

# ELITALIA



The image shows a collection of PTC thermistor components, including surface-mount devices, through-hole components, and a large cylindrical unit. These are set against a dark blue background with green circuit traces. Faint icons of a laptop, a car, and a house are visible in the background. The text 'PTC THERMISTOR' is prominently displayed in the center, with a list of applications below it.

**PTC THERMISTOR**

- Heating
- Motor Starting
- Overload
- Switching
- Temperature Sensing



PHC  
PHR  
PLA  
PPL  
PPL - ICL  
PPL - TWIN  
PSA  
PSB  
PTL  
PTM - C  
PTM - P  
TPM - S

| SERIE      | PAG |
|------------|-----|
| PHC        | 01  |
| PHR        | 04  |
| PLA        | 06  |
| PPL - PPD  | 13  |
| PPL - ICL  | 30  |
| PPL        | 39  |
| PPL - TWIN | 47  |
| PSA        | 53  |
| PSB        | 58  |
| PTL        | 63  |
| PTM - C    | 71  |
| PTM - P    | 78  |
| TPM - S    | 85  |



# CPTC Thermistor

## PRODUCT DATA

### ■ Heating

- Features

1. Self-regulating heating element
2. Constant temperature
3. Circuit simple
4. Suitable for clamp-contacting
5. Stable over a long life

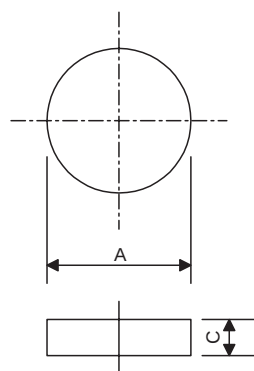
- Recommended Applications

1. Home appliances (Air conditioner)
2. Automobile



- Dimensions

PHC Series



(Unit: mm)



## ● Characteristics

### PHC Series

| Part No.      | Curie Temperature   | Surface Temperature | Nominal Zero-power Resistance | Rated Voltage      | Maximum Voltage      | Dimensions |           |
|---------------|---------------------|---------------------|-------------------------------|--------------------|----------------------|------------|-----------|
|               | T <sub>c</sub> (°C) | T <sub>s</sub> (°C) | R <sub>25</sub> (Ω)           | V <sub>R</sub> (V) | V <sub>max</sub> (V) | A±1(mm)    | C±0.2(mm) |
| PHC08102□P3B7 | 30                  | 50                  | 1000                          | 240                | 270                  | 8          | 3         |
| PHC13150□PJ60 | 65                  | 75                  | 15                            | 42                 | 60                   | 13         | 1.5       |
| PHC13102□PIB7 | 55                  | 75                  | 1000                          | 240                | 270                  | 13         | 2.3       |
| PHC08100□A030 | 100                 | 110                 | 10                            | 24                 | 30                   | 8          | 1.5       |
| PHC08180□A030 | 100                 | 110                 | 18                            | 24                 | 30                   | 8          | 1.5       |
| PHC10180□A060 | 100                 | 110                 | 18                            | 42                 | 60                   | 10         | 2.5       |
| PHC08102□A1B7 | 110                 | 130                 | 1000                          | 240                | 270                  | 8          | 2.3       |
| PHC20102□A1B7 | 110                 | 130                 | 1000                          | 240                | 270                  | 20         | 2.3       |
| PHC10501□A3B7 | 130                 | 150                 | 500                           | 240                | 270                  | 10         | 2.3       |
| PHC13360□A430 | 140                 | 150                 | 36                            | 24                 | 30                   | 13         | 1.3       |
| PHC10501□AGB7 | 135                 | 155                 | 500                           | 240                | 270                  | 10         | 2.3       |
| PHC10102□AGB7 | 135                 | 155                 | 1000                          | 240                | 270                  | 10         | 2.3       |
| PHC13680□AH60 | 145                 | 155                 | 68                            | 42                 | 60                   | 13         | 1.3       |
| PHC17150□A560 | 150                 | 160                 | 15                            | 42                 | 60                   | 17         | 1.4       |
| PHC20102□A4B7 | 140                 | 160                 | 1000                          | 240                | 270                  | 20         | 2.3       |
| PHC10201□A5B7 | 150                 | 170                 | 200                           | 220/240            | 270                  | 10         | 2.3       |
| PHC10301□A6A4 | 160                 | 175                 | 300                           | 110                | 140                  | 10         | 2.3       |
| PHC10102□AJB7 | 165                 | 180                 | 1000                          | 240                | 270                  | 10         | 2.3       |
| PHC203R6□A760 | 170                 | 180                 | 3.6                           | 42                 | 60                   | 20         | 1.4       |
| PHC10501□A7B7 | 170                 | 185                 | 500                           | 240                | 270                  | 10         | 2.3       |
| PHC14501□AKB7 | 175                 | 190                 | 500                           | 220/240            | 270                  | 14         | 2.3       |
| PHC13152□BEB7 | 215                 | 230                 | 1500                          | 240                | 270                  | 13         | 2.5       |
| PHC13152□BGB7 | 235                 | 250                 | 1500                          | 240                | 270                  | 13         | 2.5       |
| PHC20362□BGB7 | 235                 | 250                 | 3600                          | 240                | 270                  | 20         | 2.5       |

Note: □=Tolerance of R<sub>25</sub>



● Reliability Test

| Item                                                           | Test Condition / Methods                                                                    | Standard                 |
|----------------------------------------------------------------|---------------------------------------------------------------------------------------------|--------------------------|
| Rapid Change of Temperature                                    | $T_A=LCT$ $T_B=UCT$<br>Number of cycles:5<br>Duration: 30 min                               | IEC60068-2-14<br>Test Na |
| Temperature Coefficient of Resistance                          | $\alpha_T = \ln(R_{Tc+25}/R_{Tc+10}) / 15$<br>$R_{Tc}=2R_{min}$                             | IEC 60738-1              |
| Endurance at Upper Category Temperature                        | Temperature: UCT<br>Duration: 1000 hrs                                                      | IEC 60738-1              |
| Endurance at Maximum Operating Temperature and Maximum Voltage | Voltage: $V_{max}$<br>Temperature: UCT<br>Duration: 1000 hrs                                | IEC 60738-1              |
| Endurance at Room Temperature (Cycling)                        | Voltage: $V_{max}$<br>Temperature: $25 \pm 5^\circ C$<br>Number of cycle 10,000 or 100,000  | IEC 60738-1              |
| Damp Heat Steady State                                         | Temperature: $40 \pm 5^\circ C$<br>Relative humidity of air: 95~98%Rh<br>Duration: 1000 hrs | IEC 60068-2-3<br>Test Ca |



# CPTC Thermistor

## PRODUCT DATA

### ■ Heating

- Features

1. Self-regulating heating element
2. Contant temperature
3. Circuit simple
4. Suitable for clamp-contacting
5. Stable over a long life

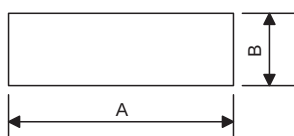
- Recommended Applications

1. Home appliances (Air conditioner)
2. Automobile



- Dimensions

PHR Series



(Unit: mm)



## ● Characteristics

PHR Series

| Part No.      | Curie Temperature   | Surface Temperature | Nominal Zero-power Resistance | Rated Voltage      | Maximum Voltage      | Dimensions |          |            |
|---------------|---------------------|---------------------|-------------------------------|--------------------|----------------------|------------|----------|------------|
|               | T <sub>c</sub> (°C) | T <sub>s</sub> (°C) | R <sub>25</sub> (Ω)           | V <sub>R</sub> (V) | V <sub>max</sub> (V) | A±1 (mm)   | B±1 (mm) | C±0.2 (mm) |
| PHRA1301□P7A4 | 70                  | 85                  | 300                           | 100/120            | 140                  | 16         | 11       | 2.5        |
| PHRA1181□P7A4 | 70                  | 90                  | 180                           | 100/120            | 140                  | 16         | 11       | 2.5        |
| PHRA1701□P8B7 | 80                  | 100                 | 700                           | 220/240            | 270                  | 16         | 11       | 2.5        |
| PHRA2501□P9B7 | 90                  | 110                 | 500                           | 220/240            | 270                  | 23.5       | 10       | 2.2        |
| PHRA3801□B1B7 | 210                 | 230                 | 800                           | 220/240            | 270                  | 19         | 12       | 2.2        |
| PHRA2301□B3A4 | 230                 | 250                 | 300                           | 100/120            | 140                  | 23.5       | 10       | 2.2        |
| PHRA2701□B4B7 | 240                 | 255                 | 700                           | 220/240            | 270                  | 23.5       | 10       | 2.2        |
| PHRA4501□B4B7 | 240                 | 255                 | 500                           | 220/240            | 270                  | 36         | 6        | 2.3        |

Note: □=Tolerance of R<sub>25</sub>

## ● Reliability Test

| Item                                                           | Test Condition / Methods                                                               | Standard                             |
|----------------------------------------------------------------|----------------------------------------------------------------------------------------|--------------------------------------|
| Rapid Change of Temperature                                    | T <sub>A</sub> =LCT T <sub>B</sub> =UCT<br>Number of cycles:5<br>Duration: 30 min      | IEC60068-2-14<br>Test N <sub>a</sub> |
| Temperature Coefficient of Resistance                          | $\alpha_T = \ln(R_{Tc+25}/R_{Tc+10}) / 15$<br>R <sub>Tc</sub> =2R <sub>min</sub>       | IEC 60738-1                          |
| Endurance at Upper Category Temperature                        | Temperature: UCT<br>Duration: 1000 hrs                                                 | IEC 60738-1                          |
| Endurance at Maximum Operating Temperature and Maximum Voltage | Voltage: V <sub>max</sub><br>Temperature: UCT<br>Duration: 1000 hrs                    | IEC 60738-1                          |
| Endurance at Room Temperature (Cycling)                        | Voltage: V <sub>max</sub><br>Temperature: 25 ±5°C<br>Number of cycle 10,000 or 100,000 | IEC 60738-1                          |
| Damp Heat Steady State                                         | Temperature: 40 ±5°C<br>Relative humidity of air: 95~98%Rh<br>Duration: 1000 hrs       | IEC 60068-2-3<br>Test C <sub>a</sub> |

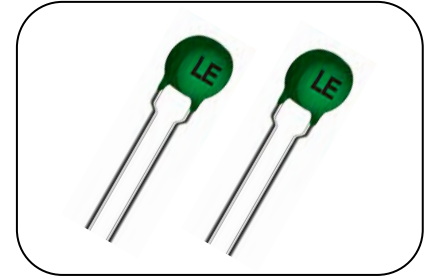
# CPTC Thermistor: PLA Series

## For Lighting Application



### ■ Features

1. RoHS compliant
2. For frequent switching
3. Small size
4. Low, medium, and high resistance ratings
5. Stable over a long life
6. Operating temperature range: 0 ~ +60°C (V=Vmax)  
-25 ~ +125°C (V=0)



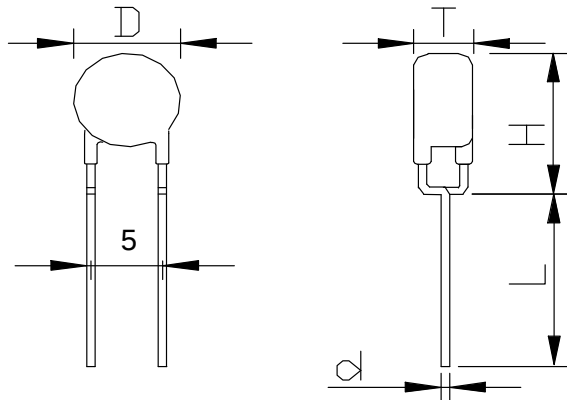
### ■ Recommended Applications

1. Electronic ballast for lamps, switching
2. Energy saving lamp

### ■ Part Number Code

| P                                                                                |  | L |  | A                                                       |  | 0 |  | 3                                                                                                  |  | 1 |  | 5                                                                                                                                               |  | 1 |  | N                                                                                                                      |  | P  |  | 8                            |  | D  |  | 2  |  | Y  |  |    |  |    |  |
|----------------------------------------------------------------------------------|--|---|--|---------------------------------------------------------|--|---|--|----------------------------------------------------------------------------------------------------|--|---|--|-------------------------------------------------------------------------------------------------------------------------------------------------|--|---|--|------------------------------------------------------------------------------------------------------------------------|--|----|--|------------------------------|--|----|--|----|--|----|--|----|--|----|--|
| 1                                                                                |  | 2 |  | 3                                                       |  | 4 |  | 5                                                                                                  |  | 6 |  | 7                                                                                                                                               |  | 8 |  | 9                                                                                                                      |  | 10 |  | 11                           |  | 12 |  | 13 |  | 14 |  | 15 |  | 16 |  |
| <b>Product Code</b><br><br>PL THINKING<br>Ceramic PTC<br>Thermistor<br>PL Series |  |   |  | <b>Dimensions</b><br><br>03 $\phi$ 3mm<br>06 $\phi$ 6mm |  |   |  | <b>Resistance (R<sub>25</sub>)</b><br><br>850 85 $\Omega$<br>151 150 $\Omega$<br>152 1.5K $\Omega$ |  |   |  | <b>Tolerance of R<sub>25</sub></b><br><br>M $\pm$ 20%<br>H $\pm$ 25%<br>N $\pm$ 30%<br>T $\pm$ 40%<br>S +35 ~ -15%<br>Q +30 ~ -20%<br>Y Special |  |   |  | <b>Curie Temperature</b><br><br>P6 60 $^{\circ}$ C<br>P8 80 $^{\circ}$ C<br>A0 100 $^{\circ}$ C<br>A2 120 $^{\circ}$ C |  |    |  | <b>Internal Control Code</b> |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
| <b>Series</b><br><br>A Lead Type                                                 |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
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|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
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|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |
|                                                                                  |  |   |  |                                                         |  |   |  |                                                                                                    |  |   |  |                                                                                                                                                 |  |   |  |                                                                                                                        |  |    |  |                              |  |    |  |    |  |    |  |    |  |    |  |

### ■ Dimensions



(Unit: mm)

# CPTC Thermistor: PLA Series

## For Lighting Application



### ■ Characteristics

| Part No.      | Curie Temperature                           | Nominal Zero-power Resistance | Withstanding Voltage              | Maximum Current       | Dimensions |         |            |                       |
|---------------|---------------------------------------------|-------------------------------|-----------------------------------|-----------------------|------------|---------|------------|-----------------------|
|               | T <sub>c</sub> (°C)                         | R <sub>25</sub> (Ω)           | V <sub>w</sub> (V <sub>ac</sub> ) | I <sub>max</sub> (mA) | D(mm)      | T(mm)   | d±0.02(mm) | H <sub>max</sub> (mm) |
| PLA03101□**D2 | (50/60/70/<br>80/90/100/<br>110/120)<br>±10 | 100                           | 420                               | 200                   | 3.0~4.5    | 3.5~4.5 | 0.5        | 8.5                   |
| PLA03151□**D2 |                                             | 150                           | 420                               |                       |            |         |            |                       |
| PLA03221□**D2 |                                             | 220                           | 420                               |                       |            |         |            |                       |
| PLA03331□**E0 |                                             | 330                           | 500                               |                       |            |         |            |                       |
| PLA03471□**E0 |                                             | 470                           | 500                               |                       |            |         |            |                       |
| PLA03681□**E0 |                                             | 680                           | 500                               |                       |            |         |            |                       |
| PLA03102□**F0 |                                             | 1000                          | 600                               |                       |            |         |            |                       |
| PLA03152□**F0 |                                             | 1500                          | 600                               |                       |            |         |            |                       |
| PLA03222□**F0 |                                             | 2200                          | 600                               |                       |            |         |            |                       |
| PLA03332□**F0 |                                             | 3300                          | 600                               |                       |            |         |            |                       |
| PLA03472□**F0 |                                             | 4700                          | 600                               |                       |            |         |            |                       |
| PLA04680□**D2 |                                             | 68                            | 420                               | 300                   | 4.0~5.5    | 3.5~4.5 | 0.6        | 9.5                   |
| PLA04101□**D2 |                                             | 100                           | 420                               |                       |            |         |            |                       |
| PLA04151□**D2 |                                             | 150                           | 420                               |                       |            |         |            |                       |
| PLA04221□**E0 |                                             | 220                           | 500                               |                       |            |         |            |                       |
| PLA04331□**E0 |                                             | 330                           | 500                               |                       |            |         |            |                       |
| PLA04471□**F0 |                                             | 470                           | 600                               |                       |            |         |            |                       |
| PLA04681□**F0 |                                             | 680                           | 600                               |                       |            |         |            |                       |
| PLA04102□**F0 |                                             | 1000                          | 600                               |                       |            |         |            |                       |
| PLA04152□**F0 |                                             | 1500                          | 600                               |                       |            |         |            |                       |
| PLA04222□**F0 |                                             | 2200                          | 600                               |                       |            |         |            |                       |
| PLA04332□**F0 |                                             | 3300                          | 600                               |                       |            |         |            |                       |
| PLA05680□**D2 |                                             | 68                            | 420                               | 400                   | 5.0~6.5    | 3.5~4.5 | 0.6        | 10.5                  |
| PLA05101□**D2 |                                             | 100                           | 420                               |                       |            |         |            |                       |
| PLA05151□**D2 |                                             | 150                           | 420                               |                       |            |         |            |                       |
| PLA05221□**E0 |                                             | 220                           | 500                               |                       |            |         |            |                       |
| PLA05331□**E0 |                                             | 330                           | 500                               |                       |            |         |            |                       |
| PLA05471□**F0 |                                             | 470                           | 600                               |                       |            |         |            |                       |
| PLA05681□**F0 |                                             | 680                           | 600                               |                       |            |         |            |                       |
| PLA05102□**F0 |                                             | 1000                          | 600                               |                       |            |         |            |                       |
| PLA05152□**F0 |                                             | 1500                          | 600                               |                       |            |         |            |                       |
| PLA05222□**F0 |                                             | 2200                          | 600                               |                       |            |         |            |                       |
| PLA05332□**F0 |                                             | 3300                          | 600                               |                       |            |         |            |                       |
| PLA06680□**D5 |                                             | 68                            | 450                               | 600                   | 5.5~7.5    | 3.5~4.5 | 0.6        | 11.5                  |
| PLA06101□**E0 |                                             | 100                           | 500                               |                       |            |         |            |                       |
| PLA06151□**E0 |                                             | 150                           | 500                               |                       |            |         |            |                       |
| PLA06221□**F0 |                                             | 220                           | 600                               |                       |            |         |            |                       |
| PLA06331□**F0 |                                             | 330                           | 600                               |                       |            |         |            |                       |
| PLA06471□**F0 |                                             | 470                           | 600                               |                       |            |         |            |                       |

#### Note:

1. □ is tolerance of R<sub>25</sub>
2. \*\* is the code of T<sub>c</sub> (curie temperature)
3. V<sub>w</sub>: Withstanding voltage at 50Hz.

# CPTC Thermistor: PLA Series

## For Lighting Application



| Part No.      | Curie Temperature                           | Nominal Zero-power Resistance | Withstanding Voltage              | Maximum Current       | Dimensions |         |            |                       |
|---------------|---------------------------------------------|-------------------------------|-----------------------------------|-----------------------|------------|---------|------------|-----------------------|
|               | T <sub>c</sub> (°C)                         | R <sub>25</sub> (Ω)           | V <sub>W</sub> (V <sub>ac</sub> ) | I <sub>max</sub> (mA) | D(mm)      | T(mm)   | d±0.02(mm) | H <sub>max</sub> (mm) |
| PLA06681□**F5 | (50/60/70/<br>80/90/100/<br>110/120)<br>±10 | 680                           | 650                               | 600                   | 5.5~7.5    | 3.5~4.5 | 0.6        | 11.5                  |
| PLA06102□**F5 |                                             | 1000                          | 650                               |                       |            |         |            |                       |
| PLA06152□**F5 |                                             | 1500                          | 650                               |                       |            |         |            |                       |
| PLA06222□**F5 |                                             | 2200                          | 650                               |                       |            |         |            |                       |
| PLA07680□**D5 |                                             | 68                            | 450                               | 800                   | 6.5~8.5    | 3.5~4.5 | 0.6        | 12.5                  |
| PLA07101□**E0 |                                             | 100                           | 500                               |                       |            |         |            |                       |
| PLA07151□**E0 |                                             | 150                           | 500                               |                       |            |         |            |                       |
| PLA07221□**F0 |                                             | 220                           | 600                               |                       |            |         |            |                       |
| PLA07331□**F0 |                                             | 330                           | 600                               |                       |            |         |            |                       |
| PLA07471□**F0 |                                             | 470                           | 600                               |                       |            |         |            |                       |
| PLA07681□**F5 |                                             | 680                           | 650                               |                       |            |         |            |                       |
| PLA07102□**F5 |                                             | 1000                          | 650                               |                       |            |         |            |                       |
| PLA07152□**F5 |                                             | 1500                          | 650                               |                       |            |         |            |                       |
| PLA07222□**F5 |                                             | 2200                          | 650                               |                       |            |         |            |                       |

### Note:

1. □ is tolerance of R<sub>25</sub>
2. \*\* is the code of T<sub>c</sub> (curie temperature)
3. V<sub>w</sub>: Withstanding voltage at 50Hz.

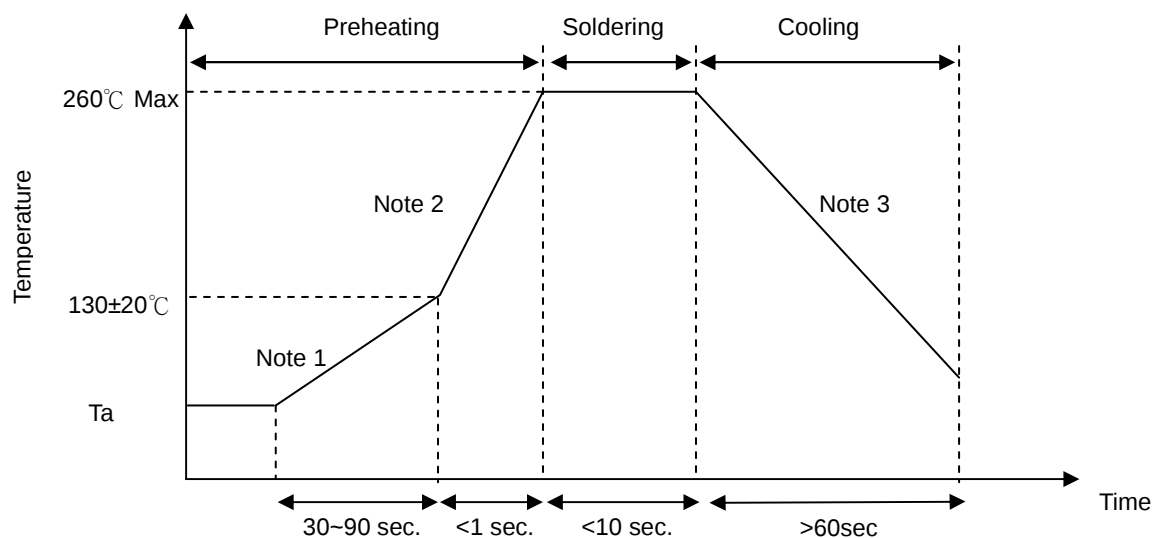
# CPTC Thermistor: PLA Series

## For Lighting Application



### ■ Soldering Recommendation

#### ● Wave Flow Soldering Profile



#### Note

1.  $(1 \sim 3^\circ\text{C})/\text{sec}$
2. Approx.  $200^\circ\text{C}/\text{sec}$
3.  $5^\circ\text{C}/\text{sec. (Max)}$

#### ● Recommended Reworking Conditions With Soldering Iron

| Item                              | Conditions                 |
|-----------------------------------|----------------------------|
| Temperature of Soldering Iron-tip | $360^\circ\text{C}$ (max.) |
| Soldering Time                    | 3 sec (max.)               |
| Distance from Coating             | 2 mm (min.)                |

# CPTC Thermistor: PLA Series

## For Lighting Application



### ■ Reliability Test

| Item                                                           | Standard         | Test Conditions and Methods                                                                                                                                                                                                                                                                                                                                                                    | Specifications                                              |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
|----------------------------------------------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|------------------|------------------|-----|-----------|--------|------------|------------------|--------------------------------------|---|--------|--------|---|------------------|-------|--------------------------------------|
| Robustness of Terminations                                     | IEC 60738-1      | Gradually apply the specified force and keep the unit fixed for 10±1 sec.<br><table><tr><td>Terminal diameter (mm)</td><td>Force T(N)</td></tr><tr><td>0.35&lt;d≤0.5</td><td>5.0</td></tr><tr><td>0.5&lt;d≤0.8</td><td>10.0</td></tr><tr><td>0.8&lt;d≤1.25</td><td>20.0</td></tr></table>                                                                                                      | Terminal diameter (mm)                                      | Force T(N)       | 0.35<d≤0.5       | 5.0 | 0.5<d≤0.8 | 10.0   | 0.8<d≤1.25 | 20.0             | △R25/R25   ≤20%<br>No visible damage |   |        |        |   |                  |       |                                      |
| Terminal diameter (mm)                                         | Force T(N)       |                                                                                                                                                                                                                                                                                                                                                                                                |                                                             |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| 0.35<d≤0.5                                                     | 5.0              |                                                                                                                                                                                                                                                                                                                                                                                                |                                                             |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| 0.5<d≤0.8                                                      | 10.0             |                                                                                                                                                                                                                                                                                                                                                                                                |                                                             |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| 0.8<d≤1.25                                                     | 20.0             |                                                                                                                                                                                                                                                                                                                                                                                                |                                                             |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| Solderability                                                  | IEC 60738-1      | 245±3 °C , 2±0.5 sec                                                                                                                                                                                                                                                                                                                                                                           | At least 95% of terminal electrode is covered by new solder |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| Resistance to Soldering Heat                                   | IEC 60738-1      | 260±3 °C , 10±1 sec                                                                                                                                                                                                                                                                                                                                                                            | △R25/R25   ≤20%<br>No visible damage                        |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| Vibration                                                      | IEC 60738-1      | Frequency range:10~55Hz<br>Amplitude: 0.75mm or 98m/s <sup>2</sup><br>Direction: 3 mutually perpendicular directions<br>Duration: 6hrs(3x2 hrs)                                                                                                                                                                                                                                                | △R25/R25   ≤20%<br>No visible damage                        |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| Shock                                                          | IEC 60738-1      | Wave: half-sine<br>△V: 1.0m/s<br>Acceleration: 50 m/s <sup>2</sup><br>Pulse time: 30ms                                                                                                                                                                                                                                                                                                         | △R25/R25   ≤20%<br>No visible damage                        |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| Rapid Change of Temperature                                    | IEC 60738-1      | <div>The thermal shock conditions shown below shall be repeated 5 cycles.</div> <table><tr><th>Step</th><th>Temperature (°C)</th><th>Period (minutes)</th></tr><tr><td>1</td><td>-40 ± 5</td><td>30 ± 3</td></tr><tr><td>2</td><td>Room temperature</td><td>5 ± 3</td></tr><tr><td>3</td><td>85 ± 5</td><td>30 ± 3</td></tr><tr><td>4</td><td>Room temperature</td><td>5 ± 3</td></tr></table> | Step                                                        | Temperature (°C) | Period (minutes) | 1   | -40 ± 5   | 30 ± 3 | 2          | Room temperature | 5 ± 3                                | 3 | 85 ± 5 | 30 ± 3 | 4 | Room temperature | 5 ± 3 | △R25/R25   ≤20%<br>No visible damage |
| Step                                                           | Temperature (°C) | Period (minutes)                                                                                                                                                                                                                                                                                                                                                                               |                                                             |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| 1                                                              | -40 ± 5          | 30 ± 3                                                                                                                                                                                                                                                                                                                                                                                         |                                                             |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| 2                                                              | Room temperature | 5 ± 3                                                                                                                                                                                                                                                                                                                                                                                          |                                                             |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| 3                                                              | 85 ± 5           | 30 ± 3                                                                                                                                                                                                                                                                                                                                                                                         |                                                             |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| 4                                                              | Room temperature | 5 ± 3                                                                                                                                                                                                                                                                                                                                                                                          |                                                             |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| Climatic Sequence                                              | IEC 60738-1      | Dry heat: 125 °C for 16 hrs<br>Damp heat first cycle: 55°C , 95% R.H, cycle time: 24 hrs<br>Cold: -25°C for 2 hrs<br>Damp heat (cyclic), remaining cycles: 5 cycles<br>Test according to IEC60068-2-30                                                                                                                                                                                         | △R25/R25   ≤20%<br>No visible damage                        |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| Damp Heat, Steady State                                        | IEC 60738-1      | 40±2°C , 90~95% RH, for 1000±2hrs                                                                                                                                                                                                                                                                                                                                                              | △R25/R25   ≤20%<br>No visible damage                        |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| Endurance at maximum operating temperature and maximum voltage | IEC60738-1       | UCT=60°C , 270V <sub>ac</sub> , I≤I <sub>max</sub> for 1000hrs                                                                                                                                                                                                                                                                                                                                 | △R25/R25   ≤20%<br>No visible damage                        |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| Endurance at maximum voltage                                   | IEC60738-1       | 25±5°C , 270V <sub>ac</sub> , I≤I <sub>max</sub><br>1min. on and 5min. Off ×10,000 cycles                                                                                                                                                                                                                                                                                                      | △R25/R25   ≤20%<br>No visible damage                        |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |

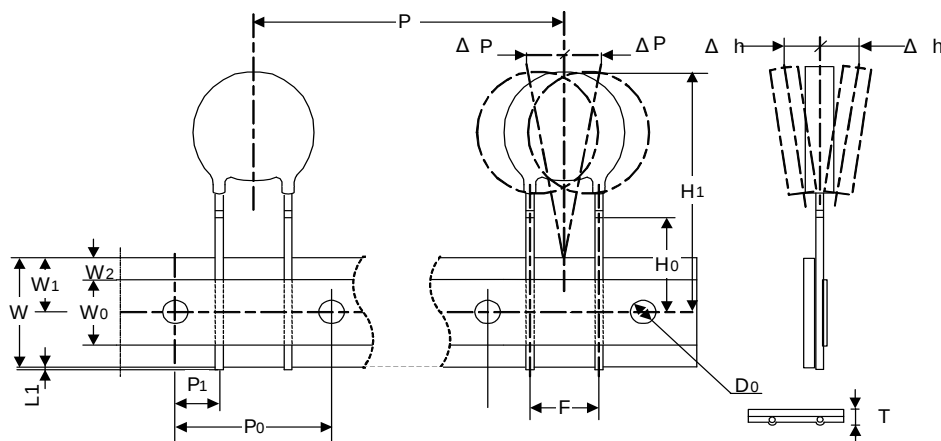
# CPTC Thermistor: PLA Series

## For Lighting Application



### ■ Packaging

#### ● Taping Specification



#### ● Parameter List

(Unit: mm)

| Index          | Parameter                           | Nominal dimensions                                                                                                                                                                               | Tolerance |    |    |    |   |   |   |                |    |    |    |    |    |    |      |
|----------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----|----|----|---|---|---|----------------|----|----|----|----|----|----|------|
| F              | Lead spacing                        | 5                                                                                                                                                                                                | ±1        |    |    |    |   |   |   |                |    |    |    |    |    |    |      |
| P <sub>0</sub> | Sprocket hole pitch                 | 12.7                                                                                                                                                                                             | ±0.3      |    |    |    |   |   |   |                |    |    |    |    |    |    |      |
| P <sub>1</sub> | Ordinate to adjacent component lead | 3.85                                                                                                                                                                                             | ±1        |    |    |    |   |   |   |                |    |    |    |    |    |    |      |
| P              | Device pitch                        | 12.7                                                                                                                                                                                             | ±1        |    |    |    |   |   |   |                |    |    |    |    |    |    |      |
| H <sub>0</sub> | Abscissa to plane (kinked lead)     | 16                                                                                                                                                                                               | ±0.5      |    |    |    |   |   |   |                |    |    |    |    |    |    |      |
| H <sub>1</sub> | Abscissa to top                     | <table><tr><td>D*</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>H<sub>1</sub></td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td></tr></table> | D*        | 3  | 4  | 5  | 6 | 7 | 8 | H <sub>1</sub> | 24 | 25 | 26 | 27 | 28 | 29 | Max. |
| D*             | 3                                   | 4                                                                                                                                                                                                | 5         | 6  | 7  | 8  |   |   |   |                |    |    |    |    |    |    |      |
| H <sub>1</sub> | 24                                  | 25                                                                                                                                                                                               | 26        | 27 | 28 | 29 |   |   |   |                |    |    |    |    |    |    |      |
| W              | Carrier tape width                  | 18                                                                                                                                                                                               | ±1        |    |    |    |   |   |   |                |    |    |    |    |    |    |      |
| W <sub>0</sub> | Hold-down tape width                | 12                                                                                                                                                                                               | ±1        |    |    |    |   |   |   |                |    |    |    |    |    |    |      |
| W <sub>1</sub> | Sprocket hole position              | 9                                                                                                                                                                                                | ±1        |    |    |    |   |   |   |                |    |    |    |    |    |    |      |
| W <sub>2</sub> | Top distance between tape edges     | 3                                                                                                                                                                                                | Max.      |    |    |    |   |   |   |                |    |    |    |    |    |    |      |
| △P             | Body tape plane deviation           | 1                                                                                                                                                                                                | Max.      |    |    |    |   |   |   |                |    |    |    |    |    |    |      |
| △h             | Body lateral deviation              | 2                                                                                                                                                                                                | Max.      |    |    |    |   |   |   |                |    |    |    |    |    |    |      |
| L <sub>1</sub> | Lead protrusion                     | 0.5                                                                                                                                                                                              | Max.      |    |    |    |   |   |   |                |    |    |    |    |    |    |      |
| D <sub>0</sub> | Sprocket hole diameter              | 4                                                                                                                                                                                                | ±0.2      |    |    |    |   |   |   |                |    |    |    |    |    |    |      |
| T              | Tape thickness                      | 0.6                                                                                                                                                                                              | ±0.2      |    |    |    |   |   |   |                |    |    |    |    |    |    |      |

**Note:** D: Disc diameter

# CPTC Thermistor: PLA Series

## For Lighting Application



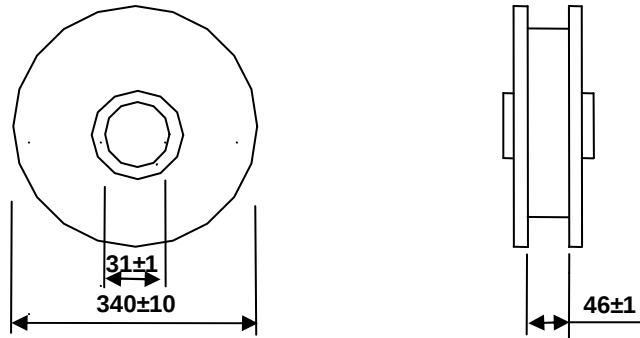
### ■ Quantity

- **Bulk Packing:**

200pcs per bag

- **Reel Packing:**

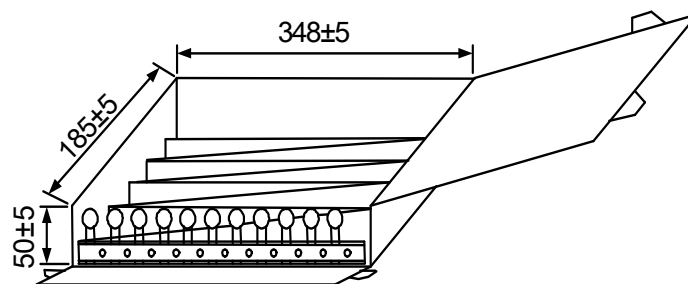
1,500pcs per reel



- **Ammo packing:**

1,000pcs per box

(Unit: mm)



### ■ Warehouse Storage Conditions of Products

- **Storage Conditions :**

1. Storage Temperature :  $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$
2. Relative Humidity :  $\leq 75\% \text{RH}$
3. Keep away from corrosive atmosphere and sunlight.

- **Period of Storage** : 1 year

### ■ Usage

Please keep products away from the conditions mentioned below to avoid their characteristic deterioration and failure.

1. Corrosive gas or deoxidizing gas ( $\text{Cl}_2$ ,  $\text{H}_2\text{S}$ ,  $\text{NH}_3$ ,  $\text{SO}_x$ ,  $\text{NO}_x$  etc.)
2. Place in a vacuum or put pressure
3. Salt water, oil, solvent and chemical liquid
4. Flammable gas
5. Place in splashed water, or high humidity and dewing place
6. Other places similar to any conditions mentioned above

# CPTC Thermistor: PP Series

## Overload Protection



### ■ Features

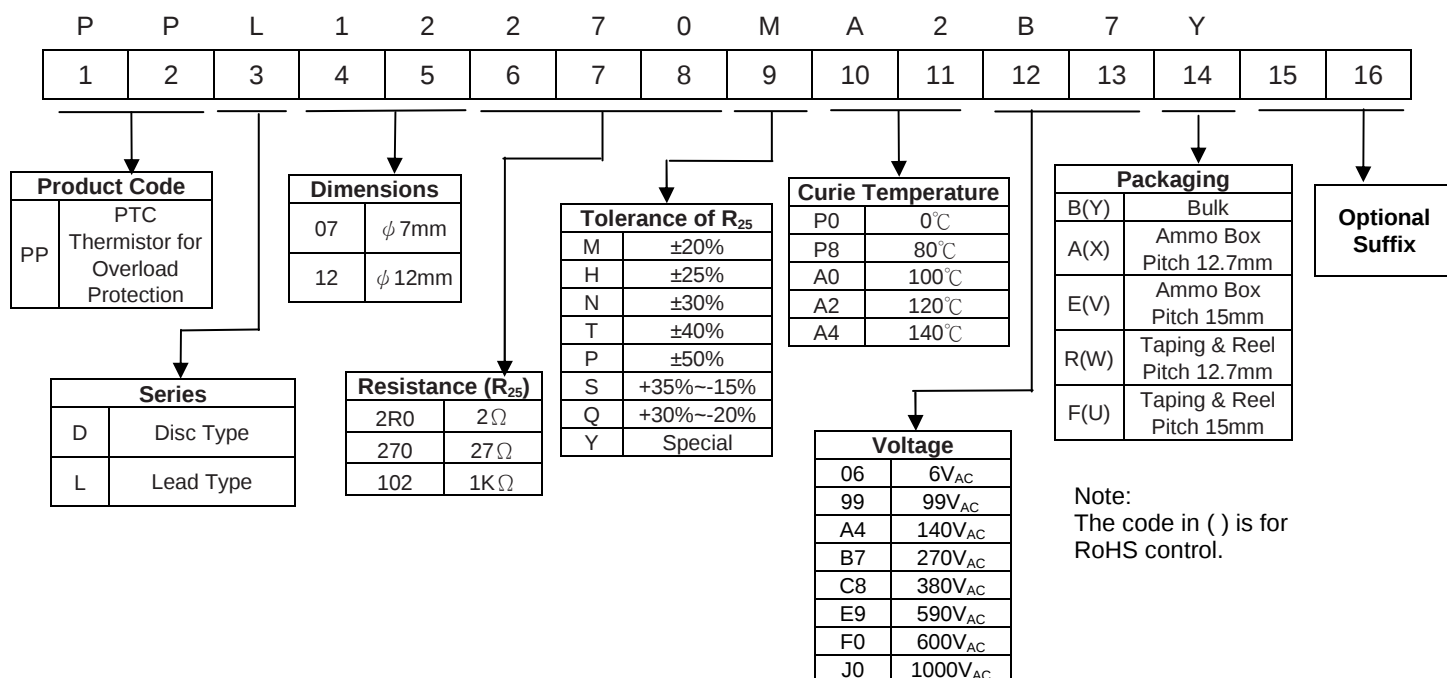
1. RoHS compliant
2. PPD type are naked
3. PPL type are leaded
4. Low, medium and high voltage ratings
5. Low resistance; Small size
6. No need to reset supply after overload
7. No noise generated
8. Stable over a long time
9. Operating temperature range : 0 ~ +60°C (V=Vmax)  
-25 ~ +125°C (V=0)
10. Agency Recognition: UL /cUL / CQC/TUV



### ■ Recommended Applications

1. Telecommunications (Program-controller)
2. Electrical equipment (Electrical machinery,Transformer)
3. Automotive electronics

### ■ Part Number Code



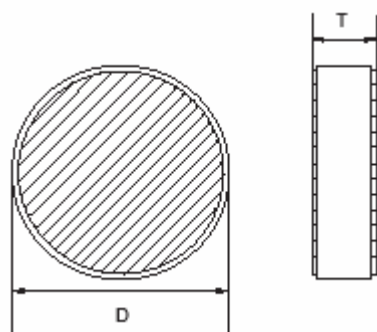
# CPTC Thermistor: PP Series

## Overload Protection



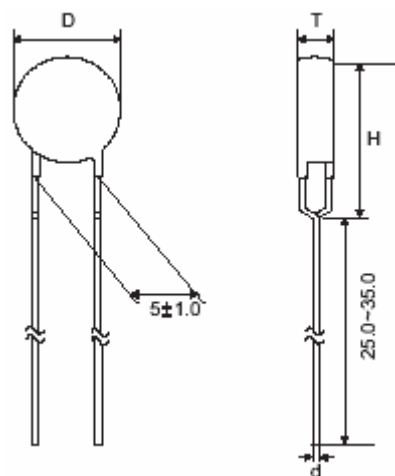
### ■ Dimensions

PPD Series



(Unit: mm)

PPL Series



(Unit: mm)

### ■ Characteristics

#### PPD Series

| Part No.      | Curie Temperature   | Nominal Zero-power Resistance | Non-operating Current at 40°C | Trip Current at 25°C | Voltage                           | Maximum Current      | Dimensions |         |
|---------------|---------------------|-------------------------------|-------------------------------|----------------------|-----------------------------------|----------------------|------------|---------|
|               | T <sub>c</sub> (°C) | R <sub>25</sub> (Ω)           | I <sub>N</sub> (mA)           | I <sub>t</sub> (mA)  | V <sub>R</sub> (V <sub>AC</sub> ) | I <sub>max</sub> (A) | D(mm)      | T(mm)   |
| PPD08120□P6B2 | 60±10               | 12                            | 80                            | 200                  | 220                               | 2                    | 8±0.5      | 1.5~2.2 |
| PPD08150□P6B2 |                     | 15                            | 80                            | 190                  | 220                               | 2                    | 8±0.5      | 1.5~2.2 |
| PPD08180□P6B2 |                     | 18                            | 80                            | 180                  | 220                               | 2                    | 8±0.5      | 1.5~2.2 |
| PPD08100□P9B2 | 90±10               | 10                            | 110                           | 250                  | 220                               | 2                    | 8±0.5      | 1.5~2.2 |
| PPD08120□P9B2 |                     | 12                            | 110                           | 250                  | 220                               | 2                    | 8±0.5      | 1.5~2.2 |
| PPD08150□P9B2 |                     | 15                            | 110                           | 240                  | 220                               | 2                    | 8±0.5      | 1.5~2.2 |
| PPD08180□P9B2 |                     | 18                            | 110                           | 240                  | 220                               | 2                    | 8±0.5      | 1.5~2.2 |
| PPD06180□A0B2 | 100±10              | 18                            | 110                           | 200                  | 220                               | 2                    | 6.5±0.5    | 1.5~2.2 |
| PPD05180□A1B2 | 110±10              | 18                            | 110                           | 200                  | 220                               | 2                    | 5.5±0.5    | 1.5~2.2 |

Note: □=Tolerance of R<sub>25</sub>

# CPTC Thermistor: PP Series

## Overload Protection



### PPL Series

#### 12V<sub>AC</sub> / 120°C

| Part No.      | Curie Temperature   | Nominal Zero-power Resistance | Non-operating Current at 25°C | Trip Current at 25°C | Voltage                           | Maximum Current      | Dimensions            |                       |             |                       | Safety Approvals |     |     |     |
|---------------|---------------------|-------------------------------|-------------------------------|----------------------|-----------------------------------|----------------------|-----------------------|-----------------------|-------------|-----------------------|------------------|-----|-----|-----|
|               | T <sub>c</sub> (°C) | R <sub>25</sub> (Ω)           | I <sub>N</sub> (mA)           | I <sub>t</sub> (mA)  | V <sub>R</sub> (V <sub>AC</sub> ) | I <sub>max</sub> (A) | D <sub>max</sub> (mm) | T <sub>max</sub> (mm) | d±0.02 (mm) | H <sub>max</sub> (mm) | UL               | cUL | CQC | TUV |
| PPL04130□A212 | 120±10              | 13                            | 120                           | 240                  | 12                                | 0.7                  | 6.5                   | 3.5                   | 0.6         | 10.5                  | ✓                | ✓   |     |     |
| PPL054R6□A212 |                     | 4.6                           | 250                           | 500                  | 12                                | 1.0                  | 7.0                   | 3.5                   | 0.6         | 10.5                  | ✓                | ✓   |     |     |
| PPL081R8□A212 |                     | 1.8                           | 450                           | 900                  | 12                                | 3.0                  | 10                    | 3.5                   | 0.6         | 13.5                  | ✓                | ✓   |     |     |
| PPL091R0□A212 |                     | 1.0                           | 410                           | 1120                 | 12                                | 3.0                  | 11                    | 3.5                   | 0.6         | 14.5                  | ✓                | ✓   |     |     |
| PPL091R4□A212 |                     | 1.4                           | 350                           | 1060                 | 12                                | 3.0                  | 11                    | 3.5                   | 0.6         | 14.5                  | ✓                | ✓   |     |     |
| PPL101R2□A212 |                     | 1.2                           | 600                           | 1200                 | 12                                | 4.3                  | 12                    | 3.5                   | 0.6         | 15.5                  | ✓                | ✓   |     |     |
| PPL120R8□A212 |                     | 0.8                           | 850                           | 1700                 | 12                                | 5.5                  | 14                    | 3.5                   | 0.6         | 17.5                  | ✓                | ✓   |     |     |
| PPL140R4□A212 |                     | 0.4                           | 950                           | 2700                 | 12                                | 5.0                  | 16                    | 3.5                   | 0.6         | 19.5                  | ✓                | ✓   |     |     |
| PPL140R5□A212 |                     | 0.5                           | 870                           | 2450                 | 12                                | 5.0                  | 16                    | 3.5                   | 0.6         | 19.5                  | ✓                | ✓   |     |     |
| PPL140R9□A212 |                     | 0.9                           | 430                           | 1210                 | 12                                | 5.0                  | 16                    | 3.5                   | 0.6         | 19.5                  | ✓                | ✓   |     |     |
| PPL160R5□A212 |                     | 0.5                           | 1300                          | 2600                 | 12                                | 8.0                  | 17.5                  | 5.0                   | 0.6         | 21.5                  | ✓                | ✓   |     |     |
| PPL200R3□A212 |                     | 0.3                           | 1800                          | 3600                 | 12                                | 10.0                 | 22                    | 5.0                   | 0.6         | 25.5                  | ✓                | ✓   |     |     |

#### 24V<sub>AC</sub> / 80°C

| Part No.      | Curie Temperature   | Nominal Zero-power Resistance | Non-operating Current at 25°C | Trip Current at 25°C | Voltage                           | Maximum Current      | Dimensions            |                       |             |                       | Safety Approvals |     |     |     |
|---------------|---------------------|-------------------------------|-------------------------------|----------------------|-----------------------------------|----------------------|-----------------------|-----------------------|-------------|-----------------------|------------------|-----|-----|-----|
|               | T <sub>c</sub> (°C) | R <sub>25</sub> (Ω)           | I <sub>N</sub> (mA)           | I <sub>t</sub> (mA)  | V <sub>R</sub> (V <sub>AC</sub> ) | I <sub>max</sub> (A) | D <sub>max</sub> (mm) | T <sub>max</sub> (mm) | d±0.02 (mm) | H <sub>max</sub> (mm) | UL               | cUL | CQC | TUV |
| PPL077R0□P824 | 80±10               | 7.0                           | 90                            | 360                  | 24                                | 2.0                  | 9.0                   | 3.5                   | 0.6         | 12.5                  | ✓                | ✓   | ✓   | ✓   |
| PPL07100□P824 |                     | 10                            | 80                            | 330                  | 24                                | 2.0                  | 9.0                   | 3.5                   | 0.6         | 12.5                  | ✓                | ✓   | ✓   | ✓   |
| PPL083R0□P824 |                     | 3.0                           | 145                           | 570                  | 24                                | 2.0                  | 10                    | 3.5                   | 0.6         | 13.5                  | ✓                | ✓   | ✓   | ✓   |
| PPL092R0□P824 |                     | 2.0                           | 185                           | 720                  | 24                                | 2.0                  | 11                    | 3.5                   | 0.6         | 14.5                  | ✓                | ✓   | ✓   | ✓   |

#### 24V<sub>AC</sub> / 120°C

| Part No.      | Curie Temperature   | Nominal Zero-power Resistance | Non-operating Current at 25°C | Trip Current at 25°C | Voltage                           | Maximum Current      | Dimensions            |                       |             |                       | Safety Approvals |     |     |     |
|---------------|---------------------|-------------------------------|-------------------------------|----------------------|-----------------------------------|----------------------|-----------------------|-----------------------|-------------|-----------------------|------------------|-----|-----|-----|
|               | T <sub>c</sub> (°C) | R <sub>25</sub> (Ω)           | I <sub>N</sub> (mA)           | I <sub>t</sub> (mA)  | V <sub>R</sub> (V <sub>AC</sub> ) | I <sub>max</sub> (A) | D <sub>max</sub> (mm) | T <sub>max</sub> (mm) | d±0.02 (mm) | H <sub>max</sub> (mm) | UL               | cUL | CQC | TUV |
| PPL084R7□A224 | 120±10              | 4.7                           | 295                           | 700                  | 24                                | 3.5                  | 10                    | 3.5                   | 0.6         | 13.5                  | ✓                | ✓   | ✓   | ✓   |
| PPL103R9□A224 |                     | 3.9                           | 340                           | 800                  | 24                                | 4.3                  | 12                    | 3.5                   | 0.6         | 15.5                  | ✓                | ✓   | ✓   | ✓   |
| PPL143R3□A224 |                     | 3.3                           | 420                           | 980                  | 24                                | 5.0                  | 16                    | 3.5                   | 0.6         | 19.5                  | ✓                | ✓   | ✓   | ✓   |

# CPTC Thermistor: PP Series

## Overload Protection



24V<sub>AC</sub>/ 140°C

| Part No.      | Curie Temperature   | Nominal Zero-power Resistance | Non-operating Current at 25°C | Trip Current at 25°C | Voltage                           | Maximum Current      | Dimensions            |                       |             |                       | Safety Approvals |     |     |     |
|---------------|---------------------|-------------------------------|-------------------------------|----------------------|-----------------------------------|----------------------|-----------------------|-----------------------|-------------|-----------------------|------------------|-----|-----|-----|
|               | T <sub>c</sub> (°C) | R <sub>25</sub> (Ω)           | I <sub>N</sub> (mA)           | I <sub>t</sub> (mA)  | V <sub>R</sub> (V <sub>AC</sub> ) | I <sub>max</sub> (A) | D <sub>max</sub> (mm) | T <sub>max</sub> (mm) | d±0.02 (mm) | H <sub>max</sub> (mm) | UL               | cUL | CQC | TUV |
| PPL056R0□A424 | 140±10              | 6.0                           | 270                           | 540                  | 24                                | 2.5                  | 7.0                   | 5.0                   | 0.6         | 10.5                  | ✓                | ✓   |     |     |
| PPL05130□A424 |                     | 13                            | 180                           | 360                  | 24                                | 1.7                  | 7.0                   | 5.0                   | 0.6         | 10.5                  | ✓                | ✓   |     |     |
| PPL073R0□A424 |                     | 3.0                           | 410                           | 820                  | 24                                | 4.5                  | 9.0                   | 5.0                   | 0.6         | 12.5                  | ✓                | ✓   |     |     |
| PPL075R0□A424 |                     | 5.0                           | 320                           | 640                  | 24                                | 3.5                  | 9.0                   | 5.0                   | 0.6         | 12.5                  | ✓                | ✓   |     |     |
| PPL081R9□A424 |                     | 1.9                           | 540                           | 1080                 | 24                                | 6.0                  | 10                    | 5.0                   | 0.6         | 13.5                  | ✓                | ✓   |     |     |
| PPL082R5□A424 |                     | 2.5                           | 470                           | 940                  | 24                                | 5.0                  | 10                    | 5.0                   | 0.6         | 13.5                  | ✓                | ✓   |     |     |
| PPL101R3□A424 |                     | 1.3                           | 700                           | 1400                 | 24                                | 8.0                  | 12                    | 5.0                   | 0.6         | 15.5                  | ✓                | ✓   |     |     |
| PPL101R7□A424 |                     | 1.7                           | 610                           | 1220                 | 24                                | 7.0                  | 12                    | 5.0                   | 0.6         | 15.5                  | ✓                | ✓   |     |     |
| PPL120R9□A424 |                     | 0.9                           | 920                           | 1840                 | 24                                | 11.0                 | 14                    | 5.0                   | 0.6         | 17.5                  | ✓                | ✓   |     |     |
| PPL121R1□A424 |                     | 1.1                           | 830                           | 1660                 | 24                                | 10.0                 | 14                    | 5.0                   | 0.6         | 17.5                  | ✓                | ✓   |     |     |
| PPL160R5□A424 |                     | 0.5                           | 1390                          | 2780                 | 24                                | 16.0                 | 17.5                  | 5.0                   | 0.6         | 21.5                  | ✓                | ✓   |     |     |
| PPL160R7□A424 |                     | 0.7                           | 1170                          | 2340                 | 24                                | 13.5                 | 17.5                  | 5.0                   | 0.6         | 21.5                  | ✓                | ✓   |     |     |
| PPL200R3□A424 |                     | 0.3                           | 2050                          | 4100                 | 24                                | 23.0                 | 22                    | 5.0                   | 0.6         | 25.5                  | ✓                | ✓   |     |     |
| PPL200R4□A424 |                     | 0.4                           | 1770                          | 3540                 | 24                                | 20.0                 | 22                    | 5.0                   | 0.6         | 25.5                  | ✓                | ✓   |     |     |

42V<sub>AC</sub>/ 80°C

| Part No.      | Curie Temperature   | Nominal Zero-power Resistance | Non-operating Current at 25°C | Trip Current at 25°C | Voltage                           | Maximum Current      | Dimensions            |                       |             |                       | Safety Approvals |     |     |     |
|---------------|---------------------|-------------------------------|-------------------------------|----------------------|-----------------------------------|----------------------|-----------------------|-----------------------|-------------|-----------------------|------------------|-----|-----|-----|
|               | T <sub>c</sub> (°C) | R <sub>25</sub> (Ω)           | I <sub>N</sub> (mA)           | I <sub>t</sub> (mA)  | V <sub>R</sub> (V <sub>AC</sub> ) | I <sub>max</sub> (A) | D <sub>max</sub> (mm) | T <sub>max</sub> (mm) | d±0.02 (mm) | H <sub>max</sub> (mm) | UL               | cUL | CQC | TUV |
| PPL06150□P842 | 80±10               | 15                            | 60                            | 230                  | 42                                | 1.5                  | 8.0                   | 4.0                   | 0.6         | 11.5                  | ✓                | ✓   | ✓   | ✓   |
| PPL06220□P842 |                     | 22                            | 45                            | 220                  | 42                                | 1.1                  | 8.0                   | 4.0                   | 0.6         | 11.5                  | ✓                | ✓   | ✓   | ✓   |
| PPL06330□P842 |                     | 33                            | 40                            | 180                  | 42                                | 0.9                  | 8.0                   | 4.0                   | 0.6         | 11.5                  | ✓                | ✓   | ✓   | ✓   |
| PPL06470□P842 |                     | 47                            | 35                            | 150                  | 42                                | 0.7                  | 8.0                   | 4.0                   | 0.6         | 11.5                  | ✓                | ✓   | ✓   | ✓   |
| PPL06560□P842 |                     | 56                            | 30                            | 140                  | 42                                | 0.7                  | 8.0                   | 4.0                   | 0.6         | 11.5                  | ✓                | ✓   | ✓   | ✓   |

42V<sub>AC</sub>/ 160°C

| Part No.      | Curie Temperature   | Nominal Zero-power Resistance | Non-operating Current at 25°C | Trip Current at 25°C | Voltage                           | Maximum Current      | Dimensions            |                       |             |                       | Safety Approvals |     |     |     |
|---------------|---------------------|-------------------------------|-------------------------------|----------------------|-----------------------------------|----------------------|-----------------------|-----------------------|-------------|-----------------------|------------------|-----|-----|-----|
|               | T <sub>c</sub> (°C) | R <sub>25</sub> (Ω)           | I <sub>N</sub> (mA)           | I <sub>t</sub> (mA)  | V <sub>R</sub> (V <sub>AC</sub> ) | I <sub>max</sub> (A) | D <sub>max</sub> (mm) | T <sub>max</sub> (mm) | d±0.02 (mm) | H <sub>max</sub> (mm) | UL               | cUL | CQC | TUV |
| PPL03510□A642 | 160±10              | 51                            | 55                            | 165                  | 42                                | 0.6                  | 5.0                   | 4.0                   | 0.5         | 8.5                   |                  |     |     |     |
| PPL05240□A642 |                     | 24                            | 95                            | 285                  | 42                                | 1.0                  | 7.0                   | 4.0                   | 0.6         | 10.5                  |                  |     |     |     |
| PPL089R1□A642 |                     | 9.1                           | 175                           | 525                  | 42                                | 3.0                  | 10                    | 4.0                   | 0.6         | 13.5                  |                  |     |     |     |
| PPL095R1□A642 |                     | 5.1                           | 290                           | 870                  | 42                                | 4.5                  | 11                    | 4.0                   | 0.6         | 14.5                  |                  |     |     |     |
| PPL113R6□A642 |                     | 3.6                           | 360                           | 1080                 | 42                                | 5.0                  | 13.5                  | 4.0                   | 0.6         | 16.5                  |                  |     |     |     |

# CPTC Thermistor: PP Series

## Overload Protection



**48V<sub>AC</sub>/ 120°C**

| Part No.      | Curie Temperature   | Nominal Zero-power Resistance | Non-operating Current at 25°C | Trip Current at 25°C | Voltage                           | Maximum Current      | Dimensions            |                       |             |                       | Safety Approvals |     |     |     |
|---------------|---------------------|-------------------------------|-------------------------------|----------------------|-----------------------------------|----------------------|-----------------------|-----------------------|-------------|-----------------------|------------------|-----|-----|-----|
|               | T <sub>c</sub> (°C) | R <sub>25</sub> (Ω)           | I <sub>N</sub> (mA)           | I <sub>t</sub> (mA)  | V <sub>R</sub> (V <sub>AC</sub> ) | I <sub>max</sub> (A) | D <sub>max</sub> (mm) | T <sub>max</sub> (mm) | d±0.02 (mm) | H <sub>max</sub> (mm) | UL               | cUL | CQC | TUV |
| PPL04420□A248 | 120±10              | 42                            | 105                           | 210                  | 48                                | 0.75                 | 6.5                   | 5.0                   | 0.6         | 10.5                  | ✓                | ✓   |     |     |
| PPL04600□A248 |                     | 60                            | 90                            | 180                  | 48                                | 0.6                  | 6.5                   | 5.0                   | 0.6         | 10.5                  | ✓                | ✓   |     |     |
| PPL04900□A248 |                     | 90                            | 70                            | 140                  | 48                                | 0.46                 | 6.5                   | 5.0                   | 0.6         | 10.5                  | ✓                | ✓   |     |     |
| PPL06220□A248 |                     | 22                            | 155                           | 310                  | 48                                | 1.3                  | 8.0                   | 5.0                   | 0.6         | 11.5                  | ✓                | ✓   |     |     |
| PPL06320□A248 |                     | 32                            | 130                           | 260                  | 48                                | 0.95                 | 8.0                   | 5.0                   | 0.6         | 11.5                  | ✓                | ✓   |     |     |
| PPL08180□A248 |                     | 18                            | 195                           | 390                  | 48                                | 1.6                  | 10                    | 5.0                   | 0.6         | 13.5                  | ✓                | ✓   |     |     |
| PPL10120□A248 |                     | 12                            | 230                           | 460                  | 48                                | 2.2                  | 12                    | 5.0                   | 0.6         | 15.5                  | ✓                | ✓   |     |     |
| PPL126R5□A248 |                     | 6.5                           | 350                           | 700                  | 48                                | 4.0                  | 14                    | 5.0                   | 0.6         | 17.5                  | ✓                | ✓   |     |     |
| PPL129R0□A248 |                     | 9.0                           | 285                           | 570                  | 48                                | 2.9                  | 14                    | 5.0                   | 0.6         | 17.5                  | ✓                | ✓   |     |     |
| PPL134R3□A248 |                     | 4.3                           | 425                           | 850                  | 48                                | 6.3                  | 15                    | 5.0                   | 0.6         | 18.5                  | ✓                | ✓   |     |     |
| PPL162R6□A248 |                     | 2.6                           | 605                           | 1210                 | 48                                | 12                   | 17.5                  | 5.0                   | 0.6         | 21.5                  | ✓                | ✓   |     |     |
| PPL163R8□A248 |                     | 3.8                           | 505                           | 1010                 | 48                                | 7.3                  | 17.5                  | 5.0                   | 0.6         | 21.5                  | ✓                | ✓   |     |     |
| PPL201R6□A248 |                     | 1.6                           | 870                           | 1750                 | 48                                | 18                   | 22                    | 5.0                   | 0.6         | 25.5                  | ✓                | ✓   |     |     |
| PPL202R2□A248 |                     | 2.2                           | 725                           | 1450                 | 48                                | 14                   | 22                    | 5.0                   | 0.6         | 25.5                  | ✓                | ✓   |     |     |

**48V<sub>AC</sub>/ 140°C**

| Part No.      | Curie Temperature   | Nominal Zero-power Resistance | Non-operating Current at 25°C | Trip Current at 25°C | Voltage                           | Maximum Current      | Dimensions            |                       |             |                       | Safety Approvals |     |     |     |
|---------------|---------------------|-------------------------------|-------------------------------|----------------------|-----------------------------------|----------------------|-----------------------|-----------------------|-------------|-----------------------|------------------|-----|-----|-----|
|               | T <sub>c</sub> (°C) | R <sub>25</sub> (Ω)           | I <sub>N</sub> (mA)           | I <sub>t</sub> (mA)  | V <sub>R</sub> (V <sub>AC</sub> ) | I <sub>max</sub> (A) | D <sub>max</sub> (mm) | T <sub>max</sub> (mm) | d±0.02 (mm) | H <sub>max</sub> (mm) | UL               | cUL | CQC | TUV |
| PPL05250□A448 | 140±10              | 25                            | 130                           | 260                  | 48                                | 1.2                  | 7.0                   | 5.0                   | 0.6         | 10.5                  | ✓                | ✓   |     |     |
| PPL05500□A448 |                     | 50                            | 94                            | 188                  | 48                                | 0.8                  | 7.0                   | 5.0                   | 0.6         | 10.5                  | ✓                | ✓   |     |     |

**63V<sub>AC</sub>/ 120°C**

| Part No.      | Curie Temperature   | Nominal Zero-power Resistance | Non-operating Current at 25°C | Trip Current at 25°C | Voltage                           | Maximum Current      | Dimensions            |                       |             |                       | Safety Approvals |     |     |     |
|---------------|---------------------|-------------------------------|-------------------------------|----------------------|-----------------------------------|----------------------|-----------------------|-----------------------|-------------|-----------------------|------------------|-----|-----|-----|
|               | T <sub>c</sub> (°C) | R <sub>25</sub> (Ω)           | I <sub>N</sub> (mA)           | I <sub>t</sub> (mA)  | V <sub>R</sub> (V <sub>AC</sub> ) | I <sub>max</sub> (A) | D <sub>max</sub> (mm) | T <sub>max</sub> (mm) | d±0.02 (mm) | H <sub>max</sub> (mm) | UL               | cUL | CQC | TUV |
| PPL03510□A263 | 120±10              | 51                            | 55                            | 165                  | 63                                | 0.7                  | 5.0                   | 4.0                   | 0.5         | 8.5                   | ✓                | ✓   | ✓   | ✓   |
| PPL05240□A263 |                     | 24                            | 90                            | 270                  | 63                                | 1.0                  | 7.0                   | 4.0                   | 0.6         | 10.5                  | ✓                | ✓   | ✓   | ✓   |
| PPL089R1□A263 |                     | 9.1                           | 160                           | 480                  | 63                                | 3.0                  | 10                    | 4.0                   | 0.6         | 13.5                  | ✓                | ✓   | ✓   | ✓   |
| PPL095R1□A263 |                     | 5.1                           | 280                           | 850                  | 63                                | 4.5                  | 11                    | 4.0                   | 0.6         | 14.5                  | ✓                | ✓   | ✓   | ✓   |
| PPL113R6□A263 |                     | 3.6                           | 320                           | 960                  | 63                                | 5.0                  | 13.5                  | 4.0                   | 0.6         | 16.5                  | ✓                | ✓   | ✓   | ✓   |
| PPL152R4□A263 |                     | 2.4                           | 460                           | 1400                 | 63                                | 7.5                  | 17.5                  | 4.0                   | 0.6         | 21.5                  | ✓                | ✓   | ✓   | ✓   |
| PPL201R7□A263 |                     | 1.7                           | 700                           | 1400                 | 63                                | 10                   | 22                    | 5.0                   | 0.6         | 25.5                  | ✓                | ✓   |     |     |

# CPTC Thermistor: PP Series

## Overload Protection



**63V<sub>AC</sub>/ 130°C**

| Part No.      | Curie Temperature   | Nominal Zero-power Resistance | Non-operating Current at 25°C | Trip Current at 25°C | Voltage                           | Maximum Current      | Dimensions            |                       |             |                       | Safety Approvals |     |     |     |
|---------------|---------------------|-------------------------------|-------------------------------|----------------------|-----------------------------------|----------------------|-----------------------|-----------------------|-------------|-----------------------|------------------|-----|-----|-----|
|               | T <sub>c</sub> (°C) | R <sub>25</sub> (Ω)           | I <sub>N</sub> (mA)           | I <sub>t</sub> (mA)  | V <sub>R</sub> (V <sub>AC</sub> ) | I <sub>max</sub> (A) | D <sub>max</sub> (mm) | T <sub>max</sub> (mm) | d±0.02 (mm) | H <sub>max</sub> (mm) | UL               | cUL | CQC | TUV |
| PPL04620□A363 | 130±10              | 62                            | 85                            | 130                  | 63                                | 0.7                  | 6.5                   | 5.0                   | 0.6         | 10.5                  | √                | √   |     |     |
| PPL05200□A363 |                     | 20                            | 150                           | 240                  | 63                                | 1.0                  | 7.0                   | 5.0                   | 0.6         | 10.5                  | √                | √   |     |     |
| PPL088R0□A363 |                     | 8.0                           | 250                           | 380                  | 63                                | 3.0                  | 10                    | 5.0                   | 0.6         | 13.5                  | √                | √   |     |     |
| PPL104R9□A363 |                     | 4.9                           | 320                           | 500                  | 63                                | 4.3                  | 12                    | 5.0                   | 0.6         | 15.5                  | √                | √   |     |     |
| PPL123R3□A363 |                     | 3.3                           | 450                           | 690                  | 63                                | 5.5                  | 14                    | 5.0                   | 0.6         | 17.5                  | √                | √   |     |     |
| PPL162R2□A363 |                     | 2.2                           | 700                           | 1100                 | 63                                | 8.0                  | 17.5                  | 5.0                   | 0.6         | 21.5                  | √                | √   |     |     |
| PPL201R2□A363 |                     | 1.2                           | 1000                          | 1500                 | 63                                | 10.0                 | 22                    | 5.0                   | 0.6         | 25.5                  | √                | √   |     |     |

**110V<sub>AC</sub>/ 120°C**

| Part No.      | Curie Temperature   | Nominal Zero-power Resistance | Non-operating Current at 25°C | Trip Current at 25°C | Voltage                           | Maximum Current      | Dimensions            |                       |             |                       | Safety Approvals |     |     |     |
|---------------|---------------------|-------------------------------|-------------------------------|----------------------|-----------------------------------|----------------------|-----------------------|-----------------------|-------------|-----------------------|------------------|-----|-----|-----|
|               | T <sub>c</sub> (°C) | R <sub>25</sub> (Ω)           | I <sub>N</sub> (mA)           | I <sub>t</sub> (mA)  | V <sub>R</sub> (V <sub>AC</sub> ) | I <sub>max</sub> (A) | D <sub>max</sub> (mm) | T <sub>max</sub> (mm) | d±0.02 (mm) | H <sub>max</sub> (mm) | UL               | cUL | CQC | TUV |
| PPL126R8□A2A1 | 120±10              | 6.8                           | 290                           | 660                  | 110                               | 1.0                  | 14                    | 4.5                   | 0.6         | 17.5                  | √                | √   |     |     |
| PPL12100□A2A1 |                     | 10                            | 220                           | 500                  | 110                               | 1.0                  | 14                    | 4.5                   | 0.6         | 17.5                  | √                | √   |     |     |
| PPL164R7□A2A1 |                     | 4.7                           | 390                           | 900                  | 110                               | 2.0                  | 17.5                  | 5.0                   | 0.6         | 21.5                  | √                | √   |     |     |

**110V<sub>AC</sub>/ 140°C**

| Part No.      | Curie Temperature   | Nominal Zero-power Resistance | Non-operating Current at 25°C | Trip Current at 25°C | Voltage                           | Maximum Current      | Dimensions            |                       |             |                       | Safety Approvals |     |     |     |
|---------------|---------------------|-------------------------------|-------------------------------|----------------------|-----------------------------------|----------------------|-----------------------|-----------------------|-------------|-----------------------|------------------|-----|-----|-----|
|               | T <sub>c</sub> (°C) | R <sub>25</sub> (Ω)           | I <sub>N</sub> (mA)           | I <sub>t</sub> (mA)  | V <sub>R</sub> (V <sub>AC</sub> ) | I <sub>max</sub> (A) | D <sub>max</sub> (mm) | T <sub>max</sub> (mm) | d±0.02 (mm) | H <sub>max</sub> (mm) | UL               | cUL | CQC | TUV |
| PPL05280□A4A1 | 140±10              | 28                            | 130                           | 260                  | 110                               | 0.6                  | 7.0                   | 5.0                   | 0.6         | 10.5                  |                  |     |     |     |
| PPL05400□A4A1 |                     | 40                            | 110                           | 220                  | 110                               | 0.5                  | 7.0                   | 5.0                   | 0.6         | 10.5                  |                  |     |     |     |
| PPL05550□A4A1 |                     | 55                            | 93                            | 186                  | 110                               | 0.45                 | 7.0                   | 5.0                   | 0.6         | 10.5                  |                  |     |     |     |
| PPL05121□A4A1 |                     | 120                           | 65                            | 130                  | 110                               | 0.3                  | 7.0                   | 5.0                   | 0.6         | 10.5                  |                  |     |     |     |
| PPL05241□A4A1 |                     | 240                           | 47                            | 94                   | 110                               | 0.2                  | 7.0                   | 5.0                   | 0.6         | 10.5                  | √                | √   |     |     |
| PPL07120□A4A1 |                     | 12                            | 210                           | 420                  | 110                               | 1.4                  | 9.0                   | 5.0                   | 0.6         | 12.5                  |                  |     |     |     |
| PPL07190□A4A1 |                     | 19                            | 170                           | 340                  | 110                               | 1.0                  | 9.0                   | 5.0                   | 0.6         | 12.5                  |                  |     |     |     |
| PPL088R0□A4A1 |                     | 8.0                           | 270                           | 540                  | 110                               | 2.2                  | 10                    | 5.0                   | 0.6         | 13.5                  |                  |     |     |     |
| PPL089R4□A4A1 |                     | 9.4                           | 250                           | 500                  | 110                               | 2.0                  | 10                    | 5.0                   | 0.6         | 13.5                  |                  |     |     |     |
| PPL105R3□A4A1 |                     | 5.3                           | 360                           | 720                  | 110                               | 3.5                  | 12                    | 5.0                   | 0.6         | 15.5                  |                  |     |     |     |
| PPL106R7□A4A1 |                     | 6.7                           | 320                           | 640                  | 110                               | 3.0                  | 12                    | 5.0                   | 0.6         | 15.5                  |                  |     |     |     |
| PPL123R8□A4A1 |                     | 3.8                           | 450                           | 900                  | 110                               | 5.0                  | 14                    | 5.0                   | 0.6         | 17.5                  |                  |     |     |     |
| PPL124R6□A4A1 |                     | 4.6                           | 410                           | 820                  | 110                               | 4.5                  | 14                    | 5.0                   | 0.6         | 17.5                  |                  |     |     |     |
| PPL162R1□A4A1 |                     | 2.1                           | 710                           | 1420                 | 110                               | 8.5                  | 17.5                  | 5.0                   | 0.6         | 21.5                  |                  |     |     |     |
| PPL162R9□A4A1 |                     | 2.9                           | 600                           | 1200                 | 110                               | 7.2                  | 17.5                  | 5.0                   | 0.6         | 21.5                  |                  |     |     |     |
| PPL201R3□A4A1 |                     | 1.3                           | 1000                          | 2000                 | 110                               | 13                   | 22                    | 5.0                   | 0.6         | 25.5                  |                  |     |     |     |
| PPL201R7□A4A1 |                     | 1.7                           | 880                           | 1760                 | 110                               | 11                   | 22                    | 5.0                   | 0.6         | 25.5                  |                  |     |     |     |

# CPTC Thermistor: PP Series

## Overload Protection



220V<sub>AC</sub>/ 80°C

| Part No.      | Curie Temperature   | Nominal Zero-power Resistance | Non-operating Current at 25°C | Trip Current at 25°C | Voltage                           | Maximum Current      | Dimensions            |                       |             |                       | Safety Approvals |     |     |     |
|---------------|---------------------|-------------------------------|-------------------------------|----------------------|-----------------------------------|----------------------|-----------------------|-----------------------|-------------|-----------------------|------------------|-----|-----|-----|
|               | T <sub>c</sub> (°C) | R <sub>25</sub> (Ω)           | I <sub>N</sub> (mA)           | I <sub>t</sub> (mA)  | V <sub>R</sub> (V <sub>AC</sub> ) | I <sub>max</sub> (A) | D <sub>max</sub> (mm) | T <sub>max</sub> (mm) | d±0.02 (mm) | H <sub>max</sub> (mm) | UL               | cUL | CQC | TUV |
| PPL03151□P8B2 | 80±10               | 150                           | 15                            | 60                   | 220                               | 0.3                  | 5.0                   | 5.0                   | 0.5         | 8.5                   | √                | √   | √   | √   |
| PPL05680□P8B2 |                     | 68                            | 35                            | 110                  | 220                               | 0.5                  | 7.0                   | 5.0                   | 0.6         | 10.5                  | √                | √   | √   | √   |
| PPL07360□P8B2 |                     | 36                            | 45                            | 180                  | 220                               | 0.7                  | 9.0                   | 5.0                   | 0.6         | 12.5                  | √                | √   | √   | √   |
| PPL08220□P8B2 |                     | 22                            | 65                            | 195                  | 220                               | 1.2                  | 10                    | 5.0                   | 0.6         | 13.5                  | √                | √   | √   | √   |
| PPL09150□P8B2 |                     | 15                            | 90                            | 270                  | 220                               | 1.5                  | 11                    | 5.0                   | 0.6         | 14.5                  | √                | √   | √   | √   |
| PPL09180□P8B2 |                     | 18                            | 75                            | 225                  | 220                               | 1.3                  | 11                    | 5.0                   | 0.6         | 14.5                  | √                | √   | √   | √   |
| PPL11100□P8B2 |                     | 10                            | 120                           | 360                  | 220                               | 2.3                  | 13.5                  | 5.0                   | 0.6         | 16.5                  | √                | √   | √   | √   |
| PPL155R6□P8B2 |                     | 5.6                           | 180                           | 540                  | 220                               | 4.5                  | 17.5                  | 5.0                   | 0.6         | 21.5                  | √                | √   | √   | √   |
| PPL203R9□P8B2 |                     | 3.9                           | 240                           | 720                  | 220                               | 7.0                  | 22                    | 5.0                   | 0.6         | 25.5                  | √                | √   | √   | √   |
| PPL242R7□P8B2 |                     | 2.7                           | 350                           | 1050                 | 220                               | 9.5                  | 26                    | 5.0                   | 0.8         | 29.5                  |                  |     |     |     |

# CPTC Thermistor: PP Series

## Overload Protection



220V<sub>AC</sub>/ 120°C

| Part No.      | Curie Temperature   | Nominal Zero-power Resistance | Non-operating Current at 25°C | Trip Current at 25°C | Voltage                           | Maximum Current      | Dimensions            |                       |             |                       | Safety Approvals |     |     |     |
|---------------|---------------------|-------------------------------|-------------------------------|----------------------|-----------------------------------|----------------------|-----------------------|-----------------------|-------------|-----------------------|------------------|-----|-----|-----|
|               | T <sub>c</sub> (°C) | R <sub>25</sub> (Ω)           | I <sub>N</sub> (mA)           | I <sub>t</sub> (mA)  | V <sub>R</sub> (V <sub>AC</sub> ) | I <sub>max</sub> (A) | D <sub>max</sub> (mm) | T <sub>max</sub> (mm) | d±0.02 (mm) | H <sub>max</sub> (mm) | UL               | cUL | CQC | TUV |
| PPL03151□A2B2 | 120±10              | 150                           | 30                            | 90                   | 220                               | 0.3                  | 5.0                   | 5.0                   | 0.5         | 8.5                   | ✓                | ✓   | ✓   | ✓   |
| PPL03302□A2B2 |                     | 3000                          | 9                             | 18                   | 220                               | 0.2                  | 5.0                   | 5.0                   | 0.5         | 8.5                   | ✓                | ✓   |     |     |
| PPL04381□A2B2 |                     | 380                           | 35                            | 70                   | 220                               | 0.25                 | 6.5                   | 5.0                   | 0.6         | 10.5                  | ✓                | ✓   |     |     |
| PPL04561□A2B2 |                     | 560                           | 30                            | 60                   | 220                               | 0.2                  | 6.5                   | 5.0                   | 0.6         | 10.5                  | ✓                | ✓   |     |     |
| PPL04851□A2B2 |                     | 850                           | 25                            | 50                   | 220                               | 0.16                 | 6.5                   | 5.0                   | 0.6         | 10.5                  | ✓                | ✓   |     |     |
| PPL04122□A2B2 |                     | 1200                          | 20                            | 40                   | 220                               | 0.13                 | 6.5                   | 5.0                   | 0.6         | 10.5                  | ✓                | ✓   |     |     |
| PPL04192□A2B2 |                     | 1900                          | 15                            | 30                   | 220                               | 0.11                 | 6.5                   | 5.0                   | 0.6         | 10.5                  | ✓                | ✓   |     |     |
| PPL05750□A2B2 |                     | 75                            | 50                            | 150                  | 220                               | 0.5                  | 7.0                   | 5.0                   | 0.6         | 10.5                  | ✓                | ✓   | ✓   | ✓   |
| PPL05181□A2B2 |                     | 180                           | 29                            | 70                   | 220                               | 0.3                  | 7.0                   | 5.0                   | 0.6         | 10.5                  | ✓                | ✓   |     |     |
| PPL06121□A2B2 |                     | 120                           | 35                            | 100                  | 220                               | 0.4                  | 8.0                   | 5.0                   | 0.6         | 11.5                  | ✓                | ✓   | ✓   | ✓   |
| PPL06201□A2B2 |                     | 200                           | 50                            | 100                  | 220                               | 0.35                 | 8.0                   | 5.0                   | 0.6         | 11.5                  | ✓                | ✓   |     |     |
| PPL06281□A2B2 |                     | 280                           | 45                            | 90                   | 220                               | 0.29                 | 8.0                   | 5.0                   | 0.6         | 11.5                  | ✓                | ✓   |     |     |
| PPL07560□A2B2 |                     | 56                            | 60                            | 200                  | 220                               | 0.8                  | 9.0                   | 5.0                   | 0.6         | 12.5                  | ✓                | ✓   |     |     |
| PPL07820□A2B2 |                     | 82                            | 60                            | 160                  | 220                               | 0.5                  | 9.0                   | 5.0                   | 0.6         | 12.5                  | ✓                | ✓   |     |     |
| PPL08240□A2B2 |                     | 24                            | 100                           | 300                  | 220                               | 1.1                  | 10                    | 5.0                   | 0.6         | 13.5                  | ✓                | ✓   |     |     |
| PPL08360□A2B2 |                     | 36                            | 85                            | 250                  | 220                               | 1.0                  | 10                    | 5.0                   | 0.6         | 13.5                  | ✓                | ✓   | ✓   | ✓   |
| PPL08390□A2B2 |                     | 39                            | 75                            | 240                  | 220                               | 1.0                  | 10                    | 5.0                   | 0.6         | 13.5                  | ✓                | ✓   | ✓   | ✓   |
| PPL08500□A2B2 |                     | 50                            | 105                           | 210                  | 220                               | 0.73                 | 10                    | 5.0                   | 0.6         | 13.5                  | ✓                | ✓   |     |     |
| PPL08510□A2B2 |                     | 51                            | 65                            | 195                  | 220                               | 1.0                  | 10                    | 5.0                   | 0.6         | 13.5                  | ✓                | ✓   | ✓   | ✓   |
| PPL08620□A2B2 |                     | 62                            | 55                            | 165                  | 220                               | 1.0                  | 10                    | 5.0                   | 0.6         | 13.5                  | ✓                | ✓   | ✓   | ✓   |
| PPL08720□A2B2 |                     | 72                            | 90                            | 180                  | 220                               | 0.6                  | 10                    | 5.0                   | 0.6         | 13.5                  | ✓                | ✓   |     |     |
| PPL09160□A2B2 |                     | 16                            | 150                           | 450                  | 220                               | 1.5                  | 11                    | 5.0                   | 0.6         | 14.5                  | ✓                | ✓   | ✓   | ✓   |
| PPL10150□A2B2 |                     | 15                            | 140                           | 280                  | 220                               | 1.5                  | 12                    | 5.0                   | 0.6         | 15.5                  | ✓                | ✓   |     |     |
| PPL10260□A2B2 |                     | 26                            | 155                           | 310                  | 220                               | 1.1                  | 12                    | 5.0                   | 0.6         | 15.5                  | ✓                | ✓   |     |     |
| PPL10390□A2B2 |                     | 39                            | 100                           | 250                  | 220                               | 1.2                  | 12                    | 5.0                   | 0.6         | 15.5                  |                  |     |     |     |
| PPL11110□A2B2 |                     | 11                            | 200                           | 600                  | 220                               | 2.2                  | 13.5                  | 5.0                   | 0.6         | 16.5                  | ✓                | ✓   | ✓   | ✓   |
| PPL12100□A2B2 |                     | 10                            | 230                           | 650                  | 220                               | 2.3                  | 14                    | 5.0                   | 0.6         | 17.5                  | ✓                | ✓   | ✓   | ✓   |
| PPL12140□A2B2 |                     | 14                            | 230                           | 460                  | 220                               | 1.7                  | 14                    | 5.0                   | 0.6         | 17.5                  | ✓                | ✓   |     |     |
| PPL12200□A2B2 |                     | 20                            | 195                           | 390                  | 220                               | 1.3                  | 14                    | 5.0                   | 0.6         | 17.5                  | ✓                | ✓   |     |     |
| PPL12270□A2B2 |                     | 27                            | 120                           | 350                  | 220                               | 1.5                  | 14                    | 5.0                   | 0.6         | 17.5                  | ✓                | ✓   | ✓   | ✓   |
| PPL14180□A2B2 |                     | 18                            | 180                           | 450                  | 220                               | 1.8                  | 16                    | 5.0                   | 0.6         | 19.5                  | ✓                | ✓   |     |     |
| PPL156R2□A2B2 |                     | 6.2                           | 320                           | 960                  | 220                               | 4.0                  | 17.5                  | 5.0                   | 0.6         | 21.5                  | ✓                | ✓   | ✓   | ✓   |
| PPL168R0□A2B2 |                     | 8.0                           | 350                           | 700                  | 220                               | 2.5                  | 17.5                  | 5.0                   | 0.6         | 21.5                  | ✓                | ✓   |     |     |
| PPL203R6□A2B2 |                     | 3.6                           | 460                           | 1380                 | 220                               | 7.0                  | 22                    | 5.0                   | 0.6         | 25.5                  | ✓                | ✓   | ✓   | ✓   |
| PPL205R0□A2B2 |                     | 5.0                           | 505                           | 1010                 | 220                               | 3.6                  | 22                    | 5.0                   | 0.6         | 25.5                  | ✓                | ✓   |     |     |
| PPL207R0□A2B2 |                     | 7.0                           | 425                           | 850                  | 220                               | 3.0                  | 22                    | 5.0                   | 0.6         | 25.5                  | ✓                | ✓   |     |     |
| PPL242R4□A2B2 |                     | 2.4                           | 660                           | 1980                 | 220                               | 10.5                 | 26                    | 5.0                   | 0.8         | 29.5                  |                  |     |     |     |

# CPTC Thermistor: PP Series

## Overload Protection



220V<sub>AC</sub>/ 130°C

| Part No.      | Curie Temperature   | Nominal Zero-power Resistance | Non-operating Current at 25°C | Trip Current at 25°C | Voltage                           | Maximum Current      | Dimensions            |                       |             |                       | Safety Approvals |     |     |     |
|---------------|---------------------|-------------------------------|-------------------------------|----------------------|-----------------------------------|----------------------|-----------------------|-----------------------|-------------|-----------------------|------------------|-----|-----|-----|
|               | T <sub>c</sub> (°C) | R <sub>25</sub> (Ω)           | I <sub>N</sub> (mA)           | I <sub>t</sub> (mA)  | V <sub>R</sub> (V <sub>AC</sub> ) | I <sub>max</sub> (A) | D <sub>max</sub> (mm) | T <sub>max</sub> (mm) | d±0.02 (mm) | H <sub>max</sub> (mm) | UL               | cUL | CQC | TUV |
| PPL04161□A3B2 | 130±10              | 160                           | 55                            | 90                   | 220                               | 0.2                  | 6.5                   | 5.0                   | 0.6         | 10.5                  | ✓                | ✓   |     |     |
| PPL05500□A3B2 |                     | 50                            | 100                           | 150                  | 220                               | 0.4                  | 7.0                   | 5.0                   | 0.6         | 10.5                  |                  |     |     |     |
| PPL08250□A3B2 |                     | 25                            | 140                           | 230                  | 220                               | 1.0                  | 10                    | 5.0                   | 0.6         | 13.5                  |                  |     |     |     |
| PPL10130□A3B2 |                     | 13                            | 200                           | 320                  | 220                               | 1.5                  | 12                    | 5.0                   | 0.6         | 15.5                  |                  |     |     |     |
| PPL129R0□A3B2 |                     | 9.0                           | 330                           | 500                  | 220                               | 2.2                  | 14                    | 5.0                   | 0.6         | 17.5                  |                  |     |     |     |
| PPL165R0□A3B2 |                     | 5.0                           | 450                           | 680                  | 220                               | 4.1                  | 17.5                  | 5.0                   | 0.6         | 21.5                  |                  |     |     |     |
| PPL203R5□A3B2 |                     | 3.5                           | 650                           | 980                  | 220                               | 7.0                  | 22                    | 5.0                   | 0.6         | 25.5                  |                  |     |     |     |

220V<sub>AC</sub>/ 140°C

| Part No.      | Curie Temperature   | Nominal Zero-power Resistance | Non-operating Current at 25°C | Trip Current at 25°C | Voltage                           | Maximum Current      | Dimensions            |                       |             |                       | Safety Approvals |     |     |     |
|---------------|---------------------|-------------------------------|-------------------------------|----------------------|-----------------------------------|----------------------|-----------------------|-----------------------|-------------|-----------------------|------------------|-----|-----|-----|
|               | T <sub>c</sub> (°C) | R <sub>25</sub> (Ω)           | I <sub>N</sub> (mA)           | I <sub>t</sub> (mA)  | V <sub>R</sub> (V <sub>AC</sub> ) | I <sub>max</sub> (A) | D <sub>max</sub> (mm) | T <sub>max</sub> (mm) | d±0.02 (mm) | H <sub>max</sub> (mm) | UL               | cUL | CQC | TUV |
| PPL03181□A4B2 | 140±10              | 180                           | 30                            | 90                   | 220                               | 0.3                  | 5.0                   | 5.0                   | 0.5         | 8.5                   | ✓                | ✓   |     |     |
| PPL05560□A4B2 |                     | 56                            | 95                            | 190                  | 220                               | 0.6                  | 7.0                   | 5.0                   | 0.6         | 10.5                  |                  |     |     |     |
| PPL05750□A4B2 |                     | 75                            | 60                            | 180                  | 220                               | 0.4                  | 7.0                   | 5.0                   | 0.6         | 10.5                  |                  |     |     |     |
| PPL05850□A4B2 |                     | 85                            | 76                            | 152                  | 220                               | 0.55                 | 7.0                   | 5.0                   | 0.6         | 10.5                  | ✓                | ✓   |     |     |
| PPL05121□A4B2 |                     | 120                           | 63                            | 126                  | 220                               | 0.45                 | 7.0                   | 5.0                   | 0.6         | 10.5                  | ✓                | ✓   |     |     |
| PPL05261□A4B2 |                     | 260                           | 39                            | 78                   | 220                               | 0.3                  | 7.0                   | 5.0                   | 0.6         | 10.5                  | ✓                | ✓   |     |     |
| PPL05501□A4B2 |                     | 500                           | 28                            | 56                   | 220                               | 0.2                  | 7.0                   | 5.0                   | 0.6         | 10.5                  | ✓                | ✓   |     |     |
| PPL05122□A4B2 |                     | 1200                          | 19                            | 38                   | 220                               | 0.14                 | 7.0                   | 5.0                   | 0.6         | 10.5                  | ✓                | ✓   |     |     |
| PPL05192□A4B2 |                     | 1900                          | 15                            | 30                   | 220                               | 0.11                 | 7.0                   | 5.0                   | 0.6         | 10.5                  | ✓                | ✓   |     |     |
| PPL05302□A4B2 |                     | 3000                          | 11                            | 22                   | 220                               | 0.08                 | 7.0                   | 5.0                   | 0.6         | 10.5                  | ✓                | ✓   |     |     |
| PPL07290□A4B2 |                     | 29                            | 140                           | 280                  | 220                               | 0.8                  | 9.0                   | 5.0                   | 0.6         | 12.5                  |                  |     |     |     |
| PPL07480□A4B2 |                     | 48                            | 110                           | 220                  | 220                               | 0.65                 | 9.0                   | 5.0                   | 0.6         | 12.5                  |                  |     |     |     |
| PPL08180□A4B2 |                     | 18                            | 190                           | 380                  | 220                               | 1.0                  | 10                    | 5.0                   | 0.6         | 13.5                  |                  |     |     |     |
| PPL08220□A4B2 |                     | 22                            | 170                           | 340                  | 220                               | 0.9                  | 10                    | 5.0                   | 0.6         | 13.5                  |                  |     |     |     |
| PPL08240□A4B2 |                     | 24                            | 110                           | 330                  | 220                               | 1.0                  | 10                    | 5.0                   | 0.6         | 13.5                  |                  |     |     |     |
| PPL09160□A4B2 |                     | 16                            | 150                           | 450                  | 220                               | 1.5                  | 11                    | 5.0                   | 0.6         | 14.5                  |                  |     |     |     |
| PPL10120□A4B2 |                     | 12                            | 250                           | 500                  | 220                               | 1.5                  | 12                    | 5.0                   | 0.6         | 15.5                  |                  |     |     |     |
| PPL10170□A4B2 |                     | 17                            | 210                           | 420                  | 220                               | 1.3                  | 12                    | 5.0                   | 0.6         | 15.5                  |                  |     |     |     |
| PPL119R1□A4B2 |                     | 9.1                           | 220                           | 660                  | 220                               | 2.5                  | 13.5                  | 5.0                   | 0.6         | 16.5                  |                  |     |     |     |
| PPL128R4□A4B2 |                     | 8.4                           | 320                           | 640                  | 220                               | 2.2                  | 14                    | 5.0                   | 0.6         | 17.5                  |                  |     |     |     |
| PPL12110□A4B2 |                     | 11                            | 280                           | 560                  | 220                               | 1.8                  | 14                    | 5.0                   | 0.6         | 17.5                  |                  |     |     |     |
| PPL164R4□A4B2 |                     | 4.4                           | 490                           | 980                  | 220                               | 3.5                  | 17.5                  | 5.0                   | 0.6         | 21.5                  |                  |     |     |     |
| PPL155R1□A4B2 |                     | 5.1                           | 350                           | 1050                 | 220                               | 4.5                  | 17.5                  | 5.0                   | 0.6         | 21.5                  |                  |     |     |     |
| PPL166R6□A4B2 |                     | 6.6                           | 400                           | 800                  | 220                               | 3.0                  | 17.5                  | 5.0                   | 0.6         | 21.5                  |                  |     |     |     |
| PPL202R8□A4B2 |                     | 2.8                           | 700                           | 1400                 | 220                               | 5.5                  | 22                    | 5.0                   | 0.6         | 25.5                  |                  |     |     |     |
| PPL203R6□A4B2 |                     | 3.6                           | 470                           | 1400                 | 220                               | 5.0                  | 22                    | 5.0                   | 0.6         | 25.5                  |                  |     |     |     |
| PPL204R0□A4B2 |                     | 4.0                           | 590                           | 1180                 | 220                               | 4.5                  | 22                    | 5.0                   | 0.6         | 25.5                  |                  |     |     |     |

# CPTC Thermistor: PP Series

## Overload Protection



### 250V<sub>AC</sub>/ 100°C

| Part No.      | Curie Temperature   | Nominal Zero-power Resistance | Non-operating Current at 25°C | Trip Current at 25°C | Voltage                           | Maximum Current      | Dimensions            |                       |             |                       | Safety Approvals |     |     |     |
|---------------|---------------------|-------------------------------|-------------------------------|----------------------|-----------------------------------|----------------------|-----------------------|-----------------------|-------------|-----------------------|------------------|-----|-----|-----|
|               | T <sub>c</sub> (°C) | R <sub>25</sub> (Ω)           | I <sub>N</sub> (mA)           | I <sub>t</sub> (mA)  | V <sub>R</sub> (V <sub>AC</sub> ) | I <sub>max</sub> (A) | D <sub>max</sub> (mm) | T <sub>max</sub> (mm) | d±0.02 (mm) | H <sub>max</sub> (mm) | UL               | cUL | CQC | TUV |
| PPL07220□A0B5 | 100±10              | 22                            | 100                           | 260                  | 250                               | 0.5                  | 9.0                   | 6.0                   | 0.6         | 12.5                  | √                | √   |     |     |

### 270V<sub>AC</sub>/ 120°C

| Part No.      | Curie Temperature   | Nominal Zero-power Resistance | Non-operating Current at 25°C | Trip Current at 25°C | Voltage                           | Maximum Current      | Dimensions            |                       |             |                       | Safety Approvals |     |     |     |
|---------------|---------------------|-------------------------------|-------------------------------|----------------------|-----------------------------------|----------------------|-----------------------|-----------------------|-------------|-----------------------|------------------|-----|-----|-----|
|               | T <sub>c</sub> (°C) | R <sub>25</sub> (Ω)           | I <sub>N</sub> (mA)           | I <sub>t</sub> (mA)  | V <sub>R</sub> (V <sub>AC</sub> ) | I <sub>max</sub> (A) | D <sub>max</sub> (mm) | T <sub>max</sub> (mm) | d±0.02 (mm) | H <sub>max</sub> (mm) | UL               | cUL | CQC | TUV |
| PPL08390□A2B7 | 120±10              | 39                            | 75                            | 240                  | 270                               | 1.2                  | 10                    | 5.0                   | 0.6         | 13.5                  | √                | √   |     |     |
| PPL10390□A2B7 |                     | 39                            | 100                           | 250                  | 270                               | 1.2                  | 12                    | 5.0                   | 0.6         | 15.5                  | √                | √   |     |     |
| PPL12270□A2B7 |                     | 27                            | 120                           | 350                  | 270                               | 1.5                  | 14                    | 5.0                   | 0.6         | 17.5                  | √                | √   |     |     |
| PPL16500□A2B7 |                     | 50                            | 320                           | 160                  | 270                               | 4.0                  | 18                    | 7.0                   | 0.6         | 21.5                  | √                | √   |     |     |

### 300V<sub>AC</sub>/ 120°C

| Part No.      | Curie Temperature   | Nominal Zero-power Resistance | Non-operating Current at 25°C | Trip Current at 25°C | Voltage                           | Maximum Current      | Dimensions            |                       |             |                       | Safety Approvals |     |     |     |
|---------------|---------------------|-------------------------------|-------------------------------|----------------------|-----------------------------------|----------------------|-----------------------|-----------------------|-------------|-----------------------|------------------|-----|-----|-----|
|               | T <sub>c</sub> (°C) | R <sub>25</sub> (Ω)           | I <sub>N</sub> (mA)           | I <sub>t</sub> (mA)  | V <sub>R</sub> (V <sub>AC</sub> ) | I <sub>max</sub> (A) | D <sub>max</sub> (mm) | T <sub>max</sub> (mm) | d±0.02 (mm) | H <sub>max</sub> (mm) | UL               | cUL | CQC | TUV |
| PPL10820□A2C0 | 120±10              | 82                            | 80                            | 250                  | 300                               | 0.5                  | 12                    | 5.5                   | 0.6         | 15.5                  |                  |     |     |     |
| PPL10151□A2C0 |                     | 150                           | 60                            | 150                  | 300                               | 0.3                  | 12                    | 5.5                   | 0.6         | 15.5                  |                  |     |     |     |
| PPL10351□A2C0 |                     | 350                           | 35                            | 100                  | 300                               | 0.3                  | 12                    | 5.5                   | 0.6         | 15.5                  |                  |     |     |     |

### 380V<sub>AC</sub>/ 120°C

| Part No.      | Curie Temperature   | Nominal Zero-power Resistance | Non-operating Current at 25°C | Trip Current at 25°C | Voltage                           | Maximum Current      | Dimensions            |                       |             |                       | Safety Approvals |     |     |     |
|---------------|---------------------|-------------------------------|-------------------------------|----------------------|-----------------------------------|----------------------|-----------------------|-----------------------|-------------|-----------------------|------------------|-----|-----|-----|
|               | T <sub>c</sub> (°C) | R <sub>25</sub> (Ω)           | I <sub>N</sub> (mA)           | I <sub>t</sub> (mA)  | V <sub>R</sub> (V <sub>AC</sub> ) | I <sub>max</sub> (A) | D <sub>max</sub> (mm) | T <sub>max</sub> (mm) | d±0.02 (mm) | H <sub>max</sub> (mm) | UL               | cUL | CQC | TUV |
| PPL05601□A2C8 | 120±10              | 600                           | 21                            | 39                   | 380                               | 0.2                  | 7.0                   | 5.0                   | 0.6         | 10.5                  | √                | √   |     |     |

### 400V<sub>AC</sub>/ 120°C

| Part No.      | Curie Temperature   | Nominal Zero-power Resistance | Non-operating Current at 25°C | Trip Current at 25°C | Voltage                           | Maximum Current      | Dimensions            |                       |             |                       | Safety Approvals |     |     |     |
|---------------|---------------------|-------------------------------|-------------------------------|----------------------|-----------------------------------|----------------------|-----------------------|-----------------------|-------------|-----------------------|------------------|-----|-----|-----|
|               | T <sub>c</sub> (°C) | R <sub>25</sub> (Ω)           | I <sub>N</sub> (mA)           | I <sub>t</sub> (mA)  | V <sub>R</sub> (V <sub>AC</sub> ) | I <sub>max</sub> (A) | D <sub>max</sub> (mm) | T <sub>max</sub> (mm) | d±0.02 (mm) | H <sub>max</sub> (mm) | UL               | cUL | CQC | TUV |
| PPL05251□A2D0 | 120±10              | 250                           | 32                            | 65                   | 400                               | 0.3                  | 7.0                   | 5.0                   | 0.6         | 10.5                  |                  |     |     |     |
| PPL05381□A2D0 |                     | 380                           | 30                            | 56                   | 400                               | 0.3                  | 7.0                   | 5.0                   | 0.6         | 10.5                  |                  |     |     |     |
| PPL05561□A2D0 |                     | 560                           | 22                            | 44                   | 400                               | 0.3                  | 7.0                   | 5.0                   | 0.6         | 10.5                  |                  |     |     |     |

# CPTC Thermistor: PP Series

## Overload Protection



### 500V<sub>AC</sub>/ 120°C

| Part No.      | Curie Temperature   | Nominal Zero-power Resistance | Non-operating Current at 25°C | Trip Current at 25°C | Voltage                           | Maximum Current      | Dimensions            |                       |             |                       | Safety Approvals |     |     |     |
|---------------|---------------------|-------------------------------|-------------------------------|----------------------|-----------------------------------|----------------------|-----------------------|-----------------------|-------------|-----------------------|------------------|-----|-----|-----|
|               | T <sub>c</sub> (°C) | R <sub>25</sub> (Ω)           | I <sub>N</sub> (mA)           | I <sub>t</sub> (mA)  | V <sub>R</sub> (V <sub>AC</sub> ) | I <sub>max</sub> (A) | D <sub>max</sub> (mm) | T <sub>max</sub> (mm) | d±0.02 (mm) | H <sub>max</sub> (mm) | UL               | cUL | CQC | TUV |
| PPL05122□A2E0 | 120±10              | 1200                          | 15                            | 30                   | 500                               | 0.1                  | 7.0                   | 5.0                   | 0.6         | 10.5                  | √                | √   |     |     |
| PPL05152□A2E0 |                     | 1500                          | 12                            | 24                   | 500                               | 0.1                  | 7.0                   | 5.0                   | 0.6         | 10.5                  | √                | √   |     |     |

### 600V<sub>AC</sub>/ 90°C

| Part No.      | Curie Temperature   | Nominal Zero-power Resistance | Non-operating Current at 25°C | Trip Current at 25°C | Voltage                           | Maximum Current      | Dimensions            |                       |             |                       | Safety Approvals |     |     |     |
|---------------|---------------------|-------------------------------|-------------------------------|----------------------|-----------------------------------|----------------------|-----------------------|-----------------------|-------------|-----------------------|------------------|-----|-----|-----|
|               | T <sub>c</sub> (°C) | R <sub>25</sub> (Ω)           | I <sub>N</sub> (mA)           | I <sub>t</sub> (mA)  | V <sub>R</sub> (V <sub>AC</sub> ) | I <sub>max</sub> (A) | D <sub>max</sub> (mm) | T <sub>max</sub> (mm) | d±0.02 (mm) | H <sub>max</sub> (mm) | UL               | cUL | CQC | TUV |
| PPL05801□P9F0 | 90±10               | 800                           | 18                            | 36                   | 600                               | 0.3                  | 7.0                   | 5.0                   | 0.6         | 10.5                  |                  |     |     |     |
| PPL05102□P9F0 |                     | 1000                          | 15                            | 30                   | 600                               | 0.3                  | 7.0                   | 5.0                   | 0.6         | 10.5                  |                  |     |     |     |
| PPL05132□P9F0 |                     | 1300                          | 13                            | 26                   | 600                               | 0.3                  | 7.0                   | 5.0                   | 0.6         | 10.5                  |                  |     |     |     |

### 600V<sub>AC</sub>/ 100°C

| Part No.      | Curie Temperature   | Nominal Zero-power Resistance | Non-operating Current at 25°C | Trip Current at 25°C | Voltage                           | Maximum Current      | Dimensions            |                       |             |                       | Safety Approvals |     |     |     |
|---------------|---------------------|-------------------------------|-------------------------------|----------------------|-----------------------------------|----------------------|-----------------------|-----------------------|-------------|-----------------------|------------------|-----|-----|-----|
|               | T <sub>c</sub> (°C) | R <sub>25</sub> (Ω)           | I <sub>N</sub> (mA)           | I <sub>t</sub> (mA)  | V <sub>R</sub> (V <sub>AC</sub> ) | I <sub>max</sub> (A) | D <sub>max</sub> (mm) | T <sub>max</sub> (mm) | d±0.02 (mm) | H <sub>max</sub> (mm) | UL               | cUL | CQC | TUV |
| PPL05152□A0F0 | 100±10              | 1500                          | 14                            | 28                   | 600                               | 0.1                  | 7.0                   | 5.0                   | 0.6         | 10.5                  | √                | √   |     |     |
| PPL05272□A0F0 |                     | 2700                          | 10                            | 20                   | 600                               | 0.2                  | 7.0                   | 5.0                   | 0.6         | 10.5                  | √                | √   |     |     |

### Non-coating Series

| Part No.      | Curie Temperature   | Nominal Zero-power Resistance | Non-operating Current at 25°C | Trip Current at 25°C | Voltage                           | Maximum Current      | Dimensions            |                       |             |                       | Safety Approvals |     |     |     |
|---------------|---------------------|-------------------------------|-------------------------------|----------------------|-----------------------------------|----------------------|-----------------------|-----------------------|-------------|-----------------------|------------------|-----|-----|-----|
|               | T <sub>c</sub> (°C) | R <sub>25</sub> (Ω)           | I <sub>N</sub> (mA)           | I <sub>t</sub> (mA)  | V <sub>R</sub> (V <sub>AC</sub> ) | I <sub>max</sub> (A) | D <sub>max</sub> (mm) | T <sub>max</sub> (mm) | d±0.02 (mm) | H <sub>max</sub> (mm) | UL               | cUL | CQC | TUV |
| PPL07131□A2C8 | 120±10              | 130                           | 45                            | 90                   | 380                               | 1                    | 7.5                   | 7                     | 0.6         | 12.5                  | √                | √   |     |     |
| PPL08700□A2C8 |                     | 70                            | 64                            | 127                  | 380                               | 1.4                  | 8.5                   | 7.0                   | 0.6         | 13.5                  | √                | √   |     |     |
| PPL08121□A2C8 |                     | 120                           | 49                            | 100                  | 380                               | 1.4                  | 8.5                   | 7.0                   | 0.6         | 13.5                  | √                | √   |     |     |
| PPL08151□A2C8 |                     | 150                           | 43                            | 86                   | 380                               | 1.4                  | 8.5                   | 7.0                   | 0.6         | 13.5                  | √                | √   |     |     |
| PPL11250□A2C8 |                     | 25                            | 123                           | 245                  | 380                               | 2.0                  | 12.5                  | 7.0                   | 0.6         | 16.5                  | √                | √   |     |     |
| PPL11500□A2C8 |                     | 50                            | 87                            | 173                  | 380                               | 2.0                  | 12.5                  | 7.0                   | 0.6         | 16.5                  | √                | √   |     |     |
| PPL11800□A2C8 |                     | 80                            | 69                            | 137                  | 380                               | 2.0                  | 12.5                  | 7.0                   | 0.6         | 16.5                  | √                | √   |     |     |
| PPL11121□A2C8 |                     | 120                           | 56                            | 112                  | 380                               | 2.0                  | 12.5                  | 7.0                   | 0.6         | 16.5                  | √                | √   |     |     |
| PPL11151□A2C8 |                     | 150                           | 50                            | 100                  | 380                               | 2.0                  | 12.5                  | 7.0                   | 0.6         | 16.5                  | √                | √   |     |     |
| PPL08501□A2E0 |                     | 500                           | 24                            | 48                   | 500                               | 1.0                  | 8.5                   | 7.0                   | 0.6         | 13.5                  | √                | √   |     |     |
| PPL08112□A2E0 | 120±10              | 1100                          | 16                            | 32                   | 500                               | 1.0                  | 8.5                   | 7.0                   | 0.6         | 13.5                  | √                | √   |     |     |
| PPL11501□A2E0 |                     | 500                           | 28                            | 55                   | 500                               | 1.4                  | 12.5                  | 7.0                   | 0.6         | 16.5                  | √                | √   |     |     |
| PPL11752□A1J0 | 110±10              | 7500                          | 8                             | 17                   | 1000                              | 0.5                  | 12.5                  | 7.0                   | 0.6         | 16.5                  |                  |     |     |     |

Note: □=Tolerance of R<sub>25</sub>

Note: UL/cUL File No. E138827 CQC File No. CQC03001008123~124

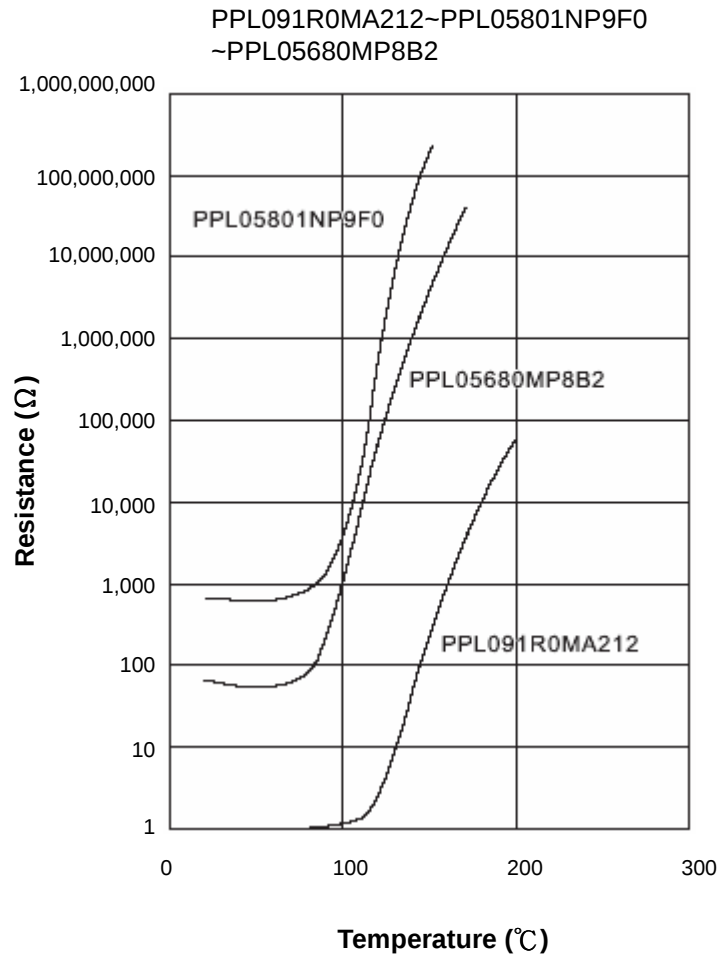
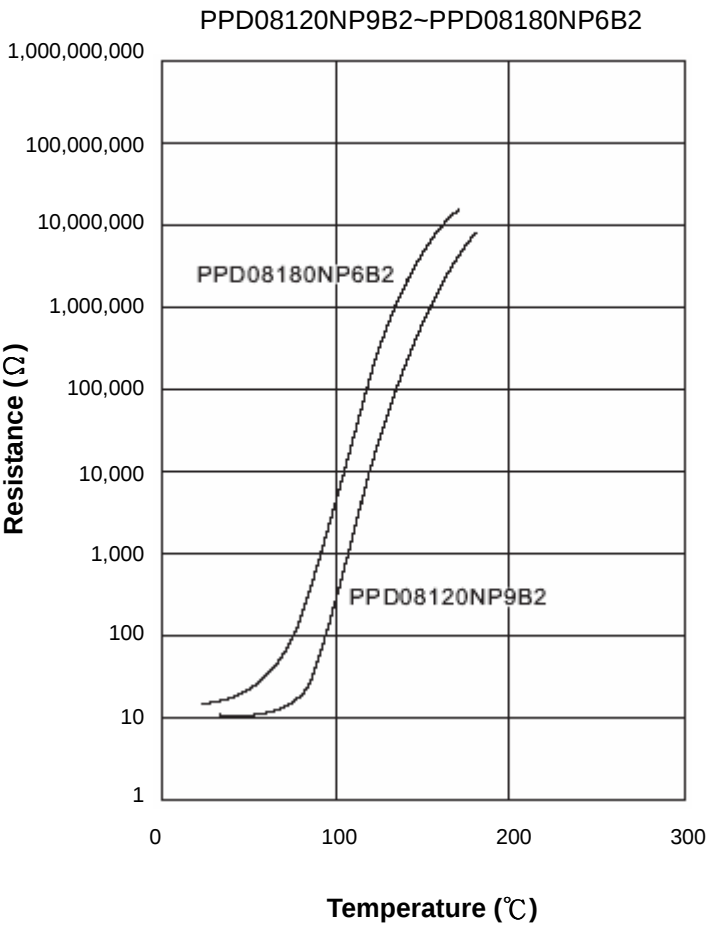
TUV File No. R50025585

# CPTC Thermistor: PP Series

## Overload Protection



■ R-T Characteristic Curve (Representative)



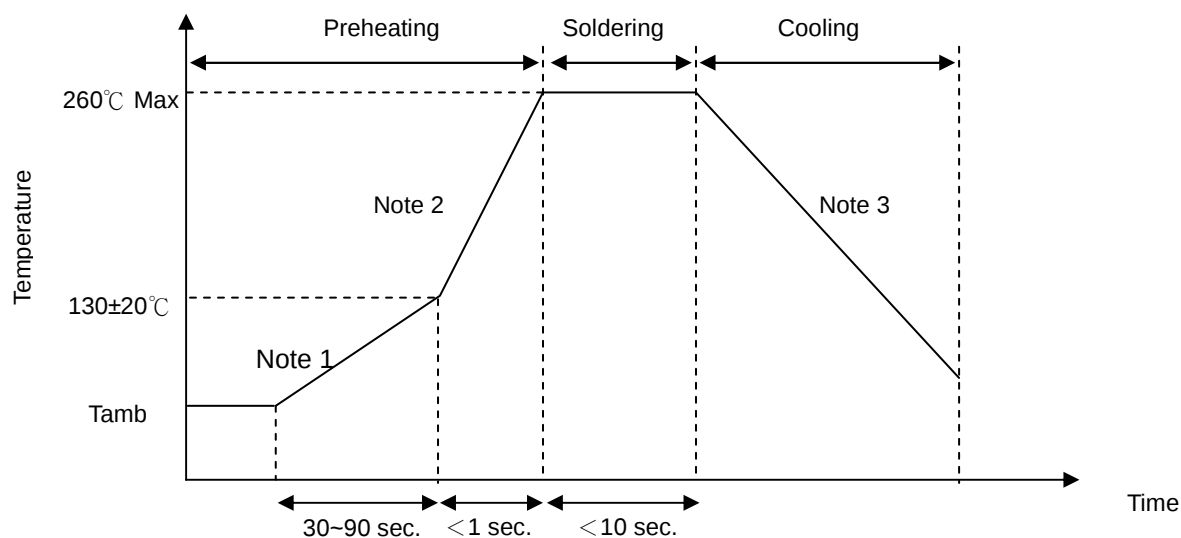
# CPTC Thermistor: PP Series

## Overload Protection



### ■ Soldering Recommendation

#### ● Wave Flow Soldering Profile



Note 1: (1-3°C)/sec

Note 2: Approx. 200°C/sec

Note 3: 5°C/sec. (Max)

#### ● Recommended Reworking Conditions With Soldering Iron

| Item                              | Conditions   |
|-----------------------------------|--------------|
| Temperature of Soldering Iron-tip | 360°C (max.) |
| Soldering Time                    | 3 sec (max.) |
| Distance from Thermistor          | 2 mm (min.)  |

# CPTC Thermistor: PP Series

## Overload Protection



### ■ Reliability Test

| Item                               | Standard         | Test conditions / Methods                                                                                                                                                                                                                                                                                                                                                                                  | Specifications                                                                  |                 |                  |     |           |        |            |                  |                                                                                 |   |         |        |   |                  |       |                                                                                 |
|------------------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------|------------------|-----|-----------|--------|------------|------------------|---------------------------------------------------------------------------------|---|---------|--------|---|------------------|-------|---------------------------------------------------------------------------------|
| Tensile Strength of Terminals *    | IEC60068-2-21    | <div>Fasten body and apply a force gradually to each lead for 10±1 sec.</div> <table><tr><td>Terminal diameter (mm)</td><td>Force T(N)</td></tr><tr><td>0.35&lt;d≤0.5</td><td>5.0</td></tr><tr><td>0.5&lt;d≤0.8</td><td>10.0</td></tr><tr><td>0.8&lt;d≤1.25</td><td>20.0</td></tr></table>                                                                                                                 | Terminal diameter (mm)                                                          | Force T(N)      | 0.35<d≤0.5       | 5.0 | 0.5<d≤0.8 | 10.0   | 0.8<d≤1.25 | 20.0             | <div>  ΔR<sub>25</sub>/R<sub>25</sub>   ≤20%</div> <div>No visible damage</div> |   |         |        |   |                  |       |                                                                                 |
| Terminal diameter (mm)             | Force T(N)       |                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                 |                 |                  |     |           |        |            |                  |                                                                                 |   |         |        |   |                  |       |                                                                                 |
| 0.35<d≤0.5                         | 5.0              |                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                 |                 |                  |     |           |        |            |                  |                                                                                 |   |         |        |   |                  |       |                                                                                 |
| 0.5<d≤0.8                          | 10.0             |                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                 |                 |                  |     |           |        |            |                  |                                                                                 |   |         |        |   |                  |       |                                                                                 |
| 0.8<d≤1.25                         | 20.0             |                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                 |                 |                  |     |           |        |            |                  |                                                                                 |   |         |        |   |                  |       |                                                                                 |
| Solderability*                     | IEC60068-2-20    | 255±5℃ ,3±0.5sec, 4±1mm from body .                                                                                                                                                                                                                                                                                                                                                                        | At least 95% of terminal electrode is covered by new solder                     |                 |                  |     |           |        |            |                  |                                                                                 |   |         |        |   |                  |       |                                                                                 |
| Resistance to Soldering Heat *     | IEC60068-2-20    | 350±10℃ ,3~4 sec, 4±1mm from body                                                                                                                                                                                                                                                                                                                                                                          | <div>  ΔR/R<sub>25</sub>   ≤20%</div> <div>No damage observed</div>             |                 |                  |     |           |        |            |                  |                                                                                 |   |         |        |   |                  |       |                                                                                 |
| Vibration *                        | IEC60068-2-6     | Frequency range:10~55Hz<br>Amplitude:0.75mm or 98m/S2<br>Direction:3 mutually perpendicular directions<br>Duration :6HRS(3x2HRS)                                                                                                                                                                                                                                                                           | <div>  ΔR<sub>25</sub>/R<sub>25</sub>   ≤20%</div> <div>No visible damage</div> |                 |                  |     |           |        |            |                  |                                                                                 |   |         |        |   |                  |       |                                                                                 |
| Shock *                            | IEC60068-2-27    | Wave: half-sine<br>ΔV:1.0m/s<br>Acceleration:50m/s2<br>Pulse time:30ms                                                                                                                                                                                                                                                                                                                                     | <div>  ΔR<sub>25</sub>/R<sub>25</sub>   ≤20%</div> <div>No visible damage</div> |                 |                  |     |           |        |            |                  |                                                                                 |   |         |        |   |                  |       |                                                                                 |
| Rapid Change of Temperature        | IEC60068-2-14    | <div>T</div> <div>The thermal shock conditions shown below shall be repeated 5 cycles</div> <table><tr><td>Step</td><td>Temperature (℃)</td><td>Period (minutes)</td></tr><tr><td>1</td><td>-40 ± 5</td><td>30 ± 3</td></tr><tr><td>2</td><td>Room temperature</td><td>5 ± 3</td></tr><tr><td>3</td><td>100 ± 5</td><td>30 ± 3</td></tr><tr><td>4</td><td>Room temperature</td><td>5 ± 3</td></tr></table> | Step                                                                            | Temperature (℃) | Period (minutes) | 1   | -40 ± 5   | 30 ± 3 | 2          | Room temperature | 5 ± 3                                                                           | 3 | 100 ± 5 | 30 ± 3 | 4 | Room temperature | 5 ± 3 | <div>  ΔR<sub>25</sub>/R<sub>25</sub>   ≤20%</div> <div>No visible damage</div> |
| Step                               | Temperature (℃)  | Period (minutes)                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                 |                 |                  |     |           |        |            |                  |                                                                                 |   |         |        |   |                  |       |                                                                                 |
| 1                                  | -40 ± 5          | 30 ± 3                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                 |                 |                  |     |           |        |            |                  |                                                                                 |   |         |        |   |                  |       |                                                                                 |
| 2                                  | Room temperature | 5 ± 3                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                 |                 |                  |     |           |        |            |                  |                                                                                 |   |         |        |   |                  |       |                                                                                 |
| 3                                  | 100 ± 5          | 30 ± 3                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                 |                 |                  |     |           |        |            |                  |                                                                                 |   |         |        |   |                  |       |                                                                                 |
| 4                                  | Room temperature | 5 ± 3                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                 |                 |                  |     |           |        |            |                  |                                                                                 |   |         |        |   |                  |       |                                                                                 |
| Climatic sequence                  | IEC60738-1       | +40℃ ,20%R.H X 24hrs →100℃ X 16hrs→25℃ X 2hrs→ +40℃ ,95%R.HX 24hrs→ 0℃ X 2hrs→+40℃ ,95%R.HX 24hrs→ 25℃ X (1~2)hrs                                                                                                                                                                                                                                                                                          | <div>  ΔR<sub>25</sub>/R<sub>25</sub>   ≤20%</div> <div>No visible damage</div> |                 |                  |     |           |        |            |                  |                                                                                 |   |         |        |   |                  |       |                                                                                 |
| High Temperature Storage           | IEC60068-2-2     | 60℃ , for 1000hrs                                                                                                                                                                                                                                                                                                                                                                                          | <div>  ΔR<sub>25</sub>/R<sub>25</sub>   ≤20%</div> <div>No visible damage</div> |                 |                  |     |           |        |            |                  |                                                                                 |   |         |        |   |                  |       |                                                                                 |
| High Temperature Continuous Load   | IEC60738-1       | UCT=60℃ , V <sub>R</sub> , It≤I≤I <sub>max</sub> for 1000hrs                                                                                                                                                                                                                                                                                                                                               | <div>  ΔR<sub>25</sub>/R<sub>25</sub>   ≤20%</div> <div>No visible damage</div> |                 |                  |     |           |        |            |                  |                                                                                 |   |         |        |   |                  |       |                                                                                 |
| Damp Heat, Steady State            | IEC60068-2-3     | 40±2℃ ,90~95%RH, for 1000±2hrs                                                                                                                                                                                                                                                                                                                                                                             | <div>  ΔR<sub>25</sub>/R<sub>25</sub>   ≤20%</div> <div>No visible damage</div> |                 |                  |     |           |        |            |                  |                                                                                 |   |         |        |   |                  |       |                                                                                 |
| Room Temperature Intermittent Load | IEC60738-1       | 25±5℃ , V <sub>R</sub> , It≤I≤I <sub>max</sub><br>1min. on and 5min. Off ×100、1,000、10,000 or 100,000cycles                                                                                                                                                                                                                                                                                                | <div>  ΔR<sub>25</sub>/R<sub>25</sub>   ≤20%</div> <div>No visible damage</div> |                 |                  |     |           |        |            |                  |                                                                                 |   |         |        |   |                  |       |                                                                                 |

\* : Only application for PPL series

# CPTC Thermistor: PP Series

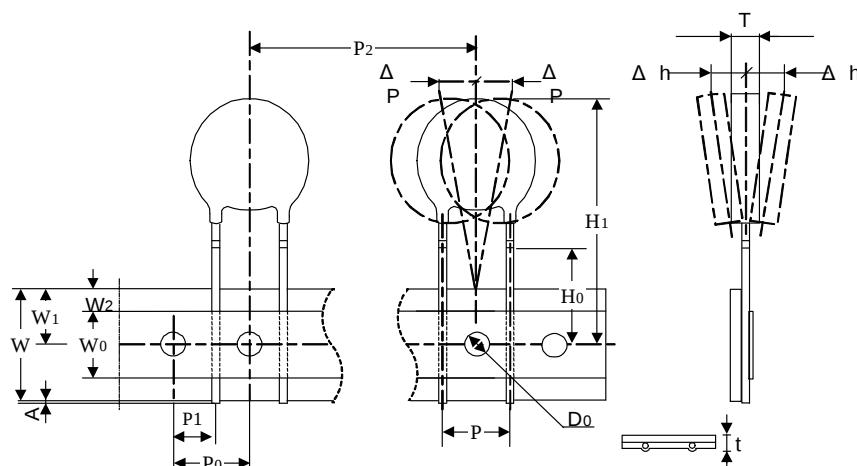
## Overload Protection



### ■ Packaging

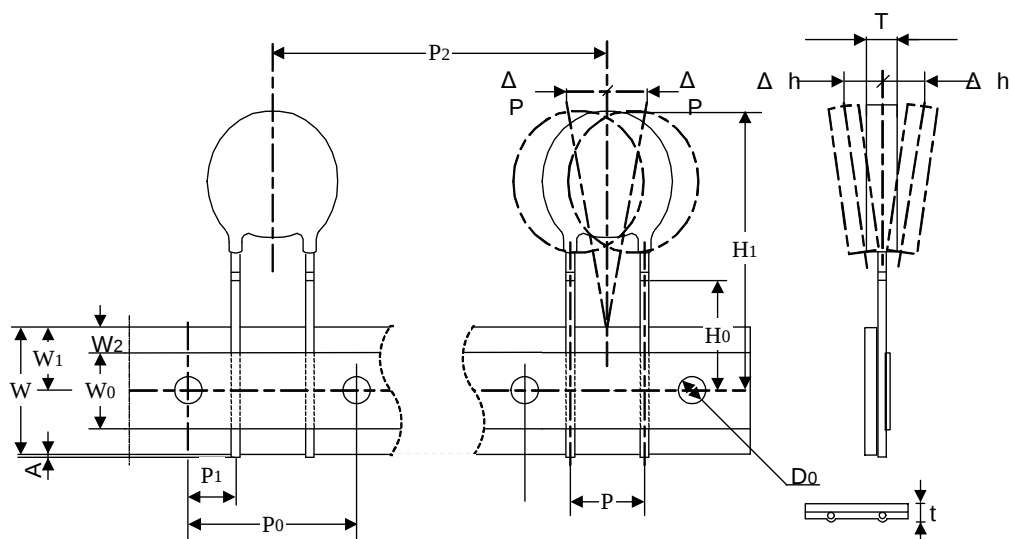
#### ● Taping Specification

*Lead Space 7.5mm (P0=12.7mm)*



*Lead Space 2.5mm & 5.0mm & 7.5mm (P0=15mm)*

*Lead Space 2.5mm & 5.0mm (P0=12.7mm)*



# CPTC Thermistor: PP Series

## Overload Protection



(Unit: mm)

| Index          | Parameter                                | Nominal dimensions |      |             |      | Tolerance |
|----------------|------------------------------------------|--------------------|------|-------------|------|-----------|
| P              | Lead spacing                             | 5                  | 7.5  | 5           | 7.5  | ±1        |
| P0             | Sprocket hole pitch                      | 12.7               | 12.7 | 15          | 15   | ±0.3      |
| P1             | Lead location                            | 3.85               | 8.95 | 5           | 3.75 | ±1        |
| P2             | Component pitch                          | 12.7 (D≤10)        |      | 15.0 (D≤10) |      | ±1        |
|                |                                          | 25.4 (D>10)        |      | 30.0 (D>10) |      |           |
| H0             | Height between component and tape centre | 16                 | 16   | 16          | 16   | ±0.5      |
| W              | Carrier tape width                       | 18                 | 18   | 18          | 18   | ±1        |
| W0             | Adhesive tape width                      | 12                 | 12   | 12          | 12   | ±1        |
| W1             | Sprocket hole position                   | 9                  | 9    | 9           | 9    | ±1        |
| W2             | Adhesive tape position                   | 3                  | 3    | 3           | 3    | Max. 3    |
| △P             | Component alignment                      | 1                  | 1    | 1           | 1    | Max. 1    |
| △h             | Component alignment                      | 2                  | 2    | 2           | 2    | Max. 2    |
| A              | Tip length                               | 0.5                | 0.5  | 0.5         | 0.5  | Max. 0.5  |
| D <sub>0</sub> | Sprocket hole diameter                   | 4                  | 4    | 4           | 4    | ±0.2      |
| t              | Total tape thickness                     | 0.6                | 0.6  | 0.6         | 0.6  | ±0.2      |

# CPTC Thermistor: PP Series

## Overload Protection



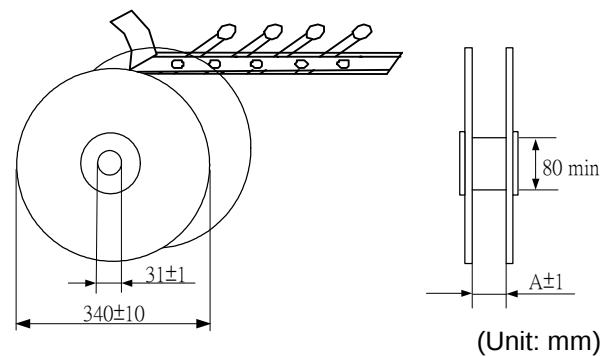
### ■ Quantity

#### ● Bulk Packing

| Disc Size/mm     | Quantity (pcs/bag) |
|------------------|--------------------|
| $\Phi \leq 10$   | 200                |
| $10 < \Phi < 20$ | 100                |
| $\Phi \geq 20$   | 50                 |

#### ● Reel Packing

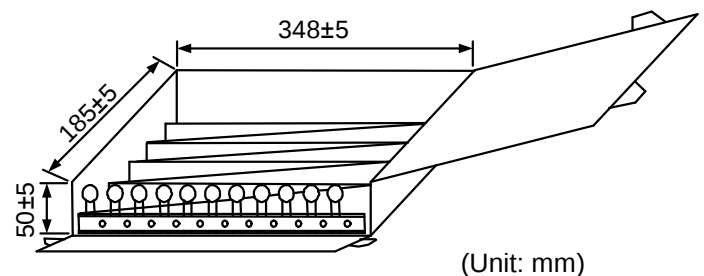
| Disc Size/mm        | Voltage( $V_R$ )     | Quantity/Reel |
|---------------------|----------------------|---------------|
| $\Phi \leq 07$      | $V_R \leq 270V_{AC}$ | 1500          |
|                     | $V_R > 270V_{AC}$    | 1000          |
| $07 < \Phi \leq 12$ | $V_R \leq 270V_{AC}$ | 1000          |
|                     | $V_R > 270V_{AC}$    | 750           |
| $12 < \Phi \leq 16$ | $V_R \leq 270V_{AC}$ | 750           |
|                     | $V_R > 270V_{AC}$    | 500           |
|                     | $V_R \leq 270V_{AC}$ | 500           |
|                     | $V_R > 270V_{AC}$    | 250           |



| Disc Size | $\Phi < 16$ | $\Phi \geq 16$ |
|-----------|-------------|----------------|
| A         | 46          | 55             |

#### ● Ammo packing

| Disc Size/mm        | Voltage( $V_R$ )     | Quantity/box |
|---------------------|----------------------|--------------|
| $\Phi \leq 07$      | $V_R \leq 270V_{AC}$ | 1000         |
|                     | $V_R > 270V_{AC}$    | 750          |
| $07 < \Phi \leq 12$ | $V_R \leq 270V_{AC}$ | 750          |
|                     | $V_R > 270V_{AC}$    | 500          |
| $12 < \Phi \leq 16$ | $V_R \leq 270V_{AC}$ | 500          |
|                     | $V_R > 270V_{AC}$    | 250          |
| $\Phi > 16$         | ---                  | 250          |



### ■ Storage Conditions of Products

#### ● Storage Conditions :

1. Storage Temperature :  $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$
2. Relative Humidity :  $\leq 75\% \text{RH}$
3. Keep away from corrosive atmosphere and sunlight.

#### ● Period of Storage : 1 year

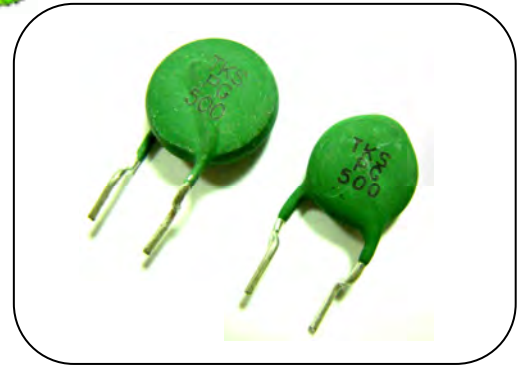
# CPTC Thermistor: Dip Type PPL Series

## Overload Protection for Telecom Application



### ■ Features

1. RoHS compliant
2. Radial leaded devices
3. Wide resistance range in telecom area from 7 to 50Ω
4. Agency recognition: UL/cUL/TUV
5. Compliant with ITU-T standards
6. Operating temperature range : 0 ~ +60°C (V=Vmax)  
-25 ~ +125°C (V=0)



### ■ Recommended Applications

1. Cable Modem, ADSL Modem with VOIP
2. Customer Premise Equipment (CPE)
3. Central Office (CO)
4. Access Equipment (AE)
5. Main Distribution Frame (MDF)
6. Public Switched Telephone Network (PSTN)
7. Exchanger

### ■ Part Number Code

| P            | P                                      | L          | 0      | 9                             | 1   | 0                            | 0       | M                 | A     | 0       | B                  | 5         | Y                          |                       |    |
|--------------|----------------------------------------|------------|--------|-------------------------------|-----|------------------------------|---------|-------------------|-------|---------|--------------------|-----------|----------------------------|-----------------------|----|
| 1            | 2                                      | 3          | 4      | 5                             | 6   | 7                            | 8       | 9                 | 10    | 11      | 12                 | 13        | 14                         | 15                    | 16 |
| Product Code |                                        | Dimensions |        | Resistance (R <sub>25</sub> ) |     | Tolerance of R <sub>25</sub> |         | Curie temperature |       | Voltage |                    | Packaging |                            | Internal Control Code |    |
|              |                                        |            |        |                               |     |                              |         |                   |       |         |                    |           |                            |                       |    |
| PPL          | PTC Thermistor for overload protection | 07         | φ 7mm  | 7R0                           | 7Ω  | K                            | ±10%    | P8                | 80°C  | A4      | 140V <sub>AC</sub> | Y         | Bulk                       |                       |    |
|              |                                        | 09         | φ 9mm  | 100                           | 10Ω | L                            | ±15%    | A0                | 100°C | B5      | 250V <sub>AC</sub> | X         | Ammo Box Pitch 12.7mm      |                       |    |
|              |                                        | 13         | φ 13mm | 500                           | 50Ω | M                            | ±20%    | A2                | 120°C | C0      | 300V <sub>AC</sub> | V         | Ammo Box Pitch 15mm        |                       |    |
|              |                                        |            |        |                               |     | H                            | ±25%    |                   |       |         |                    | W         | Taping & Reel Pitch 12.7mm |                       |    |
|              |                                        |            |        |                               |     | N                            | ±30%    |                   |       |         |                    | U         | Taping & Reel Pitch 15mm   |                       |    |
|              |                                        |            |        |                               |     | Y                            | Special |                   |       |         |                    |           |                            |                       |    |

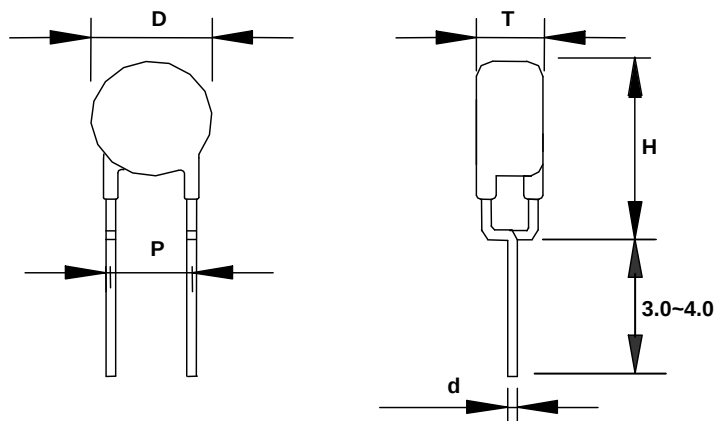
# CPTC Thermistor: Dip Type PPL Series

## Overload Protection for Telecom Application



### ■ Structure and Dimensions

#### ● Dip structure



(Unit: mm)

| Part no.      | D    | T   | H    | d     | P    |
|---------------|------|-----|------|-------|------|
|               | max  | max | max  | ±0.02 | ±1.0 |
| PPL137R0□A0B5 | 15   | 5   | 18.5 | 0.6   | 5    |
| PPL07100□A0B5 | 10.5 | 5   | 13.5 | 0.6   | 5    |
| PPL09100□A0B5 | 12   | 5   | 15.5 | 0.6   | 5    |
| PPL07180□A0B5 | 9    | 5   | 12.5 | 0.6   | 5    |
| PPL09180□A0B5 | 11   | 5   | 14.5 | 0.6   | 5    |
| PPL07250□A0B5 | 9    | 5   | 12.5 | 0.6   | 5    |
| PPL09250□A0B5 | 11   | 5   | 14.5 | 0.6   | 5    |
| PPL07390□A0B5 | 9    | 5   | 12.5 | 0.6   | 5    |
| PPL09390□A0B5 | 11   | 5   | 14.5 | 0.6   | 5    |
| PPL07500□A0C0 | 9    | 5   | 12.5 | 0.6   | 5    |
| PPL09500□A0C0 | 11   | 5   | 14.5 | 0.6   | 5    |

# CPTC Thermistor: Dip Type PPL Series

## Overload Protection for Telecom Application



### ■ Characteristics

| Part No.      | Nominal Zero-power Resistance | Non-operating Current at 25°C | Non-operating Current at 40°C | Trip Current at 25°C      | Responding Time (s) |         |            | Max Voltage        | Max. Current         | Safety Approvals |     |
|---------------|-------------------------------|-------------------------------|-------------------------------|---------------------------|---------------------|---------|------------|--------------------|----------------------|------------------|-----|
|               | R <sub>25</sub> (Ω)           | I <sub>N</sub> (mA) @25°C     | I <sub>N</sub> (mA) @40°C     | I <sub>t</sub> (mA) @25°C | 3A→0.5A             | 1A→0.5A | 0.5A→0.15A | (V <sub>AC</sub> ) | I <sub>max</sub> (A) | UL/cUL           | TUV |
| PPL137R0□A0B5 | 7                             | 180                           | 170                           | 540                       | 3                   | 20      | 90         | 250                | 3                    | √                | √   |
| PPL07100□A0B5 | 10                            | 130                           | 120                           | 390                       | 0.8                 | 8.0     | 35         | 250                | 2.5                  | √                | √   |
| PPL09100□A0B5 | 10                            | 140                           | 130                           | 390                       | 0.8                 | 8.0     | 35         | 250                | 3                    | √                | √   |
| PPL07180□A0B5 | 18                            | 110                           | 100                           | 330                       | 0.4                 | 2.5     | 10         | 250                | 3                    | √                | √   |
| PPL09180□A0B5 | 18                            | 110                           | 100                           | 330                       | 0.4                 | 2.5     | 10         | 250                | 3                    | √                | √   |
| PPL07250□A0B5 | 25                            | 90                            | 80                            | 225                       | 0.35                | 2.0     | 10         | 250                | 3                    | √                | √   |
| PPL09250□A0B5 | 25                            | 75                            | 70                            | 225                       | 0.35                | 2.0     | 10         | 250                | 3                    | √                | √   |
| PPL07390□A0B5 | 39                            | 70                            | 65                            | 180                       | 0.3                 | 1.0     | 4.0        | 250                | 3                    | √                | √   |
| PPL09390□A0B5 | 39                            | 70                            | 65                            | 180                       | 0.3                 | 1.0     | 4.0        | 250                | 3                    | √                | √   |
| PPL07500□A0C0 | 50                            | 60                            | 55                            | 165                       | 0.15                | 0.8     | 3.5        | 300                | 3                    | √                | √   |
| PPL09500□A0C0 | 50                            | 65                            | 60                            | 165                       | 0.15                | 0.8     | 3.5        | 300                | 3                    | √                | √   |

Note1: □=Tolerance of R<sub>25</sub>

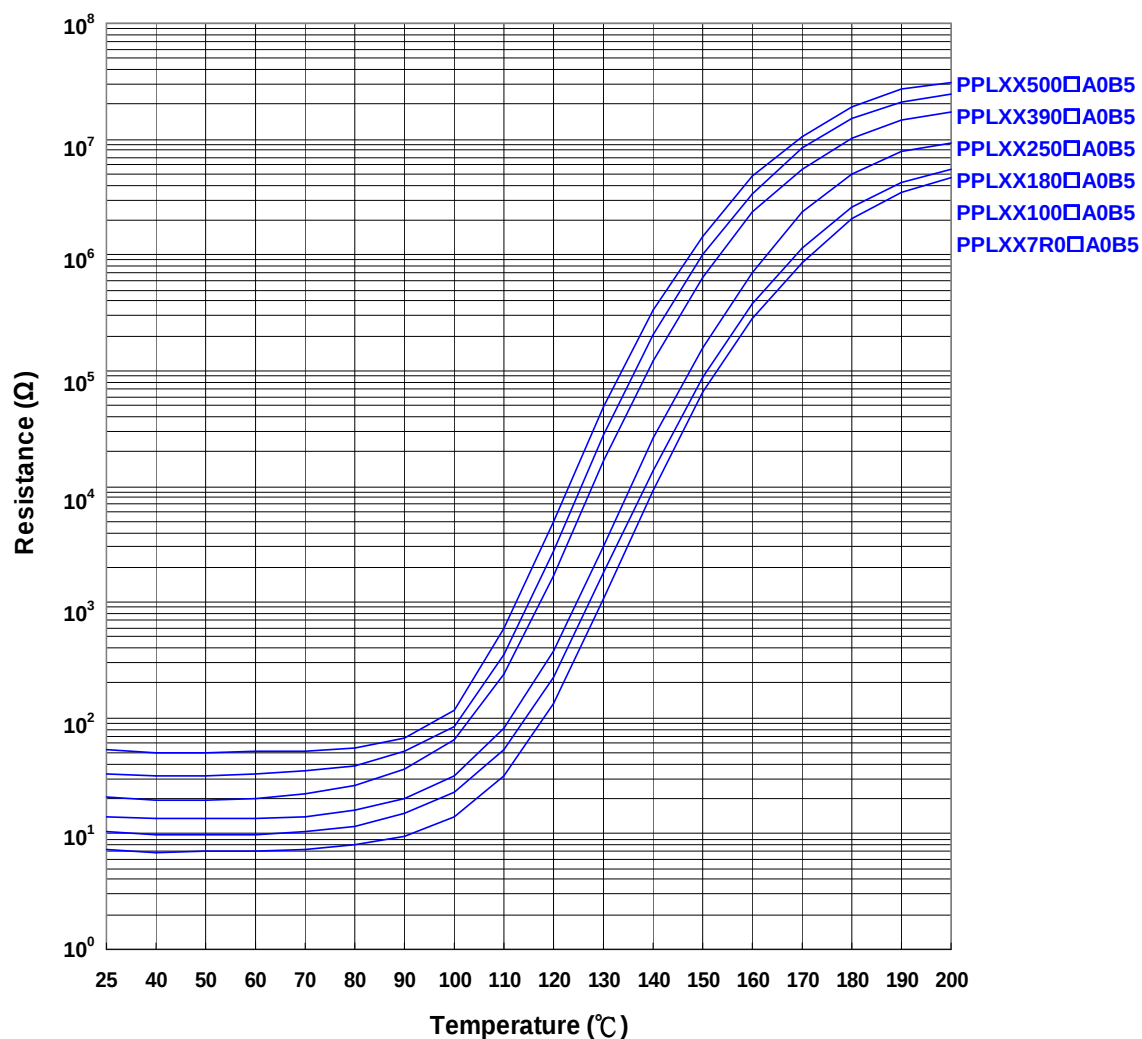
Note2: UL/cUL File No. E138827

TUV File No. R 50171789

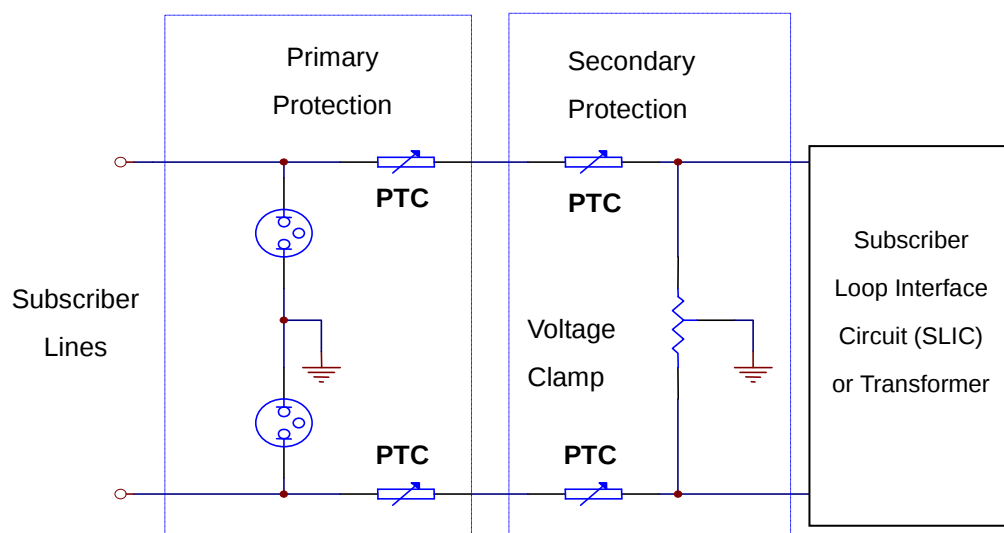
# CPTC Thermistor: Dip Type PPL Series Overload Protection for Telecom Application



## ■ R-T Characteristic Curves (Typical)



## ■ Circuit for Typical Application



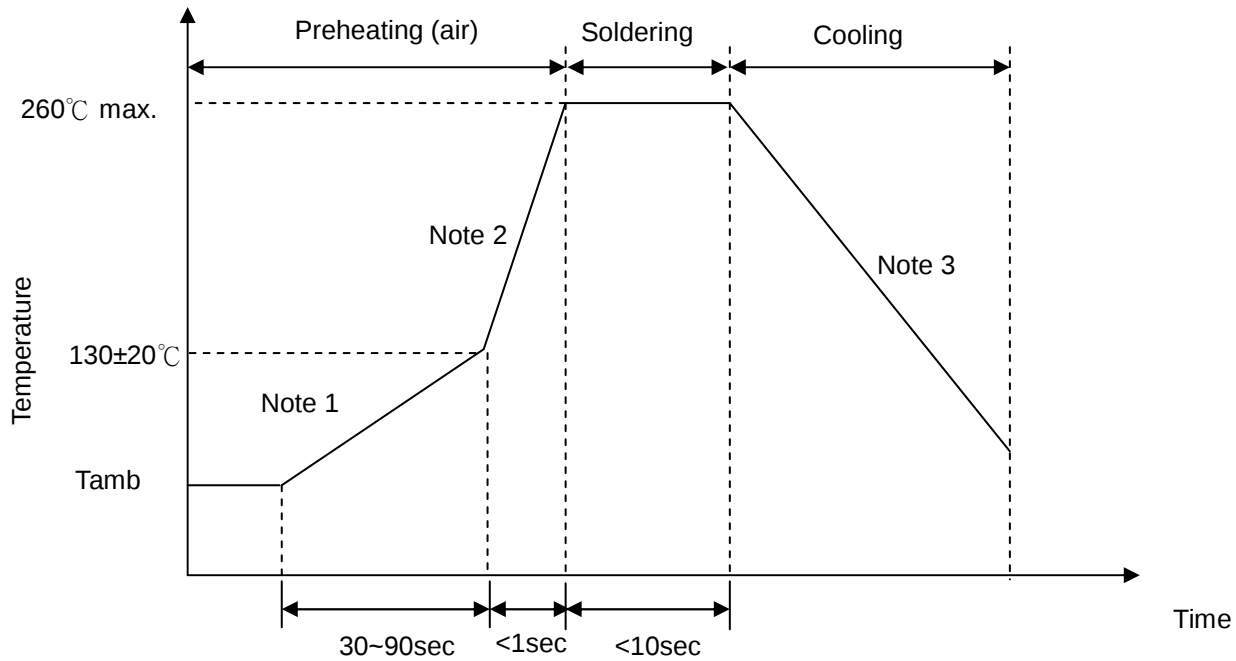
# CPTC Thermistor: Dip Type PPL Series

## Overload Protection for Telecom Application



### ■ Soldering Recommendation

#### ● Wave Soldering Profile



Note 1: (1~3)°C/sec

Note 2: Approx. 200°C/sec

Note 3: 5°C/sec Max

#### ● Recommended Reworking Conditions with Soldering Iron

| Item                              | Conditions   |
|-----------------------------------|--------------|
| Temperature of Soldering Iron-tip | 360°C (max.) |
| Soldering Time                    | 3 sec (max.) |
| Distance from coating             | 2 mm (min.)  |

# CPTC Thermistor: Dip Type PPL Series

## Overload Protection for Telecom Application



### ■ Reliability

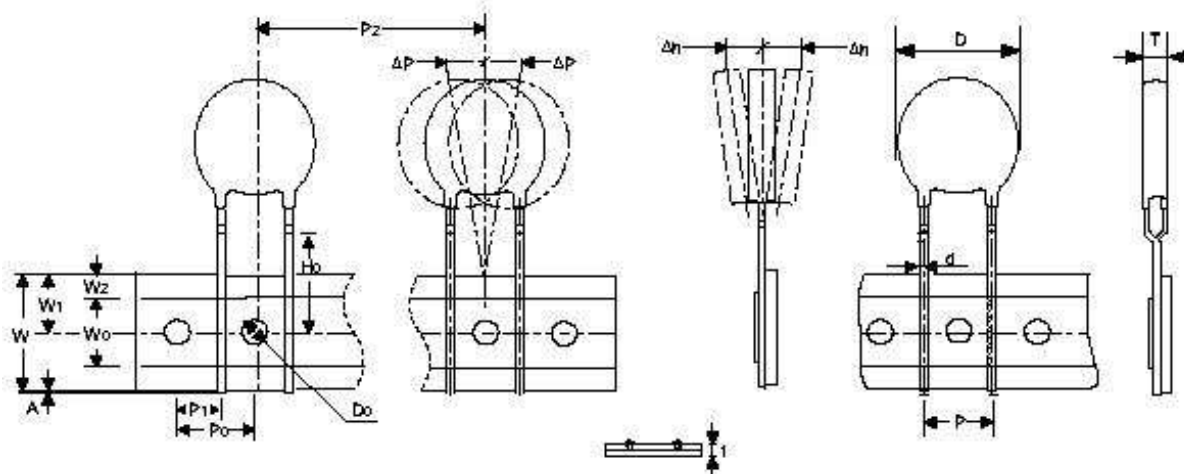
| Item                             | Standard               | Test conditions / Methods                                                                                                                                                                                                                                                                                   | Specifications                                              |                   |                 |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
|----------------------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|-------------------|-----------------|-----------------|------|---------|--------|------------|------------------|-------|-----------|--------|--------|------------|------------------|-------|
| Tensile Strength of Terminals    | IEC60068-2-21          | After gradually applying the force specified and keeping the unit fixed for 10±1 sec., the two terminals shall be visually examined for any damage.                                                                                                                                                         | ΔR/R <sub>25</sub>   ≤20%<br>No visible damage              |                   |                 |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
|                                  |                        | <table><tr><td>Terminal diameter</td><td></td><td>Force</td></tr><tr><td>(mm)</td><td></td><td>T(N)</td></tr><tr><td>0.35&lt;d≤0.5</td><td></td><td>5.0</td></tr><tr><td>0.5&lt;d≤0.8</td><td></td><td>10.0</td></tr><tr><td>0.8&lt;d≤1.25</td><td></td><td>20.0</td></tr></table>                          |                                                             | Terminal diameter |                 | Force           | (mm) |         | T(N)   | 0.35<d≤0.5 |                  | 5.0   | 0.5<d≤0.8 |        | 10.0   | 0.8<d≤1.25 |                  | 20.0  |
|                                  |                        | Terminal diameter                                                                                                                                                                                                                                                                                           |                                                             |                   | Force           |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
|                                  |                        | (mm)                                                                                                                                                                                                                                                                                                        |                                                             |                   | T(N)            |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
|                                  |                        | 0.35<d≤0.5                                                                                                                                                                                                                                                                                                  |                                                             |                   | 5.0             |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
| 0.5<d≤0.8                        |                        | 10.0                                                                                                                                                                                                                                                                                                        |                                                             |                   |                 |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
| 0.8<d≤1.25                       |                        | 20.0                                                                                                                                                                                                                                                                                                        |                                                             |                   |                 |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
|                                  |                        |                                                                                                                                                                                                                                                                                                             |                                                             |                   |                 |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
|                                  |                        |                                                                                                                                                                                                                                                                                                             |                                                             |                   |                 |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
|                                  |                        |                                                                                                                                                                                                                                                                                                             |                                                             |                   |                 |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
| Solderability                    | IEC60068-2-20          | 245±3℃ ,3±0.3sec,<br>4±1mm from body .                                                                                                                                                                                                                                                                      | At least 95% of terminal electrode is covered by new solder |                   |                 |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
| Resistance to Soldering Heat     | IEC60068-2-20          | 260±3℃ , 10±1 sec,<br>4±1mm from body                                                                                                                                                                                                                                                                       | ΔR/R <sub>25</sub>   ≤20%<br>No visible damage              |                   |                 |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
| Vibration                        | IEC60068-2-6           | Frequency range:10~55Hz<br>Amplitude:0.75mm or 98m/S2<br>Direction:3 mutually perpendicular directions ,2hrs each.                                                                                                                                                                                          | ΔR/R <sub>25</sub>   ≤20%<br>No visible damage              |                   |                 |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
| Shock                            | IEC60068-2-27          | Wave: half-sine ΔV:1.0m/s<br>Acceleration:50m/s2 Pulse time:30ms                                                                                                                                                                                                                                            | ΔR/R <sub>25</sub>   ≤20%<br>No visible damage              |                   |                 |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
| Rapid Change of Temperature      | IEC60068-2-14          | The rapid change conditions shown below shall be repeated 5 cycles.                                                                                                                                                                                                                                         | ΔR/R <sub>25</sub>   ≤20%<br>No visible damage              |                   |                 |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
|                                  |                        | <table><tr><td>Step</td><td>Temperature(℃)</td><td>Period(minutes)</td></tr><tr><td>1</td><td>-40 ± 3</td><td>30 ± 3</td></tr><tr><td>2</td><td>Room temperature</td><td>5 ± 3</td></tr><tr><td>3</td><td>85 ± 2</td><td>30 ± 3</td></tr><tr><td>4</td><td>Room temperature</td><td>5 ± 3</td></tr></table> |                                                             | Step              | Temperature(℃)  | Period(minutes) | 1    | -40 ± 3 | 30 ± 3 | 2          | Room temperature | 5 ± 3 | 3         | 85 ± 2 | 30 ± 3 | 4          | Room temperature | 5 ± 3 |
|                                  |                        | Step                                                                                                                                                                                                                                                                                                        |                                                             | Temperature(℃)    | Period(minutes) |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
|                                  |                        | 1                                                                                                                                                                                                                                                                                                           |                                                             | -40 ± 3           | 30 ± 3          |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
|                                  |                        | 2                                                                                                                                                                                                                                                                                                           |                                                             | Room temperature  | 5 ± 3           |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
| 3                                | 85 ± 2                 | 30 ± 3                                                                                                                                                                                                                                                                                                      |                                                             |                   |                 |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
| 4                                | Room temperature       | 5 ± 3                                                                                                                                                                                                                                                                                                       |                                                             |                   |                 |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
|                                  |                        |                                                                                                                                                                                                                                                                                                             |                                                             |                   |                 |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
|                                  |                        |                                                                                                                                                                                                                                                                                                             |                                                             |                   |                 |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
|                                  |                        |                                                                                                                                                                                                                                                                                                             |                                                             |                   |                 |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
| Climatic sequence                | IEC60738-1             | +40 ℃ ,20%R.H X 24hrs →100 ℃ X 16hrs→25℃ X 2hrs→<br>+40 ℃ ,95%R.HX 24hrs→ 0 ℃ X 2hrs→+40 ℃ ,95%R.HX 24hrs→<br>25 ℃ X (1~2)hrs                                                                                                                                                                               | ΔR/R <sub>25</sub>   ≤20%<br>No visible damage              |                   |                 |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
| High Temperature Storage         | IEC60068-2-2           | 60 ℃ , for 1000 hrs                                                                                                                                                                                                                                                                                         | ΔR/R <sub>25</sub>   ≤20%<br>No visible damage              |                   |                 |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
| High Temperature Continuous Load | IEC60738-1             | 60℃ , Vmax, It<I<Imax for 1000 hrs                                                                                                                                                                                                                                                                          | ΔR/R <sub>25</sub>   ≤20%<br>No visible damage              |                   |                 |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
| Damp Heat, Steady State          | IEC60068-2-3           | 40±2℃ ,90~95%RH, for 1000±2 hrs                                                                                                                                                                                                                                                                             | ΔR/R <sub>25</sub>   ≤20%<br>No visible damage              |                   |                 |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
| Over Current                     | Specification Standard | 220Vrms, Imax, 60s on and 600s off , ×20 cycles                                                                                                                                                                                                                                                             | ΔR/R <sub>25</sub>   ≤20%<br>No visible damage              |                   |                 |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
| Power Contact                    | ITU-T K.20 9.4         | 230Vrms,10Ω, 15Min                                                                                                                                                                                                                                                                                          | ΔR/R <sub>25</sub>   ≤20%<br>No visible damage              |                   |                 |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
| Lightning Surge                  | ITU-T K30 4.2.5        | DC:1.0KV, 10/1000μs,25A,×30 cycles<br>DC:1.5KV, 10/310μs,37.5A,x10cycles                                                                                                                                                                                                                                    | ΔR/R <sub>25</sub>   ≤20%<br>No visible damage              |                   |                 |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |
| Power Induction                  | Specification Standard | 650Vrms,600Ω,1s on and 60s off ×10 cycles                                                                                                                                                                                                                                                                   | ΔR/R <sub>25</sub>   ≤20%<br>No visible damage              |                   |                 |                 |      |         |        |            |                  |       |           |        |        |            |                  |       |

# CPTC Thermistor: Dip Type PPL Series Overload Protection for Telecom Application



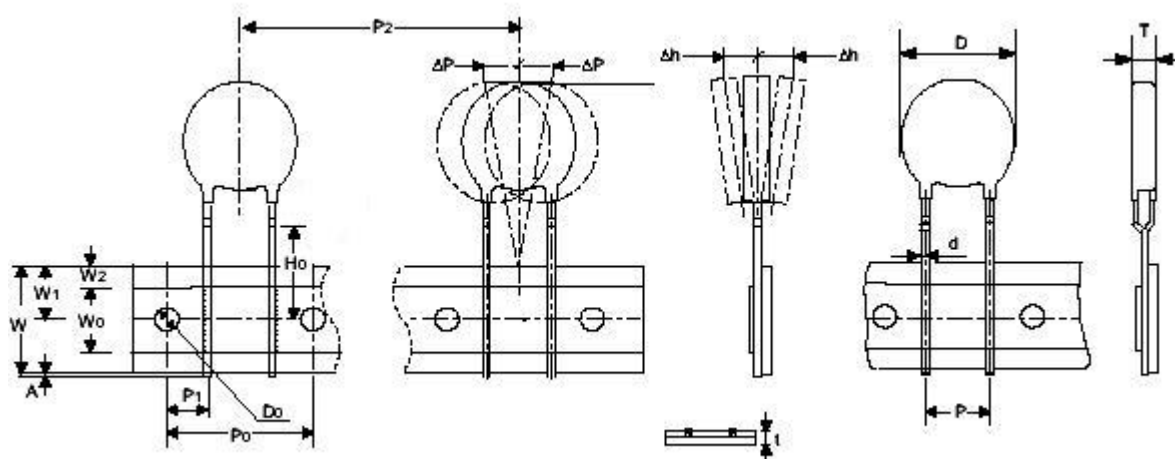
## ■ Packaging

Lead Space 7.5mm (P0=12.7mm)



Lead Space 5.0mm & 7.5mm (P0=15mm)

Lead Space 5.0mm (P0=12.7mm)



# CPTC Thermistor: Dip Type PPL Series

## Overload Protection for Telecom Application



(Unit: mm)

| Index   | Parameter                                | Nominal dimensions |      |             |      | Tolerance |
|---------|------------------------------------------|--------------------|------|-------------|------|-----------|
| P       | Lead spacing                             | 5                  | 7.5  | 5           | 7.5  | ±1        |
| P0      | Sprocket hole pitch                      | 12.7               | 12.7 | 15          | 15   | ±0.3      |
| P1      | Lead location                            | 3.85               | 8.95 | 5           | 3.75 | ±1        |
| P2      | Component pitch                          | 12.7 (D≤10)        |      | 15.0 (D≤10) |      | ±1        |
|         |                                          | 25.4 (D>10)        |      | 30.0 (D>10) |      |           |
| H0      | Height between component and tape centre | 16                 | 16   | 16          | 16   | +0.5      |
| W       | Carrier tape width                       | 18                 | 18   | 18          | 18   | ±1        |
| W0      | Adhesive tape width                      | 12                 | 12   | 12          | 12   | ±1        |
| W1      | Sprocket hole position                   | 9                  | 9    | 9           | 9    | ±1        |
| W2(max) | Adhesive tape position                   | 3                  | 3    | 3           | 3    | Max. 3    |
| △P      | Component alignment                      | 1                  | 1    | 1           | 1    | Max. 1    |
| △h      | Component alignment                      | 2                  | 2    | 2           | 2    | Max. 2    |
| A       | Tip length                               | 0.5                | 0.5  | 0.5         | 0.5  | Max. 0.5  |
| D0      | Sprocket hole diameter                   | 4                  | 4    | 4           | 4    | ±0.2      |
| t       | Total tape thickness                     | 0.6                | 0.6  | 0.6         | 0.6  | ±0.2      |

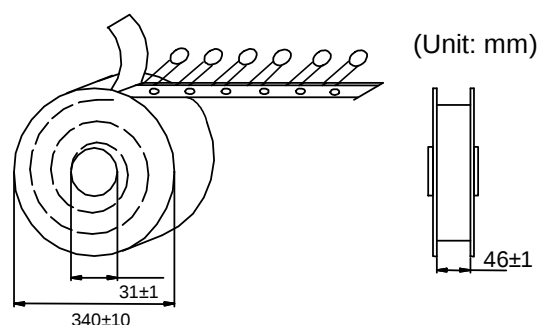
### ■ Quantity

#### ● Bulk Packing

| Type             | Quantity (Pcs/bag) |
|------------------|--------------------|
| $\Phi \leq 10$   | 200                |
| $10 < \Phi < 20$ | 100                |

#### ● Reel Packing

| Type                | Quantity (Pcs/Reel) |
|---------------------|---------------------|
| $07 < \Phi \leq 12$ | 1000                |
| $12 < \Phi \leq 16$ | 750                 |

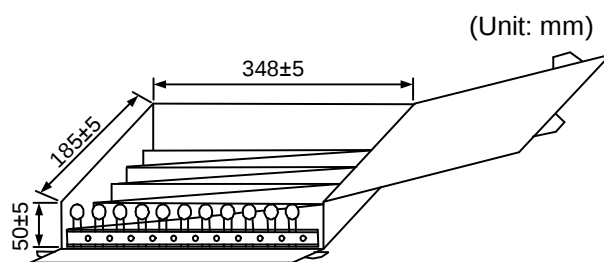


# CPTC Thermistor: Dip Type PPL Series Overload Protection for Telecom Application



- Ammo Packing

| Type                | Quantity(pcs/Box) |
|---------------------|-------------------|
| $07 < \Phi \leq 12$ | 750               |
| $12 < \Phi \leq 16$ | 500               |



## ■ Storage condition of products

- Storage Conditions :
  1. Storage Temperature :  $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$
  2. Relative Humidity :  $\leq 75\% \text{RH}$
  3. Keep away from corrosive atmosphere and sunlight.
- Period of Storage : 1 year

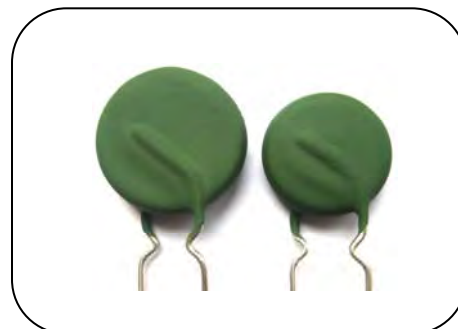
# CPTC Thermistor: PP Series

## Lead Type Inrush Current Limiter



### ■ Features

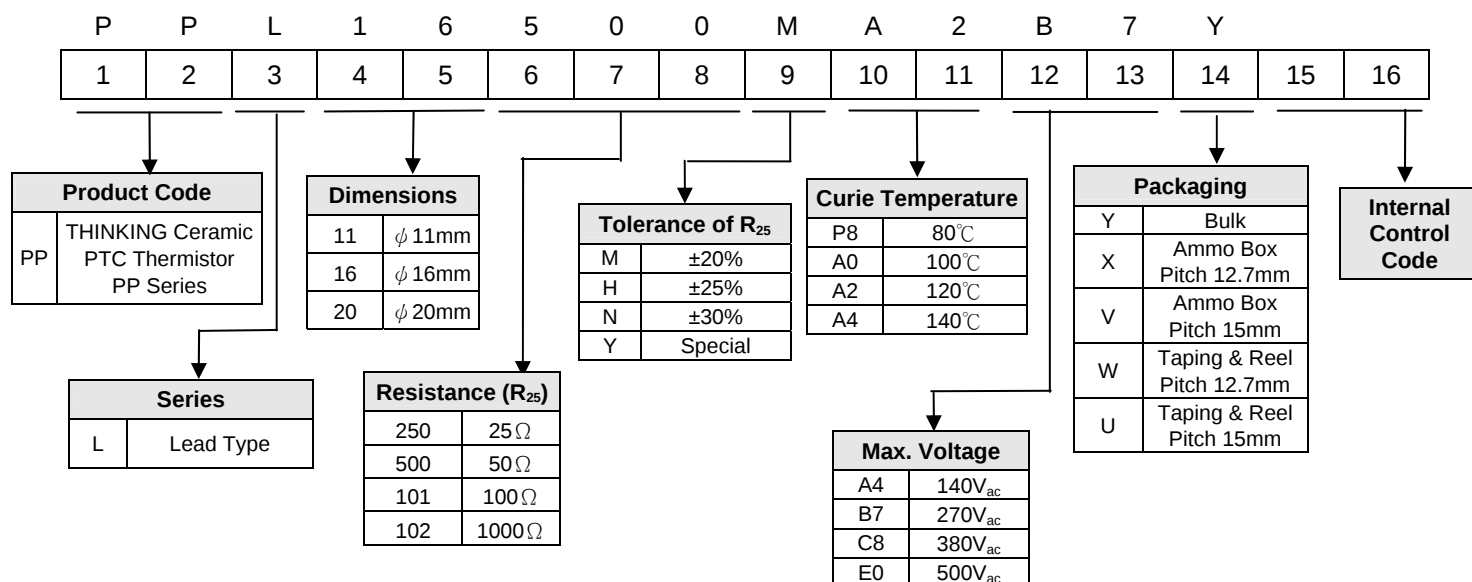
1. RoHS compliant
2. Lead type
3. Voltage rating: 270Vac~500Vac
4. Resistance range: 10~1000Ω
5. Stable over a long time
6. Operating temperature range:
  - 20 ~ +85°C (V=Vmax)
  - 40 ~ +125°C (V=0)
7. Agency Recognition:
  - UL/cUL File No. E138827



### ■ Recommended Applications

1. Air conditioner
2. Server
3. LED lamp
4. Switch power supply

### ■ Part Number Code



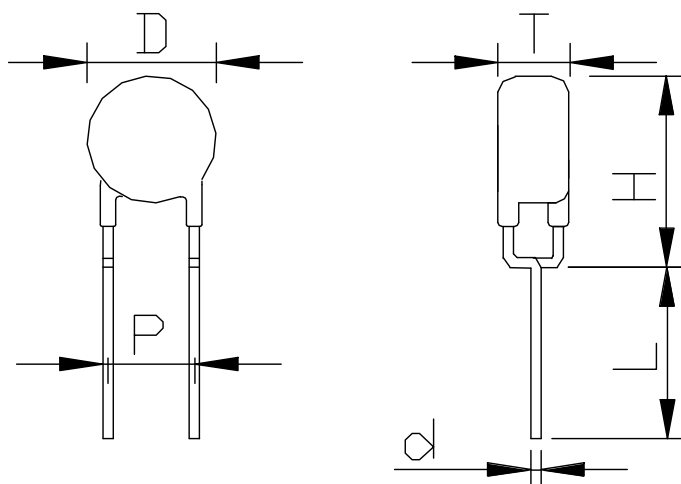
# CPTC Thermistor: PP Series

## Lead Type Inrush Current Limiter



### ■ Structure and Dimensions

#### ● Structure



#### ● Dimensions

(Unit: mm)

| Part No.      | D    | T    | H    | d     | P    | L    |
|---------------|------|------|------|-------|------|------|
|               | max  | max  | max  | ±0.02 | ±1.0 | Min. |
| PPL11250□A2C8 | 13   | 6    | 17   | 0.6   | 5    | 25   |
| PPL11500□A2C8 | 13   | 7    | 17   | 0.6   | 5    | 25   |
| PPL11800□A2C8 | 13   | 7    | 17   | 0.6   | 5    | 25   |
| PPL11121□A2C8 | 13   | 7    | 17   | 0.6   | 5    | 25   |
| PPL11151□A2C8 | 13   | 7    | 17   | 0.6   | 5    | 25   |
| PPL11501□A2E0 | 13   | 7    | 17   | 0.6   | 5    | 25   |
| PPL14121□A3D4 | 15   | 7.5  | 19.5 | 0.8   | 5    | 25   |
| PPL16270□A2B7 | 18   | 7    | 21.5 | 1.0   | 10   | 25   |
| PPL16350□A2B7 | 18   | 7    | 21.5 | 1.0   | 10   | 25   |
| PPL16500□A2B7 | 18   | 7    | 21.5 | 1.0   | 10   | 25   |
| PPL16251□A2E0 | 18   | 7    | 21.5 | 1.0   | 10   | 25   |
| PPL19100□A1B7 | 21.5 | 10.7 | 25.5 | 1.0   | 10   | 25   |
| PPL19500□A0C8 | 21.5 | 10.7 | 25.5 | 1.0   | 10   | 25   |
| PPL19102□A0D8 | 21.5 | 10.7 | 25.5 | 1.0   | 10   | 25   |
| PPL20330□A3B7 | 22   | 10.7 | 25.5 | 1.0   | 10   | 25   |

# CPTC Thermistor: PP Series

## Lead Type Inrush Current Limiter



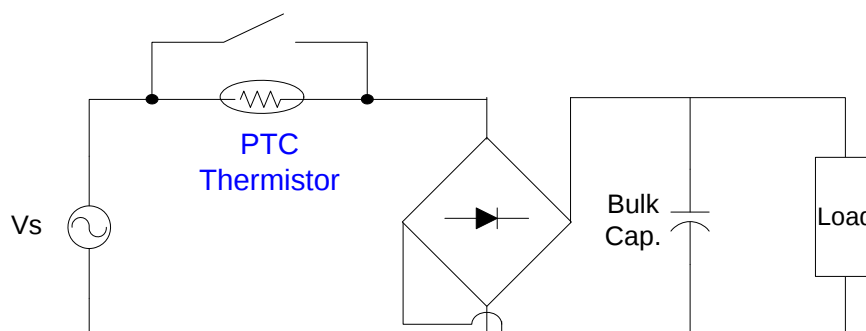
### ■ Characteristics

| Part No.      | Max. Voltage           | Nominal Zero-power Resistance | Curie Temperature   | Thermal Capacity      | Max. Non-operating Energy at 60°C | Safety Approvals |
|---------------|------------------------|-------------------------------|---------------------|-----------------------|-----------------------------------|------------------|
|               | V <sub>max</sub> (Vac) | R <sub>25</sub> (Ω)           | T <sub>c</sub> (°C) | C <sub>th</sub> (J/K) | E <sub>Non60</sub> (J)            | UL/cUL           |
| PPL19100□A1B7 | 270                    | 10                            | 110                 | 3.5                   | 123                               |                  |
| PPL16270□A2B7 | 270                    | 27                            | 120                 | 2.3                   | 97                                |                  |
| PPL20330□A3B7 | 270                    | 33                            | 130                 | 3.8                   | 186                               |                  |
| PPL16350□A2B7 | 270                    | 35                            | 120                 | 2.3                   | 97                                |                  |
| PPL16500□A2B7 | 270                    | 50                            | 120                 | 2.3                   | 97                                | ✓                |
| PPL11250□A2C8 | 380                    | 25                            | 115                 | 1.0                   | 39                                | ✓                |
| PPL11500□A2C8 | 380                    | 50                            | 115                 | 1.4                   | 54                                | ✓                |
| PPL11800□A2C8 | 380                    | 80                            | 115                 | 1.4                   | 54                                | ✓                |
| PPL19500□A0C8 | 380                    | 50                            | 100                 | 3.5                   | 98                                |                  |
| PPL11121□A2C8 | 380                    | 120                           | 115                 | 1.4                   | 54                                | ✓                |
| PPL11151□A2C8 | 380                    | 150                           | 115                 | 1.4                   | 54                                | ✓                |
| PPL14121□A3D4 | 440                    | 120                           | 130                 | 2.1                   | 103                               |                  |
| PPL19102□A0D8 | 480                    | 1000                          | 100                 | 3.8                   | 106                               |                  |
| PPL16251□A2E0 | 500                    | 250                           | 120                 | 2.3                   | 97                                |                  |
| PPL11501□A2E0 | 500                    | 500                           | 115                 | 1.4                   | 54                                | ✓                |

Note: □ is the tolerance of R<sub>25</sub>.

### ■ Application and Selection

#### ● Typical application circuit:



#### ● Selection

Select charging capacitor according to the following formula.

$$C < \frac{0.7 \times (T_c - T_a) \times C_{th} \times 10^6}{0.5 \times V^2} \quad (\text{Unit: } \mu\text{F})$$

C: Bulk Cap.

T<sub>c</sub>: Curie temperature of PTC

V: Voltage of capacitor charging ( $V = 1.414 \times V_s$ )

0.7: Safety factor

T<sub>a</sub>: Ambient temperature

$$E_{\text{Non60}} = 0.7 \times (T_c - T_a) \times C_{th}$$

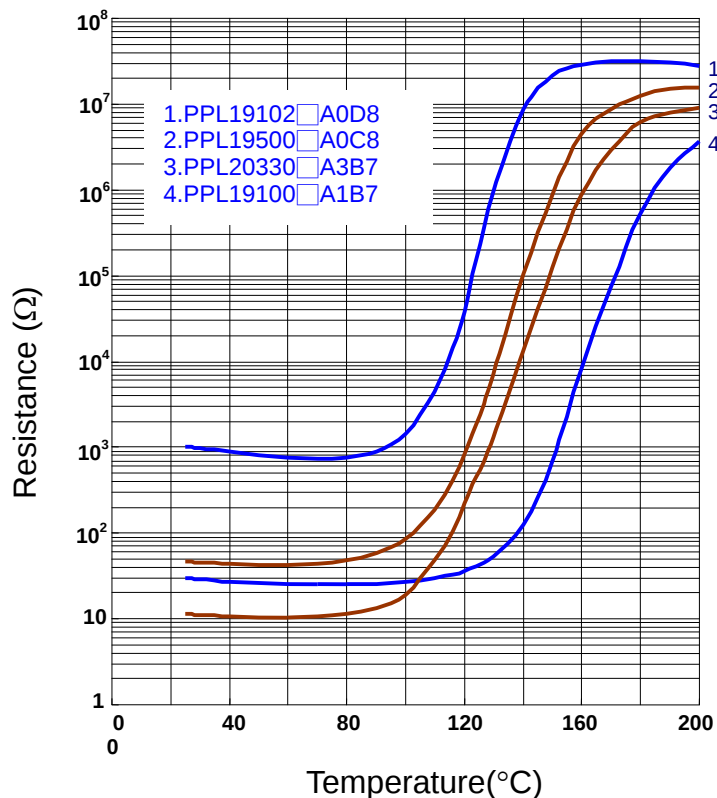
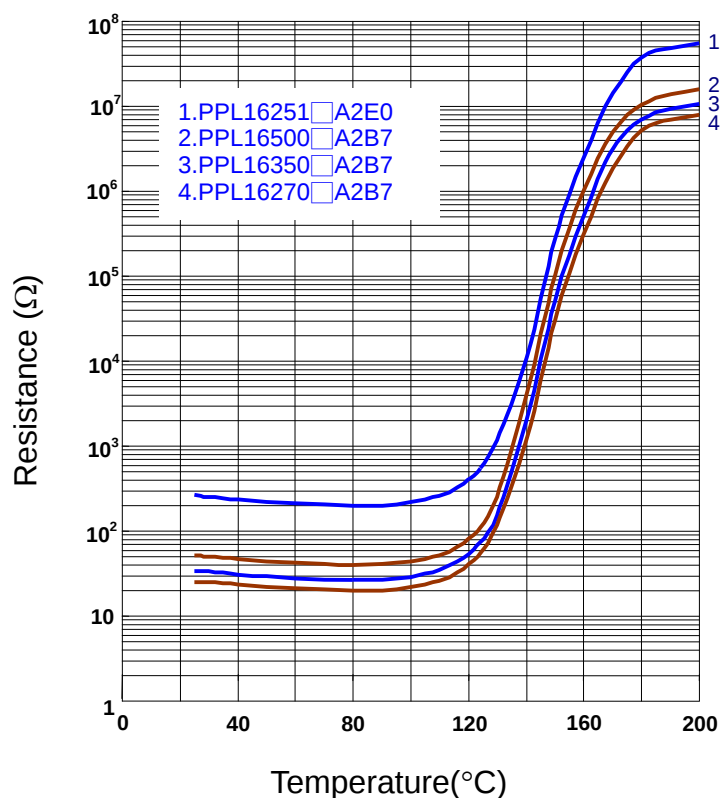
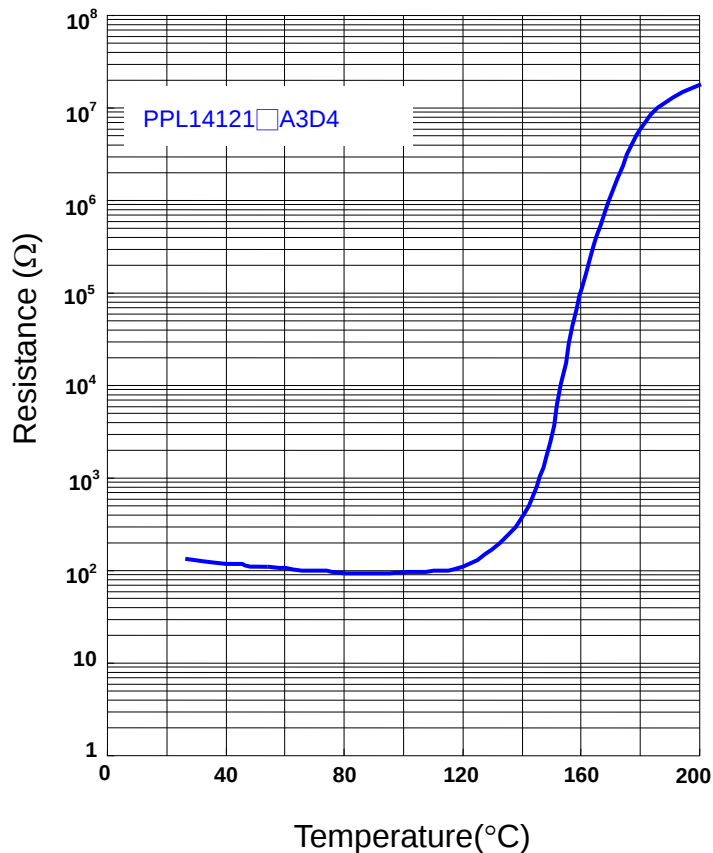
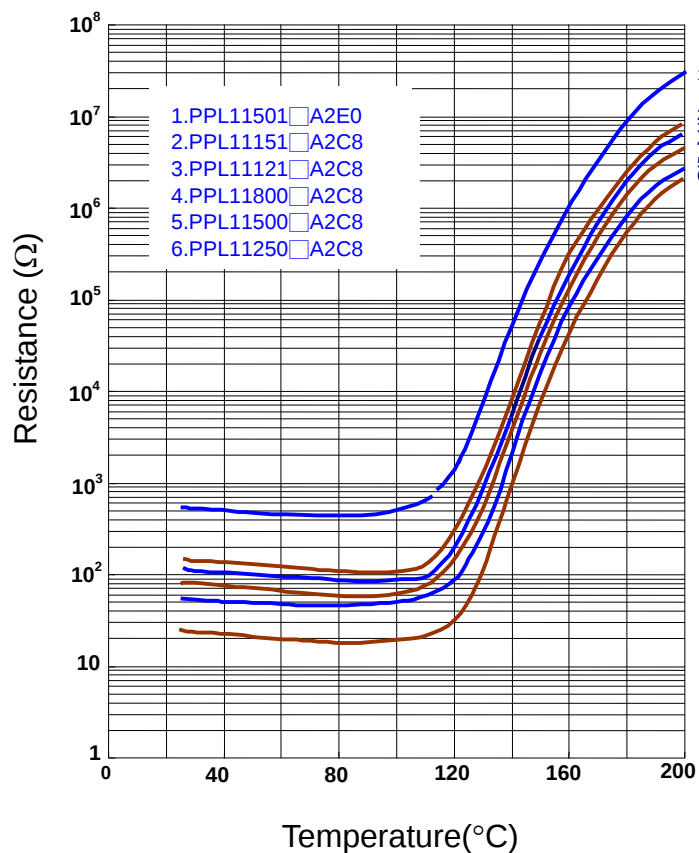
E<sub>Non60</sub>: Max Non-operating Energy at 60°C (T<sub>a</sub> = 60)

# CPTC Thermistor: PP Series

## Lead Type Inrush Current Limiter



### ■ R-T Characteristic Curve (Typical)



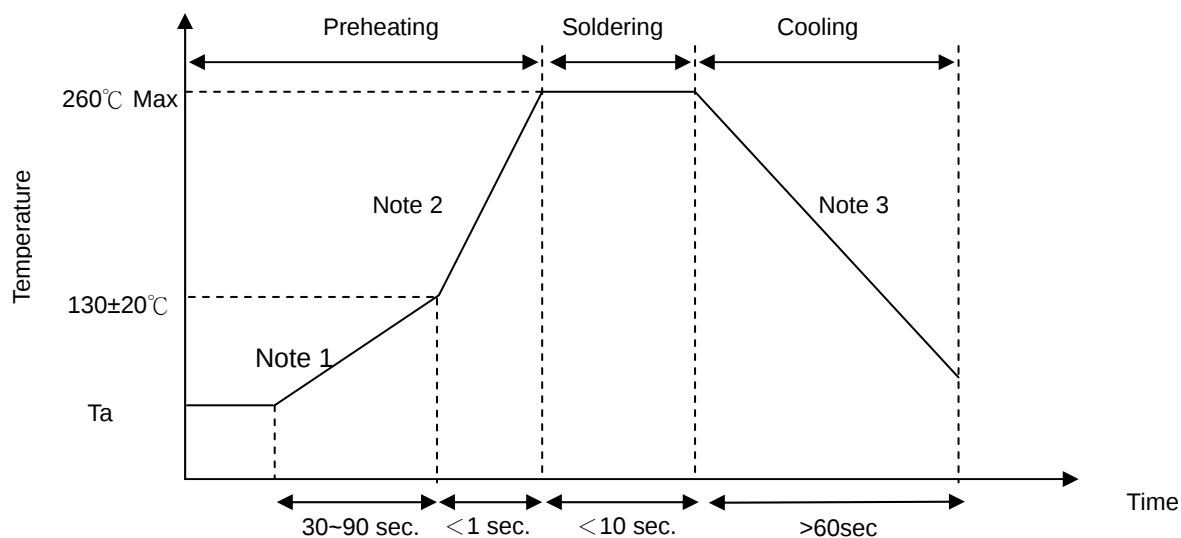
# CPTC Thermistor: PP Series

## Lead Type Inrush Current Limiter



### ■ Soldering Recommendation

#### ● Wave Flow Soldering Profile



#### Note

- 1:  $(1 \sim 3^\circ\text{C})/\text{sec}$
- 2: Approx.  $200^\circ\text{C}/\text{sec}$
- 3:  $5^\circ\text{C}/\text{sec. (Max)}$

#### ● Recommended Reworking Conditions With Soldering Iron

| Item                              | Conditions                 |
|-----------------------------------|----------------------------|
| Temperature of Soldering Iron-tip | $360^\circ\text{C}$ (max.) |
| Soldering Time                    | 3 sec (max.)               |
| Distance from Thermistor          | 2 mm (min.)                |

# CPTC Thermistor: PP Series

## Lead Type Inrush Current Limiter



### ■ Reliability Test

| Item                                                           | Standard               | Test Conditions and Methods                                                                                                                                                                                                                                                                                                                                                            |  | Specifications                                              |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
|----------------------------------------------------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------------------------------|------------------|------------------|-----|-----------|--------|------------|------------------|--------------------------------------|---|--------|--------|---|------------------|-------|--------------------------------------|
| Robustness of Terminations                                     | IEC 60738-1            | Gradually apply the specified force and keep the unit fixed for 10±1 sec.<br><table><tr><td>Terminal diameter<br/>(mm)</td><td>Force<br/>T(N)</td></tr><tr><td>0.35&lt;d≤0.5</td><td>5.0</td></tr><tr><td>0.5&lt;d≤0.8</td><td>10.0</td></tr><tr><td>0.8&lt;d≤1.25</td><td>20.0</td></tr></table>                                                                                      |  | Terminal diameter<br>(mm)                                   | Force<br>T(N)    | 0.35<d≤0.5       | 5.0 | 0.5<d≤0.8 | 10.0   | 0.8<d≤1.25 | 20.0             | △R25/R25   ≤20%<br>No visible damage |   |        |        |   |                  |       |                                      |
| Terminal diameter<br>(mm)                                      | Force<br>T(N)          |                                                                                                                                                                                                                                                                                                                                                                                        |  |                                                             |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| 0.35<d≤0.5                                                     | 5.0                    |                                                                                                                                                                                                                                                                                                                                                                                        |  |                                                             |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| 0.5<d≤0.8                                                      | 10.0                   |                                                                                                                                                                                                                                                                                                                                                                                        |  |                                                             |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| 0.8<d≤1.25                                                     | 20.0                   |                                                                                                                                                                                                                                                                                                                                                                                        |  |                                                             |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| Solderability                                                  | IEC 60738-1            | 245±3 °C , 2±0.5 sec                                                                                                                                                                                                                                                                                                                                                                   |  | At least 95% of terminal electrode is covered by new solder |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| Resistance to Soldering Heat                                   | IEC 60738-1            | 260±3 °C , 10±1 sec                                                                                                                                                                                                                                                                                                                                                                    |  | △R25/R25   ≤20%<br>No visible damage                        |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| Vibration                                                      | IEC 60738-1            | Frequency range:10~55Hz<br>Amplitude: 0.75mm or 98m/s <sup>2</sup><br>Direction: 3 mutually perpendicular directions<br>Duration: 6hrs(3x2 hrs)                                                                                                                                                                                                                                        |  | △R25/R25   ≤20%<br>No visible damage                        |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| Shock                                                          | IEC 60738-1            | Wave: half-sine<br>△V: 1.0m/s<br>Acceleration: 50 m/s <sup>2</sup><br>Pulse time: 30ms                                                                                                                                                                                                                                                                                                 |  | △R25/R25   ≤20%<br>No visible damage                        |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| Rapid Change of Temperature                                    | IEC 60738-1            | The thermal shock conditions shown below shall be repeated 5 cycles.<br><table><tr><th>Step</th><th>Temperature (°C)</th><th>Period (minutes)</th></tr><tr><td>1</td><td>-40 ± 5</td><td>30 ± 3</td></tr><tr><td>2</td><td>Room temperature</td><td>5 ± 3</td></tr><tr><td>3</td><td>85 ± 5</td><td>30 ± 3</td></tr><tr><td>4</td><td>Room temperature</td><td>5 ± 3</td></tr></table> |  | Step                                                        | Temperature (°C) | Period (minutes) | 1   | -40 ± 5   | 30 ± 3 | 2          | Room temperature | 5 ± 3                                | 3 | 85 ± 5 | 30 ± 3 | 4 | Room temperature | 5 ± 3 | △R25/R25   ≤20%<br>No visible damage |
| Step                                                           | Temperature (°C)       | Period (minutes)                                                                                                                                                                                                                                                                                                                                                                       |  |                                                             |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| 1                                                              | -40 ± 5                | 30 ± 3                                                                                                                                                                                                                                                                                                                                                                                 |  |                                                             |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| 2                                                              | Room temperature       | 5 ± 3                                                                                                                                                                                                                                                                                                                                                                                  |  |                                                             |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| 3                                                              | 85 ± 5                 | 30 ± 3                                                                                                                                                                                                                                                                                                                                                                                 |  |                                                             |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| 4                                                              | Room temperature       | 5 ± 3                                                                                                                                                                                                                                                                                                                                                                                  |  |                                                             |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| Climatic Sequence                                              | IEC 60738-1            | Dry heat: 125 °C for 16 hrs<br>Damp heat first cycle: 55°C , 95% R.H ,cycle time: 24 hrs<br>Cold: -40°C for 2 hrs<br>Damp heat (cyclic), remaining cycles: 5 cycles<br>Test according to IEC60068-2-30                                                                                                                                                                                 |  | △R25/R25   ≤20%<br>No visible damage                        |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| Damp Heat, Steady State                                        | IEC 60738-1            | 40±2°C , 90~95% RH, for 1000±2hrs                                                                                                                                                                                                                                                                                                                                                      |  | △R25/R25   ≤20%<br>No visible damage                        |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| Endurance at maximum operating temperature and maximum voltage | IEC 60738-1            | 85°C , V <sub>max</sub> , for 1000hrs                                                                                                                                                                                                                                                                                                                                                  |  | △R25/R25   ≤20%<br>No visible damage                        |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |
| Endurance Test for Charging of Capacitor                       | Specification Standard | Operating cycles at Vmax, 100,000 cycles (charging of capacitor)                                                                                                                                                                                                                                                                                                                       |  | △R25/R25   ≤20%<br>No visible damage                        |                  |                  |     |           |        |            |                  |                                      |   |        |        |   |                  |       |                                      |

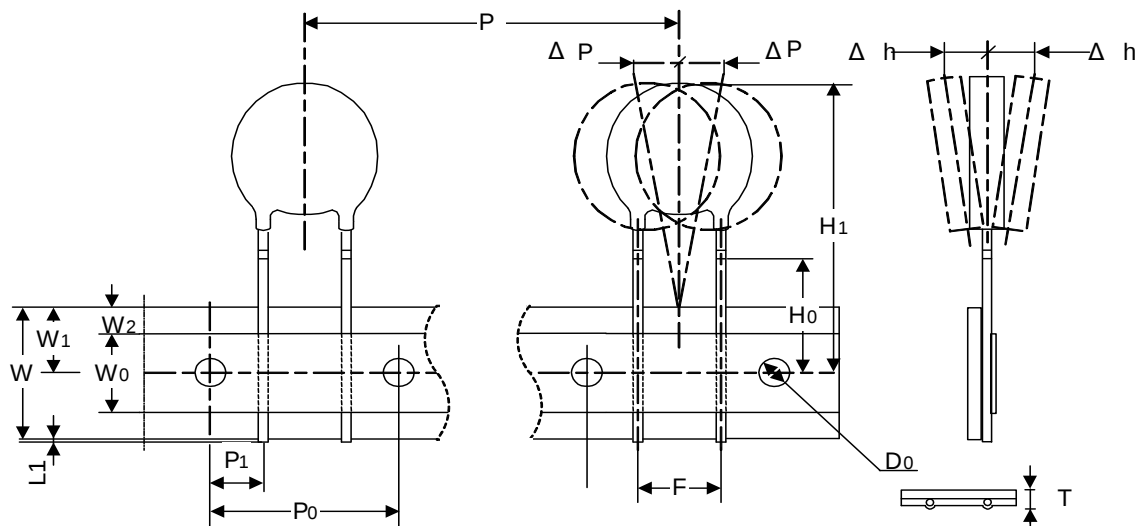
# CPTC Thermistor: PP Series

## Lead Type Inrush Current Limiter



### ■ Packaging

#### ● Taping Specification



#### ● Parameter List

(Unit: mm)

| Index          | Parameter                           | Nominal dimensions             |                                | Tolerance |
|----------------|-------------------------------------|--------------------------------|--------------------------------|-----------|
| F              | Lead spacing                        | 5                              |                                | ±1        |
| P <sub>0</sub> | Sprocket hole pitch                 | 12.7                           | 15                             | ±0.3      |
| P <sub>1</sub> | Ordinate to adjacent component lead | 3.85                           | 5                              | ±1        |
| P              | Device pitch                        | 12.7 (D ≤ 10)<br>25.4 (D > 10) | 15.0 (D ≤ 10)<br>30.0 (D > 10) | ±1        |
| H <sub>0</sub> | Abscissa to plane (kinked lead)     | 16                             | 16                             | ±0.5      |
| H <sub>1</sub> | Abscissa to top                     | 33.5 (D=11)<br>36.0 (D=14)     |                                | Max.      |
| W              | Carrier tape width                  | 18                             | 18                             | ±1        |
| W <sub>0</sub> | Hold-down tape width                | 12                             | 12                             | ±1        |
| W <sub>1</sub> | Sprocket hole position              | 9                              | 9                              | ±1        |
| W <sub>2</sub> | Top distance between tape edges     | 3                              | 3                              | Max. 3    |
| ΔP             | Body tape plane deviation           | 1                              | 1                              | Max. 1    |
| Δh             | Body lateral deviation              | 2                              | 2                              | Max. 2    |
| L <sub>1</sub> | Lead protrusion                     | 0.5                            | 0.5                            | Max. 0.5  |
| D <sub>0</sub> | Sprocket hole diameter              | 4                              | 4                              | ±0.2      |
| T              | Tape thickness                      | 0.6                            | 0.6                            | ±0.2      |

**Note:** D is the PTC disc diameter.

# CPTC Thermistor: PP Series

## Lead Type Inrush Current Limiter



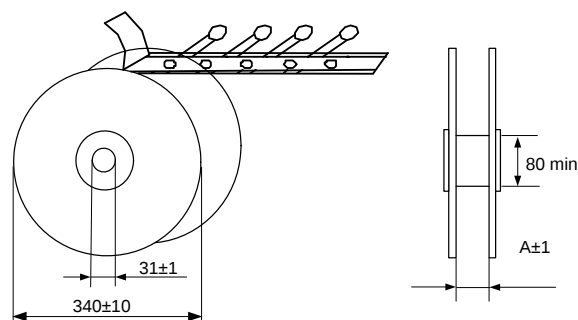
### ■ Quantity

#### ● Bulk Packing

| Disc Size (mm)   | Quantity (Pcs/bag) |
|------------------|--------------------|
| $10 < \Phi < 20$ | 100                |
| $\Phi \geq 20$   | 50                 |

#### ● Reel Packing

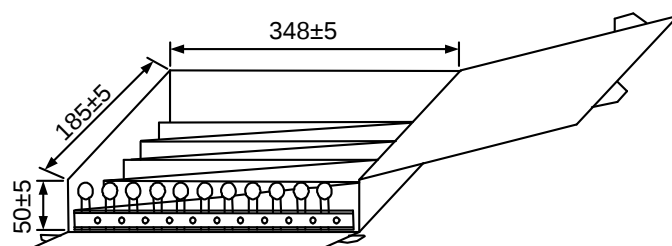
| Disc Size (mm)      | Quantity (Pcs/reel) |
|---------------------|---------------------|
| $07 < \Phi \leq 12$ | 750                 |
| $12 < \Phi \leq 16$ | 500                 |
| $\Phi > 16$         | 250                 |



| Disc Size | $\Phi < 16$ | $\Phi \geq 16$ |
|-----------|-------------|----------------|
| A         | 46          | 55             |

#### ● Ammo Packing

| Disc Size (mm)      | Quantity (Pcs/box) |
|---------------------|--------------------|
| $07 < \Phi \leq 12$ | 750                |
| $12 < \Phi \leq 16$ | 500                |
| $\Phi > 16$         | 250                |



(Unit: mm)

### ■ Warehouse Storage Conditions of Products

#### ● Storage Conditions :

1. Storage Temperature :  $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$
2. Relative Humidity :  $\leq 75\%\text{RH}$
3. Keep away from corrosive atmosphere and sunlight.

#### ● Period of Storage : 1 year

### ■ Usage

Please keep products away from the conditions mentioned below to avoid their characteristic deterioration and failure.

1. Corrosive gas or deoxidizing gas ( $\text{Cl}_2$ ,  $\text{H}_2\text{S}$ ,  $\text{NH}_3$ ,  $\text{SOx}$ ,  $\text{NOx}$  etc.)
2. Place in a vacuum or put pressure
3. Salt water, oil, solvent and chemical liquid
4. Flammable gas
5. Place in splashed water, or high humidity and dewing place
6. Other places similar to any conditions mentioned above

# CPTC Thermistor: Twin SMD Type PPL Series

## Overload Protection for Telecom Application



### ■ Features

1. RoHS compliant
2. Two resistance-matched PTCs in a plastic housing
3. Wide resistance range in telecom area from 10 to 50Ω
4. Agency recognition: UL/cUL/TUV
5. Compliant with ITU-T standards
6. Operating temperature range : 0 ~ +60°C (V=Vmax)  
-25 ~ +125°C (V=0)



### ■ Recommended Applications

1. Cable Modem, ADSL Modem with VOIP
2. Customer Premise Equipment (CPE)
3. Central Office (CO)
4. Access Equipment (AE)
5. Main Distribution Frame (MDF)
6. Public Switched Telephone Network (PSTN)
7. Exchanger

### ■ Part Number Code

|   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| P | P | L | 0 | 7 | 5 | 0 | 0 | M | A  | 0  | C  | 0  |    |    |    |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |

| Product Code |                                        |
|--------------|----------------------------------------|
| PPL          | PTC Thermistor for Overload Protection |

| Dimensions |       |
|------------|-------|
| 07         | φ 7mm |

| Resistance (R <sub>25</sub> ) |     |
|-------------------------------|-----|
| 7R0                           | 7Ω  |
| 100                           | 10Ω |
| 500                           | 50Ω |

| Tolerance of R <sub>25</sub> |         |
|------------------------------|---------|
| K                            | ±10%    |
| L                            | ±15%    |
| M                            | ±20%    |
| H                            | ±25%    |
| N                            | ±30%    |
| Y                            | Special |

| Curie temperature |       |
|-------------------|-------|
| P8                | 80°C  |
| A0                | 100°C |
| A2                | 120°C |
| A4                | 140°C |

| Voltage |                    |
|---------|--------------------|
| A4      | 140V <sub>AC</sub> |
| B5      | 250V <sub>AC</sub> |
| C0      | 300V <sub>AC</sub> |

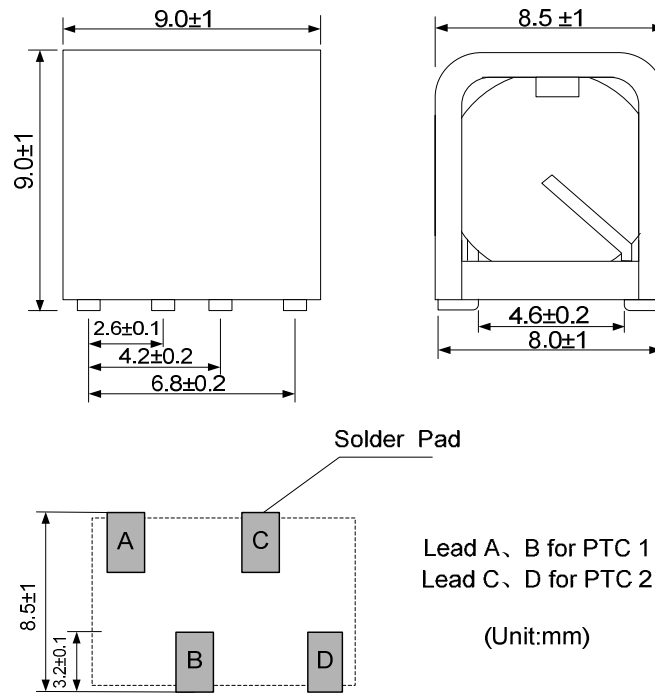
  

| Internal Control Code |  |
|-----------------------|--|
|-----------------------|--|

# CPTC Thermistor: Twin SMD Type PPL Series Overload Protection for Telecom Application



## ■ Structure and Dimensions



## ■ Characteristics

| Part No.        | Nominal Zero-power Resistance | Resistance Matching In Housing       | Non-operating Current at 25°C | Non-operating Current at 40°C | Trip Current at 25°C      | Responding Time (s) |         |            | Max Voltage        | Max. Current         | Safety Approvals |     |
|-----------------|-------------------------------|--------------------------------------|-------------------------------|-------------------------------|---------------------------|---------------------|---------|------------|--------------------|----------------------|------------------|-----|
|                 | R <sub>25</sub> (Ω)           | R <sub>1</sub> -R <sub>2</sub>   (Ω) | I <sub>N</sub> (mA) @25°C     | I <sub>N</sub> (mA) @40°C     | I <sub>t</sub> (mA) @25°C | 3A→0.5A             | 1A→0.5A | 0.5A→0.15A | (V <sub>AC</sub> ) | I <sub>max</sub> (A) | UL/cUL           | TUV |
| PPL07100□A0B5-Y | 10                            | ±0.5                                 | 130                           | 120                           | 390                       | 0.8                 | 8.0     | 35         | 250                | 2.5                  | √                | √   |
| PPL07180□A0B5-Y | 18                            |                                      | 110                           | 100                           | 330                       | 0.4                 | 2.5     | 10         | 250                | 3                    | √                | √   |
| PPL07250□A0B5-Y | 25                            |                                      | 90                            | 80                            | 225                       | 0.35                | 2.0     | 10         | 250                | 3                    | √                | √   |
| PPL07390□A0B5-Y | 39                            |                                      | 70                            | 65                            | 180                       | 0.3                 | 1.0     | 4.0        | 250                | 3                    | √                | √   |
| PPL07500□A0C0-Y | 50                            |                                      | 60                            | 55                            | 165                       | 0.15                | 0.8     | 3.5        | 300                | 3                    | √                | √   |

Note1: □=Tolerance of R<sub>25</sub>

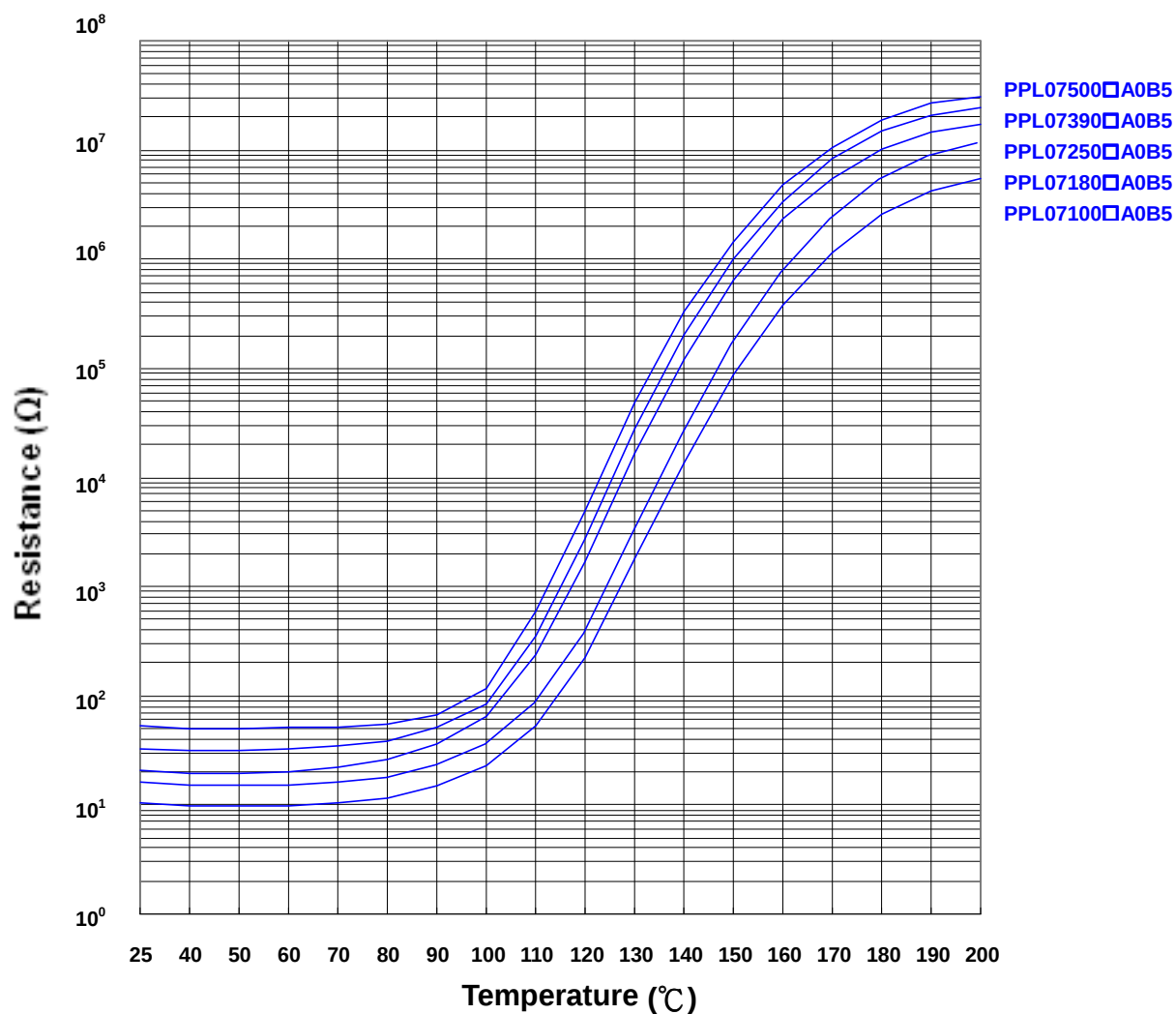
Note2: UL/cUL File No. E138827

TUV File No. R 50171789

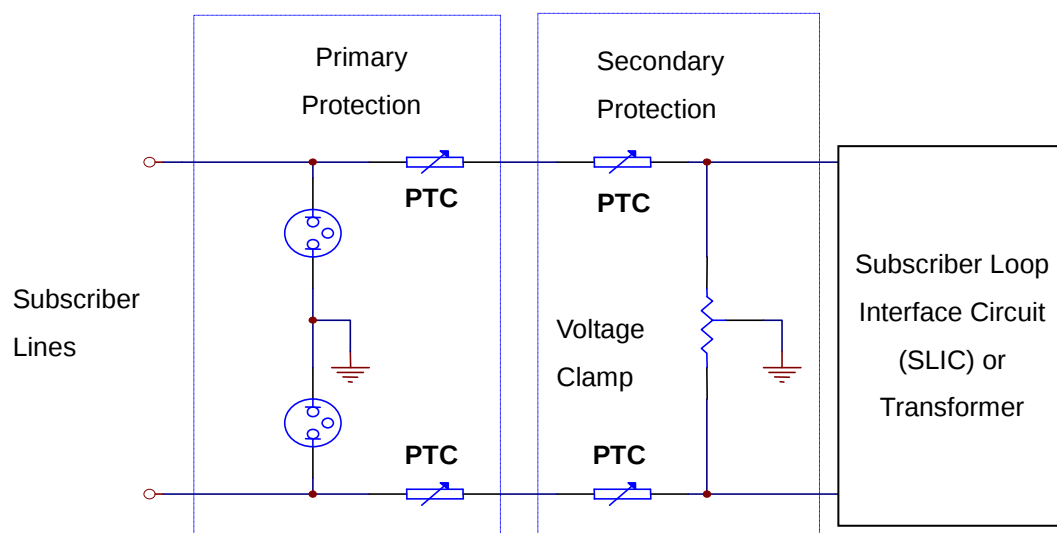
# CPTC Thermistor: Twin SMD Type PPL Series Overload Protection for Telecom Application



## R-T Characteristic Curves (Typical)



## ■ Circuit for Typical Application



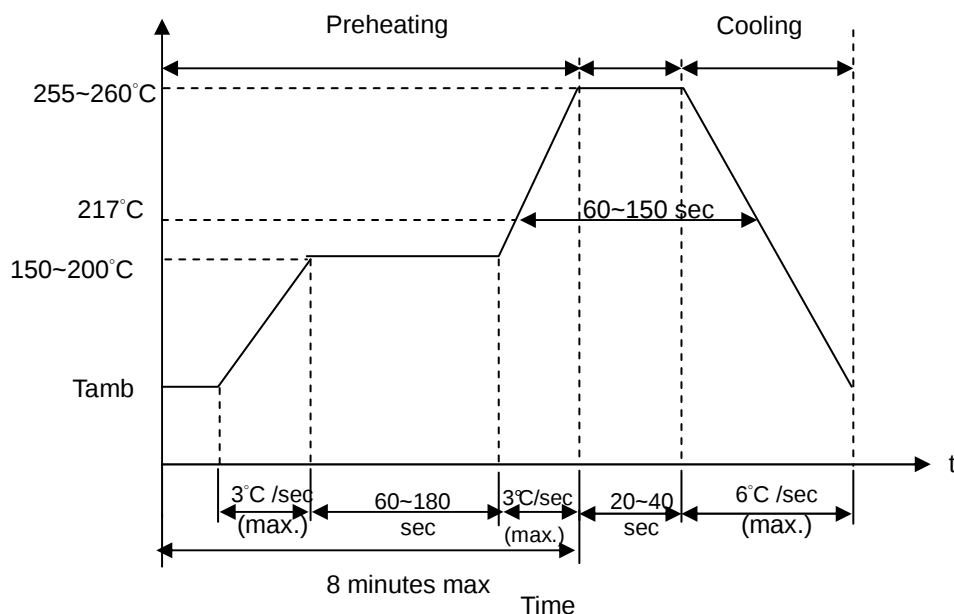
# CPTC Thermistor: Twin SMD Type PPL Series

## Overload Protection for Telecom Application



### ■ Soldering Recommendation

#### ● IR-Reflow Soldering Profile



#### ● Recommended Reworking Conditions With Soldering Iron

| Item                              | Conditions   |
|-----------------------------------|--------------|
| Temperature of Soldering Iron-tip | 360°C (max.) |
| Soldering Time                    | 3 sec (max.) |
| Diameter of Soldering Iron-tip    | Φ3mm (max.)  |

# CPTC Thermistor: Twin SMD Type PPL Series

## Overload Protection for Telecom Application



### ■ Reliability

| Item                             | Standard               | Test conditions / Methods                                                                                                                                                                                                                                                                                                                                                                  | Specifications                                              |                |                 |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                 |
|----------------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|----------------|-----------------|---|---------|--------|---|------------------|-------|---|--------|--------|---|------------------|-------|-------------------------------------------------|
| Solderability                    | IEC60068-2-58          | 245±5℃ , 3±0.3 sec.                                                                                                                                                                                                                                                                                                                                                                        | At least 95% of terminal electrode is covered by new solder |                |                 |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                 |
| Resistance to Soldering Heat     | IEC60068-2-58          | 255±5℃ ,10±1 sec.                                                                                                                                                                                                                                                                                                                                                                          | ΔR/R <sub>25</sub>   ≤ 20%<br>No visible damage             |                |                 |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                 |
| Vibration                        | IEC60068-2-6           | Frequency range: 10~55Hz<br>Amplitude: 0.75mm or 98m/S2<br>Direction: 3 mutually perpendicular directions, 2hrs each.                                                                                                                                                                                                                                                                      | ΔR/R <sub>25</sub>   ≤ 20%<br>No visible damage             |                |                 |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                 |
| Shock                            | IEC60068-2-27          | Wave: half-sine                      ΔV:1.0m/s<br>Acceleration: 50m/s2              Pulse time:30ms                                                                                                                                                                                                                                                                                        | ΔR/R <sub>25</sub>   ≤ 20%<br>No visible damage             |                |                 |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                 |
| Rapid Change of Temperature      | IEC60068-2-14          | <div>The rapid change conditions shown below shall be repeated 5 cycles.</div> <table><tr><td>Step</td><td>Temperature(℃)</td><td>Period(minutes)</td></tr><tr><td>1</td><td>-40 ± 3</td><td>30 ± 3</td></tr><tr><td>2</td><td>Room temperature</td><td>5 ± 3</td></tr><tr><td>3</td><td>85 ± 2</td><td>30 ± 3</td></tr><tr><td>4</td><td>Room temperature</td><td>5 ± 3</td></tr></table> | Step                                                        | Temperature(℃) | Period(minutes) | 1 | -40 ± 3 | 30 ± 3 | 2 | Room temperature | 5 ± 3 | 3 | 85 ± 2 | 30 ± 3 | 4 | Room temperature | 5 ± 3 | ΔR/R <sub>25</sub>   ≤ 20%<br>No visible damage |
| Step                             | Temperature(℃)         | Period(minutes)                                                                                                                                                                                                                                                                                                                                                                            |                                                             |                |                 |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                 |
| 1                                | -40 ± 3                | 30 ± 3                                                                                                                                                                                                                                                                                                                                                                                     |                                                             |                |                 |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                 |
| 2                                | Room temperature       | 5 ± 3                                                                                                                                                                                                                                                                                                                                                                                      |                                                             |                |                 |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                 |
| 3                                | 85 ± 2                 | 30 ± 3                                                                                                                                                                                                                                                                                                                                                                                     |                                                             |                |                 |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                 |
| 4                                | Room temperature       | 5 ± 3                                                                                                                                                                                                                                                                                                                                                                                      |                                                             |                |                 |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                 |
| Climatic Sequence                | IEC60738-1             | +40 ℃ , 20%R.H X 24hrs →100 ℃ X 16hrs→25℃ X 2hrs→+40 ℃ , 95%R.HX 24hrs→ 0 ℃ X 2hrs→+40 ℃ , 95%R.HX 24hrs→ 25 ℃ X (1~2)hrs                                                                                                                                                                                                                                                                  | ΔR/R <sub>25</sub>   ≤ 20%<br>No visible damage             |                |                 |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                 |
| High Temperature Storage         | IEC60068-2-2           | 60℃ , for 1000 hrs                                                                                                                                                                                                                                                                                                                                                                         | ΔR/R <sub>25</sub>   ≤ 20%<br>No visible damage             |                |                 |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                 |
| High Temperature Continuous Load | IEC60738-1             | 60℃ , Vmax, It<I<Imax for 1000 hrs                                                                                                                                                                                                                                                                                                                                                         | ΔR/R <sub>25</sub>   ≤ 20%<br>No visible damage             |                |                 |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                 |
| Damp Heat, Steady State          | IEC60068-2-3           | 40±2℃ , 90~95%RH, for 1000±2 hrs                                                                                                                                                                                                                                                                                                                                                           | ΔR/R <sub>25</sub>   ≤ 20%<br>No visible damage             |                |                 |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                 |
| Over Current                     | Specification Standard | 220Vrms, 3A, 60s on and 600s off , ×20 cycles                                                                                                                                                                                                                                                                                                                                              | ΔR/R <sub>25</sub>   ≤ 20%<br>No visible damage             |                |                 |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                 |
| Power Contact                    | ITU-T K.20 9.4         | 230Vrms,10Ω, 15Min                                                                                                                                                                                                                                                                                                                                                                         | ΔR/R <sub>25</sub>   ≤ 20%<br>No visible damage             |                |                 |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                 |
| Lightning Surge                  | ITU-T K30 4.2.5        | DC:1.0KV , 10/1000μs,25A,×30 cycles<br>DC:1.5KV , 10/310μs,37.5A,×10cycles                                                                                                                                                                                                                                                                                                                 | ΔR/R <sub>25</sub>   ≤ 20%<br>No visible damage             |                |                 |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                 |
| Power Induction                  | Specification Standard | 650Vrms, 600Ω, 1s on and 60s off ×10 cycles                                                                                                                                                                                                                                                                                                                                                | ΔR/R <sub>25</sub>   ≤ 20%<br>No visible damage             |                |                 |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                 |

# CPTC Thermistor: Twin SMD Type PPL Series

## Overload Protection for Telecom Application

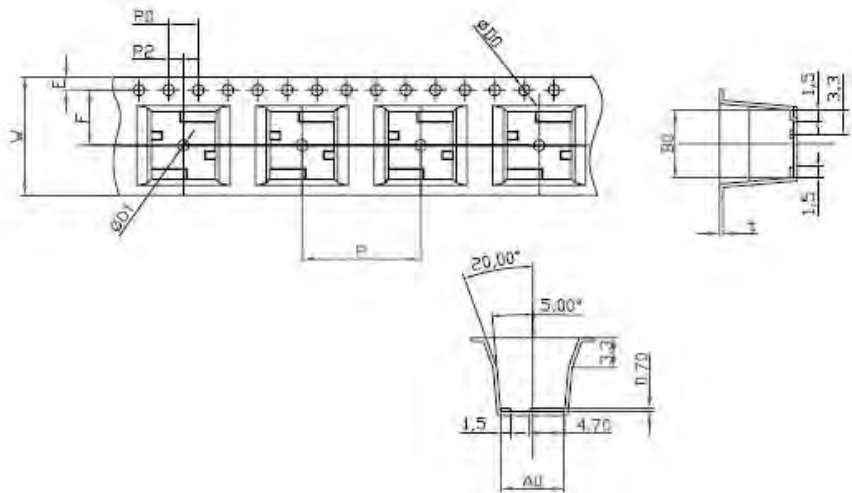


### ■ Packaging

- Taping Specification

(Unit: mm)

| Index | Nominal dimensions | Tolerance   |
|-------|--------------------|-------------|
| W     | 16.00              | ±0.30       |
| P     | 16.00              | ±0.10       |
| E     | 1.75               | ±0.10       |
| F     | 7.50               | ±0.10       |
| P2    | 2.00               | ±0.10       |
| P0    | 4.00               | ±0.10       |
| D0    | 1.50               | +0.10/-0.00 |
| D1    | 1.50               | +0.10/-0.00 |
| A0    | 8.4                | ±0.10       |
| B0    | 8.9                | ±0.10       |
| K0    | 9.3                | ±0.10       |
| t     | 0.5                | ±0.05       |

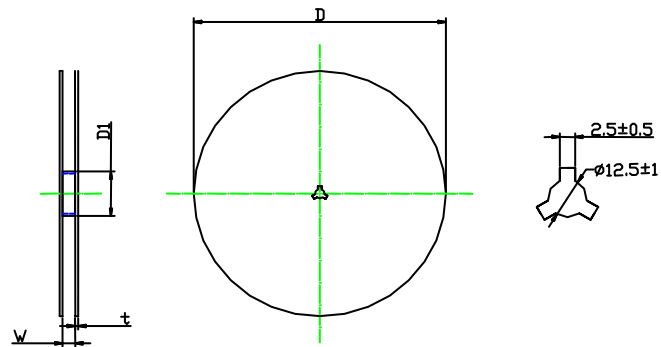


### ■ Quantity

Reel packing: 400 pcs / reel

(Unit: mm)

| Item | Nominal dimensions | Tolerance |
|------|--------------------|-----------|
| D    | 330                | ±5        |
| W    | 17.5               | ±0.5      |
| t    | 5                  | ±0.5      |
| D1   | 75                 | ±1.5      |



### ■ Storage condition of products

- Storage Conditions :
  1. Storage Temperature : -10℃~+40℃
  2. Relative Humidity : ≤ 75%RH
  3. Keep away from corrosive atmosphere and sunlight.
- Period of Storage: 1 year.

# CPTC Thermistor: PSA Series For Motor Starting Application



## ■ Features

1. RoHS compliant
2. PSA versions are uncased, metalized disc for clamp-contacting
3. Voltage ratings: from 160V<sub>ac</sub> to 430V<sub>ac</sub>
4. Stable over a long life
5. Operating temperature range
  - 10 ~ +85°C (V=V<sub>max</sub>)
  - 25 ~ +125°C (V=0)
6. Agency recognition:
  - UL&cUL File No.: E138827
  - VDE File No.: 40017625
  - TUV File No.: R 50030891
  - CQC File No.: CQC03001008127 ,CQC03001008128



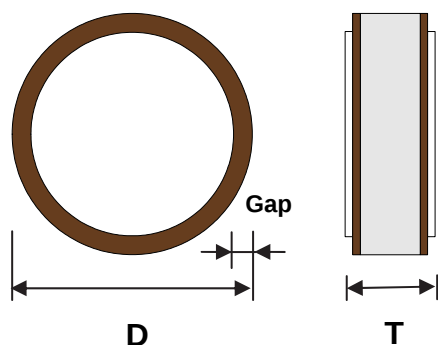
## ■ Recommended Applications

Time delay relay for compressors in refrigerators or freezers.

## ■ Part Number Code

| P                                                                         | S | A                                                                     | 3 | 3                                                                             | 0 | H                                                               | A | G                                          | C  | 6                                             | 0  | 4                                |    |    | Y  |
|---------------------------------------------------------------------------|---|-----------------------------------------------------------------------|---|-------------------------------------------------------------------------------|---|-----------------------------------------------------------------|---|--------------------------------------------|----|-----------------------------------------------|----|----------------------------------|----|----|----|
| 1                                                                         | 2 | 3                                                                     | 4 | 5                                                                             | 6 | 7                                                               | 8 | 9                                          | 10 | 11                                            | 12 | 13                               | 14 | 15 | 16 |
| <b>Product Code</b><br>PS THINKING Ceramic<br>PTC Thermistor<br>PS Series |   | <b>Resistance (R<sub>25</sub>)</b><br>4R7 4.7Ω<br>330 33Ω<br>101 100Ω |   | <b>Curie Temperature</b><br>A2 120°C<br>A3 130°C<br>AG 135°C                  |   | <b>Max. Voltage</b><br>A4 140V<br>A8 180V<br>C6 360V<br>E0 500V |   | <b>Structure Code</b><br>04 ,05 ,06 and 33 |    | <b>Optional Suffix</b><br>Y RoHS<br>Compliant |    | <b>Internal Control<br/>Code</b> |    |    |    |
|                                                                           |   |                                                                       |   |                                                                               |   |                                                                 |   |                                            |    |                                               |    |                                  |    |    |    |
| <b>Series</b><br>A Disc Type                                              |   |                                                                       |   | <b>Tolerance of R<sub>25</sub></b><br>M ±20%<br>H ±25%<br>N ±30%<br>Y Special |   |                                                                 |   |                                            |    |                                               |    |                                  |    |    |    |

## ■ Structures and Dimensions



Gap: 0.9±0.6 mm

| Series | Dimensions (mm) |         |
|--------|-----------------|---------|
|        | D               | T       |
| PSA*04 | 20.0(+0.5/-1.0) | 2.5±0.2 |
| PSA*05 | 17.5(+0.5/-1.0) | 2.5±0.2 |
| PSA*06 | 16(+0.5/-1.0)   | 2.5±0.2 |
| PSA*33 | 20(+0.5/-1.0)   | 3.2±0.2 |

# CPTC Thermistor: PSA Series For Motor Starting Application



## ■ Characteristics

| Part No.      | Nominal Resistance  | Rated Voltage                     | Max. Voltage                        | Max. Current         | Operating Time     | Power Consumption    | Recovery Time         | Safety Approvals |     |     |     |
|---------------|---------------------|-----------------------------------|-------------------------------------|----------------------|--------------------|----------------------|-----------------------|------------------|-----|-----|-----|
|               | R <sub>25</sub> (Ω) | V <sub>r</sub> (V <sub>ac</sub> ) | V <sub>max</sub> (V <sub>ac</sub> ) | I <sub>max</sub> (A) | t <sub>o</sub> (s) | P <sub>max</sub> (W) | t <sub>rmax</sub> (s) | UL/cUL           | VDE | TUV | CQC |
| PSA3R3□AGA604 | 3.3                 | 120                               | 160                                 | 12                   | 0.3-1.2            | 3.5                  | 70                    | ✓                |     | ✓   | ✓   |
| PSA4R7□AGA804 | 4.7                 | 120                               | 180                                 | 12                   | 0.3-1.2            | 3.5                  | 70                    | ✓                |     | ✓   | ✓   |
| PSA6R8□AGB004 | 6.8                 | 120                               | 200                                 | 10                   | 0.3-1.8            | 3.5                  | 70                    | ✓                |     | ✓   | ✓   |
| PSA100□AGB304 | 10                  | 120                               | 230                                 | 9                    | 0.2-1.3            | 3.2                  | 65                    | ✓                |     | ✓   | ✓   |
| PSA150□AGB504 | 15                  | 230                               | 250                                 | 8                    | 0.2-1.0            | 3.2                  | 65                    | ✓                |     | ✓   | ✓   |
| PSA220□AGC004 | 22                  | 230                               | 300                                 | 7                    | 0.2-1.0            | 3.2                  | 65                    | ✓                |     | ✓   | ✓   |
| PSA330□AGC604 | 33                  | 230                               | 360                                 | 6                    | 0.2-1.0            | 3.2                  | 65                    | ✓                |     | ✓   | ✓   |
| PSA470□AGD004 | 47                  | 230                               | 400                                 | 5                    | 0.2-1.0            | 3.2                  | 65                    | ✓                |     | ✓   | ✓   |
| PSA680□AGD304 | 68                  | 230                               | 430                                 | 4                    | 0.2-1.0            | 3.2                  | 65                    | ✓                |     | ✓   | ✓   |
| PSA4R7□AGA805 | 4.7                 | 120                               | 180                                 | 10                   | 0.3-1.0            | 3.4                  | 65                    | ✓                |     | ✓   | ✓   |
| PSA6R8□AGB005 | 6.8                 | 120                               | 200                                 | 9                    | 0.3-1.0            | 3.4                  | 65                    | ✓                |     | ✓   | ✓   |
| PSA100□AGB205 | 10                  | 120                               | 220                                 | 8                    | 0.3-1.0            | 3.2                  | 65                    | ✓                |     | ✓   | ✓   |
| PSA150□AGB405 | 15                  | 230                               | 240                                 | 7                    | 0.2-0.8            | 3.2                  | 65                    | ✓                |     | ✓   | ✓   |
| PSA220□AGB805 | 22                  | 230                               | 280                                 | 6                    | 0.2-0.8            | 3.2                  | 65                    | ✓                |     | ✓   | ✓   |
| PSA330□AGC205 | 33                  | 230                               | 320                                 | 4                    | 0.2-0.8            | 3.2                  | 65                    | ✓                |     | ✓   | ✓   |
| PSA470□AGC505 | 47                  | 230                               | 350                                 | 4                    | 0.2-0.8            | 3.2                  | 65                    | ✓                |     | ✓   | ✓   |
| PSA680□AGD005 | 68                  | 230                               | 400                                 | 4                    | 0.2-0.8            | 3.2                  | 65                    | ✓                |     | ✓   | ✓   |
| PSA4R7□AGA606 | 4.7                 | 120                               | 160                                 | 10                   | 0.3-1.0            | 3.0                  | 50                    | ✓                |     | ✓   | ✓   |
| PSA6R8□AGA806 | 6.8                 | 120                               | 180                                 | 9                    | 0.3-1.0            | 3.0                  | 50                    | ✓                |     | ✓   | ✓   |
| PSA100□AGB006 | 10                  | 120                               | 200                                 | 8                    | 0.3-1.0            | 3.0                  | 50                    | ✓                |     | ✓   | ✓   |
| PSA150□AGC506 | 15                  | 230                               | 350                                 | 7                    | 0.2-0.6            | 3.0                  | 50                    | ✓                | ✓   |     |     |
| PSA220□AGC506 | 22                  | 230                               | 350                                 | 6                    | 0.2-0.6            | 3.0                  | 50                    | ✓                | ✓   |     |     |
| PSA330□AGC506 | 33                  | 230                               | 350                                 | 6                    | 0.2-0.6            | 3.0                  | 50                    | ✓                | ✓   |     |     |
| PSA150□A2C533 | 15                  | 230                               | 350                                 | 8                    | 0.2-1.0            | 3.2                  | 120                   | ✓                | ✓   |     |     |
| PSA250□A2C533 | 22                  | 230                               | 350                                 | 8                    | 0.2-1.0            | 3.2                  | 120                   | ✓                | ✓   |     |     |
| PSA330□A2C533 | 33                  | 230                               | 350                                 | 7                    | 0.2-1.0            | 3.2                  | 120                   | ✓                | ✓   |     |     |

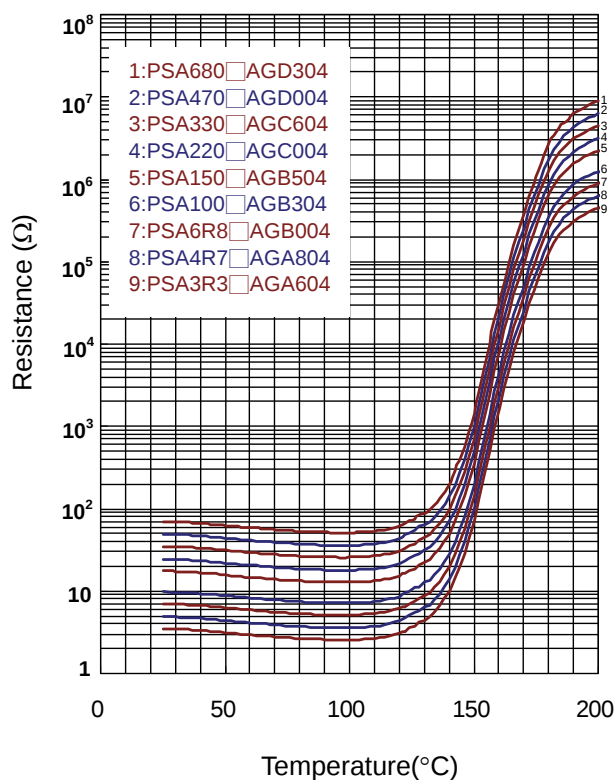
Note : □: Tolerance of R<sub>25</sub>

# CPTC Thermistor: PSA Series For Motor Starting Application

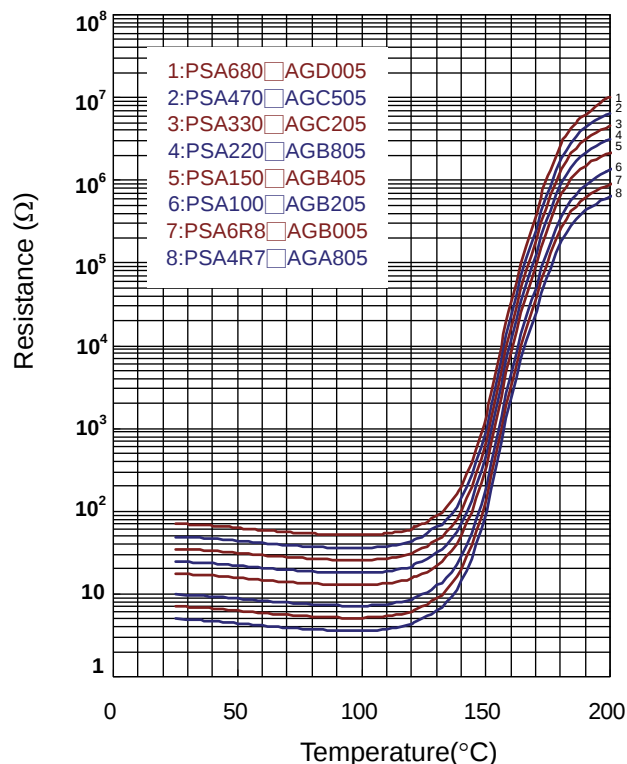


## ■ R-T Characteristic Curve (Typical)

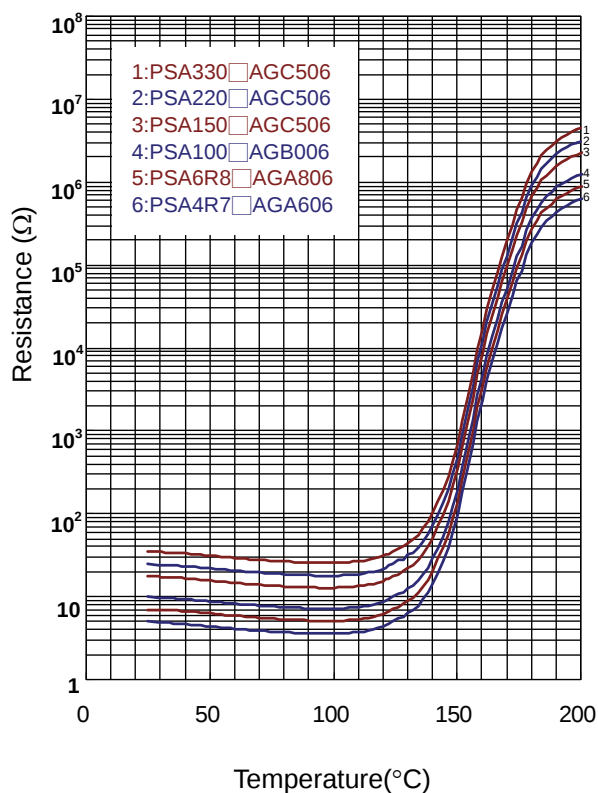
PSA \*04 series



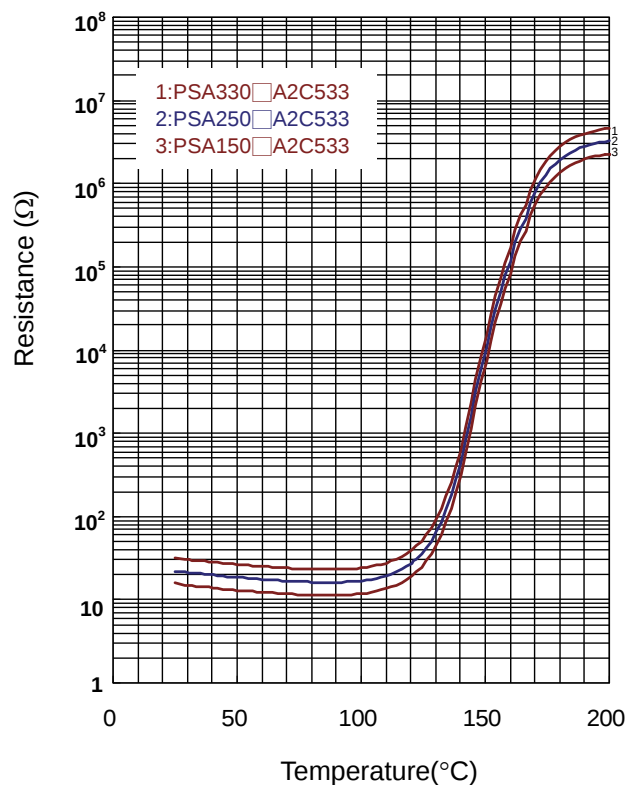
PSA \*05 series



PSA \*06 series



PSA \*33 series



# CPTC Thermistor: PSA Series

## For Motor Starting Application



### ■ Reliability Test

| Item                                                           | Standard         | Test conditions and Methods                                                                                                                                                                                                                                                                                                                                                                    | Specifications                                              |                  |                  |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                            |
|----------------------------------------------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|------------------|------------------|---|---------|--------|---|------------------|-------|---|--------|--------|---|------------------|-------|------------------------------------------------------------|
| Rapid Change of Temperature                                    | IEC 60738-1      | <div>The thermal shock conditions shown below shall be repeated 5 cycles.</div> <table><tr><th>Step</th><th>Temperature (°C)</th><th>Period (minutes)</th></tr><tr><td>1</td><td>-40 ± 5</td><td>30 ± 3</td></tr><tr><td>2</td><td>Room temperature</td><td>5 ± 3</td></tr><tr><td>3</td><td>85 ± 5</td><td>30 ± 3</td></tr><tr><td>4</td><td>Room temperature</td><td>5 ± 3</td></tr></table> | Step                                                        | Temperature (°C) | Period (minutes) | 1 | -40 ± 5 | 30 ± 3 | 2 | Room temperature | 5 ± 3 | 3 | 85 ± 5 | 30 ± 3 | 4 | Room temperature | 5 ± 3 | <div>  ΔR25/R25   ≤ 20%</div> <div>No visible damage</div> |
| Step                                                           | Temperature (°C) | Period (minutes)                                                                                                                                                                                                                                                                                                                                                                               |                                                             |                  |                  |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                            |
| 1                                                              | -40 ± 5          | 30 ± 3                                                                                                                                                                                                                                                                                                                                                                                         |                                                             |                  |                  |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                            |
| 2                                                              | Room temperature | 5 ± 3                                                                                                                                                                                                                                                                                                                                                                                          |                                                             |                  |                  |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                            |
| 3                                                              | 85 ± 5           | 30 ± 3                                                                                                                                                                                                                                                                                                                                                                                         |                                                             |                  |                  |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                            |
| 4                                                              | Room temperature | 5 ± 3                                                                                                                                                                                                                                                                                                                                                                                          |                                                             |                  |                  |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                            |
| Climatic sequence                                              | IEC60738-1       | <div>Dry heat: 125 °C for 16 hrs</div> <div>Damp heat first cycle: 55°C, 95% R.H ,cycle time: 24 hrs</div> <div>Cold: -25°C for 2 hrs</div> <div>Damp heat (cyclic), remaining cycles: 5 cycles</div> <div>Test according to IEC60068-2-30</div>                                                                                                                                               | <div>  ΔR25/R25   ≤ 20 %</div> <div>No visible damage</div> |                  |                  |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                            |
| Damp Heat, Steady State                                        | IEC 60738-1      | 40±2°C ,90~95%RH, for 1000±2hrs                                                                                                                                                                                                                                                                                                                                                                | <div>  ΔR25/R25   ≤ 20 %</div> <div>No visible damage</div> |                  |                  |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                            |
| Endurance at maximum operating temperature and maximum voltage | IEC 60738-1      | 85±5°C , Vmax, Imax for 1000±5hrs.                                                                                                                                                                                                                                                                                                                                                             | <div>  ΔR25/R25   ≤ 20%</div> <div>No visible damage</div>  |                  |                  |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                            |
| Endurance at maximum voltage                                   | IEC60738-1       | 25±5°C , Vmax, Imax,<br>6 sec. on and 15sec. off × 500,000 cycles                                                                                                                                                                                                                                                                                                                              | <div>  ΔR25/R25   ≤ 20 %</div> <div>No visible damage</div> |                  |                  |   |         |        |   |                  |       |   |        |        |   |                  |       |                                                            |

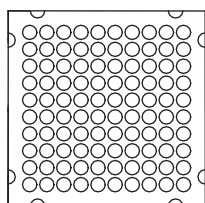
# CPTC Thermistor: PSA Series For Motor Starting Application



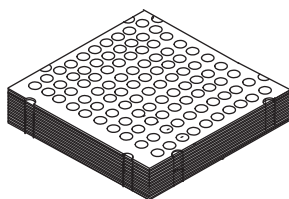
## ■ Packaging

| Series | Quantity (PCS/ Carton) |
|--------|------------------------|
| PSA*04 | 1,000                  |
| PSA*05 | 1,000                  |
| PSA*06 | 1,500                  |
| PSA*33 | 1,000                  |

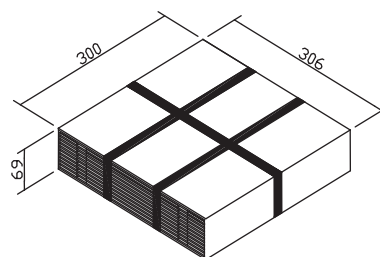
(unit:mm)



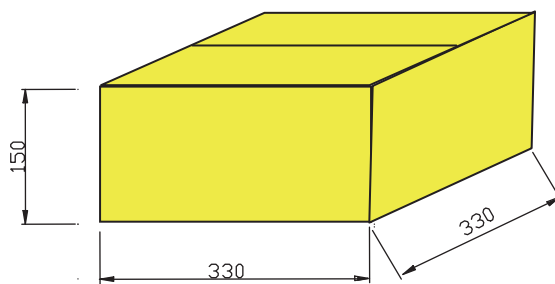
**Paper board**  
**(300x300x4.8)**



**Stacking**



**Bundling**



**Carton**

## ■ Warehouse Storage Conditions of Products

### ● Storage Conditions:

1. Storage Temperature: -10°C ~ +40°C
2. Relative Humidity:  $\leq 75\%RH$
3. Keep away from corrosive atmosphere and sunlight.

### ● Period of Storage: 1 year

## ■ Usage

Please keep products away from the conditions mentioned below to avoid their characteristic deterioration and failure.

1. Corrosive gas or deoxidizing gas ( $Cl_2$ ,  $H_2S$ ,  $NH_3$ ,  $SO_x$ ,  $NO_x$  etc.)
2. Place in a vacuum or put pressure
3. Salt water, oil, solvent and chemical liquid
4. Flammable gas
5. Place in splashed water, or high humidity and dewing place
6. Other places similar to any conditions mentioned above

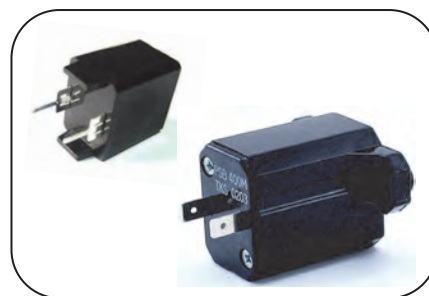
# CPTC Thermistor: PSB Series

## Case Type Inrush Current Limiter



### ■ Features

1. RoHS compliant
2. Case type
3. Voltage rating: 140Vac~380Vac
4. Resistance range: 10~100Ω
5. Stable over a long life
6. Operating temperature range:
  - 10 ~ +85°C (V=Vmax)
  - 25 ~ +125°C (V=0)
7. Agency Recognition:
  - UL&cUL File No. E138827
  - VDE File No. 40017625



### ■ Recommended Applications

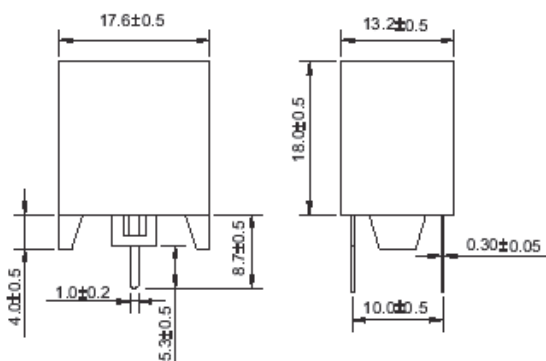
Air conditioner

### ■ Part Number Code

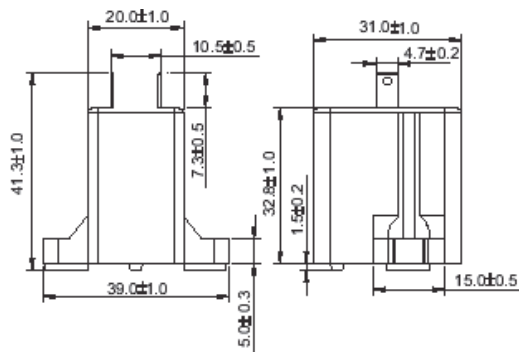
| P                                                                                                 | S | B                                                                                                                     | 3 | 3 | 0                                                                          | H | A                                                                                                                             | 2 | B  | 7                                                                                     | 0  | 7                                | Y  |    |                                                                                 |  |
|---------------------------------------------------------------------------------------------------|---|-----------------------------------------------------------------------------------------------------------------------|---|---|----------------------------------------------------------------------------|---|-------------------------------------------------------------------------------------------------------------------------------|---|----|---------------------------------------------------------------------------------------|----|----------------------------------|----|----|---------------------------------------------------------------------------------|--|
| 1                                                                                                 | 2 | 3                                                                                                                     | 4 | 5 | 6                                                                          | 7 | 8                                                                                                                             | 9 | 10 | 11                                                                                    | 12 | 13                               | 14 | 15 | 16                                                                              |  |
| <div>Product Code</div> <div>PS<div>THINKING Ceramic<br/>PTC Thermistor<br/>PS Series</div></div> |   | <div>Resistance (R<sub>25</sub>)</div> <div><div>10010Ω</div><div>33033Ω</div><div>101100Ω</div></div>                |   |   | <div>Curie Temperature</div> <div><div>A2120℃</div><div>A3130℃</div></div> |   | <div>Max. Voltage</div> <div><div>A4140V<sub>ac</sub></div><div>B7270V<sub>ac</sub></div><div>C8380V<sub>ac</sub></div></div> |   |    | <div>Structure Code</div> <div><div>07Case Type A</div><div>10Case Type B</div></div> |    | <div>Internal Control Code</div> |    |    | <div>Optional Suffix</div> <div><div>Y</div><div>RoHS<br/>Compliant</div></div> |  |
|                                                                                                   |   |                                                                                                                       |   |   |                                                                            |   |                                                                                                                               |   |    |                                                                                       |    |                                  |    |    |                                                                                 |  |
|                                                                                                   |   |                                                                                                                       |   |   |                                                                            |   |                                                                                                                               |   |    |                                                                                       |    |                                  |    |    |                                                                                 |  |
| <div>Series</div> <div><div>B</div><div>Case Type</div></div>                                     |   | <div>Tolerance of R<sub>25</sub></div> <div><div>M±20%</div><div>H±25%</div><div>N±30%</div><div>YSpecial</div></div> |   |   |                                                                            |   |                                                                                                                               |   |    |                                                                                       |    |                                  |    |    |                                                                                 |  |

### ■ Structures and Dimensions

Case Type: A



Case Type: B



Unit: mm

**Note:** Case type A and B are typical case types. Please contact us for any requests.

# CPTC Thermistor: PSB Series

## Case Type Inrush Current Limiter



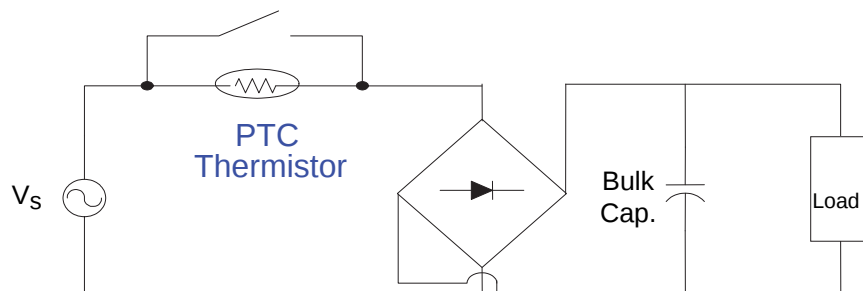
### ■ Characteristics

| Part No.      | Case Type | Max. Voltage                        | Nominal Zero-power Resistance | Curie Temperature   | Thermal Capacity      | Max. Non-operating Energy at 60°C | Safety Approvals |     |
|---------------|-----------|-------------------------------------|-------------------------------|---------------------|-----------------------|-----------------------------------|------------------|-----|
|               |           | V <sub>max</sub> (V <sub>ac</sub> ) | R <sub>25</sub> (Ω)           | T <sub>c</sub> (°C) | C <sub>th</sub> (J/K) | E <sub>Non60</sub> (J)            | UL/cUL           | VDE |
| PSB100□A2A407 | A         | 140                                 | 10                            | 120                 | 0.95                  | 40                                |                  | ✓   |
| PSB150□A2A407 | A         | 140                                 | 15                            | 120                 | 0.95                  | 40                                |                  | ✓   |
| PSB200□A2A407 | A         | 140                                 | 20                            | 120                 | 0.95                  | 40                                | ✓                | ✓   |
| PSB220□A2A407 | A         | 140                                 | 22                            | 120                 | 0.95                  | 40                                |                  | ✓   |
| PSB330□A2B707 | A         | 270                                 | 33                            | 120                 | 0.95                  | 40                                | ✓                | ✓   |
| PSB400□A2B707 | A         | 270                                 | 40                            | 120                 | 0.95                  | 40                                | ✓                | ✓   |
| PSB470□A2B707 | A         | 270                                 | 47                            | 120                 | 0.95                  | 40                                | ✓                | ✓   |
| PSB680□A2B707 | A         | 270                                 | 68                            | 120                 | 0.95                  | 40                                | ✓                |     |
| PSB101□A2C807 | A         | 380                                 | 100                           | 120                 | 0.95                  | 40                                | ✓                |     |
| PSB100□A2A410 | B         | 140                                 | 10                            | 120                 | 3.2                   | 134                               |                  | ✓   |
| PSB150□A2B710 | B         | 270                                 | 15                            | 120                 | 3.2                   | 134                               |                  | ✓   |
| PSB220□A2B710 | B         | 270                                 | 22                            | 120                 | 3.2                   | 134                               |                  | ✓   |
| PSB330□A2B710 | B         | 270                                 | 33                            | 120                 | 3.2                   | 134                               |                  | ✓   |
| PSB400□A2B710 | B         | 270                                 | 40                            | 120                 | 3.2                   | 134                               |                  | ✓   |
| PSB470□A2B710 | B         | 270                                 | 47                            | 120                 | 3.2                   | 134                               |                  | ✓   |
| PSB101□A2C810 | B         | 380                                 | 100                           | 120                 | 3.2                   | 134                               |                  | ✓   |

Note: □ is the tolerance of R<sub>25</sub>.

### ■ Application and Selection

#### ● Typical application circuit



#### ● Selection

Select charging capacitor according to the following formula.

$$C < \frac{0.7 \times (T_c - T_a) \times C_{th} \times 10^6}{0.5 \times V^2} \quad (\text{Unit: } \mu\text{F})$$

C: Bulk Cap.

T<sub>c</sub>: Curie temperature of PTC

V: Voltage of capacitor charging (V=1.414x V<sub>s</sub>)

0.7: Safety factor

T<sub>a</sub>: Ambient temperature

$$E_{\text{Non60}} = 0.7 \times (T_c - T_a) \times C_{th}$$

E<sub>Non60</sub>: Max Non-operating Energy at 60°C (T<sub>a</sub>= 60)

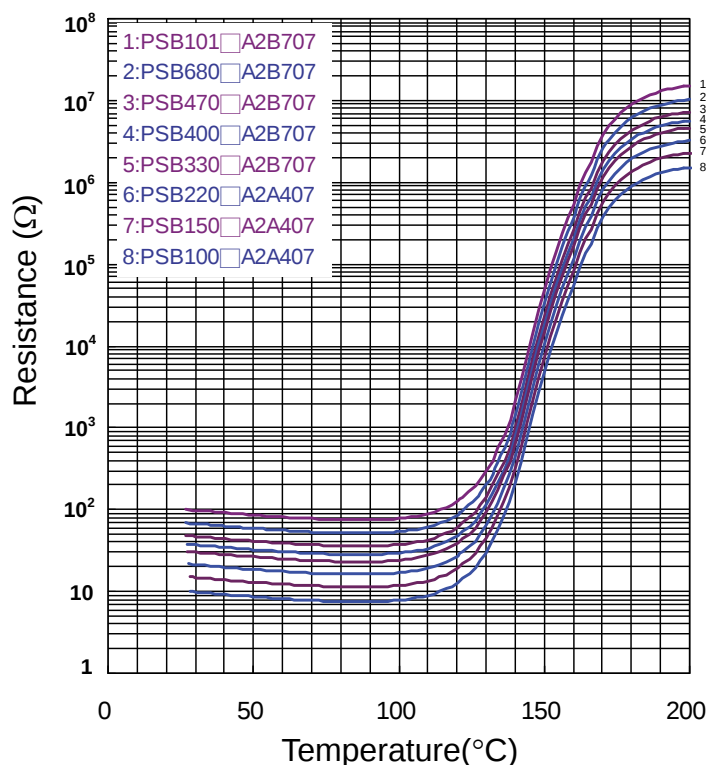
# CPTC Thermistor: PSB Series

## Case Type Inrush Current Limiter

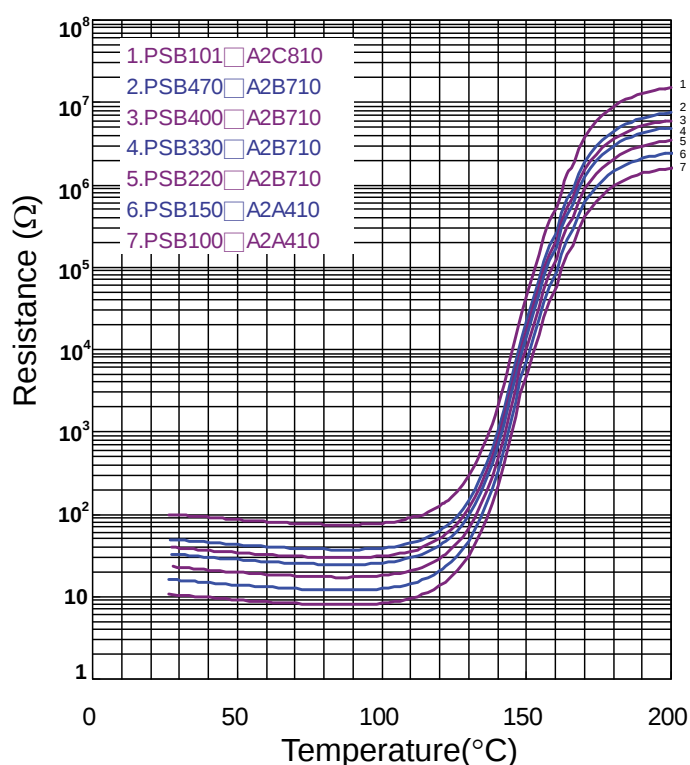


### ■ R-T Characteristic Curve (Typical)

PSB \*07 series

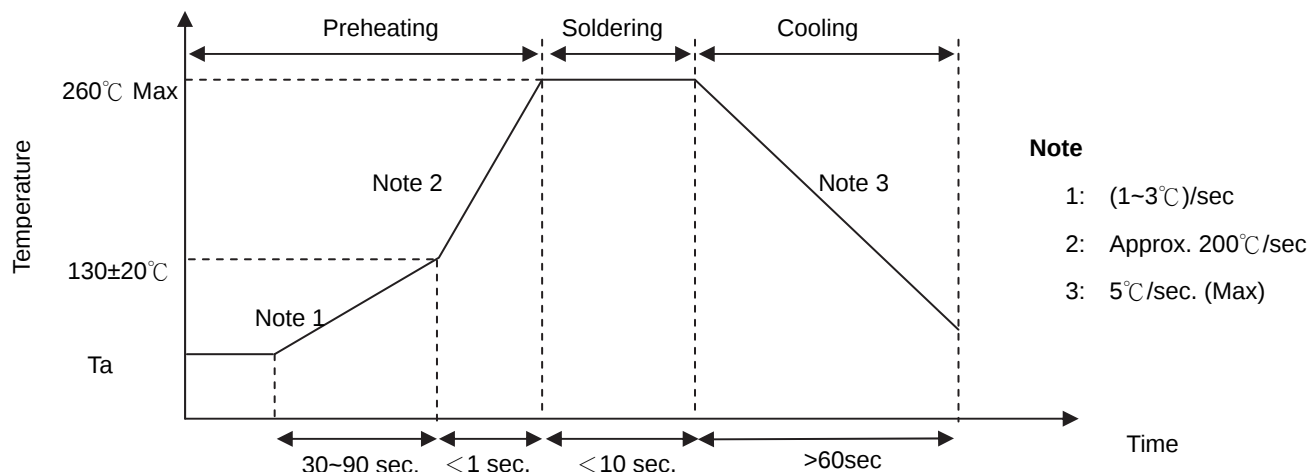


PSB \*10 series



### ■ Soldering Recommendation

#### ● Wave Flow Soldering Profile



#### ● Recommended Reworking Conditions with Soldering Iron

| Item                              | Conditions                   |
|-----------------------------------|------------------------------|
| Temperature of Soldering Iron-tip | 360°C (max.)                 |
| Soldering Time                    | 2 sec (max.)                 |
| Distance from Case                | Do not touch the case bottom |

# CPTC Thermistor: PSB Series

## Case Type Inrush Current Limiter



### ■ Reliability Test

| Item                                                           | Standard               | Test Conditions and Methods                                                                                                                                                                                                                                                                                                                                                                   | Specifications                                              |                 |                  |   |         |        |   |                  |       |   |        |        |   |                  |       |                                      |
|----------------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|-----------------|------------------|---|---------|--------|---|------------------|-------|---|--------|--------|---|------------------|-------|--------------------------------------|
| Robustness of terminations                                     | IEC 60738-1            | Gradually apply 40±0.5N and keep the unit fixed for 10±1 sec.                                                                                                                                                                                                                                                                                                                                 | △R25/R25   ≤20%<br>No visible damage                        |                 |                  |   |         |        |   |                  |       |   |        |        |   |                  |       |                                      |
| Solderability                                                  | IEC 60738-1            | 245±3 ℃ , 3±0.3 sec                                                                                                                                                                                                                                                                                                                                                                           | At least 95% of terminal electrode is covered by new solder |                 |                  |   |         |        |   |                  |       |   |        |        |   |                  |       |                                      |
| Resistance to Soldering Heat                                   | IEC 60738-1            | 260±3 ℃ , 10±1 sec                                                                                                                                                                                                                                                                                                                                                                            | △R25/R25   ≤20%<br>No visible damage                        |                 |                  |   |         |        |   |                  |       |   |        |        |   |                  |       |                                      |
| Vibration                                                      | IEC 60738-1            | Frequency range:10~55Hz<br>Amplitude: 0.75mm or 98m/s <sup>2</sup><br>Direction: 3 mutually perpendicular directions<br>Duration: 6hrs(3x2 hrs)                                                                                                                                                                                                                                               | △R25/R25   ≤20%<br>No visible damage                        |                 |                  |   |         |        |   |                  |       |   |        |        |   |                  |       |                                      |
| Shock                                                          | IEC 60738-1            | Wave: half-sine<br>△V: 1.0m/s<br>Acceleration: 50 m/s <sup>2</sup><br>Pulse time: 30ms                                                                                                                                                                                                                                                                                                        | △R25/R25   ≤20%<br>No visible damage                        |                 |                  |   |         |        |   |                  |       |   |        |        |   |                  |       |                                      |
| Rapid Change of Temperature                                    | IEC 60738-1            | <div>The thermal shock conditions shown below shall be repeated 5 cycles.</div> <table><tr><th>Step</th><th>Temperature (℃)</th><th>Period (minutes)</th></tr><tr><td>1</td><td>-40 ± 5</td><td>30 ± 3</td></tr><tr><td>2</td><td>Room temperature</td><td>5 ± 3</td></tr><tr><td>3</td><td>85 ± 5</td><td>30 ± 3</td></tr><tr><td>4</td><td>Room temperature</td><td>5 ± 3</td></tr></table> | Step                                                        | Temperature (℃) | Period (minutes) | 1 | -40 ± 5 | 30 ± 3 | 2 | Room temperature | 5 ± 3 | 3 | 85 ± 5 | 30 ± 3 | 4 | Room temperature | 5 ± 3 | △R25/R25   ≤20%<br>No visible damage |
| Step                                                           | Temperature (℃)        | Period (minutes)                                                                                                                                                                                                                                                                                                                                                                              |                                                             |                 |                  |   |         |        |   |                  |       |   |        |        |   |                  |       |                                      |
| 1                                                              | -40 ± 5                | 30 ± 3                                                                                                                                                                                                                                                                                                                                                                                        |                                                             |                 |                  |   |         |        |   |                  |       |   |        |        |   |                  |       |                                      |
| 2                                                              | Room temperature       | 5 ± 3                                                                                                                                                                                                                                                                                                                                                                                         |                                                             |                 |                  |   |         |        |   |                  |       |   |        |        |   |                  |       |                                      |
| 3                                                              | 85 ± 5                 | 30 ± 3                                                                                                                                                                                                                                                                                                                                                                                        |                                                             |                 |                  |   |         |        |   |                  |       |   |        |        |   |                  |       |                                      |
| 4                                                              | Room temperature       | 5 ± 3                                                                                                                                                                                                                                                                                                                                                                                         |                                                             |                 |                  |   |         |        |   |                  |       |   |        |        |   |                  |       |                                      |
| Climatic Sequence                                              | IEC60738-1             | Dry heat: 125 ℃ for 16hrs<br>Damp heat first cycle: 55℃, 95%R.H, cycle time: 24hrs<br>Cold: -25℃ for 2hrs<br>Damp heat (cyclic), remaining cycles: 5 cycles<br>Test according to IEC60068-2-30                                                                                                                                                                                                | △R25/R25   ≤20%<br>No visible damage                        |                 |                  |   |         |        |   |                  |       |   |        |        |   |                  |       |                                      |
| Damp Heat, Steady State                                        | IEC 60738-1            | 40±2℃ , 90~95%RH, for 1000±2hrs                                                                                                                                                                                                                                                                                                                                                               | △R25/R25   ≤20%<br>No visible damage                        |                 |                  |   |         |        |   |                  |       |   |        |        |   |                  |       |                                      |
| Endurance at maximum operating temperature and maximum voltage | IEC 60738-1            | 85±5℃ , Vmax, for 1000±5hrs                                                                                                                                                                                                                                                                                                                                                                   | △R25/R25   ≤20%<br>No visible damage                        |                 |                  |   |         |        |   |                  |       |   |        |        |   |                  |       |                                      |
| Endurance for Charging of Capacitor                            | Specification Standard | Operating cycles at Vmax,100,000 cycles (charging of capacitor)                                                                                                                                                                                                                                                                                                                               | △R25/R25   ≤20%<br>No visible damage                        |                 |                  |   |         |        |   |                  |       |   |        |        |   |                  |       |                                      |

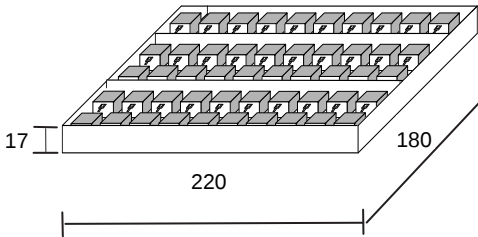
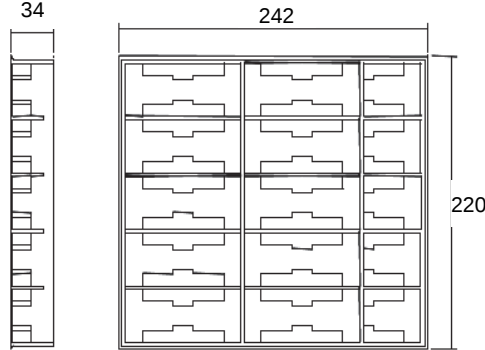
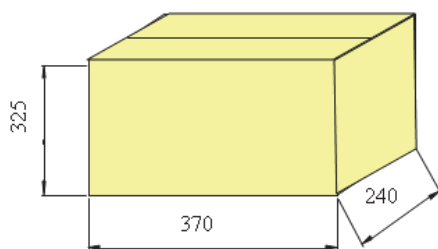
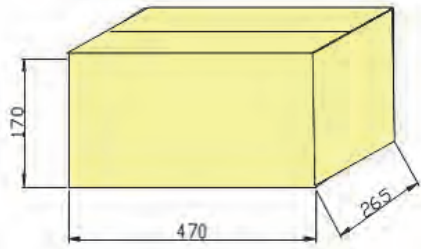
# CPTC Thermistor: PSB Series

## Case Type Inrush Current Limiter



### ■ Packaging

(unit:mm)

| Series    | PSB *07series                                                                                             | PSB *10 series                                                                                            |
|-----------|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Case type | A                                                                                                         | B                                                                                                         |
| Quantity  | 50 pcs per box<br>       | 25 pcs per box<br>      |
|           | 30 boxes per carton<br> | 8 boxes per carton<br> |

### ■ Warehouse Storage Conditions of Products

#### ● Storage Conditions:

1. Storage Temperature:  $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$
2. Relative Humidity:  $\leq 75\% \text{RH}$
3. Keep away from corrosive atmosphere and sunlight.

#### ● Period of Storage: 1 year

### ■ Usage

Please keep products away from the conditions mentioned below to avoid their characteristic deterioration and failure.

1. Corrosive gas or deoxidizing gas ( $\text{Cl}_2$ ,  $\text{H}_2\text{S}$ ,  $\text{NH}_3$ ,  $\text{SO}_x$ ,  $\text{NO}_x$  etc.)
2. Place in a vacuum or put pressure
3. Salt water, oil, solvent and chemical liquid
4. Flammable gas
5. Place in splashed water, or high humidity and dewing place
6. Other places similar to any conditions mentioned above

# CPTC Thermistor: PT Series

## Temperature Sensor



### ■ Features

1. RoHS compliant
2. Small size
3. Very fast reaction time
4. Wide range of protection temperatures
5. Stable over a long life
6. Operating temperature range:  $0 \sim T_s + 25^\circ\text{C}$  ( $V = V_{\text{max}}$ )
7. Agency Recognition: UL /cUL/CQC

UL&cUL File No. E138827, CQC File No. CQC03001008129 / CQC03001008130



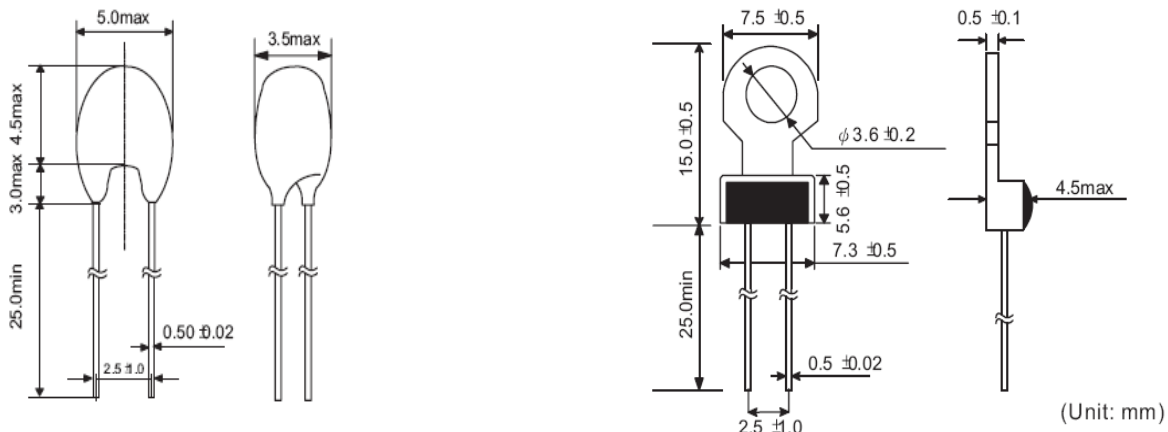
### ■ Recommended Applications

1. Lighting applications
2. Home appliances
3. Automotive electronics
4. Motor windings

### ■ Part Number Code

| P                       | T                                                  | L                    | S | 2                                      | 1 | 0                                      | 1 | Y                                                                     | P  | 8                                                           | 1  | 6                                                                                                 | Y  |                                  |    |
|-------------------------|----------------------------------------------------|----------------------|---|----------------------------------------|---|----------------------------------------|---|-----------------------------------------------------------------------|----|-------------------------------------------------------------|----|---------------------------------------------------------------------------------------------------|----|----------------------------------|----|
| 1                       | 2                                                  | 3                    | 4 | 5                                      | 6 | 7                                      | 8 | 9                                                                     | 10 | 11                                                          | 12 | 13                                                                                                | 14 | 15                               | 16 |
| <div>Product Code</div> |                                                    | <div>Dimension</div> |   | <div>Resistance (R<sub>25</sub>)</div> |   | <div>Tolerance of R<sub>25</sub></div> |   | <div>Curie Temperature</div>                                          |    | <div>Max. Voltage</div>                                     |    | <div>Packaging</div>                                                                              |    | <div>Internal Control Code</div> |    |
|                         |                                                    |                      |   |                                        |   |                                        |   |                                                                       |    |                                                             |    |                                                                                                   |    |                                  |    |
| PT                      | THINKING<br>Ceramic PTC<br>Thermistor<br>PT Series | <div>Structure</div> |   | <div>101100Ω</div> <div>331330Ω</div>  |   | <div>R&lt;0%</div> <div>YSpecial</div> |   | <div>P660℃</div> <div>P880℃</div> <div>A0100℃</div> <div>A4140℃</div> |    | <div>1616V<sub>dc</sub></div> <div>3030V<sub>dc</sub></div> |    | <div>YBulk</div> <div>X Ammo Box Pitch: 12.7mm</div> <div>W Taping &amp; Reel Pitch: 12.7mm</div> |    |                                  |    |
|                         |                                                    |                      |   |                                        |   |                                        |   |                                                                       |    |                                                             |    |                                                                                                   |    |                                  |    |
|                         |                                                    |                      |   |                                        |   |                                        |   |                                                                       |    |                                                             |    |                                                                                                   |    |                                  |    |
| L                       | Lead Type                                          |                      |   |                                        |   |                                        |   |                                                                       |    |                                                             |    |                                                                                                   |    |                                  |    |
| M                       | Metal Terminal Type                                |                      |   |                                        |   |                                        |   |                                                                       |    |                                                             |    |                                                                                                   |    |                                  |    |

### ■ Structure and Dimensions



# CPTC Thermistor: PT Series

## Temperature Sensor



### ■ Characteristics

#### PTL Series

| Part No.      | Curie Temperature   | Sensing Temperature | Resistance Value |                         |                         | Max. Voltage                        | Max. Current          | Safety Approvals |     |   |   |
|---------------|---------------------|---------------------|------------------|-------------------------|-------------------------|-------------------------------------|-----------------------|------------------|-----|---|---|
|               | T <sub>c</sub> (°C) | T <sub>s</sub> (°C) | 25°C (Ω)         | T <sub>s</sub> -5°C (Ω) | T <sub>s</sub> +5°C (Ω) | V <sub>max</sub> (V <sub>dc</sub> ) | I <sub>max</sub> (mA) | UL/<br>cUL       | CQC |   |   |
| PTLS2101□P4** | 40±10               | 55                  | 100 max.         | 330 max.                | 470 min.                | 16/30                               | 100                   | √                | √   |   |   |
| PTLS2101□P5** | 50±10               | 65                  |                  |                         |                         |                                     |                       | √                | √   |   |   |
| PTLS2101□P6** | 60±10               | 75                  |                  |                         |                         |                                     |                       | √                | √   |   |   |
| PTLS2101□P7** | 70±10               | 85                  |                  |                         |                         |                                     |                       | √                | √   |   |   |
| PTLS2101□P8** | 80±10               | 95                  |                  |                         |                         |                                     |                       | √                | √   |   |   |
| PTLS2101□P9** | 90±10               | 105                 |                  |                         |                         |                                     |                       | √                | √   |   |   |
| PTLS2101□A0** | 100±10              | 115                 |                  |                         |                         |                                     |                       | √                | √   |   |   |
| PTLS2331□P4** | 40±10               | 55                  | 330 max.         | 1500 max.               | 2200 min.               |                                     |                       |                  |     | √ | √ |
| PTLS2331□P5** | 50±10               | 65                  |                  |                         |                         |                                     |                       | √                | √   |   |   |
| PTLS2331□P6** | 60±10               | 75                  |                  |                         |                         |                                     |                       | √                | √   |   |   |
| PTLS2331□P7** | 70±10               | 85                  |                  |                         |                         |                                     |                       | √                | √   |   |   |
| PTLS2331□P8** | 80±10               | 95                  |                  |                         |                         |                                     |                       | √                | √   |   |   |
| PTLS2331□P9** | 90±10               | 105                 |                  |                         |                         |                                     |                       | √                | √   |   |   |
| PTLS2331□A0** | 100±10              | 115                 |                  |                         |                         |                                     |                       | √                | √   |   |   |

**Note:** 1: □ means Tolerance of R<sub>25</sub>

2: \*\* means Maximum Voltage (16V<sub>dc</sub> or 30V<sub>dc</sub>)

#### PTL -02/03 Series

| Part No.        | Curie Temperature   | Sensing Temperature | Resistance Value |                         |                         |                          |                           | Max. Voltage                        | Max. Current          | Safety Approvals |     |
|-----------------|---------------------|---------------------|------------------|-------------------------|-------------------------|--------------------------|---------------------------|-------------------------------------|-----------------------|------------------|-----|
|                 | T <sub>c</sub> (°C) | T <sub>s</sub> (°C) | 25°C (Ω)         | T <sub>s</sub> -5°C (Ω) | T <sub>s</sub> +5°C (Ω) | T <sub>s</sub> +15°C (Ω) | T <sub>s</sub> +23°C (Ω ) | V <sub>max</sub> (V <sub>dc</sub> ) | I <sub>max</sub> (mA) | UL/ cUL          | CQC |
| PTLS2101□P4**02 | 40±10               | 60                  | 100 max.         | 570 max.                | 570 min.                | —                        | 10K min.                  | 16/30                               | 100                   | √                | √   |
| PTLS2101□P5**02 | 50±10               | 70                  |                  |                         |                         |                          |                           |                                     |                       | √                | √   |
| PTLS2101□P6**02 | 60±10               | 80                  |                  |                         |                         |                          |                           |                                     |                       | √                | √   |
| PTLS2101□P7**03 | 70±10               | 90                  |                  | 550 max.                | 1330 min.               | 4000 min.                | —                         |                                     |                       | √                | √   |
| PTLS2101□P8**03 | 80±10               | 100                 |                  |                         |                         |                          |                           |                                     |                       | √                | √   |
| PTLS2101□P9**03 | 90±10               | 110                 |                  |                         |                         |                          |                           |                                     |                       | √                | √   |
| PTLS2101□A0**03 | 100±10              | 120                 |                  |                         |                         |                          |                           |                                     |                       | √                | √   |
| PTLS2101□A1**03 | 110±10              | 130                 |                  |                         |                         |                          |                           |                                     |                       |                  |     |
| PTLS2101□A2**03 | 120±10              | 140                 |                  |                         |                         |                          |                           |                                     |                       |                  |     |
| PTLS2101□A3**03 | 130±10              | 150                 |                  |                         |                         |                          |                           |                                     |                       |                  |     |
| PTLS2101□A4**03 | 140±10              | 160                 |                  |                         |                         |                          |                           |                                     |                       |                  |     |
| PTLS2101□A5**03 | 150±10              | 170                 |                  |                         |                         |                          |                           |                                     |                       |                  |     |
| PTLS2101□A6**03 | 160±10              | 180                 |                  |                         |                         |                          |                           |                                     |                       |                  |     |

**Note:** 1: □ means Tolerance of R<sub>25</sub>

2: \*\* means Maximum Voltage (16V<sub>dc</sub> or 30V<sub>dc</sub>)

# CPTC Thermistor: PT Series

## Temperature Sensor



### PTM Series

| Part No.      | Curie Temperature | Sensing Temperature | Resistance Value |            |            | Max. Voltage                        | Max. Current          | Safety Approvals |     |
|---------------|-------------------|---------------------|------------------|------------|------------|-------------------------------------|-----------------------|------------------|-----|
|               | Tc (°C)           | Ts (°C)             | 25°C (Ω)         | Ts-5°C (Ω) | Ts+5°C (Ω) | V <sub>max</sub> (V <sub>dc</sub> ) | I <sub>max</sub> (mA) | UL/ cUL          | CQC |
| PTMS2101□P4** | 40±10             | 55                  | 100 max.         | 330 max.   | 470 min.   | 16/30                               | 100                   | √                | √   |
| PTMS2101□P5** | 50±10             | 65                  |                  |            |            |                                     |                       | √                | √   |
| PTMS2101□P6** | 60±10             | 75                  |                  |            |            |                                     |                       | √                | √   |
| PTMS2101□P7** | 70±10             | 85                  |                  |            |            |                                     |                       | √                | √   |
| PTMS2101□P8** | 80±10             | 95                  |                  |            |            |                                     |                       | √                | √   |
| PTMS2101□P9** | 90±10             | 105                 |                  |            |            |                                     |                       | √                | √   |
| PTMS2101□A0** | 100±10            | 115                 |                  |            |            |                                     |                       | √                | √   |
| PTMS2331□P4** | 40±10             | 55                  | 330 max.         | 1500 max.  | 2200 min.  |                                     |                       | √                | √   |
| PTMS2331□P5** | 50±10             | 65                  |                  |            |            |                                     |                       | √                | √   |
| PTMS2331□P6** | 60±10             | 75                  |                  |            |            |                                     |                       | √                | √   |
| PTMS2331□P7** | 70±10             | 85                  |                  |            |            |                                     |                       | √                | √   |
| PTMS2331□P8** | 80±10             | 95                  |                  |            |            |                                     |                       | √                | √   |
| PTMS2331□P9** | 90±10             | 105                 |                  |            |            |                                     |                       | √                | √   |
| PTMS2331□A0** | 100±10            | 115                 |                  |            |            |                                     |                       | √                | √   |

**Note:** 1: □ means Tolerance of R<sub>25</sub>

2: \*\* means Maximum Voltage (16V<sub>dc</sub> or 30V<sub>dc</sub>)

### PTM -02/03 Series

| Part No.        | Curie Temperature | Sensing Temperature | Resistance Value |            |            |             |             | Max. Voltage                        | Max. Current          | Safety Approvals |     |
|-----------------|-------------------|---------------------|------------------|------------|------------|-------------|-------------|-------------------------------------|-----------------------|------------------|-----|
|                 | Tc (°C)           | Ts (°C)             | 25°C (Ω)         | Ts-5°C (Ω) | Ts+5°C (Ω) | Ts+15°C (Ω) | Ts+23°C (Ω) | V <sub>max</sub> (V <sub>dc</sub> ) | I <sub>max</sub> (mA) | UL/ cUL          | CQC |
| PTMS2101□P4**02 | 40±10             | 60                  | 100 max.         | 570 max.   | 570 min.   | —           | 10K min.    | 16/30                               | 100                   | √                | √   |
| PTMS2101□P5**02 | 50±10             | 70                  |                  |            |            |             |             |                                     |                       | √                | √   |
| PTMS2101□P6**02 | 60±10             | 80                  |                  |            |            |             |             |                                     |                       | √                | √   |
| PTMS2101□P7**03 | 70±10             | 90                  |                  | 550 max.   | 1330 min.  | 4000 min.   | —           |                                     |                       | √                | √   |
| PTMS2101□P8**03 | 80±10             | 100                 |                  |            |            |             |             |                                     |                       | √                | √   |
| PTMS2101□P9**03 | 90±10             | 110                 |                  |            |            |             |             |                                     |                       | √                | √   |
| PTMS2101□A0**03 | 100±10            | 120                 |                  |            |            |             |             |                                     |                       | √                | √   |
| PTMS2101□A1**03 | 110±10            | 130                 |                  |            |            |             |             |                                     |                       |                  |     |
| PTMS2101□A2**03 | 120±10            | 140                 |                  |            |            |             |             |                                     |                       |                  |     |

**Note:** 1: □ means Tolerance of R<sub>25</sub>

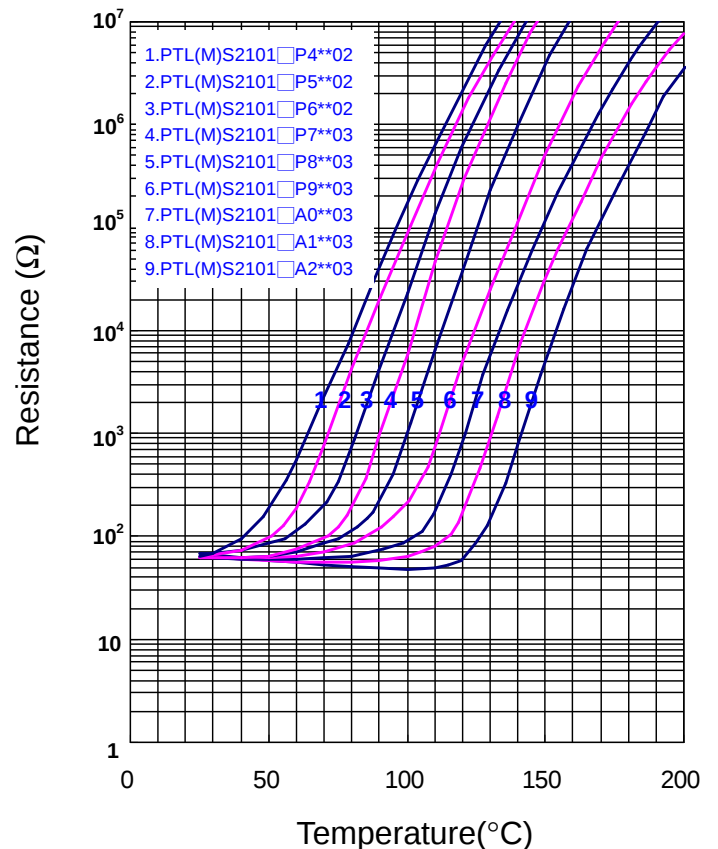
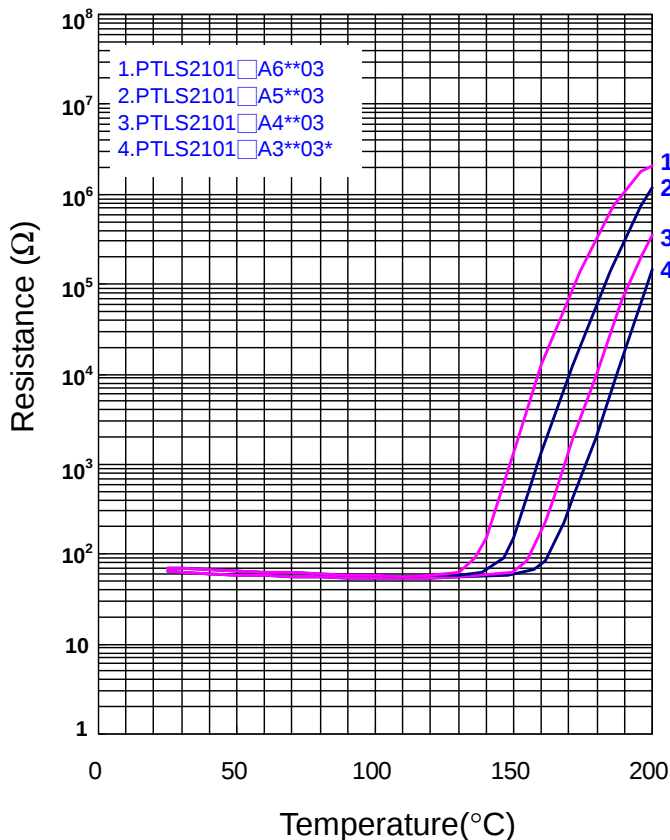
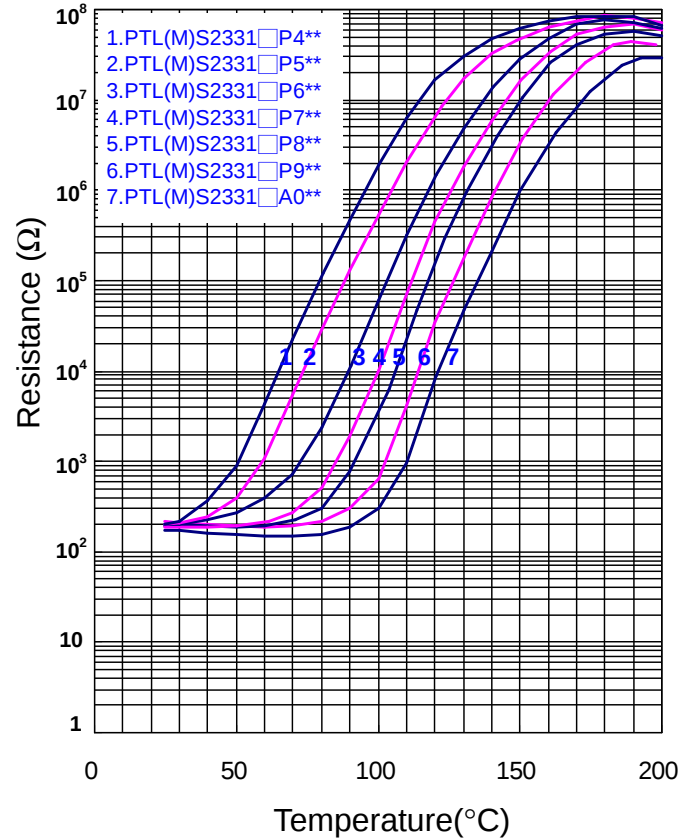
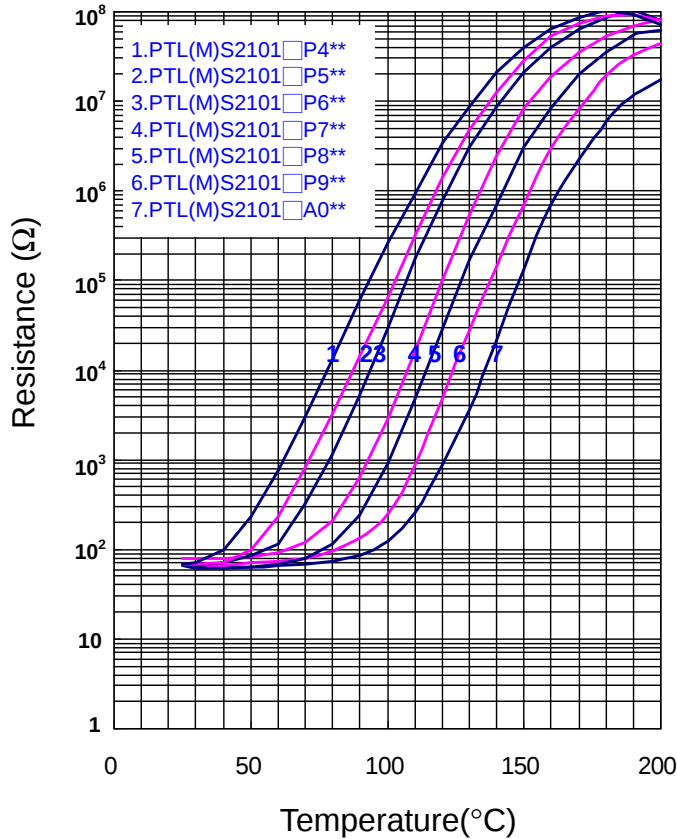
2: \*\* means Maximum Voltage (16V<sub>dc</sub> or 30V<sub>dc</sub>)

# CPTC Thermistor: PT Series

## Temperature Sensor



### ■ R-T Characteristic Curve (Typical)



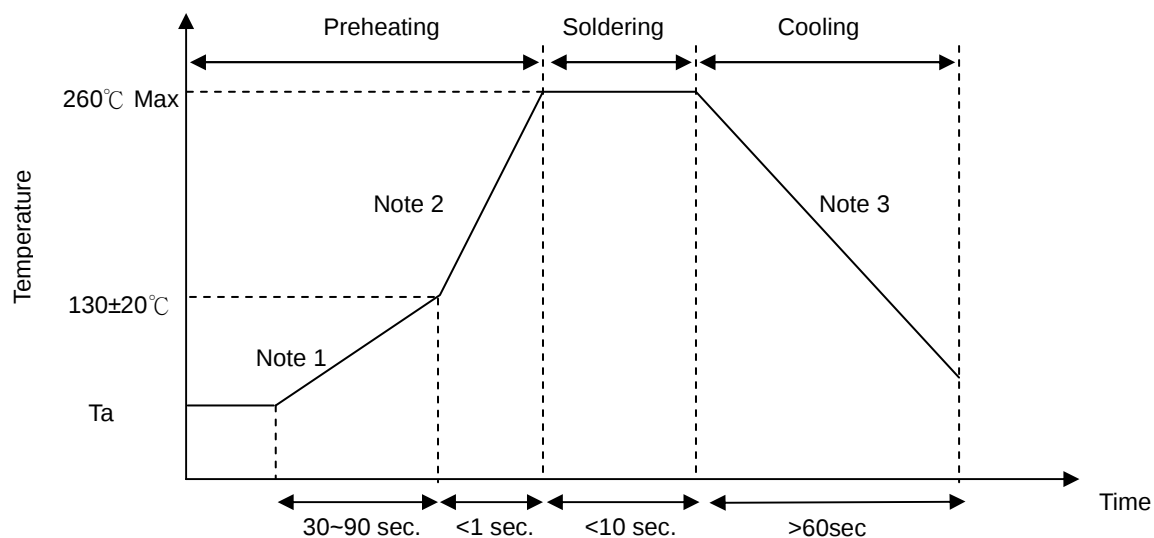
# CPTC Thermistor: PT Series

## Temperature Sensor



### ■ Soldering Recommendation

#### ● Wave Flow Soldering Profile



#### Note

1. (1~3°C)/sec
2. Approx. 200°C/sec
3. 5°C/sec. (Max)

#### ● Recommended Reworking Conditions With Soldering Iron

| Item                              | Conditions   |
|-----------------------------------|--------------|
| Temperature of Soldering Iron-tip | 360°C (max.) |
| Soldering Time                    | 3 sec (max.) |
| Distance from Coating             | 2 mm (min.)  |

# CPTC Thermistor: PT Series

## Temperature Sensor



### ■ Reliability Test

| Item                                                           | Standard         | Test Conditions and Methods                                                                                                                                                                                                                                                                                                                                                            | Specifications                                              |                  |                  |     |           |        |                                      |                  |       |   |        |        |   |                  |       |                                      |
|----------------------------------------------------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|------------------|------------------|-----|-----------|--------|--------------------------------------|------------------|-------|---|--------|--------|---|------------------|-------|--------------------------------------|
| Robustness of Terminations                                     | IEC 60738-1      | Gradually apply the specified force and keep the unit fixed for 10±1 sec.<br><table><tr><td>Terminal diameter (mm)</td><td>Force T(N)</td></tr><tr><td>0.35&lt;d≤0.5</td><td>5.0</td></tr><tr><td>0.5&lt;d≤0.8</td><td>10.0</td></tr></table>                                                                                                                                          | Terminal diameter (mm)                                      | Force T(N)       | 0.35<d≤0.5       | 5.0 | 0.5<d≤0.8 | 10.0   | △R25/R25   ≤20%<br>No visible damage |                  |       |   |        |        |   |                  |       |                                      |
| Terminal diameter (mm)                                         | Force T(N)       |                                                                                                                                                                                                                                                                                                                                                                                        |                                                             |                  |                  |     |           |        |                                      |                  |       |   |        |        |   |                  |       |                                      |
| 0.35<d≤0.5                                                     | 5.0              |                                                                                                                                                                                                                                                                                                                                                                                        |                                                             |                  |                  |     |           |        |                                      |                  |       |   |        |        |   |                  |       |                                      |
| 0.5<d≤0.8                                                      | 10.0             |                                                                                                                                                                                                                                                                                                                                                                                        |                                                             |                  |                  |     |           |        |                                      |                  |       |   |        |        |   |                  |       |                                      |
| Solderability                                                  | IEC 60738-1      | 245±3 °C , 2±0.5 sec                                                                                                                                                                                                                                                                                                                                                                   | At least 95% of terminal electrode is covered by new solder |                  |                  |     |           |        |                                      |                  |       |   |        |        |   |                  |       |                                      |
| Resistance to Soldering Heat                                   | IEC 60738-1      | 260±3 °C , 10±1 sec                                                                                                                                                                                                                                                                                                                                                                    | △R25/R25   ≤20%<br>No visible damage                        |                  |                  |     |           |        |                                      |                  |       |   |        |        |   |                  |       |                                      |
| Vibration                                                      | IEC 60738-1      | Frequency range:10~55Hz<br>Amplitude: 0.75mm or 98m/s <sup>2</sup><br>Direction: 3 mutually perpendicular directions<br>Duration: 6hrs(3x2 hrs)                                                                                                                                                                                                                                        | △R25/R25   ≤20%<br>No visible damage                        |                  |                  |     |           |        |                                      |                  |       |   |        |        |   |                  |       |                                      |
| Shock                                                          | IEC 60738-1      | Wave: half-sine                   △V: 1.0m/s<br>Acceleration: 50 m/s <sup>2</sup> Pulse time: 30ms                                                                                                                                                                                                                                                                                     | △R25/R25   ≤20%<br>No visible damage                        |                  |                  |     |           |        |                                      |                  |       |   |        |        |   |                  |       |                                      |
| Rapid Change of Temperature                                    | IEC 60738-1      | The thermal shock conditions shown below shall be repeated 5 cycles.<br><table><tr><td>Step</td><td>Temperature (°C)</td><td>Period (minutes)</td></tr><tr><td>1</td><td>-40 ± 5</td><td>30 ± 3</td></tr><tr><td>2</td><td>Room temperature</td><td>5 ± 3</td></tr><tr><td>3</td><td>85 ± 5</td><td>30 ± 3</td></tr><tr><td>4</td><td>Room temperature</td><td>5 ± 3</td></tr></table> | Step                                                        | Temperature (°C) | Period (minutes) | 1   | -40 ± 5   | 30 ± 3 | 2                                    | Room temperature | 5 ± 3 | 3 | 85 ± 5 | 30 ± 3 | 4 | Room temperature | 5 ± 3 | △R25/R25   ≤20%<br>No visible damage |
| Step                                                           | Temperature (°C) | Period (minutes)                                                                                                                                                                                                                                                                                                                                                                       |                                                             |                  |                  |     |           |        |                                      |                  |       |   |        |        |   |                  |       |                                      |
| 1                                                              | -40 ± 5          | 30 ± 3                                                                                                                                                                                                                                                                                                                                                                                 |                                                             |                  |                  |     |           |        |                                      |                  |       |   |        |        |   |                  |       |                                      |
| 2                                                              | Room temperature | 5 ± 3                                                                                                                                                                                                                                                                                                                                                                                  |                                                             |                  |                  |     |           |        |                                      |                  |       |   |        |        |   |                  |       |                                      |
| 3                                                              | 85 ± 5           | 30 ± 3                                                                                                                                                                                                                                                                                                                                                                                 |                                                             |                  |                  |     |           |        |                                      |                  |       |   |        |        |   |                  |       |                                      |
| 4                                                              | Room temperature | 5 ± 3                                                                                                                                                                                                                                                                                                                                                                                  |                                                             |                  |                  |     |           |        |                                      |                  |       |   |        |        |   |                  |       |                                      |
| Damp Heat, Steady State                                        | IEC 60738-1      | 40±2°C , 90~95%RH, 12±2V <sub>dc</sub> * for 1000±2 hrs                                                                                                                                                                                                                                                                                                                                | △R25/R25   ≤20%<br>No visible damage                        |                  |                  |     |           |        |                                      |                  |       |   |        |        |   |                  |       |                                      |
| Climatic sequence                                              | IEC60738-1       | Dry heat: Ts+25°C for 16 hrs<br>Damp heat first cycle: 55°C , 95% R.H ,cycle time: 24 hrs<br>Cold: 0°C for 2 hrs<br>Damp heat (cyclic), remaining cycles: 5 cycles<br>Test according to IEC60068-2-30                                                                                                                                                                                  | △R25/R25   ≤20%<br>No damage observed                       |                  |                  |     |           |        |                                      |                  |       |   |        |        |   |                  |       |                                      |
| Endurance at upper category temperature                        | IEC60738-1       | Ts+25°C , for 1000±2hrs                                                                                                                                                                                                                                                                                                                                                                | △R25/R25   ≤20%<br>No damage observed                       |                  |                  |     |           |        |                                      |                  |       |   |        |        |   |                  |       |                                      |
| Endurance at maximum operating temperature and maximum voltage | IEC60738-1       | Ts+25°C , Vmax, Imax for 1000±2 hrs                                                                                                                                                                                                                                                                                                                                                    | △R25/R25   ≤20%<br>No damage observed                       |                  |                  |     |           |        |                                      |                  |       |   |        |        |   |                  |       |                                      |
| Insulation *                                                   | CECC42000        | 100±15Vdc, 60±5 Sec                                                                                                                                                                                                                                                                                                                                                                    | ≥ 100MΩ                                                     |                  |                  |     |           |        |                                      |                  |       |   |        |        |   |                  |       |                                      |
| Voltage Proof *                                                | CECC42000        | 1000±10Vrms, 60±5 Sec                                                                                                                                                                                                                                                                                                                                                                  | No damage observed                                          |                  |                  |     |           |        |                                      |                  |       |   |        |        |   |                  |       |                                      |

**Note:** \* Available for PTM series only.

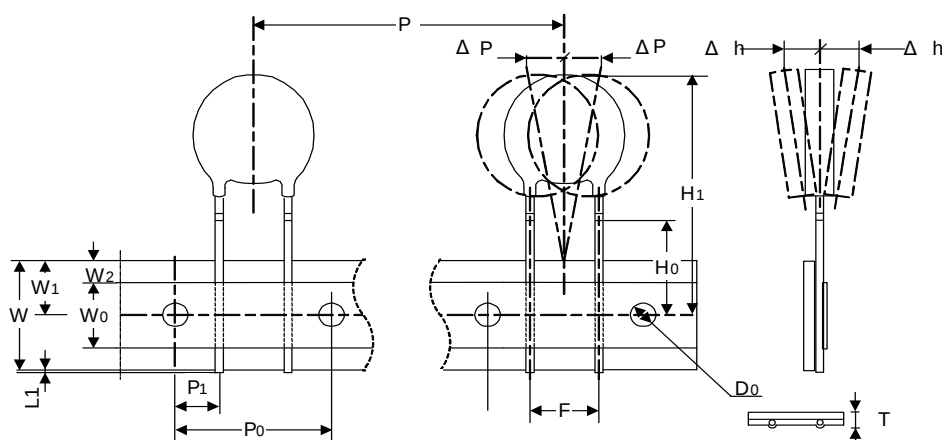
# CPTC Thermistor: PT Series

## Temperature Sensor



### ■ Packaging

#### ● Taping Specification (For PTL Series only)



#### ● Parameter List

(Unit: mm)

| Index      | Parameter                           | Nominal dimensions | Tolerance |
|------------|-------------------------------------|--------------------|-----------|
| F          | Lead spacing                        | 2.5                | $\pm 1$   |
| $P_0$      | Sprocket hole pitch                 | 12.7               | $\pm 0.3$ |
| $P_1$      | Ordinate to adjacent component lead | 5.10               | $\pm 1$   |
| P          | Device pitch                        | 12.7               | $\pm 1$   |
| $H_0$      | Abscissa to plane (kinked lead)     | 18                 | $\pm 1$   |
| $H_1$      | Abscissa to top                     | 32.5               | Max.      |
| W          | Carrier tape width                  | 18                 | $\pm 1$   |
| $W_0$      | Hold-down tape width                | 12                 | $\pm 1$   |
| $W_1$      | Sprocket hole position              | 9                  | $\pm 1$   |
| $W_2$      | Top distance between tape edges     | 3                  | 3 Max.    |
| $\Delta P$ | Body tape plane deviation           | 1                  | 1 Max.    |
| $\Delta h$ | Body lateral deviation              | 2                  | 2 Max.    |
| $L_1$      | Lead protrusion                     | 0.5                | 0.5 Max.  |
| $D_0$      | Sprocket hole diameter              | 4                  | $\pm 0.2$ |
| T          | Tape thickness                      | 0.5                | $\pm 0.2$ |

# CPTC Thermistor: PT Series

## Temperature Sensor



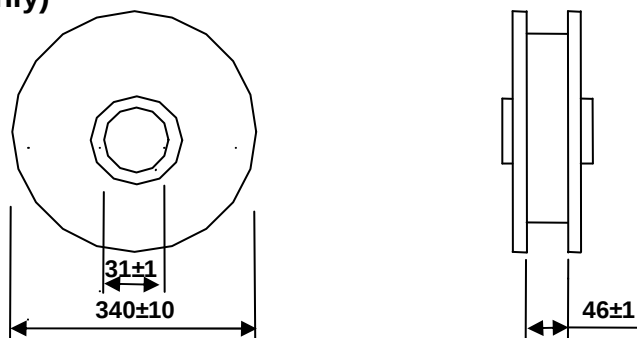
### ■ Quantity

#### ● Bulk Packing

| Type | Quantity (pcs per bag) |
|------|------------------------|
| PTL  | 500                    |
| PTM  | 200                    |

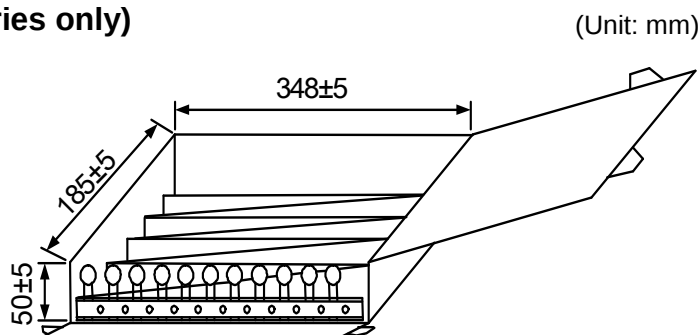
#### ● Reel Packing (For PTL Series only)

2,000 pcs per reel



#### ● Ammo packing (For PTL Series only)

1,500 pcs per box



(Unit: mm)

### ■ Warehouse Storage Conditions of Products

#### ● Storage Conditions :

1. Storage Temperature :  $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$
2. Relative Humidity :  $\leq 75\% \text{RH}$
3. Keep away from corrosive atmosphere and sunlight.

#### ● Period of Storage : 1 year

### ■ Usage

Please keep products away from the conditions mentioned below to avoid their characteristic deterioration and failure.

1. Corrosive gas or deoxidizing gas ( $\text{Cl}_2$ ,  $\text{H}_2\text{S}$ ,  $\text{NH}_3$ ,  $\text{SO}_x$ ,  $\text{NO}_x$  etc.)
2. Place in a vacuum or put pressure
3. Salt water, oil, solvent and chemical liquid
4. Flammable gas
5. Place in splashed water, or high humidity and dewing place
6. Other places similar to any conditions mentioned above

# PTC Thermistor for Automotive : TPM-C Series

## SMD PTC Thermistor for Temperature Sensing



### ■ Features

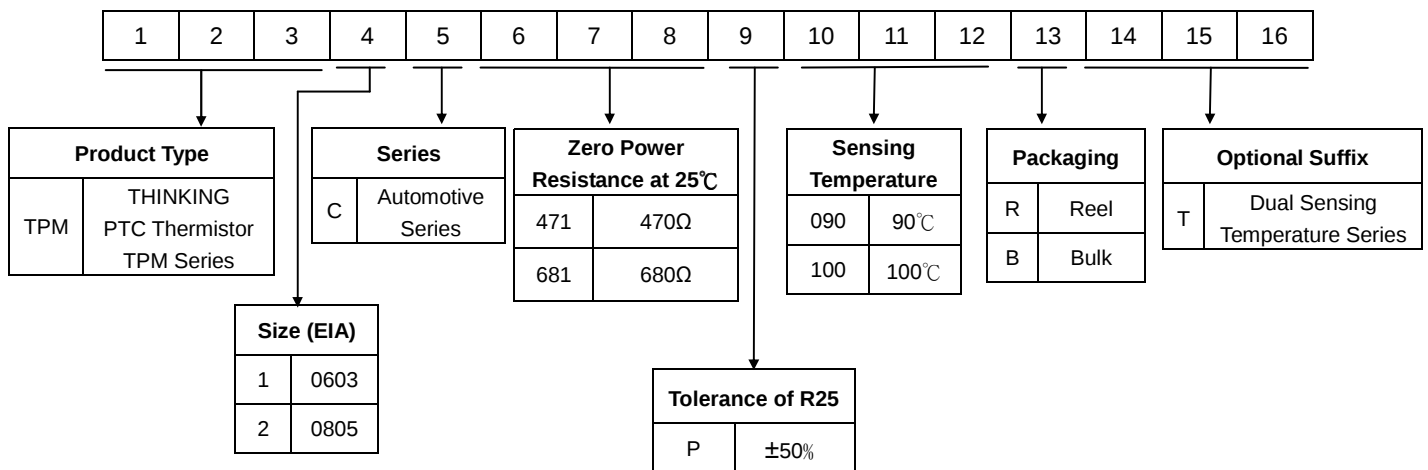
1. Qualification based on AEC-Q200 Rev-C
2. RoHS & Halogen-free compliant
3. EIA size 0603,0805
4. Fast and reliable response



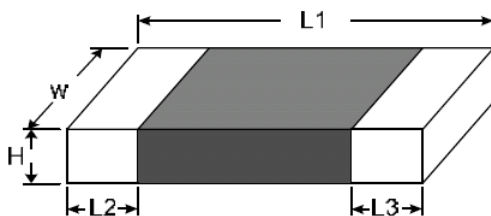
### ■ Recommended Applications

1. Automotive electronics

### ■ Part Number Code



### ■ Structures and Dimensions



(Unit: mm)

| Part No. | Size (EIA) | L1        | W         | H max. | L2 and L3 |
|----------|------------|-----------|-----------|--------|-----------|
| TPM1     | 0603       | 1.60±0.15 | 0.80±0.15 | 0.95   | 0.40±0.20 |
| TPM2     | 0805       | 2.00±0.20 | 1.25±0.20 | 1.00   | 0.45±0.25 |

# PTC Thermistor for Automotive : TPM-C Series

## SMD PTC Thermistor for Temperature Sensing



### ■ Electrical Characteristics

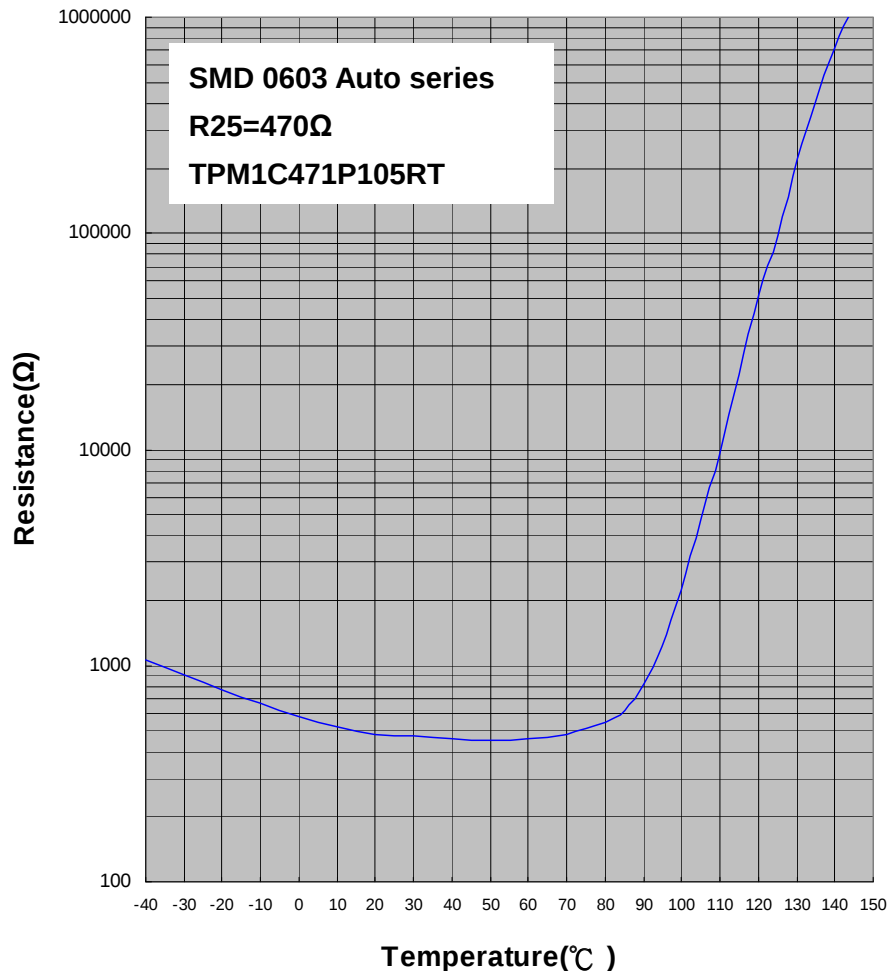
#### 0603 Series

| Part No.       | Size (EIA) | Zero Power Resistance at 25°C (Ω) | Sensing Temperature 1 at 4.7 KΩ (°C) | Sensing Temperature 2 at 47 KΩ (°C) | Max. Voltage (V) | Operating Temperature Range(°C) |
|----------------|------------|-----------------------------------|--------------------------------------|-------------------------------------|------------------|---------------------------------|
|                |            | R25                               | Ts1                                  | Ts2                                 | V <sub>dc</sub>  | T <sub>L</sub> ~T <sub>U</sub>  |
| TPM1C471P105RT | 0603       | 470                               | 105±5                                | 120±7                               | 32               | -40~+130                        |

#### 0805 Series

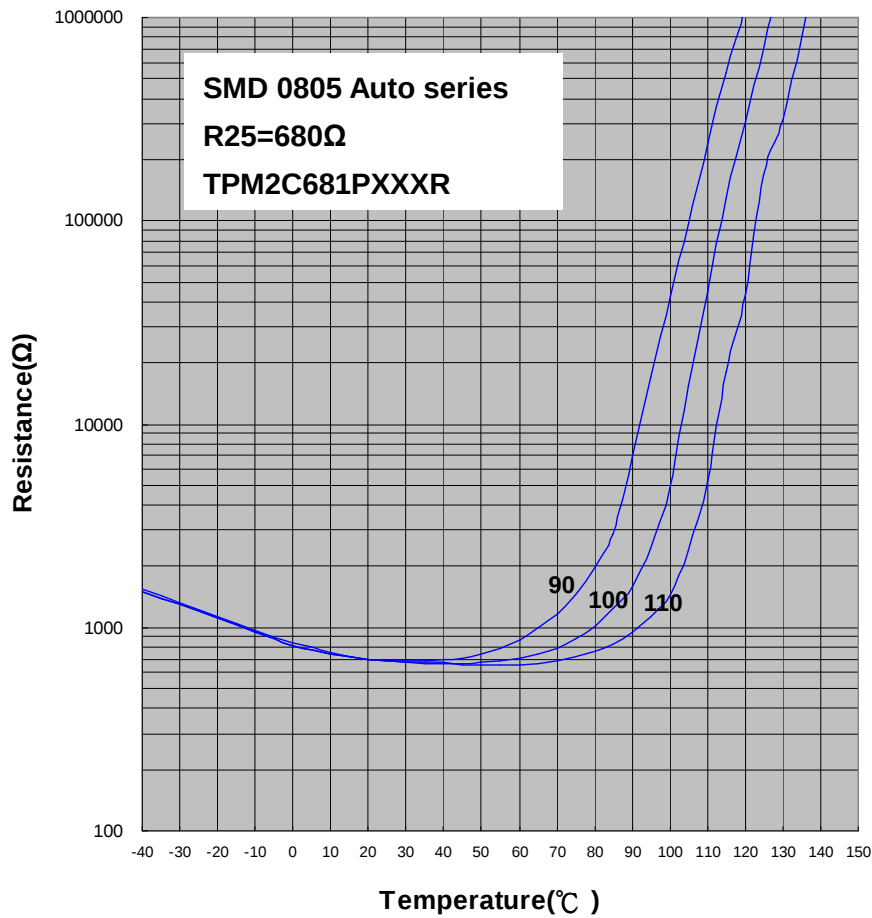
| Part No.      | Size (EIA) | Sensing Temperature (°C) | Resistance (Ω) |          |          |           | Max. Voltage (V) | Operating Temperature Range(°C) |
|---------------|------------|--------------------------|----------------|----------|----------|-----------|------------------|---------------------------------|
|               |            | Ts                       | 25°C           | Ts - 5°C | Ts + 5°C | Ts + 15°C | V <sub>dc</sub>  | T <sub>L</sub> ~T <sub>U</sub>  |
| TPM2C681P090R | 0805       | 90±5                     | 680            | ≤ 5.5K   | ≥ 13.3K  | ≥ 40K     | 32               | -40~+125                        |
| TPM2C681P100R |            | 100±5                    |                |          |          |           |                  | -40~+125                        |
| TPM2C681P110R |            | 110±5                    |                |          |          |           |                  | -40~+135                        |

### ■ Resistance-Temperature Characteristics (Typical)



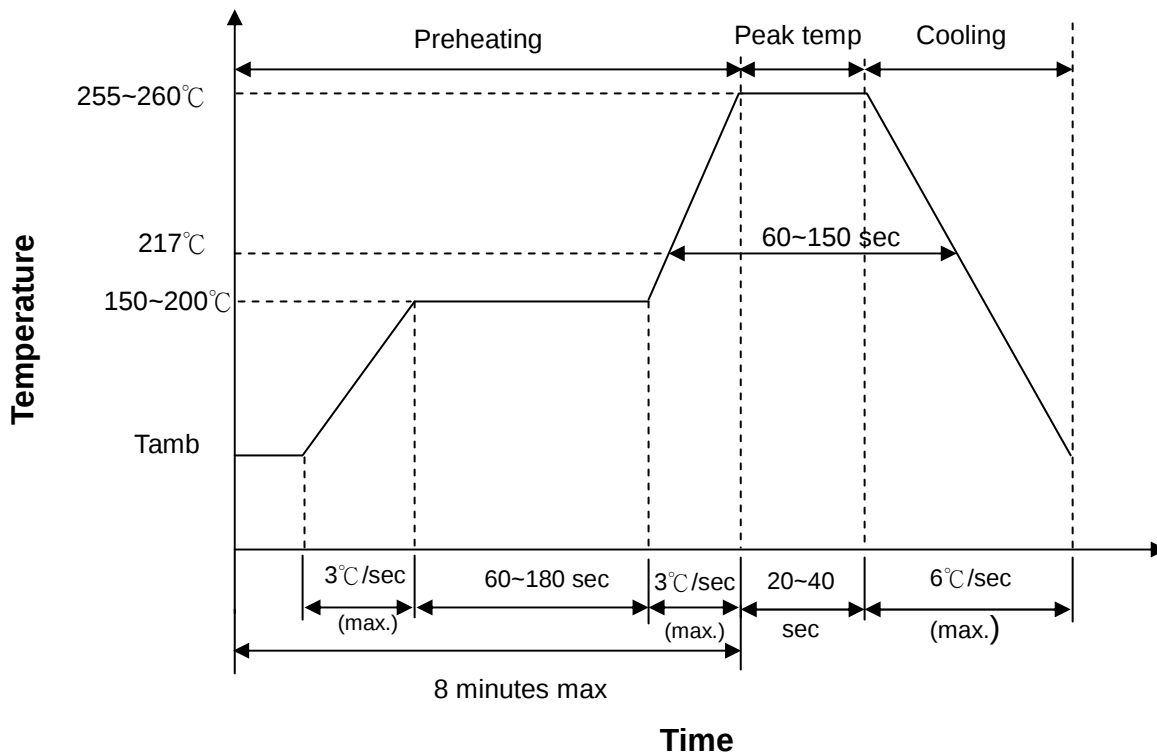
# PTC Thermistor for Automotive : TPM-C Series

## SMD PTC Thermistor for Temperature Sensing



### ■ Soldering Recommendation

#### ● IR-Reflow Soldering Profile



# PTC Thermistor for Automotive : TPM-C Series

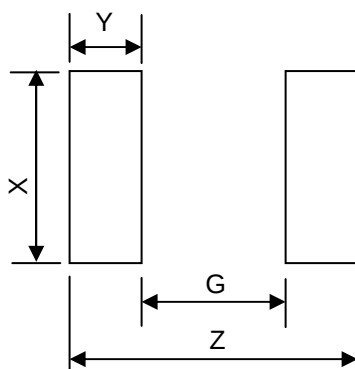
## SMD PTC Thermistor for Temperature Sensing



- Recommended Reworking Conditions with Soldering Iron

| Item                                                                                                        | Conditions   |
|-------------------------------------------------------------------------------------------------------------|--------------|
| Temperature of Soldering Iron-tip                                                                           | 360°C (max.) |
| Diameter of Soldering Iron-tip                                                                              | Φ 3mm (max.) |
| Soldering Time                                                                                              | 3 sec (max.) |
| <b>Caution:</b> Please do not touch the component surface with soldering iron directly to avoid its damage. |              |

- Recommended Pad Dimensions



| Size | Z (mm) | G (mm) | X (mm) | Y (mm) |
|------|--------|--------|--------|--------|
| 0603 | 3.0    | 1.0    | 1.0    | 1.0    |
| 0805 | 3.4    | 1.0    | 1.4    | 1.2    |

# PTC Thermistor for Automotive : TPM-C Series

## SMD PTC Thermistor for Temperature Sensing



### ■ Reliability

Tests of SMD PTC thermistors are based on AEC-Q200 Rev-C.

| Item                                | Standard                | Test Conditions / Methods                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Specifications                                                   |          |        |          |        |       |        |     |      |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |   |                                                                  |
|-------------------------------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|----------|--------|----------|--------|-------|--------|-----|------|---|----|----|--------|-----|---|----|----|--------|---|---|----|----|--------|-----|---|----|----|--------|-----|---|----|----|--------|---|---|----|----|--------|-----|---|----|----|--------|---|------------------------------------------------------------------|
| High Temperature Exposure (Storage) | MIL-STD-202 Method 108  | Test temp.: Tmax. +3/-0℃<br>Duration: 1000 hrs unpowered<br>Measurement at 24±2 hours after test conclusion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | No visible damage<br>  △R <sub>25</sub> /R <sub>25</sub>   ≤ 20% |          |        |          |        |       |        |     |      |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |   |                                                                  |
| Temperature Cycling                 | JESD22 Method JA-104    | Lower test temp.: -40 +0/-3℃<br>Upper test temp.: 125 +3/-0℃<br>Soak time at lower or upper temp.: 1 min<br>Cycle time : 2 cycles/hr<br>Number of cycles : 1000<br>Measurement at 24±2 hours after test conclusion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | No visible damage<br>  △R <sub>25</sub> /R <sub>25</sub>   ≤ 20% |          |        |          |        |       |        |     |      |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |   |                                                                  |
| Moisture Resistance                 | MIL-STD-202 Method 106  | Duration of 1 cycle: 24 hrs<br>Number of cycles: 10, unpowered<br>Measurement at 24±2 hours after test conclusion. <table border="1"><tr><th rowspan="2">Step</th><th colspan="2">Temp.(℃)</th><th>humidity</th><th>Period</th></tr><tr><th>Start</th><th>Finish</th><th>(%)</th><th>(hr)</th></tr><tr><td>1</td><td>25</td><td>65</td><td>90~100</td><td>2.5</td></tr><tr><td>2</td><td>65</td><td>65</td><td>90~100</td><td>3</td></tr><tr><td>3</td><td>65</td><td>25</td><td>80~100</td><td>2.5</td></tr><tr><td>4</td><td>25</td><td>65</td><td>90~100</td><td>2.5</td></tr><tr><td>5</td><td>65</td><td>65</td><td>90~100</td><td>3</td></tr><tr><td>6</td><td>65</td><td>25</td><td>80~100</td><td>2.5</td></tr><tr><td>7</td><td>25</td><td>25</td><td>80~100</td><td>8</td></tr></table> | Step                                                             | Temp.(℃) |        | humidity | Period | Start | Finish | (%) | (hr) | 1 | 25 | 65 | 90~100 | 2.5 | 2 | 65 | 65 | 90~100 | 3 | 3 | 65 | 25 | 80~100 | 2.5 | 4 | 25 | 65 | 90~100 | 2.5 | 5 | 65 | 65 | 90~100 | 3 | 6 | 65 | 25 | 80~100 | 2.5 | 7 | 25 | 25 | 80~100 | 8 | No visible damage<br>  △R <sub>25</sub> /R <sub>25</sub>   ≤ 20% |
| Step                                | Temp.(℃)                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                  | humidity | Period |          |        |       |        |     |      |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |   |                                                                  |
|                                     | Start                   | Finish                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | (%)                                                              | (hr)     |        |          |        |       |        |     |      |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |   |                                                                  |
| 1                                   | 25                      | 65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 90~100                                                           | 2.5      |        |          |        |       |        |     |      |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |   |                                                                  |
| 2                                   | 65                      | 65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 90~100                                                           | 3        |        |          |        |       |        |     |      |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |   |                                                                  |
| 3                                   | 65                      | 25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 80~100                                                           | 2.5      |        |          |        |       |        |     |      |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |   |                                                                  |
| 4                                   | 25                      | 65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 90~100                                                           | 2.5      |        |          |        |       |        |     |      |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |   |                                                                  |
| 5                                   | 65                      | 65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 90~100                                                           | 3        |        |          |        |       |        |     |      |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |   |                                                                  |
| 6                                   | 65                      | 25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 80~100                                                           | 2.5      |        |          |        |       |        |     |      |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |   |                                                                  |
| 7                                   | 25                      | 25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 80~100                                                           | 8        |        |          |        |       |        |     |      |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |   |                                                                  |
| Biased Humidity                     | MIL-STD-202 Method 103  | Test temp.: 85℃<br>Rel. humidity of air: 85%<br>Duration: 1000 hrs<br>10% Max. Voltage Vmax (V <sub>DC</sub> )<br>Measurement at 24±2 hours after test conclusion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | No visible damage<br>  △R <sub>25</sub> /R <sub>25</sub>   ≤ 20% |          |        |          |        |       |        |     |      |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |   |                                                                  |
| Operational Life                    | MIL-STD-202 Method 108  | Test temp.: Tmax. +3/-0℃<br>Duration: 1000 hrs<br>Bias at Max. Voltage Vmax (V <sub>DC</sub> )<br>Measurement at 24±2 hours after test conclusion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | No visible damage<br>  △R <sub>25</sub> /R <sub>25</sub>   ≤ 20% |          |        |          |        |       |        |     |      |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |   |                                                                  |
| External Visual                     | MIL-STD-883 Method 2009 | Inspect device construction, marking and workmanship.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | No visible damage                                                |          |        |          |        |       |        |     |      |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |   |                                                                  |
| Physical Dimension                  | JESD22 Method JB-100    | Verify physical dimensions to the applicable device specification.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Within the specified values                                      |          |        |          |        |       |        |     |      |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |     |   |    |    |        |   |   |    |    |        |     |   |    |    |        |   |                                                                  |

# PTC Thermistor for Automotive : TPM-C Series

## SMD PTC Thermistor for Temperature Sensing



| Item                         | Standard                  | Test Conditions / Methods                                                                                                                                                                                                           | Specifications                                          |
|------------------------------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| Resistance to Solvents       | MIL-STD-202 Method 215    | Per MIL-STD-202 Method 215<br>Solvent: 1: 3 ratio of isopropyl alcohol and mineral spirits.                                                                                                                                         | No visible damage                                       |
| Mechanical Shock             | MIL-STD-202-213           | Test Condition F<br>Peak value: 1500g's<br>Half sine Waveform<br>Normal duration (D) : 0.5ms<br>3 shocks in per axis ( $\pm X$ , $\pm Y$ , $\pm Z$ ), 3 times.                                                                      | No visible damage<br>$ \Delta R_{25}/R_{25}  \leq 20\%$ |
| Vibration                    | MIL-STD-202 Method 204    | Acceleration: 5 g's<br>Sweep time: 20 min<br>Frequency range: 10 to 2000 Hz<br>3x12 cycles                                                                                                                                          | No visible damage<br>$ \Delta R_{25}/R_{25}  \leq 20\%$ |
| Resistance to Soldering Heat | MIL-STD-202 Method 210    | Condition B No pre-heat of samples.<br>Temp. : $260 \pm 5^\circ\text{C}$ , Time: $10 \pm 1\text{s}$<br>Immersion and emersion rate: $25\text{mm/s} \pm 6\text{ mm/s}$<br>Number of heat cycles: 1                                   | No visible damage<br>$ \Delta R_{25}/R_{25}  \leq 20\%$ |
| Thermal Shock                | MIL-STD-202 Method 107    | Lower test temp. : $-40 +0/-3^\circ\text{C}$<br>Upper test temp. : $125 +3/-0^\circ\text{C}$<br>Maximum transfer time: 20 seconds.<br>Dwell time: 15 minutes. Air-Air.<br>Number of cycles : 300                                    | No visible damage<br>$ \Delta R_{25}/R_{25}  \leq 20\%$ |
| ESD                          | AEC-Q200-002              | Discharge capacitance: 150 pF<br>Charging voltage: 8 KV<br>Contact discharge<br>1 pulse in each polarity                                                                                                                            | No visible damage<br>$ \Delta R_{25}/R_{25}  \leq 20\%$ |
| Solderability                | IEC 60068-2-58 J-STD-002  | a) 4 hrs @ $155^\circ\text{C}$ dry heat<br>Dip @ $245 \pm 5^\circ\text{C}$ $3 \pm 0.3\text{sec}$<br>b) Steam aging $8\text{h} \pm 15\text{min}$ @ $93 \pm 3^\circ\text{C}$<br>Dip @ $260 \pm 5^\circ\text{C}$ $7 \pm 0.5\text{sec}$ | 95% of termination is covered by solder                 |
| Electrical Characterization  | Specifications            | Ta1: $25 \pm 2^\circ\text{C}$<br>Ta2: $[T_{\text{sx}} + \square^\circ\text{C}] \pm 0.1^\circ\text{C}$<br>Ta3: $[T_{\text{sx}} - \square^\circ\text{C}] \pm 0.1^\circ\text{C}$                                                       | Within the specified values                             |
| Board Flex                   | AEC-Q200-005 (JIS-C-6429) | Bend the board: 2mm (Min.)<br>Duration: 60 (+5) Sec                                                                                                                                                                                 | No visible damage<br>$ \Delta R_{25}/R_{25}  \leq 10\%$ |
| Terminal Strength            | AEC-Q200-006 (JIS-C-6429) | Applied force:<br>0603=1.0kg (10 N)<br>0805=1.8kg (17.7 N)<br>Duration of the applied forces :60 (+1) Sec                                                                                                                           | No visible damage<br>$ \Delta R_{25}/R_{25}  \leq 20\%$ |

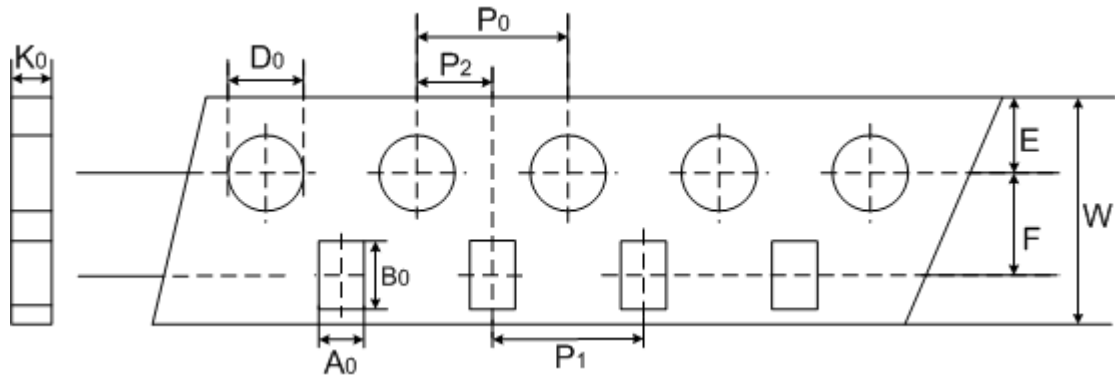
# PTC Thermistor for Automotive : TPM-C Series

## SMD PTC Thermistor for Temperature Sensing



### ■ Package

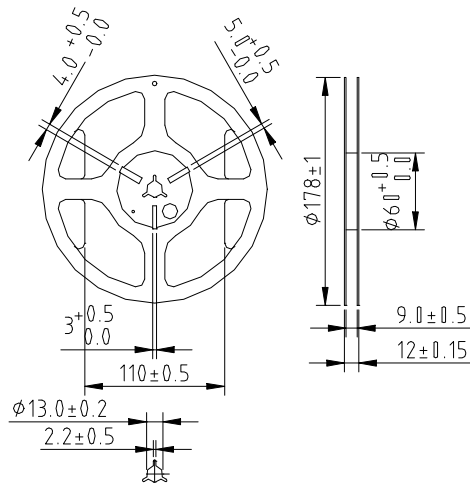
#### ● Taping Specification



(Unit: mm)

| Index<br>Type | A <sub>0</sub> | B <sub>0</sub> | W    | E    | F     | P <sub>1</sub> | P <sub>2</sub> | P <sub>0</sub> | D <sub>0</sub> | K <sub>0</sub> |
|---------------|----------------|----------------|------|------|-------|----------------|----------------|----------------|----------------|----------------|
| 0603          | ±0.2           | ±0.2           | ±0.2 | ±0.1 | ±0.05 | ±0.1           | ±0.05          | ±0.1           | ±0.1           | ±0.1           |
| 0805          | 1.1            | 1.9            | 8    | 1.75 | 3.5   | 4              | 2              | 4              | 1.55           | 0.95           |
| 0805          | 1.5            | 2.3            | 8    | 1.75 | 3.5   | 4              | 2              | 4              | 1.55           | 1.0            |

#### ● Quantity



| Type | Quantity (pcs/reel) |
|------|---------------------|
| 0603 | 4,000               |
| 0805 | 3,500               |

### ■ Warehouse Storage Conditions of Products

#### ● Storage Conditions :

1. Storage Temperature: -10°C ~ +40°C
2. Relative Humidity: ≤ 75%RH
3. Keep away from corrosive atmosphere and sunlight.

#### ● Period of Storage : 1 year

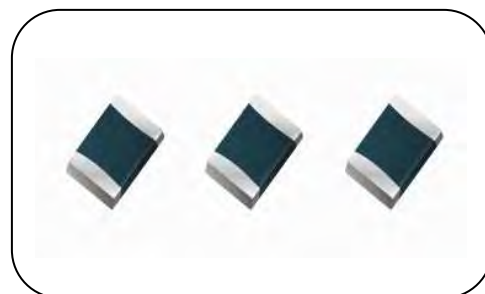
# CPTC Thermistor : TPM Type

## SMD CPTC Thermistor for Over-Current Protection



### ■ Features

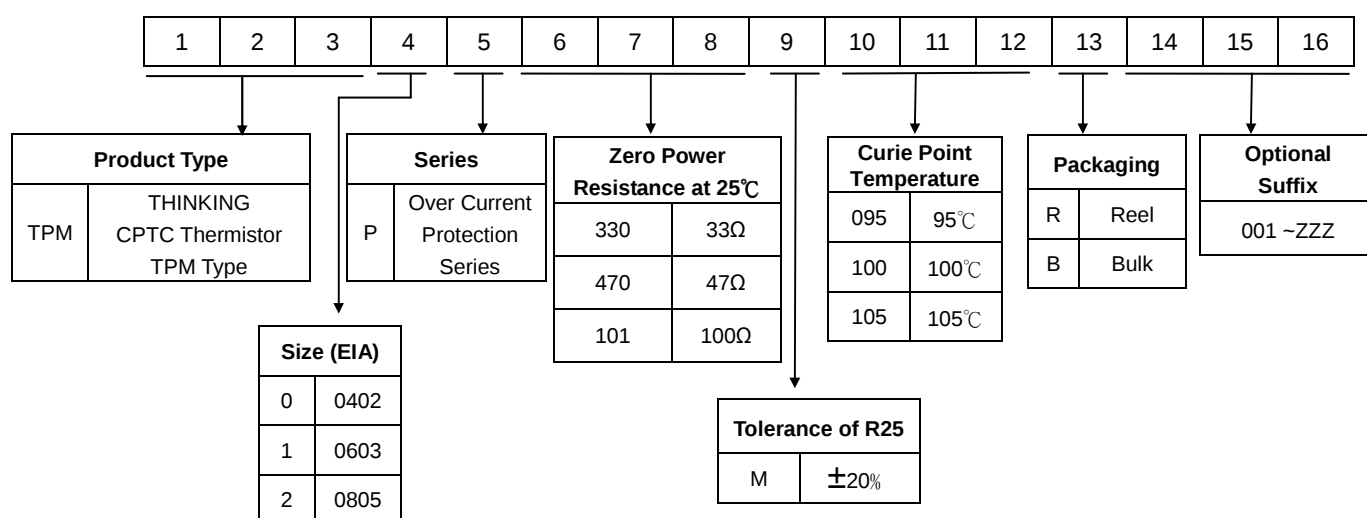
1. RoHS & Halogen-free compliant
2. EIA size 0603
3. Suitable for reflow soldering
4. Suitable for over-current or short circuit protection



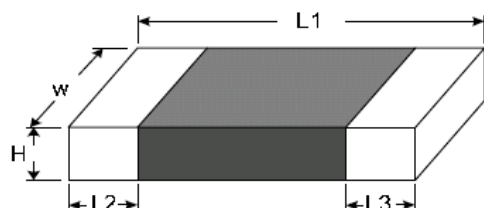
### ■ Recommended Applications

1. Notebook computer
2. AC adapter
3. Battery charger
4. LED
5. Over-current protection for any consumer device

### ■ Part Number Code



### ■ Structures and Dimensions



(Unit: mm)

| Part No. | Size (EIA) | L1        | W         | H max. | L2 and L3. |
|----------|------------|-----------|-----------|--------|------------|
| TPM1P    | 0603       | 1.60±0.15 | 0.80±0.15 | 0.95   | 0.4±0.02   |

# CPTC Thermistor : TPM Type

## SMD CPTC Thermistor for Over-Current Protection



### ■ Electrical Characteristics

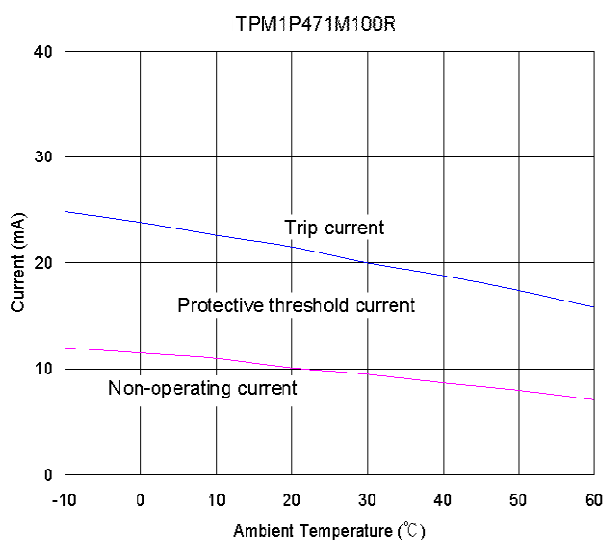
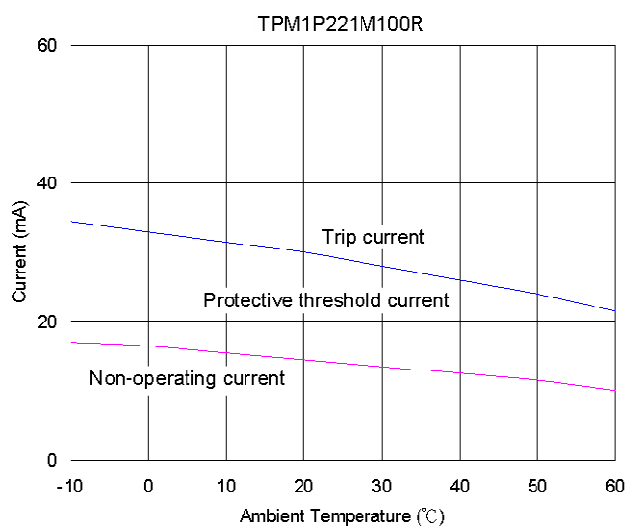
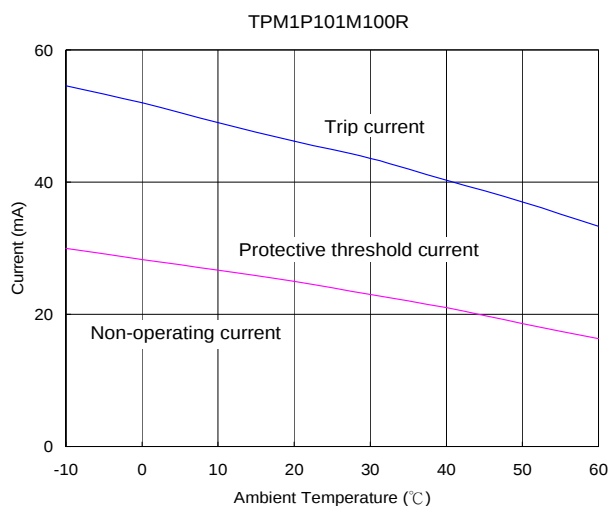
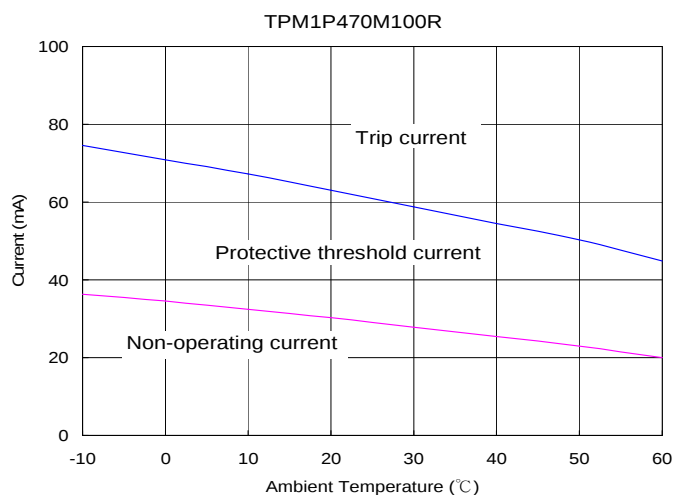
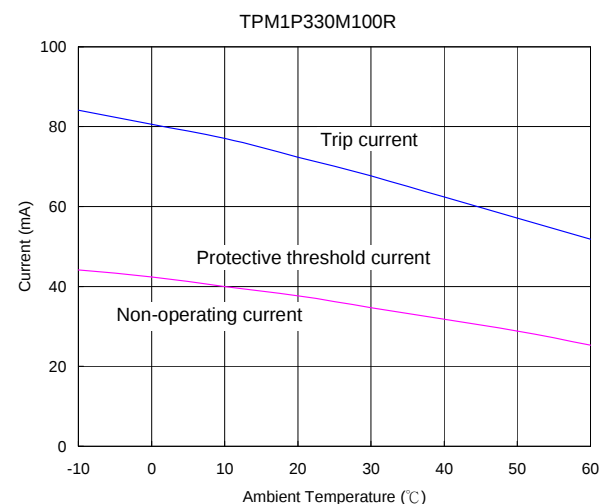
| Part No.      | Size<br>(EIA) | Curie<br>Point<br>Temp. | Zero Power<br>Resistance<br>at 25°C | Non-operating<br>Current |         | Trip Current<br>(at -10°C) |         | Max.<br>Voltage     | Max.<br>Current       | Operating<br>Temperature<br>Range   |            |
|---------------|---------------|-------------------------|-------------------------------------|--------------------------|---------|----------------------------|---------|---------------------|-----------------------|-------------------------------------|------------|
|               |               |                         |                                     | @ +25°C                  | @ +60°C | @ -10°C                    | @ +25°C |                     |                       | @ Vmax                              | @ V=0      |
|               |               | T <sub>c</sub> (°C)     | R <sub>25</sub> (Ω)                 | I <sub>n</sub> (mA)      |         | I <sub>t</sub> (mA)        |         | V <sub>dc</sub> (V) | I <sub>max</sub> (mA) | T <sub>L</sub> ~T <sub>U</sub> (°C) |            |
| TPM1P330M100R | 0603          | 100±10                  | 33                                  | 36                       | 25      | 85                         | 71      | 24                  | 900                   | -10 ~ +60                           | -40 ~ +125 |
| TPM1P470M100R |               |                         | 47                                  | 29                       | 20      | 75                         | 61      |                     | 630                   |                                     |            |
| TPM1P101M100R |               |                         | 100                                 | 21                       | 15      | 55                         | 45      |                     | 300                   |                                     |            |
| TPM1P221M100R |               |                         | 220                                 | 14                       | 10      | 35                         | 29      |                     | 130                   |                                     |            |
| TPM1P471M100R |               |                         | 470                                 | 10                       | 7       | 25                         | 21      |                     | 60                    |                                     |            |

# CPTC Thermistor : TPM Type

## SMD CPTC Thermistor for Over-Current Protection



### ■ Protective Threshold Current Range



# CPTC Thermistor : TPM Type

## SMD CPTC Thermistor for Over-Current Protection



### ■ Typical Application Circuit

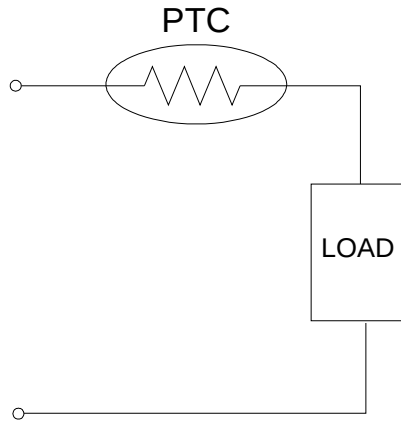


Fig 1. Over-current Protection

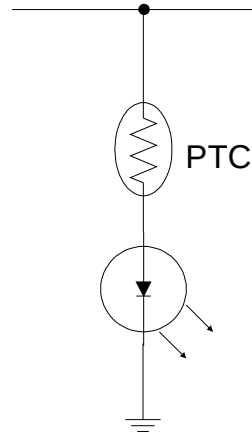
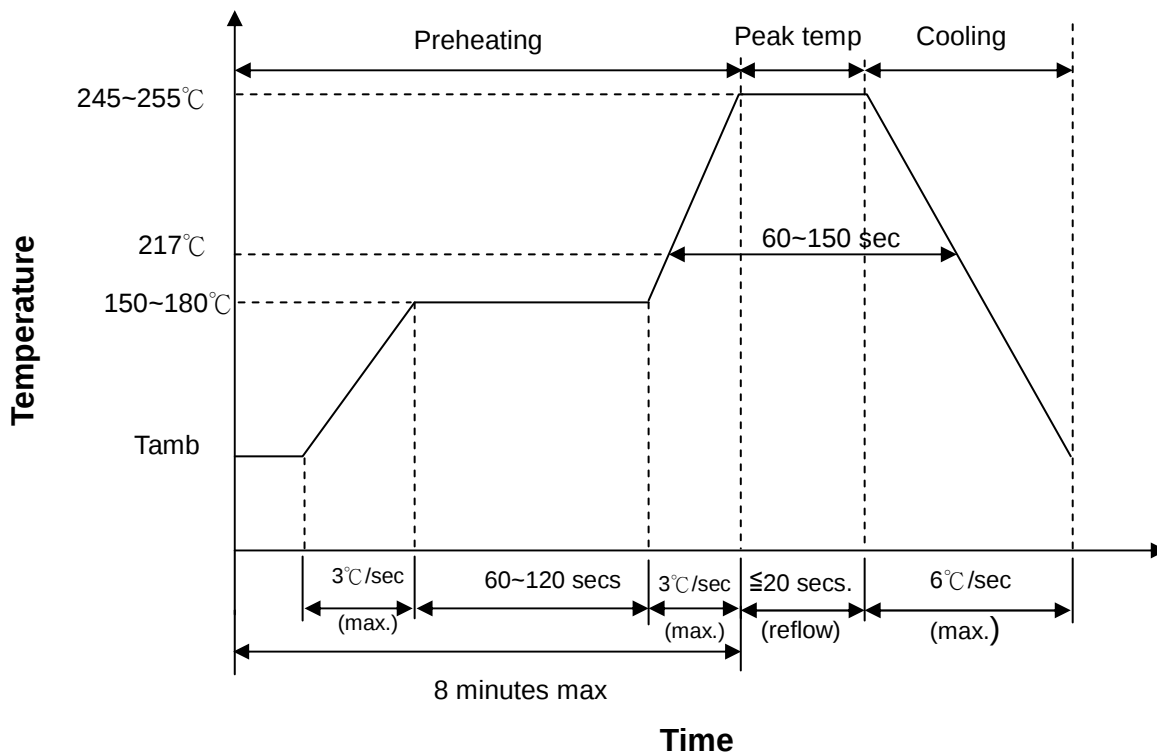


Fig 2. LED Protection

### Soldering Recommendation

#### ■ IR-Reflow Soldering Profile



# CPTC Thermistor : TPM Type

## SMD CPTC Thermistor for Over-Current Protection

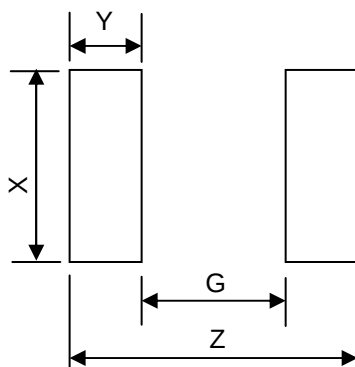


### ■ Reworking Conditions with Soldering Iron

| Item                              | Conditions   |
|-----------------------------------|--------------|
| Temperature of Soldering Iron-tip | 360°C (max.) |
| Soldering Time                    | 3 sec (max.) |
| Diameter of Soldering Iron-tip    | Φ 3mm (max.) |

Caution: Please do not touch the component surface with soldering iron directly to avoid its damage.

### ■ Recommended Pad Dimensions



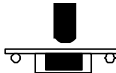
| Size | Z (mm) | G (mm) | X (mm) | Y (mm) |
|------|--------|--------|--------|--------|
| 0603 | 3.0    | 1.0    | 1.0    | 1.0    |

# CPTC Thermistor : TPM Type

## SMD CPTC Thermistor for Over-Current Protection



### ■ Reliability

| Item                            | Standard                     | Test Conditions / Methods                                                                                                                                                                                                                                                                                                                                                                       | Specifications                                                    |                  |                     |   |         |        |   |                  |       |   |         |        |   |                  |       |                                                                   |
|---------------------------------|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|------------------|---------------------|---|---------|--------|---|------------------|-------|---|---------|--------|---|------------------|-------|-------------------------------------------------------------------|
| Bending Strength                | IEC-60068-2-21               | Warp 3mm<br>Speed < 0.5mm/sec.<br>Duration: 10 sec on PCB. <div></div>                                                                                                                                                                                                                                        | No visible damage<br>  ΔR <sub>25</sub> /R <sub>25</sub>   ≤ 10 % |                  |                     |   |         |        |   |                  |       |   |         |        |   |                  |       |                                                                   |
| Damp Heat,<br>Steady State      | IEC 60068-2-3                | 60 ± 2 °C , 90 ~ 95% RH , 1000± 24 HRS                                                                                                                                                                                                                                                                                                                                                          | No visible damage<br>  ΔR <sub>25</sub> /R <sub>25</sub>   ≤ 20 % |                  |                     |   |         |        |   |                  |       |   |         |        |   |                  |       |                                                                   |
| High Temp. Storage              | IEC 60738-1<br>IEC 60068-2-2 | 125 ± 3 °C , 1000 ± 24 HRS                                                                                                                                                                                                                                                                                                                                                                      | No visible damage<br>  ΔR <sub>25</sub> /R <sub>25</sub>   ≤ 20 % |                  |                     |   |         |        |   |                  |       |   |         |        |   |                  |       |                                                                   |
| Low Temp. Storage               | Specification<br>Standard    | -40 ± 3 °C , 1000 ± 24 hrs                                                                                                                                                                                                                                                                                                                                                                      | No visible damage<br>  ΔR <sub>25</sub> /R <sub>25</sub>   ≤ 20 % |                  |                     |   |         |        |   |                  |       |   |         |        |   |                  |       |                                                                   |
| Rapid Change of<br>Temperature  | IEC 60068-2-14               | <div>The conditions shown below shall be repeated 5<br/>cycles on PCB</div> <table><tr><td>Step</td><td>Temperature (°C)</td><td>Period<br/>(minutes)</td></tr><tr><td>1</td><td>-40 ± 5</td><td>30 ± 3</td></tr><tr><td>2</td><td>Room temperature</td><td>5 ± 3</td></tr><tr><td>3</td><td>125 ± 5</td><td>30 ± 3</td></tr><tr><td>4</td><td>Room temperature</td><td>5 ± 3</td></tr></table> | Step                                                              | Temperature (°C) | Period<br>(minutes) | 1 | -40 ± 5 | 30 ± 3 | 2 | Room temperature | 5 ± 3 | 3 | 125 ± 5 | 30 ± 3 | 4 | Room temperature | 5 ± 3 | No visible damage<br>  ΔR <sub>25</sub> /R <sub>25</sub>   ≤ 20 % |
| Step                            | Temperature (°C)             | Period<br>(minutes)                                                                                                                                                                                                                                                                                                                                                                             |                                                                   |                  |                     |   |         |        |   |                  |       |   |         |        |   |                  |       |                                                                   |
| 1                               | -40 ± 5                      | 30 ± 3                                                                                                                                                                                                                                                                                                                                                                                          |                                                                   |                  |                     |   |         |        |   |                  |       |   |         |        |   |                  |       |                                                                   |
| 2                               | Room temperature             | 5 ± 3                                                                                                                                                                                                                                                                                                                                                                                           |                                                                   |                  |                     |   |         |        |   |                  |       |   |         |        |   |                  |       |                                                                   |
| 3                               | 125 ± 5                      | 30 ± 3                                                                                                                                                                                                                                                                                                                                                                                          |                                                                   |                  |                     |   |         |        |   |                  |       |   |         |        |   |                  |       |                                                                   |
| 4                               | Room temperature             | 5 ± 3                                                                                                                                                                                                                                                                                                                                                                                           |                                                                   |                  |                     |   |         |        |   |                  |       |   |         |        |   |                  |       |                                                                   |
| High Temp.<br>Endurance Load    | IEC 60738-1                  | 60 ± 3 °C Vmax., for 1.5hrs on / 0.5hrs off,<br>1000 ± 24 HRS                                                                                                                                                                                                                                                                                                                                   | No visible damage<br>  ΔR <sub>25</sub> /R <sub>25</sub>   ≤ 20 % |                  |                     |   |         |        |   |                  |       |   |         |        |   |                  |       |                                                                   |
| Climatic Sequence               | IEC 60738-1                  | a. 125°C x 16 HRS<br>b. 1st cycle : 40 °C 95 %RH x 24 HRS<br>c. -40 °C x 2 HRS<br>d. 5 cycles : 40°C 95% RH x 24 HRS / Cycle                                                                                                                                                                                                                                                                    | No visible damage<br>  ΔR <sub>25</sub> /R <sub>25</sub>   ≤ 20 % |                  |                     |   |         |        |   |                  |       |   |         |        |   |                  |       |                                                                   |
| Solderability                   | IEC 60068-2-58               | 245 ± 5 °C , 3 ± 0.3 sec                                                                                                                                                                                                                                                                                                                                                                        | At least 95% of terminal<br>electrode is covered by new<br>solder |                  |                     |   |         |        |   |                  |       |   |         |        |   |                  |       |                                                                   |
| Resistance to<br>Soldering Heat | IEC 60068-2-58               | 260 ± 5 °C , 10 ± 1 sec                                                                                                                                                                                                                                                                                                                                                                         | No visible damage<br>  ΔR <sub>25</sub> /R <sub>25</sub>   ≤ 20 % |                  |                     |   |         |        |   |                  |       |   |         |        |   |                  |       |                                                                   |

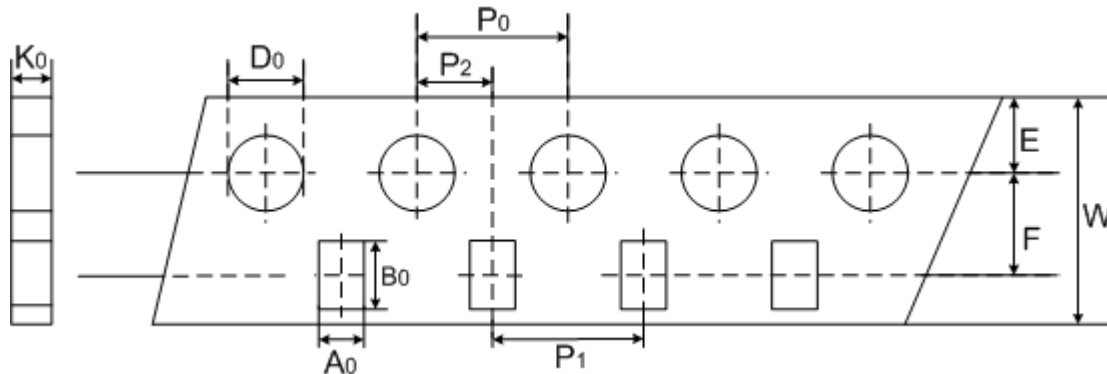
# CPTC Thermistor : TPM Type

## SMD CPTC Thermistor for Over-Current Protection



### ■ Package

#### ● Taping Specification

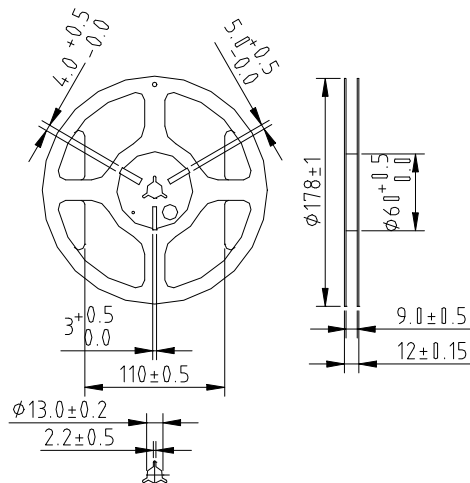


(Unit: mm)

| Index | A <sub>0</sub> | B <sub>0</sub> | W    | E    | F     | P <sub>1</sub> | P <sub>2</sub> | P <sub>0</sub> | D <sub>0</sub> | K <sub>0</sub> |
|-------|----------------|----------------|------|------|-------|----------------|----------------|----------------|----------------|----------------|
| Type  | ±0.2           | ±0.2           | ±0.2 | ±0.1 | ±0.05 | ±0.1           | ±0.05          | ±0.1           | ±0.1           | ±0.1           |
| 0603  | 1.1            | 1.9            | 8    | 1.75 | 3.5   | 4              | 2              | 4              | 1.55           | 0.95           |

#### ● Quantity

(Unit: mm)



| Type | Quantity(pcs/reel) |
|------|--------------------|
| 0603 | 4,000              |

### ■ Warehouse Storage Condition of Products

#### ● Storage Conditions :

1. Storage Temperature: -10°C ~ +40°C
2. Relative Humidity: ≤ 75%RH
3. Keep away from corrosive atmosphere and sunlight.

#### ● Period of Storage : 1 year

# PTC Thermistor : TPM-S Series

## SMD PTC Thermistor for Temperature Sensing



### ■ Features

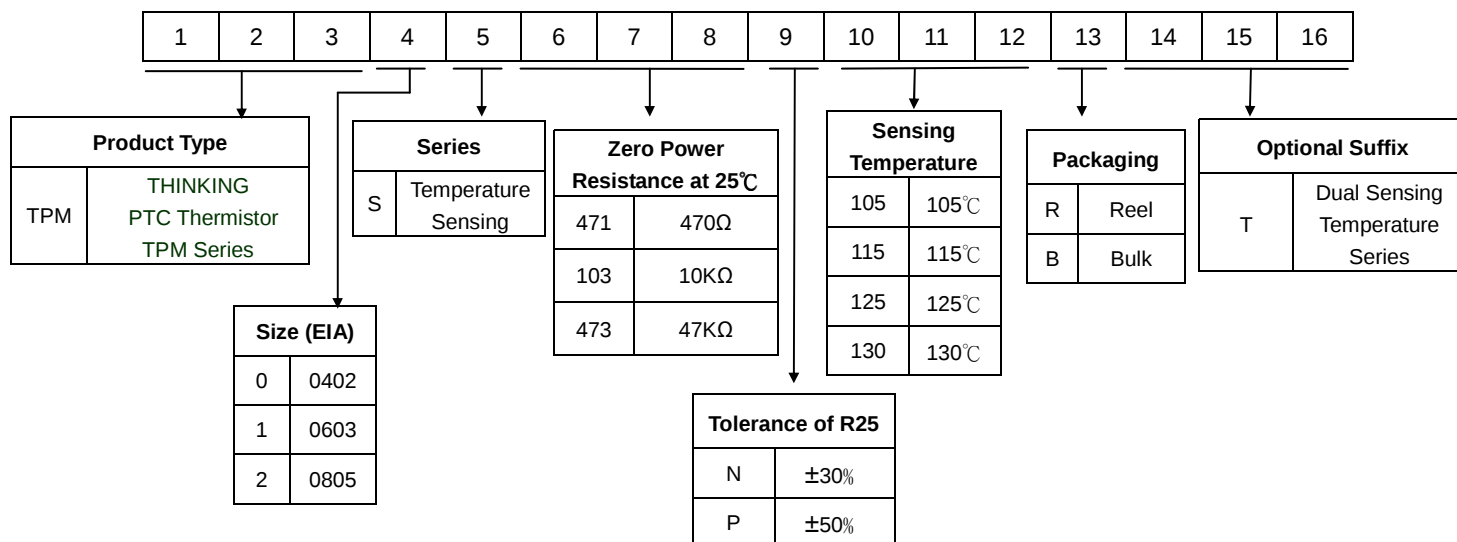
1. RoHS & Halogen-free compliant
2. Thermistor chip with lead-free tinned terminals
3. EIA size 0402,0603,0805
4. Fast and reliable response
5. Suitable for reflow soldering
6. Agency Recognition:  
UL & cUL : File No. E138827  
TUV : File No. R50133294



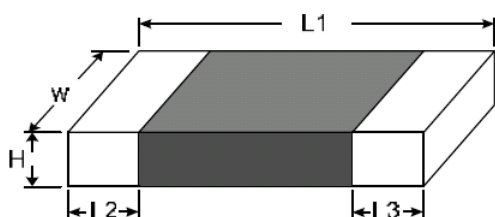
### ■ Recommended Applications

1. DC/DC converter
2. AC adapter
3. Inverter
4. Overheat protection for transistor and ICs
5. LED

### ■ Part Number Code



### ■ Structure and Dimensions



(Unit: mm)

| Part No. | Size (EIA) | L1        | W         | H max. | L2 and L3 |
|----------|------------|-----------|-----------|--------|-----------|
| TPM0     | 0402       | 1.00±0.15 | 0.50±0.10 | 0.60   | 0.20±0.10 |
| TPM1     | 0603       | 1.60±0.15 | 0.80±0.15 | 0.95   | 0.40±0.20 |
| TPM2     | 0805       | 2.00±0.20 | 1.25±0.20 | 1.00   | 0.45±0.25 |

# PTC Thermistor : TPM-S Series

## SMD PTC Thermistor for Temperature Sensing



### Electrical Characteristics

#### Dual Sensing Temperature Series

| Part No.       | Size (EIA) | Zero Power Resistance at 25°C (Ω) | Sensing Temperature 1 at 4.7 KΩ (°C) | Sensing Temperature 2 at 47 KΩ (°C) | Max. Voltage (V) | Operating Temperature Range(°C) |
|----------------|------------|-----------------------------------|--------------------------------------|-------------------------------------|------------------|---------------------------------|
|                |            | R25                               | Ts1                                  | Ts2                                 | V <sub>dc</sub>  | T <sub>L</sub> ~T <sub>U</sub>  |
| TPM0S541P115RT | 0402       | 540                               | 115±5                                | 135±7                               | 32               | -25~+150                        |
| TPM1S471P065RT | 0603       | 470                               | 65±5                                 | 80±7                                | 32               | -25~+90                         |

| Part No.       | Size (EIA) | Zero Power Resistance at 25°C (Ω) | Sensing Temperature 1 at 10 KΩ (°C) | Sensing Temperature 2 at 100 KΩ (°C) | Max. Voltage (V) | Operating Temperature Range(°C) |
|----------------|------------|-----------------------------------|-------------------------------------|--------------------------------------|------------------|---------------------------------|
|                |            | R25                               | Ts1                                 | Ts2                                  | V <sub>dc</sub>  | T <sub>L</sub> ~T <sub>U</sub>  |
| TPM0S102P115RT | 0402       | 1000                              | 115±5                               | 130±3                                | 32               | -40~+140                        |
| TPM0S102P125RT |            |                                   | 125±5                               | 140±3                                |                  | -40~+150                        |

#### Single Sensing Temperature Series

| Part No.      | Size<br>(EIA) | Sensing<br>Temperature<br>(℃) | Resistance<br>(Ω) |         |         | Max.<br>Voltage<br>(V) | Operating<br>Temperature<br>Range(℃) | Safety<br>Approvals |       |
|---------------|---------------|-------------------------------|-------------------|---------|---------|------------------------|--------------------------------------|---------------------|-------|
|               |               | Ts                            | 25℃               | Ts - 5℃ | Ts + 5℃ | V <sub>dc</sub>        | T <sub>L</sub> ~T <sub>U</sub>       | UL/<br>cUL          | TUV   |
| TPM0S471P105R | 0402          | 105±5                         | 470               | ≤4.7K   | ≥4.7K   | 32                     | -25~+120                             | √                   | √     |
| TPM0S471P115R |               | 115±5                         |                   |         |         |                        | -25~+130                             | √                   | √     |
| TPM0S471P125R |               | 125±5                         |                   |         |         |                        | -25~+140                             | √                   | √     |
| TPM0S103P130R |               | 130±5                         | 10K               | ≤4.7M   | ≥4.7M   |                        | -25~+145                             |                     |       |
| TPM1S101N130R | 0603          | 130±7                         | 100               | ≤1K     | ≥1K     | 24                     | -25~+145                             |                     |       |
| TPM1S221N105R |               | 105±7                         | 220               | ≤2.2K   | ≥2.2K   |                        | -25~+120                             |                     |       |
| TPM1S471P065R |               | 65±5                          | 470               | ≤4.7K   | ≥4.7K   | 32                     | -25~+80                              | √                   | √     |
| TPM1S471P075R |               | 75±5                          |                   |         |         |                        | -25~+90                              | √                   | √     |
| TPM1S471P085R |               | 85±5                          |                   |         |         |                        | -25~+100                             | √                   | √     |
| TPM1S471P095R |               | 95±5                          |                   |         |         |                        | -25~+110                             | √                   | √     |
| TPM1S471P105R |               | 105±5                         |                   |         |         |                        | -25~+120                             | √                   | √     |
| TPM1S471P115R |               | 115±5                         |                   |         |         |                        | -25~+130                             | √                   | √     |
| TPM1S471P125R |               | 125±5                         |                   |         |         |                        | -25~+140                             | √                   | √     |
| TPM1S471P135R |               | 135±5                         |                   |         |         |                        | -25~+150                             | √                   | √     |
| TPM1S472P105R |               | 105±5                         | 4.7K              | ≤47K    | ≥47K    |                        | -25~+120                             |                     |       |
| TPM1S103P110R |               | 110±5                         | 10K               | ≤4.7M   | ≥4.7M   |                        | -25~+125                             | √                   | √     |
| TPM1S103P120R |               | 120±5                         |                   |         |         |                        | -25~+135                             | √                   | √     |
| TPM1S103P130R |               | 130±5                         |                   |         |         |                        | -25~+145                             | √                   | √     |
| TPM1S473P130R |               | 130±5                         |                   |         |         |                        | 47K                                  | ≤4.7M               | ≥4.7M |

# PTC Thermistor : TPM-S Series

## SMD PTC Thermistor for Temperature Sensing



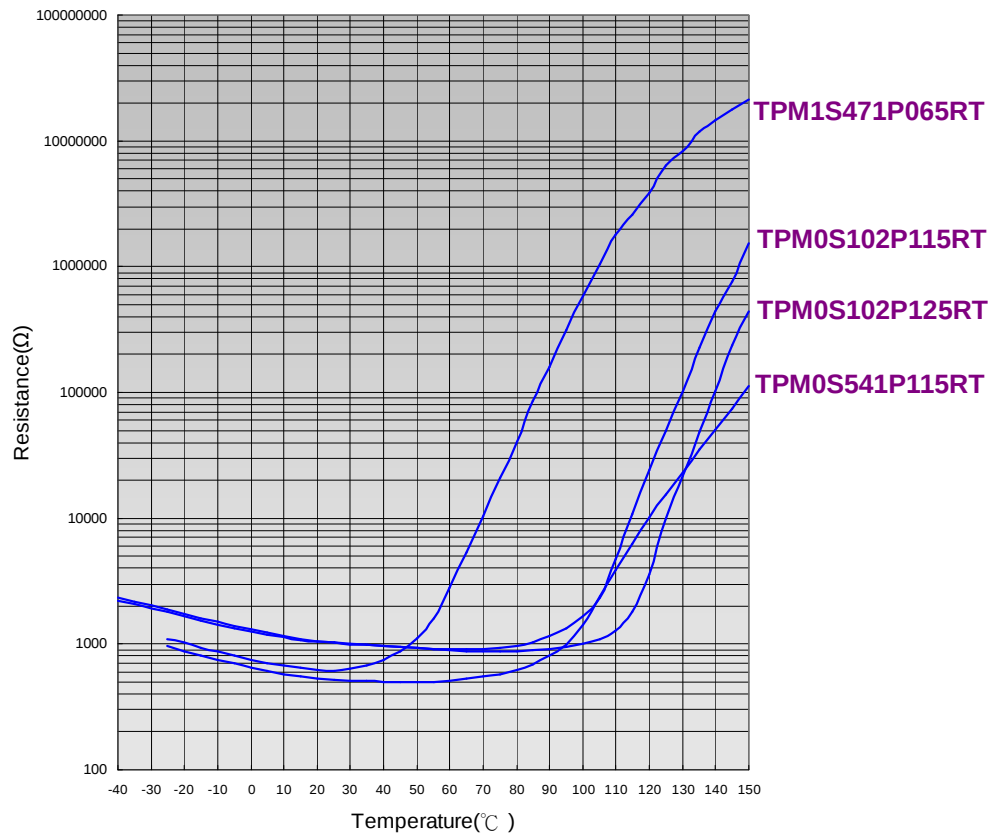
| Part No.      | Size<br>(EIA) | Sensing<br>Temperature<br>(°C) | Resistance<br>(Ω) |          |          | Max.<br>Voltage<br>(V) | Operating<br>Temperature<br>Range(°C) | Safety<br>Approvals |     |
|---------------|---------------|--------------------------------|-------------------|----------|----------|------------------------|---------------------------------------|---------------------|-----|
|               |               | Ts                             | 25°C              | Ts - 5°C | Ts + 5°C | V <sub>dc</sub>        | T <sub>L</sub> ~T <sub>U</sub>        | UL/<br>cUL          | TUV |
| TPM2S101N110R | 0805          | 110±7                          | 100               | ≤1K      | ≥1K      | 24                     | -25~+125                              |                     |     |
| TPM2S101N115R |               | 115±7                          |                   |          |          |                        | -25~+130                              |                     |     |
| TPM2S101N130R |               | 130±7                          |                   |          |          |                        | -25~+145                              |                     |     |
| TPM2S471P065R |               | 65±5                           | 470               | ≤4.7K    | ≥4.7K    | 32                     | -25~+80                               | √                   | √   |
| TPM2S471P075R |               | 75±5                           |                   |          |          |                        | -25~+90                               | √                   | √   |
| TPM2S471P085R |               | 85±5                           |                   |          |          |                        | -25~+100                              | √                   | √   |
| TPM2S471P095R |               | 95±5                           |                   |          |          |                        | -25~+110                              | √                   | √   |
| TPM2S471P105R |               | 105±5                          |                   |          |          |                        | -25~+120                              | √                   | √   |
| TPM2S471P115R |               | 115±5                          |                   |          |          |                        | -25~+130                              | √                   | √   |
| TPM2S471P125R |               | 125±5                          |                   |          |          |                        | -25~+140                              | √                   | √   |
| TPM2S471P135R |               | 135±5                          |                   |          |          |                        | -25~+150                              | √                   | √   |
| TPM2S103P130R |               | 130±5                          | 10K               | ≤4.7M    | ≥4.7M    |                        | -25~+145                              |                     |     |

# PTC Thermistor : TPM-S Series

## SMD PTC Thermistor for Temperature Sensing

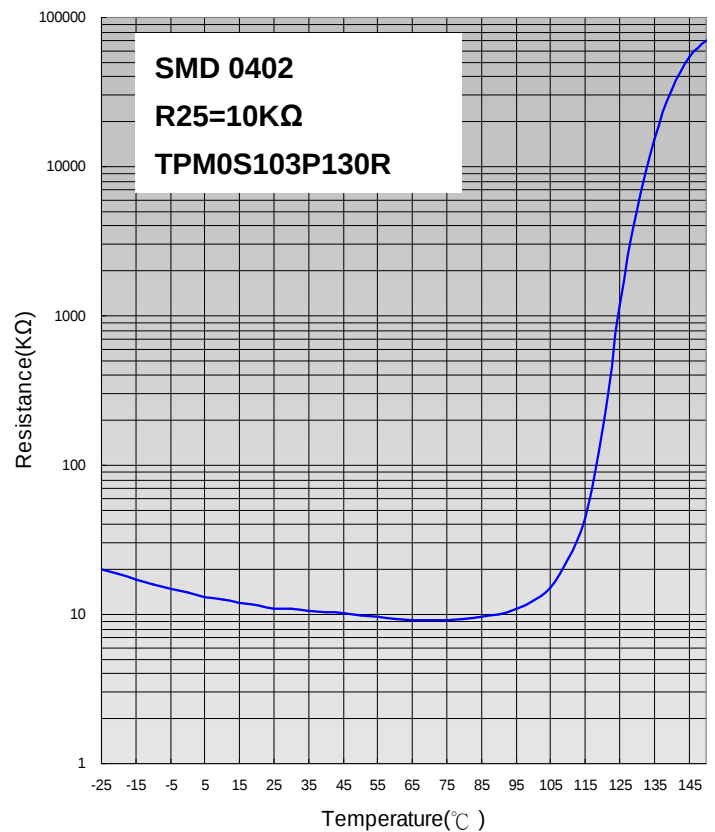
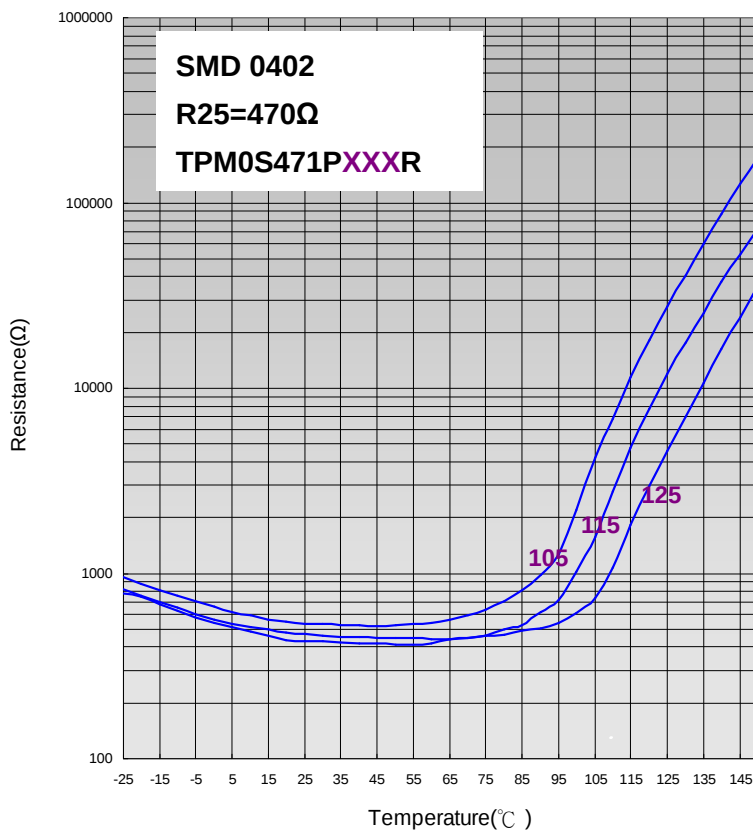


### ■ Resistance-Temperature Characteristics (Typical) Dual Sensing Temperature Series



### Single Sensing Temperature Series

#### ● 0402 Series

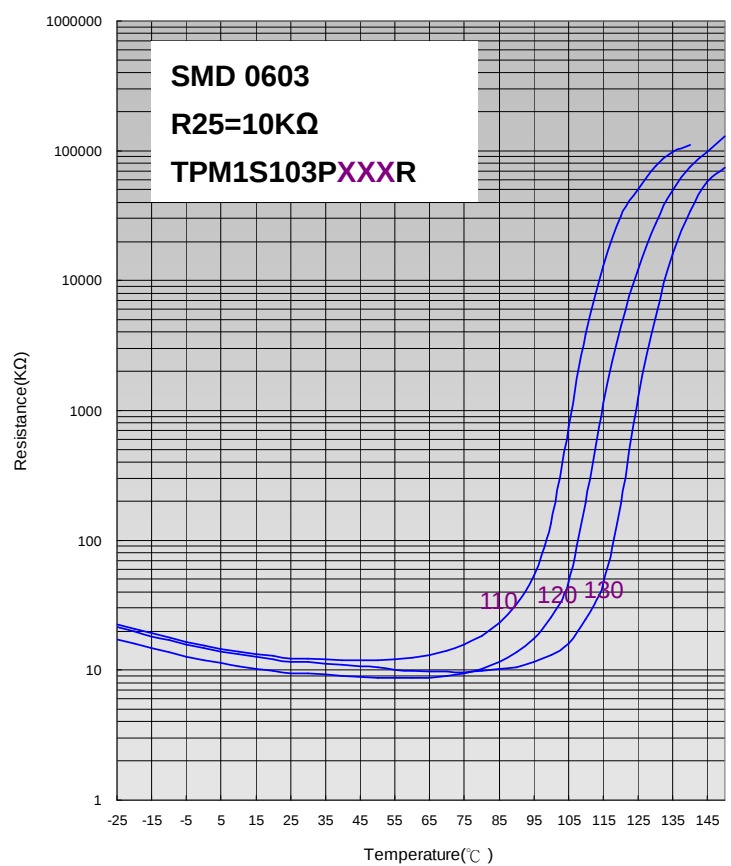
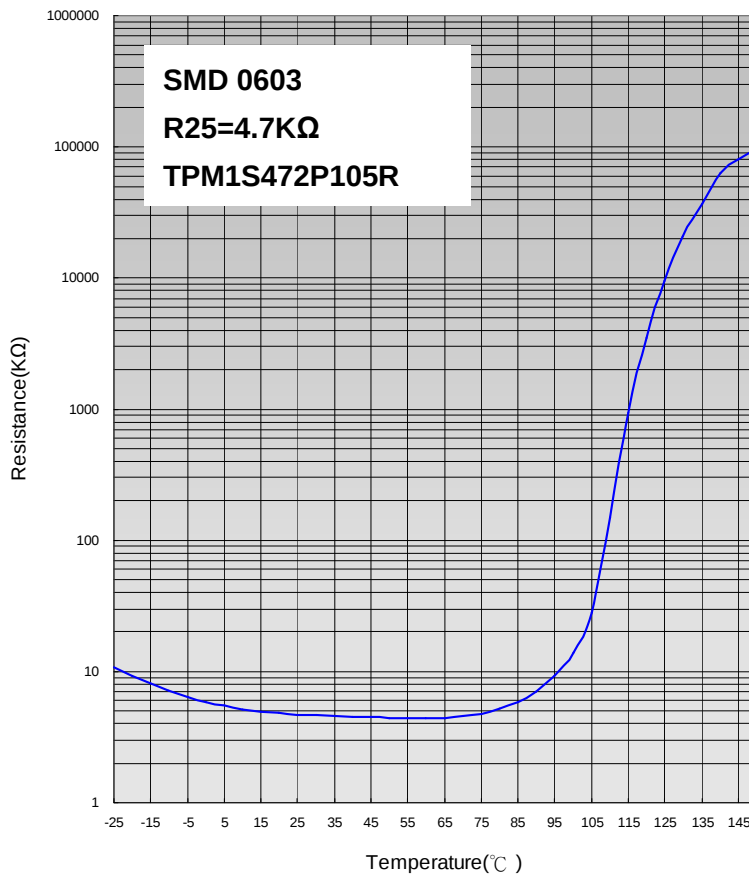
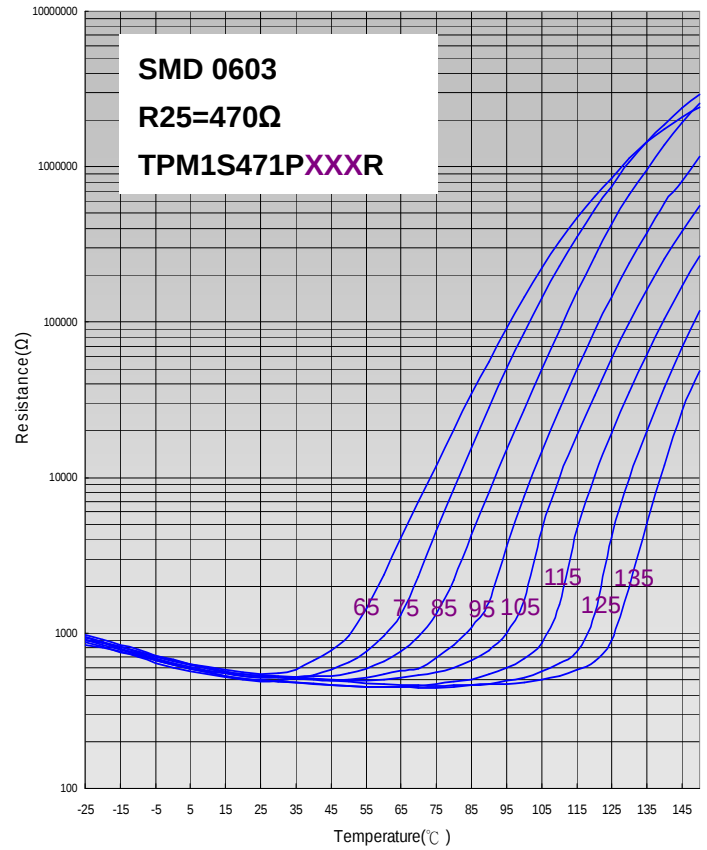
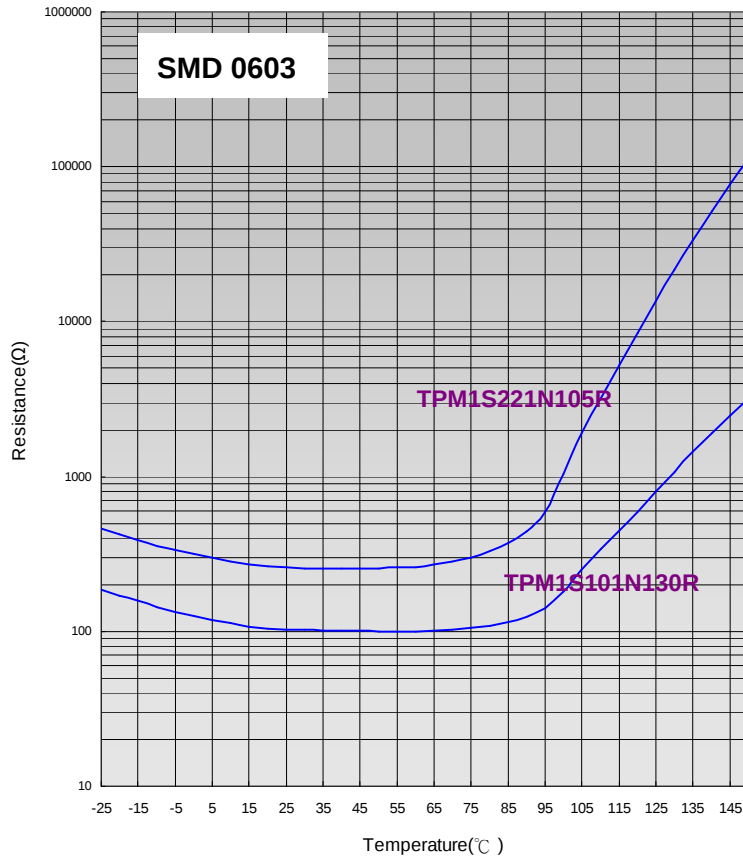


# PTC Thermistor : TPM-S Series

## SMD PTC Thermistor for Temperature Sensing



### ● 0603 Series

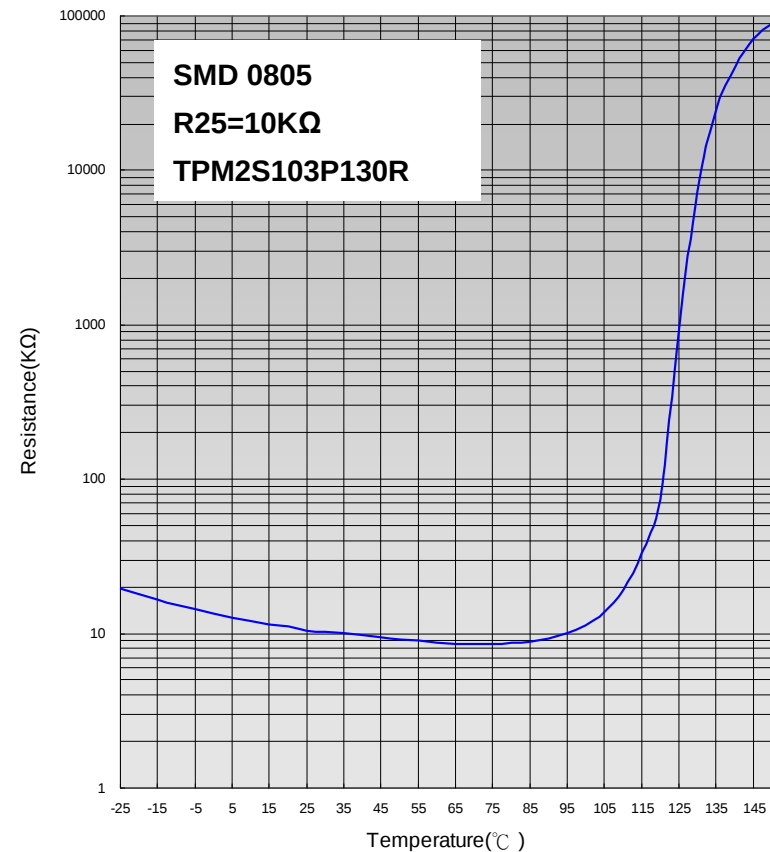
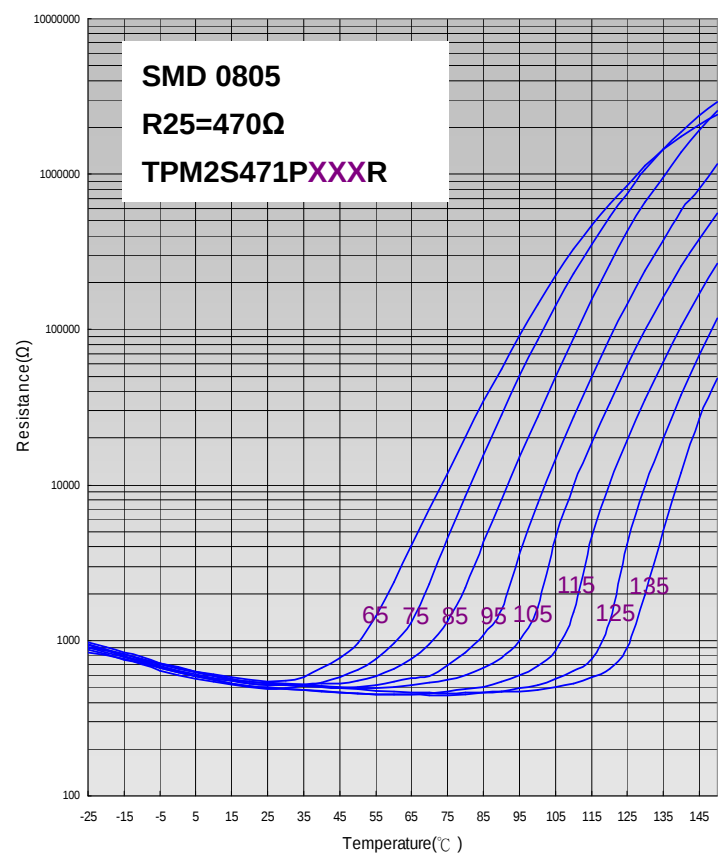
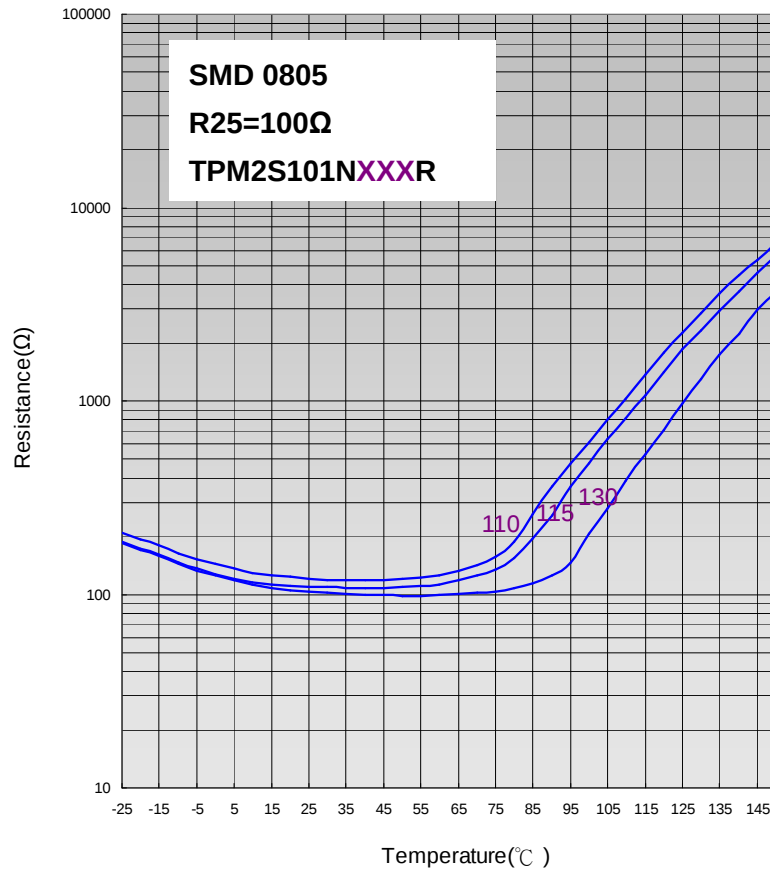


# PTC Thermistor : TPM-S Series

## SMD PTC Thermistor for Temperature Sensing



### ● 0805 Series



# PTC Thermistor : TPM-S Series

## SMD PTC Thermistor for Temperature Sensing



### ■ Typical Application Circuit

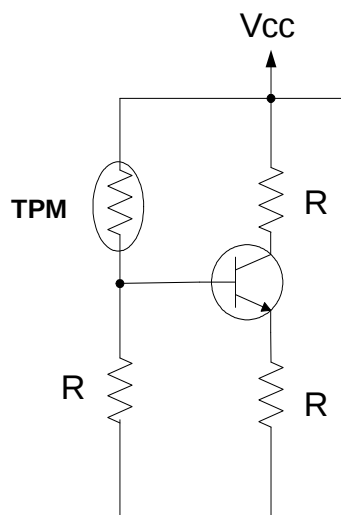


Fig 1. Overheat Protection

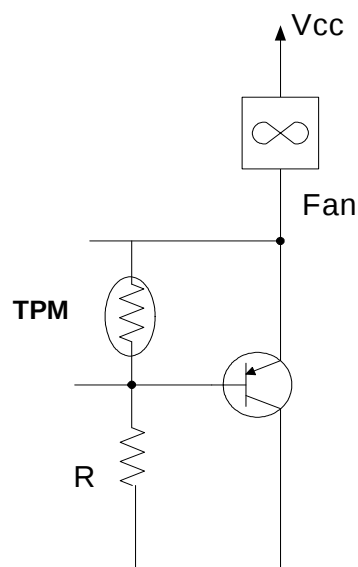


Fig 2. Temp. Sensing and Control

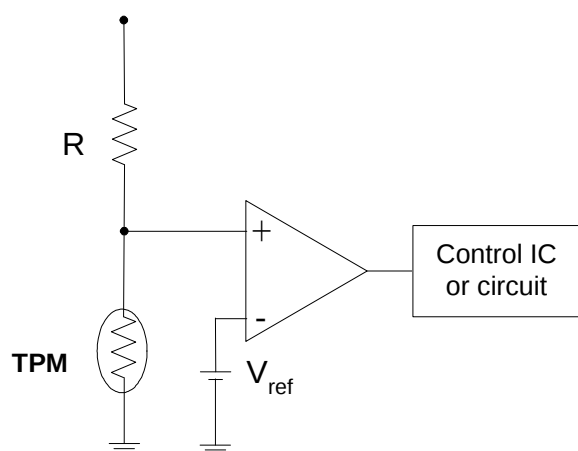


Fig 3. Comparator Circuit

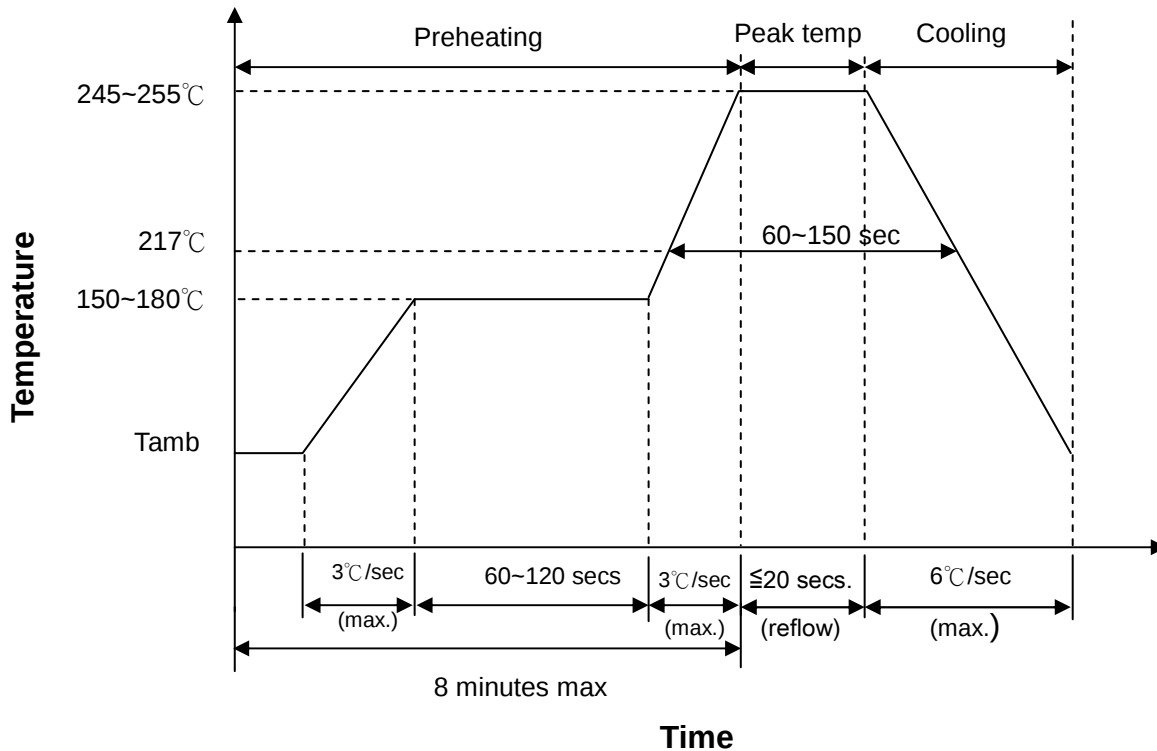
# PTC Thermistor : TPM-S Series

## SMD PTC Thermistor for Temperature Sensing



### ■ Soldering Recommendation

#### ● IR-Reflow Soldering Profile



#### ● Recommended Reworking Conditions with Soldering Iron

| Item                              | Conditions   |
|-----------------------------------|--------------|
| Temperature of Soldering Iron-tip | 360°C (max.) |
| Soldering Time                    | 3 sec (max.) |
| Diameter of Soldering Iron-tip    | Φ3mm (max.)  |

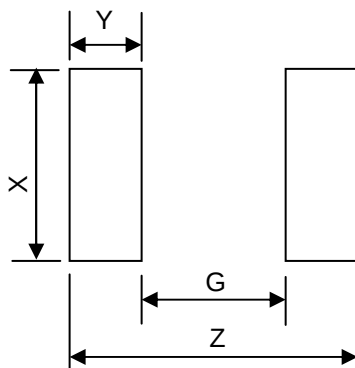
Caution: Please do not touch the component surface with soldering iron directly to avoid its damage.

# PTC Thermistor : TPM-S Series

## SMD PTC Thermistor for Temperature Sensing

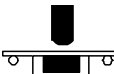


### ■ Recommended Pad Dimensions



| Size | Z (mm) | G (mm) | X (mm) | Y (mm) |
|------|--------|--------|--------|--------|
| 0402 | 1.7    | 0.5    | 0.6    | 0.6    |
| 0603 | 3.0    | 1.0    | 1.0    | 1.0    |
| 0805 | 3.4    | 1.0    | 1.4    | 1.2    |

### ■ Reliability

| Item                           | Standard                     | Test Conditions / Methods                                                                                                                                                                                                                                                                                                                                                           | Specifications                                                                                                                     |                  |                     |   |         |        |   |                  |       |   |         |        |   |                  |       |                                                                                                                                    |
|--------------------------------|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------|---|---------|--------|---|------------------|-------|---|---------|--------|---|------------------|-------|------------------------------------------------------------------------------------------------------------------------------------|
| Bending Strength               | IEC-60068-2-21               | Warp 2mm<br>Speed < 0.5mm/sec.<br>Duration: 10 sec on PCB. <div></div>                                                                                                                                                                                                                         | No visible damage<br>  ΔR <sub>25</sub> /R <sub>25</sub>   ≤ 10 %                                                                  |                  |                     |   |         |        |   |                  |       |   |         |        |   |                  |       |                                                                                                                                    |
| Damp Heat,<br>Steady State     | IEC 60068-2-3                | 40 ± 2 °C , 90 ~ 95% RH , 1000± 24 HRS                                                                                                                                                                                                                                                                                                                                              | No visible damage<br>  ΔR <sub>25</sub> /R <sub>25</sub>   ≤ 20 %<br>(   ΔR <sub>25</sub> /R <sub>25</sub>   ≤ 30 % <sup>*1)</sup> |                  |                     |   |         |        |   |                  |       |   |         |        |   |                  |       |                                                                                                                                    |
| High Temp. Storage             | IEC 60738-1<br>IEC 60068-2-2 | Tu. ± 5 °C , 1000 ± 24 HRS                                                                                                                                                                                                                                                                                                                                                          | No visible damage<br>  ΔR <sub>25</sub> /R <sub>25</sub>   ≤ 20 %<br>(   ΔR <sub>25</sub> /R <sub>25</sub>   ≤ 30 % <sup>*1)</sup> |                  |                     |   |         |        |   |                  |       |   |         |        |   |                  |       |                                                                                                                                    |
| Rapid Change of<br>Temperature | IEC 60068-2-14               | The conditions shown below shall be repeated 5<br>cycles on PCB <table><tr><th>Step</th><th>Temperature (°C)</th><th>Period<br/>(minutes)</th></tr><tr><td>1</td><td>-25 ± 5</td><td>30 ± 3</td></tr><tr><td>2</td><td>Room temperature</td><td>5 ± 3</td></tr><tr><td>3</td><td>150 ± 5</td><td>30 ± 3</td></tr><tr><td>4</td><td>Room temperature</td><td>5 ± 3</td></tr></table> | Step                                                                                                                               | Temperature (°C) | Period<br>(minutes) | 1 | -25 ± 5 | 30 ± 3 | 2 | Room temperature | 5 ± 3 | 3 | 150 ± 5 | 30 ± 3 | 4 | Room temperature | 5 ± 3 | No visible damage<br>  ΔR <sub>25</sub> /R <sub>25</sub>   ≤ 20 %<br>(   ΔR <sub>25</sub> /R <sub>25</sub>   ≤ 30 % <sup>*1)</sup> |
| Step                           | Temperature (°C)             | Period<br>(minutes)                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                    |                  |                     |   |         |        |   |                  |       |   |         |        |   |                  |       |                                                                                                                                    |
| 1                              | -25 ± 5                      | 30 ± 3                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                    |                  |                     |   |         |        |   |                  |       |   |         |        |   |                  |       |                                                                                                                                    |
| 2                              | Room temperature             | 5 ± 3                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                    |                  |                     |   |         |        |   |                  |       |   |         |        |   |                  |       |                                                                                                                                    |
| 3                              | 150 ± 5                      | 30 ± 3                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                    |                  |                     |   |         |        |   |                  |       |   |         |        |   |                  |       |                                                                                                                                    |
| 4                              | Room temperature             | 5 ± 3                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                    |                  |                     |   |         |        |   |                  |       |   |         |        |   |                  |       |                                                                                                                                    |
| High Temp. Load                | IEC 60738-1                  | 85 ± 5 °C Vmax. , 1000 ± 24 HRS                                                                                                                                                                                                                                                                                                                                                     | No visible damage<br>  ΔR <sub>25</sub> /R <sub>25</sub>   ≤ 20 %<br>(   ΔR <sub>25</sub> /R <sub>25</sub>   ≤ 30 % <sup>*1)</sup> |                  |                     |   |         |        |   |                  |       |   |         |        |   |                  |       |                                                                                                                                    |

# PTC Thermistor : TPM-S Series

## SMD PTC Thermistor for Temperature Sensing

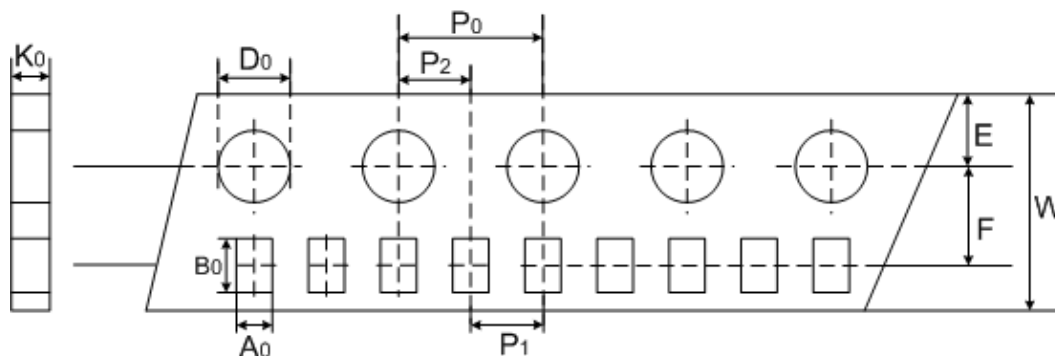


| Item                         | Standard               | Test Conditions / Methods                                                                                                  | Specifications                                                                                                  |
|------------------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Climatic Sequence            | IEC 60738-1            | a. Tu. x 16 HRS<br>b. 1st cycle : 40 °C 95 %RH x 24 HRS<br>c. -25 °C x 2 HRS<br>d. 5 cycles : 40°C 95% RH x 24 HRS / Cycle | No visible damage<br>$ \Delta R_{25}/R_{25}  \leq 20\%$<br>( $ \Delta R_{25}/R_{25}  \leq 30\%$ <sup>*1</sup> ) |
| Solderability                | IEC 60068-2-58         | 245 ± 5 °C , 3 ± 0.3 sec                                                                                                   | At least 95% of terminal electrode is covered by new solder                                                     |
| Resistance to Soldering Heat | IEC 60068-2-58         | 260 ± 5 °C , 10 ± 1 sec                                                                                                    | No visible damage<br>$ \Delta R_{25}/R_{25}  \leq 20\%$<br>( $ \Delta R_{25}/R_{25}  \leq 30\%$ <sup>*1</sup> ) |
| Low Temp. Storage            | Specification Standard | TL ± 3 °C , 1000 ± 24 HRS                                                                                                  | No visible damage<br>$ \Delta R_{25}/R_{25}  \leq 30\%$                                                         |

\*1 : Apply for TPM1S472P105R, TPM1S103P110R, TPM1S103P120R, TPM1S103P130R, TPM1S473P130R, TPM2S103P130R only.

### ■ Package

#### ● Taping Specification

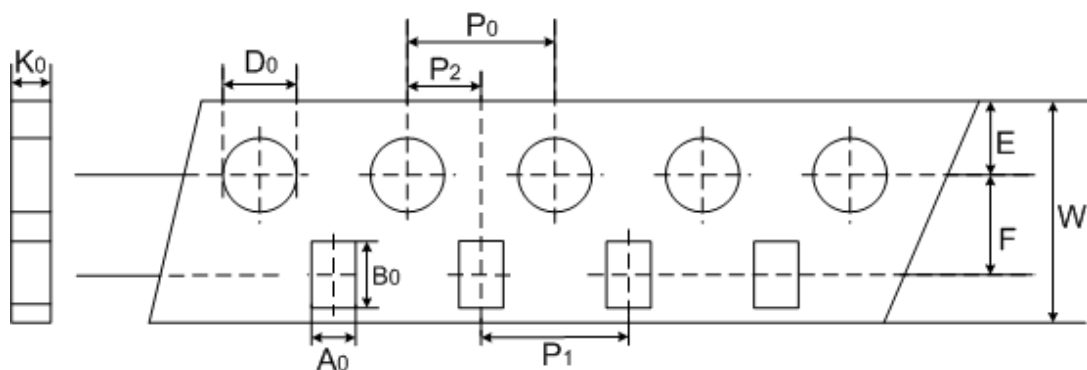


(Unit: mm)

| Index<br>Type | A <sub>0</sub> | B <sub>0</sub> | W    | E    | F     | P <sub>1</sub> | P <sub>2</sub> | P <sub>0</sub> | D <sub>0</sub> | K <sub>0</sub> |
|---------------|----------------|----------------|------|------|-------|----------------|----------------|----------------|----------------|----------------|
| 0402          | ±0.05          | ±0.12          | ±0.2 | ±0.1 | ±0.05 | ±0.1           | ±0.05          | ±0.1           | ±0.1           | ±0.1           |
|               | 0.62           | 1.12           | 8    | 1.75 | 3.5   | 2              | 2              | 4              | 1.55           | 0.60           |

# PTC Thermistor : TPM-S Series

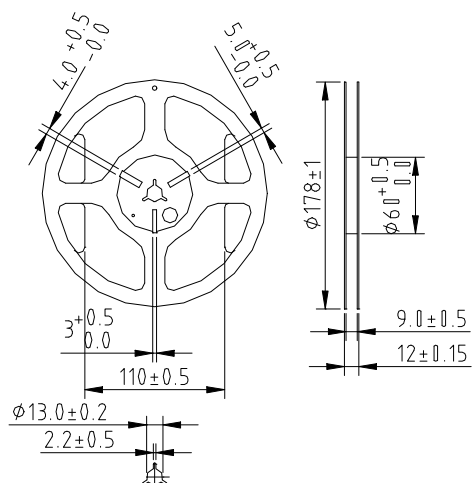
## SMD PTC Thermistor for Temperature Sensing



(Unit: mm)

| Index<br>Type | A <sub>0</sub> | B <sub>0</sub> | W    | E    | F     | P <sub>1</sub> | P <sub>2</sub> | P <sub>0</sub> | D <sub>0</sub> | K <sub>0</sub> |
|---------------|----------------|----------------|------|------|-------|----------------|----------------|----------------|----------------|----------------|
| 0603          | ±0.2           | ±0.2           | ±0.2 | ±0.1 | ±0.05 | ±0.1           | ±0.05          | ±0.1           | ±0.1           | ±0.1           |
| 0805          | 1.1            | 1.9            | 8    | 1.75 | 3.5   | 4              | 2              | 4              | 1.55           | 0.95           |
| 0805          | 1.5            | 2.3            | 8    | 1.75 | 3.5   | 4              | 2              | 4              | 1.55           | 1.00           |

### ● Quantity



| Type | Quantity(pcs/reel) |
|------|--------------------|
| 0402 | 10,000             |
| 0603 | 4,000              |
| 0805 | 3,500              |

### ■ Warehouse Storage Conditions of Products

#### ● Storage Conditions :

1. Storage Temperature: -10°C ~ +40°C
2. Relative Humidity: ≤ 75%RH
3. Keep away from corrosive atmosphere and sunlight.

#### ● Period of Storage : 1 year