

## PTC Thermistors, Sleeve Type for Over-Temperature Protection



### FEATURES

- Well-defined protection temperature levels
- 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
- Also available as triple sensor
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC



**RoHS**  
COMPLIANT

### APPLICATIONS

Over-temperature/over-load protection:

- Motor protection (thermal protection of winding)
- Industrial electronics
- Power supplies
- Electronic data processing

### DESCRIPTION

These PTC thermistors consist of a small PTC ceramic chip soldered between 2 ETFE insulated silver plated copper wires, insulated by a thermal sleeve.

They are primarily intended for over-temperature sensing inside windings, coils, transformers and alike.

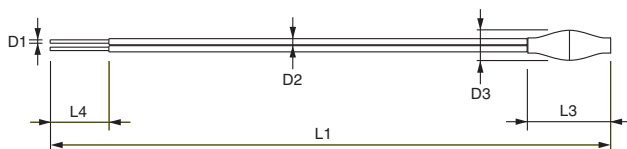
### PACKAGING

The PTC thermistors are packed in BULK per 500 pcs.

QUICK REFERENCE DATA		
PARAMETER	VALUE	UNIT
Maximum resistance at 25 °C	100	Ω
Minimum resistance at ( $T_n + 15$ ) °C	4000	Ω
Maximum (AC/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	- °C/+ °C/ days

NOMINAL WORKING TEMPERATURES AND ORDERING INFORMATION				
NOMINAL WORKING TEMPERATURE			CATALOG AND ORDERING NUMBER	12NC REFERENCE NUMBER
$T_n$ (°C)	$R_{max.}$ at $T_n - 5$ °C (Ω)	$R_{min.}$ at $T_n + 5$ °C (Ω)	SLEEVE DEVICE	2381 671 .....
70	570	570	PTCSSLVT071DBE	91402
80	550	1330	PTCSSLVT081DBE	91403
90	550	1330	PTCSSLVT091DBE	91404
100	550	1330	PTCSSLVT101DBE	91405
110	550	1330	PTCSSLVT111DBE	91406
120	550	1330	PTCSSLVT121DBE	91407
130	550	1330	PTCSSLVT131DBE	91409
140	550	1330	PTCSSLVT141DBE	91412
150	550	1330	PTCSSLVT151DBE	91414

### COMPONENT OUTLINES dimensions in millimeters

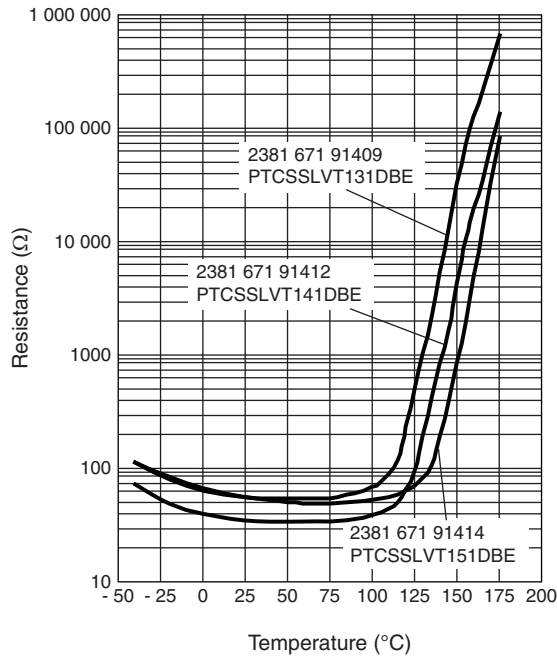
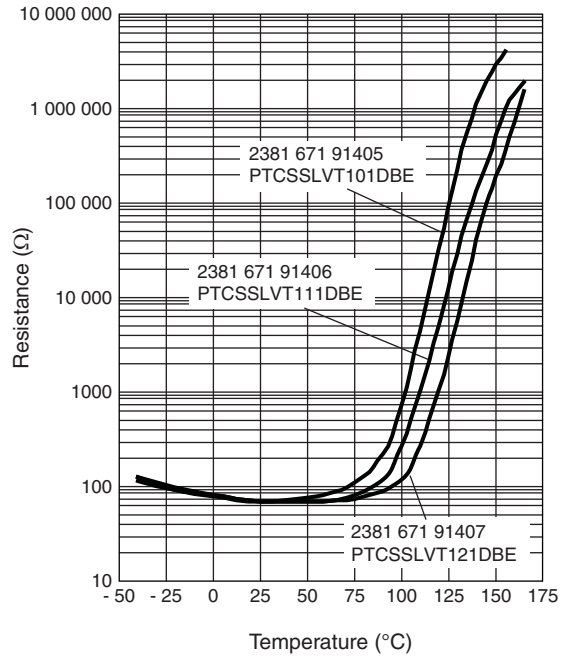
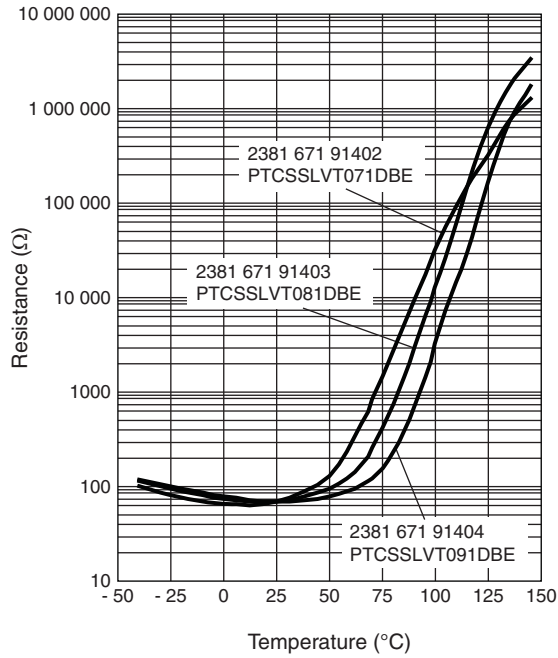


Component outline

L1	500 ± 20
L2	7 ± 2
L3	10 ± 3
D1	0.42
D2	0.7
D3	3 max.



## 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**

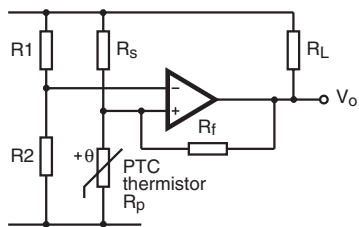


Fig. 1 Typical comparator circuit

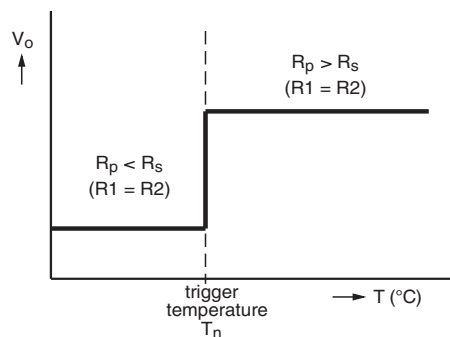
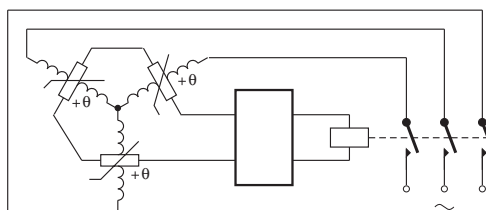


Fig. 2 Typical switch characteristic



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

Fig. 3 Temperature protection of electric motors



## **Disclaimer**

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.