



U.S. Department
of Transportation
**National Highway
Traffic Safety
Administration**

ODI RESUME

Investigation: EA08-011
Prompted By: PE08-014
Date Opened: 07/01/2008
Principal Investigator: Peter Ong
Subject: Passenger Door Fire

Date Closed: 08/21/2009

Manufacturer: Mitsubishi Motors North America, Inc., Mitsubishi Caribbean
Products: 2001 – 2003 Mitsubishi Galant
Population: 292,945

Problem Description: A fire occurs in the front passenger door panel.

FAILURE REPORT SUMMARY

	ODI	Manufacturer	Total
Complaints:	6	29	35
Crashes/Fires:	6	29	35
Injury Incidents:	1	2	3
# Injuries:	1	2	3
Fatality Incidents:	0	0	0
# Fatalities:	0	0	0
Other*:	0	307	307

*Description of Other: Warranty claims related to passenger switch failures.

Action: Close this Engineering Analysis.

Engineer: Peter Ong *POO*
Div. Chief: D. Scott Yon
Office Dir.: Kathleen C. DeMeter

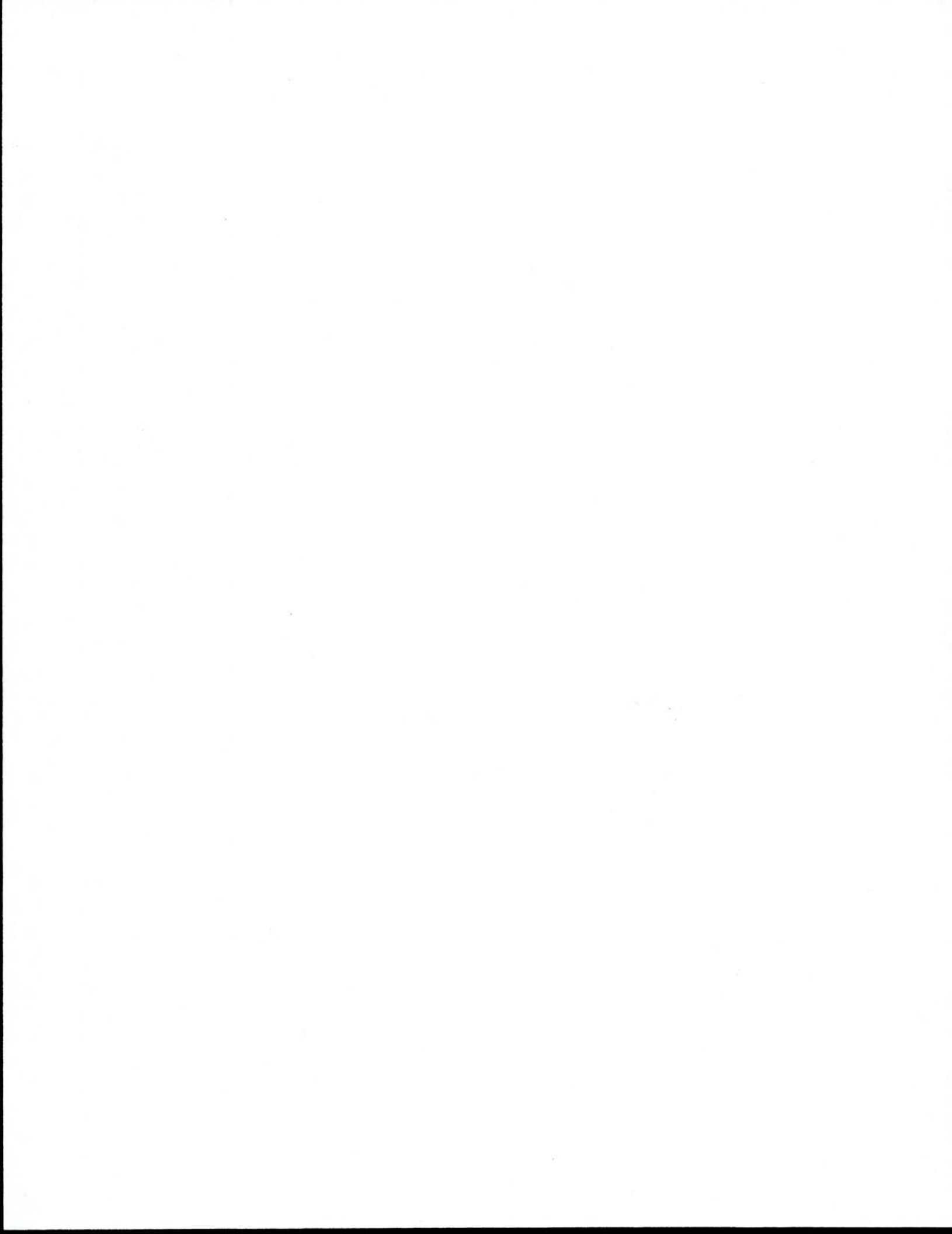
Date: 08/21/2009
Date: 08/21/2009
Date: 08/21/2009

Summary:

In response to this investigation, Mitsubishi Motors North America (MMNA) initiated a special program on July 31, 2009, to extend the warranty coverage on model year (MY) 2001-2003 Galant vehicle passenger side window switches to 10 years or 120,000 miles, whichever comes first. Notification of this special coverage program to all registered vehicle owners is scheduled to begin in late-September 2009. Owners who have experienced a problem with the power window switch (blown fuse, intermittent operation or power window malfunction) or who spilled liquids or beverages onto the front passenger door window switch will be entitled to have the switch replaced and any related repairs performed at no charge.

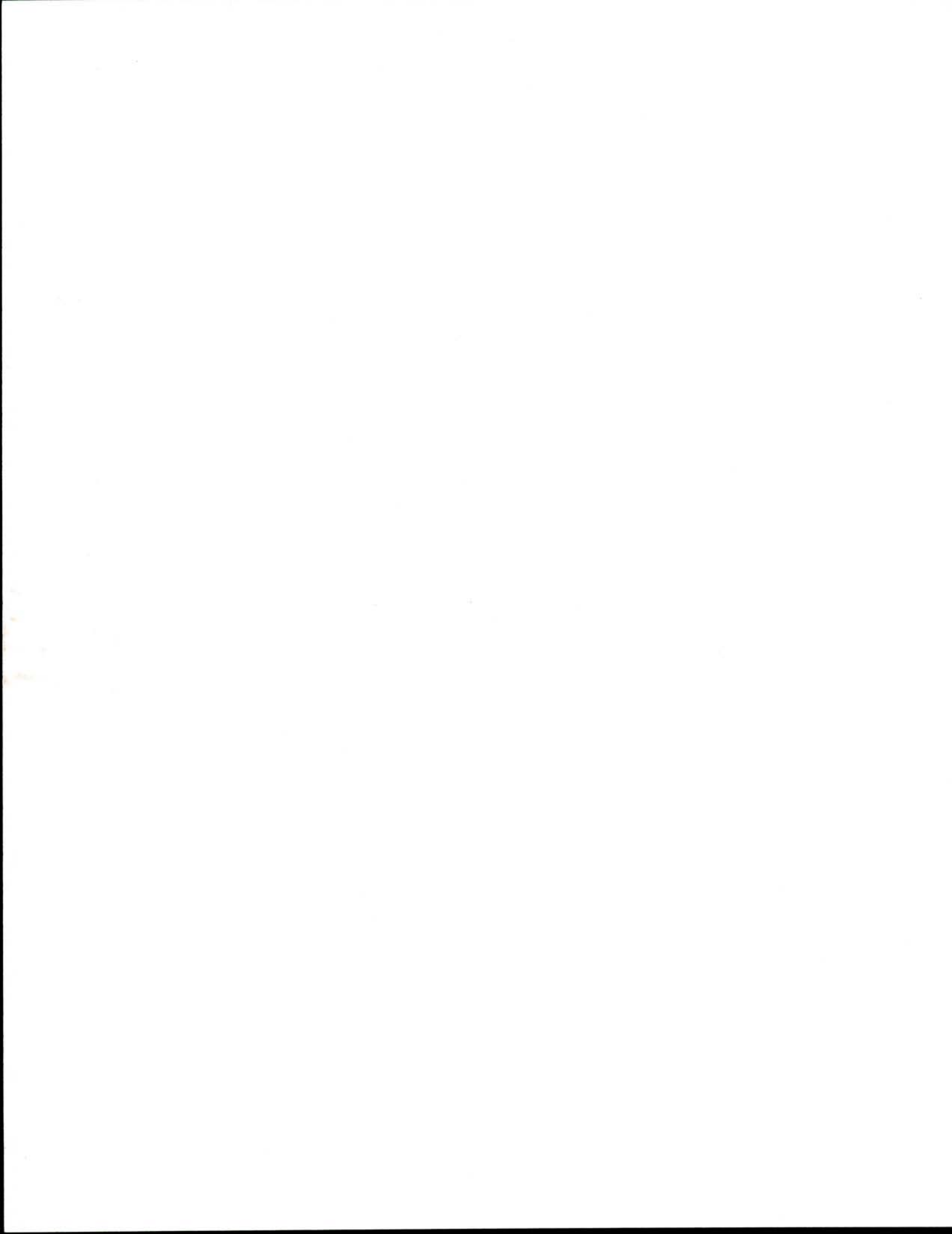
The agency is aware of 35 alleged front passenger door panel heat, smoke or fire incidents, including three reported minor burns or bruises. There are no reported crashes or fatalities. There are 307 warranty claims of switch malfunctions or short circuits without any reported heat, smoke or fire. MMNA inspection and analysis of fire-damaged door panels/switches found evidence of spilled liquids with high sugar content on the power window switches. MMNA claims the residue of these liquids led to a shorting/smoke/ fire condition inside the switch/door panel assembly.

(Continued on page two)



A safety-related defect has not been identified at this time and further use of agency resources does not appear to be warranted. Accordingly, this investigation is closed. The closing of this investigation does not constitute a finding by NHTSA that a safety-related defect does not exist. The agency will continue to monitor this issue and reserves the right to take further action if warranted by the circumstances.

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ENGINEERING ANALYSIS CLOSING REPORT

SUBJECT: Passenger Door Fire

EA No: EA08-011

DATE OPENED: 07/11/2008

DATE CLOSED: 08/21/2009

Subject Vehicles: MY 2001 – 2003 Galant vehicles

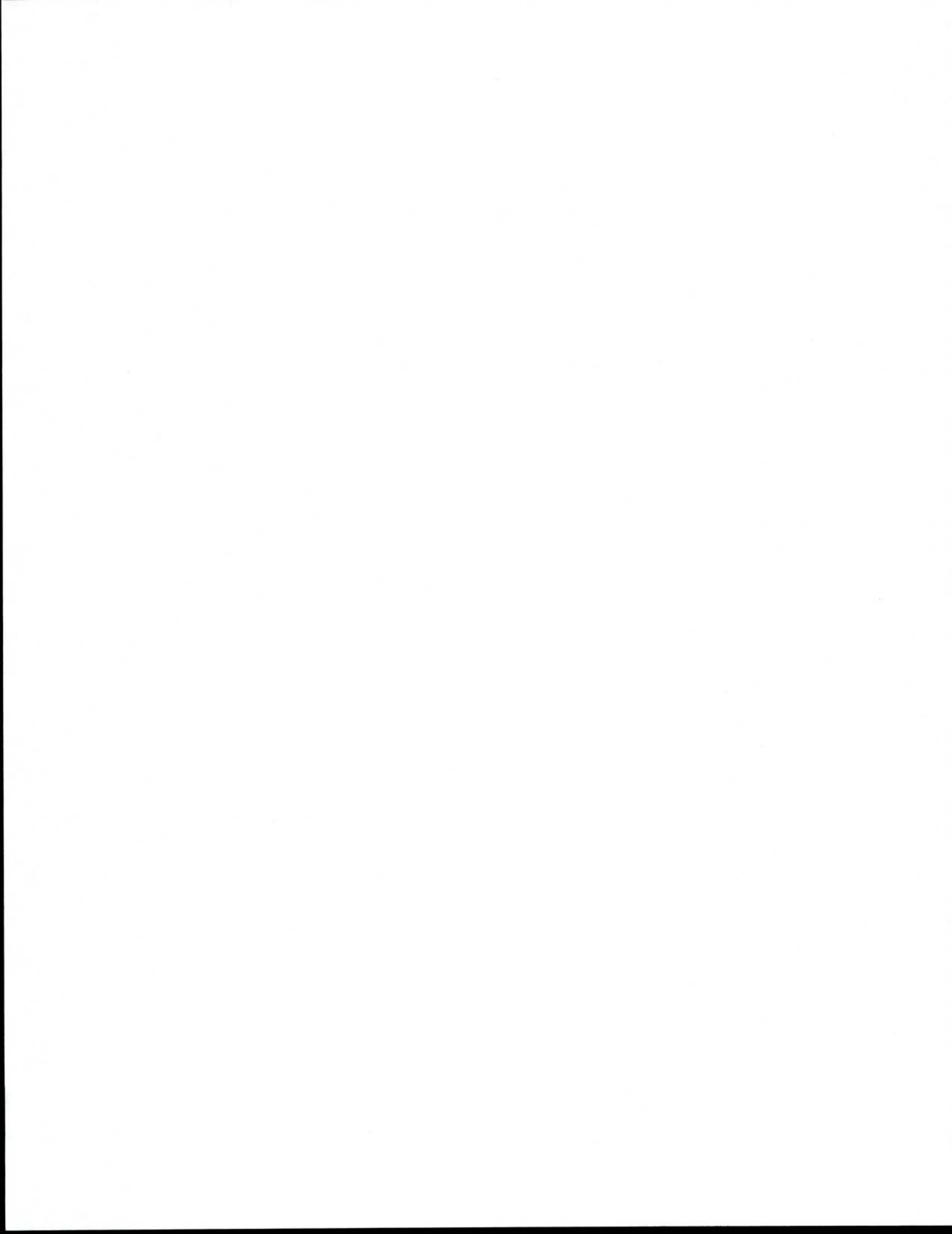
SUBJECT COMPONENT: Window Switch Assembly

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Background: On July 1, 2008, NHTSA's Office of Defects Investigation (ODI) upgraded its Preliminary Evaluation (PE08-014) to an Engineering Analysis (EA08-011) to further investigate window switch failures that can lead to faulty power window operation, electrical malfunction and/or switch/door panel fires in MY 2001-2003 Mitsubishi Galant vehicles. All 292,945 MY 2001-2003 subject Galant vehicles were equipped with an electrically operated power door lock and window switch assembly. The passenger side door - shown in Figure 1- is equipped with its own power door lock and window switches mounted on the inclined surface on the door panel arm rest. As shown in Figure 2, a single housing assembly contains both the power door lock



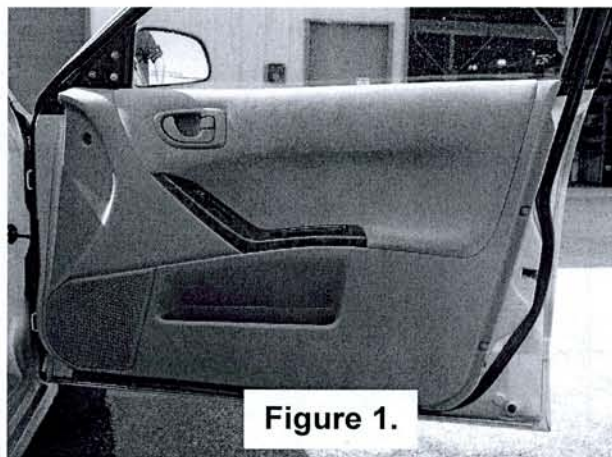


Figure 1.

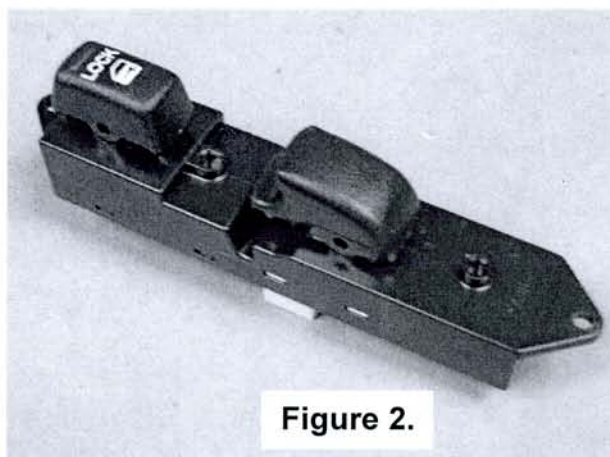


Figure 2.

and power window functions. As shown in Figure 3, the vehicle's power window and power seat electrical circuits share an electrical circuit, which is protected by a 30 ampere fuse, with the Radio/CD and Sunroof circuits (each with its own 20 Ampere fuse). Normally, if the current in the power window circuit exceeds this current limit (or from a combination of the power seat, radio and/or sunroof circuits), the 30 Ampere fuse will open and prevent further operation.

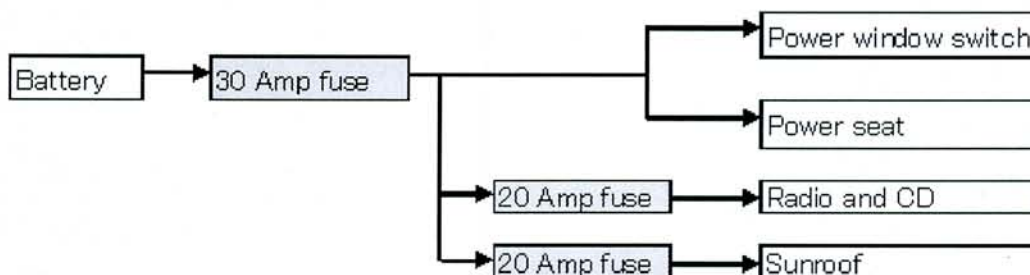
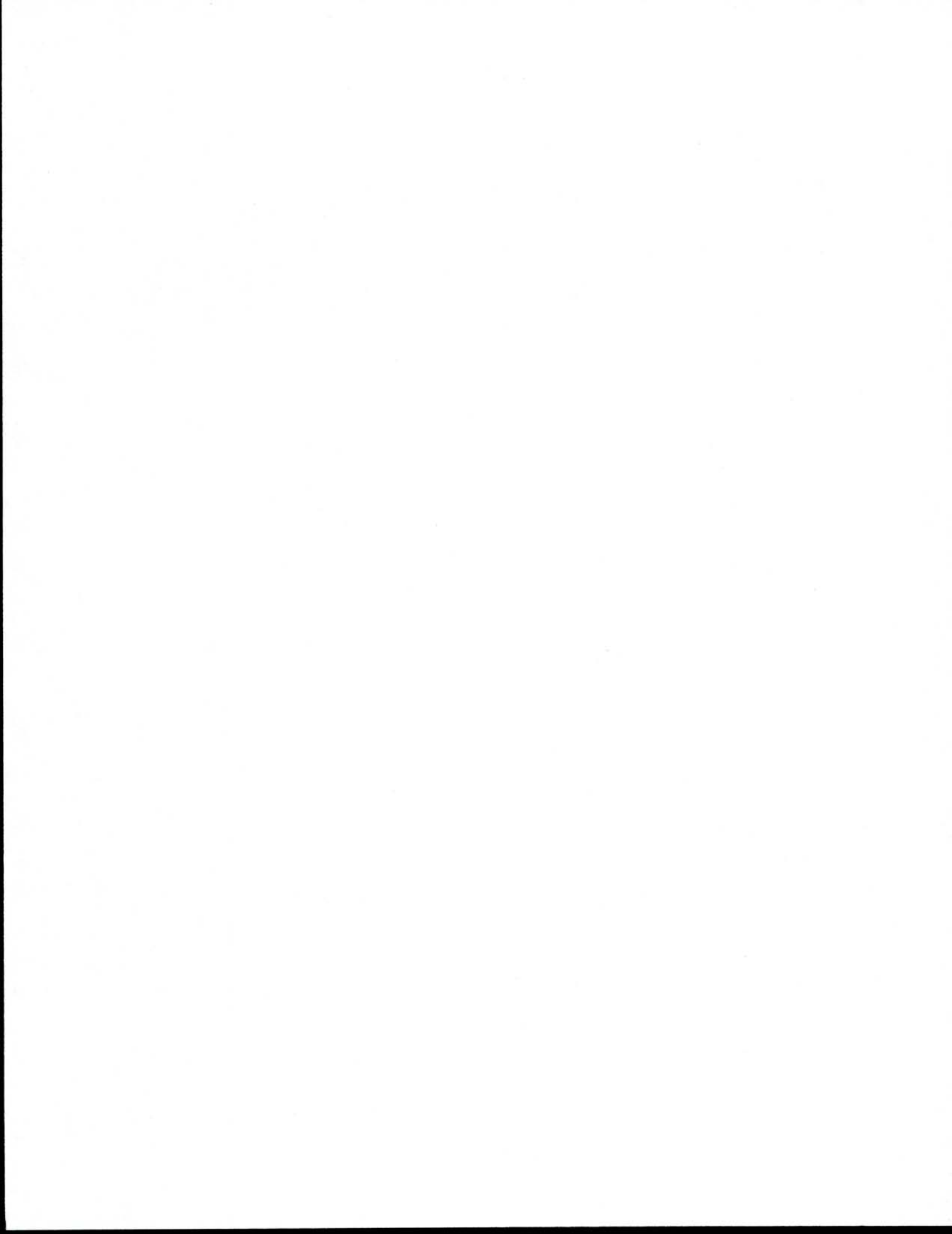


Figure 3. Power Window Switch Circuit

The subject switch assembly (Figure 2) is used in other MY 1999-2000 Galant, MY 2004-2006 Galant, MY 2000-2005 Eclipse, MY 2001-2005 Eclipse Spider and MY 2004-2006 Endeavor vehicles totaling 654,631 peer vehicles. Unlike the subject vehicles, however, the switches on these peer vehicles are mounted differently and in different locations within the door panel and thus make them less susceptible to fluid intrusion should a spill occur.

Subject Vehicle Fire Incidents: As of July, 2009, ODI has identified 35 door panel fire incidents from the MY 2001-2003 Galant vehicles. Of the 35 fire incidents, no one reported a loss of vehicle control, with only three owners alleging an injury. The reported injuries are minor: a superficial fingertip burn; a minor leg burn and a sprained ankle while exiting the vehicle; and a sore right arm. Inspections of recovered door panel assemblies indicate a contained fire event within the door panel assembly with minor to moderate thermal damage to the power window switch assemblies, wiring harnesses and/or the door trim panel pieces. Figures 4 and 5 show the typical extent of the thermal damage to the passenger door panel after a



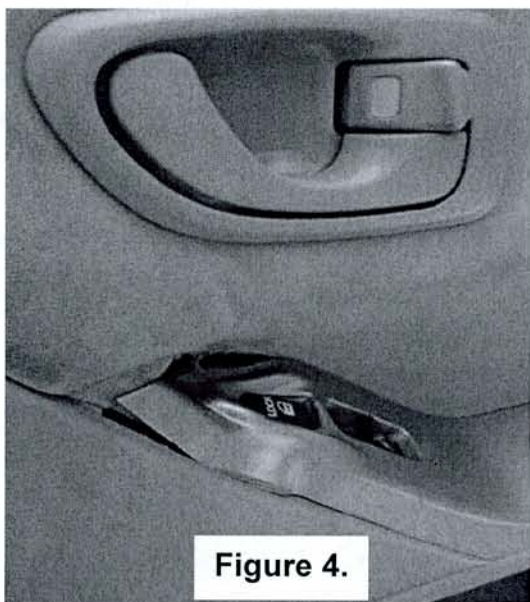


Figure 4.

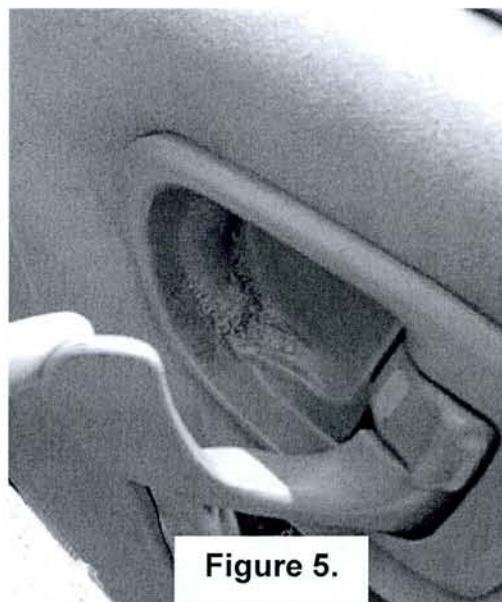


Figure 5.

fire incident. No one reported that the fire had spread beyond the door panel to any other vehicle components such as the instrument panel or seats.

Analysis of the Cause of the Electrical, Thermal or Fire Incidents: MMNA's investigation found residue from liquids on and around the power window switch assembly and door panel arm rest region in several of the returned parts. MMNA's analysis of the liquid residue indicates the source could be liquid from sport drinks containing high sugar or electrolyte content. In fact, MMNA found carbonized substance (dried/burn sugar/salt) on the circuit board traces inside the burnt power window switch assemblies.

NHTSA's Vehicle Research Test Center (VRTC) also inspected and analyzed parts obtained from three fire damaged subject vehicles. The results confirmed that the fire started at the switch region and the switches tested positive for halides (salts) and, in one case, a high probability of corn syrup. These ingredients are commonly found in sports beverages and other drinks. These findings are consistent with those of the MMNA analyses.

The spilled liquid that seeped into the switch assembly, after being heated and carbonized, can act like a high resistance "short." The carbonized material may also lead to arcing in the switch. For example, in one evaluation conducted by VRTC, a switch was injected with a sports beverage drink and later repeatedly operated under power. After numerous cycles that created arcs, carbonized material built up to an extent that an arc/current path formed between the carbonized material and the switch contacts (even when it is not being operated). The arcing and/or the shorting condition could produce sufficient heat to damage, or potentially ignite other combustible portions of the switch without exceeding the current limit of the 30 Ampere fuse intended to protect the circuit and prevent such damage.

Both MMNA and VRTC conducted tests for rain or road spray intrusion. The testing indicated that rain or road spray are blocked from intruding into the inner door panel and switch area by



the door's vapor barrier seals. Tests at varying conditions (when the door was closed, when the door was ajar, or when the window was open 1/16 inch) showed that water did not enter the inner panel/power window switch region. Therefore ODI believes that door panel heat, smoke or fire incidents are unlikely to be caused by water intrusion due to rain or other sources that commonly occur in normal vehicle usage.

NHTSA conducted a telephone survey of owners reporting a heat, smoke or fire incident. Ten owners responded. Each owner reported that there was no precipitation on the day of the incident (or the day before). Further, these owners reported that, after starting the engine, the passenger side window switch was not being operated when the fire incident occurred. They reported no prior rain water intrusion or leakage on or near the passenger door. Only two owners reported spilling a liquid (including the owner of one of the recovered damaged part that was analyzed by VRTC and later determined to have evidence of halides and corn syrup on the switch). The results of the phone survey are consistent with MMNA and VRTC analysis.

