





















# PTC Thermistor : TPM-S Series

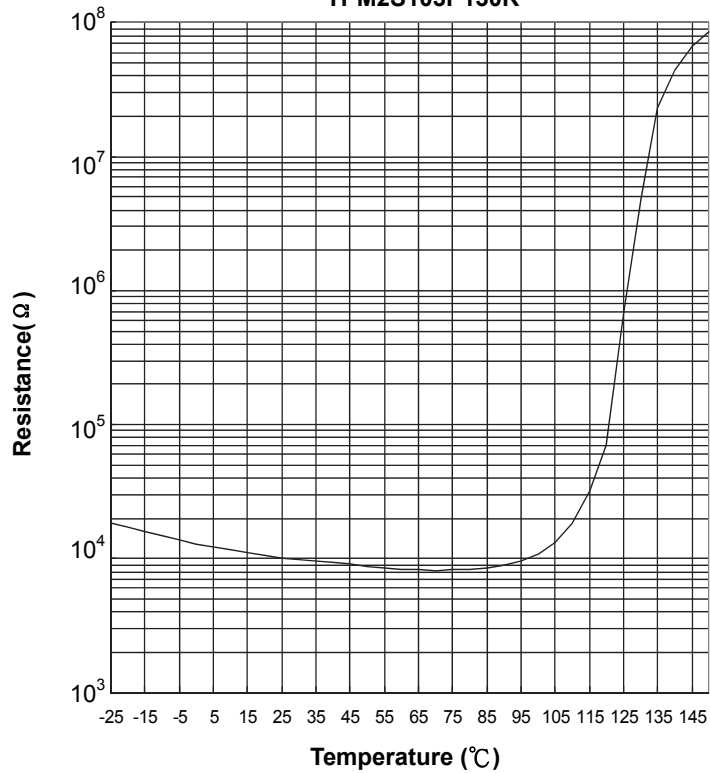
## SMD PTC Thermistor for Temperature Sensing

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### ■ Resistance-Temperature Characteristics (Typical)

SMD 0805 R25=10K $\Omega$

TPM2S103P130R



# PTC Thermistor : TPM-S Series

## SMD PTC Thermistor for Temperature Sensing

### ■ Typical Application Circuit

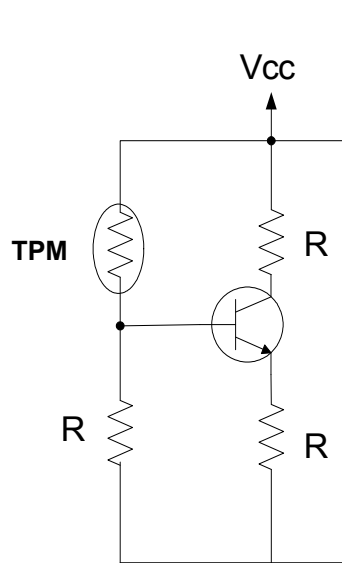


Fig 1. Overheat Protection

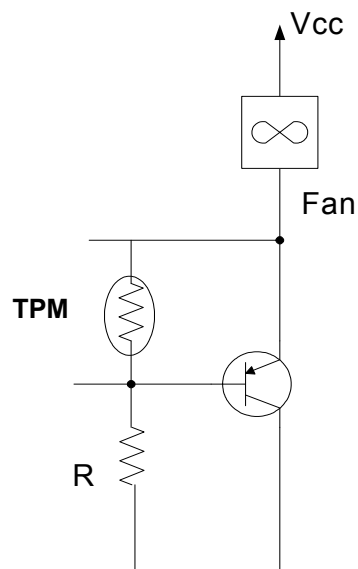


Fig 2. Temp. Sensing and Control

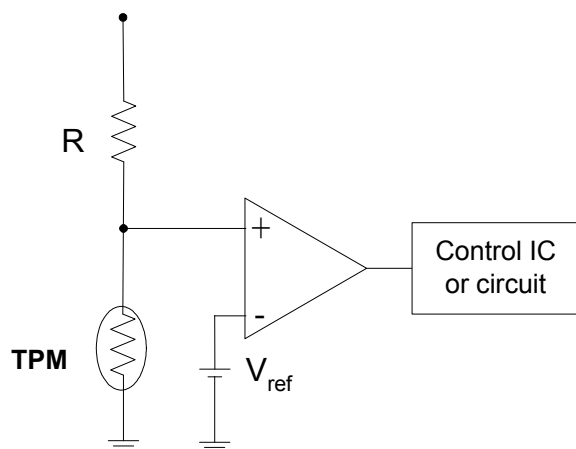


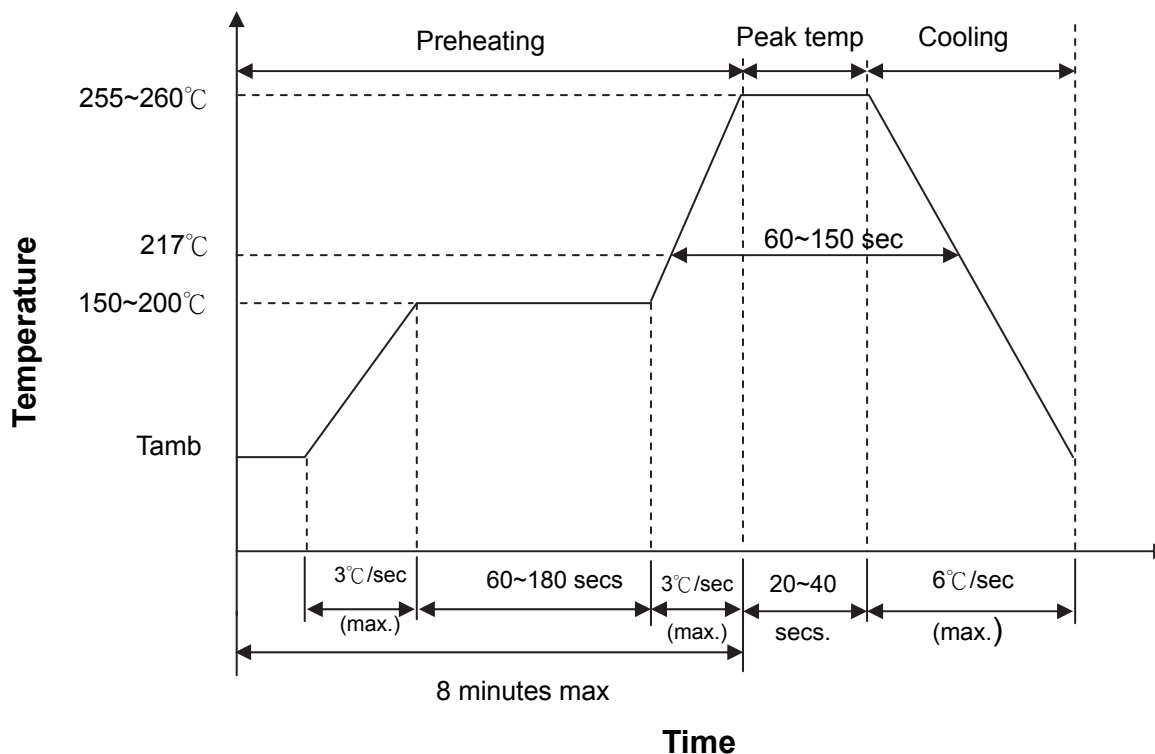
Fig 3. Comparator Circuit

# 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.)

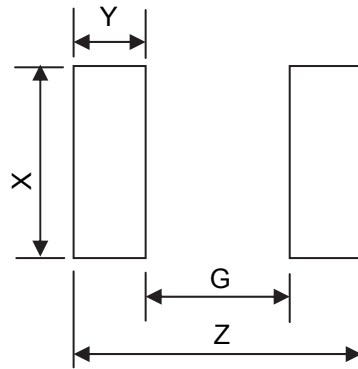
Caution: Please do not touch the component surface with soldering iron directly to avoid its damage.

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## SMD PTC Thermistor for Temperature Sensing

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### ■ Recommended Soldering Pad Dimensions

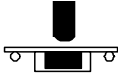


Size(EIA)	Z (mm)	G (mm)	X (mm)	Y (mm)
0402	1.7	0.5	0.6	0.6
0603	3.0	1.0	1.0	1.0
0805	3.4	1.0	1.4	1.2

# PTC Thermistor : TPM-S Series

## SMD PTC Thermistor for Temperature Sensing

### ■ Reliability (Single sensing temperature series)

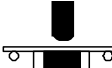
Item	Standard	Test Conditions / Methods	Specifications															
Rapid Change of Temperature	IEC 60068-2-14	<p>The conditions shown below shall be repeated 5 cycles on PCB</p> <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Period (minutes)</th> </tr> </thead> <tbody> <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> </tbody> </table>	Step	Temperature (°C)	Period (minutes)	1	-25 ± 5	30 ± 3	2	Room temperature	5 ± 3	3	150 ± 5	30 ± 3	4	Room temperature	5 ± 3	<p>No visible damage  <math> \Delta R_{25}/R_{25}  \leq 20\%</math>  <math>( \Delta R_{25}/R_{25}  \leq 30\%^{*1})</math></p>
Step	Temperature (°C)	Period (minutes)																
1	-25 ± 5	30 ± 3																
2	Room temperature	5 ± 3																
3	150 ± 5	30 ± 3																
4	Room temperature	5 ± 3																
Damp Heat, Steady State	IEC 60068-2-78	40 ± 2 °C, 90 ~ 95% RH, 1000 ± 24 hrs	<p>No visible damage  <math> \Delta R_{25}/R_{25}  \leq 20\%</math>  <math>( \Delta R_{25}/R_{25}  \leq 30\%^{*1})</math></p>															
Bending Strength	IEC-60068-2-21	<p>Warp 2mm            Speed &lt; 0.5mm/sec.            Duration: 10 sec on PCB.</p> 	<p>No visible damage  <math> \Delta R_{25}/R_{25}  \leq 10\%</math></p>															
High Temp. Storage	IEC 60068-2-2	Tu. ± 5 °C, 1000 ± 24 hrs	<p>No visible damage  <math> \Delta R_{25}/R_{25}  \leq 20\%</math>  <math>( \Delta R_{25}/R_{25}  \leq 30\%^{*1})</math></p>															
Low Temp.Storage <sup>*1</sup>	IEC 60068-2-1	T <sub>L</sub> ± 3 °C, 1000 ± 24 hrs	<p>No visible damage  <math> \Delta R_{25}/R_{25}  \leq 30\%</math></p>															
High Temp. Load	IEC 60738-1	85 ± 5 °C Vmax., 1000 ± 24 hrs	<p>No visible damage  <math> \Delta R_{25}/R_{25}  \leq 20\%</math>  <math>( \Delta R_{25}/R_{25}  \leq 30\%^{*1})</math></p>															
Climatic Sequence	IEC 60738-1	<p>a. Tu. x 16 hrs            b. 1st cycle : 40 °C 95 %RH x 24 hrs            c. T<sub>L</sub> x 2 hrs            d. 5 cycles : 40°C 95% RH x 24 hrs / Cycle</p>	<p>No visible damage  <math> \Delta R_{25}/R_{25}  \leq 20\%</math>  <math>( \Delta R_{25}/R_{25}  \leq 30\%^{*1})</math></p>															
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	<p>8.1.2.2 Solder reflow method            Preheating: 150~180°C, 60~120 secs            Peak temp.: 245~255°C, ≤ 20 secs.(reflow)</p>	<p>No visible damage  <math> \Delta R_{25}/R_{25}  \leq 20\%</math>  <math>( \Delta R_{25}/R_{25}  \leq 30\%^{*1})</math></p>															

NOTE: \*1 : Apply for TPM0S473P130R, TPM1S103PXXR, TPM1S472P105R, TPM1S473P130R, TPM2S103P130R only.

# PTC Thermistor : TPM-S Series

## SMD PTC Thermistor for Temperature Sensing

### ■ Reliability (Dual sensing temperature series)

Item	Standard	Test Conditions / Methods	Specifications															
Rapid Change of Temperature	IEC 60068-2-14	<p>The conditions shown below shall be repeated 5 cycles on PCB</p> <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Period (minutes)</th> </tr> </thead> <tbody> <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> </tbody> </table>	Step	Temperature (°C)	Period (minutes)	1	-25 ± 5	30 ± 3	2	Room temperature	5 ± 3	3	150 ± 5	30 ± 3	4	Room temperature	5 ± 3	No visible damage   $\Delta R_{25}/R_{25}$   ≤ 20 %
Step	Temperature (°C)	Period (minutes)																
1	-25 ± 5	30 ± 3																
2	Room temperature	5 ± 3																
3	150 ± 5	30 ± 3																
4	Room temperature	5 ± 3																
Damp Heat, Steady State	IEC 60068-2-78	40 ± 2 °C, 90 ~ 95% RH, 1000± 24 hrs (85 ± 3 °C, 80 ~ 85% RH, 1000± 24 hrs * <sup>1</sup> )	No visible damage   $\Delta R_{25}/R_{25}$   ≤ 20 %															
Bending Strength	IEC-60068-2-21	Warp 2mm Speed < 0.5mm/sec. Duration: 10 sec on PCB. 	No visible damage   $\Delta R_{25}/R_{25}$   ≤ 10 %															
High Temp. Storage	IEC 60068-2-2	150. ± 5 °C, 1000 ± 24 hrs (Tu. ± 5 °C, 1000 ± 24 hrs * <sup>1</sup> )	No visible damage   $\Delta R_{25}/R_{25}$   ≤ 20 %															
High Temp. Load	IEC 60738-1	85 ± 5 °C Vmax., 1000 ± 24 hrs (Tu ± 5 °C Vmax., 1000 ± 24 hrs * <sup>1</sup> )	No visible damage   $\Delta R_{25}/R_{25}$   ≤ 20 %															
Climatic Sequence	IEC 60738-1	a. Tu. x 16 hrs b. 1st cycle : 40 °C 95 %RH x 24 hrs c. -25 °C x 2 hrs d. 5 cycles : 40°C 95% RH x 24 hrs / Cycle	No visible damage   $\Delta R_{25}/R_{25}$   ≤ 20 %															
Low Temp storage	IEC 60068-2-1	-25 ± 3 °C, 1000 ± 24 hrs (-40 ± 3 °C, 1000 ± 24 hrs * <sup>1</sup> )	No visible damage   $\Delta R_{25}/R_{25}$   ≤ 20 %															
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	8.1.2.2 Solder reflow method Preheating: 150~180°C, 60~120 secs Peak temp.: 245~255°C, ≤ 20 secs.(reflow)	No visible damage   $\Delta R_{25}/R_{25}$   ≤ 20 %															

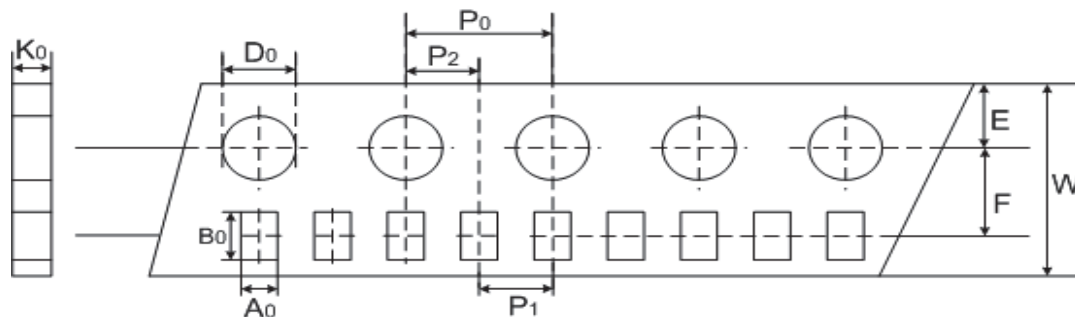
NOTE:\*<sup>1</sup> : Apply for TPM0S102PXXXRT only

# PTC Thermistor : TPM-S Series

## SMD PTC Thermistor for Temperature Sensing

### ■ Package

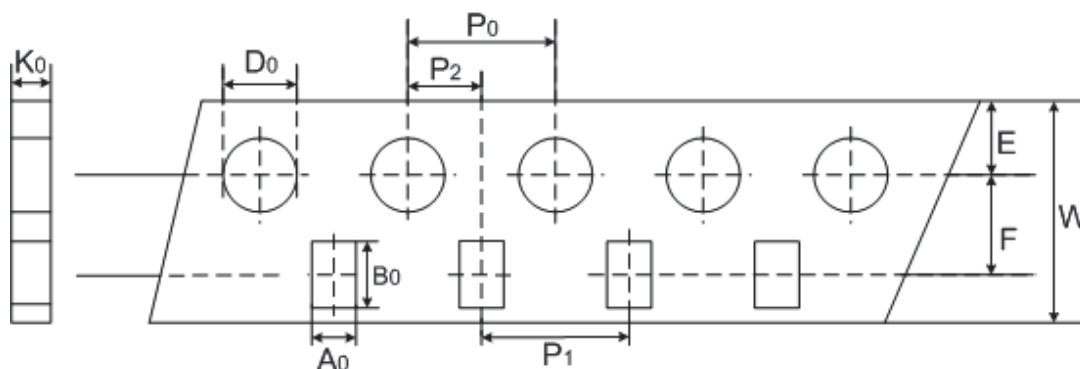
#### ● Taping Specification (0402 type)



(Unit: mm)

Index Type	$A_0$	$B_0$	$W$	$E$	$F$	$P_1$	$P_2$	$P_0$	$D_0$	$K_0$
0402	$\pm 0.05$	$\pm 0.12$	$\pm 0.2$	$\pm 0.1$	$\pm 0.05$	$\pm 0.1$	$\pm 0.05$	$\pm 0.1$	$\pm 0.1$	$\pm 0.1$

#### ● Taping Specification (0603 & 0805 type)



(Unit: mm)

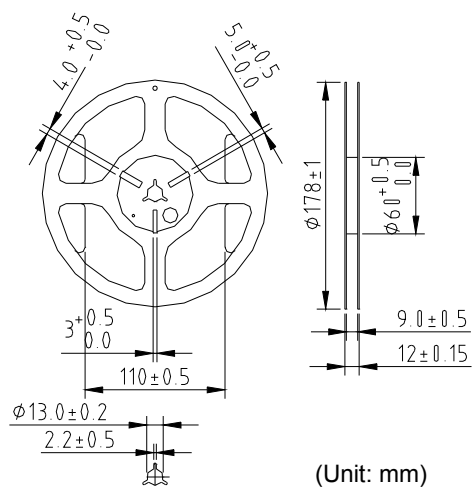
Index Type	$A_0$	$B_0$	$W$	$E$	$F$	$P_1$	$P_2$	$P_0$	$D_0$	$K_0$
0603	$\pm 0.2$	$\pm 0.2$	$\pm 0.2$	$\pm 0.1$	$\pm 0.05$	$\pm 0.1$	$\pm 0.05$	$\pm 0.1$	$\pm 0.1$	$\pm 0.1$
0805	1.5	2.3	8	1.75	3.5	4	2	4	1.55	1.0



# PTC Thermistor : TPM-S Series

## SMD PTC Thermistor for Temperature Sensing

### ■ 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