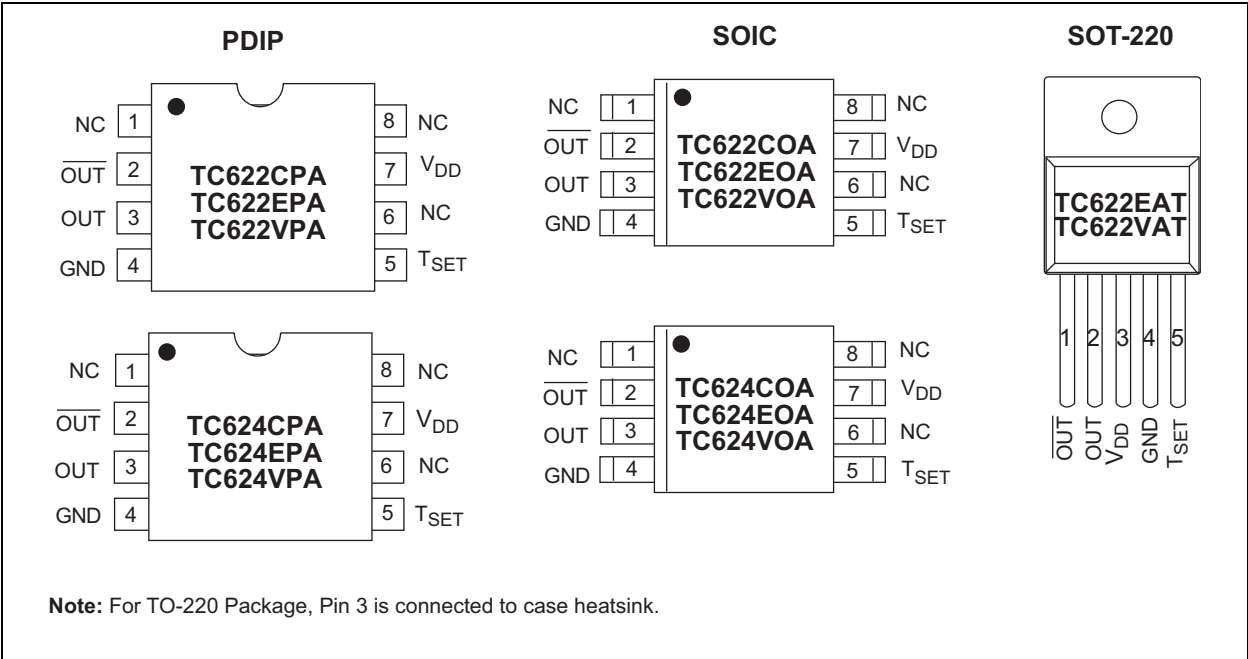
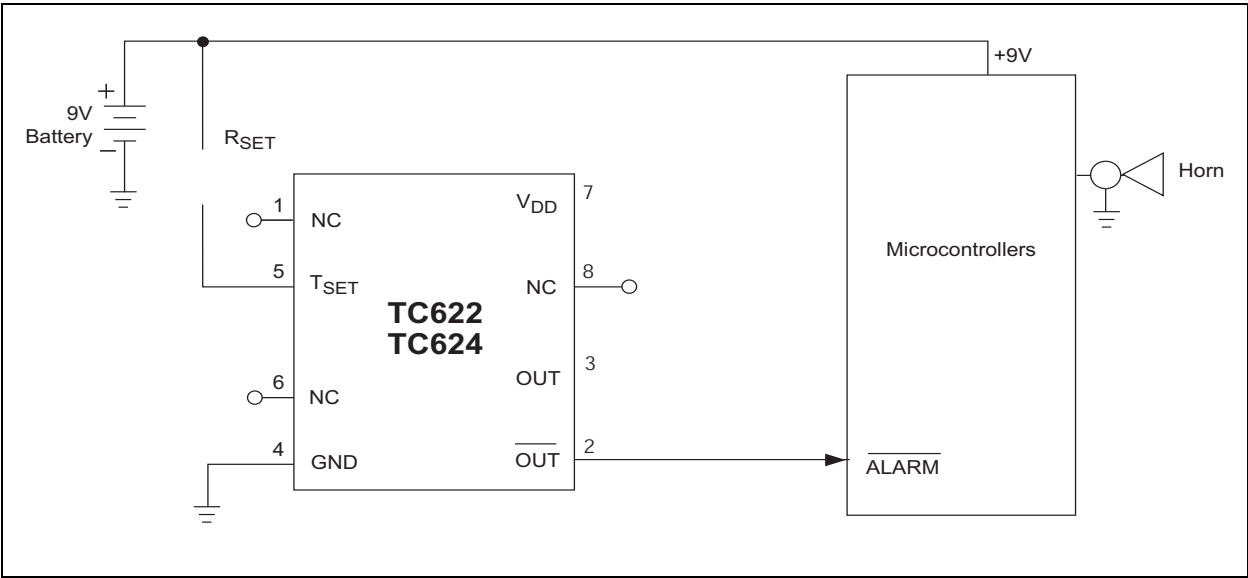


TC622/TC624

Package Type



Functional Block Diagram



1.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings*

Supply Voltage (TC622)	20V
(TC624)	5.5V
Input Voltage Any Input.. (GND – 0.3V) to (V _{DD} +0.3V)	
Operating Temperature	-40°C to +125°C
C Version	0°C to +70°C
E Version	-40°C to +85°C
V Version	-40°C to +125°C
Storage Temperature	-65°C to +150°C

Stresses above those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions above those indicated in the operation sections of the specifications is not implied. Exposure to Absolute Maximum Rating conditions for extended periods may affect device reliability.

TC622/TC624 ELECTRICAL SPECIFICATIONS

Electrical Characteristics: Over operating temperature range, unless otherwise specified.							
Sym	Parameter	Device	Min	Typ	Max	Unit	Test Conditions
V _{DD}	Supply Voltage Range	TC622 TC624	4.5 2.7	— —	18 4.5	V	
I _{DD}	Supply Current	TC622 TC624	— —	200 170	600 300	μA	5.0V ≤ V _{DD} ≤ 18V 2.7V ≤ V _{DD} ≤ 4.5V
V _{OH}	Output Voltage (High)	TC622	0.90 x V _{DD} 0.80 x V _{DD}	— —	— —	V	5.0V ≤ V _{DD} ≤ 18V, -40°C ≤ T _A ≤ +125°C, I _{OH} = 250 μA I _{OH} = 500 μA
V _{OL}	Output Voltage (Low)	TC622	— — —	— — —	0.15 x V _{DD} 0.30 x V _{DD} 0.35 x V _{DD}	V	-40°C ≤ T _A ≤ +85°C, I _{OL} = 500 μA I _{OL} = 1 mA -40°C ≤ T _A ≤ +125°C, I _{OL} = 1 mA
V _{OH}	Output Voltage (High)	TC624	— 0.90 x V _{DD} 0.80 x V _{DD}	— — —	— — —	V	2.7V ≤ V _{DD} ≤ 4.5V -40°C ≤ T _A ≤ +125°C, I _{OH} = 250 μA I _{OH} = 500 μA
V _{OL}	Output Voltage (Low)	TC624	— — —	— — —	0.1 x V _{DD} 0.2 x V _{DD} 0.25 x V _{DD}	V	-40°C ≤ T _A ≤ +85°C, I _{OL} = 500 μA I _{OL} = 1 mA -40°C ≤ T _A ≤ +125°C, I _{OL} = 1 mA
T _{SET}	Absolute Accuracy	TC622 TC624	T - 5 T - 5	T ± 1 T ± 1	T + 5 T + 5	°C	T _{SET} = Programmed Temperature T _{SET} = Programmed Temperature
OUT	Trip Point Hysteresis	TC622 TC624	— —	2 2	— —	°C	

TC622/TC624

2.0 PIN DESCRIPTION

The descriptions of the pins are listed in Table 2-1.

TABLE 2-1: PIN FUNCTION TABLE

Pin No. (8-Pin SOIC) (8-Pin PDIP)	Symbol	Description
1	NC	No Internal Connection.
2	$\overline{\text{OUT}}$	Active low output.
3	OUT	Active high output.
4	GND	Ground Terminal.
5	T _{SET}	Temperature set point. Connect an external 1% resistor from T _{SET} to V _{CC} to set trip point.
6	NC	No Internal Connection.
7	V _{DD}	Power supply input.
8	NC	No Internal Connection.

Pin No. (5-Pin SOT-220)	Symbol	Description
1	$\overline{\text{OUT}}$	Active low output.
2	OUT	Active high output.
3	V _{DD}	Power supply input.
4	GND	Ground Terminal.
5	T _{SET}	Temperature set point. Connect an external 1% resistor from T _{SET} to V _{CC} to set trip point.

3.0 DETAILED DESCRIPTION

3.1 Trip Point Programming

When the temperature of the device exceeds the programmed temperature trip point, T_{SET} , the OUT and $\overline{OUT}$ outputs are driven into their active states. The desired trip point temperature is programmed with a single external resistor connected between the T_{SET} input and V_{CC} . The relationship between the resistor value and the trip point temperature is given by Equation 3-1.

EQUATION 3-1:

$$R_{TRIP} = 0.5997 \times T^{2.1312}$$

Where:

R_{TRIP} = Programming resistor value in Ohms
 T = Desired trip temperature in degrees Kelvin.

For example, as shown in Figure 3-1, to program the device to trip at 50°C, the programming resistor is:

$$R_{TRIP} = 0.5997 \times ((50 + 273.15)^{2.1312}) = 133.65 \text{ k}\Omega$$

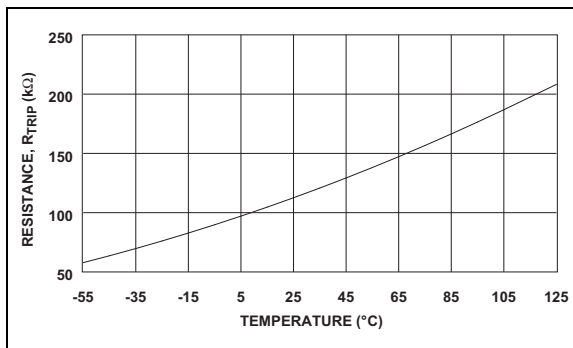


FIGURE 3-1: Programming Resistor Values vs. Temperature

3.2 Hysteresis

To prevent output “chattering” at the trip point temperature, the temperature detector in the TC622/TC624 has 2°C hysteresis (see Figure 3-2). The outputs are driven active when the temperature crosses the set point determined by the external resistor. As temperature declines below the set point, the hysteresis action will hold the outputs true until the temperature drops 2°C below the threshold.

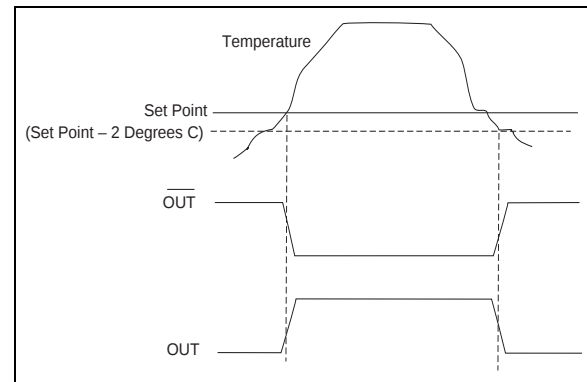


FIGURE 3-2: TC622/TC624 Hysteresis

TC622/TC624

4.0 TYPICAL APPLICATIONS

4.1 Over-Temperature Shutdown

The TC622 can be used to create a simple over-temperature shutdown circuit. In this circuit, temperature is sensed within the system enclosure (internal system ambient) or at the heatsink itself. When measured temperature exceeds a preset limit, a fault is indicated and the system shuts down.

Figure 4-1 illustrates an over-temperature shutdown circuit using the TC622 sensor in a single TO-220 package, allowing direct attachment to the heatsink surface. As shown, the TC622 outputs are driven active when the heatsink temperature equals the trip point temperature set by R_{TRIP} . When this happens, the crowbar circuit is activated, causing the supply output to fold back to zero. The TC622 outputs remain active until the heatsink temperature falls a minimum of 2°C (built-in hysteresis) below the trip point temperature, at which time the device again allows normal supply operation.

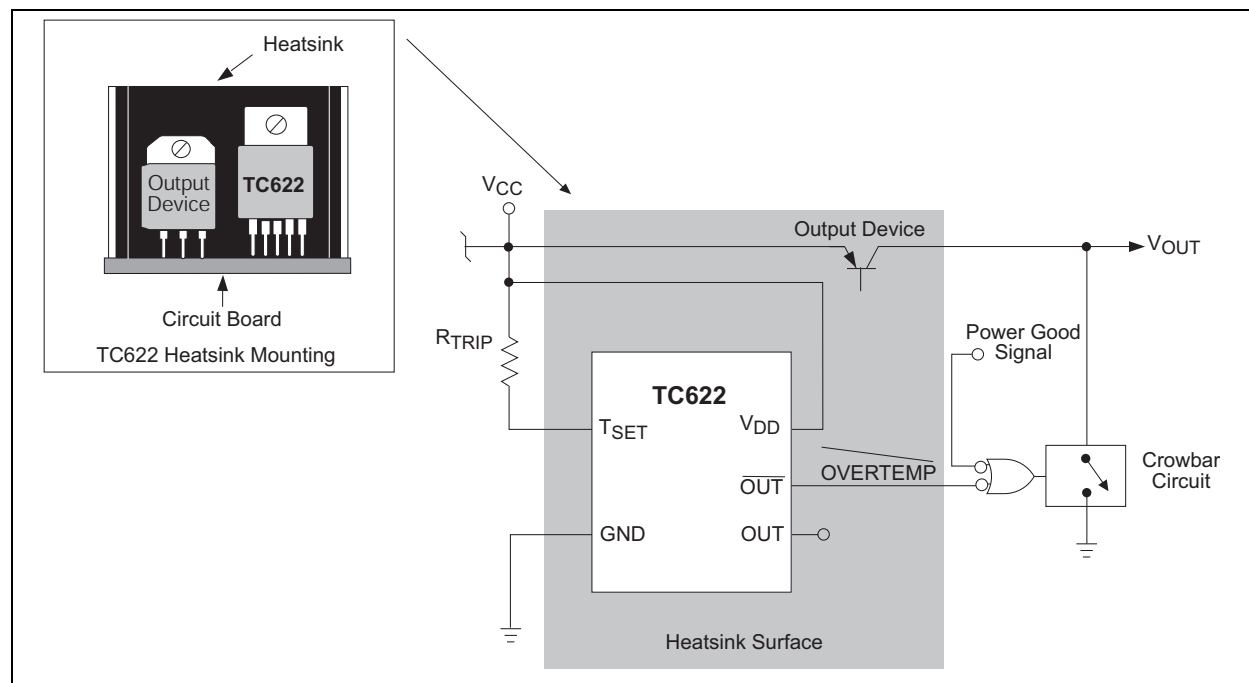


FIGURE 4-1: TC622 Power Supply Over-Temperature Shutdown

4.2 Cooling and Heating Applications

The TC622/TC624 can be used to control a DC fan as shown in Figure 4-2. The fan turns on when the sensed temperature rises above T_{SET} and remains on until the temperature falls below $T_{SET} - 2^{\circ}\text{C}$.

Figure 4-3 shows the TC622 acting as a heater thermostat. Circuit operation is identical to that of the cooling fan application.

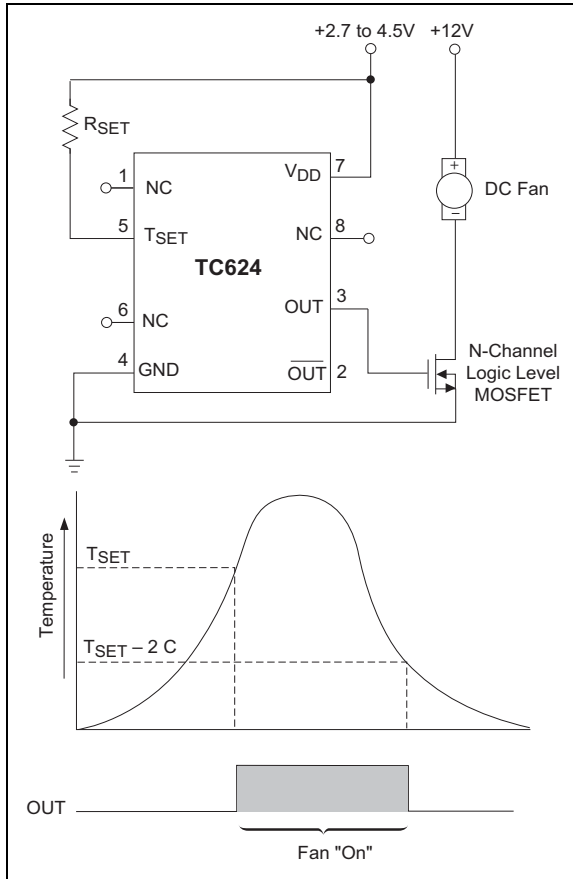


FIGURE 4-2: TC624 As A Fan Controller for Notebook PC

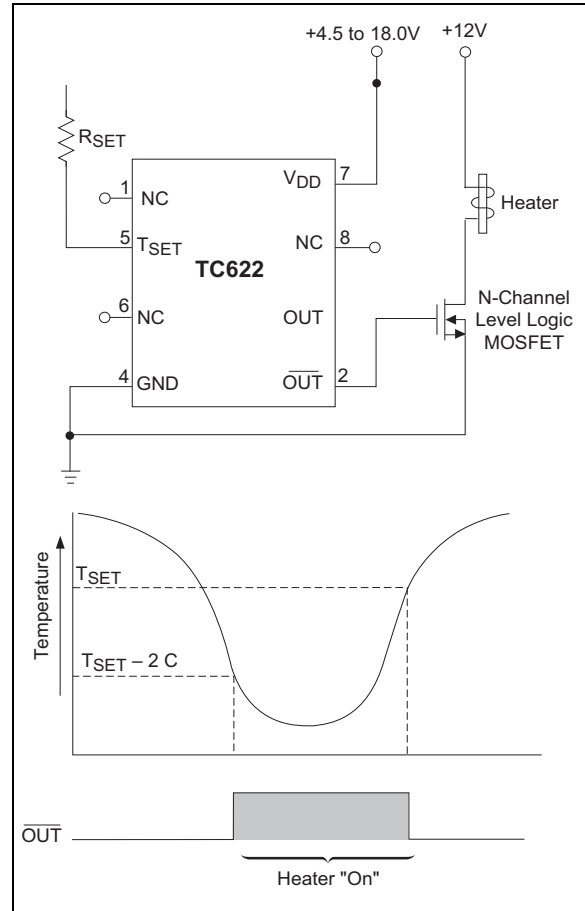


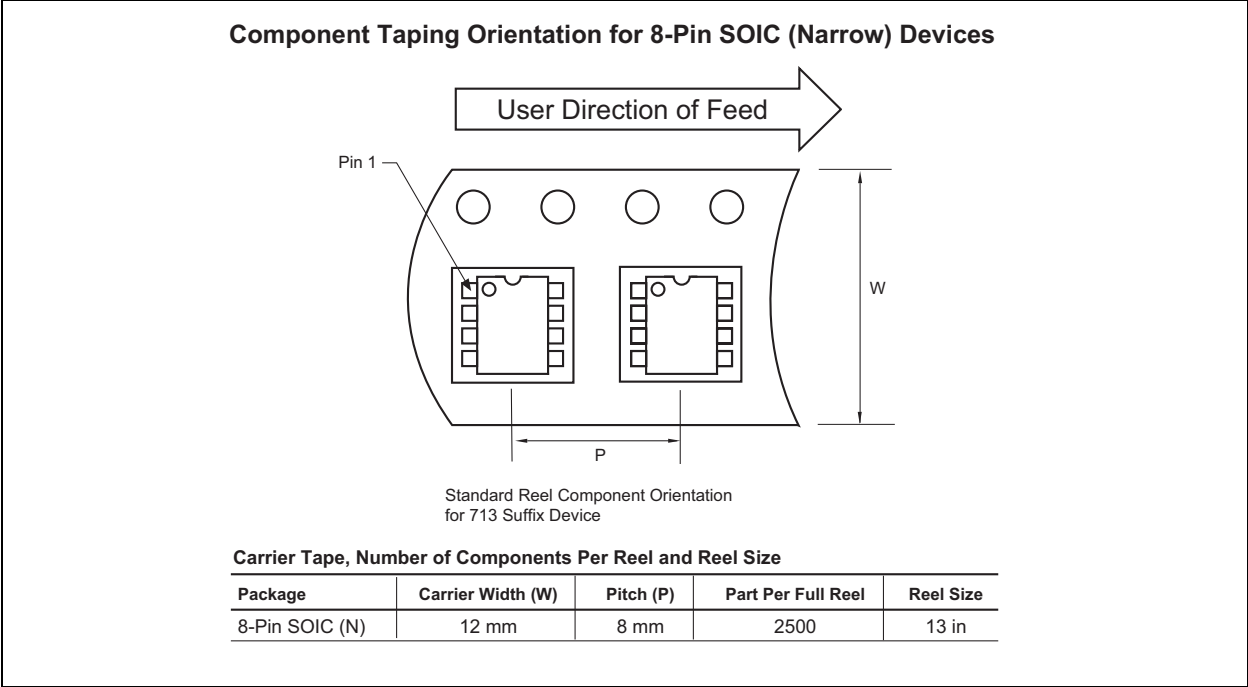
FIGURE 4-3: TC622 As A Heater Thermostat

5.0 PACKAGING INFORMATION

5.1 Package Marking Information

Package marking data not available at this time.

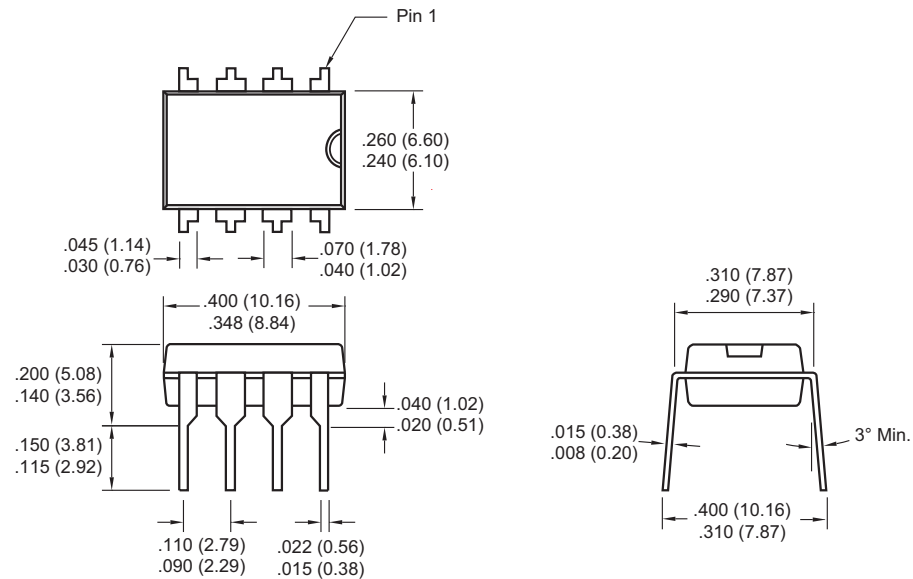
5.2 Taping Form



5.3 Package Dimensions

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

8-Pin Plastic DIP

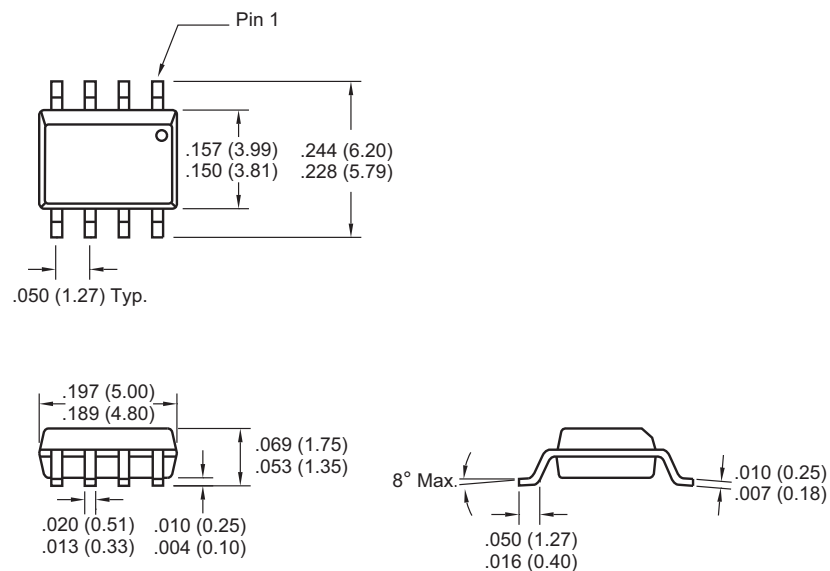


Dimensions: inches (mm)

5.4 Package Dimensions (Continued)

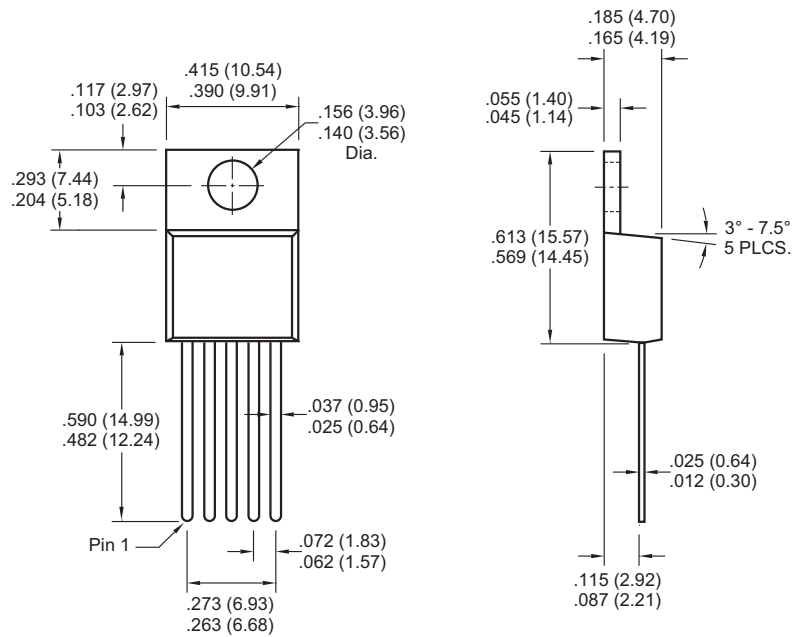
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

8-Pin SOIC



Dimensions: inches (mm)

5-Pin TO-220



Dimensions: inches (mm)

6.0 REVISION HISTORY

Revision D (December 2012)

Added a note to each package outline drawing.

TC622/TC624

NOTES:

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TC622/TC624

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