

## TD Series

## TEMPERATURE SENSORS

### 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.

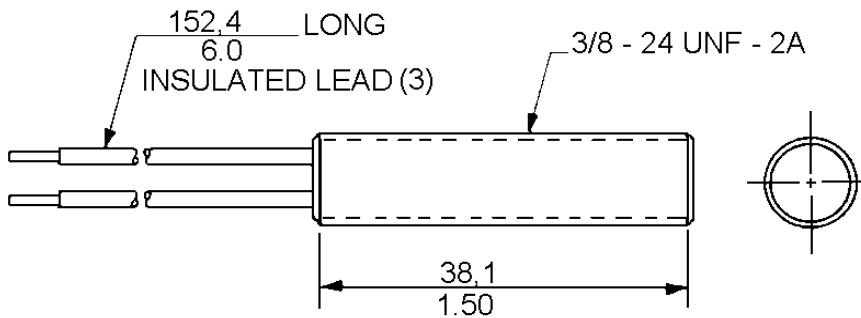
### CAUTION

#### PRODUCT DAMAGE

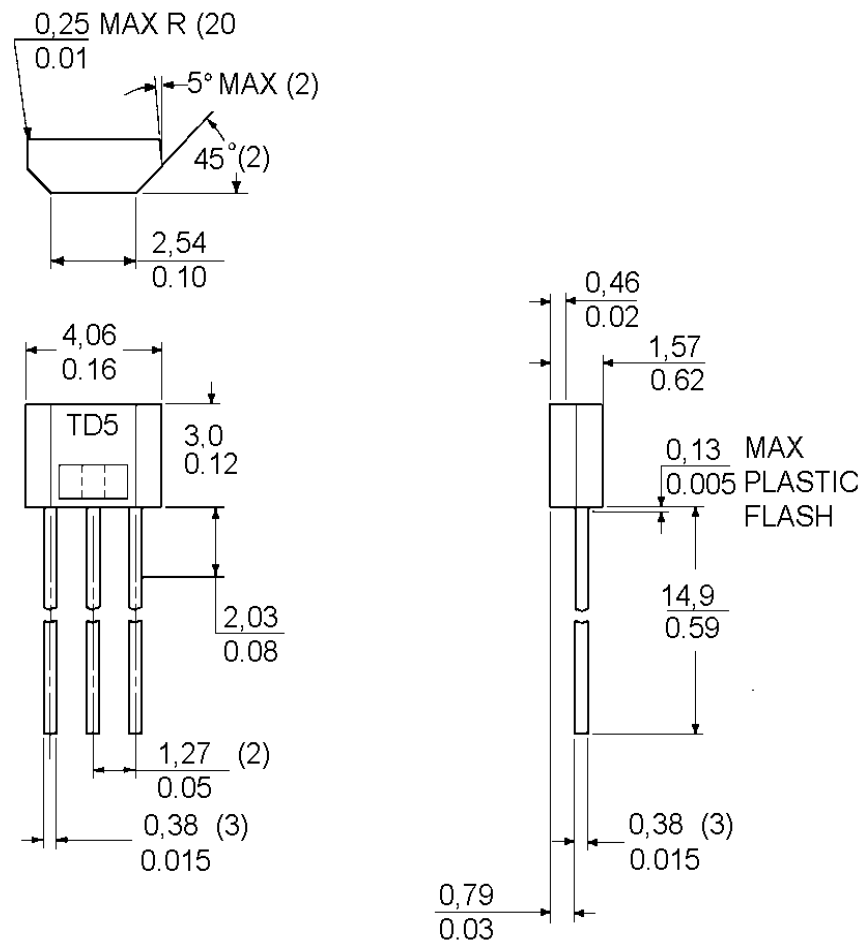
The inherent design of this component causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation, take normal ESD precautions when handling this product.

### 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:

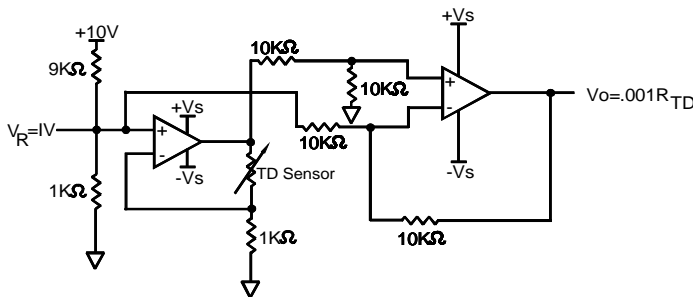
$$R_T = R_0 + (3.84 \times 10^{-3} \times R_0 \times T) + (4.94 \times 10^{-6} \times R_0 \times T^2)$$

$R_T$  = Resistance at temperature R

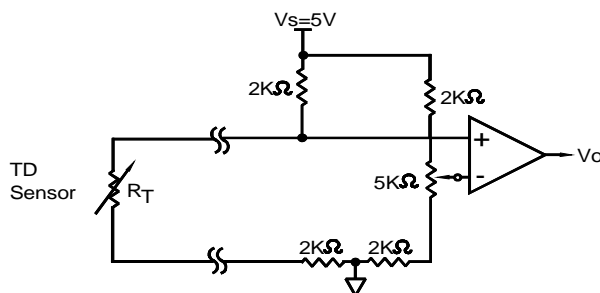
$R_0$  = Resistance at 0°C

T = Temperature in °C

**Figure 2. Linear Output Voltage Circuit**



**Figure 3. Adjustable Point (Comparator) Interface**



### Linearity

± 2% (-25 °C to 85 °C)

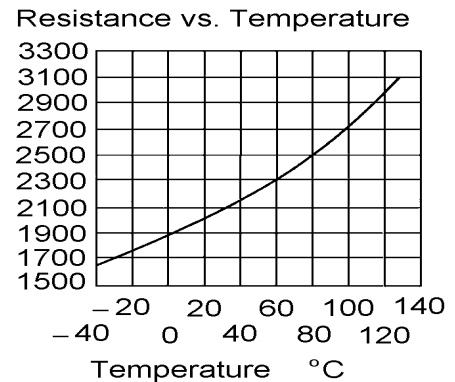
± 3% (-40 °C to 150 °C)

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.

# Temperature Sensors HEL-700

PLATINUM RTDs

## WARRANTY and REMEDY

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# Honeywell

## MICRO SWITCH

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