

# **NTC thermistors for temperature measurement**

Probe assemblies

**Series/Type:** B57560K

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**Applications**

- Temperature measurement in household appliances (e.g. induction cookers, dryers, small appliances)

**Features**

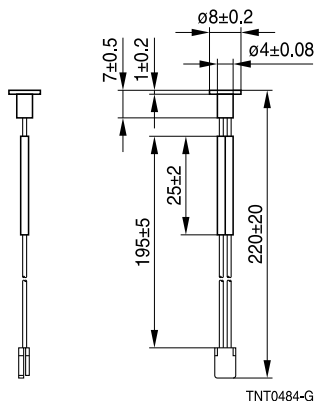
- NTC thermistor potted in an aluminum case with cable outlet
- Fast thermal response time in air stream
- Flange housing for good thermal coupling to hot surface

**Options**

- Alternative cable lengths, R/T characteristics, connectors, ceramic case available on request.

**Delivery mode**

Bulk

**Dimensional drawing**


Dimensions in mm  
Approx. weight 1.8 g

**General technical data**

Climatic category	(IEC 60068-1)		10/125/56	
Upper category temperature	(wire)		125 <sup>1)</sup>	°C
Maximum operating temperature	(sensor head)	$T_{op,max}$	250	°C
Resistance tolerance		$\Delta R_F/R_R$	±2.5	%
Rated temperature		$T_R$	100	°C
Dissipation factor	(in air)	$\delta_{th}$	approx. 2.2	mW/K
Thermal time constant	(in water)	$\tau_a$	approx. 2	s
Insulation resistance	(V = 500 V DC)	$R_{ins}$	> 100	MΩ

**Electrical specification and ordering codes**

$R_{100}$ Ω	$R_{25}$ Ω	$B_{25/100}$ K	$B_{0/100}$ K	Ordering code
3300	49120	4006	3970 ±2%	B57560K0493A001

1) JST connector is specified for a maximum temperature of 85 °C

**Reliability data**

Test	Standard	Test conditions	$\Delta R_{25}/R_{25}$ (typical)	Remarks
Storage in dry heat <sup>1)</sup>	IEC 60068-2-2	Storage at max. operating temperature (sensor head) T: 250 °C t: 1000 h	< 3%	No visible damage
Storage in coldness		Storage at lower category temperature T: -10 °C t: 1000 h	< 3%	No visible damage
Storage in damp heat, steady state	IEC 60068-2-67	Temperature of air: 85 °C Relative humidity of air: 85% Duration: 56 days	< 3%	No visible damage
Rapid change of temperature <sup>1)</sup>		Lower test temperature: -10 °C Upper test temperature: 200 °C t: 10 min Time to change from lower to upper temperature: <30 s Number of cycles: 1000 Medium: air	< 3%	No visible damage
Temperature cycling <sup>1)</sup>		Lower test temperature: room temperature T: approx. 25 °C Upper test temperature: 270 °C t: 10 min Number of cycles: 20 Medium: air	< 3%	No visible damage
High voltage test		Apply voltage between aluminum case and sensor: 1000 V AC, 50 Hz t: 1 s		No flashover
Insulation test		The sensors are placed in a vessel containing metallic balls of 1 mm diameter (with immersed aluminum case). The applied voltage is 500 V DC.		Above 100 MΩ

**Note**

- Contact of NTC thermistors with any liquids and solvents shall be prevented. It must be ensured that no water enters the NTC thermistors (e.g. through plug terminals).
- Avoid dewing and condensation unless thermistor is specified for these conditions.

1) Tested on sensor elements potted into aluminum housing (without probe assembly).

## **Cautions and warnings**

### **General**

See "Important notes" on page 2.

### **Storage**

- Store thermistors only in original packaging. Do not open the package prior to processing.
- Storage conditions in original packaging: storage temperature  $-25\text{ °C} \dots +45\text{ °C}$ , relative humidity  $\leq 75\%$  annual mean,  $< 95\%$  maximum 30 days per annum, dew precipitation is inadmissible.
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## Mounting

- Ensure that no thermo-mechanical stress occurs due to production processes (curing or overmolding processes) when thermistors are sealed, potted or overmolded or during their subsequent operation. The maximum temperature of the thermistor must not be exceeded. Ensure that the materials used (sealing/potting compound and plastic material) are chemically neutral.
- Electrodes/contacts must not be scratched or damaged before/during/after the mounting process.
- Contacts and housing used for assembly with the thermistor must be clean before mounting.
- Ensure that adjacent materials are designed for operation at temperatures comparable to the surface temperature of the thermistor. Be sure that surrounding parts and materials can withstand the temperature.
- Avoid contamination of the thermistor surface during processing.
- The connections of sensors (e.g. cable end, wire end, plug terminal) may only be exposed to an environment with normal atmospheric conditions.
- Tensile forces on cables or leads must be avoided during mounting and operation.
- Bending or twisting of cables or leads directly on the thermistor body is not permissible.
- Avoid using chemical substances as mounting aids. It must be ensured that no water or other liquids enter the NTC thermistors (e.g. through plug terminals). In particular, water based substances (e.g. soap suds) must not be used as mounting aids for sensors.
- The use of no-clean solder products is recommended. In any case mild, non-activated fluxes should be used. Flux residues after soldering should be minimized.

## Operation

- Use thermistors only within the specified operating temperature range.
- Use thermistors only within the specified power range.
- Environmental conditions must not harm the thermistors. Only use the thermistors under normal atmospheric conditions or within the specified conditions.
- Contact of NTC thermistors with any liquids and solvents shall be prevented. It must be ensured that no water enters the NTC thermistors (e.g. through plug terminals). For measurement purposes (checking the specified resistance vs. temperature), the component must not be immersed in water but in suitable liquids (e.g. perfluoropolyethers such as Galden).
- Avoid dewing and condensation unless thermistor is specified for these conditions.
- Bending or twisting of cables and/or wires is not permissible during operation of the sensor in the application.
- Be sure to provide an appropriate fail-safe function to prevent secondary product damage caused by malfunction.

This listing does not claim to be complete, but merely reflects the experience of EPCOS AG.

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The ordering code for one and the same EPCOS product can be represented differently in data

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**Symbols and terms**

Symbol	English	German
A	Area	Fläche
AWG	American Wire Gauge	Amerikanische Norm für Drahtquerschnitte
B	B value	B-Wert
B <sub>25/100</sub>	B value determined by resistance measurement at 25 °C and 100 °C	B-Wert, ermittelt durch Widerstandsmessungen bei 25 °C und 100 °C
C <sub>th</sub>	Heat capacitance	Wärmekapazität
I	Current	Strom
N	Number (integer)	Anzahl (ganzzahliger Wert)
P <sub>25</sub>	Maximum power at 25 °C	Maximale Leistung bei 25 °C
P <sub>diss</sub>	Power dissipation	Verlustleistung
P <sub>el</sub>	Electrical power	Elektrische Leistung
P <sub>max</sub>	Maximum power within stated temperature range	Maximale Leistung im angegebenen Temperaturbereich
$\Delta R_B/R_B$	Resistance tolerance caused by spread of B value	Widerstandstoleranz, die durch die Streuung des B-Wertes verursacht wird
R <sub>ins</sub>	Insulation resistance	Isolationswiderstand
R <sub>P</sub>	Parallel resistance	Parallelwiderstand
R <sub>R</sub>	Rated resistance	Nennwiderstand
$\Delta R_R/R_R$	Resistance tolerance	Widerstandstoleranz
R <sub>S</sub>	Series resistance	Serienwiderstand
R <sub>T</sub>	Resistance at temperature T (e.g. R <sub>25</sub> = resistance at 25 °C)	Widerstand bei Temperatur T (z.B. R <sub>25</sub> = Widerstand bei 25 °C)
T	Temperature	Temperatur
$\Delta T$	Temperature tolerance	Temperaturtoleranz
t	Time	Zeit
T <sub>A</sub>	Ambient temperature	Umgebungstemperatur
T <sub>max</sub>	Upper category temperature	Obere Grenztemperatur (Kategorietemperatur)
T <sub>min</sub>	Lower category temperature	Untere Grenztemperatur (Kategorietemperatur)
T <sub>op</sub>	Operating temperature	Betriebstemperatur
T <sub>R</sub>	Rated temperature	Nenntemperatur
T <sub>surf</sub>	Surface temperature	Oberflächentemperatur
V	Voltage	Spannung
V <sub>ins</sub>	Insulation test voltage	Isolationsprüfspannung
V <sub>op</sub>	Operating voltage	Betriebsspannung
V <sub>test</sub>	Test voltage	Prüfspannung

Symbol	English	German
$\alpha$	Temperature coefficient	Temperaturkoeffizient
$\Delta$	Tolerance, change	Toleranz, Änderung
$\delta_{th}$	Dissipation factor	Wärmeleitwert
$\tau_c$	Thermal cooling time constant	Thermische Abkühlzeitkonstante
$\tau_a$	Thermal time constant	Thermische Zeitkonstante

**Abbreviations / Notes**

Symbol	English	German
<b><u>SMD</u></b>	Surface-mounted devices	Oberflächenmontierbares Bauelement
*	To be replaced by a number in ordering codes, type designations etc.	Platzhalter für Zahl im Bestellnummerncode oder für die Typenbezeichnung.
+	To be replaced by a letter. All dimensions are given in mm. The commas used in numerical values denote decimal points.	Platzhalter für einen Buchstaben. Alle Maße sind in mm angegeben. Verwendete Kommas in Zahlenwerten bezeichnen Dezimalpunkte.



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2. We also point out that **in individual cases, a malfunction of electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified**. In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health (e.g. in accident prevention or life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of an electronic component.
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## Important notes

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