2009 Buick Truck Enclave AWD V6-3.6L
Vehicle > ALL Diagnostic Trouble Codes ( DTC ) > Testing and Inspection > P Code Charts

# P0698

**DTC P0641-P0643, P0651-P0653, or P0697-P0699**

**Diagnostic Instructions**

* Perform the Diagnostic System Check - Vehicle (See: Vehicle > Initial Inspection and Diagnostic Overview) prior to using this diagnostic procedure.
* Review Strategy Based Diagnosis (See: Vehicle > Initial Inspection and Diagnostic Overview) for an overview of the diagnostic approach.
* Diagnostic Procedure Instructions (See: Vehicle > Initial Inspection and Diagnostic Overview) provides an overview of each diagnostic category.

**DTC Descriptors**

DTC P0641
- 5-Volt Reference 1 Circuit

DTC P0642
- 5-Volt Reference 1 Circuit Low Voltage

DTC P0643
- 5-Volt Reference 1 Circuit High Voltage

DTC P0651
- 5-Volt Reference 2 Circuit

DTC P0652
- 5-Volt Reference 2 Circuit Low Voltage

DTC P0653
- 5-Volt Reference 2 Circuit High Voltage

DTC P0697
- 5-Volt Reference 3 Circuit

DTC P0698
- 5-Volt Reference 3 Circuit Low Voltage

DTC P0699
- 5-Volt Reference 3 Circuit High Voltage

**Circuit/System Description**

The engine control module (ECM) has 3 5-volt reference circuits. The ECM provides the 5-volt reference to various sensors. Each reference circuit provides a 5-volt reference for greater than one sensor. An open, short to ground, or

short voltage on one of the 5-volt reference circuits can affect all the components connected to that 5-volt reference circuit. The ECM monitors the voltage on the 5-volt reference circuits.

**Conditions for Running the DTC**

* The ignition is ON for greater than 2 seconds.
* DTCs P0641, P0642, P0643, P0651, P0652, P0653, P0697, P0698, and P0699 run continuously when the above condition is met.

**Conditions for Setting the DTC**

The 5-volt reference circuit voltage is greater or less than a predetermined threshold. The condition exists, then a 5 second delay for MIL ON.

**Action Taken When the DTC Sets**

DTCs P0641, P0642, P0643, P0651, P0652, P0653, P0697, P0698, and P0699 are Type A DTCs.

**Conditions for Clearing the DTC**

DTCs P0641, P0642, P0643, P0651, P0652, P0653, P0697, P0698, and P0699 are Type A DTCs.

**Diagnostic Aids**

* The 5-volt reference 1 circuit provides 5 volts to the following sensors:

  - The fuel tank pressure (FTP) sensor
  - The engine oil pressure (EOP) sensor
  - The fuel rail pressure (FRP) sensor

* The 5-volt reference 2 circuit provides 5 volts to the following sensors:

  - All four camshaft position (CMP) sensors
  - Accelerator pedal position (APP) sensor 1

* The 5-volt reference 3 circuit provides 5 volts to the following sensors:

  - Throttle position sensor (TPS) 1 and 2
  - Crankshaft position (CKP) sensor
  - Accelerator pedal position (APP) sensor 2
  - A/C pressure sensor

* If the condition is intermittent, move the related harnesses and connectors with the engine operating. Monitor the scan tool 5-volt Reference Circuit Test Status parameters for the affected components. The circuit test status parameter will change from OK or Not Run to Fault if there is a condition with the circuit or a connection.

**Reference Information**
**Schematic Reference**

Engine Controls Schematics (See: Powertrain Management > Electrical)

**Connector End View Reference**

Component Connector End Views (See: Vehicle > Connector Views)

**Electrical Information Reference**

* Circuit Testing (See: Vehicle > Component Tests and General Diagnostics)
* Connector Repairs (See: Vehicle > Component Tests and General Diagnostics)
* Testing for Intermittent Conditions and Poor Connections (See: Vehicle > Component Tests and General Diagnostics)
* Wiring Repairs (See: Vehicle > Component Tests and General Diagnostics)

**DTC Type Reference**

Powertrain Diagnostic Trouble Code (DTC) Type Definitions (See: A L L Diagnostic Trouble Codes ( DTC ) > Diagnostic Trouble Code Descriptions)

**Scan Tool Reference**

Control Module References (See: Vehicle > Programming and Relearning) for scan tool information

**Circuit/System Verification**

1. Ignition ON, observe the DTC information with a scan tool. DTC P0641, P0642, P0643, P0651, P0652, P0653, P0697, P0698, or P0699 should not set.
2. Observe the appropriate scan tool 5-volt Reference Circuit Test Status parameter. The parameter should display OK or Not Run.
3. Operate the vehicle within the Conditions for Running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

**Circuit/System Testing**

**Note:** Additional DTCs will set when disconnecting the components.

1. Ignition OFF, disconnect the harness connector of all appropriate sensors for the applicable DTC. Refer to Diagnostic Aids.
2. Ignition ON, test for 4.6-5.2 V between one of the affected 5-volt reference circuits and ground.

♦ If the voltage is less than the specified range, test for an open between the ECM and the splice for all of the affected components. Or, test for a short to ground on the 5-volt reference circuit for each of the affected components. If all circuits test normal, replace the ECM.
♦ If the voltage is greater than the specified range, test for a short to voltage on the 5-volt reference circuit for each of the affected components. If all circuits test normal, replace the ECM.

**Note:** A short to voltage on the signal circuit of certain components may cause this DTC to set.

3. Connect each component associated with the affected 5-volt reference circuit one at a time while monitoring the appropriate scan tool 5-Volt Reference Circuit Status parameter. The parameter should continue to display OK.

♦ If the parameter displays Fault when a component is connected, test the signal circuit of that component for a short to voltage. If the circuit tests normal, replace the component.

**Repair Instructions**

Perform the Diagnostic Repair Verification (See: A L L Diagnostic Trouble Codes ( DTC ) > Verification Tests) after completing the diagnostic procedure.

* Fuel Tank Pressure Sensor Replacement (See: Fuel Tank Pressure Sensor > Removal and Replacement)
* Fuel Pressure Sensor Replacement - Fuel Injection Fuel Rail (See: Fuel Pressure Sensor/Switch > Removal and Replacement > Fuel Pressure Sensor Replacement - Fuel Injection Fuel Rail)
* Engine Oil Pressure Sensor and/or Switch Replacement (See: Oil Pressure Sensor > Removal and Replacement)
* Camshaft Position Sensor Replacement - Bank 2 (Left Side) Exhaust (See: Camshaft Position Sensor > Removal and Replacement)
* Camshaft Position Sensor Replacement - Bank 2 (Left Side) Intake (See: Camshaft Position Sensor > Removal and Replacement)
* Camshaft Position Sensor Replacement - Bank 1 (Right Side) Exhaust (See: Camshaft Position Sensor > Removal and Replacement)
* Camshaft Position Sensor Replacement - Bank 1 (Right Side) Intake (See: Camshaft Position Sensor > Removal and Replacement)
* Accelerator Pedal Position Sensor Replacement (See: Accelerator Pedal Position Sensor > Removal and Replacement)
* Throttle Body Assembly Replacement (See: Throttle Body > Removal and Replacement > Throttle Body Assembly Replacement)
* Crankshaft Position Sensor Replacement (See: Crankshaft Position Sensor > Removal and Replacement)
* Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement (See: Refrigerant Pressure Sensor / Switch, HVAC > Removal and Replacement)
* Control Module References (See: Vehicle > Programming and Relearning) for ECM replacement, setup, and programming