



NTC thermistors for temperature measurement

Probe assemblies

Series/Type: B57504
Date: March 2006

Applications

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

Features

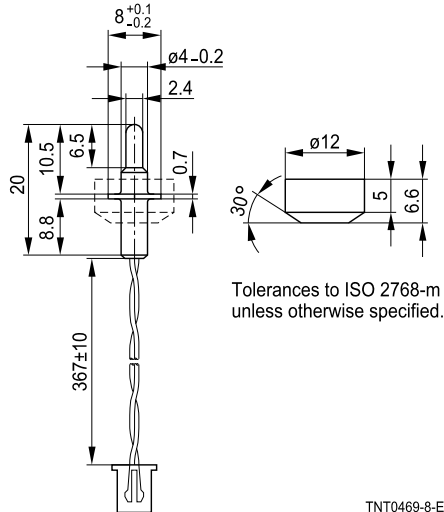
- Short response time
- Medium-resistant stainless steel tube
- Thermistor with epoxy resin encapsulation
- PTFE-insulated leads of silver-plated copper wires, AWG 28
- JST XHP-2 connector
- Plastic ring for easy mounting

Options

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

Delivery mode

Bulk

Dimensional drawing


Tolerances to ISO 2768-m unless otherwise specified.

TNT0469-8-E

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_{25}	60	mW
Resistance tolerance		$\Delta R_R/R_R$	±2	%
Rated temperature		T_R	50	°C
Dissipation factor	(in air)	δ_{th}	approx. 5	mW/K
Thermal time constant	(in water)	τ_a	<1.5	s
Thermal cooling time constant	(in air)	τ_c	approx. 75	s
Heat capacity		C_{th}	approx. 375	mJ/K
Insulation resistance	(V = 500 VDC)	R_{ins}	>100	MΩ
Test voltage	(t = 1 s)	V_{test}	1250	VAC

Electrical specification and ordering codes

R_{25} Ω	No. of R/T characteristic	$B_{0/100}$ K	Ordering code
3485	8407	3450 ±1%	B57504K0852A001

Note

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

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 M Ω

R/T characteristics

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

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_x, 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).

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