PTC Thermistor

Overcurrent protection

Series/Type:	**A321 A1090 A62**
Ordering code:	**B59321 A1090 A062**
Date:	2023-11-10
Version:	1

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Preliminary data

Applications

- Overcurrent protection
- Short circuit protection

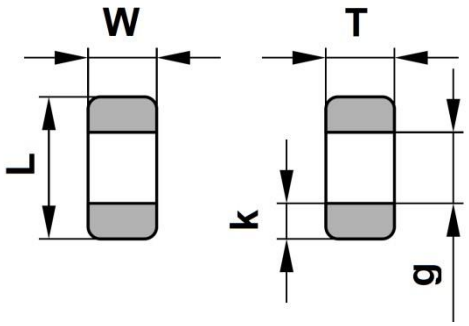
Features

- Suitable for reflow soldering only
- Fast and reliable response
- Compliant to RoHS directive
- Ceramic and termination lead-free

Delivery Mode

- Cardboard tape 180-mm reel with 8-mm tape, taping to IEC 60286-3
- Packing unit: 10.000 pcs.

Dimensional drawing in mm

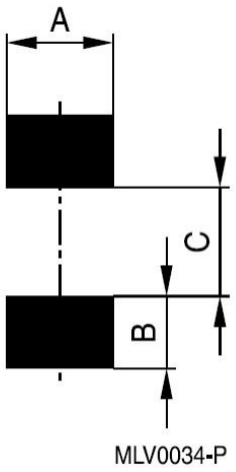


L	0.60 ± 0.05	mm
W	0.30 ± 0.05	mm
T	0.30 ± 0.05	mm
K	0.175 ± 0.075	mm
G	>0.15	mm

Recommended solder pad layout

Dimensions in mm

Case size EIA / mm	A	B	C
0201 / 0603	0.30	0.25	0.30



General technical data

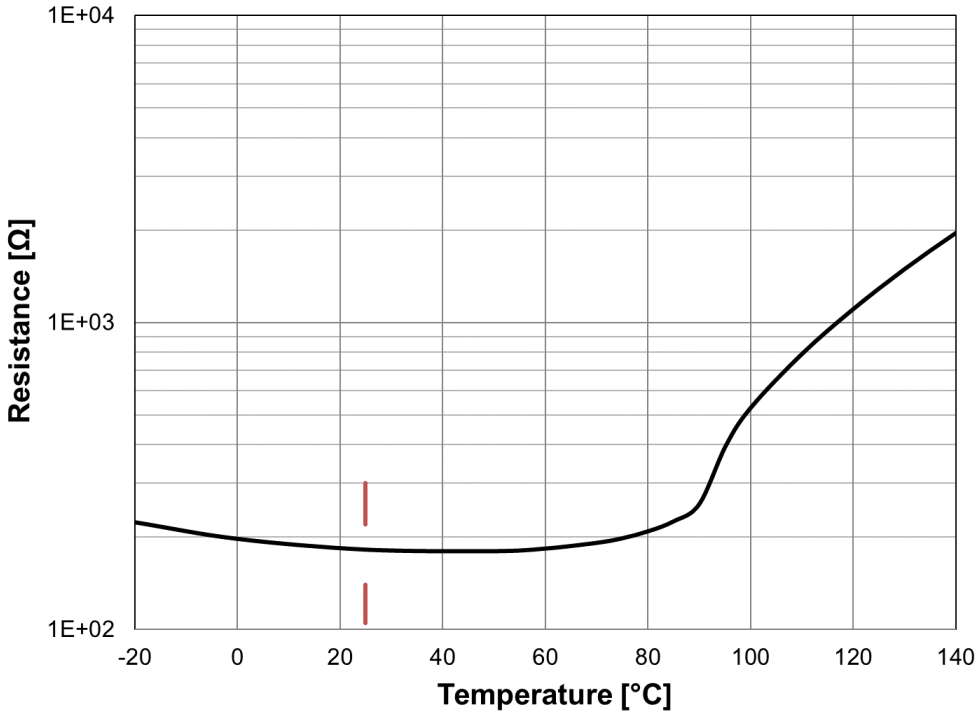
Operating voltage	V	16	V_{DC}
Max. operating voltage	V_{max}	20	V_{DC}
Rated resistance (@ 25 °C)	R_R	180 ± 60	Ω
Rated current (@ 25 °C)	I_R 1)	15	mA
Switching current (@ 25 °C)	I_S 2)	40	mA
Operating temperature range	T_{op}	-20 to +65	°C
Mass	m	0.28	mg

1) At currents ≤ I_R the PTC thermistor reliably remains in in low-resistance mode.

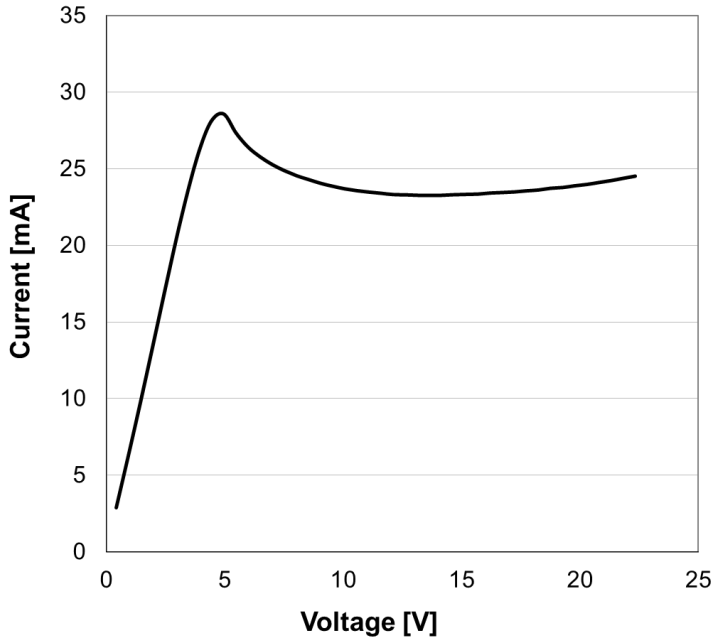
2) At currents ≥ I_S the PTC thermistor reliably goes into high-resistance mode.

Preliminary data

Typical resistance vs. temperature characteristic



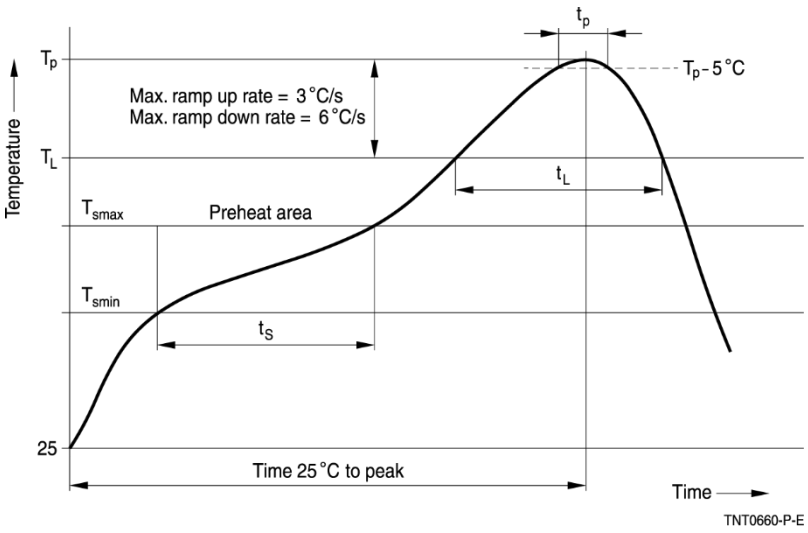
Typical current vs. voltage characteristic



Recommended soldering profiles

Reflow soldering

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



Profile feature		Sn-Pb eutectic assembly	Pb-free assembly
Preheat and soak - Temperature min - Temperature max - Time	 T_{smin} T_{smax} t_s	 100 °C 150 °C 60 … 120 s	 150 °C 200 °C 60 … 120 s
Average ramp-up rate	T_{smax} to T_p	3 °C/s max.	3 °C/s max.
Liquidous temperature Time at liquidous	T_L t_L	183 °C 40 … 150 s	217 °C 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 °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		maximum 8 min	maximum 8 min

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.

Preliminary data

General

- TDK thermistors are designed for specific applications and should not be used for purposes not identified in our specifications, application notes and data books unless otherwise agreed with TDK during the design-in-phase.
- Ensure suitability of thermistor through reliability testing during the design-in phase. The thermistors should be evaluated taking into consideration worst-case conditions.

Storage

- Store thermistors only in original packaging. Do not open the package prior to processing.
- Storage conditions in original packaging: storage temperature -25 °C ... +45 °C, relative humidity ≤ 75% annual mean, maximum 95%, dew precipitation is inadmissible.
- Avoid contamination of thermistors surface during storage, handling and processing.
- Avoid storage of thermistor in harmful environment with effect on function on long-term operation (examples given under operation precautions).
- Use thermistor within the following period after delivery: -
  SMDs in EIA sizes 1210 and smaller: 12 months

Handling

- PTCs must not be dropped. Chip-offs must not be caused during handling of PTCs.
- Components must not be touched with bare hands. Gloves are recommended.
- Avoid contamination of thermistor surface during handling.

Soldering (where applicable)

- Use rosin-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.
- Standard PTC heaters are not suitable for soldering.

Mounting

- 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. Especially grease or oil must be removed.
- When PTC thermistors are encapsulated with sealing material, the precautions given in chapter "Mounting instructions", "Sealing and potting" must be observed.
- When the thermistor is mounted, there must not be any foreign body between the electrode of the thermistor and the clamping contact.
- The minimum force and pressure of the clamping contacts pressing against the PTC must be 10 N and 50 kPa, respectively. In case the assembly is exposed to mechanical shock and/ or vibration this force should be higher in order to avoid movement of the PTC during operation.

- During operation, the thermistor's surface temperature can be very high. Ensure that adjacent components are placed at a sufficient distance from the thermistor to allow for proper cooling at the thermistors.

- Ensure that adjacent materials are designed for operation at temperatures comparable to the surface temperature of thermistor. Be sure that surrounding parts and materials can withstand this temperature.
- Avoid contamination of thermistor surface during processing.

Operation

- Use thermistors only within the specified temperature operating range.
- Use thermistors only within the specified voltage and current ranges.
- Environmental conditions must not harm the thermistors. Use thermistors only in normal atmospheric conditions. Avoid use in deoxidizing gases (chlorine gas, hydrogen sulfide gas, ammonia gas, sulfuric acid gas etc), corrosive agents, humid or salty conditions. Contact with any liquids and solvents should be prevented.
- Be sure to provide an appropriate fail-safe function to prevent secondary product damage caused by abnormal function (e.g. use VDR for limitation of overvoltage condition).

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