NTC thermistors for temperature measurement

Probe assemblies

Series/Type: **B57276K**

Date: January 2018

Applications

- Washing machines
- Dish washers
- Tumble-dryers
- Water boilers

General technical data

Climatic category	(IEC 60068-1)		10/100/56	
Max. power	(at 25 °C)	P_{25}	500	mW
Resistance tolerance		$\Delta R_R/R_R$	±2	%
Dissipation factor	(in water)	δ_{th}	approx. 20	mW/K
Thermal time constant	(in water)	τ_a	approx. 20	s
Heat capacity		C_{th}	approx. 500	mJ/K
Insulation resistance	(V = 100 V DC)	R_{ins}	> 1000	MΩ
Test voltage	(t = 1 s)	V_{test}	3750	V AC

Electrical specification and ordering codes

T_R	R_R	R_{25}	No. of R/T	$B_{25/100}$	Ordering code
°C	Ω	Ω	characteristic	K	

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	< 1%	No visible damage
Rapid temperature cycling	IEC 60068-2-14	Lower test temperature: −10 °C Upper test temperature: 100 °C Number of cycles: 10	< 1%	No visible damage
Endurance		P_{max}: 500 mW t: 1000 h	< 2%	No visible damage
Long-term stability (empirical value)		Temperature: 100 °C t: 10000 h	< 3%	No visible damage
Robustness of terminations	DIN 46 249	Pull-out force (both connectors together) F = 50 N		No visible damage

Note

- 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).
- Avoid dewing and condensation unless thermistor is specified for these conditions.

R/T characteristics

R/T No.	2003		2901	
T (°C)	$B_{25/100}$ = 3980 K		$B_{25/100}$ = 3760 K	
	R_T/R_{25}	α (%/K)	R_T/R_{25}	α (%/K)
−55.0	97.578	7.5	63.969	6.7
−50.0	67.65	7.2	46.179	6.4
−45.0	47.538	7.0	33.738	6.2
−40.0	33.831	6.7	24.927	6.0
−35.0	24.359	6.5	18.611	5.8
−30.0	17.753	6.3	14.033	5.6
−25.0	13.067	6.0	10.679	5.4
−20.0	9.7228	5.8	8.198	5.3
−15.0	7.3006	5.6	6.3123	5.2
−10.0	5.5361	5.5	4.9014	5.1
−5.0	4.2332	5.3	3.821	4.9
0.0	3.266	5.1	3.0027	4.7
5.0	2.5392	5.0	2.3801	4.6
10.0	1.9902	4.8	1.9	4.5
15.0	1.5709	4.7	1.5257	4.3
20.0	1.2492	4.5	1.233	4.3
25.0	1.0000	4.4	1.0000	4.1
30.0	0.80575	4.3	0.81679	4.0
35.0	0.65326	4.1	0.67166	3.9
40.0	0.5329	4.0	0.55527	3.8
45.0	0.43715	3.9	0.46095	3.8
50.0	0.36064	3.8	0.38459	3.7
55.0	0.29908	3.7	0.32184	3.6
60.0	0.24932	3.6	0.27068	3.5
65.0	0.20886	3.5	0.22907	3.3
70.0	0.17578	3.4	0.19468	3.2
75.0	0.14863	3.3	0.16607	3.1
80.0	0.12621	3.2	0.14221	3.1
85.0	0.10763	3.1	0.12218	3.0
90.0	0.092159	3.1	0.10533	2.9
95.0	0.079225	3.0	0.09123	2.8
100.0	0.068356	2.9	0.079284	2.8
105.0	0.059247	2.8	0.069062	2.7
110.0	0.051531	2.8	0.06034	2.7
115.0	0.044921	2.7	0.052886	2.6
120.0	0.039282	2.7	0.046482	2.5
125.0	0.034387	2.6	0.040985	2.5
130.0	0.030186	2.5	0.036233	2.5
135.0	0.02665	2.5	0.032101	2.4
140.0	0.023594	2.4	0.02851	2.4
145.0	0.020931	2.4	0.025373	2.3
150.0	0.018616	2.3	0.022633	2.3
155.0	0.016612	2.3	0.020231	2.3

Cautions and warnings

General

See "Important notes" on page 2.

Storage

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.
- The use of no-clean solder products is recommended. In any case mild, non-activated fluxes should be used. Flux residues after soldering should be minimized.

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.
- 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. perfluoropolyethers such as 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 EPCOS AG.

Display of ordering codes for EPCOS products

The ordering code for one and the same EPCOS product can be represented differently in data

sheets, data books, other publications, on the EPCOS website, or in order-related documents such as shipping notes, order confirmations and product labels. **The varying representations of the ordering codes are due to different processes employed and do not affect the specifications of the respective products**. Detailed information can be found on the Internet under www.epcos.com/orderingcodes

Symbols and terms

Symbol	English	German
A	Area	Fläche
AWG	American Wire Gauge	Amerikanische Norm für Drahtquerschnitte
B	B value	B-Wert
$B_{25/100}$	B value determined by resistance measurement at 25 °C and 100 °C	B-Wert, ermittelt durch Widerstands-messungen bei 25 °C und 100 °C

Symbol	English	German
α	Temperature coefficient	Temperaturkoeffizient
Δ	Tolerance, change	Toleranz, Änderung
δ_{th}	Dissipation factor	Wärmeleitwert
τ_c	Thermal cooling time constant	Thermische Abkühlzeitkonstante
τ_a	Thermal time constant	Thermische Zeitkonstante

Abbreviations / Notes

Symbol	English	German
SMD	Surface-mounted devices	Oberflächenmontierbares Bauelement
*	To be replaced by a number in ordering codes, type designations etc.	Platzhalter für Zahl im Bestellnummern-code oder für die Typenbezeichnung.
+	To be replaced by a letter.	Platzhalter für einen Buchstaben.
	All dimensions are given in mm.	Alle Maße sind in mm angegeben.
	The commas used in numerical values denote decimal points.	Verwendete Kommas in Zahlenwerten bezeichnen Dezimalpunkte.

Important notes

The following applies to all products named in this publication:

1. Some parts of this publication contain **statements about the suitability of our products for certain areas of application**. These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out **that such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application.**

Important notes

8. The trade names EPCOS, CeraCharge, CeraDiode, CeraLink, CeraPad, CeraPlas, CSMP, CTVS, DeltaCap, DigiSiMic, ExoCore, FilterCap, FormFit, LeaXield, MiniBlue, MiniCell, MKD, MKK, MotorCap, PCC, PhaseCap, PhaseCube, PhaseMod, PhiCap, PowerHap, PQSine, PQvar, SIFERRIT, SIFI, SIKOREL, SilverCap, SIMDAD, SiMic, SIMID, SineFormer, SIOV, ThermoFuse, WindCap are **trademarks registered or pending** in Europe and in other countries. Further information will be found on the Internet at www.tdk-electronics.tdk.com/trademarks.

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