



SMD NTC Thermistor

SMD NTC Thermistor with Ni-Barrier Termination

Series/Type:
Ordering code: B57620C5103*062
Date: 2009-01-12
Version: 3

Applications

- Temperature measurement and compensation for mobile phone applications (e.g. battery pack, TCXO, LCD display) and data systems

Features

- Standard EIA chip size 0805
- SMD NTC with Ni - Barrier termination (Ag/Ni/Sn)
- The component is compliant with ROHS (DIRECTIVE 2002/95/EC OF THE EUROPEAN PARLIAMENT AND THE COUNCIL of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment)
- Suitable for lead-free soldering process

Electrical Specifications

Part Number	Zero-Power Resistance (at 25°C)	$B_{25/100}$	$B_{25/85}$	$B_{25/50}$
B57620C5103*062	10 k Ω	3730 K $\pm$ 3%	(3730 K)	(3660 K)

* = Resistance Tolerance: J for $\Delta R/R_{25} = \pm 5\%$
K for $\Delta R/R_{25} = \pm 10\%$

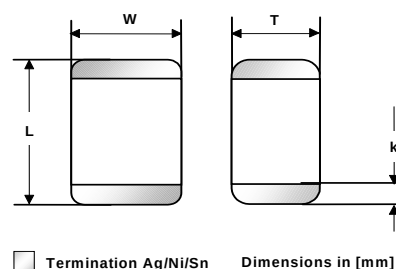
Climatic Category (IEC 60068-1)		55/125/21
Lower category temperature		-55°C
Higher category temperature		125°C
Power rating at 25°C	P_{25}	210mW¹⁾
Dissipation factor (on PCB)	G_{th}	approx. 3.5 mW/K¹⁾
Thermal cooling time constant (on PCB)	T_{th}	approx. 10 s¹⁾
Heat capacity	C_{th}	approx. 35 mJ/K¹⁾
Weight of component		approx. 13 mg

¹⁾ Depends on mounting situation

Part Dimensions

Type	L	W	T	k
0805	2.0 $\pm$ 0.20	1.25 $\pm$ 0.15	1.30 max.	0.50 $\pm$ 0.25

Dimensions in mm



Resistance - Temperature Characteristic

R/T-Curve 1011 / A01
R at 25°C 10000 [Ohm]
B(25/100) 3730[K] ± 3 [%]
Rn at 25°C 10000 [Ohm] ± 5 [%]

T [°C]	R_Nom [Ω]	R_Min [Ω]	R_Max [Ω]	ΔR/R25 [±%]	ΔT [±°C]
-55	700 137	568 416	831 857	18.8	2.7
-50	499 057	410 902	587 211	17.7	2.7
-45	360 153	300 493	419 813	16.6	2.6
-40	262 956	222 162	303 749	15.5	2.5
-35	194 112	165 954	222 269	14.5	2.4
-30	144 787	125 184	164 391	13.5	2.3
-25	109 030	95 279	122 782	12.6	2.3
-20	82 923	73 203	92 643	11.7	2.2
-15	63 591	56 682	70 500	10.9	2.1
-10	49 204	44 263	54 145	10.0	2.0
-5	38 279	34 738	41 819	9.2	1.9
0	30 029	27 481	32 577	8.5	1.8
5	23 773	21 931	25 615	7.7	1.7
10	18 959	17 625	20 293	7.0	1.6
15	15 207	14 241	16 173	6.4	1.5
20	12 280	11 581	12 979	5.7	1.4
25	10 000	9 500	10 500	5.0	1.2
30	8 178	7 714	8 642	5.7	1.4
35	6 734	6 312	7 156	6.3	1.6
40	5 575	5 193	5 956	6.8	1.8
45	4 636	4 292	4 979	7.4	2.0
50	3 874	3 566	4 182	8.0	2.2
55	3 237	2 962	3 511	8.5	2.5
60	2 720	2 475	2 965	9.0	2.7
65	2 304	2 085	2 523	9.5	2.9
70	1 960	1 765	2 156	10.0	3.1
75	1 674	1 499	1 848	10.4	3.3
80	1 434	1 278	1 590	10.9	3.6
85	1 235	1 095	1 375	11.3	3.8
90	1 067	941,3	1 192	11.8	4.1
95	927,3	814,3	1 040	12.2	4.3
100	809.0	707.1	910.9	12.6	4.6
105	706.2	614.4	797.9	13.0	4.8
110	618.3	535.6	701.0	13.4	5.1
115	542.8	468.2	617.5	13.8	5.4
120	477.9	410.4	545.4	14.1	5.6
125	422.5	361.3	483.6	14.5	5.9

Resistance - Temperature Characteristic

R/T-Curve 1011 / A01
R at 25°C 10000 [Ohm]
B(25/100) 3730[K] ± 3 [%]
Rn at 25°C 10000 [Ohm] ± 10 [%]

T [°C]	R_Nom [Ω]	R_Min [Ω]	R_Max [Ω]	ΔR/R25 [±%]	ΔT [±°C]
-55	700 137	533 410	866 864	23.8	3.5
-50	499 057	385 950	612 164	22.7	3.4
-45	360 153	282 485	437 820	21.6	3.4
-40	262 956	209 015	316 897	20.5	3.3
-35	194 112	156 249	231 975	19.5	3.3
-30	144 787	117 944	171 630	18.5	3.2
-25	109 030	89 828	128 233	17.6	3.2
-20	82 923	69 057	967 89	16.7	3.1
-15	63 591	53 502	73 680	15.9	3.0
-10	49 204	41 803	56 605	15.0	3.0
-5	38 279	32 824	43 733	14.2	2.9
0	30 029	25 980	34 079	13.5	2.8
5	23 773	20 742	26 804	12.7	2.8
10	18 959	16 677	21 241	12.0	2.7
15	15 207	13 480	16 933	11.4	2.6
20	12 280	10 967	13 593	10.7	2.5
25	10 000	9 000	11 000	10.0	2.4
30	8 178	7 305	9 050	10.7	2.7
35	6 734	5 975	7 493	11.3	2.9
40	5 575	4 914	6 235	11.8	3.2
45	4 636	4 060	5 211	12.4	3.4
50	3 874	3 372	4 376	13.0	3.6
55	3 237	2 800	3 673	13.5	3.9
60	2 720	2 339	3 101	14.0	4.2
65	2 304	1 970	2 638	14.5	4.4
70	1 960	1 667	2 254	15.0	4.7
75	1 674	1 415	1 932	15.4	5.0
80	1 434	1 206	1 662	15.9	5.2
85	1 235	1 033	1 436	16.3	5.5
90	1 067	888,0	1 246	16.8	5.8
95	927.3	768.0	1 087	17.2	6.1
100	809.0	666.7	951.4	17.6	6.4
105	706.2	579.1	833.2	18.0	6.7
110	618.3	504.6	731.9	18.4	7.0
115	542.8	441.0	644.6	18.8	7.3
120	477.9	386.6	569.3	19.1	7.6
125	422.5	340.2	504.8	19.5	7.9

Reliability

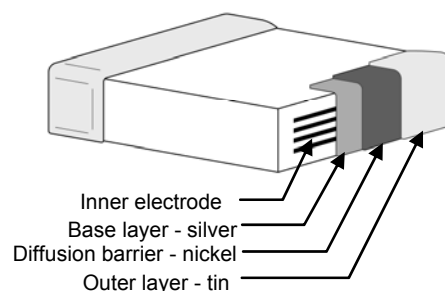
Tests of SMD NTC thermistors are made according to IEC 60068. The parts are mounted on standardized PCB in accordance with IEC 60539-1.

Test	Standard	Test conditions	$\Delta R_{25} / R_{25}$ (typical)	Remarks
Storage in dry heat	IEC 60068-2-2 (=JIS C 0021)	Storage at upper category temperature T: 125°C t: 1000h	< 3%	
Storage in damp heat, steady state	IEC 60068-2-3 (=JIS C 0022)	Temperature of air: 40°C relative humidity of air: 93% Duration: 21days	< 3%	No visible damage
Rapid temperature cycling	IEC 60068-2-14 (=JIS C 0025)	Lower test temperature: -55°C Upper test temperature: 125°C Number of cycles: 10	< 3%	
Endurance at P_{max}	-	$P_{max}=210mW$ Duration: 1000h	< 5%	
Solderability	IEC 60068-2-58 (=JIS C 0054)	Solderability: 215°C/3s 235°C/2s Resistance to soldering heat: 260°C/10s		95% of termination wetted
Resistance drift after soldering	-	reflow soldering profile wave soldering profile	< 5%	

Mounting Instructions

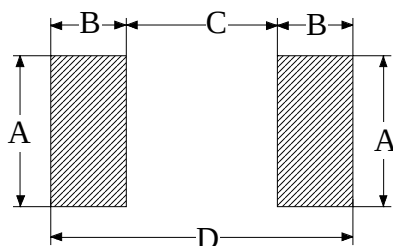
1. Termination

Ni-barrier termination (Ag/Ni/Sn)



2. Recommended geometry of solder pads

Size	A [mm]	B [mm]	C [mm]	D [mm]
0805	1.3	1.2	1.0	3.4



3. Requirements for Solderability

- Wettability test in accordance with IEC 60068-2-58 (= JIS C 0054) :

Preconditioning: Immersion into flux F-SW 32.

Evaluation criteria: Wetting of soldering areas $\geq 95\%$.

Pb-containing solder: *Sn(60)Pb(40)*

Bath temperature (°C): 215 ± 3

Dwell time (s): 3 ± 0.3

Pb-free solder: *Sn(95.1-96.0)Ag(3.0-4.0)Cu(0.5-0.9)*

Bath temperature (°C): 245 ± 5

Dwell time (s): 3 ± 0.3

- Soldering heat resistance test in accordance with IEC 60068-2-58 (= JIS C 0054) :

Preconditioning: Immersion into flux F-SW 32.

Evaluation criteria: Leaching of side edges $\leq 1/3$.

Solder: $\text{Sn}(60)\text{Pb}(40)$, $\text{Sn}(95.1-96.0)\text{Ag}(3.0-4.0)\text{Cu}(0.5-0.9)$

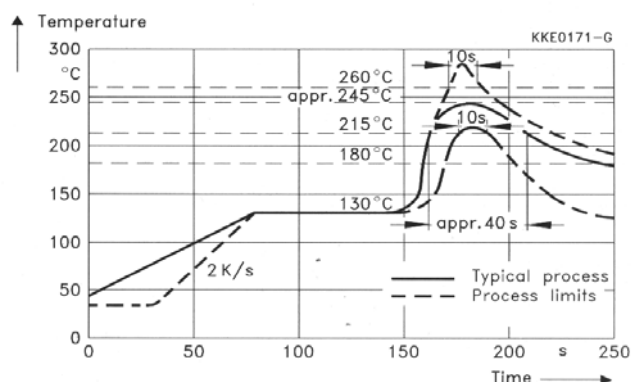
Bath temperature ($^{\circ}\text{C}$): 260 ± 5

Dwell time (s): 10 ± 1

4. Recommended soldering profiles

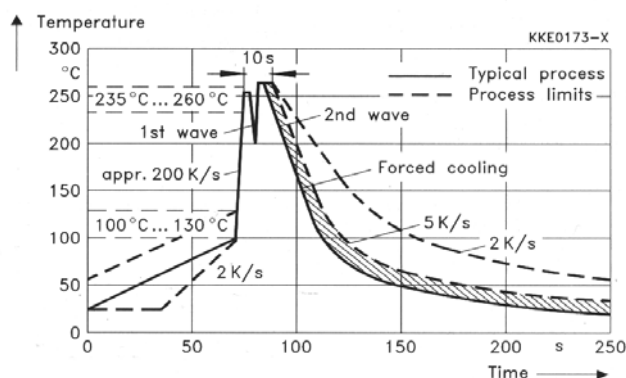
Reflow soldering profile: (according to CECC 00802)

Temperature characteristics at component terminals during reflow soldering (two cycles are permitted).



Wave soldering profile:

Temperature characteristics at component terminals during wave soldering can be recommended once in general.



5. Storage conditions

Solderability is guaranteed for 12 months from date of delivery for types with Ni-barrier termination, provided that the components are stored in the original packages.

Storage temperature: -25 ... +45°C

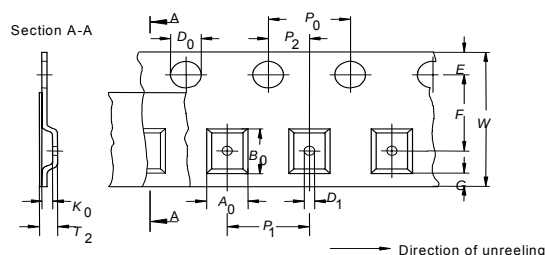
Relative humidity: < 75% annual average, < 95% on max. 30 days in a year, dew precipitation and wetness are inadmissible.

Taping and Packing

Taping:

Tape and reel packing comply with specifications of IEC 60286-3

Blister tape

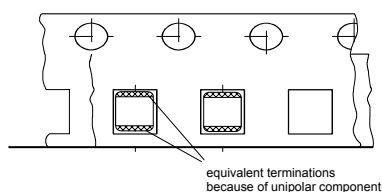


Dimensions and tolerances:

Definition	Symbol	Dimension (mm)	Tol. (mm)
		Size 0805	
Compartment width x Compartments length	$A_0 \times B_0$	1.6 x 2.4	± 0.2
Compartment height	K_0	1.4	max.
Overall thickness	T_2	2.5	max.
	T	0.3	max.
Sprocket hole diameter	D_0	1.5	$+0.1/-0$
Compartment hole diameter	D_1	1.0	min.
Sprocket hole pitch	P_0	4.0	$\pm 0.1^{1)}$
Distance centre hole to centre compartment	P_2	2.0	± 0.05
Pitch of the component compartments	P_1	4.0	± 0.1
Tape width	W	8.0	± 0.3
Distance edge to centre of hole	E	1.75	± 0.1
Distance centre hole to centre compartment	F	3.5	± 0.05
Distance edge to centre compartment	G	0.75	min.

¹⁾ ≤ 0.2 mm over 10 sprocket holes.

Part orientation in tape pocket



Reel Packing:

Reel material: PS.

Tape material: Blister

Tape break force: min. 10N

Top cover tape peel force: 0.1 - 0.65N at a peel speed of 300 mm/min, angle between top cover tape and the direction of feed during peel off: 165 -180°.

Top cover tape strength: min. 10N

Length of tape:

Leader section: additional top cover tape, length min 400 mm, before component section (including carrier tape with empty cavities, length min. 150 mm or min. 20 pcs. of empty cavities).

Trailer section: length min. 40 mm.

Empty part cavities at leader and trailer section on tape are sealed with top cover tape.

Cavity play:

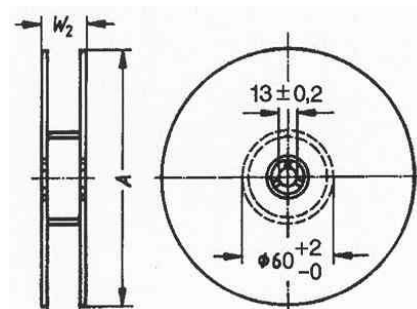
Each part rests in the cavity so that the angle between the part centreline and the cavity centreline is no more than 20°.

Weight of loaded reel: max. 1500 g

Packing units: 3000pcs.

Package 8 mm tape

Definition	Symbol	Dim. (mm)	Tol. (mm)
Reel diameter	A	180	-3/+0
Reel width (inside)	W ₁	8.4	+1.5/-0
Reel width (outside)	W ₂	14.4	max.



Cautions and warnings

Storage

- Store thermistors only in original packaging. Do not open the package before storage.
- Storage conditions in original packaging: storage temperature $-25^{\circ}\text{C} \dots +45^{\circ}\text{C}$, 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:
SMD with nickel barrier termination: 12 months
SMD with AgPd termination: 6 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 over molded with plastic material, there must be no mechanical stress caused by thermal expansion during the production process (curing / over molding process) and during later operation. The upper category temperature of the thermistor must not be exceeded. Ensure that the materials used (sealing compound and plastic material) are chemically neutral.
- Electrode must not be scratched before/during/after the mounting process.
- Contacts and housing used for assembly with thermistor have to 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 thermistor surface during processing.

Operation

- Use thermistors only within the specified operating temperature range.
- 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 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.
- 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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