



SMD NTC thermistors

SMD NTC thermistor, automotive series

Series/Type:	Automotive series
Ordering code:	B57432V5502A262
Date:	2025-08-11
Version:	1

Applications

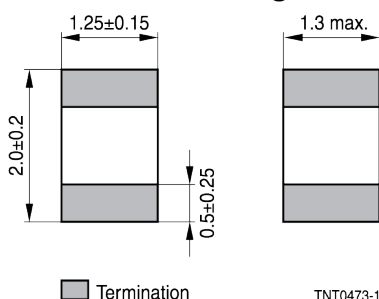
Temperature measurement and compensation in various automotive circuits, such as

- charging and temperature control of battery packs and battery management systems (BMS)
- electronic control units (ECUs), e.g., motor management, HVAC, electronic power steering (EPS), gearbox controls, ABS systems, temperature sensors for air-conditioning, LED lighting
- DC/DC converters, inverters, on-board chargers (OBC)
- thermal protection of semiconductors (GaN / SiC) in power modules

Features

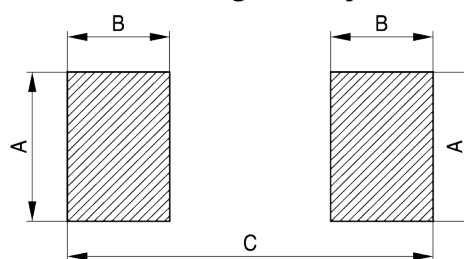
- EIA case size 0805, qualification based on AEC-Q200
- Multilayer SMD NTC thermistor with nickel barrier termination (AgNiSn)
- High temperature range up to 175°C
- Minimized resistance drift after soldering process
- Excellent long-term aging stability in high temperature and high humidity environment
- 100% Pb free, RoHS
- UL approval (file number E69802)

Dimensional drawing



Dimensions in mm

Recommended geometry of solder pads



KKE0092-X

Case size [inch/mm]	A [mm]	B [mm]	C [mm]
0805/2012	1.3	0.6	3.4

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Electrical specifications

Ordering code	Zero-power resistance (at 25 °C)	B _{25/100}	B _{25/85}	B _{25/50}
B57432V5502A262	5 kΩ ±3%	3455 K ±2.0%	(3420 K)	(3375 K)

General technical data

Operating temperature range	T _{op}	-40 ... 175	°C
Maximum power (at 25 °C, on PCB)	P ₂₅ ¹⁾	210	mW
Rated temperature	T _R	25	°C
Dissipation factor (on PCB)	δ _{th} ¹⁾	approx. 3.5	mW/K
Thermal cooling time constant (on PCB)	τ _c ¹⁾	approx. 10	s
Heat capacity	C _{th} ¹⁾	approx. 35	mJ/K
Weight of component		approx. 13	mg

¹⁾ Depends on mounting situation

Resistance/temperature characteristic

NTC resistance temperature curve

R/T curve	N/A
R at 25 °C	5000 [Ω]
B (25/100)	3455 [K] ± 2 [%]
R _N at 25 °C	5000 [Ω] ± 3 [%]

Temp. [°C]	R nom [Ω]	R min [Ω]	R max [Ω]	ΔR/R [±%]	ΔT/T [±%]	α [%/K]
-40	99092	89048	108805	9.8	1.7	5.6
-35	75165	68304	82027	9.1	1.7	5.4
-30	57542	52659	62425	8.5	1.6	5.3
-25	44436	40938	47934	7.9	1.5	5.1
-20	34602	32080	37123	7.3	1.5	4.9
-15	27158	25331	28985	6.7	1.4	4.8
-10	21477	20148	22807	6.2	1.3	4.6
-5	17108	16136	18079	5.7	1.3	4.5
0	13721	13010	14433	5.2	1.2	4.3
5	11078	10556	11600	4.7	1.1	4.2
10	9000.4	8617.0	9383.7	4.3	1.0	4.1
15	7356.7	7075.5	7638.0	3.8	1.0	4.0
20	6048.1	5842.3	6254.0	3.4	0.9	3.9
25	5000.0	4850.0	5150.0	3.0	0.8	3.8
30	4155.6	4014.7	4296.5	3.4	0.9	3.6
35	3471.5	3340.6	3602.3	3.8	1.1	3.5
40	2914.3	2793.7	3034.9	4.1	1.2	3.5
45	2458.1	2347.6	2568.6	4.5	1.3	3.4
50	2082.8	1981.9	2183.7	4.8	1.5	3.3
55	1772.5	1680.6	1864.4	5.2	1.6	3.2
60	1514.8	1431.3	1598.3	5.5	1.8	3.1
65	1299.9	1224.0	1375.7	5.8	1.9	3.0
70	1119.8	1051.0	1188.6	6.1	2.1	2.9
75	968.31	905.85	1030.8	6.4	2.2	2.9
80	840.38	783.68	897.07	6.7	2.4	2.8
85	731.92	680.43	783.42	7.0	2.6	2.7
90	639.64	592.83	686.44	7.3	2.7	2.7
95	560.82	518.25	603.40	7.6	2.9	2.6
100	493.29	454.52	532.06	7.9	3.1	2.5
105	435.22	399.87	470.57	8.1	3.3	2.5
110	385.13	352.87	417.40	8.4	3.5	2.4
115	341.79	312.30	371.28	8.6	3.7	2.4
120	304.17	277.19	331.16	8.9	3.8	2.3
125	271.43	246.70	296.15	9.1	4.0	2.3
130	242.84	220.16	265.53	9.3	4.2	2.2
135	217.82	196.98	238.66	9.6	4.5	2.1
140	195.86	176.68	215.03	9.8	4.7	2.1
145	176.53	158.86	194.20	10.0	4.9	2.1
150	159.48	143.18	175.78	10.2	5.1	2.0
155	144.40	129.34	159.46	10.4	5.3	2.0
160	131.03	117.10	144.97	10.6	5.5	1.9
165	119.15	106.25	132.06	10.8	5.8	1.9
170	108.58	96.602	120.55	11.0	6.0	1.8
175	99.137	88.014	110.26	11.2	6.2	1.8

Reliability data

- The tests of SMD NTC thermistors are based on AEC-Q200.
- The parts are mounted on standardized PCB.

Test	Standard	Test conditions	$\Delta R_{25} / R_{25}$ (typical)	Remarks
Pre-stress and post-stress electrical test		Resistance at: 25 °C and 100 °C	-	
High temperature exposure (storage)	MIL-STD-202, method 108	Test temperature: 175 °C Duration: 1000 h Unpowered	< 5%	
Temperature cycling	JESD22, method JA-104	Lower test temperature: -40 °C Upper test temperature: 175 °C Number of cycles: 1000 Dwell time: 15 min	< 5%	Temperature cycling is performed acc. To MIL-STD-202, method 107.
Biased humidity	MIL-STD-202, method 103	Test temperature: 85 °C Rel. humidity of air: 85% Duration: 1000 h Test voltage: $V_{NTC} = 0.3 \text{ V DC}$	< 5%	
Operational life	MIL-STD-202, method 108	Test temperature: 175 °C $P_{max} = 0.35 \text{ mW}$ Duration: 1000 h	< 5%	
External visual	MIL-STD-883E, method 2009	Visual inspection		
Physical dimensions	JESD22, method JB-100	Measured with calipers		Within the specified values
Resistance to solvents	MIL-STD-202, method 215	Not applicable for SMD NTC thermistors (component has no marking, color coding, or coating)		
Mechanical shock	MIL-STD-202, method 213	Peak value: 1500 g Half sine Condition F	< 5%	
Vibration	MIL-STD-202, method 204	Acceleration: 5 g Sweep time: 20 min Frequency range: 10 ... 2000 Hz 3 x 12 cycles	< 5%	
Resistance to soldering heat	MIL-STD-202, method 210	Dip: 260 °C; 10 s 1 heat cycle	< 3%	

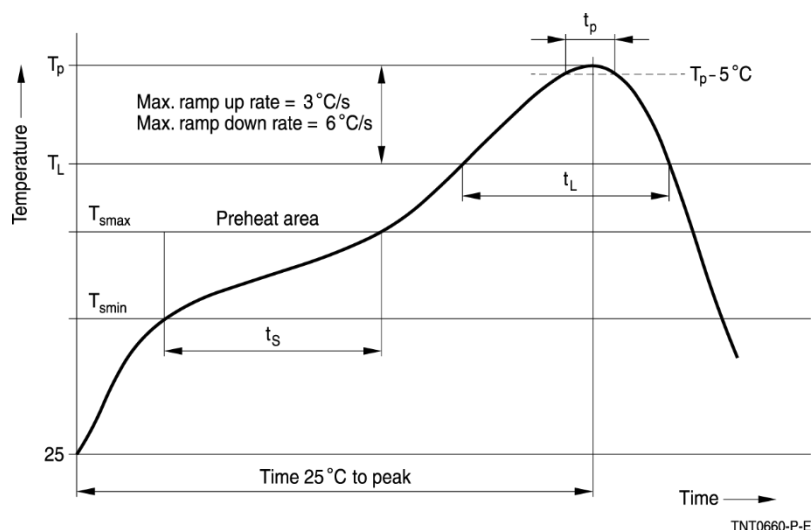
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Test	Standard	Test conditions	$\Delta R_{25} / R_{25}$ (typical)	Remarks
ESD	AEC-Q200-002, method -002	Discharge capacitance: 150 pF Discharge resistance: 2 k Ω Charging voltage: 6 kV Contact discharge 2 pulses in each polarity	< 5%	
Solderability	J-STD-002	a) Dip: 235 °C; 5 s: aging 4 h @ 155 °C b) Dip: 215 °C; 5 s: steam aging 8 h @ 92 °C c) Dip: 260 °C; 7 s: steam aging 8 h @ 92 °C		95% of termination wetted
Electrical characterization		R(25 °C), R(100 °C), B(25/100)		Within the specified values
Flammability	UL-94, V-0 or V-1	Not applicable for SMD NTC thermistors (component is not coated or encapsulated with plastic materials)		
Board flex	AEC-Q200-005, method -005	Max. bending: 2 mm Duration @ max. bending: 60 s	< 5%	
Terminal strength	AEC-Q200-006, method -006	Max. F: 17.7 N	< 5%	
Resistance drift after soldering		Reflow soldering profile	< 1%	

Recommended soldering profiles

Reflow soldering

Temperature ranges for reflow soldering acc. to IEC 60068-2-58 recommendations.



Profile feature		Sn-Pb eutectic assembly	Pb-free assembly
Preheat and soak			
- Temperature min	T_{smin}	100 °C	150 °C
- Temperature max	T_{smax}	150 °C	200 °C
- Time	t_s	60 ... 120 s	60 ... 120 s
Average ramp-up rate	T_{smax} to T_p	3 °C/s max.	3 °C/s max.
Liquidous temperature	T_L	183 °C	217 °C
Time at liquidous	t_L	40 ... 150 s	40 ... 150 s
Peak package body temperature	$T_p^{1)}$	215 °C ... 260 °C	235 °C ... 260 °C
Time (t_p) above ($T_p - 5^\circ\text{C}$)	t_p	10 ... 40 s	10 ... 40 s
Average ramp-down rate	T_p to T_{smax}	6 °C/s max.	6 °C/s max.
Time 25 °C to peak temperature		max. 8 minutes	max. 8 minutes

¹⁾Depending on package thickness.

Note:

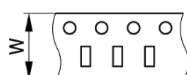
- All temperatures refer to topside of the package, measured on the package body surface.
- Number of reflow cycles: 3
- Iron soldering should be avoided. Hot air methods are recommended for repair purposes.

It is the responsibility of the user to ensure that the thermomechanical properties of substrate material and solder are compatible with the application.

Taping and packing

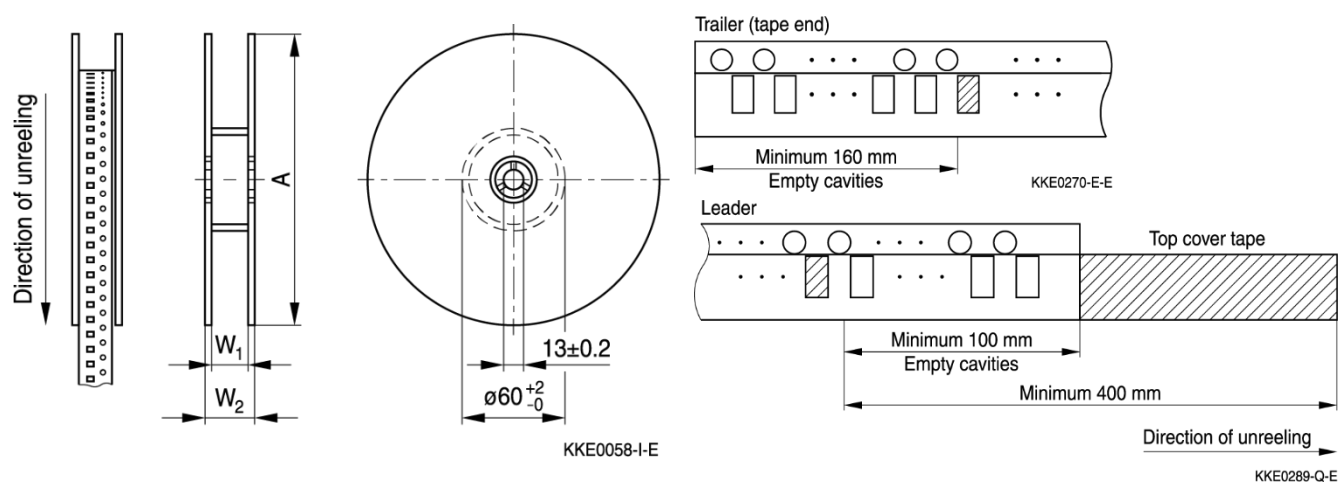
- Tape and reel packing according to IEC 60286-3
- Tape material: Blister

Tape dimensions and tolerances



Definition	Symbol	Dimension [mm]	Tolerance [mm]
Tape width	W	8.00	±0.30

Reel dimensions and tolerances



Definition	Symbol	Dimension [mm]	Tolerance [mm]
Reel diameter	A	180	+0/-3
Reel width (inside)	W1	8.4	+1.5/-0
Reel width (outside)	W2	14.4	max.

Packing unit: 4000 pcs./reel

Cautions and warnings

Storage

- Store thermistors only in original packaging. Do not open the package before storage.
- Storage conditions in original packaging: storage temperature $-25\text{ }^{\circ}\text{C}$ to $+45\text{ }^{\circ}\text{C}$, relative humidity $\leq 75\%$ annual mean, 95% on max. 30 days in a year, dew precipitation and wetness are 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. Touching the metallization of unsoldered thermistors may change their soldering properties.
- 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 TDK Electronics within the time specified:
SMD NTC thermistors with nickel-barrier termination: 12 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).

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

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Release 2024-02