

<b>DTC</b>	<b>P0128</b>	<b>COOLANT THERMOSTAT (COOLANT TEMPERATURE BELOW THERMOSTAT REGULATING TEMPERATURE)</b>
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**HINT:**

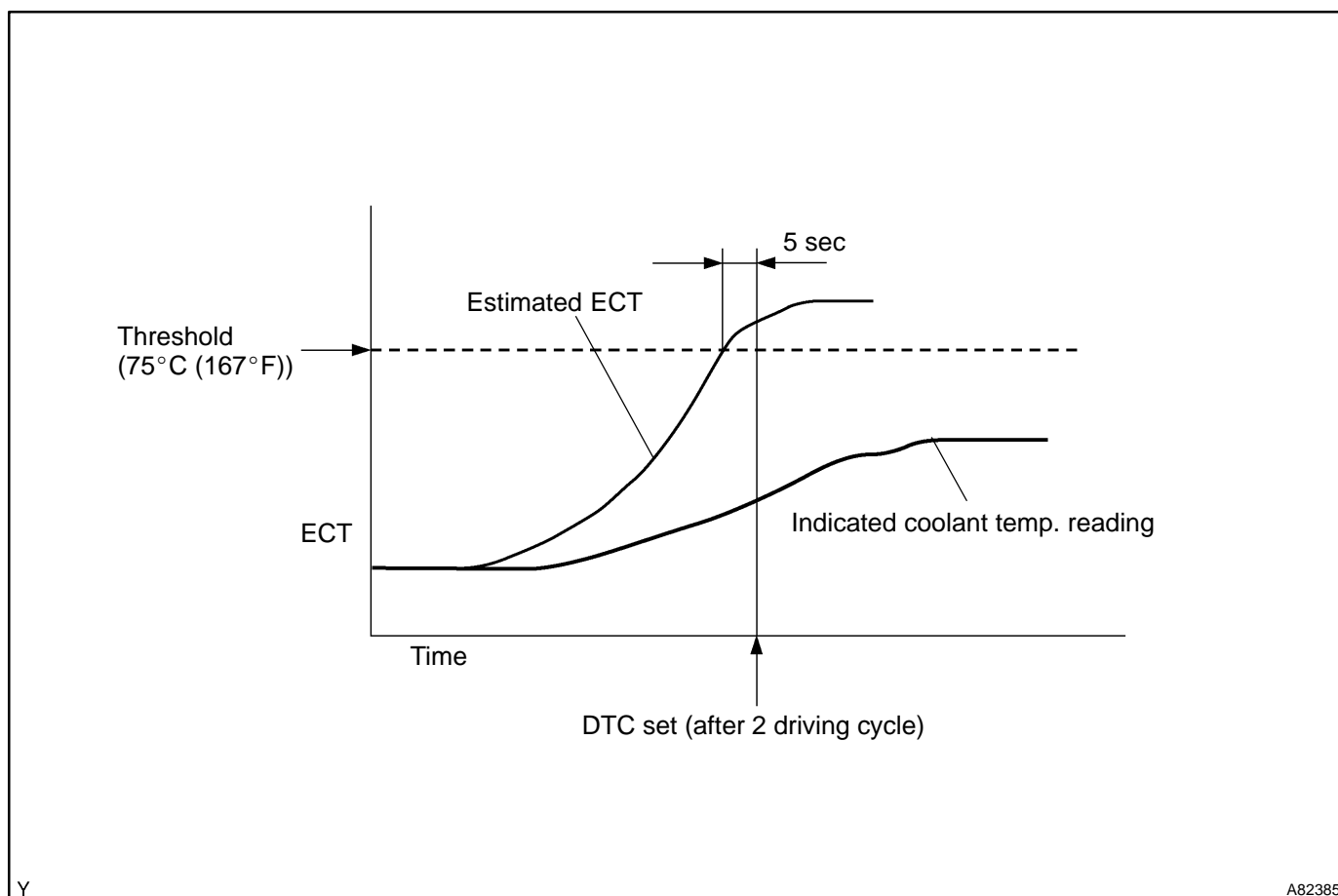
This is the purpose of the "thermostat" malfunction detection.

**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	Condition (a), (b) and (c): (a) Cold start (b) After engine is warmed up (c) Engine coolant temperature is less 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 engine coolant temperature (ECT) based on starting temperature, engine loads, and engine speeds. The ECM then compares the estimated ECT with the actual ECT. When the estimated ECT 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 or thermostat and set a DTC.

## MONITOR STRATEGY

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

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of Disable a Monitor" (On page 05-25)	
Battery voltage	11.0 V	–
Intake air temperature (at engine start)	-10°C (14°F)	35°C (95°F)
Engine coolant temperature (at engine start)	-10°C (14°F)	35°C (95°F)
Engine coolant temperature – Intake air temperature (at engine start)	-15°C (-27°F)	7°C (12.6°F)

## TYPICAL MALFUNCTION THRESHOLDS

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

## COMPONENT OPERATING RANGE

Parameter	Standard Value
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 of Test Data	Description of Test Limit	Unit	Conversion Factor
\$08	\$81	Difference between estimated and actual engine coolant temperatures is calculated by ECM. The value stored when estimated coolant temperature =75°C (167°F)	Malfunction criteria for thermostat	Degree C	Multiply by 0.625 and minus 40

Refer to page 05-27 for the 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 conditions when a malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

<b>1</b>	<b>CHECK COOLING SYSTEM</b>
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- (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.

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<b>REPAIR OR REPLACE COOLING SYSTEM</b>
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<b>OK</b>
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<b>2</b>	<b>INSPECT THERMOSTAT (See page 16-3)</b>
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<b>REPLACE THERMOSTAT (See page 16-11)</b>
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<b>OK</b>
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<b>3</b>	<b>CHECK OTHER DTC OUTPUT(IN ADDITION TO DTC P0128)</b>
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- (a) Connect the hand-held tester or the OBD II scan tool to the DLC3.  
 (b) Turn the ignition switch ON and push the hand-held tester or the OBD II scan tool main switch ON.  
 (c) Select the item "DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES".  
 (d) Read the DTCs.

**Result:**

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

**HINT:**

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

<b>B</b>
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<b>GO TO RELEVANT DTC CHART (See page 05-35)</b>
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<b>A</b>
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<b>REPLACE ECM (See page 10-11)</b>
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