

PTC Thermistors, For Temperature Protection



FEATURES

- Well-defined protection temperature levels
- Very fast reaction time
- Accurate resistance for ease of circuit design
- Excellent long term behavior
- Wide range of protection temperatures
- No need to reset supply after overtemperature switch
- Small size and rugged
- Coated leaded and naked devices available.

QUICK REFERENCE DATA

PARAMETER	VALUE	UNIT
Maximum resistance at 25 °C	120	Ω
Minimum resistance at (T _n + 15) °C	4000	Ω
Maximum (DC) voltage	30	V
Temperature range	-20 to (T _n + 15)	°C
Weight:		
91102 to 91114	≈0.08	g
91152 to 91164	≈0.09	g
Climatic category	25/125/56	

APPLICATIONS

- 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

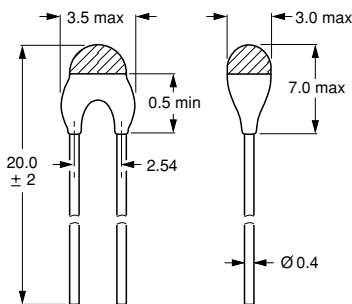
NOMINAL WORKING TEMPERATURE				CATALOG NUMBER 2322 671		
T _n (°C)	RESISTANCE from -20 °C to T _n -20 °C (Ω)	RESISTANCE at T _n -5 °C (Ω)	RESISTANCE at T _n +5 °C (kΩ)	LEADED DEVICE		COLOR CODE
				NORMAL LEADS	LONG LEADS	
70	30 to 250	50 to 570	0.570 to 50	91102	91152	black
80	30 to 250	50 to 550	1.33 to 50	91103	91153	brown
90	30 to 250	50 to 550	1.33 to 50	91104	91154	red
100	30 to 250	50 to 550	1.33 to 50	91105	91155	orange
110	30 to 250	50 to 550	1.33 to 50	91106	91156	yellow
120	30 to 250	50 to 550	1.33 to 50	91107	91157	green
130	30 to 250	50 to 550	1.33 to 50	91109	91159	blue
140	30 to 250	50 to 550	1.33 to 50	91112	91162	violet
150	30 to 250	50 to 550	1.33 to 50	91114	91164	grey

ELECTRICAL CHARACTERISTICS	
PARAMETER	VALUES
Maximum resistance at 25 °C	120 Ω
Maximum resistance at (T _n - 5) °C	see Nominal Working Temperatures and Ordering Information table
Minimum resistance at (T _n + 15) °C	4000 Ω
Minimum resistance at (T _n + 5) °C	see Nominal Working Temperatures and Ordering Information table
Maximum voltage	30 V (AC or DC)

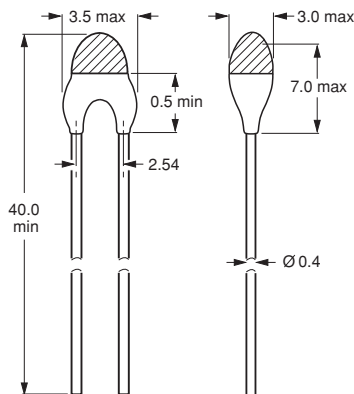
PACKAGING QUANTITIES AND CATALOG NUMBERS		
PACKAGING		CATALOG NUMBERS
SPQ	PQ	2322
500	5000	671 91102 to 671 91114
500	5000	671 91152 to 671 91164

COMPONENT OUTLINES

Dimensions in millimeters



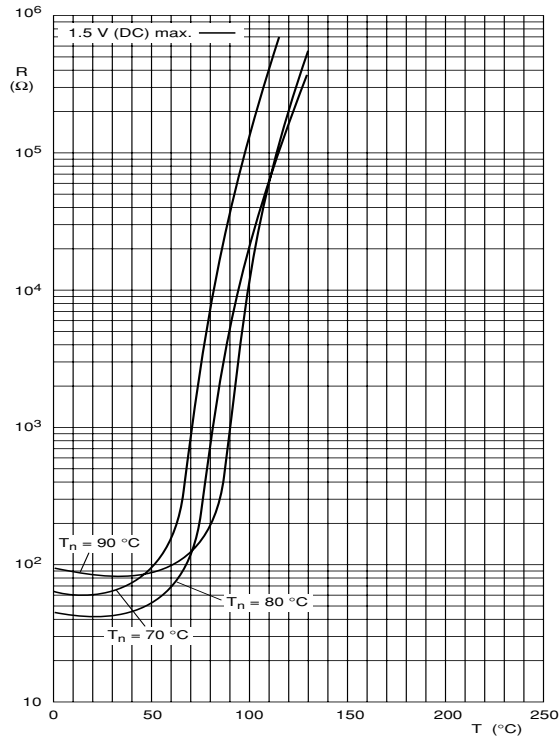
Component outline for 91102 to 91114.



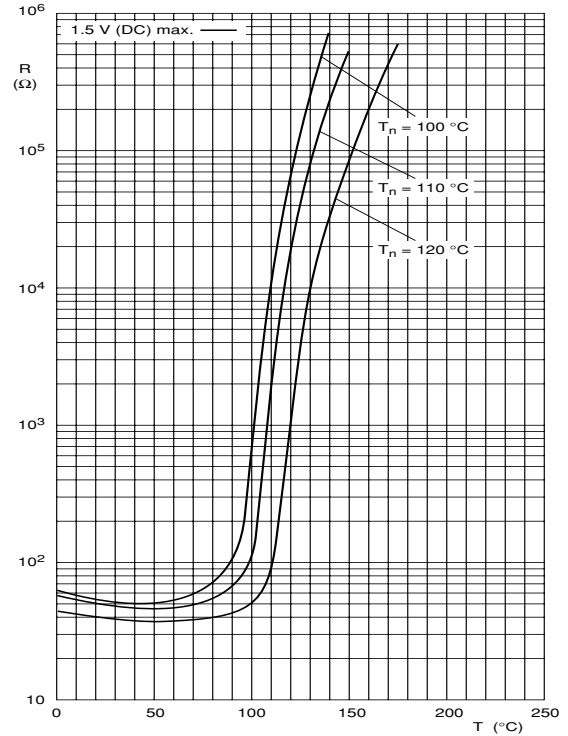
Component outline for 91152 to 91164.



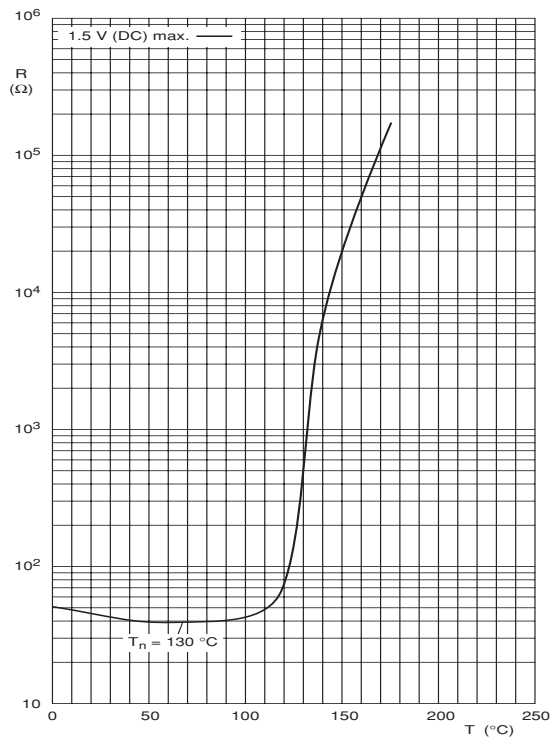
TYPICAL RESISTANCE/TEMPERATURE CHARACTERISTIC FOR 2322 671 91102 / 91103 and 91104



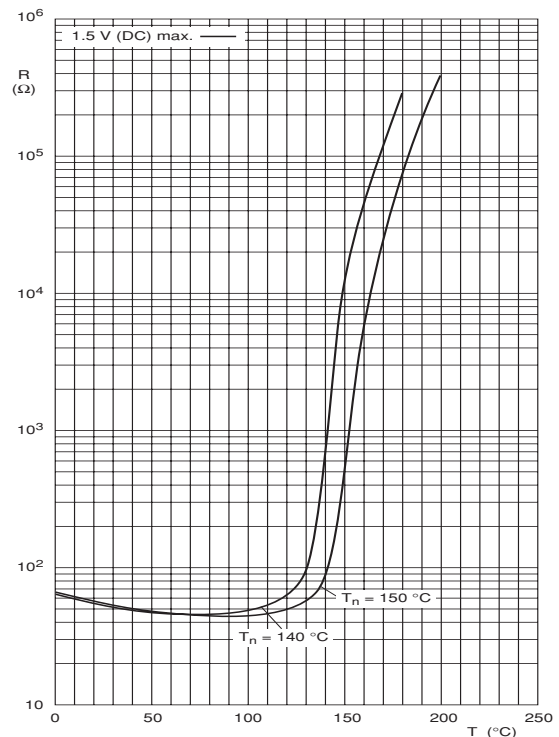
TYPICAL RESISTANCE/TEMPERATURE CHARACTERISTIC FOR 2322 671 91105 / 91106 and 91107



TYPICAL RESISTANCE/TEMPERATURE CHARACTERISTIC FOR 2322 671 91109



TYPICAL RESISTANCE/TEMPERATURE CHARACTERISTIC FOR 2322 671 91112 and 91114



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

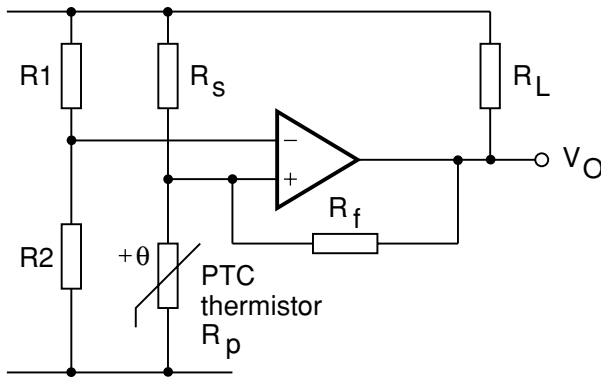


Fig.1 .Typical comparator circuit.

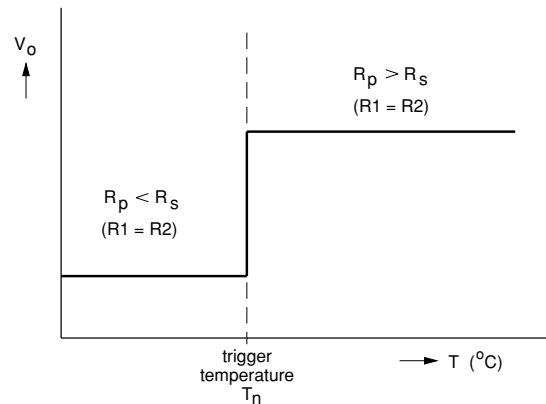
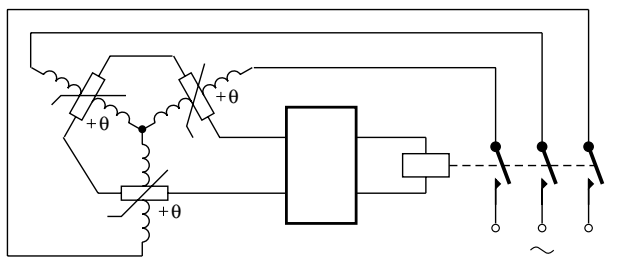
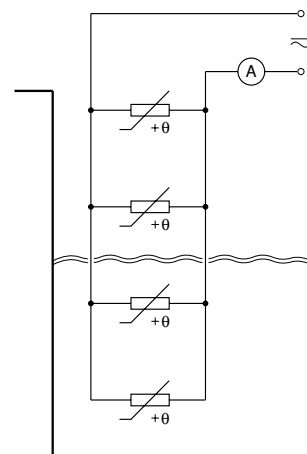


Fig.2 Typical switch characteristic.



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

Fig.3 Temperature protection of electric motors



The PTC thermistors located above the fluid level will be heated to a temperature greater than T_n . When immersed they are cooled such that their resistance value is reduced.

Fig.4 Liquid-level indication.