

<b>DTC</b>	<b>P0128</b>	<b>Coolant Thermostat (Coolant Temperature Below Thermostat Regulating Temperature)</b>
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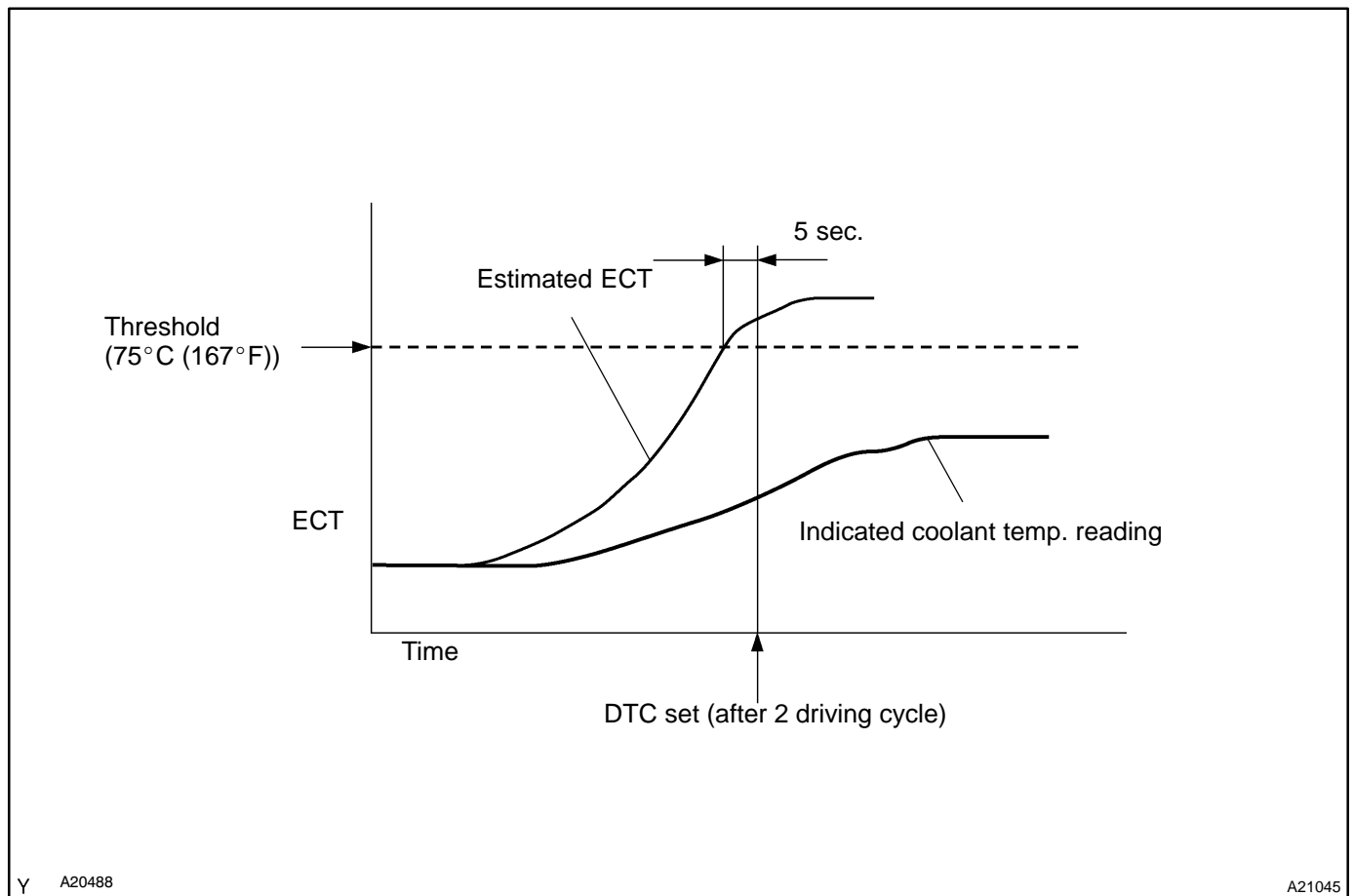
**HINT:**

This is the purpose of "thermostat" malfunction detection.

**CIRCUIT DESCRIPTION**

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

DTC No.	DTC Detection condition	Trouble Area
P0128	Condition (a), (b) and (c) are met: (a) Cold start (b) After sufficient warm-up time has elapsed (c) Engine coolant temperature greater than 75°C (167°F)	<ul style="list-style-type: none"> <li>• Thermostat</li> <li>• Cooling system</li> <li>• Engine coolant temperature sensor</li> <li>• ECM</li> </ul>

**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 (Engine Coolant Temperature). 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	Thermostat
Required sensors/components	Main sensors/components	Engine coolant temperature sensor, Engine cooling system, Thermostat
	Related sensors/components	Intake air temperature sensor, Vehicle speed sensor
Frequency of operation	Once per driving cycle	
Duration	15 min.	
MIL operation	2 driving cycles	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever this DTC is not present	See page <a href="#">DI-18</a>	
Battery voltage	11.0 V	–
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 133°F)	
(c) IAT at engine start	–10 to 56°C (14 to 133°F)	
2. All of the following conditions are met	Condition (a), (b) and (c)	
(a) ECT at engine start – IAT at engine start	7°C (44.6°F)	–
(b) ECT at engine start	–	56°C (133°F)
(c) IAT at engine start	–10°C (14°F)	–
Accumulated time that vehicle speed is 80 mph (128 km/h) or more	–	20 sec.

## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
Duration that both of following conditions 1 and 2 are met	5 sec. or more
1. Estimated ECT	75°C (167°F) or more
2. ECT sensor output	Less than 75°C (167°F)

## COMPONENT OPERATING RANGE

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

## INSPECTION PROCEDURE

### HINT:

Read freeze frame data using the hand-held tester. 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, as well as other data from the time when a malfunction occurred.

1	<b>Are there any other codes (besides DTC P0128) being output?</b>
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### PREPARATION:

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to ON and push the hand-held tester main switch ON.
- (c) When using hand-held tester, enter the following menu: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.

### CHECK:

Read the DTC using the hand-held tester.

### RESULT:

Display (DTC Output)	Proceed to
P0128	A
P0128 and other DTCs	B

### HINT:

If any other codes besides P0128 are output, perform the troubleshooting for those DTCs first.

B

Go to DTC chart (See page [DI-57](#)).

A

2	<b>Check cooling system.</b>
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### CHECK:

- (a) Check for defects in the cooling system that might cause the system to be too cold, such as abnormal radiator fan operation or a modified cooling system.
- (b) Check the valve opening temperature of the thermostat.

### OK:

**Valve opening temperature is 80 to 84°C (176 to 183°F)**

### HINT:

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

NG

Repair or replace cooling system.

OK

3	Inspect thermostat (See page <a href="#">CO-11</a> ).
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**CHECK:**

Check the valve lift.

**OK:**

Valve lift: 10 mm (0.39 in.) or more at 95°C (203°F)

NG

Replace thermostat (See page [CO-11](#)).

OK

Replace ECM (See page [SF-66](#)).