

PTC Thermistor : TPM-S Series

SMD PTC Thermistor for Temperature Sensing



■ Features

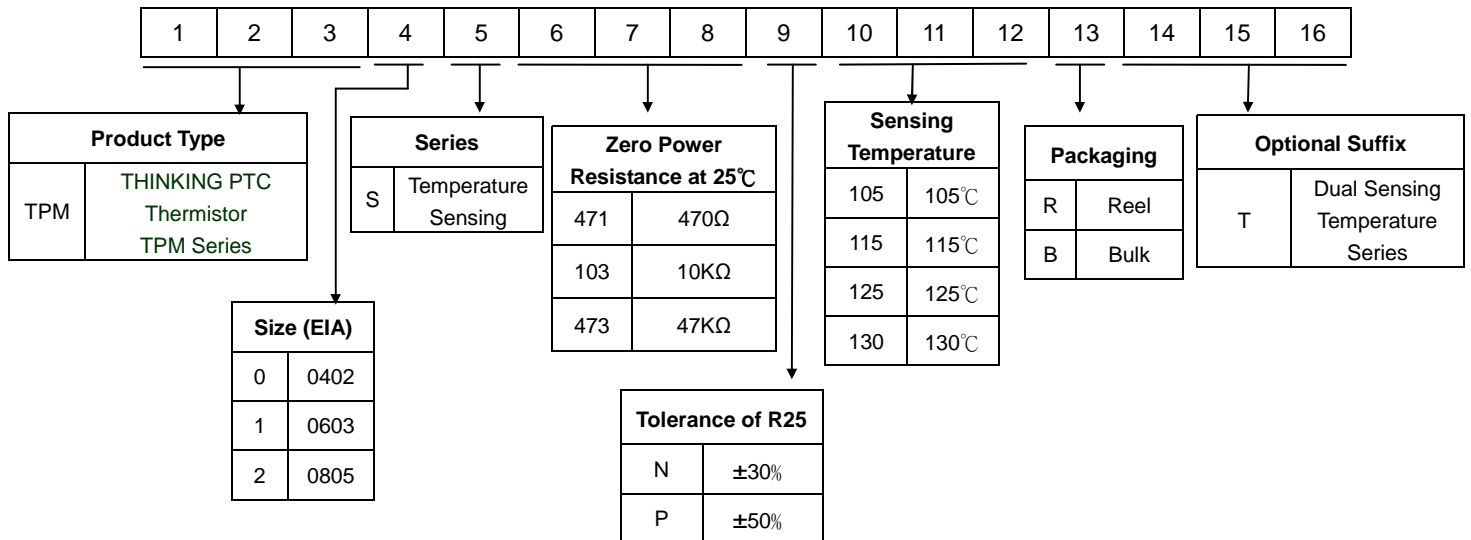
1. RoHS & Halogen-free compliant
2. Thermistor chip with lead-free tinned terminals
3. EIA size 0402,0603,0805
4. Fast and reliable response
5. Suitable for reflow soldering
6. Agency Recognition:
UL & cUL : File No. E138827
TUV : File No. R50133294



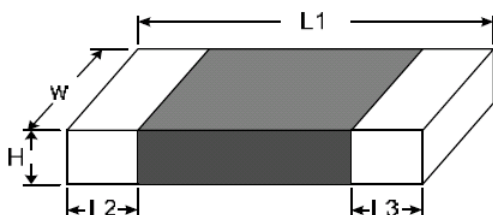
■ Recommended Applications

1. DC/DC converters
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	1.20	0.45±0.25

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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 4.7 KΩ (°C)	Max. Voltage (V)	Operating Temperature Range(°C)
		R25	Ts1	Ts2	V _{dc}	T _L ~T _U
TPM0S541P115RT	0402	540	115±5	135±7	32	-25~+150
TPM0S102P115RT		1000	115±5	130±3		-40~+140
TPM0S102P125RT			125±5	140±3		-40~+150
TPM1S471P065RT	0603	470	65±5	80±7	32	-25~+90

Single Sensing Temperature Series

Part No.	Size (EIA)	Sensing Temperature (°C)	Resistance (Ω)			Max. Voltage (V)	Operating Temperature Range(°C)	Safety Approvals				
		Ts	25°C	Ts - 5°C	Ts + 5°C	V _{dc}	T _L ~T _U	UL/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	-25~+145				√	√	

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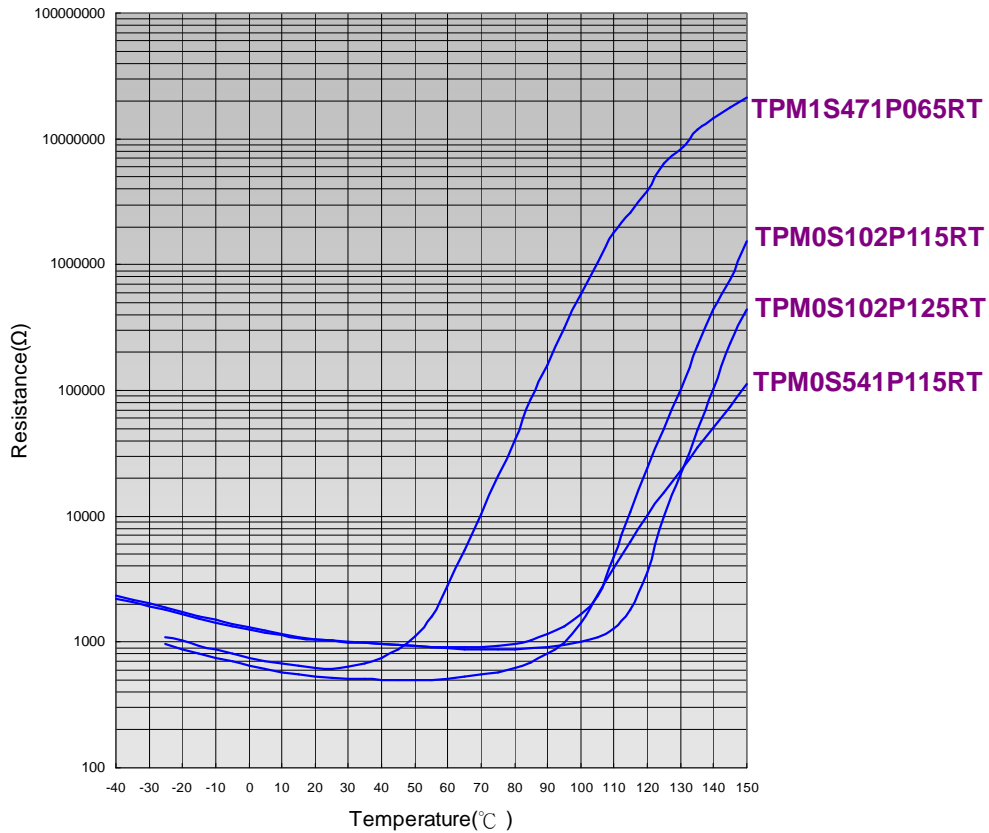
Part No.	Size (EIA)	Sensing Temperature (°C)	Resistance (Ω)			Max. Voltage (V)	Operating Temperature Range(°C)	Safety Approvals				
		Ts	25°C	Ts - 5°C	Ts + 5°C	V _{dc}	T _L ~T _U	UL/cUL	TUV			
TPM2S101N110R	0805	110±7	100	≤1K	≥1K	24	-25~+125					
TPM2S101N115R		115±7					-25~+130					
TPM2S101N130R		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		

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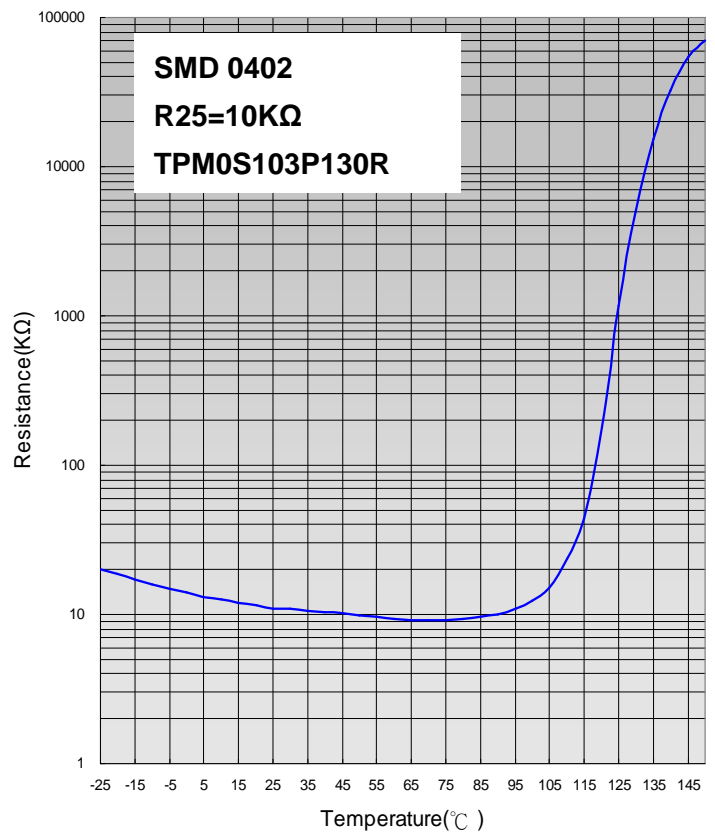
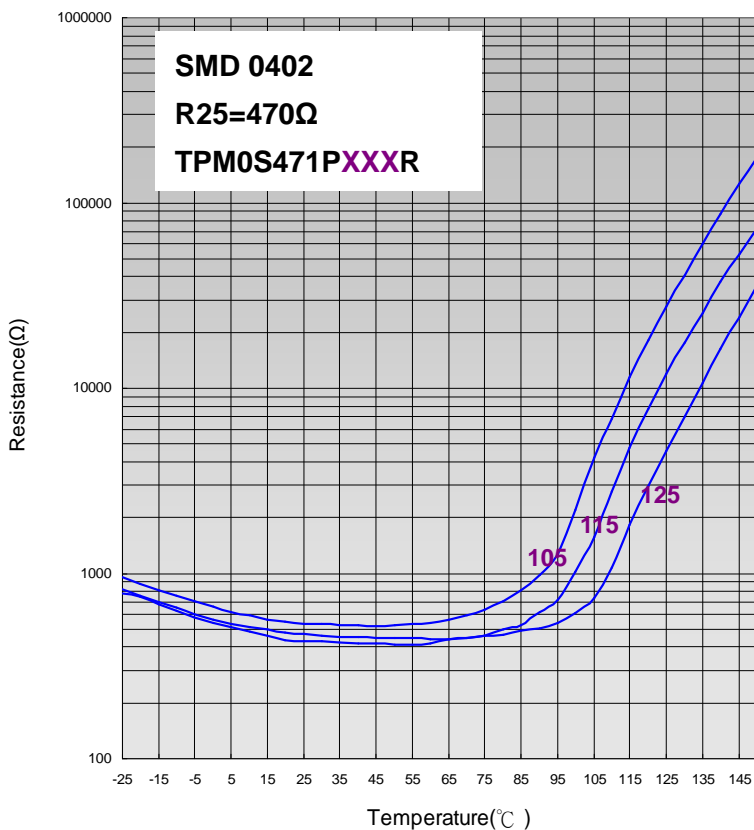


■ Resistance-Temperature Characteristics (Typical) Dual Sensing Temperature Series



● Single Sensing Temperature Series

● 0402 Series

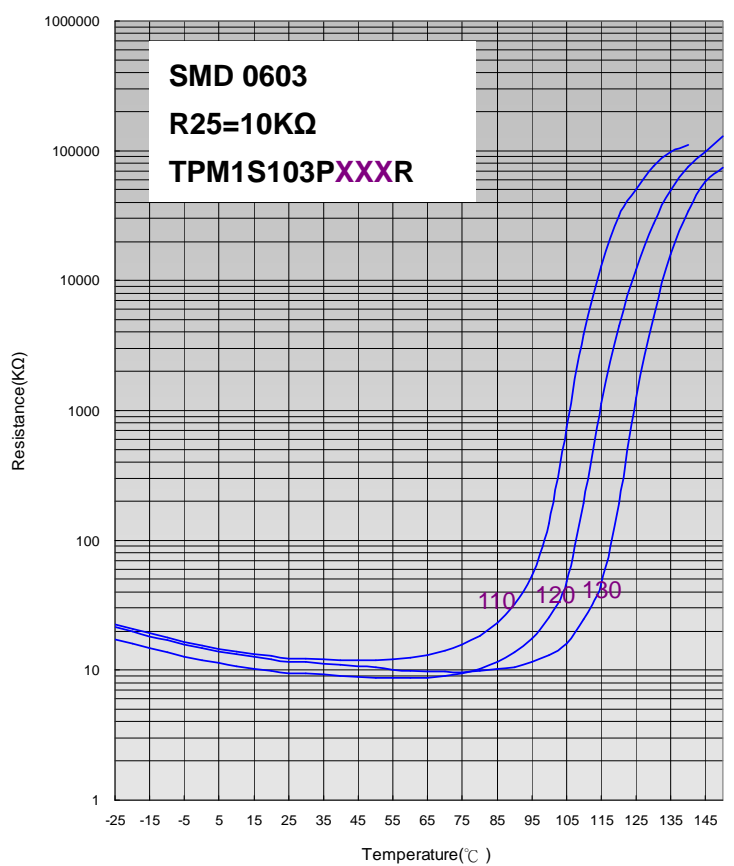
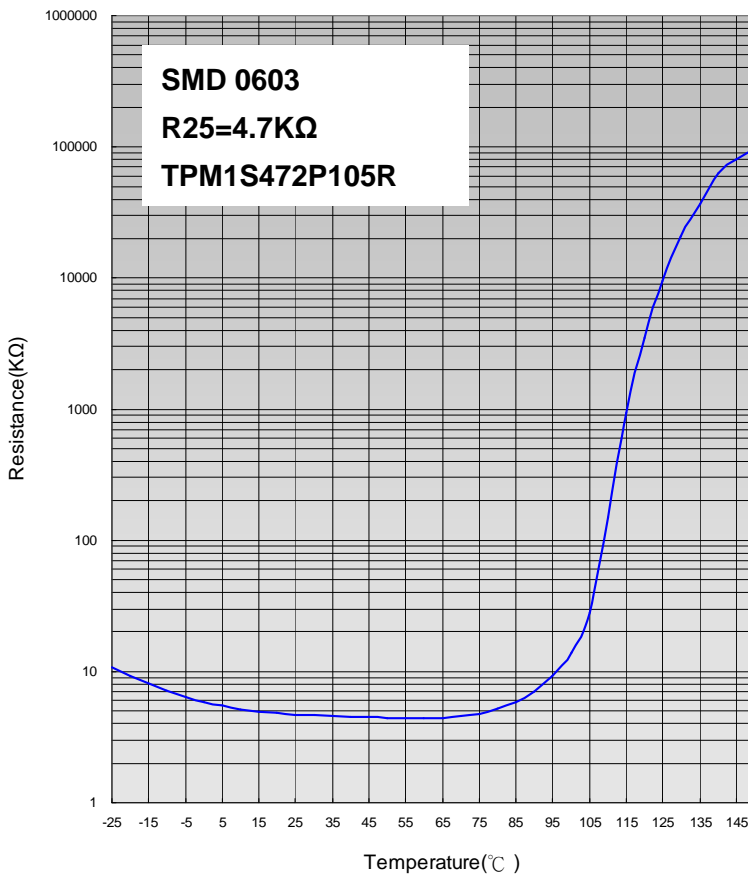
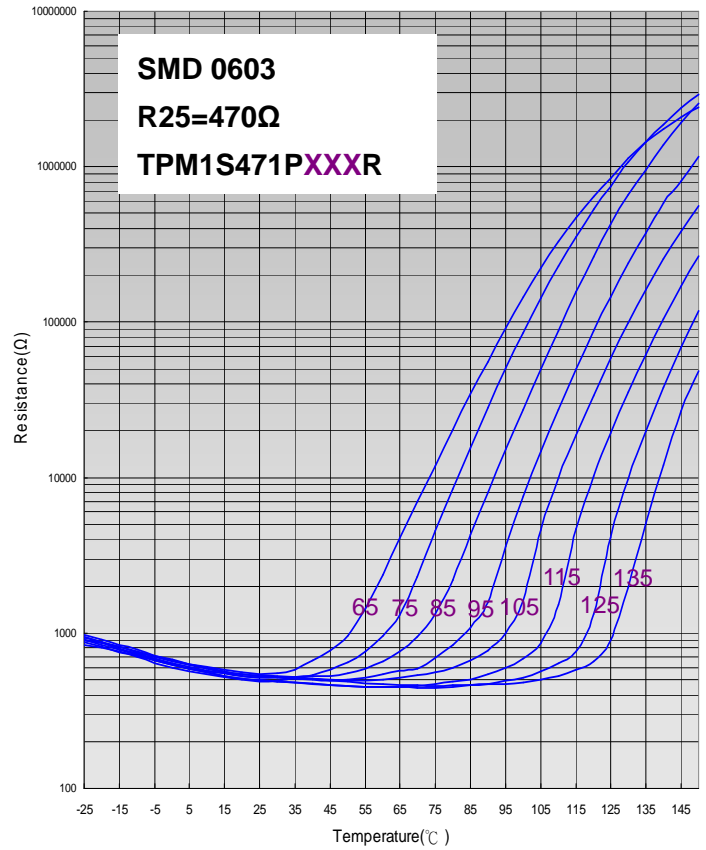
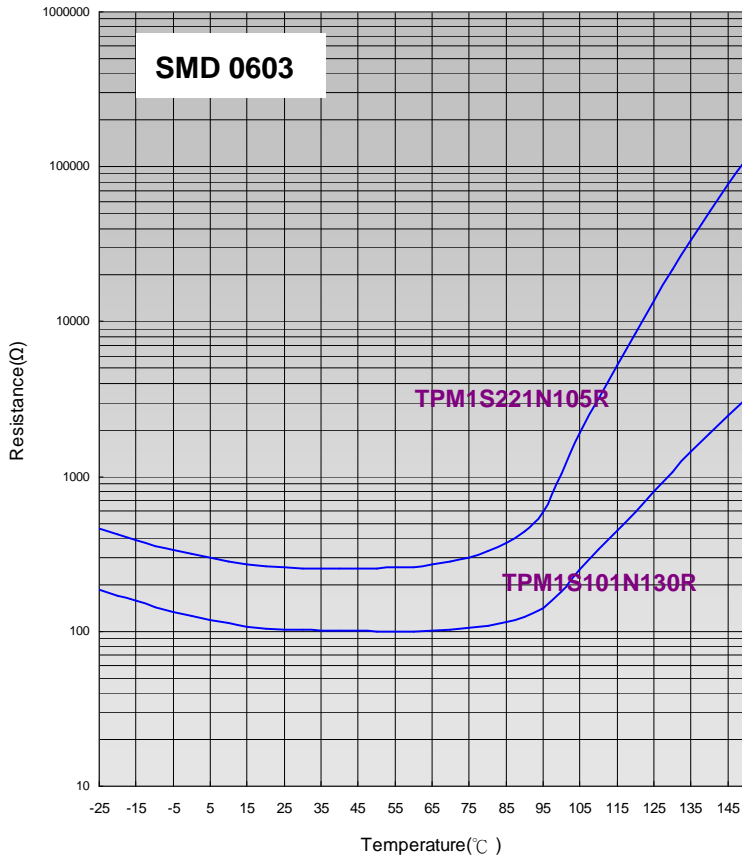


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● 0603 Series

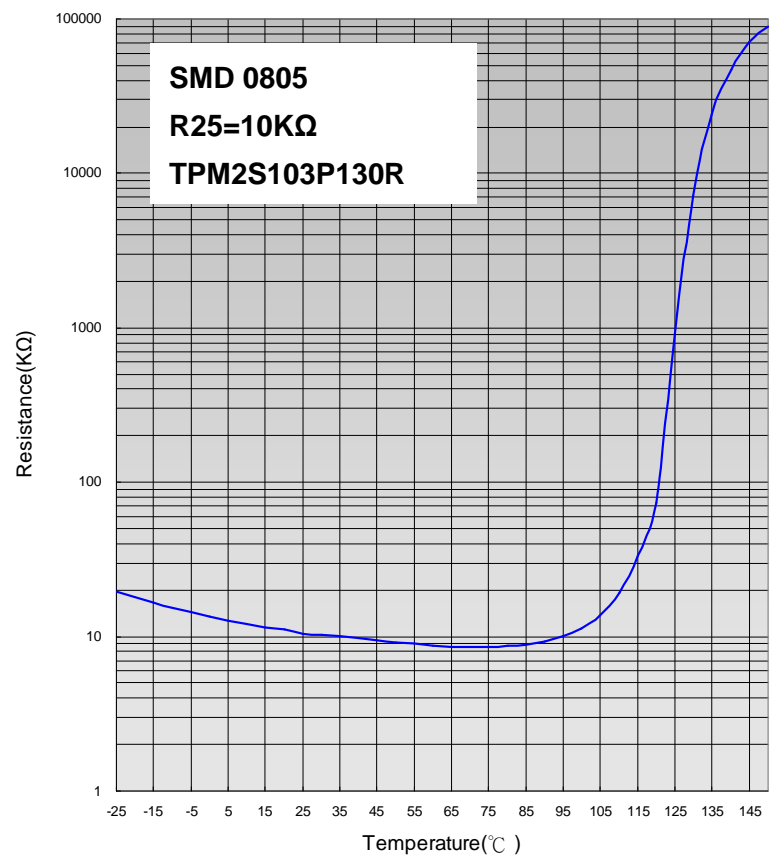
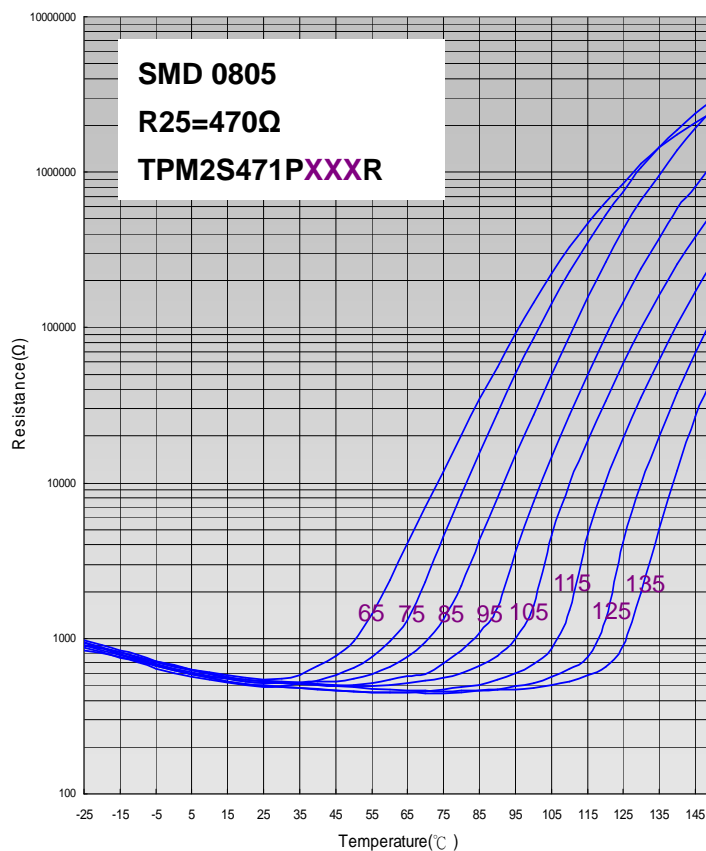
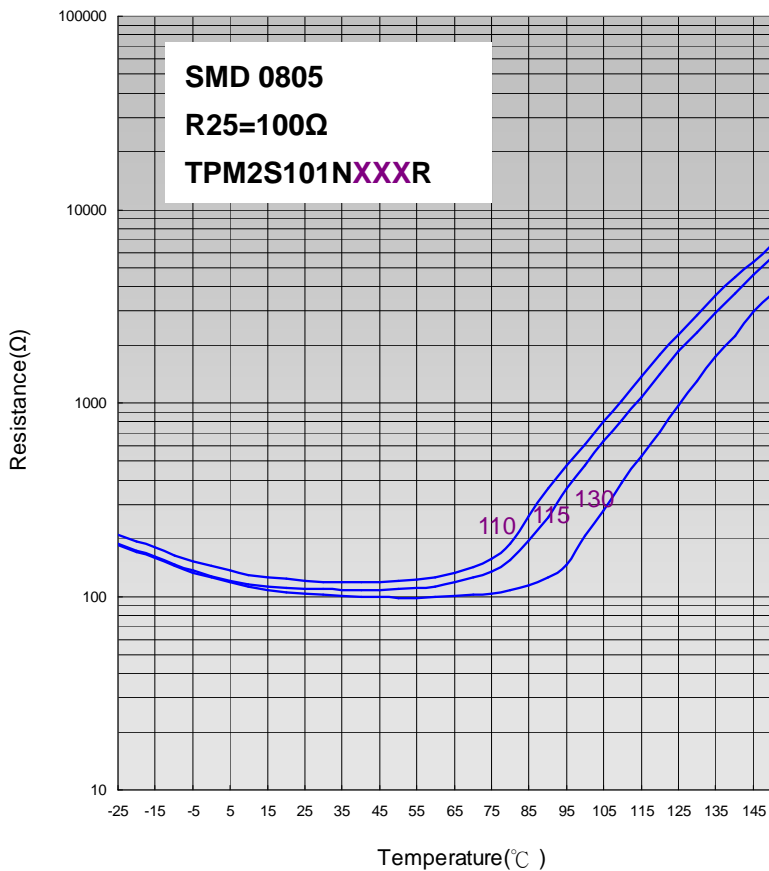


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● 0805 Series



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■ Typical Application Circuit

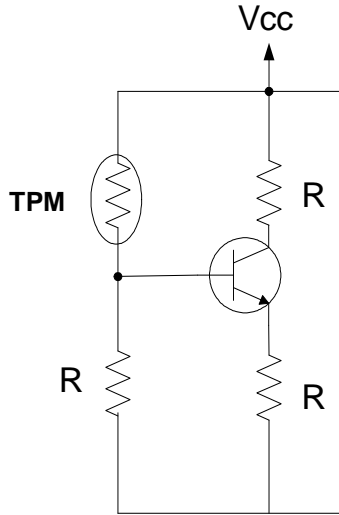


Fig 1. Overheat Protection

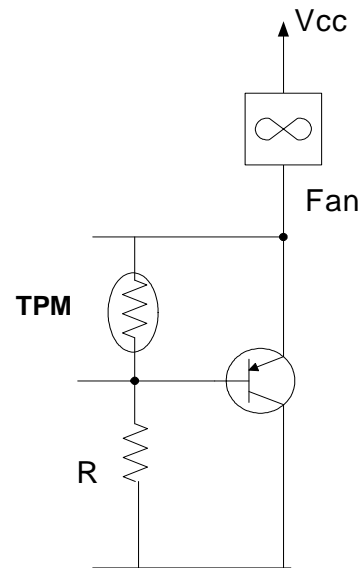


Fig 2. Temp. Sensing and Control

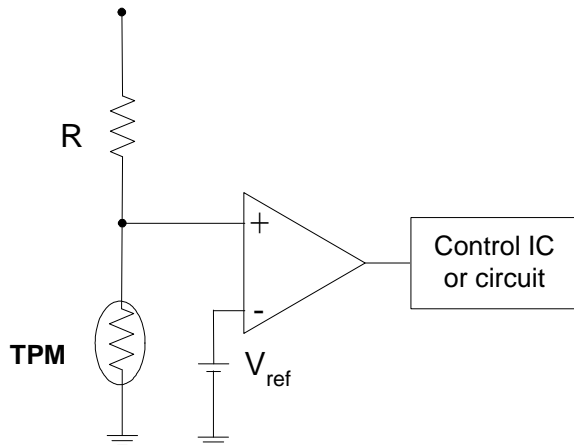


Fig 3. Comparator Circuit

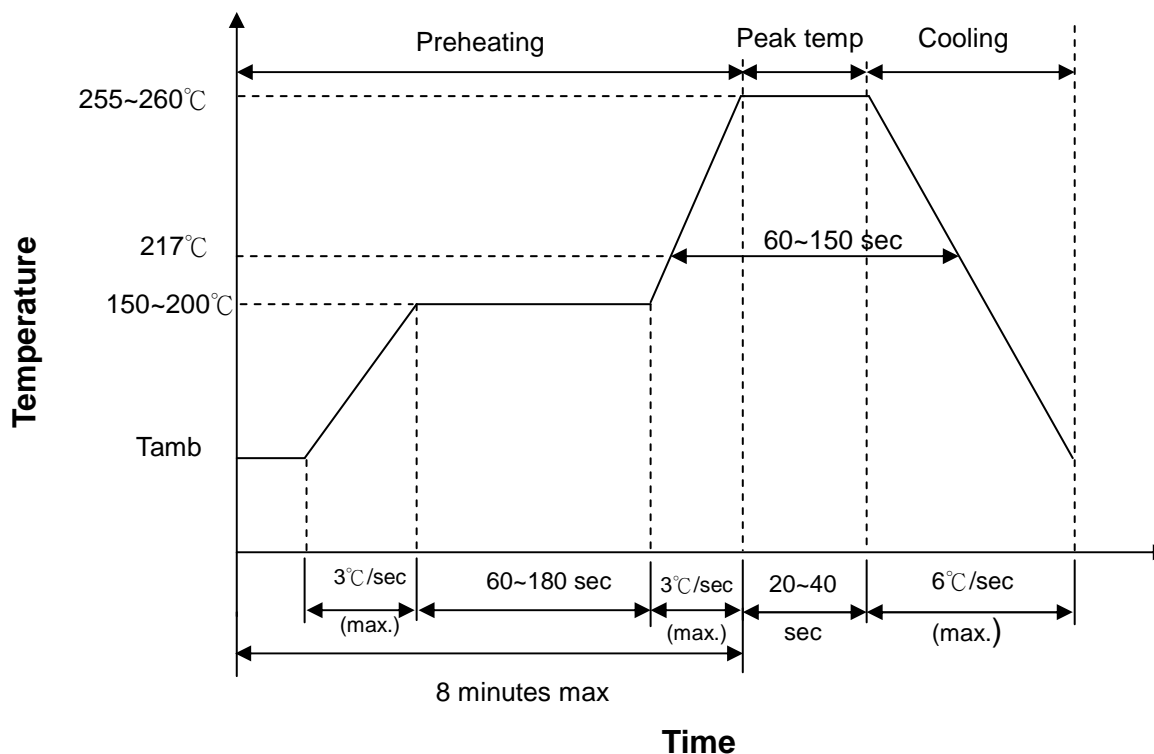
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■ Soldering Recommendation

● IR-Reflow Soldering Profile



● Recommended Reworking Conditions with Soldering Iron

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

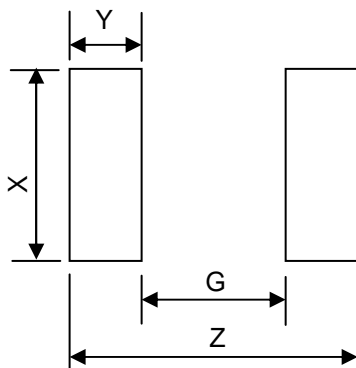
Caution: Please do not touch the component surface with soldering iron directly to avoid its damage.

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■ 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 Speed < 0.5mm/sec. Duration: 10 sec on PCB.	No visible damage $ \Delta R_{25}/R_{25} \leq 10\%$															
Damp Heat, Steady State	IEC 60068-2-3	$40 \pm 2\text{ }^\circ\text{C}$, 90 ~ 95% RH , 1000± 24 HRS	No visible damage $ \Delta R_{25}/R_{25} \leq 20\%$ ($ \Delta R_{25}/R_{25} \leq 30\%$ *1)															
High Temp. Storage	IEC 60738-1 IEC 60068-2-2	Tu. $\pm 5\text{ }^\circ\text{C}$, 1000 ± 24 HRS	No visible damage $ \Delta R_{25}/R_{25} \leq 20\%$ ($ \Delta R_{25}/R_{25} \leq 30\%$ *1)															
Rapid Change of Temperature	IEC 60068-2-14	The conditions shown below shall be repeated 5 cycles on PCB <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} \leq 20\%$ ($ \Delta R_{25}/R_{25} \leq 30\%$ *1)
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																
High Temp. Load	IEC 60738-1	$85 \pm 5\text{ }^\circ\text{C}$ Vmax. , 1000 ± 24 HRS	No visible damage $ \Delta R_{25}/R_{25} \leq 20\%$ ($ \Delta R_{25}/R_{25} \leq 30\%$ *1)															

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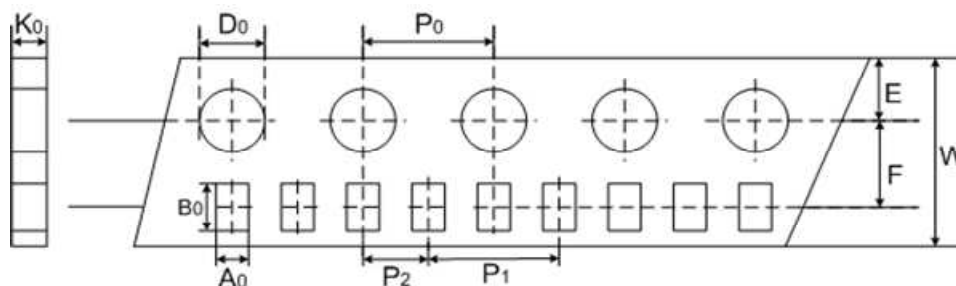


Item	Standard	Test Conditions / Methods	Specifications
Climatic Sequence	IEC 60738-1	a. Tu. x 16 HRS b. 1st cycle : 40 °C 95 %RH x 24 HRS c. -25 °C x 2 HRS d. 5 cycles : 40°C 95% RH x 24 HRS / Cycle	No visible damage $ \Delta R_{25}/R_{25} \leq 20\%$ ($ \Delta R_{25}/R_{25} \leq 30\%$ *1)
Solderability	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 $ \Delta R_{25}/R_{25} \leq 20\%$ ($ \Delta R_{25}/R_{25} \leq 30\%$ *1)
Low Temp. Storage	Specification Standard	TL ± 3 °C , 1000 ± 24 HRS	No visible damage $ \Delta R_{25}/R_{25} \leq 30\%$

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

■ Package

● Taping Specification

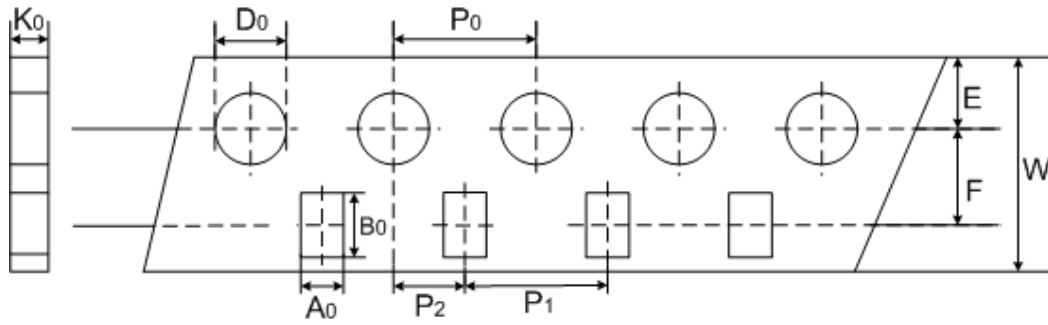


(Unit: mm)

Index Type	A ₀	B ₀	W	E	F	P ₁	P ₂	P ₀	D ₀	K ₀
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	4	2	4	1.55	0.60

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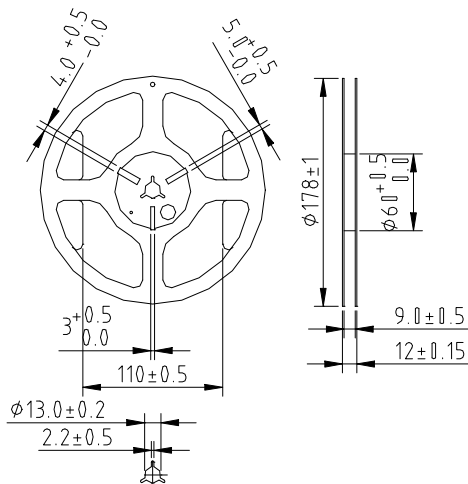
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(Unit: mm)

Index Type	A ₀ ±0.2	B ₀ ±0.2	W ±0.2	E ±0.1	F ±0.05	P ₁ ±0.1	P ₂ ±0.05	P ₀ ±0.1	D ₀ ±0.1	K ₀ ±0.1
0603	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	0.95

● Quantity



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

■ 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