



## **PTC thermistors as heating elements**

Metallized rectangular disks, 230 V

**Series/Type:** B59102  
**Date:** March 2006

**Applications**

- Home appliances
  - hair curlers
  - fan heaters
  - coffee machines
  - glue guns

**Features**

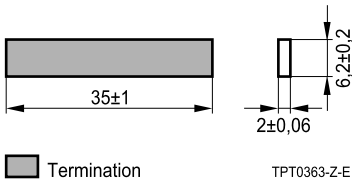
- Aluminum metallization
- Suitable for clamp contacting
- Self-regulating
- UL approval to UL 1434 (file number E69802), except  $T_{ref} = 240\text{ °C}$  and  $290\text{ °C}$
- RoHS-compatible

**Options**

Other dimensions and ratings on request

**Delivery mode**

Packed in styrofoam trays

**Dimensional drawing**


Dimensions in mm

**General technical data**

Max. operating voltage		$V_{max}$	265	VAC
Rated voltage		$V_R$	230	VAC
Operating temperature range	( $V = 0$ )	$T_{op}$	-40/+200	°C
Operating temperature range	( $V = V_R; T_{ref} \leq 60\text{ °C}$ )	$T_{op}$	-40/+60	°C
Operating temperature range	( $V = V_R; T_{ref} > 60\text{ °C}$ )	$T_{op}$	-40/+100	°C
Tolerance of $R_R$		$\Delta R_R$	±50	%
Curvature			<0.05	mm

**Heating elements**
**Metallized rectangular disks, 230 V**
**R102**
**Electrical specifications and ordering codes**

$T_{ref}$ °C	$V_{BD}$ V	$R_{min}$ ( $V = V_R$ ) Ω	$T_{surf}^{1)}$ ( $V = V_R$ ) °C	$R_R$ ( $V_{meas} \leq 1.5 V$ ) Ω	Ordering code
50	400	225 <sup>2)</sup>	100	700	B59102R0050A010
70	400	130	115	700	B59102R0070A010
90	400	115	130	700	B59102R0090A010
110	400	100	145	700	B59102R0110A010
130	400	105	160	700	B59102R0130A010
150	400	90	180	700	B59102R0150A010
180	400	66	205	700	B59102R0180A010
220	400	80	240	1000	B59102R0220A010
240	400	75	255	1000	B59102R0240A010
270	340	85	280	1300	B59102R0270A010
290	320	78	295	1300	B59102R0290A010

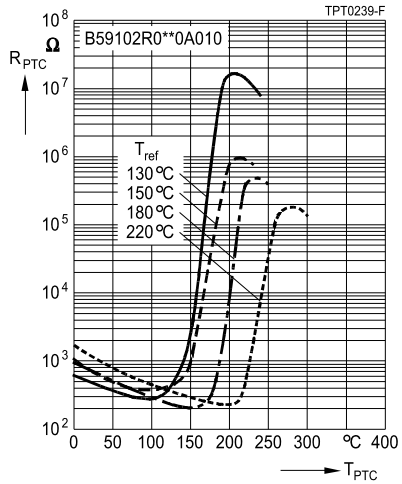
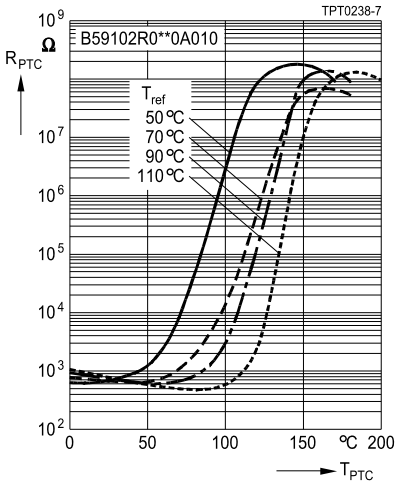
1) Measured between points

2)  $T (R_{PTC} = R_{min}) < 25 \text{ } ^\circ\text{C}$

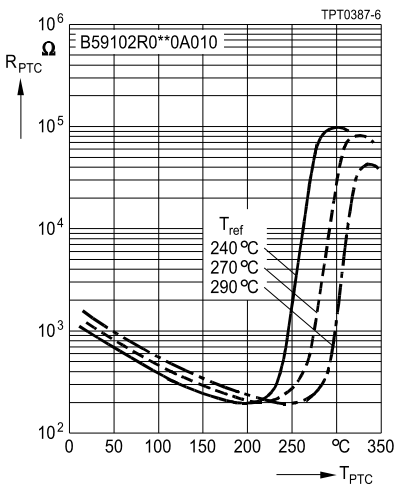
**Characteristics (typical)**

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

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



## 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  $-25\text{ °C} \dots +45\text{ °C}$ , relative humidity  $\leq 75\%$  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

- 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.

### 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.

### 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).

## Important notes

The following applies to all products named in this publication:

1. Some parts of this publication contain **statements about the suitability of our products for certain areas of application**. These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out **that such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application**. As a rule, EPCOS is either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether an EPCOS product with the properties described in the product specification is suitable for use in a particular customer application.
2. We also point out that **in individual cases, a malfunction of passive electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified**. In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of a passive electronic component could endanger human life or health (e.g. in accident prevention or life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of a passive electronic component.
3. **The warnings, cautions and product-specific notes must be observed.**
4. In order to satisfy certain technical requirements, **some of the products described in this publication may contain substances subject to restrictions in certain jurisdictions (e.g. because they are classed as “hazardous”)**. Useful information on this will be found in our Material Data Sheets on the Internet ([www.epcos.com/material](http://www.epcos.com/material)). Should you have any more detailed questions, please contact our sales offices.
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