



NTC thermistors for temperature measurement

Probe assemblies

Series/Type: B57500 / B57501

Date: March 2006

Applications

- Evaporator sensor for air conditioning systems
- Heating systems

Features

- Copper case
- Twin cable (black)
- PVC-insulated wires with tinned ends, $T_{max} = 105\text{ °C}$

Options

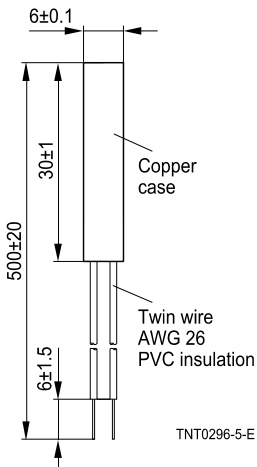
Alternative resistance ratings, rated temperatures, resistance tolerances, wire lengths and AWG 22, AWG 24 or AWG 26 available on request

Delivery mode

Bulk

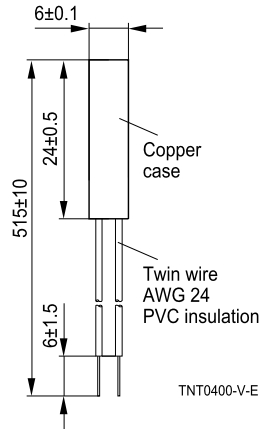
Dimensional Drawings

K500



Dimensions in mm

K501



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)	δ_{th}	approx. 7	mW/K
Thermal cooling time constant	(in air)	τ_c	approx. 130	s
Thermal time constant	(in water)	τ_a	approx. 8	s
Heat capacity		C_{th}	approx. 900	mJ/K
Insulation resistance	(V = 100 VDC)	R_{ins}	>100	M Ω
Test voltage	(t = 1 s)	V_{test}	1.5	kVAC

Electrical specification and ordering codes

Type	AWG	R_{25} Ω	No. of R/T characteristic	$B_{25/100}$ K	Ordering code
K500	26	10 k	8016	3988 $\pm 0.5\%$	B57500K0103A001
K501	24	6.8 k	8016	3988 $\pm 0.5\%$	B57501K0682A002

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 fluid)	IEC 60068-2-14	Lower test temperature: 0 °C Upper test temperature: 100 °C Time to change from lower to upper temperature: <30 s Number of cycles: 1000 Medium: oil	< 2%	No visible damage
Vibration resistance	IEC 60068-2-6	Frequency range: 5 ... 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		1500 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 M Ω

R/T characteristics

B57500K0103A001						
R/T No.	8016					
T (°C)	B _{25/100} = 3988 K, R ₂₅ = 10000 Ω, T _R = 25 °C, ΔR _R /R _R = ± 2%					
	R _{noml} [Ω]	R _{min} [Ω]	R _{max} [Ω]	ΔR _R /R _R [±%]	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
25.0	10000	9700	10300	3.0	0.7	4.4
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

B57501K0682A002						
R/T No.	8016					
T (°C)	B _{25/100} = 3988 K, R ₂₅ = 6800 Ω, T _R = 25 °C, ΔR _R /R _R = ± 2%					
	R _{noml} [Ω]	R _{min} [Ω]	R _{max} [Ω]	ΔR _R /R _R [±%]	ΔT[±°C]	α (%/K)
-30.0	120360	114870	125850	4.6	0.7	6.2
-25.0	88651	84753	92550	4.4	0.7	6.0
-20.0	66008	63210	68806	4.2	0.7	5.8
-15.0	49592	47565	51618	4.1	0.7	5.6
-10.0	37624	36142	39107	3.9	0.7	5.4
-5.0	28774	27681	29867	3.8	0.7	5.3

B57501K0682A002						
R/T No.	8016					
T (°C)	$B_{25/100} = 3988 \text{ K}$, $R_{25} = 6800 \text{ } \Omega$, $T_R = 25 \text{ } ^\circ\text{C}$, $\Delta R_R/R_R = \pm 2\%$					
	$R_{nom}[\Omega]$	$R_{min}[\Omega]$	$R_{max}[\Omega]$	$\Delta R_R/R_R[\pm\%]$	$\Delta T[\pm^\circ\text{C}]$	$\alpha (\%/K)$
0.0	22202	21389	23015	3.7	0.7	5.1
5.0	17264	16654	17873	3.5	0.7	5.0
10.0	13532	13071	13993	3.4	0.7	4.8
15.0	10681	10331	11032	3.3	0.7	4.7
20.0	8493	8224	8762	3.2	0.7	4.5
25.0	6800	6596	7004	3.0	0.7	4.4
30.0	5479	5306	5652	3.2	0.7	4.3
35.0	4441	4296	4586	3.3	0.8	4.1
40.0	3622	3500	3744	3.4	0.8	4.0
45.0	2971	2868	3074	3.5	0.9	3.9
50.0	2450	2363	2537	3.6	0.9	3.8
55.0	2031	1956	2105	3.7	1.0	3.7
60.0	1692	1628	1755	3.8	1.0	3.6
65.0	1416	1362	1471	3.8	1.1	3.5
70.0	1191	1145	1238	3.9	1.2	3.4
75.0	1007	966.9	1048	4.0	1.2	3.3
80.0	855.4	820.4	890.4	4.1	1.3	3.2
85.0	729.2	698.8	759.6	4.2	1.3	3.2
90.0	624.0	597.5	650.5	4.2	1.4	3.1
95.0	536.2	513.0	559.4	4.3	1.4	3.0
100.0	462.4	442.1	482.7	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_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).

Important notes

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