



# **NTC thermistors for temperature measurement**

Probe assemblies

**Series/Type:** B57500  
**Date:** March 2006

**Applications**

- Air sensor for air conditioning  
(not for use in evaporator)

**Features**

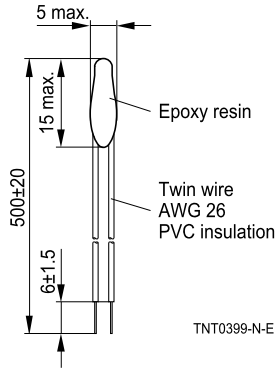
- Thermistor with epoxy resin encapsulation
- PVC-insulated wires (black) with tinned ends, AWG 26,  $T_{max} = 105\text{ °C}$

**Options**

Alternative resistance ratings, rated temperatures, resistance tolerances and wire lengths, AWG 22 or AWG 24 available on request

**Delivery mode**

Bulk

**Dimensional drawing**


Dimensions in mm

**General technical data**

Climatic category	(IEC 60068-1)		30/100/56	
Max. power	(at 25 °C)	$P_{25}$	60	mW
Resistance tolerance		$\Delta R_R/R_R$	±3	%
Rated temperature		$T_R$	25	°C
Dissipation factor	(in air)	$\delta_{th}$	approx. 3	mW/K
Thermal cooling time constant	(in air)	$\tau_c$	approx. 20	s
Heat capacity		$C_{th}$	approx. 60	mJ/K
Insulation resistance	( $V = 100\text{ VDC}$ )	$R_{ins}$	>100	MΩ
Test voltage	( $t = 1\text{ s}$ )	$V_{test}$	1.25	kVAC

**Electrical specification and ordering codes**

$R_{25}$ Ω	No. of R/T characteristic	$B_{25/100}$ K	Ordering code
10 k	8016	3988 ±0.5%	B57500M0103A005

**Note**

Only for use in dry environmental conditions.

**Reliability data**

Test	Standard	Test conditions	$\Delta R_{25}/R_{25}$ (typical)	Remarks
Storage in dry heat	IEC 60068-2-2	Storage at upper category temperature T: 100 °C t: 1000 h	< 2%	No visible damage
Storage in damp heat, steady state	IEC 60068-2-78	Temperature of air: 40 °C Relative humidity of air: 93% Duration: 56 days	< 2%	No visible damage
Storage in coldness		Storage at lower category temperature T: -30 °C t: 1000 h	< 2%	No visible damage
Rapid temperature cycling (in air)	IEC 60068-2-14	Lower test temperature: -30 °C Upper test temperature: 100 °C Time to change from lower to upper temperature: <30 s Number of cycles: 1000 Medium: air	< 2%	No visible damage
Vibration resistance	IEC 60068-2-6	Frequency range: 5 to 500 Hz Amplitude: 7.5 mm, 2 g Duration: 3 x 8 h	< 3%	No visible damage
Long-term stability (empirical value)		Temperature: 100 °C t: 10000 h	< 3%	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 100 VDC.		Above 100 MΩ

**R/T characteristics**

<b>B57500M0103A005</b>						
R/T No.	8016					
T (°C)	B <sub>25/100</sub> = 3988 K, R <sub>25</sub> = 10000 Ω, T <sub>R</sub> = 25 °C, ΔR <sub>R</sub> /R <sub>R</sub> = ± 2%					
	R <sub>nomL</sub> [Ω]	R <sub>minL</sub> [Ω]	R <sub>maxL</sub> [Ω]	ΔR <sub>R</sub> /R <sub>R</sub> [±%]	ΔT[±°C]	α (%/K)
-30.0	177000	168920	185080	4.6	0.7	6.2
-25.0	130370	124640	136100	4.4	0.7	6.0
-20.0	97070	92955	101190	4.2	0.7	5.8
-15.0	72929	69949	75909	4.1	0.7	5.6
-10.0	55330	53150	57510	3.9	0.7	5.4
-5.0	42315	40708	43922	3.8	0.7	5.3
0.0	32650	31454	33846	3.7	0.7	5.1
5.0	25388	24491	26284	3.5	0.7	5.0
10.0	19900	19223	20577	3.4	0.7	4.8
15.0	15708	15192	16223	3.3	0.7	4.7
20.0	12490	12095	12885	3.2	0.7	4.5
<b>25.0</b>	<b>10000</b>	<b>9700</b>	<b>10300</b>	<b>3.0</b>	<b>0.7</b>	<b>4.4</b>
30.0	8057	7802	8312	3.2	0.7	4.3
35.0	6531	6318	6745	3.3	0.8	4.1
40.0	5327	5147	5507	3.4	0.8	4.0
45.0	4369	4217	4520	3.5	0.9	3.9
50.0	3603	3474	3732	3.6	0.9	3.8
55.0	2986	2877	3096	3.7	1.0	3.7
60.0	2488	2395	2581	3.8	1.0	3.6
65.0	2083	2003	2163	3.8	1.1	3.5
70.0	1752	1683	1821	3.9	1.2	3.4
75.0	1481	1422	1541	4.0	1.2	3.3
80.0	1258	1207	1309	4.1	1.3	3.2
85.0	1072	1028	1117	4.2	1.3	3.2
90.0	917.7	878.7	956.7	4.2	1.4	3.1
95.0	788.5	754.4	822.6	4.3	1.4	3.0
100.0	680.0	650.1	709.9	4.4	1.5	2.9

## 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  $-25\text{ °C} \dots +45\text{ °C}$ , relative humidity  $\leq 75\%$  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 (SO<sub>x</sub>, 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.

## 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).

## Important notes

The following applies to all products named in this publication:

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