SMD02 (0402)
NTC SMD Thermistor

## FEATURE

- Small size, Low capacitance at 40 MHz (below 3 pF)
- 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]

## 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.

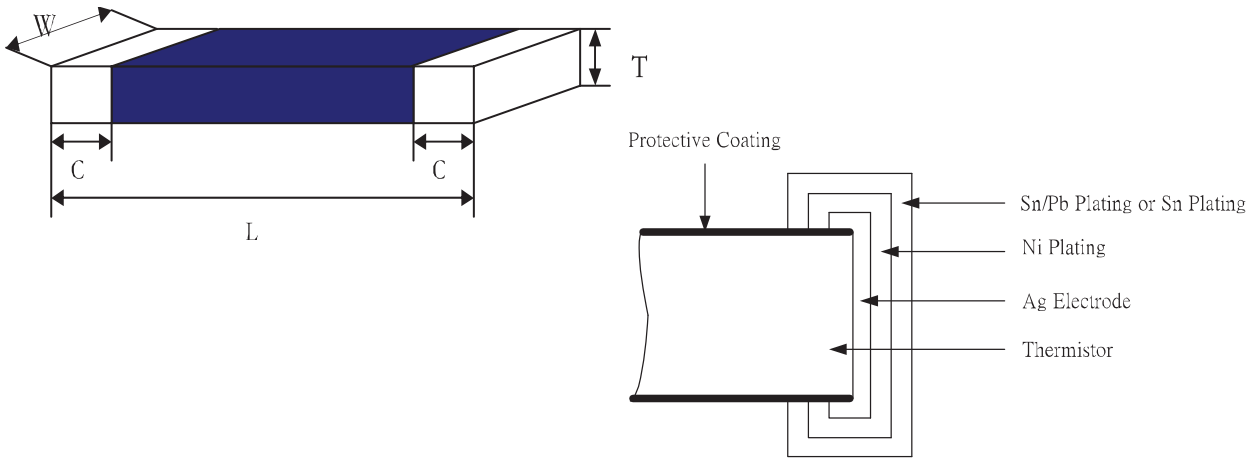
## ORDERING PROCEDURE:

Example: SMD02103J3435HT

| Type | Chip Size | Resistance | Tolerance | B-constant | B-tolerance | Package |
|---|---|---|---|---|---|---|
| SMD02 | 1005(0402) | 101=100Ω | K = ±10% | | K = ±10% | |
| SMD03 | 1608(0603) | 102=1KΩ | J = ±5% | | J = ±5% | |
| SMD05 | 2012(0805) | 103=10KΩ | H = ±3% | 3100~4700 | H = ±3% | T = Reel |
| SMD06 | 3216(1206) | 104=100KΩ | G = ±2% | | G = ±2% | |
| | | | F = ±1% | | F = ±1% | |

## 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 |
| SMD06 | 3216(1206) | 1.00±0.05 | 1.60±0.20 | 1.40±0.30 | 0.25±0.60 |

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## 1005（0402）Size

# SPECIFICATION

| Part Number (SMD) | Resistance （25℃）（Ω） | B-constant （25-85℃） （k） | Maximum Power Rating （25℃） （mW） | Thermal Dissipation Constant （mW/℃） | Operating Temp. Range （℃） |
|---|---|---|---|---|---|
| 02220□3150□ | 22 | 3150 | | | |
| 02300□3150□ | 30 | 3150 | | | |
| 02470□3150□ | 47 | 3150 | | | |
| 02680□3150□ | 68 | 3150 | | | |
| 02101□3250□ | 100 | 3250 | | | |
| 02151□3250□ | 150 | 3250 | | | |
| 02221□3250□ | 220 | 3250 | | | |
| 02102□4100□ | 1.0K | 4100 | | | |
| 02152□4100□ | 1.5K | 4100 | | | |
| 02202□4100□ | 2.0K | 4100 | | | |
| 02222□4100□ | 2.2K | 4100 | | | |
| 02332□4100□ | 3.3K | 4100 | 250 | 2.5 | -40 ~ 125 |
| 02472□4100□ | 4.7K | 4100 | | | |
| 02103□3435□ | 10K | 3435 | | | |
| 02103□3800□ | 10K | 3800 | | | |
| 02103□4100□ | 10K | 4100 | | | |
| 02103□4500□ | 10K | 4500 | | | |
| 02223□3800□ | 22K | 3800 | | | |
| 02333□4050□ | 33K | 4050 | | | |
| 02333□4500□ | 33K | 4500 | | | |
| 02473□4050□ | 47K | 4050 | | | |
| 02683□4050□ | 68K | 4050 | | | |
| 02104□4100□ | 100K | 4100 | | | |
| 02104□4500□ | 100K | 4500 | | | |
| 02154□4100□ | 150K | 4100 | | | |
| 02224□4650□ | 220K | 4650 | | | |
| 02474□4500□ | 470K | 4100 | | | |
| 02474□4750□ | 470K | 4750 | | | |

※ Please inquire to our sales for other spec.



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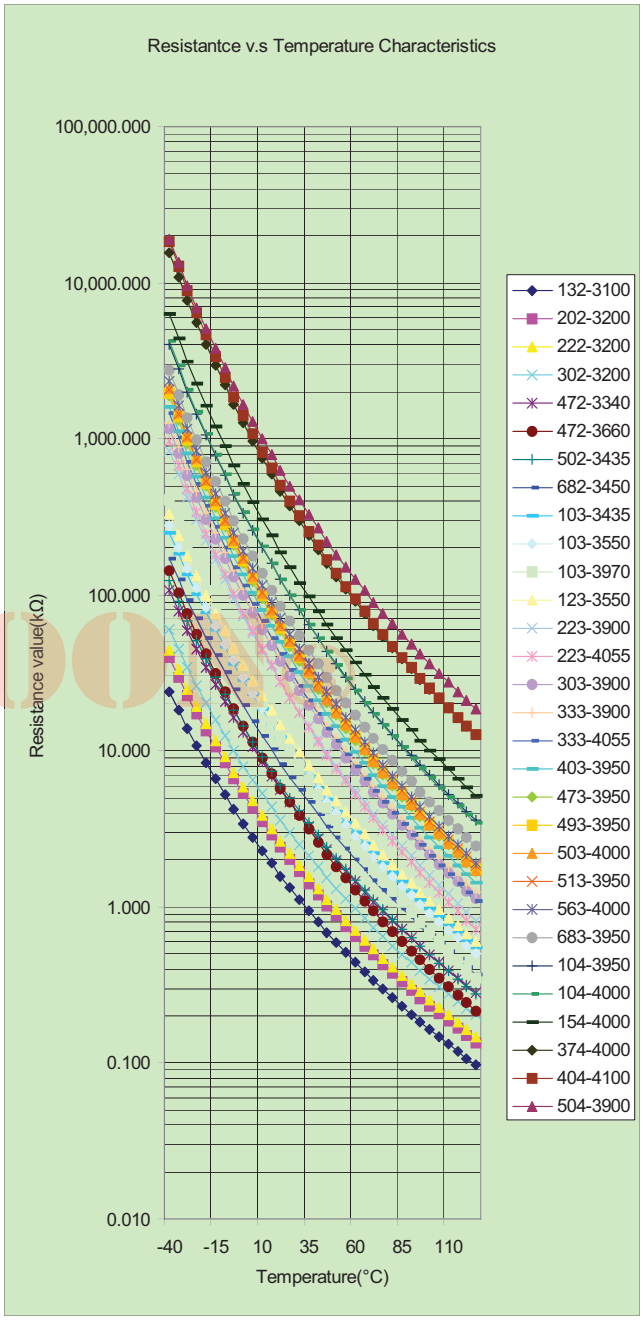
# BASIC CHARACTERISTICS

## 1. Zero-power Resistance of Thermistor

**R= R0 exp B (1/T-1/T0) .....(1)**

R : Resistance in ambient temperature T (K)
(K : absolute temperature)
R0 : Resistance in ambient temperature T0 (K)
B : B-constant of Thermistor




## 2. B-Constant

As (1) formula

**B= ln (R/$R_0$) / (1/T-1/T0) -------- (2)**

## 3. Thermal Dissipation Constant

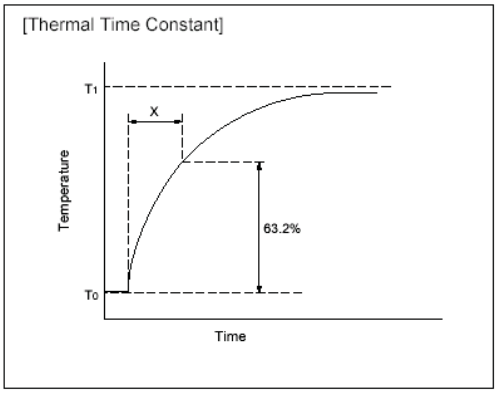
When spend electric power P (mW) in ambient temperature T1, if Thermistor temperature rises T2, there is a formula as follows

**P= C (T2 -T1) ---------- (3)**

C : Thermal dissipation constant (mW/℃)
Thermal dissipation constant change by dimensions, measure, measured condition etc.

## 4. Thermal Time Constant

Period in which Thermistor temperature will change 63.2% of its temperature difference from ambient temperature T0 (℃) to $T_1$ (℃).



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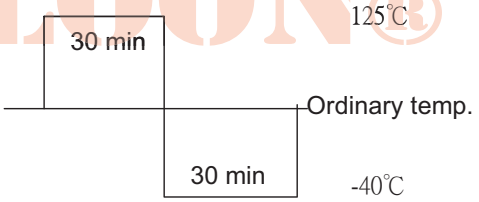
# RELIABILITY TEST

| Test Item | | Standard | Test Method | △$R_{25}$ / $R_{25}$ |
|---|---|---|---|---|
| Environmental test | Life | MIL-STD-202F Method 108A | Test temperature：70℃<br>Test duration：1000 hrs<br>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℃<br>Test humidity：95％<br>Test duration：1000 hrs<br>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<br>Test temperature：- 40℃ & 125℃<br>  | MAX. ± 3％ |
| | Storage in dry heat | IEC 68-2-2 | Test temperature：125℃<br>Test duration：1000 hrs | MAX. ± 3％ |
| Mechanical Performance test | Solderability | MIL-STD-202F Method 208 H | Soldering temperature：235℃<br>Duration of immersion：2 seconds | 95％ min. coverage |
| | Resistance to soldering heat | MIL-R-55342D PARA 4.7.7 | Soldering temperature：260℃<br>Duration of immersion：10 seconds | MAX. ± 3％ |



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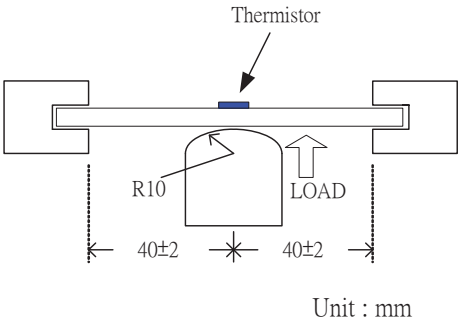
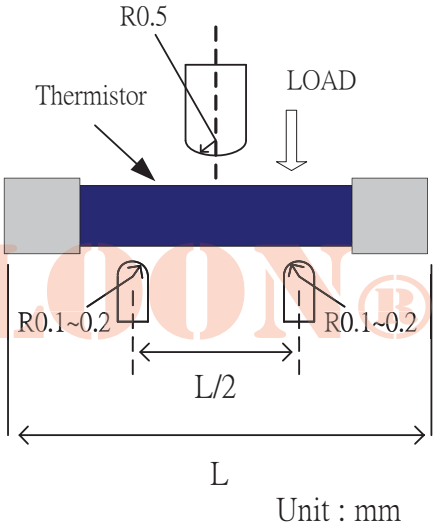
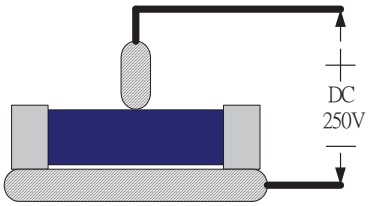
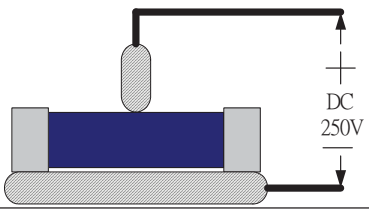
| | | | | |
|---|---|---|---|---|
| Mechanical Performance test | Bending strength | JIS C 5202 6.1.4 | Pressurizing rod at a rate of 1mm/sec<br>Maintenance time：5 sec<br>Bending distance：1 mm (min.)<br>  | Visual : No mechanical damage |
| | Resistance to flexure of substrate | JIS C 5202 6.2.1 | Pressurizing force shall be 3kg<br>  | MIN. 3Kg |
| Electrical Performance test | Insulation resistance | MIL-STD-202F Method 302 | DC 250V For 10 seconds<br>  | Over 1000MΩ |
| | Dielectric withstand voltage | MIL-STD-202F Method 301 | DC 250V For 10 seconds<br>  | NOT Short |



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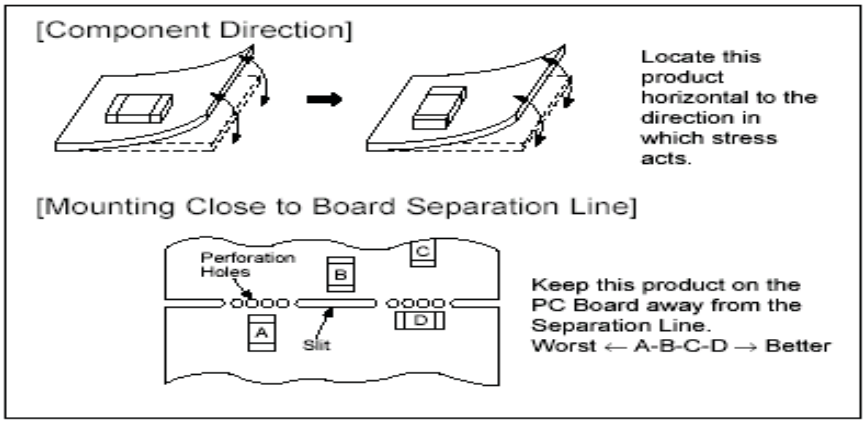
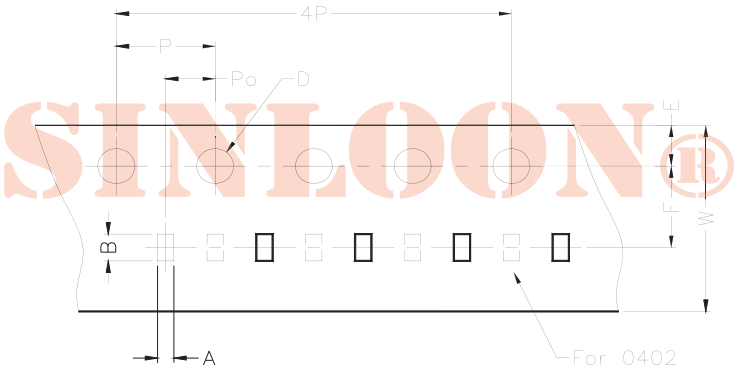
# MOUNTING POSITION




Choose a mounting position that minimize the stress imposed on the chip during flexing or bending of the board

# TAPE DIMENSIONS




| Dimension | 1206 | 0805 | 0603 | 0402 |
|---|---|---|---|---|
| A | 2.00 ± 0.05 | 1.50 ± 0.05 | 1.08 ± 0.05 | 0.66 ± 0.03 |
| B | 3.57 ± 0.05 | 2.30 ± 0.05 | 1.85 ± 0.05 | 1.15 ± 0.03 |
| W | 8.00 ± 0.02 | 8.00 ± 0.05 | 8.00 ± 0.05 | 8.00 ± 0.05 |
| D | 1.55 ± 0.05 | 1.50 ± 0.10 | 1.50 ± 0.10 | 1.50 ± 0.10 |
| E | 1.75 ± 0.10 | 1.75 ± 0.05 | 1.75 ± 0.05 | 1.75 ± 0.05 |
| F | 3.50 ± 0.05 | 3.50 ± 0.05 | 3.50 ± 0.05 | 3.50 ± 0.05 |
| P | 4.00 ± 0.10 | 4.00 ± 0.05 | 4.00 ± 0.05 | 4.00 ± 0.05 |
| Po | 2.00 ± 0.05 | 2.00 ± 0.05 | 2.00 ± 0.05 | 2.00 ± 0.05 |
| 4P | 16.00 ± 0.05 | 16.00 ± 0.05 | 16.00 ± 0.05 | 16.00 ± 0.05 |

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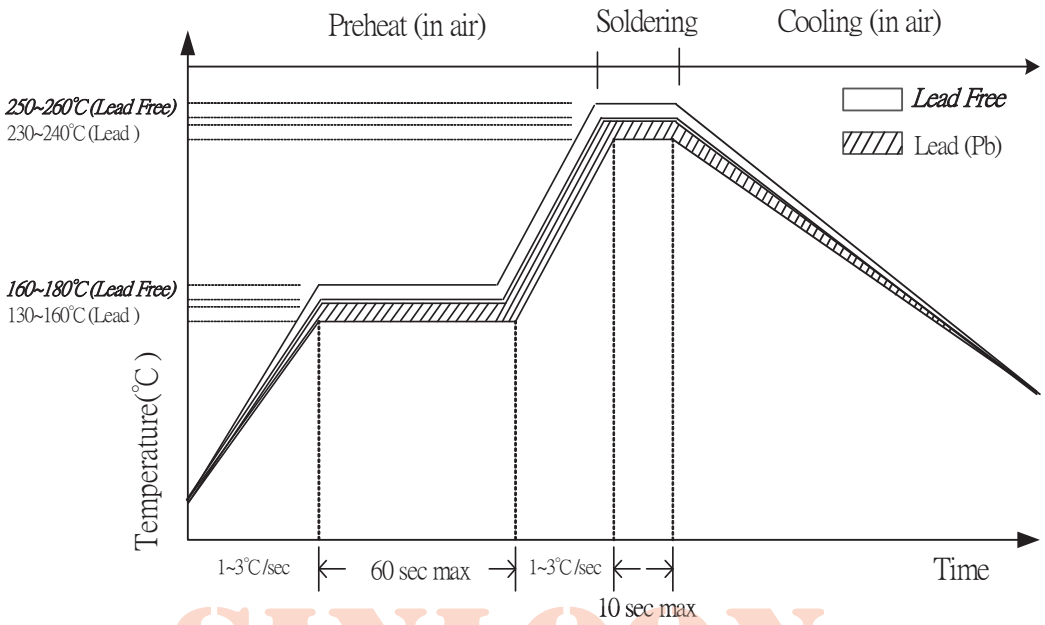
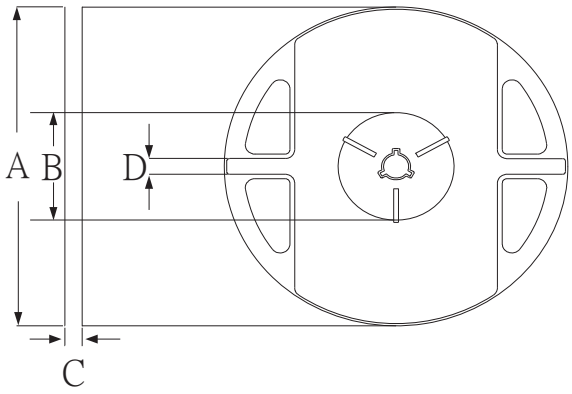
# REFLOW SOLDERING PROFILE






# REEL DIMENSIONS

Unit：mm




Unit：mm

| ITEM | A | B | C | D |
|---|---|---|---|---|
| Dimension | 178.0 ± 1.0 | 60.0 ± 1.0 | 9.0 ± 0.1 | 13.0 ± 0.1 |

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