2007 ACCESSORIES & EQUIPMENT

Seat Heating and Cooling - Outlook

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Front Heated Seat Module Screw	2 N.m	18 lb in

SCHEMATIC AND ROUTING DIAGRAMS

HEATED/COOLED SEAT SCHEMATICS (EXCEPT A45)

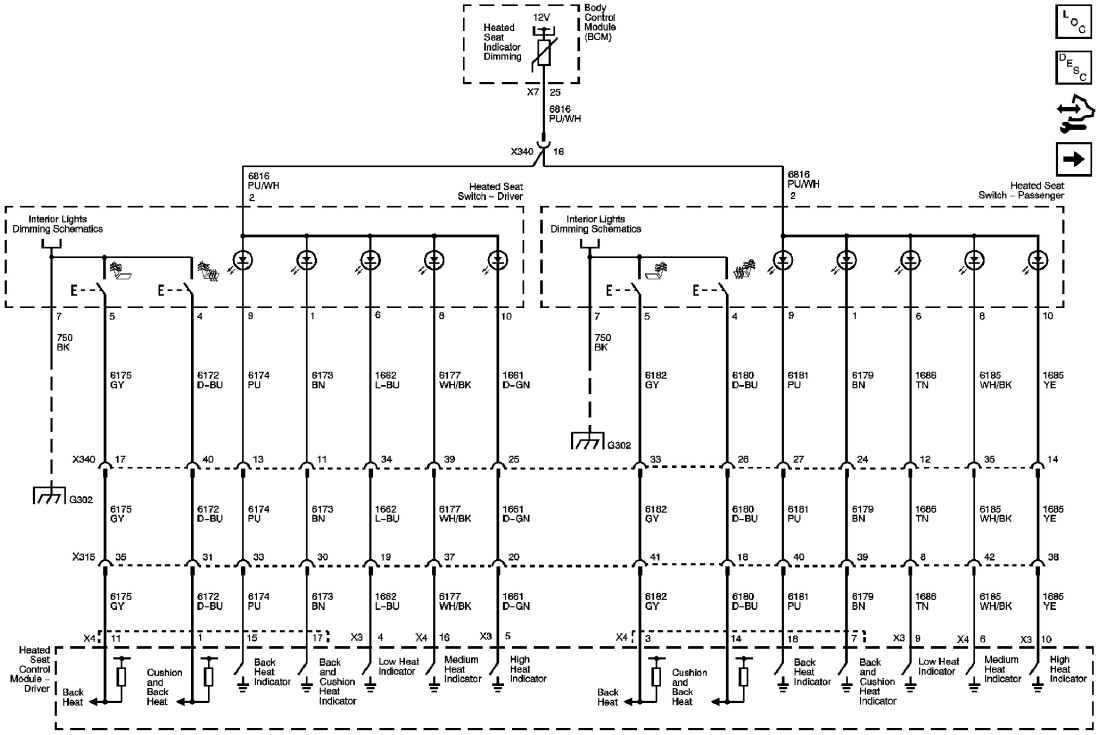

Fig. 1: Indicators & Switches Schematic
Courtesy of GENERAL MOTORS CORP.

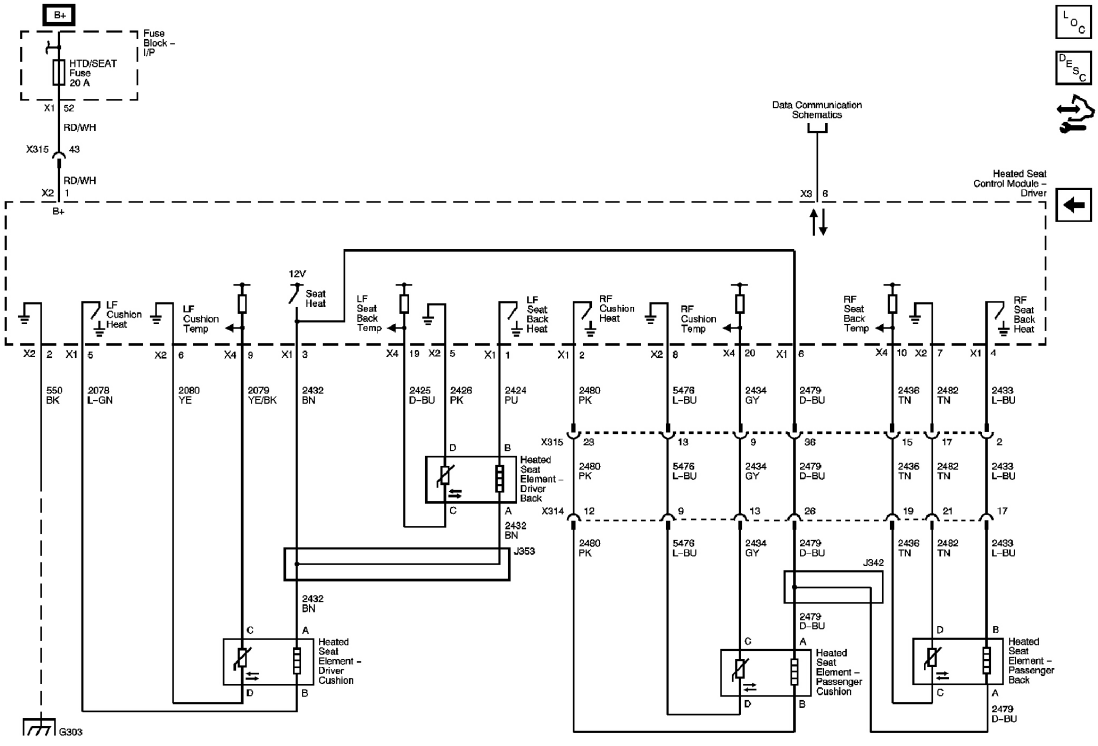

Fig. 2: Heating Elements Schematic
Courtesy of GENERAL MOTORS CORP.

HEATED/COOLED SEAT SCHEMATICS (A45)

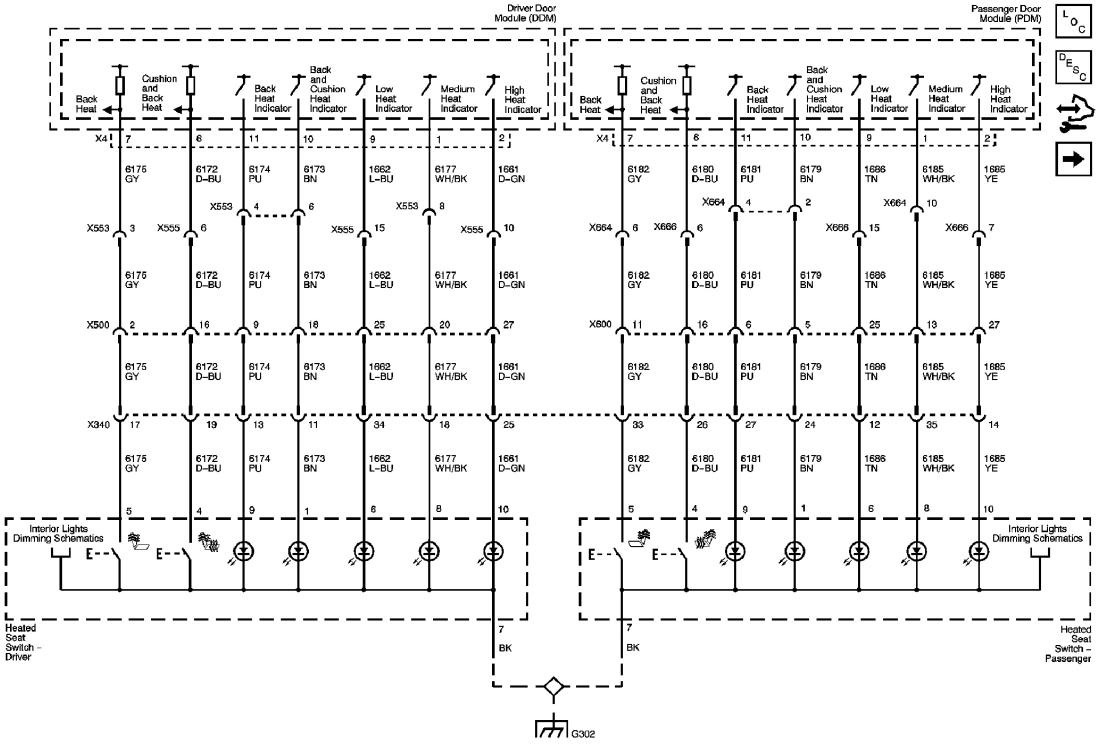

Fig. 3: Indicators & Switches Schematic
Courtesy of GENERAL MOTORS CORP.

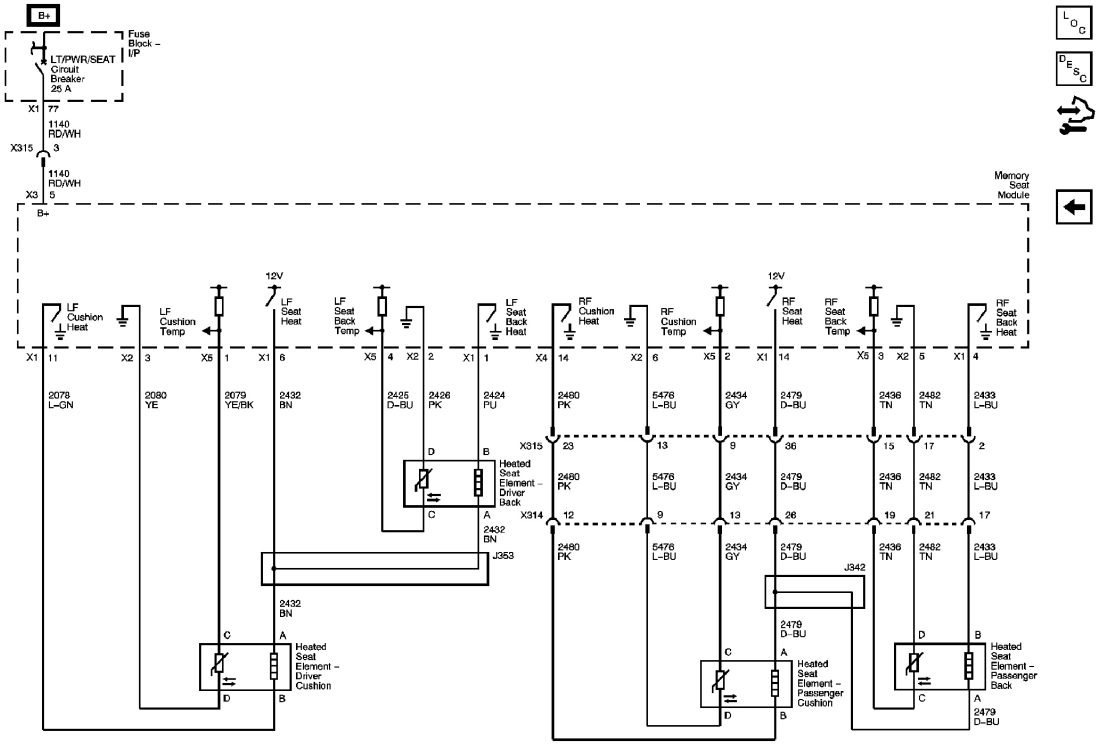

Fig. 4: Heating Elements Schematic
Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

HEATED/COOLED SEAT COMPONENT VIEWS

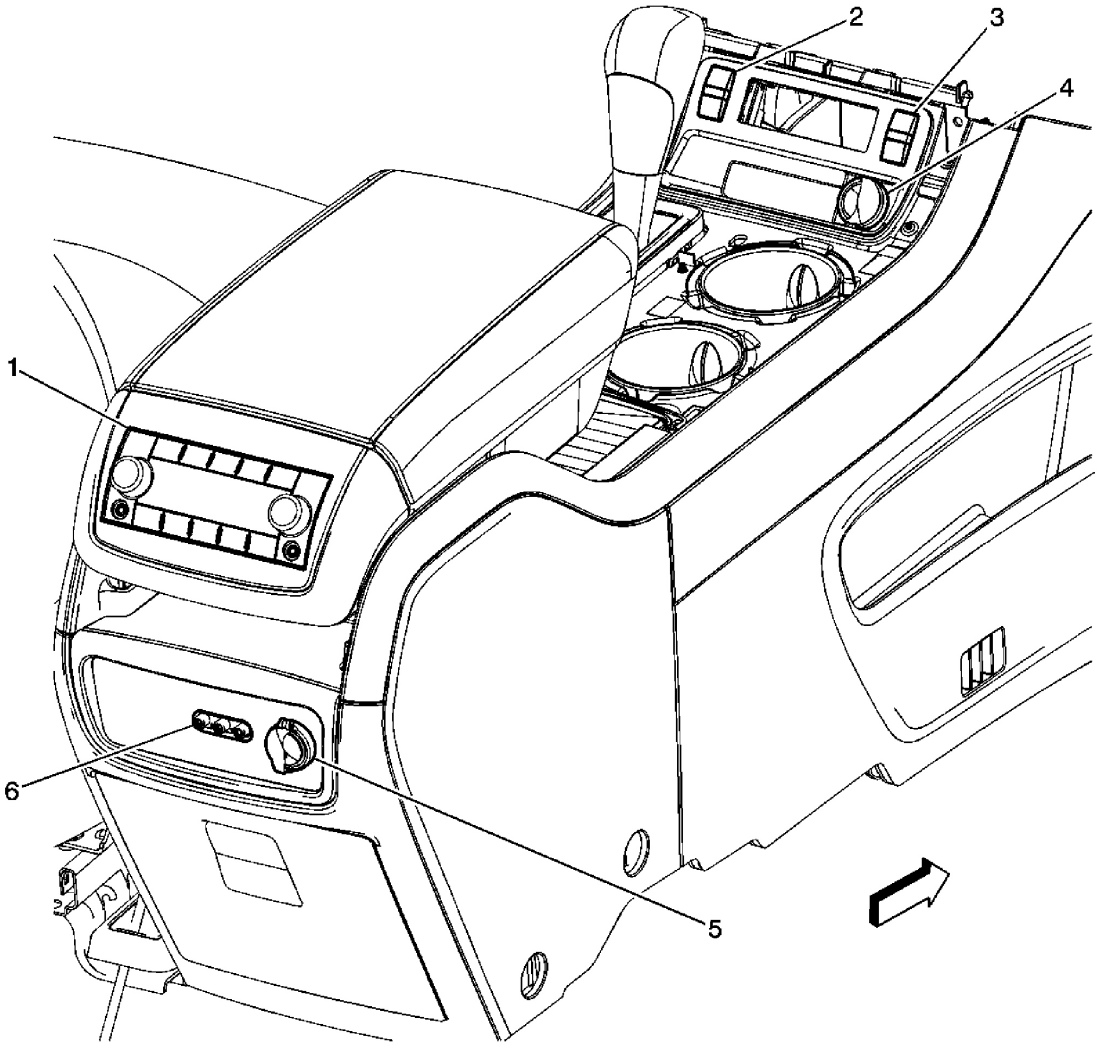

Fig. 5: Identifying Console Components
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 5

Callout	Component Name
1	Rear Video/Audio/HVAC Module (UK6)
2	Heated Seat Switch - Driver (KA1)
3	Heated Seat Switch - Passenger (KA1)
4	Cigar Lighter
5	Auxiliary Power Outlet - Console Rear (DK1)
6	Audio/Video Adapter (U42)

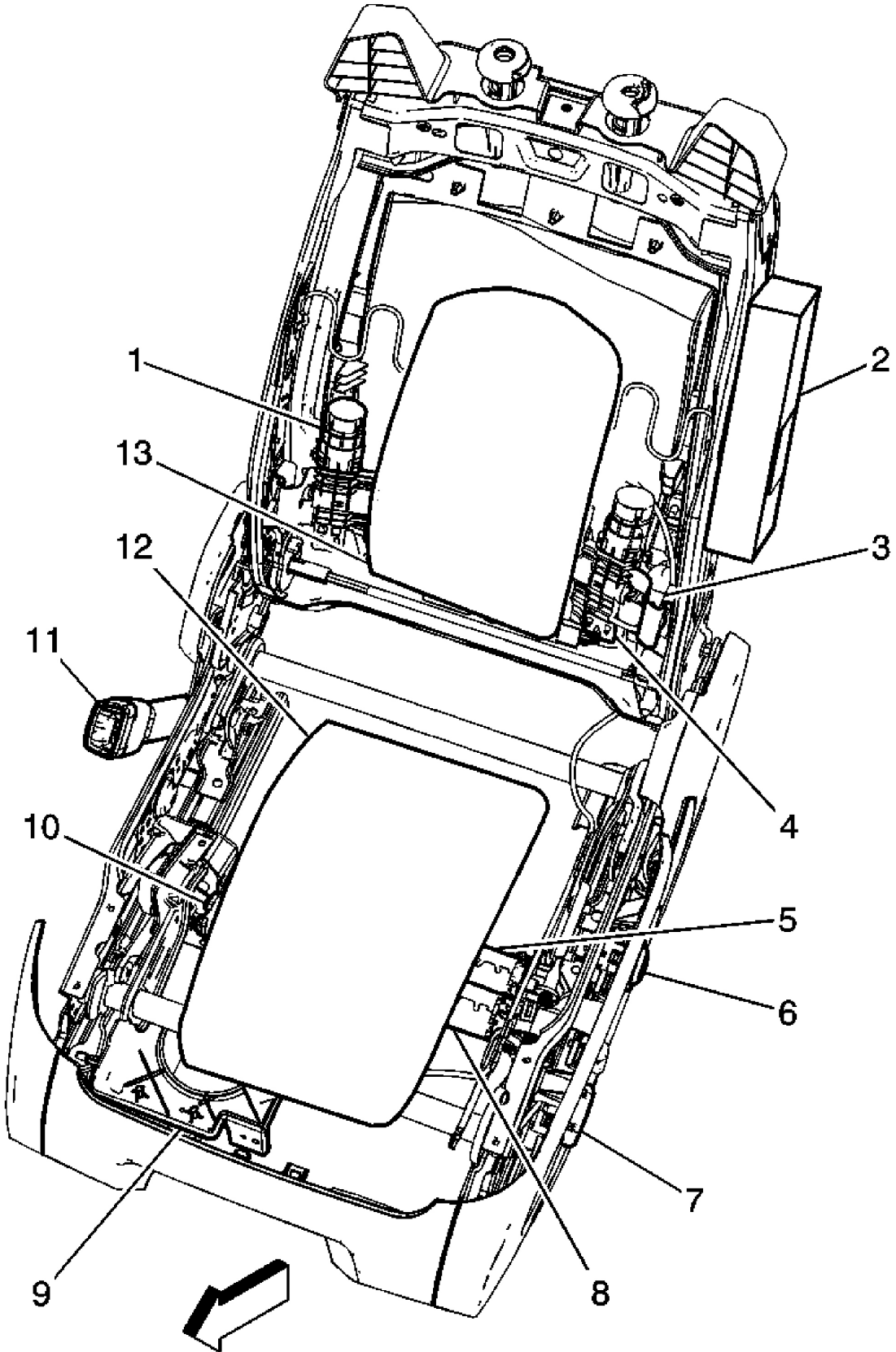
1
2
13
12
3
11
4
10
5
6
7
9
8

Fig. 6: View Of Driver Seat Components (Except A45)
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 6

Callout	Component Name
1	Seat Lumbar Vertical Motor - Driver
2	Inflatable Restraint Side Impact Module - Left
3	Seat Recline Motor - Driver
4	Seat Lumbar Horizontal Motor - Driver
5	Seat Horizontal Motor - Driver
6	Seat Lumbar Switch - Driver
7	Seat Adjuster Switch - Driver
8	Seat Rear Vertical Motor - Driver
9	Heated Seat Control Module - Driver (KA1)
10	Seat Front Vertical Motor - Driver
11	Seat Belt Switch - Driver
12	Heated Seat Element - Driver Cushion (KA1)
13	Heated Seat Element - Driver Back (KA1)

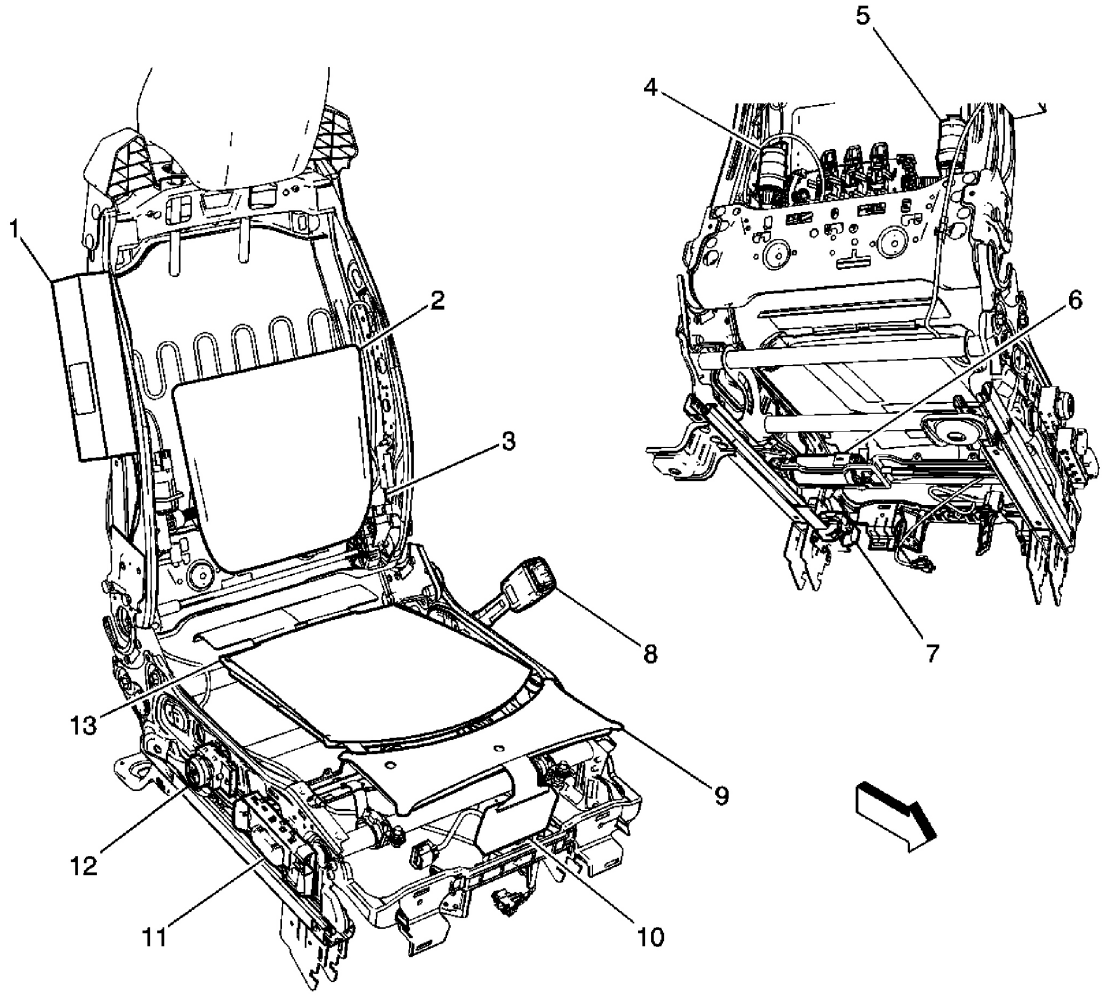

Fig. 7: Identifying Passenger Seat Components
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 7

Callout	Component Name
1	Inflatable Restraint Side Impact Module - Right
2	Heated Seat Element - Passenger Back (KA1)
3	Seat Recline Motor - Passenger (AAQ)
4	Seat Lumbar Horizontal Motot - Passenger (AAQ)
5	Seat Lumbar Vertical Motor - Passenger (AAQ)
6	Seat Horizontal Motor - Passenger
7	Inflatable Restraint Seat Position Sensor (SPS) - Passenger (W49)
8	Seat Belt Switch - Passenger

9	Inflatable Restraint Front Passenger Presence System (PPS) Sensor
10	Passenger Presence System (PPS) Module (Part of PPS Sensor)
11	Seat Adjuster Switch - Passenger
12	Seat Lumbar Switch - Passenger
13	Heated Seat Element - Passenger Back

HEATED/COOLED SEAT CONNECTOR END VIEWS

Heated Seat Control Module - Driver X1

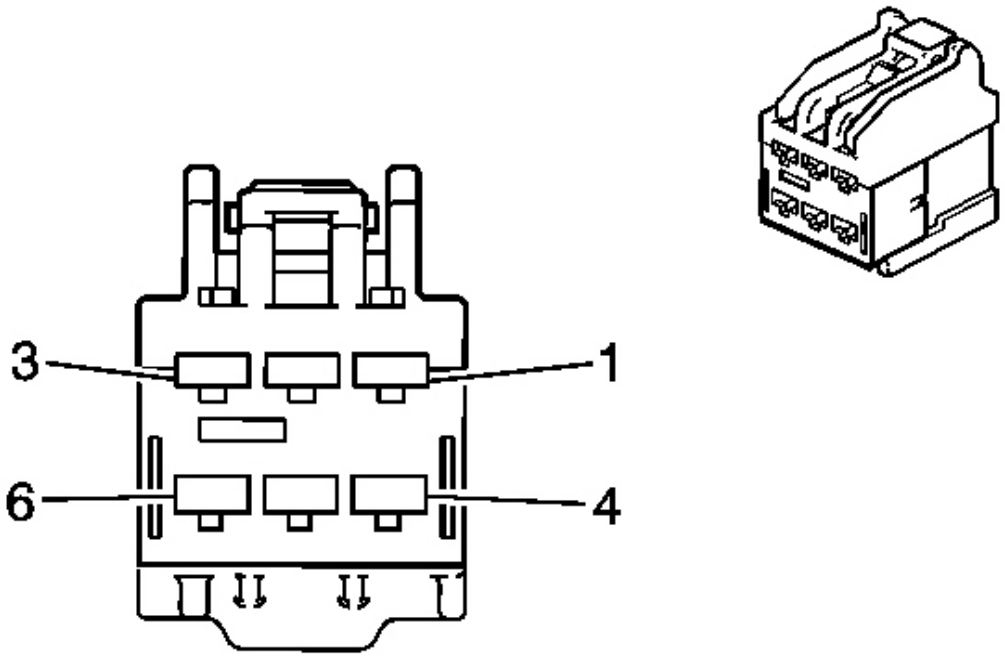

Fig. 8: Heated Seat Control Module - Driver X1 Connector End View
Courtesy of GENERAL MOTORS CORP.

Heated Seat Control Module - Driver X1 Connector Parts Information

Connector Part Information

- OEM: 6098-4606

- Service: See Catalog
- Description: 6-Way F 2.8 Series (BN)

Terminal Part Information

- Terminal/Tray: See Terminal Repair Kit
- Core/Insulation Crimp: See Terminal Repair Kit
- Release Tool/Test Probe: See Terminal Repair Kit

Heated Seat Control Module - Driver X1 Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	0.8 PU	2424	Driver Heated Seat Back Element Control
2	0.8 PK	2480	Passenger Heated Seat Cushion Element Control
3	0.8 BN	2432	Driver Heated Seat Back Element Supply Voltage
4	0.8 L-BU	2433	Passenger Heated Seat Back Element Control
5	0.8 L-GN	2078	Heated Seat Cushion Element Control
6	0.8 D-BU	2479	Passenger Heated Seat Element Supply Voltage

Heated Seat Control Module - Driver X2

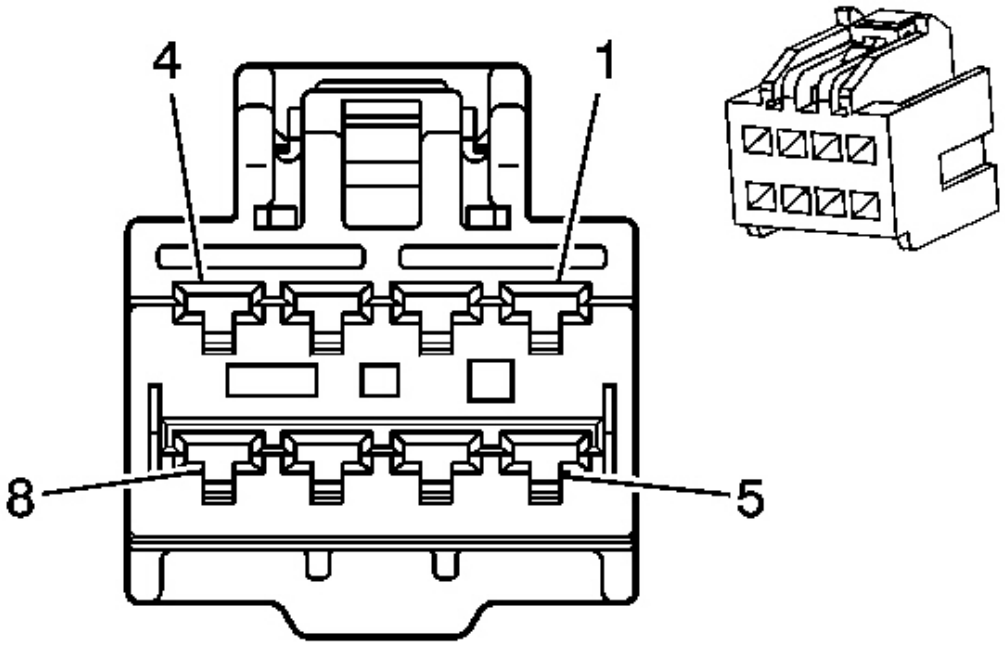

Fig. 9: Heated Seat Control Module - Driver X2 Connector End View
Courtesy of GENERAL MOTORS CORP.

Heated Seat Control Module - Driver X2 Connector Parts Information

Connector Part Information

- OEM: 6098-4713
- Service: 88988652
- Description: 8-Way F 2.8 Series (BK)

Terminal Part Information

- Terminal/Tray: See Terminal Repair Kit
- Core/Insulation Crimp: See Terminal Repair Kit
- Release Tool/Test Probe: See Terminal Repair Kit

Heated Seat Control Module - Driver X2 Connector Terminal Identification

Pin	Wire	Circuit No.	Function

1	1 RD/WH	640	Battery Positive Voltage
2	1 BK	550	Ground
3-4	-	-	Not Used
5	0.35 PK	2426	Driver Heated Seat Back Temperature Sensor Low Reference
6	0.35 YE	2080	Driver Heated Seat Cushion Temperature Sensor Low Reference
7	0.35 TN	2482	Passenger Heated Seat Back Temperature Sensor Low Reference
8	0.35 L-BU	5476	Passenger Heated Seat Back Low Reference

Heated Seat Control Module - Driver X3

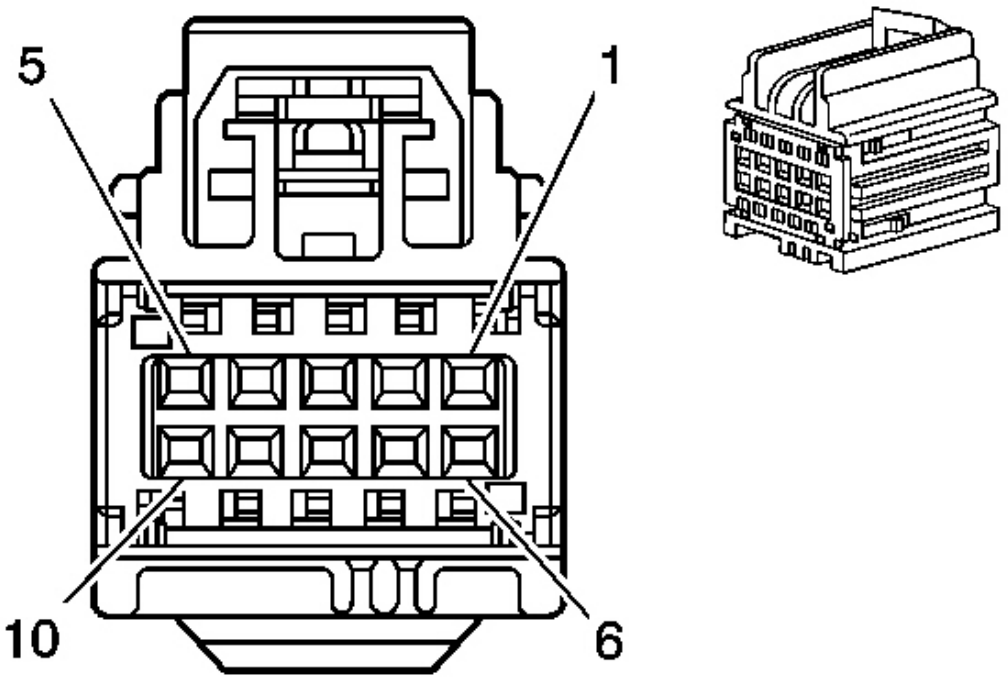

Fig. 10: Heated Seat Control Module - Driver X3 Connector End View
Courtesy of GENERAL MOTORS CORP.

Heated Seat Control Module - Driver X3 Connector Parts Information

Connector Part Information

- OEM: 7283-9040-30
- Service: See Catalog
- Description: 10-Way F YESC Kaizen Series (BK)

Terminal Part Information

- Terminal/Tray: 7116-4618-02/14
- Core/Insulation Crimp: P/P
- Release Tool/Test Probe: J-38125-215/J-35616-64B (L-BU)

Heated Seat Control Module - Driver X3 Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1-3	-	-	Not Used
4	0.35 L-BU	1662	Driver Heated Seat Low Temperature Indicator Control
5	0.35 D-GN	1661	Driver Heated Seat High Temperature Indicator Control
6	0.35 D-GN	5060	Low Speed GMLAN Serial Data
7-8	-	-	Not Used
9	0.35 TN	1686	Passenger Heated Seat Low Temperature Indicator Control
10	0.35 YE	1685	Passenger Heated Seat High Temperature Indicator Control

Heated Seat Control Module - Driver X4

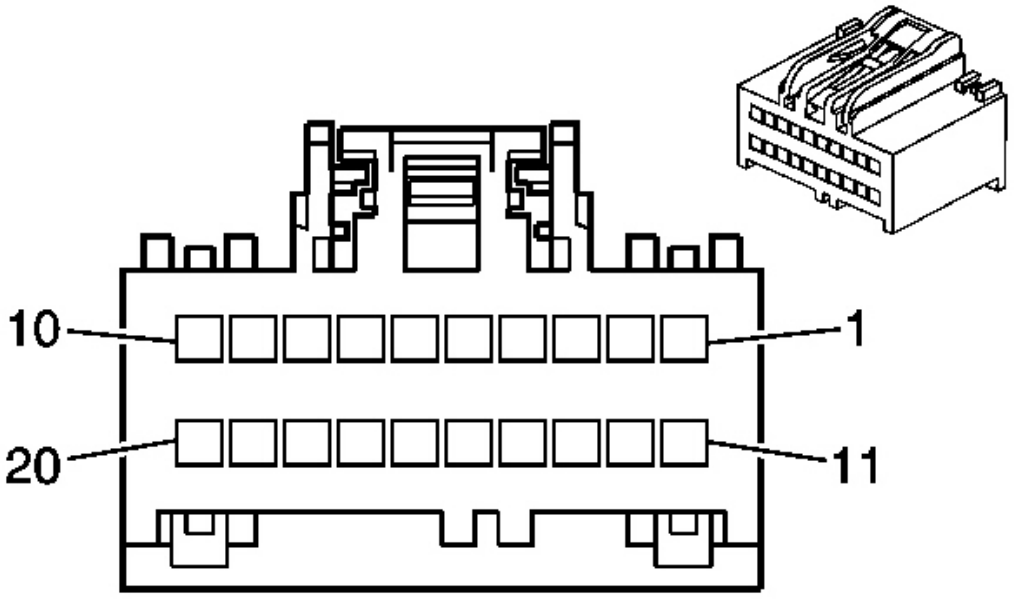

Fig. 11: Heated Seat Control Module - Driver X4 Connector End View
Courtesy of GENERAL MOTORS CORP.

Heated Seat Control Module - Driver X4 Connector Parts Information

Connector Part Information

- OEM: 31410-1200
- Service: See Catalog
- Description: 20-Way F 0.64 Series (BK)

Terminal Part Information

- Terminal/Tray: 7116-4618-02/14
- Core/Insulation Crimp: P/P
- Release Tool/Test Probe: J-38125-215/J-35616-64B (L-BU)

Heated Seat Control Module - Driver X4 Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	0.35 D-BU	6172	Driver Heated Seat Switch Back

			Cushion Signal
2	-	-	Not Used
3	0.35 GY	6182	Passenger Heated Seat Switch Back Signal
4-5	-	-	Not Used
6	0.35 BN	6185	Passenger Heated Seat Medium Indicator Control
7	0.35 BN	6179	Passenger Heated Seat Switch Back Cushion LED
8	-	-	Not Used
9	0.35 YE/BK	2079	Heated Seat Cushion Temperature Sensor Signal
10	0.35 TN	2436	Heated Seat Back Temperature Sensor Signal
11	0.35 GY	6175	Driver Heated Seat Switch Back Signal
12-13	-	-	Not Used
14	0.35 D-BU	6180	Passenger Heated Seat Switch Back Cushion Signal
15	0.35 PU	6174	Driver Heated Seat Switch Back LED
16	0.35 WH/BK	6177	Driver Heated Seat Medium Indicator Control
17	0.35 BN	6173	Driver Heated Seat Switch Back Cushion LED
18	0.35 PU	6181	Passenger Heated Seat Switch Back LED
19	0.35 D-BU	2425	Driver Heated Seat Back Temperature Sensor Signal
20	0.35 GY	2434	Passenger Heated Seat Cushion Temperature Sensor Signal

Heated Seat Element - Driver Back

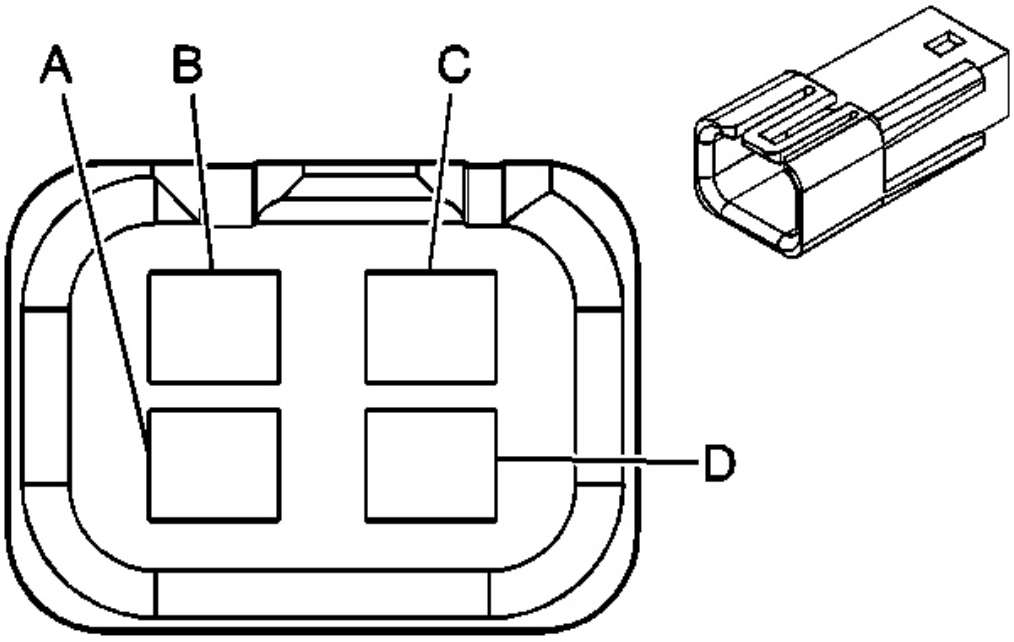

Fig. 12: Heated Seat Element - Driver Back Connector End View
Courtesy of GENERAL MOTORS CORP.

Heated Seat Element - Driver Back Connector Parts Information

Connector Part Information

- OEM: 12047786
- Service: 12085536
- Description: 4-Way M Metri-Pack 150 Series, Unsealed (BK)

Terminal Part Information

- Terminal/Tray: 12047581/2
- Core/Insulation Crimp: Pins A, B - E/A
- Core/Insulation Crimp: Pins C, D - E/C
- Release Tool/Test Probe: 12094429/J-35616-3 (GY)

Heated Seat Element - Driver Back Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 BN	2432	Driver Heated Seat Back Element Supply Voltage
B	0.8 PU	2424	Driver Heated Seat Back Element Control
C	0.35 D-BU	2425	Driver Heated Seat Back Temperature Sensor Signal
D	0.35 PK	2426	Driver Heated Seat Back Temperature Sensor Low Reference

Heated Seat Element - Driver Cushion

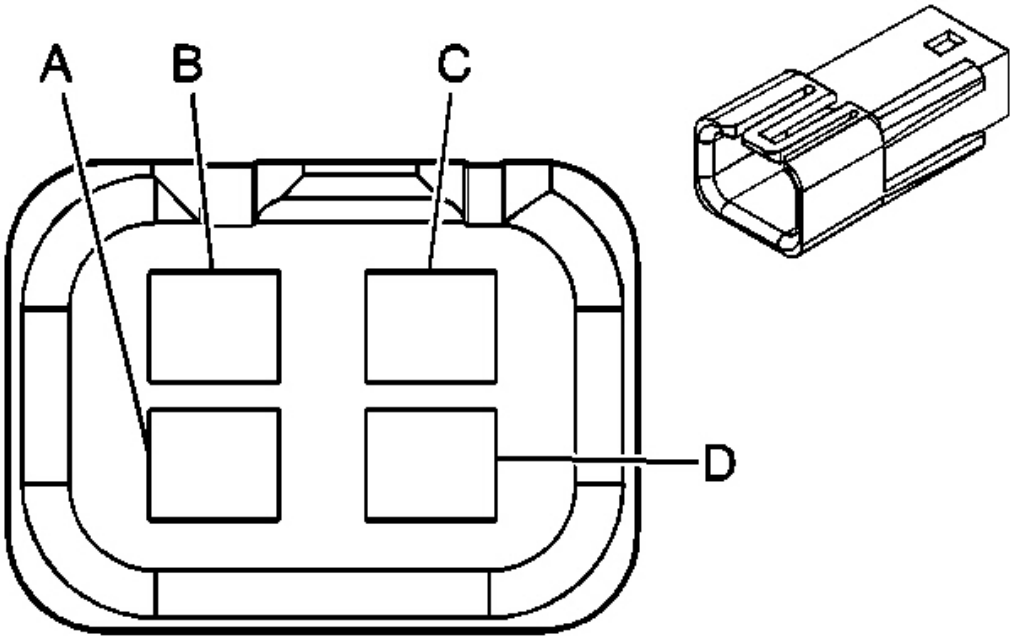

Fig. 13: Heated Seat Element - Driver Cushion Connector End View
Courtesy of GENERAL MOTORS CORP.

Heated Seat Element - Driver Cushion Connector Parts Information

Connector Part Information

- OEM: 12047786
- Service: 12085536
- Description: 4-Way M Metri-Pack 150 Series, Unsealed (BK)

Terminal Part Information

- Terminal/Tray: 12047581/2
- Core/Insulation Crimp: Pins A, B - E/A
- Core/Insulation Crimp: Pins C, D - E/C
- Release Tool/Test Probe: 12094429/J-35616-3 (GY)

Heated Seat Element - Driver Cushion Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 BN	2432	Driver Heated Seat Back Element Supply Voltage
B	0.8 L-GN	2078	Heated Seat Cushion Element Control
C	0.35 YE/BK	2079	Heated Seat Cushion Temperature Sensor Signal
D	0.35 YE	2080	Driver Heated Seat Cushion Temperature Sensor Low Reference

Heated Seat Element - Passenger Back

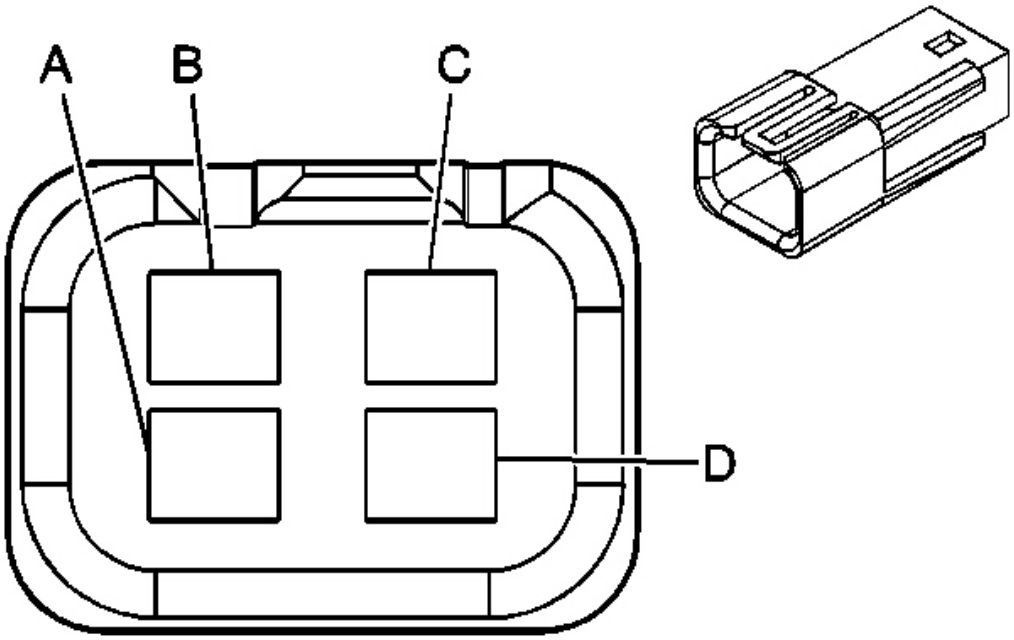

Fig. 14: Heated Seat Element - Passenger Back Connector End View
Courtesy of GENERAL MOTORS CORP.

Heated Seat Element - Passenger Back Connector Parts Information

Connector Part Information

- OEM: 12047786
- Service: 12085536
- Description: 4-Way M Metri-Pack 150 Series, Unsealed (BK)

Terminal Part Information

- Terminal/Tray: 12047581/2
- Core/Insulation Crimp: Pins A, B - E/A
- Core/Insulation Crimp: Pins C, D - E/C
- Release Tool/Test Probe: 12094429/J-35616-3 (GY)

Heated Seat Element - Passenger Back Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 D-BU	2479	Passenger Heated Seat Element Supply Voltage
B	0.8 L-BU	2433	Passenger Heated Seat Back Element Control
C	0.35 TN	2436	Heated Seat Back Temperature Sensor Signal
D	0.35 TN	2482	Passenger Heated Seat Back Temperature Sensor Low Reference

Heated Seat Element - Passenger Cushion

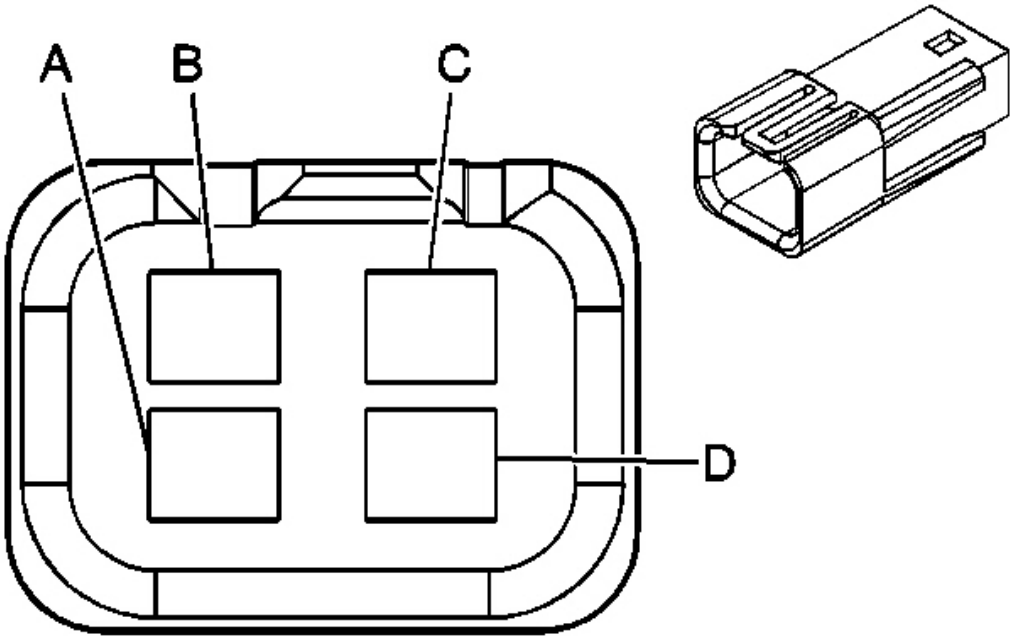

Fig. 15: Heated Seat Element - Passenger Cushion Connector End View
Courtesy of GENERAL MOTORS CORP.

Heated Seat Element - Passenger Cushion Connector Parts Information

Connector Part Information

- OEM: 12047786
- Service: 12085536
- Description: 4-Way M Metri-Pack 150 Series, Unsealed (BK)

Terminal Part Information

- Terminal/Tray: 12047581/2
- Core/Insulation Crimp: Pins A, B - E/A
- Core/Insulation Crimp: Pins C, D - E/C
- Release Tool/Test Probe: 12094429/J-35616-3 (GY)

Heated Seat Element - Passenger Cushion Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 D-BU	2479	Passenger Heated Seat Element Supply Voltage
B	0.8 PK	2480	Passenger Heated Seat Cushion Element Control
C	0.35 GY	2434	Passenger Heated Seat Cushion Temperature Sensor Signal
D	0.35 L-BU	5476	Passenger Heated Seat Back Low Reference

Heated Seat Switch - Driver

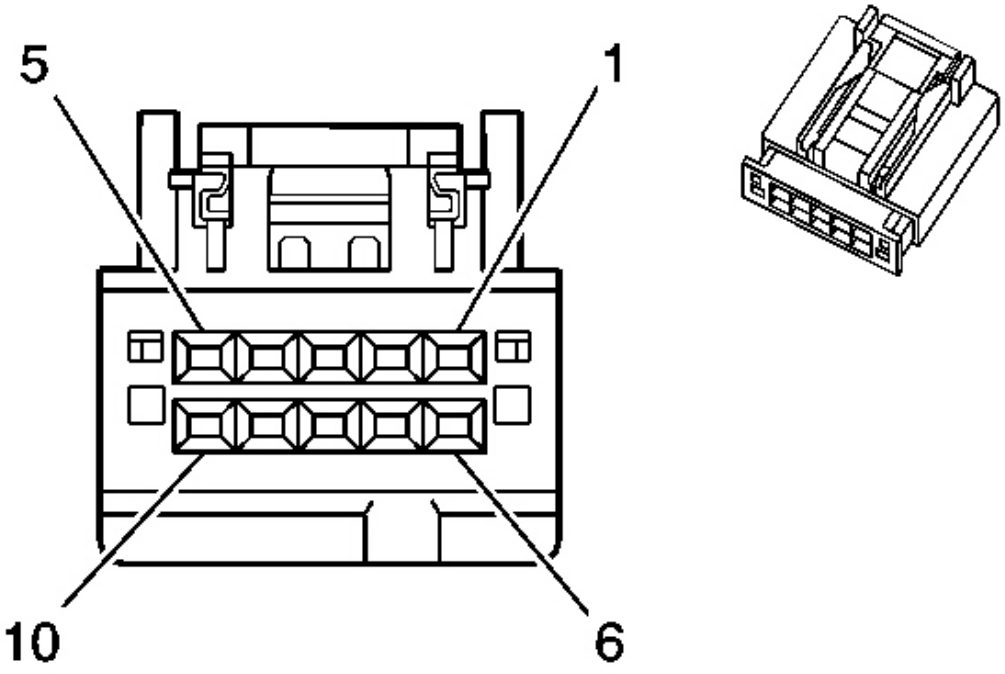

Fig. 16: Heated Seat Switch - Driver Connector End View
Courtesy of GENERAL MOTORS CORP.

Heated Seat Switch - Driver Connector Parts Information

Connector Part Information

- OEM: 30700-1100
- Service: See Catalog
- Description: 10-Way F HDAC64 DR Series (GY)

Terminal Part Information

- Terminal/Tray: 1393364-2/7
- Core/Insulation Crimp: K/K
- Release Tool/Test Probe: 15315247/J-35616-64B (L-BU)

Heated Seat Switch - Driver Connector Terminal Identification

Pin	Wire	Circuit No.	Function

1	0.35 BN	6173	Driver Heated Seat Switch Back Cushion LED
2	0.35 PU/WH	6816	Heated Seat Indicator Dimming (-A45)
3	0.35 PU/WH	1382	LED Dimming Signal
4	0.35 D-BU	6172	Driver Heated Seat Switch Back Cushion Signal
5	0.35 GY	6175	Driver Heated Seat Switch Back Signal
6	0.35 L-BU	1662	Driver Heated Seat Low Temperature Indicator Control
7	0.5 BK	750	Ground
8	0.35 WH/BK	6177	Driver Heated Seat Medium Indicator Control
9	0.35 PU	6174	Driver Heated Seat Switch Back LED
10	0.35 D-GN	1661	Driver Heated Seat High Temperature Indicator Control

Heated Seat Switch - Passenger

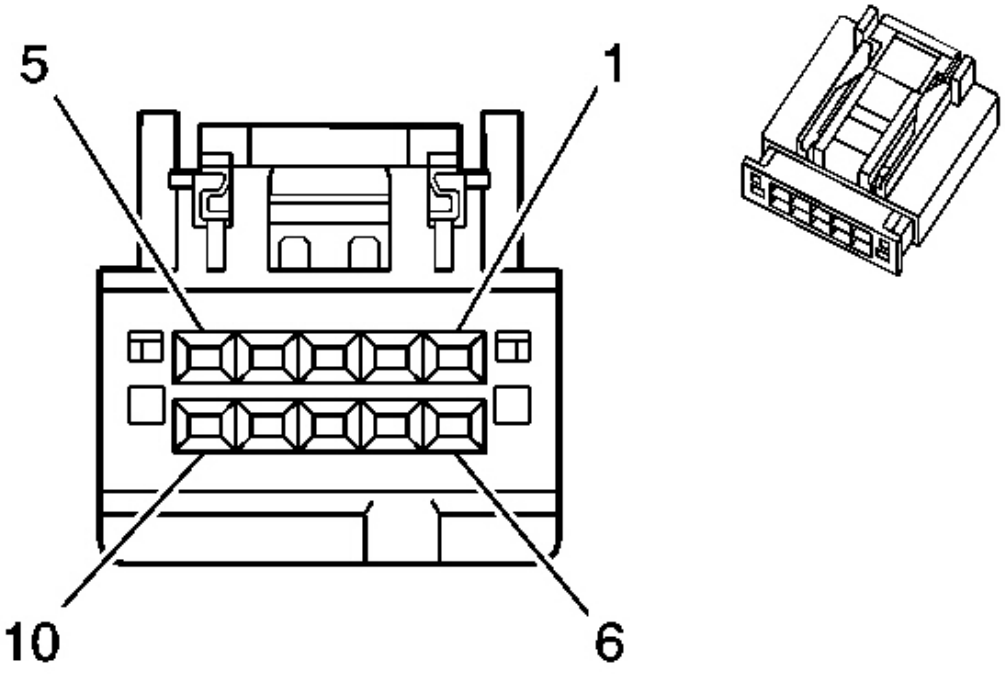

Fig. 17: Heated Seat Switch - Passenger Connector End View
Courtesy of GENERAL MOTORS CORP.

Heated Seat Switch - Passenger Connector Parts Information

Connector Part Information

- OEM: 30700-1101
- Service: See Catalog
- Description: 10-Way F HDAC64 DR Series (BK)

Terminal Part Information

- Terminal/Tray: 1393364-2/7
- Core/Insulation Crimp: K/K
- Release Tool/Test Probe: 15315247/J-35616-64B (L-BU)

Heated Seat Switch - Passenger Connector Terminal Identification

Pin	Wire	Circuit No.	Function

1	0.35 BN	6179	Passenger Heated Seat Switch Back Cushion LED
2	0.35 PU/WH	6816	Heated Seat Indicator Dimming (-A45)
3	0.35 PU/WH	1382	LED Dimming Signal
4	0.35 D-BU	6180	Passenger Heated Seat Switch Back Cushion Signal
5	0.35 GY	6182	Passenger Heated Seat Switch Back Signal
6	0.35 TN	1686	Passenger Heated Seat Low Temperature Indicator Control
7	0.5 BK	750	Ground
8	0.35 WH/BK	6185	Passenger Heated Seat Medium Indicator Control
9	0.35 PU	6181	Passenger Heated Seat Switch Back LED
10	0.35 YE	1685	Passenger Heated Seat High Temperature Indicator Control

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B1925 or B2170	Left Or Right Seat Heater Sensor Circuit Short to Ground, Battery Or Open
DTC B1935 or B2180	Left Or Right Seat Back Heater Circuit Rate of Change Above Or Below Threshold
DTC B2345	Front Seat Heater Current Sensing Circuit Concern(s)
DTC B2425 or B2430	Left Or Right Seat Heater Cushion Circuit Concern(s)
DTC B2435 or B2440	Left Or Right Seat Back Heater Sensor Circuit Short to Ground, Battery Or Open
DTC B2508 or B2509	Seat Heater Relay Circuit Short to Battery Or Ground

DIAGNOSTIC STARTING POINT - SEATS

Begin the system diagnosis with the **Diagnostic System Check - Vehicle** . The Diagnostic System Check will provide the following information:

- The identification of the control modules which command the system.
- The ability of the control modules to communicate through the serial data circuit.
- The identification of any stored diagnostic trouble codes (DTCs) and their status.

The use of the Diagnostic System Check will identify the correct procedure for diagnosing the system and where the procedure is located.

SCAN TOOL DATA LIST

Memory Seat Module

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON/Engine OFF			
Driver Seat HVC Mode	Seat 1 HVC Data	Off/Back & Cushion/Back Only/Cool	Off
Driver Seat HVC Level	Seat 1 HVC Data	High/Medium/Low	High
Passenger Seat HVC Mode	Seat 2 HVC Data	Off/Back & Cushion/Back Only/Cool	Off
Passenger Seat HVC Level	Seat 2 HVC Data	High/Medium/Low	High

Driver and Passenger Door Switches

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON/Engine OFF			
Seat Back Heat Mode Ind. Cmd.	Outputs	Off/On	Off
Seat Back Heat Mode Sw.	Inputs	Inactive/Active	Inactive
Seat Heat High Ind. Cmd.	Outputs	Off/On	Off
Seat Heat Low Ind. Cmd.	Outputs	Off/On	Off
Seat Heat Medium Ind. Cmd.	Outputs	Off/On	Off
Seat Heat Mode Cmd.	Outputs	Off/On	Off
Seat Heat Mode Sw.	Inputs	Inactive/Active	Inactive

HVAC Control Module

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value

Operating Conditions: Ignition ON/Engine OFF			
Driver Heated Seat Sw.	Inputs	Active/Inactive	Inactive
Pass. Heated Seat Sw.	Inputs	Inactive/Active	Inactive

Rear Heated Seat Module

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON/Engine OFF			
Left Rear Seat HVC Mode	Seat 1 HVC Data	Off/Back & Cushion	Off
Left Rear Seat HVC Level	Seat 1 HVC Data	High/Medium/Low	High
Left Rear Seat Cushion Heat Status	Seat 1 HVC Data	Inactive/Active	Inactive
Seat Heat Supply Voltage	Seat 1 HVC Data	Inactive/Active	Inactive
Right Rear Seat HVC Mode	Seat 2 HVC Data	Off/Back & Cushion	Off
Right Rear Seat HVC Level	Seat 2 HVC Data	High/Medium/Low	High
Right Rear Seat Cushion Heat Status	Seat 2 HVC Data	Inactive/Active	Inactive
Seat Heat Supply Voltage	Seat 2 HVC Data	OFF/ON	Off

Rear HVAC/RSA

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON/Engine OFF			
Left Rear Heated Seat Switch	Data Display	Active/Inactive	Inactive
Right Rear Heated Seat Switch	Data Display	Active/Inactive	Inactive

SCAN TOOL DATA DEFINITIONS

Memory Seat Module

Driver or Passenger Seat HVC Mode

The scan tool displays the commanded state of the heated seat or the heated cooled seat.

Driver or Passenger Seat HVC Level

The scan tool displays the commanded state of the seat temperature setting during any of the heat or cool modes.

Driver and Passenger Door Switches

Seat Heat High Ind. Cmd.

The scan tool displays the indicator command received from the memory seat module.

Seat Heat Low Ind. Cmd.

The scan tool displays the indicator command received from the memory seat module.

Seat Heat Medium Ind. Cmd.

The scan tool displays the indicator command received from the memory seat module.

Seat Heat Mode Cmd.

The scan tool displays the seat heat mode indicator command received from the memory seat module.

Seat Back Heat Mode Sw.

The scan tool displays the current state of the heated seat back switch input to the door module.

Seat Heat Mode Sw.

The scan tool displays the current state of the heated seat switch input to the door module.

HVAC Control Module

Driver Heated Seat SW.

The scan tool will display Active while any of the driver heated cooled seat switches are pressed.

Pas. Heated Seat Sw.

The scan tool will display Active while any of the Passenger heated cooled seat switches are pressed.

Rear Heated Seat Module

Left or Right Rear Seat HVC Mode

The scan tool displays Back & Cushion whenever the seat cushion heater is commanded on.

Left or Right Rear Seat HVC Level

The scan tool displays the commanded state of the seat temperature setting.

Left or Right Rear Seat Cushion Heat Status

The scan tool displays Active whenever the seat cushion heater is commanded on.

Seat Heat Supply Voltage

The scan tool displays Active whenever the seat cushion heater is commanded on.

Rear HVAC/RSA

Left Rear Heated Seat Switch

The scan tool will display Active while the left rear heated seat switch is pressed.

Right Rear Heated Seat Switch

The scan tool will display Active while the right rear heated seat switch is pressed.

DTC B1925 OR B2170

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B1925 02

Left Seat Heater Cushion Sensor Circuit Shorted to Ground

DTC B2170 02

Right Seat Heater Cushion Sensor Circuit Shorted to Ground

Diagnostic Fault Information

DTC B1925 or B2170

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Left Heated Seat Cushion Element Control	B2508 02 B2345 00	B2425 0C	B2508 01 B2345 00	B2425 0B
Left Heated Seat Cushion Element Supply Voltage	B2508 02	B2425 0C	B2508 01 B2345 00	B2425 0B
Left Heated Seat Cushion Temperature Low Reference	-	B2425 04 B2425 1F	-	-
Left Heated Seat Cushion Temperature Sensor Signal	B1925 02 B2425 1F	B2425 04 B2425 1F	B2425 04 B2425 1F	-
Right Heated Seat Cushion Element Control	B2508 02 B2345 00	B2430 0C	B2508 01 B2345 00	B2430 0B
Right Heated Seat Cushion Element Supply Voltage	B2508 02	B2430 0C	B2508 01 B2345 00	B2430 0B
Right Heated Seat Cushion Temperature Low Reference	-	B2430 04 B2430 1F	-	-
Right Heated Seat Cushion Temperature Sensor Signal	B2170 02 B2430 1F	B2430 04 B2430 1F	B2430 04 B2430 1F	-

Circuit/System Description

The heated seat temperature sensor that set this diagnostic trouble code (DTC) is located in the seat cushion just under the seat cover with the seat heating element. The temperature sensor is a 2 wire thermistor and resistance through the sensor varies with temperature. The signal circuit is referenced from 5 volts within the module and the temperature of the seat surface determines the signal circuit voltage. Once the seat reaches the set temperature, the module will then cycle the control circuits of the heating elements ON and OFF in order to maintain the desired seat

temperature based on the feedback voltage from the sensors.

Conditions for Running the DTC

The memory seat module or rear heated seat module must be powered.

Conditions for Setting the DTC

The temperature sensor voltage drops below 0.80 volt for more than 1 second.

Action Taken When the DTC Sets

The heated seat cushion function for the affected seat will be disabled.

Conditions for Clearing the DTC

- The current DTC will clear 3 seconds after the reference voltage returns to normal operating range and the ignition is cycled OFF then back to ACC or RUN.
- A history DTC will clear after 50 ignition cycles or with a scan tool using the clear DTCs function.

Reference Information

Schematic Reference

Heated/Cooled Seat Schematics (except A45) or **Heated/Cooled Seat Schematics (A45)**

Connector End View Reference

Heated/Cooled Seat Connector End Views

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

- **Scan Tool Data List**
- **Scan Tool Data Definitions**

Circuit/System Testing

1. Ignition OFF, disconnect the MSM or rear heated seat module harness connector C5 for driver or front passenger seat or C4 for a rear passenger seat.
2. Test for a minimum of 850 ohms of resistance from the signal circuit to ground.
    - If less than 850 ohms, test the signal circuit for a short to ground. If the circuit tests normal, replace the seat cushion heater element.
3. If all circuits test normal, replace the MSM or rear heated seat module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Driver Seat Cushion Heater and Passenger Seat Cushion Heater Replacement (Driver)** or **Driver Seat Cushion Heater and Passenger Seat Cushion Heater Replacement (Passenger)**
- **Control Module References** for the MSM and rear heated seat module replacement, setup and programming

DTC B1935 OR B2180

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B1935 04

Left Seat Back Heater Circuit Open

DTC B1935 0A

Left Seat Back Heater Circuit Rate of Change Below Threshold

DTC B1935 0B

Left Seat Back Heater Circuit Current Above Threshold

DTC B1935 0C

Left Seat Back Heater Circuit Current Below Threshold

DTC B1935 1F

Left Seat Back Heater Circuit Intermittent

DTC B2180 04

Right Seat Back Heater Circuit Open

DTC B2180 0A

Right Seat Back Heater Circuit Rate of Change Below Threshold

DTC B2180 0B

Right Seat Back Heater Circuit Current Above Threshold

DTC B2180 0C

Right Seat Back Heater Circuit Current Below Threshold

DTC B2180 1F

Right Seat Back Heater Circuit Intermittent

Diagnostic Fault Information

DTC B1935 or B2180

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Left Heated Seat Back Element Control	B2508 02 B2345 00	B1935 0C	B2508 01 B2345 00	B1935 0B
Left Heated Seat Back Element Supply Voltage	B2508 02	B1935 0C	B2508 01 B2345 00	B1935 0B
Left Heated Seat Back Temperature Low Reference	-	B1935 04 B1935 1F	-	-
Left Heated Seat Back				

Temperature Sensor Signal	B2435 02	B1935 04 B1935 1F	B1935 04 B1935 1F	-
Right Heated Seat Back Element Control	B2508 02 B2345 00	B2180 0C	B2508 01 B2345 00	B2180 0B
Right Heated Seat Back Element Supply Voltage	B2508 02	B2180 0C	B2508 01 B2345 00	B2180 0B
Right Heated Seat Back Temperature Low Reference	-	B2180 04 B2180 1F	-	-
Right Heated Seat Back Temperature Sensor Signal	B2440 02	B2180 04 B2180 1F	B2180 04 B2180 1F	-

Circuit/System Description

When the heated seat function is active, the Memory Seat Module (MSM) supplies battery voltage through the element supply voltage circuit to the seat heater elements. The module controls the seat temperature by providing a pulse width modulation (PWM) ground through the heated seat element control circuit to the seat heater elements. The module then monitors the current flow through the heating element and the temperature sensor rate of change to verify correct operation.

Conditions for Running the DTC

The memory seat module must be powered.

Conditions for Setting the DTC

B1935 04, B2180 04

The module does not detect a temperature change within 210 seconds.

B1935 0A, B2180 0A

The module detects that the set point temperature has not been reached within 8.5 minutes.

B1935 0B, B2180 0B

By measuring output current, the module calculates that the heating element resistance is below the minimum resistance.

B1935 0C, B2180 0C

By measuring output current, the module calculates that the heating element resistance is above the maximum resistance.

B1935 1F, B2180 1F

The temperature sensor voltage is erratic or changes suddenly.

Action Taken When the DTC Sets

The heated seat back function for the affected seat will be disabled.

Conditions for Clearing the DTC

- The current DTC clears when the malfunction is no longer present and the power mode changes to OFF then back to ACC or RUN.
- The history DTC will clear after 50 consecutive fault-free ignition cycles have occurred.

Reference Information

Schematic Reference

Heated/Cooled Seat Schematics (except A45) or **Heated/Cooled Seat Schematics (A45)**

Connector End View Reference

Heated/Cooled Seat Connector End Views

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

- **Scan Tool Data List**
- **Scan Tool Data Definitions**

Circuit/System Testing

1. Ignition OFF, disconnect the MSM connector C1.
2. Verify less than 15 ohms of resistance through the seat back heater element from the voltage

supply circuit terminal to the low side drive control circuit terminal in the harness connector.

- If the resistance is greater than 15 ohms test the supply and control circuits for an open/high resistance. If the circuits test normal replace the seat back heater element.

3. Disconnect the MSM connectors C2 and C5.
4. Verify the resistance through the seat back heat sensor is 850-300K ohms from the signal circuit terminal to the low reference circuit terminal in the harness connectors.
   - If greater than 300K ohms, test the signal circuit and low reference circuit for an open/high resistance. If the circuits test normal, replace the seat back heater element.
   - If less than 850 ohms, replace the seat back heater element.
5. Connect the MSM connectors C1, C2 and C5.
6. Disconnect the seat back heater element connector.
7. Ignition ON, verify that the heat sensor signal circuit voltage from the MSM is not greater than 5 volts.
   - If the signal circuit is greater than 5 volts test for a short to voltage. If the circuit tests normal replace the MSM.
8. If the circuits test normal replace the seat back heater element.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Driver Seat Back Cushion Heater and Passenger Seat Back Cushion Heater Replacement**
- **Control Module References** for the MSM replacement, setup and programming

DTC B2345

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B2345 00

Seat Heater Disable Circuit

DTC B2345 13

Seat Heater Disable Circuit High Temperature

DTC B2345 42

Seat Heater Disable Circuit Calibration Data Set Not Programmed

DTC B2345 4B

Seat Heater Disable Circuit Calibration Not Learned

Diagnostic Fault Information

DTC B2345

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Left Front Heated Seat Back Element Control	B2345 00 B2508 02	B1935 0C	B2345 00 B2508 01	B1935 0B
Left Front Heated Seat Cushion Element Control	B2345 00 B2508 02	B2425 0C	B2345 00 B2508 01	B2425 0B
Left Front Heated Seat Back Element Supply Voltage	B2508 02	B1935 0C	B2345 00 B2508 01	B1935 0B
Left Front Heated Seat Cushion Element Supply Voltage	B2508 02	B2425 0C	B2345 00 B2508 01	B2425 0B
Right Front Heated Seat Back Element Control	B2345 00 B2508 02	B2180 0C	B2345 00 B2508 01	B2180 0B
Right Front Heated Seat Cushion Element Control	B2345 00 B2508 02	B2430 0C	B2345 00 B2508 01	B2430 0B
Right Front Heated Seat Back Element Supply Voltage	B2508 02	B2180 0C	B2345 00 B2508 01	B2180 0B
Right Front Heated Seat Cushion Element Supply Voltage	B2508 02	B2430 0C	B2345 00 B2508 01	B2430 0B

Circuit/System Description

The front seat heating elements are controlled by a common high current relay internal to the Memory Seat Module (MSM) and on the low side by individual element control circuits. Before the MSM will allow heated seat operation, it checks to see if the heating element supply voltage circuits and control circuits are shorted to ground or battery voltage. Once the module verifies that it is not closing into a shorted heating element, it allows heated seat operation. After which it continues to monitor for a shorted circuit.

Conditions for Running the DTC

The memory seat module must be powered.

Conditions for Setting the DTC

B2345 00

After a heated seat is activated, the MSM detects a shorted circuit on the seat heating element supply voltage circuit or control circuit.

B2345 13

Any of the temperature sensor inputs remains below 1.5 volts for a seat back or 0.95 volt for a seat cushion more than 1 second.

B2345 42

The current sensing calibration data is out of range.

B2345 4B

The current sensing calibration data is not programmed.

Action Taken When the DTC Sets

The heated seat functions for both front seats will be disabled.

Conditions for Clearing the DTC

- The current DTC clears when the malfunction is no longer present and the power mode changes to OFF then back to ACC or RUN.
- The history DTC will clear after 50 consecutive fault-free ignition cycles have occurred.

Reference Information

Schematic Reference

Heated/Cooled Seat Schematics (except A45) or Heated/Cooled Seat Schematics (A45)

Connector End View Reference

Heated/Cooled Seat Connector End Views

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

- Scan Tool Data List
- Scan Tool Data Definitions

Circuit/System Testing

B2345 00

1. Ignition OFF, disconnect the MSM connectors C1 and C4.
2. Test for infinite resistance between the left seat heating element supply voltage circuit terminal 14 and ground.
    - If less than infinite, test the supply voltage circuit and the seat cushion and seat back heating element control circuits for a short to ground.
3. Ignition ON, verify that a test lamp does not illuminate between the supply voltage circuit terminal 14 and ground.
    - If the test lamp illuminates, test the supply voltage circuit and the seat cushion and seat back heating element control circuits for a short to voltage.
4. Test for infinite resistance between the right seat heating element supply voltage circuit terminal 6 and ground.
    - If less than infinite, test the supply voltage circuit and the seat cushion and seat back heating element control circuits for a short to ground.
5. Ignition ON, verify that a test lamp does not illuminate between the supply voltage circuit terminal 6 and ground.
    - If the test lamp illuminates, test the supply voltage circuit and the seat cushion and seat back heating element control circuits for a short to voltage.

6. If all circuits test normal, replace the MSM.

B2345 13

1. Disconnect the MSM connectors C2 and C5.
2. Verify the resistance through the faulted seat heat sensor is 850-300K ohms from the signal circuit terminal to the low reference circuit terminal in the harness connectors.
   - If less than 850 ohms, replace the seat heater element.
3. If the circuits test normal replace the MSM.

B2345 42 or B2345 4B

If this DTC is retrieved as a current DTC, replace the MSM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Driver Seat Back Cushion Heater and Passenger Seat Back Cushion Heater Replacement**
- **Driver Seat Cushion Heater and Passenger Seat Cushion Heater Replacement (Driver)** or **Driver Seat Cushion Heater and Passenger Seat Cushion Heater Replacement (Passenger)**
- **Control Module References** for the MSM replacement, setup and programming

DTC B2425 OR B2430

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2425 04

Left Seat Cushion Heater Circuit Open

DTC B2425 0A

Left Seat Cushion Heater Circuit Rate of Change Below Threshold

DTC B2425 0B

Left Seat Cushion Heater Circuit Current Above Threshold

DTC B2425 0C

Left Seat Cushion Heater Circuit Current Below Threshold

DTC B2425 1F

Left Seat Cushion Heater Circuit Intermittent

DTC B2430 04

Right Seat Cushion Heater Circuit Open

DTC B2430 0A

Right Seat Cushion Heater Circuit Rate of Change Below Threshold

DTC B2430 0B

Right Seat Cushion Heater Circuit Current Above Threshold

DTC B2430 0C

Right Seat Cushion Heater Circuit Current Below Threshold

DTC B2430 1F

Right Seat Cushion Heater Circuit Intermittent

Diagnostic Fault Information

DTC B2425 or B2430

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Left Heated Seat Cushion Element Control	B2508 02 B2345 00	B2425 0C	B2508 01 B2345 00	B2425 0B
Left Heated Seat				

Cushion Element Supply Voltage	B2508 02	B2425 0C	B2508 01 B2345 00	B2425 0B
Left Heated Seat Cushion Temperature Low Reference	-	B2425 04 B2425 1F	-	-
Left Heated Seat Cushion Temperature Sensor Signal	B1925 02 B2425 1F	B2425 04 B2425 1F	B2425 04 B2425 1F	-
Right Heated Seat Cushion Element Control	B2508 02 B2345 00	B2430 0C	B2508 01 B2345 00	B2430 0B
Right Heated Seat Cushion Element Supply Voltage	B2508 02	B2430 0C	B2508 01 B2345 00	B2430 0B
Right Heated Seat Cushion Temperature Low Reference	-	B2430 04 B2430 1F	-	-
Right Heated Seat Cushion Temperature Sensor Signal	B2170 02 B2430 1F	B2430 04 B2430 1F	B2430 04 B2430 1F	-

Circuit/System Description

When the heated seat function is active, the Memory Seat Module (MSM) or rear heated seat module supplies battery voltage through the element supply voltage circuit to the seat heater elements. The module controls the seat temperature by providing a pulse width modulation (PWM) ground through the heated seat element control circuit to the seat heater elements. The module then monitors the current flow through the heating element and the temperature sensor rate of change to verify correct operation.

Conditions for Running the DTC

The MSM or rear heated seat module must be powered.

Conditions for Setting the DTC

B2425 04, B2430 04

The module does not detect a temperature change within 210 seconds.

B2425 0A, B2430 0A

The module detects that the set point temperature has not been reached within 8.5 minutes.

B2425 0B, B2430 0B

By measuring output current, the module calculates that the heating element resistance is below the minimum resistance.

B2425 0C, B2430 0C

By measuring output current, the module calculates that the heating element resistance is above the maximum resistance.

B2425 1F, B2430 1F

The temperature sensor voltage is erratic or changes suddenly.

Action Taken When the DTC Sets

The heated seat cushion function for the affected seat will be disabled.

Conditions for Clearing the DTC

- The current DTC clears when the malfunction is no longer present and the power mode changes to OFF then back to ACC or RUN.
- The history DTC will clear after 50 consecutive fault-free ignition cycles have occurred.

Reference Information

Schematic Reference

Heated/Cooled Seat Schematics (except A45) or **Heated/Cooled Seat Schematics (A45)**

Connector End View Reference

Heated/Cooled Seat Connector End Views

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

- **Scan Tool Data List**
- **Scan Tool Data Definitions**

Circuit/System Testing

1. Ignition OFF, disconnect the MSM or rear head seat module connector C1 or C1 and C4 for front passenger.
2. Verify less than 15 ohms of resistance through the seat cushion heater element from the voltage supply circuit terminal to the low side drive control circuit terminal in the harness connector.
    - If the resistance is greater than 15 ohms test the supply and control circuits for an open/high resistance. If the circuits test normal replace the seat cushion heater element.
3. Disconnect the MSM connectors C2 and C5 or the rear heated seat module connectors C2 and C4.
4. Verify the resistance through the seat cushion heat sensor is 850-300K ohms from the signal circuit terminal to the low reference circuit terminal in the harness connectors.
    - If greater than 300K ohms, test the signal circuit and low reference circuit for an open/high resistance. If the circuits test normal, replace the seat cushion heater element.
    - If less than 850 ohms, replace the seat cushion heater element.
5. Connect the MSM or rear heated seat module connectors.
6. Disconnect the seat cushion heater element connector.
7. Ignition ON, verify that the heat sensor signal circuit voltage from the MSM or rear heated seat module is not greater than 5 volts.
    - If the signal circuit is greater than 5 volts test for a short to voltage. If the circuit tests normal replace the MSM or rear heated seat module.
8. If the circuits test normal replace the seat cushion heater element.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Driver Seat Cushion Heater and Passenger Seat Cushion Heater Replacement (Driver)** or **Driver Seat Cushion Heater and Passenger Seat Cushion Heater Replacement (Passenger)**
- **Control Module References** for the MSM or rear heated seat module replacement, setup and programming

DTC B2435 OR B2440

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2435 02

Left Seat Back Heater Sensor Circuit Shorted to Ground

DTC B2440 02

Right Seat Back Heater Sensor Circuit Shorted to Ground

Diagnostic Fault Information

DTC B2435 or B2440

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Left Heated Seat Back Element Control	B2508 02 B2345 00	B1935 0C	B2508 01 B2345 00	B1935 0B
Left Heated Seat Back Element Supply Voltage	B2508 02	B1935 0C	B2508 01 B2345 00	B1935 0B
Left Heated Seat Back Temperature Low Reference	-	B1935 04 B1935 1F	-	-
Left Heated Seat Back Temperature Sensor Signal	B2435 02	B1935 04 B1935 1F	B1935 04 B1935 1F	-
Right Heated Seat Back Element Control	B2508 02 B2345 00	B2180 0C	B2508 01 B2345 00	B2180 0B
Right Heated Seat Back Element Supply Voltage	B2508 02	B2180 0C	B2508 01 B2345 00	B2180 0B
Right Heated Seat Back Temperature Low Reference	-	B2180 04 B2180 1F	-	-

Right Heated Seat Back Temperature Sensor Signal	B2440 02	B2180 04 B2180 1F	B2180 04 B2180 1F	-

Circuit/System Description

The heated seat temperature sensor that set this diagnostic trouble code (DTC) is located in the seat back just under the seat cover with the seat heating element. The temperature sensor is a 2 wire thermistor and resistance through the sensor varies with temperature. The signal circuit is referenced from 5 volts within the module and the temperature of the seat surface determines the signal circuit voltage. Once the seat reaches the set temperature, the module will then cycle the control circuits of the heating elements ON and OFF in order to maintain the desired seat temperature based on the feedback voltage from the sensors.

Conditions for Running the DTC

The memory seat module (MSM) must be powered.

Conditions for Setting the DTC

The temperature sensor voltage drops below 0.8 volt for more than 1 second.

Action Taken When the DTC Sets

The heated seat back function for the affected seat will be disabled.

Conditions for Clearing the DTC

- The current DTC will clear 3 seconds after the reference voltage returns to normal operating range and the ignition is cycled OFF then back to ACC or RUN.
- A history DTC will clear after 50 ignition cycles or with a scan tool using the clear DTCs function.

Reference Information

Schematic Reference

Heated/Cooled Seat Schematics (except A45) or **Heated/Cooled Seat Schematics (A45)**

Connector End View Reference

Heated/Cooled Seat Connector End Views

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

- **Scan Tool Data List**
- **Scan Tool Data Definitions**

Circuit/System Testing

1. Ignition OFF, disconnect the MSM harness connector C5.
2. Test for a minimum of 850 ohms of resistance from the signal circuit to ground.
    - If less than 850 ohms, test the signal circuit for a short to ground. If the circuit tests normal, replace the seat back heater element.
3. If all circuits test normal, replace the MSM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Driver Seat Back Cushion Heater and Passenger Seat Back Cushion Heater Replacement**
- **Control Module References** for the MSM replacement, setup and programming

DTC B2508 OR B2509

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2508 01

Seat Heater Relay Circuit Shorted to Ground

DTC B2508 02

Seat Heater Relay Circuit Shorted to Battery or Open

Diagnostic Fault Information

DTC B2508 or B2509

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Left Front Heated Seat Back Element Control	B2345 00 B2508 02	B1935 0C	B2345 00 B2508 01	B1935 0B
Left Front Heated Seat Cushion Element Control	B2345 00 B2508 02	B2425 0C	B2345 00 B2508 01	B2425 0B
Left Front Heated Seat Back Element Supply Voltage	B2508 02	B1935 0C	B2345 00 B2508 01	B1935 0B
Left Front Heated Seat Cushion Element Supply Voltage	B2508 02	B2425 0C	B2345 00 B2508 01	B2425 0B
Right Front Heated Seat Back Element Control	B2345 00 B2508 02	B2180 0C	B2345 00 B2508 01	B2180 0B
Right Front Heated Seat Cushion Element Control	B2345 00 B2508 02	B2430 0C	B2345 00 B2508 01	B2430 0B
Right Front Heated Seat Back Element Supply Voltage	B2508 02	B2180 0C	B2345 00 B2508 01	B2180 0B
Right Front Heated Seat Cushion Element Supply Voltage	B2508 02	B2430 0C	B2345 00 B2508 01	B2430 0B

Circuit/System Description

The front seat heating elements are controlled by a common high current relay internal to the Memory Seat Module (MSM) and on the low side by individual element control circuits. Before the MSM will allow heated seat operation, it checks to see if the heating element supply voltage circuits and control circuits are shorted to ground or battery voltage. Once the module verifies that it is not closing into a shorted heating element, it allows heated seat operation. After which it continues to monitor for a shorted circuit.

Conditions for Running the DTC

The memory seat module must be powered.

Conditions for Setting the DTC

B2508 02

Before the heated seats are activated, the MSM detects a short to ground on the seat heating element supply voltage circuit or control circuit.

B2508 01

Before the heated seats are activated, the MSM detects a short to battery voltage on the seat heating element supply voltage circuit or control circuit.

Action Taken When the DTC Sets

The heated seat function for both the driver and passenger seats will be disabled.

Conditions for Clearing the DTC

- The current DTC clears when the malfunction is no longer present and the power mode changes to OFF then back to ACC or RUN.
- The history DTC will clear after 50 consecutive fault-free ignition cycles have occurred.

Reference Information

Schematic Reference

Heated/Cooled Seat Schematics (except A45) or **Heated/Cooled Seat Schematics (A45)**

Connector End View Reference

Heated/Cooled Seat Connector End Views

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

- **Scan Tool Data List**

- **Scan Tool Data Definitions**

Circuit/System Testing

1. Ignition OFF, disconnect the MSM connectors C1 and C4.
2. Test for infinite resistance between the left seat heating element supply voltage circuit terminal 14 and ground.
    - If less than infinite, test the supply voltage circuit and the seat cushion and seat back heating element control circuits for a short to ground.
3. Ignition ON, verify that a test lamp does not illuminate between the supply voltage circuit terminal 14 and ground.
    - If the test lamp illuminates, test the supply voltage circuit and the seat cushion and seat back heating element control circuits for a short to voltage.
4. Test for infinite resistance between the right seat heating element supply voltage circuit terminal 6 and ground.
    - If less than infinite, test the supply voltage circuit and the seat cushion and seat back heating element control circuits for a short to ground.
5. Ignition ON, verify that a test lamp does not illuminate between the supply voltage circuit terminal 6 and ground.
    - If the test lamp illuminates, test the supply voltage circuit and the seat cushion and seat back heating element control circuits for a short to voltage.
6. If all circuits test normal, replace the MSM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Driver Seat Back Cushion Heater and Passenger Seat Back Cushion Heater Replacement**
- **Driver Seat Cushion Heater and Passenger Seat Cushion Heater Replacement (Driver)** or **Driver Seat Cushion Heater and Passenger Seat Cushion Heater Replacement (Passenger)**
- **Control Module References** for the MSM replacement, setup and programming

SYMPTOMS - SEAT HEATING AND COOLING

IMPORTANT: The following steps must be completed before using the symptom tables.

1. Perform the **Diagnostic System Check - Vehicle** before using the Symptom Tables in order to verify that all of the following are true:
   - There are no DTCs set.
   - The control modules can communicate via the serial data link.
2. Review the system operation in order to familiarize yourself with the system functions. Refer to **Heated Seats Description and Operation**.

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the system. Refer to **Checking Aftermarket Accessories** .
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** .

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

Heated Seat Inoperative

HEATED SEAT INOPERATIVE

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Circuit/System Description

The heated seat system operation is controlled through the switch inputs to the driver and passenger door modules. When a heated seat switch is pressed a GMLAN message is sent to the Memory Seat Module (MSM) indicating the switch is active. The MSM monitors the heated seat switch inputs and determines the appropriate operating mode. When a heated seat function is activated the MSM will send a GMLAN message to the door module to illuminate the

appropriate indicators. The memory seat module controls the voltage supply and the ground circuits to the seat heater elements. When a heated seat function is commanded active, the seat module will switch battery voltage to the heater element supply circuits and ground is provided through pulse width modulation (PWM) low side drive control circuits. During heated seat operation both the seat back and cushion heater elements are supplied battery voltage. The seat module grounds the appropriate control circuits for back only or back and cushion heating modes and opens or closes the active control circuits as necessary in order to maintain the desired seat temperature. The seat module relies on 4 independent inputs from thermistors located in the seat back and seat cushion of the driver and passenger seats to control heated seat temperatures. The thermistors are 2-wire sensors supplied with a 5-volt referenced signal circuit and a low reference circuit from the seat module. Resistance through the thermistors varies with temperature causing the heated seat sensor signal circuit voltage levels to decrease as the seat temperatures rise.

Reference Information

Schematic Reference

Heated/Cooled Seat Schematics (except A45) or **Heated/Cooled Seat Schematics (A45)**

Connector End View Reference

Heated/Cooled Seat Connector End Views

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

- **Scan Tool Data List**
- **Scan Tool Data Definitions**

Circuit/System Testing

1. Ignition ON, verify that the driver and passenger door switch heated seat switch parameters display Active while the heated seat switches are pressed.
    - If either of the switch parameters are continuously Active or Inactive while the switch is pressed, perform the heated seat switch circuit test.

2. Verify that the MSM driver and passenger seat HVC mode and level parameters are displayed correctly as the heated seat switches are activated through all of the operating modes.
    - If the MSM parameters are not displayed correctly replace the MSM.
3. If the circuits test normal replace the driver or passenger door module.

Component Testing

1. Disconnect the heated seat switch connector at the door module.
2. Connect a fused jumper wire from the low reference circuit terminal 4 to ground.
3. Verify that a test lamp does not illuminate when connected from battery voltage to the switch signal circuit terminals 6 and 7.
    - If the test lamp illuminates while the switches are in an inactive state, replace the heated seat switch.
4. Verify that a test lamp illuminates when connected from battery voltage to the switch signal circuit terminals 6 and 7 while pressing the heated seat switches.
    - If the test lamp does not illuminate while the switches are in an active state, replace the heated seat switch.
5. Verify that the heated seat switch indicators illuminate with a test lamp connected from battery voltage to the indicator control circuit terminals 1, 2, 9, 10 and 11.
    - If the indicators do not illuminate replace the heated seat switch.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Heated Seat Switch Replacement**
- **Control Module References** for MSM and Driver or Passenger Door switch replacement, programming and setup

REPAIR INSTRUCTIONS

HEATED SEAT SWITCH REPLACEMENT

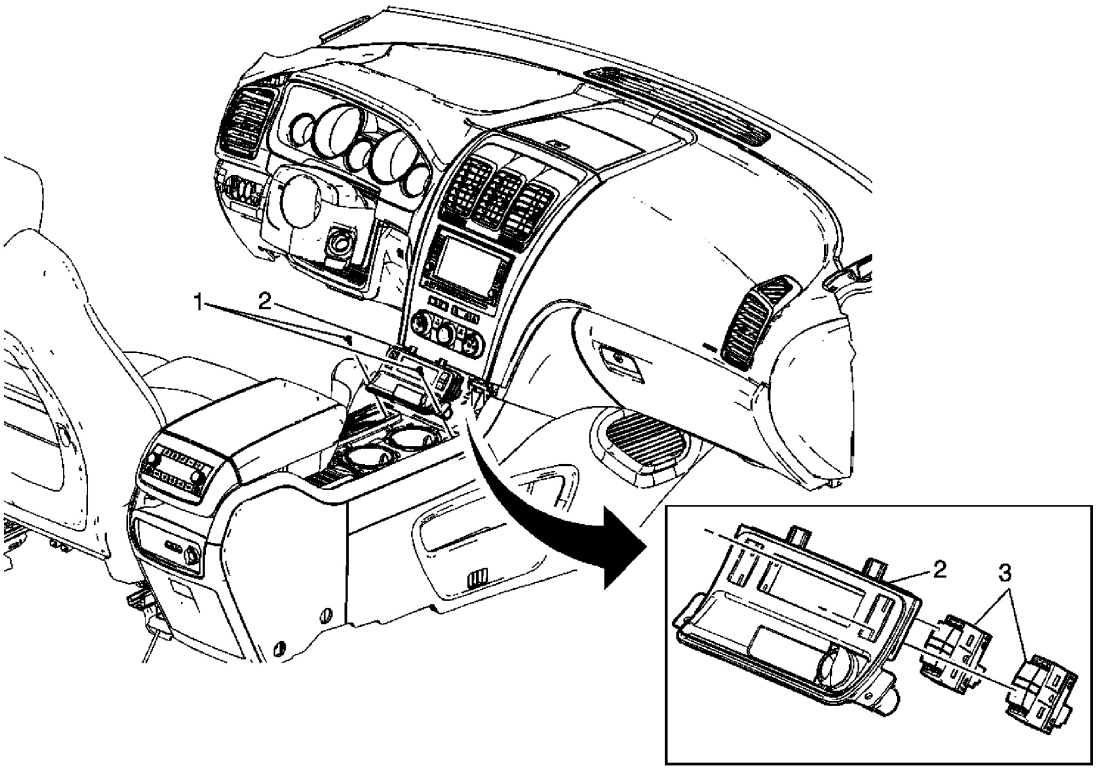

Fig. 18: Identifying Heated Seat Switch
Courtesy of GENERAL MOTORS CORP.

Heated Seat Switch Replacement

Callout	Component Name
Preliminary Procedure: Remove the front floor console accessory trim plate. Refer to **Front Floor Console Accessory Trim Plate Replacement** .	
1	Front Floor Console Accessory Switch Mounting Plate Screw (Qty: 2) **NOTE:** **Refer to Fastener Notice .** **Tighten:** 2 N.m (18 lb in)
2	Front Floor Console Accessory Switch Mounting Plate **Procedure:** Disconnect the electrical connectors.
3	Seat Heater Switch (Qty: 2) **Procedure:**

	Disengage the heated seat switches from the accessory switch mounting plate.

FRONT SEAT HEATER CONTROL MODULE REPLACEMENT

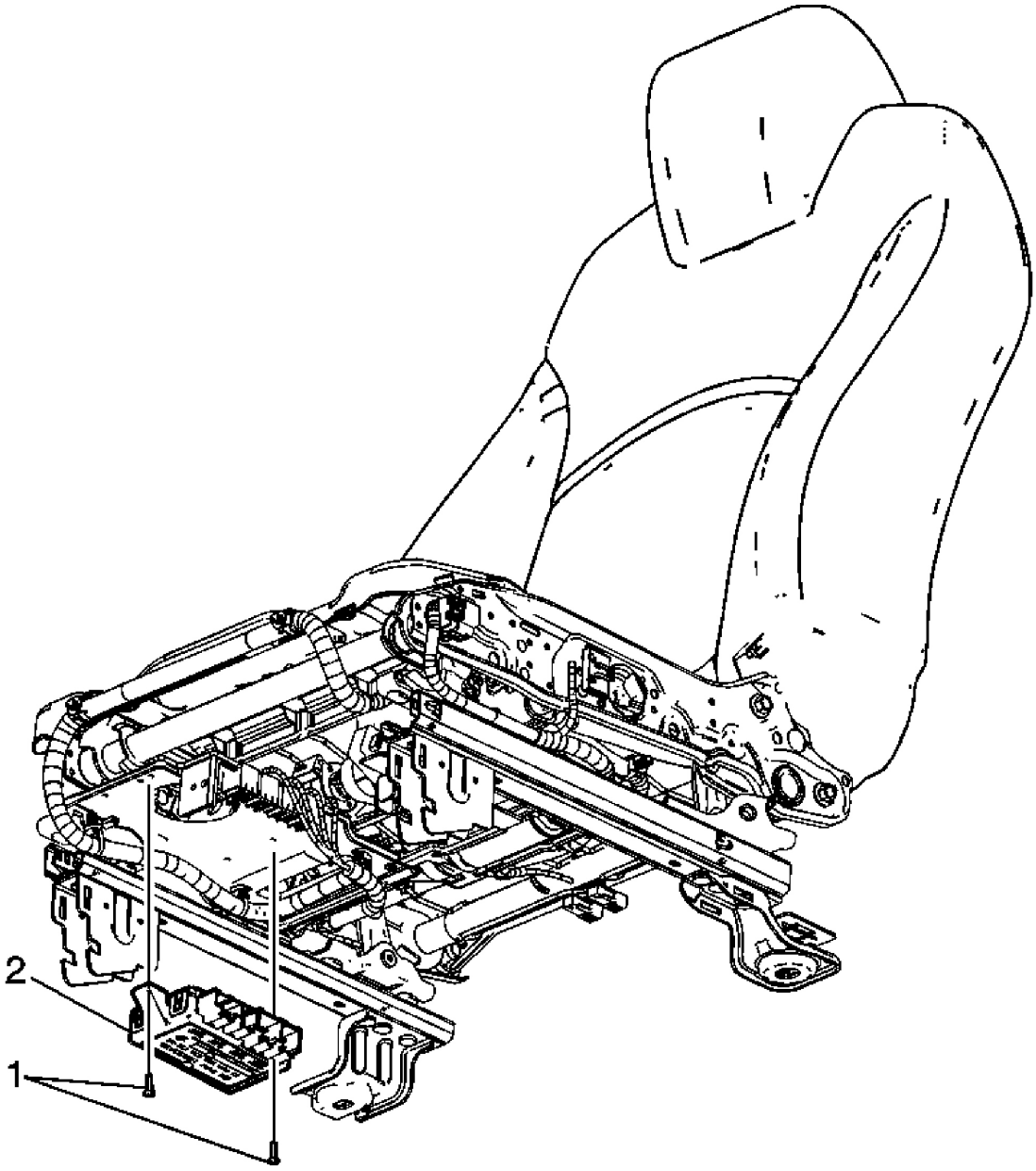

Fig. 19: View Of Front Seat Heater Control Module
Courtesy of GENERAL MOTORS CORP.

Front Seat Heater Control Module Replacement

Callout	Component Name
Preliminary Procedure: Remove the front seat. Refer to **Bucket Seat Replacement** .	
1	Front Heated Seat Module Screw (Qty: 2) **NOTE:** **Refer to Fastener Notice .** **Tighten:** 2 N.m (18 lb in)
2	Front Heated Seat Module **Procedure:** Disconnect the electrical connector.

DRIVER SEAT BACK CUSHION HEATER AND PASSENGER SEAT BACK CUSHION HEATE HEATER REPLACEMENT

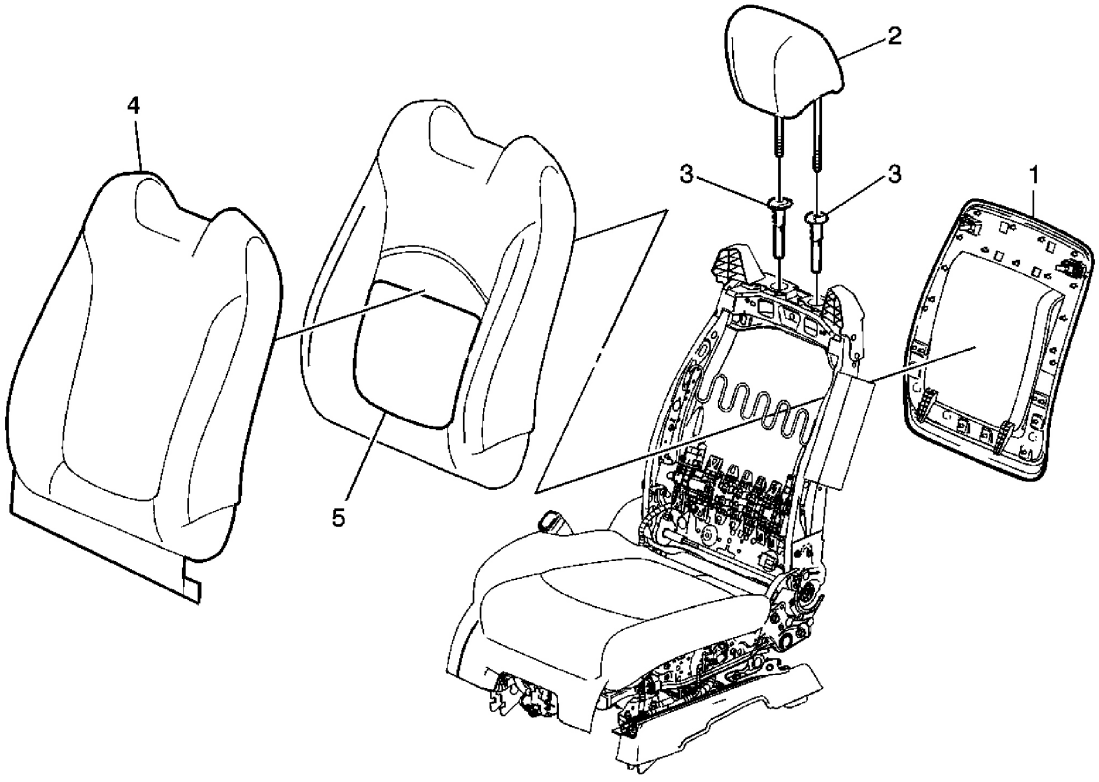

Fig. 20: View Of Front Seat Back Cushion Heater
Courtesy of GENERAL MOTORS CORP.

Driver Seat Back Cushion Heater and Passenger Seat Back Cushion Heater Replacement

Callout	Component Name
Preliminary Procedure: Remove the front seat. Refer to **Bucket Seat Replacement** .	
1	Front Seat Back Cushion Rear Finish Panel **Procedure** 1. Using a flat bladed tool, from the side, push inward on the top two retainers while pulling rearward at the top of the panel. 2. Lift the panel upward to remove from the seat.
2	Front Seat Head Restraint Assembly **Procedure** 1. Push the button on the outer head restraint guide in to adjust the head restraint to the highest position. 2. Push the button on the inner head restraint guide in while pulling upward to finish releasing the head restraint from the seat.
3	Front Seat Head Restraint Guide (Qty: 2) **Tip:** Use a rubber mallet or equivalent to tap upward on the bottom of the head restraint guide to remove from the seat back frame.
4	Front Seat Back Cushion Cover **Procedure** 1. Disengage the j-channel retainers from the seat back cushion frame. 2. Disconnect the electrical connectors that attach to the seat back cushion. 3. Remove the seat back cushion cover and pad as an assembly. 4. Pull the cover away from the pad to disengage the retainers.
5	Front Seat Back Cushion Heater **Procedure:** Carefully remove the seat cushion heater from the seat cushion pad by lifting upward starting from the bottom to disengage the adhesive.

DRIVER SEAT CUSHION HEATER AND PASSENGER SEAT CUSHION HEATER REPLA
REPLACEMENT (DRIVER)

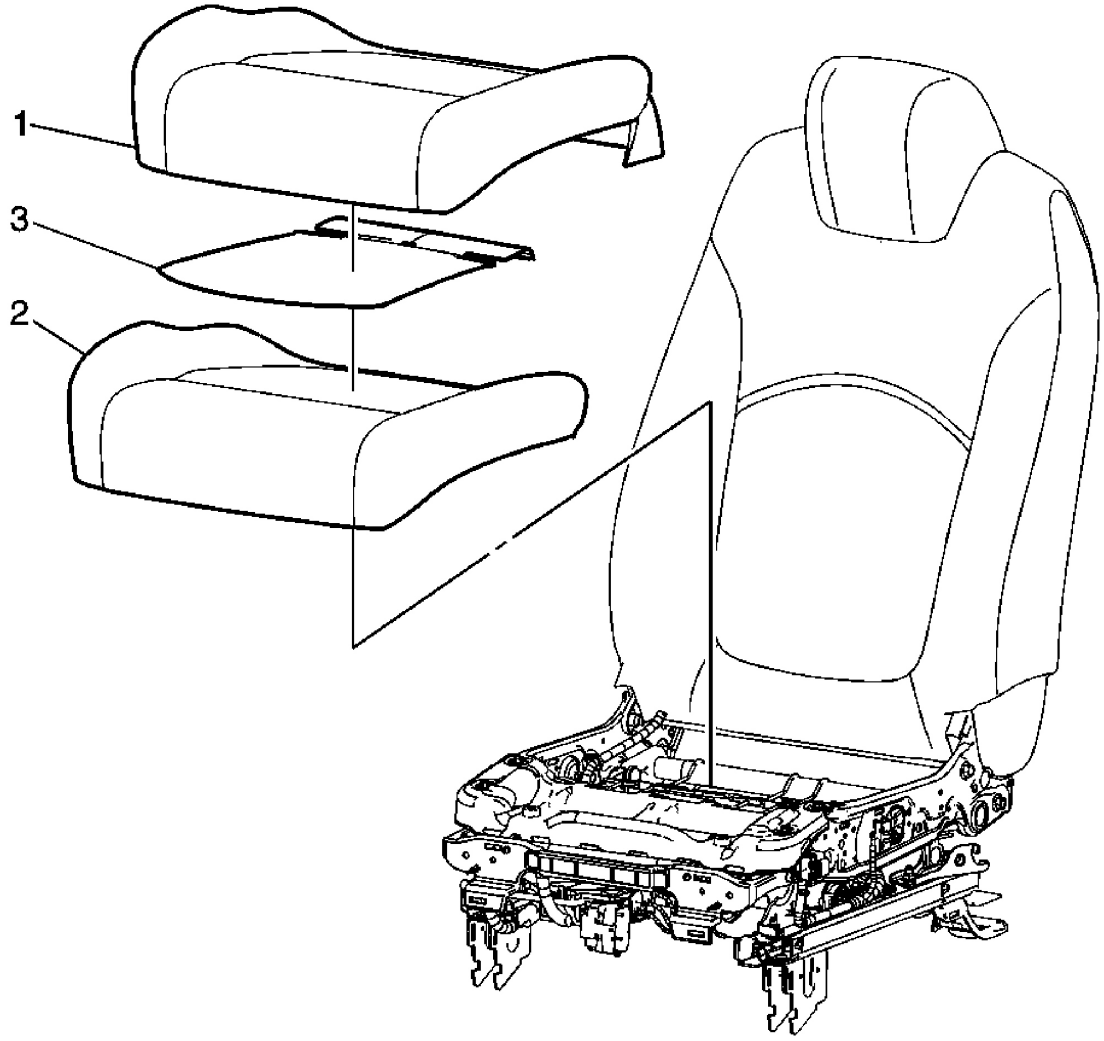

Fig. 21: Identifying Seat Cushion Heater
Courtesy of GENERAL MOTORS CORP.

Driver Seat Cushion Heater and Passenger Seat Cushion Heater Replacement (Driver)

Callout	Component Name
Preliminary Procedure 1. Remove the front seat. Refer to **Bucket Seat Replacement** . 2. Remove the front seat outer recliner finish cover. Refer to **Front Seat Back Recliner Outer Trim Panel Replacement** . 3. Remove the front seat adjuster front shield.	
	Front Seat Cushion Cover

1	**Procedure** 1. Disengage the j-channel retainers from the seat cushion frame. 2. Disconnect the electrical connector. 3. Remove the seat cushion cover and pad from the seat cushion frame as an assembly. 4. Separate the seat cushion cover from the pad.
2	Front Seat Cushion Pad
3	Driver Seat Cushion Heater **Procedure:** Carefully remove the seat cushion heater from the seat cushion pad by lifting upward starting from the rear to disengage the adhesive.

DRIVER SEAT CUSHION HEATER AND PASSENGER SEAT CUSHION HEATER REPLA REPLACEMENT (PASSENGER)

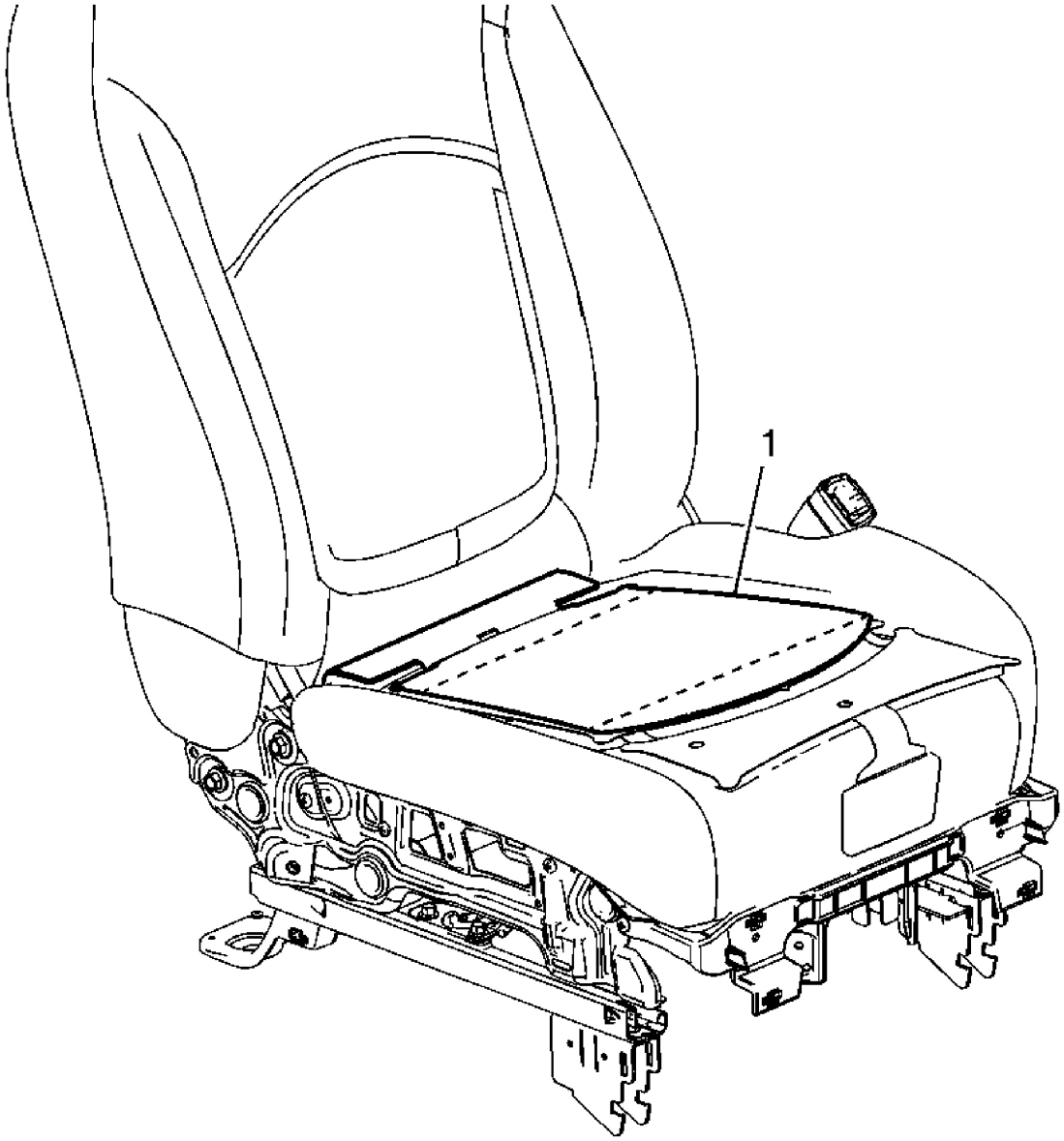

Fig. 22: Identifying Seat Cushion Heater
Courtesy of GENERAL MOTORS CORP.

Driver Seat Cushion Heater and Passenger Seat Cushion Heater Replacement (Passenger)

Callout	Component Name
CAUTION: **Replace the passenger presence system as a complete assembly to prevent possible injury to the occupant. All the components in the service kit are assembled and calibrated as a unit. Using only some of the components in the service kit will cause the passenger presence system to operate improperly.**	

Preliminary Procedure 1. Remove the front passenger seat. Refer to **Bucket Seat Replacement** . 2. Remove the front seat outer recliner finish cover. Refer to **Front Seat Back Recliner Outer Trim Panel Replacement** . 3. Remove the front seat adjuster front shield. 4. Remove the front seat cushion cover. Refer to **Front Seat Cushion Cover and Pad Replacement** .	
1	Passenger Seat Cushion Heater **Procedure** 1. Using a pair of scissors cut out the seat heater element between the front and rear adhesive strips as shown, leaving the old adhesive strip area on the Passenger Presence System (PPS). 2. Cut the pigtail wire flush to the faulty element and discard. 3. Remove the heater element leaving the old adhesive strips in tack on the PPS. The new seat heater adhesive strips will be placed over the old adhesive strips.

DESCRIPTION AND OPERATION

HEATED SEATS DESCRIPTION AND OPERATION

Description

The driver and passenger heated seats have 2 heat zone operating modes with 3 heat level modes and will operate only while the engine is running. The heat zones are determined by which of the 2 heated seat buttons are pressed, while the heat level is determined by the number of times they are pressed. Pressing the seat cushion button 1 time will activate the seat back and cushion heater elements in the high mode. Each time the seat cushion button is pressed the seat back and cushion heat level is reduced from high to medium, low and off. Pressing the heated seat back button 1 time will activate only the seat back heater element in the high mode. Each time the seat back button is pressed the seat back heat level is reduced from high to medium, low and off. During heated seat operation the heat zone operating mode may be changed without affecting the current heat level mode.

Cadillac Switches

The heated seat switches are an integrated to the HVAC control head and when a heated seat

switch is pressed the active switch signal is sent to the memory seat module as a GMLAN message. The memory seat module determines the heated seat mode based on the switch messages and sends a message to the HVAC control head to display the heated seat indicators as necessary.

Chevrolet and GMC Switches

The heated seat switches are momentary contact switches and are inputs to the driver and passenger door switches. A ground circuit is connected to the switch assembly through the door switch and when a heated seat switch is pressed and released a brief switch signal is supplied to the door switch. Whenever the door module receives an active heated seat switch input, the active switch signal is sent to the memory seat module as a GMLAN message. The memory seat module determines the heated seat mode based on the switch messages and sends a message to the door switch to display the heated seat indicators as necessary.

Heated Seat Operation

The memory seat module controls the voltage supply and the ground circuits to the seat heater elements. When a heated seat function is commanded active, the seat module will switch battery voltage to the heater element supply circuits and ground is provided through pulse width modulation (PWM) low side drive control circuits. During heated seat operation both the seat back and cushion heater elements are supplied battery voltage. The seat module grounds the appropriate control circuits for back only or back and cushion heating modes and opens or closes the active control circuits as necessary in order to maintain the desired seat temperature. The seat module relies on 4 independent inputs from thermistors located in the seat back and seat cushion of the driver and passenger seats to control heated seat temperatures. The thermistors are 2-wire sensors supplied with a 5-volt referenced signal circuit and a low reference circuit from the seat module. Resistance through the thermistors varies with temperature causing the heated seat sensor signal circuit voltage levels to decrease as the seat back temperatures rise. The seat modules allow heated seat operation only while the engine is running which is determined by a GMLAN serial data circuit message.