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

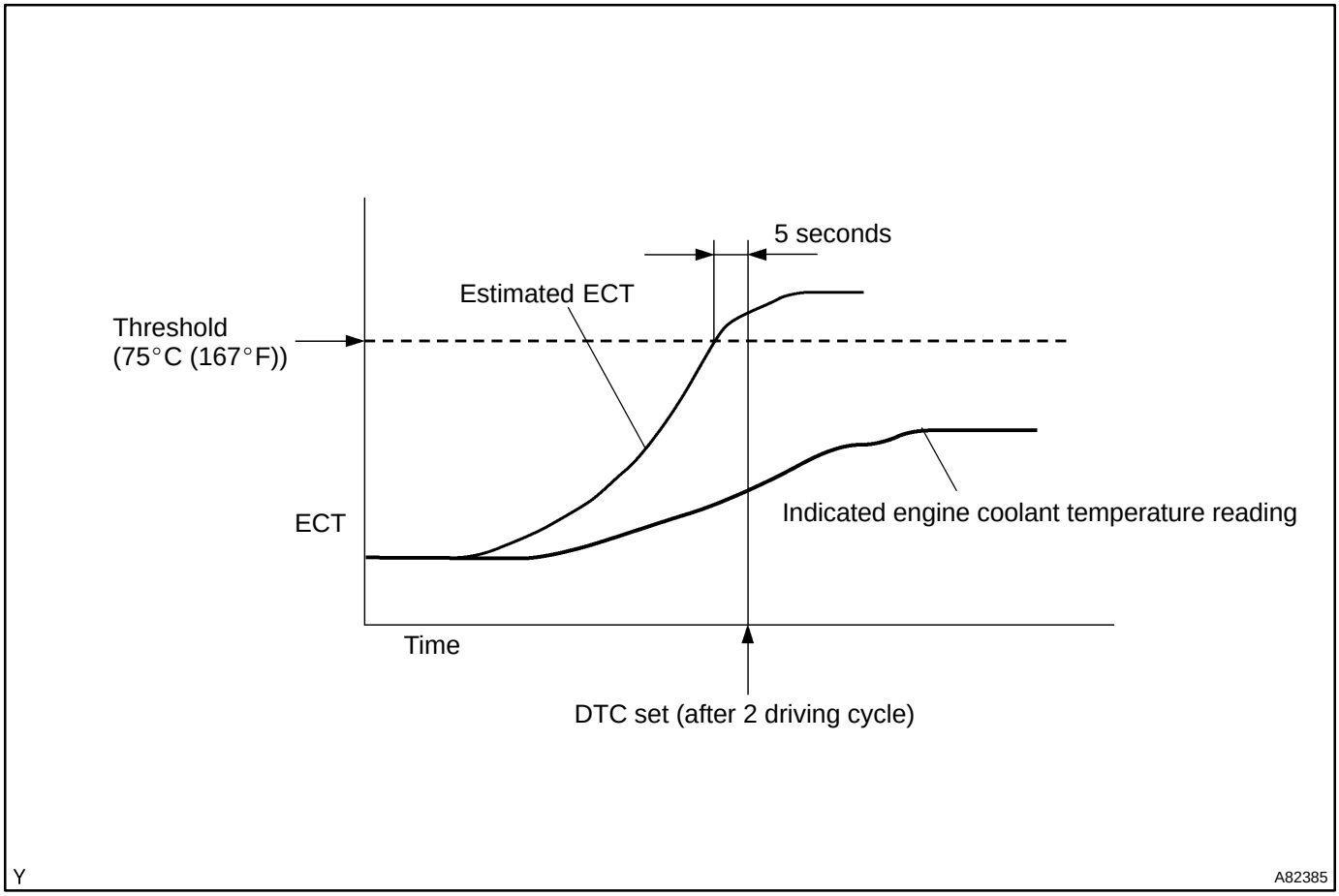
HINT:
This is the purpose of detecting the ”thermostat” malfunction.

CIRCUIT DESCRIPTION

If the engine coolant temperature (ECT) does not reach 75˚C (167˚F) despite sufficient warm–up time has elapsed.

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

MONITOR DESCRIPTION



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

MONITOR STRATEGY

Related DTCs	P0128: Thermostat
Required sensors/components	Main: Engine coolant temperature sensor, engine cooling system, thermostat Related: Intake air temperature sensor, vehicle speed sensor
Frequency of operation	Once per driving cycle
Duration	15 minutes
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever the following DTCs are not present	See page 05–20
Battery voltage	11 V or more
Intake air temperature (at engine start)	–10°C (14°F) or more, and 35°C (95°F) or less
Engine coolant temperature (at engine start)	–10°C (14°F) or more, and 35°C (95°F) or less
Engine coolant temperature at engine start compared with intake air temperature	Maximum of 15°C (27°F) lower or 7°C (12.6°F) higher

TYPICAL MALFUNCTION THRESHOLDS

(1) Estimated engine coolant temperature	75°C (167°F) or more
(2) Estimated engine coolant temperature sensor output value	Less than 75°C (167°F)
Duration of both (1) and (2)	5 seconds or more

COMPONENT OPERATING RANGE

Engine coolant temperature sensor output value after warm–up	75°C (167°F) or more

MONITOR RESULT (MODE 06 DATA)

Test ID / Comp ID	Description Test Data	Description of Test Limit	Conversion Factor (Unit)
$08 / $81	Difference between actual and estimated engine coolant temperatures The value stored when estimated coolant temperature is 75°C (167°F)	Malfunction criteria for thermostat	Multiply by 0.625 and minus 40 (°C)

Refer to page 05–26 for detailed information on Checking Monitor Status.

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand−held tester or the OBD II scan tool. Freeze frame data records the engine condition when 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 that there is a defect in the cooling system which causes overcool, such as abnormal radiator fan operation, modified cooling system and so on.
OK:
There is no modification of cooling system.

NG → **REPAIR OR REPLACE COOLING SYSTEM**

OK

2	INSPECT THERMOSTAT (See page 16–4)

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

HINT:
Also check the valve is completely closed below the temperature shown above.

NG → **REPLACE THERMOSTAT (See page 16–18)**

OK

REPLACE ECM (See page 10–24)