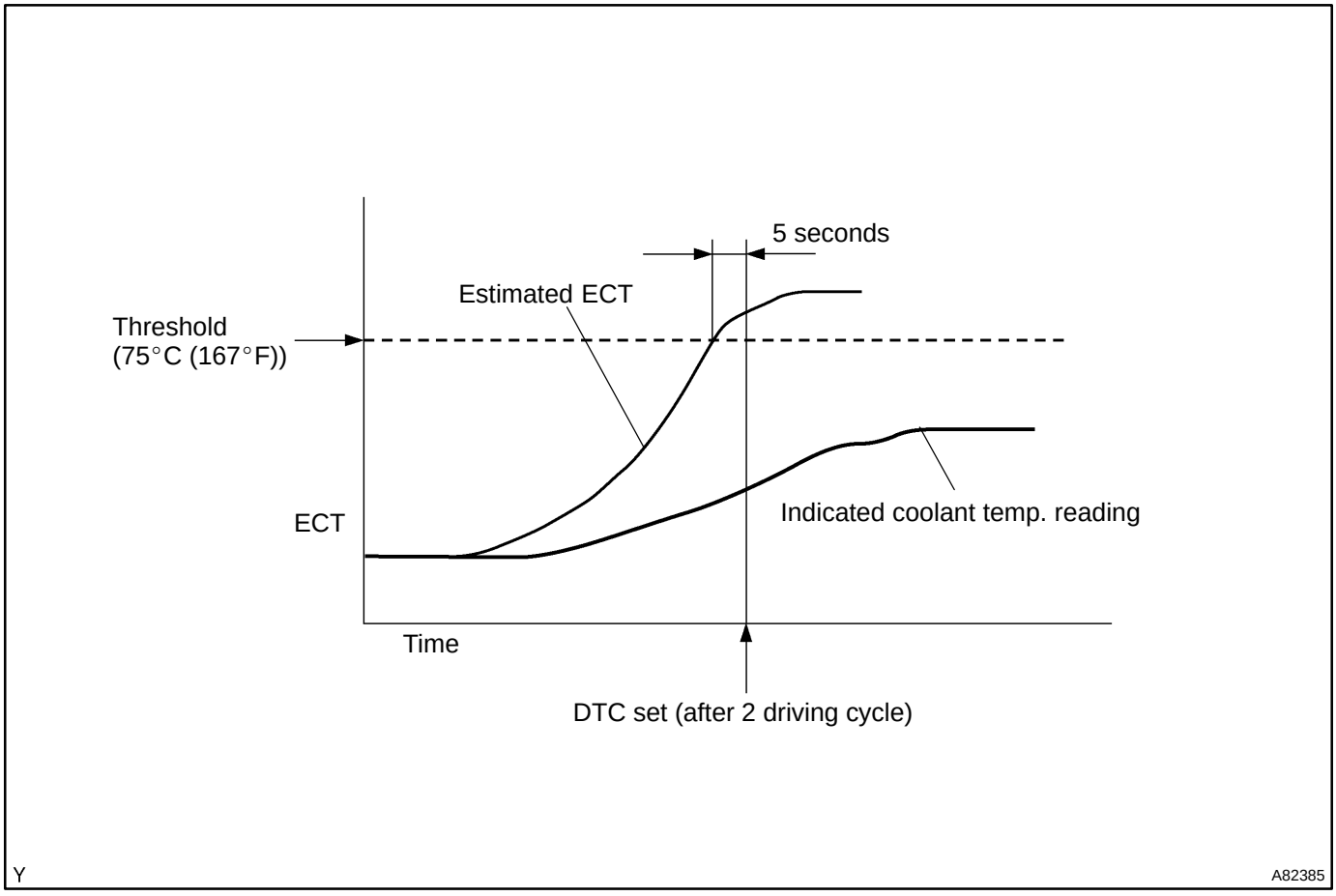
DTC	P0128	COOLANT THERMOSTAT (COOLANT TEMPERATURE BELOW THERMOSTAT REGULATING TEMPERATURE)

CIRCUIT DESCRIPTION

This DTC is output when the Engine Coolant Temperature (ECT) does not reach 75˚C (167˚F) despite sufficient engine warm-up time.

DTC No.	DTC Detection Condition	Trouble Area
P0128	Conditions (a), (b) and (c) are met: (a) Cold start (b) Sufficient warm-up time has elapsed (c) ECT is less than 75˚C (167˚F)	• Thermostat • Cooling system • ECT sensor • ECM

MONITOR DESCRIPTION



The ECM estimates the coolant temperature based on starting temperature, engine loads, and engine speeds. The ECM then compares the estimated temperature with the actual ECT. When the estimated coolant temperature reaches 75°C (167°F), the ECM checks the actual ECT. If the actual ECT is less than 75°C (167°F), the ECM will interpret this as a fault in the thermostat or engine cooling system and set a DTC.

MONITOR STRATEGY

Related DTCs	P0128: Coolant Thermostat
Required sensors / components (Main)	Thermostat
Required sensors / components (Related)	ECT sensor, IAT sensor, VSS
Frequency of operation	Once per driving cycle
Duration	900 seconds
MIL operation	2 driving cycles
Sequence operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present	See page 05-377
Battery voltage	11 V or more
Throttle position learning	Completed
Either of the following conditions is met:	Condition 1 or 2
1. All of the following conditions are met:	Condition (a), (b) and (c)
(a) ECT at engine start - IAT at engine start	-15 to 7°C (-27 to 12.6°F)
(b) ECT at engine start	-10 to 56°C (14 to 132.8°F)
(c) IAT at engine start	-10 to 56°C (14 to 132.8°F)
2. All of the following conditions are met:	Condition (a), (b) and (c)
(a) ECT at engine start - IAT at engine start	More than 7°C (12.6°F)
(b) ECT at engine start	56°C (132.8°F) or less
(c) IAT at engine start	-10 °C (14 °F) or more
Accumulated time that vehicle speed is 80 mph (128 km/h) or more	Less than 20 seconds

TYPICAL MALFUNCTION THRESHOLDS

Duration that both of the following conditions are met:	5 seconds or more
Estimated ECT	75°C (167°F) or more
Actual ECT	Less than 75°C (167°F)

MONITOR RESULT

Refer to page 05-385 for detailed information.

The test value and test limit information are described as shown in the following table. Check the monitor result and test values after performing the monitor drive pattern (see page 05-387).

- TID (Test Identification Data) is assigned to each emissions-related component.
- TLT (Test Limit Type):
  If TLT is 0, the component is malfunctioning when the test value is higher than the test limit.
  If TLT is 1, the component is malfunctioning when the test value is lower than the test limit.
- CID (Component Identification Data) is assigned to each test value.
- Unit Conversion is used to calculate the test value indicated on generic OBD II scan tools.

TID $08: Thermostat

TLT	CID	Unit Conversion	Description of Test Data	Description of Test Limit
1	$01	Multiply by 0.625 and subtract 40 (°C)	ECT sensor output when estimated ECT has reached to malfunction criterion	Malfunction criteria for thermostat

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand−held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	CHECK COOLING SYSTEM

(a) Check the cooling system for excessive cooling, such as abnormal radiator fan operation, modified cooling system and other defects.
OK: There is no modification of cooling system.

NG → **REPAIR OR REPLACE COOLING SYSTEM**

OK

2	INSPECT THERMOSTAT (See page 16-21)

(a) Check the valve opening temperature of the thermostat.
OK: Valve opening temperature: 80 to 84°C (176 to 183°F).

HINT:
Also check the valve is completely closed under opening temperature as above.

NG → **REPLACE THERMOSTAT (See page 16-31)**

OK

REPLACE ECM (See page 10-24)