

DTC	P0128	Coolant Thermostat (Coolant Temperature Below Thermostat Regulating Temperature)
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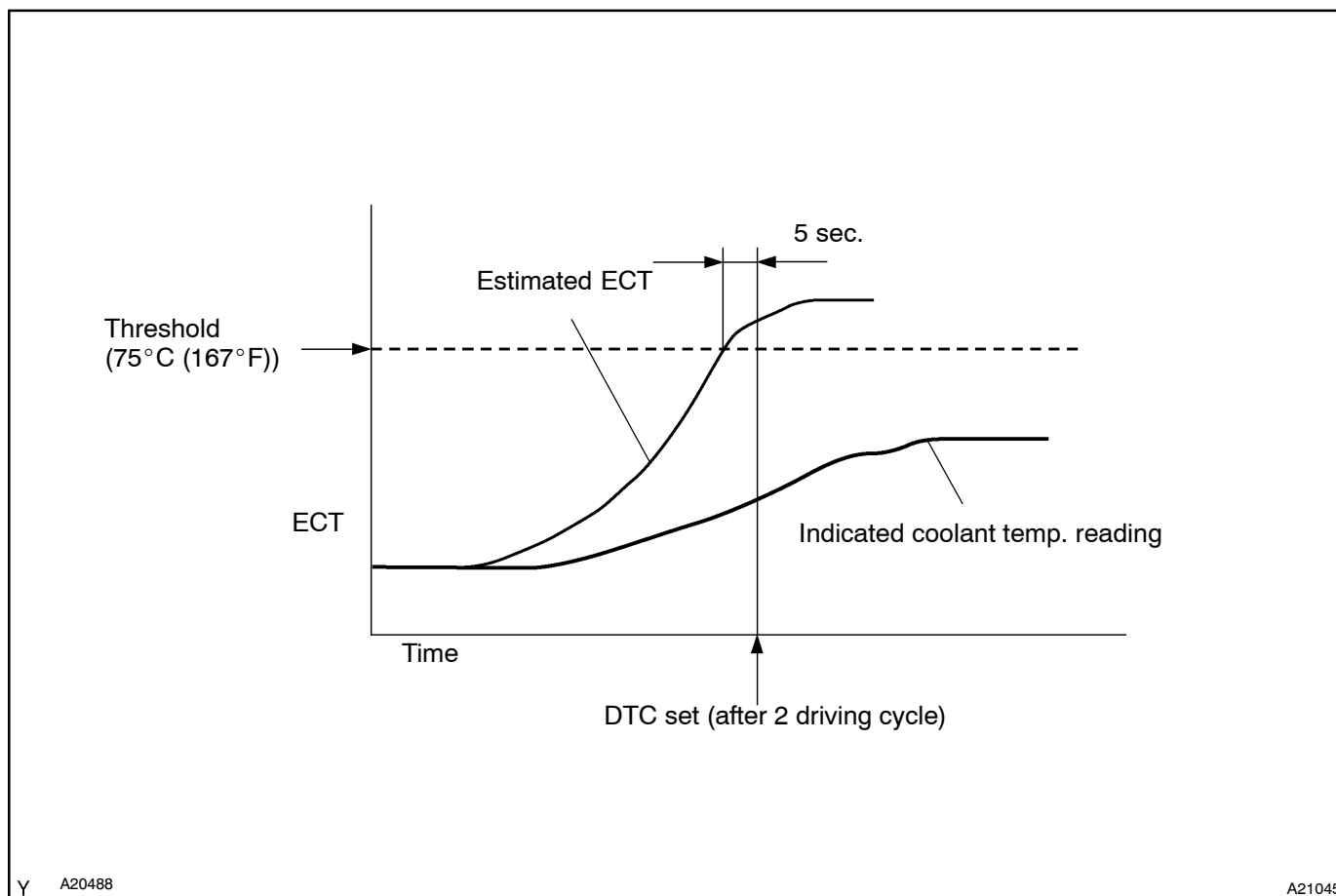
HINT:

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)	• Thermostat • Cooling system • Engine coolant temperature 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 (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 drive 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 the following DTCs are not present	See "List of disable a monitor" (on page DI-3)	
Battery voltage	11.0 V	–
Ignition Switch	ON	
Service connector and OBD check mode-conditions	Service connector OFF or (OBD check mode and idle on)	
Throttle position learning	Completed	
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)
Difference between intake air temperature and engine coolant temperature (at engine start)	–15°C (–27°F)	7°C (12.6°F)
Accumulate time with vehicle speed 128 km/h (80 mph) or more	–	20 sec.
Malfunction/pass determination during this trip	Not yet	

TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
Duration period of both A and B	5 sec. or more
A Estimated engine coolant temperature	75°C (167°F) or more
B Engine coolant temperature sensor output value	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

MONITOR RESULT (MODE 06 DATA)

Refer to page [DI-3](#) 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 [DI-34](#))

- TID (Test Identification Data) is assigned to each emissions-related component.
- TID (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 OBDII scan tools.

TID \$08: Thermostat

TLT	CID	Unit Conversion	Description of Test Value	Description of Test Limit
0	\$01	Multiply by 0.625 and subtract 40 [°C]	ECT sensor output when estimated ECT has reached to malfunction criterion	Malfunction criterion 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, as well as other data from the time when a malfunction occurred.

1	Are there any other codes (besides DTC P0128) being output?
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PREPARATION:

- Connect the hand-held tester or the OBD II scan tool to the DLC3.
- Turn the ignition switch ON and push the hand-held tester or OBD II scan tool main switch ON.
- When using hand-held tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.

CHECK:

Read the DTC using the hand-held tester or the OBD II scan tool.

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 relevant DTC chart (See page [DI-43](#)).

A

2	Check cooling system.
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CHECK:

Check that there is a defect in the cooling system which causes over-cool, such as abnormal radiator fan operation, modified cooling system and so on.

NG

Repair or replace cooling system.

OK

3	Check thermostat (See page CO-12).
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NG

Replace thermostat.

OK

Replace ECM (See page [SF-60](#)).