NTC thermistors for temperature measurement

Probe assemblies

Series/Type:	**K524/100k/A005**
Ordering code:	**B57524K0104A005**
Date:	2021-10-15
Version:	1

Applications

- Temperature measurement for hot gluing machines

Features

- Usage in high temperature applications up to 230 °C
- 6 x 45 mm stainless steel casing
- FEP-insulated leads of nickel-plated CU wire (19 x 0.15 mm), AWG 22 (600 mm)

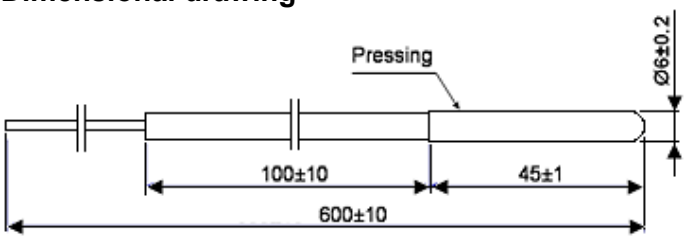
Options

- Alternative lead lengths on request

Delivery mode

- Bulk

Dimensional drawing



Dimensions in mm

General technical data

Climatic category	(IEC 60068-1)		0/230/56	
Maximum power	(at 25 °C)	P_{25}	50	mW
Resistance tolerance		$\Delta R_R/R_R$	±2.5	%
Rated temperature		T_R	160	°C
Dissipation factor	(in air)	δ_{th}	approx. 3	mW/K
Thermal constant time	(in water)	τ_a	approx. 24	s
Test voltage	(t = 1 s)	V_{test}	1250	V AC

Electrical specification and ordering code

R160 Ω	No. of R/T characteristic	$B_{0/100}$ K	Wire length in mm	Wire	Ordering code
1307	8404	4036 ±2%	600 ±10	AWG 22	B57524K0104A005

NTC resistance temperature curve

R/T curve = 8404 $B_{0/100}$ = 4036 ±2% K
R_{160} = 1307 ±2.5% Ω

Temp. [°C]	R_Nom [Ω]	R_Min [Ω]	R_Max [Ω]	ΔR [±%]
0	333885	291874	381704	14.3
5	258436	227122	293884	13.7
10	201611	178093	228093	13.1
15	158461	140670	178391	12.6
20	125438	111888	140541	12.0
25	99976	89590	111498	11.5
30	80204	72193	89048	11.0
35	64744	58529	71573	10.5
40	52577	47729	57880	10.1
45	42941	39140	47081	9.6
50	35264	32269	38513	9.2
55	29112	26741	31673	8.8
60	24155	22270	26183	8.4
65	20140	18635	21753	8.0
70	16870	15664	18158	7.6
75	14195	13224	15227	7.3
80	11995	11212	12825	6.9
85	10179	9544.7	10849	6.6
90	8672.3	8157.2	9214.2	6.2
95	7417.2	6997.7	7856.9	5.9
100	6367.3	6024.9	6725.0	5.6
105	5485.7	5205.5	5777.3	5.3
110	4742.5	4512.9	4980.8	5.0
115	4113.8	3925.2	4308.7	4.7
120	3580.0	3424.9	3739.7	4.5
125	3125.2	2997.5	3256.2	4.2
130	2736.4	2631.2	2844.0	3.9
135	2403.0	2316.3	2491.3	3.7
140	2116.2	2044.7	2188.7	3.4
145	1868.7	1809.8	1928.3	3.2
150	1654.6	1606.1	1703.4	3.0
155	1468.7	1428.9	1508.7	2.7
160	**1307.0**	**1274.3**	**1339.7**	**2.5**
165	1165.9	1134.3	1197.6	2.7
170	1042.5	1012.1	1073.0	2.9
175	934.24	905.22	963.58	3.1
180	839.08	811.41	867.16	3.3
185	755.24	728.91	782.03	3.5
190	681.19	656.19	706.69	3.7
195	615.64	591.94	639.88	3.9

200	557.49	535.06	580.50	4.1
205	505.80	484.58	527.62	4.3
210	459.76	439.70	480.43	4.5
215	418.66	399.71	438.23	4.7
220	381.90	364.01	400.43	4.9
225	348.97	332.08	366.50	5.0
230	319.41	303.46	336.00	5.2

Reliability data

Test	Test conditions	$\Delta R_{25}/R_{25}$ (typical)	Remarks
Storage in dry heat	Sensor tip approx. 20 mm is placed into metal plate Temperature: 230 °C Duration: 1000 h	< 3%	
Storage in coldness	Storage at lower category temperature Temperature: 0 °C Duration: 1000 h	< 3%	
Storage in damp heat, steady state	Temperature of air: 40 °C Relative humidity of air: 93% Duration: 56 days	< 3%	
Rapid change of temperature in air	Lower test temperature: 0 °C (time: ~5 min) Upper test temperature: 230 °C (time: ~5 min) Time to change from lower to upper temperature: < 30 s Number of cycling: 100	< 3%	
Voltage proof test	The sensors 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 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.

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