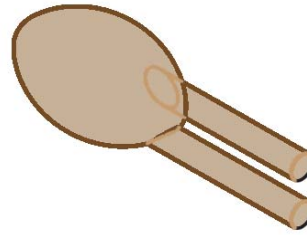




Graphic
enlarged
for
detail

TCS650

50 kΩ NTC Bead Head Thermistor



TCS650 NTC THERMISTOR

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.

FEATURES:

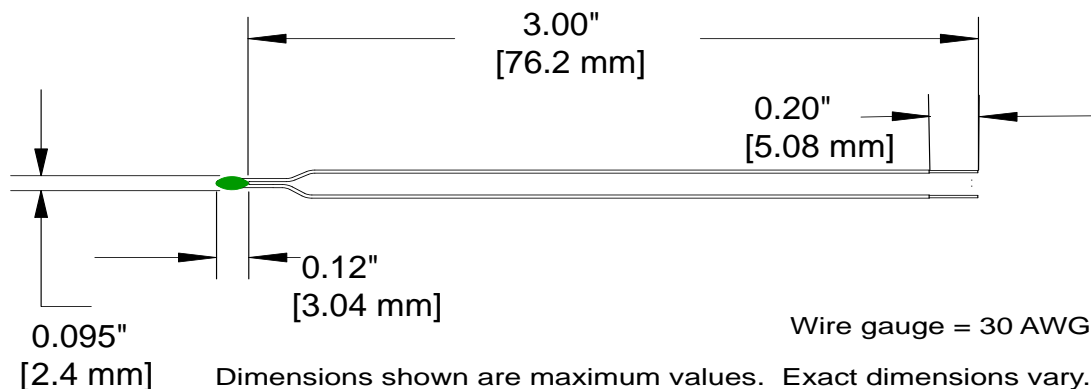
- Low Cost
- Small Size -- Conformally Coated
- Wide Resistance Range
- Available in 5 Different R-T Curves
- 1% Tolerance
- 3" Long Solid Nickel Wire Leads
- Teflon® Insulation Provides Isolation from Metal Housing
- RoHS Compliant (by exemption)

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

Thermal Time Constant is 6-14 seconds.

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

TCS650 50 kΩ THERMISTOR @ 25°C

10 μA TEMPERATURE RANGE: -18 to +49°C

100 μA TEMPERATURE RANGE: +25 to +92°C

TEMP (°C)	R _T (Ω)	VOLT (V) (10 μA)	VOLT (V) (100 μA)	TEMP (°C)	R _T (Ω)	VOLT (V) (10 μA)	VOLT (V) (100 μA)	TEMP (°C)	R _T (Ω)	VOLT (V) (10 μA)	VOLT (V) (100 μA)
-18	489000	4.890		19	66500	0.665		56	13205		1.320
-17	460500	4.605		20	63350	0.633		57	12695		1.269
-16	434000	4.340		21	60400	0.604		58	12210		1.221
-15	409000	4.090		22	57600	0.576		59	11740		1.174
-14	385500	3.855		23	54950	0.549		60	11295		1.129
-13	364000	3.640		24	52400	0.524		61	10870		1.087
-12	343500	3.435		25	50000	0.500	5.000	62	10460		1.046
-11	324000	3.240		26	47725	0.477	4.772	63	10070		1.007
-10	306000	3.060		27	45565	0.455	4.556	64	9695		0.969
-9	289000	2.890		28	43510	0.435	4.351	65	9335		0.933
-8	273000	2.730		29	41565	0.415	4.156	66	8990		0.899
-7	258000	2.580		30	39710	0.397	3.971	67	8660		0.866
-6	244000	2.440		31	37950	0.379	3.795	68	8345		0.834
-5	231000	2.310		32	36280	0.362	3.628	69	8040		0.804
-4	218500	2.185		33	34690	0.346	3.469	70	7750		0.775
-3	206500	2.065		34	33180	0.331	3.318	71	7475		0.747
-2	195500	1.955		35	31740	0.317	3.174	72	7205		0.720
-1	185500	1.855		36	30370	0.303	3.037	73	6950		0.695
0	175500	1.755		37	29070	0.290	2.907	74	6705		0.670
1	166500	1.665		38	27830	0.278	2.783	75	6465		0.646
2	157500	1.575		39	26650	0.266	2.665	76	6240		0.624
3	149500	1.495		40	25525	0.255	2.552	77	6020		0.602
4	142000	1.420		41	24455	0.244	2.445	78	5815		0.581
5	134500	1.345		42	23430	0.234	2.343	79	5610		0.561
6	127500	1.275		43	22460	0.224	2.246	80	5420		0.542
7	121500	1.215		44	21530	0.215	2.153	81	5235		0.523
8	115000	1.150		45	20645	0.206	2.064	82	5055		0.505
9	109500	1.095		46	19805	0.198	1.980	83	4885		0.488
10	103900	1.039		47	19000	0.190	1.900	84	4720		0.472
11	98800	0.988		48	18230	0.182	1.823	85	4560		0.456
12	93900	0.939		49	17495	0.175	1.749	86	4410		0.441
13	89350	0.893		50	16795		1.679	87	4260		0.426
14	85000	0.850		51	16125		1.612	88	4120		0.412
15	80850	0.808		52	15490		1.549	89	3985		0.398
16	77000	0.770		53	14880		1.488	90	3855		0.385
17	73300	0.733		54	14295		1.429	91	3730		0.373
18	69800	0.698		55	13740		1.374	92	3605		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.

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

Steinhart-Hart Coefficients

10 μA RANGE		100 μA RANGE	
A	9.5346E-04	A	9.6911E-04
B	2.1233E-04	B	2.1014E-04
C	8.1509E-08	C	8.8019E-08

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 one (1) year 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.

LIMITATIONS OF WARRANTY:

The warranty shall not apply to defects resulting from improper use or misuse of the product or operation outside published specifications.

No other warranty is expressed or implied. Wavelength specifically disclaims the implied warranties of merchantability and fitness for a particular purpose.

EXCLUSIVE REMEDIES:

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REVISION HISTORY		
REVISION	DATE	NOTES
REV. A	17-Jun-08	Added technical detail per customer request
REV. B	28-Sep-09	Updated to reflect RoHS compliance
REV. C	4-Feb-11	Updated dimensions in Figure 1
REV. D	30-Aug-13	Added wire gauge and extended warranty