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)
- No need to reset supply after overtemperature switch
- Small size and rugged
- Coated leaded and naked devices available
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC

Pb
e3
RoHS COMPLIANT

QUICK REFERENCE DATA

PARAMETER	VALUE	UNIT
Maximum resistance at 25 °C	100	Ω
Minimum resistance at (T_n + 15) °C	4000	Ω
Maximum (DC) voltage	30	V
Thermal time constant	± 8.0	s
Temperature range	- 40 to (T_n + 15)	°C
Weight:	± 2.0	g
Climatic category	40/125/56	

APPLICATIONS

Over-temperature protection and control in:

- Industrial electronics
- Power supplies
- Electronic data processing
- Motor protection

DESCRIPTION

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

NOMINAL WORKING TEMPERATURES AND ORDERING INFORMATION

NOMINAL WORKING TEMPERATURE			CATALOG NUMBER 2381 671 .....
T_n (°C)	$R_{max.}$ at T_n - 5 °C (Ω)	$R_{min.}$ at T_n + 5 °C (Ω)	LUG DEVICE
70	570	570	91202
80	550	1330	91203
90	550	1330	91204
100	550	1330	91205
110	550	1330	91206
120	550	1330	91207
130	550	1330	91209
140	550	1330	91212
150	550	1330	91214

ELECTRICAL CHARACTERISTICS

PARAMETER	VALUES
Maximum resistance at 25 °C	100 Ω
Maximum resistance at (T_n - 5) °C	See Nominal Working Temperatures and Ordering Information table
Minimum resistance at (T_n + 5) °C	See Nominal Working Temperatures and Ordering Information table
Minimum resistance at (T_n + 15) °C	4000 Ω
Maximum voltage	30 V (AC or DC)

For technical questions, contact: nlr@vishay.com
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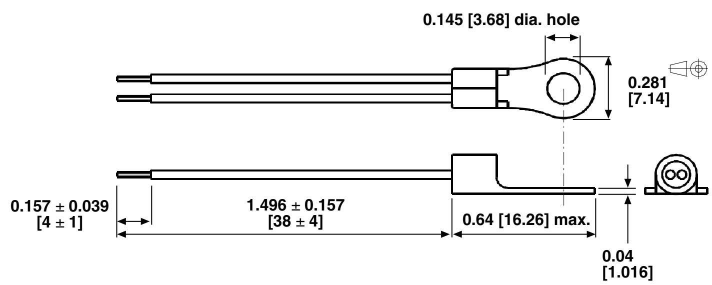
Revision: 30-Jul-10

CATALOG NUMBERS AND PACKAGING

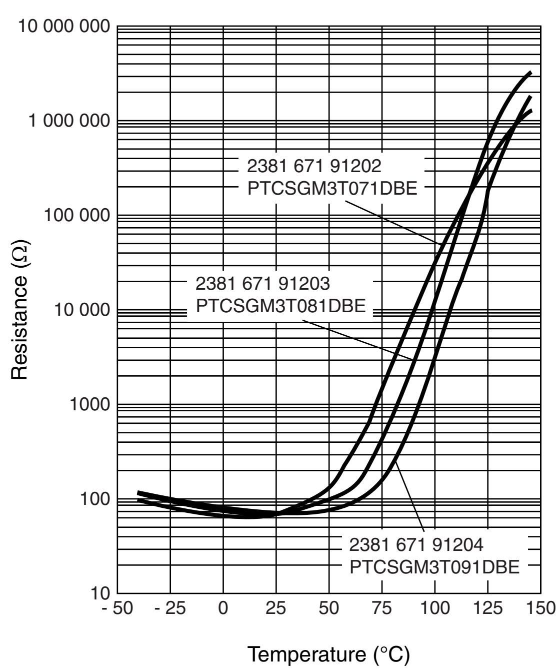
12NC	SAP	SPQ
2381 671 91202	PTCSGM3T071DBE	200
2381 671 91203	PTCSGM3T081DBE	200
2381 671 91204	PTCSGM3T091DBE	200
2381 671 91205	PTCSGM3T101DBE	200
2381 671 91206	PTCSGM3T111DBE	200
2381 671 91207	PTCSGM3T121DBE	200
2381 671 91209	PTCSGM3T131DBE	200
2381 671 91212	PTCSGM3T141DBE	200
2381 671 91214	PTCSGM3T151DBE	200

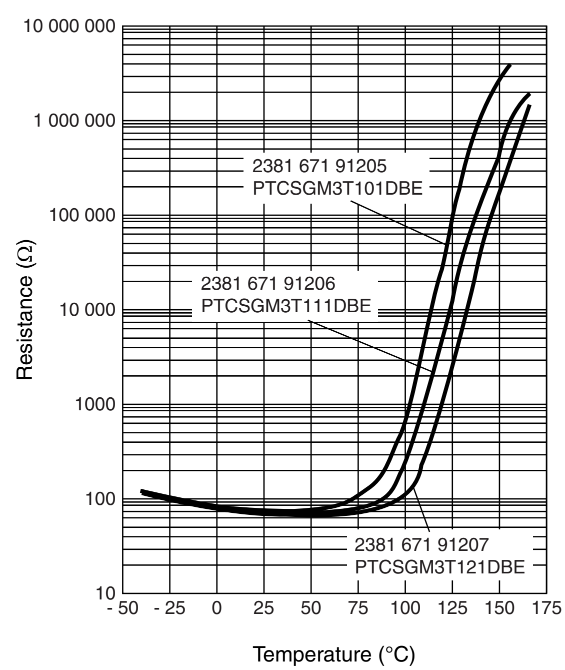
COMPONENT OUTLINES DIMENSIONS in millimeters

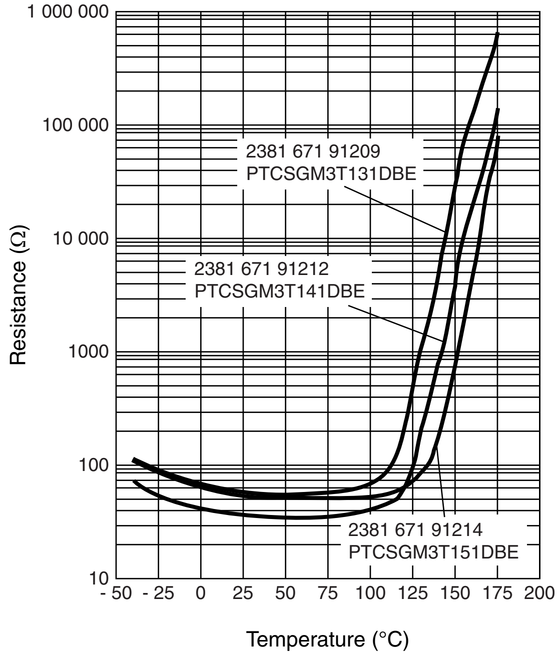


Component outline for 2381 671 91202 to 91214

TYPICAL 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 overtemperature. 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 overtemperature 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

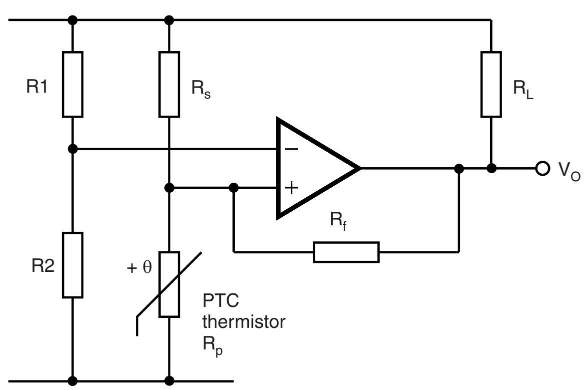


Fig. 1 Typical comparator circuit

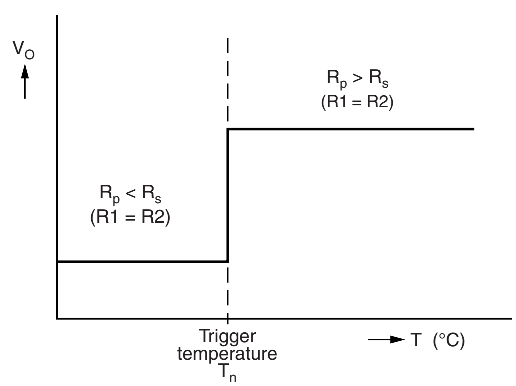


Fig. 2 Typical switch characteristic

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