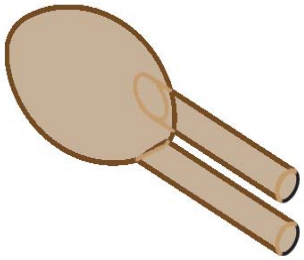
June, 2008

WAVELENGTH ELECTRONICS

TCS610

10 kΩ NTC Bead Head Thermistor

Graphic enlarged for detail



GENERAL DESCRIPTION:

These ±1% thermistors are conformally coated, two-lead thermistors for applications where embedding the thermistor is required. The coating is baked on phenolic for durability and long term stability. They have solid nickel wires with Teflon® insulation to provide isolation when assembled in metal housings.

Thermal Resistance or Dissipation Constant is 2-3 mW/°C.

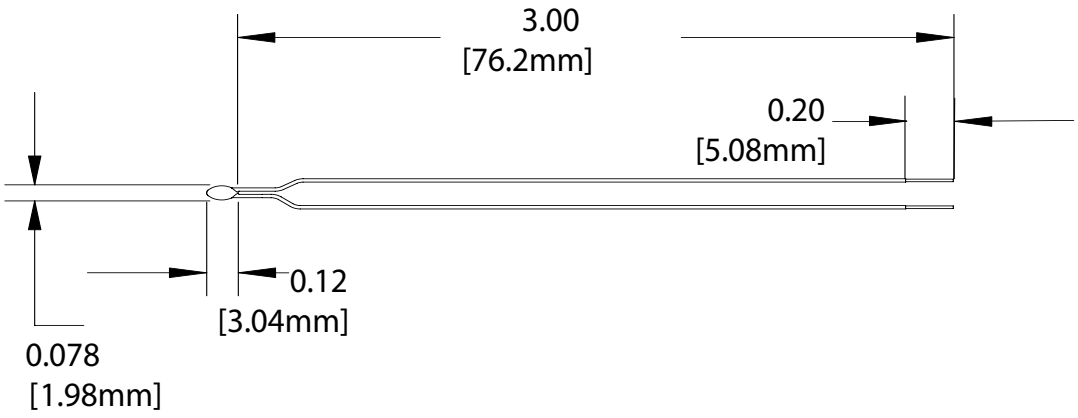
Thermal Time Constant is 6-14 seconds.

FEATURES:

- Low Cost
- Small Size -- Conformally Coated
- Wide Resistance Range
- Available in 5 Different R-T Curves
- 1% Tolerance
- 3” Long Solid Nickel Wire Leads
- Teflon® Insulation Provides Isolation from Metal Housing
- RoHS Compliant (by exemption)

Thermistor Selection Guide			
MODEL	R @ 25 °C	10 µA RANGE	100 µA RANGE
TCS605	5 kΩ	-55 to -2 °C	-20 to +33 °C
TCS610	10 kΩ	-45 to +13 °C	-8 to +50 °C
TCS10K5	10 kΩ	-45 to +13 °C	-8 to +50 °C
TCS620	20 kΩ	-35 to +28 °C	+6 to +69 °C
TCS650	50 kΩ	-18 to +49 °C	+25 to +92 °C
TCS651	100 kΩ	-6 to +67 °C	+41 to +114 °C

Figure 1
Dimensions



RESISTANCE VERSUS TEMPERATURE RESPONSE
TCS610 10 kΩ THERMISTOR @ 25°C

10 µA TEMPERATURE RANGE: -45 to +13°C
100 µA TEMPERATURE RANGE: -8 to +50°C

TEMP (°C)	R_T (Ω)	VOLT (V) (10 µA)	VOLT (V) (100 µA)
-45	473200	4.732	
-44	441800	4.418	
-43	412600	4.126	
-42	385600	3.856	
-41	360500	3.605	
-40	337200	3.372	
-39	315500	3.155	
-38	295400	2.954	
-37	276700	2.767	
-36	259300	2.593	
-35	243100	2.431	
-34	228000	2.280	
-33	213900	2.139	
-32	200800	2.008	
-31	188600	1.886	
-30	177200	1.772	
-29	166500	1.665	
-28	156600	1.566	
-27	147300	1.473	
-26	138600	1.386	
-25	130500	1.305	
-24	122900	1.229	
-23	115800	1.158	
-22	109200	1.092	
-21	103000	1.030	
-20	97130	0.971	
-19	91660	0.916	
-18	86540	0.865	
-17	81730	0.817	
-16	77220	0.772	
-15	72980	0.729	
-14	69000	0.690	
-13	65260	0.652	
-12	61750	0.617	
-11	58450	0.584	
-10	55340	0.553	
-9	52420	0.524	
-8	49670	0.496	4.967
-7	47080	0.470	4.708
-6	44640	0.446	4.464
-5	42340	0.423	4.234
-4	40170	0.401	4.017
-3	38120	0.381	3.812
-2	36200	0.362	3.620
-1	34380	0.343	3.438
0	***32660***	***0.326***	***3.266***
1	31040	0.310	3.104
2	29510	0.295	2.951
3	28060	0.280	2.806
4	26690	0.266	2.669
5	25400	0.254	2.540
6	24180	0.241	2.418
7	23020	0.230	2.302
8	21920	0.219	2.192
9	20890	0.208	2.089
10	19900	0.199	1.990
11	18970	0.189	1.897
12	18090	0.180	1.809
13	17260	0.172	1.726
14	16470		1.647
15	15710		1.571
16	15000		1.500
17	14320		1.432
18	13680		1.368
19	13070		1.307
20	12490		1.249
21	11940		1.194
22	11420		1.142
23	10920		1.092
24	10450		1.045
25	***10000***		***1.000***
26	9572		0.957
27	9165		0.916
28	8777		0.877
29	8408		0.840
30	8056		0.805
31	7721		0.772
32	7402		0.740
33	7098		0.709
34	6808		0.680
35	6531		0.653
36	6267		0.626
37	6015		0.601
38	5774		0.577
39	5545		0.554
40	5326		0.532
41	5116		0.511
42	4916		0.491
43	4725		0.472
44	4543		0.454
45	4368		0.436
46	4201		0.420
47	4041		0.404
48	3888		0.388
49	3742		0.374
50	3602		0.360

You can approximate the response of a thermistor with the Steinhart-Hart Equation. The A, B, and C values listed below apply to the following equation. The coefficients are optimized for the ranges covered by the reference currents.

$$\frac{1}{T} = A + B \times \ln R + C \times (\ln R)^3$$, where R is in ohms and T is in Kelvin

Steinhart-Hart Coefficients			
10 µA RANGE		**100 µA RANGE**	
A	1.1235E-03	A	1.1279E-03
B	2.3500E-04	B	2.3429E-04
C	8.4538E-08	C	8.7298E-08

CERTIFICATION AND WARRANTY

CERTIFICATION:
Wavelength Electronics (WEI) certifies that this product met it's published specifications at the time of shipment. Wavelength further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology, to the extent allowed by that organization's calibration facilities, and to the calibration facilities of other International Standards Organization members.

WARRANTY:
This Wavelength product is warranted against defects in materials and workmanship for a period of 90 days from date of shipment. During the warranty period, Wavelength will, at its option, either repair or replace products which prove to be defective.

WARRANTY SERVICE:
For warranty service or repair, this product must be returned to the factory. An RMA is required for products returned to Wavelength for warranty service. The Buyer shall prepay shipping charges to Wavelength and Wavelength shall pay shipping charges to return the product to the Buyer upon determination of defective materials or workmanship. However, the Buyer shall pay all shipping charges, duties, and taxes for products returned to Wavelength from another country.

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REVISION HISTORY		
REVISION	**DATE**	**NOTES**
REV. A	13-Jun-08	Added technical detail per customer request

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