PTC Thermistors, Mini Chips for Over-Temperature Protection

QUICK REFERENCE DATA

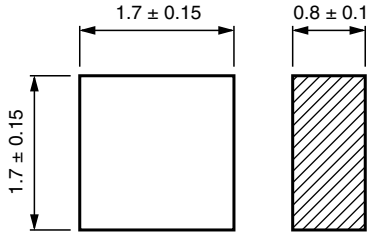
PARAMETER	VALUE	UNIT
Resistance at 25 °C (R_{25})	30 to 100	Ω
Nominal working temperature (T_n)	70 to 150	°C
Tolerance on T_n	± 5	°C
Maximum voltage (AC or DC)	30	V
Operating temperature range (1)	-20 to 165	°C
Dissipation factor	5	mW/K
Storage temperature	-25 to +155	°C

Note

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

COMPONENT OUTLINES DIMENSIONS

in millimeters



FEATURES

- Well-defined protection temperature levels
- Fast reaction time (< 6 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 170 °C)
- Small size and rugged
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT

APPLICATIONS

Over-temperature protection and control in:

- Industrial electronics
- Power supplies
- Motor protection

DESCRIPTION

These directly heated thermistors have a positive temperature coefficient and are primarily intended for sensing.

MOUNTING

For clamping, reflow or hand soldering. Not intended for ultrasonic soldering or for spot welding or bonding. All standard solder alloys with low activated halogen-free fluxes are acceptable.

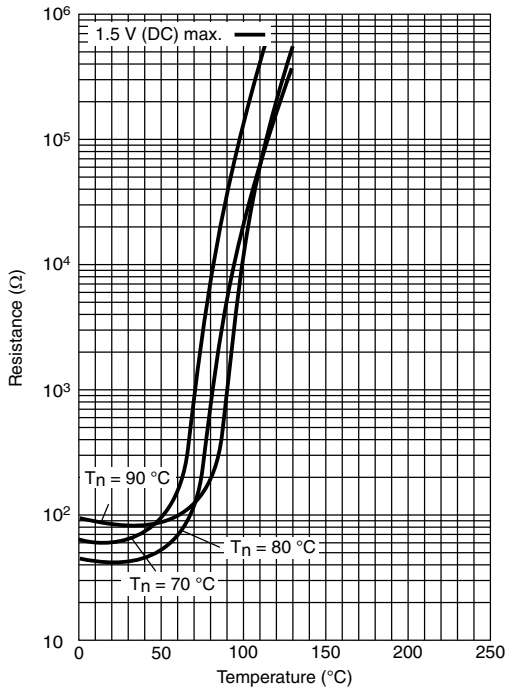
PACKAGING

PTC thermistor chips are vacuum packed in 5000 pieces.

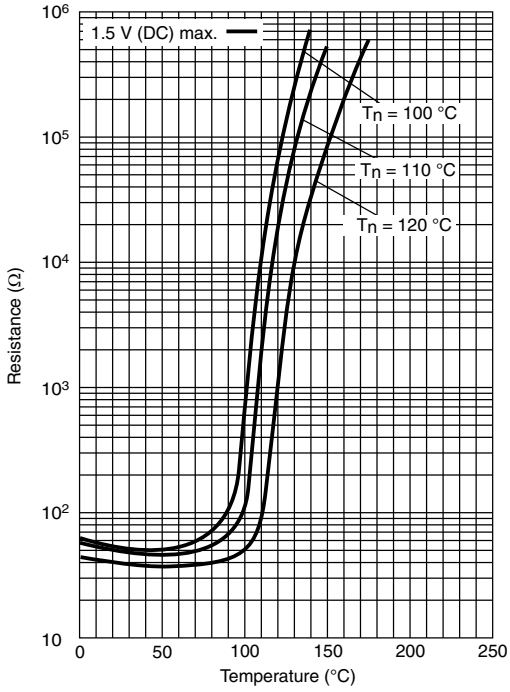
NOMINAL WORKING TEMPERATURES AND ORDERING INFORMATION

NOMINAL WORKING TEMPERATURE					ORDERING PART NUMBERS
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)	$R_{min.}$ at T_n +15 °C (kΩ)	BARE CHIP
					1.7 x 1.7 (mm)
70	30 to 250	50 to 570	0.57 to 50	4	PTCSC17T071DBE
80	30 to 250	50 to 550	1.33 to 50	4	PTCSC17T081DBE
90	30 to 250	50 to 550	1.33 to 50	4	PTCSC17T091DBE
100	30 to 250	50 to 550	1.33 to 50	4	PTCSC17T101DBE
110	30 to 250	50 to 550	1.33 to 50	4	PTCSC17T111DBE
120	30 to 250	50 to 550	1.33 to 50	4	PTCSC17T121DBE
130	30 to 250	50 to 550	1.33 to 50	4	PTCSC17T131DBE
140	30 to 250	50 to 550	1.33 to 50	4	PTCSC17T141DBE
150	30 to 250	50 to 550	1.33 to 50	4	PTCSC17T151DBE
155	30 to 250	50 to 550	1.33 to 50	4	PTCSC17T155DBE
160	30 to 250	50 to 550	1.33 to 50	4	PTCSC17T161DBE
170	30 to 250	50 to 550	1.33 to 50	4	PTCSC17T171DBE

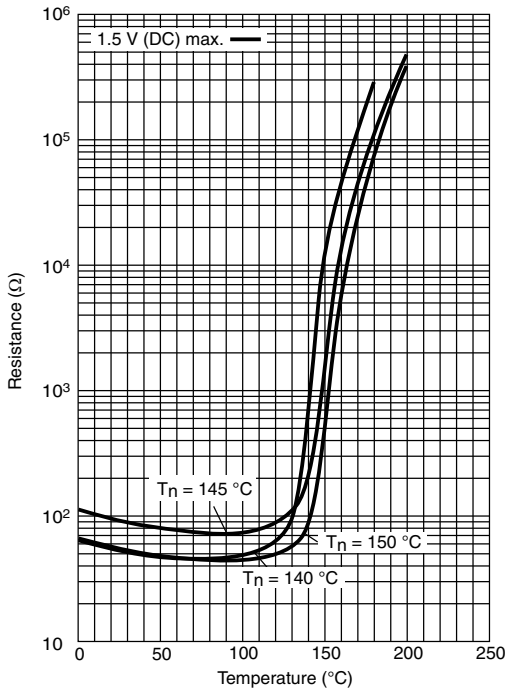
TYPICAL RESISTANCE/TEMPERATURE CHARACTERISTICS for T_n 70 °C to 90 °C



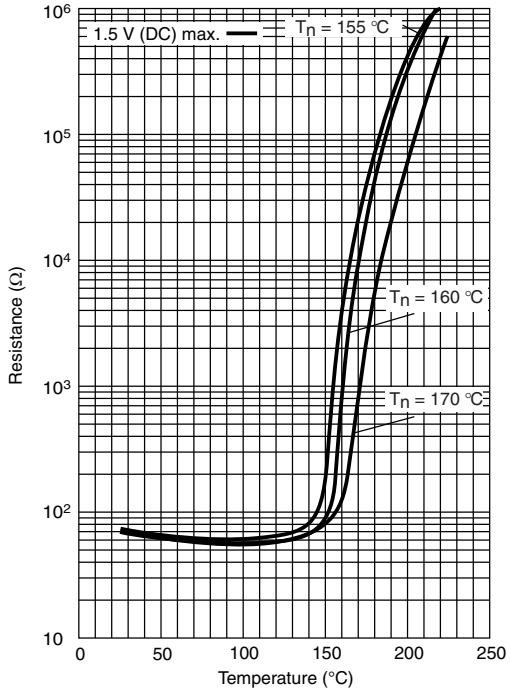
TYPICAL RESISTANCE/TEMPERATURE CHARACTERISTIC for T_n 100 °C to 120 °C



TYPICAL RESISTANCE/TEMPERATURE CHARACTERISTICS for T_n 140 °C to 150 °C



TYPICAL RESISTANCE/TEMPERATURE CHARACTERISTICS for T_n 150 °C to 170 °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.

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_0 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_0 to switch to a high level sufficient to activate an alarm, relay or power shutdown circuit.

APPLICATION EXAMPLES

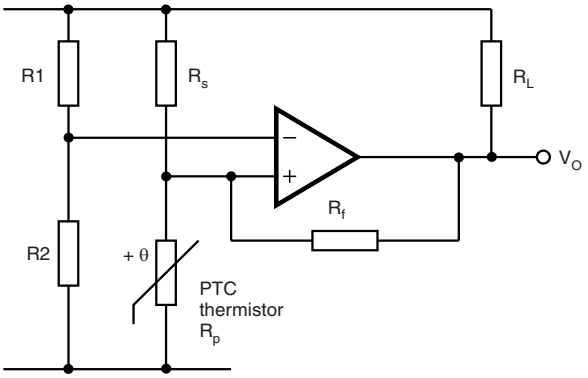


Fig. 1 - Typical comparator circuit

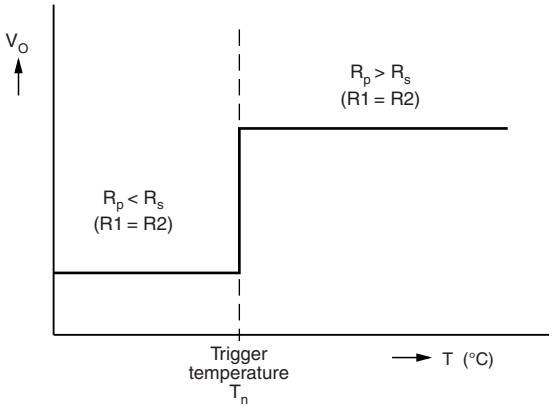
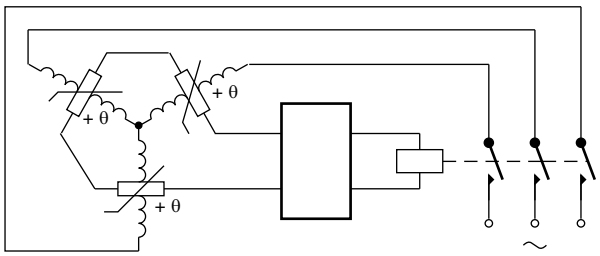


Fig. 2 - Typical switch characteristic



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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