

# NTC thermistors for temperature measurement

Probe assemblies

Series/Type: B57504
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Temperature measurement

Probe assemblies

## K504

B57504

## **Applications**

- Temperature measurement in
  - water boilers (e.g. coffee machines)
  - other home appliances

## **Features**

- Short response time
- Medium-resistant stainless steel tube
- Thermistor with epoxy resin encapsulation
- PTFE-insulated leads of silver-plated copper wires, AWG 28
- JST XHP-2 connector
- Plastic ring for easy mounting

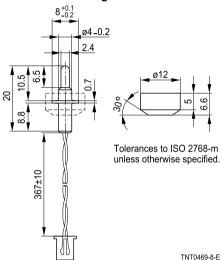
## **Options**

Alternative resistance ratings, rated temperatures, resistance tolerances, lead lengths and connectors available on request.

## **Delivery mode**

Bulk

## **Dimensional drawing**



Dimensions in mm Approx. weight 3 g

### General technical data

Climatic category	(IEC 60068-1)		30/100/56	
Maximum operating temperature		$T_{op,max}$	120	°C
Max. power	(at 25 °C)	P <sub>25</sub>	60	mW
Resistance tolerance		$\Delta R_R/R_R$	±2	%
Rated temperature		T <sub>R</sub>	50	°C
Dissipation factor	(in air)	$\delta_{\text{th}}$	approx. 5	mW/K
Thermal time constant	(in water)	$\tau_{a}$	<1.5	s
Thermal cooling time constant	(in air)	$\tau_{\rm c}$	approx. 75	s
Heat capacity		$C_{th}$	approx. 375	mJ/K
Insulation resistance	(V = 500 VDC)	R <sub>ins</sub>	>100	$M\Omega$
Test voltage	(t = 1 s)	$V_{test}$	1250	VAC

## Electrical specification and ordering codes

R <sub>25</sub>	No. of R/T	B <sub>0/100</sub>	Ordering code
Ω	characteristic	K	
3485	8407	3450 ±1%	B57504K0852A001



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### Note

The plug housing is specified for a temperature range from  $-25~^{\circ}\text{C}$  ...  $+85~^{\circ}\text{C}$ .

## Reliability data

Test	Standard	Test conditions	$\Delta R_{25}/R_{25}$ (typical)	Remarks
Storage in dry heat	IEC 60068-2-2	Storage at maximum operating temperature T: 120 °C t: 1000 h	< 2%	No visible damage
Storage in damp heat, steady state		Temperature of air: 60 °C Relative humidity of air: 93% Duration: 1000 h	< 2%	No visible damage
Storage in coldness		Storage at lower category temperature in air T: -30 °C t: 1000 h	< 2%	No visible damage
Rapid temperature cycling (in water)		Lower test temperature: 15 °C Upper test temperature: 96 °C Dwell time: 20 s Time to change from lower to upper temperature: <10 s Number of cycles: 1000 Medium: water	< 2%	No visible damage
Vibration resistance	IEC 60068-2-6	Frequency range: 10 to 500 Hz Amplitude: 1.5 mm/ 10 g Duration: 3 x 2 h	< 2%	No visible damage
Voltage proof test		1250 VAC, 1 s		No flashover
Insulation test		The sensors are placed in a vessel containing metallic balls of 1 mm diameter (with total immersed head). The applied voltage is 500 VDC.		Above 100 MΩ



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## R/T characteristics

	B57504K0852A001					
R/T No.	8407					
T (°C)	$B_{0/100} = 3450 \text{ K}, \ R_{25} = 8495 \ \Omega, \ T_R = 50 \ ^{\circ}\text{C}, \ \Delta R_R/R_R = \pm 2\%$					
	$R_{nom}[\Omega]$	$R_{min}[\Omega]$	$R_{max}[\Omega]$	$\Delta R_R/R_R[\pm\%]$	ΔT[±°C]	α (%/K)
-20.0 -15.0 -10.0 -5.0	60879 47563 37450 29706	57801 45290 35759 28441	63957 49836 39140 30971	5.1 4.8 4.5 4.3	1.0 1.0 1.0 0.9	5.0 4.9 4.7 4.6
0.0	23730	22778	24683	4.0	0.9	4.4
5.0 10.0 15.0 20.0 25.0	19085 15449 12583 10309 8495	18365 14901 12164 9988 8247	19806 15998 13002 10631 8742	3.8 3.6 3.3 3.1 2.9	0.9 0.9 0.8 0.8	4.3 4.2 4.0 3.9 3.8
30.0 35.0 40.0 45.0 <b>50.0</b>	7037 5860 4905 4125 <b>3485</b>	6846 5712 4790 4035 <b>3415</b>	7229 6009 5020 4214 <b>3555</b>	2.7 2.5 2.3 2.2 <b>2.0</b>	0.7 0.7 0.7 0.6 <b>0.6</b>	3.7 3.6 3.5 3.4 <b>3.3</b>
55.0 60.0 65.0 70.0 75.0	2957 2521 2157 1853 1598	2893 2462 2103 1804 1554	3022 2579 2211 1902 1643	2.2 2.3 2.5 2.6 2.8	0.7 0.7 0.8 0.9 1.0	3.2 3.2 3.1 3.0 2.9
80.0 85.0 90.0 95.0 100.0	1384 1202 1048 916.4 804.1	1343 1165 1014 885.8 776.2	1424 1239 1081 947.0 832.0	2.9 3.1 3.2 3.3 3.5	1.0 1.1 1.2 1.3 1.3	2.8 2.8 2.7 2.6 2.6
105.0 110.0 115.0 120.0	707.7 624.7 553.1 491.1	682.3 601.5 531.9 471.6	733.2 648.0 574.4 510.5	3.6 3.7 3.8 4.0	1.4 1.5 1.6 1.7	2.5 2.5 2.4 2.4



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## Cautions and warnings

#### General

See "Important notes" at the end of this document.

## Storage

- Store thermistors only in original packaging. Do not open the package before storage.
- Storage conditions in original packaging: storage temperature −25 °C ... +45 °C, relative humidity ≤75% annual mean, maximum 95%, dew precipitation is inadmissible.
- Do not store SMDs where they are exposed to heat or direct sunlight. Otherwise, the packing material may be deformed or SMDs may stick together, causing problems during mounting.
- Avoid contamination of thermistors surface during storage, handling and processing.
- Avoid storage of thermistor in harmful environments like corrosive gases (SOx, Cl etc).
- After opening the factory seals, such as polyvinyl-sealed packages, use the SMDs as soon as possible.
- Solder thermistors after shipment from EPCOS within the time specified:

SMDs: 12 months

Leaded components: 24 months

## Handling

- NTC thermistors must not be dropped. Chip-offs must not be caused during handling of NTCs.
- Components must not be touched with bare hands. Gloves are recommended.
- Avoid contamination of thermistor surface during handling.

## Soldering

- Use resin-type flux or non-activated flux.
- Insufficient preheating may cause ceramic cracks.
- Rapid cooling by dipping in solvent is not recommended.
- Complete removal of flux is recommended.

### Mounting

- When NTC thermistors are encapsulated with sealing material or overmolded with plastic material, the precautions given in chapter "Mounting instructions", "Sealing, potting and overmolding" must be observed.
- Electrode must not be scratched before/during/after the mounting process.
- Contacts and housings used for assembly with thermistor have to be clean before mounting.
- During operation, the thermistor's surface temperature can be very high (ICL). Ensure that adjacent components are placed at a sufficient distance from the thermistor to allow for proper cooling of the thermistors.
- 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 this temperature.
- Make sure that thermistors (ICLs) are adequately ventilated to avoid overheating.
- Avoid contamination of thermistor surface during processing.



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## Operation

- Use thermistors only within the specified operating temperature range.
- Use thermistors only within the specified voltage and current ranges (ICLs).
- Environmental conditions must not harm the thermistors. Use thermistors only in normal atmospheric conditions.
- Contact of NTC thermistors with any liquids and solvents should be prevented. It must be ensured that no water enters the NTC thermistor (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. Galden).
- Avoid dewing and condensation.
- Be sure to provide an appropriate fail-safe function to prevent secondary product damage caused by malfunction (e.g. use VDR for limitation of overvoltage condition).



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