

SINLOON®

貼片型熱敏電阻  
Chip NTC Thermistor

Type: 0402 (1005)

Resistance Range: 1K ~ 470K ohm

□ FEATURE

- ◆ Small size, Low capacitance at 40 MHz (below 3 pF)
- ◆ Resistance Range: (0402) 1K ~ 470K ohm
- ◆ Corresponding to high B value.
- ◆ Glass coated perform for long term reliability.
- ◆ Strong against electrostatic.
- ◆ Excellent in cost-performance.
- ◆ High accuracy and high environmental resistance are provided due to original manufacturing method.
- ◆ All Pb-free product [Pd and Cd are not contained in product]

Figure:



□ APPLICATIONS

- ◆ Mobile communication related equipment. (TCXO, RF circuit, LCD panel, Battery pack).
- ◆ Computer related equipment.
- ◆ Temperature detection for CPU and memory equipment.
- ◆ Temperature compensation for contrast of LCD.
- ◆ Optical communication equipment.

□ DESCRIPTION:

- ◆ NTC thermistor is Negative Temperature Coefficient of Thermistor resistor.
- ◆ A thermistor is a thermally sensitive resistor whose primary function is to exhibit a change in electrical resistance with a change in body temperature.
- ◆ NTC thermistor is one in which the zero-power resistance decreases with an increase in temperature.

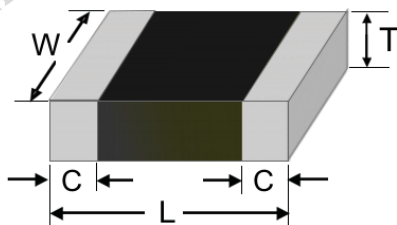
□ ORDERING PROCEDURE:

Example: SMD02472F3IH-T ( 0402-4.7K ±1% B-3435 ±3% T/Reel)

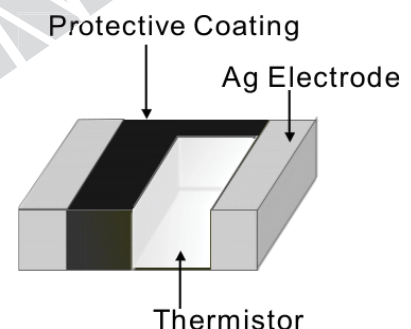
Type	Chip Size	Resistance	Tolerance	B-constant						B-tolerance	Package
SMD02	1005(0402)	102=1KΩ	K = ±10%	1 : 1000	C: 101~150	I: 401 ~ 450	O: 701 ~ 750	K = ±10%	T = Reel (7")		
SMD03	1608(0603)	103=10KΩ	J = ±5%	2 : 2000	D: 151 ~ 200	J: 451 ~ 500	P: 751 ~ 800	J = ±5%	SMD02: 10Kp		
SMD05	2012(0805)	104=100KΩ	H = ±3%	3 : 3000	E: 201 ~ 250	K: 501 ~ 550	Q: 801 ~ 850	H = ±3%	SMD03: 4Kp		
			G = ±2%	4 : 4000	F: 251 ~ 300	L: 551 ~ 600	R: 851 ~ 900	G = ±2%	SMD05: 4Kp		
			F = ±1%	A: 0 ~ 50	G: 301 ~ 350	M: 601 ~ 650	S: 901 ~ 950	F = ±1%			
				B: 51~100	H: 351 ~ 400	N: 651 ~ 700	T: 951 ~ 999				

□ DIMENSION:

Type	Chip Size	L (mm)	W (mm)	T (mm)	C (mm)
SMD02	1005(0402)	1.00±0.05	0.50±0.05	0.50±0.05	0.25±0.10
SMD03	1608(0603)	1.60±0.10	0.80±0.10	0.95±0.10	0.40±0.20
SMD05	2012(0805)	2.00±0.20	1.25±0.20	1.20±0.20	0.50±0.20



□ Bare Chip Structure



\* 電阻 Resistor - 溫度 Temperature 特性利用:

NTC 熱敏電阻隨環境溫度(T)升高, 電阻值'(R)會下降, 反之, 當溫度(T)下降, 電阻值'(R)會上升( R25°C), 其對溫度感測非常靈敏, 適用於各種溫度的感測與補償電路。

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DATA SPECIFICATION

Part Number (0402)	Resistance 25°C (Ω)	B-constance 25°C/85°C K	Maximum Power Rating	Dissipation Constant	Operating Temp.(°C)	Size (mm)
SMD02-102□4B ■	1K	4100	250 mW	2.5 mW/°C	-40~125	1.0x0.5
SMD02-202□4K ■	2K	4520	250 mW	2.5 mW/°C		
SMD02-103□3I ■	10K	3435	250 mW	2.5 mW/°C		
SMD02-103□4K ■	10K	3900	250 mW	2.5 mW/°C		
SMD02-103□4B ■	10K	4100	250 mW	2.5 mW/°C		
SMD02-473□4A ■	47K	4050	250 mW	2.5 mW/°C		
SMD02-683□4A ■	68K	4150	250 mW	2.5 mW/°C		
SMD02-104□4A ■	100K	4050	250 mW	2.5 mW/°C		
SMD02-104□4F ■	100K	4300	250 mW	2.5 mW/°C		
SMD02-474□4A ■	470K	4050	250 mW	2.5 mW/°C		

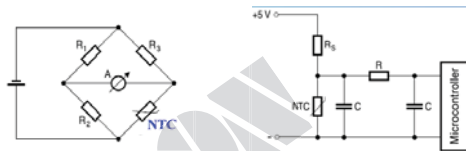
Remark: □ Resistance tolerance

■ B-constance tolerance

※ Maximum Power Rating = Dissipation Constant x (Max. Operation Temperature - 25°C).

\* Please inquire to contact us for others specification.

典型應用: 將NTC熱敏電阻置於惠斯登電橋(Wheatstone bridge, 如下圖所示)其中一邊電路上即可用於感測溫度。當電橋達到平衡時, 任何溫度變化會使NTC熱敏電阻的電阻值馬上跟著改變, 因此就會有明顯的電流通過安培計。NTC熱敏電阻與微控制器實際應用電路, 如下圖所示。



※美隆公司產品規格及其特性參數的改變或更新恕不另行通知。

※Mayloon characteristic parameters of electronic product specification changes or updates without notice to improve。

□ BASIC CHARACTERISTICS

1. Zero-power Resistance of Thermistor

$$R=R_0 \exp B (1/T-1/T_0) \dots\dots\dots(1)$$

R : Resistance in ambient temperature T (K)  
(K : absolute temperature)

R<sub>0</sub> : Resistance in ambient temperature T<sub>0</sub> (K)

B : B-constant of Thermistor

2. B-Constant

As (1) formula

$$B=\ln (R/R_0) / (1/T-1/T_0) \dots\dots\dots (2)$$

3. Thermal Dissipation Constant

When spend electric power P (mW) in ambient temperature T<sub>1</sub>, if Thermistor's temperature rises T<sub>2</sub>, there is a formula as follows

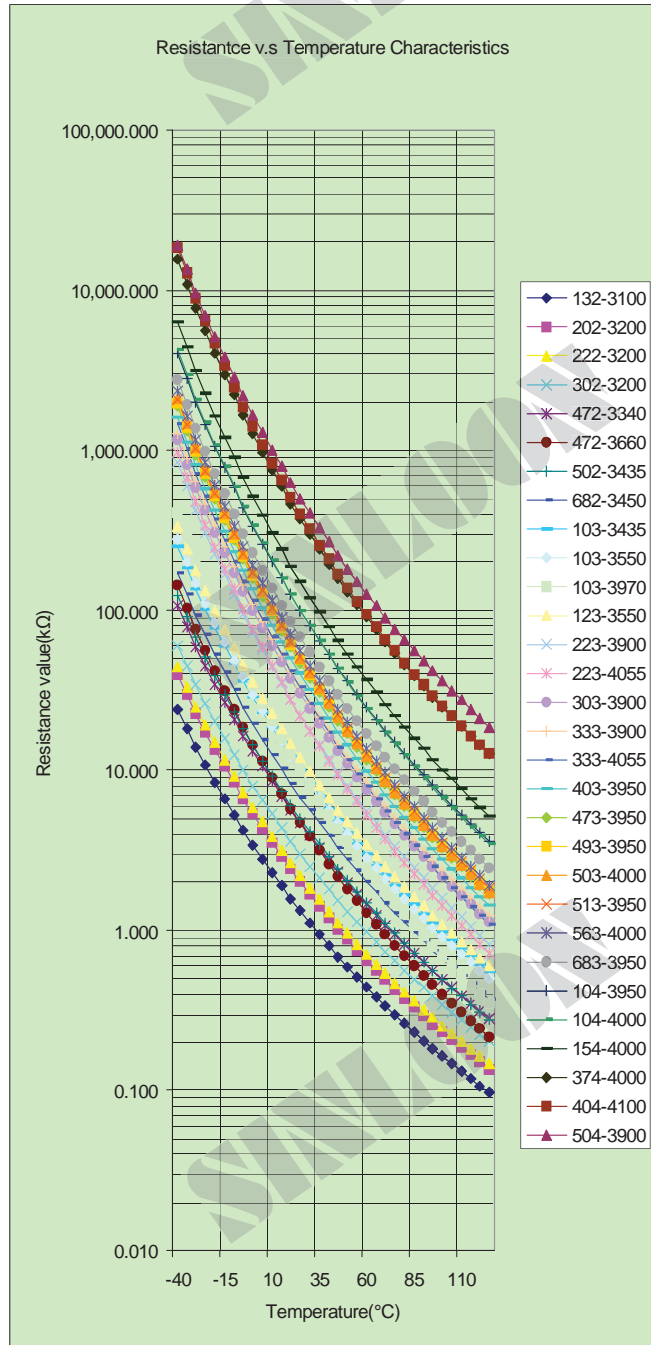
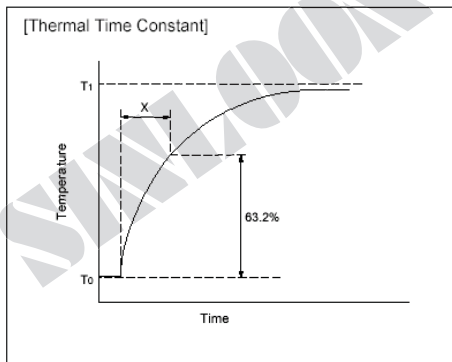
$$P=C (T_2 -T_1) \dots\dots\dots (3)$$

C : Thermal dissipation constant (mW/ °C)

Thermal dissipation constant change by dimensions, measure, measured condition etc.

4. Thermal Time Constant

Period in which Termistor's temperature will change 63.2% of its temperature difference from ambient temperature T<sub>0</sub>(°C) to T<sub>1</sub>(°C).



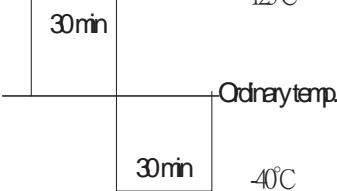
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Reliability Test

Test Item		Standard	Test Method	$\Delta R_{25} / R_{25}$
Environmental test	Life	MIL-STD-202F Method 108A	Test temperature : 70°C Test duration : 1000 hrs Load power : 1206 – 6.5 mW , 0805 – 5.0 mW , 0603 – 4.5 mW , 0402 – 3.5 mW °	MAX. ± 3 %
	Humidity	MIL-STD-202F Method 103B	Test temperature : 40°C Test humidity : 95% Test duration : 1000 hrs Load power : 1206 – 6.5 mW , 0805 – 5.0 mW , 0603 – 4.5 mW , 0402 – 3.5 mW °	MAX. ± 3 %
	Thermal shock	MIL-STD-202F Method 107G	Test cycle : 10 times Test temperature : - 40°C & 125°C 	MAX. ± 3 %
	Storage in dry heat	IEC 68-2-2	Test temperature : 125°C Test duration : 1000 hrs	MAX. ± 3 %
Mechanical test	Solderability	MIL-STD-202F Method 208 H	Soldering temperature : 235°C Duration of immersion : 2 seconds	95 % min. coverage
	Resistance to soldering heat	MIL-R-55342D PARA 4.7.7	Soldering temperature : 260°C Duration of immersion : 10 seconds	MAX. ± 3 %

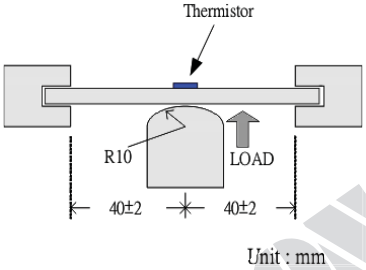
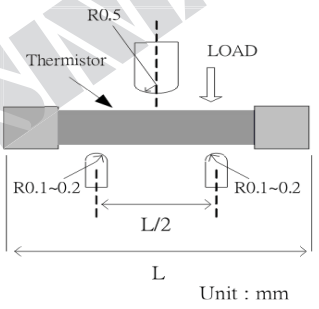
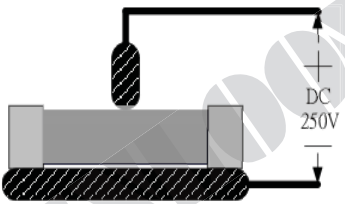
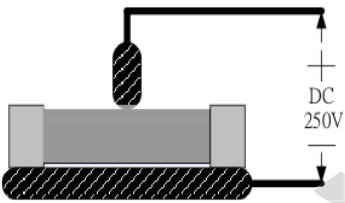
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Reliability Test

Test Item	Standard	Test Method	△25 / P
Mechanical Performance test	Bending strength	JIS C 5202 6.1.4	<p>Pressurizing rod at a rate of 1mm/sec Maintenance time : 5 sec Bending distance : 1 mm (min.)</p>  <p>Visual : No mechanical damage</p>
	Resistance to flexure of substrate	JIS C 5202 6.2.1	<p>Pressurizing force shall be 3kg</p>  <p>MIN. 3 Kg</p>
Electrical Performance test	Insulation resistance	MIL-STD-202F Method 302	<p>DC 250V For 10 seconds</p>  <p>Over 1000MΩ</p>
	Dielectric withstand voltage	MIL-STD-202F Method 302	<p>DC 250V For 10 seconds</p>  <p>NOT Short</p>

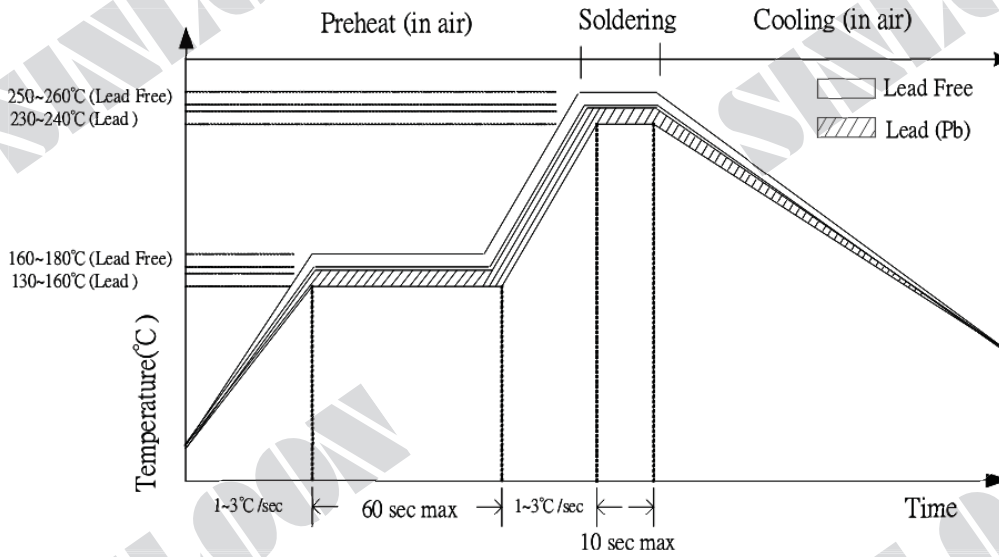
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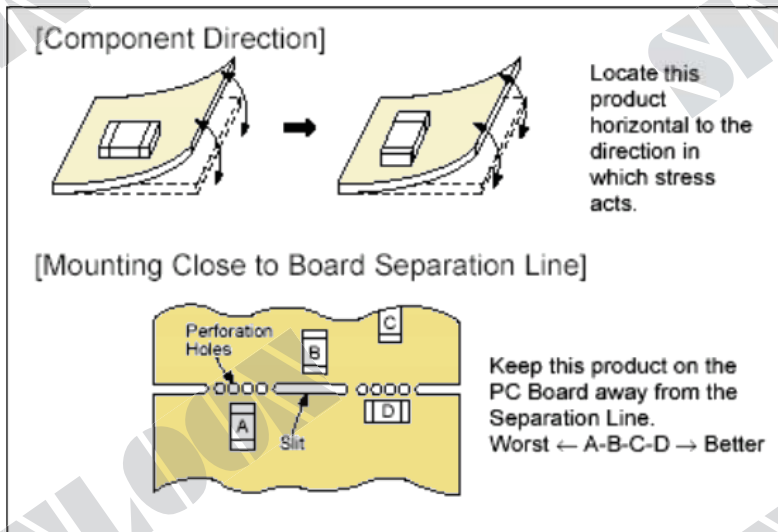
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REFLOW SOLDERING PROFILE



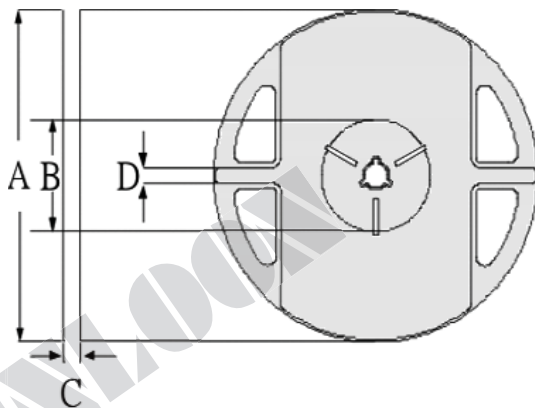
MOUNTING POSITION



PACKING REEL DIMENSIONS

Unit: mm

ITEM	A	B	C	D
Dimensions	178.0 ± 1.0	60.0 ± 1.0	9.0 ± 0.1	13.0 ± 0.1



7" Reel Tape

