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NTC thermistors for temperature measurement

Probe assemblies

Series/Type: **B57227**
Date: March 2006

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Applications

- Electric motors
- Transformers

Features

- Coated thermistor disk with shrunk sleeve insulation
- PTFE-insulated wires, AWG 26
- UL approval (E69802)

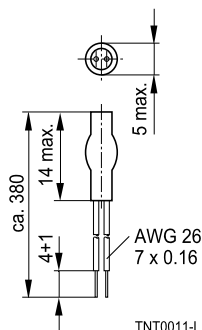
Options

Alternative resistance ratings,
rated temperatures, resistance tolerances
and wire lengths available on request

Delivery mode

Bulk

Dimensional drawing



Dimensions in mm

Approx. weight 5 g

General technical data

Climatic category	(IEC 60068-1)	P_{25}	55/155/56	
Max. power	(at 25 °C)	$\Delta R_R/R_R$	200	mW
Resistance tolerance		T_R	± 10	%
Rated temperature		δ_{th}	100	°C
Dissipation factor	(in air)	τ_c	approx. 5	mW/K
Thermal cooling time constant	(in air)	C_{th}	approx. 30	s
Heat capacity		R_{ins}	approx. 150	mJ/K
Insulation resistance	(V = 100 VDC)	V_{test}	>100	MΩ
Test voltage	(t = 1 s)		2.5	kVAC

Electrical specification and ordering codes

R_{100}	R_{25}	No. of R/T characteristic	$B_{25/100}$	Ordering code
Ω	Ω		K	
1.8 k	32.762 k	2904	4300 $\pm 3\%$	B57227K0333A001



Temperature measurement	B57227
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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: 155 °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	< 1%	No visible damage
Rapid temperature cycling	IEC 60068-2-14	Lower test temperature: –55 °C Upper test temperature: 155 °C Number of cycles: 10	< 1%	No visible damage
Endurance		P _{max} : 200 mW t: 1000 h	< 2%	No visible damage
Long-term stability (empirical value)		Temperature: 100 °C t: 10000 h	< 3%	No visible damage



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R/T characteristics

	B57227K0333A001					
R/T No.	2904					
T (°C)	B _{25/100} = 4300 K, R ₂₅ = 32762 Ω, T _R = 100 °C, ΔR _R /R _R = ± 2%					
	R _{nom} [Ω]	R _{min} [Ω]	R _{max} [Ω]	ΔR _R /R _R [±%]	ΔT[±°C]	α (%/K)
-55.0	3979200	3090600	4867900	22.3	3.1	7.3
-50.0	2766400	2166900	3365800	21.7	3.0	7.1
-45.0	1940900	1532600	2349200	21.0	3.0	7.0
-40.0	1374000	1093300	1654700	20.4	3.0	6.9
-35.0	981140	786400	1175900	19.8	3.0	6.7
-30.0	706590	570280	842900	19.3	3.0	6.5
-25.0	512420	416300	608530	18.8	3.0	6.3
-20.0	375640	307110	444170	18.2	3.0	6.2
-15.0	276870	227730	326020	17.8	3.0	6.0
-10.0	206160	170550	241780	17.3	3.0	5.8
-5.0	154230	128290	180170	16.8	3.0	5.6
0.0	116510	97429	135590	16.4	3.0	5.5
5.0	88846	74672	103020	16.0	3.0	5.3
10.0	68340	57718	78963	15.5	3.0	5.2
15.0	53089	45046	61131	15.1	3.0	5.0
20.0	41554	35417	47690	14.8	3.0	4.9
25.0	32762	28045	37479	14.4	3.0	4.7
30.0	26020	22366	29673	14.0	3.1	4.6
35.0	20728	17889	23567	13.7	3.1	4.5
40.0	16623	14402	18845	13.4	3.1	4.3
45.0	13441	11689	15194	13.0	3.1	4.2
50.0	10930	9539	12321	12.7	3.1	4.1
55.0	8925	7817	10034	12.4	3.1	4.0
60.0	7329	6440	8217	12.1	3.1	3.9
65.0	6048	5332	6764	11.8	3.1	3.8
70.0	5014	4434	5594	11.6	3.1	3.7
75.0	4179	3707	4651	11.3	3.1	3.6
80.0	3498	3112	3884	11.0	3.2	3.5
85.0	2946	2629	3264	10.8	3.2	3.4
90.0	2492	2230	2754	10.5	3.2	3.3
95.0	2114	1897	2331	10.3	3.2	3.2
100.0	1800	1620	1980	10.0	3.2	3.2
105.0	1540	1382	1698	10.3	3.3	3.1
110.0	1322	1183	1461	10.5	3.5	3.0
115.0	1138	1016	1260	10.7	3.6	3.0
120.0	983.1	875.6	1091	10.9	3.8	2.9
125.0	852.0	757.1	946.9	11.1	3.9	2.8
130.0	740.7	656.7	824.7	11.3	4.1	2.8



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	R _{nom} [Ω]	R _{min} [Ω]	R _{max} [Ω]	ΔR _R /R _R [±%]	ΔT[±°C]	α (%/K)
140.0	565.2	498.9	631.4	11.7	4.4	2.6
145.0	496.0	436.9	555.0	11.9	4.6	2.6
150.0	436.4	383.7	489.2	12.1	4.8	2.5
155.0	385.1	337.8	432.3	12.3	4.9	2.5



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 $-25\text{ }^{\circ}\text{C} \dots +45\text{ }^{\circ}\text{C}$, 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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