TD Series

GENERAL INFORMATION

Each TD sensor includes a 0.040 x 0.050 in silicon sensing element. The element is a laser trimmed thin-film resistive network, calibrated for sensor-to-sensor interchangeability.

TD4 sensors are designed for liquid temperature sensing. TD4A is a two-terminal threaded anodized aluminum housing. TD5A is a miniature plastic package designed for small size and low cost.

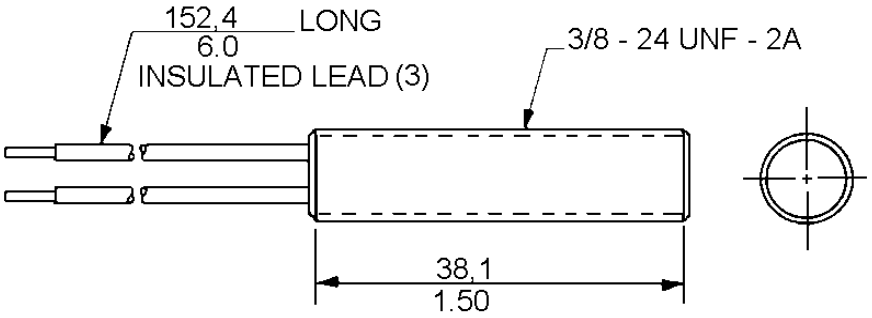
CAUTION

PRODUCT DAMAGE

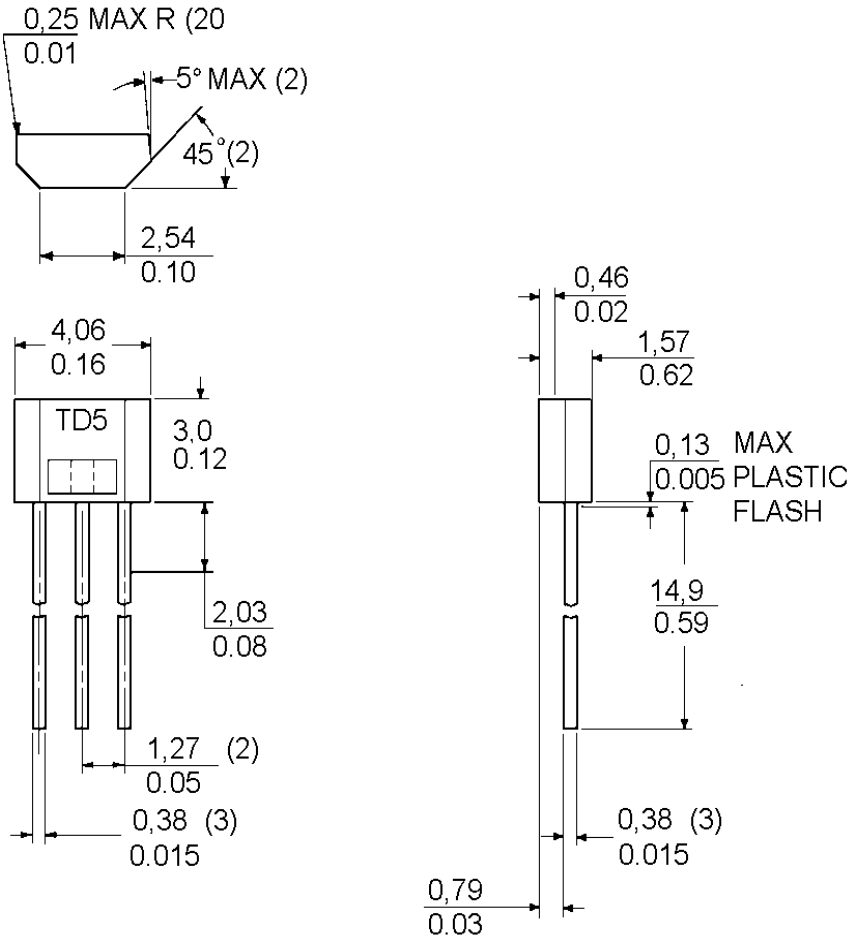
The inherent design of this component causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation, take normal ESD precautions when handling this product.

MOUNTING DIMENSIONS (for reference only) mm/in

TD4A



TD5A



ABSOLUTE MAXIMUM RATINGS

Operating Temperature	-40 to +150°C (-40 to +302°F)
Storage Temperature	-55 to +170°C (-67 to +338°F)
Voltage	10 VDC Continuous (24 hours)

INTERCHANGEABILITY (with 1 mA maximum current)

Temperature		Resistance (Ω)	Temperature		Resistance (Ω)
°C	°F		°C	°F	
-40	-40	1584 ± 12 (1.9°C)	+60	140	2314 ± 9 (1.1°C)
-30	-22	1649 ± 11 (1.7°C)	+70	158	2397 ± 10 (1.2°C)
-20	-4	1715 ± 10 (1.5°C)	+80	176	2482 ± 12 (1.4°C)
-10	14	1784 ± 9 (1.3°C)	+90	194	2569 ± 14 (1.6°C)
0	32	1854 ± 8 (1.1°C)	+100	212	2658 ± 16 (1.8°C)
+10	50	1926 ± 6 (0.8°C)	+110	230	2748 ± 18 (2.0°C)
+20	68	2000 ± 5 (0.7°C)	+120	248	2840 ± 19 (2.0°C)
+30	86	2076 ± 6 (0.8°C)	+130	266	2934 ± 21 (2.2°C)
+40	104	2153 ± 6 (0.8°C)	+140	284	3030 ± 23 (2.4°C)
+50	122	2233 ± 7 (0.9°C)	+150	302	3128 ± 25 (2.5°C)

It is recommended that resistance measurements be made of 1000 uA or less to minimize internal heating of the sensor. Measurements at currents up to 1 mA will not damage the sensor, but the resistance characteristics should be adjusted for internal heating.

Equation for computing resistance:

$R_T = R_O + (3.84 \times 10^{-3} \times R_O \times T) + (4.94 \times 10^{-6} \times R_O \times T^2)$

R_T = Resistance at temperature R

R_O = Resistance at 0°C

T = Temperature in °C

Figure 2. Linear Output Voltage Circuit

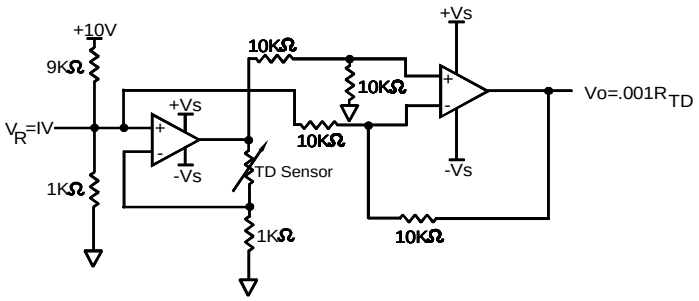
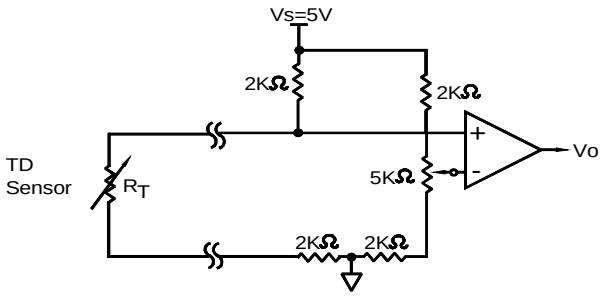


Figure 3. Adjustable Point (Comparator) Interface



Linearity

± 2% (-25 °C to 85 °C)

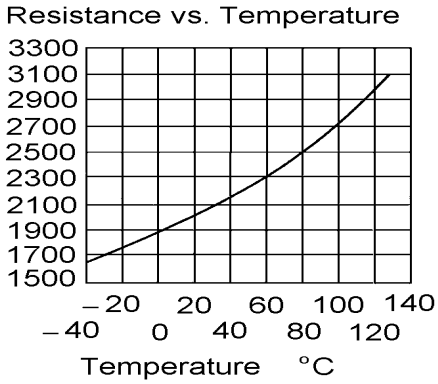
± 3% (-40 °C to 150 °C)

TD sensors can be linearized to within ± 0.2 %

Repeatability

± 1 Ohm

FIGURE 1. TD SERIES RESISTANCE VS TEMPERATURE CURVE



ELECTRICAL INTERFACING

The high nominal resistance, positive temperature coefficient and linear sensitivity characteristics of the TD Series temperature sensors simplifies the task of designing a simple circuit that can be used to linearize the voltage output to within 0.2% or a ± 0.4 °C error over a range of 40 to +150 °C (-40 to +302 °F).

Figure 2 is a simple circuit that can be used to linearize the voltage output to within 0.2% or a ± 0.4 °C error over a range of -40 to +150 °C (-40 to +302 °F).

Figure 3 illustrates one method of detecting one particular temperature. The potentiometer in the comparator circuit can be adjusted to correspond to the desired temperature.