

Ceramic PTC Thermistor: Glossary



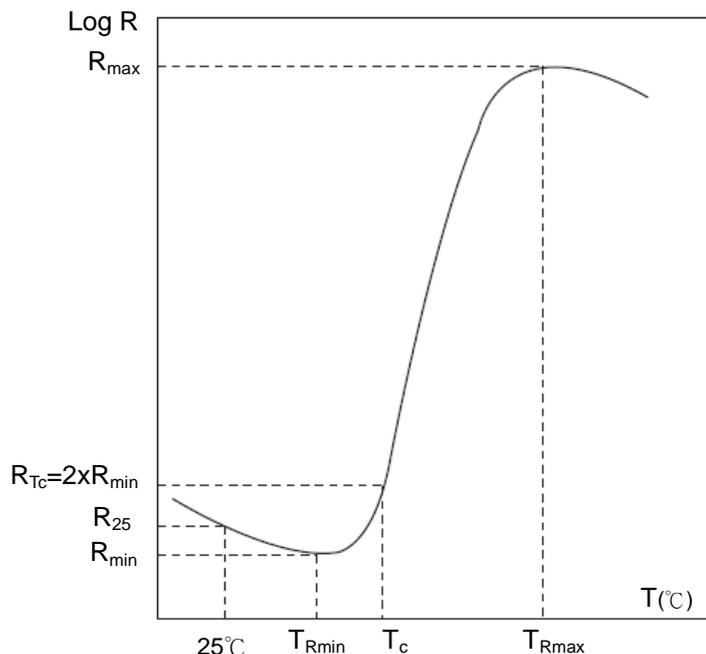
- **Zero-power resistance (R_T)**

The zero-power resistance is the resistance value measured under specified temperature conditions, and the self-heating during measurement can be negligible.

- **Resistance-temperature characteristic (R-T curve, see Fig. 4)**

R-T curve is relationship of zero-power resistance and temperature of CPTC thermistor at specified direct voltage. It is a curve drawn on a semi-logarithmic coordinate graph (Temperature (T) is on X-axis and resistance (R) is on Y axis).

Fig.4 R-T Curve



R₂₅: Zero power resistance at 25°C

R_{min}: Minimum resistance

T_{Rmin}: Temperature corresponding to minimum resistance

T_c: Curie temperature or switch temperature

R_{Tc}: Switch resistance (R_{Tc}=2×R_{min})

R_{max}: Maximum resistance

T_{Rmax}: Temperature corresponding to maximum resistance

- **Minimum resistance (R_{min})**

Minimum resistance is the lowest resistance on R-T curve and corresponds to T_{Rmin}, temperature of minimum resistance. (see Fig. 4)

- **Temperature of minimum resistance (T_{Rmin})**

T_{Rmin} is temperature that corresponds to R_{min} on R-T curve.

- **Curie temperature or switch temperature (T_c)**

Curie temperature is temperature that corresponds to R_{Tc} = 2 × R_{min}. When the temperature is reached, a step-like increase of CPTC thermistor resistance is started.

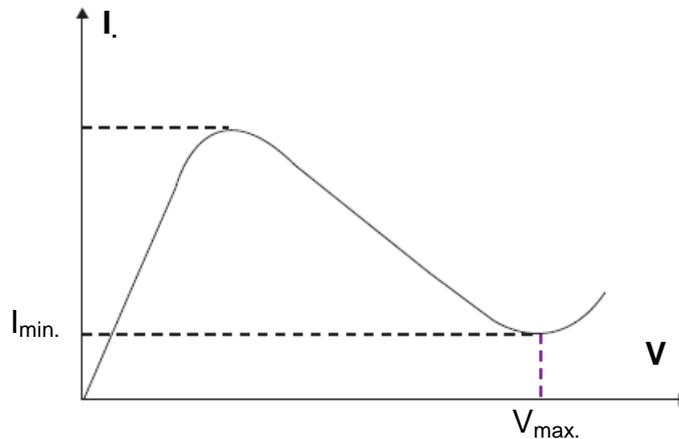
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- **Voltage-current characteristic (V- I curve, see Fig. 5)**

V-I curve is relationship of applied AC or DC voltage at thermistor terminations and steady-state current when thermal equilibrium is reached in still air at 25°C.

Fig. 5 V-I Curve



- **Rated voltage (V_R)**

Rated voltage typically equals to voltage of supply source.

- **Maximum operating voltage (V_{\max})**

Maximum operating voltage is maximum AC or DC voltage that continuously applies to thermistor and does not exceed maximum overload current.

- **Maximum link voltage ($V_{L\max}$)**

Maximum link voltage is maximum DC voltage of filter capacitor in inrush current limiting application.

- **Withstanding Voltage (V_W)**

Maximum voltage that CPTC thermistor can withstand under specific conditions.

- **Maximum operating current (I_{\max})**

Maximum operating current is maximum permissible current before reaching curie temperature.

- **Tripping current (I_T)**

Tripping current is the lowest current that causes thermistor to trip to high resistance at specified temperature (preferably 25°C).

- **Maximum non-tripping current (I_N)**

Maximum non-tripping current is maximum current that thermistor keeps definitely in its low resistance condition at a specified ambient temperature (preferably 25°C).

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- **Heat capacity(C_{th})**
Heat capacity is energy (in J) for increasing 1K of thermistor's body temperature.
- **Power consumption (P)**
Power is measured with rated voltage and I_{max} after CPTC thermistor trips.
- **Operating time(t_o)**
Operating time is the time for current of CPTC thermistor to change to 0.5 times of I_{in} after tripping is occurred.
- **Recovery time(t_r)**
Recovery time is the time which the resistance value of PTC recovers to 2 times of R25.
- **Responding time(t_a)**
Responding time is the time that A current takes to reduce to B current after CPTC thermistor trips. (A and B currents are specified in specifications.)
- **Surface temperature (T_{st})**
Surface temperature is temperature of CPTC thermistor's surface when the component is operated at specified voltage and ambient environment is in a state of thermal equilibrium for a certain period of time. Typical ambient temperature is 25°C.
- **Sensing temperature (T_s)**
Sensing temperature is temperature related to a defined resistance value in the steep region of R-T curve.