PTC thermistors for overcurrent protection

SMDs, EIA size 3225 and 4032, 24 V

Series/Type: **B59101, B59201, B59301**
Date: March 2006

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Applications

- Overcurrent protection
- Short-circuit protection

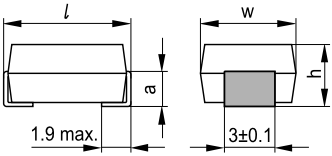
Features

- Molded epoxy encapsulation, lead-free tinned solder terminals
- Suitable for wave and reflow soldering
- Suitable for automatic placement
- RoHS-compatible

Delivery mode

- Blister tape, 330-mm reel

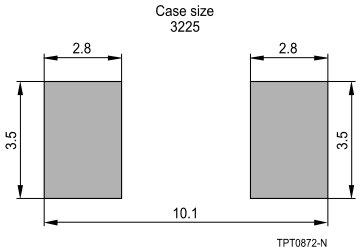
Dimensional drawing

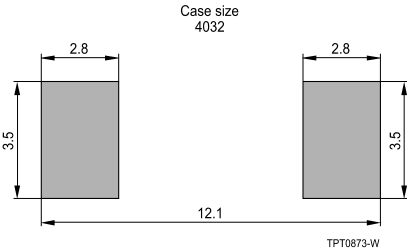


Dimensions (mm)

Type	h ±0.5	w ±0.5	l ±0.5	a ±0.3	Size
Reference temperature T_{ref} = 80 °C					
P1101	3.3	6.3	8.0	1.7	3225
P1201	3.3	6.3	8.0	1.7	3225
P1301	3.3	8.0	10.0	2.3	4032
Reference temperature T_{ref} = 120 °C					
P1101	3.3	6.3	8.0	1.7	3225
P1201	3.3	6.3	8.0	1.7	3225
P1301	3.3	8.0	10.0	2.3	4032

Geometry of solder pads





Recommended maximum dimensions (mm)

General technical data

Max. operating voltage	(T_A = 60 °C)	V_{max}	30	VDC or VAC
Rated voltage		V_R	24	VDC or VAC
Switching cycles		N	100	
Tolerance of R_R		ΔR_R	±25	%
Operating temperature range	(V = 0)	T_{op}	−40/+125	°C
Operating temperature range	($V = V_{max}$)	T_{op}	−40/+60	°C

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Electrical specifications and ordering codes

Type	I_R	I_S	I_{Smax} ($V = V_{max}$)	I_r ($V = V_{max}$) typ.	R_R	R_{min}	Ordering code
	mA	mA	A	mA	Ω	Ω	
Reference temperature T_{ref} = 80 °C							
P1301	205	420	1.6	38	3.1	1.85	B59301P1080A062
P1201	165	340	1.0	34	4.6	2.70	B59201P1080A062
P1101	90	185	0.7	25	13	7.80	B59101P1080A062
Reference temperature T_{ref} = 120 °C							
P1301	310	640	1.6	53	3.1	1.85	B59301P1120A062
P1201	265	545	1.0	45	4.6	2.70	B59201P1120A062
P1101	170	355	0.7	35	13	7.80	B59101P1120A062

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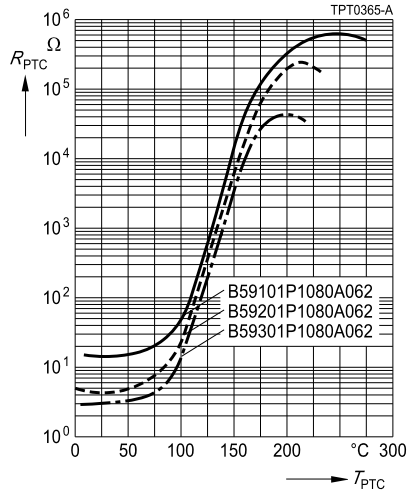
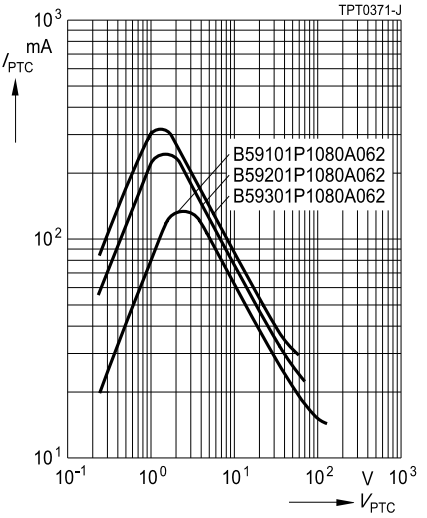
Characteristics (typical) for T_{ref} = 80 °C

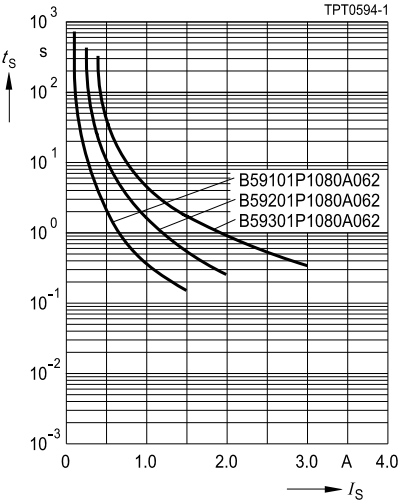
PTC resistance R_{PTC} versus PTC temperature T_{PTC} (measured at low signal voltage)



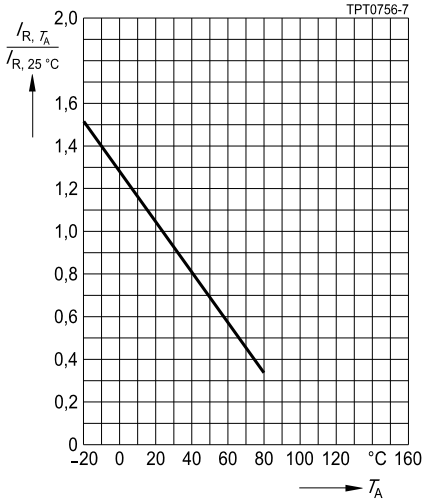
PTC current I_{PTC} versus PTC voltage V_{PTC} (measured at 25 °C in still air)



Switching time t_S versus switching current I_S (measured at 25 °C in still air)



Rated current I_R versus ambient temperature T_A (measured in still air)



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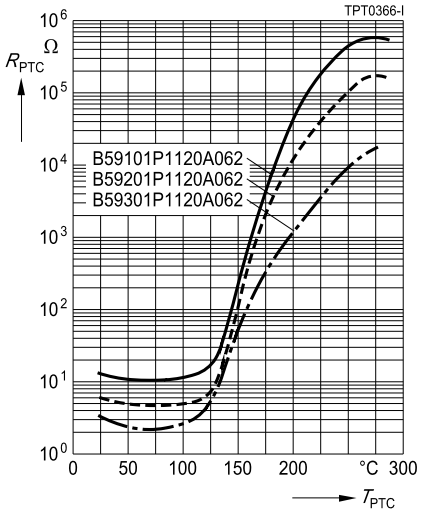
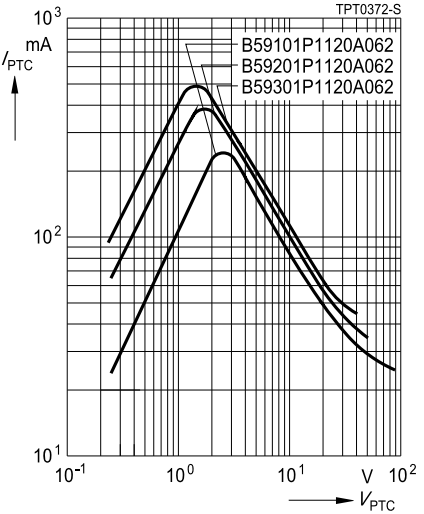
Characteristics (typical) for T_{ref} = 120 °C

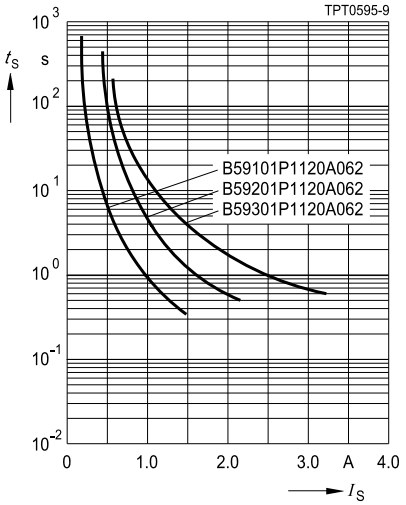
PTC resistance R_{PTC} versus PTC temperature T_{PTC} (measured at low signal voltage)



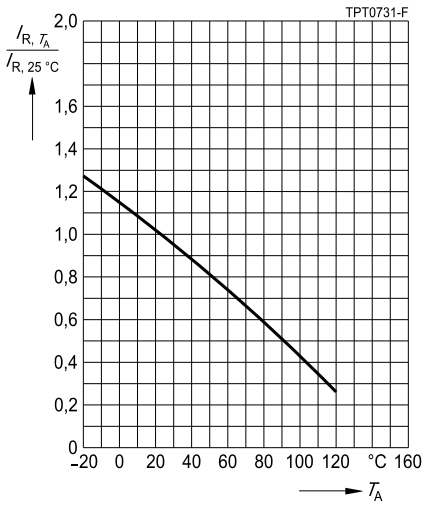
PTC current I_{PTC} versus PTC voltage V_{PTC} (measured at 25 °C in still air)



Switching time t_S versus switching current I_S (measured at 25 °C in still air)



Rated current I_R versus ambient temperature T_A (measured in still air)



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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

- 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.

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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).

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.
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