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## SPECIFICATION FOR APPROVAL

CUSTOMER	TRG
CERTIFIED MODEL/TYPE	TPM1P470M100
PART NO.	TPM1P470M100R (RoHS+HF)
APPLICATION	
CUSTOMER P/N	
ISSUE DATE	Sep. 08, 2020
REV. NO.	
REV. DATE	

FOR CUSTOMER APPROVAL	CHECKED BY
	<i>Shu Ling Fu</i>
	APPROVED BY
	<i>Chun Chu Tu</i>





**REVISED RECORD SHEET**

REV. NO	REV. DATE	REVISED CONTENT



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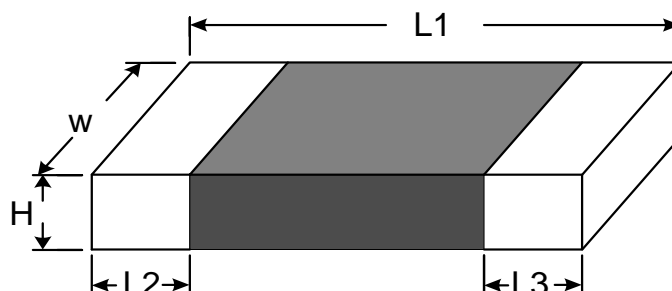
Part Number Code

Example :

**TPM**    **1**    **P**    **470**    **M**    **100**    **R**  
 (1)      (2)      (3)      (4)      (5)      (6)      (7)

No.	Item	Digit	Specification
(1)	Product Type	TPM	Thinking CPTC thermistor TPM type
(2)	Size (EIA)	1	0603
(3)	Type Series	P	Over current protection series
(4)	Zero Power Resistance at 25°C	470	$47 \times 10^0 = 47\Omega$
(5)	Tolerance of R <sub>25</sub>	M	± 20%
(6)	Curie Point Temperature	100	T <sub>c</sub> =100°C
(7)	Packaging	R	Reel

### Structure and Dimensions



( unit : mm )


L1	W	H max.	L2 and L3
1.60±0.15	0.80±0.15	0.95	0.40±0.20

### Electrical Characteristics

Part No.	Curie Point Temperature	Zero Power Resistance at 25°C	Non-operating Current		Trip Current	
	T <sub>c</sub> (°C)	R <sub>25</sub> (Ω)	(at +60°C) (mA)	(at +25°C) (mA)	(at+25°C) (mA)	(at -10°C) (mA)
TPM1P470M100R	100±10	47±20%	20	29	61	75

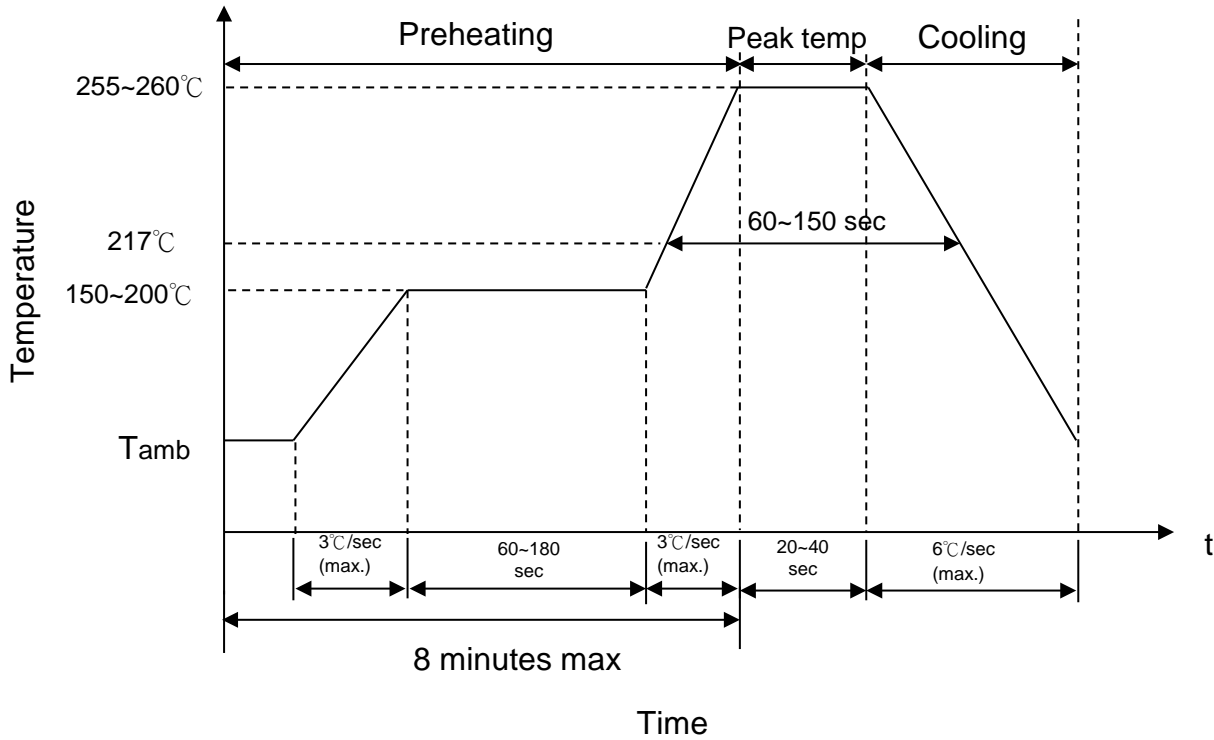
Part No.	Max. Voltage	Max. Current	Operating Temperature Range(at V=0)	Operating Temperature Range(at Vmax. )
	V <sub>max</sub> (V <sub>DC</sub> )	I <sub>max</sub> (mA)	(°C)	(°C)
TPM1P470M100R	24	630	-40 ~ +125	-10 ~ +60

**Reliability**

Item	Standard	Test conditions / Methods	Specifications															
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}  \leq 10\%$															
Damp Heat, Steady State	IEC 60068-2-78	$60 \pm 2\text{ }^\circ\text{C}$ , 90 ~ 95% RH , 1000± 24 hrs	No visible damage $ \Delta R_{25}/R_{25}  \leq 20\%$															
High Temp. Storage	IEC 60068-2-2	$125 \pm 3\text{ }^\circ\text{C}$ , 1000 ± 24 hrs	No visible damage $ \Delta R_{25}/R_{25}  \leq 20\%$															
Low Temp. Storage	IEC 60068-2-1	$-40 \pm 3\text{ }^\circ\text{C}$ , 1000 ± 24 hrs	No visible damage $ \Delta R_{25}/R_{25}  \leq 20\%$															
Rapid Change of Temperature	IEC 60068-2-14	The conditions shown below shall be repeated 5 cycles on PCB <table border="1" data-bbox="523 974 1168 1288"> <thead> <tr> <th>Step</th> <th>Temperature (<math>^\circ\text{C}</math>)</th> <th>Period (minutes)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td><math>-40 \pm 5</math></td> <td><math>30 \pm 3</math></td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td><math>5 \pm 3</math></td> </tr> <tr> <td>3</td> <td><math>125 \pm 5</math></td> <td><math>30 \pm 3</math></td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td><math>5 \pm 3</math></td> </tr> </tbody> </table>	Step	Temperature ( $^\circ\text{C}$ )	Period (minutes)	1	$-40 \pm 5$	$30 \pm 3$	2	Room temperature	$5 \pm 3$	3	$125 \pm 5$	$30 \pm 3$	4	Room temperature	$5 \pm 3$	No visible damage $ \Delta R_{25}/R_{25}  \leq 20\%$
Step	Temperature ( $^\circ\text{C}$ )	Period (minutes)																
1	$-40 \pm 5$	$30 \pm 3$																
2	Room temperature	$5 \pm 3$																
3	$125 \pm 5$	$30 \pm 3$																
4	Room temperature	$5 \pm 3$																
High Temp. Endurance Load	Specification Standard	$60 \pm 3\text{ }^\circ\text{C}$ , Vmax. for 1.5hrs on / 0.5hrs off , 1000 ± 24 hrs	No visible damage $ \Delta R_{25}/R_{25}  \leq 20\%$															
Climatic Sequence	IEC 60738-1 7.22	a. $125^\circ\text{C}$ x 16 hrs b. 1st cycle : $40\text{ }^\circ\text{C}$ 95 %RH x 24 hrs c. $-40\text{ }^\circ\text{C}$ x 2 hrs d. 5 cycles : $40^\circ\text{C}$ 95% RH x 24 hrs / Cycle	No visible damage $ \Delta R_{25}/R_{25}  \leq 20\%$															
Solderability	IEC 60068-2-58	$245 \pm 5\text{ }^\circ\text{C}$ , $3 \pm 0.3$ 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: $150\sim 180^\circ\text{C}$ , 60~120 secs. Peak temp.: $245\sim 255^\circ\text{C}$ , $\leq 20$ secs. (reflow)	No visible damage $ \Delta R_{25}/R_{25}  \leq 20\%$															

## Soldering Recommendation

### ■ IR-Reflow Soldering Profile

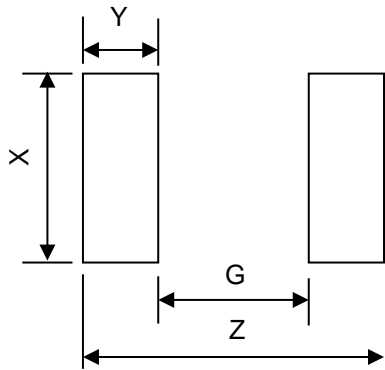


Note : Suitable for reflow soldering only.

### ■ 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	φ 3mm (max.)
Caution: Not to touch the component surface with soldering iron directly to prevent component damage.	

Recommended Soldering Pad Dimensions



Size (EIA)	0603
Z	2.8 mm
G	0.8 mm
X	1.0 mm
Y	1.0 mm

RoHS Compliant Declaration

We hereby declare that the components delivered to your company are compliant with RoHS directive 2015/863/EU.

Warehouse Storage Conditions of Products

(I) Storage Conditions :

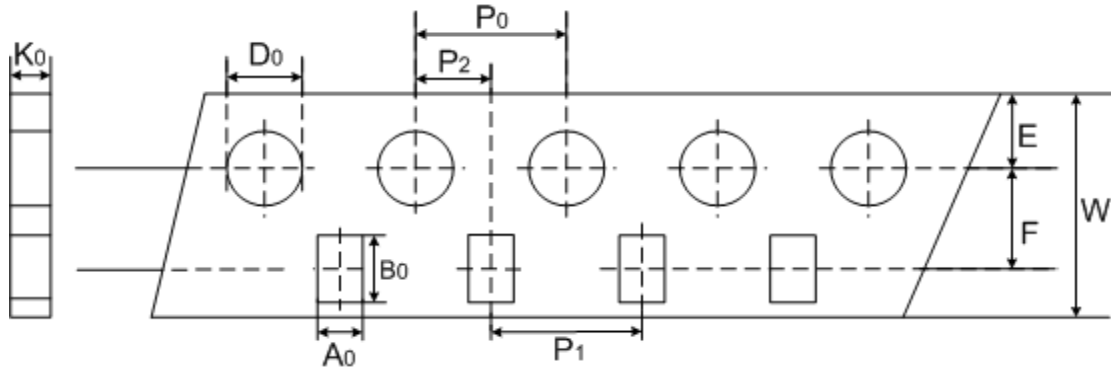
- 1.Storage Temperature : -10°C ~+40°C
- 2.Relative Humidity :  $\leq 75\%RH$
- 3.Keep away from corrosive atmosphere and sunlight.

(II) Period of Storage : 1 year



## Packaging

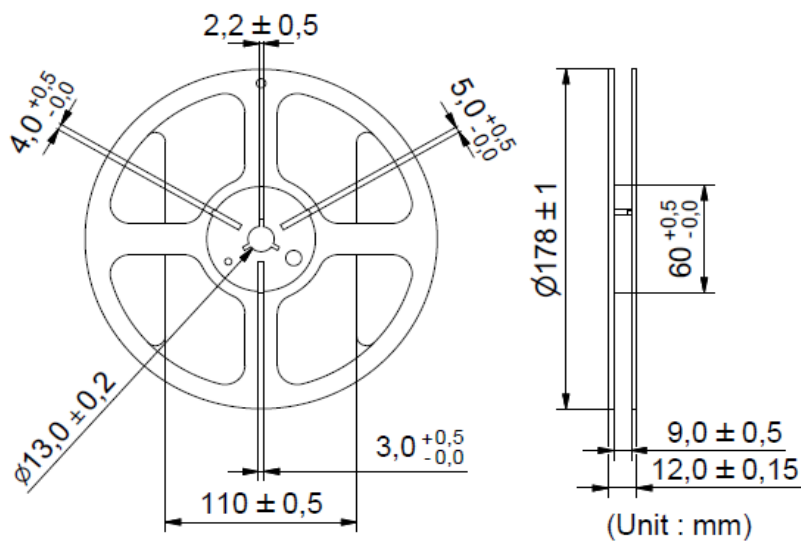
### ■ Taping specification ( 0603 Series)



(Unit : mm)

Index	$A_0$	$B_0$	$W$	$E$	$F$	$P_1$	$P_2$	$P_0$	$D_0$	$K_0$
Size	$\pm 0.2$	$\pm 0.2$	$\pm 0.2$	$\pm 0.1$	$\pm 0.05$	$\pm 0.1$	$\pm 0.05$	$\pm 0.1$	$\pm 0.1$	$\pm 0.1$
0603	1.1	1.9	8	1.75	3.5	4	2	4	1.55	0.95

### ■ Quantity ( 4000 pcs / reel )



(Unit : mm)

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Safety Approvals (Certified Model/Type : TPM1P470M100)



\* UL 1434 / cUL recognized (File # E138827)



\* TUV recognized (File # R 50193877)

Certificates

- (1) IATF 16949 certificate
- (2) ISO 9001 certificate
- (3) QC 080000 certificate

Test Report

- (1) RoHS test report
- (2) Halogen-free test report

Protective Threshold Current Range

TPM1P470M100R

