PTC Thermistors, Lug Sensors for Over-Temperature Protection

FEATURES

- Well-defined protection temperature levels
- Fast reaction time (< 30 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

RoHS COMPLIANT

APPLICATIONS

Over-temperature protection and control in:

- Industrial electronics
- Power electronics
- Motor protection

DESCRIPTION

These PTC sensing thermistors consist of a medium resistivity doped $BaTiO_3$ ceramic chip lead (Pb)-free soldered with AWG#24 PTFE insulated stranded and tinned copper wires and mounted in a metal lug barrel. The lug barrel is marked with the Tn value (ex T120).

PACKAGING

PTC thermistors are available in 200 pieces bulk packed.

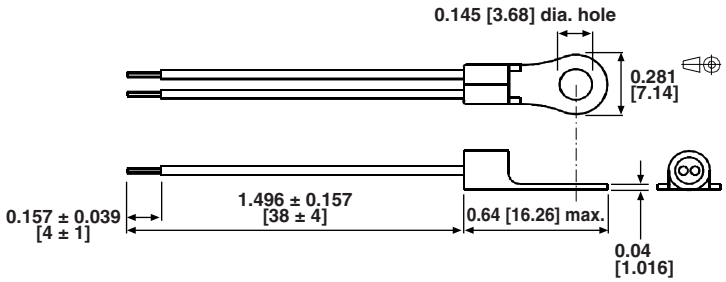
QUICK REFERENCE DATA		
PARAMETER	VALUE	UNIT
Resistance at 25 °C (R_{25})	20 to 100	Ω
Nominal working temperature (T_n)	70 to 150	°C
Tolerance on T_n	± 5	°C
Maximum voltage (AC or DC)	30	V
Thermal time constant	~ 8	s
Operating temperature range (1)	-20 to 165	°C
Dissipation factor	5	mW/K
Storage temperature	-25 to +155	°C
Weight	~ 2	g

Note

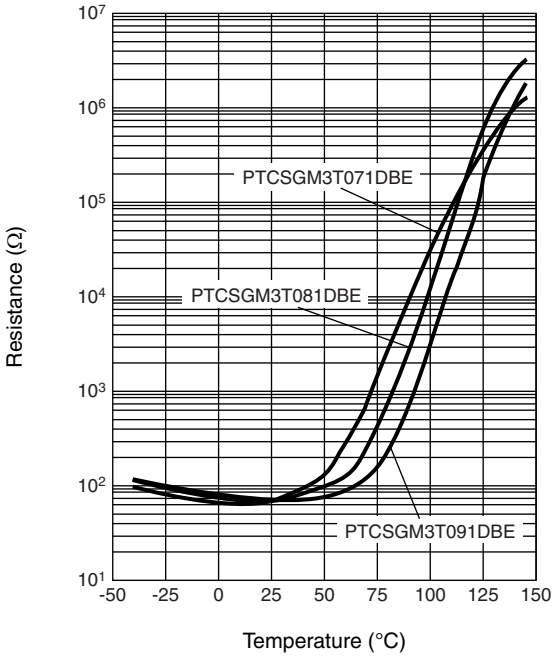
(1) Max operating temperature range is T_n +15 °C, indicated value is for T_n = 150 °C.

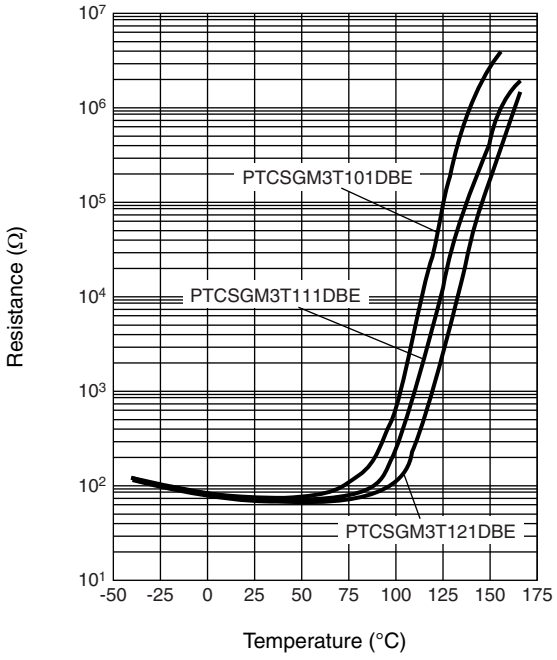
NOMINAL WORKING TEMPERATURES AND ORDERING INFORMATION				
NOMINAL WORKING TEMPERATURE T_n (°C)	$R_{max.}$ at T_n - 5 °C (Ω)	$R_{min.}$ at T_n + 5 °C (Ω)	$R_{min.}$ at T_n + 15 °C (Ω)	ORDERING PART NUMBERS
				LUG DEVICE
70	570	570	4000	PTCSGM3T071DBE
80	550	1330	4000	PTCSGM3T081DBE
90	550	1330	4000	PTCSGM3T091DBE
100	550	1330	4000	PTCSGM3T101DBE
110	550	1330	4000	PTCSGM3T111DBE
120	550	1330	4000	PTCSGM3T121DBE
130	550	1330	4000	PTCSGM3T131DBE
140	550	1330	4000	PTCSGM3T141DBE
150	550	1330	4000	PTCSGM3T151DBE

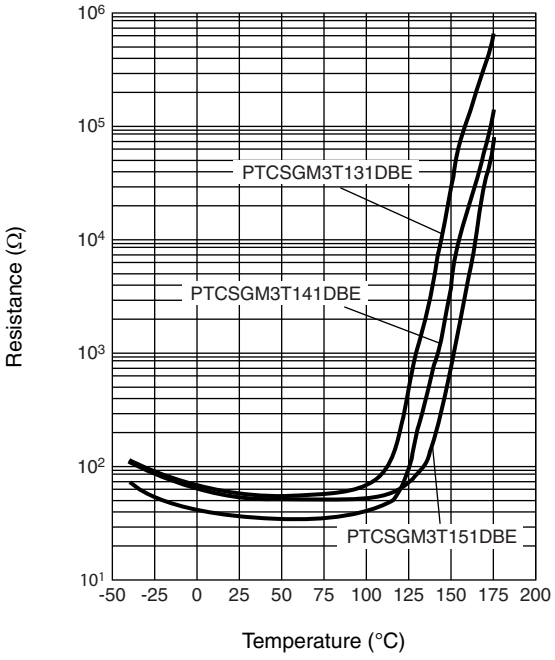
COMPONENT OUTLINES DIMENSIONS in inches (millimeters)



TYPCIAL RESISTANCE/TEMPERATURE CHARACTERISTIC







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

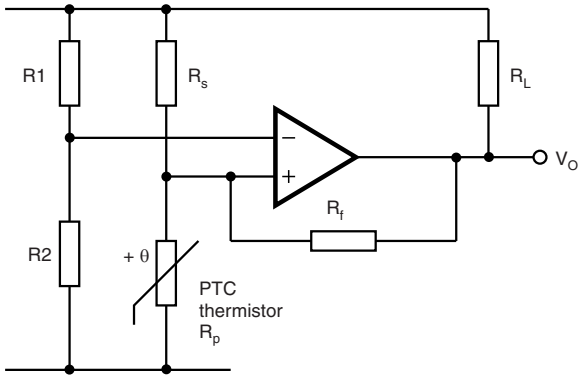


Fig. 1 - Typical comparator circuit

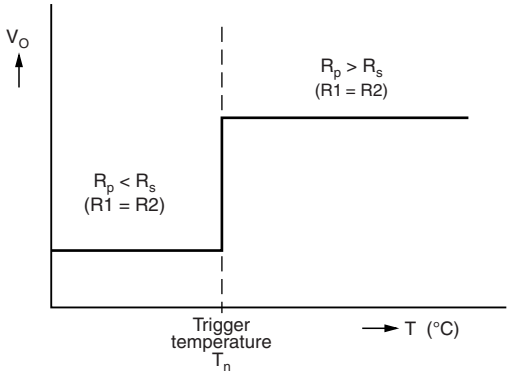


Fig. 2 - Typical switch characteristic

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