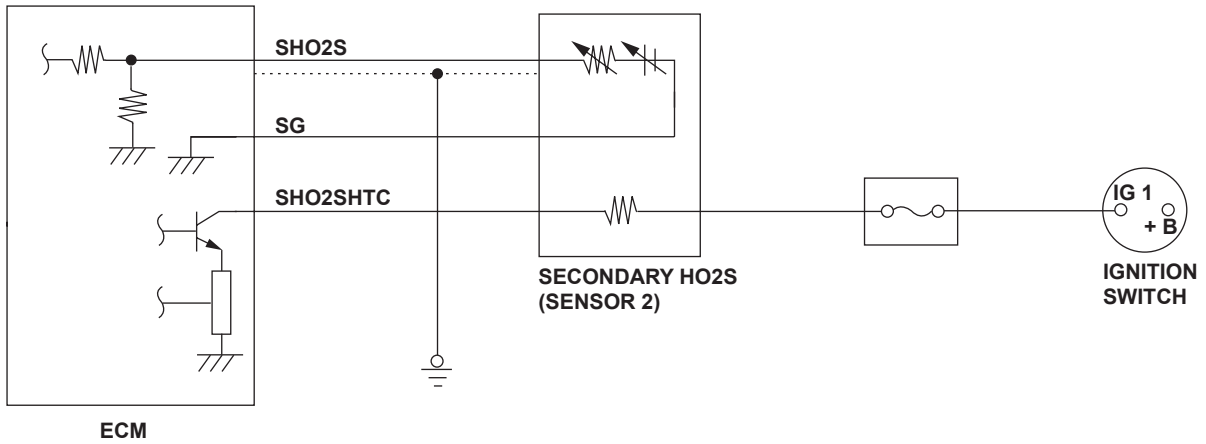


# Advanced Diagnostics

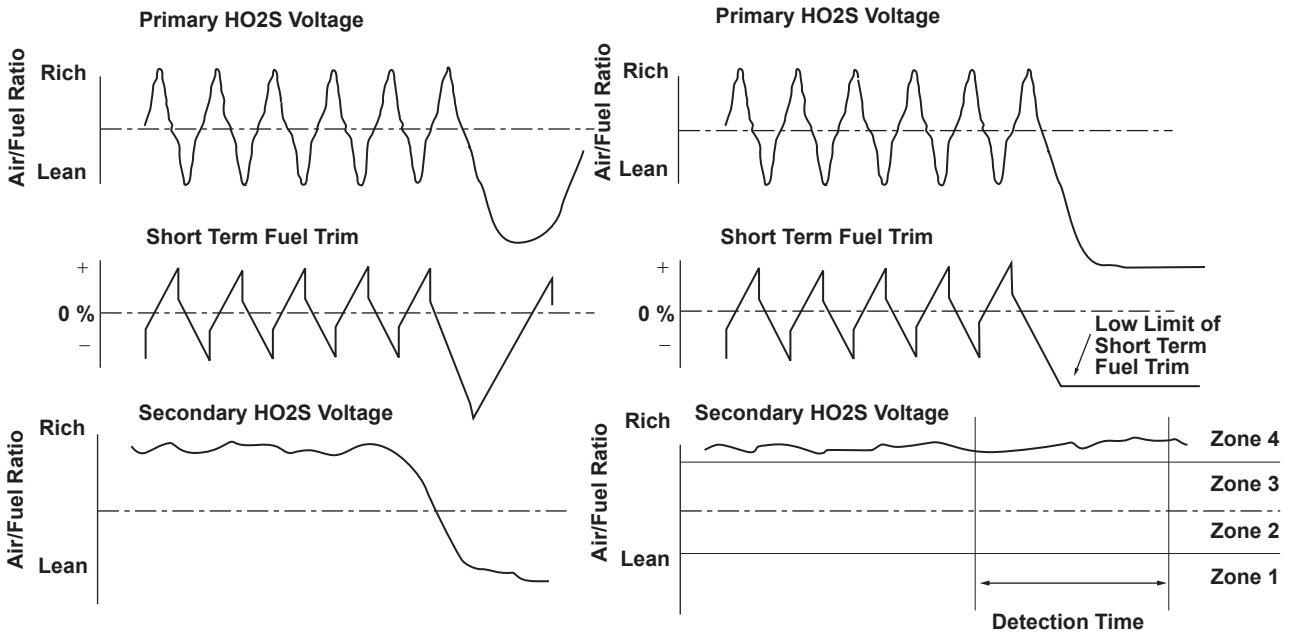
## DTC P0138: Secondary Heated Oxygen Sensor (Secondary HO2S) (Sensor 2) Circuit High Voltage (M/T)



P0137-0001

### Normal Operation

### System Failure



P0138-9671

## General Description

The secondary heated oxygen sensor (HO2S) (Sensor 2) is installed downstream of the three way catalytic converter (TWC). The HO2S detects the oxygen content in the exhaust gas downstream of the TWC during stoichiometric air/fuel ratio feedback control by the engine control module (ECM) from the primary heated oxygen sensor (HO2S) (Sensor 1) output voltage, and its output voltage is used to control the air/fuel ratio so that the TWC efficiency is optimized. The secondary HO2S output voltage range is divided into four zones. If the secondary HO2S output voltage remains in the same zone for a set time period during air/fuel ratio feedback control, the ECM controls the amount of injected fuel by changing the short term fuel trim. If the secondary HO2S output voltage remains in Zone 4 after the ECM commands a decrease in the short term fuel trim, a malfunction is detected and a DTC is stored.

## Monitor Execution, Sequence, Duration, DTC Type

Execution	Once per driving cycle
Sequence	None
Duration	77 seconds or less
DTC Type	Two drive cycles, MIL ON

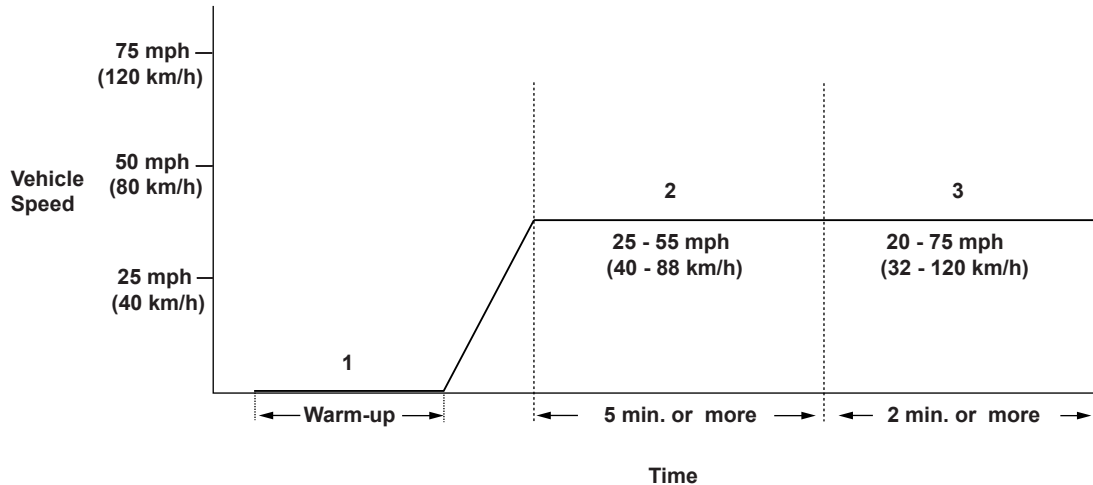
## Enable Conditions

Condition	Minimum	Maximum
Elapsed time after starting the engine	120 seconds	—
Engine coolant temperature	122°F (50°C)	—
Intake air temperature	-14°F (-25°C)	—
Engine speed	1,300 rpm	3,300 rpm
MAP value	26 kPa (190 mmHg, 7.5 in.Hg)	—
Vehicle speed	19 mph (30 km/h)	—
Fuel trim	0.71	1.35
Fuel feedback	Closed loop at stoichiometric	
Monitoring priority	A/F Sensor, EVAP, Catalyst System	
No active DTCs	ECM, A/F Sensor, A/F Sensor Heater, Secondary HO2S Heater, MAP, ECT, TP, IAT, VSS, EGR, VTEC System, Fuel System, ECM Back-up	

## Malfunction Threshold

Secondary HO2S output voltage remains in Zone 4 (0.80 V or more) for no more than 77 seconds.

## Driving Pattern



P0137-0054

1. Start the engine. Hold the engine at 3,000 rpm with no load (in park or neutral) until the radiator fan comes on.
2. Drive the vehicle at a speed between 25 - 55 mph (40 - 88 km/h) for at least 5 minutes.
3. Then, drive immediately at a steady speed between 20 - 75 mph (32 - 120 km/h) for at least 2 minutes.

- If the EVAP monitor runs instead of the HO<sub>2</sub>S monitor, turn the engine off, then restart it, and the HO<sub>2</sub>S monitor will restart.
- If you have difficulty duplicating the DTC, retest after turning off electrical components such as the audio system and A/C, and try a different gear position.
- Drive the vehicle in this manner only if the traffic regulations and ambient conditions allow.

## Diagnosis Details

### Conditions for illuminating the MIL

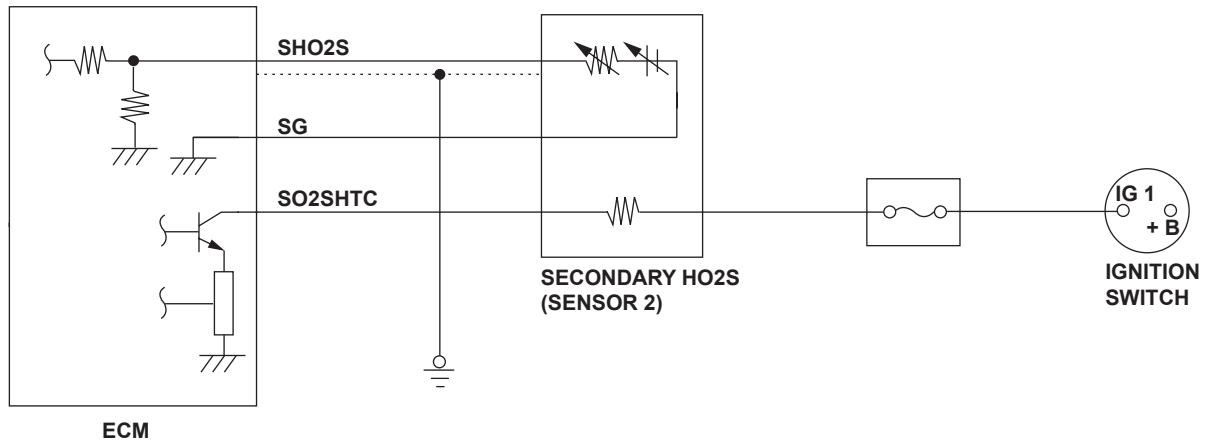
When a malfunction is detected during the first drive cycle, a Temporary DTC is stored in the ECM memory. If the malfunction recurs during the next (second) drive cycle, the MIL comes on and the DTC and the freeze frame data are stored.

### Conditions for clearing the MIL

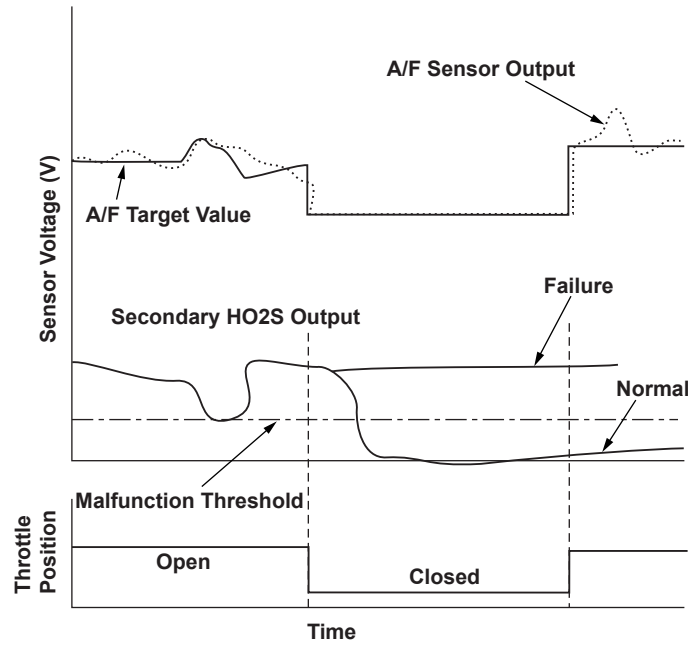
The MIL will be cleared if the malfunction does not recur during three consecutive trips in which the diagnostic runs. The MIL, the DTC, the Temporary DTC, and the freeze frame data can be cleared by using the scan tool Clear command or by disconnecting the battery.

# Advanced Diagnostics

## DTC P0138: Secondary Heated Oxygen Sensor (Secondary HO2S) (Sensor 2) Circuit High Voltage (CVT)



P0139-9601



P0138-0071

## General Description

The secondary heated oxygen sensor (HO2S) (Sensor 2) detects the oxygen content in the exhaust gas downstream of the three way catalytic converter (TWC) during stoichiometric air/fuel ratio feedback control based on the primary heated oxygen sensor (HO2S) (Sensor 1) output voltage. The secondary HO2S controls the air/fuel ratio from the primary HO2S output voltage, so that the TWC efficiency is optimized. The characteristics of the secondary HO2S output voltage are identical to the primary HO2S output voltage.

The oxygen content in the exhaust gas increases when decelerating with the throttle valve fully closed (lean), and the secondary HO2S outputs low voltage. Therefore, if the secondary HO2S outputs high voltage (rich) during deceleration with the throttle valve fully closed, a malfunction is detected and a DTC is stored.

## Monitor Execution, Sequence, Duration, DTC Type

Execution	Once per driving cycle
Sequence	None
Duration	6 seconds or less
DTC Type	Two drive cycles, MIL ON

## Enable Conditions

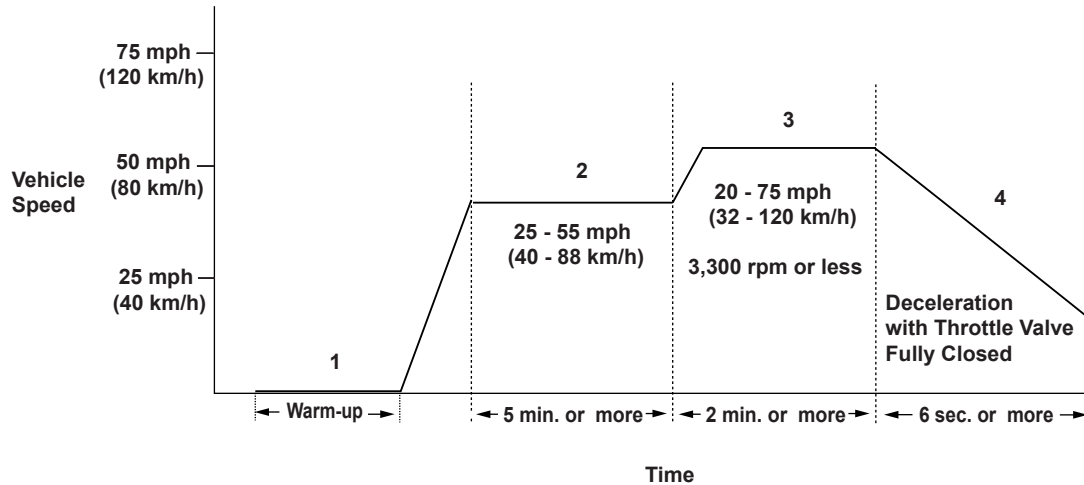
Condition	Minimum	Maximum
Elapsed time after starting the engine	128 seconds	—
Engine coolant temperature	140°F (60°C)	—
Intake air temperature	-13°F (-25°C)	—
Engine speed	*	3,300 rpm
Fuel trim	0.71	1.35
Fuel feedback	Closed loop control at stoichiometric ratio during or after deceleration	
No active DTCs	ECM, A/F Sensor, A/F Sensor Heater, Secondary HO2S Heater, MAP, ECT, TP, IAT, EGR, VSS, VTEC System, Fuel System, ECM Back-up, A/T System	

\* : Not more than 2 seconds have elapsed since the engine speed reached 0 rpm, or the auto idle stop system is in operation.

## Malfunction Threshold

The secondary HO2S output voltage is 0.80 V or more for no more than 6 seconds.

## Driving Pattern



P0137-0151

1. Start the engine. Hold the engine at 3,000 rpm with no load (in park or neutral) until the radiator fan comes on.
2. Drive the vehicle at a speed between 25 - 55 mph (40 - 88 km/h) for at least 5 minutes.
3. Then, drive immediately at a steady speed between 20 - 75 mph (32 - 120 km/h) with an engine speed of 3,300 rpm or less for at least 2 minutes.
4. Decelerate with the throttle valve fully closed for at least 6 seconds.

- If you have difficulty duplicating the DTC, retest after turning off electrical components such as the audio system and A/C, and try a different gear position.
- Drive the vehicle in this manner only if the traffic regulations and ambient conditions allow.

## Diagnosis Details

### Conditions for illuminating the MIL

When a malfunction is detected during the first drive cycle, a Temporary DTC is stored in the ECM memory. If the malfunction recurs during the next (second) drive cycle, the MIL comes on and the DTC and the freeze frame data are stored.

### Conditions for clearing the MIL

The MIL will be cleared if the malfunction does not recur during three consecutive trips in which the diagnostic runs.

The MIL, the DTC, the Temporary DTC, and the freeze frame data can be cleared by using the scan tool Clear command or by disconnecting the battery.