PTC thermistors

Limit temperature sensors,
SMD, EIA size 0805

Series/Type: **B59701**

Date: December 2006

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Applications

- DC/DC converters
- Home appliances
- Dimmers
- Electronic ballasts
- Temperature management in automotive electronics

Features

- Thermistor chip with lead-free tinned terminations
- Small size
- Fast and reliable response
- Suitable for reflow soldering
- Suitable for automatic placement
- RoHS-compatible
- Lead-free (total Pb content <0.1%), except T_{NTT} = 130 °C and 140 °C

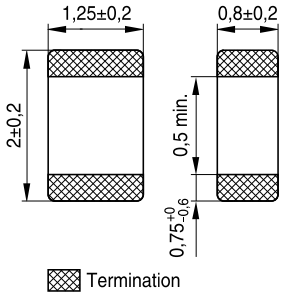
Options

- Other T_{NTT} values on request

Delivery mode

- Blister tape, 180-mm reel

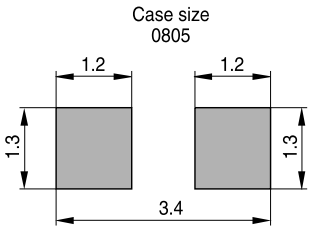
Dimensional drawing



TPT0650-F-E

Dimensions in mm

Geometry of solder pad



TPT0870-7

Recommended maximum dimensions (mm)

General technical data

Max. operating voltage	(T_A = 0 ... 40 °C)	V_{max}	25	VDC
Max. measuring voltage	(T_A = −40 °C ... T_{NTT} +15 K)	$V_{meas,max}$	7.5	VDC
Rated resistance	($V_{PTC} \leq$ 2.5 V)	R_R	≤ 1	kΩ
Operating temperature range	($V \leq V_{meas,max}$)	T_{op}	−40/ T_{NTT} +15	°C

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Electrical specifications and ordering codes

T_{NTT} °C	R (T_{NTT} − 5 K) (V_{PTC} ≤ 2.5 V) kΩ	R (T_{NTT} + 5 K) (V_{PTC} ≤ 2.5 V) kΩ	R (T_{NTT} + 15 K) (V_{PTC} ≤ 7.5 V) kΩ	Ordering code
70	≤ 5.7	≥ 5.7	≥ 40[1)]	B59701A0070A062
90	≤ 5.5	≥ 13.3	≥ 40	B59701A0090A062
100	≤ 5.5	≥ 13.3	≥ 40	B59701A0100A062
110	≤ 5.5	≥ 13.3	≥ 40	B59701A0110A062
120	≤ 5.5	≥ 13.3	≥ 40	B59701A0120A062
130	≤ 5.5	≥ 13.3	≥ 40	B59701A0130A062
140	≤ 5.5	≥ 13.3	≥ 40	B59701A0140A062

1) T_{NTT} +25 K

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Reliability data

Test	Standard	Test conditions	$\lvert\Delta R_{25}/R_{25}\rvert$
Electrical endurance, constant at 85 °C	IEC 60738-1	Storage at V_{max} T = 85 °C 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_{LCT} = −25 °C, T_{UCT} = 125 °C Number of cycles: 5 Test duration: 30 min Test according to IEC 60068-2-14, Test Na	< 10%
Vibration	IEC 60738-1	Frequency: 10 - 55 - 10 Hz Displacement amplitude: 0.75 mm Test duration: 3 · 2 h Test according to IEC 60028-2-6, Test Fc	< 5%
Bump	IEC 60738-1	Pulse shape: half-sine Acceleration: 50 g Pulse duration: 1 ms; 6 · 3 pulses Test according to IEC 60068-2-29	< 5%
Climatic sequence	IEC 60738-1	Dry heat: T_{UCT} = 125 °C Test duration: 16 h Damp heat first cycle Cold: T_{LCT} = −25 °C Test duration: 2 h Damp heat 5 cycles Tests performed according to IEC 60068-2-30	< 10%
Adhesive strength on PCB		Shearing of the component soldered on PCB by a force of 5 N is normal to components longitudinal axis	No visible damage

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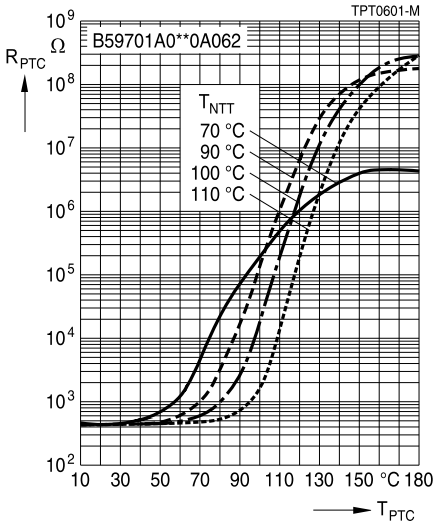
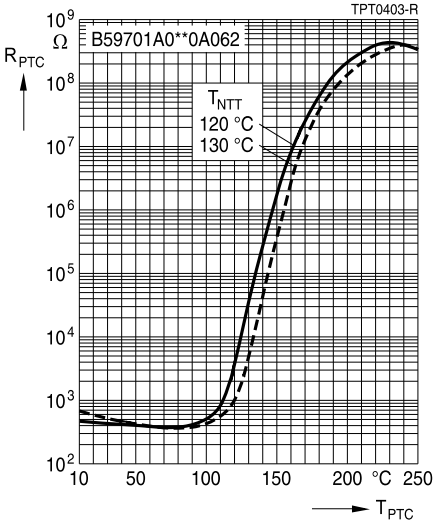
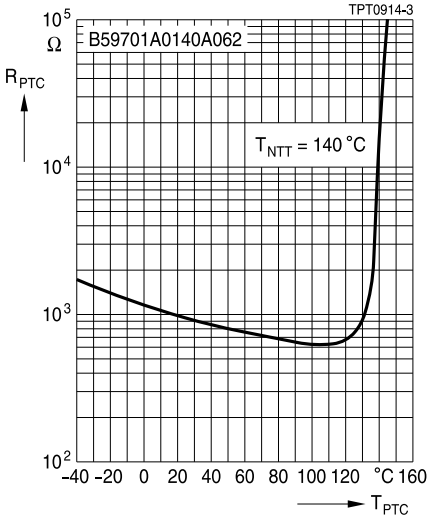
Characteristics (typical)

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







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Cautions and warnings

General

- EPCOS 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 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 6 months after delivery.

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 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 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.

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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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