# PTC Thermistor

## Overcurrent protection

| | |
|---|---|
| **Series/Type:** | **C0985-A0120-A051** |
| **Ordering code:** | **B59985C0120A051** |
| Date: | 2015-04-30 |
| Version: | a |

## Applications

- Overcurrent protection
- Short circuit protection

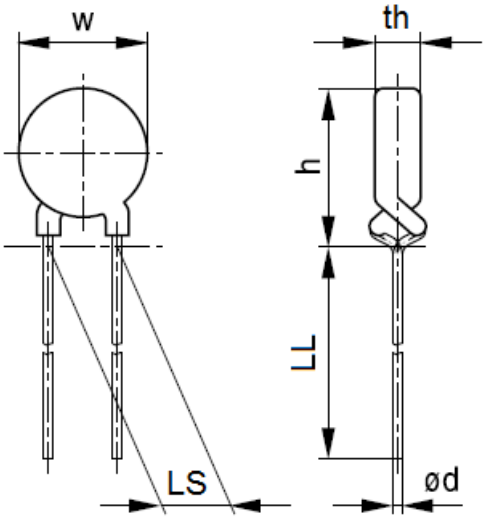
## Features

- Lead free terminals
- Marking: Type, Manufacturer's logo, reference temperature in °C and date code YYWW
- Short response time
- UL approval to UL 1434 with Vmax =15V and $V_R$ =12V (file number E69802)
- RoHS-compatible

## Delivery mode

- Cardboard tape reeled

## Dimensions and drawing




| | | |
|---|---|---|
| $w_{max}$ | 6.5 | mm |
| $th_{max}$ | 3.5 | mm |
| $h_{max}$ | 10.0 | mm |
| d | 0.6 ± 0.05 | mm |
| LS | 5.0 +0.6/-0.1 | mm |
| LL | acc. to tape | |

## General Technical Data

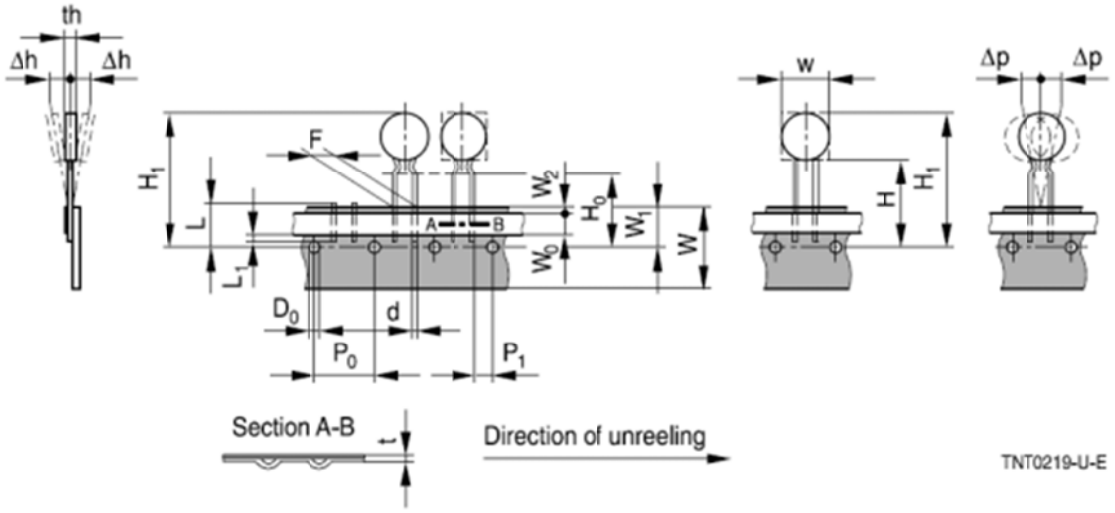
| | | | |
|---|---|---|---|
| Max. operating voltage ($T_a$ = 60°C) | $V_{max}$ | 30 | $V_{DC}$ or $V_{AC}$ |
| Rated voltage | $V_R$ | 12,24 | $V_{DC}$ or $V_{AC}$ |
| Rated resistance at $T_{amb}$ | $R_{25}$ | 4.6 | Ω |
| Rated resistance tolerance at $T_{amb}$ | $\Delta R_{25}$ | ± 25 | % |
| Min. resistance | $R_{min}$ | 2.7 | Ω |
| Rated current | $I_R$ | 250 | mA |
| Switching current | $I_S$ | 500 | mA |
| Maximal permissible switching current at $V_{max}$ | $I_{Smax}$ | 1.0 | A |
| Residual current at $V_{max}$ (typ.) for information only | $I_{res}$ | 45 | mA |
| Reference temperature (typ.) for information only | $T_{ref}$ | 120 | °C |
| Operating temperature range (V= 0) | $T_{op}$ (0) | -40/+125 | °C |
| Operating temperature range (V= $V_{max}$) | $T_{op}$ ($V_{max}$) | -40/+85 | °C |

Specification for $T_{amb}$ = 25°C

## Reliability data

| Test | Standard | Test conditions | $I\Delta R_{25}/R_{25}I$ |
|---|---|---|---|
| Electrical endurance, cycling | IEC 60738-1 | Room temperature, $I_{Smax;}$ $V_{max}$<br>Number of cycles: 100 | <25% |
| Electrical endurance, constant | IEC 60738-1 | Storage at $V_{max}$ /$T_{op,max}$ ($V_{max}$)<br>Test duration: 1000h | <25% |
| Damp heat | IEC 60738-1 | Temperature of air: 40°C<br>Relative humidity of air: 93%<br>Duration: 56 days<br>Test according to IEC 60068-2-78 | <10% |
| Rapid change of temperature | IEC 60738-1 | $T_1 = T_{op,min}$ (0 V), $T_2 = T_{op,max}$ (0 V)<br>Number of cycles: 5<br>Test duration: 30min<br>Test according to IEC 60068-2-14, Test Na | <10% |
| Vibration | IEC 60738-1 | Frequency range: 10 to 55 Hz<br>Displacement amplitude: 0.75mm<br>Test duration: 3x2 h<br>Test according to IEC 60028-2-6, Test Fc | <5% |
| Shock | IEC 60738-1 | Acceleration: 390m/s$^2$<br>Pulse duration : 6ms<br>6 x 4000 pulse | < 5% |
| Climatic sequence | IEC 60738-1 | Dry heat: $T = T_{op,max}$ (0 V)<br>Test duration: 16 h<br>Damp heat first cycle<br>Cold $T = T_{op,min}$ (0 V)<br>Test duration: 2h<br>Damp heat 5 cycle<br>Tests performed according to<br>IEC 60068-2-30 | <10% |

## Taping




Dimensions and tolerances (taping in accordance with IEC 60286-2):

| Designation | Symbol | Nominal size [mm] | Tolerance [mm] | Remarks |
|---|---|---|---|---|
| Pitch of holes | $P_0$ | 12.7 | ±0.3 | ±1 mm/20 sprocket holes |
| Spacing hole center | $P_1$ | 3.85 | ±0.7 | |
| Spacing of the lead | F | 5.0 | +0.6/-0.1 | |
| Diameter of the lead | d | 0.6 | ±0.05 | |
| Slope of component | Δh | 0 | ±2.0 | Measured at top of component body |
| Slope of component | Δp | 0 | ±1.3 | |
| Carrier type width | W | 18.0 | +1.0/-0.5 | |
| Hot adhesive tape width | $W_0$ | 5.5 | min. | peel-off force ≥ 5 N |
| Position of holes | $W_1$ | 9.0 | +0.75/-0.5 | |
| Position of adhesive tape | $W_2$ | 3.0 | max. | |
| Spacing hole center / bottom edge of component | H | 18 | +2/-0 | non-kinked lead version only |
| Spacing hole center / kink level | $H_0$ | 16.0 | ±0.5 | kinked lead version only |
| Spacing hole center / upper edge of component | $H_1$ | 32.2 | max. | |
| Hole diameter | $D_0$ | 4.0 | ±0.2 | |
| Tape thickness | t | 0.9 | max. | without wires |
| Length of remaining wire after removal of component | L | 11.0 | max. | |
| Length of wire below adhesive tap | $L_1$ | 4.0 | Max. | |

## Cautions and warnings

### General

- EPCOS thermistors are designed for specific applications and should not be used purposes not identified in our specifications, application notes and data books unless otherwise agreed with EPCOS 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 before storage.
- 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:
  - Through-hole devices (housed and leaded PTCs): 24 months
  - Motor protection sensors, glass-encapsulated sensors and probe assemblies: 24 months
  - Telecom pair and quattro protectors (TPP, TQP): 24 months
  - Leadless PTC thermistors for pressure contacting: 12 months
  - Leadless PTC thermistors for soldering: 6 months
  - SMDs in EIA sizes 3225 and 4032, and for PTCs with metal tags: 24 months
  - SMDs in EIA sizes 0402, 0603, 0805 and 1210: 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

- 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 in 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 of the clamping contacts pressing against the PTC must be 10 N.

- 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 temperature 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 and appropriate fail-safe function to prevent secondary product damage caused by abnormal function (e.g. use VDR for limitation of over voltage condition).

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