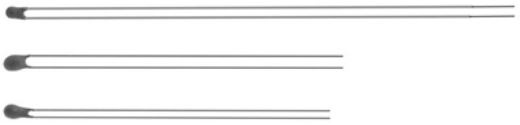
NTC Thermistors, Coated



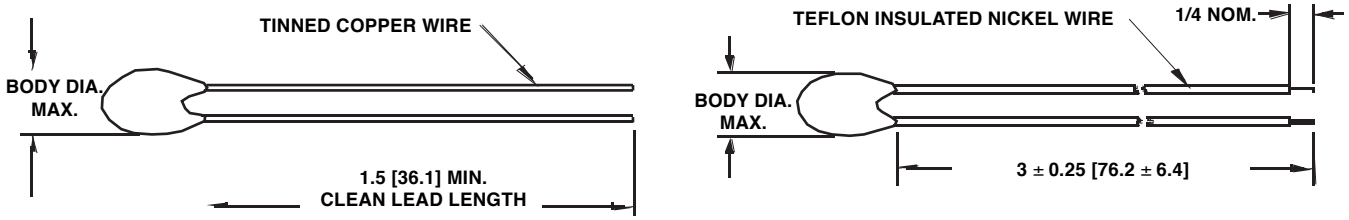
FEATURES

- Small size - conformally coated.
- Wide resistance range.
- Available in 11 different R-T curves.

DESCRIPTION

Models M, C, and T are conformally coated, leaded thermistors for standard PC board mounting or assembly in probes. The coating is baked-on phenolic for durability and long-term stability. Models M and C have tinned solid copper leads. Model T has solid nickel wires with Teflon® insulation to provide isolation when assembled in metal probes or housings.

DIMENSIONS in inches [millimeters]



LD DIAMETER	WIRE SIZE
Type M	AWG 30: 0.0100 [0.254]
Type C	AWG 28: 0.0126 [0.320]
Type T	AWG 30: 0.0100 [0.254]

GLOBAL PART NUMBER INFORMATION

New Global Part Numbering: 01C2001FP (preferred part numbering format)

0	1	C	2	0	0	1	F	P									

CURVE	GLOBAL MODEL	RESISTANCE VALUE	POINT MATCH TOLERANCE	PACKAGING
01 02 03 04 07 08 09 12 13 14 17	C M T	**2001** = 2K	**F** = ± 1 % **J** = ± 5 % **K** = ± 10 %	**F** = Lead (Pb)-free, Bulk **P** = Tin/Lead, Bulk

Historical Part Number example: 1C2001FP (will continue to be accepted)

01	C	2001	F	P
HISTORICAL CURVE	GLOBAL MODEL	RESISTANCE VALUE	TOLERANCE CODE	PACKAGING

New Global Part Numbering: 01C2001SPC3 (preferred part numbering format)

0	1	C	2	0	0	1	S	P	C	3							

CURVE	GLOBAL MODEL	RESISTANCE VALUE	CHARACTERISTICS	PACKAGING	CURVE TRACK TOLERANCE*
01 02 03 04 07 08 09 12 13 14 17	C M T	**2001** = 2K	S	**F** = Lead (Pb)-free, Bulk **P** = Tin/Lead, Bulk	A3 B3 C3 A2 B2 C2 A4 B4 A5 B5 C5 A8 B8 C8

*See following pages for Tolerance explanations and details.

Historical Part Number example: 1C2001SPC3 (will continue to be accepted)

1	C	2001	S	P	C3
HISTORICAL CURVE	GLOBAL MODEL	RESISTANCE VALUE	CHARACTERISTIC	PACKAGING	CURVE TRACK TOLERANCE

SELECTION GUIDE FOR TYPE M, C, AND T THERMISTORS

R_{25} (Ohms)	CURVE NUMBER									
	1	2	3	4	7	8	9	12	14	17
27									•	
33									••	
50									•••	
56									•••	
68			•						•••	
82			••						•••	
100			••						•••	
120			••						•••	
150			•••						•••	
180			•••						•••	
220			•••						•••	
270			•••							
330		•	•••							
390		••	•••							
470		••	•••							
500		••	•••							
560		••	•••							
680		•••								
820		•••								
1K		•••								
1.2K		•••								
1.5K		•••								
1.8K	•	•••								
2.2K	•	•••								
2.7K	••	•••								
3.3K	••	•••								
3.9K	•••									
4.7K	•••									
5K	•••									
5.6K	•••									
6.8K	•••									•
8.2K	•••						•			•
10K	•••			•			••			••
12K	•••			•			••			••
15K	•••			••			•••			•••
18K	•••			••			•••			•••
22K				••			•••			•••
27K				••	•	•	•••			•••
33K				•••	•	••	•••			•••
39K				•••	••	••	•••			•••
47K				•••	••	•••	•••			•••
50K				•••	••	•••	•••			•••
56K				•••	•••	•••	•••			
68K				•••	•••	•••				
82K				•••	•••	•••				
100K				•••	•••	•••				
120K					•••	•••				
150K					•••	•••				
180K					•••	•••				
220K					•••					
270K					•••					
330K								•		
390K								••		
470K								••		
500K								•••		
560K								•••		
680K								•••		
820K								•••		
1 Meg								•••		

MAXIMUM BODY DIAMETER

•	0.125 [3.2]
••	0.110 [2.8]
•••	0.095 [2.4]

DISSIPATION CONSTANT

2 - 3 mWatts/°C

THERMAL TIME CONSTANT

6 - 14 Seconds

NOTE:

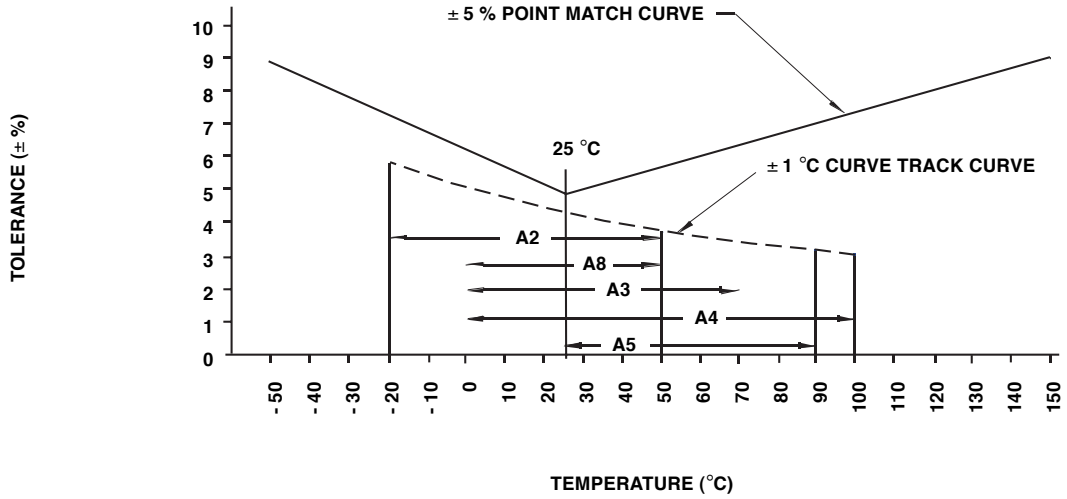
1. Intermediate resistance values between the standard value series are available. Size would be the same as the color grouping.
2. Other body diameters available. Bead diameter increases as Res. decreases. (Consult Factory)
3. Leaded series of thermistors includes additional styles: (Consult Factory)

   Type B: 26AWG lead, 0.0159 [0.40]
   Type F: 32AWG lead, 0.008 [0.20]
   Type E: 24AWG lead, 0.020 [0.51]
   Type D: 22AWG lead, 0.025 [0.64]
   Type G: 20AWG lead, 0.032 [0.81]
   Type H: 18AWG lead, 0.040 [1.02]

TOLERANCES AVAILABLE FOR TYPE M, C AND T THERMISTORS

DESCRIPTION OF THERMISTOR TOLERANCES

The many applications of thermistors have mandated the need for two basic tolerance schemes for these products - Curve Tracking and Point Match Thermistors. An example of the resistance tolerance at various temperatures for the two different tolerancing methods is described in the following graph:



CURVE TRACKING TOLERANCE

Thermistors are calibrated at the high temperature of the curve track range and then final tested at the low temperature of the curve track range. This ensures that the thermistor will meet the specified temperature accuracy at every temperature within the desired temperature range. Several temperature ranges are available and the accuracy of the thermistor may be ± 0.2 °C, ± 0.5 °C, and ± 1.0 °C. The Curve Tracking temperature ranges and their code designators are shown in Figure 1 and Table 1.

To specify, add the appropriate suffix from the following table to the part number.

Example: 1M1002-B3 = Curve 1, 10 kilohms at + 25 °C, curve tracking to ± 0.5 °C from 0 °C to + 70 °C

STANDARD ELECTRICAL SPECIFICATIONS FOR CURVE TRACKING THERMISTORS															
TEMP. RANGE		0 °C to + 70 °C			- 20 °C to + 50 °C			0 °C to + 100 °C			25 °C to + 90 °C			0 °C to + 50 °C		
TOLERANCE		± 1 °C	± 0.5 °C	± 0.2 °C	± 1 °C	± 0.5 °C	± 0.2 °C	± 1 °C	± 0.5 °C	± 0.2 °C	± 1 °C	± 0.5 °C	± 0.2 °C	± 1 °C	± 0.5 °C	± 0.2 °C
PART NO. SUFFIX		- A3	- B3	- C3	- A2	- B2	- C2	- A4	- B4	- C4	- A5	- B5	- C5	- A8	- B8	- C8
C	1	X	X	X	X	X	X	X	X	N/A	X	X	X	X	X	X
U	2	X	X	X	X	X	X	X	X	N/A	X	X	X	X	X	X
R	4	X	X	X	X	X	X	X	X	N/A	X	X	X	X	X	X
V	8	X	X	X	X	X	X	X	X	N/A	X	X	X	X	X	X
E	9	X	X	X	X	X	X	X	X	N/A	X	X	X	X	X	X

POINT MATCH TOLERANCE

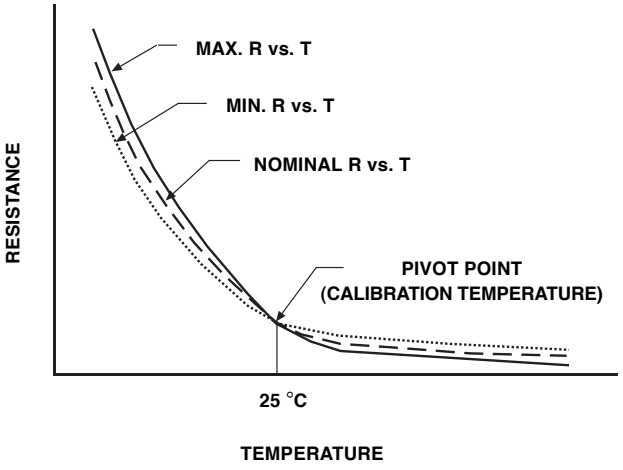
The standard leaded thermistors are calibrated and tested at 25 °C to a tolerance of ± 5 % or ± 10 %; however, tighter tolerance, point matched thermistors are readily available as are special point match temperatures to fit your application.

Since these thermistors have only one controlled point of reference (the point match temperature), the resistance at other temperatures is given by the "Resistance vs. Temperature Conversion Tables" for the appropriate material curve. The resistance value at any temperature is the ratio factor times the resistance at 25 °C.

Example: 1M1002-5, +70 °C resistance = (Resistance factor for curve 1 at 70 °C is 0.1990) X (10000 ohm resistance at 25 °C) = 1990 ohms.

The tolerance of the resistance at any temperature is described by Figure 2.

FIGURE 2
POINT MATCH TOLERANCES VS. TEMPERATURE



Point match resistance tolerances at temperatures other than 25 ºC are not the same as the calibration temperature. This difference is presented in Figure 2.

The tolerance at any given temperature is the point match tolerance + the MT ± % (Manufacturing Tolerance).

The MT ± % may be obtained from the R vs. T Conversion tables and is added to the point match temperature, i.e., ± 1 % Tol. at 25 ºC + ± 2.6 % at - 30 ºC for Curve 1 equals a total tolerance of ± 3.6 % at - 30 ºC.

COMPUTER AIDS FOR THERMISTOR SELECTION

A spreadsheet is available for the Vishay Thermistor Materials that calculates Beta, Steinhart-Hart Equation Constants A, B, and C, the resistance at any temperature based upon the Steinhart constants or Beta, the temperature equivalent of the resistance reading, and resistance temperature coefficients.

This spread sheet will also calculate the total resistance tolerance of any point matched thermistor for temperatures in 10 ºC increments, and the resistance tolerance at any temperature within the calibrated range of curve tracking thermistors. Please contact factory if interested in this Excel™ spreadsheet.

Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay’s terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Vishay:

07C1003SPA3 07M2003FP 08C3002SPA3 07M2003JP 02C1751FP 04M6802JP 02M1501JP 04T5002FP 04T5002JP 01J4002JP 01J4002KP BRACKET101012 02J7001JP 02J7001JR 02C7500KP 12J5004JR 02C9000FP 09T1002JP 09T1002FP 08C1002JP 02J5001JR 02M1801SPB2 02M2001KP 08C1003SPC3 08C1003SPB5 07C5002FP 02C5000SPA3 02C3000SPA2 08C1003FP 07C1003FP 07C1003JP 02C1001FP 04C1003SPC3 02C0750SPB3 07C1003KP 02C1001KP 02C1001JP 02C6000KP 02C5000JP 02C5000KP 07M1203KP 07C5002JP 02C5000FP 02M1201SPB3 04M5002FP 04T5002SPC5 08M5002FP 08M5002JP 01J5002JP 04T1003JP 08T1003JP 04T1003FP 02C1801JP 02C8000FP 08T4002SPC5 08M3002SPB5 01J1003JR 01J1003JP 07M1003JP 07M1003FP 04M1003JP 08M1003JP 02J1502JP 02J1502JR 09M2002KP 08T1003SPC5 02C0500KP 07M2502KP 02C2000JF 1F5001-5 02C5000FF 02C2001JF 02C5001JP 02J1002JR 02C1000FP 04T2002JP 09M2002JP 08T3002FP 08C3002SPB3 07M2003KP 08T3002JP 02J2001JR 02M2001FP 02M2001JP 08M3002SPB3 08J5003JP 04T1003SPB4 04T1003SPA4 04T1003SPA3 04T1003SPC3 09M3002FP 01J3002JR 01J3002JP 09M3002JP 08M3002FP 08M3002JP 02C2000FP 04M5002SPB3 03C2000JP 04M3002SPC3