Parking, Rear and License Plate Lamps

Special Tool(s)

 ST1137-A	73III Automotive Meter 105-R0057 or equivalent
 ST2834-A	Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool
 ST2574-A	Flex Probe Kit 105-R025C or equivalent

Principles of Operation

NOTE: The Smart Junction Box (SJB) is also known as the Generic Electronic Module (GEM).

When the SJB receives an input from the headlamp switch indicating a request for the parking lamps, the SJB supplies voltage to the parking lamps.

The battery saver feature does not turn the parking lamps off when the headlamp switch is in the PARKING LAMPS ON position.

The SJB monitors the headlamp switch position by sending voltage reference signals on multiple circuits to the headlamp switch. At any given time, one of the signal circuits is routed to ground.

If the SJB does not detect any of the inputs to the headlamp switch is active (routed to ground) for 5 seconds, the SJB turns on the exterior lights and keeps them on for 10 minutes after the ignition switch is turned off (or 10 minutes from the time the SJB does not detect any headlamp switch input if the ignition switch was already off). If the SJB detects multiple circuits short to ground, the SJB implements a planned strategy depending on the multiple inputs received. Based on the multiple inputs received, the headlamps and/or parking lamps are turned on.

If either of these situations occur, the SJB should **NOT** be ruled immediately as being at fault. This is normal behavior of the SJB design as it has detected a fault with the inputs from the headlamp switch.

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

Mechanical	Electrical
• Headlamp switch	• Wiring, terminals or connectors • Bulb(s) • Smart Junction Box (SJB)

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.

NOTE: Make sure the headlamp switch is in the OFF position.

NOTE: Make sure the multifunction switch is in the LOW BEAM position.

4. **NOTE:** Make sure to use the latest scan tool software release.

   If the cause is not visually evident, connect the scan tool to the Data Link Connector (DLC).

5. **NOTE:** The Vehicle Communication Module (VCM) LED prove-out confirms power and ground from the DLC are provided to the VCM.

   If the scan tool does not communicate with the VCM:
   - Check the VCM connection to the vehicle.
   - Check the scan tool connection to the VCM.
   - Refer to Section 418-00, No Power To The Scan Tool, to diagnose no power to the scan tool.

6. If the scan tool does not communicate with the vehicle:
   - Verify the ignition key is in the ON position.
   - Verify the scan tool operation with a known good vehicle.
   - Refer to Section 418-00 to diagnose no response from the PCM.

7. Carry out the network test.
   - If the scan tool responds with no communication for one or more modules, refer to Section 418-00.
   - If the network test passes, retrieve and record the continuous memory DTCs.

8. Clear the continuous DTCs and carry out the self-test diagnostics for the SJB.

9. If the DTCs retrieved are related to the concern, go to the Diagnostic Trouble Code (DTC) Chart in this section. For all other DTCs, refer to the Diagnostic Trouble Code (DTC) Chart in Section 419-10.

10. If no DTCs related to the concern are retrieved, GO to Symptom Chart.

Symptom Chart

Symptom Chart

Condition	Possible Sources	Action
• One or more parking, rear, or license plate lamp is inoperative	• Wiring, terminals or connectors • Bulb holder • Bussed Electrical Center (BEC) • Smart Junction Box (SJB)	• GO to Pinpoint Test N.
• The parking, rear, or license plate	• Wiring, terminals or	• GO to Pinpoint

lamps are on continuously	connectors • Headlamp switch • BEC • SJB	Test O .

Pinpoint Tests

Pinpoint Test N: One Or More Parking, Rear Or License Plate Lamp Is Inoperative

Refer to Wiring Diagrams Cell 92 , Parking Rear and License Lamps for schematic and connector information.

Normal Operation

The Smart Junction Box (SJB) sends a voltage reference signal to the headlamp switch through circuit 1401 (BK/LG). When the headlamp switch is placed in the PARKING LAMPS ON position, the SJB provides voltage to the parking, rear, license plate and side marker lamps. The lamps are grounded through circuit 1205 (BK).

DTC Description	Fault Trigger Conditions
• B2035 — LF Side Repeater Lamp Output Ckt Failure	A continuous and on-demand DTC that sets when the SJB detects an open or short to ground from all the side marker lamps voltage supply circuit.
• B2491 — RF Park Lamp Output Circuit Short to Battery	A continuous and on-demand DTC that sets when the SJB detects an open from the RH front parking lamp voltage supply circuit.
• B2493 — LF Park Lamp Output Circuit Short to Battery	A continuous and on-demand DTC that sets when the SJB detects an open from the LH front parking lamp voltage supply circuit.
• B2523 — License Lamp Circuit Failure	A continuous and on-demand DTC that sets when the SJB detects an open or short to ground from the license plate lamp and both rear parking lamp voltage supply circuits.

This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- Bulb holder
- BEC
- SJB

PINPOINT TEST N: ONE OR MORE PARKING, REAR OR LICENSE PLATE LAMP IS INOPERATIVE

NOTICE: **Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.**

NOTE: Failure to disconnect the battery when instructed will result in false resistance readings. Refer to Section 414-01 .

Test Step	Result / Action to Take
N1 CHECK THE STOPLAMP OPERATION	
• Ignition OFF.	**Yes**

- Apply and release the brake pedal while observing the stoplamps.
- **Do the stoplamps operate correctly?**

GO to N2 .

No
REFER to Stoplamps in this section.

N2 CHECK THE TURN SIGNAL OPERATION

- Ignition ON.
- Place the multifunction switch in the LH and then RH TURN position.
- **Do the turn lamps operate correctly?**

Yes
GO to N3 .

No
REFER to Turn Signal and Hazard Lamps in this section.

N3 CHECK CIRCUIT 1205 (BK) FOR AN OPEN

NOTE: Make sure the bulb is good before continuing diagnostics.

- Ignition OFF.
- Disconnect: Inoperative Parking Lamp.
- Disconnect: Negative Battery Cable.
- Measure the resistance between the inoperative parking lamp, harness side and ground as follows:

Inoperative Parking Lamp Connector-Pin	Circuit
LH front C1023-1	1205 (BK)
RH front C1043-1	1205 (BK)
LH front side marker C151-2	1205 (BK)
RH front side marker C161-2	1205 (BK)
LH rear side marker C481-2	1205 (BK)
RH rear side marker C482-2	1205 (BK)
LH rear 1 C4112-1	1205 (BK)
LH rear 2 C4113-1	1205 (BK)
LH rear parking C412-1	1205 (BK)
RH rear 1 C4114-1	1205 (BK)
RH rear 2 C4115-1	1205 (BK)
RH rear parking C415-1	1205 (BK)
License plate C4046-2	1205 (BK)

- **Is the resistance less than 5 ohms?**

Yes
For a side marker or front lamp, GO to N5 .

For a rear or license plate lamp, GO to N6 .

No
For a front side marker lamp, GO to N4 .

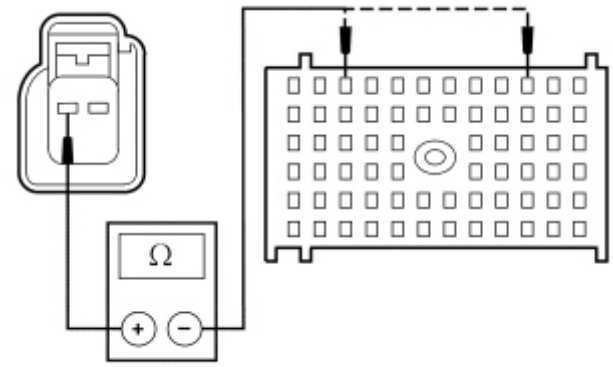
For all others, REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.

N4 CHECK CIRCUIT 1205 (BK) FOR AN OPEN (SIDE LAMP TO BEC)

- Disconnect: BEC C1035c.
- Measure the resistance between the LH front side marker C151-2, circuit 1205 (BK), harness side and the BEC C1035c-F3, circuit 1205 (BK), harness side; or between the RH front side marker C161-2, circuit 1205 (BK), harness side and the BEC C1035c-F10, circuit 1205 (BK), harness side.

Yes
INSTALL a new BEC . CLEAR the DTCs. REPEAT the self-test.

No
REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.



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- **Is the resistance less than 5 ohms?**

N5 CHECK FOR VOLTAGE TO THE BULB HOLDER

- Connect: Negative Battery Cable.
- Place the headlamp switch in the PARKING LAMPS ON position.
- Measure the voltage between the inoperative parking lamp, harness side and ground as follows:

Inoperative Parking Lamp Connector-Pin	Circuit
LH front C1023-2	1340 (DG)
RH front C1043-2	1339 (BK/PK)
LH front side marker C151-1	667 (WH/RD)
RH front side marker C161-1	14 (BN)
LH rear side marker C481-1	1361 (RD/PK)
RH rear side marker C482-1	1361 (RD/PK)

- **Is the voltage greater than 10 volts?**

Yes
INSTALL a new bulb holder. CLEAR the DTCs. REPEAT the self-test.

No
GO to N6 .

N6 CHECK THE PARKING LAMP VOLTAGE SUPPLY CIRCUIT FOR A SHORT TO GROUND

NOTE: If testing at a rear side marker lamp, both rear side marker lamps must be disconnected for correct test results.

NOTE: If testing at the rear lamp 1 or rear lamp 2, both lamps must be disconnected for correct test results.

- Connect: Negative Battery Cable.
- Place the headlamp switch in the OFF position.
- Disconnect: SJB C2280d.
- Measure the resistance between the inoperative parking lamp, harness side and ground as follows:

Inoperative Parking Lamp Connector-Pin	Circuit
LH front C1023-2	1340 (DG)
RH front C1043-2	1339 (BK/PK)
LH front side marker C151-1	667 (WH/RD)
RH front side marker C161-1	14 (BN)
LH rear side marker C481-1	1361 (RD/PK)
RH rear side marker C482-1	1361 (RD/PK)
LH rear 1 C4112-2	1366 (TN/RD)
LH rear 2 C4113-2	1366 (TN/RD)
LH rear parking C412-2	1729 (DB/LG)
RH rear 1 C4114-2	1366 (TN/RD)

Yes
GO to N9 .

No
For a front lamp or front side marker, GO to N7 .

For all others, REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test.

RH rear 2 C4115-2	1366 (TN/RD)
RH rear parking C415-2	1729 (DB/LG)
License plate C4046-1	1370 (DG/LG)

- **Is the resistance greater than 10,000 ohms?**

N7 CHECK THE PARKING LAMP VOLTAGE SUPPLY CIRCUIT FOR A SHORT TO GROUND (BEC TO SJB)

- Disconnect: BEC C1035a.
- Measure the resistance between the inoperative parking lamp, harness side and ground as follows:

Inoperative Parking Lamp Connector-Pin	Circuit
LH front C1023-2	1340 (DG)
RH front C1043-2	1339 (BK/PK)
LH front side marker C151-1	667 (WH/RD)
RH front side marker C161-1	14 (BN)

- **Is the resistance greater than 10,000 ohms?**

Yes
REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test.

No
GO to N8 .

N8 CHECK THE PARKING LAMP VOLTAGE SUPPLY CIRCUIT FOR A SHORT TO GROUND (BEC TO FRONT LAMP)

- Disconnect: BEC C1035c.
- Measure the resistance between the inoperative parking lamp, harness side and ground as follows:

Inoperative Parking Lamp Connector-Pin	Circuit
LH front C1023-2	1340 (DG)
RH front C1043-2	1339 (BK/PK)
LH front side marker C151-1	667 (WH/RD)
RH front side marker C161-1	14 (BN)

- **Is the resistance greater than 10,000 ohms?**

Yes
REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test.

No
INSTALL a new BEC . CLEAR the DTCs. REPEAT the self-test.

N9 CHECK THE PARKING LAMP VOLTAGE SUPPLY CIRCUIT FOR AN OPEN (SJB TO LAMP)

- Measure the resistance between the inoperative parking lamp, harness side and the SJB harness side as follows:

Inoperative Parking Lamp Connector-Pin/Circuit	SJB Connector-Pin/ Circuit
LH front C1023-2 1340 (DG)	C2280d-29 1340 (DG)
RH front C1043-2 1339 (BK/PK)	C2280d-31 1339 (BK/PK)
LH front side marker C151-1 667 (WH/RD)	C2280d-16 667 (WH/RD)
RH front side marker C161-1 14 (BN)	C2280d-17 14 (BN)
LH rear side marker C481-1 1361 (RD/PK)	C2280d-15 1361 (RD/PK)

Yes
GO to N12 .

No
For a front lamp or front side marker, GO to N10 .

For all others, REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test.

RH rear side marker C482-1 1361 (RD/PK)	C2280d-15 1361 (RD/PK)
LH rear 1 C4112-2 1366 (TN/RD)	C2280d-30 1364 (DB/YE)
LH rear 2 C4113-2 1366 (TN/RD)	C2280d-30 1364 (DB/YE)
LH rear parking C412-2 1729 (DB/LG)	C2280d-24 1784 (TN/RD)
RH rear 1 C4114-2 1366 (TN/RD)	C2280d-32 1366 (TN/RD)
RH rear 2 C4115-2 1366 (TN/RD)	C2280d-32 1366 (TN/RD)
RH rear parking C415-2 1729 (DB/LG)	C2280d-38 1729 (DB/YE)
License plate C4046-1 1370 (DG/LG)	C2280d-37 1370 (DG/LG)

- **Is the resistance less than 5 ohms?**

N10 CHECK THE PARKING LAMP VOLTAGE SUPPLY CIRCUIT FOR AN OPEN (SJB TO BEC)

- Disconnect: BEC C1035a.
- Measure the resistance between the BEC , harness side and the SJB , harness side as follows:

Inoperative Parking Lamp	BEC Connector-Pin	SJB Connector-Pin	Circuit
LH front	C1035a-D3	C2280d-29	1340 (DG)
RH front	C1035a-D1	C2280d-31	1339 (BK/PK)
LH front side marker	C1035a-A6	C2280d-16	667 (WH/RD)
RH front side marker	C1035a-D10	C2280d-17	14 (BN)

- **Is the resistance less than 5 ohms?**

Yes
GO to N11 .

No
REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test.

N11 CHECK THE PARKING LAMP VOLTAGE SUPPLY CIRCUIT FOR AN OPEN (BEC TO LAMP)

- Disconnect: BEC C1035c.
- Measure the resistance between the inoperative parking lamp, harness side and the BEC , harness side as follows:

Inoperative Parking Lamp Connector-Pin	BEC Connector-Pin	Circuit
LH front C1023-2	C1035c-A3	1340 (DG)
RH front C1043-2	C1035c-C1	1339 (BK/PK)
LH front side marker C151-1	C1035c-D1	667 (WH/RD)

Yes
INSTALL a new BEC . CLEAR the DTCs. REPEAT the self-test.

No
REPAIR the circuit in question. CLEAR the DTCs. REPEAT the self-test.

RH front side marker C161-1	C1035c-B10	14 (BN)

- **Is the resistance less than 5 ohms?**

N12 CHECK FOR CORRECT SJB OPERATION	

• Disconnect all the SJB connectors.
• Check for:
  ▪ corrosion
  ▪ damaged pins
  ▪ pushed-out pins
• Connect all the SJB connectors and make sure they seat correctly.
• Operate the system and verify the concern is still present.
• **Is the concern still present?**
	Yes
	INSTALL a new SJB. REFER to Section 419-10. TEST the system for normal operation.
	
	No
	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. CLEAR the DTCs. REPEAT the self-test.

Pinpoint Test O: The Parking, Rear Or License Plate Lamps Are On Continuously

Refer to Wiring Diagrams Cell 92, Parking Rear and License Lamps for schematic and connector information.

Normal Operation

The Smart Junction Box (SJB) sends a voltage reference signal to the headlamp switch through circuit 1401 (BK/LG). When the headlamp switch is placed in the PARKING LAMPS ON position, the SJB provides voltage to the parking, license plate and side marker lamps.

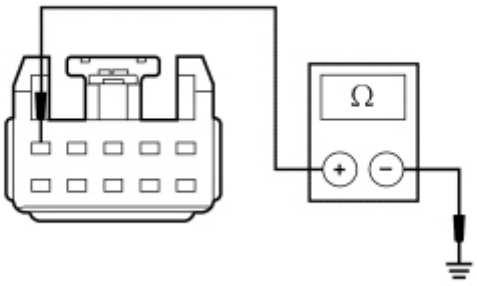
DTC Description	Fault Trigger Conditions
• B1470 — Lamp Headlamp Input Circuit Failure	A continuous and on-demand DTC that sets when the SJB detects a short to ground from the headlamp switch input circuit (parking lamps).
• B2035 — LF Side Repeater Lamp Output Ckt Failure	A continuous and on-demand DTC that sets when the SJB detects a short to voltage from the side marker lamps voltage supply circuit.
• B2491 — RF Park Lamp Output Circuit Short to Battery	A continuous and on-demand DTC that sets when the SJB detects a short to voltage from the RH front parking lamp voltage supply circuit.
• B2493 — LF Park Lamp Output Circuit Short to Battery	A continuous and on-demand DTC that sets when the SJB detects a short to voltage from the LH front parking lamp voltage supply circuit.
• B2523 — License Lamp Circuit Failure	A continuous and on-demand DTC that sets when the SJB detects a short to voltage from the license plate lamp and both tail lamp voltage supply circuits.

This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- Headlamp switch
- BEC
- SJB

PINPOINT TEST O: THE PARKING, REAR OR LICENSE PLATE LAMPS ARE ON CONTINUOUSLY

NOTICE: **Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.**

Test Step	Result / Action to Take
O1 USE THE RECORDED DTCs FROM THE SJB SELF-TEST • Ignition OFF. • Retrieve the recorded results from the SJB self-test. • **Was DTC B1470 present?**	**Yes** GO to O2. **No** GO to O4.
O2 CHECK THE HEADLAMP SWITCH • Disconnect: Headlamp Switch C205. • Carry out the headlamp switch component test. Refer to Wiring Diagrams Cell 149 for component testing. • **Is the headlamp switch OK?**	**Yes** GO to O3. **No** INSTALL a new headlamp switch. REFER to Headlamp Switch in this section. CLEAR the DTCs. REPEAT the self-test.
O3 CHECK CIRCUIT 1401 (BK/LG) FOR A SHORT TO GROUND • Disconnect: SJB C2280b. • Measure the resistance between the headlamp switch C205-5, circuit 1401 (BK/LG), harness side and ground.  N0046915 • **Is the resistance greater than 10,000 ohms?**	**Yes** GO to O7. **No** REPAIR the circuit. CLEAR the DTCs. REPEAT the self-test.
O4 CHECK THE PARKING LAMP VOLTAGE SUPPLY CIRCUITS FOR A SHORT TO VOLTAGE • Disconnect: SJB C2280d. • Ignition ON. • **Does any parking lamp continue to illuminate?**	**Yes** If a front side marker or front lamp continues to illuminate, GO to O5. For all other lamps, REPAIR the voltage supply circuit in question. CLEAR the DTCs. REPEAT the self-test. **No** GO to O7.
O5 CHECK THE PARKING LAMP VOLTAGE SUPPLY CIRCUITS FOR A SHORT TO VOLTAGE (SJB TO BEC) • Ignition OFF. • Disconnect: BEC C1035a. • Ignition ON. • **Does any parking lamp continue to illuminate?**	**Yes** GO to O6. **No**

<table>
<tr><td></td><td>REPAIR the voltage supply circuit in question between the SJB and the BEC. CLEAR the DTCs. REPEAT the self-test.</td></tr>
<tr><td>O6 CHECK THE PARKING LAMP VOLTAGE SUPPLY CIRCUITS FOR A SHORT TO VOLTAGE (BEC to LAMP)</td><td rowspan="2">Yes
REPAIR the voltage supply circuit in question. CLEAR the DTCs. REPEAT the self-test.

No
INSTALL a new BEC. CLEAR the DTCs. REPEAT the self-test.</td></tr>
<tr><td>

Ignition OFF.
Disconnect: BEC C1035c.
Disconnect: Suspect Parking Lamp.
Ignition ON.
Measure the voltage between suspect parking lamp, harness side and ground as follows:

<table>
<tr><th>Suspect Lamp</th><th>Connector-Pin</th><th>Circuit</th></tr>
<tr><td>LH front</td><td>C1023-2</td><td>1340 (DG)</td></tr>
<tr><td>RH front</td><td>C1043-2</td><td>1339 (BK/PK)</td></tr>
<tr><td>LH side marker</td><td>C151-1</td><td>667 (WH/RD)</td></tr>
<tr><td>RH side marker</td><td>C161-1</td><td>14 (BN)</td></tr>
</table>

Is any voltage present?

</td></tr>
<tr><td>O7 CHECK FOR CORRECT SJB OPERATION</td><td rowspan="2">Yes
INSTALL a new SJB. REFER to Section 419-10. TEST the system for normal operation.

No
The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. CLEAR the DTCs. REPEAT the self-test.</td></tr>
<tr><td>

Ignition OFF.
Disconnect all the SJB connectors.
Check for:

corrosion
damaged pins
pushed-out pins

Connect all the SJB connectors and make sure they seat correctly.
Operate the system and verify the concern is still present.
Is the concern still present?

</td></tr>
</table>