

# NTC Thermistors, Radial Leaded, Accuracy Line



## LINKS TO ADDITIONAL RESOURCES



| QUICK REFERENCE DATA   |                      |      |
|--|----------------------|------|
| PARAMETER  | VALUE                | UNIT |
| Resistance value at 25 °C  | 2K to 470K           | Ω    |
| Tolerance on $R_{25}$ -value   | ± 1; ± 2; ± 3; ± 5   | %    |
| $B_{25/85}$ -value   | 3528 to 4570         | K    |
| Tolerance on $B_{25/85}$ -value  | ± 0.5 to ± 2.0       | %    |
| Operating temperature range at:<br>Zero power dissipation (continuously)<br>Zero power dissipation<br>(for short periods) <sup>(2)</sup> | -40 to +125<br>≤ 150 | °C   |
| Maximum power dissipation at 55 °C   | 100                  | mW   |
| Dissipation factor $\delta$ in still air (for info)  | 2.2                  | mW/K |
| Response time <sup>(1)</sup>   | ≈ 1.7                | s    |
| Thermal time constant $\tau$ <sup>(1)</sup>  | 13                   | s    |
| Mass   | ≈ 0.11               | g    |

### Notes

- (1) Response time in silicone oil MS200/50. This is the time needed for the sensor to reach 63.2 % of the total temperature difference when subjected to a temperature change from 25 °C in air to 85 °C in oil. Thermal time constant by cooling from electrically pre-heated body
- (2) Valid for all types with the exception of the  $R_{25}$  values 12 kΩ, 22 kΩ and 470 kΩ

## FEATURES

- Accurate over a wide temperature range (tolerance on B-value down to 0.5 %)
- Good stability over a long life
- Excellent price/performance ratio
- Low heat conductivity through 0.4 mm Ni-leads
- cULus recognized, file E148885 (UL category XGPU2/XGPU8)
- Mounting: radial
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

## APPLICATIONS

- Temperature measurement, sensing and control in industrial, consumer and telecom applications. For on-board sensing or accurate remote sensing

## DESCRIPTION

These thermistors are made of NTC ceramic material. The device consists of a chip with two tinned nickel leads. The parts are coated and color band marked. Tape and reel versions available on request.

## PACKAGING

The thermistors are packed in cardboard boxes; the smallest packing quantity is 500 units.

## DESIGN-IN SUPPORT

For complete curve computation, please visit:  
[www.vishay.com/thermistors/ntc-curve-list/](http://www.vishay.com/thermistors/ntc-curve-list/).

## MARKING

The thermistors are marked with color bands on a gray epoxy base coating; see Dimensions and "Electrical Data and Ordering Information".

## MOUNTING

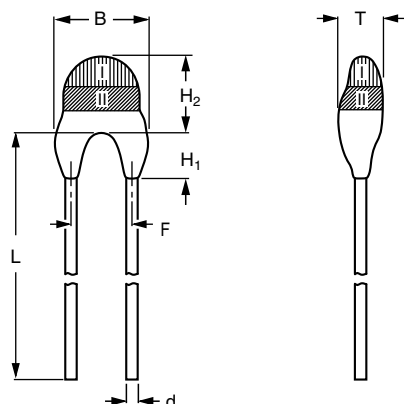
**Important mounting and handling instructions: see**  
[www.vishay.com/doc?29222](http://www.vishay.com/doc?29222)

By soldering in any position. Not intended for potting.

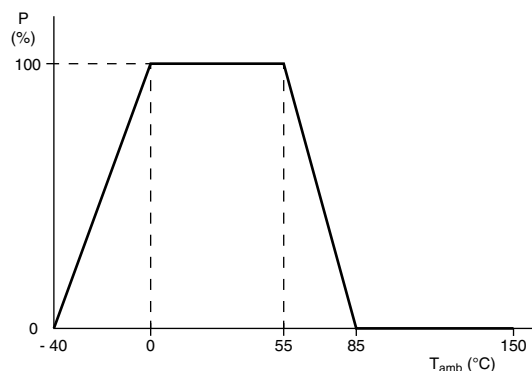
| ELECTRICAL DATA AND ORDERING INFORMATION |                         |                    |                            |                            |        |                |   |                |
|--|-------------------------|--------------------|----------------------------|----------------------------|--------|----------------|---|----------------|
| $R_{25}$<br>(Ω)                          | $R_{25}$ -TOL.<br>(± %) | $B_{25/85}$<br>(K) | $B_{25/85}$ -TOL.<br>(± %) | CODING<br>(see dimensions) |        | UL<br>APPROVED | SAP MATERIAL AND ORDERING NUMBER <sup>(1)</sup> |                |
|  |                         |                    |                            | I                          | II     |                | RoHS COMPLIANT<br>WITH EXEMPTION <sup>(2)</sup> | RoHS COMPLIANT |
| 2000                                     | 1, 2, 3, 5              | 3528               | 0.5                        | Orange                     | Orange | Y              | 202*B0  | 202*B0A        |
| 2700                                     | 1, 2, 3, 5              | 3977               | 0.75                       | Red                        | Red    | Y              | 272*B0  | 272*B0A        |
| 4700                                     | 1, 2, 3, 5              | 3977               | 0.75                       | Green                      | Green  | Y              | 472*B0  | 472*B0A        |
| 5000                                     | 1, 2, 3, 5              | 3977               | 0.75                       | Black                      | White  | Y              | 502*B0  | 502*B0A        |
| 10 000                                   | 1, 2, 3, 5              | 3977               | 0.75                       | Blue                       | Blue   | Y              | 103*B0  | 103*B0A        |
| 12 000                                   | 1, 2, 3, 5              | 3740               | 2                          | Yellow                     | Yellow | Y              | 123*B0  | 123*B0A        |
| 22 000                                   | 1, 2, 3, 5              | 3740               | 2                          | White                      | White  | Y              | 223*B0  | 223*B0A        |
| 47 000                                   | 1, 2, 3, 5              | 4090               | 1.5                        | Black                      | Black  | Y              | 473*B0  | 473*B0A        |
| 68 000                                   | 1, 2, 3, 5              | 4190               | 1.5                        | Grey                       | Grey   | Y              | 683*B0  | 683*B0A        |
| 100 000                                  | 1, 2, 3, 5              | 4190               | 1.5                        | Brown                      | Brown  | Y              | 104*B0  | 104*B0A        |
| 470 000                                  | 1, 2, 3, 5              | 4570               | 1.5                        | Violet                     | Violet | N              | 474*B0  | 474*B0A        |

### Notes

- Preferred versions for new designs
- (1) Replace \* in SAP by J for ± 5 %, H for ± 3 %, G for ± 2 %, F for ± 1 %
- (2) RoHS exemption 7(c)-I: electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezo-electronic devices, or in a glass or ceramic matrix compound

**DIMENSIONS** in millimeters


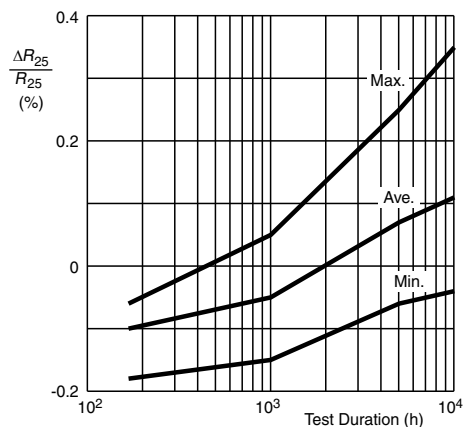
| B max. | T max. | H <sub>1</sub> | H <sub>2</sub> max. | L        | d          | F    |
|--------|--------|----------------|---------------------|----------|------------|------|
| 3.6    | 3.0    | 2.0 ± 1.0      | 6.0                 | 40 ± 1.5 | 0.4 ± 0.04 | 2.54 |

**DERATING**


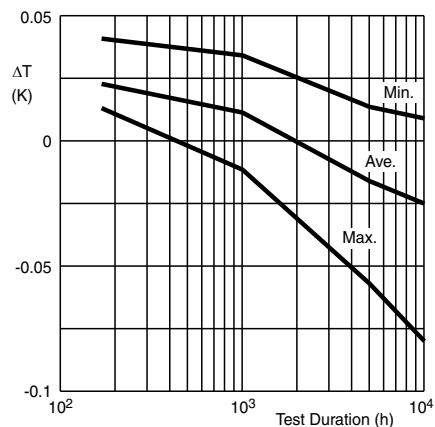
Power derating curve

**Note**

- Zero power is considered as measuring power max. 1 % of max. power

**LONG TERM STABILITY AS A FUNCTION OF TEST DURATION AT MAXIMUM TEMPERATURE (150 °C)**
**TYPICAL  $R_{25}$  STABILITY**


Typical curves valid for 2.2 kΩ to 10 kΩ

**TYPICAL ROOM TEMPERATURE STABILITY**


Typical curves valid for 2.2 kΩ to 10 kΩ



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