



## **SMD NTC thermistors**

SMD NTC thermistor, standard series

**Series/Type:**  
**Ordering code:**      **B57621C0104J062**  
Date:                      2013-01-09  
Version:                    2

## Applications

Temperature measurement and compensation for

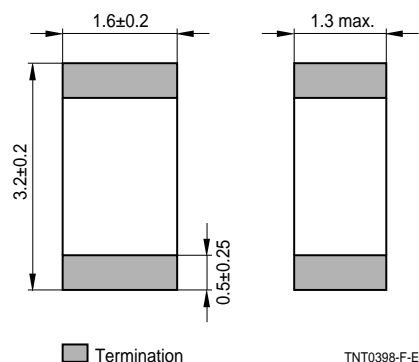
- charging control of battery packs in portable devices
- LCDs and power amplifiers in mobile phones, car radio equipment, etc.
- HDD in computers, digital cameras, DVD recorders
- air-conditioning and heating control systems
- LED lighting

## Features

- EIA case size 1206
- Silver-Palladium termination (AgPd)
- Excellent long-term aging stability in high temperature and high humidity environment

**This component is not suitable for lead free soldering process!**

## Dimensional drawing



Dimensions in mm

## Electrical specifications

Ordering code	Zero-power resistance (at 25 °C)	B <sub>25/100</sub>	B <sub>25/85</sub>	B <sub>25/50</sub>
B57621C0104J062	100 kΩ ±5%	3950 K ±3%	(3930 K)	(3870 K)

Operating temperature range	T <sub>op</sub>	-55 ... 125	°C
Maximum power (at 25 °C, on PCB)	P <sub>25</sub> <sup>1)</sup>	300	mW
Resistance tolerance	ΔR <sub>R</sub> /R <sub>R</sub>	±5	%
Rated temperature	T <sub>R</sub>	25	°C
Dissipation factor (on PCB)	δ <sub>th</sub> <sup>1)</sup>	approx. 5	mW/K
Thermal cooling time constant (on PCB)	τ <sub>c</sub> <sup>1)</sup>	approx. 10	s
Heat capacity	C <sub>th</sub> <sup>1)</sup>	approx. 50	mJ/K
Weight of component		approx. 18	mg

<sup>1)</sup> Depends on mounting situation

## Resistance/ temperature characteristic

NTC resistance temperature curve

R/T-curve 4901  
 R at 25 °C 100000 [Ω]  
 B (25/100) 3950 [K] ±3 [%]  
 R<sub>N</sub> at 25 °C 100000 [Ω] ±5 [%]

Temp. [°C]	R Nom [Ω]	R Min [Ω]	R Max [Ω]	ΔR [±%]	ΔT [±°C]	α [%/K]
-55.0	8789000	7064100	10514000	19.6	2.8	7.1
-50.0	6175900	5039000	7312800	18.4	2.7	6.9
-45.0	4393400	3635800	5151000	17.2	2.6	6.7
-40.0	3161800	2651800	3671800	16.1	2.5	6.5
-35.0	2300600	1954100	2647200	15.1	2.4	6.3
-30.0	1691500	1454000	1929000	14	2.3	6.1
-25.0	1255500	1091500	1419400	13.1	2.2	5.9
-20.0	941430	827380	1055500	12.1	2.1	5.7
-15.0	711720	631950	791500	11.2	2	5.5
-10.0	543080	486950	599220	10.3	1.9	5.4
-5.0	415050	375630	454460	9.5	1.8	5.2
0.0	320140	292330	347950	8.7	1.7	5
5.0	250110	230330	269880	7.9	1.6	4.9
10.0	196910	182820	211000	7.2	1.5	4.7
15.0	156180	146140	166220	6.4	1.4	4.6
20.0	124740	117590	131880	5.7	1.3	4.5
<b>25.0</b>	<b>100000</b>	<b>95000</b>	<b>105000</b>	<b>5</b>	<b>1.2</b>	<b>4.3</b>
30.0	80800	76190	85410	5.7	1.4	4.2
35.0	65690	61525	69854	6.3	1.6	4.1
40.0	53720	49984	57456	7	1.8	4
45.0	44235	40896	47574	7.5	2	3.9
50.0	36610	33636	39585	8.1	2.2	3.8
55.0	30393	27754	33032	8.7	2.4	3.7
60.0	25359	23019	27698	9.2	2.6	3.6
65.0	21283	19207	23358	9.8	2.8	3.5
70.0	17942	16101	19783	10.3	3	3.4
75.0	15183	13550	16817	10.8	3.3	3.3
80.0	12901	11451	14351	11.2	3.5	3.2
85.0	11002	9714.1	12290	11.7	3.7	3.1
90.0	9417.9	8272.3	10563	12.2	4	3.1
95.0	8089.6	7069.7	9109.4	12.6	4.2	3
100.0	6972.2	6063.1	7881.3	13	4.5	2.9
105.0	6039.7	5226.9	6852.6	13.5	4.7	2.9
110.0	5249.3	4521.4	5977.2	13.9	5	2.8
115.0	4573.3	3920.9	5225.7	14.3	5.2	2.7
120.0	3996.3	3410.7	4581.9	14.7	5.5	2.7
125.0	3505.9	2978.8	4032.9	15	5.8	2.6

## Reliability data

SMD NTC thermistors are tested in accordance with IEC 60068. The parts are mounted on a 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 ±2) °C t: 1000 h	<3%	
Storage in damp heat, steady state	IEC 60068-2-78 JIS C 0022	Temperature of air: (40 ±2) °C Relative humidity of air: (93 +2/-3)% under zero bias condition Duration: 21 days	<3%	
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	-	P <sub>max</sub> : 300 mW T: (65 ±2) °C t: 1000 h	<5%	
Solderability	IEC 60068-2-58 JIS C 0054	Solderability: (215 ±3) °C, (3 ±0.3) s  Resistance to soldering heat: (260 ±5) °C, (10 ±1) s		95% of termination wetted
Resistance drift after soldering	-	Reflow soldering profile Wave soldering profile	<5%	

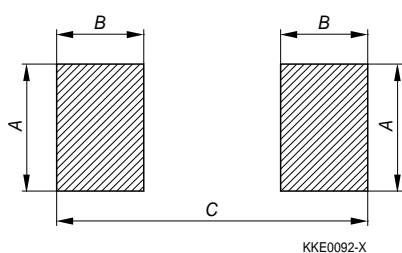
## Mounting instructions

### 1. Termination

(AgPd)

### 2. Recommended geometry of solder pads

Case size inch/mm	A [mm]	B [mm]	C [mm]
1206/3216	1.8	1.2	4.5



### 3. Requirements for Solderability

- Solderability (test to IEC 60068-2-58):

Preconditioning: Immersion into flux F-SW 32.

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

Solder	Bath temperature (°C)	Dwell time (s)
SnPb 60/40	215 $\pm$ 3	3 $\pm$ 0.3

- Resistance to soldering heat (test to IEC 60068-2-58):

Preconditioning: Immersion into flux F-SW 32.

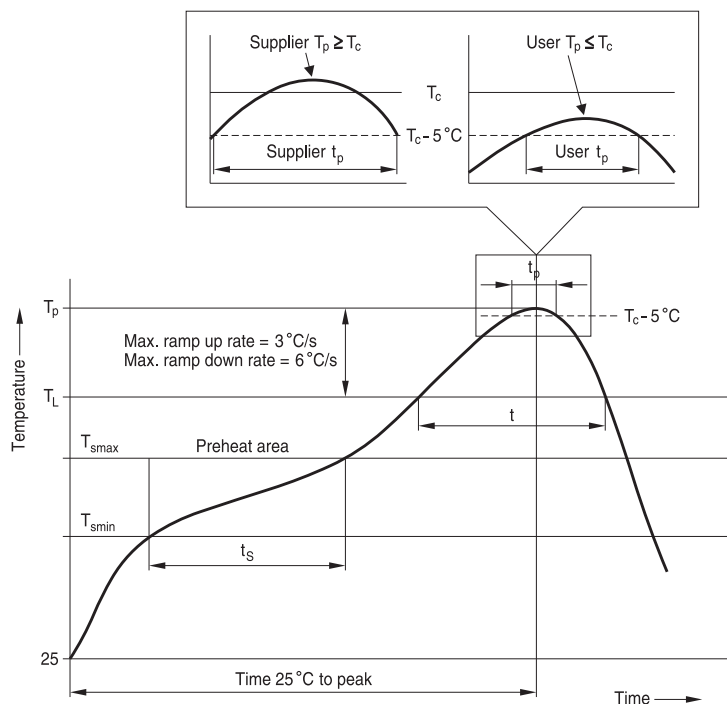
Evaluation criterion: Leaching of side edges  $\leq 1/3$ .

Solder	Bath temperature (°C)	Dwell time (s)
SnPb 60/40	260 $\pm$ 5	10 $\pm$ 1

## 4. Recommended soldering profiles

### 4.1 Reflow soldering

Recommended temperature characteristic for reflow soldering following JEDEC J-STD-020D



Profile feature		Sn-Pb eutectic assembly
Preheat and soak		
- Temperature min	$T_{smin}$	100 °C
- Temperature max	$T_{smax}$	150 °C
- Time	$t_{smin}$ to $t_{smax}$	60 ... 120 s
Average ramp-up rate	$T_{smax}$ to $T_p$	3 °C/s max.
Liquidous temperature	$T_L$	183 °C
Time at liquidous	$t_L$	60 ... 150 s
Peak package body temperature	$T_p$ <sup>1)</sup>	220 °C ... 235 °C <sup>2)</sup>
Time ( $t_p$ ) <sup>3)</sup> within 5 °C of specified classification temperature ( $T_c$ )		20 s <sup>3)</sup>
Average ramp-down rate	$T_p$ to $T_{smax}$	6 °C/s max.
Time 25 °C to peak temperature		maximum 6 min

1) Tolerance for peak profile temperature ( $T_p$ ) is defined as a supplier minimum and a user maximum.

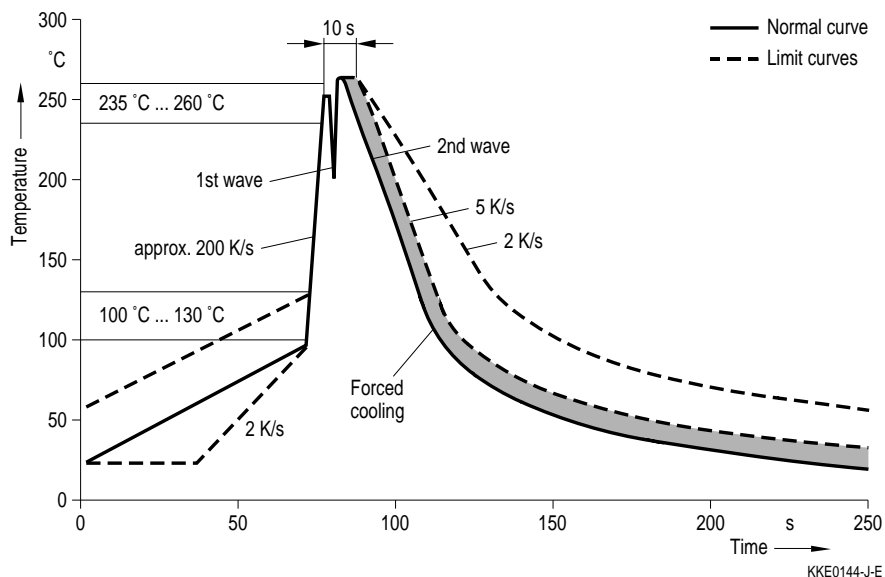
2) Depending on package thickness. For details please refer to JEDEC J-STD-020D.

3) Tolerance for time at peak profile temperature ( $t_p$ ) is defined as a supplier minimum and a user maximum.

**Note:** All temperatures refer to topside of the package, measured on the package body surface.

## 4.2 Wave soldering profile

Temperature characteristic at component terminals with dual wave soldering



## 5. Storage conditions

Solderability is guaranteed for 6 months from date of delivery, provided that the components are stored in the original packages.

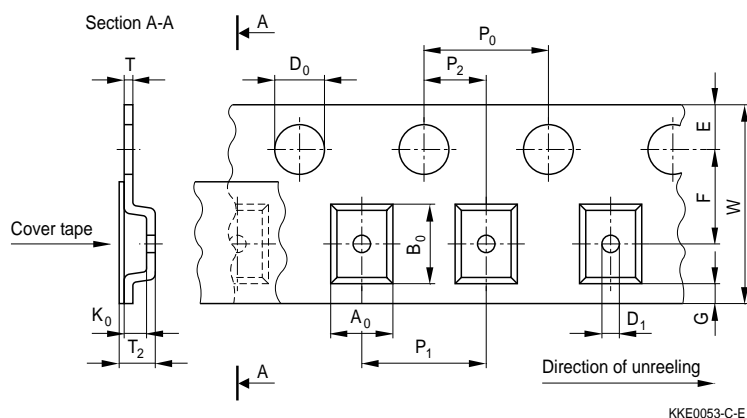
Storage temperature: -25 ... +45 °C

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

## Taping and packing

### 1. Taping

#### 1.1. Blister tape (taping to IEC 60286-3)

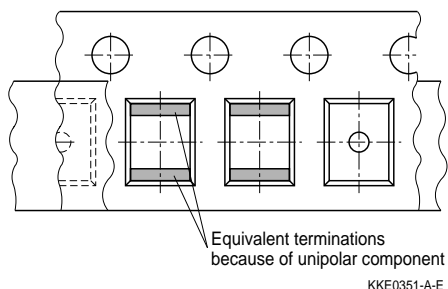


#### Dimensions (mm)

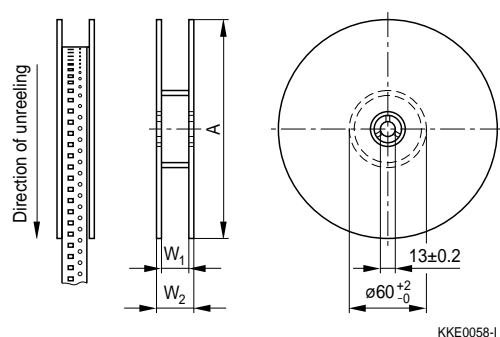
	Case size 1206 (8-mm tape)	Tolerance
$A_0 \times B_0$	1.90 x 3.50	$\pm 0.2$
$K_0$	1.40	max.
$T_2$	2.5	max.
$D_0$	1.50	$+0.10/-0$
$D_1$	1.00	min.
$P_0$	4.00	$\pm 0.10^{s1)}$
$P_2$	2.00	$\pm 0.05$
$P_1$	4.00	$\pm 0.10$
$W$	8.00	$\pm 0.30$
$E$	1.75	$\pm 0.10$
$F$	3.50	$\pm 0.05$
$G$	0.75	min.

<sup>s1)</sup>  $\leq 0.2$  mm over 10 sprocket holes.



**Part orientation in tape pocket for blister tape**

**Additional taping information**

Reel material	Polystyrol (PS)
Tape material	Polystyrol (PS) or Polycarbonat (PC) or PVC
Tape break force	min. 10 N
Top cover tape strength	min. 10 N
Top cover tape peel force	0.2 to 0.6 N for 8-mm tape and 0.2 to 0.8 N for 12-mm tape ate a peel speed of 300 mm/min
Tape peel angle	Angle between top cover tape and the direction of feed during peel off: 165 to 180 °
Cavity play	Each part rests in the cavity so that the angle between the part and cavity centre line is no more than 20 °

**2. Reel packing**


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

**Weight of loaded reel:** maximum 1.500 g

**Packing unit:** 4.000 pcs.

## Cautions and warnings

### Storage

- Store thermistors only in original packaging. Do not open the package before storage.
- Storage conditions in original packaging: storage temperature  $-25\text{ °C} \dots +45\text{ °C}$ , 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 ( $\text{SO}_x$ , 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 NTC thermistors 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.
- 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.

### 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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