



## PTC Thermistors

Limit temperature sensors, probe assemblies

**Series/Type:** D1051  
**Ordering code:** B59051D1\*\*\*A040  
**Date:** 2021-10-22  
**Version:** e

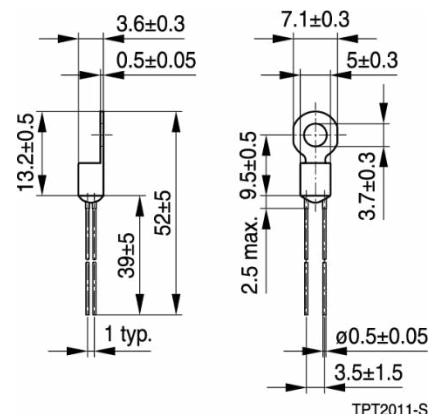
### Applications

- Limit temperature sensors

### Features

- Sensors with epoxy resin coating
- Tinned leads
- Metal tag for easy mounting
- Lead-free terminals
- Metal tag permits good thermal coupling and thus short response time
- Marking: Type, manufacturer's logo,  $T_{sense}$  temperature in °C
- UL approval to UL 1434 (file number E69802)
- RoHS-compatible

### Dimensional drawings



Dimensions in mm

### Delivery mode

- Cardboard tape cut in 18 pcs., 540 pcs. per carton box
- Carton box dimension in mm: 240 x 110 x 63

### General technical data

Max. operating voltage	( $T_A = 0 \dots 40 \text{ }^\circ\text{C}$ )	$V_{max}$	16	$V_{DC}$
Measuring voltage	( $T_A = -25^\circ\text{C} \dots T_{sense}$ )	$V_{means}$		$V_{DC}$
Rate resistance	( $V_{PTC} \leq 2.5 \text{ V}$ )	$R_R$	$\leq 330$	$\Omega$
Insulating test voltage	(between tag and leads)	$V_{ins}$	500	$V_{AC}$
Operating temperature range	( $V \leq V_{means}$ )	$T_{op}$	-25/ +130	$^\circ\text{C}$
Operating temperature range	( $V = V_{max}$ )	$T_{op}$	0/+40	$^\circ\text{C}$

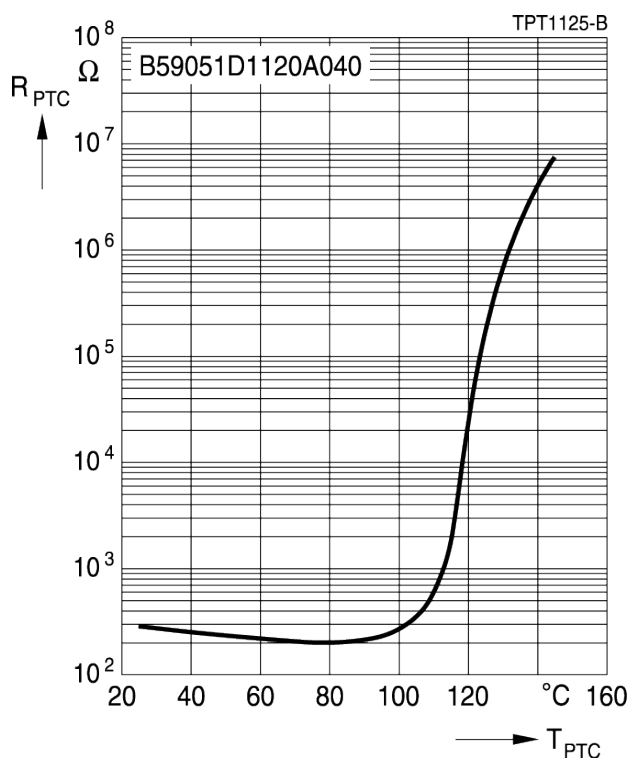
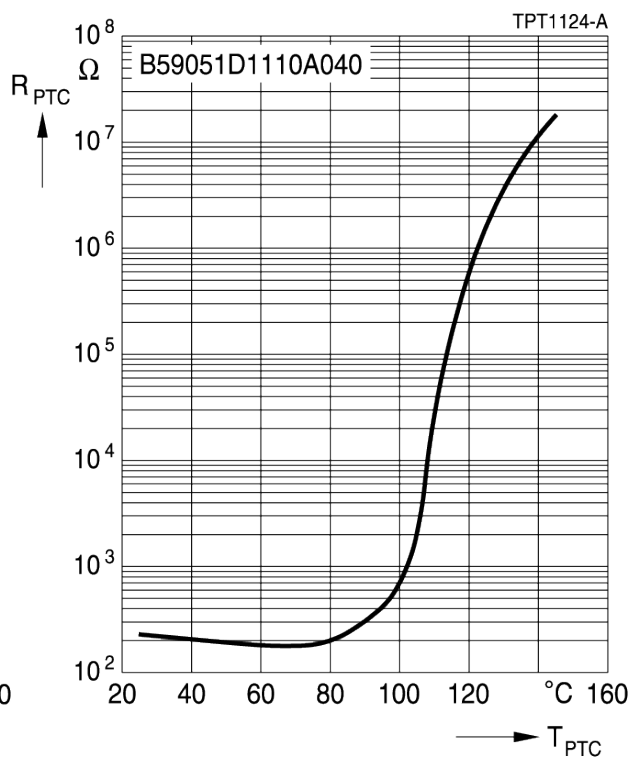
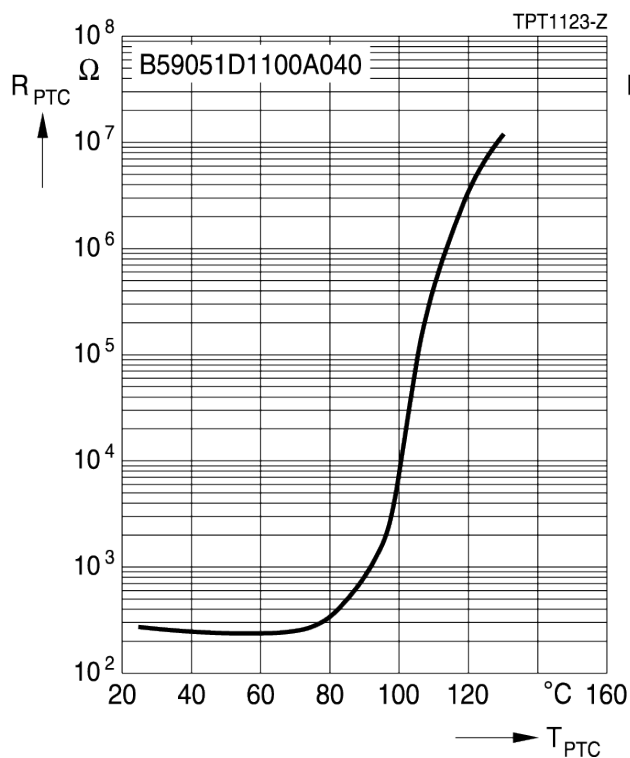
### Electrical specifications and ordering codes

$T_{sense}$ °C	R ( $T_{sense} - 10 \text{ K}$ ) ( $V_{PTC} \leq 2.5 \text{ V}$ ) $\Omega$	R ( $T_{sense}$ ) ( $V_{PTC} \leq 2.5 \text{ V}$ ) $\Omega$	Ordering code
100	$\leq 1500$	$\geq 2200$	B59051D1100A040
110	$\leq 1500$	$\geq 2200$	B59051D1110A040
120	$\leq 1500$	$\geq 2200$	B59051D1120A040

 Specification for  $T_A = 25 \pm 0.1 \text{ }^\circ\text{C}$

Characteristics (typical)

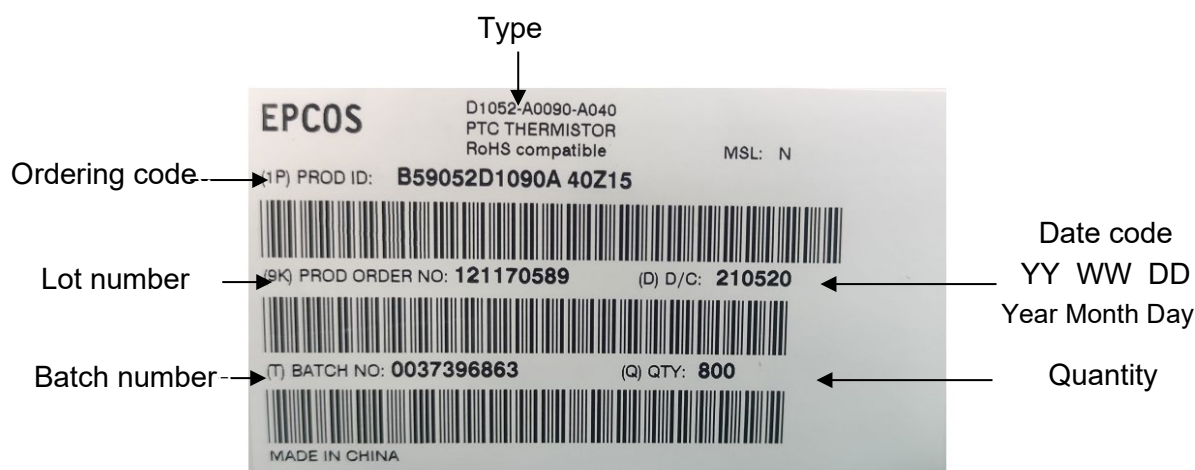
PTC resistance  $R_{PTC}$  versus PTC temperature  $T_{PTC}$  (measured at low signal voltage)



Reliability data

Test	Standard	Test conditions	$I\Delta R_{25}/R_{25}I$
Electrical endurance, constant	IEC 60738-1	Storage at $V_{max}/T_{op,max}$ (@ $V_{max}$ ) Test duration: 1000 h	<25%
Damp heat	IEC 60738-1	Temperature of air: 40 °C Relative humidity of air: 93% Duration: 56 days 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) Number of cycles: 5 Test duration: 30 min Test according to IEC 60068-2-14, test Na	<25%
Vibration	IEC 60738-1	Frequency range: 10 to 55 Hz Displacement amplitude: 0.75 mm Test duration: 3 x 2 h Test according to IEC 60068-2-6, test Fc	<5%

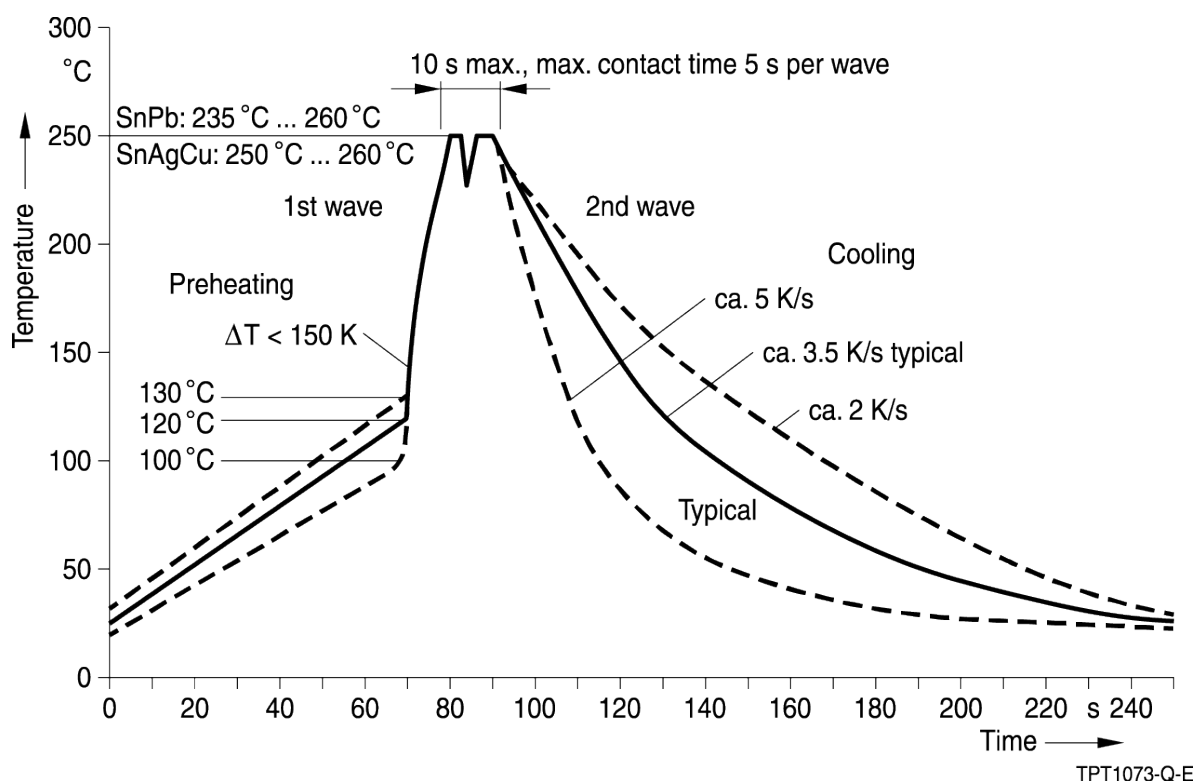
Barcode label (example)



### Soldering instructions

#### Wave soldering

Recommended temperature profile for wave soldering following IEC 61760-1. Applicable for leaded PTCs and selected SMD PTCs (case sizes 3225 and 4032).



#### Iron soldering

Soldering iron temperature  $350 \pm 10^\circ\text{C}$ . soldering time  $3 \pm 1$  s

## Cautions and warnings

### General

- TDK Electronics 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 Electronics during 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 precipitations 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 size 0402: 12 months

### Handling

- PTCs must not be dropped. Chip-offs must not be caused during handling of PTCs.
- The ceramic and metallization of the 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 proper cooling at the thermistors.
- 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 this temperature.
- Avoid contamination of the 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).

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

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## Important notes

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