

# NTC Thermistors, Insulated Leads for 185 °C Applications



## LINKS TO ADDITIONAL RESOURCES



3D Models



Design Tools



Related Documents

## QUICK REFERENCE DATA

| PARAMETER                                                                              | VALUE        | UNIT            |
|----------------------------------------------------------------------------------------|--------------|-----------------|
| Resistance value at 25 °C                                                              | 2.1K to 30K  | Ω               |
| Tolerance on $R_{25}$ -value                                                           | 1, 2, 3, 5   | %               |
| $B_{25/85}$ -value                                                                     | 3435 to 3984 | K               |
| Tolerance on $B_{25/85}$ -value                                                        | ± 0.5 to ± 1 | %               |
| Operating temperature range                                                            | -55 to +185  | °C              |
| Response time (63.2 %) in stirred air 25 °C to 85 °C (for information only)            | 6            | s               |
| Dissipation factor $\delta$ in still air (for information only)                        | 1.0          | mW/K            |
| Maximum power dissipation at 55 °C                                                     | 100          | mW              |
| Minimum dielectric withstanding voltage (RMS) between terminals and coated body        | 1000         | V <sub>AC</sub> |
| Minimum insulation resistance between terminals and coated body at 500 V <sub>DC</sub> | 100M         | Ω               |
| Weight                                                                                 | 30           | mg              |

## DESIGN-IN SUPPORT

Not intended for fluid immersed applications or continuous contact with water or conducting liquids. See also Environmental Conditions. Can be potted in suitable resins.

For complete curve computation, please visit:

[www.vishay.com/thermistors/ntc-curve-list/](http://www.vishay.com/thermistors/ntc-curve-list/)

Consult Vishay for specific applications, mounting, alternative RT curves, or wire length.

## FEATURES

- Advanced NTC ceramic technology
- Wide temperature range from -55 °C to +185 °C withstanding 200 °C for 168 hours maximum
- Cost efficient thermistor design
- Small body diameter of maximum 2.4 mm
- Fast response time and high sensitivity
- Improved noxious gas and acid resistance
- Insulated Ag-plated NiFe alloy leads
- Mounting: radial
- AEC-Q200 qualified (rev. D)
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?999912](http://www.vishay.com/doc?999912)


RoHS  
COMPLIANT

## APPLICATIONS

NTCLE350 can be processed by potting or molding into sensors for electric traction motors, for example in the sensing and protection of high current connectors.

NTCLE350 is suitable for EGR applications (exhaust gas recirculation) for steady state temperatures going up to 185 °C.

This series is also intended for oil temperatures sensors (OTS), in for example transmission systems and liquid cooled starter/generator systems.

The AEC-Q200 qualification (between -55 °C and 185 °C) enables this series to be used for classical motor thermal sensing applications (engine coolant, fuel sensor, TMAP for manifold air pressure) as well as in HVAC applications.

## DESCRIPTION

These negative temperature coefficient thermistors consist of a mini-chip soldered between two AWG #32 PEEK insulated silver plated NiFe alloy leads and coated with black colored epoxy lacquer. High adhesive strength between PEEK wire and encapsulating lacquer.

## MOUNTING

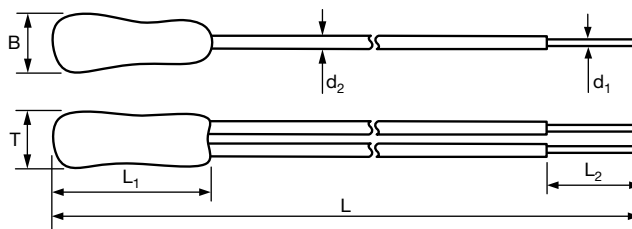
Important mounting and handling instructions: see [www.vishay.com/doc?29222](http://www.vishay.com/doc?29222)

## ELECTRICAL DATA AND ORDERING INFORMATION

| $R_{25}$<br>(Ω) | $R_{25}$ -TOL.<br>(± %) | $B_{25/85}$<br>(K) | $B_{25/85}$ -TOL.<br>(± %) | SAP MATERIAL AND ORDERING NUMBER <sup>(1)</sup> |
|-----------------|-------------------------|--------------------|----------------------------|-------------------------------------------------|
|                 |                         |                    |                            | RoHS COMPLIANT                                  |
| 2100            | 1, 2, 3, 5              | 3511               | 1                          | NTCLE350E4212xMB0                               |
| 5000            | 1, 2, 3, 5              | 3435               | 1                          | NTCLE350E4502xLB0                               |
| 10 000          | 1, 2, 3, 5              | 3984               | 0.5                        | NTCLE350E4103xHB0                               |
| 10 000          | 1, 2, 3, 5              | 3435               | 1                          | NTCLE350E4103xLB0                               |
| 30 000          | 1, 2, 3, 5              | 3935               | 1                          | NTCLE350E4303xHB0                               |

### Note

<sup>(1)</sup> Replace the x-digit by J for  $R_{25}$ -tolerance of 5 %, H for 3 %, G for 2 %, and F for 1 %

**DIMENSIONS** in millimeters


| T        | B        | L      | L <sub>1</sub> | L <sub>2</sub> | Ø d <sub>2</sub> MAX. | Ø d <sub>1</sub> |
|----------|----------|--------|----------------|----------------|-----------------------|------------------|
| 2.4 max. | 2.4 max. | 40 ± 1 | 6 ± 1          | 5 ± 1          | 0.4                   | 0.2 ± 0.02       |

**MOUNTING**

The thermistors are suitable for all standard assembly processes like crimping, brazing, and welding (laser, ultrasonic, or resistance). The parameters of the assembly process should be chosen in accordance with the lead-wire material (silver plated Ni-Fe alloy) and validated in application.

Different conductor, insulation material, and dimensions are available on request.

The mounting process should be in compliance with the following guidelines and recommendations:

- Peeling forces on the leads should be reduced to a minimum and should never exceed 3 N
- Avoid large temperature gradients between the welding region and the sensor
- After complete assembly it is recommended to fix the leads in the welding region with a strain relief

If using a ceramic adhesive / potting or filling material avoid phosphate-based binders. Always follow the supplier's curing specifications fully including bringing the part up to operating temperature for a short time to ensure good moisture resistance and electrical performance of the total sensor.

**ENVIRONMENTAL CONDITIONS**

The thermistor should not be placed in a reducing atmosphere or be subjected to corrosive substances (e.g. phosphates) which could affect the functionality or the lifetime of the thermistor. Always maintain a sufficient partial oxygen pressure to avoid abnormal electrical drift and / or a reduced "life time".

The thermistor design can withstand conditions with low concentrations of H<sub>2</sub>S, NO<sub>2</sub>, Cl<sub>2</sub>, and SO<sub>2</sub> according to DIN EN 60068-2-60, test Ke, method 4. Additionally it can withstand FOS90 testing according to ASTM B 809-95 (1000 hours / 90 °C / 76 % to 95 % RH / sulfur flowers) and 12 hours immersion (at 50 °C) in low concentrations of HCl, H<sub>2</sub>SO<sub>4</sub>, and acetic acid without functional or visual damage.

The thermistor was qualified according to AEC-Q200 rev. D with top temperature of 185 °C to assure best performance in today's most challenging environments.



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