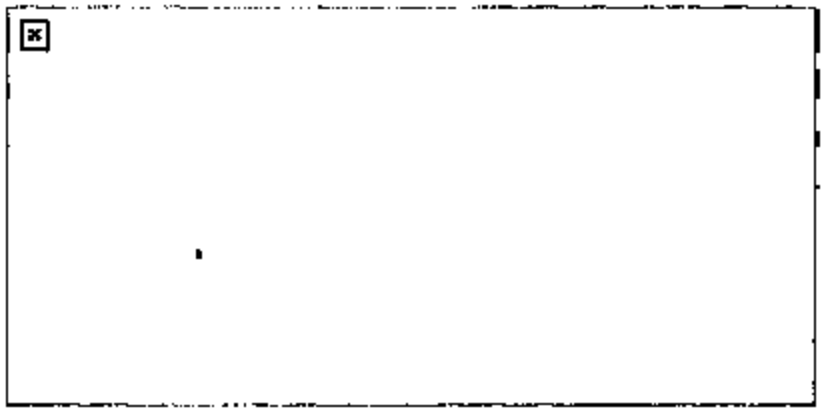
CONCLUSION

Inasmuch as no application can tolerate latchup, it is necessary to be aware of its possibility, understand it, protect against it, and take measures to prevent it from happening. Given some thought and the use of available methods and components, it is indeed possible to assemble a latchup-proof system. While discrete solutions—such as diodes—could be used, devices like latchup proof switches, fault protected multiplexers and channel protectors may provide a simpler, more-compact, and more generally suitable solution, resulting in a robust system likely to give fewer problems in the field.

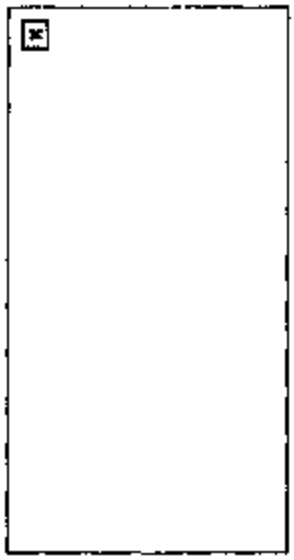
Microelectronics I Notes Supplement

Latchup in Bulk CMOS

A byproduct of the Bulk CMOS structure is a pair of parasitic bipolar transistors. The collector of each BJT is connected to the base of the other transistor in a positive feedback structure. A phenomenon called latchup can occur when (1) both BJT's conduct, creating a low resistance path between Vdd and GND and (2) the product of the gains of the two transistors in the feedback loop, b1 x b2, is greater than one. The result of latchup is at the minimum a circuit malfunction, and in the worst case, the destruction of the device.



Cross section of parasitic transistors in Bulk CMOS



Equivalent Circuit

Latchup may begin when Vout drops below GND due to a noise spike or an improper circuit hookup (Vout is the base of the lateral NPN Q2). If sufficient current flows through Rsub to turn on Q2 (I Rsub > 0.7 V), this will draw current through Rwell. If the voltage drop across Rwell is high enough, Q1 will also turn on, and a self-sustaining low resistance path between the power rails is formed. If

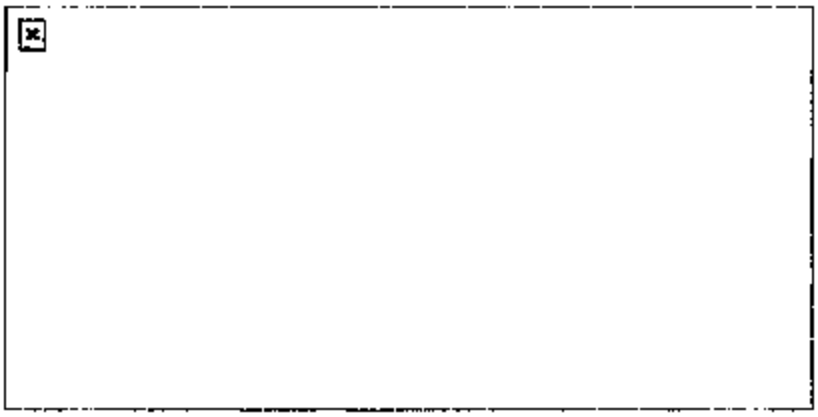
the gains are such that b1 x b2 > 1, latchup may occur. Once latchup has begun, the only way to stop it is to reduce the current below a critical level, usually by removing power from the circuit.

The most likely place for latchup to occur is in pad drivers, where large voltage transients and large currents are present.

Preventing latchup

Fab/Design Approaches

1. Reduce the gain product b1 x b1
   - move n-well and n+ source/drain farther apart increases width of the base of Q2 and reduces gain beta2 > also reduces circuit density
   - buried n+ layer in well reduces gain of Q1
2. Reduce the well and substrate resistances, producing lower voltage drops
   - higher substrate doping level reduces Rsub
   - reduce Rwell by making low resistance contact to GND
   - guard rings around p- and/or n-well, with frequent contacts to the rings, reduces the parasitic resistances.



CMOS transistors with guard rings

Systems Approaches

1. Make sure power supplies are off before plugging a board. A "hot plug in" of an unpowered circuit board or module may cause signal pins to see surge voltages greater than 0.7 V higher than Vdd, which rises more slowly to is peak value. When the chip comes up to full power, sections of it could be latched.
2. Carefully protect electrostatic protection devices associated with I/O pads with guard rings. Electrostatic discharge can trigger latchup. ESD enters the circuit through an I/O pad, where it is clamped to one of the rails by the ESD protection circuit. Devices in the protection circuit can inject minority carriers in the substrate or well, potentially triggering latchup.
3. Radiation, including x-rays, cosmic, or alpha rays, can generate electron-hole pairs as they penetrate the chip. These carriers can contribute to well or substrate currents.
4. Sudden transients on the power or ground bus, which may occur if large numbers of transistors switch simultaneously, can drive the circuit into latchup. Whether this is possible should be

checked through simulation.

Secondary Effects

- *Variations in the I-V characteristics:*
  - *The current-voltage relations deviate significantly from the ideal expressions.*
  - *The ideal expressions are:*

  - *The most important reasons for this difference are:*
- *Velocity saturation effects*
- *Mobility degradation effects*

Secondary Effects

- *Velocity Saturation:*
  - *We modeled carrier mobility, μ_n, as a constant.*
    - *We stated carrier velocity is proportional to the electric field, independent of its value.*
  - *This holds up to a critical value of electric field, E_{sat}, after which the velocity of the carriers tends to saturate:*

Secondary Effects

- *Velocity Saturation:*
  - *From our previous analysis of current in the linear region:*
    - *Current is the product of the drift velocity of the carriers and the available charge :*

Secondary Effects

- *Velocity Saturation:*
  - *This yields a linear relationship between the saturation current and the gate-source voltage (contrasts the squared relationship of long-channel devices).*

Secondary Effects

- *Velocity Saturation:*
  - *Consequently, reducing the operating voltage does not have such a significant effect in submicron devices as it would for long-channel devices (which is good).*
  - *Furthermore, I_D is independent of L in velocity-saturated devices (to the first degree).*
    - *This suggests that current drive cannot be further improved by decreasing the channel length (as was true for long-channel transistors)(which is bad).*
  - *The I-V curves on the previous slide were derived from devices in the same technology (1.2um) but different sizes.*
    - *Long-channel device on the left has W=100um and L=20um while short-channel device on the right has W=4.6um and L=1.2um.*
    - *Velocity saturation reduces the drain current by 53% for $V_{GS} = 5.0V$ and $V_{DS} = 5V$, (1.2mA versus 2.3mA).*

Secondary Effects

- *Mobility Degradation:*
  - *Mobility degradation is a second effect of reducing channel-length.*
    - *This reduces transistor current even at "normal" electric field levels.*
  - *The reduction in the electron mobility is caused by the vertical component of the electric field (which was ignored before).*

Secondary Effects

- *A Model for Velocity Saturation and Mobility Degradation.*

  - *Note that μ_n is not a constant but is a function of the applied electric field as well (due*

to mobility degradation).

- *This shows that the short-channel device has an extended saturation region when compared with a long-channel device ($0 < k < 1$).*

Secondary Effects

- *Subthreshold Conduction:*
  - *The transistor is partially conducting for voltages below the threshold voltage.*
  - *The region is referred to as weak-inversion .*

- *Right logarithmic plot shows current decays in an exponential fashion.*

Secondary Effects

- *Subthreshold Conduction:*
  - *In the absense of a conducting channel, the n^+ (source) - p (bulk) - n^+ (drain) terminals actually form a parasitic bipolar transistor .*
  - *The rate of decrease of current is described by:*

- *Therefore, subthreshold current drops by a factor of 10 for a reduction in V_{GS} of 60mV .*

- *Unfortunately, for actual devices, a is larger than 1, and current drops at a reduced rate .*
  - *Since a is a function of capacitance, it is not easily reduced (SOI).*

- *Moreover, increased temperature slows the rate of decrease.*

Secondary Effects

- *Subthreshold Conduction:*
  - *The presence of subthreshold current detracts from the ideal switch model.*
    - *Ideally, we want $I_D = 0$ when $V_{GS} = 0$.*

- *Particularly for dynamic circuits and static power consumption (I_{DDQ}).*

- *This relationship puts a firm lower bound on the value of threshold voltage.*

- *The slope of the previous plot in the subthreshold region is 121mV/decade, which is equivalent to a α-factor of 1.*

Secondary Effects

- *CMOS Latchup:*
  - *MOS technology contains a number of intrinsic bipolar transistors.*

  - *Particularly in CMOS where wells and substrates combine to form parasitic n-p-n-p structures.*

  - *Triggering these devices results in shorting V_{DD} and GND.*
    - *This often destroys the chip, or at best, requires a power cycle.*

    - *NMOS src - p-substrate - n-well - PMOS src.*

Secondary Effects

- *CMOS Latchup:*

- *When one of the bipolar transistors gets forward biased, it feeds the base of the other transistor.*
  - *Forward bias occurs when current flows through the well or substrate.*

- *Positive feedback increases the current until the circuit fails or burns out.*

Secondary Effects

- *CMOS Latchup:*
  - *R_{nwell} and R_{psubs} should be minimized in order to eliminate latchup.*

  - *This is accomplished by placing numerous well and substrate contacts close to the NMOS/PMOS devices.*

  - *I/O drivers should be surrounded by guard rings .*
    - *Guard rings are just a set of well/substrate contacts arranged around the periphery of the transistor.*
    - *They reduce resistance and the gain of the parasitic bipolars.*

  - *Latchup is not a big problem today due to process innovations and improved design techniques.*

Publications: High-Temperature Microelectronics

If you would like a copy of the paper, please send a request to Paulette Ream at: pream@engin.umich.edu

- **Scaling CMOS Design Rules for High-Temperature Operation,** Richard B. Brown and Koucheng Wu, *High-Temperature Electronics*, Ed. Randall K. Kirschman, IEEE Press, New York, 1999, pp. 278-282.

- **High Temperature Microelectronics - Expanding the Applications for Smart Sensors,** reprint, in *High-Temperature Electronics*, Ed. Randall K. Kirschman, IEEE Press, New York, 1999, pp. 223-236.

- **High Temperature Operation of Silicon MOS Transistors,** Richard B. Brown and Koucheng Wu, in *High Temperature Electronics*, Eds. M. Willander and H. L. Hartnagel, Chapman and Hall, London, pp. 67-119, 1997.

- **High-Temperature Design Rules,** Koucheng Wu, Richard B. Brown, *First International High Temperature Electronics Conference with Short Course*, Albuquerque, New Mexico, June 16-20, 1991.

  Emerging needs in automotive, aircraft, space, and well-logging industries call for operation of electronics at higher temperatures than the traditional 125oC. Many of these applications, though, do not exceed 250oC. Extending the operation of low-cost junction-isolated CMOS to this temperature range is feasible through straightforward changes in process technology, circuit styles, and layout design rules. The greatest challenge in using bulk CMOS at high temperatures is latchup, which can be triggered by junction leakage. This paper presents an empirical model for the holding voltage of CMOS latchup, which can be used to scale the design rules in a way that maintains latchup robustness at higher temperatures.

- **Junction-Isolated CMOS for High-Temperature Microelectronics,** R.B. Brown, K. Wu, M. Ghezzo, D.M. Brown, E. Downey, D. Hanchar *IEEE Transactions on Electron Devices*, vol. 36, no. 9, September 1989, pp. 1854-1856.

  A comparison of latchup susceptibility over a temperature range of 25 to 315oC has been performed for variations on a 1.2-um CMOS process. A special high-temperature process, including all-refractory metallization, thinner epi, and high doping levels, resulted in metal-migration immunity and doubling of latchup holding voltage and current at 300oC.

- ***Research Agenda Proposal for High Temperature Electronics,*** Richard B. Brown, NSF, Nov. 1988, p. 1-19.

- **A CMOS Process for High Temperature Sensors and Circuits,** by R.B. Brown, K.-C. Wu, M. Ghezzo, D.M. Brown, *Technical Digest: IEEE Solid-State Sensor and Actuator Workshop,* Hilton Head, SC, June 6-9, 1988, pp. 117-118.

  Sensor applications from automobile and jet engines to space-based power systems are begging for smart sensors and control circuitry which will operate reliably at temperatures above 200oC. The requirements of these extreme environments can be met by combining high-temperature technologies, design rules, and circuit methods. This paper reports progress in junction-isolated CMOS technology for high temperature operation. Variations on an advanced 1.25um VLSI process have addressed two of the most serious high-temperature problems in CMOS; refractory metallization has eliminated the problem of electromigration; and process variations have doubled latchup holding voltage and current at 300oC.

- **High Temperature Microelectronics - Expanding the Applications for Smart Sensors,** R.B. Brown, F.L. Terry, and K.-C. Wu, *Technical Digest: International Electron Devices Meeting (IEDM),* Washington, D.C., December 6-9, 1987, pp. 274-277.

  Solid-state sensors are attractive for many applications because they can include integrated circuitry as well as the transducer. This potential advantage is often lost because sensing requirements call for ambient temperature higher than what the electronics can tolerate. In this paper we discuss process, layout, and circuit approaches for increasing the operating temperature of silicon circuitry to as high as 300oC. Development of high-temperature microelectronics on smart sensor chips will improve system reliability and extend the use of solid-state sensors into many new applications.

Epi, Thinned, and SOI Substrates: Cure-Alls or Just Lesser Evils?

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J. R. Schwank, and D. S. Walsh

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This work was supported by the Defense Threat Reduction Agency under DTRA IACRO #01-4051 and Work Unit 03780 and the United States Department of Energy. Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy under Contract DE-AC04-94AL85000.

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ER02-827-A 18426

Outline

- Motivation
- Epitaxial substrates
  - Mitigation of single-event latchup
- Thinned substrates
  - Wafer thinning as a means of reducing single-event upset
  - Impact of wafer thinning on single-event latchup
- Silicon-on-Insulator (SOI) substrates
  - Single-event snapback in SOI
  - Anomalous charge collection in SOI devices and ICs
- Conclusions

Motivation for Studying "Alternative" Substrates

- Continuing desire to use commercial devices in the space radiation environment
  - higher performance, lower cost, better availability
  - BUT: poor single-event effects performance (and getting worse)
- Techniques for radiation-hardening reduce performance and/or add area

Is there a way to improve the SEE performance of fully-fabricated commercial integrated circuits?

-and-

By simply choosing parts with alternative substrates can we assure reduced SEE sensitivity?

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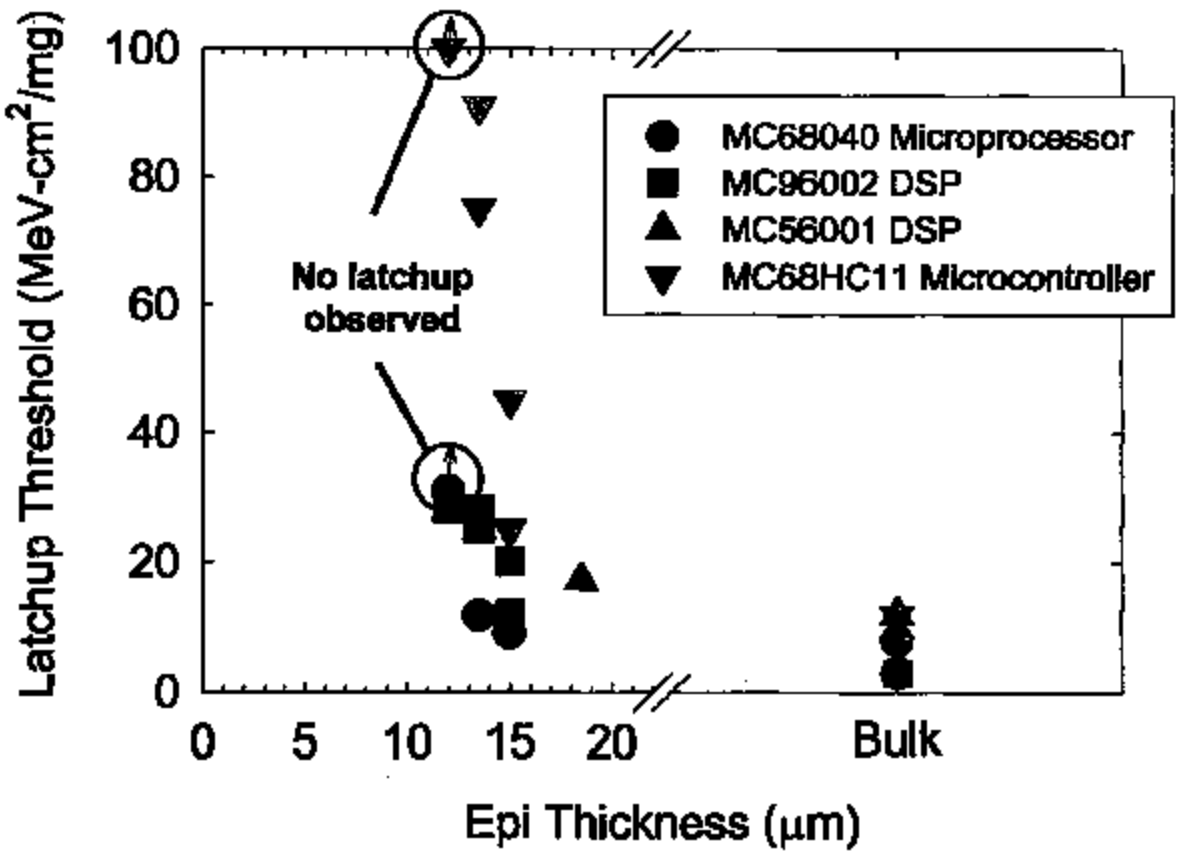
For a Given Technology, Epi Substrates Improve SEL Thresholds



These ICs were fabricated by Motorola in 1992 for evaluation purposes.

After Dodd, *et al., IEEE Trans. Nucl. Sci.* 48, 2001.

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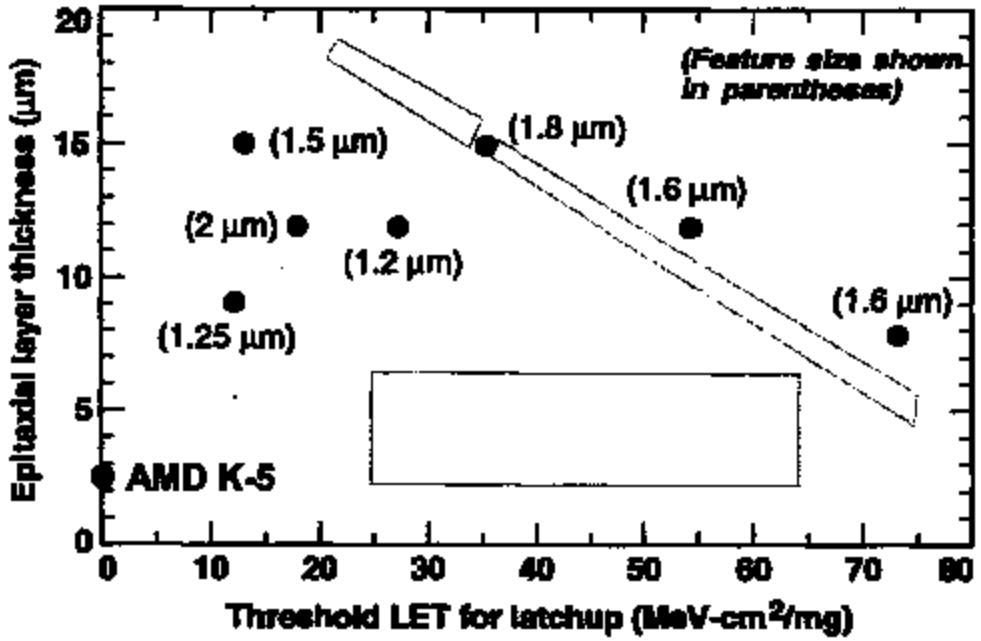
The Use of Epitaxial Substrates Does Not Guarantee Latchup Immunity!



No clear trend in single-event latchup threshold in various commercial technologies as a function of epitaxial layer thickness.

Most devices fabricated on thin epitaxial substrates don't exhibit SEL, but the AMD K-5 is a worrisome counterexample.

After Johnston, *IEEE Trans. Nucl. Sci.* **43**, p. 505, 1996.

Sandia National Laboratories

SN62-627-A 18433

Outline

- Motivation
- Epitaxial substrates
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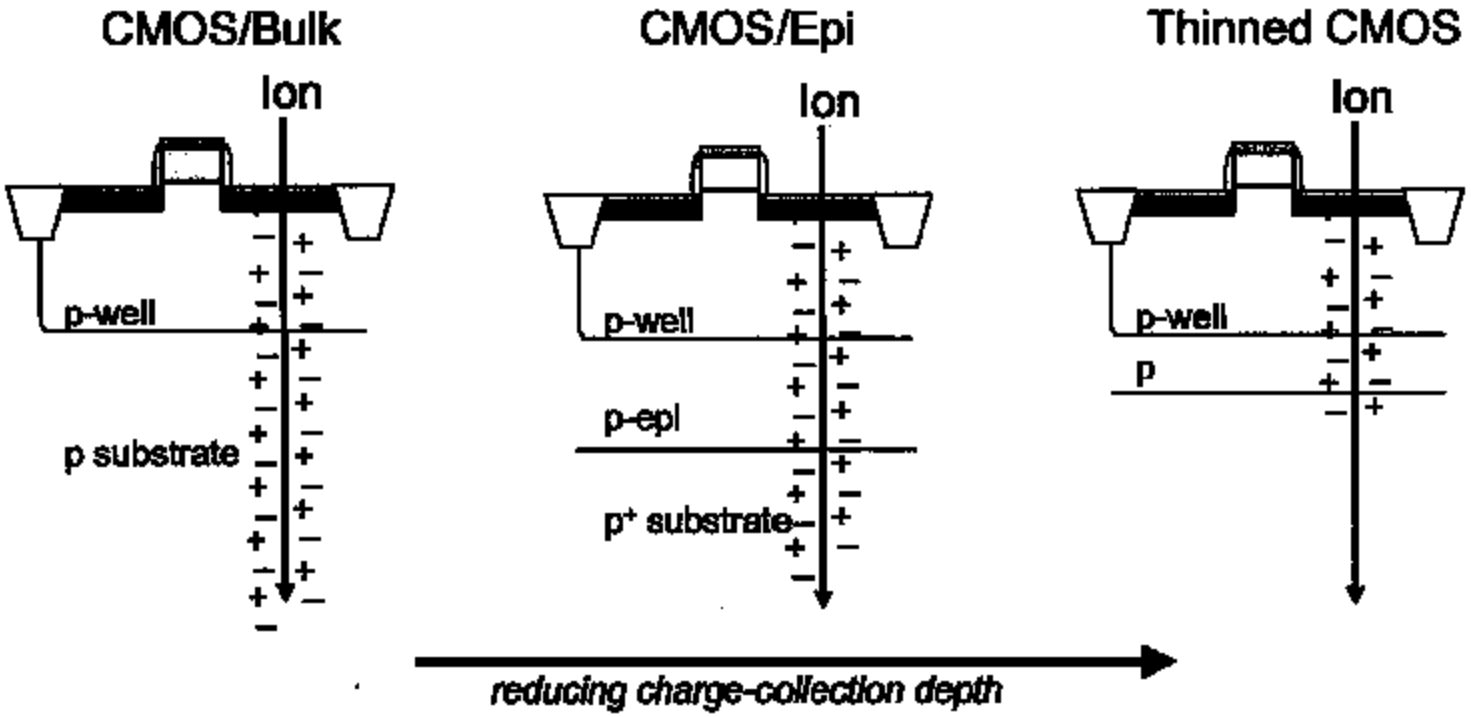
- Conclusions

Wafer Thinning Improves Tolerance to SEE by Reducing the Charge-Collection Volume



- *Practical limits to wafer thinning will be set by the manufacturability of the wafer thinning process, and the original process depths.*

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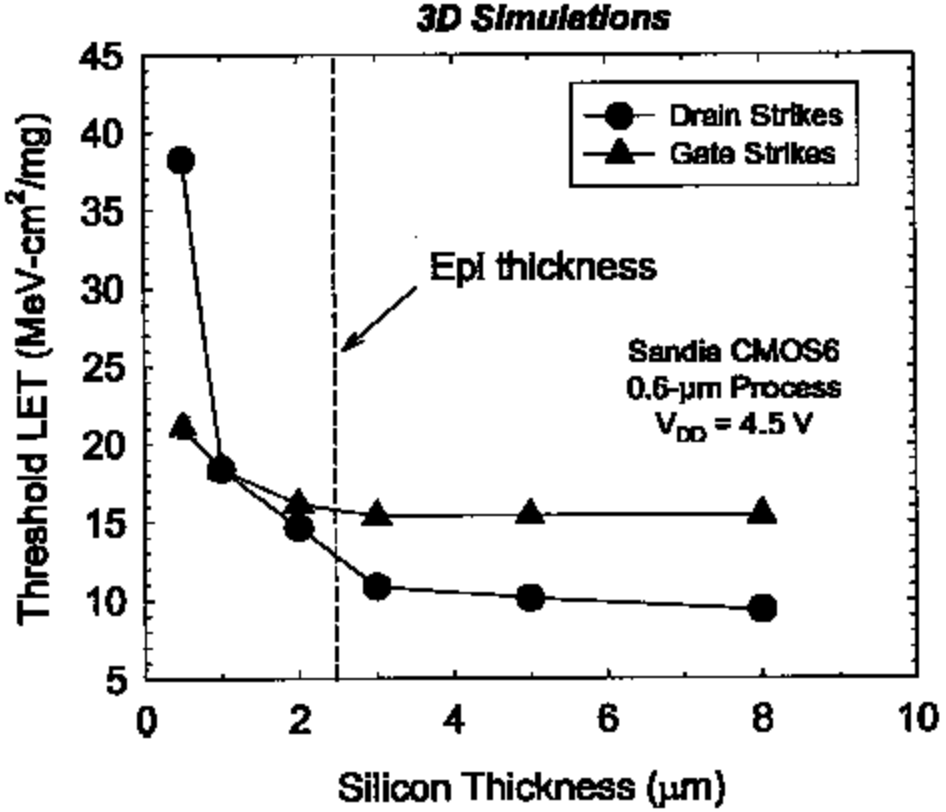
Wafer Thinning Does Not Improve SEU Threshold Until Epi Layer is Reached



For wafers thinned to 0.5 μm, the overall improvement in upset threshold LET is about a factor of two.

For wafer thicknesses less than 1 μm, gate strikes dominate the SEU response, similar to SOI technologies.

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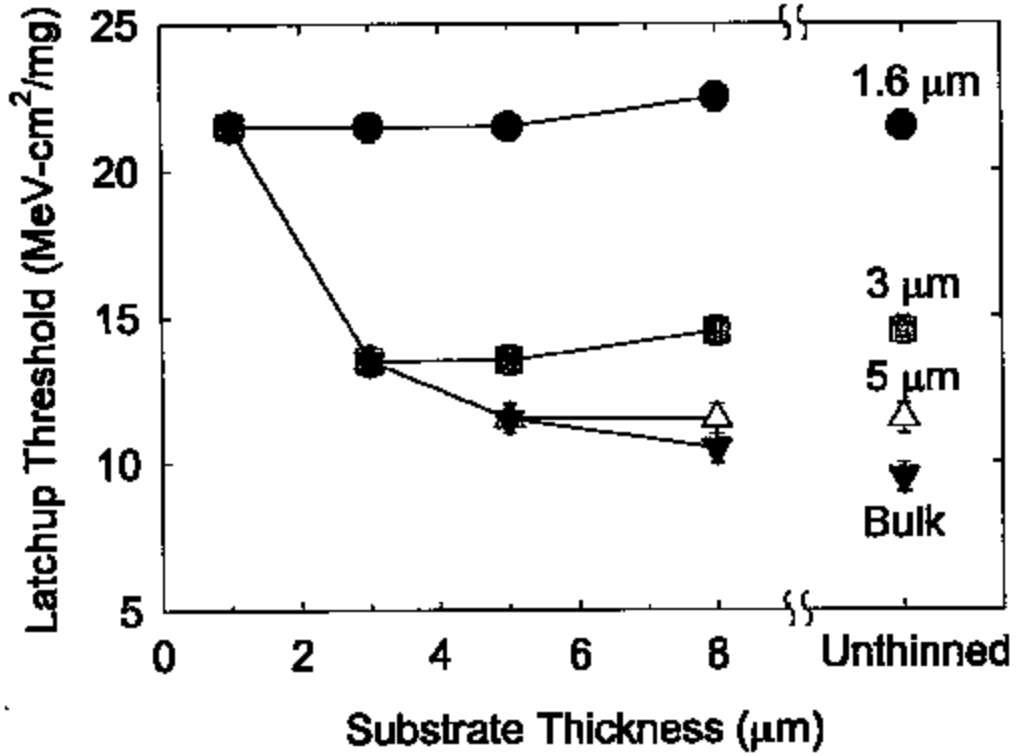
Simulations Indicate Thinned Substrates Give Same Performance as Equivalent Epi Wafer



Modest improvements in SEL threshold result from wafer thinning, but only to the level of an epitaxial wafer with the same epilayer thickness.

These results indicate that the heavily-doped substrate of epitaxial wafers already efficiently truncates charge collection.

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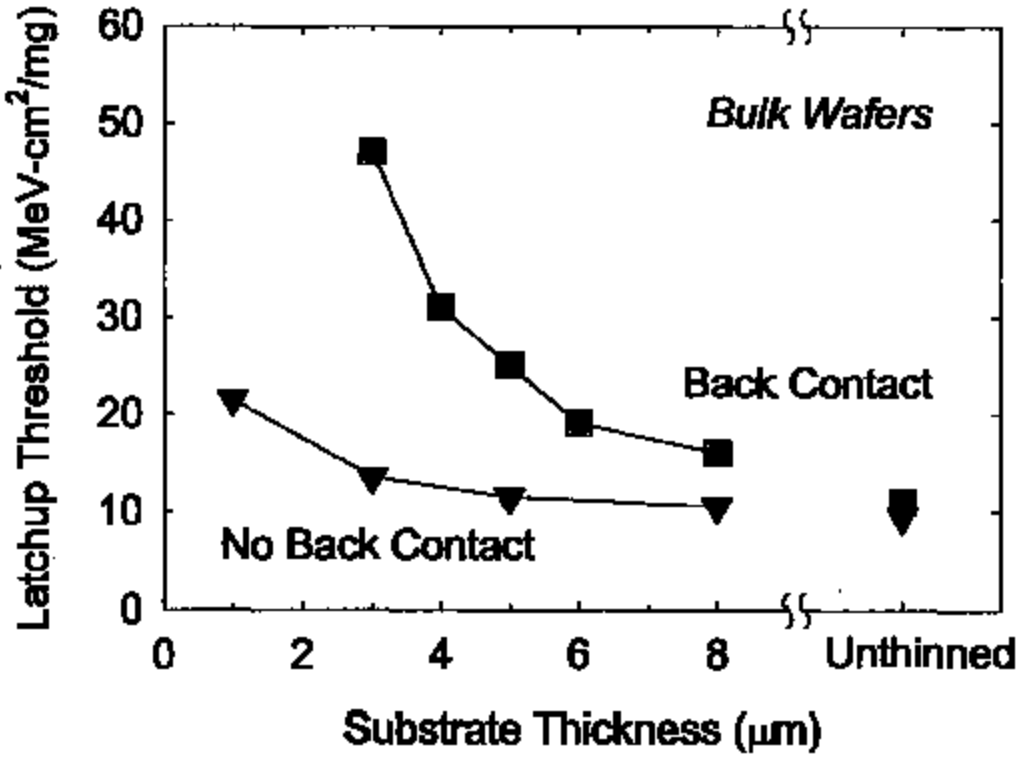
Backside Contacts in Conjunction with Wafer Thinning Greatly Enhance SEL Threshold



Backside contacts serve to shunt the substrate resistance, similar to the heavily-doped substrate in epitaxial wafers.

To use backside contacts, it is necessary to limit wafer thinning to prevent well-to-well contact.

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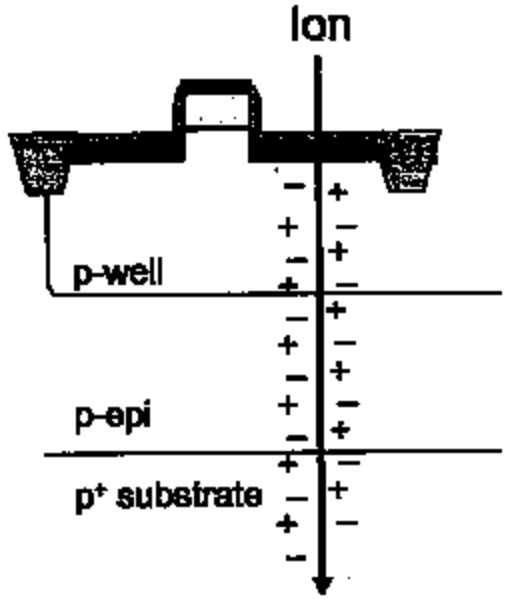
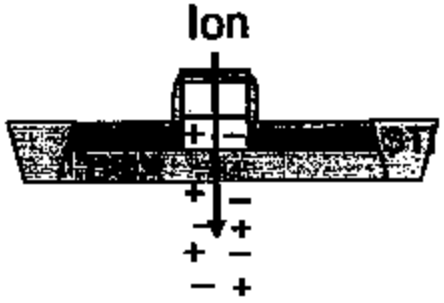
Silicon-on-Insulator Has Greatly Reduced Charge Collection Volume

CMOS/Bulk



CMOS/SOI



In bulk technologies, charge deposited several µm deep can be collected.

In thin-film SOI, the top silicon layer is typically less than 300 nm thick.

Traditional wisdom is that SOI is only sensitive to gate region strikes, and is immune to classical latchup.

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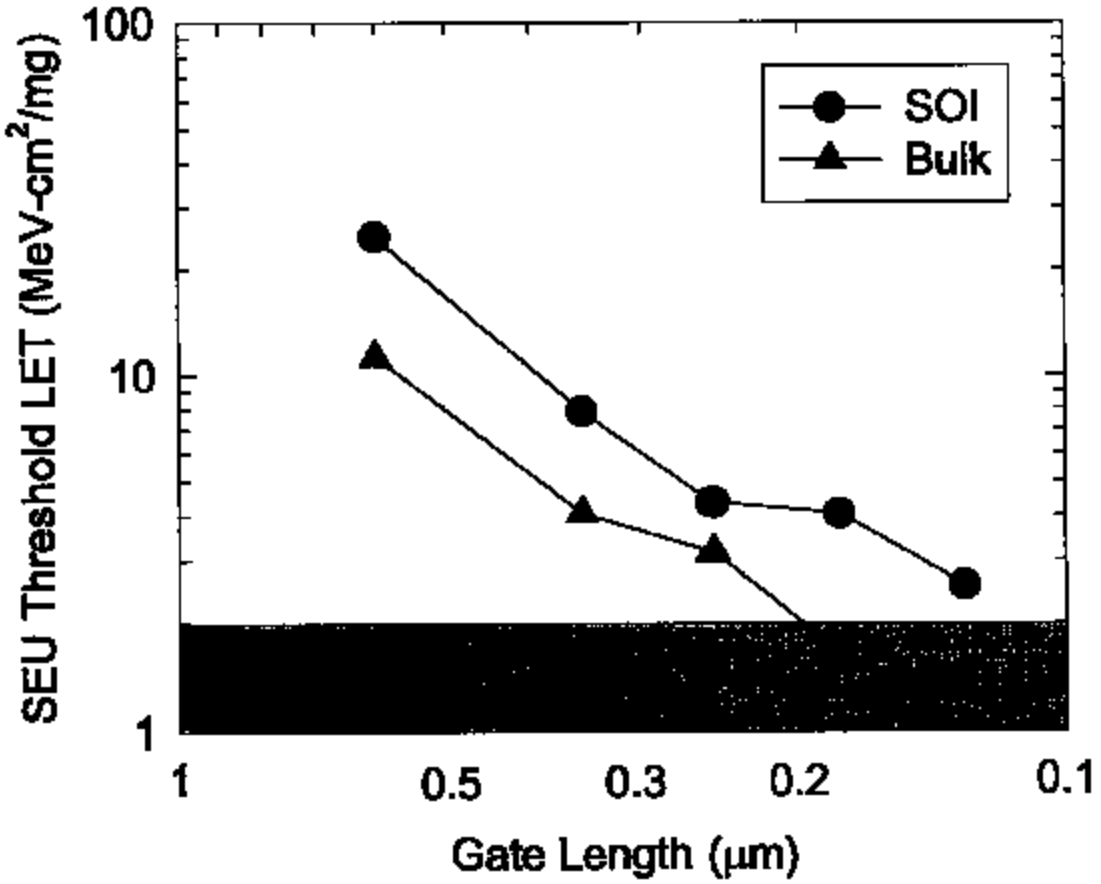
Simulations Predict SOI Upset Thresholds 1-2 Generations Behind Bulk



3D mixed-level simulations of fully-scaled technologies

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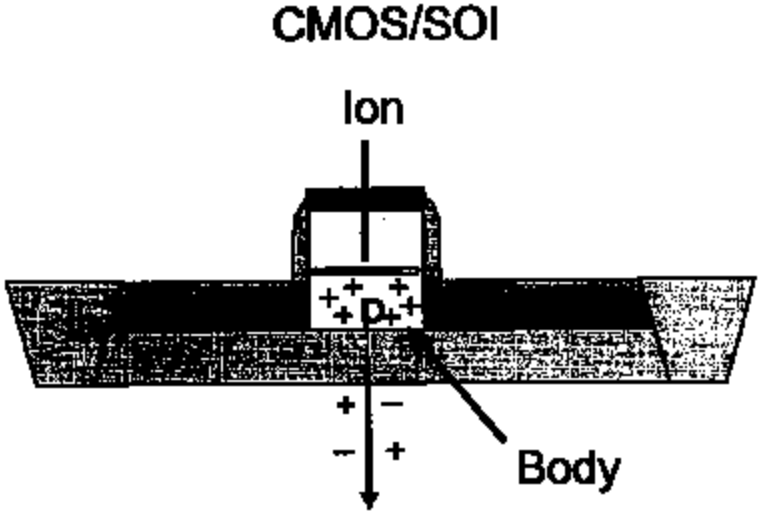
In Practice, Floating Body Effects Limit SEU Hardness of Partially-Depleted SOI



Following an ion strike electrons are swept into the source and drain, but holes are confined to the body region.

The body potential is raised by the accumulated holes, forward biasing the intrinsic source/body/drain bipolar transistor.

The floating body bipolar effect can lead to amplified charge collection, and in extreme cases leads to single-event snapback, a sustained high-current condition similar to latchup.

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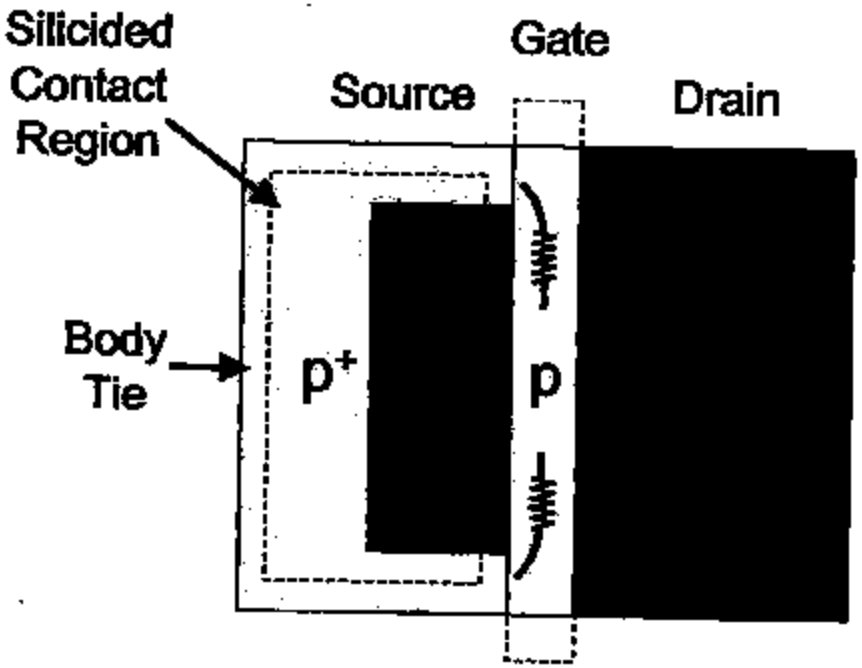
Body Ties are Used to Limit Floating Body Effects



The body tie provides a potential reference for the channel, and a path for holes to leave the body.

Body tie effectiveness is limited by channel resistance.

- center of device is most sensitive strike location
- must limit device width

Without body ties, SOI may be as SEU-sensitive as bulk CMOS.

cf. Massengill, *et al.*, *IEEE Electron Dev. Lett.* 11, p. 98, 1990.

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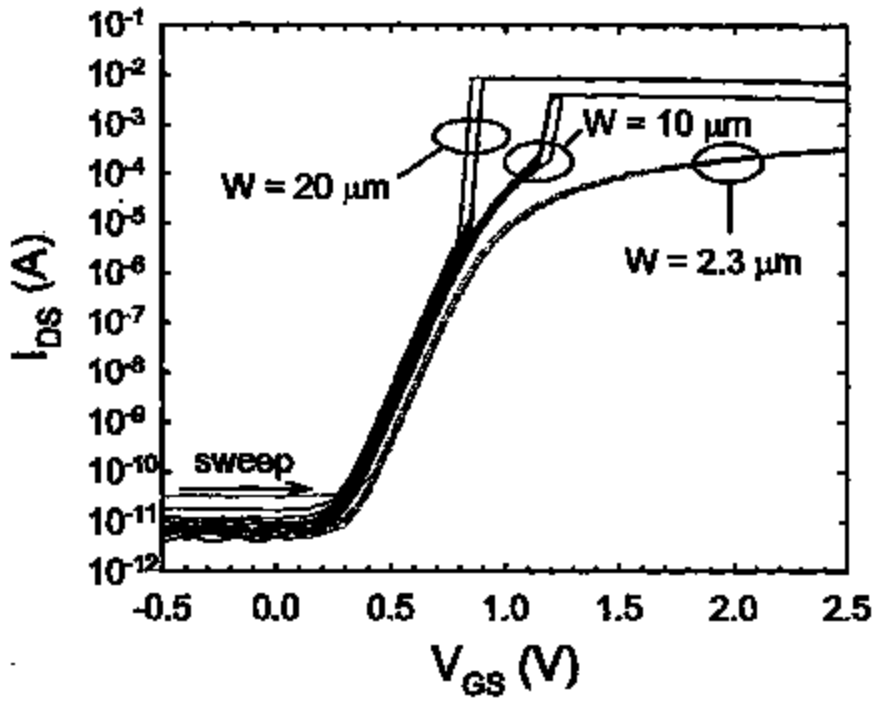
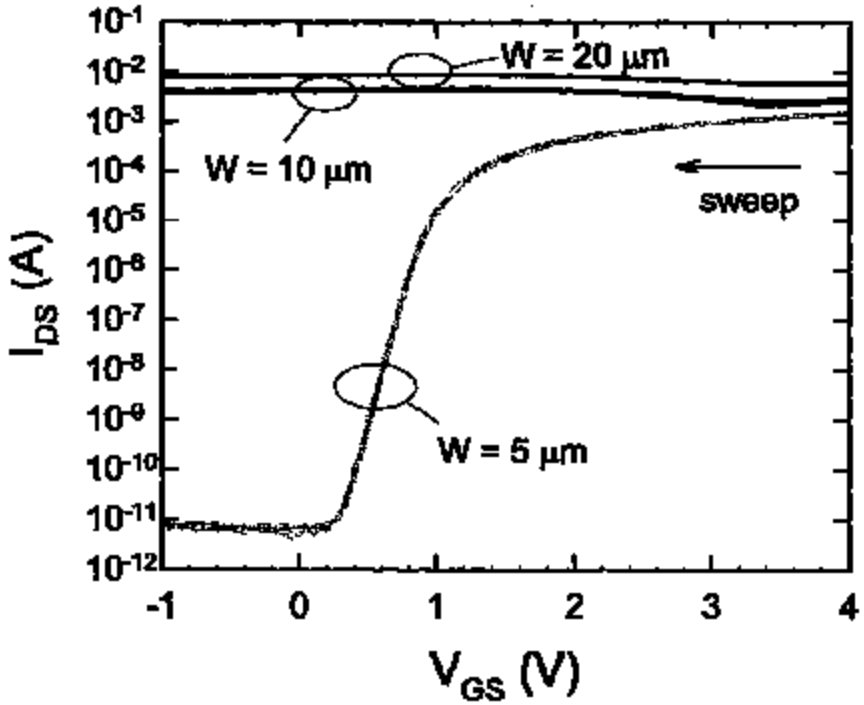
Snapback in SOI Limits Usable Device Width





Snapback can also occur following a heavy ion strike, and behaves similar to a single-event latchup.

After Dodd, *et al.*, *IEEE Trans. Nucl. Sci.* 47, p. 2165, 2000.

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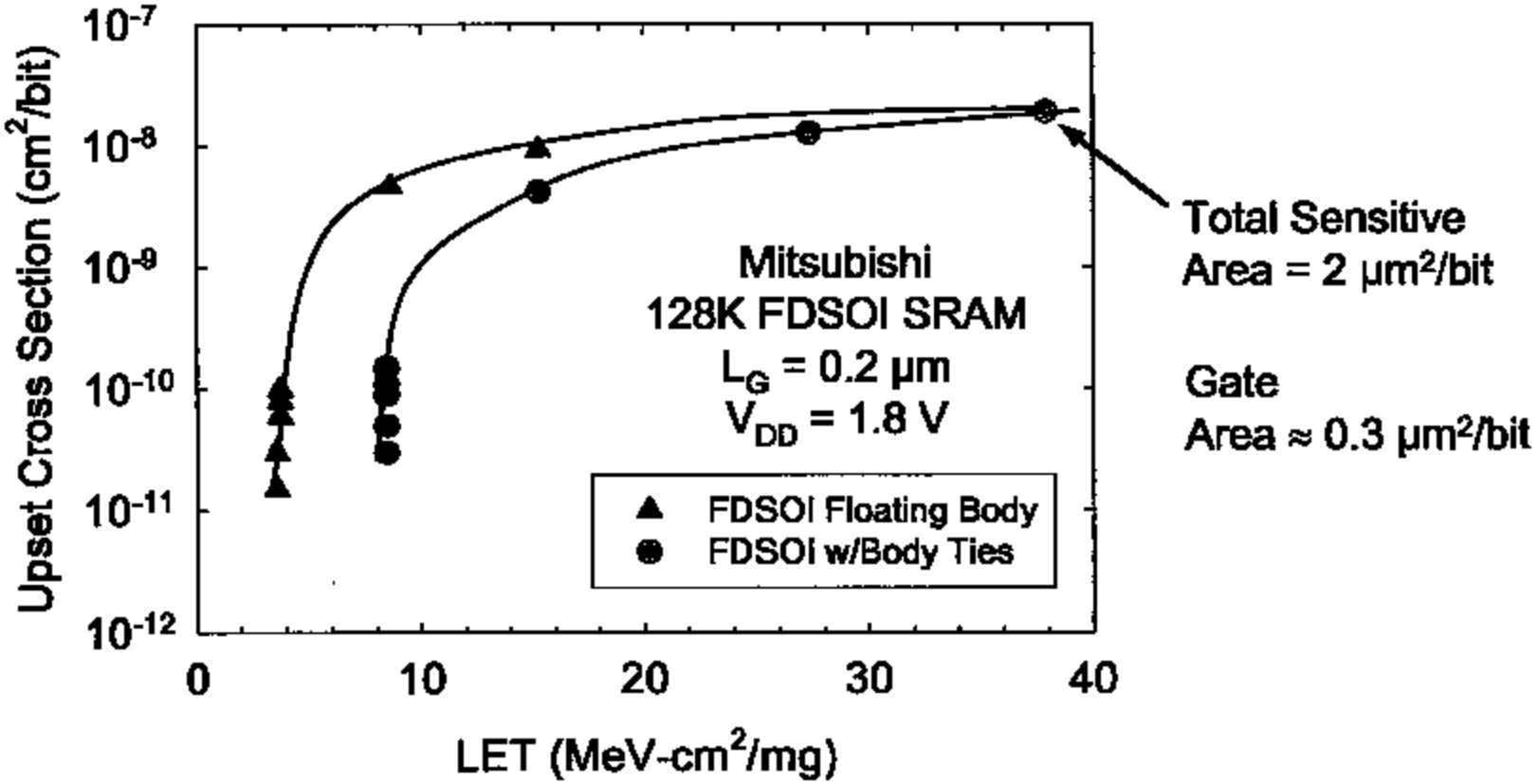
Body Ties Can Improve Upset Threshold by >2X



After Hirose, *et al., 2001 NSREC.*

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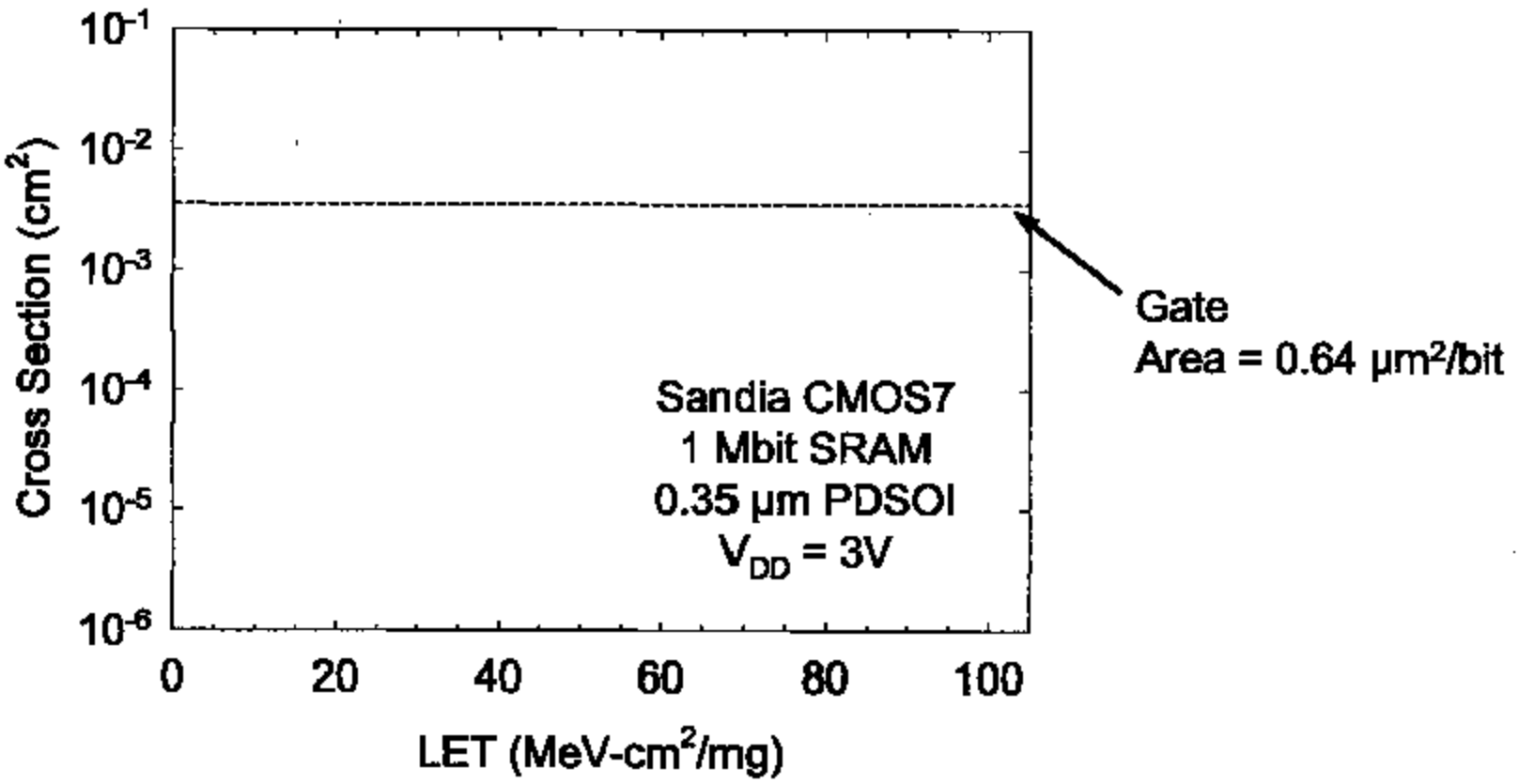
Broadbeam Heavy Ion Data Indicate Drain Strikes Can Cause Upsets



After Dodd, *IEEE Trans. Nucl. Sci.* 48, 2001.

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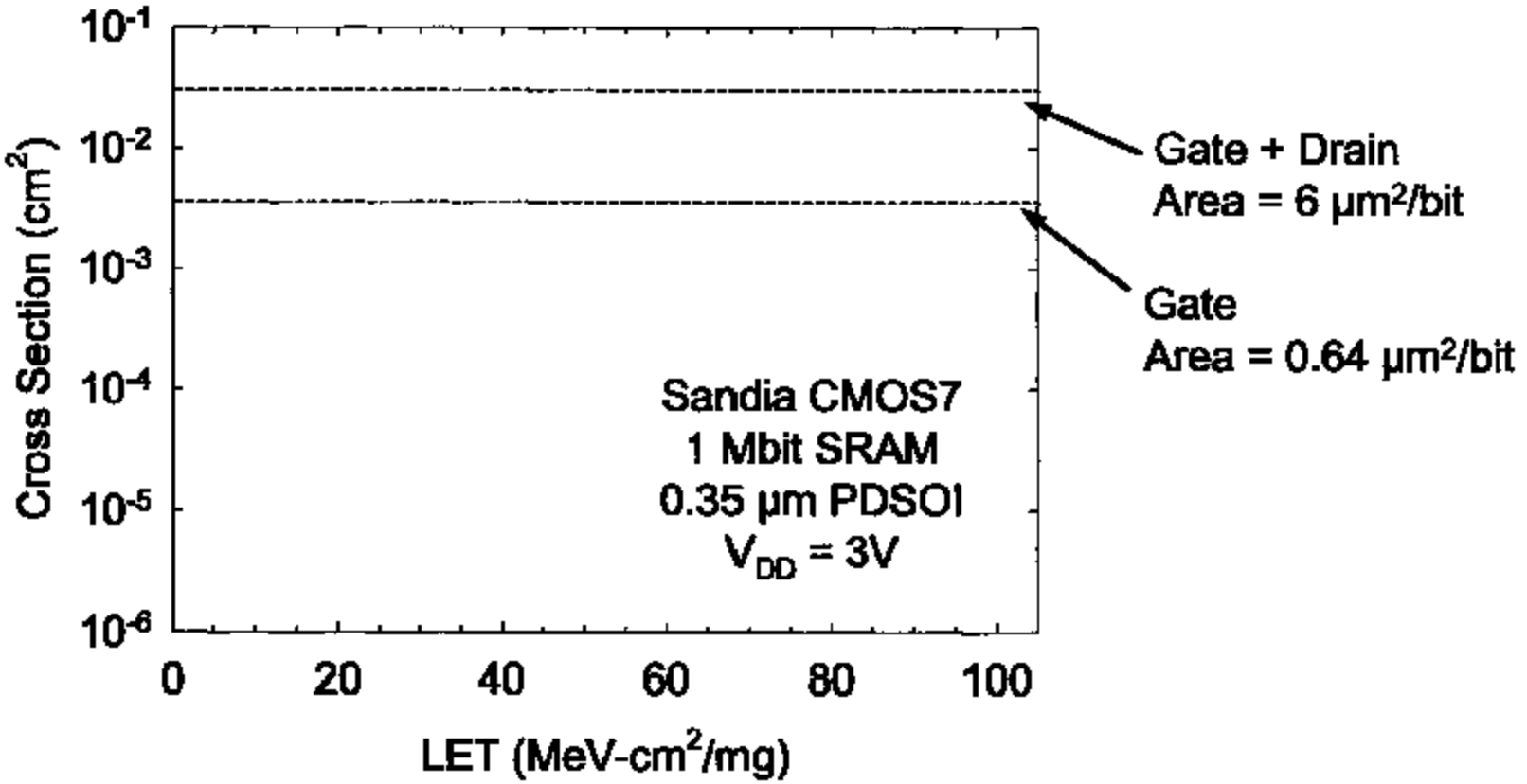
Broadbeam Heavy Ion Data Indicate Drain Strikes Can Cause Upsets



After Dodd, *IEEE Trans. Nucl. Sci.* 48, 2001.

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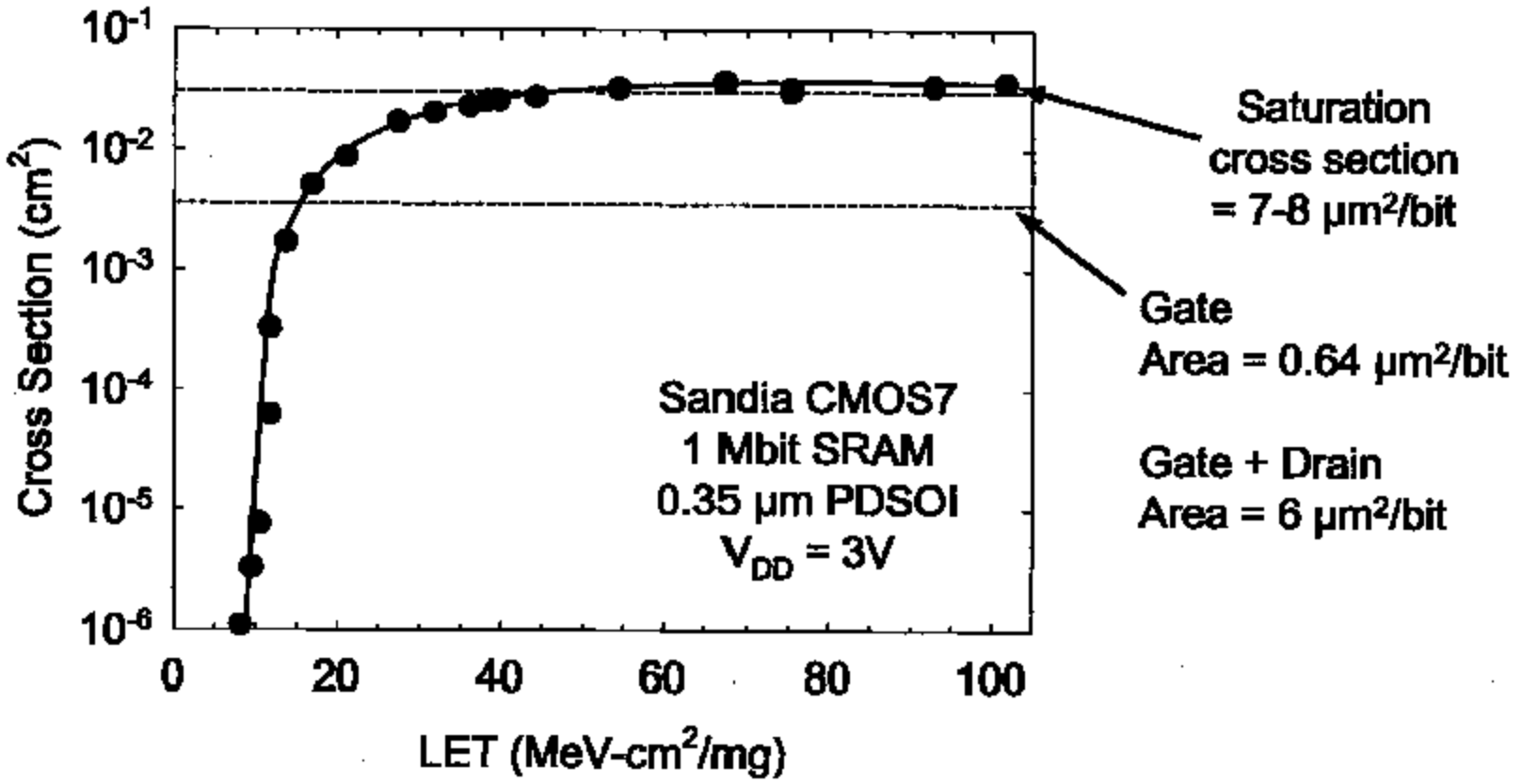
SN02-627-A 18447

Broadbeam Heavy Ion Data Indicate Drain Strikes Can Cause Upsets



After Dodd, *IEEE Trans. Nucl. Sci.* 48, 2001.

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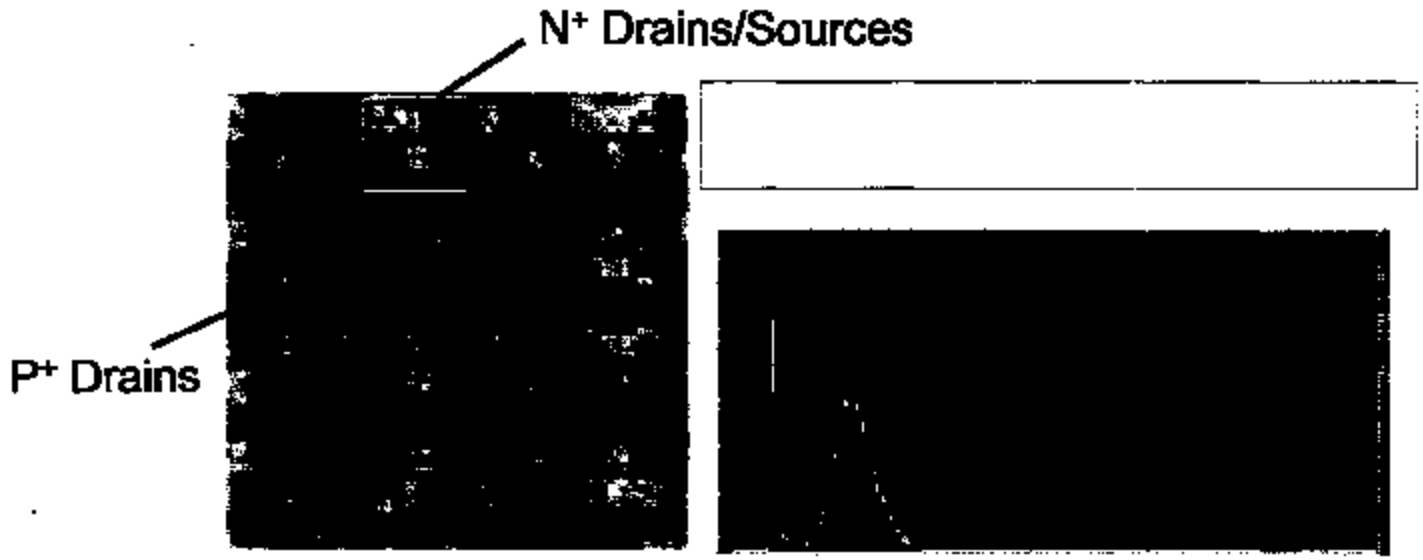
SAND2-827-0 18448

Microbeam Tests on Sandia 64K SOI SRAMs Show Significant Charge Collection from Drain Strikes



64K CMOS7 SOI SRAM
20 MeV Carbon Ions

Conventional wisdom is that no significant charge collection occurs in drain regions of SOI.

These data suggest that significant charge transport in or through the buried oxide is occurring.

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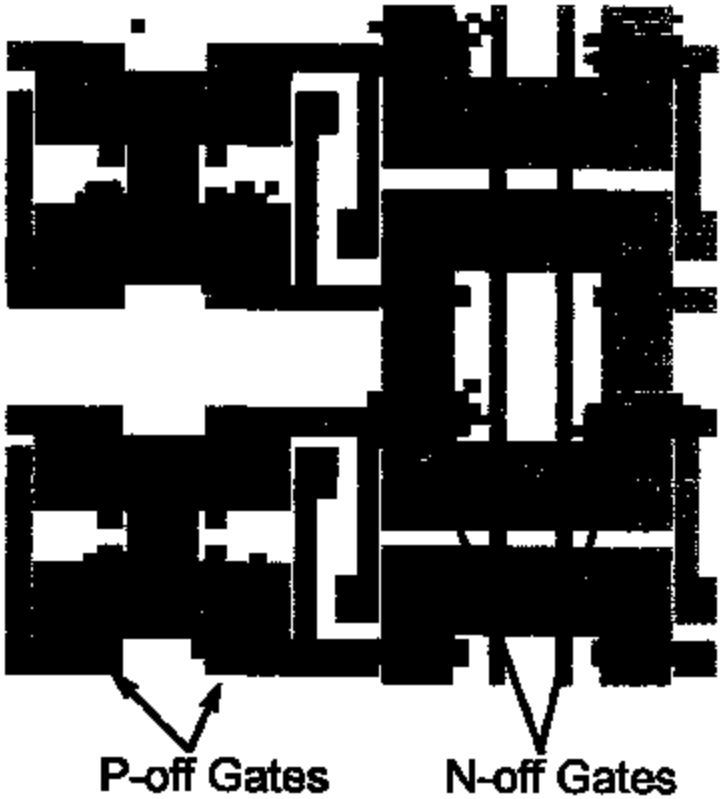
At Low LET, Gate Strikes are the Most Sensitive Strike Location

35-MeV Cl ions:
LET = 16 MeV-cm^2/mg



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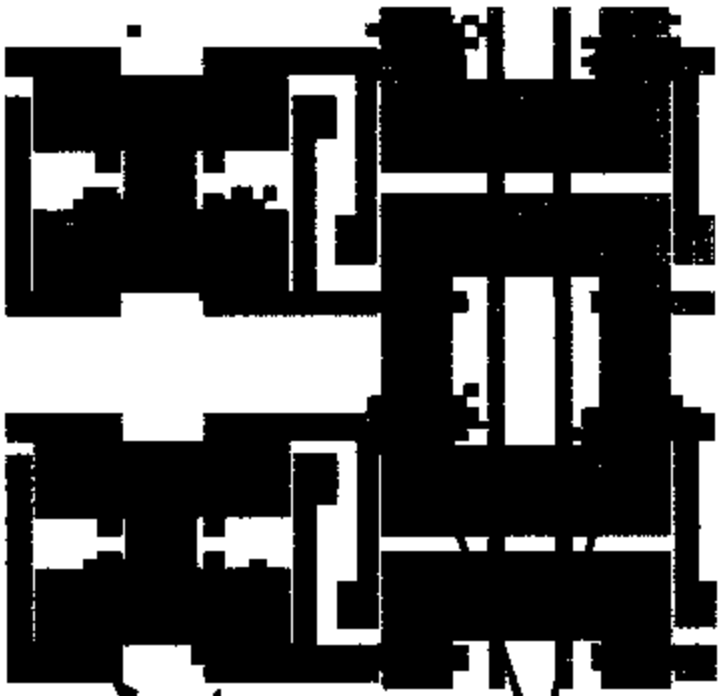
At Higher LET, Microbeam SEU Images Indicate Drain Strikes Can Cause Upsets

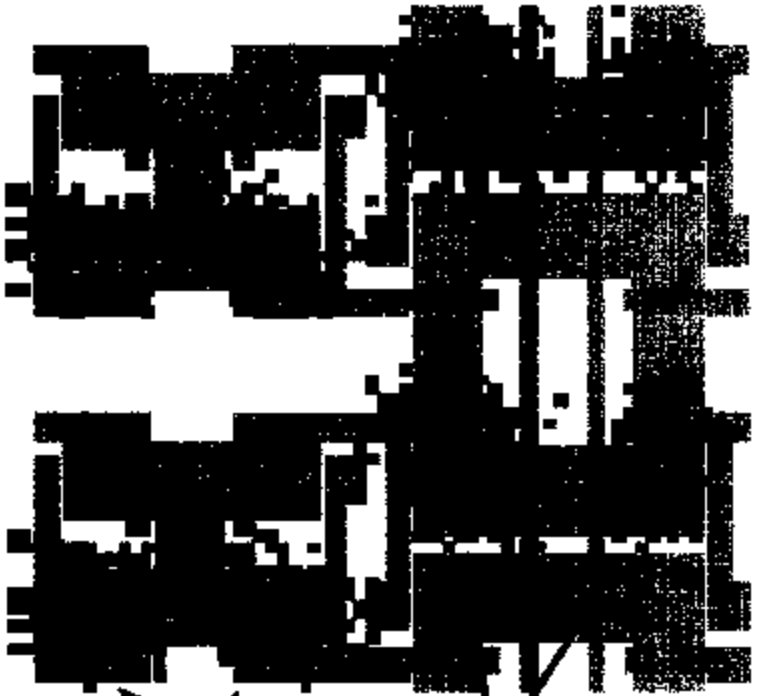
35-MeV Cl ions:
LET = 16 MeV-cm²/mg



P-off Gates

N-off Gates

50-MeV Cu ions:
LET = 29 MeV-cm²/mg



P-off Gates & Drains

N-off Gates & Drains

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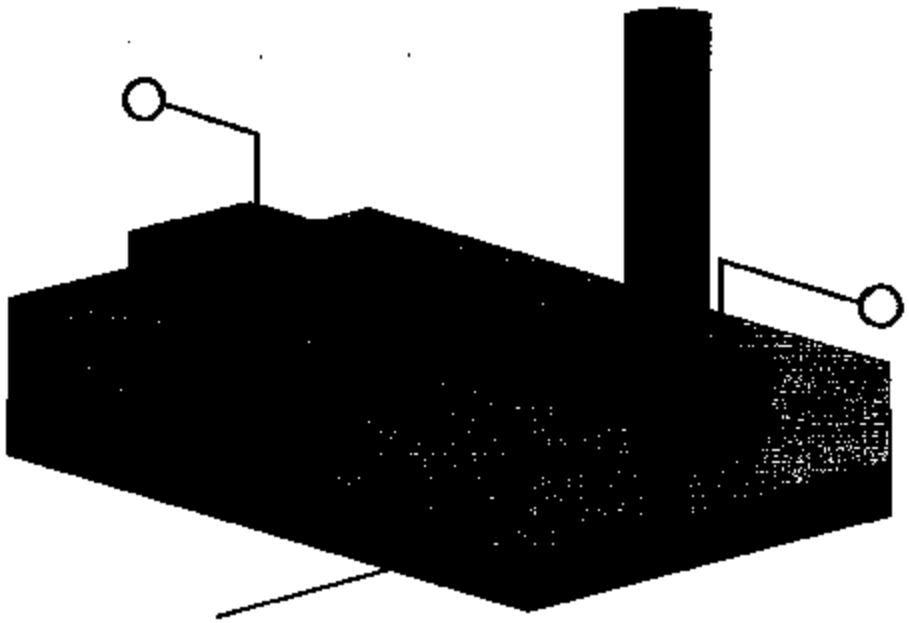
ER92-627-A 18451

Excess Charge Collection Appears to Be Coming From Buried Oxide and/or Substrate



Conductive pipe

- Carriers generated in bottom silicon may drift to top silicon via a conductive pipe and contribute to collected charge
- Charge could also be collected by other mechanisms, e.g., transport of charge generated in the oxide itself

Regardless of the mechanism, the anomalous charge collection will increase error rates in SOI ICs.

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Conclusions

- The use of epitaxial substrates improves SEL sensitivity, but does not guarantee SEL immunity
- Wafer thinning may be useful in some cases
  - minimal impact on SEU response, especially for epi technologies
  - bigger impact on SEL response, but no better than equivalent epi
  - can a manufacturable wafer thinning process be developed?
- Unexpectedly large charge collection from drain regions in SOI ICs
  - microbeam and broadbeam data indicate drain strike charge collection can cause SEUs
  - possible transport mechanism identified: conductive pipe through SOI buried oxide
  - may dramatically increase error rates in SOI ICs

Final Answer: Not Cure-Alls, Just Lesser Evils!

Start

Experimente
- Relais 1
- Relais 2
- Relais 3
- Relais 4

Grundlagen

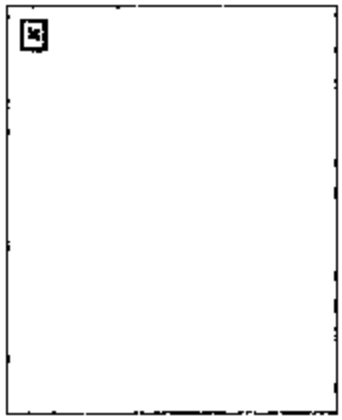
Produkte

Neues

Impressum

Das universelle Relais-Schaltmodul, Teil 2

CMOS-ICs muss man an den Eingängen besonders schützen, damit sie nicht beschädigt werden. In der Anfangszeit wurden CMOS-Eingänge oft durch statische Entladungen zerstört. Das ist jetzt nicht mehr so, weil zumindest die 40xxB-Serie Schutzdioden enthält.



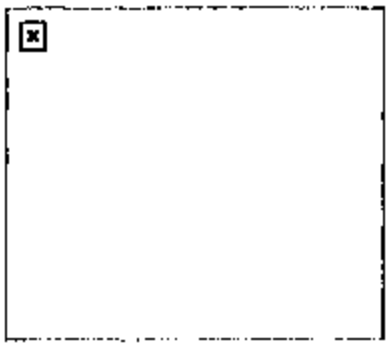
Schutzdioden

Die internen Dioden an jedem Eingang begrenzen die Spannung auf den Bereich Vss - 0,7 V bis Vdd + 0,7 V. Bei einer Betriebsspannung von 5 V werden also keine Spannungen unter -0,7 V und über 5,7 V zugelassen. Es besteht daher kaum eine Gefahr mehr für die dünne Gate-Isolierung der Eingangstransistoren. Aber man muss unbedingt dafür sorgen, dass der

maximale Strom durch die Schutzdioden begrenzt wird. Viel mehr als etwa 1 mA sollte hier niemals fließen.

CMOS-ICs kennen oft den sog. Latchup-Effekt. Die Schutzdioden an den Eingängen bilden ungewollt einen Thyristor, der durch einen zu großen Diodenstrom gezündet werden kann. Das führt dann zu einem großen Strom über die Betriebsspannungsanschlüsse. Wer sich schon einmal völlig unerwartet an einem CMOS-IC die Finger verbrannt hat, ist wahrscheinlich ein Opfer dieses Latchup-Effekts geworden.

In der Bastelkiste findet sich vielleicht CMOS-IC, das man sowieso nicht mehr braucht. Damit kann man versuchen, den gefürchteten Zustand mit Absicht herbeizuführen. Die folgende Schaltung erinnert an einen Aufbau mit einem Thyristor. Ein kurzer Stromstoß aus dem Elko kann den parasitären Thyristor zünden und die Lampe einschalten. Allerdings unterscheidet sich die Zündfreudigkeit der ICs unterschiedlicher Hersteller.



Versuch zum Latchup-Effekt

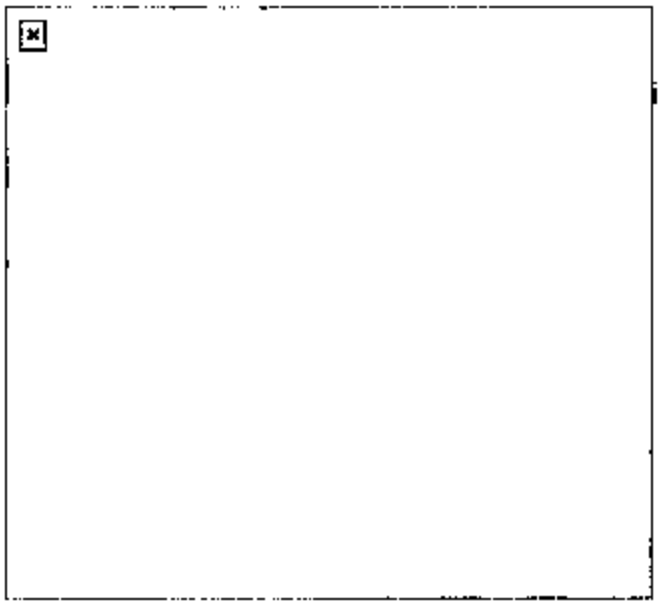
Eingangs-Schutzschaltung

Für den normalen Einsatz muss man alles daran setzen, den Latchup-Fall zu verhindern. Lange Leitungen an CMOS-Eingängen sind aber immer ein Risiko. Oft reicht eine versehentliche Berührung, wenn jemand statische Ladungen trägt. Oder ein in der Nähe einschlagender Blitz kann einen großen Spannungsimpuls auf der Leitung erzeugen. Manchmal reichen sogar die Schaltfunken größerer Maschinen, um einen CMOS-Eingang zu beschädigen.

Es gibt unterschiedlich aufwendige Methoden, Spannungsimpulse von den Eingängen fernzuhalten. Am einfachsten ist der Einsatz von hochohmigen Reihenwiderständen mit ca. 100 kOhm. Da die Eingänge selbst sehr hochohmig sind, ändern die Widerstände nichts an der Funktion, solange es nicht um sehr große Signalfrequenzen geht.

Die folgende Schaltung zeigt den Einsatz der Schutzwiderstände für jeden Eingang des 4027. Damit erreicht man eine gute Sicherheit gegen versehentliche Zerstörung durch Fremdspannung an den Eingängen. Zugleich wird hier auch versucht, die Schaltung mit einem einfachen RC-Glied zu entprellen

entprellen.



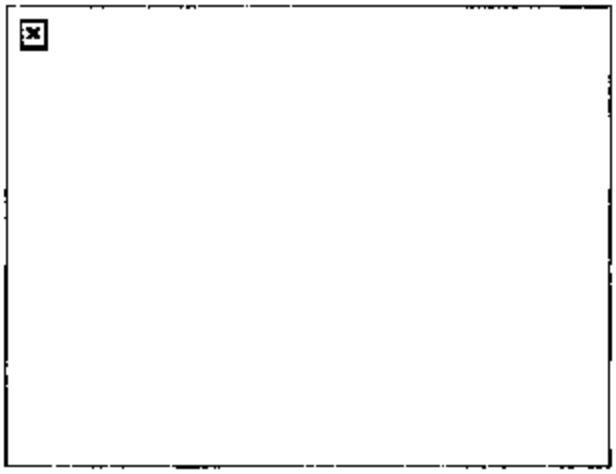
Eingangsschutz und Entprellung

Entprellung

Die Sicherheit gegen Störungen ist nun gegeben. Die Entprellung ist allerdings noch nicht ausreichend. Mit sehr guten Schaltern funktioniert es zwar einwandfrei, in vielen Fällen jedoch nicht. Für einen Schalter mit längerer Prellzeit müsste man die Zeitkonstante erhöhen, also den Kondensator oder seinen Parallelwiderstand vergrößern. Die kurze Zeit zwischen den einzelnen Prellvorgängen reicht dann nicht, um den Kondensator ausreichend zu entladen. Der CMOS-Eingang erkennt einen eindeutigen High-Pegel.

Aber eine große Zeitkonstante führt zu einer geringen Steilheit der abfallenden Flanke. Damit kommt der Clockeingang nicht zurecht. Es entstehen wieder Fehler. Man kann also mit dieser einfachen Entprellung im Einzelfall Erfolg haben, es ergibt sich jedoch keine sichere Lösung.

Die richtige Lösung ist, einen Schmitt-Trigger vorzuschalten. An seinem Ausgang entstehen immer eindeutige Rechtecksignale. Einen Schmitt-Trigger kann man aus einem CMOS-Puffer und zwei Widerständen aufbauen. Der 4027 enthält zwei JK-Flipflops, von denen eines bisher unbenutzt blieb. Unter ganz bestimmten Umständen arbeitet die Schaltung auch als Puffer. Wenn nämlich R und S gleichzeitig hochgesetzt werden, ist der Q-Ausgang grundsätzlich gesetzt. Damit ist der S-Eingang der Eingang des nachgebildeten Puffers, wenn R hochliegt.



Schmitt-Trigger

Nun sind die einzelnen Elemente der Schaltung entwickelt. Alles muss nur noch zu einer Gesamtschaltung zusammengesetzt werden. Erfahrungsgemäß wird dann noch etwas an den Bauteilen optimiert, bis alles zufriedenstellend arbeitet.

Und wenn der erste Prototyp gut funktioniert, wird eine Platine entworfen. Doch dazu mehr in der nächsten Folge.

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VLSI Circuit Design

Chapter 3

CMOS Process Technology

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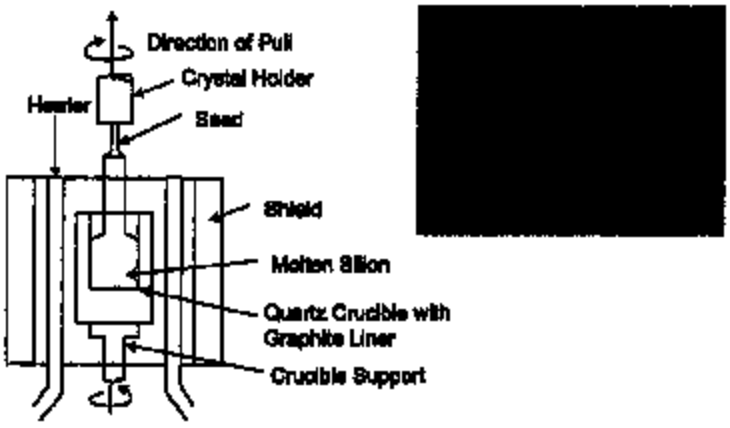
國立中央大學　電機工程學系

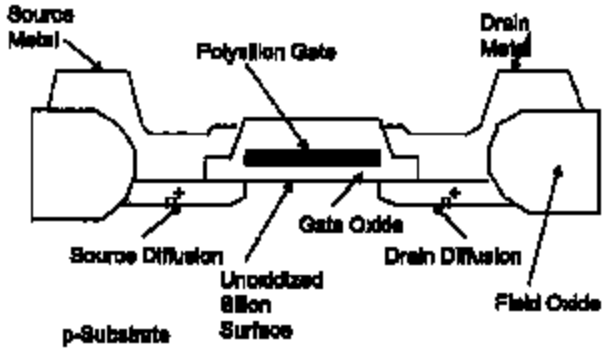
Course Contents

1. Introduction to CMOS Circuits
2. MOS Transistor Theory
3. **CMOS Processing Technology**
4. Circuit Characterization Estimation
5. CMOS Circuit and Logic Design
6. CMOS Design Methods
7. CMOS Testing
8. CMOS Subsystem Design
9. CMOS System Case study

Wafer Process - *Crystal Growth*



MOS Transistor - *Basic Structure*



MOS Transistor - *Basic Structure*

Oxidation :

Wet Oxide : Use water Vapor 900°C ~ 1000°C, Rapid .

Dry Oxide : Use Pure Oxygen 1200°C .

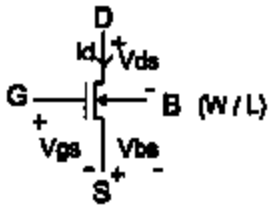
Field Oxide : Thick for Insulation Purpose .

Gate Oxide : Thin Oxide 50~100 Å Thick. As thin As Possible .

Polysilicon : Polycrystalline silicon .

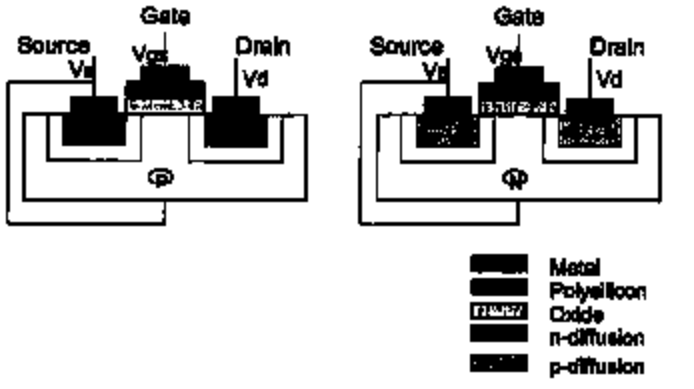
MOS Transistor - *Basic Structure*

Top View

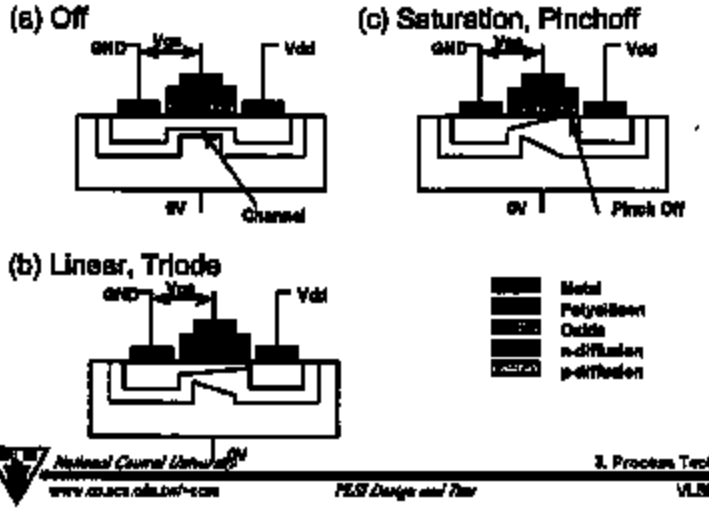


Circuit Symbol

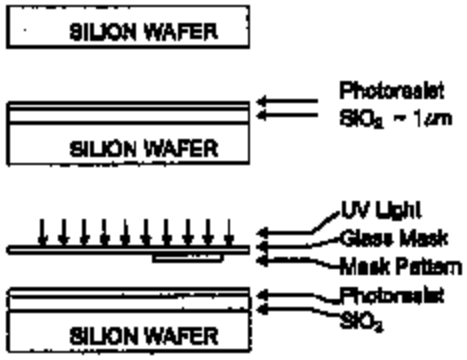
MOS Transistor - *Basic Structure*



Transistor Operation



Process Technology



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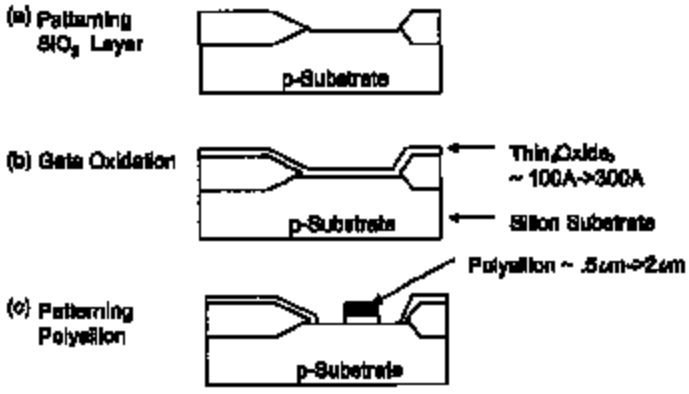
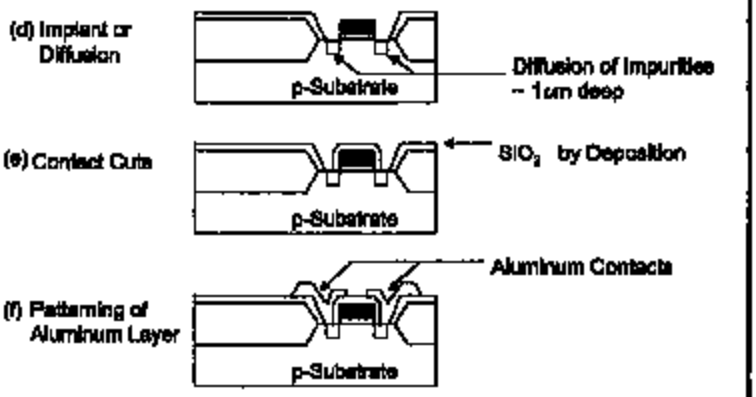
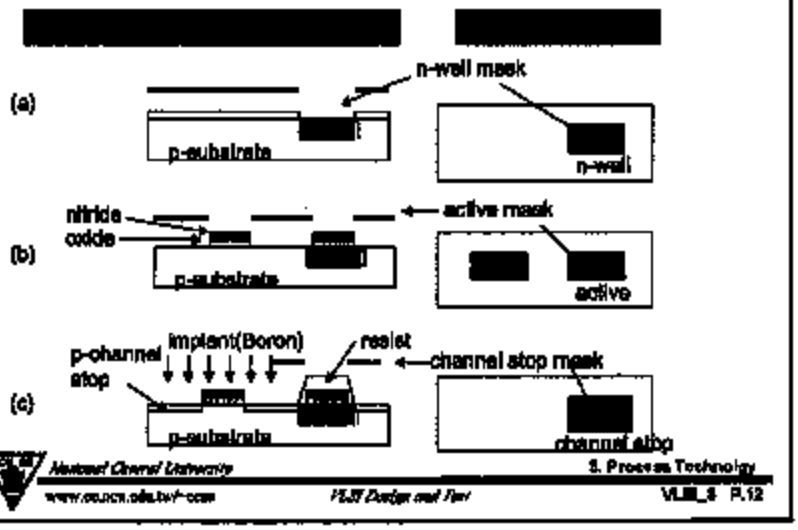


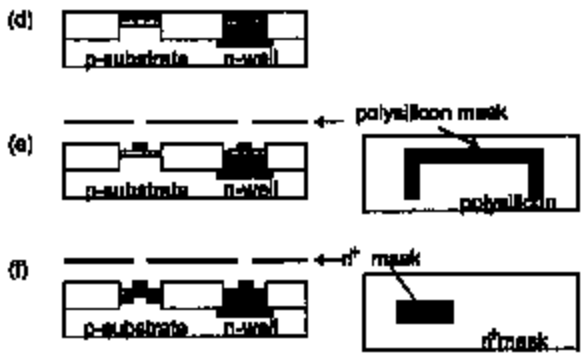
Process Technology



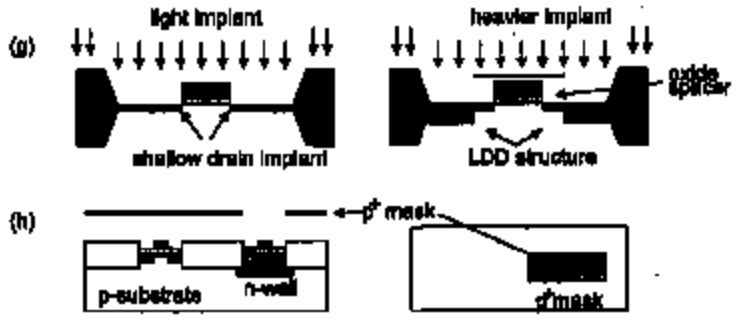
Process Technology - *N Well*



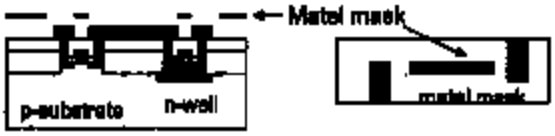
Process Technology - *N Well*



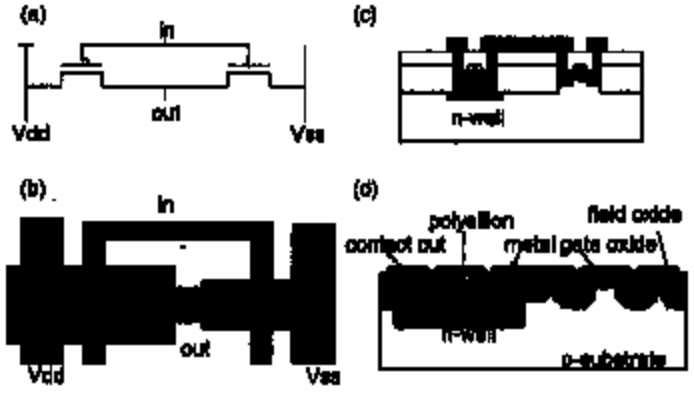
Process Technology - *N Well*



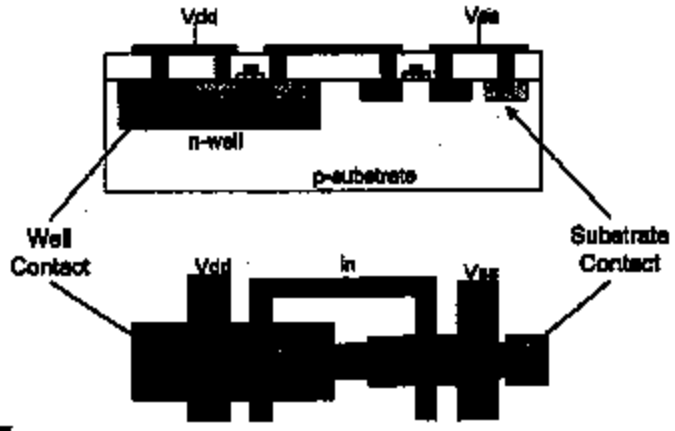
Process Technology - *N Well*



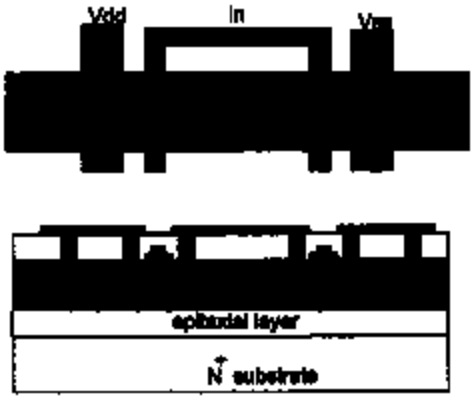
Process Technology - *Inverter*



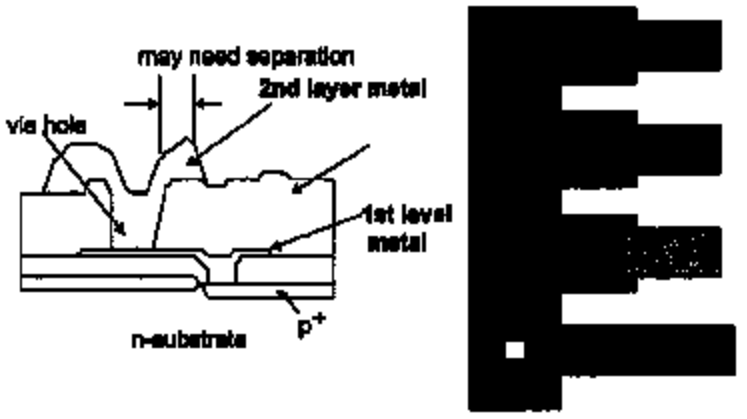
Process Technology - *Inverter*



Process Technology - *Twin Well Inverter*



Process Technology - *Multi-Layer Metal*



Process - *Circuit Elements*

Diffusion/Poly
Low Quality
25 ohm/□

Resistive Metal
High Quality
K ohm/□

Undoped Poly
High Resistor
T ohm/□

Poly / Diffusion
Low Quality
0.1fF/um²

Metal / Poly
Low Quality
0.05fF/um²

Poly2 / Poly1
Low Quality
0.1fF/um²

Layout Rules

Rules Specify :

- Minimum Feature Size.
- Minimum Separation.
- Minimum Overlap.

Two type of Rules :

μ Rules Fixed Dimention, Nonscalable.

λ Rules Mosis Scalable Rules.

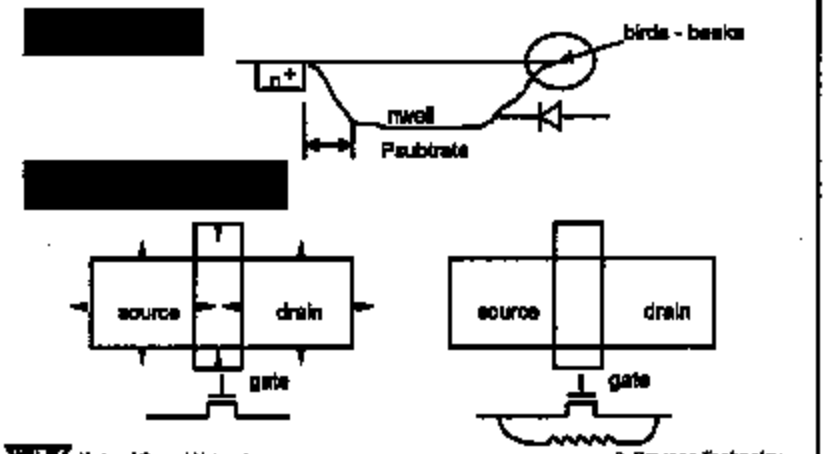
1λ = half the minimum poly width

Layout Rules

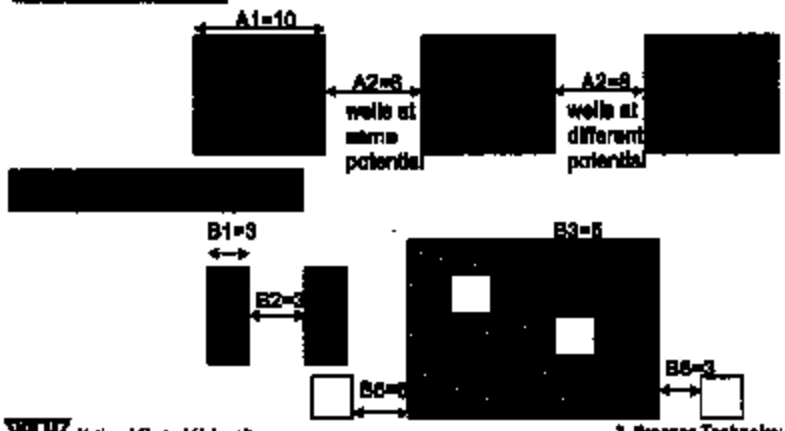
Layer	Geometry	μ Rule	λ Rule	λ to μ
Poly	Width	0.6	2	0.6
	Space	0.75	3	0.9
Thin	Width	0.6	2	0.2
	Space	1.2	4	0.4
M1	Width	0.9	3	0.9
	Space	0.6	3	0.6
M2	Width	0.9	3	0.6
	Space	0.6	3	0.9
N+	Width	0.9	3	0.9
	Space	0.9	3	0.9
Contact	Width	0.6	2	0.6
Via	Width	0.7	3	0.9

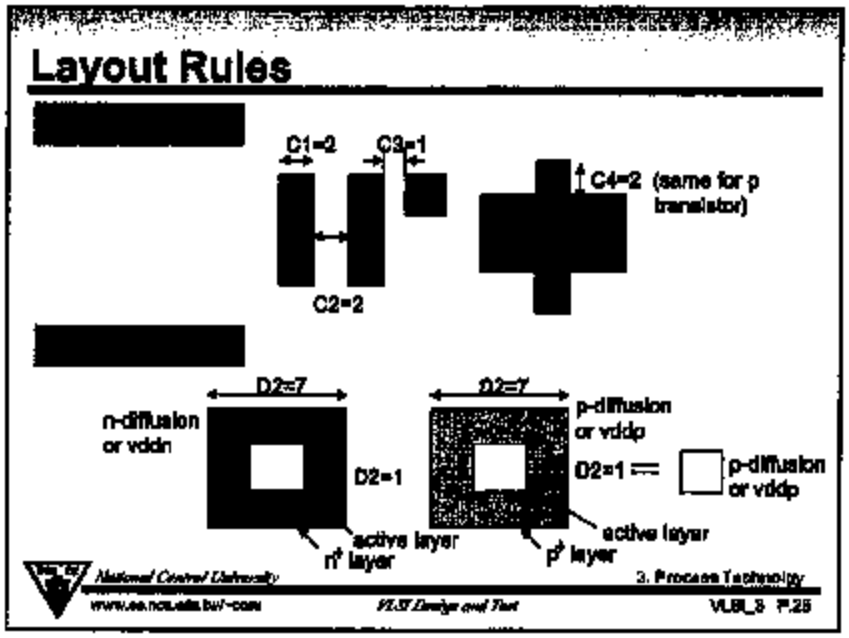
* $1\lambda = 0.3\mu m$ (half the minimum poly width)

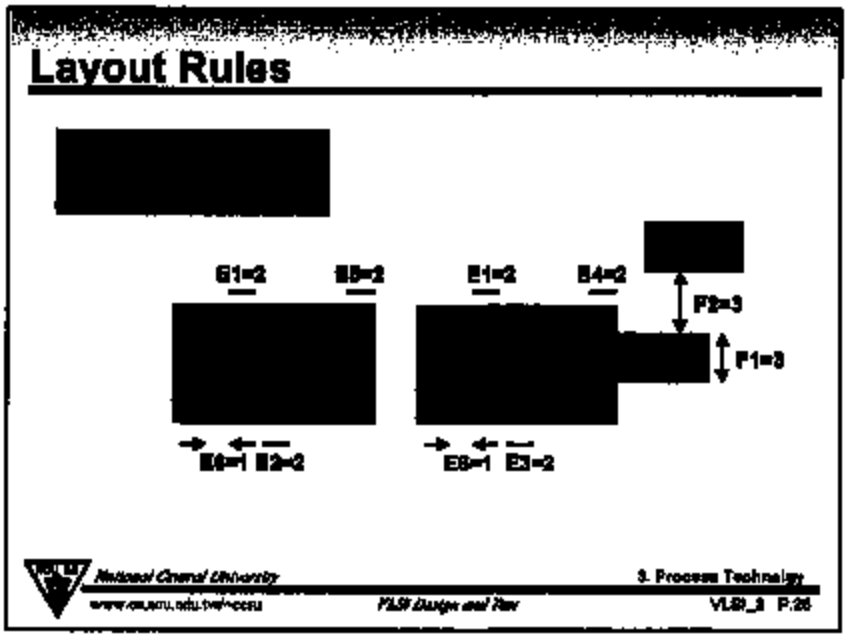
Layout Rules



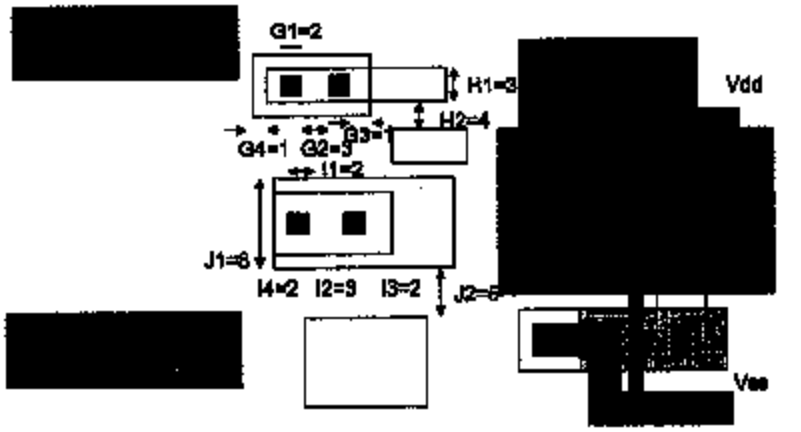
Layout Rules



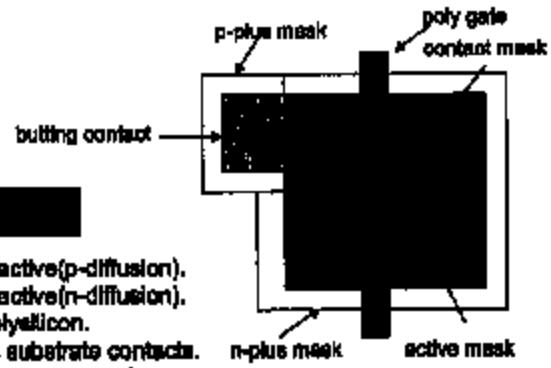




Layout Rules

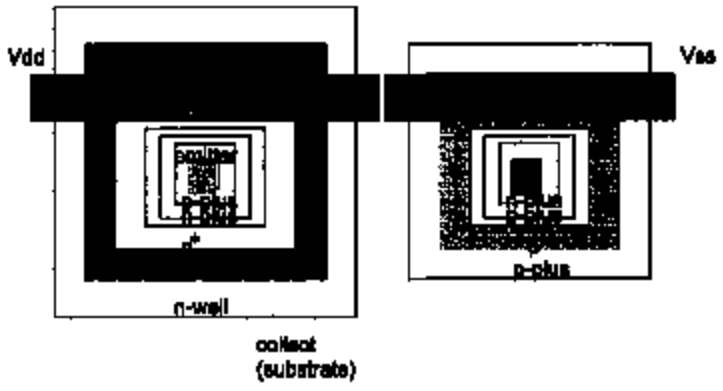


Layout Rules

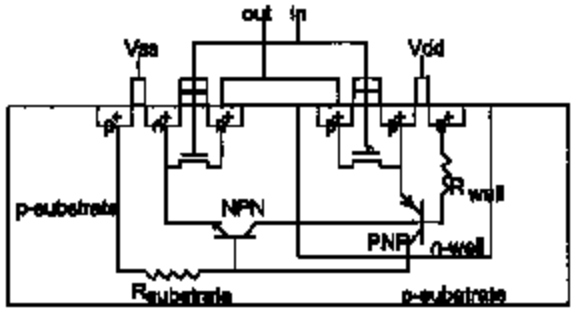


- Metal to p-active(p-diffusion).
- Metal to n-active(n-diffusion).
- Metal to polysilicon.
- Vdd to Vss substrate contacts.
- Split(substrate contacts).

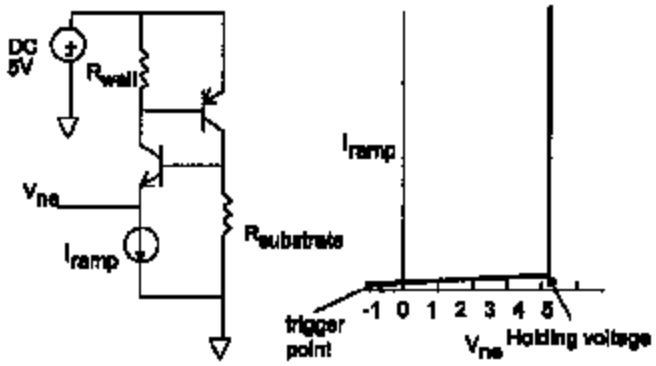
Layout Rules - *Guard Rings*



Latchup

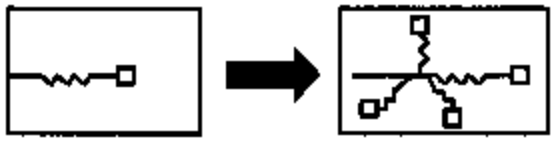


Latchup



Latchup - *Prevention*

1. Latchup Resistant CMOS Process
   Reduce the sheet resistance of well and substrate, or reduce the gain of parasitic transistor.
2. Layout techniques
   Place multiple well contacts to reduce well resistance.



Latchup - *Prevention*

- Resistance, capacitance, and inductance calculations.
- Delay estimations.
- determination of conductor size for power and clock distribution.
- Power consumption.
- Charge sharing mechanism.
- Reliability.
- Effects of scaling.

Chapter 7: MOS Field-Effect-Transistors

7.6. MOSFET Circuits and Technology

7.6.1. MOSFET fabrication process
7.6.2. Poly-silicon gate technology
7.6.3. CMOS
7.6.4. MOSFET Memory Circuits
7.6.5. Charge Coupled Devices

MOSFET circuit technology has dramatically changed over the last three decades. Starting with a ten-micron pMOS process with an aluminum gate and a single metallization layer around 1970, the technology has evolved into a tenth-micron self-aligned-gate CMOS process with up to five metallization levels. The transition from dopant diffusion to ion implantation, from thermal oxidation t oxide deposition, from a metal gate to a poly-silicon gate, from wet chemical etching to dry etching and more recently from aluminum (with 2% copper) wiring to copper wiring has provided vastly superior analog and digital CMOS circuits.

7.6.1. MOSFET fabrication process

The MOSFET fabrication process has evolved dramatically over the years. Around 1970, pMOS circuit with aluminum gate metal and wiring were dominant. The corresponding steps of a typical pMOSFET fabrication process steps are listed in Table 7.6.1.

Table 7.6.1: pMOS process steps

The primary problem at the time was threshold voltage control. Positively charged ions in the oxide decreased the threshold voltage of the devices. p-type MOSFETs were therefore the device of choice despite the lower hole mobility, since they would still be enhancement-type devices even when charge was present. Circuits were still operational at somewhat higher power supply voltages.

Thermal oxidation of the silicon in an oxygen or water vapor atmosphere provided a quality gate oxide with easily controlled thickness. The same process was also used to provide a high-temperature mask fi the diffusion process and a passivation and isolation layer.

The oxide was easily removed in hydrofluoric acid (HF), without removing the underlying silicon.

Aluminum was evaporated over the whole wafer and then etched yielding both the gate metal and the metal wiring connecting the devices. A small amount of copper (~2%) was added to make the aluminu more resistant to electromigration. Electromigration is the movement of atoms due to the impact with t electrons carrying the current through the wire. This effect can cause open circuits and is therefore a well-known reliability problem. It typically occurs at points where the local current density is very high in narrow wires, at corners or when crossing an oxide step. The addition of a small amount of copper provides a more rigid structure within the aluminum and eliminates the effect.

A metal anneal in nitrogen/hydrogen (N_2/H_2) ambient was used to improve the metal-semiconductor contact and to reduce the surface state density at the semiconductor/gate-oxide interface.

Since then the fabrication process has changed as illustrated with Table 7.6.2. Most changes were introduced to provide superior performance, better reliability and higher yield. The most important change has been the reduction of the gate length. A gate length reduction provides a shorter transit time and hence a faster device. In addition, a gate length reduction is typically linked to a reduction of the minimum feature size and therefore yields smaller transistors as well as a larger number of transistors o a chip with a given size. As the technology improved, it was also possible to make larger chips, so that the number of transistors per chip increased even faster. At the same time the wafer size was increased accommodate the larger chips while reducing the loss due to partial chips at the wafer periphery and to reduce the cost per chip as more chips can be accommodated on a single wafer.

The other changes can be split into process improvements and circuit improvements. The distinction is times artificial, as circuit improvements typically require new processes.

The key circuit improvement is the use of CMOS circuits, containing both nMOS and pMOS transistor Early on, the pMOS devices were replaced with nMOS transistors because of the better electron mobility. Enhancement-mode loads were replaced for a while by resistor loads and then depletion-mod loads yielding faster logic circuits with larger operating margins. Analog circuits benefited in similar ways. The use of complementary circuits was first introduced by RCA but did not immediately catch o since the logic circuits were somewhat slower and larger than the then-dominant nMOS depletion logic It was only when the number of transistors per chip became much larger that the inherent advantages o CMOS circuits, namely the lower power dissipation and larger operating margins became highly desirable. By now the CMOS technology is the dominant technology in the IC industry as the ten-fold reduction of power dissipation largely outweighs the 30%-50% speed reduction and size increase.

The process improvements can in turn be split into those aimed at improving the circuit performance a those improving the manufacturability and reliability. Again the split is somewhat artificial but it is beneficial to understand what factors affect the process changes. The latter group includes CVD deposition, ion implantation, RIE etching, sputtering, planarization and deuterium annealing. The process changes, which improve the circuit performance, are the self-aligned poly-silicon gate process, the silicide gate cap, LOCOS isolation, multilevel wiring and copper wiring.

The self-aligned poly-silicon gate process was introduced before CMOS and marked the beginning of modern day MOSFETs. The self-aligned structure, as further discussed in section 7.6.2, is obtained by using the gate as the mask for the source-drain implant. Since the crystal damage caused by the high-energy ions must be annealed at high temperature (~800 C), an aluminum gate could no longer be used. Doped poly-silicon was found to be a very convenient gate material as it withstands the high anneal temperature and can be oxidized just like silicon. The self-aligned process lowers the parasitic capacitance between gate and drain and therefore improves the high-frequency performance and switching time. The addition of a silicide layer on top of the gate reduces the gate resistance while still providing a quality implant mask. The self-aligned process also reduced the transistor size and hence increased the density. The field oxide was replaced by a local oxidation isolation structure (LOCOS), where a Si_3N_4 layer is used to prevent the oxidation in the MOSFET region. The oxide provides an implant mask and contact hole mask yielding an even more compact device.

Multilevel wiring is a necessity when one increases the number of transistors per chip since the number of wires increases with the square of the number of transistors and the average wire length increase linearly with the chip size. While multilevel wiring simply consists of a series of metal wiring levels separated by insulators, the multilevel wiring has increasingly become a bottleneck in the fabrication of high-performance circuits. Planarization techniques, as discussed below, and the introduction of copper instead of aluminum-based metals have further increased the wiring density and lowered the wiring resistance.

Table 7.6.2: MOS process changes and improvements

Chemical vapor deposition (CDV) of insulating layers is now used instead of thermal oxidation since it does not consume the underlying silicon. Also because there is no limit to the obtainable thickness and since materials other than SiO_2 (for instance Si_3N_4) can be deposited. CDV deposition is also frequently used to deposit refractory metals such as tungsten.

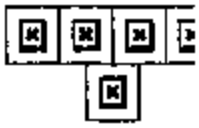
Ion implantation has replaced diffusion because of the superior control and uniformity. Dry etching including plasma etching, reactive ion etching (RIE) and ion beam etching has replaced wet chemical etching. These etch processes provide better etch rate uniformity and control as well as pronounced anisotropic etching. The high etch rate selectivity of wet chemical etching is not obtained with these dry etch techniques, but are well compensated by the better uniformity.

Sputtering of metals has completely replaced evaporation. Sputtering typically provides better adhesion and thickness control. It is also better suited to deposit refractory metals and silicides.

Planarization is the process by which the top surface of the wafer is planarized after each step. The purpose of this planarization process is to provide a flat surface, so that fine-line lithography can be performed at all stages of the fabrication process. The planarization enables high-density multi-layer wiring levels.

Deuterium anneal is a recent modification of the standard hydrogen anneal, which passivates the surface states. The change to deuterium was prompted because it is a heavier isotope of hydrogen. It chemically acts the same way but is less likely to be knocked out of place by the energetic carriers in the inversion layer. The use of deuterium therefore reduces the increase of the surface state density due to hot-electron impact.

7.6.2. Poly-silicon gate technology



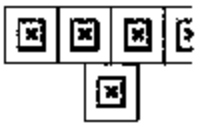
An early improvement of the technology was obtained by using a poly-silicon gate, yielding a self-aligned structure which is both compact and has better performance. The poly-silicon gate is used as a mask during the implantation so that the source and drain regions are self-aligned with respect to the gate. This self-alignment structure reduces the device size. In addition, it eliminates the large overlap capacitance between gate and drain, while maintaining a continuous inversion layer between source and drain.

A further improvement of this technique is the use of a low-doped drain (LDD) structure. As an example we consider the structure shown in Figure 7.6.1. Here a first shallow implant is used to contact the inversion layer underneath the gate. The shallow implant causes only a small overlap between the gate and source/drain regions. After adding a sidewall to the gate a second deep implant is added to the first one. This deep implant has a low sheet resistance and adds a minimal series resistance. The combination of the two implants therefore yields a minimal overlap capacitance and low access resistance.

Figure 7.6.1: Cross-sectional view of a self-aligned poly-silicon gate transistor with LOCOS isolatio

Shown is also the local oxidation isolation (LOCOS). Typically, there would also be an additional field and channel implant. The field implant increases the doping density under the oxide and thereby increases the threshold voltage of the parasitic transistor formed by the metal wiring on top of the isolation oxide. The channel implant provides an adjustment of the threshold voltage of the transistors. The use of a poly-silicon gate has the disadvantage that the sheet resistance of the gate is much larger than that of a metal gate. This leads to high RC time-constants of long poly-silicon lines. These long RC time-constants are reduced by using silicides (WSi, TaSi, CoSi etc.) instead or on top of poly-silicon. Also by using the poly-silicon only as gate material and not as a wiring level one can further eliminated such RC time delays.

7.6.3. CMOS



Complementary Metal-Oxide-Silicon circuits require an nMOS and pMOS transistor technology on the same substrate. To this end, an n-type well is provided in the p-type substrate. Alternatively one can use a p-well or both an n-type and p-type well in a low-doped substrate. The gate oxide, poly-silicon gate and source-drain contact metal are typically shared between the pMOS and nMOS technology, while the source-drain implants must be done separately. Since CMOS circuits contain pMOS devices, which are affected by the lower hole mobility, CMOS circuits are not faster than their all-nMOS counter parts. Even when scaling the size of the pMOS devices so that they provide the same current, the larger pMO device has a higher capacitance.

The CMOS advantage is that the output of a CMOS inverter can be as high as the power supply voltage and as low as ground. This large voltage swing and the steep transition between logic high and low yiel large operation margins and therefore also a high circuit yield. In addition, there is no power dissipatior in either logic state. Instead the power dissipation occurs only when a transition is made between logic states. CMOS circuits are therefore not faster than nMOS circuits but are more suited for very/ultra larg scale integration (VLSI/ULSI).

CMOS circuits have one property, which is very undesirable, namely latchup. Latchup occurs when fou alternating p and n-type regions are brought in close proximity. Together they form two bipolar transitors, one npn and one pnp transistor. The base of each transistor is connected to the collector of th other, forming a cross-coupled thyristor-like combination. As a current is applied to the base of one transistor, the current is amplified by the transistor and provided as the base current of the other one. If the product of the current gain of both transistors is larger than unity, the current through both devices increases until the series resistances of the circuit limits the current. Latchup therefore results in excessive power dissipation and faulty logic levels in the gates affected. In principle, this effect can be eliminated by separating n-type and p-type device. A more effective and less space-consuming solution the use of trenches, which block the minority carrier flow. A deep and narrow trench is etched between all n-type and p-type wells, passivated and refilled with an insulating layer.

7.6.4. MOSFET Memory

MOSFET memory is an important application of MOSFETs. Memory chips contain the largest number of devices per unit area since the transistors are arranged in a very dense regular structure. The generic structure of a memory chip is shown in Figure 7.6.2.

Figure 7.6.2: Arrangement of memory cells into an array

A two dimensional array of memory cells, which store a single bit, are connected through a series of word lines and bit lines. One row of cells is activated by changing the voltage on the corresponding wo line. The information is then stored in the cell by applying voltages to the bit lines. During a read operation, the information is retrieved by sensing the voltage on the bit lines with a sense amplifier. A possible implementation of a static random access memory (SRAM) is shown in Figure 7.6.3.

Figure 7.6.3: Static random access memory (SRAM) using a six-transistor cell.

The memory cell consists of a flip-flop and the cells are accessed through two pass transistors connecte to the bit lines and controlled by the word line. Depletion mode transistors are shown here as load devices. A common alternate load is an amorphous silicon resistor.

A simpler cell leading to denser memory chips is the dynamic random access memory shown in Figure 7.6.4.

Figure 7.6.4: Dynamic random access memory (DRAM) using a one-transistor cell.

The dynamic cell contains only a single transistor and capacitor. The cell is called dynamic since the information is stored as charge on the capacitor. This charge slowly leaks away so that the cell needs to be refreshed periodically. The reading process is also destructive since the storage capacitor is discharg as a voltage is applied to the word line. Therefore, one has to rewrite the information into all the cells o a given row after reading a single cell from that row. Despite these restrictions, dynamic memory chips represent the largest section of the memory market. The advantage of a higher storage density outweigh all other considerations. Process advances such as the use of a vertical trench, have further increased th density of dynamic memory chips.

As an example we now consider the dynamic memory cell shown in Figure 7.6.5. Shown are the top view and cross-sectional view. The figure illustrates how compact the cell can be by using the gate as th word line of the array and by using a trench capacitor. Also note that the drain of the transistor and one side of the capacitor are merged into one n-type region. The bit lines shown in the top view are placed next to the transistor for clarity. Actual memory cells have the bit lines on top of the transistors as show in the cross-sectional view. More recent memory cells even have the transistor buried in the trench together with the capacitor.

Figure 7.6.5: Dynamic random access memory (DRAM) using a one-transistor cell. (a) top view of four cells and (b) cross-sectional view of one cell.

A critical issue when scaling dynamic memory circuits is the capacitance of the storage capacitor. Scaling of all dimensions would yield a smaller value of the capacitor. However, larger arrays, made possible by scaling the device size, require a larger capacitance. After all, the critical operation in a dynamic memory is the read-out. During read-out, the memory capacitor is connected to the bit line and the charge is now distributed between the memory cell capacitance, the bit line capacitance and the parasitic capacitance of all the devices connected to the bit line. The remaining voltage on the bit line therefore depends on the ratio of the cell capacitance to that of the bit line and connected elements. In large memory chips the voltage would become unacceptably low if the memory capacitance would be

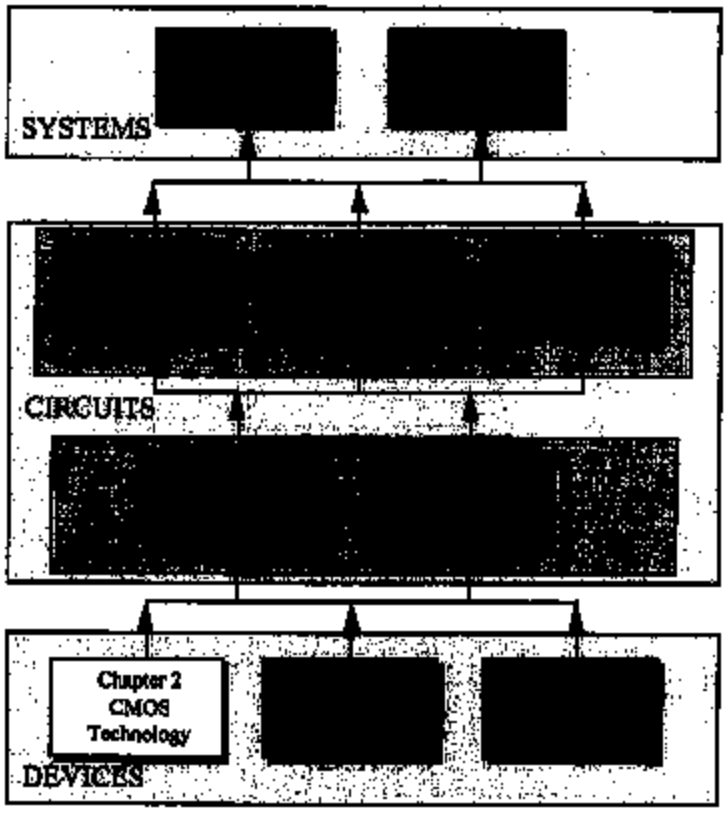
scaled down with all other device dimensions. Instead the capacitance of the memory capacitor is kept almost constant from one generation to the next at a value around 1 fF. This value corresponds to the storage of 25,000 electrons at a voltage of 5 V and results in a bit line voltage of a few millivolts.

II. CMOS TECHNOLOGY

Contents

II.1 Basic Fabrication Processes
II.2 CMOS Technology
II.3 PN Junction
II.4 MOS Transistor
II.5 Passive Components
II.6 Latchup Protection
II.7 ESD Protection
II.8 Geometrical Considerations

Perspective



OBJECTIVE

- Provide an understanding of CMOS technology sufficient to enhance circuit design.
- Characterize passive components compatible with basic technologies.
- Provide a background for modeling at the circuit level.
- Understand the limits and constraints introduced by technology.

II.1 - BASIC FABRICATION PROCESSES

BASIC FABRTICATION PROCESSES

Basic Steps

- Oxide growth
- Thermal diffusion
- Ion implantation
- Deposition
- Etching

Photolithography

Means by which the above steps are applied to selected areas of the silicon wafer.

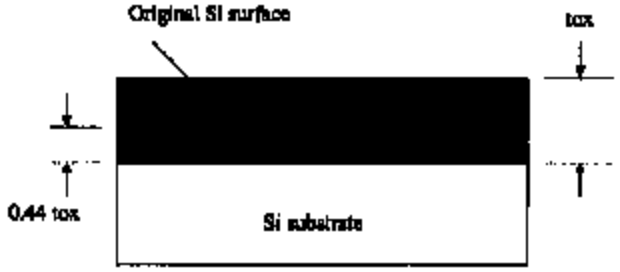
Silicon wafer

n-type: 3-5 Ω-cm

p-type: 14-16 Ω-cm

Oxidation

The process of growing a layer of silicon dioxide (SiO_2)on the surface of a silicon wafer.

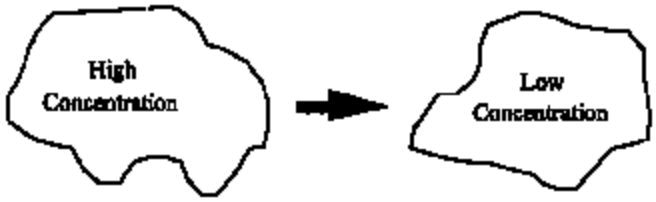


Uses:

- Provide isolation between two layers
- Protect underlying material from contamination
- Very thin oxides (100 to 1000 Å) are grown using dry-oxidation techniques. Thicker oxides (>1000 Å) are grown using wet oxidation techniques.

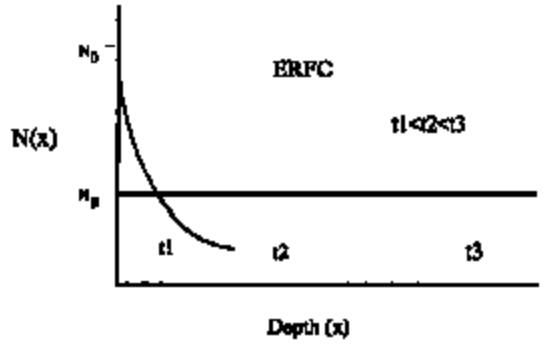
Diffusion

Movement of impurity atoms at the surface of the silicon into the bulk of the silicon - from higher concentration to lower concentration.

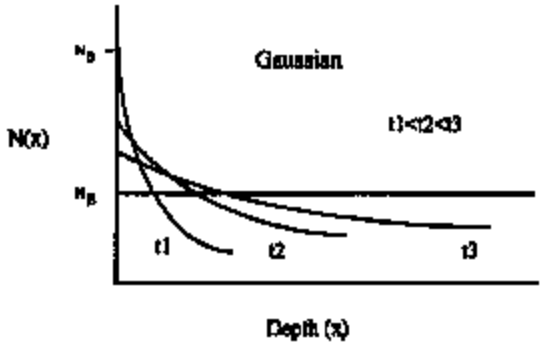


Diffusion typically done at high temperatures: 800 to 1400 °C.

Infinite-source diffusion:

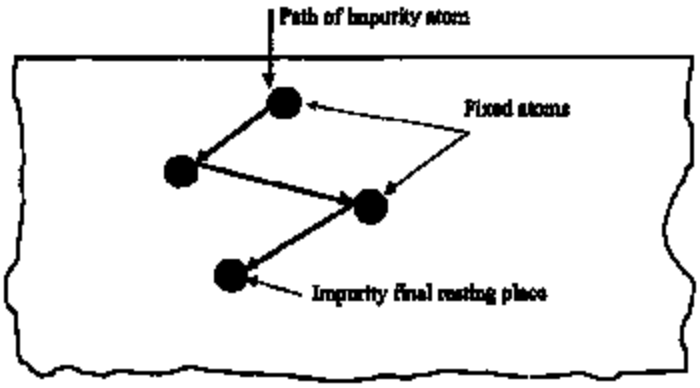


Finite-source diffusion:

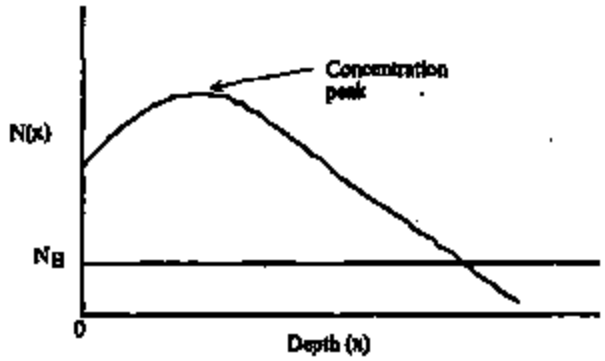


Ion Implantation

Ion implantation is the process by which impurity ions are accelerated to a high velocity and physically lodged into the target.



- Anneal required to activate the impurity atoms and repair physical damage to the crystal lattice. This step is done at 500 to 800 °C.
- Lower temperature process compared to diffusion.
- Can implant through surface layers, thus it is useful for field-threshold adjustment.
- Unique doping provile available with buried concentration peak.



Deposition

Deposition is the means by which various materials are deposited on the silicon wafer.

Examples:

- Silicon nitride (Si_3N_4)
- Silicon dioxide (SiO_2)
- Aluminum
- Polysilicon

There are various ways to deposit a meterial on a substrate:

- Chemical-vapor deposition (CVD)
- Low-pressure chemical-vapor deposition (LPCVD)
- Plasma-assisted chemical-vapor deposition (PECVD)
- Sputter deposition

Materials deposited using these techniques cover the entire wafer.

Etching

Etching is the process of selectively removing a layer of material.

When etching is performed, the etchant may remove portions or all of:

- the desired material
- the underlying layer
- the masking layer

Important considerations:

- Anisotropy of the etch

$$A = 1 - \frac{\text{lateral etch rate}}{\text{vertical etch rate}}$$

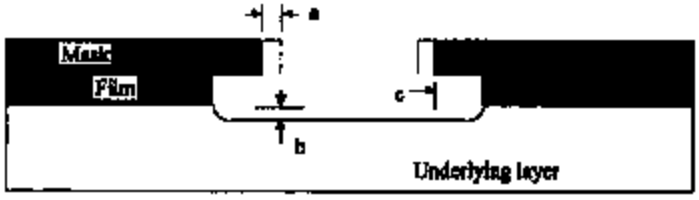
- Selectivity of the etch (film toomask, and film to substrate)

$$S_{\text{film-mask}} = \frac{\text{film etch rate}}{\text{mask etch rate}}$$

Desire perfect anisotropy (A=1) and invinite selectivity.

There are basically two types of etches:

- Wet etch, uses chemicals
- Dry etch, uses chemically active ionized gasses.



Photolithography

Components

- Photoresist material
- Photomask
- Material to be patterned (e.g., SiO_2)

Positive photoresist-

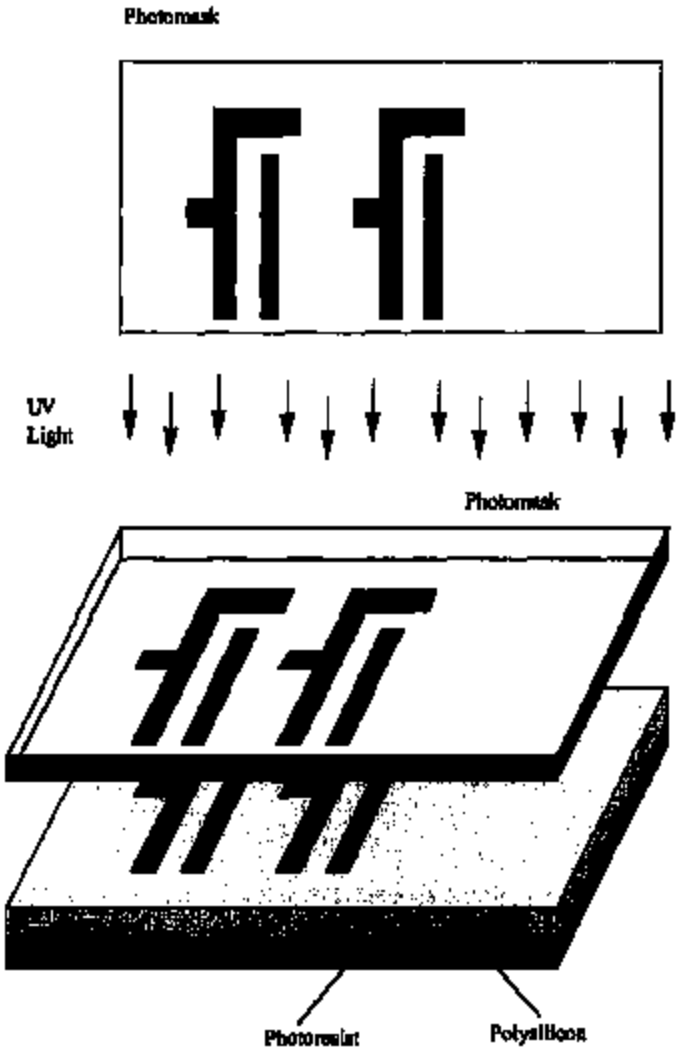
Areas exposed to UV light are soluble in the developer

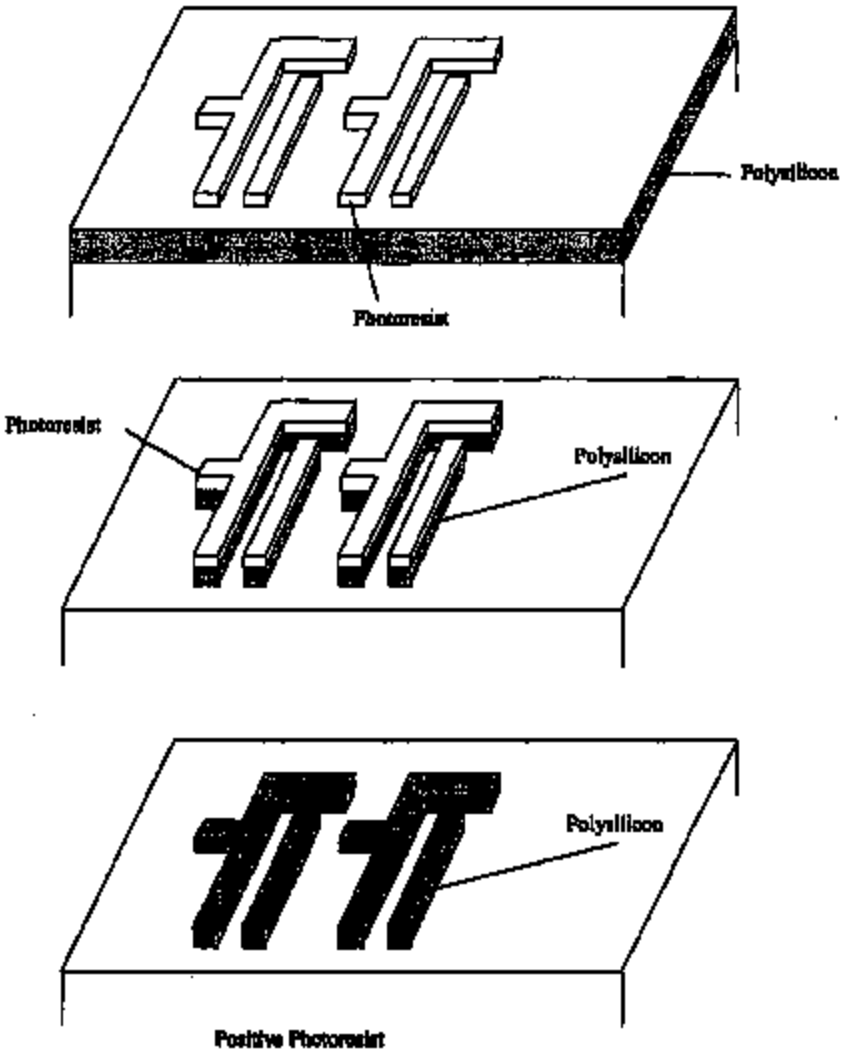
Negative photoresist-

Areas not exposed to UV light are soluble in the developer

Steps:

1. Apply photoresist
2. Soft bake
3. Expose the photoresist to UV light through photomask
4. Develop (remove unwanted photoresist)
5. Hard bake
6. Etch the exposed layer
7. Remove photoresist


Photomask
UV
Light
Photomask
Photoresist
Polysilicon


Polysilicon
Photoresist
Photoresist
Polysilicon
Polysilicon
Positive Photoresist

II.2 - CMOS TECHNOLOGY

TWIN-WELL CMOS TECHNOLOGY

Features

- Two layers of metal connections, both of them of high quality due to a planarization step.
- Optimal threshold voltages of both p-channel and n-channel transistors
- Lightly doped drain (LDD) transistors prevent hot-electron effects.
- Good latchup protection

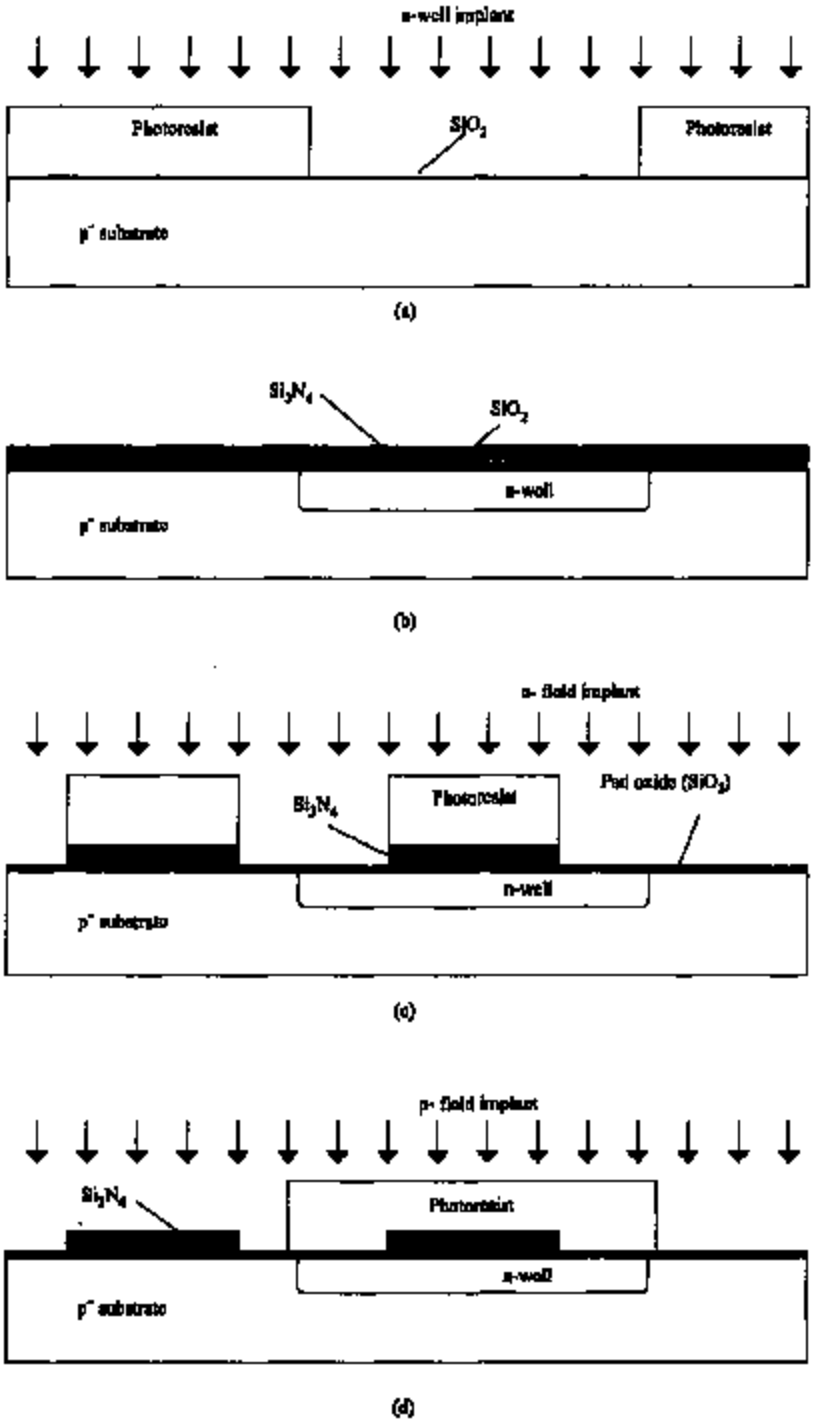


Figure 2.1-5 The major CMOS process steps.

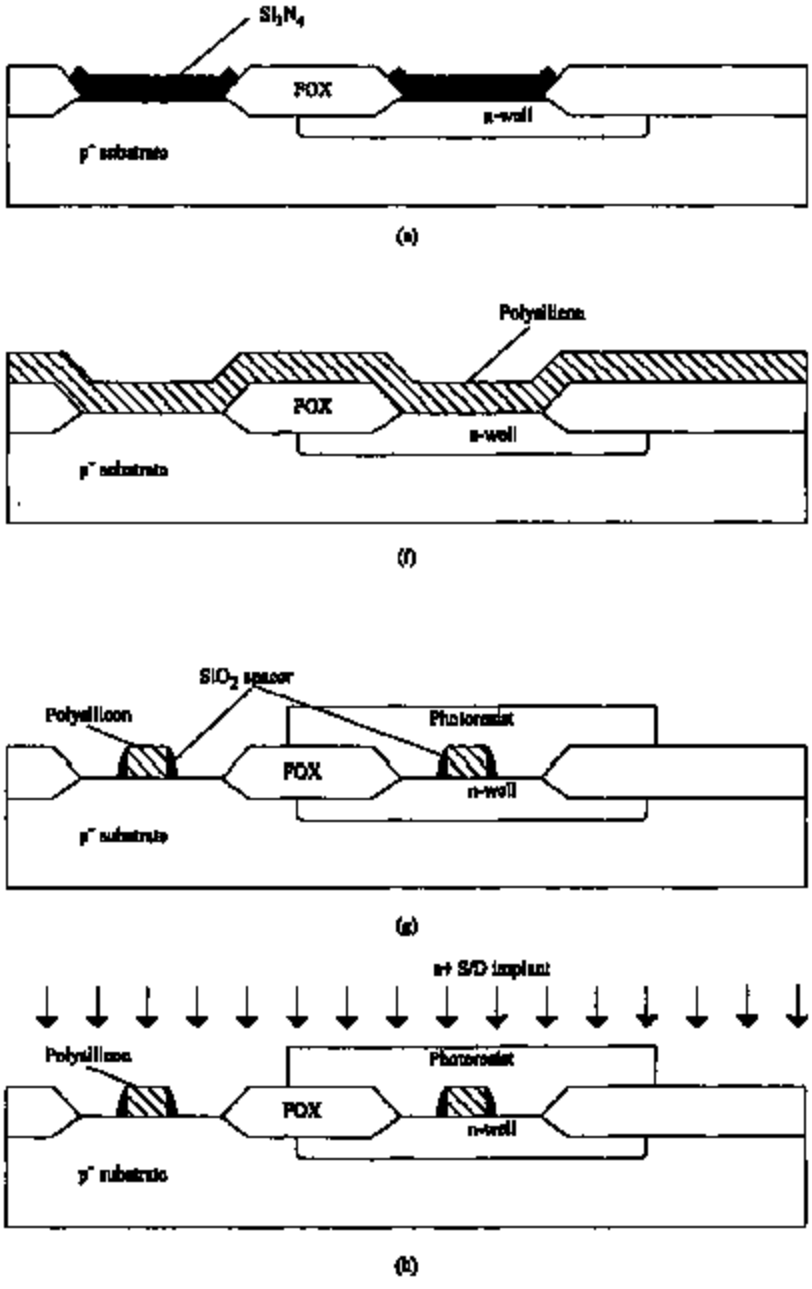


Figure 2.1-5 The major CMOS process steps (cont'd).

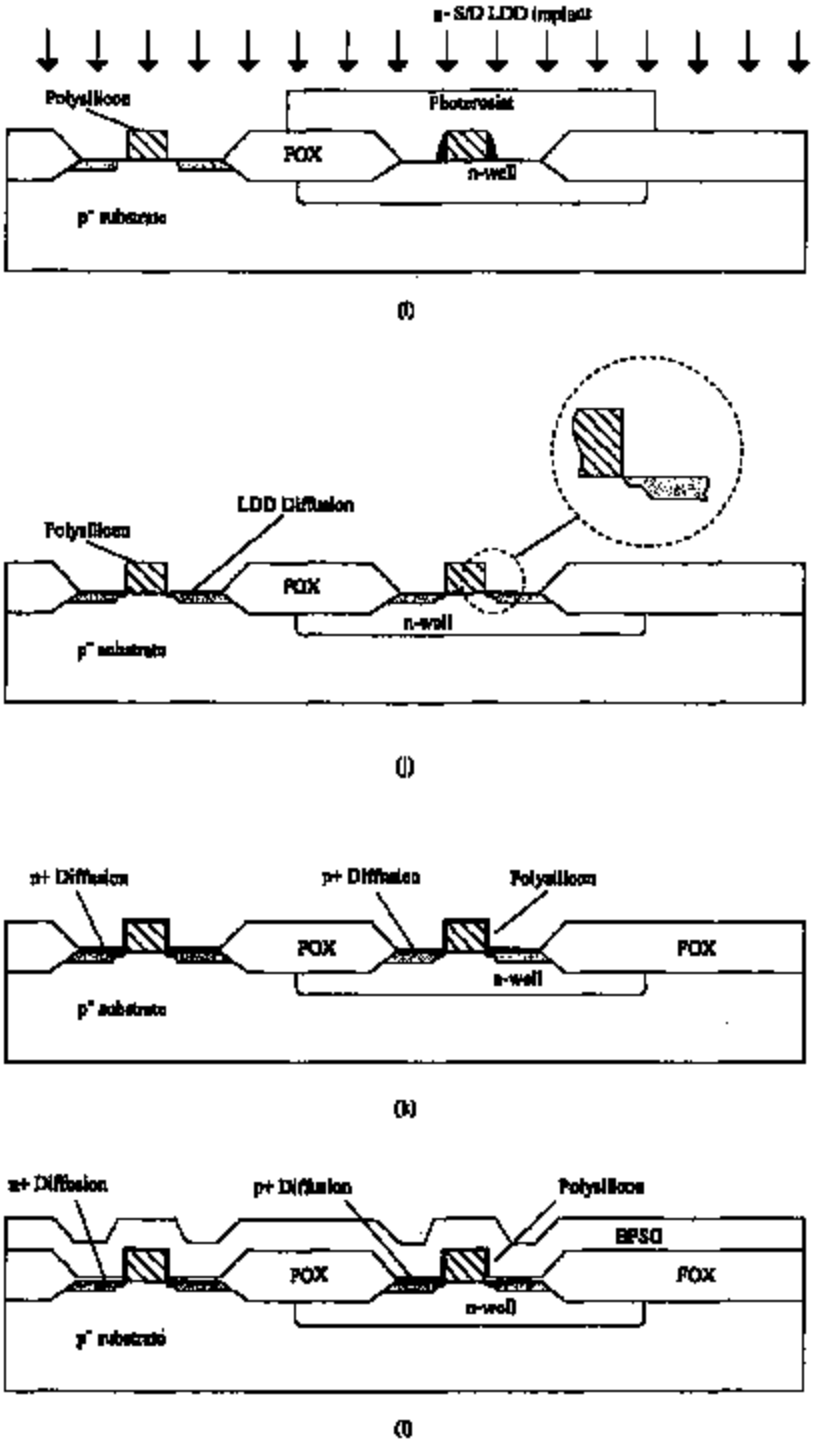
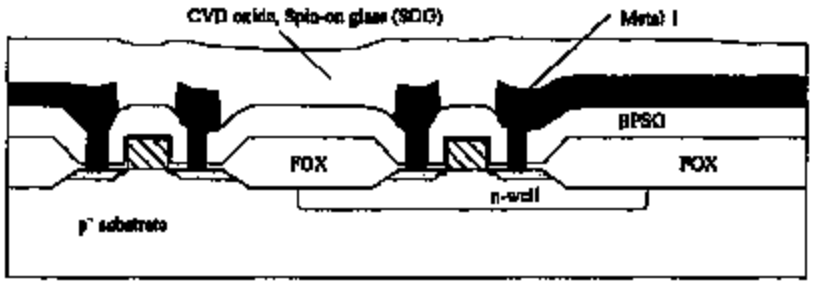
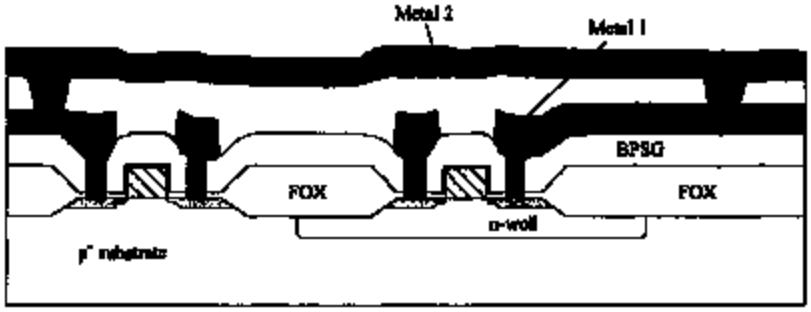


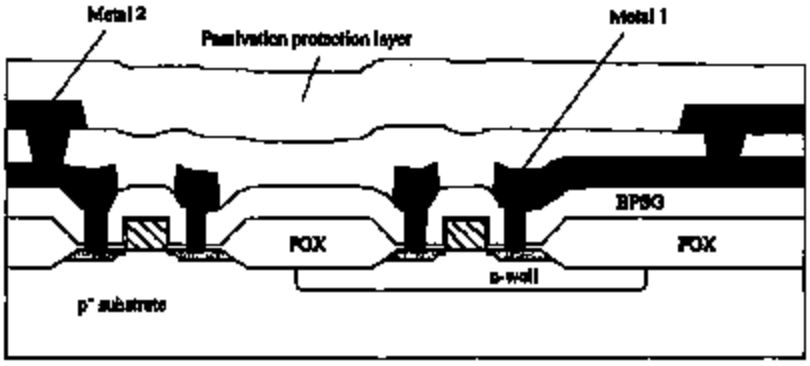
Figure 2.1-6 The major CMOS process steps (cont'd).



(m)



(n)



(o)

Figure 2.1-5 The major CMOS process steps (cont'd).

Silicide/Salicide

Purpose

- Reduce interconnect resistance,

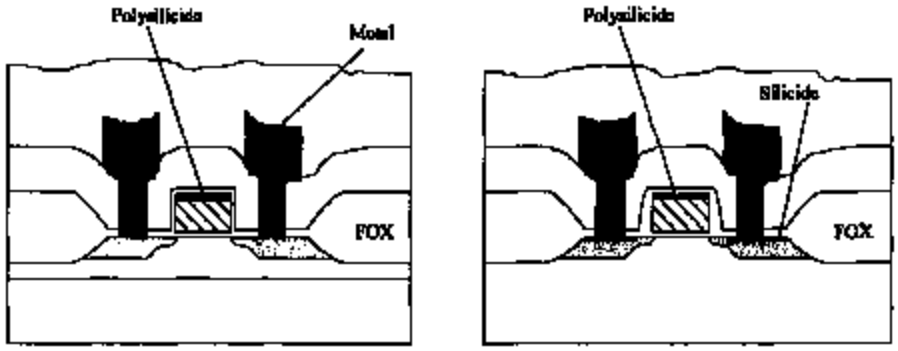
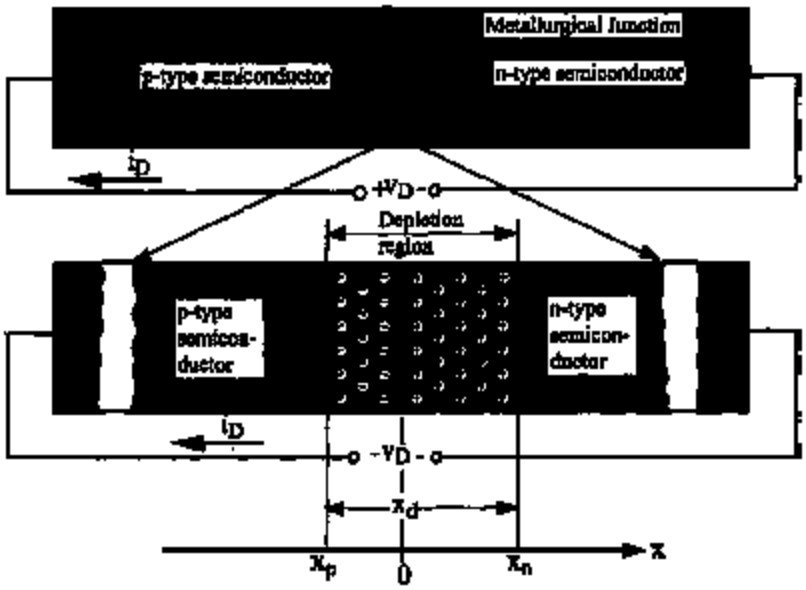


Figure 2.1-6 (a) Polycide structure and (b) Salicide structure.

II.3 - PN JUNCTION

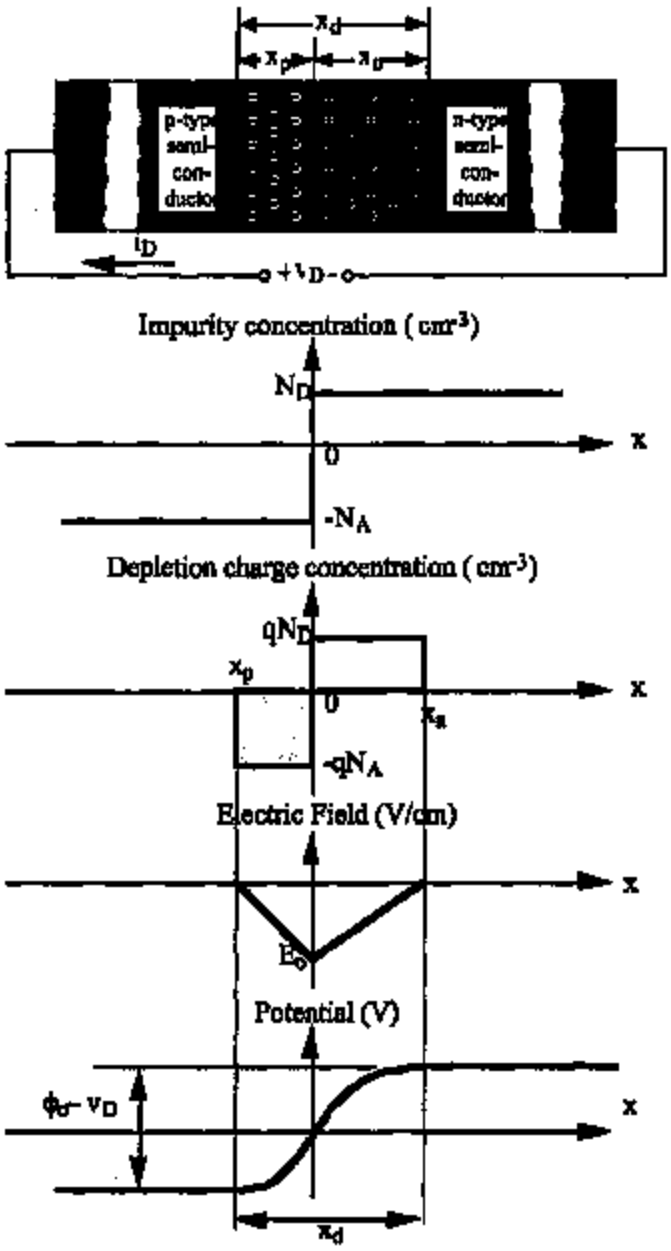
CONCEPT



1. Doped atoms near the metallurgical junction lose their free carriers by diffusion.
2. As these fixed atoms lose their free carriers, they build up an electric field which opposes the diffusion mechanism.
3. Equilibrium conditions are reached when:

Current due to diffusion = Current due to electric field

PN JUNCTION CHARACTERIZATION



SUMMARY OF PN JUNCTION ANALYSIS

Barrier potential-

$$\phi_o = \frac{kT}{q} \ln\left[\frac{N_A N_D}{n_i^2}\right] = V_t \ln\left[\frac{N_A N_D}{n_i^2}\right]$$

Depletion region widths-

$$\left.\begin{aligned} x_n &= \sqrt{\frac{2\varepsilon_{si}(\phi_o - v_D)N_A}{qN_D(N_A+N_D)}} \\ x_p &= \sqrt{\frac{2\varepsilon_{si}(\phi_o - v_D)N_D}{qN_D(N_A+N_D)}} \end{aligned}\right\} \quad x \propto \sqrt{\frac{I}{N}}$$

Depletion capacitance-

$$C_j = A\sqrt{\frac{\varepsilon_{si} q N_A N_D}{2(N_A+N_D)}} \frac{1}{\sqrt{\phi_o - v_D}} = \frac{C_{j0}}{\sqrt{\phi_o - v_D}}$$

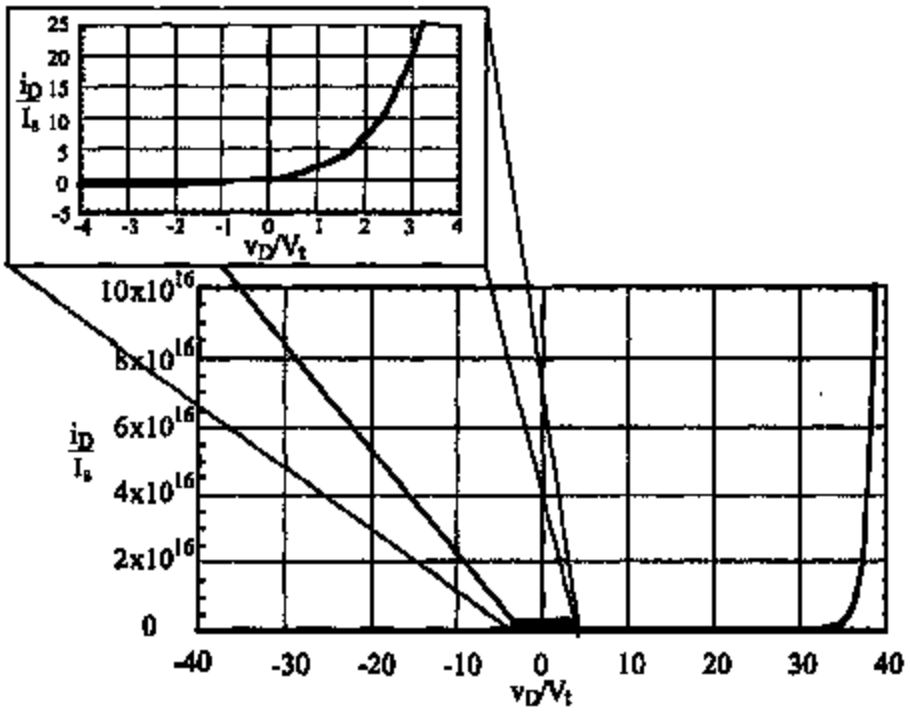
Breakdown voltage-

$$BV = \frac{\varepsilon_{si}(N_A+N_D)}{2qN_A N_D} E_{max}^2$$

SUMMARY - CONTINUED

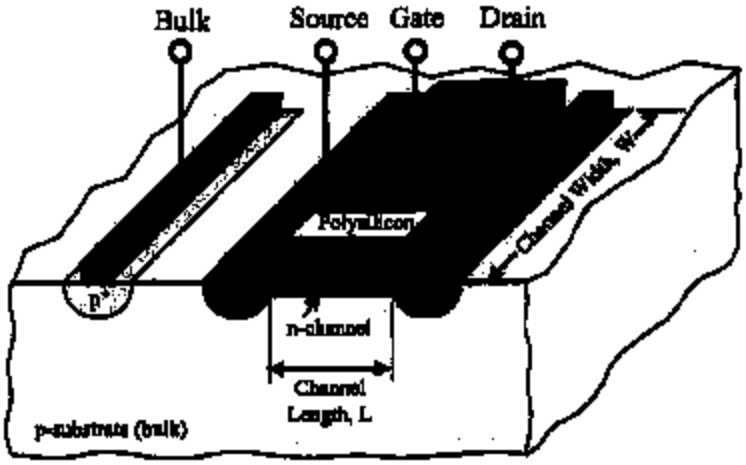
Current-Voltage Relationship-

$$i_D = I_s\left[\exp\left(\frac{v_D}{V_t}\right) - 1\right] \quad \text{where} \quad I_s = qA\left[\frac{D_p p_{no}}{L_p} + \frac{D_n n_{po}}{L_n}\right]$$



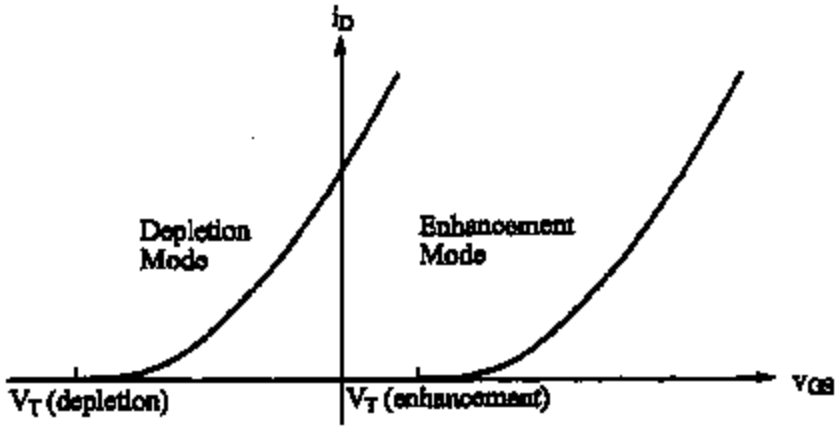
II.4 - MOS TRANSISTOR

ILLUSTRATION



t_{OX} = 200 Angstroms = 0.2×10^{-7} meters = 0.02 μm

TYPES OF TRANSISTORS



CMOS TRANSISTOR

N-well process

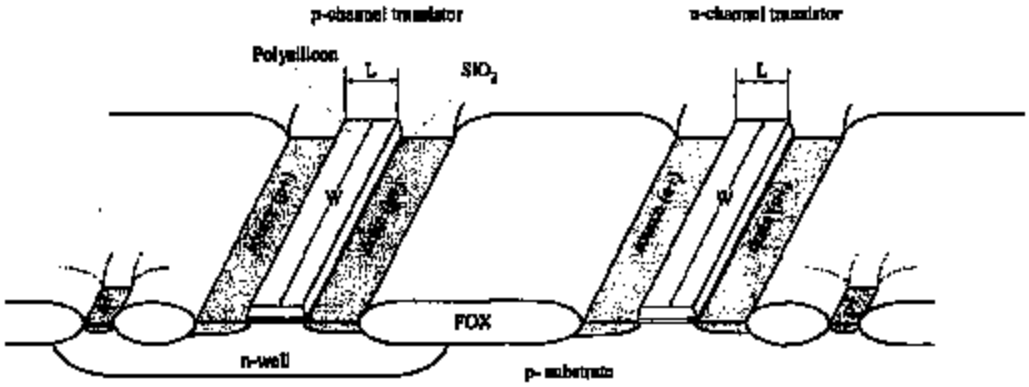


Figure 2.3-1 Physical structure of an n-channel and p-channel transistor in an n-well technology.

P-well process

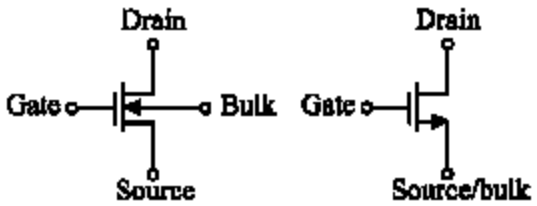
- Inverse of the above.

Normally, all transistors are enhancement mode.

TRANSISTOR OPERATING POLARTIES

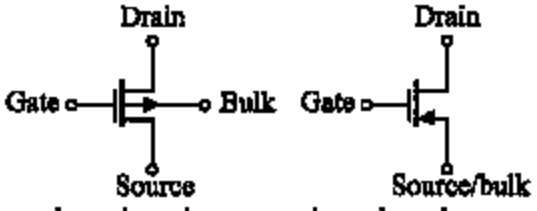
Type of Device	Polarity of v_{GS} and V_T	Polarity of v_{DS}	Polarity of v_{BULK}
n-channel, enhancement	+	+	Most negative
n-channel, depletion	-	+	Most negative
p-channel, enhancement	-	-	Most positive
p-channel, depletion	+	-	Most positive

SYMBOLS FOR TRANSISTORS



n-channel, enhancement, $V_{BS} \neq 0$

n-channel, enhancement, bulk at most negative supply



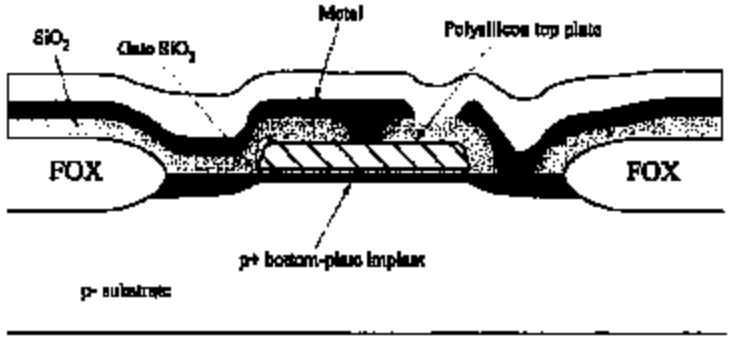
p-channel, enhancement, $V_{BS} \neq 0$

p-channel, enhancement, bulk at most positive supply

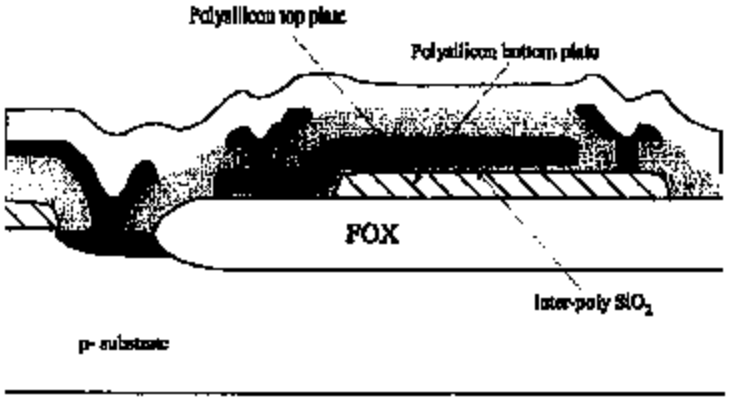
II.5 - PASSIVE COMPONENTS CAPACITORS

$$C = \frac{\varepsilon_{ox} A}{tox}$$

Polysilicon-Oxide-Channel Capacitor and Polysilicon-Oxide-Polysilicon Capacitor



(a)



(b)

Figure 2.4-1 MOS capacitors. (a) Polysilicon-oxide-channel. (b) Polysilicon-oxide-polysilicon.

Metal-Metal and Metal-Metal-Poly Capacitors

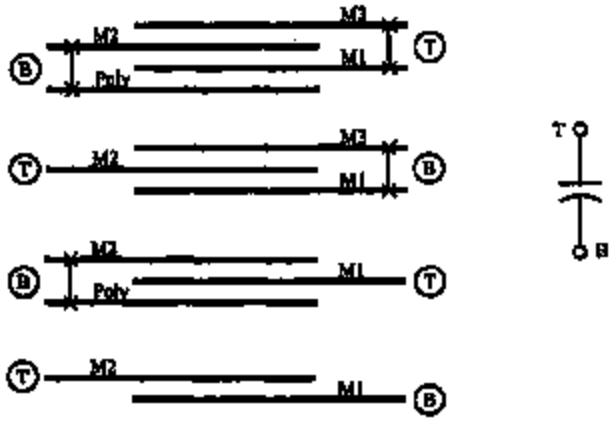


Figure 2.4-2 Various ways to implement capacitors using available interconnect layers. M1, M2, and M3 represent the first, second, and third metal layers respectively.

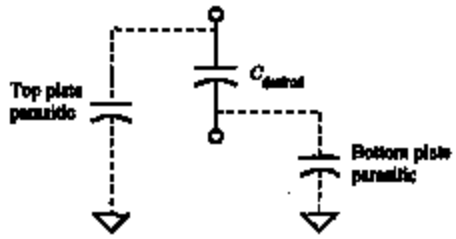


Figure 2.4-3 A model for the integrated capacitor showing top and bottom plate parasitics.

PROPER LAYOUT OF CAPACITORS

- Use "unit" capacitors
- Use "common centroid"

Want A=2*B

Case (a) fails

Case (b) succeeds!

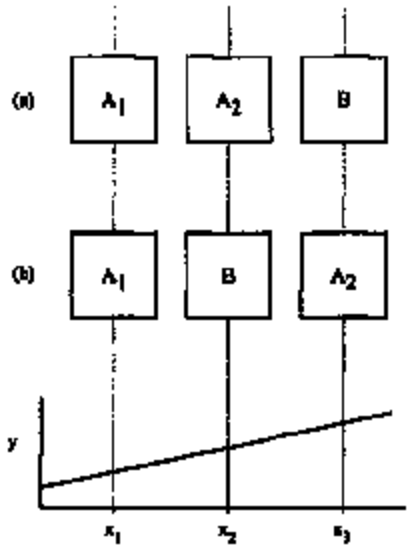


Figure 2.5-3 Components placed in the presence of a gradient, (a) without common-centroid layout and (b) with common-centroid layout.

NON-UNIFORM UNDERCUTTING EFFECTS

Large-scale distortion

Random edge distortion

Corner-rounding distortion

VICINITY EFFECT

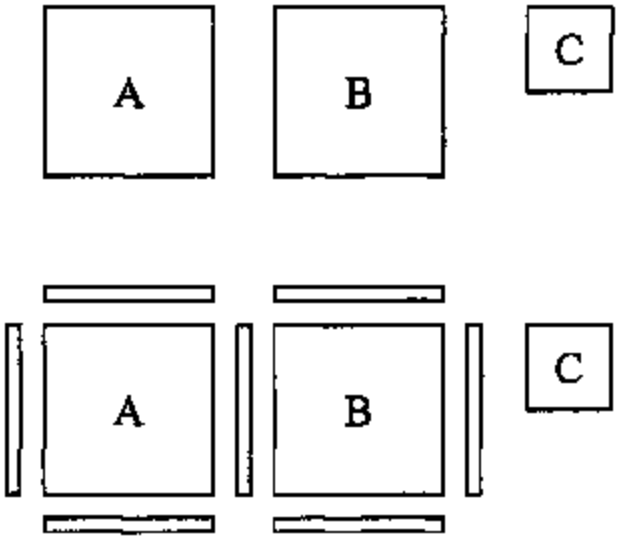
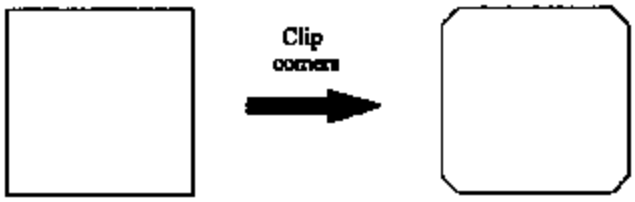


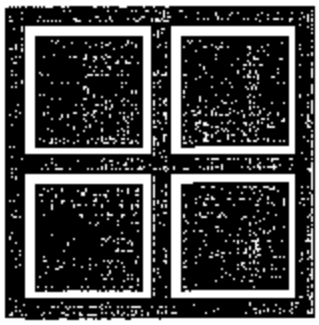
Figure 2.6-1 (a)Illustration of how matching of A and B is disturbed by the presence of C. (b) Improved matching achieved by matching surroundings of A and B

IMPROVED LAYOUT METHODS FOR CAPACITORS

Corner clipping:



Street-effect compensation:



ERRORS IN CAPACITOR RATIOS

Let C_1 be defined as

$$C_1 = C_{1A} + C_{1P}$$

and C_2 be defined as

$$C_2 = C_{2A} + C_{2P}$$

C_{XA} is the bottom-plate capacitance
C_{XP} is the fringe (peripheral) capacitance

$C_{XA} >> C_{XP}$

The ratio of C_2 to C_1 can be expressed as

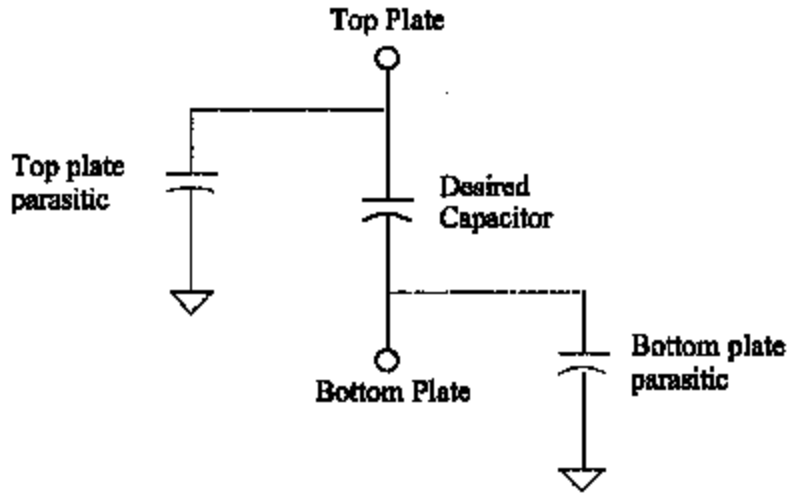
$$\frac{C_2}{C_1} = \frac{C_{2A} + C_{2P}}{C_{1A} + C_{1P}} = \frac{C_{2A}}{C_{1A}}\left[\frac{1 + \frac{C_{2P}}{C_{2A}}}{1 + \frac{C_{1P}}{C_{1A}}}\right]$$

$$\cong \frac{C_{2A}}{C_{1A}}\left[1 + \frac{C_{2P}}{C_{2A}} - \frac{C_{1P}}{C_{1A}} - \frac{(C_{1P})(C_{2P})}{C_{1A}C_{2A}}\right]$$

$$\cong \frac{C_{2A}}{C_{1A}}\left[1 + \frac{C_{2P}}{C_{2A}} - \frac{C_{1P}}{C_{1A}}\right]$$

Thus best matching is achieved when the area to periphery ratio remains constant.

CAPACITOR PARASITICS



Parasitic is dependent upon how the capacitor is constructed.

Typical capacitor performance (0.8μm Technology)

Capacitor Type	Range of Values	Relative Accuracy	Temperature Coefficient	Voltage Coefficient	Absolute Accuracy
Poly/poly capacitor	0.8-1.0 fF/μm^2	0.05%	50 ppm/°C	50 ppm/V	±10%
MOS capacitor	2.2-2.5 fF/μm^2	0.05%	50 ppm/°C	50 ppm/V	±10%
MOM capacitor	0.02-0.03 fF/μm^2	1.5%			±10%

RESISTORS IN CMOS TECHNOLOGY

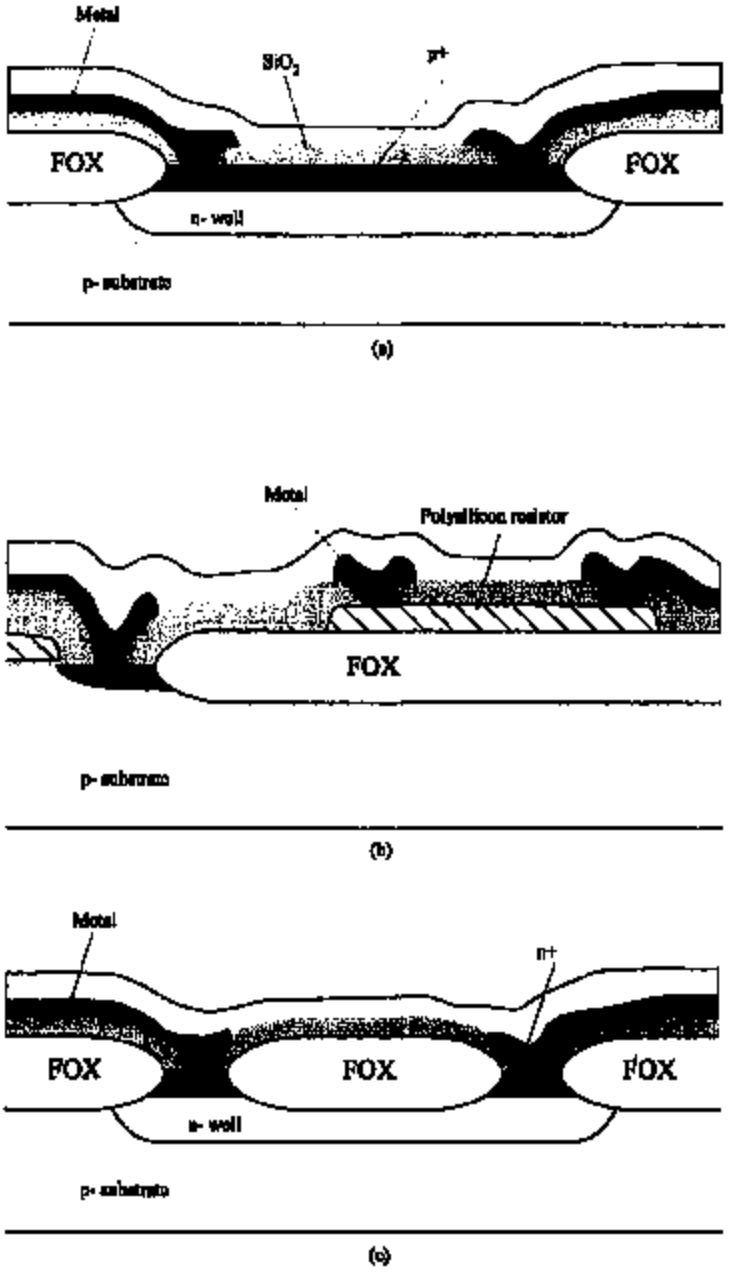


Figure 2.4-4 Resistors. (a) Diffused (b) Polysilicon (c) N-well

PASSIVE COMPONENT SUMMARY

(0.8μm Technology)

Component Type	Range of Values	Matching Accuracy	Temperature Coefficient	Voltage Coefficient	Absolute Accuracy
Poly/poly capacitor	0.8-1.0 fF/μm^2	0.05%	50 ppm/°C	50ppm/V	±10%
MOS capacitor	2.2-2.5 fF/μm^2	0.05%	50 ppm/°C	50ppm/V	±10%
MOM capacitor	0.02-0.03 fF/μm^2	1.5%			±10%
Diffused resistor	20-150 Ω/sq.	0.4%	1500 ppm/°C	200ppm/V	±35%
Polysilicide R	2-15 Ω/sq.				
Poly resistor	20-40 Ω/sq.	0.4%	1500 ppm/°C	100ppm/V	±30%
N-well resistor	1-2k Ω/sq.	0.4%	8000 ppm/°C	10k ppm/V	±40%

BIPOLARS IN CMOS TECHNOLOGY

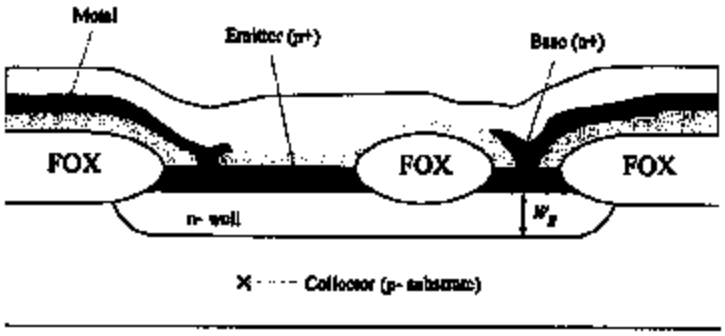


Figure 2.5-1 Substrate BJT available from a bulk CMOS process.

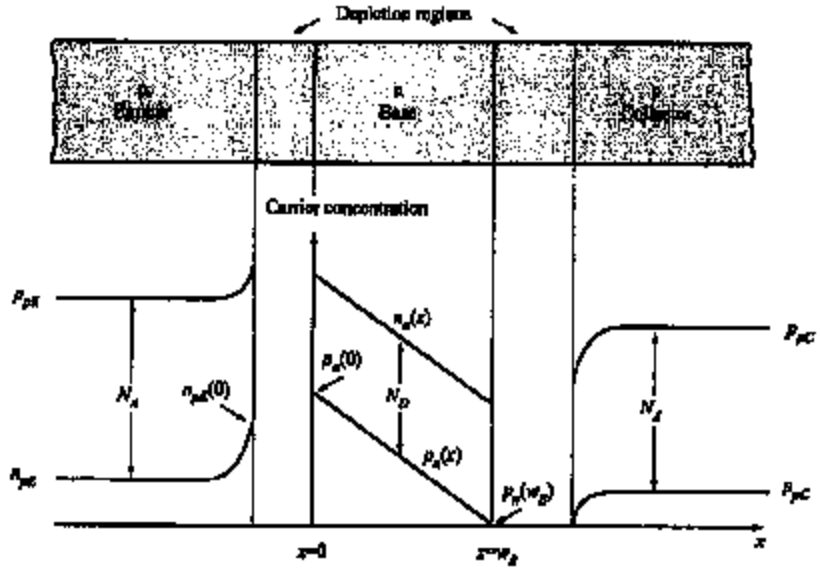


Figure 2.5-2 Minority carrier concentrations for a bipolar junction transistor.

II.6 - LATCHUP

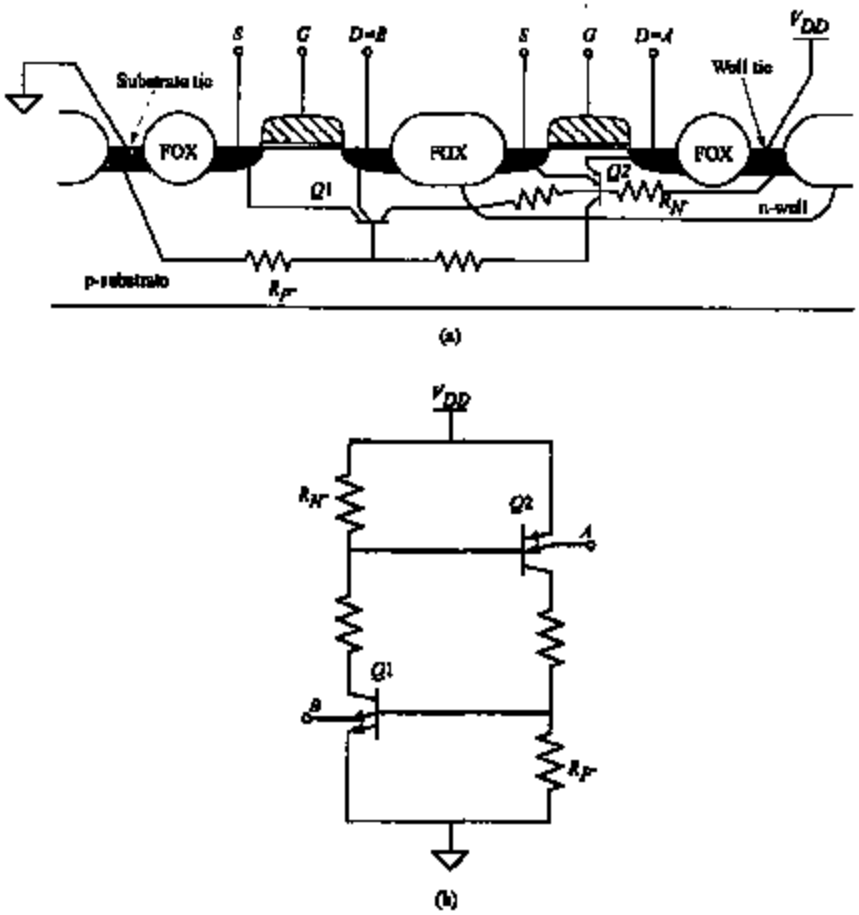


Figure 2.5-3 (a) Parasitic lateral NPN and vertical PNP bipolar transistor in CMOS integrated circuits. (b) Equivalent circuit of the SCR formed from the parasitic bipolar transistors.

PREVENTING LATCHUP

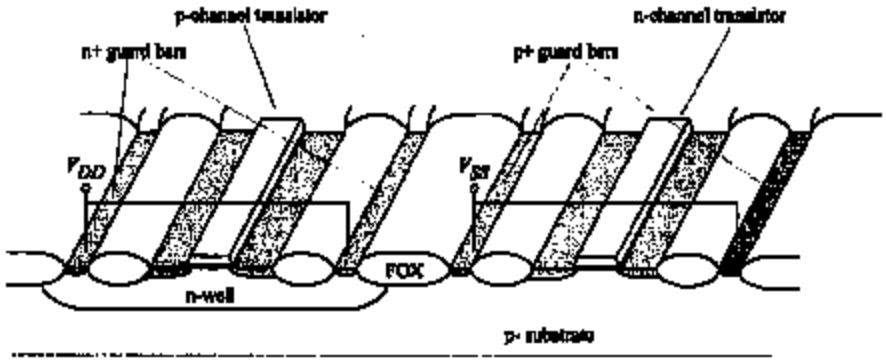


Figure 2.5-4 Preventing latch-up using guard bars in an n-well technology

II.7 - ESD PROTECTION

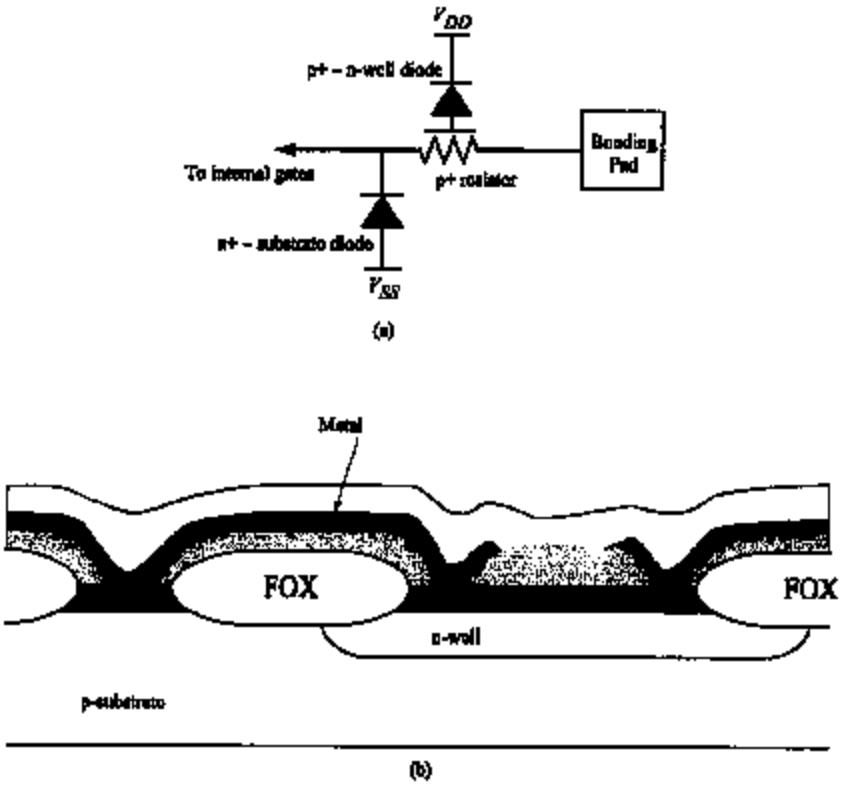


Figure 2.3-3 Electrostatic discharge protection circuitry. (a) Electrical equivalent circuit (b) Implementation in CMOS technology

II.8 - GEOMETRICAL CONSIDERATIONS

Design Rules for a Double-Metal, Double-Polysilicon, N-Well, Bulk CMOS Process.

Minimum Dimension Resolution (λ)

1. N-Well
   - 1A. width 6
   - 1B. spacing 12
2. Active Area (AA)
   - 2A. width 4

   Spacing to Well
   - 2B. AA-n contained in n-Well 1
   - 2C. AA-n external to n-Well 10
   - 2D. AA-p contained in n-Well 3
   - 2E. AA-p external to n-Well 4

   Spacing to other AA (inside or outside well)
   - 2F. AA to AA (p or n) 3
3. Polysilicon Gate (Capacitor bottom plate)
   - 3A. width 2
   - 3B. spacing 3
   - 3C. spacing of polysilicon to AA (over field) 1
   - 3D. extension of gate beyond AA (transistor width dir.) 2
   - 3E. spacing of gate to edge of AA (transistor length dir.) 4
4. Polysilicon Capacitor top plate
   - 4A. width 2
   - 4B. spacing 2
   - 4C. spacing to inside of polysilicon gate (bottom plate) 2
5. Contacts

5A. size 2x2
5B. spacing 4
5C. spacing to polysilicon gate 2
5D. spacing polysilicon contact to AA 2
5E. metal overlap of contact 1
5F. AA overlap of contact 2
5G. polysilicon overlap of contact 2
5H. capacitor top plate overlap of contact 2

6. Metal-1
6A. width 3
6B. spacing 3

7. Via
7A. size 3x3
7B. spacing 4
7C. enclosure by Metal-1 1
7D. enclosure by Metal-2 1

8. Metal-2
8A. width 4
8B. spacing 3

Bonding Pad
8C. spacing to AA 24
8D. spacing to metal circuitry 24
8E. spacing to polysilicon gate 24

9. Passivation Opening (Pad)

9A. bonding-pad opening	100μm x 100μm
9B. bonding-pad opening enclosed by Metal-2	8
9C. bonding-pad opening to pad opening space	40

Note: For a P-Well process, exchange p and n in all instances.

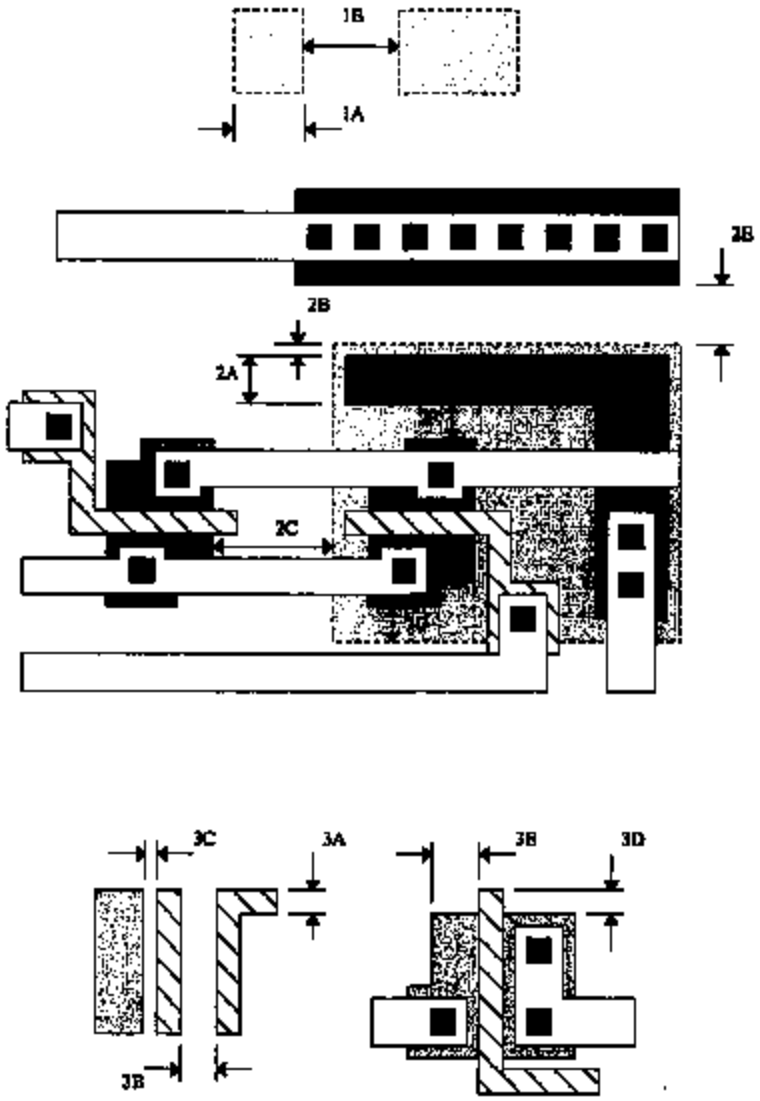


Figure 2.6-8(a) Illustration of the design rules 1-3 of Table 2.6-1.

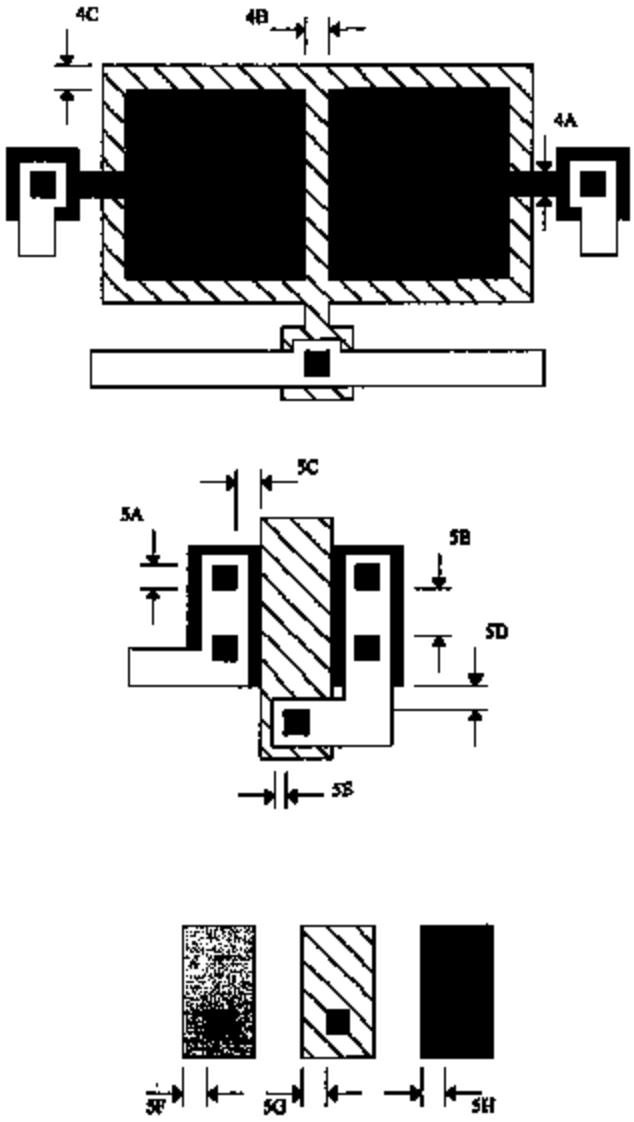


Figure 2.6-8(b) Illustration of the design rules 4-5 of Table 2.6-1.

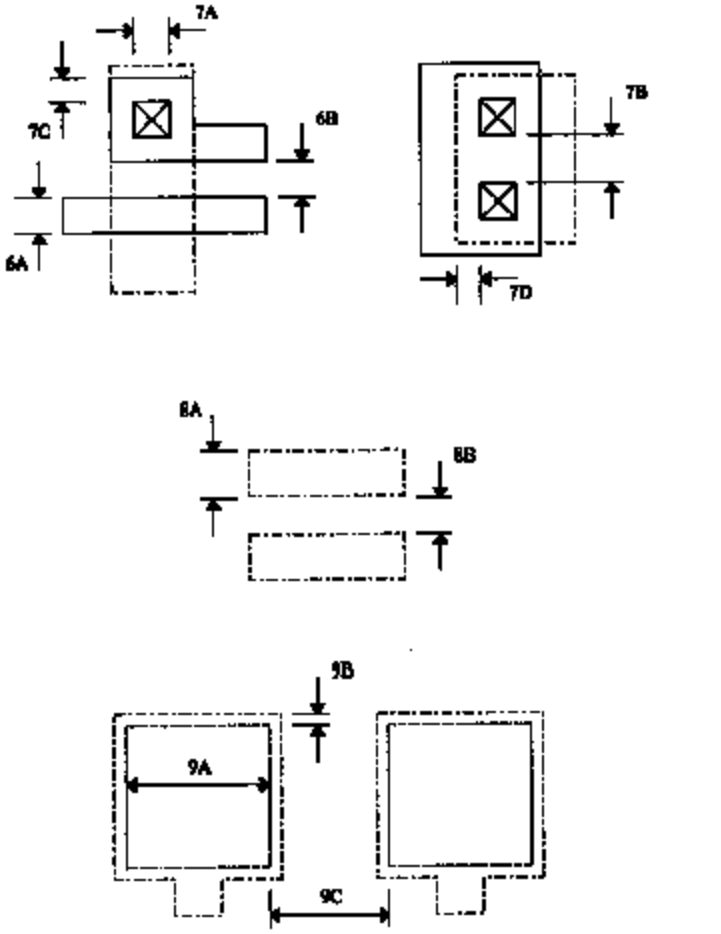


Figure 2.6-8(c) Illustration of the design rules 6-9 of Table 2.6-1.

Transistor Layout

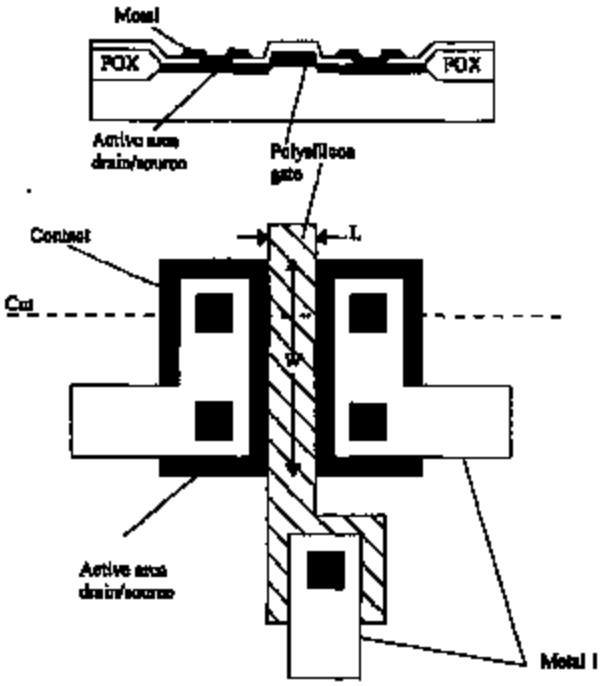


Figure 2.6-3 Example layout of an MOS transistor showing top view and side view at the cut line indicated.

SYMMETRIC VERSUS PHOTOLITHOGRAPHIC INVARIANT

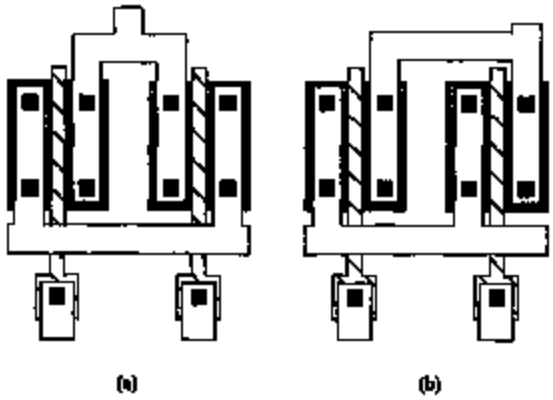


Figure 2.6-4 Example layout of MOS transistors using (a) mirror symmetry, and (b) photolithographic invariance.

PLI IS BETTER

Resistor Layout

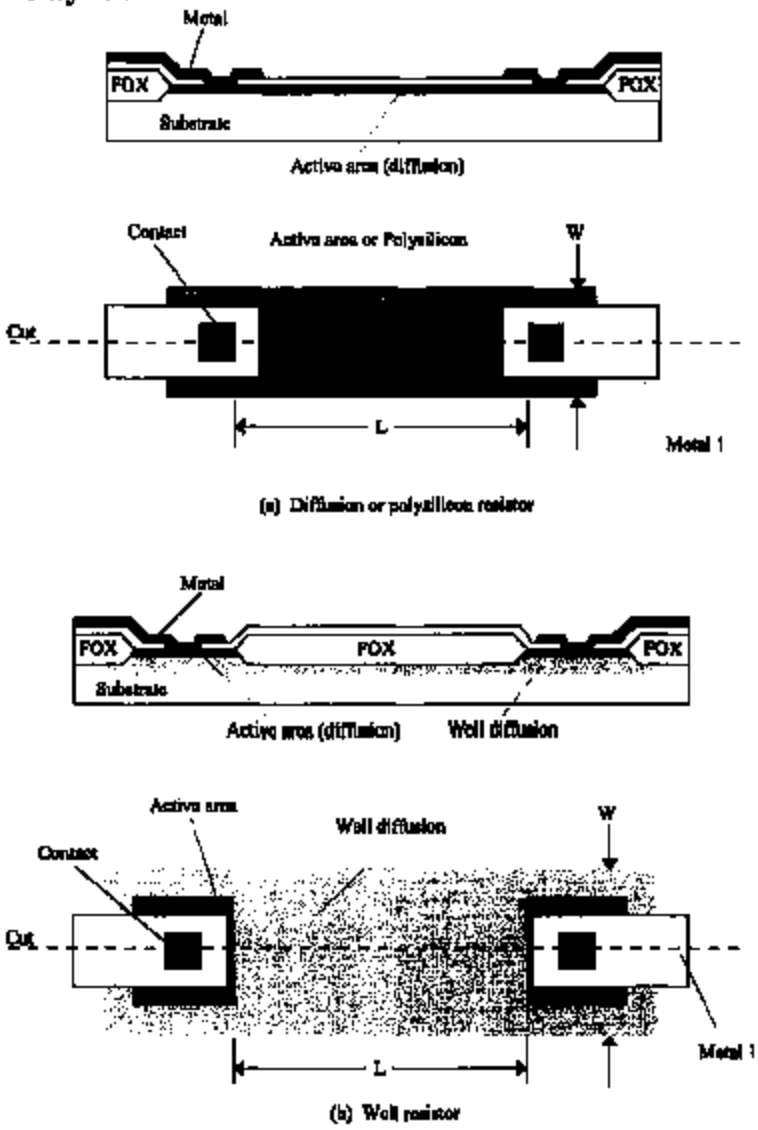
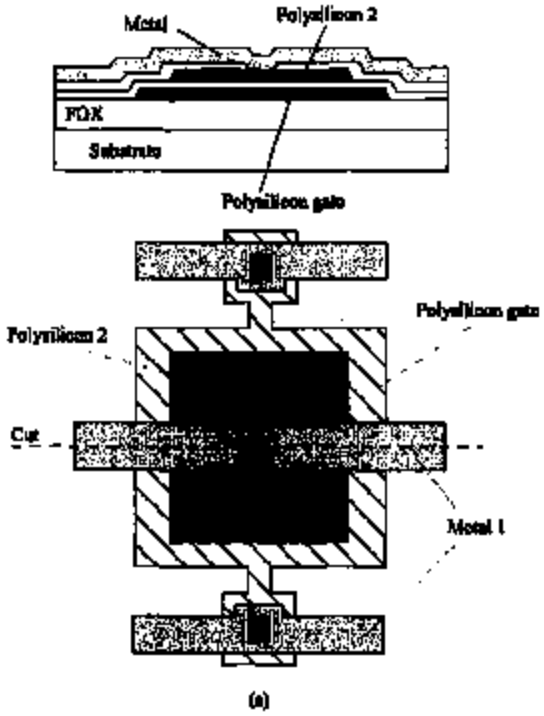
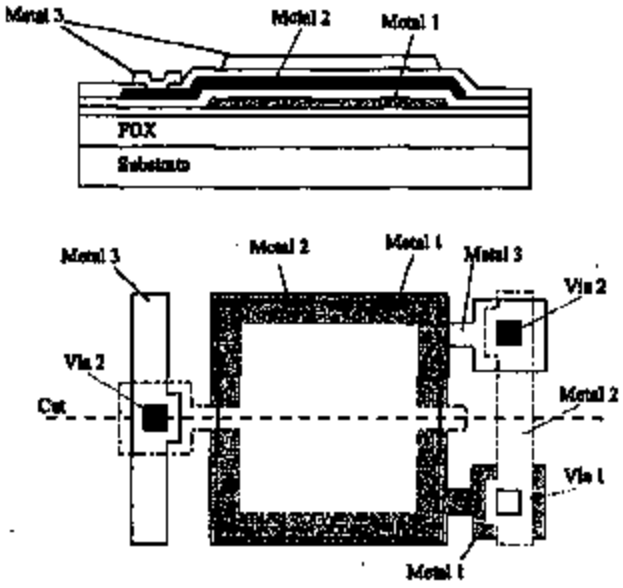


Figure 2.6-5 Example layout of (a) diffusion or polysilicon resistor and (b) Well resistor along with their respective side views at the cut line indicated.

Capacitor Layout



(a)



Reexamination Proceeding

by Stan Protigal

The purpose of this document is to provide practitioners with a working sample of areexamination preceding.

Contents

this page:

- Description of a Reexamination - 35 U.S.C. 301 and the reasons for invoking a Reexamination proceeding
- Contents Description and Synopsis
- Chronology
- Reasons Attorney Protigal Chose a Reexamination
- Definitions of Technical Terms

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other page at this website, contains prosecution documents:

- Documents including prosecution papers and claims
- Request for Reexamination
- Application of Prior Art References to Claims (part of the *Request for Reexamination*)
- Preliminary Amendment In this case, a preliminary amendment was filed concurrently with the *Request for Reexamination*. Consists of:
  Claims as Amended
  Remarks, and a
  Drawing Submission

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other pages at this site:

- Brief Bio Sketch of the Author
- Resume

Contents Description

This particular reexamination case is interesting because all of the claims with the amendments originally proposed on filing of the Reexamination request were allowed. Nevertheless, the applicant for undisclosed reasons declined to accept the patent.

All documents displayed herein are public documents. The reason for termination of prosecution after obtaining full allowance of the claims under reexamination and other business decisions cannot be disclosed.

Synopsis

This patent defined a CMOS circuit in which I/O lines are precharged to preferred voltage levels in order to avoid latch up. The patent issued in October, 1990. By October, 1992 it was determined that the patent should be limited specifically to *inter alia* a CMOS circuit implementation.

(In addition, the term "signal lines" was changed to "input/output lines" which more closely followed the description in the Specification, and the term "precharge transistors" was changed in two dependent claims.)

Description of a Reexamination

35 U.S.C. 301 - Any person ... may file a request for Reexamination of any claim on the basis of any prior art cited ... . The request must set forth the pertinency and manner of applying cited prior art to every claim for which reexamination is requested. ...

It is possible to narrow the scope of claims with a reexamination proceding. One advantage of the preceding for the patent owner is that the U.S. Patent Examiner makes a determination of the validity of such an amended claim in view of the prior art. Such a determination gives the patent a legal presumption that it is valid over that cited art.

In a *reissue* proceeding, the Examiner's evaluation of the patent in view of newly-presented prior art is not given as a matter of statutory right.

The *reissue* proceeding is intended to permit the patent owner to refine his/her rights as set forth in the patent. The *reexamination* proceeding is intended to permit *anyone* to attack a patent. Patent owners often will do so in order to place a patent in better condition for enforcement and litigation.

Chronology

July 22, 1988

Patent application describing an anti-latchup circuit used on CMOS DRAMs filed on behalf of Ward Parkinson and Wen Foo Chern. The attorney was Stan Protigal, who was house counsel for Micron Technology. Stan Protigal had prosecuted both the original application and the reexamination.

October 9, 1990

U.S. Patent Number 4,962,326 issues after initial rejection and amendments to the claims.

October, 1990 to October, 1992

Micron legal makes a determination that in order to place the patent in better condition for assertion of patent rights, the patent should be limited to a CMOS circuit. Such changes are typically accomplished by Reissue patents. The U.S. patent law also provides for a reexamination preceding, which does not require a showing of unforeseen circumstances.

Unlike a reissue patent, a reexamination patent specifically provides for the citation of additional prior art under which a determination of patentability is made. In this case it was desired to limit the scope of the patent to CMOS circuitry. Stan Protigal determined that this could be achieved by requesting a reexamination.

Essentially, attorney Protigal determined that a desire for revision could best be expressed by attacking his client's patent. The desired result was fully achieved in that the revised claims and changes were allowed by the Examiner. This of course required complete coverage of the

subject matter in the original patent -- the document was complete but overbroad in its claim coverage.

October 20, 1992

Request for Reexamination filed with U.S. Patent and Trademark Office. At the time of the filing of the request, attorney Stan Protigal filed an amendment to the claims and remarks, an Information Disclosure Statement regarding prior art and a drawing change. Since the additional documents were not required at the time of the Request for Examination, the amendment was considered to be a Preliminary Amendment.

June 2, 1993

U.S. Patent Examiner Roseen issues Notice of intent to issue "confirmation" that all of Claims 1-7 are allowable. At this point, a Reexamined Patent would have issued in due course.

June 28, 1993

Formal drawings filed, representing the change previously approved.

July 20, 1993

Attorney submitted a letter requesting abandonment of the application. The reasons for the request to abandon the case are not part of the public record and so we have a patent in which the U.S. Patent Examiner approved all requested changes, but was abandoned for undisclosed reasons. Micron made a determination not to attempt to enforce this patent.

August 3, 1993

Examiner Roseen issues Notice of Intent to Issue Reexamination Certificate with all claims canceled.

Claims

The Claims as Amended are presented in the Preliminary Amendment, and were accepted by the U.S. Patent Examiner as proposed in that amendment.

Definition of Terms

CMOS

Complementary Metal Oxide Semiconductor - the semiconductor chip, which is typically doped to have either "n-type" or "p-type" minority carriers, is subsequently doped to have "wells" of the opposite type of doped material. This provides certain advantages in terms of speed and circuit density of the semiconductor part.

A definition of CMOS circuitry as applies to this invention is found within the Preliminary Amendment

latchup

as used here, an event caused by the CMOS wells acting to form a short circuit under certain voltage conditions.

DRAM

Dynamic Random Access Memory - memory in which bit values are stored as charge levels in capacitive devices. It is called "dynamic" because the bits must be read and refreshed on an ongoing basis, so that in addition to being volatile, will quickly lose its value without being refreshed on an ongoing basis. The refresh operation is accomplished with a DRAM controller. In contrast, an SRAM is volatile memory, but will retain its values so long as power is applied to it.

SCN Home Page

(if that doesn't work, try http://www.scn.org)

Prepared by Stan Protigal e-mail: st an@scn.org

Compatible software, works with *Any Browser*

Complementary MOS (CMOS) Logic Design

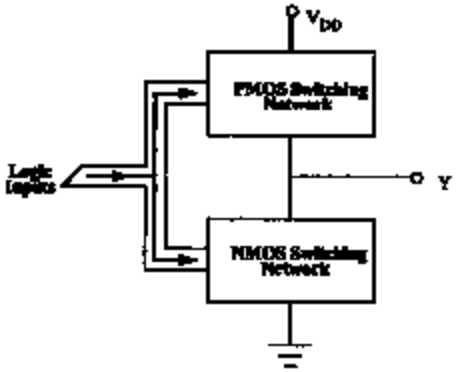
MES Institute of Microelectronic Systems

Basic CMOS Logic Gate Structure

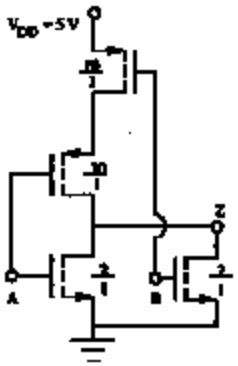
- PMOS and NMOS switching networks are complementary

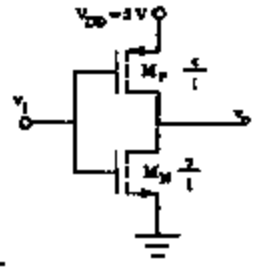
⇒Either the PMOS or the NMOS network is on while the other is off

⇒No static power dissipation



CMOS NOR Gate





NOR Gate Truth Table

A B	$Z = \overline{A+B}$
0 0	1
0 1	0
1 0	0
1 1	0

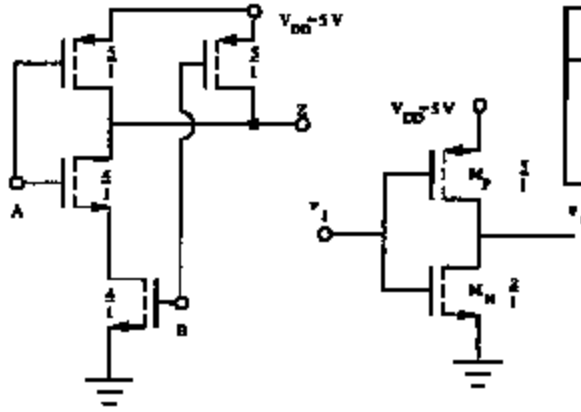
Transistor Sizing for CMOS Gates: Review

Goal: To maintain the delay times equal the reference inverter design under the worst-case input conditions

Example: 2 input CMOS NOR gate

- Each transistor of the NMOS network is capable of discharging individually the load capacitance C ⇒ Same size as NMOS transistor of reference inverter
- PMOS network conducts only when AB = 00 (Transistors in serie) ⇒ Each PMOS must be twice larger
  (On-resistance proportional to $(W/L)^{-1}$)

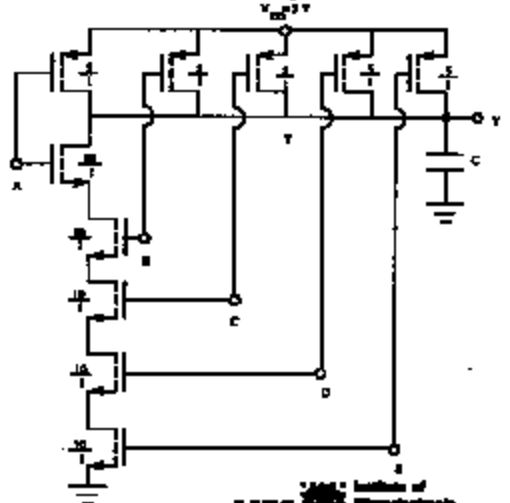
CMOS NAND Gate



NAND Gate Truth Table

A B	$Z=\overline{AB}$
0 0	1
0 1	1
1 0	1
1 1	0

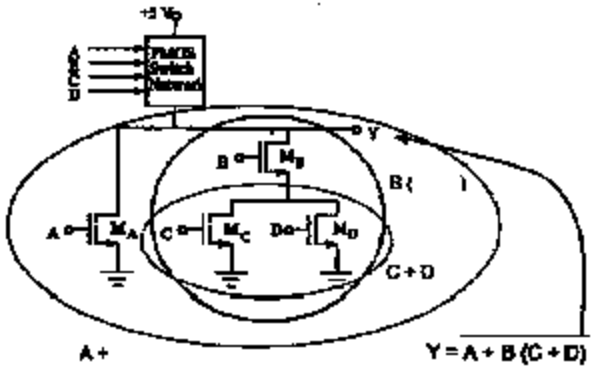
Multi-Input NAND Gate



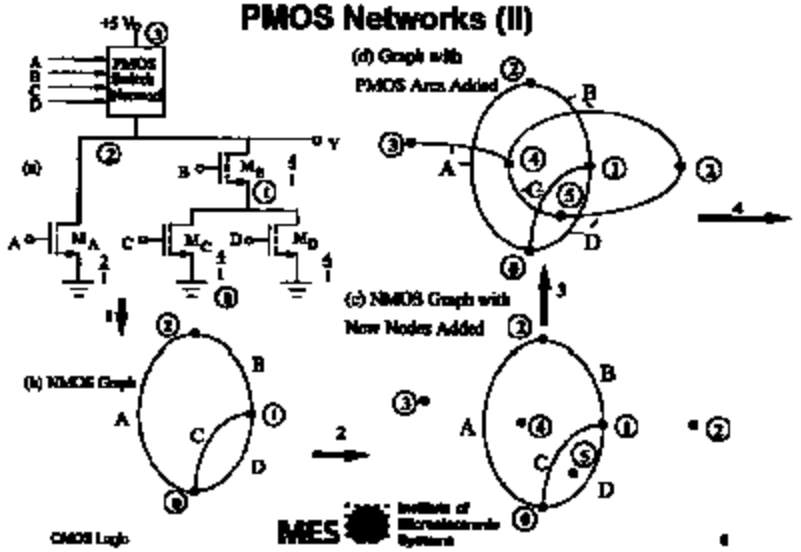
$Y=\overline{ABCDE}$

Why should one prefer a NAND gate rather than a NOR gate?

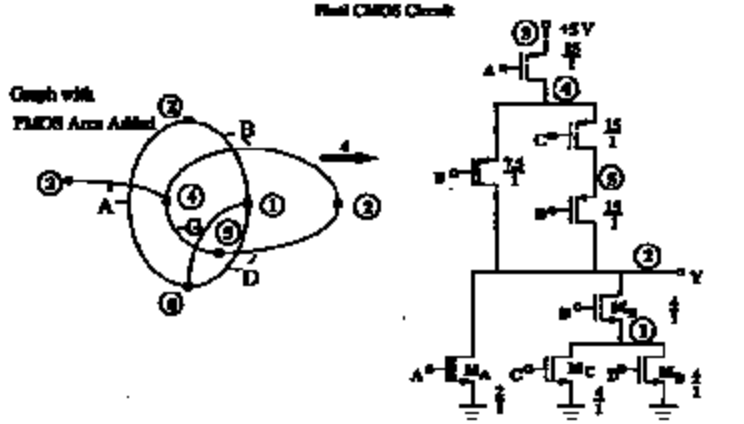
Steps In Constructing Graphs for NMOS and PMOS Networks (I)



Steps In Constructing Graphs for NMOS and PMOS Networks (II)

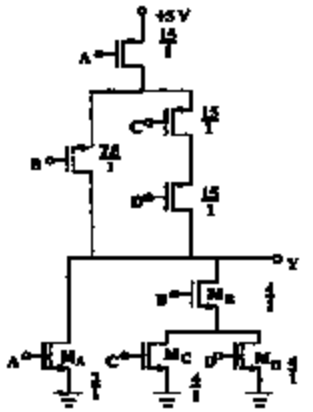


Steps in Constructing Graphs for NMOS and PMOS Networks (III)



Summary

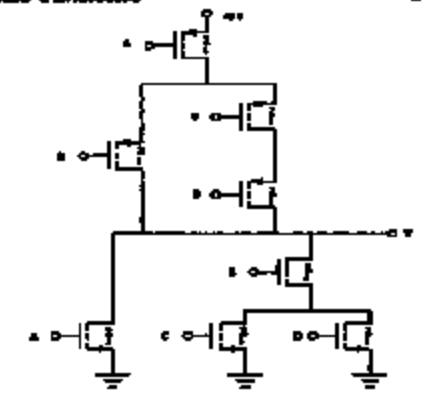
- AND - serially connected FET
- OR - parallel connected FET
- NMOS network implements "zeros"
- PMOS network implements "ones"
- W/L ratio has to be determined as a design parameter



CMOS Gate Design: Minimum Size Vs. Performance (I)

CMOS circuit with only minimum size transistors ➡ Considerable savings in chip area, but increased logic delay

Example:



CMOS Gate Design: Minimum Size Vs. Performance (II)

(W/L) for PMOS network = 2/3

$$\tau_{PLH} = \frac{\left(\frac{5}{1}\right)}{\left(\frac{2}{3}\right)}\tau_{PLH} = 7.5\tau_{PLH}$$

$\tau_{PLH} = \tau_{PLH}$ of reference inverter

For NMOS network ➡ $\tau_{PHL} = 2\tau_{PLH}$

The average propagation delay of the minimum size logic gate is:

$$\tau_p = \frac{(\tau_{PLH} + \tau_{PHL})}{2} = \frac{(2\tau_{PLH} + 7.5\tau_{PHL})}{2} = \frac{9.5\tau_{PLH}}{2} = 4.75\tau_{PLH}$$

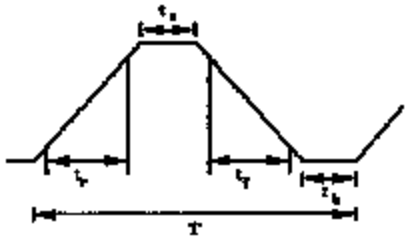
Mininimum size gate will 4.75 times slower than reference inverter when driving the same load capacitance

Power-Delay Product (PDP)

The PDP is an important figure of merit for a logic technology

$$PDP = P_{AV}\tau_p$$

For CMOS: $P_{AV} = CV_{DD}^2 f$ with $f = \frac{1}{T}$



CMOS switching waveform

Power-Delay Product (cont'd)

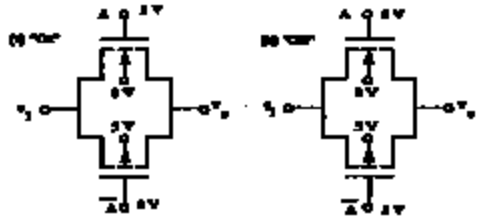
- The period T must satisfy: $T \geq t_r + t_w + t_f + t_b$
- Assumptions: At high frequencies $t_w \to 0$ and $t_b \to 0$, t_r and t_f account for approximately 80 % of the total transition time

For symmetrical inverter:

$$T \geq \frac{2t_r}{0.8} = \frac{2(2\tau_p)}{0.8} = 5\tau_p$$

$$PDP \geq \frac{CV_{DD}^2}{5\tau_p}\tau_p = \frac{CV_{DD}^2}{5}$$

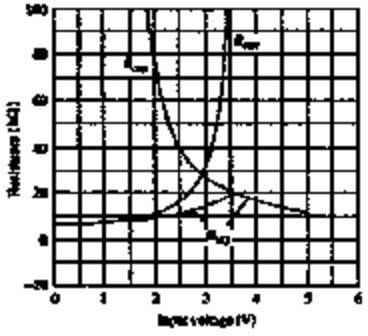
CMOS Transmission Gate (I)



Circuit symbol for the transmission gate (TG)

- Bidirectional resistive connection between the input and output terminals
- Useful in both analog (e.g. for relay contacts) and in digital design (e.g. for multiplexers)

CMOS Transmission Gate (II)



$$R_{eq} = \frac{R_{nmp}R_{pmn}}{R_{nmp} + R_{pmn}}$$

On-resistance of a transmission gate, including body effect

$V_{TON} = 0.75V$, $V_{TOP} = -0.75V$

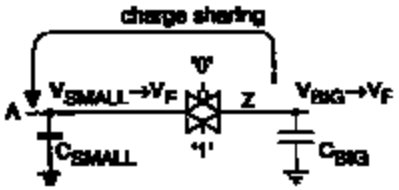
$\gamma = 0.5V^{0.5}$, $2\phi_F = 0.6V$,

$K_p = 20\mu A/V^2$, $K_n = 50\mu A/V^2$

CMOS Transmission Gate (III)

- Charge sharing problem

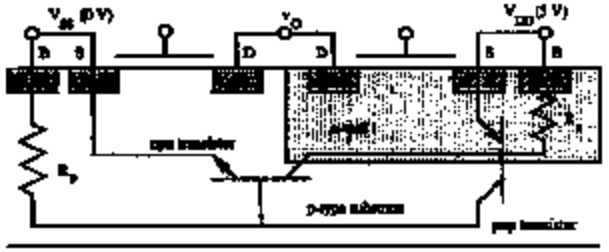
$$V_F = \frac{C_{BIG}V_{BIG} + C_{SMALL}V_{SMALL}}{C_{BIG} + C_{SMALL}}$$



Example: C_{SMALL} = 0.02 pF, V_{SMALL} = 5 V, V_{BIG} = 0 V
C_{BIG} = 0.2 pF (about 10 standard loads in a 0.5 CMOS process)
V_F = 0.45 V ⇒ The 'big' capacitor has forced node A to a voltage close to a '0'

Node A has to be insulated from node Z by including a buffer (e.g. inverter) between the 2 nodes, if node A is not strong enough to overcome the 'big' capacitor

CMOS Latchup



- The parasitic bipolar transistors can destroy the CMOS circuitry
- The bipolar devices are normally inactive
- The collector of each bipolar transistor is connected to the base of the other in a positive feedback structure
- The latchup effect can occur when:
  1. Both bipolar transistors conduct
  2. Product of gains of the 2 transistors in the feedback loop exceeds unity ($\beta_n\beta_p > 1$)

Heidi N. Becker, Tetsuo F. Miyahira

and Allan H. Johnston

Jet Propulsion Laboratory

California Institute of Technology

2002 Single Event Effects Symposium

The research in this presentation was carried out by the Jet Propulsion Laboratory, California Institute of Technology under contract with the National Aeronautics and Space Administration (NASA) Code AE.

8902-8274-4 1057A

JPL

NASA

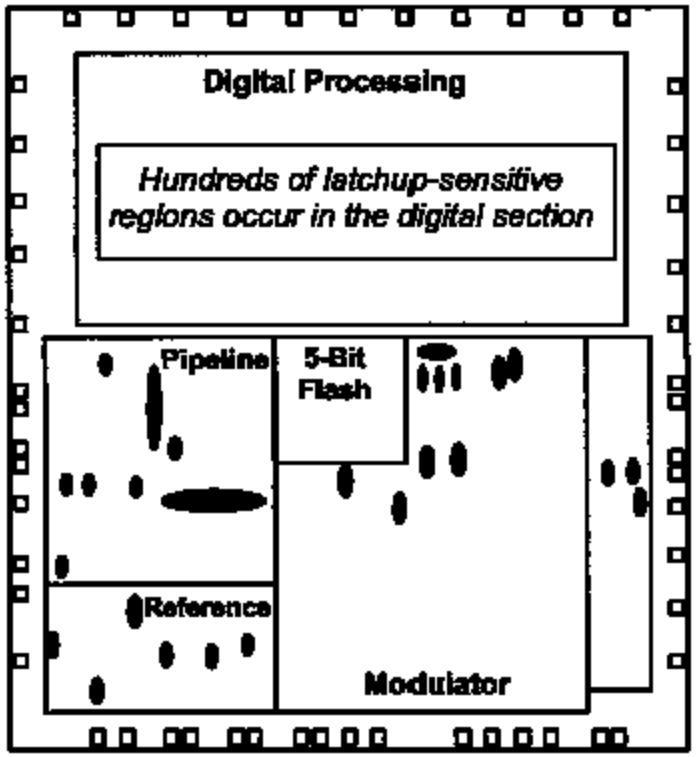
Outline -

- Initial Interest & Observations
- Data
- Analysis
- Conclusions

Initial Interest: *Catastrophic* SEL

- How are SEL failures related to device properties?
- AD9260 failed from latchup during heavy ion testing
- Laser-induced SEL testing at the Aerospace Corp.
  - induce latchup with laser pulses
  - observe latchup equilibrium currents
  - monitor device functionality
  - observe irradiated area on the die through CCD camera/video monitor

Initial Interest: Identification of Latchup-Sensitive Regions



- Identify latchup regions with distinct geometries and equilibrium
- Use [illegible] section 32 and AD7260

JPL

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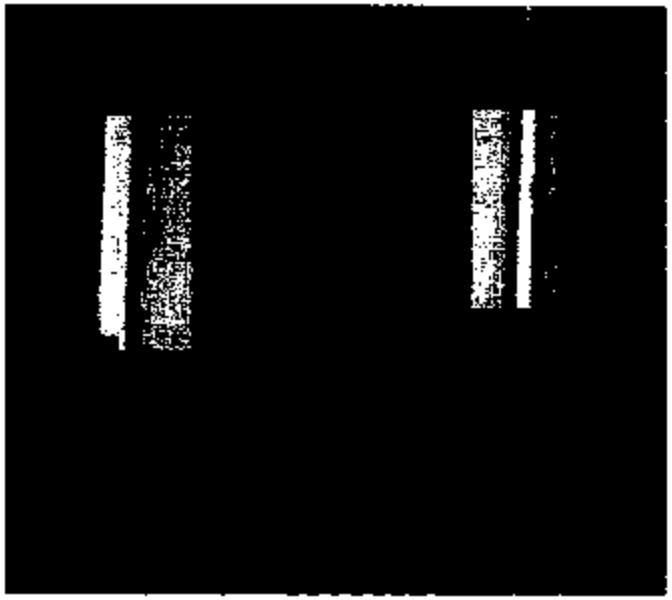
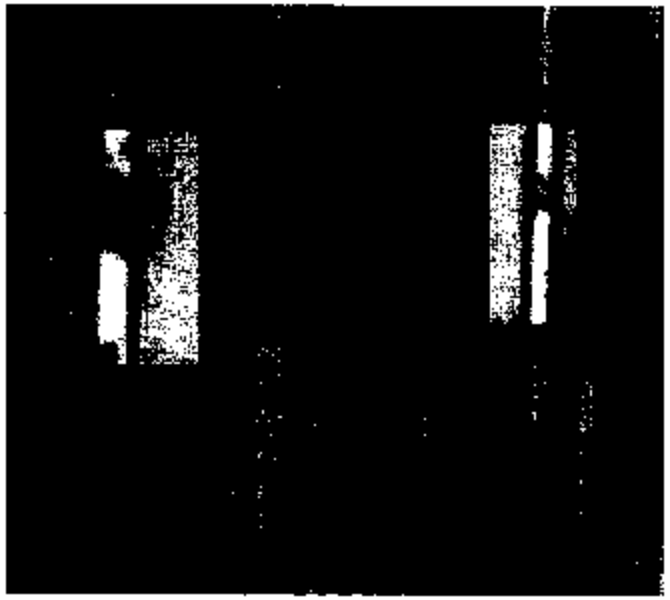
An Unexpected Observation





- A structurally damaging SEL was observed
- The DUT was still *functional* after holding 200mA for 1ms
- Reproducible experiment: 50% functional, 50% destroyed

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[redacted] Devices Studied for SEL-Induced [redacted]

CMOS Device	Device Type	Manufacturer	Latent Damage
AD9260	ADC	Analog Devices	[redacted]
AD9240	ADC	Analog Devices	No
ADC10321	ADC	NSC	[redacted]
CAR/CPPX1T-A7BR	Oscillator	Cardinal/Cypress Hybrid	[redacted]
LTC1799	Oscillator	Linear Technology	No
ADSP2100	DSP	Analog Devices	No

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Data: Methods/Diagnostic Approaches

- Testing with Cf^{252}
  - SEL equilibrium current & DUT functionality monitored
  - DUT removed from chamber after SEL events
- Optical microscopy
  - Die is scanned for potential damage sites
  - Often difficult due to the complexity of many CMOS circuits
- Scanning Electron Microscopy (SEM)
  - Better resolution
  - Energy Dispersive Spectroscopy (EDS) reveals properties of damage site

Data: Latent Damage Signatures

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- Cracking of insulator material (silicon nitride/silicon dioxide)
- Significant voiding of interconnect metal
- Fracturing and lifting of insulator to release metal
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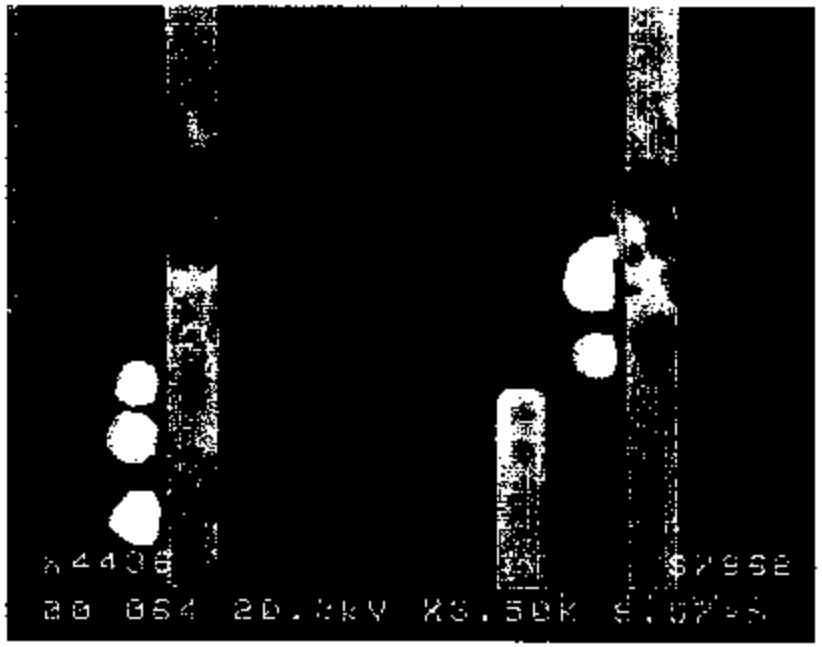

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  - Ranged from 10^7-$10^8 A/cm^2$
  - Based on latchup equilibrium current drawn by DUT & cross-sectional area of damaged interconnect
- Cross-sectional area of damaged interconnect: 1-10μm^2
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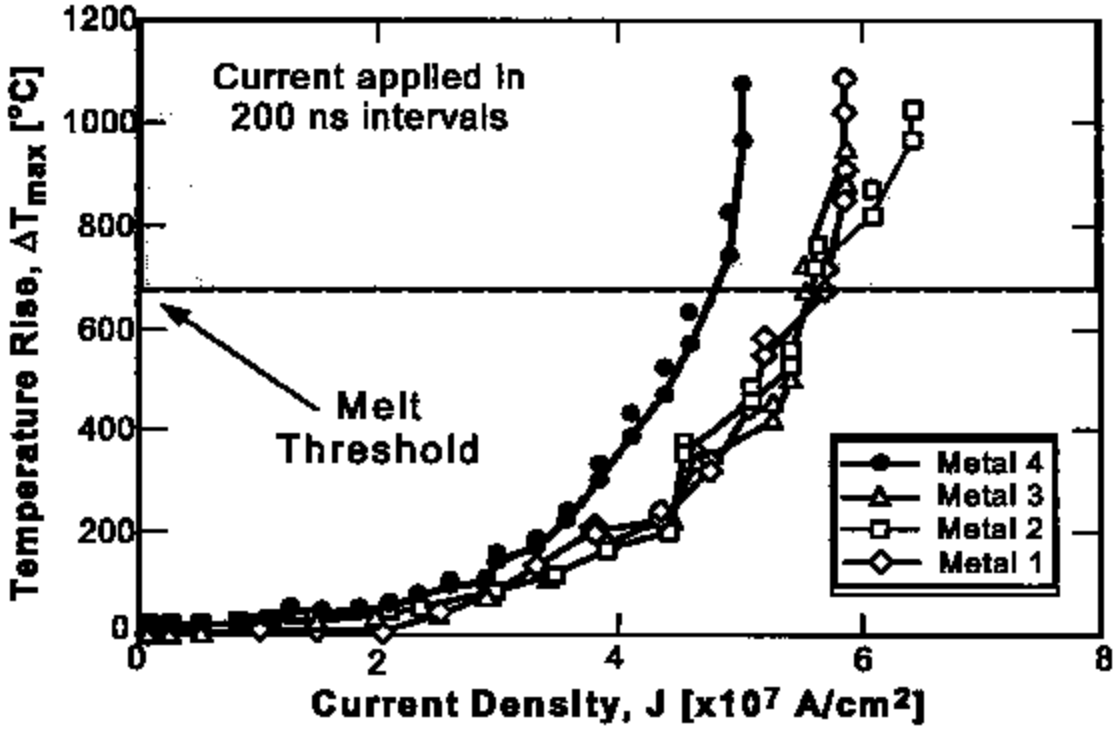
- Time scale: 60μs – 18ms
- More extreme/violent than electromigration ($5x10^5 A/cm^2$)

Analysis: Thermal Model



After Banerjee, et al., IEEE Elect. Dev. Lett., 18(9), 1997

Melting of Al/Cu circuit failure predicted at 5x10^7 A/cm^2 for pulses as short as 200ns

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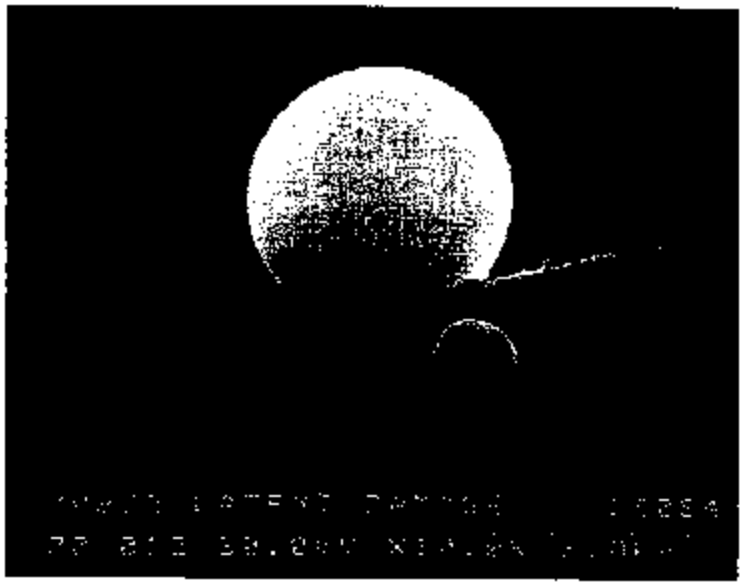
Analysis: A Physical Interpretation



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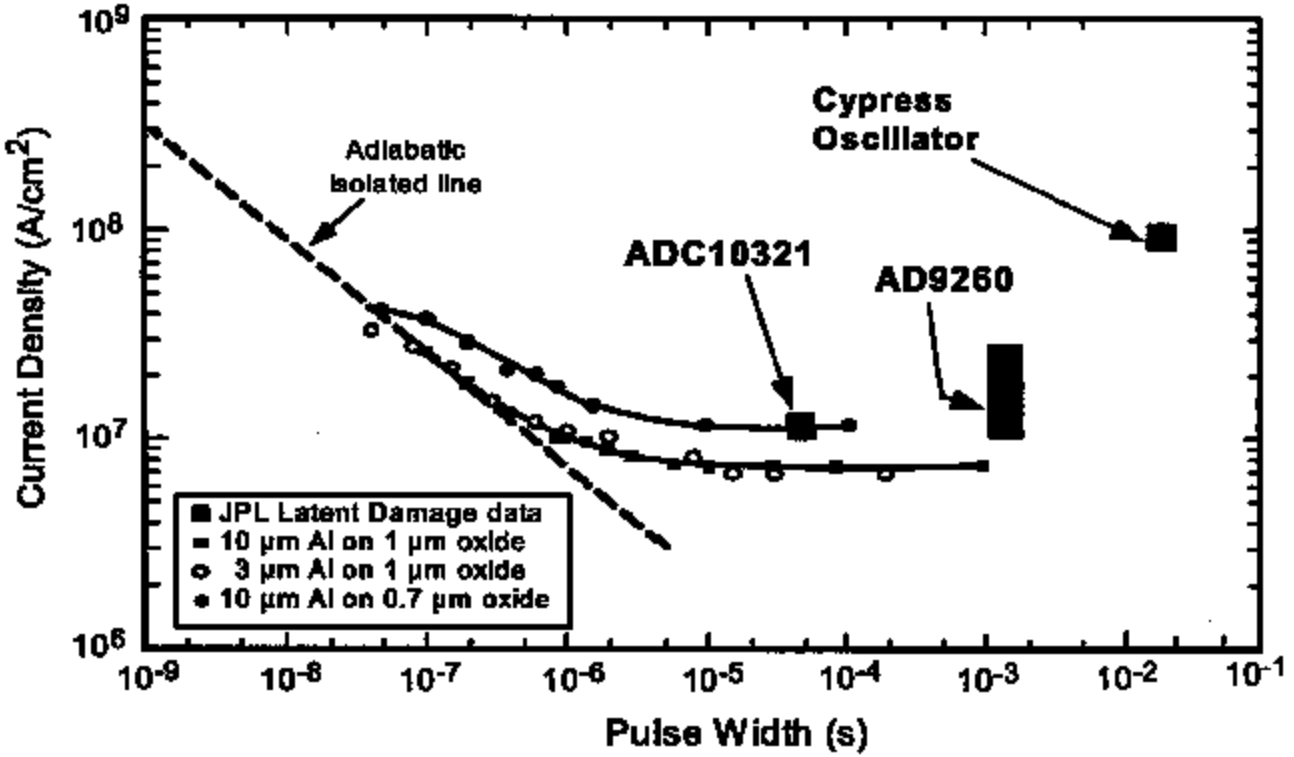

After Murguia & Bernstein, IEEE Elect. Dev. Lett., 14(10), 1993

[redacted]

Analysis: Why Some Events are Not Catastrophic (Latent Damage)

- Amount of released metal may be too small to cause failure
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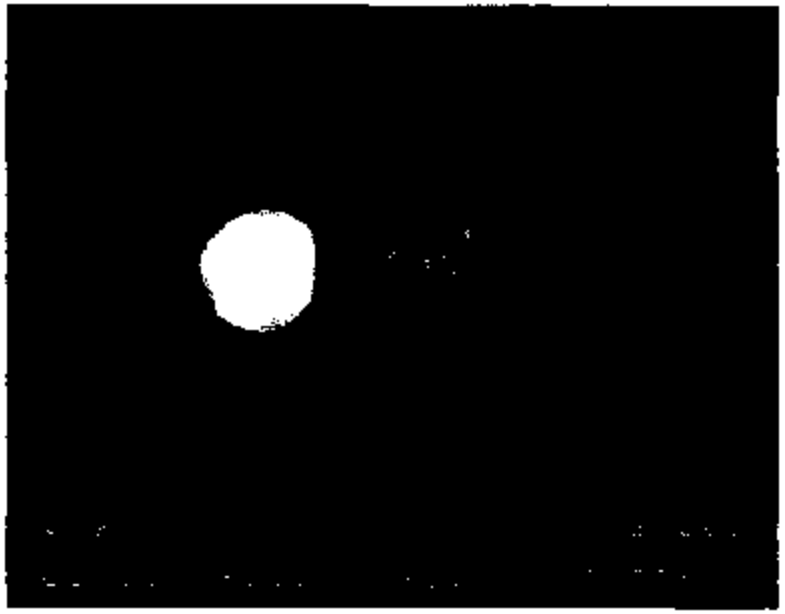
- Interconnect cross-section may be smaller, more susceptible to later failures



Device still *functional*

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Conclusions: Impact on Future SEL Testing

- Unless you look for latent damage, you don't know it's there
- Permanent structural damage may eventually cause device failure
- Latchup circumvention should address concerns about latent damage
- The semiconductor industry is moving toward using more levels of metal and smaller interconnects

=> next generation devices may exhibit a higher rate of latent damage

Acknowledgements

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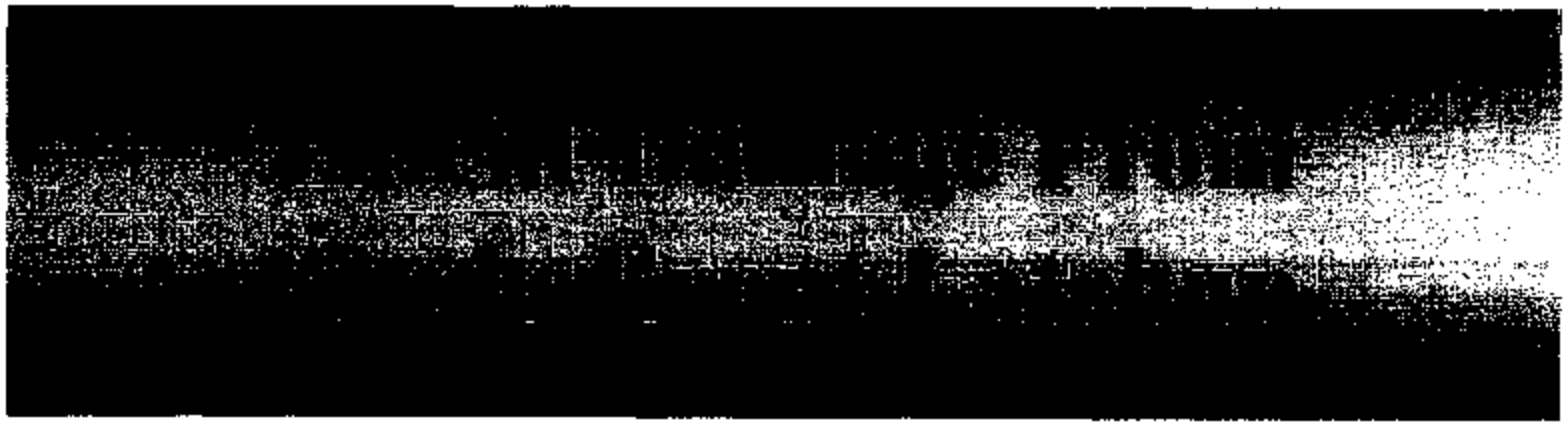
Jet Propulsion Laboratory

SEM



Heidi N. Becker, Tetsuo F. Miyahira

and Allan H. Johnston

Jet Propulsion Laboratory

California Institute of Technology

2002 Single Event Effects Symposium

The research in this presentation was carried out by the Jet Propulsion Laboratory, California Institute of Technology under contract with the National Aeronautics and Space Administration (NASA) Code AE.

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Outline

- Initial Interest & Observations
- Data
- Analysis
- Conclusions

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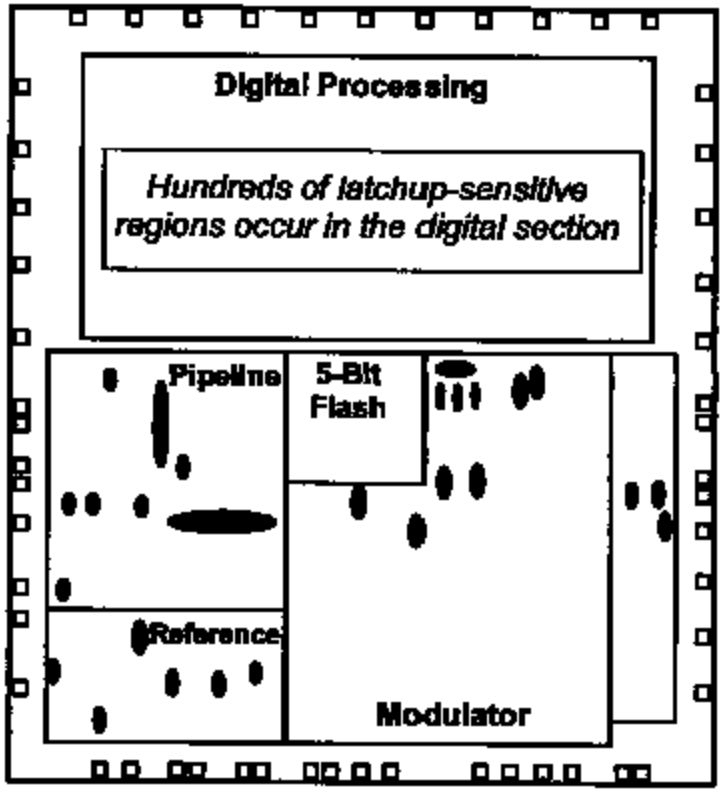
Initial Interest: *Catastrophic* SEL

- How are SEL failures related to device properties?
- AD9260 failed from latchup during heavy ion testing
- Laser-induced SEL testing at the Aerospace Corp.
  - induce latchup with laser pulses
  - observe latchup equilibrium currents
  - monitor device functionality
  - observe irradiated area on the die through CCD camera/video monitor

Initial Interest: Identification of Latchup-Sensitive Regions



- 20 latchup-sensitive regions with distinct geometries and equilibrium currents were located in analog section of the AD9260

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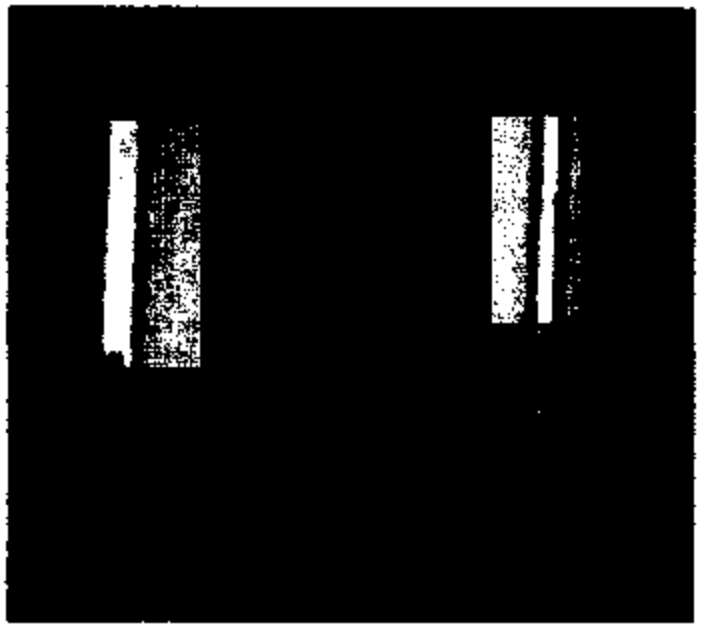
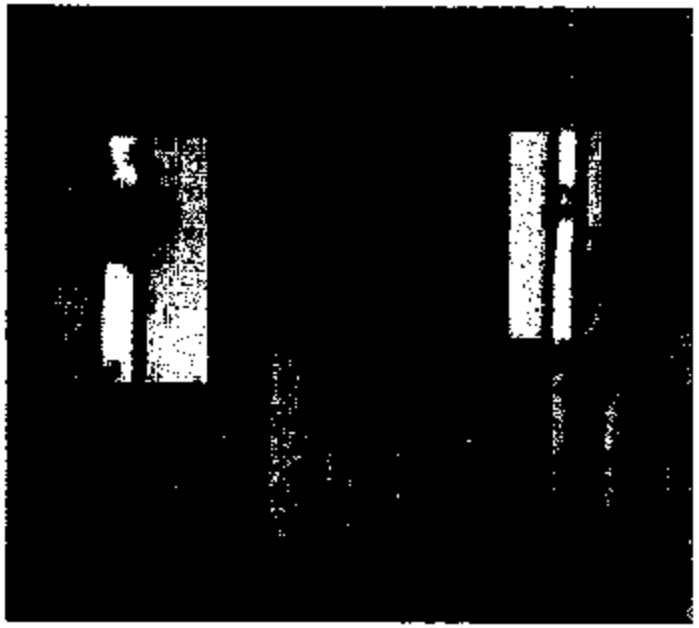
An Unexpected Observation





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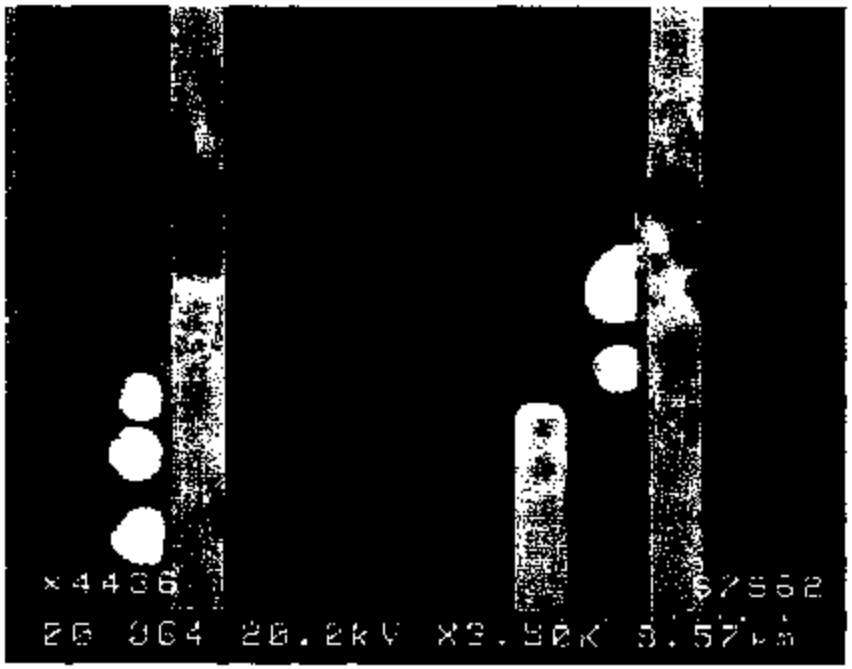

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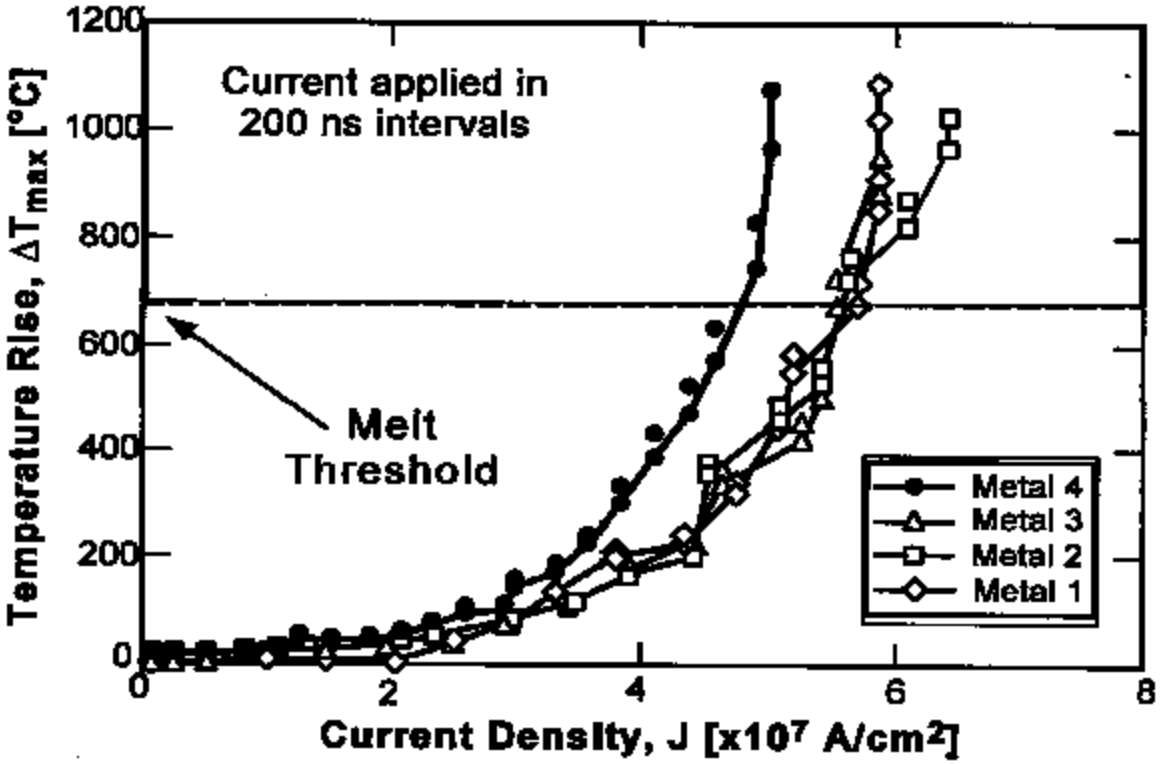

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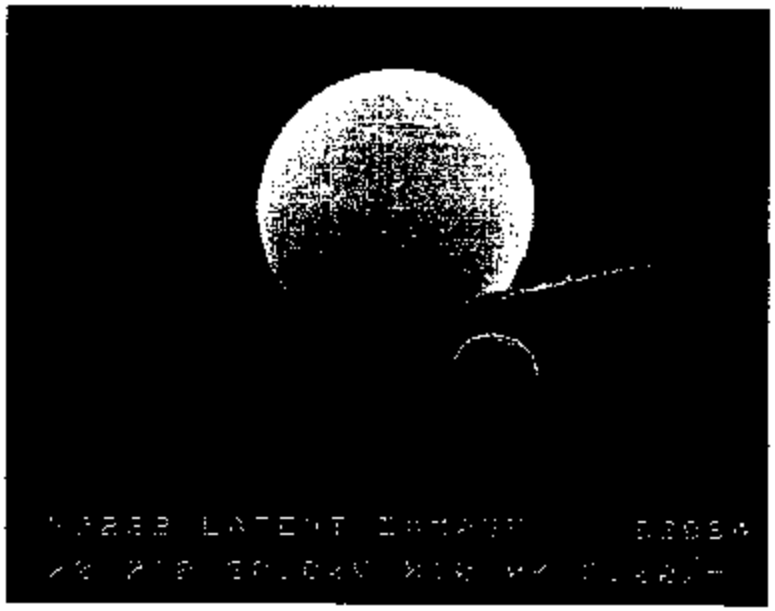

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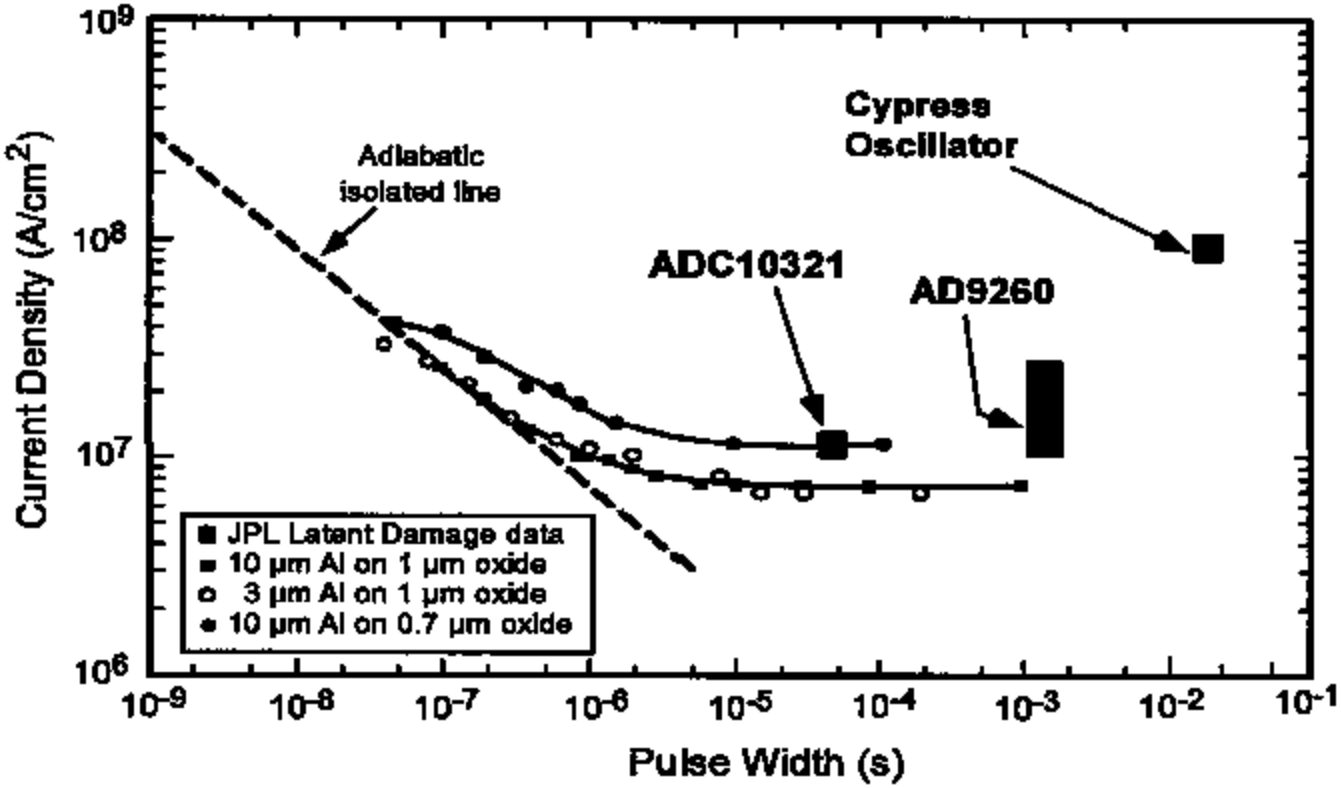
Adiabatic Latent Damage Data



After Murguia & Bernstein, IEEE Elect. Dev. Lett., 14(10), 1993

- Occurs at 10^7-10^8 A/cm^2 & durations of >60µs
- Caused by device failure, not latent damage

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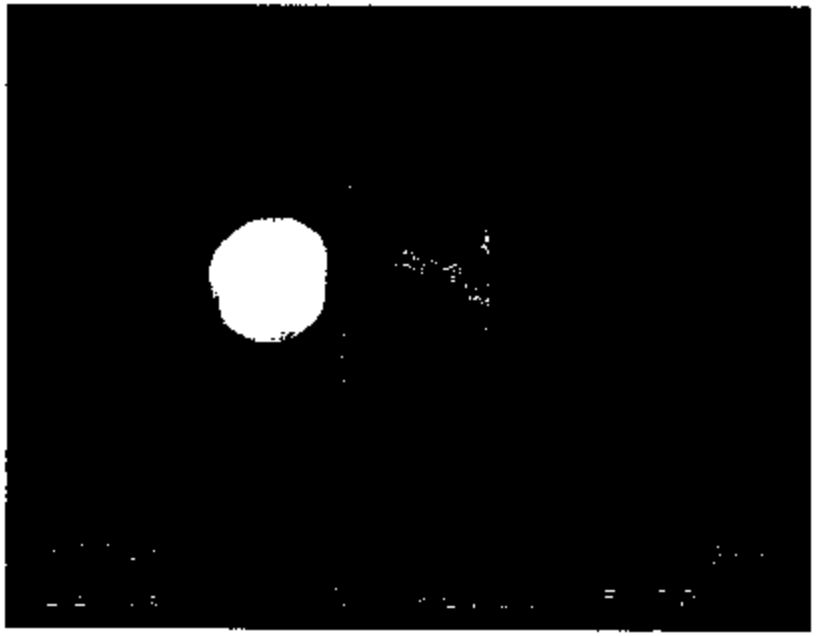

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Post Box 1542, D-84003 Landshut,

Single-Event Latchup Protection of Integrated Circuits

A new technology shows much promise in recovering from single-event upsets.

Space Electronics Inc., San Diego, California

Many commercially available advanced-technology CMOS and bipolar integrated circuits are susceptible to single-event latchup (SEL) effects caused by heavy ions or protons from cosmic rays or solar flares, making them unsuitable for satellite applications. Remanufacturing the integrated circuits in an inherently SEL-immune process has been an expensive and technically difficult option, as is the alternate option of incorporating latchup protection and recovery circuitry in the spacecraft system's electronics.

Space Electronics Inc. has developed several different circuits that provide protection and recovery of integrated circuits known to exhibit single-event-induced latchup. These circuits are integrated within the same package as the susceptible integrated circuit using multichip module (MCM) and modern packaging technology, resulting in a device-level solution providing minimum cost and minimum impact on the system.

The Latchup Protection Technology (LPT™) circuit was designed to provide current limiting to the device, detect the increase in current during the SEL event above a preset threshold, force a shutdown when the threshold is exceeded, hold the device in the shutdown mode for a preset time interval, and return the device's supply voltage to its original operating level.

The LPT circuitry (patent pending) has the potential to be applied to a wide variety of susceptible devices. The specific implementation details such as current latchup protection threshold and supply off time are determined by characterization of the susceptible devices at a heavy ion facility. The LPT device converts a single-event latchup into a recoverable event.

Two devices were evaluated with LPT: the ADS7805 16-bit analog-to-digital converter and the Gatefield GR10009 9000-gate flash programmable gate array. The first was selected for latchup protection, and the preliminary circuit design and analysis was based on protecting the ADS7805 device, which is susceptible to SEL at low linear energy transfer levels.

The ADS7805 integrated circuit draws current from an analog and digital supply pin. The LPT circuit must sense the current into the supply pins, and, when the latchup current threshold is exceeded, remove the supply voltage from the latched device. During the time that the supply voltage is removed from the device, the supply current draw will come exclusively from the LPT circuit. After a set time interval required for the latchup to clear, the LPT circuit reapplies the supply voltage to the

device and normal operation is restored.

The figure shows the supply current with and without a protection circuit during a single-event latchup. The LPT circuit will have a latchup current threshold, $I_{threshold}$, an activation delay time, t_D, and recovery time t_{REC}. The LPT circuit is activated when the supply current exceeds the $I_{threshold}$ value; the supply current is turned off (grounded) within time t_D after $I_{threshold}$ is reached. The device is off for time period t_{REC}. This can be compared with the unprotected latchup supply current response shown in the figure, where the normal operating current rises to the latchup current in response to a single-event latchup.

Heavy ion characterization and validation of the ADS7805 with the LPT circuitry was performed using the Jet Propulsion Laboratories Californium-252 source at Pasadena, CA, and also using the Texas A&M University cyclotron facility. Latchup protection and recovery of the ADS7805 was demonstrated at both. Peak latchup current was measured between 146 and 267 mA and device recovery as shown with supply off times of 45 μs and 2.5 ms. Additional validation testing was performed by NASA Goddard Space Flight Center.

This work was done by P.J. Layton, D.R. Czalkowski, J.C. Marshall, H.F.D. Anthony, and R.W. Boss at **Space Electronics Inc.**, *4031 Sorrento Valley Blvd., San Diego, CA 92121; (619) 452-4167. RAD-PAK is a registered trademark of Space Electronics Inc. LPT is a trademark of Space Electronics. This work was partially supported by NASA contract no. NAS8-97186.*

Experiment 6

Integrated CMOS Transistors

1 Introduction

The transistor array used in this experiment, the CD4007 or CA3600, provides an opportunity to study MOSFETs similar to those used in CMOS technology.

In order to implement both PMOS and NMOS devices on a single substrate, a typical process starts with a p-type substrate. Wherever the p-channel devices will be built, an n-type region is created. The p-type source and drain regions are then created inside these n-wells. The n-type source and drain of the n-channel FETs are created directly in the p-type substrate material. In addition to the gate, source, and drain connections for the FETs, a contact is provided to the n-wells, which are all connected together. There is also a contact to the substrate.

A careful examination of this structure shows that there are two parasitic bipolar transistors. There is a pnp transistor which has its collector at the substrate, its base as the n-well, and its emitter at the source of the PMOSFET. There is also an npn transistor with its collector at the n-well, its base as the substrate, and its emitter as the source of the NMOSFET. The material between the pn junctions introduces resistances between the base and emitter of these bipolar transistors, making a bipolar parasitic circuit. In order to assure that this bipolar circuit does not influence the operation of the MOS devices, it is important that the n-wells be at the most positive voltage applied to the chip and the substrate be at the most negative voltage. Thus, although you may use a transistor from any one of the three pairs of devices, **you must connect pin 14 to the highest voltage and pin 7 to the lowest volatge in your circuit.**

The full model equations for NMOS and PMOS devices are as follows:

NMOS: $K_n = K_n' \frac{W}{L} = \mu_n C_{ox} \frac{W}{L}$

Threshold Voltage: $V_{TN} = V_{T0} + \gamma\left(\sqrt{v_{SB} + 2\phi_F} - \sqrt{2\phi_F}\right)$

Cutoff: $i_D = 0$ for $v_{GS} \le V_{TN}$

Ohmic: $i_D = K_n\left[(v_{GS} - V_{TN}) - \frac{v_{DS}}{2}\right] v_{DS}$ for $0 \le v_{DS} \le v_{GS} - V_{TN}$

Saturation: $i_D = \frac{1}{2} K_n (v_{GS} - V_{TN})^2 (1 + \lambda v_{DS}))$ for $0 \le (v_{GS} - V_{TN}) \le v_{DS}$

PMOS: $K_p = K_p' \frac{W}{L} = \mu_p C_{ox} \frac{W}{L}$

Threshold Voltage: $V_{TP} = V_{T0} - \gamma\left(\sqrt{v_{SB} + 2\phi_F} - \sqrt{2\phi_F}\right)$

Cutoff: $i_D = 0$ for $v_{SG} \le -V_{TP}$

Ohmic: $i_D = K_p\left[(v_{SG} + V_{TP}) - \frac{v_{SD}}{2}\right] v_{SD}$ for $0 \le v_{SD} \le v_{SG} + V_{TP}$

Saturation: $i_D = \frac{1}{2} K_p (v_{SG} + V_{TP})^2 (1 + \lambda v_{SD}))$ for $0 \le (v_{SG} + V_{TP}) \le v_{SD}$

In these equations, V_{T0} is the turn-on voltage when the substrate ("body") is connected to the source, γ is the body effect parameter, and $2\phi_F$ is the surface potential parameter. It is important to note that **in CMOS circuits it is not possible to set the body-to-substrate voltages to zero in both the NMOS and PMOS devices simultaneously.** In the process described above, the NMOSFET typically has its source connected to the substrate. Thus, even though the p- and n-channel devices are built on the same chip, they will have significantly different threshold voltages.

A good review of the operation of MOSFETs, including JAVA animations of the input and output curves can be found on the Semiconductor Applet Service website. (There's a link to this site on my ECE330 course page.)

2 Prelab

1. Find a data sheet for your device. (Search for the part number at www.ti.com.) To get a feeling for the true complexity of the device you will be using in this experiment, examine the detailed circuit diagram in the data sheet.
2. Review the modes of operation of a MOSFET.
3. Make sure you know which pins of the device are the gates of the FETS. **All unused inputs (gates) must be grounded!**
4. Note that pins 7 and 14 are the n-well and substrate connections. **The n-well must be connected to the highest voltage in the circuit, and the substrate must be connected to the lowest voltage even if these pins are not shown in the schematics.**

3 DC Characterization of an NMOSFET

Procedure

1. **Threshold Voltage:** Determine the threshold voltage of one of the NMOS transistors using the circuit of figure 1 with $V_{DD} \simeq 5\,\text{V}$. Be sure to connect the n-well and substrate pins appropriately! Use a digital meter, and record all the significant digits. Change V_{DD} by $\pm 2\,\text{V}$. Does changing the overall voltage change V_{TN}?

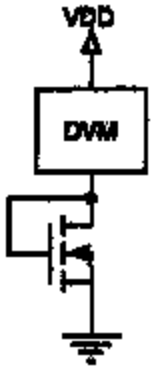

Figure 1: Circuit to measure V_{TN}

2. **Active Load Circuit:** Build the NMOS active load circuit shown in figure 2. Determine I_D and $V_{GS} = V_{DS}$ for $0.5\,\text{mA} \leq I_D \leq 7.5\,\text{mA}$ in $0.5\,\text{mA}$ steps by changing V_{DD}. Use a digital meter to measure the gate-source voltage and record all the significant digits. (Remember that you will be using $V_{GS} - V_{TN}$ when you fit your data. When the two voltages are not very different in value, the errors in the difference can be rather large.)
3. **DC Output Characteristic:** Measure I_D as a function of V_{DS} for constant V_{GS}. Note that the following procedure starts by setting V_{DD} and the voltage across the resistor so that V_{DS} will give a particular drain current with the FET in saturation! Once you set V_{GS}, you will measure I_D vs. V_{DS} for that gate voltage.
   (a) Set $V_{DD} = 6\,\text{V}$. Then adjust V_{SG} to give $V_{DS} = 5\,\text{V}$. Record the value of V_{GS}. (Since $R = 1\,\text{k}\Omega$ and the voltage across it is 1 V, you have set a drain current of 1 mA.)
   (b) Vary V_{DD} to obtain values of V_{DS} in the range $0\,\text{V} \leq V_{DS} \leq 6\,\text{V}$. Measure I_D at each of your chosen values of V_{DS}.

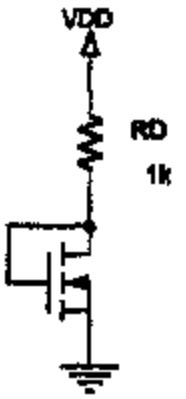

Figure 2: NMOS active load

(c) Repeat the above procedure for initial drain currents of 0.5 mA and 2 mA. (That is, you should have data for three curves of I_D vs. V_{DS}. Each curve should pass through the specified drain current at a voltage $V_{DS} = 5$ V.

(d) Plot all three curves of I_D vs. V_{DS} before you leave the lab to make sure that you haven't made any errors.

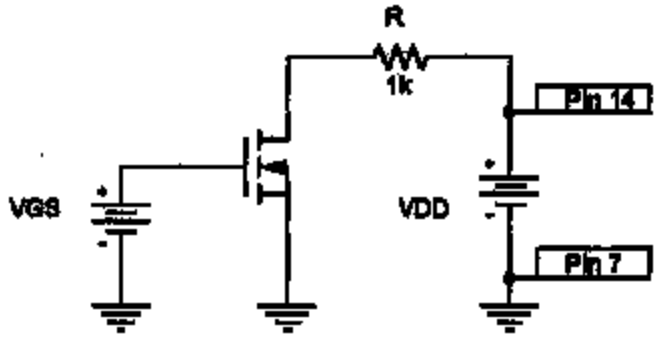

Figure 3: Circuit to measure NMOS output characteristic curves

Analysis

1. Use your results from steps 2 and 3 of the procedure to plot $I_D/(V_{GS} - V_{TN})^2$ vs. $V_{DS} = V_{GS}$. Fit your graph to a straight line. Find the FET parameters K_n and λ from the intercept and slope of the fitted line. Comment on any difficulties that you observe.

2. Now use your FET parameters to calculate I_D vs. V_{DS} for the values of V_{GS} you used in step 3 of the procedure. Plot your calculated and experimental curves on the same graph. How well do your calculated curves compare with the measured ones? If there are significant differences, can you tell which parameter is likely to dominate the errors?

4 DC Characterization of a PMOSFET

Procedure

1. **Threshold Voltage:** Determine the threshold voltage of one of the PMOS transistors using the circuit of figure 4 with $V_{SS} \simeq 5\,\text{V}$. Be sure to connect the n-well and substrate pins appropriately! Use a digital meter, and record all the significant digits. Change V_{SS} by $\pm 2\,\text{V}$. Does changing V_{SS} change V_{TP}?

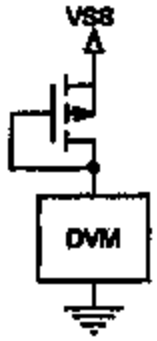

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Figure 5: PMOS active load

Analysis

1. Use your results from steps 2 and 3 of the procedure to plot $I_D/(V_{SG} - V_{TP})^2$ vs. $V_{SD} = V_{SG}$. Fit your graph to a straight line. Find the FET parameters K_p and λ from the intercept and slope of the fitted line. Comment on any difficulties that you observe.
2. Compare your FET parameters for the PMOSFET to those you measured for the NMOSFET.

Overvoltage Protection for CMOS Switches and Multiplexers

CMOS analog switches and multiplexers are critical components in many electronic systems. Even though their ruggedness and reliability have been demonstrated in countless applications, it is still not uncommon to encounter "mysterious" failures caused by conditions that exceeded the absolute maximum ratings. By including overvoltage and fault protection in your circuits, you can achieve successful designs that will be in service for many years and will provide better performance at a low cost.

Identifying The Problem

Overvoltage (OV) refers to a case where the analog signal amplitude applied to a switch terminal exceeds the power supply rails. A fault can also occur when power to a CMOS device is lost while the analog signals are still on.

From the simplified CMOS switch cross section shown in Figure 1, it is obvious that if voltages outside the power supply rails are applied to the source or the drain, or if power to the chip is lost, one or more of the parasitic diodes (D1 through D4) will become forward biased. Therefore, it is necessary to take precautions so that the power dissipation capabilities of these diodes are not exceeded, otherwise unprotected devices can malfunction or be destroyed.

This application note refers mostly to the DG408 (8-channel multiplexer), but the same principles apply to most CMOS analog switches and multiplexers.

Fault Currents

When the diodes shown in Figure 1 are allowed to conduct, as during an overvoltage condition, potentially damaging currents can occur. Additionally, the analog signal gets clamped to the supply rail, which can overload the signal source and produce signal clipping. This condition may be detrimental if the analog signal is also going to another destination.

In the circuit shown in Figure 2, per Ohm's law, the current flow is limited only by the generator's resistance (R_g) and by the the forward biased diode's resistance (R_d). At 25°C, R_d may have values that range from 6 Ω (DG408) to 19 Ω (DG508A). Therefore the fault current is given by

$$I_f = \frac{V_g - (V+) - V_F}{R_g + R_d}$$

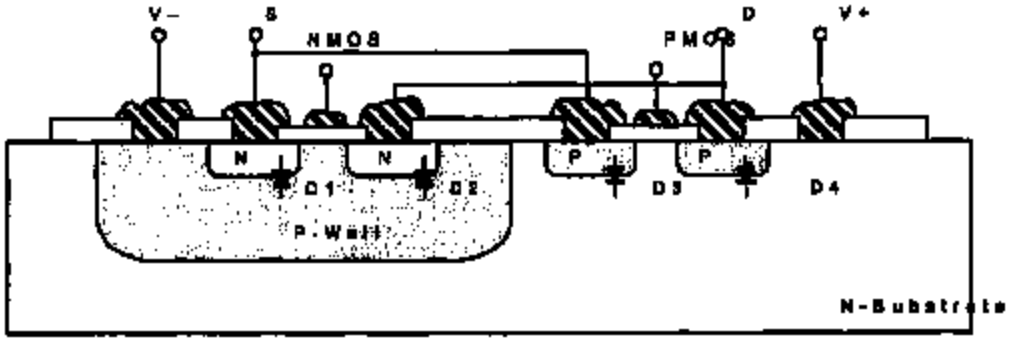

FIGURE 1. CMOS Switch Cross Section Showing Parasitic P-N Junctions

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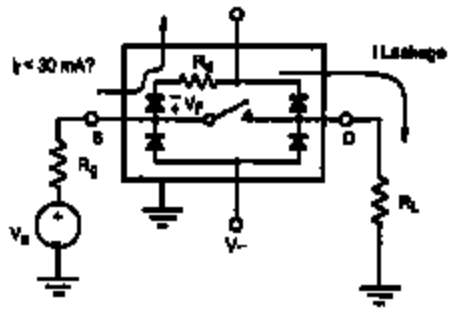

FIGURE 2. Fault Current Flows When $V_g > V+$

As long as I_f does not exceed the absolute maximum continuous-current rating (source or drain, typically 20 or 30 mA) no problem will occur. For instance, when using the 8-channel silicon-gate multiplexer (DG408) in an audio system where $R_g = 600\ \Omega$, V_g will have to exceed V+ by more than 12 V before it reaches the 20-mA limit.

On the other hand, a 12-V overvoltage coming from a 1-Ω signal source will produce 1.6 A. At that current, it won't take long for the device to be damaged. A similar situation occurs for negative overvoltages. Due to the rectifiers used in most power supplies, a supply will not sink current if it was designed to source it. That is, if V+ is supposed to be +15 V and V_g is equal to +20 V, do not be surprised if V+ loses regulation and rises to one diode drop below V_g. V_g ends up supplying power to the whole circuit, and the question becomes whether or not the additional voltage will exceed the ratings of the other components in the circuit.

Crosstalk And Latchup

Ideally, when one channel experiences an overvoltage condition, processing the information arriving on the other channels would still be possible. But since the clamping diodes are part of parasitic transistors (Figure 3), when activated, they can induce leakage currents on other channels located on the same chip. This condition is especially inconvenient when dealing with CMOS multiplexers. The channel experiencing overvoltage will cause dc offsets (sometimes called crosstalk) on the output even when one of the good channels is selected. This form of crosstalk or error source is demonstrated by the test circuit shown in Figure 4. Figure 5 is the resulting scope plot. Note that when S1 is supposed to be off and S8 is on, every time the analog signal rises above V+, the output shows a positive voltage signal instead of zero. When S1 is turned on, the output shows considerable distortion because the signal is clamped to the +5-V rail.

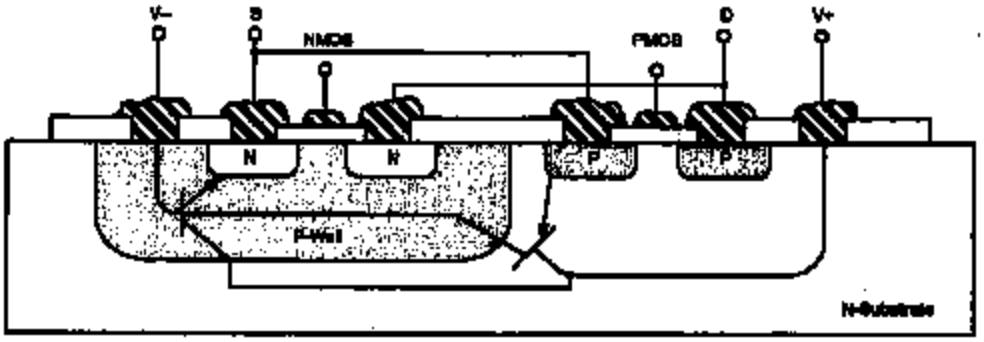

FIGURE 3. Two Parasitic Transistors Form an Intrinsic SCR on a CMOS structure

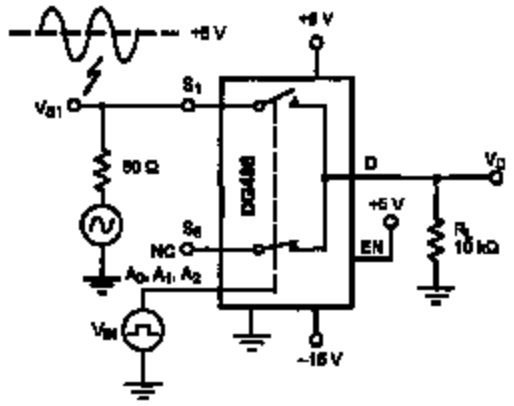

FIGURE 4. Test Circuit Used to Evaluate OV Induced Crosstalk

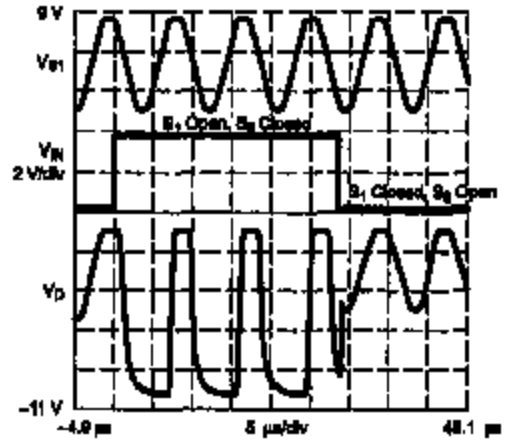

FIGURE 5. Scope Plot of the Test Circuit Shown in Figure 4

If the combined gain of the two parasitic transistors shown in Figure 3 is more than 1, a real SCR results. It can be triggered by a very small fault current. The condition is known as latchup, and the effect is a loss of switch control. No matter what the logic inputs, the switch will remain unresponsive until both the overvoltage and the power are removed from the device. Without current limiting, latchup can cause permanent damage to the chip. This phenomenon plagued many early CMOS switches. With advances in design techniques, such as the use of buried layers (to reduce transistor gain) and isolated polysilicon resistors (for current limiting), all Vishay Siliconix CMOS switches are self-resetting—that is, latchproof.

The Solution: Overvoltage Protection

The two main objectives are:

1. To protect the analog switch or multiplexer from suffering physical destruction due to fault currents
2. To avoid degradation of the analog signals in the system due to overloads, signal clipping, and crosstalk problems.

The most popular protection methods use one or more of the following:

- Reverse-current blocking diodes
- Current limiting
- Pico-amp diode clamps.

A convenient and inexpensive form of overvoltage protection consists of adding two small diodes (1N4148, 1N914 type) in series with the supply pins (see Figure 6).

During an OV condition, this arrangement protects the multiplexer and the signal source by blocking the flow of reverse current via the substrate diodes. It floats the supply pins above or below the normal V– or V+ rail.

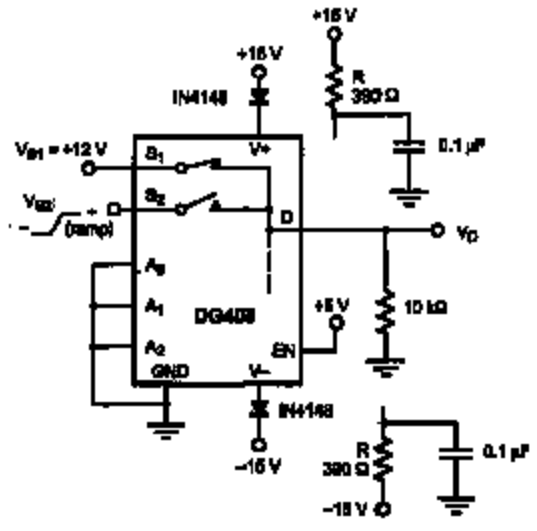

FIGURE 6. Overvoltage Test Circuit

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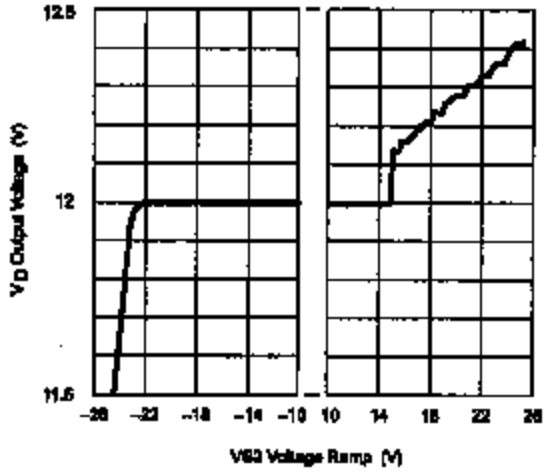

FIGURE 7. Overvoltage-Induced Errors for the Diode-Protected Circuit of Figure 6

In this case, the OV signal actually becomes the power supply to the IC. Damage to the chip is avoided as long as the difference, Vg − (V−), does not exceed the absolute maximum breakdown voltage limit for the process (44 V). The addition of these diodes reduces the analog signal range by two diode drops (to (V−)+ 0.7 V minimum and (V+) − 0.7 V maximum), but it preserves the low channel resistance and low-leakage characteristics so that the error term, $r_{DS(on)} \times I_{D(on)}$, is kept to a minimum.

This method does not eliminate crosstalk or leakage to other channels. The test circuit shown in Figure 6 illustrates what happens. Here +12 V dc was applied to a 10 kΩ load via channel one of the multiplexer. At the same time, a ramping dc voltage (V_{S2}) was applied to the adjacent channel (S2). The output voltage V_D was then plotted as a function of V_{S2}. Figure 7a shows that the output voltage develops an error as soon as V_{S2} goes above +15 V. In the negative direction, however, the error only becomes significant when V_{S2} reaches −21 V (see Figure 7).

Current Limiting Resistors

Protection of analog multiplexers can also be accomplished by installing current-limiting resistors in series with the power supply leads. This is shown on Figure 8 where the R-C networks are installed in place of the 1N4148 diodes. During normal operation, the bypass capacitors provide the current pulses required when the analog multiplexer changes states. During a fault condition the reverse current is given by

$$I_f = \frac{V_g - (V+) - V_F}{R_s + R_d + R}$$

From this expression, the required value of R can be calculated. For example, if 28 V dc (0-Ω source impedance) is connected to one of the source pins and the operating supplies are ± 15 V, the minimum value of R needed to protect a DG408 is given by

$$R = \frac{28\ V - 15\ V - 0.7\ V}{30\ mA} - 6\ \Omega = 404\ \Omega$$

(The diode resistance, R_d, is assumed to be 6 Ω)

An advantage of the current-limiting resistor method is that the R-C networks help to eliminate any switching noise that would otherwise appear on the analog power supply lines every time the multiplexer changed states.

A disadvantage is that the errors seen on a good channel when an adjacent channel experiences an overvoltage are greater than those resulting when reverse-current blocking diodes are used (see Figure 8).

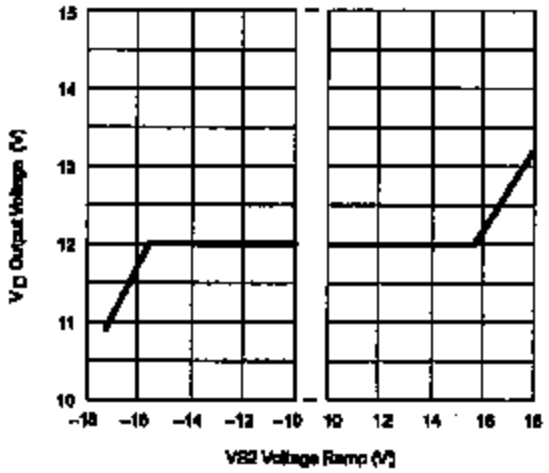

FIGURE 8. Overvoltage-Induced Errors for the Resistor-Protected Circuit of Figure 6

Picoamp Diode Clamps

Figure 9 shows a multiplexer overvoltage protection method that uses external picoamp diodes to divert the fault current away from the internal clamping diodes. Vishay Siliconix' picoamp diodes (PADs) provide a superior alternative to conventional diodes since they practically eliminate reverse-current (leakage) induced errors. Reverse-current specifications under one picoamp are possible (PAD1).

Forward current through the PADs should be limited to 50 mA, so a series current limiting resistor (R_1) may be required. For more information, consult the JPAD/PAD/SSTPAD data sheet.

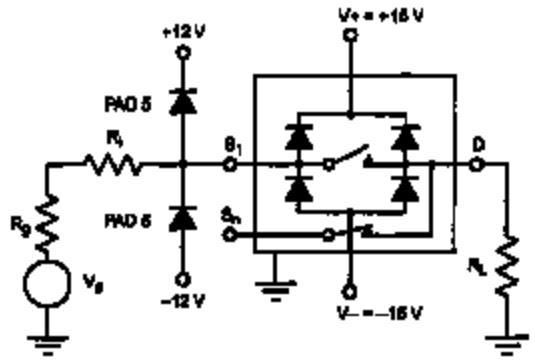

FIGURE 9. Picoamp Diode Clamps Used to Protect the Switch/Multiplexer and Preserve Accuracy on Remaining Channels

The PAD protection method preserves system accuracy and speed at the expense of a large number of external protection components. The clamping voltages do not need to be accurate. They may be supplied by Zener references.

Fault Protected Multiplexers

To eliminate the need for external protection, several types of overvoltage and/or fault protected multiplexers have been designed. Some, like the HI-508A, use an internal 1-kΩ current-limiting resistor in series with each analog switch. The higher equivalent $r_{DS(on)}$ increases leakage-induced errors, slows down setting times and, under fault conditions, may cause excessive power dissipation.

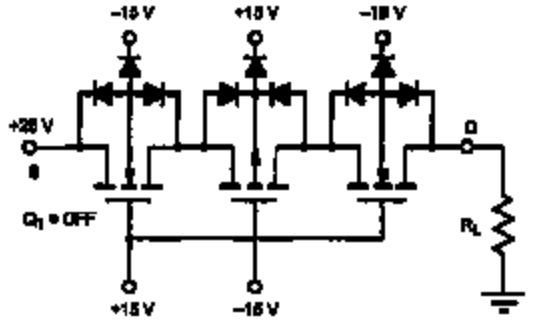

FIGURE 10. The 3-FETs-In-Series Channel Offers Inherent Fault Protection

Other designs like the Vishay Siliconix DG468 use three MOSFETs in series (two n-channels and one p-channel) to form a self-protecting analog switch that turns itself off when the analog signal level approaches or exceeds the power supply voltage rails.

Figure 10 illustrates the equivalent circuit for one channel. This protection method reduces the analog signal range by approximately two volts from each power supply rail, increases charge injection-induced offset errors, and increases setting times due to the increased $r_{DS(on)}$.

Conclusion

No overvoltage protection method is perfect. Existing OV protected multiplexers are more expensive and sacrifice performance with their higher $r_{DS(on)}$, longer settling times, and higher charge injection. They are convenient and easy to design with if system accuracy is not critical. If your circuit design does not require remote signal generation, or if you must try to maintain the highest accuracy possible, then the standard unprotected analog switches and multiplexers with or without the external overvoltage protection methods discussed in this application note should be used.

New Latchup Mechanism in Complementary Bipolar Power ICs Triggered by Backside Die Attach Glue

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Abstract

It is shown that in complementary bipolar power ICs latchup can be caused by a thyristor formed by the V-PNP power transistor at the frontside of the die and a Ag-filled glue die attach at the backside of the die (used to provide a good thermal contact between the die and the Cu-heatsink. The thyristor is triggered by saturation of the V-PNP power transistors or by forward biasing the backside diode between Ag-filled glue and p-type silicon. The effect is strongly temperature dependent. It can be eliminated by either leaving the backside floating or by applying backside metallization. Consequences for latchup qualification testing are discussed.

1. Introduction

Latchup [1] is a known reliability risk in complementary bipolar power processes (featuring both vertical-PNP and vertical-NPN power transistors) as thyristors are intrinsically present in these technologies, see fig. 1 and 2. Furthermore complementary bipolar processes are more susceptible to latchup than CMOS processes as the presence of n- and p-type buried layers prevents the use of p^- epi/p^{++} low ohmic (= 0.01 Ωcm) bulk epitaxial substrates. The thyristors are located at the frontside (top side) of the die, see fig. 1 and 2, and can be triggered by currents injected by both external spikes as well as by saturation of internal bipolar transistors. Note that in harsh automotive application environments these injection currents can be well over 1 A. Generally many design and layout measures are taken to prevent latchup from occurring like the use of guardrings, limitation of bipolar transistor saturation currents and by grounding the substrate as good as possible. Because of the above, latch-up testing is a routine part of product qualification programs for complementary bipolar power ICs as e.g. required by the Automotive Electronic Council (AEC).

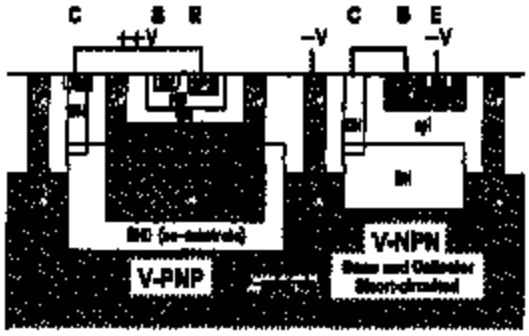


Fig. 1: Schematic view of a cross section of the complementary bipolar IC showing the V-PNP and V-NPN transistor.

Bipolar power ICs are often packaged in Single-In-Line (SIL) power packages where the low-doped p^--substrate is attached to a copper (Cu)-heatsink by a silver (Ag)-filled epoxy glue to achieve low thermal resistance values. In the application the Cu heatsink is generally contacted to the ground potential (just as the p^- substrate).

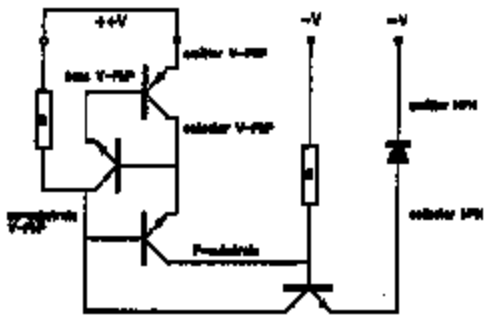


Fig. 2: Schematic view of an electrical scheme showing connections in fig. 1 between the various bipolar transistors forming a thyristor at the topside of the die.

In this paper we will show that this packaging method gives rise to a new latchup failure mechanism where latchup is not induced by triggering one of the known thyristors at the top side of the die but by triggering of an unexpectedly present parasitic thyristor located between the frontside and the (n-type) Ag-filled glue contacting the backside of the die, see fig. 3. The phenomenon will be described in more detail in the paper and options for its elimination will be presented. Consequences for qualification testing will be discussed.

2. Occurrence of a parasitic thyristor between frontside and backside of the die

The power ICs in our study are fabricated in a 2 µm double metal complementary bipolar process featuring both V-NPN and V-PNP power transistors. The transistors are build in a 10 µm thick, 2 Ωcm n-type epi layer on top of a 375 µm thick 4 Ωcm p-substrate. Isolation between different n⁻-epi islands is achieved by deep-P//buried-P (DP//BP) junction isolation. The base of the V-PNP transistor is formed by a N_{well} (NW) diffusion in the n⁻-epi layer and the transistor isolated from the p⁻ substrate by a deep buried-N (BND) diffusion, see fig. 3. The bipolar gains h_{fe} of the active V-PNP transistor T1 formed by the SP-(NW//n⁻-epi)-BP diffusions, the parasitic V-PNP transistor T3 formed by the BP-BND-p⁻-substrate and the parasitic V-NPN transistor T2 formed by the (NW//n⁻-epi)-BP-BND diffusions, see fig. 4, typically equal 60, 120 and 11 respectively at 25°C. At the end of the process all n-doped diffusion layers are removed from the backside of the die by a wet silicon etch using a SBZ spin etcher. The purpose of this is to eliminate unwanted pn-diodes that may be the source of minority carrier (electron) injection when the substrate potential is lifted e.g.due to saturation events of the V-PNP power transistor. These injected electrons may disturb the proper functioning of the circuit.

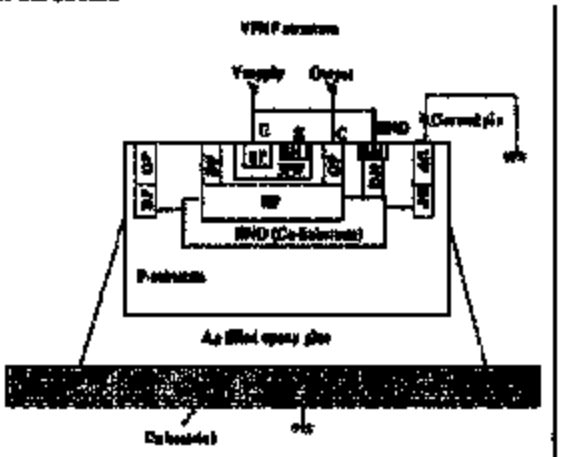


Fig. 3: Schematic view of a cross section of the complementary bipolar IC showing the V-PNP transistor as well as the Cu-heatsink and Ag-filled epoxy glue.

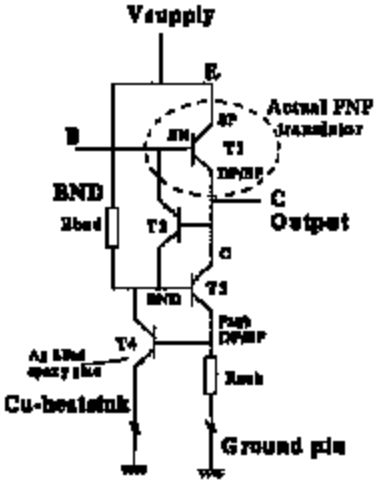
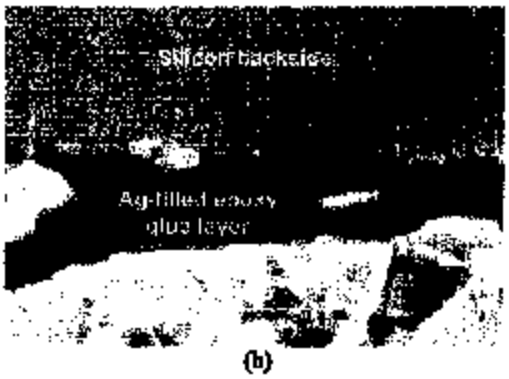


Fig. 4: Electrical scheme showing connections between the parasitic bipolar transistors, Cu-heatsink and Ag-filled epoxy glue that together form the thyristor between frontside and backside of the die.

The ICs are subsequently packaged in a SIL-power package. Here the p$^+$ substrate backside is attached to a Cu-heatsink by an epoxy glue containing Ag-fillers to achieve low thermal resistance values, see fig. 3 and 5.

(a)



(b)

Fig. 5: SEM cross section showing a) the backside of the die, the 6µm thick silver filled epoxy glue layer and the copper heatsink and b) in more detail the backside die - epoxy glue interface.

Unfortunately, it appears that this packaging method results in the formation of a diode between the n-type Ag-filled epoxy glue layer and the low doped p$^-$ substrate, see fig. 4 and 6. Note that diode does not behave like a real Ag-Si Schottky diode. Fig. 6 shows that the diode forward voltage is >0.7V. Given the barrier height for an Ag to p-type silicon metal-semiconductor contact of 0.54 eV at 25°C [2], a good Ag-Si(p-type) Schottky diode should exhibit a much lower forward voltage than observed here. Furthermore, we find that the n-type Ag-filled glue layer also can act as the emitter of a parasitic NPN transistor (T4 in fig. 4) between the frontside and backside of the die where the the p$^-$ substrate acts as the base and the deep buried-N (BND) isolation of the V-PNP transistor as collector, see fig. 4. Fig. 6 shows the bipolar gain of this transistor as a function of the emitter current for a small test structure. Despite the very thick base (≈ 375 µm), the NPN gain h_{fe} ranges from 10^{-4} to 10^{-2} at 25°C. Note that the h_{fe} scales with the collector area; in real circuits h_{fe} values up to 0.5 have been observed. Note that both the diode and the NPN characteristics are not well controlled as these are influenced by many parameters as e.g. the surface roughness of the backside of the silicon die, the thickness of native oxide layers on the silicon backside, the electron minority carrier lifetime in the p$^-$ substrate, the thickness of the epoxy glue, the distribution and concentration of Ag-fillers in the epoxy glue. As a result, a large spread is observed in both the diode I(V) curves, see fig. 6, as well as the NPN current gain (h_{fe}) characteristics, see fig. 7, depending on the specific process flow. The fact that the NPN gain in fig. 7 increases with injected current is characteristic for metal-semiconductor junctions where the ratio of minority injection (electrons in this case) increases with current due to the enhancement of the drift-field component, which becomes much larger than the diffusion current [2].

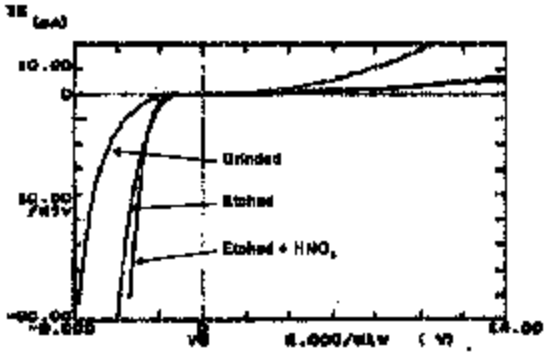


Fig. 6: I(V) characteristics at 25°C of the backside diode formed by the Ag-filled epoxy glue layer and the low doped p$^-$-substrate for three different treatments of the backside of the wafer, a) grinded backside, b) wet etched backside and c) as b) but with an HNO_3 treatment resulting in a thicker native oxide layer on the wafer backside.

As shown in fig. 4, the parasitic NPN transistor T4 forms in combination with the V-PNP transistor T1 a thyristor between the frontside and the backside of the die. As the parasitic V-PNP has high gain, the thyristor loop gain is larger than 1 and thus latchup can occur.

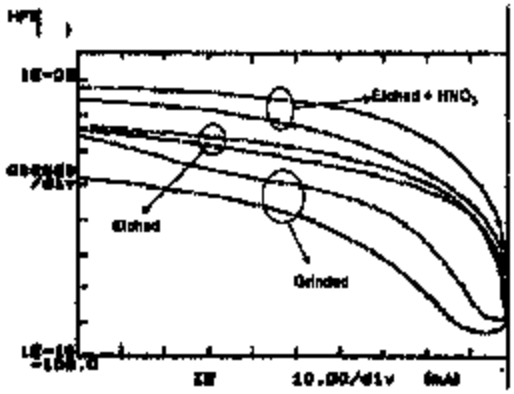


Fig. 7: Gain of the parasitic NPN transistor formed by the Ag-filled epoxy glue layer at the backside (emitter), p⁻ substrate (base) and BND-layer at the frontside (collector) as a function of the backside emitter current for the same treatments of the wafer backside as in fig. 6 (V_{base}=0V, $V_{collector}$=5V, T=25°C).

3. Latchup trigger mechanism

3.1 Backside current injection

One way to trigger the thyristor is by forcing the Cu-heatsink to a negative voltage and thus forward biasing the backside diode T4 and injecting electrons into the substrate. In table 1 typical trigger currents are shown for a typical product in this technology.

3.2 Saturation of V-PNP transistors

In a real automotive application, the thyristor can be triggered by severe saturation of the V-PNP power transistors. This occurs regularly during e.g. an engine start event of a car where the supply voltage can drop as low as 6V. In this case a large hole current is injected into the low doped p⁻-substrate resulting in a significant lifting of the substrate potential. Consequently, the backside diode T4 is forward biased and electrons are injected into the substrate and collected by the BND-layer, see fig. 3 and 4. This causes a voltage drop across R_{BND} which forces parasitic PNP transistor T3 to switch on. A current now flows from the emitter of the V-PNP power transistor T1 to the substrate via T3, causing a voltage drop across R_{sub}. When this voltage exceed the forward voltage of the backside diode, the parasitic NPN transistor T4 may remain conducting even when the V-PNP saturation event is over. Parasitic NPN transistor T2 then starts to operate in reverse and as a result the collector current of T4 will start to drive transistor T1 and a thyristor is being build-up.

Backside treatment Si wafer	Die attach	H_{fe} NPN T4	Backside latchup trigger current
Etched	Ag-filled epoxy	$0.8 \cdot 10^{-3}$	120 mA
Etched+ HNO3	Ag-filled epoxy	$3 \cdot 7 \cdot 10^{-3}$	60 mA
Grinded	Ag-filled epoxy	0.3-$3 \cdot 10^{-3}$	130 mA
Etched	Ti/Ni/Ag backside metallization	$3 \cdot 10^{-4}$	>3 A

Table 1: Gain of the parasitic NPN T4 and latchup trigger current at 25°C for a typical product in case of injection from the backside diode for various treatments of the wafer backside as in fig. 6 and for various die attach materials.

The thyristor turns-on when the injected electron current from the backside diode $I_{backside}$ exceeds a certain trigger value I_{trig} while the back-tab is at 0V. The effect is strongly temperature dependent, see fig. 8, as both the saturation current of the V-PNP power transistors and the substrate resistivity increase with temperature resulting in an increased substrate potential lifting. In combination with the drop in backside diode forward voltage with temperature, this results in a strong increase of the current $I_{backside}$ injected by the backside diode. When it exceeds the latchup trigger current I_{trig} latchup will occur. Note that I_{trig} decreases with temperature due to the increase of the gain of the bipolars and the drop of diode forward voltages with temperature. Fig. 8 shows that for our typical product latchup will occur for T>105°.

4. Elimination of the backside triggered latchup mechanism

There exist several possibilities to prevent the above described latchup mechanism. The first is to disconnect the Cu-heatsink from the ground potential thereby forcing the emitter of T4 to be floating. This can be achieved by either leaving the external heatsink to which the Cu-heatsink is attached floating or by placing a thin electrically isolating sheet between them. This is a very robust solution but care must be taken not to detoriate the thermal impedance characteristics. The second is to use an isolating epoxy glue instead of a glue containing Ag-fillers.

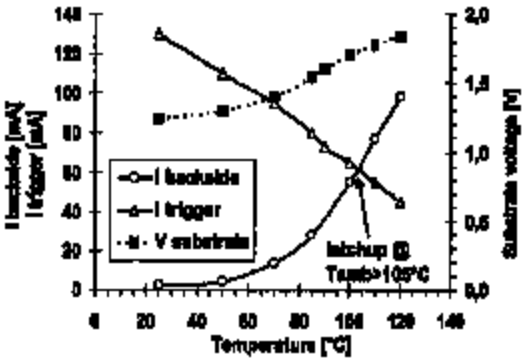
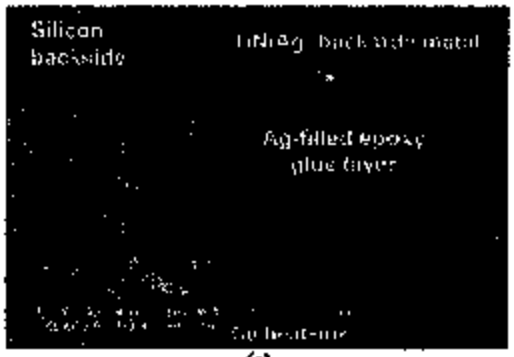


Fig. 8: Backside injection related latchup trigger current I_{trig} (triangles), substrate potential lifting (squares) and resulting backside diode injection current $I_{backside}$ (crosses) as a function of temperature for the case of a typical product during a V-PNP saturation event at V_{supply}= 7V; at T>105°C current $I_{backside} > I_{trig}$ and latchup will occur.

Again thermal impedance characteristics will determine the feasibility of this solution. The third option is to lower the resistivity of the p⁻ substrate, thereby reducing both the substrate potential lifting in case of saturation as well as the bipolar gain of the parasitic NPN transistor T4. If the loop gains remains <1 no latchup will occur. It is however difficult to prove that this a 100% robust solution up to 150°C for all designs at all application conditions. The final solution is to apply a Ti-Ni-Ag backside metallization to the low doped p-type wafer backside, see fig. 9. The Ti-Si interface forms a kind of a Schottky diode with a barrier height of 0.61 eV [2]. The corresponding I(V) characteristics are shown in fig. 10 and it can be clearly seen that the diode forward voltage is reduced to about 0.3V. Furthermore, as the Schottky diode is a majority carrier device [2], the TiNiAg backside metallization decreases the bipolar gain of the parasitic NPN transistor T4 by more than a factor 100, see table 1. This is probably caused by a strongly reduced emitter efficiency in the case of the backside metal. As a result, the thyristor loop gain is effectively reduced to much lower than 1 thus preventing the occurrence of latchup. Furthermore the backside metallization also strongly reduces the substrate resistance R_{sub}. Table 1 shows indeed that no latchup is observed up to backside injection currents exceeding 3A.



(a)

(b)

Fig. 9: SEM cross section showing a) the backside of the die, the 100nm thick TiNiAg backside metallization, the 10µm thick silver filled epoxy glue layer and the copper heatsink and b) in more detail the backside die - TiNiAg interface.

5. Impact on latchup qualification testing

Our results clearly suggest that a number of improvements are required for the latchup test procedure of (medium) power ICs. Firstly we recommend that during the standard latchup test procedure the backside of the die (or any leadfinger that makes electrical contacted to the diepad as in the case of certain medium power packages) must be contacted to ground potential. Secondly we recommend also a measurement of the latchup trigger current while injecting from the backside diode at maximum application temperature. The trigger current pass/fail criteria for this case are subject of discussion but probably should be >500mA.

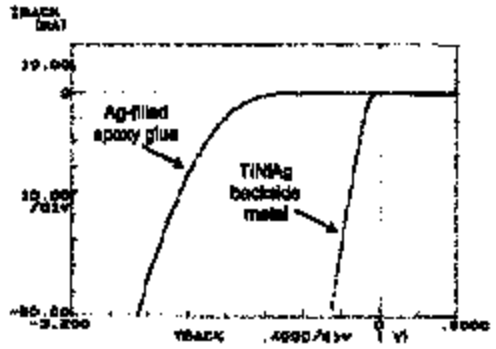


Fig. 10: I(V) characteristics at 25°C of the backside diode formed by a) the TiNiAg backside metal and the low doped p⁻-substrate and b) the Ag-filled epoxy glue layer and the low doped p⁻-substrate. In both cases the backside was wet etched.

6. Conclusions

A new latchup failure mechanism in complementary bipolar power ICs has been described. Latchup is caused by a thyristor constituted by the V-PNP power transistor at the frontside of the die and a parasitic NPN transistor between the frontside and the backside of the die. The emitter of this NPN transistor is formed by the Ag fillers in the die attach glue at the backside of the die, its base by the p⁻ substrate and its collector by the n-type BND isolation of the V-PNP transistor. The thyristor is triggered by saturation of the V-PNP power transistors or by forward biasing the backside diode between Ag-filled glue and p-type silicon. The effect is strongly temperature dependent. It can be eliminated by either leaving the backside floating, thus eliminating the parasitic NPN, or by applying backside metallization which strongly reduces the bipolar gain of the parasitic NPN.

Consequences for latchup qualification testing are that during the standard latchup test procedure the backside of the die (or any leadfinger that makes electrical contacted to the diepad as in the case of certain medium power packages) must be contacted to ground potential. This is currently not prescribed in the existing latchup test specifications. Furthermore it would make sense to an additional test where the latchup trigger current is measured while injecting from the backside diode (all at maximum application temperature).

7. References

[1] R.R. Troutman, 'Latchup in CMOS technology', Kluwer Academic Publishers, Boston, (1986)

[2] S.M. Sze, 'Physics of Semiconductor devices', 2nd edition, John Wiley & Sons, New York, (1981)

From: Sanders, Muriel (M.S.)
Sent: Monday, March 18, 2002 10:14 AM
To: Altoonian, Don (D.J.); Amenda, Harry (H.F.); Badgley, Joel (J.K.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); Cary Powell; Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); Dan Rothweiler; De Pena, Juan (J.E.); Diez, Timothy (T.P.); Fascetti, Bob (R.J.); Foumelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); John McDonald; Jones, Andy; Jordan, Donald (D.E.); Kanal, Shinji (S.); King, Robert (R.F.); Klostermann, Eric (E.); Koako, Jeff (J.R.); Kwon, Soon (S.K.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Luehraen, Eric (E.A.); Marck, Edmond (E.C.); Matasa, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); Morgan, Tom; Morishima, Shigeki (S.); Naveed Khan; Nematollahi, Sonya (S.); Nikolai, Bernie; Noteboom, Jim (J.E.); Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Sanders, Muriel (M.S.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhae (R.); Sullivan, Jamie (J.P.); Takasawa, Keith (K.D.); Takubo, Hirokhi (H.); Vecchio, Anne Marie (A.); Wakenell, Ray (R.A.); Wettach, Bill (B.); Williams, Lee (LHW.); Williamson, David (D.E.); Yeung, Lem (.)
Subject: U204 Phantom Stall Meeting 3/21/02

Here is the updated meeting information for this week. A meeting notice will follow.

New dial-in information.
Dial in: 1-877-870-3431 or Fordnet: 9-1-954-1143
International Participants # 1 (630) 693-1703
Passcode: 7865386#

For 3/21/2002 Only:
Location is TEE Conference Rm 1

Meeting time remains the same as Thursdays, 2-3pm.

Have a good day.

Muriel Sanders
U204 3.0L Calibration
Ford Motor Company
Phone: 313-32-27307
Fax: 313-32-31786
E-mail: msander6@ford.com

From: Sanders, Muriel (M.S.)
Sent: Wednesday, July 24, 2002 10:49 AM
To: Dalbo, Bob (R.J.)
Cc: Bogema, John (P.)
Subject: RE: Stalling Escapes

The service manager from Bill Woods called me back. He said they have done the TSB, MAF and dPFE. The only thing from the TSB that I could confirm was the IAC & throttle body. Mike couldn't positively say the rest had been done, other than he was sure the tech would do everything. He could not really confirm the other ISM items either. He just said he was sure they would have checked them and that they have talked to the hotline several times.

Muriel Sanders
U204 3.0L Calibration
Ford Motor Company
Phone: 313-32-27307
Fax: 313-32-31786
E-mail: msander6@ford.com

-----Original Message-----
From: Sanders, Muriel (M.S.)
Sent: Wednesday, July 24, 2002 10:34 AM
To: Dalbo, Bob (R.J.)
Cc: Bogema, John (P.)
Subject: RE: Stalling Escapes

The vehicle at Metro Ford has had everything except the dPFE done. The service manager was going to have that changed.

The tech at Bill Woods Ford is to call me back to verify what repairs have been done.

Muriel Sanders
U204 3.0L Calibration
Ford Motor Company
Phone: 313-32-27307
Fax: 313-32-31786
E-mail: msander6@ford.com

-----Original Message-----
From: Grossmann, Richard (R.A.)
Sent: Wednesday, July 24, 2002 10:19 AM
To: Sanders, Muriel (M.S.); Terzes, Laura (L.D.)
Cc: MacRitchie, Janice (J.V.); Helleson, Kevin (K.J.); Dalbo, Bob (R.J.); Bogema, John (P.); Fascetti, Bob (R.J.)
Subject: RE: Stalling Escapes

Muriel,

Per our conversation this morning, the correct VIN for the Metro Ford vehicle is 1FMCU04102KB85206. In addition, I have also requested a PCM for the stalling Escape at Bill Woods Ford. Thanks.

-----Original Message-----
From: Sanders, Muriel (M.S.)
Sent: Tuesday, July 23, 2002 1:42 PM
To: Grossmann, Richard (R.A.); Terzes, Laura (L.D.)
Cc: MacRitchie, Janice (J.V.); Helleson, Kevin (K.J.); Dalbo, Bob (R.J.); Bogema, John (P.); Fascetti, Bob (R.J.)

Subject: RE: Stalling Escapes

Richard Grossmann's e-mail (red text) referenced VIN 1FMCU03172KB22346 which is at Metro Ford. When I spoke to the Metro Ford Service Manager, Cory Thompson, he was under the impression that we are sending a PCM to that dealership for VIN 1FMCU04102KB85206. The mailing information below is for Bill Woods Ford.

Please clarify where I should send the PCM and the VIN number of the vehicle the PCM is intended for. Thanks.

Muriel Sanders
U204 3.0L Calibration
Ford Motor Company
Phone: 313-32-27307
Fax: 313-32-31786
E-mail: msander6@ford.com

-----Original Message-----
From: Dalbo, Bob (R.J.)
Sent: Tuesday, July 23, 2002 1:49 PM
To: Sanders, Muriel (M.S.); Bogema, John (P.)
Cc: Terzes, Laura (L.D.); MacRitchie, Janice (J.V.); Hellesen, Kevin (K.J.); Grossmann, Richard (R.A.)
Subject: RE: Stalling Escapes

John,
Please program a PCM with the 2003 calibration and contact Sheila Ward for info on the necessary exemption.

Muriel,
Once John has the module ready please ship it to the dealer per the directions below. Also, please contact the dealer and identify everything that has been done to the truck.

Thanks,

Bob Dalbo
3.0L Calibration Supervisor
Outfitters Calibration, NAT
Phone: (313) 24-84947 Fax: (313) 32-31786
Pager: (313) 795-2859 Email: *rdalbo@ford.com*

-----Original Message-----
From: Grossmann, Richard (R.A.)
Sent: Tuesday, July 23, 2002 11:08 AM
To: Dalbo, Bob (R.J.)
Cc: Terzes, Laura (L.D.); MacRitchie, Janice (J.V.); Hellesen, Kevin (K.J.)
Subject: RE: Stalling Escapes

Bob,

I just found out the Escape mentioned below from Bill Woods Ford has just returned again for intermittent stalling. We might be able to save a buy back on this one if you could send an experimental PCM to the dealer. Please send it to:

Bill Woods Ford
5025 N.E. Antioch
Kansas City MO 64119

ATTENTION: MIKE HAWES

Thanks.

—Original Message—
From: Dalbo, Bob (R.J.)
Sent: Wednesday, July 17, 2002 5:10 PM
To: Grossmann, Richard (R.A.)
Cc: Fast, Mathew (M.F.); Suarez, Rhae (R.); Klarr, Jerry (G.T.); Terzes, Laura (L.D.); Fascetti, Bob (R.J.); Corbett, Sandra (S.M.)
Subject: RE: Stalling Escapes

Rick,
We can get you an experimental PCM (with our latest, not-quite-released changes) late next week. This would have to be replaced with the released version in a month or two. Would the customer be interested in this arrangement?

Bob Dalbo

3.0L Calibration Supervisor
Outfitters Calibration, NAT
Phone: (313) 24-84947 Fax: (313) 32-31786
Pager: (313) 795-2869 Email: *rdalbo@ford.com*

—Original Message—
From: Terzes, Laura (L.D.)
Sent: Tuesday, July 16, 2002 5:53 PM
To: Corbett, Sandra (S.M.); Fascetti, Bob (R.J.); Dalbo, Bob (R.J.)
Cc: Fast, Mathew (M.F.); Suarez, Rhae (R.); Klarr, Jerry (G.T.)
Subject: FW: Stalling Escapes

Sandra, Bob or Bob: Please let Rick Grossman the FSE know directly (copy to me) if you want to utilize this vehicle to test the newest fix (calibration and h/w chgs.). I confirmed with Rick, the dealer has performed the latest TSB 02-11-06 and ISM 02-05-043, and the stalling concern has returned. One other troubling point, this customer is in their 2nd Escape. We bought back the first vehicle for the same concern. A quick response would be helpful, as Rick needs to decide how to manage the customer and dealer. I have conveyed to him, the approximate new calibration timing. PLS. ADVISE.

Laura Terzes
Manager, Outfitters Concerns
FCSD, Customer Service Engineering
PDC TVC 1JF56
(313) 32-36572 / fax (313) 24-86161 / lterzes.ford.com

—Original Message—
From: Grossmann, Richard (R.A.)
Sent: Tuesday, July 16, 2002 5:02 PM
To: Terzes, Laura (L.D.)
Cc: MacRitchie, Janice (J.V.); Heileson, Kevin (K.J.)
Subject: FW: Stalling Escapes

Laura,

Neither service manager has been contacted by anyone at the Kansas City Assembly Plant, so I assume someone has resolved this concern and does not need to inspect any vehicles. However, the final resolution has not been communicated to our dealers. This is a problem because the customer that owns Escape 1FMCU03172KB22346 reports the vehicle still stalls and we don't know how to repair it. We need immediate help on this or we will be buying this vehicle back. You may contact me by E-mail, by phone at cell phone . 816-678-6004 or directly contact Metro Ford Service Manager Cory Thompson at 816-254-9800. Thank you.

—Original Message—
From: Terzes, Laura (L.D.)
Sent: Thursday, June 13, 2002 7:30 AM
To: Grossmann, Richard (R.A.); Suarez, Rhae (R.)
Subject: RE: Stalling Escapes

Richard, there is a conf. call today on Escape Stalls, we will bring this info into the mtg. and Rhae has sent

same to the engineers working on the Stalls team, Powertrain engineers at KCAP. You should hear something soon regarding further investigation of these units. Thanks for the help. We really need more hands on to get the final root cause.

Laura Terzes
Manager, Outfitters Concerns
FCSD, Customer Service Engineering
PDC TVC 1JF58
(313) 32-36672 / fax (313) 24-68161 / lterzes.ford.com

-----Original Message-----
From: Grossmann, Richard (R.A.)
Sent: Wednesday, June 12, 2002 11:56 PM
To: Suarez, Rhae (R.)
Cc: Terzes, Laura (L.D.)
Subject: FW: Stalling Escapes

Rhae,

Since Bob is out, you may be interested in this.

-----Original Message-----
From: Grossmann, Richard (R.A.)
Sent: Wednesday, June 12, 2002 10:53 PM
To: Terzes, Laura (L.D.); King, Robert (R.F.)
Cc: MacRitchie, Janice (J.V.)
Subject: Stalling Escapes

Bob and Laura,

Cory Thompson, service manager at Metro Ford (816-254-9800), tells me the Escape listed below is in the process of being required since it has been to the dealer multiple times for stalling. TSB 02-05-043 and ISM 02-05-043 have been performed on the vehicle.

Mike Hawes, service manager a Bill Woods Ford (816-454-4200), reports he has an Escape that reportedly stalls after TSB 02-05-043 and ISM 02-05-043 have been performed. Please see the CQIS report listed below. I asked Mike to put the VDR on that vehicle and try to get a recording of the stall.

As both of these vehicles are close to the Kansas City Assembly Plant, and both reports indicate the latest fix is not effective, I thought you might be interested in taking a look at them.

Please let me know if you wish to inspect these vehicles.

Rpt#: 2E3CY004 NHL Rpt: 05/29/2002 Odom: 2,615 M
Rvwd: File: _ Folder: _____ Images: 0 Print Smy/Disp Detail(P/D): _
Vehicle: 2002 ESCAPE 4X2,XLT ,WAGON 1FMCU03172KB22346 Bld: 11/09/2001
Engine: 3.0L DUR Calb: 2M11A30A Trans: CD4E E Axle: 3800F2.73C A/C: YES
Dealer Id: 05158 Metro Ford, Inc. Ph#: (816) 254-9803
State: Missouri City: Independence Orig/Caller: JOHN LARGENT
Symptom: 6 07 7 00 DRVABL,STALL/QUITS,DECELERATION,OTHER-CODE NA
Addl Sym: ALLEDGED STALLS St: CCRG/EPRC: _ Rvwd: Dt:
Fbc Caus. Comp: – Condition Code:
Hotliner: RSTEGEMA Phone: 313 317-0000 Regn Cd: 53 Kansas City - 53
Engineering: Phone: TAR:
Dlr Contact: Phone: Title Cde: T
REPAIR VEHICLE WAS BROUGHT IN FOR A STALL CONCERN EVE AFTER TSB 02-05-06 WAS PERFORMED. TECH IS UNABEL TO DUPLICATE CONCERN. SEEKING ADVICE.
RECOMM ISM 02-05-043 VEH STALL AFT TSB 02-05-06, R&R MAF, CK DPFE, CK G300, SUGGESTED OF ISM ABOVE.

ADD-ON 06/12/2002 11:32PM RICK GROSSMAN(FSE) MSS - FCSD - REG - KANSAS CTY
SERVICE MANAGER CORY THOMPSON REPORTS AFTER DILLEGENTLY PERFORMING TSB
02-08-06 AND ISM 02-05-043, CUSTOMER REPORTS VEHICLE STILL INTERMITTE
NTLY STALLS. DUE TO THE NUMBER OF TIMES IN FOR THIS CONCERN, CORY REPO
RTS THE COMPANY HAS AGREED TO RAV THE VEHICLE.

==> _____ 1 of 1
Rpt#: 2FFA7020 NHL Rpt: 06/06/2002 Odom: 2,183 M
Rvwd: File: _ Folder: _____ Images: 0 Print Smy/Disp Detail(P/D): _
Vehicle: 2002 ESCAPE 4X4,XLT ,WAGON 1FMYU04192KD11746 Bld: 04/11/2002
Engine: 3.0L DUR Calb: 2M11A30A Trans: CD4E E Axle: 3800F2.73L A/C: YES
Dealer Id: 05079 Bill Woods Ford Ph#: (816) 454-4200
State: Missouri City: Kansas City Orig/Caller: TOM WOODROOF
Symptom: 6 07 0 00 DRVABL,STALL/QUITS,OTHER-CODE NA,OTHER-CODE NA
Addl Sym: INT STALLS, NO CODES St: CCRG/EPRC: _ Rvwd: Dt:
Fix: Caus. Comp: – Condition Code:
Hotliner: KAVERY3 Phone: 313 317-9356 Regn Cd: 53 Kansas City - 53
Engineering: Phone: TAR:
Dir Contact: Phone: Title Cde: T
REPAIR TECH STATES CUST ALLEGES INT STALLS, CANNOT GET FROM CUST ANY DETAILS
AS TO CONDITIONS WHEN VEHICLE STALLS, DID TSB 02-11-06 AND CANNOT
VERIFY, PASSES TSB, SEEKING KNOWNS.
RECOMM TSB 02-11-06 PERFORM NORMAL DIAG, RE-FLASH THE (PCM)
ADV TECH NO FURTHER KNOWNS, ADV TRY TO DETERMINE VEH SPEED AT TIME OF
CONCERN, IF ACCEL/DECEL/CRUISE, AND IF GOING DOWNHILL/UPHILL/LEVEL
GROUND.
REPAIR 06/06/2002 03:33PM ANDREW BARNES MSS - FCSD - TECH SVC HOTLINE
SM IS CALLING BACK AND HAD REMEMBERED SOME OTHER GROUNDS AND STUFF
THAT WE HAVE TOLD THEN TO CHECK ON.
RECOMM ISM 02-05-043 VEH STALL AFT TSB 02-08-06, R&R MAF, CK DPFE, CK G300,
ADVISED THE SM OF THE INFO LISTED IN THE ABOVE ISM.

Rich Grossmann

Field Service Engineer
913-541-4883

From: Sanchez, Daniel (D.A.)
Sent: Thursday, August 01, 2002 2:24 PM
To: Glass, Diana (D.); Young, Dan (D.G.); Bogema, John (P.); Belaus, Leo (L.); Guajardo, Juan (J.)
Cc: Honert, Gail (G.D.); Balsis, Jeff (J.A.); Sanchez, Daniel (D.A.)
Subject: FW: Calibration change


03 stall production cal_Rev_02... 03 stall service cal_Rev_02.do...

Diana, the two documents which name the calibration for South America are Argentina and Chile. I would need to ask Leo Belaus and Juan Guajardo respectively, and I suspect it will be alright to use the White Paper info since it's FTP75 just like the witness test you ran, but of course need to make sure with them.

Leo, Juan, attached is the subject White Paper for the 2003 MY Escape 3.0L which names the calibrations including the ROW calibration. As stated below the US is using White Paper/Engineering Judgement on this change to justify that there is no need to retest for the US itself. Is this White Paper sufficient for your respective areas?

The documentation for Argentina and Chile at this point is nearing completion using the witness test for FTP-75 on the ROW calibration BEFORE THE CHANGE, which will be submitted to you shortly. I am hoping this White Paper will cover the certificate AFTER the change, without further testing necessary if you agree. Please advise and thank you.

-----Original Message-----
From: Glass, Diana (D.)
Sent: Wednesday, July 31, 2002 10:27 AM
To: Brach, Margaret (M.M.); McCormick, Jamie (J.); Kaye Jr., Rick (R.R.); Sanchez, Daniel (D.A.); Honert, Gail (G.D.); Balsis, Jeff (J.A.); Jenkins, Tim (T.L.)
Cc: Johnson, Hosea (H.L.); Bogema, John (P.)
Subject: Calibration change

Friday, I received an email with the white paper for the post job 1 calibration change for the 3.0L. It is scheduled for August 12 (Europe's actual Job 1). In the US, it is implemented with only a white paper since emissions are minimally affected. However, in Europe, the certificate must show actual test data for the specific calibration released. This means we must rerun two 3.0L tests for emission. Noise is not affected, so this test does not need to be re-run. There will be two days minimum of cold CO testing prior to rerunning the original emissions tests - depending on results, it could be longer. Anticipated completion time for all tests is within two weeks. This assumes that South America use the US white paper to implement the calibration change. Since US allows use of a white paper, my assumption is that South America will allow the same since they use a US test cycle. I need confirmation of this from Dan Sanchez and Gail Honert.

The developmental cold CO tests passed. However, the first witness test (today)

failed. The vehicle stalled at startup when the vehicle was shifted into gear. It also stalled last week during the developmental test, although it passed that test. A restart during the test cycle will almost always cause the test to fail. John Bogema and friends have evaluated the vehicle. They believe that the problem is a small, non-visible crack in the PCM circuit board. Therefore, they are supplying a new PCM with the new calibration. If they are correct, then no need to worry.

From: Pepitone, Gil (J.)
Sent: Monday, July 01, 2002 2:32 PM
To: Jensen, Ted (T.E.)
Cc: Johnson, Jim (J.S.); Billcki, John (J.R.); Corbett, Sandra (S.M.); Altoonian, Don (D.J.); Ayvazzian, Kam (K.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); Rothweiler, Daniel (D.); De Pena, Juan (J.E.); Diez, Timothy (T.P.); Fascetti, Bob (R.J.); Fourneile, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); Mcdonald II, John (J.M.); Jordan, Donald (D.E.); King, Robert (R.F.); Kosko, Jeff (J.R.); Kwon, Soon (S.K.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Mandziuk, Roger (R.S.); Merck, Edmond (E.C.); Matesa, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); Morgan, Tomiko (T.T.); Morishima, Shigeki (S.); Nematollahi, Sonya (S.); Noteboom, Jim (J.E.); Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Sanders, Muriel (M.S.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhae (R.); Takasewa, Keith (K.D.); Takubo, Hirokhi (H.); Veenstra, Tim (T.W.); Wakenell, Ray (R.A.); Wettach, Bill (B.); Williams, Les (LHW.); Yeung, Lem (.); Benintende, Robert (R.F.); Goering, Kimberly (K.L.); Suarez, Rhae (R.); Terzes, Laura (L.D.); Martin, Mike (M.S.); Wexler, Mark (M.A.); Amely, Felix (F.A.); Bradley, Joe (J.C.); Linde, Peter (P.A.); Goering, Kimberly (K.L.); Terzes, Laura (L.D.); Benintende, Robert (R.F.); Wexler, Mark (M.A.); Amely, Felix (F.A.); Pepitone, Gil (J.); DiAngelo, Renaldo (R.); Pepitone, Gil (J.); DiAngelo, Renaldo (R.)
Subject: RE: PFQS's Investigation Results of Virgin Islands Escape Driveability Concerns

Hi Ted: I took the liberty of sharing my reply with all those previously cc'ed. This may influence the decision makers for the release for an Info Only Oasis Message, advising certain Markets {Caribbean, others??} to check for dirty fuel.

To answer your question : "During your visit did you visit any other OEM dealers?"
Answer; yes.
I took samples on two Islands, St. Thomas and St. Croix. The majority had dirty fuel.

As for your statement: "General fuel quality could be improved by a group effort through local governmental units and business groups."
I could not agree more. If the Dealerships receive an Oasis Message, this would lend weight to push for change, not to mention the happy customers and lower Warranty numbers.

Your other statement: "I would be very surprised if this were a Ford only issue."
Again, I agree. This is NOT a Ford Only Concern, since my samples were random.
Also note this quote from one Tech named "Yantis" at St. Thomas Metro Motors: "Gas is terrible on this Island".

Here's a proposed Oasis Message. Maybe you can assist me in getting some version of it generated??

Info Only Oasis Message XXX: All vehicle lines, engines. Driveability Concerns may be due to dirty fuel. Check for contamination by removing the fuel filter and blowing backwards to flow into a container, using shop air. Advise Owner to change fuel filling locations] as required. If filter is found restricted, replace. This is not a Warranty chargeable item, due to Owner choice of fuel usage.

This is just a framework. I am open to suggestions and improvements. Please advise. This includes those cc'ed.

Thank you,
Gil Pepitone
Powertrain Field Quality Specialist-"PFQS" In
South Florida

Office/Answering Machine: 954-753-9989
Cell Phone 954-242-2066
"With Warranty you are Paying for the Sins of the Past"

-----Original Message-----
From: Jensen, Ted (T.E.)
Sent: Monday, July 01, 2002 8:50 AM
To: Pepitone, Gil (J.)
Subject: RE: PFQS's Investigation Results of Virgin Islands Escape Driveability Concerns

Gil,

Fuel quality should be a common factor for all OEMs. During your visit did you visit any other OEM dealers? It would be very helpful to know the experience of others. General fuel quality could be improved by a group effort through local governmental units and business groups. I would be very surprised if this were a Ford only issue.

Ted

-----Original Message-----
From: Pepitone, Gil (J.)
Sent: Thursday, June 27, 2002 2:11 AM
To: Johnson, Jim (J.S.); Bilicki, John (J.R.); Corbett, Sandra (S.N.); Altoonian, Don (D.J.); Aynessazian, Kam (K.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.N.); Delbo, Bob (R.J.); Rothweiler, Daniel (D.); De Pena, Juan (J.E.); Diez, Timothy (T.P.); Pascetti, Bob (R.J.); Foumelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); Mcdonald II, John (J.M.); Jordan, Donald (D.E.); King, Robert (R.P.); Kosko, Jeff (J.R.); Kwon, Soon (S.K.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Mandaluk, Roger (R.S.); Marck, Edmond (E.C.); Matesa, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); Morgan, Tomiko (T.T.); Morishima, Shigeki (S.); Nemazbiahi, Sonya (S.); Notaboom, Jim (J.E.); Orman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Sanders, Muriel (M.S.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhae (R.); Takasawa, Keith (K.D.); Takubo, Hirokhi (H.); Veenstra, Tim (T.W.); Wakanell, Ray (R.A.); Wettach, Bill (B.); Williams, Lee (LHW.); Yeung, Lem (.); Benintende, Robert (R.F.); Goering, Kimberly (K.L.); Suarez, Rhae (R.); Terzes, Laura (L.D.); Martin, Mike (M.S.); Weeder, Mark (M.A.); Amely, Felix (F.A.); Bradley, Joe (J.C.); Linde, Peter (P.A.); Goering, Kimberly (K.L.); Terzes, Laura (L.D.); Benintende, Robert (R.F.); Weeder, Mark (M.A.); Amely, Felix (F.A.)
Cc: Pepitone, Gil (J.); DiAngelo, Ramaldo (R.); Berenter, Joel (J.R.);
Subject: PFQS's Investigation Results of Virgin Islands Escape Driveability Concerns
Importance: High

Good evening everyone:

Here's my report on my trip.

<< File: Results of Virgin Island Escape Decall Stalls Investigation.doc >>

I will be calling in on the Conference all at 2pm today.

Call-In Info: 1-877-870-3529 or Ford net 9-1-954-1144
International Participants: 1-630-693-1704
Passcode: 7873538, then hit #

I thank the Team for all their assistance.

Gil Pepitone
Powertrain Field Quality Specialist-"PFQS" In
South Florida
Office/Answering Machine: 954-753-9989
Cell Phone 954-242-2066
"With Warranty you are Paying for the Sins of the Past"

From:	Pepitone, Gil (J.)
Sent:	Monday, July 15, 2002 6:10 PM
To:	Hansen, George (G.C.); Bak, Paul (P.E.); Alashe, Waheed (W.D.); Altoonian, Don (D.J.); Anyanwu-Ebo, Ike (I.C.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); Dubovec, Jan (J.D.); Grewal, Bill (B.S.); Grimes, Jeff (J.R.); Hale, Tony (A.S.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Hoshino, Jun (J.); 'Inoue, Takashi (T.)'; Kalnas, Dana (D.J.); Kemerly-Finke, Nikki (K.); King, Robert (R.F.); Klarr, Jerry (G.T.); Kresovaky, Lee (L.P.); Mateas, John (J.); McGee, Brett (B.L.); Miller, Brian (B.J.); Moorhouse, Scott (S.R.); Olfer, John (J.D.); Ondrejko, Rick (R.T.); Phariss, Richard (R.L.); Rondier, Philippe (P.); Shiraishi, Masaru (M.); Smith, Tony (T.R.); Suarez, Rhea (R.); Vecchio, Anne Marie (A.); Yeung, Lam (.); Johnson, Jim (J.S.); Whitworth, Rudy (A.R.); Billicki, John (J.R.); Ayvazzian, Kam (K.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Rothweiler, Daniel (D.); De Pena, Juan (J.E.); Diaz, Timothy (T.P.); Fascetti, Bob (R.J.); Foumelis, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); Mcdonald II, John (J.M.); Jordan, Donald (D.E.); King, Robert (R.F.); Koako, Jeff (J.R.); Kwon, Soon (S.K.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Mendziuk, Roger (R.S.); Merck, Edmond (E.C.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mooney, Larry (L.); Morgan, Tomiko (T.T.); Morishima, Shigeki (S.); Nematollahi, Sonya (S.); Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Sanders, Muriel (M.S.); Shah, Kiran (K.C.); Stilgenbauer, Jeffrey (J.R.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Veenstra, Tim (T.W.); Wakenell, Ray (R.A.); Wettach, Bill (B.); Williams, Lee (LHW.); Yeung, Lam (.); Benintende, Robert (R.F.); Terzes, Laura (L.D.); Martin, Mike (M.S.); Wexler, Mark (M.A.); Amely, Felix (F.A.); Bradley, Joe (J.C.); Linde, Peter (P.A.); Goering, Kimberly (K.L.); Benintende, Robert (R.F.); Amely, Felix (F.A.); Lee, Pamela (P.F.); 'mmkee@visteon.com'; Hollister, Dave (D.); Zigler, Brad (B.T.); Stump, Steven (S.M.); Giordano, Mike (M.A.); Zaghati, Z. (.); Semerdzich, Raul (R.J.)
Cc:	Noteboom, Jim (J.E.); Pepitone, Gil (J.); DiAngelo, Renaldo (R.); Surti, P. J. (P.J.)
Subject:	Collapsing PCV Hose on 2.0L Zetec for Focus and Escape causing Idle Concerns and/or MIL

Executive Summary

2.0l Zetec Applications can have Rolling Idle/Idle Stalls and "Check Engine" event due to the collapse of the YS4Z-6758-EA PCV hose. This same hose PN is used on both the Focus and Escape.

This Concern is difficult to diagnosis due to the intermittent nature of the failed state. High idle vacuum causes the softened hose elbow rubber to collapse, which partially blocks airflow to the PCV value. This restriction alters the calibration of the PCV value, which allows crankcase airflow at idle.

The two results are:
a. Increased throttle body sludge due to increase oil presence within the zip tube. The resulting TB sludge decreases base idle air flow beyond IAC duty cycle compensation with a resulting Rolling/Hunting Idle.
b. PCV airflow at idle bias the HEGO sensor lean, which the MIL sets a Lean System DTC P0171.

The long term durability of the 2.0L Zetec intake sealing system may also be affected.

TSB/Oasis Communications is recommended.

Pls note that this failure mode affects the 2.0L Zetec engine only. Also, this is not involve the "splitting" rubber elbow/vacuum leak issue reported recently.

Background

PCV hose/elbow material issues involving multiple engine applications is currently in investigation. An Oasis Message describing vacuum leaks which set lean DTCs P0171/P0174 and at the PCV elbow is currently being drafted.

However, there is new failure mode with involves the 2.0L Zetec only, which causes a Drive Concern of Rolling/Hunting Idle and/or MIL on with DTC P0171.

US Virgin Island 2.0L Zetec Escape

One of 23 Escape Units inspected recently was a 2.0L Zetec Escape exhibiting rolling idle. High IAC DC of 46% were observed.
Root cause was a sludge throttle body.
Further inspection revealed that the YS4Z-6758-EA PCV hose was deformed and collapsed at it's elbow area at Idle.

Local South Florida 2.0L Zetec Focus'

Recently, local Technicians have alerted PFQS to a growing Concern Trend. The 2000/01 2.0L Zetec Focus have been generating a MIL/DTC of P0171. However, instead of root cause of the above "split rubber elbow" concern as described above (this vacuum leak also affects the 2.0L SPI), the hose would be found collapsed at it's elbow.


Overview of subject PCV hose,j...


PCV soft elbow. Note the sligh...


Hose is easily pushed in. It i,...

The Techs state that the setting of this lean DTC was common on the 2.0L Zetec Focus and replacement of this PCV hose resolved the Concern. They learned to inspect this hose due to the other failure scenario cited of rubber failure/splitting, which causes engine vacuum leak.

Investigation

PFQS (Powertrain Field Quality Specialist) pondered how a collapsed PCV hose could set a lean DTC. He then realized a system relationship.
Challenges to this theory are welcome, as are alternate suggestions as to the relationship of the subject collapsed PCV hose and the setting of the MIL with lean DTC P0171.

The PCV valve is normally closed at idle, due to the high idle engine vacuum.

However, if the subject hose is restricted, this changes the ability of the engine's vacuum to fully close the PCV valve at idle. The PCV valve's spring is calibrated to be overcome the application of the high engine idle vacuum.
With diminished idle vacuum volume, the PCV valve remains partially open.

This results in unmetered airflow at idle, as supplied by the crankcase. The HEGO signal is now biased lean. Short Term Fuel Trims are now affected, which in turn sets the Check Engine Light, with the Lean System DTC of P0171 in Memory.

Also, not all of this additional crankcase idle is ingested back into the intake manifold . Some will migrate toward the throttle body and solidify in the form of sludge between the TB plate and bore.
This sludge will reduce the base airflow, increasing the IAC duty cycle. Over time, the IAC is not able to compensate.
The result is low idle airflow, which results in Rolling/Hunting idle.

The affect of idle ingestion of crankcase airflow can adversely affect the intake manifold sealing system. A current example is 1999-2000 3.6L Windstar, in which PCV system improvements are part of the exhibiting TSB Service actions to resolve intake system leakage.

While not experienced on the above Concern Units, a low base airflows can result in Decell Engine Stalls.

Recommendation

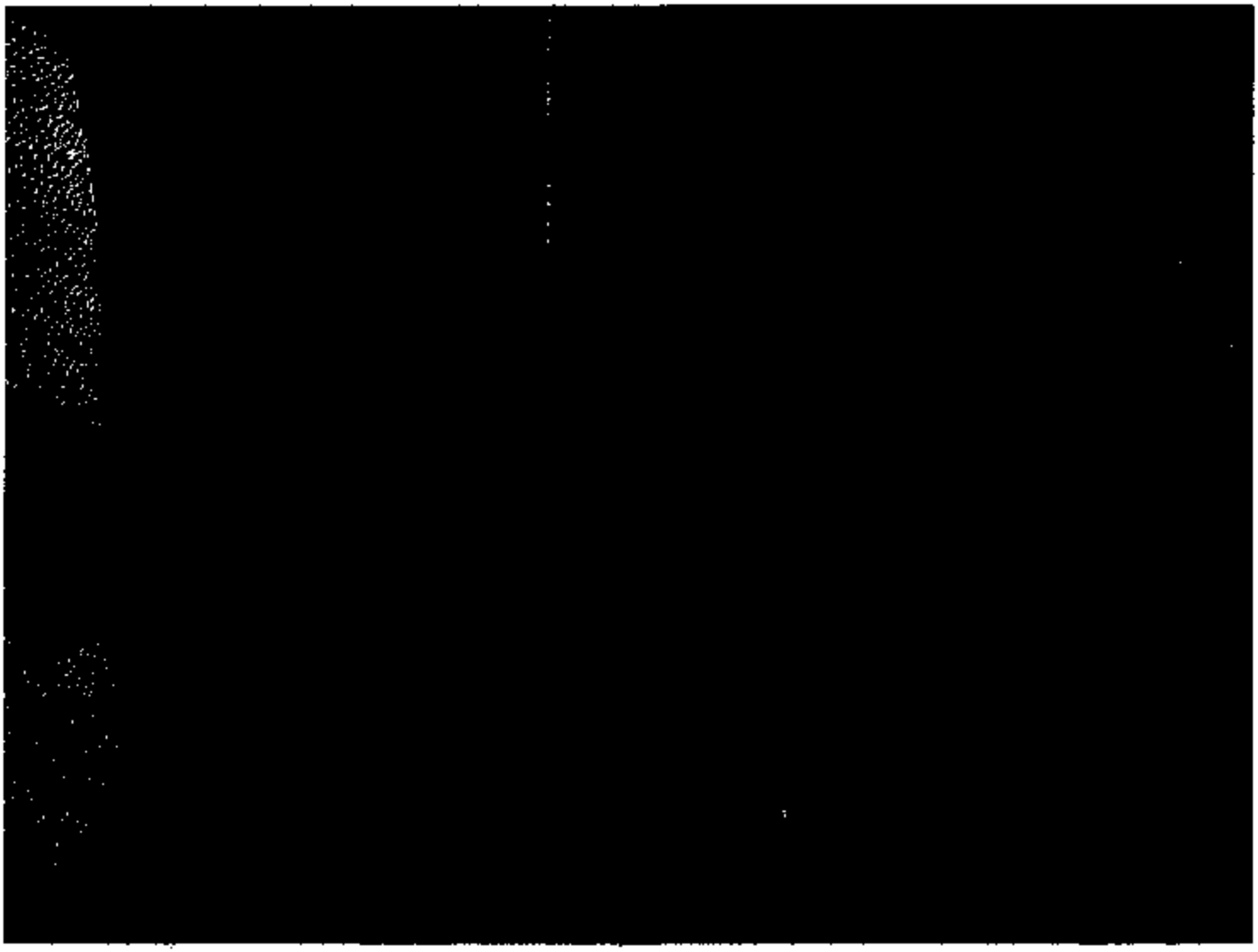
An Oasis Message, both Broadcast and Symptom Code driven, should be generated. A TSB should also be generated, complete with an illustration.

Sample Oasis Message XXXX: 2000-2002 2.0L Zetec Focus, 2001/2002 Escape. Rolling/Hunting Idle and/or Check Engine Light with DTC P0171 may be caused by a soft/collapsed PCV hose, PN YS4Z-6758-EA, located at the intake manifold/bulkhead side of the engine. Inspect the elbow area for deformities. Note if the hose can easily be squeezed shut and remains in that state. If found, replace and check engine oil condition/change interval. Advise Owner that proper oil change intervals need to be maintained to ensure that oil degradation does not deteriorate rubber components.

PFQS volunteers to assist Engineering in creation of any resulting communications.

Feedback is requested.

Thank you,
Gil Peplone
Powertrain Field Quality Specialist-"PFQS" In
South Florida
Office/Answering Machine: 954-753-9989
Cell Phone 954-242-2066
"With Warranty you are Paying for the Sins of the Past"



EH82-627-A 18730

EA82-827-R 18748

From: Noteboom, Jim (J.E.)
Sent: Tuesday, July 30, 2002 11:27 AM
To: Sanders, Muriel (M.S.); Altoonian, Don (D.J.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); 'Cary Powell'; Chick, John (J.); Chin, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); 'Dan Rothwaller'; De Pena, Juan (J.E.); Diez, Timothy (T.P.); Duvall, Allen (A.W.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Freeland, Mark (M.); Glee, Stuart (S.); Gokhale, Renuka (R.V.); Goodwin, William (W.R.); Grewal, Bill (B.S.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Hoshino, Jun (J.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); 'John McDonald'; 'Jones, Andy'; Jordan, Donald (D.E.); Kanai, Shinji (S.); King, Robert (R.F.); Kosko, Jeff (J.R.); Kwon, Soon (S.K.); Le, Dzung (D.H.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Mandziuk, Roger (R.S.); Marok, Edmond (E.C.); Matese, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); McGee, Brett (B.L.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); 'Morgan, Tom'; Morishima, Shigeki (S.); 'Naveed Khan'; Nematollahi, Sonya (S.); 'Nikolai, Bernie'; Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhae (R.); Takasawa, Keith (K.D.); Takubo, Hirokhi (H.); Veenstra, Tim (T.W.); Wakenell, Ray (R.A.); Wettach, Bill (B.); Williams, Les (LHW.); Yeung, Lem (.)
Subject: RE: U204 Stall Investigation, 7-26-02

VEH: '02 Escape VIN: 1FMCU04112KD11749 BUILT: 4-11-02 MILES: 1650
CUSTOMER: Carol Segety / 303-252-8278 (home) LOCATION: Northglenn, Colo.
COMPLAINT: Stalls in slow traffic. Note: the stall occures in the same location (80th between Wadsworth and 36) as the previous vehicle; checked this out and there are high tension lines crossing the road there.

TSB and SSM results:

- IAC=34%
- EVAP system passed.
- DPFE and EEC relay are the latest.
- Keys do not have excessive weight.
- All related grounds were secure.

Based on the stall location and the possibility of RFI, the MAF was updated to a 1L2Z-BA.

Also on this vehicle the battery was leaking from the seam on the corner opposite the negative post (see photos). The customer stated that when the vehicle was purchased, the original batt. was dead and was replaced. This batt. was not a service piece but looked like original equipment so it's history is in question. A new service batt. was installed.

MVC-039F.JPG

Serial no.

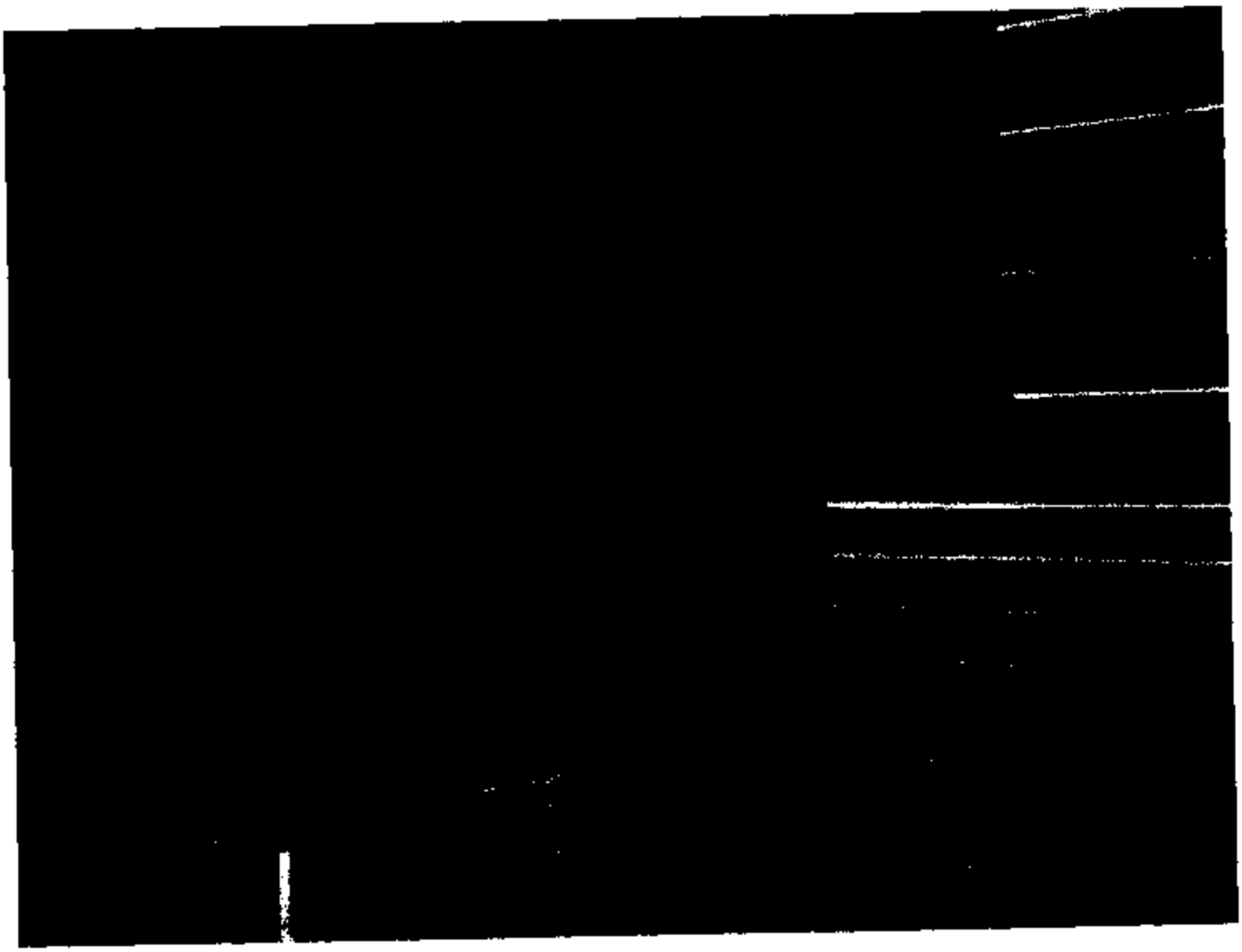
MVC-040F.JPG

Acid drip from seam.

ER02-627-A 18741

Jim Noteboom
Powertrain Field Quality Specialist/Denver
Phone: 303.674.4015 FAX: 303.674.5730
Cell: 303.921.2076

EA02-027-A 18743



From:	Waud, Sachiko (S.)
Sent:	Friday, August 02, 2002 4:06 AM
To:	Bogema, John (P.); Fujioka, Kenji (K.)
Cc:	Takasawa, Keith (K.D.); Veenstra, Tim (T.W.); Corbett, Sandra (S.M.); Altoonian, Don (D.J.); Peters, Robin (R.S.); Sanders, Muriel (M.S.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Dalbo, Bob (R.J.); Shiraishi, Masaru (M.); Ichikawa, Jiyunichiro (J.); Takubo, Hiroichi (H.); Kawasaki, Shunsuke (S.); Hamano, Naoumi (N.); Kodama, Masaki (M.); Yamamoto, Nobuhiro (N.); Inoue, Hiroshi (H.)
Subject:	RE: Need Mazda Part Numbers for Service Calibration Release for Escape/Tribute Stalling

C11390580.xls

John,

Please find the attached PAS for all of these mazda numbers you need.
I thought that all the parts were already provided by the mazda engineers since I found all the parts were added to NPSD screen in this notice.
But, I veified with Fujioka-san and some of the mazda numbers in NPSD screen are not correct.
Please make sure that these mazda part numbers in this file will be used as I don't have authorization to correct part numbers in NPSD screen for APED activities.
Please contact me if you have any question on this.

Thank you and sorry for the delay.
<<C11390580.xls>>
Sachiko Waud
FORD Program and Pre-Production Management (PPM)
swaud@ford.com
Phone:81-82-287-1093 (820-440)
Fax:81-82-287-5357 (20357)

> -----Original Message-----
> From: Inoue, Hiroshi (H.)
> Sent: Thursday, August 01, 2002 11:36 PM
> To: Yamamoto, Nobuhiro (N.); Bogema, John (P.)
> Cc: Takasawa, Keith (K.D.); Veenstra, Tim (T.W.); Corbett, Sandra (S.M.); Altoonian, Don (D.J.); Peters, Robin (R.S.); Sanders, Muriel (M.S.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Dalbo, Bob (R.J.); Waud, Sachiko (S.); Shiraishi, Masaru (M.); Ichikawa, Jiyunichiro (J.); Takubo, Hiroichi (H.); Kawasaki, Shunsuke (S.); Hamano, Naoumi (N.); Kodama, Masaki (M.)
> Subject: RE: Need Mazda Part Numbers for Service Calibration Release for Escape/Tribute Stalling
>
> Yamamoto-san,
> Please lead Mazda internal actions and also be the single contact window for this subject.
>
> John,
> You are the single contact window in Ford side, right?

> TDA2 0M11B30J14 1U7A 12A650 BDC TDA1 0M11B30J14 1U7A 12A650 BDB
> RIL2 0M11A30X11 1U7A 12A650 BEC RIL1 0M11A30X11 1U7A 12A650 BEB >
> XHR2 0M11A30G13 1U7A 12A650 APC XHR1 0M11A30G13 1U7A 12A650 APB
>
> John P. Bogema
> 3.0L Escape Calibration Engineering
> Phone:313.33.75133
> Location:TEE 1AE22
> Email:JBOGEMA@FORD.COM
>
> -----Original Message-----
> From: Dalbo, Bob (R.J.)
> Sent: Wednesday, July 31, 2002 3:26 PM
> To: Waud, Sachiko (S.); Shiraishi, Masaru (M.); Ichikawa, Jiyunichiro (J.); Takubo, Hiroichi (H.); Kawasaki, Shunsuke (S.); Hamano, Naoumi (N.)
> Cc: Takasawa, Keith (K.D.); Inoue, Hiroshi (H.); Veenstra, Tim (T.W.); Corbett, Sandra (S.M.); Altoonian, Don (D.J.); Peters, Robin (R. S.); Sanders, Muriel (M.S.); Bob Fascetti; Gilbert Fournelle; John Bogema
> Subject: Need Mazda Part Numbers for Service Calibration Release for Escape/Tribute Stalling
> Importance: High
>
> Waud-san,
> Concern C11390580, which releases 2001MY and 2002MY service calibrations and PCMs to address stalling on Escapes and Tributes, needs to have Mazda part numbers inserted in order to proceed. Since the concern has been approved by program management, please input the Mazda part numbers as soon as possible.
>
> Bob Dalbo
> 3.0L Calibration Supervisor
> Outfitters Calibration, NAT
> Phone: (313) 24-84947 Fax: (313) 32-31786
> Pager: (313) 795-2859 Email: rdalbo@ford.com
>

WWRSC06A R126083A Concern Description 02/07/23 03:08:19
Concern: C11390580 Activity: ML00 Status: A Local: N Pgm Mgt Auth: I
Search or Mail=>> User Id: _ _____ _____ Acty: ____ Date: _____
Scroll (Entry, Top, Bottom) : SCREEN Display (Name) : USER ID

REVISED PRODUCTION (2003) AND SERVICE (2001 & 2002) CALIBRAT
IONS ARE REQUIRED TO IMPROVE STALLS ROBUSTNESS AND ALLEVIATE
CUSTOMER COMPLAINTS.
*
CALIBRATIONS AFFECTED (ALL ARE 3.0L V6 CD4E)

MY	MARKET	OLD CAL #	NEW CAL #	OLD PCM	NEW PCM
2003	LEV-FORD	3M11A30600	3M11A30610	3L8A-BA	3L8A-BB
2003	CAA	3M11B30500	3M11B30610	3L8A-CA	3L8A-CB
2003	STG3-FORD	3M11A30E00	3M11A30E10	3L8A-BA	3L8A-BB
2003	STG3-MAZDA	3M11B30E00	3M11B30E10	3L8A-AHA	3L8A-AHB
2003	JPN-PATS	3M11A30J00	3M11A30J10	3L8A-FA	3L8A-FB
2003	JPN-NO PATS	3M11B30J00	3M11B30J10	3L8A-HA	3L8A-HB
2003	ROW	3M11A30X00	3M11A30X10	3L8A-JA	3L8A-JB
2003	LEADED	3M11A30G00	3M11A30G10	3L8A-GA	3L8A-GB
2002	LEV-FORD	2M11A30610	N/A	2L8A-AD	PLS ASSIGN SERV #
2002	CAA	2M11B30610	N/A	2L8A-BD	PLS ASSIGN SERV #
2002	LEV-MAZDA	2M11C30510	N/A	2L8A-CD	PLS ASSIGN SERV #
2002	STG3-FORD	2M11A30E10	N/A	2L8A-GD	PLS ASSIGN SERV #
2002	JPN-PATS	2M11A30J11	N/A	2L8A-HE	PLS ASSIGN SERV #
2002	JPN-NO PATS	2M11B30J11	N/A	2L8A-JE	PLS ASSIGN SERV #
2002	ROW	2M11A30X10	N/A	2L8A-KD	PLS ASSIGN SERV #
2002	ROW-SEVERE	2M11B30X10	N/A	2L8A-MD	PLS ASSIGN SERV #
2002	LEADED	2M11A30G10	N/A	2L8A-LD	PLS ASSIGN SERV #
2001	LEV-FORD	1M11A30612	N/A	1U7A-AXB	1U7A-AXC
2001	LEV-MAZDA	1M11C30512	N/A	1U7A-AYB	1U7A-AYC
2001	CAA	1M11B30512	N/A	1U7A-AZB	1U7A-AZC
2001	STG3-FORD	1M11A30E12	N/A	1U7A-BBB	1U7A-BBC
2001	JPN-PATS	1M11A30J14	N/A	1U7A-BCB	1U7A-BCC
2001	JPN-NO PATS	1M11B30J14	N/A	1U7A-BDB	1U7A-BDC
2001	ROW	1M11A30X11	N/A	1U7A-BEB	1U7A-BEC
2001	LEADED	1M11A30G13	N/A	1U7A-APB	1U7A-APC

****
PLEASE ASSIGN SERVICE PART NUMBERS FOR THE 2002 MY PARTS, AND CONFIRM THE PART
NUMBERS FOR THE 2001 AND 2003 MY PARTS.
****
FUTURE CONCERN QUESTIONS SHOULD BE DIRECTED TO THE 3.0L U204 CALIBRATION
SECTION: GILBERT FOURNELLE (390-4968) OR JOHN BOGEMA (337-5133).
****
ADDITIONAL INFORMATION: CONCERN C11299149 HAS BEEN RAISED TO REVISE A CAPACITOR
IN THE PCM. THE CALIBRATION CHANGES RELEASED BY THIS CONCERN NEED TO BE
CONCURRENT WITH THAT CAPACITOR CHANGE.
SACHIKO WAUD, ARE YOU STILL THE POINT PERSON FOR PCM RELEASES FOR MAZDA?
YOUNG, DAN G. 313 59-41587 N PWRTRAIN DYOUNG19 APED 02/07/12
NEW C/W NEW CAL # NEW P/N OLD C/W OLD CAL # OLD P/N

BAR1	3M11A30510	3L8A	12A650	BB	BAR0	3M11A30500	3L8A	12A650	BA
CAS1	3M11B30510	3L8A	12A650	CB	CAS0	3M11B30500	3L8A	12A650	CA
EJD1	3M11A30E10	3L8A	12A650	EB	EJD0	3M11A30E00	3L8A	12A650	EA
IPC1	3M11B30E10	3L8A	12A650	AHB	IPC0	3M11B30E00	3L8A	12A650	AHA
FGM1	3M11A30J10	3L8A	12A650	FB	FGM0	3M11A30J00	3L8A	12A650	FA
HIS1	3M11B30J10	3L8A	12A650	HB	HIS0	3M11B30J00	3L8A	12A650	HA
JLS1	3M11A30X10	3L8A	12A650	JB	JLS0	3M11A30X00	3L8A	12A650	JB
GYL1	3M11A30G10	3L8A	12A650	GB	GYL0	3M11A30G00	3L8A	12A650	GB
NSP0	2M11A30510	2U7A	12A650	CZA	BUS3	2M11A30510	2L8A	12A650	AD
PVN0	2M11B30510	2U7A	12A650	CPA	ZRZ3	2M11B30510	2L8A	12A650	BD
RKG0	2M11C30510	2U7A	12A650	CRA	HQP3	2M11C30510	2L8A	12A650	CD
SGG0	2M11A30E10	2U7A	12A650	CSA	JTM3	2M11A30E10	2L8A	12A650	GD
THE0	2M11A30J11	2U7A	12A650	CTA	LUX4	2M11A30J11	2L8A	12A650	HE
UJB0	2M11B30J11	2U7A	12A650	CUA	CKQ4	2M11B30J11	2L8A	12A650	JE
VFN0	2M11A30X10	2U7A	12A650	CVA	SQQ3	2M11A30X10	2L8A	12A650	KD
XAN0	2M11B30X10	2U7A	12A650	CXA	CFD3	2M11B30X10	2L8A	12A650	MD
YWC0	2M11A30G10	2U7A	12A650	CYA	MQE3	2M11A30G10	2L8A	12A650	LD
ATF2	0M11A30512	1U7A	12A650	AXC	ATF1	0M11A30512	1U7A	12A650	AXB
SJA2	0M11C30512	1U7A	12A650	AYC	SJA1	0M11C30512	1U7A	12A650	AYB
ESG2	0M11B30512	1U7A	12A650	AZC	ESG1	0M11B30512	1U7A	12A650	AZB
FGB2	0M11A30E12	1U7A	12A650	BBC	FGB1	0M11A30E12	1U7A	12A650	BBB
QPR2	0M11A30J14	1U7A	12A650	BCC	QPR1	0M11A30J14	1U7A	12A650	BCB
TDA2	0M11B30J14	1U7A	12A650	BDC	TDA1	0M11B30J14	1U7A	12A650	BDB
RIL2	0M11A30X11	1U7A	12A650	BEC	RIL1	0M11A30X11	1U7A	12A650	BEB
XHR2	0M11A30G13	1U7A	12A650	APC	XHR1	0M11A30G13	1U7A	12A650	APB

THERE WAS A COUPLE ERRORS THAT HAVE BEEN TAKEN CARE OF THAT NEED TO BE KNOWN:
CATCHWORDS NEED TO ADDED NEXT TIME. PLEASE ADD THEM NEXT TIME YOU DO A CHANGE.
THE CALIBRATIONS FOR THE 2001 SERVICE PARTS ARE SUPPOSED TO BE A 0 NOT A 1.
BELZYT, ROSEANN 313 24-87595 N PWRTRAIN RBELZYT APED 02/07/15
S.OL CALIBRATION ENGINEERING AGGREES WITH PART NUMBER AND CALIBRATION NUMBER
ASSINGMENT.
BOGEMA, JOHN 313 33-75133 N PWRTRAIN JBOGEMA NE01 02/07/16
DAN YOUNG ... PLEASE PROVIDE THE MAZDA SERVICE PART NUMBERS AND THE STOCK
DISPOSITION FOR ALL THE CALIBRATIONS SHOWN.
GRZINCIC, KAREN (313) 322-4593 N 3570 KMG6603 APED 02/07/17
JOHN BOGEMA ... PLEASE PROVIDE THE INFORMATION REQUESTED IN THE ABOVE ENTRY.
THANKS.
GRZINCIC, KAREN (313) 322-4593 N 3570 KMG6603 APED 02/07/17
STOCK SHOULD BE REWORKED
SI CODE IS 1
SERVICE STOCK SHOULD BE REWORKED
SAR = Y
BOGEMA, JOHN 313 33-75133 N PWRTRAIN JBOGEMA NE01 02/07/19
SACHIKO WAUD, PLEASE ENTER THE NEEDED MAZDA PART NUMBERS FOR SERVICE
BOGEMA, JOHN 313 33-75133 N PWRTRAIN JBOGEMA NE01 02/07/19
ROUTED TO BACKBONE 5 PCS PROVE OUT LINE TRIAL REQUIRED FOR EOL TESTING
O'CALLAHAN, JOH 816-459-1627 N MZDA204 JOCALLA2 ML00 02/07/22
ABOVE STATEMENT REFERS TO PSW FUNCTIONAL TRIAL BEFORE IMPLEMENTING AT PRODUCTIO
N VOLUME.
LINDE, PETE (PV 816-459-1866 N LTREL PLINDE ML00 02/07/22

From: Grossmann, Richard (R.A.)
Sent: Wednesday, July 24, 2002 10:19 AM
To: Sanders, Muriel (M.S.); Terzea, Laura (L.D.)
Cc: MacRitchie, Janice (J.V.); Helleson, Kevin (K.J.); Dalbo, Bob (R.J.); Bogema, John (P.); Fascetti, Bob (R.J.)
Subject: RE: Stalling Escapes

Muriel,

Per our conversation this morning, the correct VIN for the Metro Ford vehicle is 1FMCU04102KB85206. In addition, I have also requested a PCM for the stalling Escape at Bill Woods Ford. Thanks.

-----Original Message-----
From: Sanders, Muriel (M.S.)
Sent: Tuesday, July 23, 2002 1:42 PM
To: Grossmann, Richard (R.A.); Terzea, Laura (L.D.)
Cc: MacRitchie, Janice (J.V.); Helleson, Kevin (K.J.); Dalbo, Bob (R.J.); Bogema, John (P.); Fascetti, Bob (R.J.)
Subject: RE: Stalling Escapes

Richard Grossmann's e-mail (red text) referenced VIN 1FMCU03172KB22346 which is at Metro Ford. When I spoke to the Metro Ford Service Manager, Cory Thompson, he was under the impression that we are sending a PCM to that dealership for VIN 1FMCU04102KB85206. The mailing information below is for Bill Woods Ford.

Please clarify where I should send the PCM and the VIN number of the vehicle the PCM is intended for. Thanks.

Muriel Sanders
U204 3.0L Calibration
Ford Motor Company
Phone: 313-32-27307
Fax: 313-32-31786
E-mail: msander6@ford.com

-----Original Message-----
From: Dalbo, Bob (R.J.)
Sent: Tuesday, July 23, 2002 1:49 PM
To: Sanders, Muriel (M.S.); Bogema, John (P.)
Cc: Terzea, Laura (L.D.); MacRitchie, Janice (J.V.); Helleson, Kevin (K.J.); Grossmann, Richard (R.A.)
Subject: RE: Stalling Escapes

John,
Please program a PCM with the 2003 calibration and contact Sheila Ward for info on the necessary exemption,

Muriel,
Once John has the module ready please ship it to the dealer per the directions below. Also, please contact the dealer and identify everything that has been done to the truck.

Thanks,

Bob Dalbo

3.0L Calibration Supervisor
Outfitters Calibration, NAT
Phone: (313) 24-84947 Fax: (313) 32-31786
Pager: (313) 795-2859 Email: *rdalbo@ford.com*

-----Original Message-----
From: Grossmann, Richard (R.A.)
Sent: Tuesday, July 23, 2002 11:08 AM
To: Dalbo, Bob (R.J.)
Cc: Terzes, Laura (L.D.); MacRitchie, Janice (J.V.); Helleson, Kevin (K.J.)
Subject: RE: Stalling Escapes

Bob,

I just found out the Escape mentioned below from Bill Woods Ford has just returned again for intermittent stalling. We might be able to save a buy back on this one if you could send an experimental PCM to the dealer. Please send it to:

Bill Woods Ford
6025 N.E. Antioch
Kansas City MO 64119

ATTENTION: MIKE HAWES

Thanks.

-----Original Message-----
From: Dalbo, Bob (R.J.)
Sent: Wednesday, July 17, 2002 5:10 PM
To: Grossmann, Richard (R.A.)
Cc: Fast, Mathew (M.F.); Suarez, Rhea (R.); Klarr, Jerry (G.T.); Terzes, Laura (L.D.); Pascetti, Bob (R.J.); Corbett, Sandra (S.M.)
Subject: RE: Stalling Escapes

Rick,
We can get you an experimental PCM (with our latest, not-quite-released changes) late next week. This would have to be replaced with the released version in a month or two. Would the customer be interested in this arrangement?

Bob Dalbo

3.0L Calibration Supervisor
Outfitters Calibration, NAT
Phone: (313) 24-84947 Fax: (313) 32-31786
Pager: (313) 795-2869 Email: *rdalbo@ford.com*

-----Original Message-----
From: Terzes, Laura (L.D.)
Sent: Tuesday, July 16, 2002 5:53 PM
To: Corbett, Sandra (S.M.); Pascetti, Bob (R.J.); Dalbo, Bob (R.J.)
Cc: Fast, Mathew (M.F.); Suarez, Rhea (R.); Klarr, Jerry (G.T.)
Subject: FW: Stalling Escapes

Sandra, Bob or Bob: Please let Rick Grossman the FSE know directly (copy to me) if you want to utilize this vehicle to test the newest fix (calibration and h/w chgs.). I confirmed with Rick, the dealer has performed the latest TSB 02-11-06 and ISM 02-05-043, and the stalling concern has returned. One other troubling point, this customer is in their 2nd Escape. We bought back the first vehicle for the same concern. A quick response would be helpful, as Rick needs to decide how to manage the customer and dealer. I have conveyed to him, the approximate new calibration timing. PLS. ADVISE.

Laura Terzes
Manager, Outfitters Concerns
FCSD, Customer Service Engineering
PDC TVC 1JF58
(313) 32-36572 / fax (313) 24-88161 / lterzes.ford.com

-----Original Message-----
From: Grossmann, Richard (R.A.)

Sent: Tuesday, July 16, 2002 5:02 PM
To: Terzes, Laura (L.D.)
Cc: MacRitchie, Janice (J.V.); Hallesen, Kevin (K.J.)
Subject: FW: Stalling Escapes

Laura,

Neither service manager has been contacted by anyone at the Kansas City Assembly Plant, so I assume someone has resolved this concern and does not need to inspect any vehicles. However, the final resolution has not been communicated to our dealers. This is a problem because the customer that owns Escape 1FMCU03172KB22346 reports the vehicle still stalls and we don't know how to repair it. We need immediate help on this or we will be buying this vehicle back. You may contact me by E-mail, by phone at cell phone 816-678-6004 or directly contact Metro Ford Service Manager Cory Thompson at 816-254-9800. Thank you.

---Original Message---
From: Terzes, Laura (L.D.)
Sent: Thursday, June 13, 2002 7:30 AM
To: Grossmann, Richard (R.A.); Suarez, Rhae (R.)
Subject: RE: Stalling Escapes

Richard, there is a conf. call today on Escape Stalls, we will bring this info into the mtg. and Rhae has sent same to the engineers working on the Stalls team, Powertrain engineers at KCAP. You should hear something soon regarding further investigation of these units. Thanks for the help. We really need more hands on to get the final root cause.

Laura Terzes
Manager, Outfitters Concerns
FCSD, Customer Service Engineering
PDC TVC 1JF56
(313) 32-36572 / fax (313) 24-86161 / lterzes.ford.com

---Original Message---
From: Grossmann, Richard (R.A.)
Sent: Wednesday, June 12, 2002 11:56 PM
To: Suarez, Rhae (R.)
Cc: Terzes, Laura (L.D.)
Subject: FW: Stalling Escapes

Rhae,

Since Bob is out, you may be interested in this.

---Original Message---
From: Grossmann, Richard (R.A.)
Sent: Wednesday, June 12, 2002 10:53 PM
To: Terzes, Laura (L.D.); King, Robert (R.F.)
Cc: MacRitchie, Janice (J.V.)
Subject: Stalling Escapes

Bob and Laura,

Cory Thompson, service manager at Metro Ford (816-254-9800), tells me the Escape listed below is in the process of being repaired since it has been to the dealer multiple times for stalling. TSB 02-05-043 and ISM 02-05-043 have been performed on the vehicle.

Mike Hawes, service manager a Bill Woods Ford (816-454-4200), reports he has an Escape that reportedly stalls after TSB 02-05-043 and ISM 02-05-043 have been performed. Please see the CQIS report listed below. I asked Mike to put the VDR on that vehicle and try to get a recording of the stall.

As both of these vehicles are close to the Kansas City Assembly Plant, and both reports indicate the latest fix is not effective, I thought you might be interested in taking a look at them.

Please let me know if you wish to inspect these vehicles.

Rpt#: 2E3CY004 NHL Rpt: 05/29/2002 Odom: 2,615 M
Rvwd: File: _ Folder: _____ Images: 0 Print Smy/Disp Detail(P/D): _
Vehicle: 2002 ESCAPE 4X2,XLT ,WAGON 1FMCU03172KB22346 Bld: 11/09/2001
Engine: 3.0L DUR Calb: 2M11A30A Trans: CD4E E Axle: 3800F2.73C A/C: YES
Dealer Id: 05168 Metro Ford, Inc. Ph#: (816) 254-9803
State: Missouri City: Independence Orig/Caller: JOHN LARGENT
Symptom: 6 07 7 00 DRVABL,STALL/QUITS,DECELERATION,OTHER-CODE NA
Addl Sym: ALLEDGED STALLS St: CCRG/EPRC: _ Rvwd: Dt:
Fix: Caus. Comp: – Condition Code:
Hotliner: RSTEGEMA Phone: 313 317-0000 Regn Cd: 53 Kansas City - 53
Engineering: Phone: TAR:
Dlr Contact: Phone: Title Cde: T
REPAIR VEHICLE WAS BROUGHT IN FOR A STALL CONCERN EVE AFTER TSB 02-06-06 WAS PERFORMED. TECH IS UNABEL TO DUPLICATE CONCERN. SEEKING ADVICE.
RECOMM ISM 02-05-043 VEH STALL AFT TSB 02-06-06, R&R MAF, CK DPFE, CK G300, SUGGESTED OF ISM ABOVE.
ADD-ON 06/12/2002 11:32PM RICK GROSSMAN(FSE) MSS - FCSD - REG - KANSAS CTY SERVICE MANAGER CORY THOMPSON REPORTS AFTER DILLEGENTLY PERFORMING TSB 02-06-06 AND ISM 02-05-043, CUSTOMER REPORTS VEHICLE STILL INTERMITTE NTLY STALLS. DUE TO THE NUMBER OF TIMES IN FOR THIS CONCERN, CORY REPO RTS THE COMPANY HAS AGREED TO RAV THE VEHICLE.

==> _____ 1 of 1
Rpt#: 2FFA7020 NHL Rpt: 06/06/2002 Odom: 2,163 M
Rvwd: File: _ Folder: _____ Images: 0 Print Smy/Disp Detail(P/D): _
Vehicle: 2002 ESCAPE 4X4,XLT ,WAGON 1FMYU04192KD11746 Bld: 04/11/2002
Engine: 3.0L DUR Calb: 2M11A30A Trans: CD4E E Axle: 3800F2.73L A/C: YES
Dealer Id: 05079 Bill Woods Ford Ph#: (816) 454-4200
State: Missouri City: Kansas City Orig/Caller: TOM WOODROOF
Symptom: 6 07 0 00 DRVABL,STALL/QUITS,OTHER-CODE NA,OTHER-CODE NA
Addl Sym: INT STALLS, NO CODES St: CCRG/EPRC: _ Rvwd: Dt:
Fix: Caus. Comp: – Condition Code:
Hotliner: KAVERY3 Phone: 313 317-9356 Regn Cd: 53 Kansas City - 53
Engineering: Phone: TAR:
Dlr Contact: Phone: Title Cde: T
REPAIR TECH STATES CUST ALLEGES INT STALLS, CANNOT GET FROM CUST ANY DETAILS AS TO CONDITIONS WHEN VEHICLE STALLS, DID TSB 02-11-06 AND CANNOT VERIFY, PASSES TSB, SEEKING KNOWNS.
RECOMM TSB 02-11-06 PERFORM NORMAL DIAG, RE-FLASH THE (PCM) ADV TECH NO FURTHER KNOWNS, ADV TRY TO DETERMINE VEH SPEED AT TIME OF CONCERN, IF ACCEL/DECEL/CRUISE, AND IF GOING DOWNHILL/UPHILL/LEVEL GROUND.
REPAIR 06/06/2002 03:33PM ANDREW BARNES MSS - FCSD - TECH SVC HOTLINE SM IS CALLING BACK AND HAD REMEMBERED SOME OTHER GROUNDS AND STUFF THAT WE HAVE TOLD THEN TO CHECK ON.
RECOMM ISM 02-05-043 VEH STALL AFT TSB 02-06-06, R&R MAF, CK DPFE, CK G300, ADVISED THE SM OF THE INFO LISTED IN THE ABOVE ISM.

Rick Grossmann

Field Service Engineer

From: Dalbo, Bob (R.J.)
Sent: Wednesday, December 19, 2001 4:21 PM
To: Bogema, John (P.); Fournelle, Gilbert (G.); Hockaday Jr., John (J.C.); Klostermann, Eric (E.); Matesa, John (J.); Mikota, Dennis (D.P.); Mroz, David (D.R.); Smith, Tony (T.R.); Williams, Lee (LHW.)
Subject: FW: Stalls

Concern for finned-pintle Hitachi IAC valve.

Bob Dalbo

3.0L Calibration Supervisor
Outfitters Calibration, North American Truck
Phone: (313)24-84947 Fax: (313)32-31788
Pager: (313)795-2859 E-mail: *rdalbo@ford.com*

-----Original Message-----
From: Hale, Tony (A.S.)
Sent: Wednesday, December 19, 2001 10:13 AM
To: Rusek, Ron (R.J.)
Cc: Dalbo, Bob (R.J.)
Subject: RE: Stalls

For the Upgrade Hitachi IABV? If so, C11252737 is in the System. Currently, we are waiting for Transparency data from Sci-Lab and/or Bob Dalbo's confirmation.

-----Original Message-----
From: Rusek, Ron (R.J.)
Sent: Tuesday, December 18, 2001 4:05 PM
To: Hale, Tony (A.S.)
Subject: FW: Stalls

Tony, has a concern been issued yet?

-----Original Message-----
From: Sventickas, Ed (E.)
Sent: Tuesday, December 18, 2001 1:31 PM
To: Young, Lem (J.); Rusek, Ron (R.J.)
Subject: Stalls

What is the status on the release of the anti stick idle speed control motor ..??

Ed Sventickas

Manager of 2.5/3.0L V6
Duratec Engines
V-Engine Engineering
Phone - 313 845 5060
Fax - 313 594 7323
esventic@ford.com
Text Pager:313-861-0626

From: Dalbo, Bob (R.J.)
Sent: Wednesday, May 16, 2001 4:33 PM
To: Shelton, Randy (R.)
Cc: Kanai, Shinji (S.); Inooka, Kimiaki (K.); King, Robert (R.F.); Vecchio, Anne Marie (A.); Limtiaco, Steven (S.)
Subject: RE: Vehicle Data Recorder Requests

Randy,
These vehicles have DOAR1 strategy (R07 calibration). Can you please configure the flight recorder currently in my posession for this strategy to use in this stall investigation? Can we get a second VDR, or will Mr. Limtiaco have to make do with this one?

Bob Dalbo
3.0L Calibration Supervisor
Compact Pickup PTSE, Truck Vehicle Center
Phone: (313)24-84947 Fax: (313)32-31786
Pager: (313)795-2859 E-mail: rdalbo@ford.com

-----Original Message-----
From: Steven Limtiaco [mailto:SLimtiac@mazdausa.com]
Sent: Wednesday, May 16, 2001 12:44 PM
To: 'rdalbo@ford.com'
Cc: Shinji Kanai; Kimiaki Inooka; 'rking9@ford.com'; 'avecchi1@ford.com'
Subject: Vehicle Data Recorder Requests

Bob,

Requesting assistance for 3.0L intermittent engine stall investigation.
Please supply 2 vehicle data recorders for the following vehicles:

1. 4F2YU08171KM00373, tear tag code = JYB3 (JYB2 scratched off with black marker)
2. 4F2YU07171KM16218, tear tag code = JYB3

Please include instructions for set-up / maintenance and send to:

Mazda North American Operations
1444 McGaw Avenue
Irvine CA 92614-5570

Attn: Steve Limtiaco

Thank you in advance for your assistance.

Steve Limtiaco
Mazda North American Operations
Tribute Product Support
949-442-6514 (phone)
949-442-6599 (fax)
e-mail: slimtiac@mazdausa.com

From: King, Robert (R.F.)
Sent: Monday, July 30, 2001 4:47 PM
To: King, Robert (R.F.)
Subject: EEC Pwr Relay

EEC PWR RELAY

Hella Relay = no white writing, ford logo & p/n embossed on relay. Same relay for f-150 & ranger.

Omran Relay = white writing/made in canada. deleted Friday July 27.

SMMPEXEA Engineering to Service Cross Reference 07/30/01 16:44:27
==>

ENGINEERING PART: F0AB 14B192 AA ORIGIN: WERS

A C	SERVICE PART	Service Part Description	EFFECTIVE IN DATE	Effective Out Date
	FINIS- 3875484-	RELAY	12/08/94	
	F0AZ- 14N089-A	RELAY	06/16/89	

Ford-"The Most Wanted Car on the American Road" circa 1952

Robert King
LHD Escape/Maverick FCSD Program Manager
PVT & Field Support, Vehicle Service & Programs
Kansas City Assembly Plant (816) 459-1872, fax 459-1726

From: Hoshino, Jun (J.)
Sent: Tuesday, April 23, 2002 9:53 AM
To: King, Robert (R.F.)
Subject: RE: Escape 3.0L Engine Quit TSB 02-08-06

Thanks Bob,

Mazda Australia/New Zealand service managers are visiting Hiroshima now.
They and Mazda TSD will discuss about engine stall issue.
This information definitely helps them.

Thanks again!

Jun Hoshino

RHD Escape/Maverick FCSD PVT Program Manager
PVT & Field Support, Vehicle Service & Programs
Hiroshima Japan **Tel:** 81-82-287-4603 **Fax:** 81-82-287-5220

-----Original Message-----
From: King, Robert (R.F.)
Sent: Tuesday, April 23, 2002 10:49 PM
To: Kanai, Shinji (S.); Hoshino, Jun (J.); Johnson, Warren (W.K.); Lintiaco, Steven (S.); Aoyama, Fumihiko (F.); Bradley, Joe (J.C.); 'tokunaga.ni@av.mazda.co.jp'
Cc: Powers, Ken (K.W.); Terzes, Laura (L.D.); Klarr, Jerry (G.T.); Dominick, Brian (B.J.); Takasawa, Keith (K.D.); Hofman, Michael (M.V.); Giblin, Michael (M.); Chin, Darrel (D.)
Subject: Escape 3.0L Engine Quit TSB 02-08-06
Importance: High

Technical Service Bulletin 02-08-06 has been approved & released.

DRIVEABILITY - INTERMITTENT ENGINE QUIT OR IDLE DIP ESCAPE 3.0L

Ford-"The Most Wanted Car on the American Road" circa 1962

Robert King
LHD Escape/Maverick FCSD Program Manager
PVT & Field Support, Vehicle Service & Programs
Kansas City Assembly Plant (816) 459-1672, fax 459-1726

-----Original Message-----
From: Suarez, Rhea (R.)
Sent: Tuesday, April 23, 2002 7:32 AM
To: Dalbo, Bob (R.J.); Sanders, Muriel (M.S.); Williams, Les (LHW.)
Cc: King, Robert (R.F.); Price, Martin (M.)
Subject: Stall TSB

Next/Previous Article (N/P): _ Article #: TSB 02-08-06 Date: 04/24/2002
Symptom: 6 07 DRVABL STALL/QUITS
Year Vt Fm Vl Mdl Trans Engine Calib Axle
Criteria: 2001 T MR

DRIVEABILITY - INTERMITTENT ENGINE QUIT OR IDLE DIP - NO DIAGNOSTIC TROUBLE
SOME VEHICLES EQUIPPED WITH THE 3.0L DURATEC ENGINE MAY EXHIBIT AN

INTERMITTENT ENGINE QUIT CONDITION. THIS IS USUALLY A ONE TIME EVENT DURING CLOSED THROTTLE DECELERATION WITH NO DIAGNOSTIC TROUBLE CODES (DTCS) AND NO MALFUNCTION INDICATOR LAMP (MIL). THE ENGINE WILL RESTART IMMEDIATELY. WHEN NORMAL DIAGNOSTICS CANNOT PINPOINT THE ROOT CAUSE, REFER TO THE TSB FOR DETAILS.

<< File: TSB 02-08-06.doc >>

Let me know if you need anything else.

Rhae M. Suarez

Rhae Michael Suarez
Product Concern Engineer - Escape / Tribute / Maverick
PVT & Field Support / FCSD
DSC II (room 648) / 1600 Fairlane Dr. / Allen Park, MI 48101
Phone: 313-32-23344 Pager: 313-798-8242
Fax: 313-33-78337
Email: rsuarez8@ford.com

From: King, Robert (R.F.)
Sent: Monday, February 11, 2002 11:10 AM
To: Ricks, Kevin (K.J.); Terzes, Laura (L.D.)
Cc: Kiser, Kurt (K.W.); Steckler, Mike (C.M.); Suarez, Rhae (R.)
Subject: RE: 2001 AND 2002 ESCAPE

Kevin,

Actually there are only TWO bolts holding the throttle body to the intake manifold. The plastic manifold utilizes "worm-groove" style gaskets. The manifold has TWO brass threaded inserts for the t-body (they are designed this way). I will advise the dealer. Thanks

Rhae, Please contact the WDS folks to determine if there is a WDS software issue or dealer "hardware" systems issue with the latest WDS release (ASK Ernie). The NHL handles the WDS support 1-800-826-4694. Thanks

Ford-"The Most Wanted Car on the American Road" circa 1952

Robert King
LHD Escape/Maverick FCSD Program Manager
PVT & Field Support, Vehicle Service & Programs
Kansas City Assembly Plant (816) 459-1872, fax 459-1726

-----Original Message-----
From: Ricks, Kevin (K.J.)
Sent: Monday, February 11, 2002 9:11 AM
To: Terzes, Laura (L.D.); King, Robert (R.F.)
Cc: Kiser, Kurt (K.W.); Steckler, Mike (C.M.)
Subject: FW: 2001 AND 2002 ESCAPE

Laura / Bob, I believe we are aware of something here? Does this dealer need assistance in downloading calibrations / updates? You may want to contact the dealer. 3 bolts on a throttle body seems odd.

-----Original Message-----
From: Steckler, Mike (C.M.)
Sent: Monday, February 11, 2002 9:04 AM
To: Ricks, Kevin (K.J.)
Subject: FW: 2001 AND 2002 ESCAPE

Kevin, good feedback from one of our dealers. Thought you might find it useful.

Mike Steckler
Consumer Affairs Operations Manager
Ford Customer Service Division
RCB 3NE202
Phone (313) 390-4236 Fax (313) 845-5444
msteckl1@ford.com

-----Original Message-----
From: rgautier1@juno.com [mailto:rgautier1@juno.com]
Sent: Friday, February 08, 2002 12:44 PM

To: msteckl1@ford.com
Cc: kipsbox@aol.com
Subject: 2001 AND 2002 ESCAPE

Hi Mike,

I have something you might find interesting. We have seen a rash of problems with random engine stalling on Escape. Technical Hotline is aware and the final repair of pcm replacement or re-flash hopefully has resolved this (SSM #15589). There is a problem in that the re-flashing of the pcm requires an update that is not included in the current WDS cd ROM. We were able to download it through the satellite after a couple of days worth of figuring out the whole process involved. If Detroit thinks that the WDS update process is the answer, just be aware that several other dealers in the area, along with us, do not have the set up to have WDS connected for the overnight updates. I wanted to send the vehicle to the Region and have the Training Center do the update but their system isn't updated either. The message may be that all the information is available, but the dealers find it cumbersome or out of reach to make the system work, the desired results will not happen. Toyota used to have an action team that visited me to review "serviceability" issues as they apply to design. The approach was that if components were easy to service, or the process of repair was technician friendly, then the warranty cost would be less and the technician satisfaction/final quality of repair would be higher. Might be an interesting approach. Think of spark plug replacement in a 5.4L Expedition.

I have enclosed a photo that you might want to investigate. In the process of evaluating these stalling issues on Escapes, we found that only three bolts are being used to mount the throttle body to the intake manifold. We thought this was an assembly plant problem, but after comparing this to the others in service, it seems that they have elected to use 3 even when the throttle body is clearly designed to have 4 mounting points. One of my team leaders, Shawn Kramer, brought this to my attention. I hope that this is not going to present a sealing condition after miles have accumulated on these vehicles. Integrity of this system is critical since it is sealed all the way up to the mass air sensor. This "missing" bolt just seems very unusual to me. Looks like it may be a cost savings that could come back and bite us.

I hope this info helps.

p.s. The vin on this vehicle is:
1FMCU04141KD99436

Rod Gautier
Fixed Operations Manager
Kip Killmon's Tysons Ford

From: King, Robert (R.F.)
Sent: Tuesday, February 12, 2002 10:29 AM
To: Grossmann, Richard (R.A.)
Cc: MacRitchie, Janice (J.V.); Helleson, Kevin (K.J.); Moorhouse, Scott (S.R.)
Subject: RE: Another Stalling Escape-CQIS Report 2BIAW002-Metro Ford

Rick,

Send me the VIN or CQIS report number. What time on Friday?

Scott, How's Friday?

Ford-"The Most Wanted Car on the American Road" circa 1952

Robert King
LHD Escape/Maverick FCSD Program Manager
PVT & Field Support, Vehicle Service & Programs
Kansas City Assembly Plant (816) 459-1872, fax 459-1726

-----Original Message-----
From: Grossmann, Richard (R.A.)
Sent: Monday, February 11, 2002 8:23 PM
To: King, Robert (R.F.)
Cc: MacRitchie, Janice (J.V.); Helleson, Kevin (K.J.)
Subject: Another Stalling Escape-CQIS Report 2BIAW002-Metro Ford

Bob,

I just received a TAR on this Escape for stalling. The thing that is different about this situation from most others is that the DSB bought this customer's first Escape back for the same concern. I know we communicated the other day about this concern on an Escape at Shawnee Mission Ford and you told me the latest fix, and one that would work, was the PCM recal that is now described in SSM 15589. Now I see we have ISM 02-01-070. That makes me wonder if anyone really has a handle on this concern.

Metro has performed SSM 15589. They will perform ISM 02-01-070. I will work with the dealer on this on Friday, 2/15/02. Besides the published information on the subject, what guidance can you offer me on this? If you can meet me at Metro on Friday, I would greatly appreciate it. Since this is the second Escape for the same concern from the same customer, this has the potential to get ugly.

My cell phone number is 816-678-6004.

Rick Grossmann

Rick Grossmann
Field Service Engineer
913-541-4883
RGROSSMA@FORD.COM

From: King, Robert (R.F.)
Sent: Wednesday, February 13, 2002 11:02 AM
To: Grossmann, Richard (R.A.)
Cc: Moorhouse, Scott (S.R.)
Subject: RE: Another Stalling Escape-CQIS Report 2BIAW002-Metro Ford

We may be a little late, but I'll be there. Looks like reading the report, no one has verified the stall.

Scott, can we get a VDR?

Ford-"The Most Wanted Car on the American Road" circa 1952

Robert King
LHD Escape/Maverick PCSD Program Manager
PVT & Field Support, Vehicle Service & Programs
Kansas City Assembly Plant (816) 459-1872, fax 459-1726

---Original Message---
From: Grossmann, Richard (R.A.)
Sent: Tuesday, February 12, 2002 2:46 PM
To: King, Robert (R.F.)
Subject: RE: Another Stalling Escape-CQIS Report 2BIAW002-Metro Ford

Bob,

2BIAW002, 1FMCU04102KB85206, 9:00 AM. Hope to see you there.

Rick Grossmann

Rick Grossmann
Field Service Engineer
913-541-4883
RGROSSMA@FORD.COM

---Original Message---
From: King, Robert (R.F.)
Sent: Tuesday, February 12, 2002 9:29 AM
To: Grossmann, Richard (R.A.)
Cc: MacRitchie, Janice (J.V.); Halleson, Kevin (K.J.); Moorhouse, Scott (S.R.)
Subject: RE: Another Stalling Escape-CQIS Report 2BIAW002-Metro Ford

Rick,

Send me the VIN or CQIS report number. What time on Friday?

Scott, How's Friday?

Ford-"The Most Wanted Car on the American Road" circa 1952

Robert King
LHD Escape/Maverick PCSD Program Manager
PVT & Field Support, Vehicle Service & Programs
Kansas City Assembly Plant (816) 459-1872, fax 459-1726

-----Original Message-----
From: Grossmann, Richard (R.A.)
Sent: Monday, February 11, 2002 8:23 PM
To: King, Robert (R.F.)
Cc: MacRitchie, Janice (J.V.); Helleson, Kevin (K.J.)
Subject: Another Stalling Escape-CQIS Report 2BIAW002-Metro Ford

Bob,

I just received a TAR on this Escape for stalling. The thing that is different about this situation from most others is that the DSB bought this customer's first Escape back for the same concern. I know we communicated the other day about this concern on an Escape at Shawnee Mission Ford and you told me the latest fix, and one that would work, was the PCM recal that is now described in SSM 15589. Now I see we have ISM 02-01-070. That makes me wonder if anyone really has a handle on this concern.

Metro has performed SSM 15589. They will perform ISM 02-01-070. I will work with the dealer on this on Friday, 2/15/02. Besides the published information on the subject, what guidance can you offer me on this? If you can meet me at Metro on Friday, I would greatly appreciate it. Since this is the second Escape for the same concern from the same customer, this has the potential to get ugly.

My cell phone number is 816-678-6004.

Rick Grossmann

Rick Grossmann
Field Service Engineer
913-541-4883
RGROSSMA@FORD.COM

From: King, Robert (R.F.)
Sent: Friday, February 16, 2002 10:09 AM
To: Moorhouse, Scott (S.R.); Suarez, Rhea (R.)
Cc: Powers, Ken (K.W.); Stilgenbauer, Jeffrey (J.R.); Sauer, Robert (R.M.); Dalbo, Bob (R.J.); Williams, Les (LHW.)
Subject: RE: RELAY WARRANTY-STALLS

I have requested parts returned for Doug Haney (Lear) for investigation last week.

Ford-"The Most Wanted Car on the American Road" circa 1952

Robert King
LHD Escape/Maverick PCSD Program Manager
PVT & Field Support, Vehicle Service & Programs
Kansas City Assembly Plant (816) 459-1872, fax 459-1726

—Original Message—
From: Moorhouse, Scott (S.R.)
Sent: Friday, February 15, 2002 6:48 AM
To: King, Robert (R.F.); Suarez, Rhea (R.)
Cc: Powers, Ken (K.W.); Stilgenbauer, Jeffrey (J.R.); Sauer, Robert (R.M.); Dalbo, Bob (R.J.); Williams, Les (LHW.)
Subject: RELAY WARRANTY-STALLS

Relay warranty (for stalls) continues to climb despite the fact that we implemented the Hella relay in production vehicles 27 July (my records).

Please insure that relative ism/tsb's have the appropriate "on vehicles built before" condition. It would appear to
me that dealers are being directed to replace good relays. Please copy all. Thanks.

From: King, Robert (R.F.)
Sent: Monday, February 18, 2002 9:29 AM
To: Terzea, Laura (L.D.); Bergsrud, Randy (R.S.)
Cc: Tennal, Brian (B.P.)
Subject: RE: Hawaii Parts and Service Club Meeting

Laura & Randy,

I think it would be best to respectfully decline the P&S Club visit at this time. Based on recent NHTSA inquiry on stalls issue. Sorry Brian & Randy for any inconvenience this may cause. I appreciate your invitation. Maybe in the future we can re-visit this opportunity. Thank you.

Ford-"The Most Wanted Car on the American Road" circa 1952

Robert King
LHD Escape/Maverick FCSD Program Manager
PVT & Field Support, Vehicle Service & Programs
Kansas City Assembly Plant (816) 459-1872, fax 459-1726

----Original Message-----
From: Terzea, Laura (L.D.)
Sent: Thursday, January 31, 2002 2:44 AM
To: King, Robert (R.F.)
Subject: RE: Hawaii Parts and Service Club Meeting

OK, I think we could manage the costs if we are conservative. See what airfare will cost., and we will decide when I return. thanks for the heads up.
-----Original Message-----
From: King, Robert (R.F.)
To: Terzea, Laura (L.D.)
Cc: Tennal, Brian (B.P.); Bergsrud, Randy (R.S.)
Sent: 30/01/02 11:33
Subject: RE: Hawaii Parts and Service Club Meeting

Laura,

When you return from Australia, would like to discuss if an opportunity exist for P&S Club visits. Thanks

Ford-"The Most Wanted Car on the American Road" circa 1952

Robert King
LHD Escape/Maverick FCSD Program Manager
PVT & Field Support, Vehicle Service & Programs
Kansas City Assembly Plant (816) 459-1872, fax 459-1726

> -----Original Message-----
>From: Bergsrud, Randy (R.S.)
>Sent: Tuesday, January 29, 2002 12:18 AM
>To: King, Robert (R.F.)
>Cc: Tennal, Brian (B.P.)
>Subject: Hawaii Parts and Service Club Meeting
>
>
>Bob,

>I received your name from Brian Tennal and he indicated that you would
>be interested in coming out to our next Parts and Service Club meeting.
>Both the dealer group and I would love to have you come speak and also
>visit a few of the dealers if your schedule permits. Our meeting is
>scheduled for Saturday the 9th of March.
>
>I have had a couple dealers that have had an unfair share of Escapes
>that experienced the stalling concern and having you attend our meeting
>would reinforce our commitment to these dealers and also our confidence
>in the Escape. The dealer on the island of Kauai had 3 or 4 Tributes
>bought back and I have taken two customers out of Escapes. On the
>island of Maui we have taken 3 people out of Escapes for stalling.
>
>A few points to consider when determining if you can attend.
>
>1) The meeting is on a weekend which reduces travel time during the
>week
>2) I will book you Hotels for less then $150.00
>3) With proper planning you can get very attractive airfare. Much
>cheaper then you can fly a lot of places on the mainland.
>
>
>If I can answer any questions regarding the meeting or the dealers
>please drop me back a note. Look forward to hearing if you can attend.

From: King, Robert (R.F.)
Sent: Tuesday, February 19, 2002 3:14 PM
To: Steckler, Mike (C.M.); Terzea, Laura (L.D.); Ricks, Kevin (K.J.)
Cc: Feloni, Sandra (S.K.)
Subject: RE: 2001 escape - stalls

Sandy,

OASIS has the latest information for this concern. All dealerships & the CSO field activity has access to this data. If anyone has any questions, they can contact me direct. Hope this helps.

Next/Previous Article (N/P): _ Article #: SSM 16589 Date: 01/30/2002
Symptom: 6 07 DRVABL STALL/QUITS
Year Vt Fm Vl Mdl Trans Engine Calib Axle
Criteria: 2001 T MR

REFLASH (PCM) W WDS VERSION B17.1 OR LATER
SOME 2001/2002 3.0L ESCAPES MAY EXHIBIT AN INTERMITTENT ENGINE QUIT CONDITION, USUALLY 1 TIME DURING CLOSED THROTTLE DECEL WITH NO DTC'S OR MIL. THE ENGINE RESTARTS IMMEDIATELY. TO SERVICE, REPROGRAM PCM W/WDS VERSION B17.1 OR LATER. SOME 2001MY PCMS CAN NOT BE REPROGRAMMED AND MUST BE REPLACED. THIS IS DETERMINED BY THE MPC # LOCATED IN UPPER LEFT CORNER OF THE BARCODE ON THE PCM. IF MPC# 160 THEN REPLACE WITH PART# 1U7Z-12A650-AXA AND REPROGRAM. IF MPC# IS 161 THEN JUST REPROGRAM. ALL 2002MY PCMS CAN BE REPROGRAMMED. DISCONNECT THE VENT LINE IN THE EVAP EMISSIONS SYSTEM FROM THE CHECK VALVE SIDE. USING SHOP AIR, BLOW AIR THROUGH THE VENT LINE FROM THE CHECK VALVE SIDE FORWARD. CHECK FOR REVISED EEC POWER RELAY. IF RELAY HAS WHITE LETTERING, REPLACE W/F0AZ-14N089-A. MAKE SURE RELAY PIN CONNECTIONS ARE TIGHT IN POWER DISTRIBUTION BOX.

Ford-"The Most Wanted Car on the American Road" circa 1952

Robert King
LHD Escape/Maverick FCSD Program Manager
PVT & Field Support, Vehicle Service & Programs
Kansas City Assembly Plant (816) 459-1872, fax 459-1726

-----Original Message-----
From: Steckler, Mike (C.M.)
Sent: Tuesday, February 19, 2002 1:32 PM
To: Terzea, Laura (L.D.); Ricks, Kevin (K.J.); King, Robert (R.F.)
Cc: Feloni, Sandra (S.K.)
Subject: RE: 2001 escape - stalls

Sandy, would you make sure the dealer has performed this procedure before we scrap? Thanks

Mike Steckler
Consumer Affairs Operations Manager
Ford Customer Service Division
RCB 3NE202
Phone (313) 390-4236 Fax (313) 845-5444
msteckl1@ford.com

-----Original Message-----
From: Terzea, Laura (L.D.)
Sent: Tuesday, February 19, 2002 2:29 PM
To: Ricks, Kevin (K.J.); Steckler, Mike (C.M.); King, Robert (R.F.)

Subject: RE: 2001 escape - stalls

We have a published diagnostic procedure and a calibration change for this concern. Bob, pls. get with Mike to see if the RAV repairing dealers, have the latest information.

Laura Terzes
Manager, Outfitters Concerns
FCSD, Customer Service Engineering
OSCII, Rm 458A
(313) 32-36572 / fax (313) 39-04457 / lterzes.ford.com

—Original Message—
From: Ricks, Kevin (K.J.)
Sent: Tuesday, February 19, 2002 2:00 PM
To: Steckler, Mike (C.M.); King, Robert (R.F.); Terzes, Laura (L.D.)
Subject: FW: 2001 escape - stalls

Laura / Bob, Any thoughts? RAV's.

—Original Message—
From: Steckler, Mike (C.M.)
Sent: Tuesday, February 19, 2002 1:49 PM
To: Ricks, Kevin (K.J.)
Cc: Glass, Jim (J.B.); Feloni, Sandra (S.K.)
Subject: 2001 escape - stalls

Kevin, I know I am wearing you out on this issue, but I am getting ready to scrap an Escape that we cannot fix (stalls quits on accel). I know we have sent a bunch of notes back and forth, but do we have a fix yet or at least an ETA? If not, I am going to start recycling these units as I cannot hold forever, and I can't put them back out on the street. Any info?

Mike Steckler
Consumer Affairs Operations Manager
Ford Customer Service Division
RCB 3NE202
Phone (313) 390-4236 Fax (313) 845-5444
msteckl1@ford.com

From:	King, Robert (R.F.)
Sent:	Tuesday, April 23, 2002 9:43 AM
To:	Kanai, Shinji (S.); Hoshino, Jun (J.); Johnson, Warren (W.K.); Limtiaco, Steven (S.); Aoyama, Fumihiko (F.); Bradley, Joe (J.C.); 'tokunaga.mi@av.mazda.co.jp'
Cc:	Powers, Ken (K.W.); Terzes, Laura (L.D.); Kerr, Jerry (G.T.); Dominick, Brian (B.J.); Takasawa, Keith (K.D.); Hofman, Michael (M.V.); Giblin, Michael (M.); Chin, Darrel (D.)
Subject:	Escape 3.0L Engine Quit TSB 02-08-06
Importance:	High

Technical Service Bulletin 02-08-06 has been approved & released.

DRIVEABILITY - INTERMITTENT ENGINE QUIT OR IDLE DIP ESCAPE 3.0L

Ford-"The Most Wanted Car on the American Road" circa 1952

Robert King
LHD Escape/Maverick PCSD Program Manager
PVT & Field Support, Vehicle Service & Programs
Kansas City Assembly Plant (816) 459-1872, fax 459-1726

-----Original Message-----
From: Suarez, Rhae (R.)
Sent: Tuesday, April 23, 2002 7:32 AM
To: Dalbo, Bob (R.J.); Sanders, Muriel (M.S.); Williams, Les (LHW.)
Cc: King, Robert (R.F.); Price, Martin (M.)
Subject: Stall TSB

Next/Previous Article (N/P): _ Article #: TSB 02-08-06 Date: 04/24/2002
Symptom: 6 07 DRVABL STALL/QUITS
Year Vt Fm Vl Mdl Trans Engine Calib Axle
Criteria: 2001 T MR

DRIVEABILITY - INTERMITTENT ENGINE QUIT OR IDLE DIP - NO DIAGNOSTIC TROUBLE
SOME VEHICLES EQUIPPED WITH THE 3.0L DURATEC ENGINE MAY EXHIBIT AN INTERMITTENT ENGINE QUIT CONDITION. THIS IS USUALLY A ONE TIME EVENT DURING CLOSED THROTTLE DECELERATION WITH NO DIAGNOSTIC TROUBLE CODES (DTCS) AND NO MALFUNCTION INDICATOR LAMP (MIL). THE ENGINE WILL RESTART IMMEDIATELY. WHEN NORMAL DIAGNOSTICS CANNOT PINPOINT THE ROOT CAUSE, REFER TO THE TSB FOR DETAILS.

TSB 02-08-06.doc

Let me know if you need anything else.
Rhae M. Suarez

Rhae Michael Suarez
Product Concern Engineer - Escape / Tribute / Maverick
PVT & Field Support / FCSD
DSC II (room 548) / 1600 Fairlane Dr. / Allen Park, MI 48101
Phone: 313-32-23344 Pager: 313-758-6242

Fax: 313-33-78337
Email: rsuarez6@ford.com

TSB 02-08-06

ISSUE:

Some vehicles equipped with the 3.0L Duratec engine may exhibit an intermittent engine quit condition. This is usually a one time event during closed throttle deceleration with no Diagnostic Trouble Codes (DTCs) and no Malfunction Indicator Lamp (MIL). The engine will restart immediately.

ACTION:

When normal diagnostics cannot pinpoint the root cause, refer to the following Driveability Checklist for details.

SERVICE PROCEDURE

1. With the transmission in Park, the engine should be at idle at approximately 750 RPM, and the engine temperature should be at least 88°C (190°F). All accessories and the engine cooling fan should be off. Using only WDS version B17.1 or later, verify that Idle Air Control (IAC) duty cycle is between 32%-40% with no purge flow. If IAC duty cycle is within specification, then proceed to Step 2 now. If IAC duty cycle is out of specification, replace IAC with part YF1Z-9F715-AA. Verify that IAC duty cycle is between 32-40% with no purge flow. If IAC duty cycle is within specification after replacing with a new IAC, then proceed to Step 2 now. If IAC duty cycle is still out of specification, replace throttle body with part YL8Z-9E926-DA. Verify corrective action, then proceed to Step 2.

   NOTE: ENGINE RPM WILL SLOWLY RAMP UP. IT IS EXTREMELY IMPORTANT TO CHECK THE IAC DUTY CYCLE WHEN THE RPM IS AT 750 RPM. EVEN 800 RPM IS TOO HIGH FOR CHECKING IAC DUTY CYCLE UNDER THESE CONDITIONS.

2. **For vehicles sold in the U.S. and Canada perform the following:** If the vehicle was built on or after 1/16/2002, then proceed to Step 4 now. If not, reprogram PCM with WDS version B17.1 or later. Only use WDS version B17.1 or later during this reprogramming. Some 2001 model year PCMs cannot be reprogrammed and must be replaced. This is determined by the MPC # located in upper left corner of the barcode on the PCM. If the PCM is an MPC 160, then replace with part 1U7Z-12A650-AXA and reprogram with WDS version B17.1 or later. If the PCM is MPC 161, then just reprogram with WDS version B17.1 or later. Verify latest calibration was successfully reprogrammed. WDS should show latest calibration level as 1U7Z-12A650-AXB. Proceed to Step 4.
3. **For vehicles sold in Mexico perform the following:** If vehicle was built on or after 1/16/2002 then proceed to Step 4 now. If not, reprogram the PCM with WDS version B17.15 or later. Only use WDS version B17.15 or later during this reprogramming. Some 2001 model year PCMs cannot be reprogrammed and must be replaced. This is determined by the MPC # located in upper left corner of the barcode on the PCM. If the PCM is an MPC 160, then replace with part 1U7Z-12A650-AZA and reprogram with WDS version B17.15 or later. If the PCM is MPC 161, then just reprogram with WDS version B17.15 or later. Verify latest calibration was successfully reprogrammed. WDS should show latest calibration level as 1U7Z-12A650-AZB. Proceed to Step 4.

4. With the transmission in Park, the engine should be at idle at approximately 750 RPM, and the engine temperature should be at least 88°C (190°F). All accessories and the engine cooling fan should be off. With WDS version B17.1 (U.S.) or B17.15 (Mexico) or later, determine if the Evaporative Vapor Management (EVAPVM) duty cycle stops increasing and remains at 95-100% while FTP holds at approximately 2.6 volts. If this occurs, replace the EVAPVM valve with part number YL8Z-9C915-AA. If EVAPVM is functioning correctly, the duty cycle should increase to 84-100% with the FTP decreasing to approximately 2.2 volts and then recycle back to 0% duty cycle while FTP holds at approximately 2.6 volts. Do not replace the EVAPVM valve. Verify corrective action, then proceed to Step 5.
5. With the transmission in Park, the engine should be at idle at approximately 750 RPM, and the engine temperature should be at least 88°C (190°F). All accessories and the engine cooling fan should be off. With WDS version B17.1 (U.S.) or B17.15 (Mexico) or later, if EVAPVM drops to 0% from 60 - 80% (premature purge shutoff), check for an obstructed vent line. This condition may be accompanied by a sudden RPM drop while idling. The premature purge shutoff is caused by the tank not reaching a pre-specified vacuum state. To clear the possible obstructed vent line, disconnect the vent line in the evaporative emissions system from the check valve side (check valve part # is YL8U-9C915-AB). This connection is located just forward of the evaporative emissions canister assembly, underneath the vehicle in the area of the driver side rear seat. Using shop air, blow the vent line from the check valve side forward (towards the brake booster). In the past, spiders have been known to construct webs in vent lines so handle with caution. Possible obstructions in the vent line can prevent the evaporative emissions system from purging properly, and in some cases stalling occurs. Verify corrective action, then proceed to Step 6.
6. If the Electronic Engine Control (EEC) relay has stamped lettering, proceed to Step 7 now. If the EEC relay has white lettering printed on the top surface, replace with a new Hella service relay that is all black and has stamped lettering on the top surface. Both the new Hella service relay and the old relay have the same part number (F0AZ-14N089-A). Make sure the relay you are installing has stamped lettering. For location, use 2001 Wiring Diagram sections 303-07B-00-1 Connector C1016, 700-08-00-37 Battery Junction Box. Proceed to Step 7.
7. Ask the customer if they have significant weight (approximately 9 oz or more) hanging from the key ring while the keys are in the ignition. If they do, and the engine quits while traveling over bumps, the key ring may move the ignition cylinder out of the Run position and stop the engine. When this occurs, all gauges immediately shut off (fuel reads "E", tachometer goes to zero, speedometer goes to zero immediately). It is recommended that the customer attach fewer keys to the key ring that retains the vehicle ignition key. Proceed to Step 8.
8. Road the test vehicle long enough to experience 3 closed throttle decelerations from approximately 40 mph down to 10 mph. Use scan tool to examine engine RPM during test. Ensure there are no engine RPM dips below 660 RPM.

From: Noteboom, Jim (J.E.)
Sent: Thursday, May 09, 2002 3:46 PM
To: Sanders, Muriel (M.S.); Altoonian, Don (D.J.); Badgley, Joel (J.K.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); 'Cary Powell'; Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Delbo, Bob (R.J.); Rothweiler, Daniel (D.); De Pena, Juan (J.E.); Diez, Timothy (T.P.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); 'John McDonald'; 'Jones, Andy'; Jordan, Donald (D.E.); Kanal, Shinji (S.); King, Robert (R.F.); Klostermann, Eric (E.); Kosko, Jeff (J.R.); Kwon, Soon (S.K.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Marok, Edmond (E.C.); Matsas, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); 'Morgan, Tom'; Morishima, Shigeki (S.); 'Naveed Khan'; Nematollahi, Sonya (S.); 'Nikolai, Bernie'; Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhea (R.); Sullivan, Jamie (J.P.); Takasawa, Keith (K.D.); Takubo, Hirokhi (H.); Vecchio, Anne Marie (A.); Wakenell, Ray (R.A.); Weitach, Bill (B.); Williams, Lee (LHW.); Williamson, David (D.E.); Yeung, Lam (.)
Subject: RE: U204 Stall Meeting Agenda - 5/9/02

Inspection results of '02 Escape VIN: 1FMYU0414KC19492

LOCATION: John Elway West, Denver
OWNER: Mike Cochran (JEW Service Mgr.)
MILEAGE: 3342
BUILD DATE: 1-29-02
COMPLAINT: Stalled while driving approx. 50 mph. Noticed dash lights came on and steering became stiff; coasted to side of
road, went to crank (did not turn key off) and the engine restarted. Occured at around 2500 miles and has not
happened since.
DIAGNOSTICS: Went through the latest TSB/ISM draft; no concerns were found except for the following:

- There was battery acid in the batt. tray that had seeped down onto grounds G-104 and 106; some corrosion was evident.
- The customer's key chain contained several oz. of additional weight.

Jim Noteboom
Powertrain Field Quality Specialist/Denver
Phone: 303.674.4015 FAX: 303.674.5730
Page: 1.888.375.1980

From: Shinji Kanai [kanai.sh@ev.mazda.co.jp]
Sent: Monday, March 19, 2001 11:17 PM
To: 'H. Kawano'; Moorhouse, Scott (S.R.)
Cc: King, Robert (R.F.); Vecchio, Anne Marie (A.); 'K. Inooka'; Limtiaco, Steven (S.)
Subject: FW: Intermittent Engine Stall Questionnair

MNAO will start to contact customers who experienced intermittent engine stall.
Following questionnaire is for MNAO's Tech Hotline operators. They will use this for customer contact.
Please review this and give us your comment.
I will recommend MNAO to add "Daytime or Nighttime?", "Fuel customer use (Octane value)".

Background:
We are monitoring this issue at CMT in order to find vehicle which dealer can duplicate concern.
We feel that the character of this issue is "dealer cannot duplicate concern".
So we would like to collect and gathering all information then to request engineer to conduct FTA in order to find suspect causes and taking improvement action for most suspect causes.

Shinji Kanai
Manager, Tribute Plant QA
Mazda North American Operations

Ford Kansas City Assembly Plant
Plant Vehicle Team
8121 N.E. Hwy. 69, Claycomo, MO 64119 USA
Tel: 816-459-1623/ Fax: -1726/ e-mail: kanai.sh@ev.mazda.co.jp
Local Text Pager: 9135877158@alphapage.airtouch.com

—Original Message—
Some 2001 Tributes may experience an intermittent engine stall while driving. In most cases, the vehicle can be restarted. However, diagnosing the concern may be difficult if it cannot be duplicated. This concern is under engineering investigation. When a hotline call is received, please use following codes:

Category : F
Symptom : 060 (will restart)
Condition: xxx

In addition, please ask the following questions that will assist engineering investigations:

1. Vehicle speed when incident occurred?
2. Road condition (flat, uphill, on hill, downhill)?
3. Engine condition (cold or warm)?
4. Approximate time from engine start to when stall occurs?
5. Accessory load (see below)....
   - Climate control (a/c on or off, blower speed 1, 2, 3, or 4)?
   - Exterior lighting (headlights on or off, low or high beam)?
   - Radio (on or off)?
   - Wipers (on or off)?
6. Power steering (during right turn, left turn, or straight)?
7. Brake pedal depressed or free?
8. Automatic transmission range (1, 2, D, or R)?
9. 4WD (on or off)?
10. Cruise control (on or off)?
11. Outside temperature (approximate)?

Please include all answers in the hotline report. Thank you for your assistance.

From:	Suarez, Rhae (R.)
Sent:	Wednesday, March 27, 2002 10:41 AM
To:	Yu, Dave (D.)
Cc:	King, Robert (R.F.); Terzes, Laura (L.D.); Sanders, Muriel (M.S.); Dalbo, Bob (R.J.)
Subject:	97-4373 TSB Escape 3.0L - Reprogram/Repl PCM driveability Check

Dave,

I just wanted to check with you to see if ASO has had an opportunity to look over this TSB (tracking number 97-4373). If you need any additional information please feel free to contact me so we can continue the release of the TSB.

Thanks!

Rhae M. Suarez

Rhae Michael Suarez
Product Concern Engineer - Escape / Tribute / Maverick
PVT & Field Support / FCSD
DSC II (room 648) / 1800 Fairlane Dr. / Allen Park, MI 48101
Phone: 313-32-23344 Pager: 313-796-6242
Fax: 313-33-78337
Email: rsuarez8@ford.com

From:	Williams, Les (LHW.)
Sent:	Wednesday, February 20, 2002 12:06 PM
To:	Altoonian, Don (D.J.); Amende, Harry (H.F.); Badgley, Joel (J.K.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); Cary Powell; Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); De Pena, Juan (J.E.); Diez, Timothy (T.P.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Hurley, Robert (R.E.); Ishikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); John McDonald (E-mail); Jones, Andy; Jordan, Donald (D.E.); Kanai, Shinji (S.); King, Robert (R.F.); Kloatermann, Eric (E.); Kwon, Soon (S.K.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Luehrsen, Eric (E.A.); Marck, Edmond (E.C.); Matese, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); Morgan, Tom; Morishima, Shigeki (S.); Naveed Khan; Nematollahi, Sonya (S.); Nikolai, Bernie; Noteboom, Jim (J.E.); Ortman, James (J.W.); Powell, Cary; Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Rothweiler, Daniel (D.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhea (R.); Sullivan, Jamie (J.P.); Takasawa, Keith (K.D.); Takubo, Hirokhi (H.); Vecchio, Anne Marie (A.); Wakenell, Ray (R.A.); Williams, Les (LHW.); Williamson, David (D.E.); Yeung, Lem (.)
Cc:	Hermann, Thomas (T.J.); Diez, Timothy (T.P.)
Subject:	Meeting Minutes: EMC PSW Results for current production Kavlico DPFE

Meeting Minutes

Attendees:
Bob Dalbo (U204 V6 Calibration Supervisor)
Gilbert Fournelle (U204 V6 Calibration)
Les Williams (U204 Calibration)
Tom Hermann (EMC Supervisor)
Tim Diez (EMC)

On Friday February 15, 2002 EMC PSW test data for current production Kavlico DPFE sensor was reviewed. Thomas Hermann has independently investigated the behavior of this sensor. Based on his investigations and this data, he concluded that the current production Kavlico DPFE sensor should not contribute to U204 stalling in the field due to RFI and coupled noise from the wiring harness.

Regards,
Les Williams
For More, Count on Les
U204 3.0L Powertrain Calibration
Truck Engine Engineering, Suite 1AE20
Phone: (313)33-72503
Fax: (313) 32-31786

From: Stilgenbauer, Jeffrey (J.R.)
Sent: Monday, November 19, 2001 10:28 AM
To: Giles, Stuart (S.)
Cc: Moorhouse, Scott (S.R.)
Subject: RE: C11294758

The PCM group specified this ground scheme. The resident Power Train engineer lobbied to make this ground an inverted delta to address stalls. The only thing we are changing is the frequency the tool is monitored and its performance.

----Original Message----
From: Giles, Stuart (S.)
Sent: Monday, November 19, 2001 7:37 AM
To: Stilgenbauer, Jeffrey (J.R.)
Subject: C11294758

Mr. Stilgenbauer.
Do we also need to get concurrence for the PCM group that the grounding strategy conforms to their specs? I mean it's all very well having to check the torques etc but if there is a sneak path or something else which may affect the PCM don't they need to approve the ground scheme?

From: Shinji Kanai [kanai.sh@sv.mazda.co.jp]
Sent: Wednesday, June 19, 2002 10:05 AM
To: 'Sanders, Muriel (M.S.)'; 'Alloonian, Don (D.J.)'; 'Aynessazian, Kam (K.)'; 'Badgley, Joel (J.K.)'; 'Bauer, Scott (S.C.)'; 'Bhojwani, Kamal (K.)'; 'Blackburn, Thomas (T.J.)'; 'Bogema, John (P.)'; 'Cary Powell'; 'Chick, John (J.)'; 'Chin, Ming-Niu (M.N.)'; 'Chin, Darrel (D.)'; 'Corbett, Sandra (S.M.)'; 'Dalbo, Bob (R.J.)'; 'Dan Rothweiler'; 'De Pena, Juan (J.E.)'; 'Diez, Timothy (T.P.)'; 'Faecett, Bob (R.J.)'; 'Fourmelle, Gilbert (G.)'; 'Freeland, Mark (M.)'; 'Giles, Stuart (S.)'; 'Gokhale, Renuka (R.V.)'; 'Grewal, Bill (B.S.)'; 'Grimes, Jeff (J.R.)'; 'Hansen, George (G.C.)'; 'Herr, George (G.J.)'; 'Hofman, Michael (M.V.)'; 'Holmes, Jeffrey (J.R.)'; 'Ichikawa, Jiyunichiro (J.)'; 'Jansen, Ted (T.E.)'; 'John McDonald'; 'Jones, Andy'; 'Jordan, Donald (D.E.)'; 'Kanai, Shinji (S.)'; 'King, Robert (R.F.)'; 'Kosko, Jeff (J.R.)'; 'Kwon, Soon (S.K.)'; 'Limtiaco, Steven (S.)'; 'Linde, Peter (P.A.)'; 'Liu, Jane (J.)'; 'Mandziuk, Roger (R.S.)'; 'Marck, Edmond (E.C.)'; 'Matesa, John (J.)'; 'Maurer, James (J.B.)'; 'Mazzella, Gary (G.R.)'; 'Mooney, Larry (L.)'; 'Moorhouse, Scott (S.R.)'; 'Morgan, Tom'; 'Morishima, Shigeki (S.)'; 'Naveed Khan'; 'Nematollahi, Sonya (S.)'; 'Nikolai, Bernie'; 'Noteboom, Jim (J.E.)'; 'Ortman, James (J.W.)'; 'Powers, Ken (K.W.)'; 'Price, Martin (M.)'; 'Raquepau, Alden (A.P.)'; 'Shah, Kiran (K.C.)'; 'Shiraishi, Masaru (M.)'; 'Stilgenbauer, Jeffrey (J.R.)'; 'Suarez, Rhae (R.)'; 'Takasawa, Keith (K.D.)'; 'Takubo, Hirotchi (H.)'; 'Veenstra, Tim (T.W.)'; 'Wakenell, Ray (R.A.)'; 'Wettach, Bill (B.)'; 'Williams, Les (LHW.)'; 'Young, Lem (.)'
Subject: One example of Engine quit

My lease vehicle 2002MY Tribute experienced engine quit last night.

4F2YU08172KM28336 Build 12/11/2001, Retail 1/11/2002
Mileage: 7360 miles Event: 6/16/2002

After 25 minutes Freeway driving, I exited and stopped traffic signal.
About 30 sec. later I started moving to left turn and stopped at traffic signal again about 50m later.
About 30 sec. later I started moving 20m and right turn.
Then I gave throttle accelerating vehicle up to 35 MPH - 40MPH at slight up hill about 200m.
Then road switched down hill, I released throttle. Usually vehicle slight increase speed up to 45MPH about 200m.
I applied throttle gently after changing road up hill. Few seconds later I realized that vehicle kept down speed and three warning
lamp illuminated about 40MPH.
I did not calm enough.
I turned key to start position, but engine did not start because shifter was stayed D range.
I cycled key OFF and ON again, all warning lamp illuminated about 25MPH.
I applied brake to reduce speed and turned vehicle to left.
I shifted N range and cranked. Small gear noise (starter engagement ?) was heard but Engine started normally about 10 MPH.

I remember engine rpm dropped twice on this vehicle during last 6 month.
Possibly engine rpm drop might happen more than two, but I recognized twice.
One is same location same direction, another one was opposite direction almost same location.
No ECM like building or equipment near there, as far as I know.
This is my first V6-4WD model. Previous Tribute was I4-4WD.
I will bring this vehicle to dealer for usual scheduled (7,500 miles) maintenance this week.
I will ask dealer to reflash PCM calibration and continue to monitor.

If you have any question or comment, please feel free to contact to me.

Shinji Kanai

Manager, Tribute Plant QA
Mazda North American Operations

Ford Kansas City Assembly Plant
Plant Vehicle Team
8121 N.E. Hwy. 69, Claycomo, MO 64119 USA
Tel: 816-459-1623/ Fax: -1726/ e-mail: kanai.sh@av.mazda.co.jp
Local Text Pager: 9135677156@alphapage.airtouch.com

From: Sanders, Muriel (M.S.)
Sent: Friday, May 03, 2002 1:30 PM
To: Altoonian, Don (D.J.); Badgley, Joel (J.K.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); Cary Powell; Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); Dan Rothweiler; De Pena, Juan (J.E.); Diez, Timothy (T.P.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); John McDonald; Jones, Andy; Jordan, Donald (D.E.); Kanai, Shinji (S.); King, Robert (R.F.); Klostermann, Eric (E.); Koako, Jeff (J.R.); Kwon, Soon (S.K.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Marck, Edmond (E.C.); Matese, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); Morgan, Tom; Morishima, Shigeki (S.); Naveed Khan; Nematollahi, Sonya (S.); Nikolai, Bernie; Noteboom, Jim (J.E.); Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Sanders, Muriel (M.S.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhea (R.); Sullivan, Jamie (J.P.); Takasawa, Keith (K.D.); Takubo, Hirokhi (H.); Vecchio, Anne Marie (A.); Wakenell, Ray (R.A.); Wettach, Bill (B.); Williams, Lee (LHW.); Williamson, David (D.E.); Yeung, Lam (.)
Subject: New Dial-in No. for Stalls Meeting

The dial-in information has changed for the weekly stalls meeting. Please note the new information below. This will be effective next Thursday (May 9, 2002).

New Dial-in Numbers & Passcode
Dial in: 1-877-870-3529 or Fordnet: 9-1-954-1144
International Participants # 1 (630) 693-1704
Passcode: 7673538#

Muriel Sanders
U204 3.0L Calibration
Ford Motor Company
Phone: 313-32-27307
Fax: 313-32-31786
E-mail: msander6@ford.com

From:	Pepitone, Gil (J.)
Sent:	Friday, June 14, 2002 3:23 PM
To:	Johnson, Jim (J.S.); Blicki, John (J.R.); Corbett, Sandra (S.M.); DiAngelo, Renaldo (R.); Altoonian, Don (D.J.); Ayvazazian, Kam (K.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Bleckburn, Thomas (T.J.); Bogema, John (P.); Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); Rothweiler, Daniel (D.); De Pena, Juan (J.E.); Diez, Timothy (T.P.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); Mcdonald II, John (J.M.); Jordan, Donald (D.E.); King, Robert (R.F.); Kosko, Jeff (J.R.); Kwon, Soon (S.K.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Mandziuk, Roger (R.S.); Marck, Edmond (E.C.); Mateos, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); Morgan, Tomiko (T.T.); Morishima, Shigeki (S.); Nematollahi, Sonya (S.); Noteboom, Jim (J.E.); Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Sanders, Muriel (M.S.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhea (R.); Takasawa, Keith (K.D.); Takubo, Hirokhi (H.); Veenstra, Tim (T.W.); Wakenell, Ray (R.A.); Wettach, Bill (B.); Williams, Lee (LHW.); Yeung, Lem (.); Benintende, Robert (R.F.); Fernandez, Ruben (R.); Bradley, Joe (J.C.); Goering, Kimberly (K.L.); Suarez, Rhea (R.); Terzes, Laura (L.D.); Martin, Mike (M.S.); Wexler, Mark (M.A.); Amely, Felix (F.A.)
Cc:	Pepitone, Gil (J.)
Subject:	Inspection Sheet for St. Croix Vehicle Inspection

Good afternoon everyone: I have included all those that I have been in continuous communication, plus all who are part of the "Escape Stalls Team" Conference Call which I have attended.

The file below contains the form I will use. This information is a result of the feedback I have received from Mr. Altoonian, plus all existing Service Communications, both external and internal.

Please note that the items are ordered in such a way to allow me to leave the vehicle in it's original state until I can replicate the Stalls Concern, if ever.
I intend on extensively driving these Units until I deem it impossible for Concern replication.
At that point, I will perform any modifications to at least leave the Units at the latest repair level possible.

St. Croix Escape Vehicle Inspe...

FYI...
Gil Pepitone
Powertrain Field Quality Specialist-"PFQS" In
South Florida
Office/Answering Machine: 954-753-9989
Cell Phone 954-242-2066
"With Warranty you are Paying for the Sins of the Past"

Escape Stalls Concern Vehicle Inspection Data
In St. Croix by Gil Pepitone 6/15/-6/24/2002

Date:

Owner:

VIN:

M.Y.:

Mileage:

Conditions during Owner's experience, including heavy keys/radio towers?

Calibration level:

DTCs? If P1000, check OBD monitor status/measure KAM Pin 55 if OBD is dumb:

DPFE level {2A07 or later}

MAF level {BA?}

Relay PN level OK? {White letters NG} /Terminals go/no go?

PCM Hardware level/ "160" or "161"?:

Connectors/Grounds in order of inspection flow
C270b
G300
G104

G105
G101
C110
C133
G100
C270c
C270d
CPS pigtail contacting A/C pulley?

Rattle ignition key/engine cuts out?

Stabilized RPM Value in Park, Fan off, A/C off, no Purge flow, not prolonged idle time:

Stabilized IAC Duty Cycle Percentage in P/N, A/C off:

TPS voltage (Bogie .9 +-.05):

Relationship of EVAP % value vs. FTP Voltage ok?

If no OK, what were values?

If relation not ok, did tapping on VMV make FTP voltage jump/engine's reaction?

Position of Flapper Valve ok?

PFQS drive results/Verified?

If verified, what were conditions?

Repairs/adjustments to vehicle:
H2O witness marks/Rust in Left Kickpanel?
Restricted EVAP line?/Blew out??
Replaced Flapper Vlv if web found?
Drilled out TB plate holes? If so, what size drill bit?/New IAC D.C.?

Tightened any Ground/stalled connectors?
Changed DPFE?
Changed IAC?
Changed MAF?

Additional Comments:

From: Peplione, Gil (J.)
Sent: Thursday, June 27, 2002 9:38 AM
To: Johnson, Jim (J.S.); Billicki, John (J.R.); Corbett, Sandra (S.M.); Altoonian, Don (D.J.); Ayvazzadeh, Kam (K.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); Rothweiler, Daniel (D.); De Pena, Juan (J.E.); Diez, Timothy (T.P.); Fascetti, Bob (R.J.); Fourmelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); Mcdonald II, John (J.M.); Jordan, Donald (D.E.); King, Robert (R.F.); Koeko, Jeff (J.R.); Kwon, Soon (S.K.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Mendzjuk, Roger (R.S.); Merck, Edmond (E.C.); Matese, John (J.); Meurer, James (J.B.); Mazzella, Gary (G.R.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); Morgan, Tomiko (T.T.); Morishima, Shigeki (S.); Nematollahi, Sonya (S.); Noteboom, Jim (J.E.); Orlman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Sanders, Muriel (M.S.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhae (R.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Veenstra, Tim (T.W.); Wakenell, Ray (R.A.); Weltach, Bill (B.); Williams, Les (LHW.); Yeung, Lam (.); Benintende, Robert (R.F.); Goering, Kimberly (K.L.); Suarez, Rhae (R.); Terzea, Laura (L.D.); Martin, Mike (M.S.); Wexler, Mark (M.A.); Amely, Felix (F.A.); Bradley, Joe (J.C.); Linde, Peter (P.A.); Goering, Kimberly (K.L.); Terzea, Laura (L.D.); Benintende, Robert (R.F.); Wexler, Mark (M.A.); Amely, Felix (F.A.)
Cc: Peplione, Gil (J.)
Subject: RE: Inspection Sheet for St. Croix Vehicle Inspection

Good Morning: Mr. Jim Johnson informed me that he was unable to review the Inspection Sheet listed within my Summary Report on Escape Drive Concerns in the Virgin Islands. It appears my use of a "shortcut" prevented the icon's data transfer.

I am providing it here as an aid. Pls review as you see fit.

St. Croix Escape Vehicle Inspe...

Gil Peplione
Powertrain Field Quality Specialist-"PFQS" In
South Florida
Office/Answering Machine: 954-753-9989
Cell Phone 954-242-2066
"With Warranty you are Paying for the Sins of the Past"

----Original Message----
From: Peplione, Gil (J.)
Sent: Friday, June 14, 2002 6:50 PM
To: Dalbo, Bob (R.J.)
Cc: Sanders, Muriel (M.S.); Altoonian, Don (D.J.); Moorhouse, Scott (S.R.); DiAngelo, Renaldo (R.); Peplione, Gil (J.)
Subject: RE: Inspection Sheet for St. Croix Vehicle Inspection
Importance: High

HI Bob: ok, I will not.

Question: If I have high IAC DC, what should I do?
Clean the TB?
Turn the Throttle stop in to get o the desired 32% IAC DC?
If you want me to change the TB, I'm not prepared, since I d not have any, and I expect a long delay in getting

TB from the States.
However, it would be good for my tan as I wait for them.....heh, heh.....

If you do want low air flow throttle bodies, maybe a batch (5-8??) could be sent directly to the Dealership Metro Motors in St. Croix??

Please advise via voice mail since I will be disconnecting my laptop soon for packing. But send a note away since I HOPE to be able to use my laptop there. Help desk promised, but you know how that goes.....

You can leave voice mail on both my cell and office phone. I can check the office # from afar.

I will do whatever you wish: I want to get the data we need, and not just fix these Units.
Gil Pepitone
Powertrain Field Quality Specialist-"PFQS" in
South Florida
Office/Answering Machine: 954-753-9989
Cell Phone 954-242-2066
"With Warranty you are Paying for the Sins of the Past"

----Original Message----
From: Dalbo, Bob (R.J.)
Sent: Friday, June 14, 2002 5:29 PM
To: Pepitone, Gil (J.)
Cc: Sanders, Muriel (M.S.)
Subject: RE: Inspection Sheet for St. Croix Vehicle Inspection

Gil,
Please don't drill out any throttle plates. For one thing, it's not approved practice, and for another, we'd like to get back any you have problems with.

Bob Dalbo

3.0L Calibration Supervisor
Outfitters Calibration, NAT
Phone: (313) 24-84947 Fax: (313) 32-31788
Pager: (313) 795-2859 Email: *rdalbo@ford.com*

----Original Message----
From: Pepitone, Gil (J.)
Sent: Friday, June 14, 2002 3:23 PM
To: Johnson, Jim (J.S.); Billcki, John (J.R.); Corbett, Sandra (S.M.); DiAngelo, Renaldo (R.); Altoonian, Don (D.J.); Ayvazian, Kam (K.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Daniel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); Rothweiler, Daniel (D.); De Pena, Juan (J.E.); Diez, Timothy (T.P.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Ramuka (R.V.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Ichikawa, Jyunichiro (J.); Jensen, Ted (T.E.); Mcdonald II, John (J.M.); Jordan, Donald (D.E.); King, Robert (R.F.); Koeko, Jeff (J.R.); Kwon, Soon (S.K.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Mandziuk, Roger (R.S.); Marck, Edmond (E.C.); Matesa, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); Morgan, Tomiko (T.T.); Morishima, Shigeki (S.); Namatolahi, Sonya (S.); Notebaert, Jim (J.E.); Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Sanders, Muriel (M.S.); Shah, Kiran (K.C.); Shinishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhae (R.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Veenstra, Tim (T.W.); Wakenell, Ray (R.A.); Weltach, Bill (B.); Williams, Les (LHW.); Yeung, Lem (.); Benintende, Robert (R.F.); Fernandez, Ruben (R.); Bradley, Joe (J.C.); Goering, Kimberly (K.L.); Suarez, Rhae (R.); Terzes, Laura (L.D.); Martin, Mike (M.S.); Weber, Mark (M.A.); Amely, Felix (F.A.)
Cc: Pepitone, Gil (J.)
Subject: Inspection Sheet for St. Croix Vehicle Inspection

Good afternoon everyone: I have included all those that I have been in continuous communication, plus all who are part of the "Escape Stalls Team" Conference Call which I have attended.

The file below contains the form I will use. This information is a result of the feedback I have received from Mr. Altoonian, plus all existing Service Communications, both external and internal.

Please note that the items are ordered in such a way to allow me to leave the vehicle in it's original state until I can replicate the Stalls Concern, if ever.
I intend on extensively driving these Units until I deem it impossible for Concern replication.
At that point, I will perform any modifications to at least leave the Units at the latest repair level possible.

<< File: St. Croix Escape Vehicle Inspection Sheet.doc >>

FYI...
Gil Pepitone
Powertrain Field Quality Specialist-"PFQS" in
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Escape Stalls Concern Vehicle Inspection Data
In St. Croix by Gil Pepitone 6/15/-6/24/2002

Date:

Owner:

VIN:

M.Y.:

Mileage:

Conditions during Owner's experience, including heavy keys/radio towers?

Calibration level:

DTCs? If P1000, check OBD monitor status/measure KAM Pin 55 if OBD is dumb:

DPFE level {2A07 or later}

MAF level {BA?}

Relay PN level OK? {White letters NG} /Terminals go/no go?

PCM Hardware level/AXB &ATF1 Catch word is latest/ "160" or "161"?

Connectors/Grounds in order of inspection flow
C270b
G300
G104
G105
G101
C110
C133
G100
C270c
C270d
CPS pigtail contacting A/C pulley?

Rattle ignition key/engine cuts out?

Stabilized RPM Value in Park, Fan off, A/C off, no Purge flow, not prolonged idle time:

Stabilized IAC Duty Cycle Percentage in P/N, A/C off:

Does Engine stay running w/ IAC disconnected?

If so, what is base RPM?

TPS voltage {Bogie .9 +-.05}:

Relationship of EVAP % value vs. FTP Voltage ok?

If no OK, what were values?

If relation not ok, did tapping on VMV make FTP voltage jump/engine's reaction?

Position of Flapper Valve ok?

PFQS drive results/Verified?

If verified, what were conditions?

Repairs/adjustments to vehicle:
H2O witness marks/Rust in Left Kickpanel?
Restricted EVAP line?/Blew out??
Replaced Flapper Vlv if web found?
New IAC D.C.?
Replaced TB?
Tightened any Ground/stalled connectors?
Changed DPFE?
Remove IAC/Inspect for sludge/Oil in rear hole?
Changed IAC?
Changed MAF?
Cleaned DTCs?

Additional Comments:

From: Noteboom, Jim (J.E.)
Sent: Thursday, May 09, 2002 3:48 PM
To: Sanders, Muriel (M.S.); Altoonian, Don (D.J.); Badgley, Joel (J.K.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); 'Cary Powell'; Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); 'Dan Rothweiler'; De Pena, Juan (J.E.); Diez, Timothy (T.P.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Grimes, Jeff (J.R.); Haneen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); 'John McDonald'; 'Jones, Andy'; Jordan, Donald (D.E.); Kanai, Shinji (S.); King, Robert (R.F.); Klostermann, Eric (E.); Kosko, Jeff (J.R.); Kwon, Soon (S.K.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Marck, Edmond (E.C.); Mateos, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); 'Morgan, Tom'; Morishima, Shigeki (S.); 'Naveed Khan'; Nematollahi, Sonya (S.); 'Nikolai, Bernie'; Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhae (R.); Sullivan, Jamie (J.P.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Vecchio, Anne Marie (A.); Wakenell, Ray (R.A.); Wettach, Bill (B.); Williams, Lea (LHW.); Williamson, David (D.E.); Yeung, Lam (.)
Subject: RE: U204 Stell Meeting Agenda - 5/9/02

Inspection results of '02 Escape VIN: 1FMYUO414KC19492

LOCATION: John Elway West, Denver
OWNER: Mike Cochran (JEW Service Mgr.)
MILEAGE: 3342
BUILD DATE: 1-29-02
COMPLAINT: Stalled while driving approx. 50 mph. Noticed dash lights came on and steering became stiff; coasted to side of
road, went to crank (did not turn key off) and the engine restarted. Occured at around 2500 miles and has not
happened since.
DIAGNOSTICS: Went through the latest TSB/ISM draft; no concerns were found except for the following:

- There was battery acid in the batt. tray that had seeped down onto grounds G-104 and 105; some corrosion was evident.
- The customer's key chain contained several oz. of additional weight.

Jim Noteboom
Powertrain Field Quality Specialist/Denver
Phone: 303.674.4015 FAX: 303.674.5730
Page: 1.888.375.1980

From: Noteboom, Jim (J.E.)
Sent: Tuesday, July 30, 2002 11:27 AM
To: Sanders, Muriel (M.S.); Altoonian, Don (D.J.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); 'Cary Powell'; Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); 'Dan Rothweiler'; De Pena, Juan (J.E.); Diaz, Timothy (T.P.); Duvall, Allen (A.W.); Fascetti, Bob (R.J.); Foumelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Goodwin, William (W.R.); Grewal, Bill (B.S.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Hoshino, Jun (J.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); 'John McDonald'; 'Jones, Andy'; Jordan, Donald (D.E.); Kanai, Shinji (S.); King, Robert (R.F.); Kosko, Jeff (J.R.); Kwon, Soon (S.K.); Le, Dzung (D.H.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Mandziuk, Roger (R.S.); Merck, Edmond (E.C.); Metese, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); McGee, Brett (B.L.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); 'Morgan, Tom'; Morishima, Shigeki (S.); 'Naveed Khan'; Nematollahi, Sonya (S.); 'Nikolai, Bernie'; Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhae (R.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Veenstra, Tim (T.W.); Wakenell, Ray (R.A.); Wettach, Bill (B.); Williams, Lea (LHW.); Yeung, Lam (.)
Subject: RE: U204 Stall Investigation, 7-26-02

VEH: '02 Escape VIN: 1FMCU04112KD11749 BUILT: 4-11-02 MILES: 1650
CUSTOMER [redacted] LOCATION: Northglenn, Colo.
COMPLAINT: Stalls in slow traffic. Note: the stall occures in the same location (80th between Wadsworth and 36) as the previous vehicle; checked this out and there are high tension lines crossing the road there.

TSB and SSM results:

- IAC=34%
- EVAP system passed.
- DPFE and EEC relay are the latest.
- Keys do not have excessive weight.
- All related grounds were secure.

Based on the stall location and the possibility of RFI, the MAF was updated to a 1L2Z-BA.

Also on this vehicle the battery was leaking from the seam on the corner opposite the negative post (see photos). The customer stated that when the vehicle was purchased, the original batt. was dead and was replaced. This batt. was not a service piece but looked like original equipment so it's history is in question. A new service batt. was installed.

MVC-039F.JPG

Serial no.

MVC-040F.JPG

Acid drip from seam.

Jim Noteboom
Powertrain Field Quality Specialist/Denver
Phone: 303.674.4015 FAX: 303.674.5730
Cell: 303.921.2076

From: Marianos, Tom (T.E.)
Sent: Thursday, January 16, 2003 8:12 AM
To: Fournelle, Gilbert (G.); Hofman, Michael (M.V.); Nakano, Hideki (H.); Lawler, Dave (D.A.); Grimes, Jeff (J.R.); Price, Martin (M.); Moorhouse, Scott (S.R.); Hoshino, Jun (J.); Hofman, Michael (M.V.); Blackburn, Thomas (T.J.); Altoonian, Don (D.J.); Andy Jones (E-mail); Bauer, Scott (S.C.); Bernie Nikolai (E-mail); Bhojwani, Kamal (K.); Bogema, John (P.); Cary Powell (E-mail); Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); De Pena, Juan (J.E.); Diez, Timothy (T.P.); Duvall, Allen (A.W.); Fascetti, Bob (R.J.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Goodwin, William (W.R.); Grewal, Bill (B.S.); Hansen, George (G.C.); Herr, George (G.J.); Holmes, Jeffrey (J.R.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); John McDonald (E-mail); Jordan, Donald (D.E.); Kanai, Shinji (S.); Kosko, Jeff (J.R.); Le, Dzung (D.H.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Marck, Edmond (E.C.); Mateos, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); McCarthy, Fran (F.); McGee, Brett (B.L.); Mooney, Larry (L.); Morishima, Shigeki (S.); Naveed Khan (E-mail); Nematollahi, Sonya (S.); Noteboom, Jim (J.E.); Ortman, James (J.W.); Ott, David (D.J.); Powers, Ken (K.W.); Raquepau, Alden (A.P.); Rothweiler, Daniel (D.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhee (R.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Veenstra, Tim (T.W.); Wakenell, Ray (R.A.); Wettach, Bill (B.); Williams, Les (LHW.); Yeung, Lem (.)
Subject: RE: 3.0L U204 phantom stall meeting agenda 1/16/03

I will be unable to attend this meeting. However, we may have found a problem with our tool that has resulted in the reflashing of the old module's calibration. We are conducting a test that will be concluded tomorrow (1/17). Based on the results of that test, I will make recommendations for the current released WDS version for the U204 group to decide upon.

If the results come back as expected, I would assume that an SSM covering the existing WDS release would be in order and that the next release B24 which should be available in late February, should fix the issue completely. And not update would be required for the existing TSB.

Again, I won't have a definite answer until tomorrow.

Tom

---Original Message---
From: Fournelle, Gilbert (G.)
Sent: Thursday, January 16, 2003 8:05 AM
To: Hofman, Michael (M.V.); Nakano, Hideki (H.); Lawler, Dave (D.A.); Grimes, Jeff (J.R.); Price, Martin (M.); Moorhouse, Scott (S.R.); Hoshino, Jun (J.); Hofman, Michael (M.V.); Blackburn, Thomas (T.J.); Marianos, Tom (T.E.); Altoonian, Don (D.J.); Andy Jones (E-mail); Bauer, Scott (S.C.); Bernie Nikolai (E-mail); Bhojwani, Kamal (K.); Bogema, John (P.); Cary Powell (E-mail); Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); De Pena, Juan (J.E.); Diez, Timothy (T.P.); Duvall, Allen (A.W.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Goodwin, William (W.R.); Grewal, Bill (B.S.); Hansen, George (G.C.); Herr, George (G.J.); Holmes, Jeffrey (J.R.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); John McDonald (E-mail); Jordan, Donald (D.E.); Kanai, Shinji (S.); Kosko, Jeff (J.R.); Le, Dzung (D.H.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Marck, Edmond (E.C.); Mateos, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); McCarthy, Fran (F.); McGee, Brett (B.L.); Mooney, Larry (L.); Morishima, Shigeki (S.); Naveed Khan (E-mail); Nematollahi, Sonya (S.); Noteboom, Jim (J.E.); Ortman, James (J.W.); Ott, David (D.J.); Powers, Ken (K.W.); Raquepau, Alden (A.P.); Rothweiler, Daniel (D.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhee (R.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Veenstra, Tim (T.W.); Wakenell, Ray (R.A.); Wettach, Bill (B.); Williams, Les (LHW.); Yeung, Lem (.)
Subject: 3.0L U204 phantom stall meeting agenda 1/16/03

1/16/03 2:00pm MEETING AGENDA

- **Reports from Field** *2:00-2:10*
  - **Don Altoonian**
  - **Dan Rothweiler**
  - **Scott Moorhouse**

- **Steve Lintlaco**
- **Marti Price**
- **Jim Noteboom**

- Issue of reprogramming a new (MPC-161) PCM with the old (MPC-160) calibration **2:15-2:25**
  - Update from **Tom Marianos** on possible software fix
  - Discuss SSM if necessary

- Walk-in ***2:25-2:45***

KCAP Implementation Timing

KCAP Actions	Concern #	Revised Part #	Implementation Timing
1. Omron to Hella Relays	C11293441	No Change	07/27/01
2. Updated production calibration	C11299149	See concern	1/16/02 (3 out of 7)
3. Inverted delta status- G101 ground		N/A	01/15/02
4. Inverted delta status- G100 ground	C11294758	N/A	
5. Inverted delta status- G104/G105	C11294758	N/A	
6. Implementation of robust MAF	C11299286	1L2F-12B579-BA	05/30/02
7. IAC change from Guide A to Pinned Pintle (CEP2 action)	C11252737	1L8E-9F715-AA	8/30/02 Cleveland
			9/16/02 KCAP
8. 3.0L dPFE change from Kavlico to Motorola	C11262413	2F1Z-9J460-AA	07/22/02
9. 2.0L dPFE change from Kavlico to Motorola	C11274132	2F1Z-9J460-AA	07/22/02
10. Revised vent line location	C11326381		09/09/02
11. Technical Service Bulletin (TSB 02-08-06)	N/A	N/A	4/24/02
12. Special Service Message (SSM 15589)	N/A	N/A	1/29/02
13. Internal Service Message (ISM 02-01-070) - pre-TSB	N/A	N/A	2/5/02
14. ISM 02-05-017 - post-TSB	N/A	N/A	5/6/02
15. ISM 02-05-043 - Add MAF Gskt to ISM 02-05-017	N/A	N/A	5/20/02
16. TSB 02-11-06 - Modify Calibration Wording	N/A	N/A	6/5/02
17. ISM 02-06-025 - Update TSB Reference	N/A	N/A	6/14/02
18. TSB 02-23-1 - Incorporate some of ISM & improve wording		N/A	N/A 11/14/02
19. IAC changed to Pinned Pintle for service (released)	C11390555	1L8Z-9F715-AA	9/13/02
Estimated availability is 11/08/02			
20. Calibration Enhancements	C11390580	See concern	9/11/02 for N.A.
21. EEC w/modified capacitor - production	C11371349	See concern	8/12/02 Est.
22. EEC w/modified capacitor - service	C11350478	See concern	8/12/02 Est.
23. Inverted delta status - G102/103	C11394835	N/A	TBD

dial in info:

toll free: 1-866-227-7015
Ford net: 954-1206

International: 1-630-693-6145
pass code: 8402370#
moderator code: 3467370

Thursday, January 16th
TEE building CR#1

Regards,

Gilbert Fournelle

V6 U204 Calibration Engineering
1AE27 Truck Engine Engineering (TEE)
Phone:(313)3904968 Fax:(313)3231786

From: Johnson, Jim (J.S.)
Sent: Thursday, June 27, 2002 8:12 AM
To: Pepitone, Gil (J.); Blicki, John (J.R.); Corbett, Sandra (S.M.); Altoonian, Don (D.J.); Ayvazzadian, Kam (K.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Datbo, Bob (R.J.); Rothwaller, Daniel (D.); De Pena, Juan (J.E.); Diaz, Timothy (T.P.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); Mcdonald II, John (J.M.); Jordan, Donald (D.E.); King, Robert (R.F.); Kosko, Jeff (J.R.); Kwon, Soon (S.K.); Limtaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Mandziuk, Roger (R.S.); Marck, Edmond (E.C.); Mateos, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); Morgan, Tomiko (T.T.); Morishima, Shigeki (S.); Nematollahi, Sonya (S.); Noteboom, Jim (J.E.); Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Sanders, Muriel (M.S.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhea (R.); Takasawa, Keith (K.D.); Takubo, Hirokhi (H.); Veenstra, Tim (T.W.); Wakenell, Ray (R.A.); Wettach, Bill (B.); Williams, Lee (LHW.); Yeung, Lem (.); Suarez, Rhea (R.); Terzes, Laura (L.D.); Martin, Mike (M.S.); Amely, Felix (F.A.); Bradley, Joe (J.C.); Linde, Peter (P.A.); Goering, Kimberly (K.L.); Terzes, Laura (L.D.); Benintende, Robert (R.F.); Kaercher, Don (D.F.)
Cc: DiAngelo, Renaldo (R.); Berenter, Joel (J.R.); Surti, P. J. (P.J.); Noteboom, Jim (J.E.)
Subject: RE: PFQS's Investigation Results of Virgin Islands Escape Drivability Concerns

Gil, thanks for the report and supporting WDMO on the trip. It appears you identified a few items that will benefit the group.

I did research Air Box replacements for the 2.0 and 3.0 engines and found the following.

3.0L PN, YL8Z-9600-BA - SALES	2.0L PN, YL8Z-9600-AE - SALES
2002 - 529	2002 - 80
2001 - 642	2001 - 104
2000 - 103	2000 - 52

It appears that YL8Z-9600-BA is in the process of being replaced by 2L8Z-9600-BA.

----Original Message----
From: Pepitone, Gil (J.)
Sent: Thursday, June 27, 2002 2:11 AM
Cc: Pepitone, Gil (J.); DiAngelo, Renaldo (R.); Berenter, Joel (J.R.); Surti, P. J. (P.J.); Noteboom, Jim (J.E.)
Subject: PFQS's Investigation Results of Virgin Islands Escape Drivability Concerns
Importance: High

Good evening everyone:

Here's my report on my trip.

<< File: Results of Virgin Island Escape Decell Stalls Investigation.doc >>

I will be calling in on the Conference all at 2pm today.

Call-in info: 1-877-870-3529 or Ford net 9-1-954-1144
International Participants: 1-630-693-1704
Passcode: 7673538, then hit #

I thank the Team for all their assistance.

Gil Pepitone
Powertrain Field Quality Specialist-"PFQS" in
South Florida

Office/Answering Machine: 954-753-9989
Cell Phone 954-242-2066
"With Warranty you are Paying for the Sins of the Past"

From: Fournelle, Gilbert (G.)
Sent: Thursday, January 23, 2003 9:46 AM
To: Altoonian, Don (D.J.); Andy Jones (E-mail); Bauer, Scott (S.C.); Bernie Nikolai (E-mail); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); Cary Powell (E-mail); Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); De Pena, Juan (J.E.); Diaz, Timothy (T.P.); Duvall, Allen (A.W.); Fournelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Goodwin, William (W.R.); Grewal, Bill (B.S.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Hoshino, Jun (J.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); John McDonald (E-mail); Jordan, Donald (D.E.); Kanai, Shinji (S.); Kosko, Jeff (J.R.); Lawler, Dave (D.A.); Le, Dzung (D.H.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Marek, Edmond (E.C.); Marianos, Tom (T.E.); Matasa, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); McGee, Brett (B.L.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); Morishima, Shigeki (S.); Nakano, Hideki (H.); Naveed Khan (E-mail); Nematollahi, Sonya (S.); Noteboom, Jim (J.E.); Ortman, James (J.W.); Ott, David (D.J.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Rothweiler, Daniel (D.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhea (R.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Veenstra, Tim (T.W.); Wakenell, Ray (R.A.); Wettach, Bill (B.); Williams, Les (L.HW.); Yeung, Lem (.)
Subject: 3.0L U204 Phantom staff meeting agenda 1/23/03 2:00pm

1/23/03 2:00pm MEETING AGENDA

- **Reports from Field** ***2:00-2:10***
  - **Don Altoonian**
  - **Dan Rothweiler**
  - **Scott Moorhouse**
  - **Steve Limtiaco**
  - **Marti Price**
  - **Jim Noteboom**

- Issue of reprogramming a new (MPC-161) PCM with the old (MPC-160) calibration **2:10-2:20**
  - new data fix for the latest WDS Releases (B22NM.9 and B22N.5)
  - Discuss SSM to notify dealers of new WDS release

- Walk-in ***2:20-2:30***

KCAP Implementation Timing

KCAP Actions	Concern #	Revised Part #	Implementation Timing
1. Omron to Hella Relays	C11293441	No Change	07/27/01
2. Updated production calibration	C11299149	See concern	1/16/02 (3 out of 7)
3. Inverted delta status- G101 ground		N/A	01/15/02
4. Inverted delta status- G100 ground	C11294758	N/A	
5. Inverted delta status- G104/G105	C11294758	N/A	
6. Implementation of robust MAF	C11299286	1L2F-12B579-BA	05/30/02
7. IAC change from Guide A to Finned Pintle (CEP2 action)	C11252737	1L8E-9F715-AA	8/30/02 Cleveland
			9/16/02 KCAP
8. 3.0L dPFE change from Kavlico to Motorola	C11262413	2F1Z-9J460-AA	07/22/02

9. 2.0L dPFE change from Kavlico to Motorola	C11274132	2F1Z-9J460-AA	07/22/02	
10. Revised vent line location	C11326381		09/09/02	
11. Technical Service Bulletin (TSB 02-08-06)	N/A	N/A	4/24/02	
12. Special Service Message (SSM 15589)	N/A	N/A	1/29/02	
13. Internal Service Message (ISM 02-01-070) - pre-TSB	N/A	N/A	2/5/02	
14. ISM 02-05-017 - post-TSB	N/A	N/A	5/6/02	
15. ISM 02-05-043 - Add MAF Galt to ISM 02-05-017	N/A	N/A	5/20/02	
16. TSB 02-11-06 - Modify Calibration Wording	N/A	N/A	6/5/02	
17. ISM 02-06-025 - Update TSB Reference	N/A	N/A	6/14/02	
18. TSB 02-23-1 - Incorporate some of ISM & improve wording		N/A	N/A	11/14/02
19. IAC changed to Finned Pintle for service (released)	C11390555	1L8Z-9F715-AA	9/13/02	
Estimated availability is 11/08/02				
20. Calibration Enhancements	C11390580	See concern	9/11/02 for N.A.	
21. EEC w/modified capacitor - production	C11371349	See concern	8/12/02 Est.	
22. EEC w/modified capacitor - service	C11350478	See concern	8/12/02 Est.	
23. Inverted delta status - G102/103	C11394835	N/A	TBD	

dial in info:

toll free: 1-866-227-7015
Ford net: 954-1206
international: 1-630-693-6145
pass code: 8402370#
moderator code: 3457370

Thursday, January 23th
TEE building CR#1

Regards,

Gilbert Fournelle
V8 U204 Calibration Engineering
1AE27 Truck Engine Engineering (TEE)
Phone:(313)3904968 Fax:(313)3231786

From: Foumelle, Gilbert (G.)
Sent: Tuesday, January 21, 2003 9:17 AM
To: Altoonian, Don (D.J.); Andy Jones (E-mail); Bauer, Scott (S.C.); Bernie Nikolai (E-mail); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); Cary Powell (E-mail); Chiok, John (J.); Chih, Ming-Niu (M.N.); Chin, Daniel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); De Pena, Juan (J.E.); Diez, Timothy (T.P.); Duvall, Allen (A.W.); Fascetti, Bob (R.J.); Foumelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Goodwin, William (W.R.); Grewal, Bill (B.S.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Hoshino, Jun (J.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); John McDonald (E-mail); Jordan, Donald (D.E.); Kanel, Shinji (S.); Kosko, Jeff (J.R.); Lawler, Dave (D.A.); Le, Dzung (D.H.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Marck, Edmond (E.C.); Marianos, Tom (T.E.); Matesa, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); McGee, Brett (B.L.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); Morishima, Shigeki (S.); Nakano, Hideki (H.); Naveed Khan (E-mail); Nematollahi, Sonya (S.); Noteboom, Jim (J.E.); Ortman, James (J.W.); Ott, David (D.J.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Rothweiler, Daniel (D.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhae (R.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Veenstra, Tim (T.W.); Wakenell, Ray (R.A.); Wettach, Bill (B.); Williams, Lee (LHW.); Yeung, Lam (.)
Subject: 3.0L U203 phantom stall meeting minutes

1/16/02 2:00pm MEETING AGENDA

Attendees:

Don Altoonian
Marti Price
Rhae Suarez
Steve Limtiaco
John McDonald
Scott Bauer

- **Reports from Field**
  - No new stall complaints from any field engineer or hotline
  - Marti price reported that WDS asks for an M number when a reflashing procedure is performed. The M number refers to a Mazda bulletin which explains which problem the reflash is addressing. This has been occurring since release B22. For Ford vehicles, there should be a reference to the TSB (2-23-1) instead of a Mazda bulleting

- **Issue of reprogramming a new (MPC-161) PCM with the old (MPC-160) calibration**

  - Tom Marianos tried out new data fix for the latest WDS Releases (B22NM.9 and B22N.5). It appears to work fine now and no revision of the TSBs will be required for the updates. Pending further confirmation, an SSM will be needed to notify technicians to update WDS to this latest version before conducting the PCM replacement/reflash.

KCAP Implementation Timing

KCAP Actions	Concern #	Revised Part #	Implementation Timing
1. Omron to Hella Relays	C11293441	No Change	07/27/01
2. Updated production calibration	C11299149	See concern	1/16/02 (3 out of 7)

3. Inverted delta status- G101 ground		N/A	01/15/02	
4. Inverted delta status- G100 ground	C11294758	N/A		
5. Inverted delta status- G104/G105	C11294758	N/A		
6. Implementation of robust MAF	C11299286	1L2F-12B579-BA	05/30/02	
7. IAC change from Guide A to Pinned Pintle (CEP2 action)	C11252737	1L8B-9F715-AA	8/30/02 Cleveland	
			9/18/02 KCAP	
8. 3.0L dPFE change from Kavlico to Motorola	C11262413	2F1Z-9J460-AA	07/22/02	
9. 2.0L dPFE change from Kavlico to Motorola	C11274132	2F1Z-9J460-AA	07/22/02	
10. Revised vent line location	C11326381		09/09/02	
11. Technical Service Bulletin (TSB 02-08-06)	N/A	N/A	4/24/02	
12. Special Service Message (SSM 15589)	N/A	N/A	1/29/02	
13. Internal Service Message (ISM 02-01-070) - pre-TSB	N/A	N/A	2/5/02	
14. ISM 02-05-017 - post-TSB	N/A	N/A	5/6/02	
15. ISM 02-05-043 - Add MAF Gskt to ISM 02-05-017	N/A	N/A	5/20/02	
16. TSB 02-11-06 - Modify Calibration Wording	N/A	N/A	6/5/02	
17. ISM 02-06-025 - Update TSB Reference	N/A	N/A	6/14/02	
18. TSB 02-23-1 - Incorporate some of ISM & improve wording		N/A	N/A	11/14/02
19. IAC changed to Pinned Pintle for service (released)	C11390555	1L8Z-9F715-AA	9/13/02	
Estimated availability is 11/08/02				
20. Calibration Enhancements	C11390580	See concern	9/11/02 for N.A.	
21. EEC w/modified capacitor - production	C11371349	See concern	8/12/02 Est.	
22. EEC w/modified capacitor - service	C11350478	See concern	8/12/02 Est.	
23. Inverted delta status - G102/103	C11394835	N/A	TBD	

Regards,

Gilbert Fournelle
V6 U204 Calibration Engineering
1AE27 Truck Engine Engineering (TEE)
Phone:(313)3904968 Fax:(313)3231786

From: Fournelle, Gilbert (G.)
Sent: Thursday, January 16, 2003 6:05 AM
To: Hofman, Michael (M.V.); Nakano, Hideki (H.); Lawler, Dave (D.A.); Grimes, Jeff (J.R.); Price, Martin (M.); Moorhouse, Scott (S.R.); Hoshino, Jun (J.); Hofman, Michael (M.V.); Blackburn, Thomas (T.J.); Marianos, Tom (T.E.); Altoonian, Don (D.J.); Andy Jones (E-mail); Bauer, Scott (S.C.); Bernie Nikolai (E-mail); Bhojwani, Kamal (K.); Bogema, John (P.); Cary Powell (E-mail); Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darral (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); De Pena, Juan (J.E.); Diez, Timothy (T.P.); Duvall, Allen (A.W.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Goodwin, William (W.R.); Grewal, Bill (B.S.); Hansen, George (G.C.); Herr, George (G.J.); Holmes, Jeffrey (J.R.); Ichikawa, Jiyunichiro (J.); Jansen, Ted (T.E.); John McDonald (E-mail); Jordan, Donald (D.E.); Kanai, Shinji (S.); Kosko, Jeff (J.R.); Le, Dzung (D.H.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Marck, Edmond (E.C.); Matese, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); McCarthy, Fran (F.); McGee, Brett (B.L.); Mooney, Larry (L.); Morishima, Shigeki (S.); Naveed Khan (E-mail); Nematollahi, Sonya (S.); Noteboom, Jim (J.E.); Ortman, James (J.W.); Ott, David (D.J.); Powers, Ken (K.W.); Raquepau, Alden (A.P.); Rothweiler, Daniel (D.); Shah, Kiran (K.C.); Shinaishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhae (R.); Takasawa, Keith (K.D.); Takubo, Hirokhi (H.); Veenstra, Tim (T.W.); Wakenell, Ray (R.A.); Wattach, Bill (B.); Williams, Lee (LHW.); Yeung, Lem (.)
Subject: 3.0L U204 phantom stall meeting agenda 1/16/03

1/16/03 2:00pm MEETING AGENDA

- **Reports from Field** *2:00-2:10*
  - **Don Altoonian**
  - **Dan Rothweiler**
  - **Scott Moorhouse**
  - **Steve Limtiaco**
  - **Marti Price**
  - **Jim Noteboom**

- Issue of reprogramming a new (MPC-161) PCM with the old (MPC-160) calibration **2:15-2:25**
  - Update from **Tom Marianos** on possible software fix
  - Discuss SSM if necessary

- Walk-in *2:25-2:45*

KCAP Implementation Timing

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			9/16/02 KCAP

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10. Revised vent line location	C11326381		09/09/02	
11. Technical Service Bulletin (TSB 02-08-06)	N/A	N/A	4/24/02	
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15. ISM 02-05-043 - Add MAF Gskt to ISM 02-05-017	N/A	N/A	5/20/02	
16. TSB 02-11-06 - Modify Calibration Wording	N/A	N/A	6/5/02	
17. ISM 02-06-025 - Update TSB Reference	N/A	N/A	6/14/02	
18. TSB 02-23-1 - Incorporate some of ISM & improve wording		N/A	N/A	11/14/02
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Estimated availability is 11/08/02				
20. Calibration Enhancements	C11390580	See concern	9/11/02 for N.A.	
21. EEC w/modified capacitor - production	C11371349	See concern	8/12/02 Est.	
22. EEC w/modified capacitor - service	C11350478	See concern	8/12/02 Est.	
23. Inverted delta status - G102/103	C11394835	N/A	TBD	

dial in info:

toll free: 1-866-227-7015
Ford net: 954-1206
International: 1-630-693-6145
pass code: 8402370#
moderator code: 3457370

Thursday, January 16th
TEE building CR#1

Regards,

Gilbert Fournelle
V6 U204 Calibration Engineering
1AE27 Truck Engine Engineering (TEE)
Phone:(313)3904966 Fax:(313)3231786

Subject:	3.0L U 204 Phenom stall meeting
Location:	TEE CR#1
Start:	Thu 1/16/2003 2:00 PM
End:	Thu 1/16/2003 3:00 PM
Show Time As:	Tentative
Recurrence:	Weekly
Recurrence Pattern:	every Thursday from 2:00 PM to 3:00 PM
Meeting Status:	Not yet responded
Required Attendees:	Fournelle, Gilbert (G.); Hofman, Michael (M.V.); Nakano, Hideki (H.); Lawler, Dave (D.A.); Grimes, Jeff (J.R.); Price, Martin (M.); Moorhouse, Scott (S.R.); Hoshino, Jun (J.); Blackburn, Thomas (T.J.); Altoonian, Don (D.J.); Andy Jones (E-mail); Bauer, Scott (S.C.); Bernie Nikolai (E-mail); Bhojwani, Kamal (K.); Bogema, John (P.); Cary Powell (E-mail); Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); De Pena, Juan (J.E.); Diez, Timothy (T.P.); Duvall, Allen (A.W.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Goodwin, William (W.R.); Grewal, Bill (B.S.); Hansen, George (G.C.); Herr, George (G.J.); Holmes, Jeffrey (J.R.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); John McDonald (E-mail); Jordan, Donald (D.E.); Kanai, Shinji (S.); Kosko, Jeff (J.R.); Le, Dzung (D.H.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Marok, Edmond (E.C.); Marlance, Tom (T.E.); Matese, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); McCarthy, Fran (F.); McGee, Brett (B.L.); Mooney, Larry (L.); Morishima, Shigeki (S.); Naveed Khan (E-mail); Namatollahi, Sonya (S.); Noteboom, Jim (J.E.); Ortman, James (J.W.); Ott, David (D.J.); Powers, Ken (K.W.); Requepeu, Alden (A.P.); Rothweiler, Daniel (D.); Shah, Kiran (K.C.); Shirakshi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhae (R.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Veenstra, Tim (T.W.); Wakenell, Ray (R.A.); Wettach, Bill (B.); Williams, Lee (L.H.W.); Yeung, Lem (.)

Meeting agenda and meeting minutes will be send separately on a weekly basis.

toll free: 1-866-227-7015
Ford net: 954-1206
International: 1-630-893-8145

pass code: 8402370#
moderator code: 3457370

From: Dalbo, Bob (R.J.)
Sent: Wednesday, June 19, 2002 10:58 AM
To: Kanai, Shinji (S.); Sanders, Muriel (M.S.); Altoonian, Don (D.J.); Aynessazian, Kam (K.); 'Badgley, Joel (J.K.)'; Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); 'Cary Powell'; Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); Rothweiler, Daniel (D.); De Pena, Juan (J.E.); Diez, Timothy (T.P.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Grewal, Bill (B.S.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); 'John McDonald'; 'Jones, Andy'; Jordan, Donald (D.E.); Kanai, Shinji (S.); King, Robert (R.F.); Kosko, Jeff (J.R.); Kwon, Soon (S.K.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Mandziuk, Roger (R.S.); Marck, Edmond (E.C.); Matesa, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); 'Morgan, Tom'; Morishima, Shigeki (S.); 'Naveed Khan'; Nematollahi, Sonya (S.); 'Nikolai, Bernie'; Noteboom, Jim (J.E.); Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhae (R.); Takasawa, Keith (K.D.); Takubo, Hirokhi (H.); Veenstra, Tim (T.W.); Wakenell, Ray (R.A.); Wettach, Bill (B.); Williams, Lee (LHW.); Yeung, Lam (.)
Subject: RE: One example of Engine quit

Kanai-san,
This is the exact problem we have been working on. If your dealer services your vehicle per the TSB and ISM we have released, we believe your issue should be resolved.

Mr. Limtiaco,
Can you please help ensure Kanai-san's vehicle is properly serviced?

Bob Dalbo
3.0L Calibration Supervisor
Outfitters Calibration, NAT
Phone: (313) 24-84947 Fax: (313) 32-31786
Pager: (313) 795-2859 Email: rdalbo@ford.com

-----Original Message-----
From: Shinji Kanai [mailto:kanai.sh@sv.mazda.co.jp]
Sent: Wednesday, June 19, 2002 10:05 AM
To: 'Sanders, Muriel (M.S.)'; 'Altoonian, Don (D.J.)'; 'Aynessazian, Kam (K.)'; 'Badgley, Joel (J.K.)'; 'Bauer, Scott (S.C.)'; 'Bhojwani, Kamal (K.)'; 'Blackburn, Thomas (T.J.)'; 'Bogema, John (P.)'; 'Cary Powell'; 'Chick, John (J.)'; 'Chih, Ming-Niu (M.N.)'; 'Chin, Darrel (D.)'; 'Corbett, Sandra (S.M.)'; 'Dalbo, Bob (R.J.)'; 'Dan Rothweiler'; 'De Pena, Juan (J.E.)'; 'Diez, Timothy (T.P.)'; 'Fascetti, Bob (R.J.)'; 'Fournelle, Gilbert (G.)'; 'Freeland, Mark (M.)'; 'Giles, Stuart (S.)'; 'Gokhale, Renuka (R.V.)'; 'Grewal, Bill (B.S.)'; 'Grimes, Jeff (J.R.)'; 'Hansen, George (G.C.)'; 'Herr, George (G.J.)'; 'Hofman, Michael (M.V.)'; 'Holmes, Jeffrey (J.R.)'; 'Ichikawa, Jiyunichiro (J.)'; 'Jensen, Ted (T.E.)'; 'John McDonald'; 'Jones, Andy'; 'Jordan, Donald (D.E.)'; 'Kanai, Shinji (S.)'; 'King, Robert (R.F.)'; 'Kosko, Jeff (J.R.)'; 'Kwon, Soon (S.K.)'; 'Limtiaco, Steven (S.)'; 'Linde, Peter (P.A.)'; 'Liu, Jane (J.)'; 'Mandziuk, Roger (R.S.)'; 'Marck, Edmond (E.C.)'; 'Matesa, John (J.)'; 'Maurer, James (J.B.)'; 'Mazzella, Gary (G.R.)'; 'Mooney, Larry (L.)'; 'Moorhouse, Scott (S.R.)'; 'Morgan, Tom'; 'Morishima, Shigeki (S.)'; 'Naveed Khan'; 'Nematollahi, Sonya (S.)'; 'Nikolai, Bernie'; 'Noteboom, Jim (J.E.)'; 'Ortman, James (J.W.)'; 'Powers, Ken (K.W.)'; 'Price, Martin (M.)'; 'Raquepau, Alden (A.P.)'; 'Shah, Kiran (K.C.)'; 'Shiraishi, Masaru (M.)'; 'Stilgenbauer, Jeffrey

(J.R.)'; 'Suarez, Rhae (R.)'; 'Takasawa, Keith (K.D.)'; 'Takubo, Hiroichi (H.)'; 'Veenstra, Tim (T.W.)'; 'Wakenell, Ray (R.A.)'; 'Wettach, Bill (B.)'; 'Williams, Les (LHW.)'; 'Yeung, Lem (.)'
Subject: One example of Engine quit

My lease vehicle 2002MY Tribute experienced engine quit last night.

4F2YU08172KM28336 Build 12/11/2001, Retail 1/11/2002
Mileage: 7360 miles Event: 6/18/2002

After 25 minutes Freeway driving, I exited and stopped traffic signal.
About 30 sec. later I started moving to left turn and stopped at traffic signal again about 50m later.
About 30 sec. later I started moving 20m and right turn.
Then I gave throttle accelerating vehicle up to 35 MPH - 40MPH at slight up hill about 200m.
Then road switched down hill, I released throttle. Usually vehicle slight increase speed up to 45MPH about 200m.
I applied throttle gently after changing road up hill. Few seconds later I realized that vehicle kept down speed and three warning lamp illuminated about 40MPH.
I did not calm enough.
I turned key to start position, but engine did not start because shifter was stayed D range.
I cycled key OFF and ON again, all warning lamp illuminated about 25MPH.
I applied brake to reduce speed and turned vehicle to left.
I shifted N range and cranked. Small gear noise (starter engagement ?) was heard but Engine started normally about 10 MPH.

I remember engine rpm dropped twice on this vehicle during last 6 month.
Possibly engine rpm drop might happen more than two, but I recognized twice.
One is same location same direction, another one was opposite direction almost same location.
No ECM like building or equipment near there, as far as I know.
This is my first V6-4WD model. Previous Tribute was I4-4WD.
I will bring this vehicle to dealer for usual scheduled (7,500 miles) maintenance this week.
I will ask dealer to reflash PCM calibration and continue to monitor.

If you have any question or comment, please feel free to contact to me.

Shinji Kanai
Manager, Tribute Plant QA
Mazda North American Operations

Ford Kansas City Assembly Plant
Plant Vehicle Team
8121 N.E. Hwy. 69, Claycomo, MO 64119 USA
Tel: 816-459-1623/ Fax: -1726/ e-mail: kanai.sh@sv.mazda.co.jp
Local Text Pager: 9135677156@alphapage.airtouch.com

From: Bhojwani, Kamal (K.)
Sent: Wednesday, August 22, 2001 10:21 AM
To: Glee, Stuart (S.)
Subject: FW: Int. Stall CQIS reports

FYI

Regards,
Kamal Bhojwani
U204 3.0L Powertrain Calibration
TEE, Suite 1AE30
Phone: (313) 39-01969
Fax: (313) 32-31786

----Original Message----
From: Badgley, Joel (J.)
Sent: Tuesday, August 21, 2001 3:42 PM
To: Bhojwani, Kamal (K.)
Subject: FW: Int. Stall CQIS reports

Joel Badgley
Escape P/T CRT
West Park Center 425 F

----Original Message----
From: Vecchio, Anne Marie (A.)
Sent: Friday, July 27, 2001 9:49 AM
To: Badgley, Joel (J.)
Subject: Int. Stall CQIS reports

CQIS-Int. Stall No codes.XLS

Anne Marie Vecchio
Product Concern Engineer - Escape
PVT & Field Support/FCSD
313-32-39037/fax: 313-33-78337

Intermittent Stall - No Codes, No Verification

REPORT DATE	MILES	VIN	BUILD DATE	ST	SYMPT	ADDL SYM	COMMENTS
11022000	1327	1FMYU09161KD92209	09072000	MO	607700	INT STALL ON DECEL	TECH STATES THAT THE CUSTOMER IS COMPLAINING OF AN INT STALL ON DECEL WITH THE BRAKE NOT APPLIED. NO DIAG HAS BEEN DONE CALLING FOR KNOWNS. ADVISED THE TECH THAT THERE ARE NO COMMON CONCERNS FOR THIS AS YET. LOOK FOR LOOSE CONNECTIONS OR GROUNDS OR HARNESS CONCERNS, TRY TO DUPLICATE THE CONCERN AND WATCH FUEL PRESSURE GET A RECORDING AND LOOK FOR EVAP OR EGR FLOW. DEALER CALL MADE REPAIR IDLE AIR CONTROL.
11022000	2034	1FMYU04171KD92756	07182000	MN	607700	INT STALL ON DECEL	TECH STATES THAT THE CUSTOMER STATES THAT THE VEH HAS AN INT STALL ON DECEL. THEY CAN NOT DUPLICATE THE CONCERN. CALLING FOR KNOWNS. ADVISED THE TECH TO LOOK FOR LOOSE CONNECTIONS POOR GROUNDS OR HARNESS CHAFES, ALSO LOOK TO SEE IF THE EVAP IS COMMANDED ON DURRING THE CONCE CONCERN, THERE MAY BE FUEL IN THE CANITESR, OR THE ROLLOVER VALVE MAY BE STICKING, CAUSING RAW FUEL TO BE PULLED IN WHILE PURGING. TECH STATES THEY HAVE BEEN DRIVING THE VEHICLE FOR ALMOST A WEEK AND CANNOT DUPLICATE THE CUSTOMERS CONCERN. TECH HAS CHECK THE CANISTER FOR SIGNS OF RAW FUEL AND NONE WERE NOTED. CUST IS NOT WANTING THE VEHICLE BACK UNTIL FIXED. ADV TECH TO HAVE THE CUST DRIVE THE VEHICLE WITH YOU. IF TECH STILL CANNOT DUPLICATE THE CONCERN RETURN IT TO THE CUST. IF CUST WILL NOT TAKE THE VEHICLE BACK GET THE CSM INVOLVED... DEALER CALL MADE NO DEFECT FOUND.
11062000	2362	1FMCU04161KD97039	07272000	WA	607600	INTERMITTENT STALL/HES	CUSTOMER STS VEH HAS INTERMITTENT STALL CONCERN AT 20MPH AND INTERMITTENT HES/STUMBLE ON ACCEL TECH UNABLE TO DUPLICATE OR VERIFY SEEKING KNOWNS NO DTC'S FUEL TRIMS NORMAL ADV TECH OF NO KNOWNS AND TO ADV CUSTOMER TO CHANGE FUEL BRANDS POSSIB LE CAUSE
11062000	1412	1FMCU03191KE78985	08312000	FL	607693	ALLEGE STALL AT CRUISE	TECH STATES THE CUSTOMER ALLEGES THE VEHICLE STALLS ONCE WHILE AT A CRUISE. NO CODES ARE SET IN THE PCM. HE HAS NOT BEEN ABLE TO DUPLICATE THE CONCERN. THE CUSTOMER STATES THAT IT FELT LIKE SOMEONE SHUT THE KEY OFF. THE VEHICLE RESTARTED RIGHT AWAY. SEEKING FOR ANY KNOWNS OR ADVICE. ADVISE TECH NO KNOWNS WERE AVAILABLE, ADVISE TO CHECK ALL THE POWERS AND GROUNDS FOR THE PCM, INSPECT THE EEC HARNESS AT THE RIGHT NEAR THE MOTOR MOUNT FOR POSSIBLE PINCH OR CHAFFING. DEALER CALL WAS MADE,NO CODES DISPLAYED AND NO DEFECT FOUND.
11062000	1379	1FMYU04161KF08483	10172000	MO	607000	INT. STALL	TECH LOOKING FOR KNOWNS ON STALLING CONERNS. CAN'T DUPLICATE. ADVISE TECH TO CHECK WIRING HARNESS ON RIGHT HAND SIDE ENGINE MOUNT.
11062000	87	1FMYU02121KEB8004	09222000	CO	607693	DIED WHILE DRIVING	SD STATES THE CAR DIED WHILE DRIVING AND IS LOOKING FOR KNOWNS FOR THIS CONCERN. ADV SD THERE IS NO KNOWNS, ADV TO DO BASIC CHECKS. DEALER CALL MADE, TECH INDICATED THAT THE AIRFLOW METER WAS UNPLUGGED, VEHICLE WORKED OK. NO DEFECT FOUND.
11062000	3307	1FMYU04151KD92029	07292000	NJ	607793	INT. STALL ON DECEL/NO DUPLICA	CUSTOMER STATES WHEN CRESTING A HILL AND STARTING TO GO DOWN THE VEHIC LE WILL STALL. CUSTOMER STATES IT STALLS WHEN HE LETS OFF THE GAS PEDA L. CUSTOMER STATES IT ONLY HAPPENS ON HILLS. ADV TECH OF NO KNOWN CONCERNS. ADV TECH TO VERIFY IAC % BASE IDLE, VMV

REPORT DATE	MILES	VIN	BUILD DATE	ST	SYMPT	ADDL SYM	COMMENTS
							NOT OPENING. CONSULTED WITH SME JAKE DOSS AND HE HAD NO INFORMATION. ADV TECH TO VERIFY THE CONCERN. DEALER CALL WAS MADE,NO DEFECT FOUND.
11102000	37	1FMYU02131KE88004	09222000	CO	607000		VEHICLE DIED WHILE DRIVING, WON'T RESTART. NO CHECK ENGINE LIGHT, NO CODES, DCL DISPLAY, SHORT FUEL TRIM AT 22 TO 24% SHOULD BE 0. MAF HAD WATER CONTAMINATION. INSTALLED NEW MAF AND CHECKED, OK.
11102000	3748	1FMCU04151KE89221	08212000	ON	607600		THE ENGINE STALLED WHILE DRIVING. WE CHECKED FOR CODES - NO CODES. WE DROVE THE TRUCK AND TRIED TO DUPLICATE THE CONCERN. WE WERE UNABLE TO DO SO. WE CONTACTED THE TECH HOTLINE - NO OTHER CONCERN OUT THERE. WE RELEASED THE TRUCK AND ASKED THE CUSTOMER TO TRY AGAIN AND SEE HOW MUCH FUEL IS IN IT AND WEATHER FACTOR IF RELATED OR NOT. PART_NBR 12650 CHANGED TO BY NBAKER6 SYMPTOM_CODE 607000 CHANGED TO 607600 BY NBAKER6 DEALER CALL MADE NO DEFECT FOUND. SECOND TIME VEHICLE WAS IN FOR REPAI R.
11102000	3748	1FMCU04151KE89221	08212000	ON	696296	P0401 CONTINSOUS P1408 RUNING	THE VEHICLE IS IN FOR SERVICE DUE TO THE CUSTOMER ALLEGES THE VEHICLE STALLED ON DECEL. THE CUSTOMER INDICATED SHE WAS COMING OF THE HIGHWAY ON DECEL AND THE VEHICLE STALLED. THE TECHNICIAN STATED HE IS UNABLE TO DUPLICATE THE CONCER AND IS REQUESTING ANY ADDITIONAL TECHNICAL INFORMATION. RECOMMENDED TECHNICIAN FOR THIS CONCERN IT WILL BE NECESSARY TO RECREATE THE CONCERN BEFORE ANY REPAIR ATTEMPT. FOR NOW MONITOR THIS PIDS AND ESURE THEY ARE WITH IN SPECS: IAC % = AT IDLE/HWY MILES IAT = TEMPERATURE/VOLTAGE IAC % = VOLTAGE ECT = TEMPERATURE/VOLTAGE TP = VOLTAGE/MODE VSS = MILES/HERTZ/SPEEDOMENTER NO KNOWNS PERTAINING TO THIS COCERN. DEALER CALL WAS MADE VEHICLE WAS RETURNED TWICE WITH NO DEFECT FOUND. NO CODES DISPLAYED. FREEZE FRAME DATA: ECT = 90C DEG. LFTR 1 = -07.80 % LOAD = 51.4 % LFTR 2 = -02.34 % CLOSED LOOP. RPM = 2160.00 SFTR 1 = -01.56 % MPH = 101.00 SFTR 2 = -02.34 % THE TECHNICIAN WORKING ON THE VEHICLE STATES THE CHECK ENGINE LIGHT IS ON. CODES P0401/P1408 ARE STORED IN MEMORY, THE WDS DATA LOGIER SHOWS THE DPFE VOLTAGE IS AT 4.5 VOLTS, IS THIS CORRECT? THE VEHICLE RUNS FINE. THE CUSTOMERS ALSO COMPLAINED LONG TIME AGO THAT THE VEHICLE STALLED. REQUESTING ADDITIONAL TECHNICAL INFORMATION. REVIEW THE ABOVE FREEZE FRAME DATA. ISM 00-13-026 CK FOR STICKING SHUT OR STUCK OPEN EGR VALVE INDICATED TECHNICIAN IS LIKELY THE DPFE SENSOR IS DOING ITS JOG, CHECK FOR LOOSE POWER/GROUNDS CONNECTIONS. IF ALL CHECKS O.K. THEN THE EGR VALVE IS STOCK OPENS, THE DPFE VOLTAGE AT IDLE/KOEO SHOULD BE AT 1.0 VOLTS, USE TSB 97-22-01 AS A REFERENCE. USING SHOP AIR REGULATE IT TO

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							10 PSI, USE AN AIR NOZZLE, REMOVE THE EGR VALVE FROM THE VEHICLE AND APPLY AIR TO BOTH ENDS, IF AIR FLOW IS EVIDENT THEN THE VALVE IS STUCK OPEN.
11202000	327	1FMYU05181KE69823	09272000	CA	607703	STALLS ON TURNS.	SYMPTOM 6 07 7 93 CHANGED TO 6 96 2 96 BY JCHACONS TECH STATES THE VEHICLE STALLS ON RIGHT TURNS. NO CODES IN THE PCM. NO DIAGNOSTIC HAVE BEEN STARTED. SEEKING FOR KNOWNS OR ADVICE. ADVISE TECH OF THE FEW CASE WE HAD ON HAND. ADVISE TECH TO INSPECT FOR POSSIBLE WATER INTRUSION INTO THE MAF SENSOR. ALSO MONITOR THE FUEL PRESSURE WHEN THE CONCERN IS PRESENT. CHECK THE CKP CIRCUIT AS WELL.
11272000	241	1FMYU04121KF17808	10122000	NH	607500	INT STALLS/LEFT TURNS	SF STS CUSTOMER STS THAT VEHICLE STALLS INTERMITTENTLY ON LEFT HAND TU RNS, HASN'T VERIFIED, MONITORED FUEL PRESS WITH GAUGE, ALSO MONITORED PIDS, SEEKING KNOWNS
11202000	2757	1FMCU04101KE70468	08242000	IL	607603	STALL AT CRUISE	ADV SF NO KNOWNS, TRY TO DUPLICATE CONCERN, CHECK IAC, LOAD TECH STATES THAT THE CUST ALLEGES THAT THE VEH STALLED AT CRUISE. TECH STATES THAT HE CANNOT DUPLICTE THE CONCERN HE ALSO STATES THAT THERE ARE NO CODES. TECH STATES THAT HE CHECKED THE FUEL PRESSURE & IT IS AT 42 PSI. TECH LOOKING FOR KNOWNS.
12072000	34	1FMYU01121KF69710	11062000		607501	1X STALL AT 45 MPH	ADVISED TECH THAT THE FUEL PRESSURE SHOULD BE 65 PSI ADVISED TECH TO REPLACE THE FUEL PUMP & TO RECHECK THE FUEL PRESSURE. VEHICLE STALLED 1X ON ACCEL FROM 45MPH COLD WHEN SALESPERSON WAS MOVIN G UNIT TO A DIFFERENT LOT. VEHICLE RESTARTED IMMEDIATELY IN NUETRAL. N O CODES. CAN NOT DUPLICATE AGAIN.
12062000	80	1FMYU02111KE65800	09262000	NH	607500	STALL ON HARD DECEL	NO KNOWNS AT THIS TIME. POSSIBLE FUEL ISSUE. ATTEMPT TO DUPLICATE BEFO RE ATTEMPTING REPAIR. TECH STS HAS A STALL ON A HARD DECEL. TECH LOOKING FOR KNOWNS.
12162000	399	1FMCU03112KF46008	11022000	FL	607603	CUSTOMER ALLEDGES STALL	ADV TECH TO CHECK FOR IAC OPERATION. ADV TECH TO CHECK FOR LIQUID FUE L IN THE VAPOR MANAGEMENT SYSTEM. CUSTOMER ALLEDGES VEHICLE STALLED, RESTARTED NORMALLY. TECH UNABLE TO VERIFY CONCERN, HAS DRIVEN 40 MILES.
12202000	664	1FMYU01B21KF63270	11032000	VA	607403	STUMBLE STALL LOW FULE PRESS	ADVISE CHECK PCM POWER AND GROUND CIRCUITS, BATTERY JUNCTION BOX CONNE CTIONS AND TAP ON PCM. NO KNOWNS ON THIS CONCERN AT THIS TIME. DEALER CALL MADE NO DEFECT FOUND NO CODES DISPLAYED. TECH STATES VEHICLE WILL STUMBLE AND STALL. VEHICLE IS RUNNING REAL LEAN AND DOES NOT SEEM TO BE GETTING FUEL PRESSURE. TECH HAS REPLACED THE FUEL PUMP. TECH IS LOOKING FOR KNOWNS.
01102001	678	1FMCU041X1KF02214	10042000	OR	607600	INT STALL DOWNHILL	ADV TECH TO VOLT DROP POWER AND GROUND TO THE FUEL PUMP. TECH STS CUSTOMER STS THAT VEHICLE STALLED ONCE GOING DOWN A STEEP HIL L, ONLY HAD 1/4 TANK OF FUEL AT TIME, TECH HASN'T VERIFIED, SEEKING KN OWNS
01122001	4640	1FMYU04181KE00002	09012000	NY	606401	INT STALL/RUNS ROUGH COLD	ADV TECH NO KNOWNS TECH STS CUSTOMER STS THAT INTERMITTENTLY ON A COLD MORNING VEHICLE WI LL STALL AND RUN ROUGH AFTER STARTUP, TECH HASN'T VERIFIED, CHECKED FU EL PRESS WITH GAUGE, SEEKING KNOWNS
01162001	2945	1FMYU04111KE69363	09152000	MI	606200	STALLS/RPM GUAGE INOP.	ADV TECH NO KNOWNS, CHECK IAC OPERATION, DUPLICATE CONCERN TECH STS CUST STS INTERMITT. VEHICLEWILL STALL AT A STOP. CUST ALSO ST

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							S RPM GUAGE WENT TO 4000 WHEN TRYING TO PASS ANOTHER VEHICLE ON THE HI GHWAY AND ALL POWER WAS LOST. TECH STS HAS NOT BEEN ABLE TO VERIFY EIT HER CONCERN. TECH STS HAS NO CODES...SEEKING KNOWNS. ADVISED TECH OF NO KNOWNS ON EITHER CONCERN. ADVISED TECH TO VERIFY CO NCERNS THEN DIAGNOSE OR CALL HOTLINE BACK.
01232001	702	1FMYU03191KF44185	11062000	CA	607493	STALLS @ IDLE AND RUNS ROUGH	CUST ALLEGE THAT VEHICLE WILL STALL AT IDLE AND RUNS ROUGH ONLY AFTER FILLING THE GAS TANK. SF WAS UNABLE TO VERIFY CONCERN BUT STATES THAT CUST STOPS FUELING AT THE FIRST CLICK OF THE PUMP. SF SEEKING KNOWNS. ADVISED SF OF NO KNOWNS. ADVISED SF TO CHECK EVAP CANISTER FOR RAW FUEL, CHECK EVAP SYSTEM TO MAKE SURE THEYRE FUNCTIONING,...
02012001	3518	1FMCU04111KF06765	10062000	CA	607700	ALLEGED STALL AT STOP	TECH STS CUST STS OVER 3500 MILE PERIOD VEHICLE HAS STALLED TWICE WHEN COMING TO A STOP. TECH STS HAS NOT BEEN ABLE TO VERIFY THE CONCERN. TE CH STS HAS NO CODES. TECH SEEKING KNOWNS. ISM 00-12-025 CK FOR STICKING SHUT OR STUCK OPEN EGR VALVE ADVISED TECH TO VERIFY THAT EGR IS NOT STICKING OPEN AT IDLE AS PER IS M ABOVE. ADVISED TECH TO VERIFY THAT PCM HAS LATEST CALIBRATION.
02052001	4087	1FMYU02191KD97030	07252000	IL	607693	STALLS AT CRUISE	TECH STATES THE CUSTOMER ALLEGES THE VEHICLE STALLS WHILE DRIVING THE VEHICLE LOOSES ALL ELECTRICAL POWER. WHEN THE CONCERN IS PRESENT THE VEHICLE WILL NOT CRANK, THE LIGHTS ON THE DASH, THE RADIO OR THE HEAD LIGHT ARE ALSO INOP. THE ONLY THING THAT DOES WORK ARE THE POWER DOOR LOCKS. HE HAS WIGGLE THE HARNESS AND HAS FOUND NOTHING WRONG. HE ALSO INSPECTED THE IGNITION SWITCH AND IT SEEMS FINE. SEEKING FOR ANY KNOWNS OR ADVICE. ADVISE TECH NO KNOWNS WERE AVAILABLE, ADVISE HIM TO CHECK THE CENTRAL JUNCTION BOX FOR POSSIBLE WATER INTRUSION, IF FOUND RESEAL THE WINDSHEILD. ALSO INSPECT THE MAIN LOOM AT THE POWER DIST.BOX AS IT ENTERS THE LEFT FENDER FOR POSSIBLE CHAFFING.
02062001	1860	1FMCU04161KF43763	11132000	NC	607582	STALLED ON DECEL.	VEHICLE WAS BROUGHT IN FOR A STALLING CONCERN. CUSTOMER DESCRIBED AS WHILE GOING UP A HILL RIGHT AT THE TOP OF THE HILL VEHICLE STALLED OUT. CUSTOMER LET VEHICLE ROLLED DOWN THE HILL PULLED OVER TRY TO START IT AND IT STARTED RIGHT UP. TECH CANNOT DUPLICATE CONCERN. SEEKING ADVICE. ADVISED TECH NO KNOWNS. POSSIBEL STICKY IAC. REPLACE IF NECESSARY.
02162001	1867	1FMYU04121KF62994	12092000	NC	607692	STALLED ONE TIME AT CRUISE	TECH STATES THAT THE CUSTOMER STATES THAT THE VEH STALL ONE TIME AT CRUISE, THE VEH IMMEDIATELY RESTARTED AFTER PULLING OVER AND STOPPING. THE TECH HAS DRIVEN THE VEHICLE FOR TWO DAYS AND HAS NOT BEEN ABLE TO VERIFY THE CONCERN. CALLING FOR SUGGESTIONS. ISM 00-12-026 CK FOR STICKING SHUT OR STUCK OPEN EGR VALVE ADVISED THE TECH OF THE ABOVE, THE CONCERN WILL HAVE TO BE VERIFIED BEFORE FURTHER DIAG WILL BE EFFECTIVE.
							TECH CALLING ON STALLING CONCERN INTERMITTENTLY,HAS NOT VERIFIED,HOW-EVER THE CUSTOMER HAS EXPERIENCED SEVERAL TIMES NOW WHILE AT 45 MPH. SUGGEST TECH TO REPLACE THE PCM POWER RELAY,HAVE HAD SOME REPORTS OF PCM POWER RELAY ISSUES.ALSO MAY CK THE POWER DISTRIBUTION BOX FOR WATER ENTRY.(SME)JAKE.

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REPORT DATE	MILES	VIN	BUILD DATE	ST	SYMPT	ADDL SYM	COMMENTS
							THE TECH CALLED BACK STATING THAT THE VEHICLE DOES HAVE A SUNROOF. SEEKING KNOWNS ON THE CONCERN. ADVISED THE TECH TO INSPECT THE POWER DISTRIBUTION BOX FOR WATER INTRUSION, REPAIR OR REPLACE AS NECESSARY. TECH STATES THAT THE CUSTOMER IS STILL COMPLAINING OF AN INT STALL CONCERN. THE VEHICLE AWLAYS RESTARTS. THEY CAN NOT DUPLICATE THE CONCE RN. CALLING FOR FURTHER SUGGESTIONS. ADVISED THE TECH THAT THERE ARE STILL NO COMMON CONCERNS, WE HAVE SEEN A FEW DPFE SENSOR CONCERNS, STICK IAC OR EGR VALVE CONCERNS. THE BEST THING WOULD BE TO VERIFY THE CONCERN.
02282001	6288	1FMCU04111KE70186	09082000	BC	607792	ONE TIME STALL AT CRUISE	TECH STS VEHICLE STALLED ONE TIME FOR OWNER AND RESTARTED AFTER A FEW SECONDS OF CRANKING. TECH STS HE HAS FOUND NO CODES IN PCM. TECH CANNO T DUPLICATE CONCERN. SEEKING KNOWNS. ADV TECH OF NO LIKE REPORTS IN OASIS. ADV TECH TO ASK OWNER TO WATCH M IL LIGHT IF CONCERN RETURNS TO POSSIBLY AID IN DIAG. TECH COULD TAP TE ST PCM RELAYS, PCM, ETC..
02282001	11000	1FMYU03151KE61069	09212000	FL	607693	INT STALLS	TECH STS THAT INTERMITTENTLY VEHICLE WILL STALL, TECH HAS ONLY HAD IT HAPPEN TO HIM ONCE, NO CODES, HAS MONITORED PIDS AND TEST DROVE, SEEKI NG KNOWNS/ADVICE ADV TECH NO KNOWNS, WIGGLE TEST PCM HARNESS, BJB CONNECTIONS, MONITOR FRP, PIP, RPM
03062001	5800	1FMYU04191KE57853	09222000	CT	607609	ALEDGED STALL AND RESTART	TECH STS CUSTOMER ALEDGES VEHICLE STALLS AND RESTARTS AND TECH STS HAS NOT BEEN ABLE TO VERIFY CONCERN AND HAS NO OTHER INFOMATION ON VEH ICLE . AND IS SEEKING KNOWNS ADVISE TECH TO VERIFY WITH CUSTOMER FUEL LEVEL AND SPEED OF VEHICLE TU RNING OR STOPING OR ACCLERATING HOT OR COLD OK FUEL PRESSURE AT IDLE A ND WOT .
03062001	6000	1FMYU041X1KE60088	09152000	WV	204227	DRIVING OIL, ALT ENGINE LITE	SM STATES CUSTOMER STATES THAT WHILE DRIVING OIL, ALT AND ENGINE LITE COMES ON HAS LOSS OF STEERING AND BRAKES. VEHICLE IS NOT THERE SO HAS NOT ROAD TESTED OR LOOKED AT. ADV SM TO SEE IF ANY CODES THEN LOOK FOR WATER OR CORROSION IN FUSE BO X AND CONNECTOR 263 RT BELOW FUSE BOX. SM STATES THAT HE LOOKED AT CENTRAL JUNCTION BOX AND FOUND NO WATER E NTRY THERE OR IN CONNECTOR 263 HAS STILL NOT DUPLICATED CONCERN. LOOKI NG FOR ANY KNOWNS.
03122001	499	1FMYU04181KA73144	02282001	OH	607793	STALL AT DECEL/ROUGH IDLE	TECH STS VEHICLE HAS STALL CONCERN AT COAST, TECH HAS 2 VEHICLES WITH THIS CONCERN, TECH IS SEEKING KNOWNS ON ISSUE. ISM 00-12-026 OK FOR STICKING SHUT OR STUCK OPEN EGR VALVE ISM 95-03-032 CALL VANCE EDGAR FOR ASSISTANCE ADVISED TECH TO INSPECT FOR PCM POWER RELAY RELEASEING, PCM POWERS AND GROUNDS, VERIFY EGR IS NOT STICKING, TRY TO DUPLCIATE CONCERN, MAKE SURE VMV IS NOT PULLING LIQUID FUEL AFTER OVERFILLING. TECH STS OI IS STILL COMPLAINING OF CONCERN, THE VEHICLE HAS NEW PCM RELAYS BUT CONCERN IS STILL PRESENT TECH HAS NEVER DUPLICATED CONCERN SEEKING KNOWNS ON PCM CALIBRATION RELATED TO CONCERN. ADVISED TECH TO PREVIOUS RECOMMENDATIONS, VERIFY CONCERN, INSPECT FOR

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REPORT DATE	MILES	VIN	BUILD DATE	ST	SYMPT	ADDL SYM	COMMENTS
							OVERFILLING, RIDE WITH CUSTOMER. TECH CALLS BACK AND STATES THAT CUST IS CONCERN OF ROUGH IDLE AND RPM FLUCTUATIONS@RPM?? TECH HAS COMPARED VEHICLE WITH KNOWN GOOD VEHICLE CAN COULD NOT FIND ANYTHING WRONG. TECH SEEKING KNOWNS. ADVISED TECH OF NO KNOWNS. ADVISED TECH THAT IF HE HAS COMPARED WITH KNOWN GOOD VEHICLE AND THEY ARE THE SAME, THEN IT'S NORMAL. RPM WILL FLUCTUATE SOME WITH LOAD INCREASE OR DECREASE. ADVISED TECH THAT IDLE RPM FOR VEHICLE IS 750-750RPM ACCORDING TO PCED. ADVISED TECH THAT HE COULD CHECK IAC, MAF, POWER BALANCE,...
03122001	3312	1FMYU01BX1KA03710	12052000	CA	607592	INTERMITTENT STALL ON ACCEL	TECH STATES THAT THE CUSTOMER IS COMPLAINING THAT THE VEHICLE STALLS, THE TECH CAN NOT DUPLICATE THE PROBLEM. THE MOST RECENT CONCERN WAS AT THE TOP OF A LONG HILL DURING ACCELERATION. SEEKING FOR ANY KNOWNS OR ADVICE. ADVISED TECH TO CHECK THE FUEL SYSTEM UNDER THE SAME CONDTIONS TO VERIFY THAT THE FUEL PUMP WILL MAINTAIN PRESSURE. ALSO CHECK THE FUEL SYSTEM FOR LEAK DOWN, AND CHECK CRANKSHAFT ENDPLAY FOR POSSIBLE INTERMITTENT BAD SIGNAL FROM THE CKP. TECH STS THAT ONE OF THE VEHICLES OWNERS STS THAT GOING UPHILL AROUND 70MPH+ THE ENGINE WILL LOSE POWER, HE WILL PULL OVER AND ENGINE REVS F INE IN NEUTRAL BUT WHEN PUT INTO GEAR IT WILL BARELY MOVE. THE OTHER O WNER STS THAT THE ENGINE STALLS GOING UPHILL AROUND 70MPH+, TECH HASN' T BEEN ABLE TO DUPLICATE EITHER CONCERN, ROAD TESTED VEHICLE AND MONIT ORED ICHT AND FUEL PRESSURE WITH GAUGE, FUEL PRESSURE IS ABOVE 40PSI, C HT WILL GET UP TO 230 DEG UPHILL AT ABOUT 70MPH, TECH THINKS ENGINE IS RUNNING TOO HOT. PREVIOUS TECH REPLACED WIRES & COIL, SEEKING ADVICE ADV TECH THAT ENGINE IS STILL RUNNING WITHIN NORMAL OPERATING TEMP, AD V THAT IF ENGINE IS RUNNING TOO HOT IT SHOULD SET A CODE OR COOLANT SH OULD BOIL OUT OVERFLOW, MAKE SURE FANS ARE WORKING PROPERLY, TECH NEED S TO DUPLICATE CONCERN, IF CANNOT HE MAY NEED TO GET CSM INVOLVED WITH CUSTOMER DIFFERENT DEALER CALLING ON ON VEHICLE. CUSTOMER HAS SAME COMPLAINT. V EHICLE BEGINS TO LACK POWER, THEN STALLS. CUSTOMER RELUCTANT TO BRING VEHICEL IN TO DEALER - WANTS IT BOUGHT BACK. SM SEEKING ANY SUGGESTI ONS - ***TAR*** IF POSSIBLE? DISCUSSED CONCERN WITH ZETEC SUBJECT MATTER EXPERT AND ADVISED SM TO C HECK FOR CODES. IF P1270 IS PRESENT, THEN KNOWN CONCERN THAT IS UNDER INVESTIGATION. IF NO CODE PRESENT AND STILL CANNOT DUPLICATE, CONTACT CSM. ADVISED WILL NOT ***TAR*** REPORT AT THIS TIME AS VEHICLE IS NOT AT DEALER AND CONCERN CAN NOT BE REDILY DUPLICATED.
03122001	3505	1FMYU03121KF79179	12112000	MO	607593		AS REPORTS THEY DID GET VEHICLE TO STALL ONCE. NO CODES LOOKING FOR KNOWNS ADVISED @ POSSIBLE EGR VALVE PROBLEMS, CHECK PCM AND FUEL RELAY, IF TH EY CAN DUPLICATE IT, TO HOOK UP WDS AND WATCH PIDS, IF NOT THEN HOOK UP FLIGHT RECORDER.REPLACE RELAY
03122001	3726	1FMCU04151KE73019	08252000	ON	607600	STALLED AT CRUISE P0400	TECH STATES VEHICLE STALL OUT ON CUSTOMER AT CRUISE. TECH ALSO STATED THAT VEHICLE CAME IN WITH A DISCHARGED BATTERY. BATTERY WAS CHARGED

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							AND GENERATOR TESTED, BOTH TESTED OK. LOOKING FOR KNOWNS ADVISED TECH TO PREFORM WIGGLE TEST ON PCM, ALSO CHECK PCM POWER AND G ROUND CIRCUITS. TECH WAS UNABLE TO VERIFY CONCERN.
03292001	6694	1FMYU041X1KE74408	09062000	NJ	607000	INT STALLS	TECH STS CUSTOMER STS THAT ENGINE QUIT AND VEHICLE LOST POWER STEERING AND BRAKING, TECH HASN'T VERIFIED, NO CODES, WIGGLE TESTED BJB, PCM H ARNESS AND ENGINE CONTROL CIRCUITRY TO NO EFFECT, SEEKING KNOWNS ADV TECH NO KNOWNS, ATTEMPT TO DUPLICATE CONCERN, GET MORE INFO FROM C USTOMER.
04042001	438	1FMYU0417YKA93991	05122001	OH	607400	DIES AT IDLE	TECH STATES VEHICLE DIES AT IDLE WHEN HOT. STATES HAS NO CODES. STATES CAN KEEP IT RUNNING BY FEATHERING. STATES HAS PUT NEW IAC ON. STATES LOOKING FOR KNOWNS. ISM 06-02-026 VAPOR LOCK CAUSED BY "WINTER BLEND" FUELS ISM 00-12-026 CK FOR STICKING SHUT OR STUCK OPEN EGR VALVE ADVISED TO CHECK FOR STICKING EGR VALVE AND TO CHECK FUEL QUALITY. ADVISED TECH TO CALL BACK IF FURTHER ASSISTANCE IS NEEDED.
04062001	4218	1FMYU0418YKE96881	06282000	HI	607402	INT STALL ON DECEL	CUSTOMER STS VEH HAS INTERMITTENT STALL CONCERN ON DECEL DOWN A HILL AND DURRING TURNS TECH UNABLE TO VERIFY NO DTC'S HAS REPLACE PCM RELAY TO NO AVAIL SEEKING KNOWNS ADV TECH OF NO KNOWNS AND TO CHECK BASE IDLE AND FUEL LEVEL DURRING CONCERN GET INFO FROM CUSTOMER ON WHEN CONCERN HAPPENS FUEL LEVEL AND DUPLICATE AND ISOLATE CAUSE SM CALLS ON SAME CONCERN, STATES THAT CONCERN COULD NOT BE VERIFIED, FUEL LEVEL WAS AT 1/4 TANK, SEEKING KNOWNS. ADVISED SM PER PREVIOUS RECOMMENDATION, NO KNOWNS, DO NOT ATTEMPT REPAIR UNLESS CONCERN IS VERIFIED. GENERAL MANAGER STATES THE VEHICLE HAS STALL DURING DECEL,DEALER HAS NOT VERIFIED THE CONCERN,BUT CUSTOMER STATES VEHICLE STALLS AT CRUISE 35 MPH USUALLY ON DECEL,HAS NO CODES,PCM POWER RELAY HAS BEEN REPLACED AND DISTRIBUTION BOX INSPECTED. SUGGEST TO REMOVE G104,CLEAN AND RE-INSTALL,BLOCK OFF THE EVAP VMV AND RETEST FOR POSSIBLE RICH CONCVERN FLOODING OUT ENGINE ON DECEL. LOOK AT THE DPFE VOLTAGE READING BEING ERRATIC-REPLACE DPFE SENSOR IF SUSPECT.NORMAL VOLTAGE AT 1.0V KOEO AND KOER.
04062001	3496	1FMYU04191KF42676	10302000	PA	607000	ALLEGE STALL WHILE DRIVING	CUST ALLEGE THAT VEHICLE STALLED WHILE DRIVING. TECH HAS NOT VERIFIED CONCERN AND IS SEEKING KNOWNS. ADVISED TECH OF NO KNOWNS, DO NOT ATTEMPT REPAIR UNLESS CONCERN IS VERIFIED.
04062001	5142	1FMCU03161KF70772	11162000	MI	607702	ALLEGED STALL BRAKING/TURNING	TECH STS HAS ALLEGED STALL WHEN BRAKING AND TURNING. HAS NO CODES IN PCM. TECH STS HE HEARD ABOUT A WATER CONCERN IN THE WIRING. SEEKING INFORMATION FOR WATER REPAIR. ADV TECH TO CHECK CENTRAL JUNCTION BOX FOR WATER DAMAGE. THIS CAN CAUSE RADIO CONCERN OR STARTING WITH KEY IN THE RUN POSITION. MAY NOT BE RELATED TO A STALL CONCERN. ADV TO TAP ON PCM RELAY FOR POSSIBLE UNLATCHING CONCERN. IF ENGINE STALLS WHEN RELAY IS TAPPED, REPLACE RELAY. ADV INTERMITTENT CONCERNS ARE HARD TO VERIFY REPAIRS.
04062001	7665	1FMYU04151KB51178	09062000	GA	607000	STALLS AT CRUISE.	TECH STATES THE VEHICLE HAS CRUISE,HAPPENED FOR THE CUSTOMER 2 TIMES.

REPORT DATE	MILES	VIN	BUILD DATE	ST	SYMPT	ADDL SYM	COMMENTS
							TECH HAS NOT VERIFIED,NO CODES,RESTARTS FINE.SEEKING SUGGESTIONS/KNOWN S.
							ADVISED TECH TO A FEW CONCERNS,CK THE PCM POWER RELAY,REPLACE AND CK T HE WIRING,ALSO ADVISED OF POSSIBLE WATER ENTRY AT LEFT KICK PANEL.
04072001	2250	1FMCU03141KF42807	11022000	FL	607793	ALEDGED STALL ON DECELL	TECH STS CUSTOMER ALEDGES VEHICLE STALLS GOING DOWN THIS ONE HILL AND AS SOON AS YOU STOP VEHICLE WILL RESTART AND TECH STS HAS NOT BEEN ABL E TO VERIFY CONCERN AND TECH STS CUSTOMER WILL NOT LEAVE VEHICLE TO BE CKED OR ROAD TESTED AND TECH IS SEEKING KNOWNS FOE CONCERN
							ADVISE TECH THERE ARE NO KNOWNS FOR THIS CONCERN AND TO ATTEMPT TO VER IFY CONCERN CK BASE GROUNDS AND POWERS AND IF CONCERN FOUND SUBMITT EDBR FOR FIX
04112001	740	1FMYU0418YKA85796	03142001	PA	607791	STALLS/QUITS WHILE TURNING.	THE TECHNICIAN WORKING ON THIS VEHICLE STATES THIS VEHICLE STALL AND QUITS INTERMITTENTLY WHILE TURNING, NO CODES IN THE PCM AND STILL UNABLE TO DUPLICATE THE CONCERN, ARE THERE ANY KNOWNS PERTAINING TO THIS, REQUESTING ADDITIONAL TECHNICAL INFORMATION.
							SM 00-12-026 CK FOR STICKING SHUT OR STUCK OPEN EGR VALVE
							TSB 97-22-01 DELTA PRESSURE FEEDBACK EGR (DPFE) - DIAGNOSTIC TIPS
							INDICATED TECHNICIAN FOR THIS CONCERN CHECK FOR LOOSE CONECTIONS AT THE MASS AIR FLOW, MONITOR THE MAF VOLTAGE AND HERTZ, MONITOR THE DPFE VOLTAGE KOEO&DER @ IDLE USE TSB 97-22-01.
04112001	7427	1FMCU04171KF81721	10272000	NC	607693	ALLEGE STALL WHILE DRIVING	CUST ALLEGE THAT VEHICLE STALLED WHILE DRIVING. TECH HAS NOT VERIFIED CONCERN, NO CODES SET AND STATES THAT PIDS ARE READING NORMAL. TECH SEEKING KNOWNS.
							ADVISED TECH OF NO KNOWNS. ADVISED TECH TO FIND OUT MORE ABOUT CONCERN FROM CUST, CHECK FOR OVERFILLING CONCERN,...
04132001	5883	1FMCU04141KE81462	09052000	PA	607693	ALLEGED DIES WHILE DRIVING	SM STS HAS ALLEGED STALL WHILE DRIVING. THE VEHICLE WILL RESTART. HAS NO CODES IN PCM. HAS NOT BEEN ABLE TO DUPLICATE CONCERN. SEEKING ADV.
							ADV SM TO TAP ON THE PCM POWER RELAY WHILE RUNNING. IF IT STALLS, REPLACE THE RELAY. ALSO CHECK POWER DIOD FOR LOOSE TERMINALS.
							TECH STATES CUSTOMER WAS DRIVING VEHICLE AND ALLEDGEDLY STALLED AND CUSTOMER LOSTED POWER STEERING. ADVISED TECH REPORT WILL BE PROCESSED FOR TECH ASSIST AS FOR CUSTOMER SATISFACTION ON REPEAT STALL CONCERN.
							ADVISED TECH WHILE WAITING FOR FSE CHECK G101 AND G100, AS WELL AT PIN 21/22 FOR CKP SENSOR FOR POOR CONNECTIONS.
							WENT TO DEALERSHIP ON 6/27/01 AND SPOKE WITH TECHNICIAN (BRAD) AND SM (GARY DIANGELIS) ON THIS CONCERN. CONCERN HAPPENED FOR THE CUSTOME R A COUPLE OF TIMES IN INTERVALS OF APPROX 1000 MILES. WE WERE NOT AB LE TO VERIFY CONCERN, BUT IT WAS DISCOVERED THAT + TERMINAL GOING TO P OWER DISTRIBUTION BOX DID NOT SEEM TO BE SUPPORTED PROPERLY. THERE WA S SOME MOVEMENT AT BOX AND 20 AMP FUEL PUMP FUSE MOVED WHEN CABLE WAS WIGGLED. WIGGLE TEST AT POW DIST BOX DID NOT REPEAT CONCERN. FROM HO TLINE'S SUGGESTIONS, R & RD CKP SENSOR, WENT OVER G100 & G101 & POWER DISTRIBUTION BOX.
							FOLLOWED UP ON THIS VEH ON 7/9/01. CUST HAS BEEN DRIVING VEH AND HAS N OT HAD STALL CONCERN, ACCORDING TO SERV WRITER (CHUCK). CLOSE TAR.
04162001	7602	1FMYU04161KE58578	08212000	TN	607693	STALL WHILE DRIVING	1X STALL AT CRUISE. VEHICLE RESTARTED IMMEDIATELY.

Intermittent Stall - No Codes, No Verification

REPORT DATE	MILES	VIN	BUILD DATE	ST	SYMPT	ADDL SYM	COMMENTS
							CAN NOT VERIFY CONCERN. NO CODES, SEEKING KNOWNS
							NO KNOWNS, CHECK ODOMETER FOR PCM COMMUNICATION AT TIME OF CONCERN.
04172001	466	1FMYU031X1KA89539	03202001	GA	607592	STALL AT CRUISE REPORTED	CUSTOMER REPORTS ENGINE STALLED WHILE DRIVING. RESTARTED OK.
							FOREMAN STATES NO CODES PRESENT (PASS).
							VEHICLE DRIVEN SIXTY MILES WITHOUT DUPLICATING CONCERN.
							RECOMMENDED INSPECTION OF ENGINE CONTROL WIRING HARNESSES AND
							CONNECTORS. INSPECT CENTRAL JUNCTION BOX AND WIRING FOR LOOSE
							CONNECTIONS OR WATER ENTRY.
04202001	3028	1FMYU04181KE88881	09202000	HI	607000		INTERMITTENT STALL OVER BUMPS.
							WE COULD NOT DUPLICATE THE CONCERN BY DRIVING THE VEHICLE. WE OPENED
							THE POWER DISTRIBUTION BOX UNDER THE HOOD AND TAPPED ON THE TOP OF THE
							RELAY AND IF IT IS THE EARLY DESIGN RELAY IT HAS HORIZONTAL POINTS IN
							THE RELAY AND THE ENGINE WILL STALL. WE HAVE BEEN ABLE TO VERIFY THIS
							CONDITION WITH ALMOST EVERY V6 ESCAPE IN INVENTORY. REPAIR IS TO
							REPLACE THE RELAY WITH A RANGER STYLE AND IT HAS VERTICAL POINTS
							INSIDE AND IT WILL NOT STALL OVER BUMPS.
04232001	100	1FMYU04131KB12805	03282001	PA	601300	INTERMITTENT STALL/RESTART	TECH STATES VEHICLE HAS INTERMITTENT STALL CONCERN. TECH STATES
							VEHICLE DOES RESTART HOWEVER. TECH LOOKING FOR KNOWNS.
							ADVISED TECH OF CONCERNS AT POWER DISTROBUTION BOX. ADVISED TECH TO
							WIGGLE TEST PCM POWER RELAY AND DIODE. ADVISED TECH TO PERFORM SAME
							TEST FOR FUEL PUMP RELAY. ADVISED TECH TO ALSO CHECK PCM GROUNDS.
04252001	6748	1FMCU04181KF08985	10182000	NJ	607000	INTERMITTENT STALL CONCERN	TECH STATES VEHICLE HAS INTERMITTENT STALL CONCERN. TECH WAS ABLE TO
							VERIFY CONCERN. TECH STATES AT TIME HAD MANUAL FUEL PRESSURE GAUGE
							INSTALLED AND SAW FUEL PRESSURE GO FROM 65 PSI TO 30. TECH LOOKING
							FOR KNOWNS.
							ADVISED TECH TO VOLTAGE DROP GROUND CIRCUIT FOR FUEL PUMP. ADVISED
							TECH IF POWER AND GROUNDS CIRCUITS OK, TO REPLACE FUEL PUMP MODULE
							ASSEMBLY.
04262001	6100	1FMYU04181KD97306	10052000	NJ	607000	INT STALL HARD START	CUSTOMER STS VEH HAS INTERMITTENT STALL CONCERN HARD START NEED TO
							FETHER ACCEL PEDDAL FOR VEH TO START AND RUN. TECH UNABLE TO DUPLICATE
							NO DTC'S SEEKING KNOWNS
							ADV TECH OF NO KNOWNS SUSPECT POSSIBLE FUEL PUMP CONCERN OR LEAKING
							FRP (CONSULTED WITH SANTOS RIVERA SUBJECT MATTER EXPERT)
04262001	6871	1FMCU04101KA97023	02122001	VA	607000	STALL ON DECEL	TECH STS CUST STS ON A LONG DECEL AFTER UNIT HAS WARMED UP ENGINE WILL
							DIE. TECH STS HAS NO CODES AND CANNOT DUPLICATE THE CONCERN...SEEKING
							KNOWNS.
							ADVISED TECH OF NO KNOWNS IN OASIS OR FIELD REPORTS. ADVISED TECH TO C
							HECK EGR OPERATION/RUN WDS EVAP TEST/CHECK FOR ANY LATER PCM CALIBRATI
							ONS...VERIFY CONCERN BEFORE ATTEMPTING REPAIRS.
04272001	5001	1FMYU04131KE84113	09182000	GA	607765	ALEDGED VEHICLE STALL	SD STS CUSTOMER ALEDGES VEH STALLS AT SLOW SPEEDS AND RESTARTS WITH NO
	0						PROBLEM SD HAS NOT VERIFED CONCERN AS OF YET BUT IS SEEKING KNOWNS FO
	0						R CONCERN
	0						ADVSIE SD TO CK FOR WATER ENTERY INTO CONNECTORS UNDER DASH SINCE VEH
	0						ICLE HAD WINDSHIELD WATER LEAK AND CK EEC POWER RELAY FOR SHOCK SINSIT
	0						IVEATIVY VERIFY ALL POWERS AND GROUNDS ARE SECURE
05012001	5008	1FMYU041X1KF86876	01112001	MI	607468	LOW ENGINE RPM	TECH STS ALLEGED STALL ON ACCEL. TECH HAS NOT VERIFIED THE CONCERN.

REPORT DATE	MILES	VIN	BUILD DATE	ST	SYMPT	ADDL SYM	COMMENTS
							TECH HAS VERIFIED A LOW ENGINE RPM OF 400 RPM. HAS NO CODES IN PCM TECH REPROGRAMMED THE PCM WITH NO CHANGE. SEEKING ADVICE ADV TECH TO UNPLUG THE IAC. CHECK THE RPM READING AND COMPARE TO COMPLAINT RPM. IF THE RPM MATCHES, LOOK FOR LOSS OF POWER OR GROUND TO IAC. ALSO MAY HAVE A STICKING IAC OR PCM CONCERN. REPLACED IAC VALVE.
06022001	2718	1FMYU04191KA73135	02222001	PA	607492	INTERMITTENT STALLING CONCERN	TECH STATES THAT THE CUST ALLEGES THAT WHEN AT A STOP OR WHILE TURNING THE ENG WILL STALL. TECH STATES THAT ARE NO CODES ALSO STATES THAT HE CANNOT DUPLICATE THE CONCERN. ALSO STATES THAT HE MONITORED PIDS & CHECKED FOR VACCUUM LEAKS & IT IS OK. TECH ALSO STATES THAT HE CHECKED FUEL PRESSURE & IT IS 35 PSI. TECH LOOKING FOR KNOWNS. ADVISED TECH OF NO KNOWNS. ALSO ADVISED TECH THE FUEL PRESSURE & IF STILL 35 PSI ADVISED TECH TO REPLACE THE FUEL PUMP & RECHECK FOR THE CONCERN. ADVISED TECH THAT THE FUEL PRESSURE SHOULD BE 65 PSI.
06032001	1717	1FMCU041X1KA73382	02222001	MO	607792	INTERMITTENT STALL	THE TECH STATES THAT THE CUSTOMER IS COMPLAINING OF AN INTERMITTENT STALL ON DECEL AT A STOP. THE TECH CAN NOT VERIFY. SEEKING FOR KNOWNS ADVISED THE TECH TO ATTEMPT TO DUPICATE THE CONCERN, INSPECT THE IAC FOR STICKING AND INSPECT FUEL LEVEL AND QUALITY. COULD NOT DUPLICATE CONCERN. ALL WIRING AND CONNECTIONS.
06032001	2999	1FMCU04121KF85945	12112000	NC	607692	INTERMITTENT STALL	THE TECH STATES THAT THE CUSTOMER STATED THAT THE VEHICLE STALLED WHILE CRUISING AT 45 MPH. THE VEHICLE THEN RESTARTED. FUEL LEVEL IS ABOUT 1/2 TANK AND THERE ARE NO CODES. SEEKING FOR KNOWNS. ISM 00-12-026 CK FOR STICKING SHUT OR STUCK OPEN EGR VALVE ADVISED THE TECH TO INSPECT THE EGR SYSTEM FOR POSSIBLE STICKING EGR VALVE OR FAULTY DPFE SENSOR. REPAIR OR REPLACE AS NECESSARY. COULD NOT VERIFY
06042001	2751	1FMYU04111KF57088	11012000	HI	607600		THE ENGINE SHUTS DOWN WHEN DRIVING PAST CERTAIN LOCATIONS. CONSISTANTLY AROUND WIRELESS PHONE SATELLITE TRANSMISSION TOWERS. CHECKED FOR DTC'S NONE IN MEMORY OR SELF TEST. NO OASIS SSM'S OR TSBS. SRV_DUR_CODE 07883 CHANGED TO 07899 BY PCHARNEY SYMPTOM_CODE 607000 CHANGED TO 607600 BY PCHARNEY SENT TO VISTEON.
06042001	7658	1FMYU04131KE82480	09142000	PA	607000	UNVERIFIED QUIT ON ROAD	CUSTOMER REPORTS VEHICLE QUIT ON ROAD COASTED TO A STOP. CUSTOMER CYCLED IGNITION KEY AND VEHICLE STARTED/RAN NORMALLY. CODES REPORTEDLY PASS ADVISED TECH USE WDS TO RECORD ANY NETWORTK CODES, PENDING OR FREEZE-FRAME DATA. SUGGESTED VEHICLE WIRING OR LOSS OF CKP SIGNAL AS POSSIBLE "NO CODE" FAILURE RECOMMENDED TECH OR WATER DRIVE OVER WEEKEND IF POSSIBLE ATTEMPTING TO DUPLICATE CONCERN.
06072001	2585	1FMYU04191KF42757	10232000	BC	607792	INTERMITTENT STALL	TECH STATES THAT THE CUST ALLEGES THAT THE ENG STALLED WHEN GOING DOWN HILL & IT DID IT ONCE & IT STARTED RIGHT UP. TECH STATES THAT THERE ARE NO CODES ALSO STATES THAT HE DROVE THE VEH & CANNOT DUPLICATE THE CONCERN. TECH LOOKING FOR KNOWNS. ADVISED TECH OF NO KNOWNS. ALSO ADVISED TECH TO DRIVE THE VEH &

REPORT DATE	MILES	VIN	BUILD DATE	ST	SYMPT	ADDL SYM	COMMENTS
05072001	3161	1FMYU04151KE70352	09142000	PA	607702	ALLEGED STALL	MONITOR PIDS & FUEL PRESSURE. FUEL PRESSURE SHOULD BE 55 PSI. TECH STS HAS INTERMITTENT STALL ON DECEL. HAS NO CODES IN PCM. TECH IS NOT ABLE TO VERIFY THE CONCERN. ADV TECH TO VERIFY THE CONCERN. ADV THE PCM LEVEL IS NOT CURRENT. ADV TO CHECK AND SET BASE IDLE IF NEEDED. ALSO LOOK FOR LOSS OF CKP SIGNAL SURVEY ENTER - INTERMITTENT STALL ON DECEL. TOLD TO V AND RESET. BASE IDLE-ENGINE DID NOT IDLE AT ALL WHEN ISC DISCONNECTED RESET BASE IDLE TO 550 RPM EXTENSIVE TEST DRIVE.
05072001	2761	1FMYU0411 9KF57086	11012000	HI	607000	INTERMITTENT STALL	TECH STATES CUSTOMER IS COMPLAINING OF INTERMITTENT STALL CONCERN. CUSTOMER STATES VEHICLE STALLS OUT WHEN PASSES CELL PHONE SIGHTS. CUSTOMER ALLEDGES VEHICLE WILL STALL OUT 2 OUT OF 3 TIMES AT SIGHT. TECH HAS BEEN UNABLE TO VERIFY CONCERN. ADVISED TECH TO CHECK GROUND G109 FOR CKP SHIELD GROUND. ADVISED TECH TO SHIELD CKP CIRCUIT AND GROUND ONE END OF SHIELD. TECHNICIAN STATED THAT HAS THE SAME CONCERN AND STILL CAN NOT VERIFY THE CONCERN. LOOKING FOR FURTHER ASSISTANCE. ADVISED THE TECHNICIAN TO VERIFY THE CONCERN, USE WDS AND MONITOR ALL PIDS. TECH CALLED IN AND STATES THAT THE CUSTOMER STILL ALLEGES THAT THE VEHICLE STALLS IN THIS ONE AREA. TECH SEEKING KNOWNS AND IS UNABLE TO DUPLICATE. ADVISED THE TECH TO ASK MORE QUESTIONS OF THE CUSTOMER ABOUT THE AREA AND TERRAIN (EX. STEEP HILL) THAT THE STALL HAPPENS IN. ADVISED TO TEST DRIVE WITH CUSTOMER TO OBSERVE DRIVING HABITS.
05082001	13666	1FMYU09141KF00935	10042000	CA	607600	STALLS/HESITATION	CUSTOMERS CONCERN REPORTED AS STALL AT STOPS/DECEL TECH REPORTS NOT BEING ABLE TO DUPLICATE CONCERN NOTED PERCEIVED HESITATION ON ACCEL. CODES REPORTED AS PASS TECH AWARE OF REPEAT VEHICLE CONCERNS REPORTED BY CUSTOMER ENGINE HAS BEEN REPLACED TECH FEELS CUSTOMER MAY WISH TO HAVE VEHICLE REACQUIRED COMPETENT TECH FEELS THAT PERFORMANCE OF THIS VEHICLE MAY BE NORMAL TECH CALLED TO CHECK LATEST INFORMATION REGARDING HESITATION ISM 06-12-026 CK FOR STICKING SHUT OR STUCK OPEN EGR VALVE RECOMMENDED NORMAL DIAG FOR CONCERN REPORTED BARO VALUE CORRECT FOR LOCALITY WDS FUEL SYSTEM TESTS VOLT.DROP-TEST VEHICLE WIRING GROUND POINTS MONITOR EGR SYSTEM FOR INTERMITTENT DPFE SENSOR SIGNAL FAULT. ADVISED TO AVOID REPLACEMENT OF PART(S) NOT TESTED AS DEFECTIVE OR FOUND TO BE CAUSUAL. TECH DROVE THE VEHICLE OVERNIGHT AND FELT BUCK/JERK STALL CONCERN.TECH PINPOINTED TO THE PCM HARNESS CONNECTOR AT PCM.TESTED ALL PINS AND WIRES FOR LOOSENESS.FEELS HAS PCM CONCERN. SUGGEST TECH TO REPLACE THE PCM BASE ON THE INFORMATION GIVEN,WILL NEED TO PERFORM KEY CODE PROGRAM WITH 2 KEYS AND SET TIRE SIZE AND

REPORT DATE	MILES	VIN	BUILD DATE	ST	SYMPT	ADDL SYM	COMMENTS
							AXLE RATIO.
05152001	5280	1FMYU03151KF83545	11022000	TX	607600	STALLS AT 45 MPH INTER,	CUSTOMER STATES THE VEHICLE HAS STALLING CONCERN WHILE DRIVING.TECH HAS NOT BEEN ABLE TO DUPLICATE THE CONCERN.VEHICLE RESTARTS FINE. SUGGEST DEALER TO REPLACE THE PCM POWER RELAY AND CK PRIMARY GROUND G104 AND CLEAN AS NECESSARY.
							HAS RECHECKED DRIVING 100 MILES TOTAL DRIVE WITH NO CODES
							STILL CANNOT DUPLICATE CONCERN.
							RECC TO DISSCONNECT DPFE VALVE AND RETEST.
							CHECK TO SEE IF ODOMETER GOES TO ALL DASHES DUE TO LOSS PCM CONNECTION
							SF 8TSI LAST TIME VEHICLE STALLED HAD 1/4 TANK OF FUEL BUT STARTED RIGH
							T BACK UP PER CUSTOMER THEN VEHICLE STALLED AGAIN AND CUSTOMER HAD VEH
							ICLE TOWED IN
							ADVISE SF TO INSPECT FOR CONTAMINATION IN FUEL TANK AND POSSABLE CLOGG
							ED FUEL RESIVOER
05132001	641	1FMYU04151KB40489	04172001	KS	607593	ALLEDGED STALLING CONCERN	TECH STS THAT CUSTOMER STS THAT THE VEHICLE STALLED. TECH STS THAT HE HAS DRIVEN THE VEHICLE FOR 50 MILES AND IS UNABLE TO VERIFY THE COMPLAINT. TECH SEEKING KNOWNS.
							ADVISED THE TECH OF NO KNOWNS. ADVISED THE TECH TO CHECK THE EEC RELAY FOR TIGHT CONNECTIONS. CHECK THE CKP CIRCUIT FOR ANY PINCHED OR CHAFFED WIRES.
05122001	485	1FMYU04151KB40489	04172001	KS	607600		THE ENGINE DIED WHILE DRIVING ON HIGHWAY. DID NOT START BACK UP ON FIRST TRY, WOULDN'T CRANK. AFTER IT SAT 1 HOUR STARTED OK. HAD BEEN DRIVING 20 MINUTES.
							EEC TEST PASS 51607. PINPOINT TEST. TEST DROVE 73 MILES AND CALLED HOTLINE, UNABLE TO DUPLICATE ANY CONCERNS. CUSTOMER WANTED VEHICLE BACK.
							SYMPTOM_CODE 607000 CHANGED TO 607600 BY DSTELTER
05152001	781	1FMCU03181KB49688	04182001	GA	607593	ALLEGE STALL WHILE DRIVING	CUST ALLEGES THAT VEHICLE STALLS WHILE DRIVING. SD HAS NOT VERIFIED CONCERN AND IS SEEKING KNOWNS.
							ISM 98-02-036 VAPOR LOCK CAUSED BY "WINTER BLEND" FUELS
							ADVISED SD OF NO KNOWNS. ADVISED SD NOT TO ATTEMPT REPAIR UNLESS CONCERN IS VERIFIED. ADVISED SD TO CALL CUST AND CHECK IF CUST FILLS THE GAS TANK PRIOR TO CONCERN, SUSPECT OVERFILLING.
							NO PROBLEM FOUND FOR CUSTOMERS STALLING OUT CONCERN.
05152001	7697	1FMYU04131KB81258	09092000	PA	607593	ALLEGED STALL CONCERN	TECHNICIAN BOB STATES THAT THE VEHICLE HAS AN ALLEGED STALL CONCERN. THE CUSTOMER STATES THAT HE VEHICLE LOST POWER, AND THE CHECK ENGINE LIGHT AND OIL LIGHT CAME ON. THE VEHICLE STALLED, AND THEY PULLED ON TO THE SIDE OF THE ROAD. THE VEHICLE STARTED FINE, AND THE CONCERN WAS GONE. NOW THE VEHICLE IS BACK WITH THE SAME CONCERN. THE FIRST TIME THE CONCERN HAPPENED WAS AT 626 MILES AND THE SECOND TIME WAS AT 7220 MILES. THE TECHNICIAN TOOK THE VEHICLE ON A 20 MILE TEST DRIVE, AND WASN'T ABLE TO DUPLICATE THE CONCERN. THERE ARE NO CODES, AND THE VEHICLE IS WORKING CORRECTLY AT THIS TIME. TECHNICIAN SEEKING ANY KNOWNS...
							ADVISED TECHNICIAN THAT THERE ARE NO KNOWNS FOR THIS CONCERN. ADVISED TECHNICIAN TO MAKE SURE THAT HE PCM IS AT THE LATEST CALIBRATION.

REPORT DATE	MILES	VIN	BUILD DATE	ST	SYMPT	ADDL SYM	COMMENTS
							ADVISED TECHNICIAN TO CHECK THE FUEL PRESSURE AND TO MAKE SURE THAT IT ISN'T BLEEDING DOWN. ADVISED TECHNICIAN NOT TO ATTEMPT ANY REPAIRS UNLESS THE CONCERN CAN BE DUPLICATED. ADVISED TECHNICIAN TO CALL BACK IF NEEDING ANY FURTHER ASSISTANCE...
05172001	1700	1FMCU03491KB27126	04102001	GA	607602	INTERM. STALL/RESTART/NO CODI	R/O#79647, THIS VEHICLE HAS A VERY INTERM. CONCERN OF STALL AT CRUISE /NO CODES. THE TECH HAS NOT BEEN BALE TO VERIFY THE CONCERN.
	0						ADVISED THE TECH TO CHECK POWERS AND GROUNDS TO THE PCM. TRY AN
	0						REPRODUCE THE CONCERN WITH THE NGS OR WDS.
	0						COULD NOT DUPLICATE CONCERN
	0						
05182001	4480	1FMYU041X1KF58601	01102001	OH	607693	ALLEDGED INTERMITTENT STALLIN	TECH STS THAT HE HAS AN INTERMITTENT STALLING CONCERN. TECH STS THAT
	0						HE IS UNABLE TO VERIFY THE CONCERN. TECH SEEKING KNOWNS FOR A
	0						INTERMITTENT STALLING CONCERN.
	0						ADVISED THE TECH TO TRY TAPPING ON THE EEC POWER RELAY. ADVISED
	0						TECH THAT HE MAY HAVE A LOOSE PIN ON THE RELAY. ADVISED THE
	0						TECH TO VERIFY THE CONCERN.
05212001	1518	1FMYU01191KA56947	01292001	FL	607692	ALLEGE SHUTS-OFF WHILE DRIVING	CUST ALLEGE THAT VEHICLE SHUTS-OFF WHILE DRIVING WHEN ENGINE IS HOT.
	0						SM HAS NOT VERIFIED CONCERN, HAS NO CODES AND IS SEEKING KNOWNS.
	0						ISM 96-02-035 VAPOR LOCK CAUSED BY "WINTER BLEND" FUELS
	0						ADVISED SM OF NO KNOWNS. ADVISED SM TO CHECK FUEL QUALITY AND NOT TO
	0						ATTEMPT REPAIR UNLESS CONCERN IS VERIFIED.
05212001	6801	1FMYU04111KD89139	07212000	VA	607000		TECH STATES THAT THE VEH HAS AN INT STALL CONCERN. THE TECH HAS VERY
	0						LITTLE INFO FROM THE CUST AS TO WHEN IT HAPPENS AND CAN NOT VERIFY THE
							CONCERN. CALLING FOR KNOWNS.
							ISM 00-12-025 CK FOR STICKING SHUT OR STUCK OPEN EGR VALVE
							ADVISED THE TECH THAT THE CONCERN WILL HAS TO BE VERIFIED, LOOK
							FOR STICKING EGR, OR POSS A BAD DPFE. LOOK FOR FUEL SYSTEM CONCERNS,
							IAC, CKP. POSS GET A RECORDING OF THE CONCERN.
							CUSTOMER WANTED VEHICLE RETURNED
05212001	6724	1FMYU04161KD89743	07242000	NE	607492	INTERMITTENT STALL AT STOP.	TECH STATES THAT THE CUST ALLEGES THAT THE ENG STALLED WHILE AT A STOP
							BUT STARTED RIGHT UP. TECH STATES THAT THERE ARE NO CODES HE ALSO
							STATES THAT HE DROVE THE VEH & CANNOT DUPLICATE THE CONCERN. TECH
							LOOKING FOR KNOWNS.
							ADVISED TECH OF NO KNOWNS. ALSO ADVISED TECH TO HOOKUP A FUEL PRESSURE
							GAUGE & CHECK FUEL PRESSURE & LEAKDOWN SHOULD HAS 85 PSI FUEL PRESSURE
							ALSO ADVISED TECH TO CHECK FUEL QUALITY.
05252001	780	1FMCU04141KB29964	04092001	WA	607793	STALLED ON DECEL ONCE B1352	TECH STATES THE CUSTOMER ALLEGES THE VEHICLE STALLED ONCE ON A DECEL
							AT 40 MPH. TECH CANNOT DUPLICATE. NO CODES IN PCM. SEEKING KNOWNS.
							VEHICLE HAS A SUNROOF.
							ISM 00-12-026 CK FOR STICKING SHUT OR STUCK OPEN EGR VALVE
							ADV TECH TO CHECK FOR BINDING EGR VALVE. CHECK CENTRAL JUNCTION BOX
							AND C253 FOR WATER ENTRY. REROUTE DRAIN HOSE FOR SUNROOF.
							S.M CALLING FOR FOLLOWUP INFO CONCERNING FUEL GAUGE AND LOW FUEL LAMP
							NOT COMMING ON WHEN VEHICLE RAN OUT OF GAS.
							ADVISE S.M. OF DEALER TEST MODE, ICM FAULT CODES AND VARIOUS TEST
							METHODS FOR ICM .
05292001	11686	1FMYU01181KA59476	12112000	KY	607693	UNVERIFIED STALL	SERVICE MANAGER LOOKING FOR "KNOWNS" FOR UNVERIFIED STALL/QUIT CONCERN

REPORT DATE	MILES	VIN	BUILD DATE	ST	SYMPT	ADDL SYM	COMMENTS
							VEHICLE NOT PRESENTLY AT DEALER REPORTED MILAGE WAR RECORDED 05/05/01. ADVISED MANAGER HAVE DRIVE TECH USE WDS TO DETERMINE CODE STATUS WHEN VEHICLE IS SCHEDULED INTO SHOP. TECH STATES THAT THE VEHICLE IS IN NOW AND THE MILEAGE IS 12,258. TECH HAS INSPECTED FUEL PRESSURE (33 PSI), IAC 43.8%. TECH UNABLE TO DUPLICATE CONCERN. TECH SEEKING DIRECTION. ADVISED THE DLR TO REPLACE PCM POWER RELAY AND TO INSTALL A FLIGHT REC ORDER IN THE VEHICLE. ADVISED TO MONITOR VREF, VPWR, IAC, ETC.
05302001	640	1FMCU04131KA03934	01022001		607592	STALLS AT CRUISE	SERVICE MANAGER STATED THAT HAS A CONCERN OF STALLS AT CRUISE, PULLS OVER AND STARTS UP- CAN NOT VERIFY THE CONCERN, NO CODES, FREEZE FRAME DATA. ADVISED THE SERVICE MANAGER TO VERIFY THE CONCERN. PER SME- TO CHECK THE POWERS AND GROUNDS TO THE PCM- TO PERFORM A TAP TEST ON THE PCM, TO SWAP IN A KNOWN GOOD DPFE.
06062001	7226	1FMYU04141KE91728	09162000	MA	607403	DIES ON TURNS	TECH STATES HE IS LOOKING FOR KNOWNS ON DIES ON TURNS AT TIMES, THE TECH HAS NOT VERFIED THE CONCERN,NO CODES IN THE SYSTEM. ADV TECH TO CHECK THE FUEL FILTER, ADV TO TALK WITH THE CUSTOMER, CHECK HOW MUCH FUEL WAS IN THE TRUCK DURING THE CONCERN. ISM 96-02-036 VAPOR LOCK CAUSED BY "WINTER BLEND" FUELS
06062001	3358	1FMYU02141KF99192	12062000	OH	607593	ALEDGED STALLS AT CRUSE	TECH STS CUSTOMER ALEDGES VEHICLE WILL STALL WITH CRUISE ON AND TECH ST S HAS NOT BEEN ABLE TO VERIFY CONCERN AND IS SEEKING ANY KNOWNS FOR CO NCERN ADVISE TECH THERE ARE NO KNOWNS FOR ALEDGED CONCERN AND HE WILL NEED T O ATTEMPT TO VERIFY CONCERN AND SUBMITE EDSR WITH FINDINGS
06062001	160	1FMYU03131KB63430	05252001	TX	607593	INT STALL ON DIPS/HILLS	SF STATES THE VEHICLE IS AN ALLEGED STALL CONCERN ONLY IN ONE AREA. IT WILL ALLEGEDLY STALL ON A DIP IN THE ROAD. THE SF HAS DRIVEN THE VEHICLE IN THIS AREA AND HE CANNOT DUPLICATE THE CONCERN. HE IS LOOKIN LOOKING FOR ANY KNOWNS ON THIS CONCERN. THIS IS THE SECOND VEHICLE THE CUSTOMER HAS HAD THIS CONCERN WITH. THE FIRST VEHICLE WAS BOUGHT BACK AND SHE WAS PUT INTO A NEW ESCAPE. NOW THIS VEHICLE IS DOING THE SAME THING. ADVISED SF TO TRY TO DUPLICATE THE CONCERN. DUE TO THE CIRCUMSTANCES INVOLVED, HE MAY NEED TO GET THE ZONE INVOLVED. IF HE CANNOT DUPLICATE AFTER REPETED TESTING, HE SHOULD CONTACT HIS ZONE REP OR RECONTACT US FOR A TECH ASSIST REFERRAL. SHOP FORMAN REDROVE UNIT TO SAME LOCATION AND CAN DUPLICATE STALL BY DOING FOLLOWING: LONG DECEL DOWN HILL, AT BOTTOM START TO ACCELERATE AND ENGINE STALLS. IMMEDIATE RESTART. UNABLE TO DETERMINE CAUSE.\
06062001	1662	1FMCU02101KB12676	03312001	MD	607462	VEHICLE STALLED/NO CODES	TECH CALLED STATING THE VEHICLE STALLED ON THE CUSTOMER AND TOOK SEVERAL ATTEMPTS TO START. STATED THERE ARE NO CODES. DOES NOT KNOW HOW MUCH GAS WAS IN THE TANK. DOES NOT HAVE ANY MORE INFO PERTAINING TO THE STALL. LOOKING FOR ADVICE. ADVISED TO TAP ON THE EEC POWER RELAY. IF THE RELAY UNLATCHES, CHECK THE POWERS AND GROUNDS TO THE RELAY. IF THEY ARE FINE REPLACE IT AND REVERIFY. ADVISED TO GET MORE INFO FROM THE CUSTOMER AND SUBMIT EDSR. CHECK TO SEE THE VEHICLE

REPORT DATE	MILES	VIN	BUILD DATE	ST	SYMPT	ADDL SYM	COMMENTS
							RUN ROUGH WHEN IT DID START? DID IT BLOW BLACK SMOKE?
							TECH STS THAT HE HAS A STALLING CONCERN. TECH STS THAT HE IS UNABLE TO VERIFY THE CONCERN. TECH STS THAT HE REPLACED THE EEC RELAY.
							TECH SEEKING KNOWNS
							ADVISED TECH TO MAKE SURE THAT THE RELAY PIN CONNECTIONS ARE TIGHT.
							ADVISED TECH TO CHECK THE DPFE VOLTAGE KOEO AND KOER AT IDLE THE VOLTAGES SHOULD BE THE SAME. ADVISED TECH TO CHECK THE BARO, MONITOR THE FUEL TRIMS, MAF, TP. VERIFY THE CONCERN.
							TECH STS STILL HAS THE SAME CONCERN. TECH CAN'T VERIFY THE CONCERN. HAS NO CODES. TECH STS HIS FSE WANTED HIM TO CALL FOR UPDATED INFO.
							REPORT #: 1ECHJ005 REPLACE PROCESSOR ASSY
							REPORT #: 1EAH027
							ADV TECH TO UNPLUG THE IAC. CHECK THE RPM READING AND COMPARE TO COMPLAINT RPM. IF THE RPM MATCHES, LOOK FOR LOSS OF POWER OR GROUND TO IAC. ALSO MAY HAVE A STICKING IAC OR PCM CONCERN.
							ADV TECH TO VERIFY THE CONCERN. ADV TO CHECK THE RPM PID AND FUEL PRESSURE AT THE TIME OF THE CONCERN. ADV TECH TO CHACK AND ADJUST BASE IDLE IF NEEDED.
							R&R EEC POWER RELAY. WOULD BECOME CUT OFF POWER TO PCM.
							FSE LOOKING FOR ANY UPDATES ON THE STALLING CONCERN. CHECKED PAST REPORTS AND CONSULTED MARTI PRICE. ADVISED FSE THERE ARE NO UPDATES.
06072001	11645	1FMYU04161KE70562	08232000	OH	607695	ALEDGED STALLS AT CRUSE	TECH STS CUSTOMER ALEDGES VEHICLE WILL STALL AT CRUISE SPEEDS AND HAS T O STOP VEHICLE TO RESTART AND TECFH STS HE HAS NOT BEEN ABLE TO VERIF Y CONCERN AND IS SEEKING KNOWNS FOR THIS ALEDGED CONCERN
							ADVISE TECH THAT THERE ARE NO KNOWNS FOR STALL AT CRUSE SPEEDS AND TRY TO VERIFY CONCERN AND RETRIVE ANY DTC'S AND REVIEW DATA IF ANY THING FOUND SUBMITTE EDSR
							UNABLE TO DUPLICATE CONCERN
							TECH STS SAME CONCERN, CANNOT VERIFY, SEEKING KNOWNS.
							BM 01-07-035 CK GNDS 104 & 105, SEND EDSRS
							ADV TECH CHECK FOR LATEST PCM CALIBRATION.
06072001	10501	1FMYU04131KF57755	11152000	OK	607693	INT STALL WHILE DRIVING	INT STALL AT CRUISE. SEEMS TO HAPPEN MORE ON DOWN HILLS. HAPPENS WITH IN FIRST 5-6 MILES OF DRIVE.
							HAS NOT BEEN ABLE TO DUPLICATE ON MULTIPLE TEST DRIVES. NO CODES.
							REPORT #: 1EGFS010 - RESET BASE IDLE
							CHECK BASE IDLE. ADVISED THIS IS A KNOWN COPNCERN AND IS UNDER INVESTI GATION. THERE IS NO OTHER FIX AVAILABLE AT THIS TIME.
06082001	10615	1FMCU04191KF31688	10312000	MO	607693	STALL AT CRUISE/RESTARTS	TECH STS CUSTOMER & PORTER STS THAT VEHICLE BOGGED DOWN AND STALLED AT CRUISE, TECH HASN'T BEEN ABLE TO DUPLICATE, NO CODES IN PCM , SEEKING KNOWNS
							ADV TECH NO KNOWNS, CHECK OTHER MODULES FOR CODES FOR POSSIBLE PCM POW ER OR GROUND ISSUE, CHECK FUEL PUMP CIRCUIT, MONITOR IAC%, MAF, BARO, FUEL TRIMS
06122001	3075	1FMYU04191KF31653	10262000	VA	607692	STALL WHILE DRIVING	TECH CALLED STATING THE VEHICLE INTERMITTENTLY STALLED.
							THERE ARE NO CODES AND CANNOT VERIFY THE CONCERn. THERE IS CURRENTLY A 1/2 TANK OF FUEL IN THE VEHICLE, BUT DOES NOT

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							KNOW HOW MUCH WAS IN AT THE TIME OF CONCERN. THE CUSTOMER EXPLAINED IT FELT LIKE THE VEHICLE LOSS POWER BEFORE THE STALL. THERE WAS ONE TIME WHERE IT STARTED TO LOSE POWER AND PRESSED ON THE GAS TO GET IT GOING AGAIN. WHEN THE VEHICLE DID STALL, IT HAD TO SIT FOR ABOUT 10 MINUTES BEFORE IT STARTED. THE FUEL TRIMS ARE SITTING AT ABOUT 0 AND IS LOOKING FOR ADVICE. ADVISED HE MAY HAVE TO VERIFY THE CONCERN TO DIAGNOSE. ADVISED TO CHECK THE FUEL PRESSURE. CHECK $402.
06122001	38468	1FMYU02181KE77467	08072000	NC	807000	ALLEGE CUTTING OFF AT STOPS	CUST ALLEGES THAT VEHICLE WILL INTERMITTENTLY STALLS COMING TO A STOP AND IN REVERSE. TECH HAS NOT VERIFIED STALLING AT STOPS BUT STATES THAT VEHICLE WILL INTERMITTENTLY STALLS IN REVERSE. TECH HAS REPLACED IAC TO NO AVAIL, SEEKING KNOWNS. ISM 00-12-026 CK FOR STICKING SHUT OR STUCK OPEN EGR VALVE ADVISED TECH TO MONITOR IAC AND LOAD PID DURING CONCERN, IF BOTH INCREASES, POSSIBLE TRANS CONCERN. ADVISED TECH TO CHECK BASE IDLE SETTING, FUEL TRIMS, BARO,... TECH HAVING SAME CONCERN. TECH STATES RIGHT BEFORE VEHICLE DIES LOAD GOES UP TO 99% AND IAC GOES UP TO 70%. TECH STATES CONCERN IS MOSTLY PRESENT COLD AND WHEN PLACED IN REVERSE. ADVISED TECH TO CHECK FOR KINKED TRANS COOLER LINES. ADVISED TECH TO CHECK TRANS LINE PRESSURE. ADVISED TECH TO PLACE MOD LIGHT ON INJECTORS AND SEE IF INJECTOR PULSE IS LOST BEFORE VEHICLE DIES. TECH STATES VERY INTERMITTANTLY STALLS WHEN SHIFTED INTO REVERSE. TECH STATES IAC GOES FROM 29% TO 45 %, AND LOAD GOES FROM 29% TO 69% WHEN CONCERN (STALL) IS PRESENT. TECH SEEKING IF ANY KNOWNS ADVISED TECH TO PUT VEHICLE ON HOIST AND SEE IF STALLS WHEN PUT IN REVERSE, WITH FOOT ON BRAKE. RETEST WITH FOOT OFF BRAKE, IF OK, POSSIBLE THE TORQUE CONVERTOR COMING ON. TECH STATES NO STALL IF WHEELS OFF GROUND AND BRAKE OFF. ALSO TRIED TO STALL ONE TIME AS SLOW TO STOP IN FWD WITH INCREASE IN LOAD PID. STALLS MORE WHEN COLD AND MOSTLY IN REV. LOOKING FOR EXCH. ADVISE TO ORDER NEW OVER COUNTER IF NEED EXCH.
06122001	10094	1FMYU04161KE66502	06112000	IL	807793	ALLEGED STALL ON DECEL	TECH STS HAS ALLEGED STALL CONCERN ON DECEL. TECH STS HAS NO CODES IN PCM. TECH HASN'T BEEN ABLE TO VERIFY THE CONCERN. SEEKING KNOWNS REPORT #: 1EGF8010 ADV TECH TO VERIFY THE CONCERN. ADV THE PCM LEVEL IS NOT CURRENT. ADV TO CHECK AND SET BASE IDLE IF NEEDED. ALSO LOOK FOR LOSS OF CKP SIGNAL ADV TECH OF THE ABOVE REPORT. ADV TO CHECK AND ADJUST BASE IDLE IF NEEDED. ALSO VERIFY PCM POWERS AND GROUNDS. ADJ UP IDLE
06132001	1308	1FMYU04161KB68130	05062001	ON	807662		THE VEHICLE STALLED WHILE DRIVING AT APPROX. 80 KILOS ON DECELERATION. ALSO THE FOLLOWING DAY THE ENGINE CRANKED AND WOULD NOT START. THE CUSTOMER WAITED ABOUT AN HOUR AND THE VEHICLE STARTED. THE SAME CONDITION EXISTED THE NEXT DAY. AFTER THE VEHICLE STALLED ON THE HIGHWAY IT RESTARTED AFTER CUSTOMER CAME TO A STOP.

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							WE ROAD TESTED VEHICLE AND TESTED THE EEC. AFTER DRIVING FOR APPROX. 80 KILOMETERS THE CONCERN COULD NOT BE DUPLICATED BY US. WE RELEASED THE VEHICLE TO THE CUSTOMER AND SHE WILL MONITOR. THE CUSTOMER IS NERVOUS DRIVING THIS VEHICLE NOW.
06132001	18684	1FMCU04141KD09744	07282000	MO	607481	START STALL IN MORNING	VIN 1FMYU04161KB69130 CHANGED TO 1FMYU04161KB69130 BY DSTELTER SYMPTOM_CODE 607000 CHANGED TO 607682 SY DSTELTER ADVISED TECH THERE ARE NO KNOWNS AT THIS TIME. HE SHOULD CHECK TO MAKE SURE BASE IDLE IS CORRECT. NEEDS TO DUPLICATE BEFORE ANY REPAIR ATTEMPTS ARE MADE.
06152001	21837	1FMCU04111KD82573	08082000	TX	607782	STALLS/RESTARTS	THE TECH STATES THAT THE VEHICLE INTERMITTENTLY STALLS, AND HAS STALLED ON DECEL. THE TECH CAN NOT DUPLICATE THE CONCERN AND IS SEEKING FOR KNOWNS ON THE ISSUE. ADVISED THE TECH TO ATTEMPT TO VERIFY LOSS OF CKP SIGNAL, PCM POWER, OR FUEL, AND TO INSPECT THE PCM POWER RELAY BY LIGHTLY TAPPING ON THE RELAY, AND CHECKING THE CONNECTION.
06152001	1595	1FMCU04191KB29245	04202001	OH	607483	STALLS INTERMITTENTLY	INTERMITTENT STALLING TECH HAS NOT DUPLICATED CHECK FOUND NO CODES CANT REMEBER WHAT PID VALUES WERE HAS NOT PERFORMED INTERMITTENT FAULT DIAGNOSIS THINKS IT IS PCM PROGRAMMING DOSENT KNOW ANYTHING ELSE AT THIS TIME RECC TO TECH TO GET PCED AND FOLLOW INTERMITTENT FAULT DIAGNOSIS AAND TO GET MORE INFORMATION FROM CUSTOMER ON WHEN THIS HAPPENS AND ITMES LIKE FULE LEVEL AND TIME OF DAY TO POSSIBLY HELP PINPOINT
06152001	2588	1FMCU0419XKB94782	09222001	NY	607683	ALLEDGED STALLING CONCERN	TECH STS THAT HE HAS A STALLING CONCERN. TECH STS THAT HE IS UNABLE TO DUBLICATE THE CONCERN. TECH STS THAT HE HAS NO CODES. TECH SEEKING KNOWNS ADVISED TECH TO CHECK THE EEC POWER RELAY PINS FOR PROPER TIGHTNESS. ADVISED TECH THAT A LOOSE CONNECTION COULD CAUSE A STALLING CONCERN. CHECK ALL PCM POWERS AND GROUNDS.
06162001	15760	1FMYU04101KD91825	07202000	VA	607000	ALLEGE CUTS-OFF WHILE DRIVING	INTERMITTENTLY STALLS WHILE TURNING/ COULD NOT VERIFY CONCERN. CUST ALLEGE THAT VEHICLE CUTS-OFF WHILE DRIVING, WILL RESTART EASILY. TECH HAS NOT VERIFIED CONCERN, NO CODES AND SEEKING KNOWNS. ADVISED TECH OF NO KNOWNS. ADVISED TECH TO GET MORE INFO FROM CUST IF CONCERN HAPPENED ON ACCEL, TURN, DECEL,...AFTER FILLING GAS TANK,... VERIFY CONCERN,..
06182001	6267	1FMYU04131KD82807	07192000	NJ	607700	UNVERIFIED STALL	UNVERIFIED STALL CONCERN.CUSTOMER ALLEGES ENGINE STALLS.TYPICALLY WHEN USING SPEED-PASS AT TOLLBOOTH ON NJ TRNPK. LOSS OF POWER WINDOWS AND SPEED CONTROL ALSO REPORTED.TECH HAS NOT BEEN ABLE TO VERIFY OR DUPLICATE CONCERN.CODES OBTAINED,B1323 AND B1362.
06182001	6128	1FMCU03161KE71660	08302000	FL	607000	INTERMITTENT STALL	CLIFORD BRAND ALARM(REMOTE START?)ADD-ON EQUIPMENT PRESENT IN VEHICLE INSPECT VEHICLE WIRING,HARNESSES,CONNECTORS AND GROUND POINTS. MONITOR DPFE SIGNAL FOR ERRATIC VOLTAGE. AFTER-MARKET ALARM EQUIP./WIRING MAY NEED TO BE REMOVED AND AFFECTED WIRING REPAIRED TO ELIMINATE ADD-ON EQUIPTMENT AS CAUSUAL. TECH CALLED STATING THE VEHICLE WILL STALL INTERMITTENTLY. STATED HE VERIFIED THE CONCERN. THERE ARE NO CODES IN THE PCM AND WAS ABLE TO COMMUNICATE WITH THE PCM AT THE TIME. STATED

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							IT WILL STALL OVER A SPEED BUMP OR WHEN PUT INTO DRIVE. CHECKED PCM CONNECTIONS. WIGGLED THE HARNESS AND COULD NOT VERIFY BY WIGGLING THE HARNESS. CHECKED POWERS AND GROUNDS TO PCM. LOOKING FOR ADVICE. ADVISED TO CHECK FOR CHAFFING AT THE PDB WHERE THE HARNESS ENTERS THE INNER FENDER. ADVISED TO TAP ON THE EEC RELAY AND SEE IF IT RELEASES. IF IT RELEASES, REPLACE THE RELAY. CHECK THE HARNESS AT THE ENGINE MOUNT ON THE RH SIDE FOR CHAFFING. WIGGLE THE ENGINE HARNESS AND TRY AND DUPLICATE THE STALL.
08192001	4163	1FMCU04128KF69403	11302000	PA	607792	ALLEGED STALL WITH A/C ON	TECH STS HAS ALLEGED STALL WITH A/C ON AND ON DECEL. TECH STS HAS NO CODES IN PCM. SEEKING KNOWNS REPORT #: 1EGF8010 ADV TECH TO VERIFY THE CONCERN. ADV THE PCM LEVEL IS NOT CURRENT. ADV TO CHECK AND SET BASE IDLE IF NEEDED. ALSO LOOK FOR LOSS OF CKP SIGNAL. ADV TECH OF THE ABOVE REPORT. ADV TO CHECK THE BASE IDLE. ALSO VERIFY THE A/C PRESSURES ARE OK. ADV TECH TO VERIFY THE CONCERN.
08192001	8085	1FMCU03111KD89804	07242000	CA	607593	INT STALL ON DECEL	TECH STATES THAT THE CUST ALLEGES THAT THE VEH STALLED WHEN EXITING THE FREEWAY & IT WAS HARD TO START. TECH STATES THAT THERE ARE NO CODES ALSO STATES THAT HE CANNOT DUPLICATE THE CONCERN. TECH LOOKING FOR KNOWNS. ADVISED TECH OF NO KNOWNS. ALSO ADVISED TECH TO CHECK THE FUEL PRESSURE & LEAKDOWN FUEL PRESSURE SHOULD BE 65PSI & THERE SHOULD BE NO LEAKDOWN. ALSO ADVISED TECH TO MONITOR PIDS & FUEL PRESSURE WHILE DRIVING THE VEH ALSO TO GET MORE INFORMATION FROM THE CUST LIKE HOW MUCH FUEL WAS IN THE FUEL TANK HOW LONG THEY WERE DRIVING THE VEH.
08202001	4461	1FMYU04111KF87434	01102001	PA	607693	REPEAT STALLIN AT CRUISE	TECH STATES THE CUSTOMER ALLEGES THE VEHICLE STALLS AT A CRUISE. NO CODES ARE STORED IN THE PCM AND HE HAS NOT BEEN ABLE TO DUPLICATE THE CONCERN. THE CUSTOMER STATES THE VEHICLE STARTS RIGHT BACK UP WITH NO PROBLEM AT ALL. SEEKING FOR ANY KNOWNS OR ADVICE. ADVISE TECH NO KNOWNS WERE AVAILABLE, ADVISE TO TAP ON THE EEC RELAY AND SEE IF IT STALLS, CHECK FOR LOOSE PINS AT THE POWER DIST. BOX AS WELL.
08202001	3969	1FMYU01111KA46596	01222001	TX	607000	INT STALLS WHEN DRIVING	SF STS CUST ALLEGES VEH STALLED WHEN DRIVING, STS WAS WRITTEN UP PREVIOUSLY FOR STRUGGLES TO START AND THEN TICKING NOISE ONCE RUNNING, SF STS CANNOT VERIFY CONCERN AND HAS NO CODES, UNSURE OF PID READINGS, SEEKING KNOWNS. ADV TECH NO KNOWNS, ADV VERIFY CONCERN OR OBTAIN APPLICABLE DTCS BEFORE ATTEMPTING REPAIRS, CHECK FUEL DELIVERY SYSTEM.
08202001	824	1FMYU03111KB60286	09032001	OH	607793	INT STALL AT CRUISE	TECH STATES THAT THE CUST ALLEGES THAT THEY WERE DRIVING THE VEH & THE ENG STALLED BUT IT STARTED RIGHT UP. TECH STATES THAT THERE ARE NO CODES ALSO STATES THAT HE DROVE THE VEH A HOUR & A HALF & CANNOT DUPLICATE THE CONCERN. TECH LOOKING FOR KNOWNS. ADVISED TECH TO CHECK FUEL PRESSURE & IT SHOULD BE 65 PSI ALSO ADVISED HIM TO CHECK FOR A STICKING IAC & TO CHECK FOR THE PCV HOSE BLOWING OFF & TO CHECK THE BJB CONNECTIONS & THE PCM POWERS & GROUNDS.

Intermittent Stall - No Codes, No Verification

REPORT DATE	MILES	VIN	BUILD DATE	ST	SYMPT	ADDL SYM	COMMENTS
06202001	8320	1FMCU04151KF54463	12012000	IN	607760	DIED ONCE	HAS NO CODES CUSTOMER COPLAINED OF CUTTING OUT ONCE WHEN TANK WAS ABOUT HALF FULL TECH SEEKING KNOWNS RECC TO DRAIN TANK TO 1/4 FULL AND RETEST TO SEE IF A FUEL PUMP ISSUE EXSISTS AND TO ALSO MONITOR PIDS WHILE DRIVING TO SEE IF TP SIGNAL IS LOST
06212001	6815	1FMYU04161KE36451	09282000	NY	607560	STALLS	ON ACCLERATION TECH STS ALLEGED STALL ON ACCEL. TECH HAS NOT VERIFIED THE CONCERN. TECH HAS VERIFIED A LOW ENGINE RPM OF 400 RPM. HAS NO CODES IN PCM TECH REPROGRAMMED THE PCM WITH NO CHANGE. SEEKING ADVICE ADV TECH TO UNPLUG THE IAC. CHECK THE RPM READING AND COMPARE TO COMPLAINT RPM. IF THE RPM MATCHES, LOOK FOR LOSS OF POWER OR GROUND TO IAC. ALSO MAY HAVE A STICKING IAC OR PCM CONCERN.
06212001	850	1FMCU04161KB73803	05182001	CA	607603	ALEDGED STALLS	WHILE CRUSE TECH STS CUSTOMER ALEDGES VEHICLE STALLED WHILE DRIVING AND RESTARTED WITHOUT PROBLEM AND TECH IS UN ABLE TO VERIFY CONCERN AND IS SEEKING K NOWNS FOR CONCERN ADVISE TECH THAT THERE ARE NO KNOWNS FOR CONCERN AT THIS TIME AND TO TRY TO VERIFY CONCERN
06222001	2020	1FMYU04111KF77020	12012000	AB	607000	INT STALL, NO CODES	SF STS CUST ALLEGES VEH HAS STALLED 3 TIMES SINCE NEW. DOESN'T WANT VEH BACK UNTIL CONCERN IS RESOLVED, SF STS CANNOT VERIFY, NO CODES, SEEKING KNOWNS. ADV SF NO KNOWNS, ADV POSSIBLE CONNECTION CONCERNS IN PDS, POSSIBLE PCM DIODE OR POWER RELAY CONCERN.
06252001	6020	1FMYU04181KF88803	12152000	OH	607000	INT STALL ON HILLS	FULL FUEL SW STATES THE CUSTOMER ALLEGES THE VEHICLE HAS STALLED 2 TIMES IN 6000 MILES. HE STATES IT HAPPENED WHEN GOING DOWN HILL WITH A FULL TANK OF FUEL. HE IS LOOKING FOR ANY KNOWNS. ADVISED SW THERE ARE NO KNOWNS. HE SHOULD CHECK THE VMV LINE AND CANISTER FOR RAW FUEL. POSSIBLE RICH PURGE CONCERN. NEED TO DUPLICATE BEFORE MORE DIAGNOSIS/REPAIRS CAN BE PERFORMED. COULD NOT VERIFY CONCERN
06262001	5358	1FMYU04181KF16439	10122000	OH	607602	INT STALL	WHILE DRIVING SM STATES THAT THE CUST ALLEGES THAT THE ENG STALLED WHILE DRIVING & IT STARTED RIGHT UP. SM STATES THAT THEY CANNOT DUPLICATE THE CONCERN & THERE ARE NO CODES. SM LOOKING FOR KNOWNS. ADVISED SM OF NO KNOWNS. ALSO ADVISED SM TO CHECK THE FUEL PRESSURE & IT SHOULD BE 66 PSI ALSO TO DRIVE THE VEH & TO MONITOR FUEL PRESSURE & PIDS & TRY TO DUPLICATE THE CONCERN.
06272001	316	1FMYU04101KA34077	01252001	PA	607000		WHILE DRIVING HOME AFTER TAKING DELIVERY, VEHICLE STALLED OUT. CUSTOMER COASTED INTO A DRIVEWAY AND VEHICLE RESTARTED NORMALLY. VEHICLE RAN NORMALLY AFTER THAT. DROVE IT TO DEALERSHIP. DOES NOT WANT VEHICLE BACK UNTIL FIXED. TECH ROAD TESTED SEVERAL MILES, CHECK ENGINE LIGHT NOT ON, RAN GOOD. RAN KOS, EEC SCAN, ALL PASS. CHECKED ALL ELEC. CONNECTIONS AND FUSE/RELAY CONNS. ALL OK. RAN OASIS, NO TSBS OR SSM'S. CALLED TECH HOTLINE, WAS ADVISED OF A POSSIBLE CONCERN WITH A FEW OTHER VEHICLES. FORD ENGINEERS UNABLE TO DUPLICATE AND HAVE NO ANSWERS.
06272001	11889	1FMYU03101KE83660	09282000	TN	607000	ALLEGED STALL	WHILE DRIVING CUSTOMER ALLEGES THAT THE VEHICLE STALLS WHILE DRIVING. TECH IS UNABLE TO DUPLICATE THE CONCERN. TECH SEEKING KNOWNS. ADVISED THE TECH TO LIGHTLY TAP ON THE EEC POWER RELAY WHILE THE

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							VEHICLE IS RUNNING. TECH STATED THAT THE VEHICLE DID STALL WHEN HE TAPPED ON THE RELAY. ADVISED THE TECH TO CHECK THE PINS IN THE FUSE BOX AND IF OK THEN REPLACE THE RELAY AND RETEST.
06272001	315	1FMYU04101KA34077	01252001	PA	607602	STALLED AND RESTARTED	TECH CALLED STATING THE CUSTOMER WAS DRIVING THE VEHICLE AND IT STALLED. STATED THE VEHICLE WAS BEING DRIVEN AT LOW SPEEDS. THE AMBIENT TEMP IS VERY WARM. CUSTOMER COASTED TO THE SIDE OF THE ROAD AND THE VEHICLE STARTED WITH NO PROBLEM. TECH DROVE THE VEHICLE 10 MILES AND NO PROBLEM FOUND. THERE ARE NO CODES. LOOKING FOR ADVICE. STATED THE FUEL GAGE IS ON A LITTLE OVER 1/4 TANK. ADVISED TO CHECK THE PCM CONNECTIONS. ADVISED TO CHECK THE CONNECTIONS IN THE POWER DISTRIBUTION BOX AND AT THE EEC RELAY. UNABLE TO DUPLICATE CONCERN
06282001	5514	1FMYU04111KE78057	09012000	OH	607703	ALEDGED STALLS ON DECELL	TECN STS HAS VEHICLE THAT CUSTOMER ALEDGES STALLS ON DECELL AND TECH H AS DRIVEN VEHICLE FOR TWO DAYS AND HAS NOT VERIFIED ANY DRIVE SYMPTOMS AND HAS NO DTC'S AND IS SEEKING ANY KNOWNS FOE CONCERN
06282001	657	1FMYU04101KB90537	05302001	PA	607603	STALLED WHILE DRIVING	ADVISE TECH TO CK EEC POWER RELAY FOR SHOCK SENSITIVE BY TAPPING RELAY AND ALSO CK EGR OPERATION AND THERE ARE NO OTHER KNOWNS CUSTOMER STATES THE VEHICLE STALLED WHILE DRIVING.WOULD NOT RESTART. HAS NO CODES,WAS TOWED IN AND TECH HAS NOT DUPLICATED.
06282001	12882	1FMYU04121KF08314	10172000	NC	607600	ALLEDGE STALL AT CRUISE.	SUGGEST TECH TO CK FOR WATER ENTRY NEAR THE DRIVERS KICK PANEL,CK PCM POWER RELAY AND CONNECTIONS,CK DPFE FOR SHORTING OUT VREF.(SME)MARTI. VEHICLE WAS BROUGHT IN FOR A STALL WHILE AT CRUISE. TECH AS YET TO DUPLICATE CONCERN, NO CODES
06282001	2460	1FMYU04151KA44335	01252001	AB	607000	VEH STALLING DURING CRUISE	REPORT #: 1ECIP010 ADVISED THE TECH TO ATTEMPT TO DUPICATE THE CONCERN. CHECK BASE IDLE POSSIBLE IAC. TECH REPORTS VEHICLE HAS INT STALL DUING CRUISE. CANNOT VERIFY REPAIR SEEKING KNOWNS.
06282001	5586	1FMCU04171KA83778	02062001	ON	607600	STALLS ON HIGHWAY	ADVISED TECH TO CHECK PCM POWER RELAY PINS FOR TIGHTNESS. CHECK IAC OPERATION, BASE IDLE. CHECK CRANK SHAFT ENDPLAY AND INTEGRITY OF THE CRANK SENSOR. CHECK FOR PCM UPDATES. CUSTOMER ALLEGES THAT THE VEHICLE STALLS WHEN DRIVING AND WHEN RESTARTED IT HAD NO POWER. TECH IS UNABLE TO CONFIRM CONDITION AND SAID THAT EVERYTHING APPEARED OK. TECH SEEKING KNOWNS.
06302001	6701	1FMYU04161KF43646	11132000	PA	607602		ADVISED THE TECH TO LIGHTLY TAP ON THE EEC POWER RELAY AND SEE IF THE VEHICLE STALLS. ADVISED IF DOES THEN REPLACE THE RELAY. ADVISED TECH TO CHECK TO SEE IF THE PCM HAS THE LATEST CAL ALSO. ADV TO CONFIRM CONDITION BEFORE ATTEMPTING ANY OTHER REPAIRS. CUST. STATES: VEH. STALLS WHILE DRIVING AT STEADY SPEED OF 45 MPH. * ON 4-20-01 CUST. COMPLAINED THAT VEH. QUITS WHILE DRIVING. HOTLINE DIRECTED TECH. TO TAP ECC POWER RELAY, VEH. STALLED. TECH. REPLACED ECC POWER RELAY. * ON 5-3-01 CUST. COMPLAINED THAT VEH. QUITS WHILE DRIVING. HOTLINE DIRECTED TO CHECK VARIOUS ITEMS, TECH. REPLACED FUSE BOX DIODE.

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05302001	7192	1FMCU04141KEB1182	09082000	PA	607692		* ON 5-5-01 CUST. COMPLAINED THAT VEH. QUIT WHILE DRIVING AT STEADY SPEED OF 45 MPH. REGION TRADED CUST. OUT OF VEHICLE. * ROOT CAUSE NOT DETERMINED. * MARK HAYDUK - PITTSBURGH FOE - 724-822-4342 CUST. STATES: ENGINE WILL STALL WHILE DRIVING AT STEADY SPEED. * CUST. COMPLAINED ON 4-12-01 AT 5,888 MI. THAT THE ENGINE SHUT OFF WHILE DRIVING. TECH. FOUND NO CODES AND COULD NOT DUPLICATE CONCERN. TECH. TAPPED ON ECC POWER RELAY AND ENG. DID NOT STALL. TECH. CHANGED ECC POWER RELAY AS A PRECAUTION PER HOTLINE. * CUST. COMPLAINED ON 6-21-01 AT 7,192 MI. THAT THE ENGINE SHUT OFF WHILE DRIVING AT A STEADY SPEED. TECH. FOUND NO CODES AND COULD NOT DUPLICATE CONCERN. FOE SUGGESTED CHANGING POWER DIST. BOX FOR POTENTIAL LOOSE PINS. * MARK HAYDUK - PITTSBURGH FOE - 724-822-4342
05302001	333	1FMYU04161KC00796	05112001	NE	607693	ALEDGED STALLS AND QUITS	SM STS HAS VEHICLE THAT CUSTOMER ALEDGES STALLS WHILE AT CRUISE SPEED A ND SM HAS NOT BEEN ABLE TO VERIFY CONCERN AND IS SEEKING KNOWNS FOR CO NCERN ADVISE SM TO PERFORM SHOCK TEST ON POWER RELAY AND IF ENGINE DIES THEN REPLACE RELAY AND CK PINS AND ALSO CK FOR ANY DTC'S IF P1000 PRESENT THEN CK FOR BASE POWERS AND GROUNDS
07022001	11633	1FMYU04161KE00307	07282000	CO	607600	INT STALL DURING CRUISE	THE TECH STATES THAT THE CUSTOMER IS COMPLAINING OF AN INTERMITTENT STALLING CONCERN. THE TECH HAS BEEN UNABLE TO VERIFY THE CONCERN. SEEKING FOR ANY KNOWNS ON THE ISSUE. ADVISED THE TECH TO CHECK PCM POWERS AND GROUNDS, PCM POWER RELAY, AND INSPECT THE CRANK SENSOR.
07022001	2618	1FMYU04161KB61100	04252001	PA	607700	ALLEGED STALL WHILE DRIVING	CUSTOMER ALLEGES THAT THE VEHICLE STALLED WHILE DRIVING. TECH IS UNABLE TO CONFIRM THE CONDITION. TECH CALLING SEEKING KNOWNS. ADVISED THE TECH TO LIGHTLY TAP ON THE EEC POWER RELAY WHILE THE ENGINE IS RUNNING AND SEE IF IT STALLS. ADVISED IF IT DOES THEN CHECK PINS IN THE FUSE BOX FOR THE RELAY AND REPLACE THE RELAY. ADVISED THE TECH IF THE CONCERN IS STILL THERE THEN CHECK BASE IDLE WITH IAC UNPLUGGED AND IF NEEDED ADJUST TO 650 RPMS. ADVISED TECH THAT IF NO OTHER CONCERNS ARE FOUND THEN DUPLICATE THE CONCERN BEFORE ATTEMPTING ANY OTHER REPAIRS.
07022001	166	1FMCU04101KB81988	06012001	PA	607692	STALL AT CRUISE, NO CODES	CUSTOMER PURCHASED A NEW ESCAPE SEVERAL WEEKS AGO. DURING THE FIRST C OUPLE HUNDRED MILES IT STALLED 2X AT CRUISE. COULD NOT FIND ANYTHING W RONG, SO DEALER GAVE CUSTOMER A DIFFERENT ESCAPE. THIS ONE HAS NOW STA LLED 1X AT CRUISE. SEEMS TO HAPPEN WITHIN A 2 MILE STRETCH OF HIGHWAY THAT IS KNOWN FOR RADIO INTERFERENCE (CELL PHONES GO OUT). VEHICLE RE STARTS FINE. HAS NOT VERIFIED OR DUPLICATED CONCERN. ATTEMPTED 1HR ROAD TEST IN TH AT 2 MILE STRETCH OF HIGHWAY TO NO AVAIL. KNOWN CONCERN. UNDER INVESTIGATION. ATTEMPT TO DUPLIACTE CONCERN FURTH ER. CHECK FOR PCM POWER, GROUND, COMMUNICATION. MAY WANT TO SHIELD CKP WIRING FROM C110 TO PCM.
07032001	9950	1FMYU04161KF01123	12042000	WV	607692		THE VEHICLE STALLS AND WILL NOT RESTART. THE ENGINE QUIT WHILE DRIVING

REPORT DATE	MILES	VIN	BUILD DATE	ST	SYMPT	ADDL SYM	COMMENTS
							AT 45 MPH AND WOULD NOT RESTART. SECOND TIME I LET IT SIT FOR A HALF HOUR AND IT RESTARTED. COULD NOT VERIFY CONCERN, NO CODES. TEST DROVE APPROXIMATELY 100 MILES AND COULD NOT VERIFY CONCERN. SRV_DLR_CODE E4010 CHANGED TO 07467 BY SDAVI520 SYMPTOM_CODE 607500 CHANGED TO 607592 BY SDAVI520
07032001	7855	1FMYU04161KE69136	09152000	ON	607593	STALLS WHILE DRIVING, ONCE	CUST STATES STALLED WHILE DRIVING. TECH STATES CANNOT VERIFY CONCERN AT THIS TIME. NO MIL CODES, RUNS FINE. SEEKING IF ANY KNOWNS REPORT #: 1EAH027 TECHC 08/02/2001 06:58AM SURVEY ENTRY MSS - FCSD - TECH SV REPLACED IAC VALVE. ISM 01-05-025 HESITATIONSTUMBLE ON TIP-IN, UPDATE (PCM) CALI TO R12 ADVISED TECH TO CHECK AND SEE IF PCM IS AT LATEST CALIBRATION, PER ISM CHECK IAC AND EGR VALVE FOR STICKING.
07032001	5960	1FMYU04181KF51123	12042000	WV	607592	STALLS, HARD RESTART	CUST STATES STALLS AT CRUISE, CRANKS, BUT DOES NOT RESTART. LET SIT 1/2 HOUR AND VEHICLE STARTS UP. HAPPENED TWICE. SF STATES ALWAYS START S AT DEALER AND CANNOT VERIFY ANY STALL CONCERN. CUST STATES HAS ENGIN E KNOCK ALSO, SF STATES UNABLE TO VERIFY THAT CONCERN ALSO. SEEKING IF ANY KNOWNS ADVISED SF TO VERIFY CONCERN BEFORE ANT REPAIRS ARE MADE. CHECK FUEL PRESSURE, JUNCTION BOX CONNECTIONS, CHECK FOR EGR VALVE STICKING. NO KNOWNS AT THIS TIME
07032001	3742	1FMCU04121KB27421	04062001	MO	601300	INT STALL NO START	CUSTOMER STS VEH STALL WHEN DRIVING WITH NO CRANK NO START CONCERN TECH UNABLE TO DUPLICATE FOUND B1352 IN ICM SEEKING KNOWNS ADV TECH OF NO KNOWNS AND TO CHECK POWER DIST BOX FOR CONNECTION CONCERNS
07032001	8060	1FMYU03121KE86246	09272000	HI	607795	STALL ON DECEL, AND CRUISE	INTERMITTANT STALL WHILE DRIVING AND ON DECEL. RESTARTS FINE. NO CODES. HAS NOT VERIFIED OR DUPLICATED CONCERN. ISM 00-12-026 CK FOR STICKING SHUT OR STUCK OPEN EGR VALVE REPORT #: 1EGFS010 - RESET BASE IDLE REPORT #: 1ECIP010 - COULD NOT DUPLICATE CHECK FOR COMMUNICATION WITH PCM AT TIME OF CONCERN. POSSIBLY SWAP DPF E AND RETEST. RESET BASE IDLE PER PAST REPORT. ADVISED STALL AT CRUIS E CONCERN IS UNDER INVESTIGATION, NO FIX AVAILABLE AT THIS TIME.
07052001	9483	1FMYU04191KE75433	06302000	PO	607593	STALL ON ACEL	TECH STATED THAT VEHICLE WILL STALL AFTER A DOWNHILL COAST AND THEN AC ELERATING TO START UP AN INCLINE,TECH HAS ROADTESTED VEHICLE AND IS UN ABLE TO REPRODUCE CONCERN. CHECK FOR LOOSE CONNECTIONS,CHECK GROUNDS,
07052001	32398	1FMYU03141KE57083	08042000	GA	607000	INTERMITTENT STALL	TECH STATES VEHICLE WAS TOWED IN BECAUSE IT STALLED AND WOULD NOT START, THERE ARE NO DTC'S AND VEHICLE STARTED RIGHT UP WHEN IT GOT TO THE DLR. TECH HAS REFLASHED PCM AND IS CALLING FOR MORE INFO. ADV. TECH THAT WE ARE LOOKING INTO THIS CONCERN AND ADVISE TO CHECK PCM POWERS AND GROUNDS, EEC RELAY AND TRY TO DUPLICATE CONCERN. NO OTHER KNOWNS AT THIS TIME.
07062001	17651	1FMCU041X1KE45254	08072000	MO	607500	INT STALL 30-45 MPH	SM STATES THE VEHICLE HAS AN INTERMITTENT STALL CONCERN USUALLY BETWEEN 30-45 MPH. HE STATES THEY CANNOT DUPLICATE THE CONCERN, BUT

REPORT DATE	MILES	VIN	BUILD DATE	ST	SYMPT	ADDL SYM	COMMENTS
							THE VEHICLE BELONGS TO ONE OF THE SALESMEN AND HE HAS DUPLICATED THE CONCERN. HE STATES IT HAPPENS 1-2 TIMES IN A TWO WEEK PERIOD. HE IS LOOKING FOR ANY KNOW CONCERNS. ADVISED SM THAT THERE ARE NO KNOWNS. HE SHOULD CHECK THE PIN FITS IN THE POWER DISTRIBUTION BOX. IF POSSIBLE, HE MAY TRY SENDING A WDS - HOME WITH THE SALESMAN AND TRY TO CAPTURE A RECORDING OF THE EVENT. HE NEEDS TO DUPLICATE BEFORE MORE DIAGNOSIS CAN BE DONE.
							SM STS SAME CONCERN, CANNOT VERIFY IN 3 DAY TEST WITH WDS, SEEKING KNOWNS. ADV SM NO KNOWNS, ADV NEED A RECORDING OF EVENTS DURING THE CONCERN.
07092001	8785	1FMCU04161KE72856	09262000	BC	607000		THE VEHICLE STALLS OUT AFTER DRIVING DOWNHILL AT CITY SPEEDS, A LOSS OF BRAKES AND STEERING ASSIST. UNABLE TO DUPLICATE. THIS HAPPENED TWICE IN ONE WEEK. NO CODES. THIS IS THE SECOND CUSTOMER WITH THE SAME CONCERN. BOTH WERE COMING FROM HIGHER ELAVATIONS DROPPING APPROXIMATELT 600-700 FEET. IF THERE IS ANY INFORMATION OUT THERE WE WOULD LIKE TO KNOW, THANKS.
07092001	623	1FMCU04121KB90146	05302001	PA	607000	INT STALL DOING DOWN INCLINES	TECH STS CUST ALLEGES VEH STALLED TWICE WHEN DRIVING, BOTH TIMES WHEN GOING DOWN A HILL, STS ALSO ONE OTHER TIME WENT TO START VEH AND WOULD CRANK BUT NOT START, CYCLED KEY AND VEH STARTED, CUST DOESN'T RECALL IF THEFT LIGHT WAS FLASHING OR NOT, CANNOT VERIFY, NO CODES, PIDS ARE FINE, SEEKING KNOWNS. ADV TECH NO KNOWNS, VERIFY CONCERN BEFORE REPAIRING.
07092001	9700	1FMYU04161KF01700	10052000	MI	607703	INTERMITTENT STALLING CONCERN	TECH STS THAT HE HAS AN INTERMITTENT STALLING CONCERN WHILE GOING OVER ROUGH ROAD. TECH STS THAT HE HAS NO CODES. TECH SEEKING ANY KNOWNS FOR THIS CONCERN. ADVISED TECH TO CHECK THE EEC POWER RELAY. ADVISED TECH TO MAKE SURE THAT THE PINS ARE TIGHT. ADVISED TECH TO CHECK PCM POWERS AND GROUNDS. ALSO CHECK FOR POSSIBLE CKP CHAFFING CONCERNS.
07092001	20111	1FMYU03141KF33045	10162000	TX	607000	INTER STALL AT IDLE AND DECEL	TECH STATES THAT CUSTOMER SAYS VEHICLE INTER STALLS AT IDLE AND DURING A DECEL. NO CODES. VEHICLE STARTS RIGHT BACK UP WHEN IT STALLS. ADVISED TECH TO CHECK FUEL PRESSURE, AND FPDM GROUND. ALSO CHECK IAC, AND PCV VALVE. TECH NEEDS TO MONITOR MAFV, TP, DPFEV, AND FUEL PRESSURE ON A ROAD TEST.
07102001	2085	1FMYU0415YKB61785	05232001	NE	607003	STALLS AT CRUISE/NO RESTART	SD STS CUSTOMER STS THAT VEHICLE STALLED 3X AT CRUISE AND WOULDN'T RES TART UNLESS THEY LET IT SIT AWHILE, SD HASN'T VERIFIED CONCERN, SEEKIN G KNOWNS/ADVICE ADV SD TO CHECK BJB CONNECTIONS, TAP ON RELAYS, CHECK PCM HARNESS, DIS CONNECT IAC AND MAKE SURE ENGINE STILL IDLES, IF NOT RESET THROTTLE ST OP SO ENGINE IDLES BETWEEN 500-650 RPM W/IAC DISCONNECTED, SUBMIT EDBR
07102001	1023	1FMYU0412YKB61152	05102001	VA	607003	INTERMITTENT STALL	SHOP FOREMAN CALLED STATING THE VEHICLE INTERMITTENTLY STALLS. STATED THEY CANNOT VERIFY THE CONCERN. STATED THERE ARE NO CODES. STATED THE VEHICLE STALLED ON DECEL AT CRUISE. STATED THE CUSTOMER PULLS OFF TO THE SIDE OF THE ROAD AND THE VEHICLE RESTARTS. STATED THE LONG AND SHORT FUEL TRIMS ARE AROUND 0, PLUS OR MINUS A COUPLE PERCENT. LOOKING FOR ADVICE.

REPORT DATE	MILES	VIN	BUILD DATE	ST	SYMPT	ADDL SYM	COMMENTS
							REPORT #: 1RLHF023 REPORT #: 1EGF3010 ADV TECH TO VERIFY THE CONCERN. ADV THE PCM LEVEL IS NOT CURRENT. ADV TO CHECK AND SET BASE IDLE IF NEEDED. ALSO LOOK FOR LOSS OF CKP SIGNAL ADV TECH OF THE ABOVE REPORT. ADV TO CHECK AND ADJUST BASE IDLE IF NEEDED. ALSO VERIFY PCM POWERS AND GROUNDS. REPORT #: 1EGF3010 ADV TECH TO VERIFY THE CONCERN. ADV THE PCM LEVEL IS NOT CURRENT. ADV TO CHECK AND SET BASE IDLE IF NEEDED. ALSO LOOK FOR LOSS OF CKP SIGNAL ADVISED OF THE ABOVE REPORTS. ADVISED TO DISCONNECT THE IAC AND SET THE BASE IDLE TO 600-650 RPM. ADVISED TO RESET THE KAM.
07102001	4650	1FMYU04161KA79203	02282001	PA	607693	ALLEGED STALL WHILE DRIVING	TECH STS HAS ALLEGED STALL WHILE DRIVING. HAS NO CODES AND FUEL PRESSURE IS 40 PSI. TECH CANT VERIFY THE CONCERN. SEEKING KNOWNS REPORT #: 1ECHL005 REPLACE PROCESSOR ASSY REPORT #: 1EAH0027 ADV TECH TO UNPLUG THE IAC. CHECK THE RPM READING AND COMPARE TO COMPLAINT RPM. IF THE RPM MATCHES, LOOK FOR LOSS OF POWER OR GROUND TO IAC. ALSO MAY HAVE A STICKING IAC OR PCM CONCERN.
07112001	6872	1FMCU04171KF66399	11292000	OH	607693	ALLEGE STALL AT CRUISE	--------- ADV TECH THE REPORTS SEEM TO BE STALLING AT IDLE OR ON DECEL. ADV TECH TO VERIFY THE CONCERN PRIOR TO ANY REPAIRS. TECH STATES THE CUSTOMER ALLEGES THE VEHICLE STALLS AT A STEADY CRUISE NO CODES IN THE PCM AND HE HAS NOT BEEN ABLE TO DUPLICATE THE CONCERN. THE CUSTOMER ALLEGES THAT IT FELT AS IF SOMEONE SHUT THE KEY OFF. THE CUSTOMER ALSO ALLEGES THE BATTERY LIGHT COMES ON WHILE DRIVING AT A CRUISE INTERMITTENTLY. SEEKING FOR ANY KNOWNS OR ADVICE. ISM 01-05-013 ESCAPE 3.0L CHRGING SYSTEM, CALL NUMBER LISTED BELOW ADVISE TECH TO GET MORE INFORMATION REGARDING THE ALLEGE BATTERY LIGHT COMING ON AT A CRUISE, IF HE CAN VERIFY THEN CALL TONY C. AT THE ABOVE LISTED IN THE ISM. AS FOR THE ALLEGE STALL CHECK THE EEC POWER RELAY, HE CAN TAP ON IT AND SEE IF IT STALLS.
07112001	10577	1FMCU03161KD07464	07242000	TX	607693	STALL AT CRUISE/NO CODES	SERVICE MANAGER CALLED STATING THE VEHICLE STALLS AT CRUISE INTERMITTENTLY. THEY CANNOT VERIFY THE CONCERN. STATED THERE ARE NO CODES. THE CUSTOMER NOTICES THE STALL WHEN THE STEERING GETS STIFF. LOOKS DOWN AT THE TACH AND IT IS AT 0. PULLS OFF TO THE SIDE OF THE ROAD AND THE VEHICLE WILL RESTART WITH NO PROBLEM. LOOKING FOR ADVICE. ADVISED TO CHECK THE IAC CONNECTIONS. ADVISED TO CHECK THE EEC RELAY CONNECTIONS AND THE HARNESS THROUGH THE GROMMET AT THE POWER DISTRIBUTION BOX. ADVISED TO RESET THE BASE IDLE TO 600-650 RPM. ADVISED TO SUBMIT AN 8D8R OR CALL THE HOTLINE BACK IF THEY FIND THE ROOT CAUSE. THE TECHNICIAN IS LOOKIG FOR ADDITIONAL INFORMATION ON THIS VEHICLE, THE CUSTOMER ALLEGES THE VEHICLE JUST STALLS AND QUITS WHILE DRIVING.

REPORT DATE	MILES	VIN	BUILD DATE	ST	SYMPT	ADDL SYM	COMMENTS
							ANY ADDITIONA KNOWNS? REQUESTING ADDITIONAL TECHNICAL INFORMATION. ISM 01-06-013 ESCAPE 3.0L CHRGING SYSTEM, CALL NUMBER LISTED BELOW ADVISED TECHNICIAN FOR THIS CONCERN NO OTHER UPDATES, ONLY ONE CONFIRM FIX WITH LOOSE GROUNDS G104/G105. THESE GROUNDS ARE LOCATED BELOW THE BATTERY TRAY. TRY TO DRIVE THE VEHICLE WITH ALL THE ELECTRICAL LOADS ON AND CHECK IF THE CONCERN IS PRESENT. IF ABLE TO DUPLICATE THE CONCERN SUGGEST TO CONTACT THE FOLLOWING FIELD QUALITY ENGINEERS, FORD IS CURRENTLY REVIEWING THIS UNITS. TEXAS / DAN HAMMACK / 713-691-4003 / 713-542-4186 TEXAS / DAVE PILGRIM / 972-318-1058 / 972-571-8407 TEXAS / LYNN SORENSEN / 281-443-8582 / 281-384-0617
07112001	7570	1FMYU04121KA34470	01282001	PA	607000	ALLEGED STALL WHILE DRIVING	CUSTOMER ALLEGES THAT THE VEHICLE STALLED WHILE DRIVING DOWNHILL. TECH UNABALE TO DUPLICATE AND CAN SEE NO CONCERNS WITH THE VEHICLE. SF SEEKING KNOWNS. ADVISED THE SF TO CHECK THE FUEL LEVEL OF THE VEHICLE TO MAKE SURE THAT THERE ARE NO CONCERNS WITH FUEL SENDER. ADVISED SF TO TAP ON EEC RELAY TO SEE IF THE VEHICLE STALLS AND IF IT DOES THEN REPLACE THE RELAY. ADVISED SF TO ALSO CHECK THE BASE IDLE WITH THE IAC UNPLUGGED (550 RPMS).
07112001	8018	1FMYU03131KA69029	02122001	BG	607792	ENGINE STALL AT HOT	DLR STS ENGINE STALL AT HOT TEMPERATURES WHILE DECEL.NO DTC PRESENT. ISM 00-12-026 CK FOR STICKING SHUT OR STUCK OPEN EGR VALVE ISM 01-06-013 ESCAPE 3.0L CHRGING SYSTEM, CALL NUMBER LISTED BELOW
07112001	1372	1FMYU04141KC18079	09092001	MO	607000	ALLEGED STALL WHILE DRIVING.	TECHNICIAN STATED THAT HAS AN ALLEGED CASE OF THE ENGINE STALLING WHIL E DRIVING, RESTARTED RIGHT AWAY. LOOKING FOR ASSISTANCE. REPORT #: 1EUFL002 ADVISED TECH OF NO KNOWNS. ALSO ADVISED TECH TO HOOKUP A FUEL PRESSURE GAUGE & CHECK FUEL PRESSURE & LEAKDOWN SHOULD HAS 65 PSI FUEL PRESSURE ALSO ADVISED TECH TO CHECK FUEL QUALITY. REPORT #: 1EGFS010 ADV TECH TO VERIFY THE CONCERN. ADV THE PCM LEVEL IS NOT CURRENT. ADV TO CHECK AND SET BASE IDLE IF NEEDED. ALSO LOOK FOR LOSS OF CKP SIGNAL. REPORT #: 1FLHF023 REPORT #: 1EGFS010 ADV TECH TO VERIFY THE CONCERN. ADV THE PCM LEVEL IS NOT CURRENT. ADV TO CHECK AND SET BASE IDLE IF NEEDED. ALSO LOOK FOR LOSS OF CKP SIGNAL. ADV TECH OF THE ABOVE REPORT. ADV TO CHECK AND ADJUST BASE IDLE IF NEEDED. ALSO VERIFY PCM POWERS AND GROUNDS. ADVISED THE TECHNICIAN OF THE PREVIOUS REPORTS.
07122001	1675	1FMYU04121KB91674	05112001	NY	607000	INT STALL CONCERN.	TECH STATES THE VEHICLE HAS AN INTERMITTENT STALL CONCERN. HE STATES HE HAS NOT BEEN ABLE TO DUPLICATE THE CONCERN. THE CUSTOMER STATES THAT THEY HEAR A "SIZZLING" NOISE AND THEN IT WILL STALL. THE CUSTOMER STATES THEY MUST WAIT FOR A WHILE THEN IT WILL RESTART. HE IS SEEKING ANY KNOWNS. ADVISED TECH THAT HE SHOULD CHECK FOR PROPER PIN FITS IN THE POWER DISTRIBUTION BOX. ALSO CHECK FOR COMPONENTS HEATING UP AND GOING OPEN. SINCE THERE ARE NO CODES, IT SOUNDS LIKE THE PCM IS LOSING POWER OR

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							GROUND. CHECK POWER RELAY AND DIODE FOR ANY CONCERNS. NEEDS TO DUPLICATE BEFORE MORE DIAGNOSIS/REPAIRS ARE ATTEMPTED.
07132001	28992	1FMCU04161KD92357	08032000	OK	607600	STALLS WHILE DRIVING	THE TECH STATES THAT THE CUSTOMER IS COMPLAINING OF A STALL WHILE DRIVING. THE TECH CAN NOT DUPLICATE THE CONCERN AND IS SEEKING FOR KNOWNS. ADVISED THE TECH TO CHECK THE CONNECTORS IN THE DRIVERS SIDE KICK PANEL FOR WATER INTRUSION, CHECK THE CCRM FOR WATER INTRUSION, TAP ON THE PCM POWER RELAY, PERFORM A VOLT DROP ON ALL THE PCM GROUNDS, AND VERIFY IF THE CONCERN COULD BE FUEL RELATED.
07142001	12094	1FMYU03101KE59571	08042000	IA	607600	STALLS ON CRUISE.	TECH STS STILL CAN'T VERIFY THE CONCERN TECH STS HE RELEASED THE VEHICLE AND DID NO REPAIRS. REPORT #: 1DME8004 REPLACE SENSOR - CRANKSHAFT POSITION - I CALLED BACK THE TECH AS REQUESTED. HE TOLD ME THAT HE LET THE VEHICLE GO. ADV TECH IF THE CUSTOMER COMES BACK, VERIFY THE CONCERN ALSO ADV TECH TO CHECK THE PCM POWER RELAY AND CKP SENSOR.
							TECHNICAIN STATED THAT HAS A CONCERN OF STALLS WHILE DRIVING FORWARD - REVERSE- HOT OR COLD- CAN NOT VERIFY THE CONCERN. ADVISED THE TECHNICIAN NO KNOWN CONCERNS- VERIFY THE CONCERN- USE CUSTOMER FLIGHT RECORDER- JOHN OWENS WILL CALL BACK - FOR FURTHER ASSISTANCE.
07162001	4710	1FMYU02141KA25115	12182000	CA	607600		THE CUSTOMER REPORTS THE VEHICLE DIES AT TIMES. RAN A 120 MILE ROAD TEST WITH TECH AND THE CONCERN NEVER SURFACED. I'M SENDING THIS IN BECAUSE AT A RECENT SOPSA MEETING, SEVERAL OTHER TECHS FROM DIFFERENT DEALERS HAD EXPERIENCED SIMILAR CONCERNS WITH NEW ESCAPES. SRV_DLR_CODE BYE10 CHANGED TO 07742 BY SDAVIS20
07162001	3143	1FMYU04171KA89005	02122001	NY	607402		THE VEHICLE ACTS LIKE IT WANTS TO STALL AT TIMES, ONLY WHEN OUTSIDE AIR TEMPERATURE IS HOT. NO DTC'S AND WE COULD NOT REPRODUCE THE SYMPTOM AT THIS TIME. SYMPTOM_CODE 607000 CHANGED TO 607402 BY NBAKER8
07162001	1231	1FMYU03151KC18562	08142001	GA	607702	INT STALL ON DECEL	CUSTOMER STS VEH HAS INTERMITTENT STALL CONCERN ON DECEL TECH NOT ABLE TO DUPLICATE VEH HAS NO DTC'S SEEKING KNOWNS ISM 00-12-026 CK FOR STICKING SHUT OR STUCK OPEN EGR VALVE REPORT #: 1EGFS010 REPORT #: 1FUHF023 REPORT #: 1EGFS010 ADV TECH OF ISM AND TO VERIFY BASE IDLE SETTING PER PAST REPORTS
07162001	1643	1FMYU03151KB52916	04272001	TX	607703	ALEDGED STALL ON STOPS	TECH STS CUSTOMER ALEDGES VEHICLE STALLS ON STOPS AND WILL RESTART AND TECH STS HAS NO DTC'S AND IS UNABLE TO VERIFY CONCERN ADVISE TECH TO VERIFY CONCERN IF POSSABLE AND VERIFY POWER RELAY IS NOT SHOCK SENSITIVE NO OTHER KNOWNS FOR CONCERN
07162001	3400	1FMYU04101KB40593	04172001	PA	607703	INTERMITTENT STALL ON DECEL	FSE STS VEHICLE HAS A CONCERN OF STALLING INTERMITTENTLY ON DECEL. CONCERN HAS NOT BEEN DUPLICATED. FSE HAS NO PID INFORMATION. QUICK TEST HAS NOT BEEN PERFORMED. SEEKING KNOWNS. ISM 00-12-026 CK FOR STICKING SHUT OR STUCK OPEN EGR VALVE REPORT #: 1EGFS010

REPORT DATE	MILES	VIN	BUILD DATE	ST	SYMPT	ADDL SYM	COMMENTS
							ADV TECH TO VERIFY THE CONCERN. ADV THE PCM LEVEL IS NOT CURRENT. ADV TO CHECK AND SET BASE IDLE IF NEEDED. ALSO LOOK FOR LOSS OF CKP SIGNAL. ADV FSE TO MONITOR PIDS. PERFORM QUICK TEST. VERIFY BASE IDLE. RECORD EVENT IF POSSIBLE AND DIAG AS PER DATALOGGER. IF ASSISTANCE IS NEEDED TO DIAG AS PER RECORDING, CALL BACK FOR ASSISTANCE.
07172001	709	1FMYU04131KC37271	06272001	MO	807793	ALLEGE STALL ON DECEL	TECH STATES THE CUSTOMER ALLEGES THE VEHICLE STALL ON HER WHILE DRIVING DOWN A HILL AT A DECEL. NO CODES ARE STORED IN THE PCM. HE HAS NOT BEEN ABLE TO DUPLICATE THE CONCERN. SEEKING FOR ANY KNOWNS OR ADVICE. ADVISE TECH TO CHECK THE EEC POWER RELAY FOR POSSIBLE CONCERNS. NO KNOWNS WERE AVAILABLE.
07172001	2386	1FMYU041X1KF18032	10252000	GA	807493	INTERMITTENT STALL/NO CODES	TECH CALLED STATING THE VEHICLE STALLS INTERMITTENTLY. STATED THERE ARE NO CODES. T/STATED HE REPLACED THE IAC ABOUT 3 WEEKS AGO AND IS BACK FOR THE CONCERN. CUSTOMER STATES THE CONCERN HAPPENS WARM OR COLD. WILL HAPPEN ON ACCEL OR DECEL. STATED HE VERIFIED THE CONCERN ONCE WHEN THE VEHICLE WAS PUT INTO GEAR. LOOKING FOR ADVICE. ADVISED TO DRIVE THE VEHICLE AGAIN AND TRY TO DUPLICATE THE STALL. ADVISED TO TAKE A RECORDING OF AS MANY PIDS HE CAN SELECT. ADVISED IF HE CANNOT VERIFY THE STALL, SET THE BASE IDLE AND RESET THE KAM.
07172001	13470	1FMYU03101KE76150	08312000	MI	807793	ALLEGED STALL/ HESITATION	TECH STS HAS ALLEGED HESITATION AND WANTS TO STALL OUT. TECH STS WHEN THE VEHICLE IS ALMOST STOPPED THEN ACCELERATED, THE ENGINE WANTS TO STALL. TECH CANT VERIFT THE CONCERN. HAS NO CODES IN THE PCM. SEEKING KNOWNS ISM 00-12-026 CK FOR STICKING SHUT OR STUCK OPEN EGR VALVE REPORT #: 1FLHF029 REPORT #: 1EGFS010 ADV TECH TO VERIFY THE CONCERN. ADV THE PCM LEVEL IS NOT CURRENT. ADV TO CHECK AND SET BASE IDLE IF NEEDED. ALSO LOOK FOR LOSS OF CKP SIGNAL. ADV TECH OF THE ABOVE REPORT. ADV TO CHECK AND ADJUST BASE IDLE IF NEEDED. ALSO VERIFY PCM POWERS AND GROUNDS. REPORT #: 1EGF9010 ADV TECH TO VERIFY THE CONCERN. ADV THE PCM LEVEL IS NOT CURRENT. ADV TO CHECK AND SET BASE IDLE IF NEEDED. ALSO LOOK FOR LOSS OF CKP SIGNAL --- ADV TECH TO VERIFY THE CONCERN. ADV TO ALSO CHECK THE BASE IDLE AND ADJUST IF NEEDED. ALSO ADV TECH TO CHECK FOR POSSIBLE STICKING EGR VALVE.
07172001	10398	1FMYU04111KF69404	12012000	NB	807792	INTERMITTENT STALL ON DECEL	TECH STS VEHICLE HAS AN INTERMITTENT STALLING CONCERN ON DECEL. TECH HAS NOT BEEN ABLE TO DUPLICATE CONCERN. HAS PROPER PID VALUES AT THIS TIME. SEEKING KNOWN CONCERNS. ISM 00-12-026 CK FOR STICKING SHUT OR STUCK OPEN EGR VALVE ADV TECH POSSIBILITY OF EGR VALVE STICKING OPEN. ALSO ADV TECH TO VERIFY BASE IDLE AS PER IAC DUTY CYCLE.
07172001	4834	1FMYU03161KB22312	04032001	OH	807793	INTERMITANT STALL ON DECEL	TECH STATES HAS INTERMITANT STALL. STATES HAS NOT REPRODUCED IT. STATE

Intermittent Stall - No Codes, No Verification

REPORT DATE	MILES	VIN	BUILD DATE	ST	SYMPT	ADDL SYM	COMMENTS
							S CUSTOMER COMPLAINT OF INTERMITTANT STALL ON DECEL GOING DOWN A HILL. STATES FUEL PRESSURE NORMAL. LOOKING FOR ANY KNOWNS. ADVISED IT SOUNDS FUEL RELATED AND NEED TO INVESTIGATE HOW MUCH FUEL WAS IN TANK. ADVISED IF MORE HELP NEEDED TO CALL BACK.
07162001	11583	1FMYU04141KA46276	02062001	VA	607583	STALL AT CRUISE, RESTARTS.	INTERMITTANT STALL AT CRUISE. VEHICLE RESTARTS FINE. CANNOT DUPLICATE CONCERN. NO CODES. INSPECT CKP SENSOR AND HARNESS. CHECK DPFE. CONCERN IS UNDER INVESTIGATION. VERIFY CONCERN BEFORE ATTEMPTING REPAIR. CHECK FUEL PUMP GROUND.
07162001	3364	1FMYU04161KB28038	04112001	MI	607000	STALLS AT 40 MPH INTER	TECH STATES THAT CUSTOMER SAYS VEHICLE STALLS INTER, WHILE DRIVING. NO CODES. ENGINE CUTS OUT LIKE KEY IS BEING TURNED OFF. WARNING LIGHTS ARE ON WHEN THE VEHICLE DIES. TECH CANT VERIFY AND HE IS LOOKING FOR ANY KNOWNS. ADVISED TECH TO CHECK FPDM GROUND AND CONNECTOR. ALSO CHECK C140 NEAR THE TRANSMISSION FOR CHAFING. TECH NEEDS TO ROAD TEST VEHICLE AND MONITOR CKP, TP, AND FRPPSI AND VOLTAGE.
07192001	10804	1FMYU04111KF63892	11102000	SC	607793	ALLEGE STALL	TECH STATES THE CUSTOMER ALLEGES THE VEHICLE STALLS INTERMITTENTLY ON A CRUISE OR DECEL. NO PATTERN TO THE CONCERN. THE VEHICLE RESTARTS FINE EVERYTIME. NO CODES IN THE PCM AND HE HAS NOT BEEN ABLE TO DUPLICATE THE CONCERN. SEEKING FOR ANY KNOWNS OR ADVICE. REPORT #: 1FUHF028 REPORT #: 1EGFS010 ADV TECH TO VERIFY THE CONCERN, ADV THE PCM LEVEL IS NOT CURRENT. ADV TO CHECK AND SET BASE IDLE IF NEEDED. ALSO LOOK FOR LOSS OF CKP SIGNAL ADV TECH OF THE ABOVE REPORT. ADV TO CHECK AND ADJUST BASE IDLE IF NEEDED. ALSO VERIFY PCM POWERS AND GROUNDS. TAP ON THE EEC RELAY AS WELL, IF IT STALLS REPLACE IT.
07192001	6023	1FMYU03171KF86016	12212000	MO	607503	STALLS, WHILE DRIVING	CUST STATES VEHICLE WILL STALL AT CRUISE. CYCLE KEY AND VEHICLE STARTS . SW STATES NO MIL CODES, (PASS), HAS CHECKED ALL WIRING FOR CONCENS A ND NONE FOUND. SEEKING IF ANY KNOWNS ADVISED SW TO CHECK PIN FIT ON BATTERY JUNCTION BOX. TAP TEST PCM POWE R RELAY. POSSIBLY REPLACE PCM RELAY.
07202001	5726	1FMYU04161KA65460	03122001	PA	607500	INTERMITTENT STALLING.	THE TECHNICIAN WORKING ON THIS VEHICLE STATES THIS VEHICLE STALLS/ QUITS INTERMITTENTLY. NO CODES IN THE PCM AND UNABLE TO DUPLICATE THE CONCERN, ASKED THE TECHNICIAN IS THIS CONCERN HAPPENS WHEN THE VEHICLE HOT/COLD? THE TECHNICIAN WAS UNABLE TO ANSWER THIS CONCERN. REQUESTING ADDITIONAL TECHNICAL INFORMATION. ISM 01-06-013 ESCAPE 3.0L CHRGING SYSTEM, CALL NUMBER LISTED BELOW ISM 00-12-028 CK FOR STICKING SHUT OR STUCK OPEN EGR VALVE REPORT #: 1FUHF028 REPORT #: 1EGFS010 REPORT #: 1EUFL002 ADVISED THE TECHNICIAN NO TO MANY KNOWNS, REVIEW THE ABOVE ISM'S. CHECK FOR LOOSE GROUNDS G104/G105 AND SUBMIT AN EDSR WITH DETAILED INFORMATION ON THIS CONCERN.
07232001	15311	1FMYU04151KF63721	11142000	NH	607000	INT. STALL ON DECEL	CUSTOMER STATES VEHICLE WILL STALL ON DECEL AT APPROX 40 MPH, VEHICLE WILL ONLY STALL AFTER WARMED TO NORMAL OPERATING TEMPERATURE. TECH HAS

REPORT DATE	MILES	VIN	BUILD DATE	ST	SYMPT	ADDL SYM	COMMENTS
							NOT BEEN ABLE TO VERIFY CONCERN AND IS SEEKING KNOWNS. ADVISED TECH TO INSPECT PCM GROUNDS, ESPECIALLY G104, 105 BENEATH BATTERY TRAY. PERFORM WIGGLE TEST ON POWER DISTRIBUTION BOX AND CKP CIRCUIT. ALSO LIGHTLY TAP ON CKP AND PCM POWER RELAY WITH VEHICLE RUNNING TO TRY TO DUPLICATE CONCERN. ADVISED TECH THAT THIS CONCERN IS CURRENTLY UNDER INVESTIGATION BY ENGINEERING.
07242001	584	1FMYU0415KC00698	09042001	OH	607000	STALLS	ISM 01-07-036 CK GNDS 104 & 105, SEND EDSRTS VEHICLE BROUGHT IN FOR A STALL. TECH HAS NOT BEEN ABLE TO DUPLICATE. DROVE OVER 80 MILES TO TRY TO DUPLICATE CONCERN.
07242001	8883	1FMCU0412YKB35474	04112001	WV	607883	INT STALL AT CRUISE, RESTARTS	SUGGESTED TO REMOVE BATTERY TRAY AND INSPECT G104. MAKE SURE SCREW BOTTOMS OUT AND THERE IS A TIGHT CONNECTIONS AT G104. TECH STATES THAT THE VEH INT STALLS AT CRUISE AND WILL RESTART. THEY CAN NOT DUPLICATE THE CONCERN. CALLING FOR KNOWNS OR SUGGESTIONS. ISM 01-07-036 CK GNDS 104 & 105, SEND EDSRTS ISM 00-12-026 CK FOR STICKING SHUT OR STUCK OPEN EGR VALVE
07242001	1322	1FMYU04181KF16747	10162000	KS	607000	INTERMITTENT STALLING	REPORT #: 1ECIP010 REPORT #: 1DME0004 REPLACE SENSOR - CRANKSHAFT POSITION - ADVISED OF THE ABOVE. TECH STS THAT HE HAS AN INTERMITTENT STALLING CONCERN. TECH STS THAT THIS IS THE SECOND TIME THAT THE VEHICLE HAS BEEN IN FOR THE SAME CONCERN. TECH STS THAT THE VEHICLE HAS NO CODES AND IT ALWAYS STARTS RIGHT BACK UP FOR THE CUSTOMER. ADVISED TECH TO CHECK G104/105 FOR GOOD CONNECTION. ADVISED TECH THAT THIS IS THE GROUND FOR THE EEC RELAY. ADVISED TECH THAT THE GROUND IS UNDER THE BATTERY TRAY.
07242001	3599	1FMYU04171KB40526	04102001	MN	607599	INTERMITTENT STALLING	SW STS THAT HE HAS AN INTERMITTENT STALLING CONCERN. SW STS THAT HIS TECH HAS BEEN UNABLE TO FIND ANYTHING WRONG. SW STS THAT THERE ARE NO CODES AND THE VEHICLE WILL START RIGHT UP AFTER STALLING. SW STS THAT THE VEHICLE WILL SEEM TO STALL AFTER HITTING THE BRAKES TECH SEEKING KNOWNS. ADVISED TECH TO REMOVE THE BATTERY AND TRAY. CHECK THE GROUND 104/105 MAKE SURE THAT IT IS CLEAN AND TIGHT FOR A GOOD CONNECTION. ADVISED SW THAT THIS GROUND IS FOR THE EEC POWER RELAY.
07242001	10691	1FMYU03101KF71228	12162000	MS	607000	INT STALLING/CAN NOT DUPLICATE	THE TECH STATES THAT THE CUSTOMER IS COMPLAINING OF AN INTERMITTENT STALLING CONCERN THAT OCCURS WITH A LOW TANK OF FUEL, OFTEN WHILE TURNING OUT OF THE DRIVEWAY. THE TECH CAN NOT DUPLICATE THE CONCERN. SEEKING FOR ANY KNOWNS. ADVISED THE TECH TO ATTEMPT TO VERIFY A LOSS OF FUEL PRESSURE WITH A LOW FUEL LEVEL, INSPECT THE FUEL PUMP JET SCREEN FOR CONTAMINATION, AND REPLACE THE FUEL PUMP, FILTER, AND FLUSH THE TANK. ALSO INSPECT G104 AND G105 UNDER THE BATTERY TRAY, INSPECT THE CONNECTORS IN THE DRIVERS FRONT KICK PANEL AND THE DCRM FOR WATER INTRUSION, AND TAP ON THE PCM POWER RELAY.

From: Bhojwani, Kamal (K.)
Sent: Thursday, October 11, 2001 4:11 PM
To: Inoue, Takashi (T.)
Cc: Jordan, Donald (D.E.); Dalbo, Bob (R.J.); Giles, Stuart (S.)
Subject: Mazda Electrical Support

Inoue-san,
I'm currently looking into a stall concern on 3.0L Escape's/Tribute's and I have come across some electrical/grounding issues that need to be reviewed. Can you provide me with a contact person that is familiar with the U204 wiring strategy? We need someone that can help us better understand the grounds and possibly help us troubleshoot some of the vehicles (customer buy-back's) that are being reviewed.

Regards,
Kamal Bhojwani
U204 3.0L Powertrain Calibration
TER, Suite 1AE30
Phone: (313) 39-01969
Fax: (313) 32-31786

From: Bhojwani, Kamal (K.)
Sent: Friday, October 12, 2001 3:45 PM
To: Inoue, Takeshi (T.)
Cc: Jordan, Donald (D.E.); Dalbo, Bob (R.J.); Giles, Stuart (S.); Morishima, Shigeki (S.)
Subject: RE: Mazda Electrical Support

Inoue-san,
Thank you for your response.

Morishima-san,
I will add your name to the distribution list for the stall concern.
We will also be reviewing several units early next week for this stall concern.
I will send you the details when we get the evaluation scheduled.

Thank you!

Regards,
Kamal Bhojwani
U204 3.0L Powertrain Calibration
TEE, Suite 1AR30
Phone: (313) 39-01969
Fax: (313) 32-31786

-----Original Message-----
From: Takeshi Inoue (PT Controls) [mailto:inoue.t@pt.mazda.co.jp]
Sent: Thursday, October 11, 2001 9:28 PM
To: Bhojwani, Kamal (K.)
Cc: Jordan, Donald (D.E.); Dalbo, Bob (R.J.); Giles, Stuart (S.);
Shigeki Morishima; ???? (??)
Subject: Re: Mazda Electrical Support

Kamal-san,
I think Morishima-san will help you.

Wiring PMT US Dearborn Core Team:
Shigeki Morishima
morishima.s@dev.mazda.co.jp
phone:313-390-0762

If you can send the vehicle to Hiroshima Japan, Mazda Electrical Testing
will support you.

Takashi Terano
terano.t@elec.mazda.co.jp
Supervisor of Mazda Electrical Testing

Regards,
Takeshi Inoue @ Hiroshima Japan
PT Control System Engineering Group

----- Original Message -----
From: "Bhojwani, Kamal (K.)" <kbhojwan@ford.com>
To: "Inoue, Takeshi (T.)" <inoue.t@pt.mazda.co.jp>
Cc: "Jordan, Donald (D.E.)" <djordan1@ford.com>; "Dalbo, Bob (R.J.)"
<rdalbo@ford.com>; "Giles, Stuart (S.)" <sgiles2@ford.com>

Sent: Friday, October 12, 2001 5:11 AM
Subject: Mazda Electrical Support

Inoue-san,
I'm currently looking into a stall concern on 3.0L Escape's/Tribute's and I have come across some electrical/grounding issues that need to be reviewed. Can you provide me with a contact person that is familiar with the U204 wiring strategy? We need someone that can help us better understand the grounds and possibly help us troubleshoot some of the vehicles (customer buy-back's) that are being reviewed.

Regards,
Kamal Bhojwani
U204 3.0L Powertrain Calibration
TEE, Suite 1AE30
Phone: (313) 39-01969
Fax: (313) 32-31786

From: Bhojwani, Kamal (K.)
Sent: Monday, October 15, 2001 10:19 AM
To: Giles, Stuart (S.)
Cc: Stilgenbauer, Jeffrey (J.R.); Jordan, Donald (D.E.); Dalbo, Bob (R.J.)
Subject: RE: C11226316

Stuart,
This issue has been addressed during the meetings. We're just not clear at this point on the impact that this would have in the field. According to the EMC folks it seems very unlikely that volume of stall complaints that we are seeing in the field could be due to this issue. We'll have to see what comes out of the EMC test results.

-----Original Message-----
From: Giles, Stuart (S.)
Sent: Thursday, October 11, 2001 6:15 PM
To: Stilgenbauer, Jeffrey (J.R.); Jordan, Donald (D.E.)
Cc: Diez, Timothy (T.P.); Bhojwani, Kamal (K.)
Subject: C11226316

Gentlemen.
I was rather surprised to learn from Tim that there is/was a concern in the system for an EMC related stall/stagger on vehicles, which has been root caused as the MAP sensor. (The same sensor is being replaced on other vehicle lines because of an EMC issue).
As I understand it, we have a known failure mode. Shouldn't this be a part of the vehicle stall issues mtg?

Tim has some very specific data which may be of use.

Thanks very much.

Stuart Giles
U204 '03 Vehicle Integration
tel: 313 323 0490
(Text) Page : 313 613 6296

7/11

H/o for PSMAC mtg.

Tracy, Lynn (L.J.)

From: Koelber, Janet (J.)
Sent: Tuesday, June 18, 2002 8:37 AM
To: Tracy, Lynn (L.J.)
Subject: FW: FordStar Broadcast June 24th - Ford Dealer Council

Importance: High

-----Original Message-----
From: Koelber, Janet (J.) On Behalf Of Kapp, Dan (Daniel R.)
Sent: Monday, June 17, 2002 12:17 PM
To: Kunda, Olaf (O.); Kerr, Jerry (G.T.)
Cc: Giordano, Mike (M.A.)
Subject: FW: FordStar Broadcast June 24th - Ford Dealer Council
Importance: High

I am out of the office until the 24th, therefore, I will not be prepared. I would appreciate it if you could please review the stalls portion of the attached presentation file and meet me at 11:30 on Monday at the FNC facility at Recent Court to prep me.

-----Original Message-----
From: Koerschner, Michelle (M.M.)
Sent: Thursday, June 13, 2002 1:42 PM
To: Kapp, Dan (Daniel R.); Samardzich, Barb (B.J.); Kozlowski, John (J.L.)
Cc: Graham, Amy (A.S.); Bartlett, Michele (M.W.); Koelber, Janet (J.); Porosky, Sue (S.E.); Isaacson, Linda (L.)
Subject: FW: FordStar Broadcast June 24th - Ford Dealer Council
Importance: High

As Amy stated below you are requested to participate in a Fordstar Broadcast to the dealers (agenda below). In the one hour broadcast the intent is to provide brief feedback to the dealers on the PTO concerns in the Dealer "Top 6 Areas of Concern". The original intent was to ask if Dan could cover all of the PTO items for the sake of time. I understand Dan is returning to the office June 24th. **We need to know who will present the Powertrain Systems (stalls), Engine and Transmission slides?**

Amy and I have pulled together a summarized presentation of the Powertrain Systems, Engine and Transmission concerns for the broadcast (reman will be presented by Larry King). The progress and results for each concern have been summarized on one slide. Keep in mind the charts and data will not be visible in a broadcast. The intent would be for you to verbalize any additional information or actions.

Please let us know:
1) **If each of you agrees with the content on the slides. If it needs to be improved, clarified or changed let us know who we should work with on it.**
2) **Who will be available to present each or all portions of the presentation at the broadcast.**

If there are any additional questions of information you need please let Amy and I know.

Fordstar Jun04 Product Concern...

Sincerely,

Michelle M. L. Koerschner
Executive Advisor to Louise Goeser, Corporate Quality
PDC 1RA11 In Office: M-T-Th
PH: 313-24-88999
FAX: 313-59-43207

PLEASE CC TWA JOB SHARE PARTNER ON ALL NOTES: Amy Graham - AGRAHAM4 (M-T-W-F)
PH: 313-39-09702

—Original Message—

From:	Graham, Amy (A.S.)
Sent:	Wednesday, June 12, 2002 3:00 PM
To:	Samardzich, Barb (B.J.); Koszewnik, John (J.J.); Kapp, Dan (Daniel R.)
Cc:	Koerschner, Michelle (M.M.); Bartlett, Michele (M.W.); Feller, Mike (M.W.)
Subject:	FordStar Broadcast June 24th - Ford Dealer Council

Barb, John and Dan,
You are requested to join Louise Goeser for a FordStar Broadcast to provide an update on the Product Concerns to the Ford Dealer body. I have attached a copy of an agenda for your review.

The broadcast is from 1:00pm to 2:00pm at Regent Court Building in the basement room GN248 – please refer to attached meeting notice. Please plan to arrive by 12:30pm to ensure coordination for the meeting. Also, be aware the meeting may run over and the agenda times may change based on the Dealers calls during the broadcast.

We will provide you with a copy of your presentation slides (Michelle and I will coordinate to ensure consistency between the slides) based on the Product Concern Matrix for your review the first of the week.

We have been offered the time slot of 11:30am to 12:30am at the FCN facility in Regent Court to conduct dry runs should you wish to do so....please let Michelle and I know if you would like to take advantage of this offer.


agenda1 624.doc


FordStar Broadcast

Please contact us with any questions, appreciate your support.

Sincerely,

Amy S. Graham
Executive Advisor to Louise Goeser, VP Quality
PDC 1R-A09 In-Office: M,T,W, F
Phone: (313) 39-09702 Fax: (313) 59-43207
e-mail: agraham4@ford.com
TWA Job Share Partner: Michelle Koerschner
Ph: (313)24-88999 e-mail: mkoersch@ford.com In-Office: M,T,Th

海外市場品質情報

Field Quality Information Report (FQIR)

YU2-221

Issued Date 2002 Yr 3 Mr 25 Day

Dist Code & Country Name		Accessories
M101A	United States	Unknown
Reporter: MNAO Technical Service Dept.		
S.Limitless	Information from	Hot_Line

Subject

2.0L Int Rough Idle/Misfire with Cooling Fans ON

Model 01MY TRX DX4 P (CKD)

Car Spec.

Eng. CE(DOHC/SOHC)/DE/RE Carburetor/EGI/Turbocharger/LPG/Direct Injection	MT 3, 4, 5, 6 Gear AT 3, 4 Gear	Differential W/LSD, Normal	Parts	No Parts, Requested, MC Received	
Steering System W/P/S, W/O P/S	Brake W/ABS, W/TCS Drum(Fr. Rr) Disc(Fr. Fr)	Suspension Type IRS, SLS	Climate Control W/AC, W/O AC	Photo	No Photo, Requested, MC Received, Attached
Body SDN, Coupe, Hardtop, HB, Wagon, Van, Pick Up Truck, W-Cab, Cab-Plus	Others				

	Chassis No.	Mileage	Prod. Date	Retail Date	Repair Date	Engine No.	Remarks
1	4F2CU08B91KM22482	18,162 mile	00/10/06	00/11/18	02/03/15		HTLN=251621
2		mile					

Problem Situation

Customer Complaint	Rough Idle.
Problem Description (SW+1H)	Rough Idle, Idle fluctuation, and misfire whenever cooling fans turn ON.
Condition (When, Where)	Occurs at Idle in all conditions and locations.

SA Result

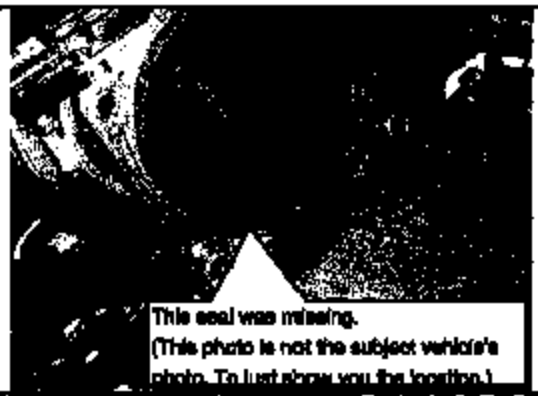
Investigation Result	Verified. Found MAF sensor gasket missing.
Possible Cause	When cooling fans turned ON, this turbo-charged the air directly through the MAF sensor. Sensor is not programmed to compensate for this abnormal airflow. When A/C compressor turned ON, concern would lessen due to different idle strategy.

DLR/Dist. Disposal

Action	
Result of repair	

MNAO PSE & RQE Comment

Extremely difficult to diagnose. Initially looks like electromagnetic interference. Recommend gluing gasket to sensor for better retention.



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(This photo is not the subject vehicle's photo. To just show you the location.)

Parts Number	YF09-13-211 Gasket

EM02-627-A 10000

S20ACM1 PRODUCT QUALITY INFORMATION (PQI) REVIEW1 05/10/02
09:58:58
P394 CRPP253
PQI Ref No: 0065674 PQI Status: PE ENTERED Entry Date: 05/09/02
Subject Descr: DS INTERMITTANT STALL/AIR LEAK AT MAF HOUSING

VIN.....: 4F2CU09111KM58777 Mdl/yr: TR2 LX A /01 Prod Date: 05/16/01
Miles.....: 30000 Problem Date: 12/01/01
Category.....: F FUEL AND EMISSION Repair Compl Date: 05/08/02

Reported By..: DAVE SCOTT Job Code: MC30 NON-MMA/REGION QA SP
Reporting Loc: PA54 WESTERN SUPPORT AND TRAIN

Hotline Ref #:

PQI Location.: 41179 CUSH MAZDA Telephone: ( ) -
City.....: ESCONDIDO ST: CA

Vehicle Status: 4 FINAL Retail Date.....: 06/11/01
R/O-Claim No..: R/O-Claim Prob No.....:
R/O-Claim Date: Covered under Warranty?: Y (Y or N)

Describe Symptoms and Conditions:
CUSTOMER COMPLAINS OF A INTERMITTANT IDLE DIP AND OCCASIONAL STALL AT STOPS

Cat.: F FUEL AND EMISSION
Symp: 05A STALL - WILL RESTART
Cond: AJB AFTER STOPPING
CAA ACCLRATR FULLY CLSED
FCA NORMAL TEMPERATURE
GCA BETWEEN 33'F & 86'F(1'C - 30'
MAA NORMAL DRIVING
Symptom Freq: I INTERMIT.

Did you work on the vehicle?....: Y (Y or N)
Were the symptoms duplicated?...: Y (Y or N)

Describe Causes of the Symptoms:
ROOT CAUSE: OUT OF POSITION FOAM GASKET THAT IS BETWEEN THE AIR FILTER
HOUSING AND THE MAF HOUSING, WHEN THE COOLING FAN WAS OPERATING AT IDLE
AIR WAS FORCED INTO THE MAF SENSOR CAUSING THE PCM TO PERCEIVE THAT THERE

WAS MORE AIR FLOW THAN ACTUAL.
MONITOR SFT AT IDLE FOUND WHEN FAN OPERATING SFT WOULD RISE FROM 0 TO OVER
20% POSITIVE.(LOW FAN SPEED)

Cause Code.....: SBL DISLOCATED
Case Ref No....:

Corrective Action Taken:
REPLACED GASKET BETWEEN THE TWO HOUSINGS, AIR FILTER/MAF

	Qty	Part Number	Part Description
PNMC.....:	0	AJ03-13-211	GASKET

Related Parts:

Was the problem solved?.....: Y (Y or N)
If "No", how was the situation handled?:

Writer's Comments:
ONE MORE REASON FOUND FOR3.0L TRIBUTE IDLE DIP/STALL. HOTTER LOCATIONS MAY
EXPERIENCE MORE-HIGHER FAN SPEEDS MORE AIR FORCED INTO MAF

Concern Code....: 4 DRIVABLE, BUT IS ANNOYED
Supporting Media: N Other:
(D=Drawing, P=Photo, V=Video, A=Audio, F=Form, N=None)
Media received at Corp QA?.: N (Y or N)
Media sent to Manufacturer?: N (Y or N)

Post-modification Problem?: N (Y or N) RI Ref No.....:

Request Parts.....: N (Y OR N) Request Date.....: 06/10/02
Ship Via.....: Received Date.....:
Req Srce Loc.....: Sent to Mfr:
Manufacturer Comments:

Manufacturer Evaluation: 2 By: LIMTIACO Loc: MA24 Date: 05/10/02

Reviewed by....: LIMTIACO Location: MA24 Completion Dt: 05/10/02

海外市場品質情報

Field Quality Information Report (FQIR)

YU2-221

Issued Date 2002 Yr 3 Mr 25 Day

Dist Code & Country Name		Accessories
M101A	United States	Unknown
Reporter: MNAO Technical Service Dept.		
	S.Umitaka	Information from: Hot_Line

Subject: 2.0L Int Rough Idle/Misfire with Cooling Fans ON

Model: 01MY TRX DX4 P (DBU) CKD

Car Spec.

Eng. CE(DOHC/SOHC)/DE/RE Carburetor/SGI/Turbocharger/LPG/Direct Injection	MT 3. 4. 5. 6 Gear AT 3. 4 Gear	Differential W/LSD. Normal	Parts: No Parts, Requested, MC Received
Steering System W/P/S. W/O P/S	Brake W/ABS. W/TCS Drum(Fr. Rr) Disc(Fr. Rr)	Suspension Type IRS. SLS	Climate Control W/AC. W/O AC	Photo: No Photo, Requested, MC Received, Attached
Body SDN. Coupe. Hardtop. HB. Wagon. Van. Pick Up Truck. W-Cab. Cab-Plus	Others		

	Chassis No.	Mileage	Prod. Date	Retail Date	Repair Date	Engine No.	Remarks
1	4F2CU06B91KM22462	18,162 mls	00/10/06	00/11/16	02/03/15		HTLN=251521
2		mls					

Problem Situation

Customer Complaint	Rough Idle.
Problem Description (5W+1H)	Rough Idle, idle fluctuation, and misfire whenever cooling fans turn ON.
Condition (When, Where)	Occurs at idle in all conditions and locations.

SA Result

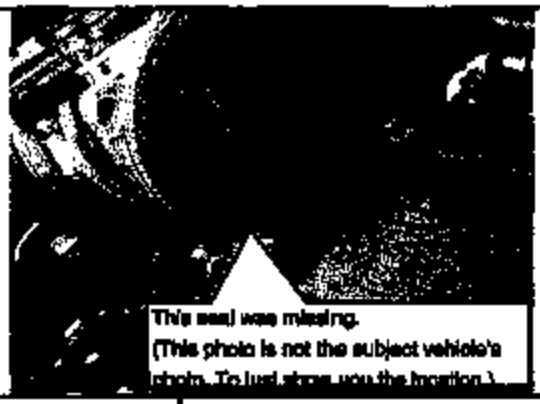
Investigation Result	Verified. Found MAF sensor gasket missing.
Possible Cause	When cooling fans turned ON, this turbo-charged the air directly through the MAF sensor. Sensor is not programmed to compensate for this abnormal airflow. When A/C compressor turned ON, concern would lessen due to different idle strategy.

DLR/Dist. Disposal

Action	
Result of repair	

MNAO PSE & FOB Comment

Extremely difficult to diagnose. Initially looks like electromagnetic interference. Recommend gluing gasket to sensor for better retention.



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(This photo is not the subject vehicle's photo. To just show you the location.)

Parts Number	YF09-13-211 Gasket

海外市場品質情報

Field Quality Information Report (FQIR)

YU2-221

Issued Date 2002 Yr 3 Mn 25 Day

Dist Code & Country Name		Accessories
M101A	United States	Unknown
Reporter: MNAO Technical Service Dept.		
	S.Limtaco	Information from: Hot_Line

Subject

2.0L Int Rough Idle/Misfire with Cooling Fans ON

Model 01MY TRX DX4 P (CBU) CKD

Car Spec.

Eng. CE(DOHC/SOHC)/DE/RE Carburetor/EGI/Turbocharger/LPG/Direct Injection	MT 3, 4, 5, 6 Gear AT 3, 4 Gear	Differential W/LSD, Normal	Parts: No Parts, Requested, MC Received
Steering System W/P/S, W/O P/S	Brake W/ABS, W/TCS Drum(Fr. Rr) Disc(Fr. Rr)	Suspension Type I/RS, SLS	Climate Control W/AC, W/O AC	Photo: No Photo, Requested, MC Received, Attached
Body 4DN, Coupe, Hardtop, HB, Wagon, Van, Pick Up Truck, W-Cab, Cab-Plus	Others			

	Chassis No.	Mileage	Prod. Date	Retail Date	Repair Date	Engine No.	Remarks
1	4F2CU06B91KM22462	16,162 mile	00/10/06	00/11/16	02/03/15		HTLN=251521
2		mile					

Problem Situation

Customer Complaint	Rough Idle.
Problem Description (5W1H)	Rough idle, idle fluctuation, and misfire whenever cooling fans turn ON.
Condition (When, Where)	Occurs at idle in all conditions and locations.

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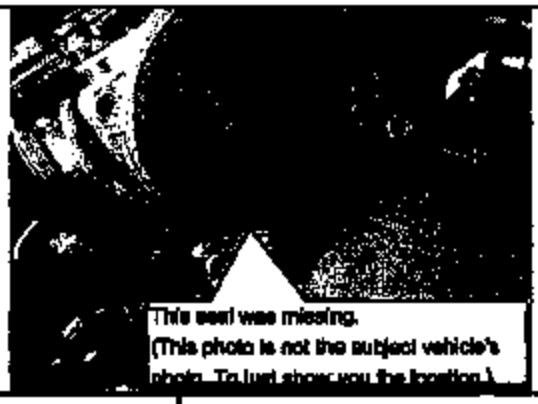
Possible Cause	When cooling fans turned ON, this turbo-charged the air directly through the MAF sensor. Sensor is not programmed to compensate for this abnormal airflow. When A/C compressor turned ON, concern would lessen due to different idle strategy.

DLR/Dist. Disposal

Action	
Result of repair	

MNAO PSE & FQS Comment

Extremely difficult to diagnose. Initially looks like electromagnetic interference. Recommend gluing gasket to sensor for better retention.



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(This photo is not the subject vehicle's photo. To just show you the location.)

Parts Number	YF09-13-211 Gasket

S20ACM1 PRODUCT QUALITY INFORMATION (PQI) REVIEW1 05/10/02
09:58:58
P384 CRPP253
PQI Ref No: 0065674 PQI Status: PE ENTERED Entry Date: 05/09/02
Subject Descr: DS INTERMITTANT STALL/AIR LEAK AT MAF HOUSING

VIN.....: 4F2CU09111KM58777 Mdl/yr: TR2 LX A /01 Prod Date: 05/16/01
Miles.....: 30000 Problem Date: 12/01/01
Category.....: F FUEL AND EMISSION Repair Compl Date: 05/08/02

Reported By..: DAVE SCOTT Job Code: MC30 NON-MMA/REGION QA SP
Reporting Loc: PA54 WESTERN SUPPORT AND TRAIN

Hotline Ref #:

PQI Location.: 41179 CUSH MAZDA Telephone: ( ) -
City.....: ESCONDIDO ST: CA

Vehicle Status: 4 FINAL Retail Date.....: 06/11/01
R/O-Claim No..: R/O-Claim Prob No.....:
R/O-Claim Date: Covered under Warranty?: Y (Y or N)

Describe Symptoms and Conditions:
CUSTOMER COMPLAINS OF A INTERMITTANT IDLE DIP AND OCCASIONAL STALL AT STOPS

Cat.: F FUEL AND EMISSION
Symp: 05A STALL - WILL RESTART
Cond: AJB AFTER STOPPING
CAA ACCLRATR FULLY CLSED
FCA NORMAL TEMPERATURE
GCA BETWEEN 33'F & 66'F(1'C - 30'
MAA NORMAL DRIVING
Symptom Freq: I INTERMIT.

Did you work on the vehicle?....: Y (Y or N)
Were the symptoms duplicated?...: Y (Y or N)

Describe Causes of the Symptoms:
ROOT CAUSE: OUT OF POSITION FOAM GASKET THAT IS BETWEEN THE AIR FILTER
HOUSING AND THE MAF HOUSING, WHEN THE COOLING FAN WAS OPERATING AT IDLE
AIR WAS FORCED INTO THE MAF SENSOR CAUSING THE PCM TO PERCEIVE THAT THERE

WAS MORE AIR FLOW THAN ACTUAL.
MONITOR SFT AT IDLE FOUND WHEN FAN OPERATING SFT WOULD RISE FROM 0 TO OVER
20% POSITIVE.(LOW FAN SPEED)

Cause Code.....: SBL DISLOCATED
Case Ref No....:

Corrective Action Taken:
REPLACED GASKET BETWEEN THE TWO HOUSINGS, AIR FILTER/MAF

	Qty	Part Number	Part Description
PNMC.....:	0	AJ03-13-211	GASKET

Related Parts:

Was the problem solved?.....: Y (Y or N)
If "No", how was the situation handled?:

Writer's Comments:
ONE MORE REASON FOUND FOR3.0L TRIBUTE IDLE DIP/STALL. HOTTER LOCATIONS MAY
EXPERIENCE MORE-HIGHER FAN SPEEDS MORE AIR FORCED INTO MAF

Concern Code....: 4 DRIVABLE, BUT IS ANNOYED
Supporting Media: N Other:
(D=Drawing, P=Photo, V=Video, A=Audio, F=Form, N=None)
Media received at Corp QA?.: N (Y or N)
Media sent to Manufacturer?: N (Y or N)

Post-modification Problem?: N (Y or N) RI Ref No.....:

Request Parts.....: N (Y OR N) Request Date.....: 05/10/02
Ship Via.....: Received Date.....:
Req Srce Loc.....: Sent to Mfr:
Manufacturer Comments:

Manufacturer Evaluation: 2 By: LIMTIACO Loc: MA24 Date: 05/10/02

Reviewed by....: LIMTIACO Location: MA24 Completion Dt: 05/10/02

From: Fournelle, Gilbert (G.)
Sent: Tuesday, September 03, 2002 3:27 PM
To: Altoonian, Don (D.J.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); Cary Powell (E-mail); Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); De Pena, Juan (J.E.); Diaz, Timothy (T.P.); Duvall, Allen (A.W.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Goodwin, William (W.R.); Grewal, Bill (B.S.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Hoshino, Jun (J.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); Jones, Andy; Jordan, Donald (D.E.); Kanai, Shinji (S.); Khan, Naveed; Kosko, Jeff (J.R.); Kwon, Soon (S.K.); Lawler, David (D.A.); Le, Dzung (D.H.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Marek, Edmond (E.C.); Matese, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mcdonald, John; McGee, Brett (B.L.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); Morgan, Tomiko (T.T.); Morishima, Shigeki (S.); Nematollahi, Sonya (S.); Nikolai, bernie; Noteboom, Jim (J.E.); Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Rothweiler, Daniel (D.); Sanders, Muriel (M.S.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhae (R.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Veenstra, Tim (T.W.); Wakenell, Ray (R.A.); Wettach, Bill (B.); Williams, Lee (L.W.)
Subject: Phantom stall meeting agenda 9/5/02

There will be a stall meeting this Thursday at 2:00pm (normal scheduled time).

U204 Stall Issue Meeting Agend...

dial in info:

toll free: 1-866-227-7015
Ford net: 954-1206
International: 1-630-693-6145

pass code: 8402370#

Gilbert Fournelle
V6 U204 Calibration Engineering
1AE27 Truck Engine Engineering (TEE)
Phone:(313)3904968 Fax:(313)3231786

From: Sanders, Muriel (M.S.)
Sent: Friday, August 02, 2002 8:38 AM
To: Bogema, John (P.)
Subject: RE: Exemption stickers

Copies are on your keyboard.

Muriel Sanders
U204 3.0L Calibration
Ford Motor Company
Phone: 313-32-27307
Fax: 313-32-31786
E-mail: msander6@ford.com

-----Original Message-----
From: Bogema, John (P.)
Sent: Thursday, August 01, 2002 5:27 PM
To: Sanders, Muriel (M.S.)
Subject: Exemption stickers

Muriel,

Just because I thought of it now, can I get a copy of all the information you have on the 2 vehicles. I need them for my "EPA Required" folders on the matter.

John P. Bogema
3.0L Escape Calibration Engineering
Phone:313.33.75133
Location:TEE 1AE22
Email:JBOGEMA@FORD.COM

From: Duvall, Allen (A.W.)
Sent: Wednesday, July 10, 2002 12:48 PM
To: Sanders, Muriel (M.S.)
Subject: RE: U204 Stall Meeting Agenda - 7/11/02

Hi Muriel: Yes, but stress to follow copy policy when handling Confidential Info!

—Original Message—
From: Sanders, Muriel (M.S.)
Sent: Wednesday, July 10, 2002 12:24 PM
To: Duvall, Allen (A.W.)
Subject: RE: U204 Stall Meeting Agenda - 7/11/02

Many people will be calling in so is it all right if I forward this file to the team?

Muriel Sanders
U204 3.0L Calibration
Ford Motor Company
Phone: 313-32-27307
Fax: 313-32-31786
E-mail: msander6@ford.com

—Original Message—
From: Duvall, Allen (A.W.)
Sent: Wednesday, July 10, 2002 11:29 AM
To: Sanders, Muriel (M.S.)
Subject: RE: U204 Stall Meeting Agenda - 7/11/02

Hi Muriel:

Please reference attached file that I will be reviewing as handout tomorrow.

<< File: Is_IsNot.doc >>

D21 Stalls

D21 Stalls

92217 11226 EMS-827-4

D21 Stalls

D21 Stalls

D21 Stalls

ISBN 0-471-11533

D21 Stalls

EM02-827-H 11534

D21 Stalls

E462-027-R 11541

D21 Stalls

D21 Stalls

EMR2-4271-4 11043

D21 Stalls

D21 Stalls

From: Khan, Naveed (N.A.) [nkhan3@visteon.com]
Sent: Tuesday, July 16, 2002 6:53 AM
To: 'Woodings, Andrew (A.T.)'
Cc: Sanders, Muriel (M.S.)
Subject: RE: MAF Gasket Part Number

Its YL8U-9E931-CA

-----Original Message-----
From: Woodings, Andrew (A.T.) [mailto:awooding@ford.com]
Sent: Monday, July 15, 2002 5:02 PM
To: Naveed Khan (E-mail)
Cc: Sanders, Muriel (M.S.)
Subject: FW: MAF Gasket Part Number

Naveed,
Can you confirm the correct part number for the 3.0L MAF gasket for Muriel?
See email below.
Thanks

Andrew Woodings
Ford Motor Company
U204 3.0L Engine Calibration
awooding@ford.com
313-845-5153
TER-1AE21

> -----Original Message-----
> From: Sanders, Muriel (M.S.)
> Sent: Monday, July 15, 2002 4:52 PM
> To: Woodings, Andrew (A.T.)
> Subject: MAF Gasket Part Number
>
> Please verify that this is the correct part number for the current MAF sensor gasket. This is the service number so the Z will probably be a different letter for the engineering number.
>
> YL8Z-9E931-CA
>
> We need this ASAP so we can release the TSB.
>
> Thanks,
> Muriel Sanders
> U204 3.0L Calibration
> Ford Motor Company
> Phone: 313-32-27307
> Fax: 313-32-31786
> E-mail: msander6@ford.com
>
>

From: Steven Limtiaco [SLimtiac@mazdausa.com]
Sent: Tuesday, May 07, 2002 8:35 PM
To: 'afernse@ford.com'
Cc: Kathy Chin; 'nsuarez6@ford.com'; 'rdalbo@ford.com'; 'msander6@ford.com'
Subject: TRIBUTE DPFE SENSOR, P/N 2F1E-9J460-AA (Mazda P/N 1F22-18-210A)

Importance: High

Sam,

Is it possible to enlist your help in obtaining 150 emergency pieces of the latest DPFE sensor? Mazda is currently back ordered on these parts and needs this quantity as quickly as possible. Please let me know what I can do to expedite this request.

Thank you,

Steve Limtiaco
Mazda North American Operations
Tribute Product Support
949-442-6514 (phone)
949-442-6599 (fax)
e-mail: slimtiac@mazdausa.com

From: Jordan, Donald (D.E.)
Sent: Tuesday, May 14, 2002 5:24 PM
To: Noteboom, Jim (J.E.)
Cc: Sanders, Muriel (M.S.); Altoonian, Don (D.J.); Jordan, Donald (D.E.)
Subject: RE: U204 Stall Meeting Agenda - 5/9/02

Jim, you list battery acid in the tray had seeped down onto grounds G-104 & 105 w/some corrosion evident. Low mileage veh shouldn't have acid in tray. Was battery taken out of tray and looked at, crack, puncture on bottom from sitting on an object, etc.. Talking with FSS battery engineer and have seen battery installed on screw, bolt, etc. in tray and that would crack case and get leaking, but other than that.....
Can you get veh to look at, was the battery crack on the bottom or was there acid expelled from vent caps and running down?
Thanks,
Donald E. Jordan
U204 OPD E/E Systems & EDS
(313) 32-25147
Pager: T (djordan1) or 313-795-4342

----Original Message----
From: Noteboom, Jim (J.E.)
Sent: Thursday, May 09, 2002 3:46 PM
To: Sanders, Muriel (M.S.); Altoonian, Don (D.J.); Badgley, Joel (J.K.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); 'Cary Powell'; Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); 'Dan Rothwaller'; De Pena, Juan (J.E.); Diaz, Timothy (T.P.); Fascetti, Bob (R.J.); Fourmella, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Hart, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); 'John McDonald'; 'Jones, Andy'; Jordan, Donald (D.E.); Kanal, Shinji (S.); King, Robert (R.F.); Klostermann, Eric (E.); Kosko, Jeff (J.R.); Kwon, Soon (S.K.); Limbaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Marck, Edmond (E.C.); Matesa, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); 'Morgan, Tom'; Morishima, Shigeki (S.); 'Naveed Khan'; Nematollahi, Sonya (S.); 'Nikolai, Bernie'; Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilgenbauer, Jeffrey (J.R.); Suarez, Rhae (R.); Sullivan, Jamie (J.P.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Vecchio, Anne Marie (A.); Wakenell, Ray (R.A.); Wattach, Bill (B.); Williams, Les (L.H.W.); Williamson, David (D.E.); Yeung, Lam (.)
Subject: RE: U204 Stall Meeting Agenda - 5/9/02

Inspection results of '02 Escape VIN: 1FMYU0414KC19482

LOCATION: John Elway West, Denver
OWNER: Mike Cochran (JEW Service Mgr.)
MILEAGE: 3342
BUILD DATE: 1-29-02
COMPLAINT: Stalled while driving approx. 50 mph. Noticed dash lights came on and steering became stiff; coasted to side of
road, went to crank (did not turn key off) and the engine restarted. Occured at around 2500 miles and has not
happened since.
DIAGNOSTICS: Went through the latest TSB/ISM draft; no concerns were found except for the following:

- There was battery acid in the batt. tray that had seeped down onto grounds G-104 and 105; some corrosion was evident.
- The customer's key chain contained several oz. of additional weight.

Jim Noteboom
Powertrain Field Quality Specialist/Denver
Phone: 303.674.4015 FAX: 303.674.5790
Page: 1.888.375.1980

From: Steven Limtiaco [SLimtiac@mazdausa.com]
Sent: Tuesday, June 04, 2002 7:07 PM
To: 'msander6@ford.com'
Cc: 'rdalbo@ford.com'
Subject: FW: BUYBACKS AT FORD ENGINEERING

Muriel,

Here are the original miles for each vehicle. Could you send back current miles? We need this information to set pricing on the vehicles. Thanks,

Steve Limtiaco
Mazda North American Operations
Tribute Product Support
949-442-6514 (phone)
949-442-6599 (fax)
e-mail: slimtiac@mazdausa.com

> -----Original Message-----
> From: Bob Newell
> Sent: Tuesday, June 04, 2002 3:44 PM
> To: Steven Limtiaco
> Subject: RE: BUYBACKS AT FORD ENGINEERING
>
> Please provide a contact name at Ford and we will make arrangements to
> have the vehicles moved, unless Ford wants to do it and pay the
> transportation costs.
>
> Thanks!
> Bob
>
> -----Original Message-----
> From: Steven Limtiaco
> Sent: Tuesday, June 04, 2002 1:41 PM
> To: Bob Newell
> Subject: BUYBACKS AT FORD ENGINEERING
> Importance: High
>
> Bob,
>
> I made a slight change and moved the Lord vehicle up to Ford, Allen
> Park, MI. This should make 4 buybacks currently at Ford engineering.
> If I recall, we agreed that these vehicles be shipped back to MW region
> for buyback repair. Can you confirm? Ford should be done with the
> vehicles.
>
> Also, could you provide mileage of each vehicle at the time of
> buyback? Engineering needs for their records. Thanks,
>
> 4F2CU09161KM27024 (California) [User] - 4389mi
> 4F2YU07171KM16218 (Alabama) [User] - 3000 mi
> 4F2YU07101KM14486 (Louisiana) [User] - 9633 m
> 4F2YU08101KM06161 (Tennessee) [User] - 12576 mi
>

> Steve Limtiaco
> Mazda North American Operations
> Tribute Product Support
> 949-442-6514 (phone)
> 949-442-6599 (fax)
> e-mail: slimtiac@mazdausa.com
>
> << File: qryTributeLocations.xls >>

From: Steven Limtiaco [SLimtiac@mazdausa.com]
Sent: Thursday, June 06, 2002 3:42 PM
To: Bob Newell
Cc: Darrel Chin; 'msander6@ford.com'
Subject: FW: BUYBACKS AT FORD ENGINEERING

Bob,

Ford engineering will be done with testing the week of June 17th. Arrangments to pick up all 4 vehicles can be made anytime during the week of June 24th or after. Contact is:

> Muriel Sanders
> U204 3.0L Calibration
> Ford Motor Company
> Phone: 313-32-27307
> Fax: 313-32-31786
> E-mail: msander6@ford.com

Heads up: Ford engineering is requesting 2 add'l buybacks that exhibit signs of IAC valve contamination, with minimal repair history. I'll keep you posted. Thanks,

Steve Limtiaco
Mazda North American Operations
Tribute Product Support
949-442-6514 (phone)
949-442-6599 (fax)
e-mail: slimtiac@mazdausa.com

-----Original Message-----
From: Steven Limtiaco
Sent: Thursday, June 06, 2002 10:27 AM
To: Bob Newell
Subject: FW: BUYBACKS AT FORD ENGINEERING

Bob,

Here you go....current mileage of Ford engineering buyback vehicles. I'll let you know later today who the contact is to pick up the vehicles.

Steve Limtiaco
Mazda North American Operations
Tribute Product Support
949-442-6514 (phone)
949-442-6599 (fax)
e-mail: slimtiac@mazdausa.com

-----Original Message-----

From: Sanders, Muriel (M.S.) [mailto:msander6@ford.com]
Sent: Wednesday, June 05, 2002 12:11 PM
To: Limtiaco, Steven (S.)
Subject: RE: BUYBACKS AT FORD ENGINEERING

Thanks Steve! Here are the current mileages on each vehicle. Let me know if you need anything else.

> 4F2CU09161KM27024 (California) - 11746 mi
> 4F2YU07171KM16218 (Alabama) - 20022 mi
> 4F2YU07101KM14486 (Louisiana) - 17255 mi
> 4F2YU08101KM06161 (Tennessee) - 27958 mi

> Muriel Sanders
> U204 3.0L Calibration
> Ford Motor Company
> Phone: 313-32-27307
> Fax: 313-32-31786
> E-mail: msander6@ford.com
>

-----Original Message-----
From: Steven Limtiaco [mailto:SLimtiac@mazdausa.com]
Sent: Tuesday, June 04, 2002 7:07 PM
To: 'msander6@ford.com'
Cc: 'rdalbo@ford.com'
Subject: FW: BUYBACKS AT FORD ENGINEERING

Muriel,

Here are the original miles for each vehicle. Could you send back current miles? We need this information to set pricing on the vehicles. Thanks.

Steve Limtiaco
Mazda North American Operations
Tribute Product Support
949-442-6514 (phone)
949-442-6599 (fax)
e-mail: slimtiac@mazdausa.com

> -----Original Message-----
> From: Bob Newell
> Sent: Tuesday, June 04, 2002 3:44 PM
> To: Steven Limtiaco
> Subject: RE: BUYBACKS AT FORD ENGINEERING
>
> Please provide a contact name at Ford and we will make arrangements to
> have the vehicles moved, unless Ford wants to do it and pay the
> transportation costs.
>
> Thanks!
> Bob
>

> -----Original Message-----
> From: Steven Limtiaco
> Sent: Tuesday, June 04, 2002 1:41 PM
> To: Bob Newell
> Subject: BUYBACKS AT FORD ENGINEERING
> Importance: High
>
> Bob,
>
> I made a slight change and moved the Lord vehicle up to Ford, Allen Park, MI. This should make 4 buybacks currently at Ford engineering. If I recall, we agreed that these vehicles be shipped back to MW region for buyback repair. Can you confirm? Ford should be done with the vehicles.
>
> Also, could you provide mileage of each vehicle at the time of buyback? Engineering needs for their records. Thanks,
>
> 4F2CU09161KM27024 (California) [User] - 4389mi
> 4F2YU07171KM16218 (Alabama) [User] - 3000 mi
> 4F2YU07101KM14486 (Louisiana) [User] - 9633 m
> 4F2YU08101KM06161 (Tennessee) [User] - 12576 mi
>
> Steve Limtiaco
> Mazda North American Operations
> Tribute Product Support
> 949-442-6514 (phone)
> 949-442-6599 (fax)
> e-mail: slimtiac@mazdausa.com
>
> << File: qryTributeLocations.xls >>

From: Steven Limtiaco [SLimtiac@mazdausa.com]
Sent: Thursday, June 13, 2002 4:32 PM
To: Bob Newell
Cc: 'msander6@ford.com'
Subject: FW: BUYBACKS AT FORD ENGINEERING

Bob,

Not sure if I followed up with you on the Ford buyback vehicle disposition. Ford engineering will be done with all four buyback Tributes. They can be picked up anytime after June 24th. The contact at Ford is:

Muriel Sanders
> U204 3.0L Calibration
> Ford Motor Company
> Phone: 313-32-27307
> Fax: 313-32-31786
> E-mail: msander6@ford.com

Will you be making arrangements to pick the vehicles up for return to MW region?

Steve Limtiaco
Mazda North American Operations
Tribute Product Support
949-442-6514 (phone)
949-442-6599 (fax)
e-mail: slimtiac@mazdausa.com

-----Original Message-----
From: Sanders, Muriel (M.S.) [mailto:msander6@ford.com]
Sent: Wednesday, June 05, 2002 12:11 PM
To: Limtiaco, Steven (S.)
Subject: RE: BUYBACKS AT FORD ENGINEERING

Thanks Steve! Here are the current mileages on each vehicle. Let me know if you need anything else.

> 4F2CU09161KM27024 (California) - 11746 mi
> 4F2YU07171KM16218 (Alabama) - 20022 mi
> 4F2YU07101KM14486 (Louisiana) - 17255 mi
> 4F2YU08101KM06161 (Tennessee) - 27958 mi

> Muriel Sanders
> U204 3.0L Calibration
> Ford Motor Company
> Phone: 313-32-27307
> Fax: 313-32-31786
> E-mail: msander6@ford.com
>

-----Original Message-----
From: Steven Limtiaco [mailto:SLimtiac@mazdausa.com]
Sent: Tuesday, June 04, 2002 7:07 PM
To: 'msander6@ford.com'
Cc: 'rdalbo@ford.com'
Subject: FW: BUYBACKS AT FORD ENGINEERING

Muriel,

Here are the original miles for each vehicle. Could you send back current miles? We need this information to set pricing on the vehicles. Thanks,

Steve Limtiaco
Mazda North American Operations
Tribute Product Support
949-442-6514 (phone)
949-442-6599 (fax)
e-mail: slimtiac@mazdausa.com

> -----Original Message-----
> From: Bob Newell
> Sent: Tuesday, June 04, 2002 3:44 PM
> To: Steven Limtiaco
> Subject: RE: BUYBACKS AT FORD ENGINEERING
>
> Please provide a contact name at Ford and we will make arrangements to
> have the vehicles moved, unless Ford wants to do it and pay the
> transportation costs.
>
> Thanks!
> Bob
>
>> -----Original Message-----
>> From: Steven Limtiaco
>> Sent: Tuesday, June 04, 2002 1:41 PM
>> To: Bob Newell
>> Subject: BUYBACKS AT FORD ENGINEERING
>> Importance: High
>>
>> Bob,
>>
>> I made a slight change and moved the Lord vehicle up to Ford, Allen
> Park, MI. This should make 4 buybacks currently at Ford engineering.
> If I recall, we agreed that these vehicles be shipped back to MW region
> for buyback repair. Can you confirm? Ford should be done with the
> vehicles.
>
>> Also, could you provide mileage of each vehicle at the time of
> buyback? Engineering needs for their records. Thanks,
>
>> 4F2CU09161KM27024 (California) [User] - 4389mi
>> 4F2YU07171KM16218 (Alabama) [User] - 3000 mi
>> 4F2YU07101KM14486 (Louisiana) [User] - 9633 m
>> 4F2YU08101KM06161 (Tennessee) [User] - 12576 mi
>

> Steve Limtiaco
> Mazda North American Operations
> Tribute Product Support
> 949-442-6514 (phone)
> 949-442-6599 (fax)
> e-mail: slimtiac@mazdausa.com
>
> << File: qryTributeLocations.xls >>

From: Corbett, Sandra (S.M.)
Sent: Monday, June 24, 2002 10:24 AM
To: Delbo, Bob (R.J.); Sanders, Muriel (M.S.)
Subject: FW: '02 3.0L ESCAPE WITH BATT. ACID LEAKAGE

Bob/Muriel,
This is about a month old...info on a stall due to leaking battery acid. You might have already seen it since it came from Noteboom.

-----Original Message-----
From: Nehasil, Linda (L.F.)
Sent: Wednesday, May 29, 2002 10:14 AM
To: Corbett, Sandra (S.M.)
Subject: FW: '02 3.0L ESCAPE WITH BATT. ACID LEAKAGE

Sandy, Greg or Hassan may have sent this to you already.....

Quality comes first....
Linda F. Nehasil
Explorer Powertrain Quality
32-38671

-----Original Message-----
From: Noteboom, Jim (J.E.)
Sent: Friday, May 24, 2002 12:42 PM
To: Ponder, Ray (R.L.); Billingslea, Charles (C.F.); Boyk, Greg (G.J.); Dakhlallah, Hassan (H.A.); Michalowicz, Cheryl (C.C.); Nehasil, Linda (L.F.)
Cc: DiAngelo, Renaldo (R.); Pepitone, Gil (J.); Surti, P. J. (P.J.)
Subject: '02 3.0L ESCAPE WITH BATT. ACID LEAKAGE

The battery was returned to Cross & Black Test Lab; attn.; Mike Kaler (313-594-8309).

==> _____ _____ 1 of 1
Rpt#: 2EXIC001 PTOFSE Rpt: 05/24/2002 Odom: 3,909 M
Rvwd: File: _ Folder: _____ Images: 0 Print Smy/Disp Detail(P/D): _
Vehicle: 2002 ESCAPE 4X4,XLT ,WAGON 1FMYU04142KC19492 Bld: 01/29/2002
Engine: 3.0L DUR Calib: 2M11A30A Trans: CD4E E Axle: 3800F2.73L A/C: YES
Dealer Id: 01108 John Elway Ford West Ph#: (303) 421-5350
State: Colorado City: Wheat Ridge Orig/Caller: J. NOTEBOOM
Symptom: 6 07 6 92 DRVABL,STALL/QUITS,AT CRUISE,HOT ENGINE
Addl Sym: St: CCRG/EPRC: _ Rvwd: Dt:
Fix: Caus. Comp: BATTERY -- RPL Condition Code: B5
JNOTEBOO (303) 674-4015 FAX: MIL? N ABA? Symp Vf? Survey? N
EO: EC: Prt St: O
ER: CB: Intrnlt? Y
CONCER "RANDOMLY STALLS, OCCURED ONCE AT APPROX. 2500 MILES."
REPAIR THE CONCERN HAS NOT BEEN VERIFIED, THERE WERE NO DTCS PRESENT IN THE SYSTEM. DURING AN INSPECTION(3342 MI) OF VARIOUS GROUNDS, IT WAS NOTED THE BATTERY TRAY HAD BATT ACID PRESENT AND IT HAD SEEPED DOWN ON GRDS. G-104 & 105. THIS WAS CLEANED UP AND THE GROUNDS VERIFIED. AT THIS TIME THERE WAS NO INDICATION OF A BATT CASE LEAK, ONLY A LIGHT DEPOSIT NEAR THE CELL CAPS. ALSO, THER WAS NO DEBRIS IN THE BATT TRAY. AT 3909 MILES THE VEH. WAS RETURNED TO REPLACE THE BATT. AT THAT TIME ACID WAS AGAIN PRESENT IN THE TRAY (A LEAK IS SUSPECT IN THE BOTTOM OF THE BATT. CASE). THE BATT WAS R&R'S AND RETURNED TO MIKE KALER FOR TESTING.

Jim Noteboom
Powertrain Field Quality Specialist/Denver
Phone: 303.674.4015 FAX: 303.674.5730
Page: 1.888.375.1980

From:	Pepitone, Gil (J.)
Sent:	Saturday, June 08, 2002 9:06 PM
To:	Johnson, Jim (J.S.); 'jannis@attglobal.net'; Bilicki, John (J.R.)
Cc:	Pepitone, Gil (J.); DiAngelo, Renaldo (R.); Fernandez, Ruben (R.); Benintende, Robert (R.F.); Dalbo, Bob (R.J.); Sanders, Muriel (M.S.)
Subject:	RE: Phone Numbers
Importance:	High

Hi Joe: great info. I will do as I think you suggest. Firstly, I will request to those co'ed for the parts below be shipped directly to your Dealership.

However, I'm a little confused on your reply concerning the tools handling. Here's a repaste:
When leaving the main land into St. Croix you will not go through customs with your checked luggage. Leaving St. Croix is another story. Your luggage will go through customs but you should not have any problems with tools and such as long as they are check..
Do I understand you correctly: I should carry my tools with me (My NGS, DVOM, flashlight, small drill/bits) since I will not be going thur Customs on my way into St. Croix.
But when LEAVING St, Croix, I should put tools in my checked luggage. Would I then tell them about the tools, thus I would get them "checked"?
Is this correct?? Sorry for any misunderstanding on my part...I do not want to be delayed..

Hi Jim/John: would/could you arrange/request to have the list of components sent directly to the Dealership? That list was provided on a prior note, but I will repaste for your convenience:

Vapor Management Valves (VMV)

Known Good "White Dot" DPFE sensors

EVAP "Flapper" Valves

Known good Idle Speed Control (ISC a.k.a IAC) valves

Pls note that I used plurals for my parts request. I do NOT know how many Units I will be inspecting. I would be nice to have multiple sets of the above parts in hand, or sent to Metro Motors directly before I arrive.

Would someone (Mr. Joe Annis??) pls advise? I do not want to burn up Company $$ waiting for known good parts to arrive.

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Answering Machine: 954-753-9989
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"With Warranty you are Paying for the Sins of the Past"

-----Original Message-----
From: Joe Annis [mailto:jannis@vtford.com]
Sent: Friday, June 07, 2002 6:27 PM
To: Pepitone, Gil (J.); Johnson, Jim (J.S.)
Cc: Pepitone, Gil (J.); DiAngelo, Renaldo (R.)
Subject: Re: Phone Numbers

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Thanks
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From: Pepitone, Gil (J.) <mailto:gpepiton@ford.com>
To: Johnson, Jim (J.S.) <mailto:jjohns21@ford.com> ; 'jannis@attglobal.net' <mailto:'jannis@attglobal.net'>
Cc: Pepitone, Gil (J.) <mailto:gpepiton@ford.com> ; DiAngelo, Renaldo (R.) <mailto:rdiangel@ford.com>
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Sent: Friday, June 07, 2002 2:23 PM
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Sent: Monday, June 10, 2002 4:40 PM
To: Blicki, John (J.R.); 'jannis@attglobal.net'; Johnson, Jim (J.S.)
Cc: DiAngelo, Renaldo (R.); Dalbo, Bob (R.J.); Sanders, Muriel (M.S.); Altoonian, Don (D.J.); Benintende, Robert (R.F.); Moorhouse, Scott (S.R.); Terzes, Laura (L.D.); Linde, Peter (P.A.); Pepitone, Gil (J.); Bradley, Joe (J.C.); Goering, Kimberly (K.L.); Suarez, Rhae (R.); Powers, Ken (K.W.); Terzes, Laura (L.D.); Fernandez, Ruben (R.); Martin, Mike (M.S.); Wexler, Mark (M.A.); Amely, Felix (F.A.)
Subject: RE: Escape stall in St. Croix

Importance: High

Good afternoon Everyone: I have confirmed my air reservations as cited below. I have secured hotel reservations as well.

Mr. Annis: please arrange to have Ms. Matto meet me at American Airlines, Flight # 5288 from San Juan at 1PM this Saturday, June 15th.
I wish to then go directly to your Dealership to start my work. Hopefully, some of the Concern Units will be available then so I may start the Process.

The last item to be addressed are my request for the necessary components, as outlined in my prior notes.

Would anyone wish to step forward to assist me my efforts to acquire these parts? I would not mind having the parts shipped directly to my home and take them to St. Croix. This will save the Company shipping cost to St. Croix and also ensure that the parts have arrived on time.
See the note directly below which lists quantity and type of items.
My address is:
10775 NW 5th Place
Coral Springs, Fla, 33071

Please advise: the timing is now very tight and above all, I would really like to have the "good" DPFEs w/ the white dot and/or a build date of 2A07 or later.

Pls advise asap...
Gil Pepitone
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I am formally requesting that 15 sets of the know good parts {In particular, DPFEs with either a White Dot or a BD date code from 2A07 on is requested} be sent directly to Metro Motors this week.

I tentatively have the following flight schedule. I have NOT made formal reservations yet, as I am awaiting approval from Mr. Johnson, per my note sent yesterday:
Arrive on American Airline Jun 15h {this Sat} in St. Croix at 1pm
Depart St. Croix on Jun 25th {Tues} at 10:30am.

Mr. Annis has agreed to have the Service Manager, Ms. Bette Matto pick me up at the Airport this Saturday, once I have confirmed these flight times to him, via e-mail.

I am asking for conformation of the requested Part Send.
I am requesting final approval of the time span suggested for this trip.

Pls advise asap: I want to ensure I get those flights at the great rate {$486.40} and also get the low hotel rate for the place recommended to me.
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Sent: Monday, June 10, 2002 10:42 AM
To: Altoonian, Don (D.J.)
Cc: DiAngelo, Renaldo (R.); Dalbo, Bob (R.J.); Sanders, Muriel (M.S.); Pepitone, Gil (J.); Johnson, Jim (J.S.)
Subject: RE: Escape stall in St. Croix

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Gil Pepitone has requested the following parts to support his trip to St. Croix:

Vapor Management Valves {VMV}
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Known good Idle Speed Control {ISC a.k.a IAC} valves

Gil and I are not sure if ALL parts in service stock are at the latest quality level. Please advise if we should pursue known good parts from an alternate source or should current service stock be adequate? If need be can you provide known good parts?

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Sent: Saturday, June 08, 2002 9:06 PM
To: Johnson, Jim (J.S.); 'jannis@attglobal.net'; Bilicki, John (J.R.)
Cc: Pepitone, Gil (J.); DiAngelo, Renaldo (R.); Fernandez, Ruben (R.); Benintende, Robert (R.F.); Dalbo, Bob (R.J.); Sanders, Muriel (M.S.)
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Importance: High

HI Joe: great info. I will do as I think you suggest. Firstly, I will request to those cc'ed for the parts below be shipped directly to your Dealership.

However, I'm a little confused on your reply concerning the tools handling. Here's a repaste:
When leaving the main land into St. Croix you will not go through customs with your checked luggage. Leaving St. Croix is another story. Your luggage will go through customs but you should not have any problems with tools and such as long as they are check..
Do I understand you correctly: I should carry my tools with me {My NGS, DVOM, flashlight, small drill/bits} since I will not be going thur Customs on my way into St. Croix.
But when LEAVING St, Croix, I should put tools in my checked luggage. Would I then tell them about the tools, thus I would get them "checked"?
Is this correct?? Sorry for any misunderstanding on my part...I do not want to be delayed..

Hi Jim/John: would/could you arrange/request to have the list of components sent directly to the Dealership? That list was provided on a prior note, but I will repaste for your convenience:

Vapor Management Valves {VMV}

Known Good "White Dot" DPFE sensors

EVAP "Flapper" Valves

Known good Idle Speed Control {ISC a.k.a IAC} valves

Pls note that I used plurals for my parts request. I do NOT know how many Units I will be inspecting. I would be nice to have multiple sets of the above parts in hand, or sent to Metro Motors directly before I arrive.

Would someone {Mr. Joe Annis??} pls advise? I do not want to burn up Company $$ waiting for known good parts to arrive.

Pls note my reference for knowing in advance the Number of Units involved, so I may not only know how many "sets" of the above parts to have delivered, but also so I may know how long to may my stay for: obviously, the more cars to fix, the longer the stay.
Joe: would you be able to advise us on the number of cars I will be involved with??

Thank you,
Gil Pepitone
Powertrain Field Quality Specialist-"PFQS"
Answering Machine: 954-753-9969
Non-Text Beeper: 1888-375-1981
"With Warranty you are Paying for the Sins of the Past"
----Original Message----
From: Joe Annis [mailto:jannis@vifford.com]
Sent: Friday, June 07, 2002 6:27 PM
To: Pepitone, Gil (J.); Johnson, Jim (J.S.)

Cc: Pepitone, Gil (J.); DiAngelo, Renaldo (R.)
Subject: Re: Phone Numbers

HI Gil

When leaving the main land into St. Croix you will not go through customs with your checked luggage. Leaving St. Croix is another story. Your luggage will go through customs but you should not have any problems with tools and such as long as they are check.

If you are shipping small parts, etc. it is best to have them shipped to the dealership via US Mail, using the over night service. If you are flying in with checked luggage, you should be able to bring tools with you. Any thing you need shipped back we can do from the dealership. Give me a call if I can be of any help. Best number to use is my cell 340 690 2406.

Thanks
Joe Annis

----- Original Message -----
From: Pepitone, Gil (J.) <mailto:gpepiton@ford.com>
To: Johnson, Jim (J.S.) <mailto:jlohns21@ford.com> ; 'jannis@attglobal.net' <mailto:'jannis@attglobal.net'>
Cc: Pepitone, Gil (J.) <mailto:gpepiton@ford.com> ; DiAngelo, Renaldo (R.) <mailto:rdiangel@ford.com>
Sent: Friday, June 07, 2002 6:49 PM
Subject: RE: Phone Numbers

Hi Jim: I will take your direction regarding making the reservations at the Buccaneer Hotel. However, am I correct in understand that I may make then directly, and not thru the Ford Travel Website? Pls advise.

HI Joe: I intend on calling you Monday afternoon. I'm waiting till then so I may know if my prior note's request regarding the importing of Parts and my tools is a Go.

Based on the pending timing of shipment of known good parts, I will make my flight reservations. Unless, Jim, you would want me to leave BEFORE parts are sent out. Please advise. I'm way flexible...

As for my personal transportation, I agree with the approach that I should drive the Concern Units. I want to load the WDS VDR and record the Stalls, if I'm lucky enough to have them Stall for me..

Thank you,
Gil Pepitone
Powertrain Field Quality Specialist-"PFQS"
Answering Machine: 954-753-9989
Cell # 954-242-2066
"With Warranty you are Paying for the Sins of the Past"
-----Original Message-----
From: Johnson, Jim (J.S.)
Sent: Friday, June 07, 2002 3:09 PM
To: Pepitone, Gil (J.)
Subject: FW: Phone Numbers

-----Original Message-----

From: Joe Annis [mailto:jannis@attglobal.net]
Sent: Friday, June 07, 2002 12:43 PM
To: Johnson, Jim (J.S.)
Subject: Re: Phone Numbers

Jim

If he need a car we could let him drive an Escape the time he is here. I have two that are on our list and I think we have done the TSB on them. Just let me know his flights and we will have him picked up at the Air Port and go from there.

Thanks
Joe

---- Original Message ----
From: Johnson, Jim (J.S.) <mailto:jjohns21@ford.com>
To: 'Joe Annis' <mailto:jannis@attglobal.net> ; Pepitone, Gil (J.) <mailto:gpepiton@ford.com>
Cc: Benintende, Robert (R.F.) <mailto:rbeninte@ford.com>
Sent: Friday, June 07, 2002 2:23 PM
Subject: RE: Phone Numbers

Joe, sorry for the confusion, Gil is going to St. Croix. Do you recommend Gil rent a car? Please advise.

Gil, Joe Annis (The dealer Principal) recommends the Buccaneer Hotel, phone 340-773-2100 he has a preferred rate of approximately $100.00 per night vs. the rack rate of $200.00. You have to tell them your working on Ford Motor Company business at Metro Motors and request the Metro Motors rate.

Also please forward your flight details when you get a chance. Joe will meet you at the airport.

-----Original Message-----
From: Joe Annis [mailto:jannis@attglobal.net]
Sent: Friday, June 07, 2002 10:09 AM
To: Johnson, Jim (J.S.)
Subject: Phone Numbers

Jim

My cell number is 340 690 2406 my home number in St. Thomas is 340 714 1905 and in St. Croix the home is 340 773 9559 I think. In your note you said that the person would be going to St. Thomas. We have a lot of Escapes in St. Croix and a much better service department to work in.

Thanks
Joe

D21 Stalls

D21 Stalls

[redacted]

[redacted] 11770

D21 Stalls

EB62-627-A 11774

D21 Stalls

Ford Motor Company

2000 Enterprise Dr.
Allen Park, MI 48101

January 14, 2003

Mr. Cory Thompson
Metro Ford
2880 South Noland Rd.
Independence, MO 64055

Dear Cory:

Enclosed are the exemption sticker and PCM for the 2002 Escape (VIN 1FMCU04102KB85206). Please refer to the attached sheet for the exemption sticker placement instructions. The exemption sticker and PCM will need to be returned within 30 days to the address below.

Ford Motor Company
TEE Building
ATTN: Gilbert Fournelle
2000 Enterprise Dr.
Allen Park, MI 48101

If you have any questions please contact me at 313-322-7307 or Gilbert Fournelle at 313-390-4968.

Sincerely,

Muriel Sanders
3.0L Escape Calibration
Ford Motor Company

Ford Motor Company

2000 Enterprise Dr.
Allen Park, MI 48101

January 14, 2003

Mr. Mike Hawes
Bill Woods Ford
5025 N. E. Antioch
Kansas City, MO 64119

Dear Mike:

Enclosed are the exemption sticker and PCM for the 2002 Escape (VIN 1FMYU041S2KD11746). Please refer to the attached sheet for the exemption sticker placement instructions. The exemption stiker and PCM will need to be returned within 30 days to the address below.

Ford Motor Company
TEE Building
ATTN: Gilbert Fournelle
2000 Enterprise Dr.
Allen Park, MI 48101

If you have any questions please contact me at 313-322-7307 or Gilbert Fournelle at 313-390-4668.

Sincerely,

Muriel Sanders
3.0L Escape Calibration
Ford Motor Company

From: Dalbo, Bob (R.J.)
Sent: Thursday, January 10, 2002 6:38 PM
To: Williams, Lee (LHW.)
Cc: Fournelle, Gilbert (G.)
Subject: FW: Travel Approval Needed

Well, Lee, you silver-tongued devil, I guess you go to New Jersey after all. I hope you like it as much as Toronto!

Bob Dalbo

3.0L Calibration Supervisor
Outfitters Calibration, North American Truck
Phone: (313)24-84947 Fax: (313)32-31786
Pager: (313)795-2859 E-mail: *rdalbo@ford.com*

—Original Message—
From: Pascetti, Bob (R.J.)
Sent: Thursday, January 10, 2002 6:33 PM
To: Dalbo, Bob (R.J.)
Subject: RE: Travel Approval Needed

ok.

—Original Message—
From: Dalbo, Bob (R.J.)
Sent: Thursday, January 10, 2002 6:18 PM
To: Pascetti, Bob (R.J.)
Subject: FW: Travel Approval Needed

Bob,
The FCG office will not fund Lee' travel. Does this note imply that Jerry is willing to do so?

This trip will wind up costing less than $1000/person and there are a lot of vehicles to examine in 3 days.

Bob Dalbo

3.0L Calibration Supervisor
Outfitters Calibration, North American Truck
Phone: (313)24-84947 Fax: (313)32-31786
Pager: (313)795-2859 E-mail: *rdalbo@ford.com*

—Original Message—
From: Klarr, Jerry (G.T.)
Sent: Thursday, January 10, 2002 2:12 PM
To: Corbett, Sandra (S.M.)
Cc: Hofman, Michael (M.V.); Pascetti, Bob (R.J.); Dalbo, Bob (R.J.)
Subject: RE: Travel Approval Needed

OK

G. T. Klarr (Jerry)
P/T Chief Engineer: PH: 32-26669/Cube: 1BA45
PDC/MD #205/FAX: 62-18063/gklarr@ford.com

—Original Message—
From: Corbett, Sandra (S.M.)
Sent: Thursday, January 10, 2002 1:44 PM
To: Klarr, Jerry (G.T.)

Cc: Hofman, Michael (M.V.); Fascetti, Bob (R.J.); Dalbo, Bob (R.J.)
Subject: Travel Approval Needed

Jerry,
Can you grant travel approval for 2 engineers (+1 FCG) in support of the Escape/Tribute stalls issue. Inspections will be conducted with Mazda Northeast region on 13 buy back vehicles. I have attached the Mazda request below.

The itineray would include travel to New Jersey on Tuesday, 1/15/02 returning on Friday, 1/18/02. Cheapest tickets include a stop in Chicago offering approx. $200+ savings/ ticket. Fare is $456.

Vehicle rental will not be needed, Mazda van will be provided for team to share.

Sandy Corbett
Escape P/T QRT
Phone/Fax: (313)59-44351
West Park Center 426-C

---Original Message---
From: Darrel Chin [mailto:DChin@mazdausa.com]
Sent: Tuesday, January 08, 2002 6:15 PM
To: 'rdalbo@ford.com'; 'bfascett@ford.com'
Cc: Steven Limtiaco; Michael Giblin
Subject: Request for Assistance

Gentlemen,
The Mazda Northeast Region will be conducting an inspection of repurchased vehicles at their office in Somerset, New Jersey. The intent is to either confirm what is already known, or to report any new items that may further contribute to the intermittent stall concern. This is being done to support current Ford engineering investigations. We feel that this will benefit both companies and request Ford engineering support in conducting these inspections to ensure the best capture of information.

We believe that the information obtained will be a valuable input for the Ford investigation team. Please advise at your earliest opportunity if Ford engineering can support this activity. The attached file list the vehicles currently at the regional office and includes a summary of their repair history. Mazda's Northeast Region Technical Specialist, Dan Rothweiler, will be taking the lead on the inspections.

<<CRV Tribute Inventory Stall Test Results.xls>>
Thank you for your time and consideration.
Darrel Chin
Product Support Manager
dchin @mazdausa.com
(949) 442-6525

From: Peters, Robin (R.S.)
Sent: Thursday, November 29, 2001 2:36 PM
To: Alan Trilling (E-mail); Atley III, David (D.); Austin, James (J.E.); Belzyt, Roseann (R.); Bogema, John (P.); Buick, Jeffrey (J.); Campbell, Stacie (S.J.); Dalbo, Bob (R.J.); Dave Godshall (E-mail); DeBrule, Peter (P.E.); Don Marzewski (E-mail); Fagerman, Todd (T.M.); Fascetti, Bob (R.J.); Finley, Rick (R.W.); Forintos, Darryl (D.A.); Foumelle, Gilbert (G.); Gobis, Linas (L.P.); Gould, Torri (T.); Green, Michael (M.L.); Grzinolo, Karen (K.M.); Hazime, Joe (J.); Hendricks, Kerry (K.D.); Herr, George (G.J.); Hodgson, Linda (L.K.); Huck, Dave (D.E.); Junker, Lawrence (L.W.); Kalafut, Stephen (S.J.); Kreuter, Richard (R.B.); Krohn, Maggie (M.M.); Kwon, Soon (S.K.); Lewis, Dennis (D.J.); Loo, Donald (D.C.); Mazzella, Stephanie (S.R.); McDonald, John (J.R.); Morgan, Dan (W.D.); Nelson, Daniel (D.G.); Nikolai, Bernie (B.E.); Oetach, Gabrielle (G.); Palazzolo, Pete (P.); Pawlak, Greg (G.J.); Plattenberger, Karl (K.J.); Przybylo, Ken (K.); Redding, Joe (J.M.); Rich Fad (E-mail); Schlott, Michael (M.D.); Sheeran, William (W.M.); Smith, Steven (S.V.); Stanley, Mark (M.); Sullivan, Todd (T.E.); Traskos, Diane (D.M.); Vandeglessen, Larry (L.W.); Weaver, Dick (R.T.); Weber, Chris (C.R.); Wild, Kenneth (K.); Young, Dan (D.G.); Zielinski, Jay (J.A.)
Subject: 2002/2001 3.0L U204 Emergency PCM Release Workplan

The attached workplan was developed at today's emergency release meeting. If you have any questions or issues with dates, please contact me ASAP.

[redacted]

U204R10.doc

Robin Peters
Truck PCM Timing Coordinator
Emission Compliance Dept.
Phone: 313-39-01658

WORKPLAN FOR EMERGENCY RELEASE

Thursday, November 29, 2001 - 1:30 p.m.

2002 Job #2 3.0L U204 R10 & 2001 Service Fix Emergency Release

C11299149

Cal. No.	Part No.			
2002			2001	
2M11A30510	2L8A-AD	BUS3	0M11A30512	1U7A-AXA
2M11B30510	2L8A-BD	ZRZ3	0M11B30512	1U7A-AZA
2M11C30510	2L8A-CD	HQP3	0M11C30512	1U7A-AYA

Plus additional calibrations for non-US Cert. Markets – see concern.

TASK	PROJ. COMPLETION DATE	RESPONSIBILITY
ET-90	Complete	R. Finley
Code Sign-off	11/29E	B. Dalbo
Code Sign-off OBD-II	12/3E	D. Huck
SWDV Complete	12/3E	DeBrule/Gould
Notice Raised	12/4E	K. Grzincic
Appl. Engineer Approval	12/4E	J. Bogema
Module Conf. Engineer Approval	12/4E	B. Nikolai/Andy Jones
Notice Routed for Telegram	12/4E	K. Grzincic
Telegram/Codes:	12/5E	
APO to Supplier	12/6E	T. Gould/P. DeBrule
APO Drawings Complete	12/6E	K. Wild/Visteon
Notice to Complete Status	12/6E	S. Smith
Notice WERS Released		WERS Queue
Flash Cards Prepared	N/R	T. Sullivan
Update EOL	12/15E	D. Weaver
Certification:		
Testing Complete	N/R	
White Paper to Cert Comp.	Complete	B. Dalbo
White Paper & R/C to VEE	Complete	J. Zielinski
VEE Approval	12/5E	S. Campbell
Supplier PSW	12/18E	A. Trilling/D. Godshall
VO Releases to Supplier	12/10E	R. Krueter
Module Ship Date	12/18E Provided releases are in place for affected plants.	
Module MRD	12/21	

From: Williams, Les (LHW.)
Sent: Thursday, March 14, 2002 2:49 PM
To: Chih, Ming-Niu (M.N.)
Cc: Sanders, Muriel (M.S.); Dalbo, Bob (R.J.)
Subject: Silver buyback

Importance: High

Hello Ming, we'll need the silver buyback ASAP for testing. Can you have it to us by Friday?

Thx!

From: Williams, Lee (LHW.)
Sent: Thursday, March 14, 2002 4:30 PM
To: Dalbo, Bob (R.J.); Sanders, Muriel (M.S.)
Subject: FW: Silver buyback

FYI

-----Original Message-----
From: Chih, Ming-Niu (MLN.)
Sent: Thursday, March 14, 2002 4:29 PM
To: Williams, Lee (LHW.)
Subject: RE: Silver buyback

Lee,
I'll drop it tomorrow.
Hope that the trial on Monday will be the last one and the parts accepted by KCAP.

-----Original Message-----
From: Williams, Lee (LHW.)
Sent: Thursday, March 14, 2002 2:49 PM
To: Chih, Ming-Niu (MLN.)
Cc: Sanders, Muriel (M.S.); Dalbo, Bob (R.J.)
Subject: Silver buyback
Importance: High

Hello Ming, we'll need the silver buyback ASAP for testing. Can you have it to us by Friday?

Thx!

From: Williams, Lee (LHW.)
Sent: Friday, March 15, 2002 2:13 PM
To: Dalbo, Bob (R.J.); Sanders, Muriel (M.S.)
Subject: White buyback keys found 4PJY693

Hey ya'll:

Somebody put keys back in box, I checked before I sent Armida the note (they didn't return keys to my desk so I had no idea it was returned). We are all good. Muriel, white buyback and silver buyback are on third flr on the railroad tracks-side of deck. My white buyback is in space 77, and Armida's will be returned Monday.

Regards,
Lee Williams
For More, Count on Lee
U204 3.0L Powertrain Calibration
Truck Engine Engineering, Suite 1AB20
Phone: (313)33-72503
Fax: (313) 32-31786

From: Dalbo, Bob (R.J.)
Sent: Thursday, March 14, 2002 5:19 PM
To: Svenkickas, Ed (E.)
Cc: Hofman, Michael (M.V.); Young, Lam (.); Bob Fascetti
Subject: PCV System Improvements

Ed,
Ted Jensen is seeing an increasing number of IACVs with oil only on the entrance side. The stalls team hasn't heard anything about the progress of PCV system revisions to address this issue; have you?

Bob Dalbo

3.0L Calibration Supervisor
Outfitters Calibration, NAT
Phone: (313) 24-84947 Fax: (313) 32-31786
Pager: (313) 795-2859 Email: *rdalbo@ford.com*

From: Dalbo, Bob (R.J.)
Sent: Monday, March 25, 2002 5:06 PM
To: Grimes, Jeff (J.R.)
Cc: Kwon, Soon (S.K.)
Subject: RE: Finned pintle IABV

Finned pintle will be introduced at Job #1 2003. We have another action we are investigating for stall reduction and when that is complete we will release a service calibration capable of using finned pintle IACV.

Bob Dalbo

3.0L Calibration Supervisor
Outfitters Calibration, NAT
Phone: (313) 24-84947 Fax: (313) 32-31786
Pager: (313) 795-2859 Email: *rdalbo@ford.com*

----Original Message----
From: Grimes, Jeff (J.R.)
Sent: Monday, March 25, 2002 4:04 PM
To: Dalbo, Bob (R.J.)
Cc: Kwon, Soon (S.K.)
Subject: Finned pintle IABV

What is the status of testing for the Finned Pintle IABV...

This is another critical warranty improvement we need to get in soon...Bob, is this a possible for Job #1? Or definitely J#2?

Forgive my ignorance...This got dumped on me, and I need to catch up with the history.

Soon, why isn't this one on the P/T actions at KCAP??

Jeff R.Grimes
Duratec Engine Programs
Ph: (313) 32-25237 Fax: (313) 59-47323
email: jgrimes1@ford.com

From: Dalbo, Bob (R.J.)
Sent: Friday, April 26, 2002 1:54 PM
To: Ortman, James (J.W.); Grimes, Jeff (J.R.)
Cc: Sanders, Muriel (M.S.)
Subject: RE: Test Plan for Mazda Buyback Vehicle

Jim,
Of course we won't complain if we can pull ahead the date, but this timing is OK. We just need a credible date for our test completion.

Bob Dalbo

3.0L Calibration Supervisor
Outfitters Calibration, NAT
Phone: (313) 24-84947 Fax: (313) 32-31786
Pager: (313) 795-2859 Email: *rdalbo@ford.com*

—Original Message—
From: Ortman, James (J.W.)
Sent: Friday, April 26, 2002 11:26 AM
To: Dalbo, Bob (R.J.); Grimes, Jeff (J.R.); Sanders, Muriel (M.S.)
Subject: RE: Test Plan for Mazda Buyback Vehicle

MPG reports the test will not be done until late next week. They have to do a safety inspection, set-up the equipment, collect the data, and then remove the equipment.

Is this timing going to cause a problem?

—Original Message—
From: Dalbo, Bob (R.J.)
Sent: Thursday, April 25, 2002 5:29 PM
To: Ortman, James (J.W.); Grimes, Jeff (J.R.); Sanders, Muriel (M.S.)
Subject: Test Plan for Mazda Buyback Vehicle

Jeff/Jim,
The Mazda buyback vehicle we loaned you was previously used for some NVH evaluations. When analyzing the data, an RPM control issue was identified. We have been tasked with analyzing and resolving that issue.

We do not want to interrupt the PCV testing that vehicle is undergoing. We would like a timing plan for that testing so we can in turn develop issue resolution timing. Please provide an estimate of when your testing on that vehicle will be completed.

Muriel,
Please provide the vehicle number to clarify which truck we are concerned with.

Bob Dalbo

3.0L Calibration Supervisor
Outfitters Calibration, NAT
Phone: (313) 24-84947 Fax: (313) 32-31786
Pager: (313) 795-2859 Email: *rdalbo@ford.com*

From:	Williamson, David (D.E.)
Sent:	Monday, April 29, 2002 2:34 PM
To:	Grimes, Jeff (J.R.)
Cc:	Kwon, Soon (S.K.); Dalbo, Bob (R.J.); Miller, Brian (B.J.); Taylor, Perry (P.Allen.); Mateos, John (J.); Ricotta, Jim (J.M.); Williamson, David (D.E.)
Subject:	No New IAC Valves for 2003MY U204 Job 1
Importance:	High

Jeff, Intro of new IAC vales was overruled by launch management (Hopclan, Ianuzzi, & Veenstra). The valves can not be switched for Job 1. So they will not be evaluated at KCAP this week by Mateos & Ricotta.

Direction is that they can not come in earlier than Job 2 (Nov. 11) due to the late request & the new rules in place that eliminates +90 days.

Thanks.

From:	Dalbo, Bob (R.J.)
Sent:	Monday, April 29, 2002 4:14 PM
To:	Bob Fascetti
Cc:	Corbett, Sandra (S.M.); Gilbert Foumelle
Subject:	FW: No New IAC Valves for 2003MY U204 Job 1
Importance:	High

Since 4P engines were delivered w/o finned-pintle IACVs, the finned-pintle introduction will be delayed until Job #2.

Bob Dalbo

3.0L Calibration Supervisor
Outfitters Calibration, NAT
Phone: (313) 24-84947 Fax: (313) 32-31786
Pager: (313) 795-2859 Email: *rdalbo@ford.com*

----Original Message----

From:	Williamson, David (D.E.)
Sent:	Monday, April 29, 2002 2:34 PM
To:	Grimes, Jeff (J.R.)
Cc:	Kwon, Soon (S.K.); Dalbo, Bob (R.J.); Miller, Brian (B.J.); Taylor, Perry (P.Allen.); Meteea, John (J.); Ricotta, Jim (J.M.); Williamson, David (D.E.)
Subject:	No New IAC Valves for 2003MY U204 Job 1
Importance:	High

Jeff, Intro of new IAC valve was overruled by launch management (Hopclan, Ianuzzi, & Veenstra). The valves can not be switched for Job 1. So they will not be evaluated at KCAP this week by Mateea & Ricotta.

Direction is that they can not come in earlier than Job 2 (Nov. 11) due to the late request & the new rules in place that eliminates +90 days.

Thanks.

From:	Sloan, Burt (B.E.)
Sent:	Thursday, May 02, 2002 3:24 PM
To:	Klarr, Jerry (G.T.); Fascetti, Bob (R.J.); Dakhlallah, Hassan (H.A.); Dennis, Matt (M.A.); Ward, Sheila (S.A.); Whitehead, Joe (J.P.); Foumelle, Gilbert (G.); Boyk, Greg (G.J.); Adams, Kerry (K.N.); Matkovich, Dale (D.M.); Sabin, Scott (S.M.); Haneen, George (G.C.); Young, Dan (D.G.); Coffey, Dan (D.C.); Putney, Bill (W.); Kieliszewski, Mark (M.D.); King, Brian (B.M.); Mazzella, Gary (G.R.); Liller, David (D.J.); McIntee, Brian (B.E.); Gaynier, Larry (L.J.); Hille, Kevin (K.T.); Lewis, Marvin (M.A.); Turner, Donald (D.A.); Perlok, Don (D.A.); Gibson, Patrick (P.W.); Crowley, Pat (P.J.); Kosko, Jeff (J.R.); Newman, Chris (C.W.); Delaroderie, Jim (J.A.); Dalbo, Bob (R.J.); Squires, Mark (D.M.)
Cc:	Hofman, Michael (M.V.); Corbett, Sandra (S.M.); Schmidt, Gregory (G.A.); Van Wiemeersch, John (J.R.)
Subject:	Outfitters & Ranger Engine Hesitation/Surge, Stall, and No Start Affinity Team Meetings

Outfitters & Ranger Affinity Team
Drivability
May 8, 2002
8:00 am to 9:30 am
TEE - Conference Rm 1

Call In Phone Number: 9-1-877-877-7126
Participant Code: 6341969 #

May 7, 2002 Meeting Agenda:

1) No Start PCM 6 Sigma Project status		Pat Gibson, Kevin Hille
2) U152 Stalls DOE preliminary conclusions		Scott Sabin
3) UP207 Toyota Air Valve addition	Approval given at Bob Himes PDQOR Meeting Discuss next steps to proceed	Sheila Ward Mark Squires
3) Hard Start Investigation, Dakhlallah	Overview	Hassan
	IAC Warranty Review	Kerry Adams Jim Delaroderie
4) Throttle Body Anaerobic Sealer CR status		Pat Crowley Jeff Kosko

May 1st Agreements & Assignments:

No Start PCM 6 Sigma	Buying back 1 vehicle from Seattle Team will visit local dealerships to diagnose the root causes
U152 D21 No Stalls	DOE testing has been completed 4/25/02.

	Analysis of results is expected to take 2 weeks.
Throttle Body Break Off Screw hand	Decided to provide an adjustable Throttle Body for service 30 Piece TB study concluded no difference between originals and carried TB
anaerobic	Pat Crowley to follow up with Jeff Kosko on status of CR for sealer

From: Dalbo, Bob (R.J.)
Sent: Thursday, May 16, 2002 5:53 PM
To: Kwon, Soon (S.K.); Yeung, Lem (.)
Cc: Corbett, Sandra (S.M.); Fournelle, Gilbert (G.)
Subject: RE: IAC change

We did emissions and functional testing of the finned-pintle IACV on the 2003 Job #1 calibration. Gilbert Fournelle can provide the details.

Bob Dalbo

3.0L Calibration Supervisor
Outfitters Calibration, NAT
Phone: (313) 24-84947 Fax: (313) 32-31786
Pager: (313) 795-2859 Email: *rdalbo@ford.com*

—Original Message—
From: Kwon, Soon (S.K.)
Sent: Thursday, May 16, 2002 11:23 AM
To: Dalbo, Bob (R.J.); Yeung, Lem (.)
Cc: Corbett, Sandra (S.M.)
Subject: IAC change

I would like to confirm that the new IAC valve (YF1E-9F715-AB, released on CR # C11252737) has been tested with 2003 Job 1 calibration, Emissions/functional transparency has been proven, DVP&R completed on U204 engine and we can proceed implementation without further testing.

Lem, what is the R/1000 improvement projection with new IAC valve ?

Pls reply asap.

Thanks.

Regards,
Soon Kwon
Escape/Tribute P/T OPD Supervisor
Compact Utility PTSE, TVC
2F639, MD 406, PDC Dearborn 48126
Phone (313) 322-6844, Fax
Pager (313) 795-1636, email: skwon@ford.com

From: Fascetti, Bob (R.J.)
Sent: Monday, May 20, 2002 7:37 AM
To: Dalbo, Bob (R.J.)
Subject: FW: Some feedback from FCSD personnel @ Tahoe for you

Bob,
please follow up with Paul directly on this. Thanks.

—Original Message—
From: Klarr, Jerry (G.T.)
Sent: Sunday, May 19, 2002 9:07 PM
To: Koszewnik, John (J.J.); Fascetti, Bob (R.J.); Gray, Chuck (C.E.)
Cc: Samardzich, Barb (B.J.); Corbett, Sandra (S.M.)
Subject: RE: Some feedback from FCSD personnel @ Tahoe for you

Thanks for the info. Bob - need to confirm if the dealer tried the TSB. As we discussed, we need to see if we have other failure modes not captured by the recent field actions.

G. T. Klarr (Jerry)
P/T Chief Engineer: PH: 32-28869/Cube: 1BA45
POC/MD #205/FAX: 82-18083/gklarr@ford.com

—Original Message—
From: Koszewnik, John (J.J.)
Sent: Sunday, May 19, 2002 4:16 PM
To: Fascetti, Bob (R.J.); Klarr, Jerry (G.T.); Gray, Chuck (C.E.)
Cc: Samardzich, Barb (B.J.)
Subject: FW: Some feedback from FCSD personnel @ Tahoe for you

Bob and Jerry,

I think you are both heavily involved in the Escape stalls issue. Could you please contact Paul Belote of FCSD and answer his questions.

Chuck,

Please have Frank or someone else in your organization follow-up with Oscar Rosignon. Also, note the heads up on 4.0L "warble" noise. I wonder if this is the 4.0L "marble noise" issue associated with the OHV version of the Cologne engine. You might want to check with the Hotline to find out if something new is developing.

Barb,

Thanks for forwarding these concerns.

John Koszewnik
Chief Engineer
V-Engine Engineering
Ph. 32-28973
Fx. 24-86067
jkoszewn@ford.com

—Original Message—
From: Samardzich, Barb (B.J.)
Sent: Thursday, May 16, 2002 10:31 AM

To: Kozemnik, John (J.J.)
Subject: Some feedback from FCSD personnel @ Tahoe for you

A couple of the FCSD attendees had some specific request for you, or one of your team to follow up with them:

Paul Belote (Pittsburgh Region) 412.512.6457
Has a serious issue with engine stalls on Escape. Had one customer w/ a 2001 product, bought it back from the customer and put him into a 2002 Escape, had to buy that one back also. (If this is Brian Wolfe's, please forward my note to him). Wants to understand details of the issue and what we are doing about it.

Oscar Rosanon (Atlanta Region) 678.355.6329
Two concerns: 3.0L Ranger spark knock and rough idle. Head gasket failures. Again, would just like to talk to someone about our fixes, what they can / should say to the customer, etc.

Only other specific item was a concern with a 4.0L warble noise on Rangers. Don't have much info other than a couple of the service rep.'s felt this was a serious issue.

Regards,

Barb Samardzich
Chief Engineer
Automatic Transmission Engineering
Phone: 734-52-36775
Text Page: bsamardz
Admin: Linda Isakson

From: Steven Limtiaco [SLimtiac@mazdausa.com]
Sent: Tuesday, June 04, 2002 7:07 PM
To: 'meander6@ford.com'
Cc: 'rdalbo@ford.com'
Subject: FW: BUYBACKS AT FORD ENGINEERING

Muriel,

Here are the original miles for each vehicle. Could you send back current
miles? We need this information to set pricing on the vehicles.
Thanks,

Steve Limtiaco
Mazda North American Operations
Tribute Product Support
949-442-6514 (phone)
949-442-6599 (fax)
e-mail: slimtiac@mazdausa.com

> -----Original Message-----
> From: Bob Newell
> Sent: Tuesday, June 04, 2002 3:44 PM
> To: Steven Limtiaco
> Subject: RE: BUYBACKS AT FORD ENGINEERING
>
> Please provide a contact name at Ford and we will make arrangements to
> have the vehicles moved, unless Ford wants to do it and pay the
> transportation costs.
>
> Thanks!
> Bob
>
> -----Original Message-----
> From: Steven Limtiaco
> Sent: Tuesday, June 04, 2002 1:41 PM
> To: Bob Newell
> Subject: BUYBACKS AT FORD ENGINEERING
> Importance: High
>
> Bob,
>
> I made a slight change and moved the Lord vehicle up to Ford,
Allen
> Park, MI. This should make 4 buybacks currently at Ford engineering.
> If I recall, we agreed that these vehicles be shipped back to MW
region
> for buyback repair. Can you confirm? Ford should be done with the
> vehicles.
>
> Also, could you provide mileage of each vehicle at the time of
> buyback? Engineering needs for their records. Thanks,
>
> 4F2CU09161KM27024 (California) [User] - 4389mi
> 4F2YU07171KM16218 (Alabama) [User] - 3000 mi
> 4F2YU07101KM14486 (Louisiana) [User] - 9633 m

> 4F2YU08101KM06161 (Tennessee) [User] - 12576 mi
>
> Steve Limtiaco
> Mazda North American Operations
> Tribute Product Support
> 949-442-6514 (phone)
> 949-442-6599 (fax)
> e-mail: slimtiac@mazdausa.com
>
> << File: qryTributeLocations.xls >>

From: Huok, Dave (D.E.)
Sent: Friday, June 07, 2002 11:08 AM
To: Altoonian, Don (D.J.); Dalbo, Bob (R.J.)
Cc: Shelton, Randy (R.)
Subject: U204 Duratec Fuek Trim Stalls

Bob, Don

I talked with Randy about the buy-back vehicles with stalls that have fuel trim correction but too low to set fuel codes and yet LAMBSE is too far from stoich ultimately resulting in a stall. We had been discussing an "experimental" calibration with lower limits to use as a screening test to assure the buy-backs are completely repaired before resale.

Randy suggested using VDR's instead. He could program them to capture a set of parameters under a specific set of conditions that indicates the fault experienced e.g. KAMBAR > "x" .AND. LAMBSE < "y". This would capture the data without need to reflash the vehicles. (I still think we would need to certify the "experimental" calibration even though it is not intended for use by the public. If so, this would be prohibitively expensive for the number of vehicles involved.)

If you think this would do the job, please let me know and we'll work with Randy to make it happen.

From: Steven Limtiaco [SLimtiac@mazdausa.com]
Sent: Monday, June 17, 2002 6:07 PM
To: 'msander6@ford.com'
Cc: 'rdalbo@ford.com'; Bob Newell
Subject: Tribute Buyback Plates

Importance: High

Muriel,

I have a favor to ask. Would you mind pulling all four distributor plates
off the buyback Tributes, then ship them back to my attention? Thanks!

Steve Limtiaco
Mazda North American Operations
Tribute Product Support
949-442-6514 (phone)
949-442-6599 (fax)
e-mail: slimtiac@mazdausa.com

From: Williams, Lee (LHW.)
Sent: Monday, November 12, 2001 10:16 AM
To: Lovelace, Maria (M.E.)
Cc: Foumelle, Gilbert (G.); Dalbo, Bob (R.J.)
Subject: FW: Information

Thanks for the information Maria, and it was a pleasure meeting you!

I would like to come talk with the FQE's on Tuesday, December 11 around 3:00 PM concerning the stalls issue so I can meet them/discuss progress and field any questions.
3:00 PM would give me some time with both the powertrain group and the electronics group. ----Original Message----

From: Lovelace, Maria (M.E.)
Sent: Monday, November 12, 2001 8:50 AM
To: Williams, Lee (LHW.)
Subject: Information

here you go

[redacted] dec.AGENDA.doc [redacted] dept.doc

Maria E. Lovelace
Enhanced Concern Identification - FCSD
600 Town Center, Suite 300 Cube 25
600 Town Center Drive
Dearborn, Michigan 48126
313-323-6561/800-521-4450

TENTATIVE

FOE AGENDA
DECEMBER 11 THRU 13

12/11/02 11:30-1:00	***LUNCH - FQEs*** ***Guilio & Sons – Hyatt Regency Hotel***
1:30-2:00	***TIRE GROUP- McCarthy***
2:10-2:40	***CHASSIS GROUP-Jones***
2:50-3:15	***POWERTRAIN GROUP-Bissi***
3:25-3:45	***ELECTRONICS GROUP - Trzeciak***
12/12/2001	
8:00-11:00	***IT SOLUTION – Karen Kurzyniec***
1:00-2:00	***AIRBAGS - David Bauch***
2:00-3:00	***SEAT BELTS - Roy Nacewicz***
12/13/2001	
8:00-9:00	***AVIATOR***
9:10-10:10	***NAVIGATOR – Fahd Ahmed/Dave Walus***
10:20-11:20	***BLACKWOOD – Rob Ballinger (Magna)***
1:00-2:00	***Pete Bandoske – Delamination***
3:00-5:00	***Staff Dinner***

All meetings held in Conference Room "A", Suite 300, 500 Town Center

ENHANCED CONCEsN IDENTIFICATION

NAMB		LOCATON	PHONB	FAX	CELL	EMAIL ID
Lee Bernuder	Supervisor					
Maria Lovelace	Prod. Prob. Analyst PQB Coordinator					
Tony Colarossi	Field Quality Engineer					
Dan Hammack	Field Quality Engineer					
Tom Hecker	Field Quality Engineer					
Harry Ireland	Field Quality Engineer					
Dave Cox	Field Quality Engineer					
Tony Dionisi	Field Quality Engineer					
Don Christoff	Field Quality Engineer					
Mark Haydnk	Field Quality Engineer					
Lynn Sorensen	Field Quality Engineer					
Tom Peeler	Field Quality Engineer					
John Domka	Field Quality Engineer					
Ron Trower	Field Quality Engineer					
Gordie Kaltz	Field Quality Engineer					
Brian Howe	Field Quality Engineer					
Dan Myers	Field Quality Engineer					

Dept 4oc
Dept.# 24601222
222 can be used

From: Bhojwani, Kamal (K.)
Sent: Wednesday, September 26, 2001 4:55 PM
To: Kwon, Soon (S.K.); Dalbo, Bob (R.J.); Fournelle, Gilbert (G.); Limtiaco, Steven (S.); Marck, Edmond (E.C.); Altoonian, Don (D.J.); Moorhouse, Scott (S.R.)
Subject: Stall VOQ Data for Escape and Tribute

Some of you may be receiving the Escape VOQ data for the second time (I forgot to include a few people the first time). Here are the most recent copies for both Escape and Tribute.

[redacted] [redacted]

Escape Stalls VOQ 9_26_01.xls Tribute Stalls VOQ 9_26_01.xls...

Regards,
Kamal Bhojwani
U204 3.0L Powertrain Calibration
TEE, Suite 1AE30
Phone: (313) 39-01969
Fax: (313) 32-31786

Item No	ODI No	Manufacturer	Model Yr	Model	Vin	Failure Date	Letter Date	Accident	Injured	Fault	Fire	Part Name	City	State	Miles
9	551408	FORD MOTOR COMPANY	2001	ESCAPE	1FMYU04141KF16726	12-Apr-01	31-May-01		0	ERRATIC OPERATION,POOR PERFORMANCE		ELECTRICAL SYSTEM	CANADA	KY	0
11	691700	FORD MOTOR COMPANY	2001	ESCAPE	1FMYU04161KB95100	1-Jun-01	2-Jul-01	N	0	ERRATIC OPERATION,POOR PERFORMANCE	N	ENGINE	UTICA	PA	2
16	747923	FORD MOTOR COMPANY	2001	ESCAPE	1FMCU04101KB91968	29-Jun-01	30-Jun-01		0	INOPERATIVE	N	ENGINE	KING OF PRUSSIA	PA	117
19	750045	FORD MOTOR COMPANY	2001	ESCAPE	1FMCU04161KB90277		8-Aug-01		0	INOPERATIVE		ENGINE	CHESTERFIELD	MO	0
22	694758	FORD MOTOR COMPANY	2001	ESCAPE		9-Aug-01	20-Aug-01	N	0	ERRATIC OPERATION,POOR PERFORMANCE	N	STEERING:POWER ASSIST	DUNDEE	OR	0
26	751047	FORD MOTOR COMPANY	2001	ESCAPE	1FMYU01131KE58549		24-Aug-01		0	ERRATIC OPERATION,POOR PERFORMANCE	N	POWER TRAIN:TRANSMISSIO N:AUTOMATIC	LAND O LAKES	FL	0
27	751237	FORD MOTOR COMPANY	2001	ESCAPE	1FMCU04101KB40572	7-Aug-01	27-Aug-01		0	ERRATIC OPERATION,POOR PERFORMANCE	N	ELECTRICAL SYSTEM:IGNITION	FAIRFAX STATION	VA	2480
40	559599	FORD MOTOR COMPANY	2001	ESCAPE	1FMYU04131KF13772	17-Nov-00	14-Dec-00		0	INOPERATIVE		STEERING	BALLSTON S	NY	0
42	740039	FORD MOTOR COMPANY	2001	ESCAPE	1FMCU04131KFD9467	22-Dec-00	27-Jan-01		0	ERRATIC OPERATION,POOR PERFORMANCE	N	EXHAUST SYSTEM	NEWBURYPORT	MA	1800
64	744822	FORD MOTOR COMPANY	2001	ESCAPE	1FMJU01BX1KE84089		2-May-01		0	ELECTRICAL SHORT, ELECTRICAL SHOCK	N	ELECTRICAL SYSTEM:WIRING:HAR NESS:UNDER DASH	LEBANON	OH	0
71	748611	FORD MOTOR COMPANY	2001	ESCAPE	1FMYU04111KF67099	7-Mar-01	24-May-01		0	DESIGN	N	STEERING:ANTI-THEFT CONTROLLER (SEE 08560000)	HAIKU	HI	2600
80	738090	FORD MOTOR COMPANY	2001	ESCAPE	1FMYU04111KF16650	1-Jan-01	9-Jan-01		0	ELECTRICAL SHORT, ELECTRICAL SHOCK	N	ELECTRICAL SYSTEM	CLARKS SUMMIT	PA	9500
100	748710	FORD MOTOR COMPANY	2001	ESCAPE	1FMCU03141KF42807	2-Apr-01	8-Apr-01		0	INOPERATIVE	N	ENGINE	TALLAHASSEE	FL	2120
102	743953	FORD MOTOR COMPANY	2001	ESCAPE	1FMCU04111KB03917	12-Apr-01	12-Apr-01		0	INOPERATIVE	N	ENGINE	CHESTERFIELD	MO	350
121	690480	FORD MOTOR COMPANY	2001	ESCAPE	1FMCU04171KB80626	13-Jun-01	14-Jun-01	N	0	ELECTRICAL SHORT, ELECTRICAL SHOCK	N	ELECTRICAL SYSTEM:FUSE AND FUSE RECEPTICLE	DANSVILLE	MI	650

Summary
VEHICLE STALLED, DEALER STATED FAILURE WAS DUE TO AN ELECTRICAL PROBLEM, AFTER ELECTRICAL REPAIR THE PANIC LIGHTS AND HORN HAVE ACTIVATED FOUR TIMES FOR NO REASON. CONSUMER STATES THE CIGARETTE LIGHTER HAS NEVER WORKED. *SLC
WHILE DRIVING DOWN HILL, VEHICLE STALLED WITHOUT PRIOR WARNING, CAUSING LOSS OF ALL POWER STEERING AND BRAKING ABILITY. CONSUMER HAS CONTACTED DEALER, DEALER NOT WILLING TO PROVIDE ANY ASSISTANCE.*AK CONSUMER STATES ANOTHER DEALER REPAIRED VEHICLE BY REPLACING THE RELAY. *SLC
WHILE DRIVING 35-40 MPH ON LEVEL ROAD, ENGINE SHUTDOWN; POWER STEERING LOST, POWER ASSIST BRAKING LOST; 3 OCCURRENCES SAME SITUATION, SAME ROAD & APPROXIATE LOCATION AND TIME OF DAY; THIS IS THE SECOND VEHICLE TO WHICH THIS HAS HAPPENED; DEALER HAS VEHICLE. *AK
STALLED WHILE TRAVELING 35 MPH TWO SEPARATE TIMES. CAN'T FIND PROBLEM. *AK
WAS TRAVELING 40MPH ON HIGHWAY WENT TO CHANGE LANES AND POWER STEERING DIDN'T RESPOND. DEALERSHIP WAS AWARE OF PROBLEM.*AK
ENGINE STALLS WHEN SHIFTING FROM DRIVE TO REVERSE. ENGINE HAS STALLED WHEN COASTING IN TRAFFIC. DEALER CANNOT FIND/REPAIR PROBLEM. *AK
WHILE THE ESCAPE IS DRIVING AT NO PARTICULAR SPEED, THE STEERING WHEEL TUGS A LITTLE THEN IT LOCKS COMPLETELY UP, THEN THE BRAKES FAIL, THE ENGINE LIGHT COMES ON AND THE ONLY WAY TO GET THE CAR TO STOP IS TO USE THE EMERGENCY BRAKE. MY ESCAPE HAS DONE THIS THREE TIMES SINCE I BOUGHT IT IN MAY OF THIS YEAR. TWO OF THE INCIDENTS ALMOST RESULTED IN CAR ACCIDENTS BECAUSE THE CAR CAN NOT BE STEERED. THE CAR TOTALLY FREEZES UP WITH ALL ENGINES LIGHTS COMING ON. THE SPEED DOESN'T SEEM TO BE A FACTOR. ALL THREE OCCASSIONS MY CD PLAYER HAS BEEN ON, THE AIR HAS BEEN ON LOW AND MY LIGHTS HAVE BEEN ON. AFTER THE CAR FINALLY STOPS BY USING THE EMERGENGIY BRAKE, I SHUT EVERYTHING OFF AND IT STARTS RIGHT BACK UP AGAIN.
CONSUMER NOTICED THAT THE STEERING WAS VERY TIGHT AND WAS HAVING TROUBLE KEEPING THE VEHICLE ON THE ROAD. NLM
NO SUMMARY LISTED FOR ABOVE VEHICLE. *AK
NO SUMMARY LISTED FOR ABOVE VEHICLE. *AK
DRIVING DOWN A SLIGHT GRADE THE ENGINE JUST QUIT ON SIX OCCASIONS AT THE SAME LOCATION ADJACENT TO A CELLULAR ANTENNA TOWER. TOOK VEHICLE TO DEALER WHO SAID THE DIAGNOSTIC COMPUTER CODE INDICATED INTERRUPTION IN THE ANTI-THEFT SMART KEY SYSTEM. WHEN THE SAME PROBLEM REOCCURRED, THE DEALER HAD THE CAR FOR A WEEK AND FORD'S SERVICE HOTLINE TOLD THEM TO SHIELD THE IGNITION AND ADD GROUNDING TO THAT ELECTRICAL SYSTEM. THE ENGINE HAS SHUT DOWN ONCE AGAIN AND DEALER WANTS US TO BRING CAR BACK SO THEY CAN TRY TO DUPLICATE FAILURE WHILE HOOKED UP TO THEIR SERVICE COMPUTER.OCCURRED
VEHICLE LOST SUECTICAL POWER, INCLUDING IGNITION WHILE TRAVELING AT 65 MPH. IF THE VEHICLE HAD BEEN IN THE PASSING LANE OR IN A TUNNEL UPCOMING IN 35 MILES, THE ACCIDENT WOULD HAVE BEEN VERY SERIOUS AND VERY LIKELY CATASTROPHIC. VEHICLE WAS TOWED 100 MILES TO GIBSONS FORD. IT REMAINS THERE AS OF 9 JAN 01.*AK
ENGINE SHUT OFF WHILE DRIVING DOWN A HILL HAS HAPPENED TO ME FOUR TIMES THIS WEEK. CAUSES LOSS OF POWER-ASSISTED BRAKES AND STEERING. VEHICLE PUT IN DEALER SHOP ON 4/9/2001. NO REPAIRS MADE BECAUSE DEALER COULD NOT DUPLICATE THE PROBLEM IN THE SHOP.
DRIVING DOWN A BUSY STREET, DOWN A SLIGHT GRADE ABOUT 45 MPH, THE CAR SUDDENTLY DIED. I HAD TO PULL OVER TO THE SIDE OF THE ROAD. I WAITED A COUPLE OF MINUTES AND IT RESTARTED. THERE WAS NO INDICATION OF ANY PROBLEM PRIOR TO THIS.*AK
VEHICLE LOST ALL POWER COMPLETLY. WAS TOWED TO DEALER. DEALER REPAIRED SHORT IN WIRING HARNESS. REPAIRED/ RELOCATED HARNESS AND REPLACED NECCESSARY FUSES. TESTED EEGPC-1000. REPAIR WAS MADE UNDER WARRANTY. *AK *SLC

125	800438	FORD MOTOR COMPANY	2001	ESCAPE	1FMYU04131KD02807		15-Jun-01	N	0	INOPERATIVE	N	ELECTRICAL SYSTEM:IGNITION	LITTLE FERRY	NJ	0
126	746727	FORD MOTOR COMPANY	2001	ESCAPE	1FMYU04191KA06838	6-Jun-01	12-Jun-01		0	INOPERATIVE	N	ENGINE	KNOXVILLE	TN	0
127	746809	FORD MOTOR COMPANY	2001	ESCAPE			13-Jun-01		0	DESIGN	N	TIRES	CAMP HILL	PA	0
128	746829	FORD MOTOR COMPANY	2001	ESCAPE	1FMYU04141KB61916		12-Jul-01		0	ERRATIC OPERATION,POOR PERFORMANCE		ENGINE	STUARTS DRAFT	VA	0
129	746874	FORD MOTOR COMPANY	2001	ESCAPE	1FMYU04121KB61574	9-Jul-01	16-Jul-01		0	ERRATIC OPERATION,POOR PERFORMANCE	N	ENGINE	WAVERLY	NY	1548
130	746937	FORD MOTOR COMPANY	2001	ESCAPE	1FMYU03161KB24745	14-Jun-01	17-Jul-01		0	DESIGN	M	ENGINE	DALLAS	TX	16100
132	746998	FORD MOTOR COMPANY	2001	ESCAPE	1FMYU04121KF70866	23-Jul-01	24-Jul-01		0	FLOODS,LEAKS	N	FUEL:FUEL INJECTION SYSTEM	SCHUYLKILL HAVEN	PA	6136
133	749472	FORD MOTOR COMPANY	2001	ESCAPE	1FMYU04111KF03666		30-Jul-01		0	ERRATIC OPERATION,POOR PERFORMANCE	N	ENGINE	CAMP HILL	PA	0
137	749668	FORD MOTOR COMPANY	2001	ESCAPE	1FMYU04111KB81789		3-Aug-01		0		N	ELECTRICAL SYSTEM:IGNITION	OAKHAM	MA	0
139	749708	FORD MOTOR COMPANY	2001	ESCAPE	1FMYU04121KF70868		3-Aug-01		0	ERRATIC OPERATION,POOR PERFORMANCE		ENGINE	SCHUYLKILL HAVEN	PA	0
144	894885	FORD MOTOR COMPANY	2001	ESCAPE	1FMYU04131KB91908	10-Aug-01	16-Aug-01	N	0	ERRATIC OPERATION,POOR PERFORMANCE	N	STEERING:POWER ASSIST	SHERMANSDALE	PA	2300
147	750049	FORD MOTOR COMPANY	2001	ESCAPE	1FMCU04161KB90377		6-Aug-01		0	INOPERATIVE		ENGINE	CHESTERFIELD	MO	0
150	752016	FORD MOTOR COMPANY	2001	ESCAPE	1FMYU04121KF87158	7-Sep-01	10-Sep-01		1	INOPERATIVE	M	ENGINE	RALEIGH	NC	11224
157	752210	FORD MOTOR COMPANY	2001	ESCAPE	1FMCU04161KA79177	17-Jun-01	18-Sep-01		0	DESIGN	M	ENGINE	GREER	SC	3480

WHILE DRIVING AT ANY SPEED VEHICLE COMPLETELY SHUTDOWN WITHOUT WARNING , CAUSING LOSS OF POWER BRAKES AND STEERING CONTROL, NEARLY CAUSING A COLLISION. DEALER REPLACED ENGINE WHICH HAS NOT CORRECTED THE PROBLEM. PLEASE GIVE ANY FURTHER DETAILS. *AK
WHILE DRIVING AT ABOUT 35-40 MPH, THE ENGINE JUST CUTS. ONCE I COME TO A ROLLING STOP, I HAVE TO TURN THE CAR OFF AND RESTART IT. THIS IS THE SECOND TIME THIS HAS HAPPENED.*AK
(1) ENGINE HAS STARTED STALLING AT STOP SIGNS, WAITING FOR SOMEONE IN PARKING LOT, ETC. (2) WHEN MAKING A HARD RIGHT TRUN INTO A PARKING SPACE, THERE IS A KIND OF CLICKING SOUND FROM THE FRONT TIRES AREA.
DRIVING 45-50 MPH WHEN ENGINE JUST SHUT DOWN. HAD ALL LOSS OF POWER INCLUDING STEERING AND BRAKES. COASTED TO EDGE OF ROAD, PLACED GEAR IN PARK AND SAT FOR A FEW MINUTES AND TRIED TO RESTART. WAS SUCCESSFUL AT RESTARTING WITH NO PROBLEM. THIS IS THE FIRST OF TWO INCIDENTS WITHIN A PERIOD OF 5 DAYS. THE SECOND HAPPENED AT 60 MPH. TO AFRAID TO ATTEMPT DRIVING ON INTERSTATE AND AM ON PINS AND NEEDLES EVEN ON RURAL ROADS. MADE APPT WITH DEALER THE FIRST BUSINESS DAY AFTER IT HAPPENED AND THEY ARE TRYING TO FIGURE IT OUT ALSO. JIM SNEAD FORD IS REPLACING THE IGNITION STARTER SWITCH HOPING THIS SOLVES THE PROBLEM.*AK
ENGINE SHUT OFF WHILE DRIVING DOWN A HILL WITHOUT PRIOR WARNING.LOSS OF POWER STEERING AND POWER BRAKES.PULLED OVER AND SHUT CAR OFF.WHEN I RESTARTED IT IT SEEMED TO WORK OK.TOOK IT TO THE GARAGE AND THEY SAID IT WAS RUNNING VERY HOT.CALLED FORD AND THEY MADE SUGGESTIONS ON A FIX.THEY ENDED UP REPLACING THE EGR VALVE.I HAVE DRIVEN IT FOR TWO DAYS AND IT HASN'T HAPPENED AGAIN.....YET.VERY DANGEROUS TO DRIVE WITH NO STEERING OR BRAKES.SOMEONE IS GOING TO END UP HURT BADLY OR KILLED.*AK
OUR CAR SPORADICALLY STALLS WHEN COASTING TO A STOP, CHANGING GEARS FROM DRIVE TO REVERSE, AND WHEN GOING OVER ANY SMALL BUMP IN THE ROAD. WE'VE TAKEN IT TO THE DEALER FOR REPAIR BUT THEY CLAIM THAT THEY'RE NOT ABLE TO REPLICATE THE PROBLEM. IT'S BEEN TO THE DEALER TWICE NOW AND THE STALLING HAS OCCURRED MORE THAN 15 TIMES IN A SPAN OF A MONTH. THE STALLING CAUSES ALL POWERED SYSTEMS TO FAIL (IE. BRAKES, STEERING).*AK
TRAVELING AT APPROXIMATELY 35MPH -CAR DID NOT SHUT OFF, BUT LOST STEERING AND BRAKES. FROM TIME TO TIME THERE IS A GAS ODOR COMING FROM AIR VENTS. ALSO, IN THE MORNING VEHICLE HESITATES WHEN PULLING OUT FROM A STOP SIGN. CAR WAS TOWED TO LOCAL FORD DEALERSHIP AND THEY WERE UNABLE TO DETERMINE PROBLEM. *AK
PREVIOUSLY REPORTED AS #746906. VEHICLE CONTINUES TO STALL OR ALMOST STALL AT STOP SIGNS OR IN SLOW MOVING TRAFFIC. HAS BEEN TO AN AUTHORIZED DEALER TWICE NOW TO NO AVAIL. IS CURRENTLY AT DEALER FOR THE THIRD TIME. (TIRE CLICKING REPORTED UNDER #746906 WAS FIXED....STONE CAUGHT DEEP INSIDE TIRE RIM.) *AK
ENGINE HAS SHUT OFF 3 TIMES WHILE DRIVING, SINCE CAR BOUGHT 6 WEEKS AGO. ALWAYS ON HILLY, CURVEY ROADS, DOING 35-40 MPH, COASTING AND BRAKING LIGHTLY. CHECK ENGINE LIGHT COMES ON. POWER STEERING AND BRAKES GO. HAVE TO MUSCLE CAR TO ROADSIDE. TURNING OFF KEY AND RESTARTING SEEMS TO WORK. HAVE ALSO PUT IN NEUTRAL, TURNED KEY OFF AND RESTARTED, SHIFTING BACK INTO DRIVE. BEEN TO DEALER ONCE LAST WEEK FOR PROBLEM. THEY COULD NOT DETECT OR RECREATE. DEALER CONTACTED FORD HOT-LINE, WHO MADE SUGGESTIONS, TO NO AVAIL. DEALER SAYS THEY NOR FORD HAVE HEARD OF THIS PROBLEM. HARD TO BELIEVE THIS. HAVE SPOKEN WITH FORD CUSTOMER SERVICE TWICE, SYMPATHETIC REACTION BUT WITH NO ADVICE OR SOLUTION. HAPPENED AGAIN YESTERDAY. CAR BACK TO DEALER NOW FOR WEEK WHILE ON VACATION. VERY AFRAID I'M GOING TO KILL MYSELF OR SOMEONE ELSE IN ACCIDENT. EXPRESSED CONCERNS TO DEALER AND FORD. THERE ARE 16 LIKE COMPLAINTS ON NHTSA SIGHT. IS ANYTHING BEING DONE?*AK
DRIVE DOWN A HILL AT APPROXIMATELY 30 MPH - ENGINE AND OIL LIGHT WENT ON. LOSS OF POWER AND CAR DID NOT APPEAR TO BE GETTING ANY GAS. CAR KEPT RUNNING. *AK
CONSUMER WAS TRAVELING ABOUT 45MPH ON A MOUNTAIN ROAD, AND WITHOUT PRIOR WARNING, ENGINE CHECK LIGHT CAME ON THE DASHBOARD. THEN, THERE WERE NO BRAKES OR POWER STEERING. ALSO, SPEED PEDAL WENT ALL THE WAY TO THE FLOOR. CONSUMER WAS ABLE TO CONTROL VEHICLE. DEALERSHIP WAS AWARE OF PROBLEMS. *AK
STALLED WHILE TRAVELING 35 MPH TWO SEPARATE TIMES. CAN'T FIND PROBLEM. *AK
THE SUV WAS PURCHASED NEW IN MID-DECEMBER 2000. ON 6/7/07, I WAS SLOWING DOWN, ON A DOWNHILL SLOPE, TO MAKE A RIGHT TURN WHEN THE SUV SHUT ITSELF OFF AND THE STEERING COLUMN LOCKED UP. IT HAD 1/8 TANK OF GAS. I SHIFTED THE AUTOMATIC INTO PARK, TURNED THE KEY, THE CAR STARTED AND I EXTRICATED MY 7 YEAR OLD SON AND MYSELF FROM THE BUSY INTERSECTION AND FROM THE MOUTH OF ON-COMING TRAFFIC (WE LANDED IN THE LEFT TURN LANE, MUCH TO A JEEP'S DISMAY). I DROVE SLOWLY TO MY SON'S SCHOOL (3 BLOCKS DOWN), THEN TO WORK WHERE I NOTIFIED FORD VIA IT'S 800 NUMBER. I MADE AN APPOINTMENT FOR THAT AFTERNOON WITH THE DEALERSHIP TO HAVE THE CAR FIXED. I LEFT THE CAR WITH THE DEALERSHIP. ON 6/8/01, I CALLED AND THE DEALERSHIP SAID THE CAR WAS READY. I ASKED THE SERVICE MANAGER TO REVIEW THE REPAIRS WITH ME & MY HUSBAND AND TO EXPLAIN WHY THE REPAIR "FIXED" THE PROBLEM. HE SAID THEY REPLACED A VALVE WHICH CONTROLS AIR FLOW. HE SAID THIS WOULD CAUSE THE CAR TO SHUT OFF, ESPECIALLY IF I HAD BEEN ENGAGING THE BRAKES WHEN THE CAR SHUT OFF. I WAS ENGAGING THE BRAKES WHEN IT SHUT OFF, SO I ACCEPTED THIS
6 MOS OLD VEH; 4700 MILES; ENGINE HAS STALLED ON 3 SEPARATE OCCASIONS (MID-JUN, MID-JUL, EARLY SEP) WHILE TRAVELING AT 45 MPH; ORIGINAL DEALER COULD PROVIDE NO SOLUTION; CURRENTLY BEING EVALUATED AT 2ND LOCAL DEALER; SEEKING GUARANTEED RESOLUTION; REPLACEMENT VEHICLE OR REFUND. *AK

168	752265	FORD MOTOR COMPANY	2001	ESCAPE	1FMYU04101KB34839	16-Sep-01	16-Sep-01		0	DESIGN	N	ENGINE	OMAHA	NE	0
169	692227	FORD MOTOR COMPANY	2001	ESCAPE	1FMCU03191KB14182	18-Jul-01	24-Jul-01		0	INOPERATIVE	N	ENGINE	MIAMI	FL	0
170	689686	FORD MOTOR COMPANY	2001	ESCAPE			21-Mar-01	N	0	ERRATIC OPERATION,POOR PERFORMANCE	N	BRAKES:HYDRAULIC: ANTI-SKID SYSTEM	EL SEGUNDO	CA	0
177	688811	FORD MOTOR COMPANY	2001	ESCAPE	1FMYU04181KA73136	30-Apr-01	10-May-01	N	0	DESIGN	N	ENGINE	COAL TOWNSHIP	PA	8000
182	746630	FORD MOTOR COMPANY	2001	ESCAPE	1FMYU04181KB81268	9-Nov-00	6-Jun-01		0	ELECTRICAL SHORT, ELECTRICAL SHOCK	N	ELECTRICAL SYSTEM	COCHRANVILLE	PA	600
185	746588	FORD MOTOR COMPANY	2001	ESCAPE	1FMYU04181KB87008	2-Aug-01	4-Aug-01		0	ERRATIC OPERATION,POOR PERFORMANCE	N	ENGINE	WAPWALLOPEN	PA	5200
186	694180	FORD MOTOR COMPANY	2001	ESCAPE	1FMYU04181KF17896	15-Jun-01	13-Aug-01	N	0	ERRATIC OPERATION,POOR PERFORMANCE	N	ENGINE	RENSSELAER	NY	5197

ENGINE HAS STALLED FOUR TIMES IN BUSY TRAFFIC IN THE PAST TEN MONTHS. DEALER CANNOT DUPLICATE PROBLEM.*AK
WHILE DRIVING, VEHICLE STALLED, WHICH WAS THEN TOWED TO DEALERSHIP, CONSUMER WAS THEN INFORMED THAT THE PROBLEM COULD NOT BE DUPLICATED.*YD
WHILE TURNING VEHICLE ON NOTICED ALL DASH BOARD INDICATION LIGHTS ON BEGAN TO TRAVEL. WHEN DEPRESSed BRAKES VEHICLE WENT INTO EXTENDED STOPPING DISTANCE. PLEASE PROVIE FURTHER INFORMATION.*AK
WHILE DRIVING AT 45MPH SUDDENLY VEHICLE STALLED OUT FOR NO REASON IN MIDDLE OF TRAFFIC. THIS WAS SECOND TIME IT HAS HAPPENED. WAS AT A STOP SIGN WHEN STALLING FIRST TIME.*AK *JB
TOTAL AND COMPLETE LOSS OF POWER AND ALL ELECTRICAL SYSTEM WHILE CAR IS BEING OPERATED ON BUSY ROADS
OVER A PERIOD OF 2 MONTHS, THE CAR LOST ALL POWER DURING THE AM DRIVE TO WORK. THIS OCCURRED ON THREE SEPARATE OCASSIONS, ALMOST EXACTLY 7 MILES FROM MY HOME. GOING 20-30 MILES PER HOUR DURING EACH OCCURRENCE. CAR JUST LOSES ALL POWER, AS WELL AS BRAKES, STEERING, ETC. PULLED OVER TO THE SIDE OF THE ROAD, TURNED CAR OFF, CAR STARTS UP, AND DOES NOT RECUR FOR SEVERAL WEEKS. HAS BEEN BACK TO DEALER THREE TIMES- THEY CANNOT REPLICATE, CANNOT FIX. THIS IS AN EXTREMELY DANGEROUS SITUATION– I AM MINUTES FROM THE INTERSTATE AND COULD BECOME A MAJOR PROBLEM. DEALER IS WELL AWARE THAT THIS IS THE LAST TIME. WE WILL EXPLORE GETTING A SWAP FROM FORD OR LEMON LAW IF WE HAVE TO. *AK
WHILE DRIVING, ENGINE STALLED AND OIL LIGHT ILLUMINATED. CONSUMER CHECKED OIL LEVEL AND IT WAS AT THE NORMAL LEVEL. *SLC

Item No	ODI No	Manufacturer	Model Yr	Model	Vin	Failure Date	Letter Date	Accident	Injured	Fault	Fire	Part Name
7	895536	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2YU06161KM16215	1-Apr-01	30-Aug-01	N	0	DESIGN	N	ELECTRICAL SYSTEM:IGNITION:SWITCH
8	873718	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2YU06191KM04642	3-Oct-00	24-Oct-00	N	0	ERRATIC OPERATION, POOR PERFORMANCE	N	ELECTRICAL SYSTEM:IGNITION
11	874318	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2YU07171KM16218	27-Oct-00	3-Nov-00	N	0	INOPERATIVE	N	ELECTRICAL SYSTEM:IGNITION
20	560295	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE		27-Oct-00	12-Mar-01		0	INOPERATIVE		ENGINE
22	867589	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2YU07171KM40485	2-May-01	7-May-01	N	0	ERRATIC OPERATION, POOR PERFORMANCE	N	ENGINE
23	867600	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2YU07171KM16218	1-Oct-00	7-May-01	N	0	DESIGN	N	ENGINE
24	867636	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2YU07141KM10835	16-Mar-01	7-May-01	N	0	LOCKS UP, STICKS, GRABS	N	STEERING
26	867761	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2YU07101KM14486	1-Nov-00	8-May-01	N	0	ERRATIC OPERATION, POOR PERFORMANCE	N	ENGINE
30	877779	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE			8-Jan-01	N	0	INOPERATIVE	N	STEERING
39	881173	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2YU09161KM08088	1-Oct-00	22-Feb-01	N	0	STALLS	N	ENGINE
43	893169	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2YU06171KM02365		25-Jul-01	N	0	DESIGN	N	POWER TRAIN:TRANSMISSION:AUTOMATIC
44	893766	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	N/A	3-May-01	8-Aug-01	N	0	ERRATIC OPERATION, POOR PERFORMANCE	N	ENGINE
46	894057	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE		25-Sep-00	10-Aug-01	N	0	DESIGN	N	ENGINE
47	894265	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2YU09141KM04668		14-Aug-01	N	0	ERRATIC OPERATION, POOR PERFORMANCE	N	ENGINE
48	894407	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2CU06131KM03368	17-Jul-01	15-Aug-01	N	0	STALLS	N	ENGINE

City	State	Miles	Summary
PHILADELPHIA	PA	11500	VEHICLE HAS STALLED 5 TIMES, ALWAYS AROUND 30-40 MPH. TAKEN TO DEALER 4 TIMES, REPLACED IGNITION SWITCH ONCE. CANNOT REMEDY.*AK
ALEXANDRIA	VA	1005	WHILE DRIVING AT ABOUT 50 MPH AND COMING TO A FORK IN THE ROAD, AS SOON AS CONSUMER MERGED TO RIGHT STEERING WHEEL GOT VERY STIFF. THEN, WHOLE DASH LIT UP. CONSUMER PUT ON BRAKES/ PUT IN PARK, AND WENT TO A MAZDA DEALER. DEALER COULD NOT FIND ANYTHING. AT ANOTHER DAY WHILE DRIVING AT 60 MPH CONSUMER WAS BEARING OVER, STEERING WHEEL GOT TIGHT AGAIN, AND VEHICLE CUT OFF.*AK
BERMINGHAM	AL	0	VEHICLE STALLED OUT AND DIED WITHOUT WARNING, CAUSING LOSS OF STEERING AND BRAKES. DEALER HAS INSPECTED VEHICLE, AND WAS NOT ABLE TO DUPLICATE OR CORRECT THE PROBLEM.*AK
CENTER POI	AL	450	THE VEHICLE SHUTS DOWN WITHOUT WARNING WHILE DRIVING DOWN HILL LEAVING THE DRIVER WITH NO BRAKES OR STEERING. NUM
BURMINGHAM	AL	900	VEHICLE STALLED AT 30 MPH, THIS HAPPENED ONCE. VEHICLE AT DEALER'S AT THIS TIME. *AK
BURMINGHAM	AL	4000	VEHICLE STALLED 3 TIMES AROUND 30 MPH. CONSUMER WAS ABLE TO RETURN VEHICLE UNDER LEMON LAW.*AK
WAIPAHU	HI	4223	WHILE DRIVING STEERING LOCKED UP WITH LITTLE PRIOR WARNING. CONSUMER PULLED OVER AND WAITED WHICH ALLOWED STEERING TO COMEBACK. ON APRIL 26, 2001 BEGAN HAVING PROBLEMS STARTING UP. DEALER HAS HAD VEHICLE FOR ABOUT A WEEK, AND HAS NOT BEEN ABLE TO PROVIDE REMEDY. *AK
FRANKLIN	LA	9600	CONSISTANTLY VEHICLE WOULD BEGIN TO STALL. DEALER HAS HAD VEHICLE ON NUMEROUS OCCASIONS, BUT HAS NOT BEEN ABLE TO PROVIDE REMEDY.*AK
LOCUS VALLEY	NY	0	WHEN MAKING A LEFT TURN VEHICLE COMPLETLEY LOSES ALL POWER STEERING CONTROL, CAUSE UNKNOWN. PLEASE GIVE ANY FURTHER DETAILS.*AK
HONALULU	HI	2	WHILE DRIVING, VEHICLE WILL STALL, THE STEERING AND BRAKES LOCK AND CONSUMER HAS NOT CONTROL, DEALER HAS MADE REPAIRS TO THE IGNITION SWITCH AND TAPPED NEW RELAY, HOWEVER STALLING STILL OCCURS. *SLC
THOMASVILLE	NC	0	WHEN STARTING VEHICLE AND PROCEEDING FROM PARK INTO TRAFFIC VEHICLE HESITATES AND NEARLY STALLS, CAUSE UNKNOWN. DEALER CANNOT IDENTIFY PROBLEM. PLEASE GIVE ANY FURTHER DETAILS.*AK
BLOOMINGTON	IN	6	WHILE DRIVING AN APPLYING THE BRAKES VEHICLE WILL STALL. PROBLEM IS INTERMITTENT.*AK
FAIRFIELD	OH	20	WHILE DRIVING 30 TO 40 MPH DOWNHILL VEHICLE STALLS WITHOUT WARNING. ALSO, VEHICLE LOSES ALL POWER. VEHICLE USUALLY STARTS BACK UP AGAIN. THIS HAPPENS LIKE ONCE A MONTH. PLEASE ADD VIN #. *AK
HATTIESBURG	MS	0	WHILE TRAVELING AND WITHOUT ANY INDICATION VEHICLE WOULD STALL. DEALER HAS BEEN CONTACTED. PLEASE PROVIDE FURTHER INFORMAITON.*AK
MONROVIA	MD	1500	WHILE TRAVELING BETWEEN 30 AND 40 MPH ENGINE STALLED, CAUSING A LOSS OF POWER ASSISTED COMPONENTS. DEALERSHIP WAS IN POSSESSION OF VEHICLE FOR TWO WEEKS, AND COULD NOT REPRODUCE PROBLEM. PLEASE PROVIDE ANY ADDITIONAL INFORMATION/ATTACHMENTS.*AK

49	751465	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2YU07161KM47993	22-Aug-01	31-Aug-01		0	DESIGN	N	ELECTRICAL SYSTEM:IGNITION
50	751576	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE		3-Sep-01	5-Sep-01		0	ERRATIC OPERATION, POOR PERFORMANCE	N	STEERING:POWER ASSIST
53	692136	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2YU08191KM01579	16-Feb-01	6-Jul-01	N	0	INOPERATIVE	N	ENGINE
58	750196	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2YU08151KM59795	9-Aug-01	10-Aug-01		0	ERRATIC OPERATION, POOR PERFORMANCE	N	ELECTRICAL SYSTEM:ALTERNATOR:GENERATOR
60	750637	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2YU08161KM00509	16-Aug-01	16-Aug-01		0	INOPERATIVE	N	ELECTRICAL SYSTEM:IGNITION
61	695106	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	PLEASE FILL IN	17-Aug-01	24-Aug-01	N	0	ERRATIC OPERATION, POOR PERFORMANCE	N	ENGINE
62	750656	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2YU09191KM58480	20-Aug-01	21-Aug-01		0	ELECTRICAL SHORT, ELECTRICAL SHOCK	N	ELECTRICAL SYSTEM:IGNITION
63	750663	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2YU09161KM39245	16-Aug-01	22-Aug-01		0	ERRATIC OPERATION, POOR PERFORMANCE	N	ENGINE
66	751356	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE		29-Aug-01	29-Aug-01		0	INOPERATIVE	N	ENGINE
73	745069	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2YU09101KM19541	19-Oct-00	8-May-01		0	INOPERATIVE	N	ELECTRICAL SYSTEM:IGNITION

ST. ANN	MO	6870	VEHICLE STALLED WITHOUT WARNING WHEN ACCELERATING FROM A STOP SIGN. THE NEXT FAILURE OCCURED WHEN TRAVELING AT 40 MPH ACCELERATING ON AN ENTRANCE RAMP. THIRD FAILURE OCCURRED WHEN DECELERATING TO A STOP SIGN. ALL DASH LIGHTS COME ON AND STEERING GOES OUT, HOWEVER, THE VEHICLE WILL IMMEDIATELY START AFTER PLACED IN NEUTRAL. THIS VEHICLE HAS BEEN TO THE DEALER ONE TIME BUT THE SERVICE DEPARTMENT WAS UNABLE TO DUPLICATE PROBLEM. DEALER HAS BEEN NOTIFIED OF THE CURRENT FAILURE BUT CAN OFFER NO SOLUTIONS. DEALER HAS ADVISED WILL CONTACT THEIR SERVICE REP.*AK
LITTLE ROCK	AR	7000	VEHICLE HAS LOST STEERING AND BRAKE POWER ON HILLS AT SPEEDS AROUND 30-35 MPH. THE ONLY WAY TO REGAIN POWER IS TO CUT THE IGNITION. THIS IS AN EXTREME HEALTH HAZARD: OCCURRENCES ARE NUMEROUS AND THE DEALER HAS BEEN NOTIFIED.
LIL BURN	GA	5355	WHILE DRIVING AND MAKING A LEFT HAND TURN VEHICLE SUDDENLY DIED, NO PRIOR WARNING. THERE WAS NOT STEERING OR BRAKING. CONSUMER HAD TO STOP VEHICLE WITH EMERGENCY BRAKE. VEHICLE WAS STUCK IN TRAFFIC. CONSUMER HAD VEHICLE TOWED TO DEALER ,AND DEALER REPLACED ELECTRICAL RELAY SYSTEM. HOWEVER, PROBLEM REOCCURRED ON JULY 3, 2001 WHILE TRAVELING AT 45 MPH ON A DECLINE VEHICLE DIED, AND EMERGENCY BRAKE WOULD NOT STOP VEHICLE. EVENTUALLY EMERGENCY BRAKE KICKED IN AND STOPPED VEHICLE. CONSUMER STATED THAT WHEN TRYING TO START AGAIN, THERE WERE NO TRANSMISSION LIGHTS, AND WOULD NOT GO INTO GEAR. CONSUMER HAD VEHICLE TOWED TO DEALER, AND THEY COULD NOT DUPLICATE PROBLEM. PLEASE PROVIDE ANY FURTHER INFORMATION.*AK
ROCKVILLE	MD	74	VEHICLE GOING UPHILL, ENGINE STOPPED, BRAKES WERE USED TO STOP VEHICLE FROM ROLLING DOWNHILL, ENGINE LIGHT, BATTERY LIGHT AND OIL LIGHT CAME ON. NO COMPONENTS WORKING INSIDE OF THE CAR EXCEPT THE WINDOWS. CAR REMAINED STATIONARY FOR 20 MINUTES WAITING ON HELP AND THEN STARTED AFTER SEVERAL TRIES. SLIGHT SHIMMY WHILE DRIVING TO THE DEALER, ALONG WITH TACHOMETER JUMPING ABOUT ON AT A STEADY SPEED. *AK
GIBSONIA	PA	7800	VEHICLE STALLED 1X GOING DOWN HILL AT 40 MPH. DIFFICULT TO STEER AND BRAKE TO STOP. *AK
GIBSONVILLE	NC	594	3.0L ENGINE. AT 45MPH VEHICLE STALLED WITHOUT WARNING. DEALER HAS INSPECTED VEHICLE AND COULD NOT DUPLICATE OR CORRECT THE PROBLEM. PLEASE PROVIDE ADDITIONAL INFORMATION.*AK
TUCSON	AZ	7001	THE TRIBUTE LOSS ALL POWER COMING DOWN A MOUNTAIN PASS, I STOPPED IT ON SIDE OF ROAD TURNED OFF, CHECKED OIL, IT WAS OK, SO I STARTED IT UP AND DROVE TO THE MAZDA DEALER. THEY PUT IT IN FOR SERVICE, WHEN I PICKED IT UP THEY SAID THERE WAS NOTHING WRONG WITH IT. THERE WAS NO PAPERWORK. THIS HAPPENED COMING DOWN A MOUNTAIN PASS WHICH IS HAS SEVERAL SHARP TURNS. I TRAVEL THIS PASS OFTEN AND FEEL THIS IS A SAFTY ISSUE THAT SHOULD BE ADDRESSED. I COULD HAVE BEEN ON A TURN WHEN THIS HAPPENED. THANK YOU FOR YOUR TIME. JUDY & BILL WHITNEY. *AK
SAN MARCOS	CA	5786	THE ENGINE STALLED WHILE THE TRUCK WAS BEING DRIVEN ON A FLAT, DRY ROAD AT ABOUT 40 MPH. WHEN THAT HAPPENED, THE POWER STEERING AND THE POWER BRAKES STOPPED WORKING, SO THE TRUCK WAS VERY HARD TO STEER AND TO STOP. THE DRIVER PULLED OVER AND THEN WAS ABLE TO START THE ENGINE AGAIN. THIS HAS ONLY HAPPENED ONCE TO US BUT THIS IS STILL VERY SERIOUS. WE THINK THIS SHOULD BE CONSIDERED A SAFETY HAZARD FOR THIS TRUCK. *AK
JAMESTOWN	NC	13844	ENGINE STALLED AFTER GOING DOWN A HILL AT 35-40 MPH. NO ENGINE WARNING LIGHT CAME ON. WAS ABLE TO RESTART WITHOUT FURTHER PROBLEMS.*AK
AUSTIN	TX	400	VEHICLE DIES WHILE DRIVING. THIS OCCURRED 8 TIMES; MAZDA AGREED TO REPURCHASE VEHICLE AFTER 4TH INSPECTION, AND THEY CANNOT LOCATE THE PROBLEM. THEREFORE, THEY CAN'T FIX IT. THIS IS A SERIOUS SAFETY HAZARD. MY NEIGHBOR TOLD ME THIS WEEK THAT THIS EXACT SAME STALLING PROBLEM HAS HAPPENED TO HER TWO TIMES. I FEEL THIS IS MORE THAN A COINCIDENCE AND THAT THERE IS A SEVERE STALLING PROBLEM AND A RECALL HAS YET TO BE DONE BY MAZDA. *AK

74	745127	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2YU07141KM10835	26-Apr-01	9-May-01		0	INOPERATIVE	N	ELECTRICAL SYSTEM:IGNITION
92	852091	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2YU09181KM12830	10-Jan-01	5-Mar-01	N	0	INOPERATIVE	N	ENGINE
98	744011	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2YU09151KM09751	11-Dec-00	13-Apr-01		0	DESIGN	N	ENGINE
100	880389	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	FILL IN PLEASE	1-Nov-00	13-Jun-01	N	0	DESIGN	N	ENGINE
102	747088	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2CU09111KM60599	19-Jun-01	19-Jun-01		0	LOCKS UP, STICKS, GRABS	N	ENGINE
109	748572	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2YU08111KM07704	6-Jul-01	17-Jul-01		0	ERRATIC OPERATION, POOR PERFORMANCE	N	ENGINE
110	749638	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2CU08151KM03711	31-Jul-01	2-Aug-01		0	ELECTRICAL SHORT, ELECTRICAL SHOCK	N	ELECTRICAL SYSTEM:IGNITION
111	693736	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4S2YU08121KM70516	7-Aug-01	7-Aug-01	N	0	ERRATIC OPERATION, POOR PERFORMANCE	N	STEERING
113	750198	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2YU08151KM59795	9-Aug-01	10-Aug-01		0	ERRATIC OPERATION, POOR PERFORMANCE	N	ELECTRICAL SYSTEM:ALTERNATOR/GENERATOR
117	751890	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2YU09121KM11327	10-Nov-00	7-Sep-01		0	DESIGN	N	ENGINE

WAIPAHU	HI	3302	STEERING SHUT DOWN, CAR DIE OUT AT 45MPH AND CAR STALLED. *AK
KAIAUA	HI	3079	VEHICLE HAS STALLED THREE TIMES, AFTER FIRST TIME TAKEN TO DEALER WHO REPAIRED IT. VEHICLE AT DEALER. *AK *SLC
AUSTELL	GA	1517	MY 2001 MAZDA TRIBUTE STALLS SUDDENLY WHILE DRIVING. THIS HAS OCCURRED 4 TIMES SINCE I PURCHASED THE VEHICLE IN NOVEMBER 2000. MY TRIBUTE IS CURRENTLY AT THE DEALER FOR THE THIRD TIME FOR THIS 'STALLING' PROBLEM. I WAS CONTACTED BY AN INDIVIDUAL WITH THE MAZDA NORTH AMERICAN TECHNICAL HEADQUARTERS APRIL 12. THE MAZDA REPRESENTATIVE ASKED A BATTERY OF QUESTIONS PERTAINING TO THE VEHICLE STALLING. FORTUNATLEY, NO ONE HAS BEEN INJURED AT THIS TIME DUE TO THIS PROBLEM WHICH SEEMS TO HAVE NO RESOLUTION.*AK
PITTSBURGH	PA	8000	WHILE OPERATING VEHICLE ENGINE HAS STALLED THREE TIMES. DEALERSHIP HAS EXAMINED VEHICLE, AND COULD NOT DETERMINE A REASON FOR PROBLEM. PLEASE PROVIDE ANY ADDITIONAL INFORMATION/ATTACHMENTS - SIGN & RETURN THIS FORM.*AK
CHARLOTTE	NC	554	I PURCHASED A 2001 TRIBUTE ON SUNDAY 6/17/01WITH 420 MILES ON IT. TWO DAYS LATER TUESDAY 6/19/01 THE ENGINE COMPLETLY LOCKED UP ON ME TWICE IN THE SAME DAY. IT NOW HAS ONLY 562 MILES ON IT. LUCKILY BOTH TIMES I WAS ABLE TO AVOID A WRECK. THE ENGINE TOTALLY SHUTS DOWN, MEANING NO STEERING, NO BRAKING. I WAS ABLE TO STOP BY USING THE EMERGANCY BRAKE AFTER STOPPPING I HAD TO PUT THE CAR INTO PARK IN WHICH IT THEN RESTARTED. THIS ALL CAME IF NO WARNING AT ALL. I IMMEDIATELY TOOK THE CAR BACK. THE DEALERSHIP SAID THEY HAD NOT HAD ANY PROBLEMS LIKE THIS BEFORE OR ANY OTHERS. I NOW SEE THEY MUST OF BEEN MISTAKEN, BECAUSE IT SEEMS TO ME THAT THIS IS NOT THE FIRST TIME!! I WILL TAKE AS MUCH OF THIS INFO. WITH ME BACK TO THE DEALERSHIP AND HOPE FOR THE BEST.*AK
LIHUE	HI	6400	I WERE DRIVING DOWN A HILL WHEN MY CAR ENGINE DIES WHILE DRIVING ON THE HIGHWAY, THE (RADIO DIES, A.C., ENGINE, AND STEERING WHEEL TIGHENS. THIS IS THE SECOND MAZDA TRIBUTE I OWNED IN A YEAR WITH THE SAME PROBLEM THAT THE COMPANY CAN'T FIX. THE OTHER 8 ARE NOT AS MAJOR. I FEEL THIS IS A(LEMON AND A RECALL) IF THE COMPANY CAN'T THE PROBLEM. SAFETY PLAY A BIG PART IN THIS CASE WHEN THE ENGINE DIES FOR NO REASON. THIS IS A HIGHWAY SAFETY ISSUE. *AK
LITTLETON	CO	1200	DRIVING AT APPROX 40-45 MPH AND ENTIRE SUV SHUTDOWN MECHANICALLY AND ELETRICALLY. COASTED TO STOP COULD NOT RE-START AGAIN, UNTIL 10-15 MINUTES LATER. THIS IS THE SECOND OCCURRENCE AND THE SAME SYMPTOMS. *AK
NEW PROVIDENCE	NJ	100	THE VEHICLE WAS ON LOCAL ROAD AND STEERING AND BRAKES WERN'T RESPONDING. WAS ABLE TO COAST ALL THE WAY DOWN THE HILL. ONCE CONSUMER CAME TO A COMPLETE STOP, VEHICLE STARTED UP. DEALERSHIP WAS AWARE OF PROBLEM.*AK *SLC
ROCKVILLE	MD	74	VEHICLE GOING UPHILL, ENGINE STOPPED, BRAKES WERE USED TO STOP VEHICLE FROM ROLLING DOWNHILL, ENGINE LIGHT, BATTERY LIGHT AND OIL LIGHT CAME ON. NO COMPONENTS WORKING INSIDE OF THE CAR EXCEPT THE WINDOWS. CAR REMAINED STATIONARY FOR 20 MINUTES WAITING ON HELP AND THEN STARTED AFTER SEVERAL TRIES. SLIGHT SHIMMY WHILE DRIVING TO THE DEALER, ALONG WITH TACHOMETER JUMPING ABOUT ON AT A STEADY SPEED. *AK
TYLER	TX	500	WHEN COASTING DOWN HILL AT 30-40 MPH AND SLIGHTLY APPLING BRAKES, ENGINE DIES, AND THE VEHICLE BECOMES INOPERABLE. THIS PROBLEM HAS OCCURRED 10 TIMES, AND THE VEHICLE HAS BEEN IN THE DEALER'S SHOP TWICE WITH THE PROBLEM. THE FIRST TIME, THE DEALER HAD NOT HEARD OF, NOR COULD FIX THE PROBLEM. SEVERAL MONTHS LATER, THE DEALER HAD HEARD OF THE PROBLEM, BUT STILL HAD NO FIX. MAZDA WAS CONTACTED, KNEW OF THE PROBLEM, BUT HAD NOT RELEASED THE FIX. I CONTACTED MAZDA, AND WAS TOLD THAT BOTH MAZDA AND FORD ENGINEERS WERE WORKING ON THE SOLUTION, AND THE DEALERS WOULD BE NOTIFIED OF THE FIX WHEN AVAILABLE. IF THE SOLUTION IS NOT REBOLVED, I WILL PERSUE A BUY BACK UNDER THE LEMON LAW. THIS VEHICLE IS DRIVEN BY OUR SIXTEEN YEAR OLD SON WHO CARRIES HIS YOUNGER SISTER ALSO TO SCHOOL. WE ARE GREATLY CONCERNED FOR THEIR SAFETY. *AK

118	762109	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2CU08141KM53297	7-Sep-01	12-Sep-01		0	INOPERATIVE	N	ELECTRICAL SYSTEM:IGNITION
119	762217	MAZDA (NORTH AMERICA), INC	2001	TRIBUTE	4F2CU09161KM52954	10-Aug-01	15-Sep-01		0	INOPERATIVE	N	ELECTRICAL SYSTEM:IGNITION

EA02-27A-14178

BELLEVILLE	IL	3550	THIS IS THE SECOND TIME THE CAR HAS DIED ON ME WHEN I WAS DRIVING; THE FIRST TIME WAS ON APRIL 20 RIGHT AFTER I PURCHASED THE CAR."AK
BALTIMORE	MD	1800	WHILE DRIVING VEHICLE STALLS AND I LOSE POWER/STEERING. AFTER SAFELY GETTING MY CAR TO THE SIDE OF THE ROAD I AM ABLE TO RESTART THE CAR. THE DEALER HAS SEEN MY CAR TWICE NOW AND FINDS NOTHING WRONG WITH IT, AND EXPECTS ME TO DRIVE THE DEFECTIVE VEHICLE. THIS STALLING HAS HAPPENED TWICE NOW."AK

From: Bhojwani, Kamal (K.)
Sent: Monday, September 17, 2001 9:34 AM
To: Hayden, John (J.T.)
Cc: Dalbo, Bob (R.J.); Fourmelle, Gilbert (G.); Meteea, John (J.); Altoonian, Don (D.J.); Badgley, Joel (J.); Moorhouse, Scott (S.R.)
Subject: FW: Req01-56 Info.

John, please see the note below. Is there a difference in relay's for Escape with or without trailer tow?

Regards,
Kamal Bhojwani
U204 3.0L Powertrain Calibration
TEE, Suite 1AE30
Phone: (313) 39-01969
Fax: (313) 32-31786

—Original Message—
From: Vecchio, Anne Marie (A.)
Sent: Monday, September 17, 2001 9:04 AM
To: Bhojwani, Kamal (K.)
Subject: FW: Req01-56 Info.

Kamal,

Attached is the first questionnaire received from a customer. I will track the information in a spreadsheet and send updates as they are completed. Please review and let me know if you need any other data.

Anne Marie

—Original Message—
From: Pilgrim, Dave (D.A.)
Sent: Sunday, September 16, 2001 11:45 PM
To: Lovelace, Maria (M.E.)
Cc: Vecchio, Anne Marie (A.)
Subject: Req01-56 Info.

Maria/Anne:

I found a stalling Escape Thursday afternoon right after getting the assignment. I checked it out and found that the EEC relay terminals were loose as can be. Once tightened, it helped a lot but I still found it necessary to change out the relay - we put a trailer tow package relay in it and it appeared to work well.

Here is the questionnaire for this one.

[redacted]

Req01-56
stionnaire DPW1.do

Dave Pilgrim
Field Quality Engineer
Ford Motor Company
Region: Dallas / Ft. Worth, Texas
972-318-1059 (office)
972-571-9407 (cell)
972-318-0535 (fax)
dpilgrim@ford.com

Customer Questionnaire for Vehicle Concerns

Customer name: Michael Garcia

City, State: Fort Worth, TX

Phone #: 534-2512

Tribute or Escape: Escape

VIN: 1FMYU01111KB05694

1. How many times did vehicle concern occur? 3-4 x/day
   a. Able to restart immediately? Yes
2. Outside temperature (approximate)? 90-95
3. Weather (dry, rainy, cloudy, sunny)? All
4. Type of fuel used? Reg. Unleaded
5. Fuel level when concern occurred? All
6. Daytime or nighttime? Both
7. Shift lever position (1,2, D, or R)? D and R
8. 4WD (on or off)? 2 WD vehicle
9. Approximate time from engine start to when concern occurs? <1 min. at times
10. Vehicle speed when concern(s) occurred? All
11. Vehicle mode (cruise, coast, accel, idle) at time when concern occurred? Accel / Idle mostly
12. Location where concern occurred (different every time or same general area)? Different places but same general area (TX)
13. Road condition (flat, uphill, downhill, or on a hill)? All
14. Power steering (during right turn, left turn, or straight)? Straight
15. Brake pedal depressed or free? Free?
16. Cruise control (on or off)? Off
17. What caused you to realize that the concern had occurred? PS effort
18. Which indicators (if any) were lit after the concern occurred? MIL/Theft
19. Accessory load **before** concern (see below)....
    - Climate control (a/c on or off, blower speed 1, 2, 3, or 4)? AC on – 2-3 blower
    - Exterior lighting (headlights on or off, low or high beam)? Both
    - Radio ON before concern? Both
    - Wipers (on or off)? Rear wipers (on or off)? OFF

From:	McCarthy, Fran (F.)
Sent:	Thursday, October 31, 2002 3:11 PM
To:	'hallerol@eaton.com'; 'marchsanderson@eaton.com'
Cc:	McCarthy, Fran (F.); Florini, John (J.J.); Fourmelle, Gilbert (G.); Corvea, Kevin (K.W.); Odum, Ike (I.C.); Altoonian, Don (D.J.); Abbasi, Basel (B.A.); Haneen, George (G.C.); Dalbo, Bob (R.J.); Price, Martin (M.)
Subject:	Eaton VMV Diagnostic Review
Importance:	High
Follow Up Flag:	Follow up
Due By:	Monday, November 04, 2002 1:00 PM
Flag Status:	Flagged

Marc,
We are tentatively setting up the subject review for the week of 11/11/02. You will recall when we met on 10/22/02 that I gave you a list of pre-set faults I wanted to see in VMVs to be tested on the Escape.

1. Current Model VMV after running KLT Dust Test
2. Current Model VMV after running KLT Dust Test w/foam improperly seated
3. Revised VMV (New Cap w/Standoffs) after running KLT Dust Test
4. Revised VMV (New Cap w/Standoffs) after running KLT Dust Test w/foam improperly seated
5. Current Model VMV with spring improperly seated
6. Current Model VMV with pin hole in diaphragm

Based on the #37 field return, I am requesting additional VMVs for the Escape be staged with the following pre-set issues:

7. Current Model VMV w/Shrader valve stuck open
8. Current Model VMV w/Diaphragm biased to one side
9. Current Model VMV w/Contamination on calibration spring
10. Current Model VMV w/Warped diaphragm

This testing has priority; be sure that you will be ready to go the week of 1/11/02. Please confirm you will meet this timing. Thanks.

Fran McCarthy St. Clair (fmccarth)
VMV & EVMV
Outfitter Stationary Components
Phone: (313) 32-25718
Fax: (313) 84-50578
E-Mail: fmccarth@ford.com

From: Pepitone, Gil (J.)
Sent: Thursday, June 27, 2002 2:11 AM
To: Johnson, Jim (J.S.); Bilicki, John (J.R.); Corbett, Sandra (S.M.); Altoonian, Don (D.J.); Avnessazian, Kam (K.); Bauer, Scott (S.C.); Shojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); Chiok, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); Rothweiler, Daniel (D.); De Pena, Juan (J.E.); Diez, Timothy (T.P.); Fascetti, Bob (R.J.); Fourmelle, Gilbert (G.); Freeland, Mark (M.); Gilles, Stuart (S.); Gokhale, Renuka (R.V.); Grimes, Jeff (J.R.); Hansen, George (G.C.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Ishikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); Mcdonald II, John (J.M.); Jordan, Donald (D.E.); King, Robert (R.F.); Kosko, Jeff (J.R.); Kwon, Soon (S.K.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Mandziuk, Roger (R.S.); Marck, Edmond (E.C.); Mateos, John (J.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mooney, Larry (L.); Moorhouse, Scott (S.R.); Morgan, Tomiko (T.T.); Morishima, Shigeki (S.); Nemalolahi, Sonya (S.); Noteboom, Jim (J.E.); Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Sanders, Muriel (M.S.); Shah, Kiran (K.C.); Shiraishi, Masaru (M.); Stilpenbauer, Jeffrey (J.R.); Suarez, Rhae (R.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Veenstra, Tim (T.W.); Wakeneli, Ray (R.A.); Wettach, Bill (B.); Williams, Lee (L.H.W.); Yeung, Lem (.); Benintende, Robert (R.F.); Goering, Kimberly (K.L.); Suarez, Rhae (R.); Terzea, Laura (L.D.); Martin, Mike (M.S.); Wexler, Mark (M.A.); Amely, Felix (F.A.); Bradley, Joe (J.C.); Linde, Peter (P.A.); Goering, Kimberly (K.L.); Terzea, Laura (L.D.); Benintende, Robert (R.F.); Wexler, Mark (M.A.); Amely, Felix (F.A.)
Cc: Pepitone, Gil (J.); DiAngelo, Renaldo (R.); Berenter, Joel (J.R.); Surti, P. J. (P.J.); Noteboom, Jim (J.E.)
Subject: PFQS's Investigation Results of Virgin Islands Escape Driveability Concerns

Importance: High

Good evening everyone:

Here's my report on my trip.

[redacted]
lts of Virgin Isl:
Escap...

I will be calling in on the Conference all at 2pm today.

Call-in info: 1-877-670-3529 or Ford net 9-1-954-1144
International Participants: 1-630-693-1704
Passcode: 7673536, then hit #

I thank the Team for all their assistance.

Gil Pepitone
Powertrain Field Quality Specialist-"PFQS" In
South Florida
Office/Answering Machine: 954-753-9969
Cell Phone 954-242-2066
"With Warranty you are Paying for the Sins of the Past"

Results of St. Croix/St. Thomas Virgin Island Investigation of 3.0L Escape

Executive Summary

A total of 22 Concern Units were inspected by Powertrain Field Quality (PFQS) Gil Pepitone from 6/15-6/25/02.

18% of inspected vehicles with certain key Service Actions applied and containing uncontaminated fuel were fully resolved for the "Stalling during Deceleration" Concern, as reported by Owners.

The vehicle population which had prior repair attempts, (55%) did not have TSB/Oasis SSM Service repairs fully applied for various reasons, including test data mis-interpretation, component ordering wait time, WDS test equipment procedures/hardware issues, and "Repair Holds" for pending Engineering visitation.

However, 67% Units had **contaminated fuel and restricted fuel filters**, which may have been a **contributor** to the unverified **Deceleration Stalling** issue.

A second Driveability Concern (which included Units that contained the latest calibration level) of **Hesitation during moderate engine temp** was listed as a Concern for 32% of the Units. The Hesitation Concern was then verified and data /reviewed or recorded by PFQS. However, resolution was not determined. Local fuel volatility and/or PCM calibration may root cause, but this is speculation. Further investigation is in progress.

An omission of a Diagnostic procedure in TSB 02-8-6 was found, involving the requirement for a drive cycle in order to prompt the start of the Purge Cycle for proper EVAP System evaluation.

The surface blistering of multiple MAF sensor's plastic case was reported, with a sample captured.
A second MAF related issue of tight MAF retaining nuts resulted in airbox lid breakage.

A third MAF sensor related issue of missing Part Number imprint was found on two Units.

Idle Air Control (IAC) Duty Cycles were found in 27% Units to be on the high end of the spec. In some cases, IAC replacements did not reduce DC. Also, there is a need for multiple improved IAC diagnostic procedures for TSB
02-8-6.

PFQS recommendations are listed at the end of this report.

Background

PFQS was contacted in early June to inspect and resolve the reported Decell Stalling Concern on a minimum of 10 3.0L 2001/02 Escapes on the Islands of St. Croix and St. Thomas, U.S. Virgin Islands. Both dealerships use the same name of Metro Motors.

Figure 1 Metro Motors, St. Croix, VI

Figure 2 Sumete Matto, Service Manager

Figure 3 Isaac, Driveability Technician

Figure 4 Service area at Metro Motors

Figure 5 Service area, alternate view

A review of Service records and Oasis repair histories as compared to the actual PFQS inspection of the 22 Units, indicated that corrective Service procedures were only partially performed on 55% of Units.
However, 18% of Units had been fully serviced per the existing Service Communications.
The remaining percentile involved Units which had not been to the Dealership for the Decell Stalls Concern prior to the Inspection period.

Both Islands are small (St. Croix, the larger, is 28x7 miles). The terrain is very hilly, with some considerable grade angles. The

Concern of Decell Stall for 3.0L Escape is reported as most common in uneven topography as evidenced from a prior PFQS review of North American CQIS data.

Of the 22 Units inspected, 20 were at the St. Croix location, while two were done in St. Thomas. A total of four Units were originally scheduled for St. Thomas, but two were no-shows. The majority of this report's data stems from the St. Croix Dealership.

Investigation of Decell Stall

PFQS arrived on Saturday, 6/15. Basic Inspection and VDR recorder Drive Testing began that day and throughout the weekend for the three high priority Units as designated by the Dealership.

PFQS's original plan was to first verify the Drive Concern, but soon realized that Concern replication was difficult.
None of the Units ever exhibited a Stall in any drive mode during PFQS use.

On 6/17, the Inspection worksheet,

[redacted] Shortcut to St. Croix Escape Vehicle Inspection Sheet.lnk , was started to be used.

Over the course of the Investigation, some Units (18%) had arrived to the Dealership that had been "Owner Determined" as resolved because of prior service actions performed by the St. Croix Metro Motors.
Being a small Island, word of the "Ford Rep" presence prompted some Owners to return to the Dealership for a "Health Check" on their prior resolved Units.

Only one Unit was found by PFQS with the known Concern of "spider web" EVAP line restriction.

As cited, some Units had only part of the necessary Service actions completed. Also, Interpretation of some data was either misunderstood, or the existing TSB diagnostics required additional

deacription. On this last point, details are provided throughout Sections below.

Fuel Quality Issues

The first priority Unit investigated was described as having a different Drive Concern of "**Hesitation** after Cold Start".
Note that this Unit did **NOT** have the Concern of **Decell Stall** as part of the original listed complaint.

The heavy hesitation {lasting about 3 seconds} from a dead stop on a 30 degree upgrade acceleration, during a moderate engine temp range {approx 100F-160F} was replicated by PFQS. A fuel gauge had been installed along with a WDS VDR recorder. All parameters, including both fuel pressure and volume were confirmed as acceptable.
However, because this was a Returnless Fuel application, PFQS felt that his old method to check volume {filling 12oz bottle in 15 sec at Idle} may not be valid.

As a result, the fuel filter was removed and blew backwards into a glass bottle:

Figure 6 Contaminated fuel, after sitting overnight

Figure 7 Bottom view of the fuel sample-Nasty Stuff

Figure 5 This is the fuel sample after the bottle is shaken, not stirred. This is what it looks like after you blow out the fuel filter.

PFQE then realized that perhaps local fuel is a negative influence in the generation of Decell Stalls, as well as possibly contributing to the Hesitation Concern.

From that point on, every Unit was inspected for restricted fuel filter/dirty fuel. 67% of inspected Units had restricted fuel filters and dirty fuel.

However, 32% of the Units which had "Complete Service Actions" (see below), **PLUS** a new fuel filter, were **STILL** verified by PFQS **for the Hesitation Concern.**
Note that the latest PCM flash is included, and this includes some Units of which had the latest PCM Flash prior to PFQS visitation: the need for Adaptive Learning Strategy was NOT a factor for some of the repeatable **Hesitation** Concern Units.

It appears that the **replacement** of the restricted **fuel filter did not** resolve the **Hesitation** Concern.
However, **filter replacement** may be a **positive factor** in resolving the **Decell Stalls** Concern.

In defining "Complete Service Actions", PFQS includes a PCM Reflash to the latest available calibration level, the latest level EEC Relay, the latest level DPFE, a complete check of ALL grounds and connectors, proper evaluation of the EVAP Purge D.C. vs. FTP sensor voltage data and conformation of acceptable IAC D.C. values when observed during the PROPER conditions. Note that MAF replacement is not included unless the Owner cited a specific,

repetitive location during the Decell Stall event, implying local electrical "noise" generation (i.e. radio towers, etc).

New Concern of Moderate Engine Temp Hesitation discovered

PFQS then concluded: this repeatable Hesitation Concern could possibly be caused by one of two items, or perhaps both.

a. Local Fuel Quality (suspect volatility, not just the "dirt factor")
b. PCM Calibration

Please note that PFQS has no proof to indict either suspected root cause. PFQS is in communications with the St. Croix Service Manager for feedback of alternate fuel brand usage as recommended in an attempt to resolve those Units with the unresolved Hesitation Concern.
PFQS welcomes Engineering feedback on possible calibration issues and is willing to assist further.

In addition, a VDR recording was captured in this Hesitation drive mode on 6/25 on one Unit, which had all "Complete Service Actions" and a clean fuel filter. This data will be shared with Engineering in the very near future.

Procedural Omission in TSB 02-8-6
The Repairing Tech described the following prior repair effort.

The Tech stated that while following Step #4 of the above TSB, the EVAPVM (VMV Duty Cycle) percentage was not seen to change from Zero % at idle (as specified by the TSB) after a one hour idle.
PFQS was able to replicate this scenario on the same Unit and also for a second Unit. The fuel tanks were above ¼ full.
During discussions with Engineering during his visitation, it was suggested that the vehicle be driven to prompt the Purge Process. As a result, the purge cycle started to increase.

While Step #4 described Purge Cycle function over 84%, it's diagnostic do not describe what must be done if the value does not change from Zero% while at prolonged idle.

The Tech's interpretation of the lack of VMV Duty Cycle change from Zero % at Idle resulted in the ordering of a VMV. The Tech mentioned that if VMV replacement did not prompt a purge cycle DC increase from Zero%, a PCM would have been considered for order. Potential TNI Warranty for both the VMV (9C915) and the PCM (12A650) exists.

MAF and Related Hardware Issues

Three different issues were experienced during this inspection. Pls note that none involved the actual FUNCTION of the MAF. DTCs were NOT set, nor were inappropriate MAF voltage values witnessed.

However, Warranty, TNI and Real, have been generated as a result.

Item #1; The Tech described prior MAF replacements based upon the observation of the blistering of the MAF's Sensor's Surface:

Figure 9 Blister on the MAF' sensor's Case

Figure 10 Close up of the Blister

The Tech cited two replacements. The Parts Dept search only produced the one item photographed here. The Tech said the other one was "worst" with multiple blisters present.

Item #2: During PFQS inspection, one of the 3.0L Escapes MAF was found to be missing the imprinted part number on the sensor's plastic body:

Figure 11 MAF without a Imprinted part number

A second Unit, a lone 2.0L Zetec Escape was presented for inspection. This Unit (which was not supposed to be part of the Study) was reviewed as a courtesy. It too did not have a PN imprinted on it. It was not replaced. However, the Tech felt it should be, because of the uncertainly of the level of the MAF component. This Indicates that TNI Warranty may result for MAF due to the missing PN.

Item #3: During the removal of the MAF for one Unit for updates per the TSB (Owner reported Stalls in one particular location), the retaining nuts were found very tight. Hand tools, not power tools were used.
During the attempted removal, the studs started to unscrew from the airbox lid. One of the plastic bosses of the airbox stud broke as a result:

Figure 12 Airbox lid that contains MAF retaining studs

Figure 13 As stud walked out, it broke the case's boss

Figure 14 This is the rear view of the case's boss

Figure 15 A second stud walked out, but the case did not break. The witness marks are pliers on the threads.

At first PFQS suspected the nuts as over torque. A subsequent inspection found "Lock Tite" substance on the fine thread end of the studs. It is possible the adhesive is too strong.

As these MAFs are being replaced per the TSB, it is possible Warranty will be generated for the YL8U-9643-BC Airbox Lid.

Intake Airflow Control (IAC) Solenoid Duty Cycle Value Results

As part of requested Engineering data, IAC Duty Cycle values were monitored per Step #1 of TSB 02-8-6. Note that awareness of proper

conditions to determine acceptable IAC D.C. were not understood by all repair Techs interviewed. While IACs had been replaced on some Units, those were probably changed mainly as part of a general repair attempt, and not necessarily due to data acquisition.

As a result, some repeat Concern Units {46%} required IAC and in some instances, Throttle Body {TB} replacement.
Pls note, however, TBs were not available at the Dealership, and Engineering shipment did not arrive during PFQS visitation. The Engineering shipment of IACs did arrive and most were used.

Idle Air Control {IAC} Duty Cycles were found in 27% Units to be on the high end {greater than 40%} of the allowable spec.

30% of Units with IAC replacement did NOT realize a substantial change {less than 1%} for IAC D.C. value.
Other Units {8%} realized a desired small decrease in D.C., but their final value was still above acceptable range of 40% per the TSB, which would then require a TB replacement.

The high airflow D.C. after IAC replacement indicts either initial throttle body airflow set and/or plate sludge build-up.
Mileage range for unchanging D.C. values after IAC replacement were 2K-18K.

If the pending shipment of TBs arrive at Metro Motors St. Croix, PFQS is to be contacted. Concern Units will be requested for return and their TB will be replaced and then sent to PFQS, who in turn will return same to Engineering.

Additional IAC Diagnostic Improvements are provided below in the Recommendations Section.

<u>Recommendations</u>

1. A Market directed "Info Only" Oasis Broadcast Message should be generated to emphasize fuel filter/fuel quality as part of routine inspection when diagnosing all Driveability Concerns. Locations could include the Caribbean Islands and other

Markets were local Service Facilities practices come into question.

2. A review of TSV 02-8-6, Step #4 should be conducted for consideration of the inclusion of a drive cycle prior to inspection of EVAP Purge VMV Duty Cycle values. This drive cycle would only be used for those Units which do not show an increase from 0% at idle. A time factor should be provided to aid the Tech on when he should perform the drive cycle.
   Also, if fuel tank level is an influencing factor for valid EVAP evaluation, an acceptable fill range should be included in any TSB revision.

3. The three issues cited which involve MAF should be investigated by Ford Engineering and Visteon. MAF Sensor blistering, missing MAF PNs, and tight MAF retaining nut on airbox studs are subject.

4. A review of TSB 02-8-6, step #1 should be conducted to clarify and emphasize the definition of "no purge flow". This subtle reference was overlooked by all Techs interviewed. Specific reference, similar to Step #4 wording, which involves a PID definition and values (I.e.: observe IAC D.C. while EVAPVM is Zero%) is necessary to enable ALL Techs to properly diagnose the true need for IAC replacement.
   If there is confusion, the part will be replaced on an assumption, and not the result of data acquisition.

   Also, the converse is true: some Units will quickly START the purge cycle, before IAC D.C. could be read under proper conditions. A work around can be done by shutting off ignition and immediately restarting, and then waiting for all other conditions (RPM to return to 750) to be proper before reading IAC D.C. This additional procedure should be considered for inclusion to any TSB revision.

   A reference to the Catalyst Protection of a 50 RPM increase for a base idle of 800RPM should be included. Also, instructions to apply throttle briefly to reduce this RPM value to return to 750

RPM is necessary to allow the Techs to determine true IAC D.C. and is recommended for TSB revision inclusion.

5. A review for the need to spray insect/spider removal agent should be conducted. It is conceivable that the above TSB's Step #5 will temporarily remove a spider from the EVAP fresh air line, but there is nothing to prevent the return of another spider. Should we use something to stop the potential cycle of web build up?

I will be calling into the "Escape Stalls Team" 2PM conference call on 6/27/02 to discuss my Inspection.

Gil Pepitone
Powertrain Field Quality Engineer In South Florida

gpepiton@ford.com
Office 954-753-9989
Cell 954-242-2066

From: Dalbo, Bob (R.J.)
Sent: Thursday, June 20, 2002 6:01 PM
To: Gilbert Fournelle; Bob Fascetti
Subject: Cell Phone

If you need to contact me, call 734-502-7683.

Bob Dalbo

3.0L Calibration Supervisor
Outfitters Calibration, NAT
Phone: (313) 24-84947 Fax: (313) 32-31788
Pager: (313) 795-2858 Email: *rdalbo@ford.com*

From:	Williams, Lee (LHW.)
Sent:	Monday, February 11, 2002 5:15 PM
To:	Green, Timothy (T.A.); Munoz, Kathleen (K.)
Cc:	Dalbo, Bob (R.J.); Fournelle, Gilbert (G.)
Subject:	RE: NHTSA Inquiry PE01-049 - discuss distribution list and documents

Greetings:

Here is the list you requested. I alphabetized it and designated pertinent members with asterisks by their names (see legend at the top of the first page of the spreadsheet).
I'll keep you posted (more names may arise in the future)!

Thx,
Lee

[redacted]
Ford Employees List.xls

Regards,
Lee Williams
For More, Count on Lee
U204 3.0L Powertrain Calibration
Truck Engine Engineering, Suite 1AE20
Phone: (313)33-72503
Fax: (313) 32-31786

	Ford Employees	
	*= U204 3.0L V6 Calibration(TRR bldg)	
	**= Employee's car stalled/analyzed at six sigma garage	
	***= Field Quality Engineers	
	****= U204 2.0L I4 Calibration	
1	Allen, Dave (D.R.);	
2	Altenglen, Don (D.J.);	
3	Alvarado, OJ (O.J.);	
4	Amanda, Harry (H.F.);	
5	Anyanwu-Ebo, Ike (I.C.);	
6	Atkinson, Art (A.W.);	
7	Austin, James (J.E.)	****
8	Badgley, Joel (J.K.);	
9	Bagozzi, Andrew (A.J.)	****
10	Baldwin, Stu (S.);	
11	Bauer, Scott (S.C.);	
12	Bernadac, Lee (L.C.)	***
13	Bhojwani, Kamal (K.);	(mass email distributor)
14	Blackburn, Thomas (T.J.);	
15	Boardley, Brian (B.A.);	
16	Bogema, John (P.);	*
17	Brim, Bobby (R.L.);	
18	Brown, Mark (M.B.);	
19	Brunkow, Greg (G.L.);	
20	Balck, Jeffrey (J.)	****
21	Bunck, Jamie (J.L.);	
22	Campbell, Wayne (C.W.)	
23	Chih, Ming-Nin (M.N.);	
24	Chilcott, Michael (M.D.);	
25	Chin, Darryl (D.);	
26	Christoff II, Donald (D.A.)	***
27	Cianciolo, David (D.A.)	****
28	Ciandejerre, Dale (D.E.);	
29	Clawson, Randy (R.R.);	
30	Clifford, Michael (M.J.);	
31	Colaruosi, Anthony (A.)	***
32	Cole, Jeanne (J.);	
33	Corbett, Sandra (S.M.);	
34	Cosenza, Pat (P.D.);	
35	Cowher, Terry (T.)	****
36	Cox, David (D.M.)	***
37	DaDeppo, Lynn (L.D.);	
38	Dalbo, Bob (R.J.);	*
39	Davis, Mark (M.L.)	**
40	De Pena, Juan (J.E.);	
41	DiAngelo, Rosalie (R.);	
42	Diez, Timothy (T.F.);	
43	Dicaist, Anthony (A.J.)	***
44	Domka, John (J.J.)	***

EMC2-427-A 13004

45	Downs, Melissa (M.A.);	
46	English, Loy (L.E.);	
47	Errick, Steven (.);	
48	Fascetti, Bob (R.J.);	*
49	Fournelle, Gilbert (G.);	*
50	Fregonese, Brian (B.J.)	****
51	Gansmann, Hari (S.)	**
52	Giles, Stuart (S.);	
53	Gokhale, Renuka (R.V.);	
54	Hager, Tim (TCH.)	**
55	Hale, Tony (A.S.);	
56	Hammack, Dan (D.W.)	***
57	Hansen, George (G.C.);	
58	Hayduk, Mark (M.S.)	***
59	Hecker, Thomas (T.P.)	***
60	Heinrichs, Harold (H.D.);	
61	Herrmann, Thomas (T.J.)	
62	Herr, George (G.J.);	
63	Hlavaty, Robert (R.H.)	****
64	Hockaday Jr., John (J.C.)	*
65	Hoeser, Janeen (J.E.)	****
66	Hofman, Michael (M.V.);	
67	Holmes, Jeffrey (J.R.);	
68	Hoshino, Jun (J.);	
69	Howe, Brian (B.T.)	***
70	Hurley, Robert (R.E.);	
71	Ireland, Harry Ireland (H.K.)	***
72	Jablonski, Gary (G.F.);	
73	Jammoul, Ali (A.);	
74	Jensen, Ted (T.E.);	
75	Jia, Howard (Z.H.);	
76	Johnson, Ruth (R.);	
77	Jones, Andy;	
78	Jordan, Donald (D.E.);	
79	Kaltz, Gordie (G.)	***
80	Kapp, Dan (Daniel R.);	
81	Katinas, Dana (D.J.);	
82	Kennerly-Finke, Nikki (K.);	
83	Kieliszewski, Mark (M.D.)	****
84	King, Robert (R.F.);	
85	Klarr, Jerry (G.T.);	
86	Klostermann, Eric (E.);	*
87	Kosnewik, John (J.J.)	
88	Koo, Benjamin (B.Y.);	
89	Kwan, Soon (S.K.);	
90	Lam, Anselm (A.Y.);	
91	Leap-Apollonl, Laurine (L.J.);	
92	Lent, Mark (M.G.)	**
93	Linde, Peter (P.A.);	
94	Lipa, Jeffrey (J.A.);	
95	Liu, Jane (J.);	
96	Lovelace, Maria (M.E.)	***

97	Lowe, Bill (B.F.);	
98	Luehrsen, Eric (E.A.);	
99	Madhavan, Ranganathan (R.);	
100	Maloney, Michelle (M.M.)	****
101	Marck, Edmund (E.C.);	
102	Mass, Noah (N.S.)	
103	Mateos, John (J.);	*
104	Maurer, James;	
105	Mazzella, Gary (G.R.);	
106	Mazzella, Stephanie (S.R.)	****
107	McDaniel, Keith (R.K.);	
108	McGee, Brett (B.L.);	
109	Miketa, Dennis (D.P.)	*
110	Miller, Brian (B.J.);	
111	Miller, Chuck (C.A.);	
112	Moorhouse, Scott (S.R.);	
113	Morgan, Tom;	
114	Morishima, Shigeki (S.);	
115	Myers, Dan (D.P.)	***
116	Nematollahi, Sonya (S.);	
117	Noteboom, Jim (J.E.);	
118	Offler, John (J.D.);	
119	Ondrejko, Rick (R.T.);	
120	Ortman, James (J.W.);	
121	Owens, Karen (K.R.);	
122	Pawlak, Greg (G.J.)	
123	Peeler, Tom (T.H.)	***
124	Peplinski, Gil (J.);	
125	Pharias, Richard (R.L.);	
126	Plattenberger, Karl (K.J.);	
127	Powers, Ken (K.W.);	
128	Prabhu, Sheela (S.P.);	
129	Preston, Carla Traci (C.T.);	
130	Price, Martin (M.);	
131	Raquepau, Alden (A.P.);	
132	Ricotta, Jim (J.M.)	****
133	Rockel, Royce (R.R.);	
134	Rodgers, David (D.L.);	
135	Rogers, Michelle (L.)	****
136	Roncler, Philippe (P.);	
137	Rusek, Ron (R.F.);	
138	Sarsfan, David (D.H.);	
139	Sarver, Mel (M.M.);	
140	Sauer, Robert (R.M.);	
141	Savchetz, David (D.W.);	
142	Schilp, Robert (R.J.)	**
143	Scott, Francis (F.X.);	
144	Shah, Kiran (K.C.);	
145	Smith, Tony (T.R.)	*
146	Soderquist, Todd (T.);	
147	Sorensen, Lynn (R.L.)	***
148	Stilgenbauer, Jeffrey (J.R.);	

EXHIBIT 1 (2002-127-0)

149	Suarez, Rhae (R.);	
150	Sullivan, Jamie (J.F.);	
151	Surti, P. J. (P.J.);	
152	Sventickas, Ed (E.);	
153	Szczupak, Dave (D.T.)	
154	Takasawa, Keith (K.D.);	
155	Taylor, Perry (P.Allen.);	
156	Terzes, Laura (L.D.);	
157	Tetreault, James (J.P.);	
158	Trower, Ron (R.D.)	***
159	Van Slambrouck, James (J.M.);	
160	Vecchio, Anne Marie (A.);	
161	Von Foerster, Steve (S.);	
162	Wakenell, Ray (R.A.);	*
163	Walters, Alexander (A.M.);	
164	Williams, Les (L.H.W.);	*
165	Williamson, David (D.E.);	
166	Wilson, Doug (D.A.);	
167	Wineland, Richard (R.J.)	**
168	Woodings, Andrew	*
169	Wrobel, Mark (M.J.)	**
170	Wu, Chun (C.Y.);	
171	Yeung, Lam (.)	
172	Young, Dan (D.G.)	****
173	Yuen, Lucinda (.);	
174	Zagotta, Tom (T.)	**
175	Zamora, Andy (J.A.)	**

From: Grimes, Jeff (J.R.)
Sent: Thursday, February 28, 2002 2:22 PM
To: Foumelle, Gilbert (G.)
Subject: FW: MAP Sensor on Escape

Gilbert, can you address my concern below?

Jeff R.Grimes
Duratec Engine Programs
Ph: (313) 32-25237 Fax: (313) 59-47323
email: jgrimes1@ford.com

-----Original Message-----
From: Hale, Tony (A.S.)
Sent: Thursday, February 28, 2002 2:19 PM
To: Grimes, Jeff (J.R.)
Cc: Yeung, Lam (.); Grandas, Joseph (J.M.)
Subject: RE: MAP Sensor on Escape

No I haven't. Calibration is the one that pushed for the C/O system. I do NOT plan on incorporating any more changes at this time.

Tony Hale
U204 Duratec Systems Engineer
1-313-248-8462
Ahale7@ford.com <mailto:Ahale7@ford.com>

-----Original Message-----
From: Grimes, Jeff (J.R.)
Sent: Thursday, February 28, 2002 1:26 PM
To: Hale, Tony (A.S.)
Cc: Yeung, Lam (.); Grandas, Joseph (J.M.)
Subject: MAP Sensor on Escape

Tony, the Kaviloo ESM module incorporated a MAP sensor...have you:

a) verified that reverting to Motorola TMDPE, and losing the map sensor, is OK with calibration?
b) Looked into packaging the map sensor if necessary?

Thanx

Jeff R.Grimes
Duratec Engine Programs
Ph: (313) 32-25237 Fax: (313) 59-47323
email: jgrimes1@ford.com <mailto:jgrimes1@ford.com>

ER02-827-R 15859

From: hamano.n@mazda.co.jp
Sent: Wednesday, June 12, 2002 6:20 PM
To: gfournel@ford.com
Subject: FW: (#C11376681) 2002 & 2003 white paper for CAA calibration

Gilbert-san,

Thank you for your explanation.
Now I understand:
this is preliminary information of calibration release for correcting
the
sift schedule release mistake and implementation of the countermeasures
against Phantom Stall.

There is no another person you should contact in the future.

Thanks.

Best regards.
Naoumi Hamano J14/U204 Hofu
Program Develop. Promotion Gr.
Powertrain Development Promotion Dept.
Mazda Motor Corporation

----Original Message----
From: Fournelle, Gilbert (G.) [mailto:gfournel@ford.com]
Sent: Tuesday, June 11, 2002 8:57 PM
To: Hamano Naoumi (濱野 直生)
Subject: RE: (#C11376681) 2002 & 2003 white paper for CAA calibration

Hamano-san,

The white paper was sent to you to inform you of new calibration
releases.
Is there another pe4rson I should contact in the future?

I tried to answer your question below.
If you need further info, don't hesitate to contact me.

1)
This calibration is for many export markets one of which is Taiwan.
This change was driven by drive by noise issues.
We mistakenly released the US shift schedule instead of the Japan shift schedule in our CAA calibration.
This is for 2L8A-BD replacement (2L8A-BE new PCM part number) and 3L8A-CA replacement (3L8A-CB new PCM part number).
It does not relate to fuel tank sourcing.

2)
Drive by noise (see concern mentioned in the white paper C11376681).
There is an undesired downshift during the drive by noise test due to the
release of the wrong shift schedule

Phantom stall: This is the stall problem for which we have a weekly meeting with MNAO.
The evap system is a contributor for our stall problem.
We have a evap issue when the check valve in the fresh air line is defective (hanging
open during no purge condition), and there is a blockage in the line.
Initially, fresh air will be drawn through the check valve, then as purge duty cycle increases,
the valve will shut and the purge system will suddenly draw fuel vapors straight from the fuel tank.
This cause a rich excursion and a potential stall.
As a permanent solution, the evap check valve will be deleted for MY 2003.
As an interim solution we propose this calibration change which will detect sudden
pressure changes in the fuel tank and cause a purge reset when such a pressure change is detected.

3) as described above

4) FNPG_DP_CR_L (x input is % PCOMP (% fuel from purge system), Y is rate of pressure change)
is calibrated to cause a purge reset at when a sudden pressure change is detected at small % PCOMP contributions.

New released shift schedule is the Japan shift schedule, instead of the European shift schedule

5)I do not know what a pink report is.

Sincerely,

Gilbert Fournelle
V6 U204 Calibration Engineering
1AE27 Truck Engine Engineering (TEE)
Phone:(313)3904968 Fax:(313)3231786

-----Original Message-----
From: hamano.n@mazda.co.jp [mailto:hamano.n@mazda.co.jp]
Sent: Tuesday, June 11, 2002 4:54 AM
To: gfournel@ford.com
Cc: skwon@ford.com; rdalbo@ford.com; takubo.h@mazda.co.jp; ichikawa.j@mazda.co.jp
Subject: RE: (#C11376681) 2002 & 2003 white paper for CAA calibration

Gilbert-san,

We are puzzled to receive your White Paper and guess that this is preliminary information of an engineering change.
Please answer the following questions so that we can understand what this
White Paper is.

1. It says CCA (export). Is this for Taiwan?

Does this relate with the fuel tank sourcing change?

2. Would you describe the issue/failure?
   It says Phantom stall and the noise. What are they?

3. What is the root cause of this issue?

4. Would you give us detailed information on the calibration change?
   Will you change the Shift Schedule as well?

5. Will you release Pink Report?

Thanks.

Best regards.
Naoumi Hamano J14/U204 Hofu
Program Develop. Promotion Gr.
Powertrain Development Promotion Dept.
Mazda Motor Corporation

---Original Message---
From: Fournelle, Gilbert (G.) [mailto:gfournel@ford.com]
Sent: Tuesday, June 11, 2002 4:39 AM
To: Kwon, Soon (S.K.); Hamano Naoumi (濱野 直生); Ichikawa Junichirou (市川 潤一郎); Takubo Hirokhi (田窪 博一)
Cc: Dalbo, Bob (R.J.)
Subject: 2002 & 2003 white paper for CAA calibration

Attached is the white paper for the 2002 and 2003 CAA calibration change.

<<caa white paper.doc>> <<caa.xls>>

Gilbert Fournelle

V6 U204 Calibration Engineering
1AE27 Truck Engine Engineering (TEE)
Phone:(313)3904966 Fax:(313)3231786

From: Fournelle, Gilbert (G.)
Sent: Tuesday, June 11, 2002 7:57 AM
To: Hamano, Naoumi (N.)
Subject: RE: (#C11376661) 2002 & 2003 white paper for CAA calibration

Hamano-san,

The white paper was sent to you to inform you of new calibration releases. Is there another pe4rson I should contact in the future? I tried to answer your question below. If you need further info, don't hesitate to contact me.

1)
This calibration is for many export markets one of which is Taiwan. This change was driven by drive by noise issues. We mistakenly released the US shift schedule instead of the Japan shift schedule in our CAA calibration. This is for 2L8A-BD replacement (2L8A-BE new PCM part number) and 3L8A-CA replacement (3L8A-CB new PCM part number). It does not relate to fuel tank sourcing.

2)
Drive by noise (see concern mentioned in the white paper C11376661). There is an undesired downshift during the drive by noise test due to the release of the wrong shift schedule

Phantom stall: This is the stall problem for which we have a weekly meeting with MNAO. The evap system is a contributor for our stall problem. We have a evap issue when the check valve in the fresh air line is defective (hanging open during no purge condition), and there is a blockage in the line. Initially, fresh air will be drawn through the check valve, then as purge duty cycle increases, the valve will shut and the purge system will suddenly drew fuel vapors straight from the fuel tank. This cause a rich excursion and a potential stall. As a permanent solution, the evap check valve will be deleted for MY 2003. As an interim solution we propose this calibration change which will detect sudden pressure changes in the fuel tank and cause a purge reset when such a pressure change is detected.

3) as described above

4) FNPG_DP_CR_L (x input is % PCOMP (% fuel from purge system), Y is rate of pressure change) is calibrated to cause a purge reset at when a sudden pressure change is detected at small % PCOMP contributions.

New released shift schedule is the Japan shift schedule, instead of the European shift schedule

5)I do not know what a pink report is.

Sincerely,

Gilbert Fournelle
V6 U204 Calibration Engineering
1AE27 Truck Engine Engineering (TEE)
Phone:(313)3904968 Fax:(313)3231786

----Original Message----
From: hamano.n@mazda.co.jp [mailto:hamano.n@mazda.co.jp]
Sent: Tuesday, June 11, 2002 4:54 AM
To: gfournel@ford.com
Cc: skwon@ford.com; rdelbo@ford.com; takubo.h@mazda.co.jp; ichikawa.j@mazda.co.jp
Subject: RE: (#C11376881) 2002 & 2003 white paper for CAA calibration

Gilbert-san,

We are puzzled to receive your White Paper and guess that this is preliminary information of an engineering change.
Please answer the following questions so that we can understand what this
White Paper is.

1. It says CCA (export). Is this for Taiwan?
   Does this relate with the fuel tank sourcing change?

2. Would you describe the issue/failure?
   It says Phantom stall and the noise. What are they?

3. What is the root cause of this issue?

4. Would you give us detailed information on the calibration change?
   Will you change the Shift Schedule as well?

5. Will you release Pink Report?

Thanks.

Best regards.
Naoumi Hamano J14/U204 Hofu
Program Develop. Promotion Gr.
Powertrain Development Promotion Dept.
Mazda Motor Corporation

----Original Message----
From: Fournelle, Gilbert (G.) [mailto:gfournel@ford.com]
Sent: Tuesday, June 11, 2002 4:39 AM
To: Kwon, Soon (S.K.); Hamano Naoumi (濱野 直生); Ichikawa Junichirou (市川 潤一郎); Takubo Hiroichi (田窪 博一)
Cc: Dalbo, Bob (R.J.)
Subject: 2002 & 2009 white paper for CAA calibration

Attached is the white paper for the 2002 and 2003 CAA calibration change.

<<caa white paper.doc>> <<caa.xls>>

Gilbert Fournelle
V6 U204 Calibration Engineering
1AE27 Truck Engine Engineering (TEE)
Phone:(313)3904966 Fax:(313)3231786

From: Fournelle, Gilbert (G.)
Sent: Thursday, May 09, 2002 11:17 AM
To: Grimes, Jeff (J.R.)
Cc: Dalbo, Bob (R.J.)
Subject: PCV hose connection on cam cover of batch 1 engines

Jeff,

We are having issues with connection of the PCV hose on the bank 2 cam cover.
The hose is rubbing against the radiator hose and is becoming completely disconnected. The hose only fits loosely on the cam cover and is not secured in any way.
In addition, during APTL testing, I saw almost 2 air/fuel ratio's difference of during a cold start, with the hose connected and disconnected.
We have currently installed a hose clamp on all our vehicles with batch 1 engines, and it is imperative that everyone with a batch one engine does so. This issue should be addressed as soon as possible.

Sincerely,

Gilbert Fournelle
V6 U204 Calibration Engineering
1AE27 Truck Engine Engineering (TEE)
Phone:(313)3904968 Fax:(313)3231786

From: Grimes, Jeff (J.R.)
Sent: Thursday, May 09, 2002 11:52 AM
To: Fournelle, Gilbert (G.)
Subject: RE: PCV hose connection on cam cover of batch 1 engines

ThankYou...

We will get updates going...

Jeff R.Grimes
Duratec Engine Programs
Ph: (313) 32-25237 Fax: (313) 59-47323
email: jgrimes1@ford.com

----Original Message----
From: Fournelle, Gilbert (G.)
Sent: Thursday, May 09, 2002 11:17 AM
To: Grimes, Jeff (J.R.)
Cc: Dalbo, Bob (R.J.)
Subject: PCV hose connection on cam cover of batch 1 engines

Jeff,

We are having issues with connection of the PCV hose on the bank 2 cam cover.
The hose is rubbing against the radiator hose and is becoming completely disconnected. The hose only fits loosely on the cam cover and is not secured in any way.
In addition, during APTL testing, I saw almost 2 air/fuel ratio's difference of during a cold start, with the hose connected and disconnected.
We have currently installed a hose clamp on all our vehicles with batch 1 engines, and it is imperative that everyone with a batch one engine does so. This issue should be addressed as soon as possible.

Sincerely,

Gilbert Fournelle
V6 U204 Calibration Engineering
1AE27 Truck Engine Engineering (TEE)
Phone:(313)3904966 Fax:(313)3231786

From: Fournelle, Gilbert (G.)
Sent: Tuesday, July 16, 2002 6:57 AM
To: Shelton, Randy (R.)
Subject: FW: Collapsing PCV Hose on 2.0L Zetec for Focus and Escape causing Idle Concerns and/or MIL

Is this the ODBII code you were investigating?

Gilbert Fournelle
V6 U204 Calibration Engineering
1AE27 Truck Engine Engineering (TEE)
Phone:(313)3904968 Fax:(313)3231786

----Original Message----
From: Pepitone, Gil (J.)
Sent: Monday, July 15, 2002 6:10 PM
To: Hansen, George (G.C.); Bak, Paul (P.E.); Alasha, Waheed (W.D.); Altoonian, Don (D.J.); Anyanwu-Ebo, Ike (I.C.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); Dubovec, Jan (J.D.); Grewal, Bill (B.S.); Grimes, Jeff (J.R.); Hale, Tony (A.S.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Hoshino, Jun (J.); 'Inoue, Takashi (T.)'; Kathuss, Dana (D.J.); Kemerly-Finke, Nikki (K.); King, Robert (R.F.); Klarr, Jerry (G.T.); Krasovsky, Lee (L.P.); Matasa, John (J.); McGee, Brett (B.L.); Miller, Brian (B.J.); Moorhouse, Scott (S.R.); Otter, John (J.D.); Ondrejka, Rick (R.T.); Pharies, Richard (R.L.); Roncier, Philippe (P.); Shiraishi, Masaru (M.); Smith, Tony (T.R.); Suarez, Rhea (R.); Vecchio, Anne Marie (A.); Young, Lam (.); Johnson, Jim (J.S.); Whitworth, Rudy (A.R.); Billick, John (J.R.); Aynessazian, Kam (K.); Bauer, Scott (S.C.); Bhojwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); Chick, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Rothweiler, Daniel (D.); De Pena, Juan (J.E.); Diez, Timothy (T.P.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); Mcdonald II, John (J.M.); Jordan, Donald (D.E.); King, Robert (R.F.); Kosko, Jeff (J.R.); Kwon, Soon (S.K.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Mandaluk, Roger (R.S.); Marek, Edmond (E.G.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mooney, Larry (L.); Morgan, Tanako (T.T.); Morishima, Shigeki (S.); Nematollahi, Sonya (S.); Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Sanders, Muriel (M.S.); Shah, Kiran (K.C.); Stilgenbauer, Jeffrey (J.R.); Takasawa, Keith (K.D.); Takubo, Hiroichi (H.); Veenstra, Tim (T.W.); Wakanell, Ray (R.A.); Wettach, Bill (B.); Williams, Lee (LHW.); Young, Lam (.); Benintende, Robert (R.F.); Terzes, Laura (L.D.); Martin, Mike (M.S.); Weaver, Mark (M.A.); Amaly, Felix (F.A.); Bradley, Joe (J.C.); Linde, Peter (P.A.); Goering, Kimberly (K.L.); Benintende, Robert (R.F.); Amaly, Felix (F.A.); Lee, Pamela (P.F.); 'mmkee@visteon.com'; Hollister, Dave (D.); Zigler, Brad (B.T.); Stump, Steven (S.M.); Giordano, Nina (M.A.); Zaghati, Z. (.); Samardzich, Raul (R.J.)
Cc: Notebaert, Jim (J.E.); Pepitone, Gil (J.); DiAngelo, Renaldo (R.); Surti, P. J. (P.J.)
Subject: Collapsing PCV Hose on 2.0L Zetec for Focus and Escape causing Idle Concerns and/or MIL

Executive Summary

2.0l Zetec Applications can have Rolling Idle/Idle Stalls and "Check Engine" event due to the collapse of the YS4Z-6758-EA PCV hose. This same hose PN is used on both the Focus and Escape.

This Concern is difficult to diagnosis due to the intermittent nature of the failed state. High idle vacuum causes the softened hose elbow rubber to collapse, which partially blocks airflow to the PCV value. This restriction alters the calibration of the PCV value, which allows crankcase airflow at idle.

The two results are:
a. Increased throttle body sludge due to increase oil presence within the zip tube. The resulting TB sludge decreases base idle air flow beyond IAC duty cycle compensation with a resulting Rolling/Hunting Idle.
b. PCV airflow at idle bias the HEGO sensor lean, which the MIL sets a Lean System DTC P0171.

The long term durability of the 2.0L Zetec intake sealing system may also be affected.

TSB/Oasis Communications is recommended.

Pls note that this failure mode affects the 2.0L Zetec engine only. Also, this is not involve the "splitting" rubber elbow/vacuum leak issue reported recently.

Background

PCV hose/elbow material issues involving multiple engine applications is currently in investigation. An Oasis Message describing vacuum leaks which set lean DTCs P0171/P0174 and at the PCV elbow is currently being drafted.

However, there is new failure mode with involves the 2.0L Zetec only, which causes a Drive Concern of Rolling/Hunting Idle and/or MIL on with DTC P0171.

US Virgin Island 2.0L Zetec Escape

One of 23 Escape Units inspected recently was a 2.0L Zetec Escape exhibiting rolling idle. High IAC DC of 46% were observed.
Root cause was a sludge throttle body.
Further inspection revealed that the YS4Z-6758-EA PCV hose was deformed and collapsed at it's elbow area at idle.

Local South Florida 2.0L Zetec Focus'

Recently, local Technicians have alerted PFQS to a growing Concern Trend. The 2000/01 2.0L Zetec Focus have been generating a MIL/DTC of P0171. However, instead of root cause of the above "split rubber elbow" concern as described above (this vacuum leak also affects the 2.0L SPI), the hose would be found collapsed at it's elbow.

[redacted] [redacted] [redacted]

verview of subject PCV soft elbow. Notice is easily pushe
PCV hose.j... the sligh... in. It i...

The Techs state that the setting of this lean DTC was common on the 2.0L Zetec Focus and replacement of this PCV hose resolved the Concern. They learned to inspect this hose due to the other failure scenario cited of rubber failure/splitting, which causes engine vacuum leak.

Investigation

PFQS (Powertrain Field Quality Specialist) pondered how a collapsed PCV hose could set a lean DTC. He then realized a system relationship.
Challenges to this theory are welcome, as are alternate suggestions as to the relationship of the subject collapsed PCV hose and the setting of the MIL with lean DTC P0171.

The PCV valve is normally closed at idle, due to the high idle engine vacuum.

However, if the subject hose is restricted, this changes the ability of the engine's vacuum to fully close the PCV valve at idle. The PCV valve's spring is calibrated to be overcome the application of the high engine idle vacuum.
With diminished idle vacuum volume, the PCV valve remains partially open.

This results in unmetered airflow at idle, as supplied by the crankcase. The HEGO signal is now biased lean. Short Term Fuel Trims are now affected, which in turn sets the Check Engine Light, with the Lean System DTC of P0171 in Memory.

Also, not all of this additional crankcase idle is ingested back into the intake manifold . Some will migrate toward the throttle body and solidify in the form of sludge between the TB plate and bore.
This sludge will reduce the base airflow, increasing the IAC duty cycle. Over time, the IAC is not able to compensate.
The result is low idle airflow, which results in Rolling/Hunting Idle.

The affect of idle ingestion of crankcase airflow can adversely affect the intake manifold sealing system. A current example is 1999-2000 3.8L Windstar, in which PCV system improvements are part of the exhibiting TSB Service actions to resolve intake system leakage.

While not experienced on the above Concern Units, a low base airflows can result in Decell Engine Stalls.

Recommendation

An Oasis Message, both Broadcast and Symptom Code driven, should be generated. A TSB should also be generated, complete with an illustration.

Sample Oasis Message XXXX: 2000-2002 2.0L Zeteo Focus, 2001/2002 Escape. Rolling/Hunting Idle and/or Check Engine Light with DTC P0171 may be caused by a soft/collapsed PCV hose, PN YS4Z-6758-EA, located at the intake manifold/bulkhead side of the engine. Inspect the elbow area for deformities. Note if the hose can easily be squeezed shut and remains in that state. If found, replace and check engine oil condition/change interval. Advise Owner that proper oil change intervals need to be maintained to ensure that oil degradation does not deteriorate rubber components.

PFQS volunteers to assist Engineering in creation of any resulting communications.

Feedback is requested.

Thank you,
Gil Pepitone
Powertrain Field Quality Specialist-"PFQS" in
South Florida
Office/Answering Machine: 954-753-9989
Cell Phone 954-242-2066
"With Warranty you are Paying for the Sins of the Past"

Name: Overview of subject PCV hose.jpg

Name: PCV soft elbow. Note the slight indentation.jpg

Name: Hose is easily pushed in. It is even softer as the hose is hot and has oil vapor in it.jpg

From: Pepitone, Gil (J.)
Sent: Monday, July 15, 2002 6:10 PM
To: Hansen, George (G.C.); Bak, Paul (P.E.); Alashe, Waheed (W.D.); Altoonian, Don (D.J.); Anyanwu-Ebo, Ike (I.C.); Corbett, Sandra (S.M.); Dalbo, Bob (R.J.); Dubovec, Jan (J.D.); Grewal, Bill (B.S.); Grimes, Jeff (J.R.); Hale, Tony (A.S.); Herr, George (G.J.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Hoshino, Jun (J.); 'Inoue, Takashi (T.)'; Kathas, Dana (D.J.); Kemerly-Finke, Nikki (K.); King, Robert (R.F.); Klarr, Jerry (G.T.); Kresovsky, Lee (L.P.); Mateos, John (J.); McGee, Brett (B.L.); Miller, Brian (B.J.); Moorhouse, Scott (S.R.); Offer, John (J.D.); Ondrejko, Rick (R.T.); Pharies, Richard (R.L.); Ronder, Philippe (P.); Shiraishi, Masaru (M.); Smith, Tony (T.R.); Suarez, Rhea (R.); Vecchio, Anne Marie (A.); Yeung, Lem (.); Johnson, Jim (J.S.); Whitworth, Rudy (A.R.); Billicki, John (J.R.); Ayvazzadian, Kam (K.); Bauer, Scott (S.C.); Bholwani, Kamal (K.); Blackburn, Thomas (T.J.); Bogema, John (P.); Chiok, John (J.); Chih, Ming-Niu (M.N.); Chin, Darrel (D.); Rothweiler, Daniel (D.); De Pena, Juan (J.E.); Diez, Timothy (T.P.); Fascetti, Bob (R.J.); Fournelle, Gilbert (G.); Freeland, Mark (M.); Giles, Stuart (S.); Gokhale, Renuka (R.V.); Hofman, Michael (M.V.); Holmes, Jeffrey (J.R.); Ichikawa, Jiyunichiro (J.); Jensen, Ted (T.E.); Mcdonald II, John (J.M.); Jordan, Donald (D.E.); King, Robert (R.F.); Kosko, Jeff (J.R.); Kwon, Soon (S.K.); Limtiaco, Steven (S.); Linde, Peter (P.A.); Liu, Jane (J.); Mandziuk, Roger (R.S.); Marck, Edmond (E.C.); Maurer, James (J.B.); Mazzella, Gary (G.R.); Mooney, Larry (L.); Morgan, Tomiko (T.T.); Morishima, Shigeki (S.); Namatollahi, Sonya (S.); Ortman, James (J.W.); Powers, Ken (K.W.); Price, Martin (M.); Raquepau, Alden (A.P.); Sanders, Muriel (M.S.); Shah, Kiran (K.C.); Stilgenbauer, Jeffrey (J.R.); Takasawa, Keith (K.D.); Takubo, Hirokhi (H.); Veenstra, Tim (T.W.); Wakenell, Ray (R.A.); Wettach, Bill (B.); Williams, Lee (LHW.); Yeung, Lem (.); Benintende, Robert (R.F.); Terzee, Laura (L.D.); Martin, Mike (M.S.); Wexler, Mark (M.A.); Arnely, Felix (F.A.); Bradley, Joe (J.C.); Linde, Peter (P.A.); Goering, Kimberly (K.L.); Benintende, Robert (R.F.); Arnely, Felix (F.A.); Lee, Pamela (P.F.); 'mmkee@visteon.com'; Hollister, Dave (D.); Zigler, Brad (B.T.); Stump, Steven (S.M.); Giordano, Mike (M.A.); Zaghati, Z. (.); Samardzich, Raul (R.J.)
Cc: Noteboom, Jim (J.E.); Pepitone, Gil (J.); DiAngelo, Renaldo (R.); Surti, P. J. (P.J.)
Subject: Collapsing PCV Hose on 2.0L Zetec for Focus and Escape causing Idle Concerns and/or MIL

Executive Summary

2.0l Zetec Applications can have Rolling Idle/Idle Stalls and "Check Engine" event due to the collapse of the YS4Z-6758-EA PCV hose. This same hose PN is used on both the Focus and Escape.

This Concern is difficult to diagnosis due to the intermittent nature of the failed state. High idle vacuum causes the softened hose elbow rubber to collapse, which partially blocks airflow to the PCV value. This restriction alters the calibration of the PCV value, which allows crankcase airflow at idle.

The two results are:
a. Increased throttle body sludge due to increase oil presence within the zip tube. The resulting TB sludge decreases base idle air flow beyond IAC duty cycle compensation with a resulting Rolling/Hunting Idle.
b. PCV airflow at idle bias the HEGO sensor lean, which the MIL sets a Lean System DTC P0171.

The long term durability of the 2.0L Zetec intake sealing system may also be affected.

TSB/Oasis Communications is recommended.

Pls note that this failure mode affects the 2.0L Zetec engine only. Also, this is not involve the "splitting" rubber elbow/vacuum leak issue reported recently.

Background

PCV hose/elbow material issues involving multiple engine applications is currently in investigation. An

Oasis Message describing vacuum leaks which set lean DTCs P0171/P0174 and at the PCV elbow is currently being drafted.

However, there is new failure mode with Involves the 2.0L Zetec only, which causes a Drive Concern of Rolling/Hunting Idle and/or MIL on with DTC P0171.

US Virgin Island 2.0L Zetec Escape

One of 23 Escape Units Inspected recently was a 2.0L Zetec Escape exhibiting rolling idle. High IAC DC of 46% were observed.
Root cause was a sludge throttle body.
Further inspection revealed that the YS4Z-6758-EA PCV hose was deformed and collapsed at it's elbow area at Idle.

Local South Florida 2.0L Zetec Focus'

Recently, local Technicians have alerted PFQS to a growing Concern Trend. The 2000/01 2.0L Zetec Focus have been generating a MIL/DTC of P0171. However, instead of root cause of the above "split rubber elbow" concern as described above (this vacuum leak also affects the 2.0L SPI), the hose would be found collapsed at it's elbow.



verview of subjectCV soft elbow. Notice is easily pushe
PCV hose.j... the sligh... in. It i...

The Techs state that the setting of this lean DTC was common on the 2.0L Zetec Focus and replacement of this PCV hose resolved the Concern. They learned to inspect this hose due to the other failure scenario cited of rubber failure/splitting, which causes engine vacuum leak.

Investigation

PFQS (Powertrain Field Quality Specialist) pondered how a collapsed PCV hose could set a lean DTC. He then realized a system relationship.
Challenges to this theory are welcome, as are alternate suggestions as to the relationship of the subject collapsed PCV hose and the setting of the MIL with lean DTC P0171.

The PCV valve is normally closed at idle, due to the high idle engine vacuum.

However, if the subject hose is restricted, this changes the ability of the engine's vacuum to fully close the PCV valve at idle. The PCV valve's spring is calibrated to be overcome the application of the high engine idle vacuum.
With diminished idle vacuum volume, the PCV valve remains partially open.

This results in unmetered airflow at idle, as supplied by the crankcase. The HEGO signal is now biased lean. Short Term Fuel Trims are now effected, which in turn sets the Check Engine Light, with the Lean System DTC of P0171 in Memory.

Also, not all of this additional crankcase idle is ingested back into the intake manifold . Some will migrate toward the throttle body and solidify in the form of sludge between the TB plate and bore.
This sludge will reduce the base airflow, increasing the IAC duty cycle. Over time, the IAC is not able to compensate.
The result is low idle airflow, which results in Rolling/Hunting Idle.

The effect of idle ingestion of crankcase airflow can adversely effect the intake manifold sealing system. A current example is 1999-2000 3.8L Windstar, in which PCV system improvements are part of the exhibiting

TSB Service actions to resolve intake system leakage.

While not experienced on the above Concern Units, a low base airflows can result in Decell Engine Stalls.

Recommendation

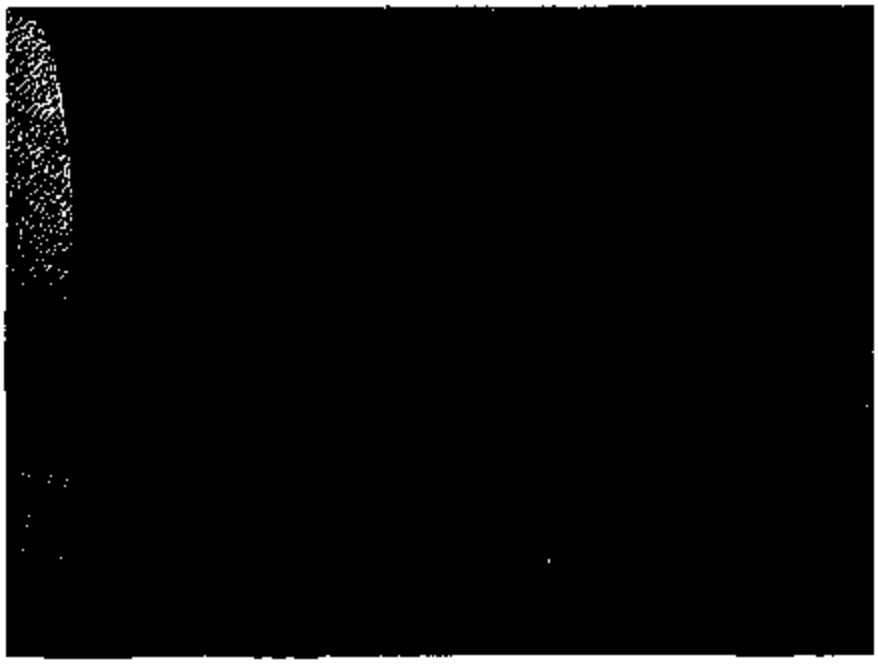
An Oasis Message, both Broadcast and Symptom Code driven, should be generated. A TSB should also be generated, complete with an illustration.

Sample Oasis Message XXXX: 2000-2002 2.0L Zetec Focus, 2001/2002 Escape. Rolling/Hunting Idle and/or Check Engine Light with DTC P0171 may be caused by a soft/collapsed PCV hose, PN YS4Z-6758-EA, located at the intake manifold/bulkhead side of the engine. Inspect the elbow area for deformities. Note if the hose can easily be squeezed shut and remains in that state. If found, replace and check engine oil condition/change interval. Advise Owner that proper oil change intervals need to be maintained to ensure that oil degradation does not deteriorate rubber components.

PFQS volunteers to assist Engineering in creation of any resulting communications.

Feedback is requested.

Thank you,
Gil Pepitone
Powertrain Field Quality Specialist-"PFQS" in
South Florida
Office/Answering Machine: 954-753-9989
Cell Phone 954-242-2066
"With Warranty you are Paying for the Sins of the Past"



Name: Overview of subject PCV hose.jpg

Name: PCV soft elbow. Note the slight indentation.jpg

Name: Hose is easily pushed in. It is even softer as the hose is hot and has oil vapor in it.jpg

Combined Ford and Lincoln Mercury Dealer Council P&S Committee/PSMAC Meeting
July 8-11, 2002
Ford Motor Company Conference & Events Center

Monday, July 8, 2002 RM 105

Morning	**PSMAC Parts Managers Arrive**	Dearborn Inn Hotel
11:45 - 12:00 p.m.	Parts Managers Shuttle Bus to Ford Conference & Events Center	Ballroom Lobby Departure
12:00 - 1:00 p.m.	Lunch	Gallery
1:00 - 1:15 p.m.	Welcome/Introductions/Agenda Review	Pat Hoye/Kent O'Hara/Joe Hill
1:15 - 3:00 p.m.	Parts Claims Workshop	Joe Hill/Dan Merchak
3:00 - 3:15 p.m.	Break	
3:15 - 5:00 p.m.	Parts Claim Workshop Report-Outs	Joe Hill/Dan Merchak
5:15 - 6:00 p.m.	Reception	Lookout Room
6:00 - 7:30 p.m.	Dinner	Lookout Room

Tuesday, July 9, 2002 RM 105

Morning	Dealer Council Delegates & PSMAC Service Managers Arrive	Dearborn Inn
PSMAC Parts Manager Meeting		
7:00 - 7:45 a.m.	Shuttle Bus Runs to Ford Conference & Events Center	
7:00 - 7:55 a.m.	Buffet Breakfast	Gallery
8:00 - 9:30 a.m.	G-CAT/Catalog Follow-up	John Sullivan/Joe Morelli/ Doug King/Rodney Kemp
9:30 - 9:45 a.m.	Break	
9:45 - 10:00 a.m.	Opening Comments	Tom Breen/Phil Collier/Joe Hill
10:00 – 10:45 a.m.	Parts Distribution/Availability Update • Overall Fill • Supplier Direct Ship Fill Status • Reverse Logistics Discussion	Tom Breen/Phil Collier Kent O'Hara
10:45 – 11:00 a.m.	MAFS Update	Suzanne Singel/Bob McCaffery
11:00 - 11:45 a.m.	Packaging Update • Bar Coding – Marketing Insert in binder	Doug Moyer
11:45 - 12:00 p.m.	**Dealer Council Delegates, PSMAC Service Managers, Body Shop Managers & Regional Office Participants Shuttle to Ford Conference and Events Center**	Ballroom Lobby Depart
12:00 - 1:00 p.m.	Lunch	
1:00 p.m.	Ford & LM Dealer Council/PSMAC Meeting Begins	Room 203
1:00 - 1:30 p.m.	Welcome/Introductions/Agenda Review/2002 PSMAC Priorities Status	Ann O'Neill/Pat Hoye
1:30 - 2:00 p.m.	Opening Comments	Sims/Abatsis/Banse
2:00 - 3:00 p.m.	What's On Your Mind?	Group
3:00 - 3:15 p.m.	Break	
3:15 - 3:45 p.m.	Business Review	Pat Hoye/Larry King
3:45 - 5:30 p.m.	Warranty Update ***(Ford P&S Priories #1 & 4; LM P&S #8)***	
	• Retail Reimbursement	Paul Barry
	• Parts Return Tags	Nick Ayres/Donna Reiners
	• Warranty Counseling Update	Kirk Leifson/Kirk Born
5:30 - 5:45 p.m.	Bus Shuttle to Dearborn Inn	
6:00 - 6:45 p.m.	Reception	Poolside – Dearborn Inn
6:45 - 8:30 p.m.	BBQ	Poolside – Dearborn Inn

8:59 AM2/3/03

Combined Ford and Lincoln Mercury Dealer Council P&S Committee/PSMAC Meeting
July 9-11, 2002
Ford Motor Company Conference & Events Center

Wednesday July 10, 2002 RM 203

7:00 - 7:45 a.m.	Shuttle Bus Runs to Ford Conference & Events Center	Ballroom Lobby Departure
7:00 - 7:55 a.m.	Buffet Breakfast	
8:00 - 9:00 a.m.	Daily Parts Advantage Update & Discussion ***(Ford P&S Priority #2)***	Dan Merchak/Kent O'Hara
	• Parts Trading Terms Update	Dan Merchak
9:00 - 10:00 a.m.	Technician Recruiting/Retention/Recognition ***(Ford P&S Priority #3; LM P&S #6)***	Steve DeAngelis/Kathleen Merchak/ David McClain
	• 7.3L Diesel Certification Status	
	• Expanded Technician Recognition Program Status	
	• Dealership Technician Recognition Discussion	
	• Technician Training Discussion	
	• Rotunda Update	Roni Issa
10:00 - 10:15 a.m.	Break	
10:15 - 10:45 a.m.	Service Labor Time Standards Update ***(Ford P&S Priority #3; LM P&S #1)***	
	• PTS SLTS Workshop Status	Kathleen Merchak
	• M Time Policy Status	Bob Knecht
10:45 - 11:15 a.m.	QCDealer Update	Linda Perry-Lube/Mike Feller
11:15 - 12:00 p.m.	Customer Relationship Center Update	Nelda Connors
	• Customer Differentiation Model Update	
	• CRC Update	
12:00 - 12:45 p.m.	Lunch	Gallery
12:45 - 1:15 p.m.	Customer Viewpoint Update	George Goddu
	• Daily Survey Return Reports	
	• Individual Tech. Scores	
1:15 - 1:45 p.m.	2002 Marketing Update	Allen Benson
	• 2002 Marketing Events	
	• QC Connect Update	Brian Weyers
1:45 - 2:15 p.m.	2002 2nd Half National Events Review	Mike Simon/Mike Warwood Jim Stewart
2:15 - 2:45 p.m.	2002 Incentive Programs	Jim Stewart
2:45 - 3:15 p.m.	Crash Club Update	Susan Rell Johnson
3:15 - 3:45 p.m.	REACT Update (Reporting/Data/Status)	Barry Levey
3:45 - 4:00 p.m.	Break	
4:00 - 5:00 p.m.	Vehicle Quality & Reliability Update ***(Ford P&S Priority #1, L/M Major Priority)***	
	• Firestone Status	Mike Warwood
	• Remanufactured Products Update/Discussion	Larry King/John Dan
	- Quality Status	Helen Corry
	- Policy Status	
5:00 - 5:30 pm	New hand held Diagnostic tool review & demo	Mark Coleman/Mark Stiegel
5:30 - 5:45 p.m.	Open Issues	
5:45 - 7:00 p.m.	Greenfield Village Reception/Tours	Greenfield Village
7:00 - 9:00 p.m.	Dinner	Eagle Tavern

Combined Ford and Lincoln Mercury Dealer Council P&S Committee/PSMAC Meeting
July 9-11, 2002
Ford Motor Company Conference & Events Center

Thursday, July 11, 2002 RM 203

7:00 - 7:45 a.m.	Shuttle Bus Runs to Ford Conference & Events Center	Ballroom Lobby Departure
7:00 - 7:55 a.m.	Buffet Breakfast	
8:00 - 9:00 a.m.	Ford Vehicle Insurance Program	Phil Horlock
	Certified Collision Repair Network	Garry Nelson
9:00 - 9:15 a.m.	Break	

Service Meeting
Ford and Lincoln Mercury Dealer Council Quality Status Report - (***Ford P&S Priority #1***)

9:15 – 9:30 a.m.	Opening Comments	Louise Goeser
9:30 - 10:00 a.m..	What's On Your Mind?	Group
10:00 - 10:15 a.m.	Break	
10:15 - 12:15 p.m.	Powertrain Update	
	• Engine & 5.4L Update	John Koszewnik/Dan Kapp Mark Albrant/Scott Makowski
	• Transmission	Serb Samardzich
12:15 - 1:00 p.m.	Lunch	
1:00 - 2:15 p.m.	Product Engineering Update	Mike Beck
	• Seat Belts	
	• Windnoise	
	• Brake Rotor Quality/Brake Noise	
	• NVH	
	• Focus Seat Plastic Protection Wrap	Mike Williams
2:15 - 2:45 p.m..	Vehicle Operations Update	
	• Paint	Adrian Vido
	• Protective Stickers	Adrian Vido
3:00 - 3:15 p.m.	Break	
3:15 - 4:00 p.m.	Open Dialogue/Closing Comments	Jim Padilla
4:00	Delegates Depart for Metro Airport	

Parts Meeting	**RM 105**	
9:15 - 9:20 a.m.	Opening Comments	Pat Hoye/Joe Hill
9:20 - 9:45 a.m.	What's On Your Mind?	Group
9:45 - 10:15 a.m.	OE Connection Update	Mary Baumgartner/Kevin Rigg
10:15 – 10:30 a.m.	Break	
10:30 - 11:00 a.m.	WINS Update	Barry Levey
11:00 - 11:30 a.m.	Maintenance Commodity Team Update	Mike Simon
11:30 - 12:00 p.m.	Heavy Repair Team Update	Leo Hughes
12:00 - 12:30 p.m.	Lunch	
12:30 - 1:00 p.m.	Light Repair Team Update	Mike Warwood
1:00 - 1:30 p.m.	Accessories Update	Matt Kesler
1:30 - 1:45 p.m.	Closing Comments	Pat Hoye/Joe Hill
1:45 p.m.	Delegates Depart for Metro Airport	