NTC thermistors for temperature measurement

Probe assemblies

Series/Type:	**M1703/100k/A002**
Ordering code:	**B57703M1104A002**
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Version:	1

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Applications

- Measurement of high temperature on surfaces, e.g. in ovens, on heat sinks and housings

Features

- Ring tongue with crimp fixation on wire
- Maximum operating temperature of 300 °C (sensor head)
- Easy mounting and good thermal coupling
- PTFE-insulated leads of silver-plated CU wire (7 x 0.16 mm), AWG 26 (220 mm), covered with fiberglass sleeve

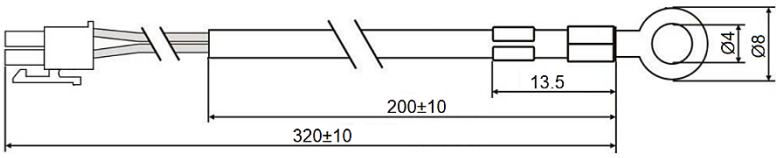
Options

- Alternative lead lengths on request

Delivery mode

- Bulk

Dimensional drawing



Dimensions in mm

General technical data

Climatic category	(IEC 60068-1)		10/200/56	
Maximum power	(at 25 °C)	P_{25}	50	mW
Resistance tolerance		$\Delta R_R/R_R$	±3	%
Rated temperature		T_R	25	°C
Dissipation factor	(in air)	δ_{th}	approx. 2	mW/K
Thermal constant time	(on metal plate)	τ_a	approx. 8	s
Test voltage	(t = 1 s)	V_{test}	1250	V AC

Electrical specification and ordering code

R25 Ω	No. of R/T characteristic	$B_{0/100}$ K	Wire length in mm	Wire	Ordering code
100 k	8404	4036 ±1%	320 ±10	AWG 26	B57703M1104A002

NTC resistance temperature curve

R/T curve = 8404 $B_{0/100}$ = 4036 ±1% K
R_{25} = 100k ±3% Ω

Temp. [°C]	R_Nom [Ω]	R_Min [Ω]	R_Max [Ω]	ΔR [±%]
10	201660	194120	209200	3.7
15	158500	152980	164020	3.5
20	125470	121410	129530	3.2
25	**100000**	**97000**	**103000**	**3.0**
30	80223	77631	82814	3.2
35	64759	62523	66995	3.5
40	52589	50659	54519	3.7
45	42951	41284	44618	3.9
50	35272	33832	36713	4.1
55	29119	27872	30366	4.3
60	24161	23080	25242	4.5
65	20144	19205	21084	4.7
70	16874	16057	17692	4.8
75	14198	13485	14911	5.0
80	11998	11375	12622	5.2
85	10181	9635	10727	5.4
90	8674	8195	9154	5.5
95	7419	6997	7841	5.7
100	6369	5997	6741	5.8
105	5487	5158	5816	6.0
110	4744	4452	5035	6.1
115	4115	3856	4373	6.3
120	3581	3351	3811	6.4
125	3126	2921	3331	6.6
130	2737	2554	2920	6.7
135	2404	2239	2568	6.8
140	2117	1969	2264	7.0
145	1869	1737	2001	7.1
150	1655	1536	1774	7.2
155	1469	1362	1577	7.3
160	1307	1210	1405	7.4
165	1166	1078	1254	7.6
170	1043	962.8	1123	7.7
175	934.5	861.8	1007	7.8
180	839.3	773.1	905.4	7.9
185	755.4	695.1	815.7	8.0

190	681.3	626.2	736.5	8.1
195	615.8	565.4	666.2	8.2
200	557.6	511.4	603.8	8.3

Reliability data

Test	Test conditions	$\Delta R_{25}/R_{25}$ (typical)	Remarks
Storage in dry heat	Sensor head placed on metal plate. Temperature: 200 °C Duration: 1000 h	< 3%	
Storage in damp heat, steady state	Temperature of air: 85 °C Relative humidity of air: 85% Duration: 56 days	< 3%	
Rapid temperature cycling in air	Lower test temperature: 10 °C (time: ~5 min) Upper test temperature: 200 °C (time: ~5 min) Number of cycling: 100	< 3%	
Voltage proof test	The sensors are placed in a vessel containing metallic balls of 1 mm diameter (with total immersed head) at ambient temperature. The applied voltage is 1250 V AC/1 s/0.5 mA		No flash over
Insulation test	The sensors are placed in a vessel containing metallic balls of 1 mm diameter (with total immersed head) at ambient temperature. The applied voltage is 500 V DC.		Above 100 MΩ

Cautions and warnings

Storage

- Store thermistors only in original packaging. Do not open the package prior to storage.
- Storage conditions in original packaging: storage temperature −25 °C ... +45 °C, relative humidity ≤75% annual mean, <95% maximum 30 days per annum, dew precipitation is inadmissible.
- Do not store thermistors where they are exposed to heat or direct sunlight. Otherwise, the packing material may be deformed or components may stick together, causing problems during mounting.
- Avoid contamination of thermistor surface during storage, handling and processing.
- Avoid storage of thermistors in harmful environments like corrosive gases (SOx, Cl etc).
- Use the components as soon as possible after opening the factory seals, i.e. the polyvinyl-sealed packages.
- Solder thermistors within the time specified after shipment.
  For leaded components this is 24 months.

Handling

- NTC thermistors must not be dropped. Chip-offs or any other damage must not be caused during handling of NTCs.
- Do not touch components with bare hands. Gloves are recommended.
- Avoid contamination of thermistor surface during handling.
- Washing processes may damage the product due to the possible static or cyclic mechanical loads (e.g. ultrasonic cleaning). They may cause cracks to develop on the product and its parts, which might lead to reduced reliability or lifetime.

Bending/Twisting

- Bending on wire is permitted at a minimum distance of twice the wire's diameter plus 4 mm from the component head or housing. When bending ensure the wire is mechanically relieved at the component head or housing. The bending radius should be at least eight times the wire's diameter.
- Twisting is prohibited as it may cause cracks and or reduce bonding between insulation and coating/potting material.

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

- Ensure that no thermo-mechanical stress occurs due to production processes (curing or overmolding processes) when thermistors are sealed, potted or overmolded or during their subsequent operation. The maximum temperature of the thermistor must not be exceeded. Ensure that the materials used (sealing/potting compound and plastic material) are chemically neutral.
- Electrodes/contacts must not be scratched or damaged before/during/after the mounting process.
- Contacts and housing used for assembly with the thermistor must be clean before mounting.
- 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 the temperature.
- Avoid contamination of the thermistor surface during processing.
- The connections of sensors (e.g. cable end, wire end, plug terminal) may only be exposed to an environment with normal atmospheric conditions.
- Tensile forces on cables or leads must be avoided during mounting and operation.
- Bending or twisting of cables or leads directly on the thermistor body is not permissible.
- Avoid using chemical substances as mounting aids. It must be ensured that no water or other liquids enter the NTC thermistors (e.g. through plug terminals). In particular, water based substances (e.g. soap suds) must not be used as mounting aids for sensors.

Operation

- Use thermistors only within the specified operating temperature range.
- Use thermistors only within the specified power range.
- Environmental conditions must not harm the thermistors. Only use the thermistors under normal atmospheric conditions or within the specified conditions.
- Ensure that no significant thermo-mechanical stress occurs during operation due to the mounting situation. Fixtures must not overstress the sensor by an excessive mechanical preload.
- Contact of NTC thermistors with any liquids and solvents shall be prevented. It must be ensured that no water enters the NTC thermistors (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 unless thermistor is specified for these conditions.
- Bending or twisting of cables and/or wires is not permissible during operation of the sensor in the application.
- Be sure to provide an appropriate fail-safe function to prevent secondary product damage caused by malfunction.

This listing does not claim to be complete, but merely reflects the experience of TDK Electronics.

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Important notes

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