PTC Thermistors, Mini Radial Leaded for Over-Temperature Protection

Non preferred type
(replaced by PTCSL03)

FEATURES

- Well-defined protection temperature levels
- Fast reaction time (< 15 s in still air)
- Accurate resistance for ease of circuit design
- Excellent long term behavior (< 1 °C or 5 % after 1000 h at T_n +15 °C)
- Wide range of protection temperatures (70 °C to 150 °C)
- Small size and rugged
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb e3 RoHS COMPLIANT

APPLICATIONS

Over-temperature protection and control in:

- Industrial electronics
- Power supplies
- Motor protection

DESCRIPTION

These PTC sensing thermistors consist of a medium resistivity doped BaTiO3 ceramic chip lead (Pb)-free soldered with nickel wires and coated with a high temperature silicone lacquer and color coding band.

PACKAGING

PTC thermistors are available in 500 pieces bulk packed.

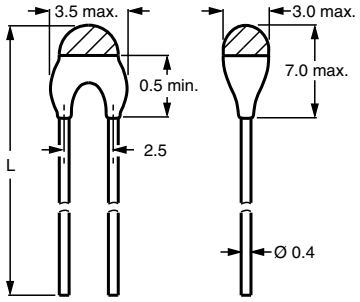
QUICK REFERENCE DATA

PARAMETER	VALUE	UNIT
Resistance at 25 °C (R_{25})	20 to 100	Ω
Nominal working temperature (T_n)	70 to 150	°C
Tolerance on T_n	± 5	°C
Maximum voltage (AC or DC)	30	V
Operating temperature range (1)	-20 to 165	°C
Dissipation factor	5	mW/K
Storage temperature	-25 to +155	°C

Note

(1) Max operating temperature range is T_n +15 °C, indicated value is for T_n = 150 °C.

COMPONENT OUTLINES DIMENSIONS in millimeters



PTCSL20T..., L = 20 ± 2
PTCSL40T..., L = 40 min.

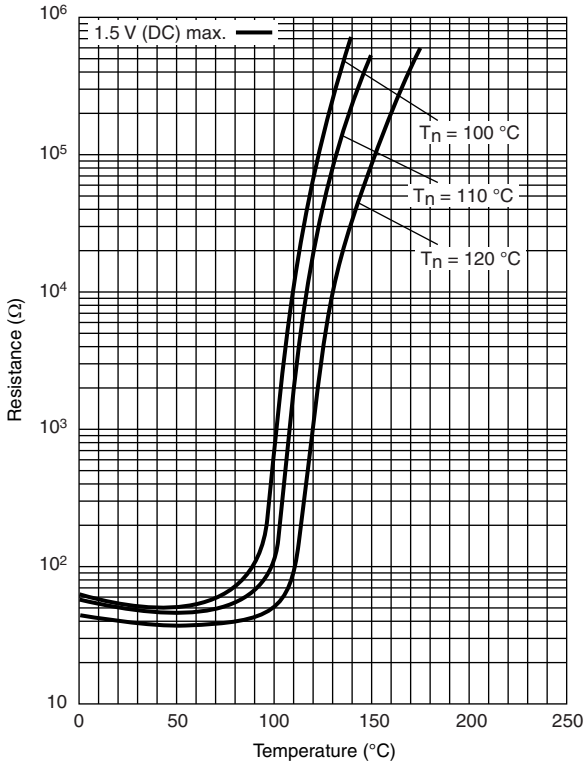
NOMINAL WORKING TEMPERATURES AND ORDERING INFORMATION

NOMINAL WORKING TEMP. T_n (°C)	RESISTANCE from -20 °C to T_n -20 °C (Ω)	RESISTANCE at T_n -5 °C (Ω)	RESISTANCE at T_n +5 °C (kΩ)	MIN. RESISTANCE at T_n +15 °C (kΩ)	COLOR CODE	ORDERING PART NUMBERS (2)
70	20 to 250	50 to 570	0.570 to 50	4	Black	PTCSL20T071DBE
80	20 to 250	50 to 550	1.33 to 50	4	Brown	PTCSL20T081DBE
90	20 to 250	50 to 550	1.33 to 50	4	Red	PTCSL20T091DBE
100	20 to 250	50 to 550	1.33 to 50	4	Orange	PTCSL20T101DBE
110	20 to 250	50 to 550	1.33 to 50	4	Yellow	PTCSL20T111DBE
120	20 to 250	50 to 550	1.33 to 50	4	Green	PTCSL20T121DBE
130	20 to 250	50 to 550	1.33 to 50	4	Blue	PTCSL20T131DBE
140	20 to 250	50 to 550	1.33 to 50	4	Violet	PTCSL20T141DBE
150	20 to 250	50 to 550	1.33 to 50	4	Grey	PTCSL20T151DBE

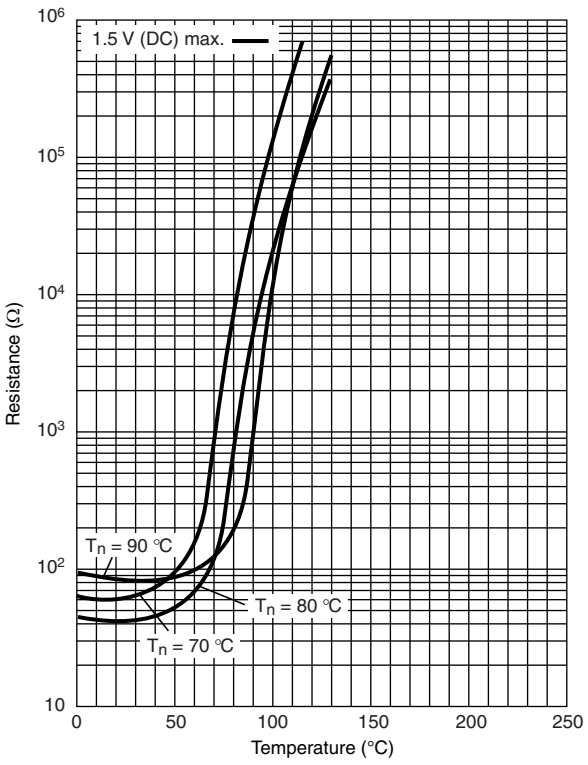
Note

(2) Parts with total length of 40 mm available as PTCSL40T...DBE catalog numbers.

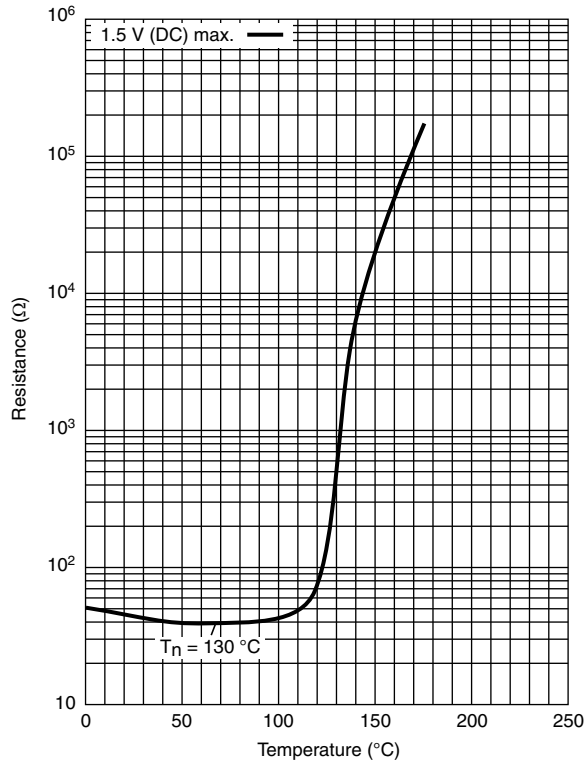
TYPICAL RESISTANCE/TEMPERATURE CHARACTERISTIC for T_n 100 °C to 120 °C



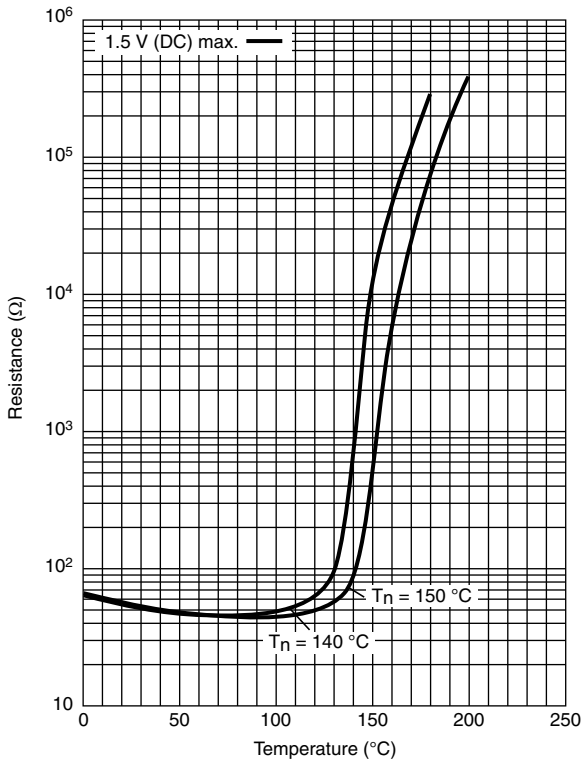
TYPICAL RESISTANCE/TEMPERATURE CHARACTERISTIC for T_n 70 °C to 90 °C



TYPICAL RESISTANCE/TEMPERATURE CHARACTERISTIC for T_n 130 °C



TYPICAL RESISTANCE/TEMPERATURE CHARACTERISTIC for T_n 140 °C and 150 °C



APPLICATION SPECIFIC DATA

Negative Temperature Coefficient (NTC) thermistors are well known for temperature sensing. What is not well known, however, is that Positive Temperature Coefficient (PTC) thermistors can be used for thermal protection. Although their operating principles are similar, the applications are very different; whereas NTC thermistors sense and measure temperature over a defined range, PTC thermistors switch at one particular temperature.

Just like thermostats they protect such equipment and components as motors, transformers, power transistors and thyristors against over temperature. A PTC thermistor is less expensive than a thermostat, and its switch temperature can be more accurately specified. It is also smaller and easier to design-in to electronic circuitry.

So how does it work? The PTC thermistor is mounted in thermal contact with the equipment to be protected, and connected into the bridge arm of a comparator circuit, such as shown in Fig. 1. At normal temperature, the PTC thermistor resistance (R_p) is lower than R_s (see Fig. 2), so the comparator's output voltage V_O will be low. If an equipment over temperature occurs, the PTC thermistor will quickly heat up to its trigger or nominal reference temperature T_n, whereupon its resistance will increase to a value much higher than R_s, causing V_O to switch to a high level sufficient to activate an alarm, relay or power shutdown circuit.

APPLICATION EXAMPLES

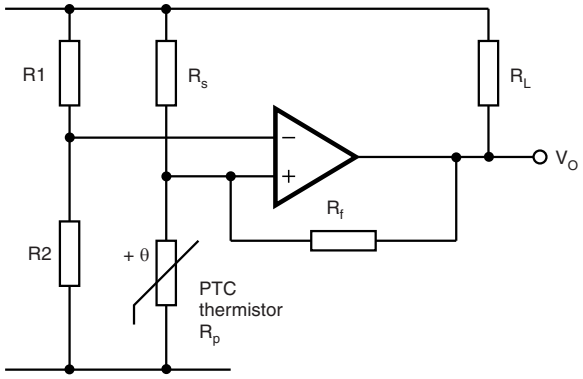


Fig. 1 - Typical Comparator Circuit

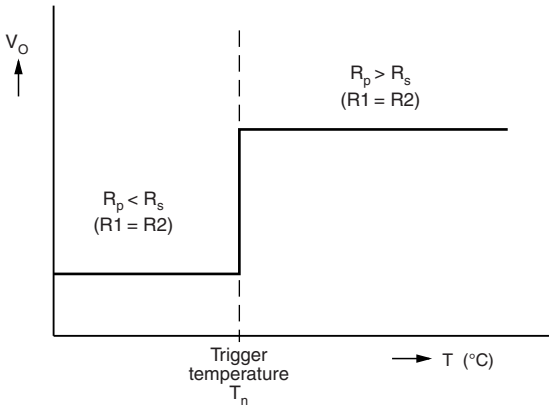
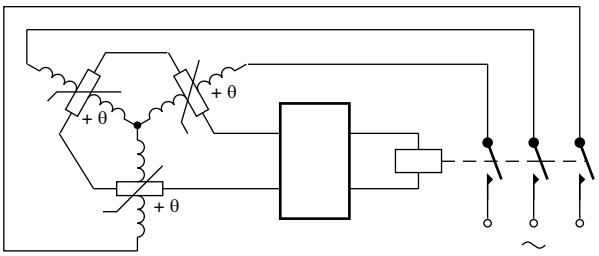


Fig. 2 - Typical Switch Characteristic



As soon as one or more of the windings becomes too hot, the motor is switched off.

Fig. 3 - Temperature Protection of 3-phase electric motor

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