PTC thermistors

Motor protection, triple sensors

Series/Type: **B59300**
Date: March 2006

Applications

- Thermal protection of winding in electric motors
- Limit temperature monitoring

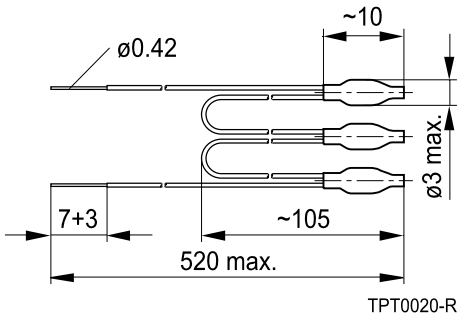
Features

- Thermistor pellets with insulating encapsulation in series connection (triple sensor)
- Low-resistance type, steep R/T curve
- Silver-plated and Teflon-insulated AWG 26 litz wires
- Characteristics for nominal threshold temperatures T_{NTT} = 90 up to 160 °C conform with DIN 44082
- Color coding of litz wires to DIN 44082, connecting wires in yellow
- UL approval to UL 1434 (file number E69802)
- RoHS-compatible

Delivery mode

- Bulk

Dimensional drawing



Dimensions in mm

General technical data

Max. operating voltage	(T_A = 0 ... 40 °C)	V_{max}	30	VDC
Max. measuring voltage	(T_A = −25 °C ... T_{NTT} +23 K)	$V_{meas,max}$	7.5	VDC
Rated resistance	(V_{PTC} ≤ 2.5 V)	R_R	≤300	Ω
Insulating test voltage		V_{ins}	2.5	kVAC
Thermal threshold time		t_a	<3	s
Operating temperature range	($V \le V_{meas,max}$)	T_{op}	−25/ T_{NTT} +23	°C
Operating temperature range	($V = V_{max}$)	T_{op}	0/+40	°C

Electrical specifications and ordering codes

T_{NTT} °C	R (T_{NTT} − ΔT) (V_{PTC} ≤ 2.5 V) Ω	R (T_{NTT} + ΔT) (V_{PTC} ≤ 2.5 V) Ω	R (T_{NTT} + 15 K) (V_{PTC} ≤ 7.5 V) Ω	R (T_{NTT} + 23 K) (V_{PTC} ≤ 2.5 V) Ω	Ordering code
ΔT = 5 K					
60	≤ 1710	≥ 1710	-	≥ 30 k	B59300M1060A070
70	≤ 1710	≥ 1710	-	≥ 30 k	B59300M1070A070
80	≤ 1710	≥ 1710	-	≥ 30 k	B59300M1080A070
90	≤ 1650	≥ 3990	≥ 12 k	-	B59300M1090A070

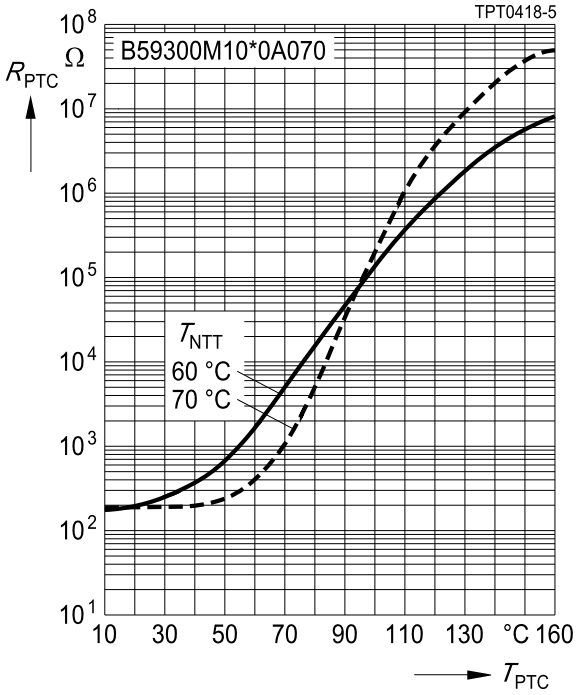
T_{NTT} °C	R ($T_{NTT} - \Delta T$) ($V_{PTC} \leq 2.5$ V) Ω	R ($T_{NTT} + \Delta T$) ($V_{PTC} \leq 2.5$ V) Ω	R (T_{NTT} + 15 K) ($V_{PTC} \leq 7.5$ V) Ω	R (T_{NTT} + 23 K) ($V_{PTC} \leq 2.5$ V) Ω	Ordering code
100	≤ 1650	≥ 3990	≥ 12 k	-	B59300M1100A070
110	≤ 1650	≥ 3990	≥ 12 k	-	B59300M1110A070
120	≤ 1650	≥ 3990	≥ 12 k	-	B59300M1120A070
130	≤ 1650	≥ 3990	≥ 12 k	-	B59300M1130A070
140	≤ 1650	≥ 3990	≥ 12 k	-	B59300M1140A070
145	≤ 1650	≥ 3990	≥ 12 k	-	B59300M1145A070
150	≤ 1650	≥ 3990	≥ 12 k	-	B59300M1150A070
155	≤ 1650	≥ 3990	≥ 12 k	-	B59300M1155A070
160	≤ 1650	≥ 3990	≥ 12 k	-	B59300M1160A070
ΔT = 7 K					
170	≤ 1710	≥ 1710	-	≥ 30 k	B59300M1170A070
180	≤ 1710	≥ 1710	-	≥ 30 k	B59300M1180A070
190	≤ 1710	≥ 1710	-	≥ 30 k	B59300M1190A070

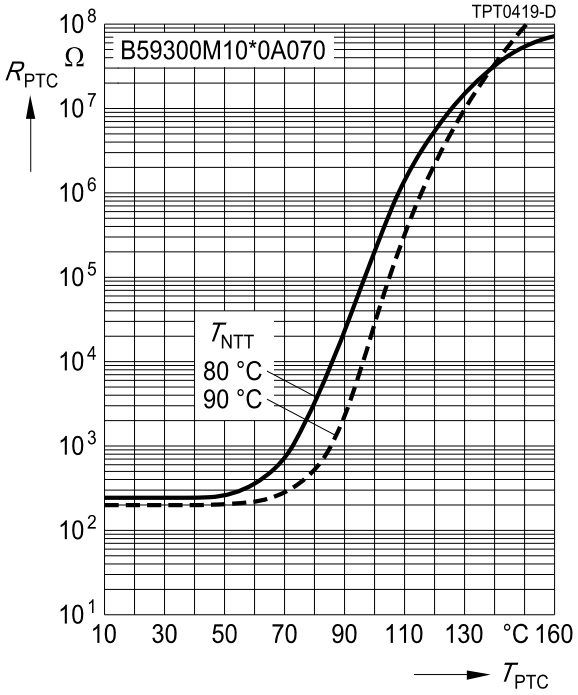
Color coding of litz wires (to DIN 44081)

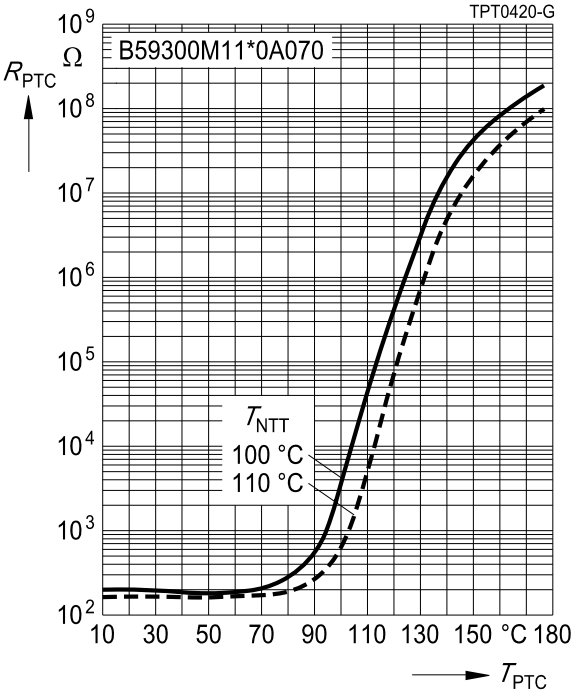
T_{NTT} °C	Color
60	white/grey
70	white/brown
80	white/white
90	green/green
100	red/red
110	brown/brown
120	grey/grey
130	blue/blue
140	white/blue
145	white/black
150	black/black
155	blue/black
160	blue/red
170	white/green
180	white/red
190	black/grey

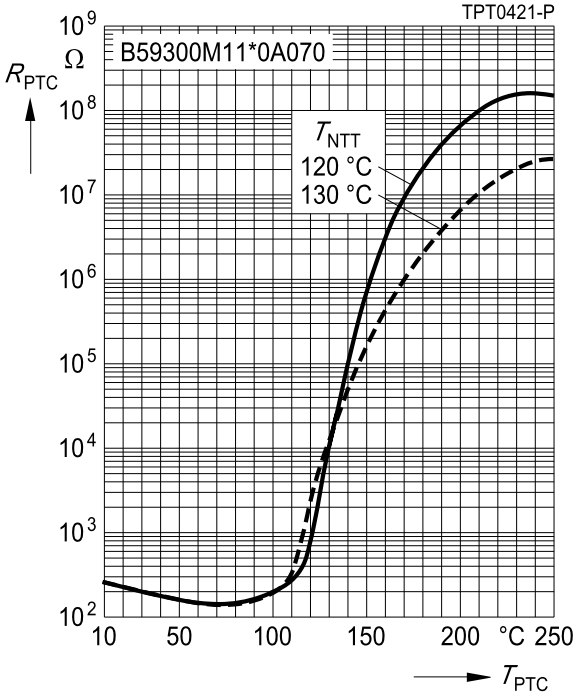
Characteristics (typical)

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









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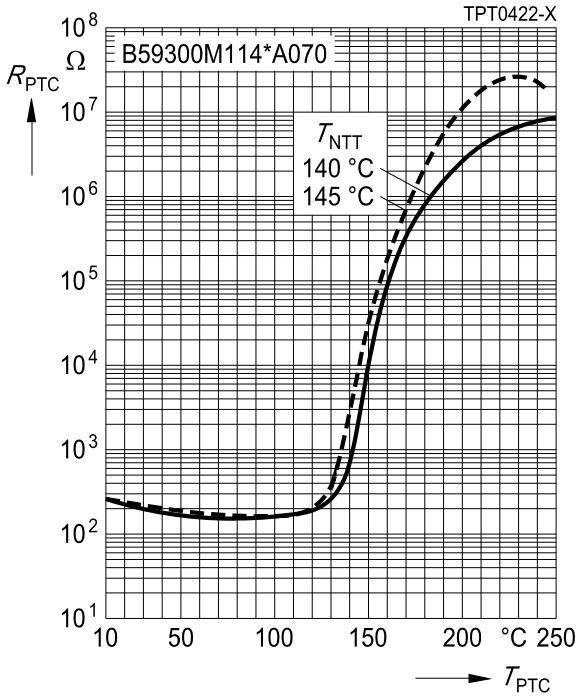

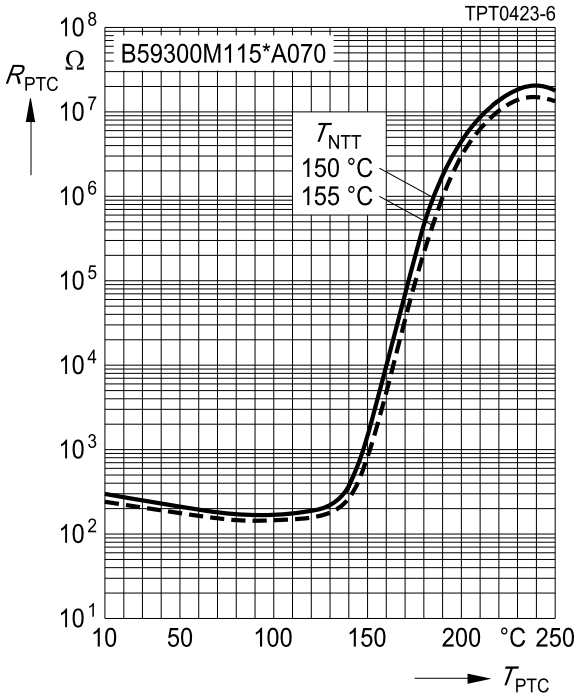

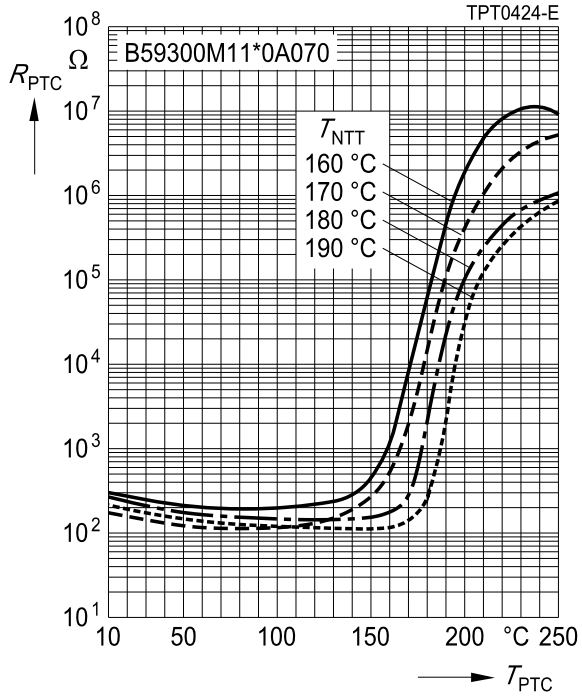

Cautions and warnings

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

- 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.
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