

NTC Thermistor : TTC05 Series



Φ5 mm Lead Type for Temperature Sensing/Compensation

■ Features

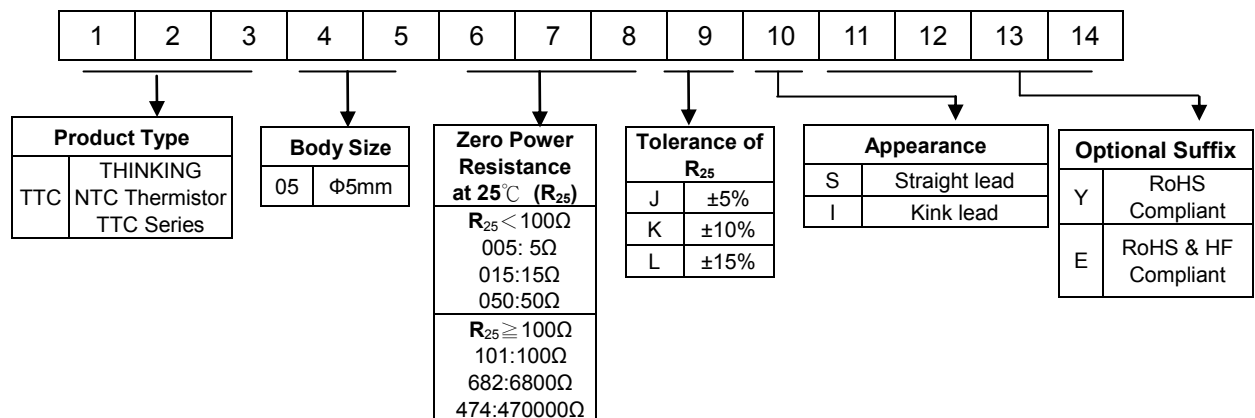
1. RoHS compliant
2. Halogen-Free (HF) series are available
3. Body size: Φ5mm
4. Radial lead resin coated
5. Operating temperature range: -30°C~+125°C
6. Wide resistance range
7. Cost effective
8. Agency recognition: UL / cUL / TUV / CQC



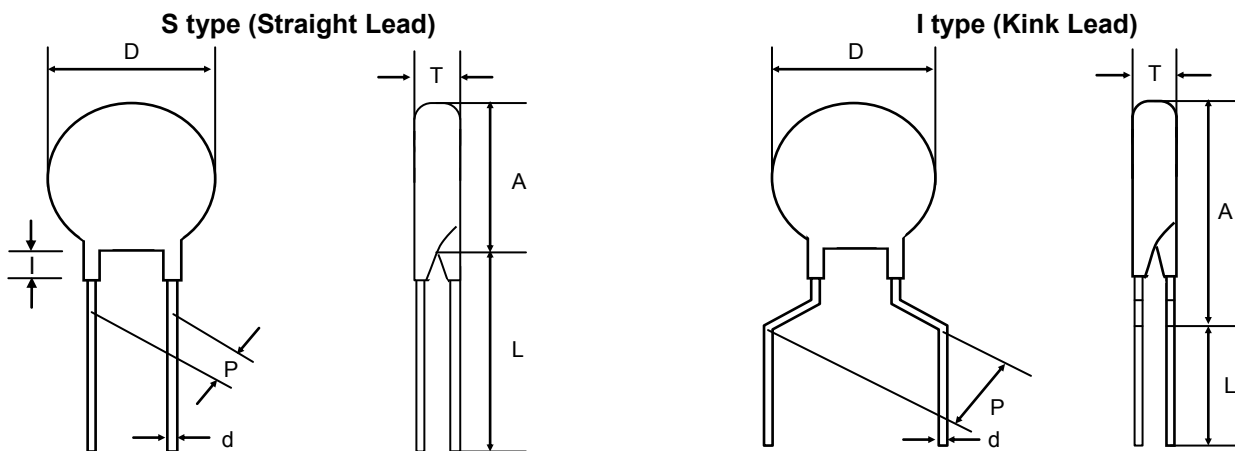
■ Recommended Applications

1. Home appliances
2. Automotive electronics
3. Computers
4. Switch mode power supplies
5. Adapters

■ Part Number Code



■ Structure and Dimensions



(Unit: mm)

| Type | D | P | d | I max. | A max. | L min. | T |
|---------------|---------|----------|----------|--------|--------|--------|---------|
| S Type | 4.0~6.5 | 3.5± 0.5 | 0.5±0.02 | 3 | 6.5 | 31 | 2.5~5.0 |
| I Type | 4.0~6.5 | 5± 0.5 | 0.5±0.02 | — | 10 | 29 | 2.5~5.0 |

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Electrical Characteristics

| Part No. | Zero Power Resistance at 25°C | Tolerance of R ₂₅ | B _{25/50} Value | Max. Power Dissipation at 25°C | Dissipation Factor | Thermal Time Constant | Operating Temperature Range | Safety Approvals | | | | | | | |
|-----------|-------------------------------|------------------------------|--------------------------|--------------------------------|--------------------|-----------------------|-------------------------------------|------------------|-----|-----|---|--|---|---|---|
| | R ₂₅ (Ω) | (±%) | (K) | P _{max} (mW) | δ(mW/°C) | τ (Sec.) | T _L ~T _U (°C) | UL/cUL | TUV | CQC | | | | | |
| TTC05005□ | 5 | 10, 15 | 2400 | 450 | Approx. 4.5 | Approx. 20 | -30~+125 | | √ | √ | | | | | |
| TTC05010□ | 10 | | | | | | | 2800 | | | | | √ | √ | |
| TTC05015□ | 15 | | | | | | | 2800 | | | | | √ | √ | √ |
| TTC05020□ | 20 | | | | | | | 2800 | | | | | √ | √ | √ |
| TTC05025□ | 25 | | | | | | | 2900 | | | | | √ | √ | √ |
| TTC05045□ | 45 | | | | | | | 3100 | | | | | √ | √ | √ |
| TTC05050□ | 50 | | | | | | | 3100 | | | | | √ | √ | √ |
| TTC05060□ | 60 | | | | | | | 3100 | | | | | √ | √ | √ |
| TTC05085□ | 85 | | | | | | | 3200 | | | | | √ | √ | √ |
| TTC05090□ | 90 | | | | | | | 3200 | | | | | √ | √ | √ |
| TTC05101□ | 100 | | | | | | | 3200 | | | | | √ | √ | √ |
| TTC05121□ | 120 | | | | | | | 3300 | | | | | √ | √ | √ |
| TTC05151□ | 150 | | | | | | | 3300 | | | | | √ | √ | √ |
| TTC05201□ | 200 | | | | | | | 3500 | | | | | √ | √ | √ |
| TTC05221□ | 220 | | | | | | | 3500 | | | | | √ | √ | √ |
| TTC05251□ | 250 | | | | | | | 3500 | | | | | √ | √ | √ |
| TTC05301□ | 300 | | | | | | | 3800 | | | | | √ | √ | √ |
| TTC05471□ | 470 | | | | | | | 3500 | | | | | √ | √ | √ |
| TTC05501□ | 500 | | | | | | | 3700 | | | | | √ | √ | √ |
| TTC05681□ | 680 | | | | | | | 3800 | | | | | √ | √ | √ |
| TTC05701□ | 700 | | | | | | | 3800 | | | | | √ | √ | √ |
| TTC05102□ | 1000 | | | | | | | 3800 | | | | | √ | √ | √ |
| TTC05152□ | 1500 | | | | | | | 3950 | | | | | √ | √ | √ |
| TTC05202□ | 2000 | | | | | | | 4000 | | | | | √ | √ | √ |
| TTC05222□ | 2200 | | | | | | | 4000 | | | | | √ | √ | √ |
| TTC05252□ | 2500 | | | | | | | 4000 | | | | | √ | √ | √ |
| TTC05302□ | 3000 | | | | | | | 4000 | | | | | √ | √ | √ |
| TTC05332□ | 3300 | | | | | | | 4000 | | | | | √ | √ | √ |
| TTC05402□ | 4000 | | 4000 | | | | | √ | √ | √ | | | | | |
| TTC05472□ | 4700 | | 4050 | | | | | √ | √ | √ | | | | | |
| TTC05502□ | 5000 | | 3950 | | | | | √ | √ | √ | | | | | |
| TTC05602□ | 6000 | | 4050 | | | | | √ | √ | √ | | | | | |
| TTC05682□ | 6800 | | 4050 | | | | | √ | √ | √ | | | | | |
| TTC05802□ | 8000 | | 4050 | | | | | √ | √ | √ | | | | | |
| TTC05103□ | 10000 | 5, 10, 15 | 4050 | | | | | √ | √ | √ | | | | | |
| TTC05123□ | 12000 | | | 4050 | | | | | √ | √ | √ | | | | |
| TTC05153□ | 15000 | | | 4150 | | | | | √ | √ | √ | | | | |
| TTC05203□ | 20000 | | | 4250 | | | | | √ | √ | √ | | | | |
| TTC05303□ | 30000 | | | 4250 | | | | | √ | √ | √ | | | | |
| TTC05473□ | 47000 | | | 4300 | | | | | √ | √ | √ | | | | |
| TTC05503□ | 50000 | | | 4300 | | | | | √ | √ | √ | | | | |
| TTC05104□ | 100000 | | | 4400 | | | | | √ | √ | √ | | | | |
| TTC05154□ | 150000 | | | 4500 | | | | | √ | √ | √ | | | | |
| TTC05204□ | 200000 | | | 4600 | | | | | √ | √ | √ | | | | |
| TTC05224□ | 220000 | | | 4600 | | | | | √ | √ | √ | | | | |
| TTC05474□ | 470000 | | | 4750 | | | | | √ | √ | √ | | | | |

Note 1: □ = Tolerance of R₂₅

Note 2: UL/cUL File No: E138827

CSA File No: 97495

TUV File No: R 50050155

CQC File No: CQC05001011991 ; CQC05001011994

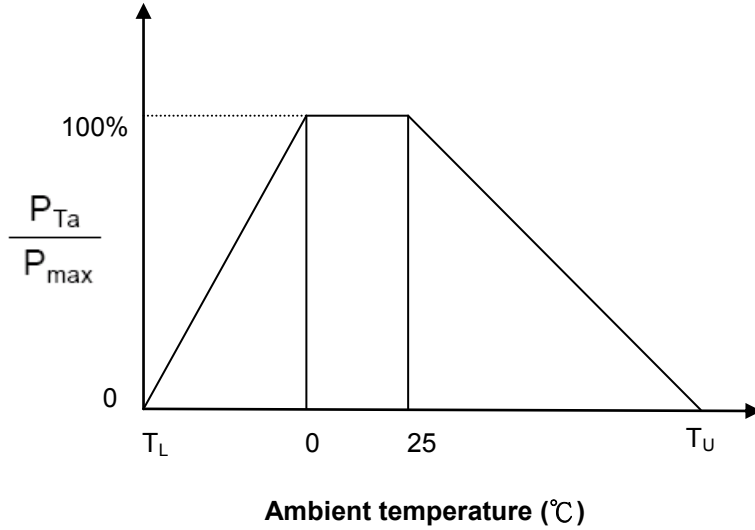
Note 3: Special specifications are available upon request.

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Φ5 mm Lead Type for Temperature Sensing/Compensation

Max. Power Dissipation Derating Curve



T_U : Maximum operating temperature (°C)

T_L : Minimum operating temperature (°C)

For example:

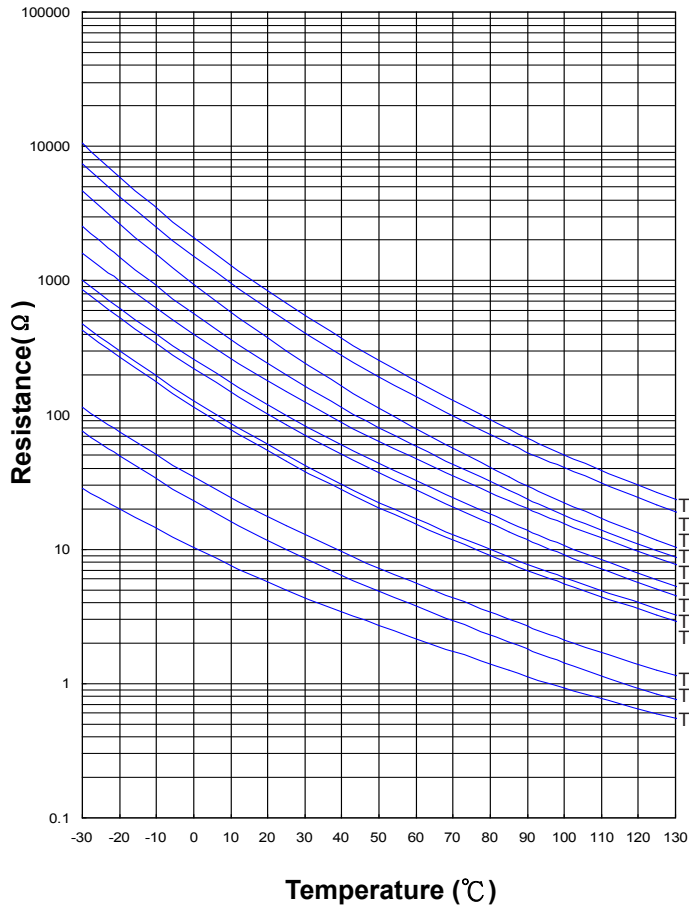
Ambient temperature (T_a) = 55°C

Maximum operating temperature (T_U) = 125°C

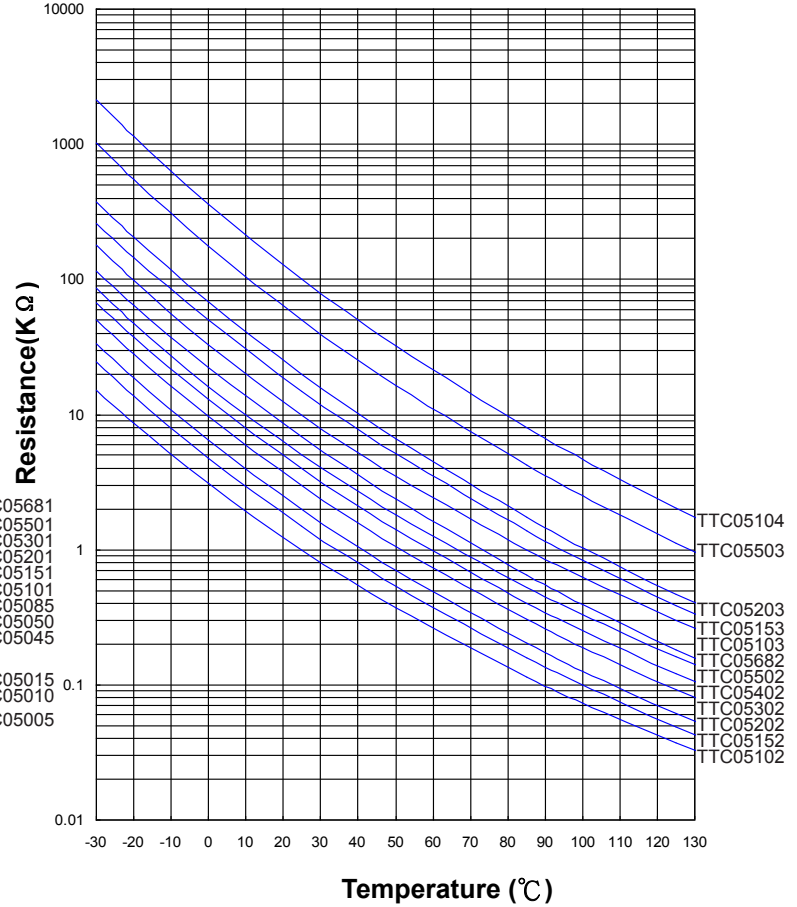
$$P_{Ta} = (T_U - T_a) / (T_U - 25) \times P_{max} = 70\% P_{max}$$

R-T Characteristic Curves (representative)

TTC05005~TTC05681



TTC05102~TTC05104

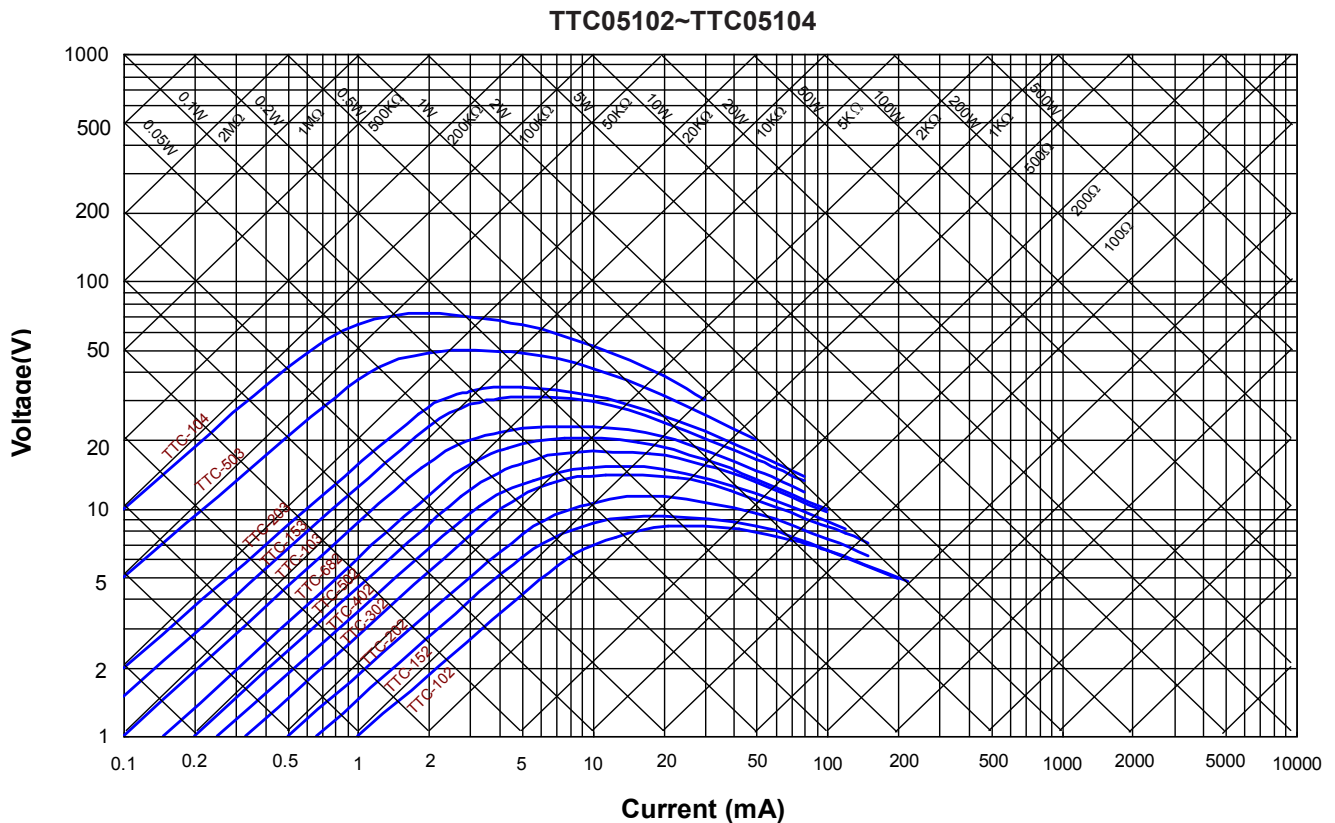
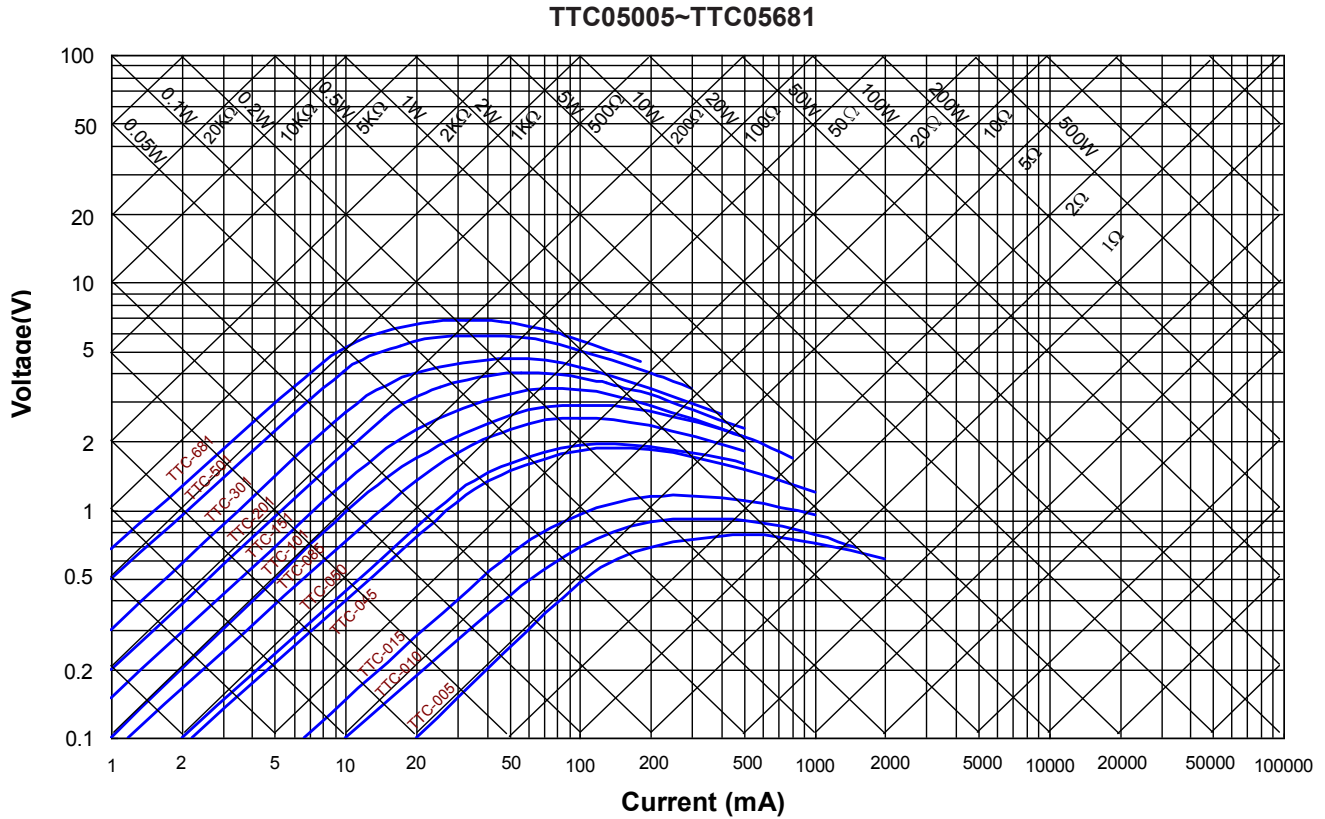


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Φ5 mm Lead Type for Temperature Sensing/Compensation

■ V-I Characteristic Curves (representative)



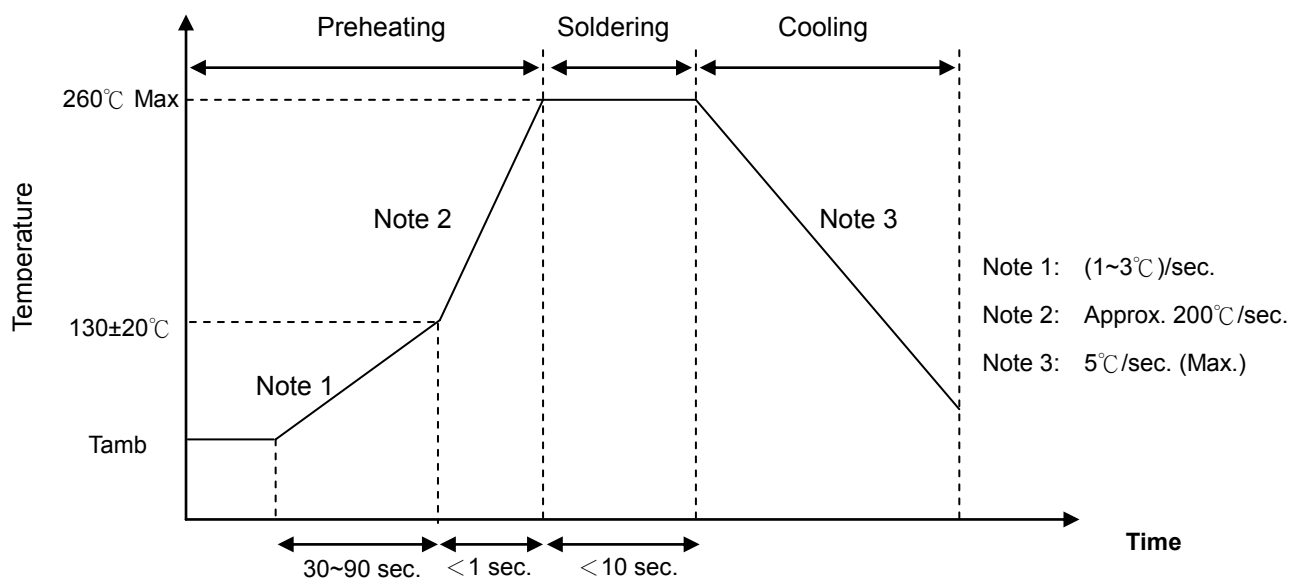
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Φ5 mm Lead Type for Temperature Sensing/Compensation

■ Soldering Recommendation

● Wave Soldering Profile



Caution: It had better to keep the minimum distance as 6mm between the bottom of the thermistor body and PCB surface to prevent component damage.

● Recommended Reworking Conditions with Soldering Iron

| Item | Conditions |
|-----------------------------------|---------------|
| Temperature of Soldering Iron-tip | 360°C (max.) |
| Soldering Time | 3 sec. (max.) |
| Distance from Thermistor | 2 mm (min.) |

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■ Reliability

| Item | Standard | Test conditions / Methods | Specifications | | | | | | | | | | | | | | | |
|-------------------------------|--------------------------|---|--|------------------|------------------|---|---------|--------|---|------------------|-------|---|---------|--------|---|------------------|-------|--|
| Tensile Strength of Terminals | IEC 60068-2-21 | Gradually apply the specified force and keep the unit fixed for 10±1 sec. Terminal diameter (mm) $0.3 < d \leq 0.5$ Force (Kg) 0.5 | No visible damage | | | | | | | | | | | | | | | |
| Bending Strength of Terminals | IEC 60068-2-21 | Hold specimen and apply the force specified below to each lead. Bend the specimen to 90°, and then return to the original position. Repeat the procedure in the opposite direction. Terminal diameter (mm) $0.3 < d \leq 0.5$ Force (Kg) 0.25 | No visible damage | | | | | | | | | | | | | | | |
| Solderability | IEC 60068-2-20 | 245 ± 3 °C , 3 ± 0.3 sec. | At least 95% of terminal electrode is covered by new solder | | | | | | | | | | | | | | | |
| Resistance to Soldering Heat | IEC 60068-2-20 | 260 ± 3 °C , 10 ± 1 sec. | No visible damage ΔR ₂₅ /R ₂₅ ≤ 3 % | | | | | | | | | | | | | | | |
| High Temperature Storage | IEC 600068-2-2 | 125 ± 5 °C , 1000 ± 24 hrs | No visible damage ΔR ₂₅ /R ₂₅ ≤ 5 % | | | | | | | | | | | | | | | |
| Damp Heat, Steady State | IEC 60068-2-78 | 40 ± 2 °C , 90~95% RH, 1000 ± 24 hrs | No visible damage ΔR ₂₅ /R ₂₅ ≤ 3 % | | | | | | | | | | | | | | | |
| Rapid Change of Temperature | IEC 60068-2-14 | The conditions shown below shall be repeated 5 cycles. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Period (minutes)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-30 ± 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>125 ± 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 | -30 ± 5 | 30 ± 3 | 2 | Room temperature | 5 ± 3 | 3 | 125 ± 5 | 30 ± 3 | 4 | Room temperature | 5 ± 3 | No visible damage ΔR ₂₅ /R ₂₅ ≤ 3 % |
| Step | Temperature (°C) | Period (minutes) | | | | | | | | | | | | | | | | |
| 1 | -30 ± 5 | 30 ± 3 | | | | | | | | | | | | | | | | |
| 2 | Room temperature | 5 ± 3 | | | | | | | | | | | | | | | | |
| 3 | 125 ± 5 | 30 ± 3 | | | | | | | | | | | | | | | | |
| 4 | Room temperature | 5 ± 3 | | | | | | | | | | | | | | | | |
| Max. Power Dissipation | IEC 60539-1 4.26.3 | 25 ± 5 °C , Pmax. , 1000 ± 24 hrs | No visible damage ΔR ₂₅ /R ₂₅ ≤ 5 % | | | | | | | | | | | | | | | |
| Insulation Test | MIL-STD-202F -Method 302 | 1000 V _{DC} , 1 min | ≥ 500 MΩ | | | | | | | | | | | | | | | |

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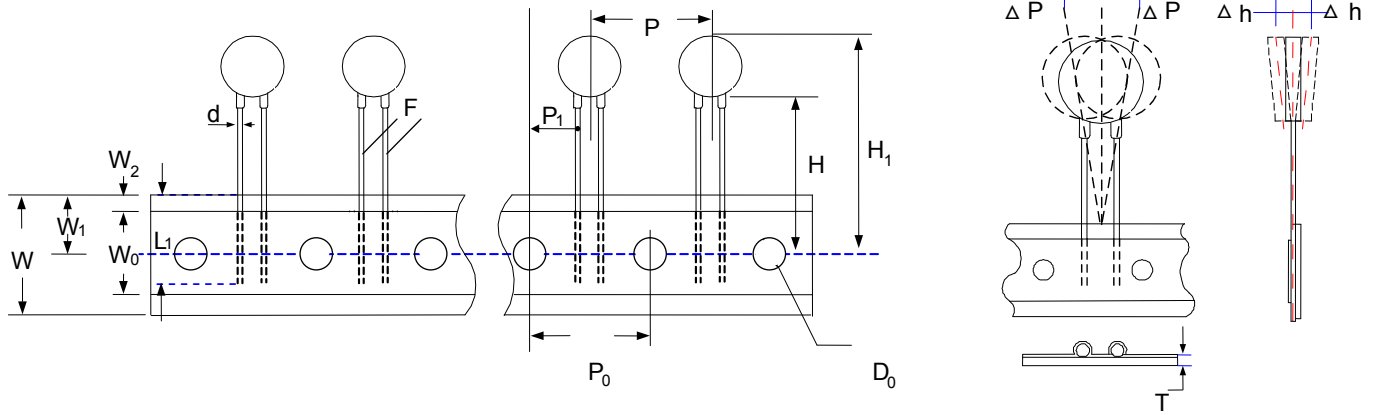


Φ5 mm Lead Type for Temperature Sensing/Compensation

■ Packaging

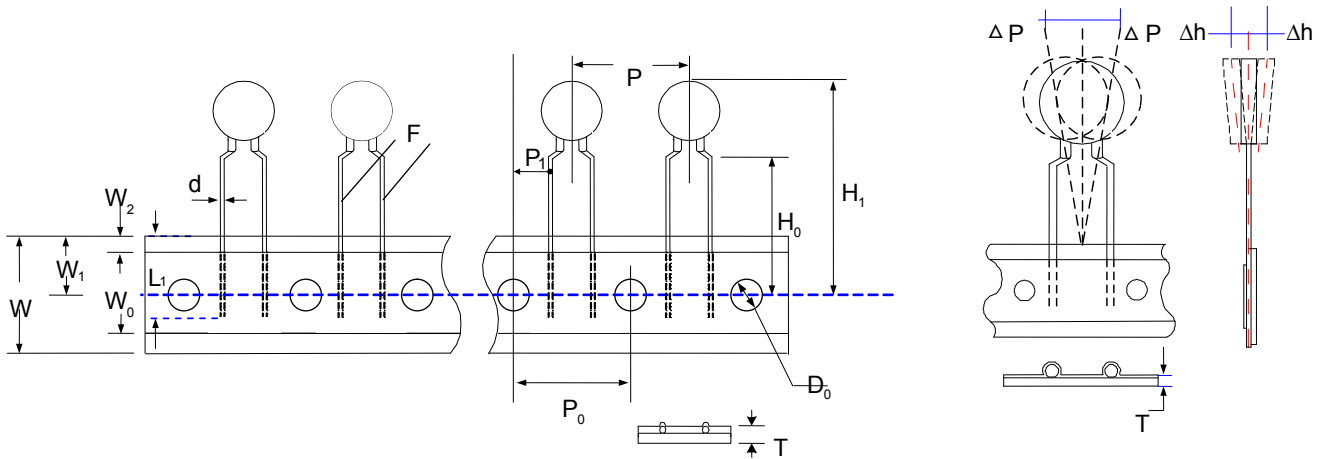
● Taping Specification :

S Type (Straight Lead)



| Taping Dimension | P ₀ | F | P | P ₁ | H | H ₁ | d | W ₀ | W ₁ | W ₂ | W | Δ P | Δ h | L ₁ | D ₀ | T |
|----------------------|----------------|------|------|----------------|-------|----------------|-------|----------------|----------------|----------------|-------------|------|------|----------------|----------------|------|
| | ±0.3 | ±0.5 | ±1 | ±0.7 | +2/-0 | Max. | ±0.02 | ±1 | +0.75 /-0.5 | Max. | +1/ -0.5 | Max. | Max. | Min. | ±0.2 | ±0.2 |
| P ₀ :12.7 | 12.7 | 3.5 | 12.7 | 4.60 | 18 | 28 | 0.5 | 12 | 9 | 3 | 18 | 1 | 2 | 9 | 4 | 0.6 |
| P ₀ :15.0 | 15.0 | 3.5 | 15.0 | 5.75 | 18 | 28 | 0.5 | 12 | 9 | 3 | 18 | 1 | 2 | 9 | 4 | 0.6 |

I Type (Kink Lead)



| Taping Dimension | P ₀ | F | P | P ₁ | H ₀ | H ₁ | d | W ₀ | W ₁ | W ₂ | W | Δ P | Δ h | L ₁ | D ₀ | T |
|----------------------|----------------|------|------|----------------|----------------|----------------|-------|----------------|----------------|----------------|-------------|------|------|----------------|----------------|------|
| | ±0.3 | ±0.5 | ±1 | ±0.7 | ±0.5 | Max. | ±0.02 | ±1 | +0.75 /-0.5 | Max. | +1/ -0.5 | Max. | Max. | Min. | ±0.2 | ±0.2 |
| P ₀ :12.7 | 12.7 | 5.0 | 12.7 | 3.85 | 16 | 28 | 0.5 | 12 | 9 | 3 | 18 | 1 | 2 | 9 | 4 | 0.6 |
| P ₀ :15.0 | 15.0 | 5.0 | 15.0 | 5.00 | 16 | 28 | 0.5 | 12 | 9 | 3 | 18 | 1 | 2 | 9 | 4 | 0.6 |

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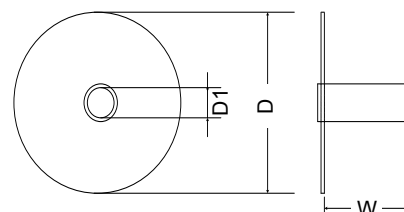
■ Quantity

● Bulk Packing

| Series | Standard Lead Type Quantity (pcs/bag) | Cut Lead Type Quantity (pcs/bag) |
|--------|--|-------------------------------------|
| TTC05 | 250 | 500 |

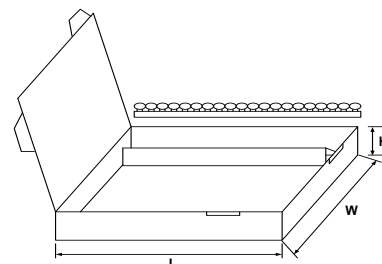
● Reel Packing:

| Series | D (mm) | D1 (mm) | W (mm) | Quantity (pcs/reel) |
|--------|-----------|------------|-----------|------------------------|
| TTC05 | 340±10 | 31±1 | 46±1 | 2,500 |



● Ammo Packing:

| Series | Quantity (pcs/box) |
|--------|--------------------|
| TTC05 | 2,000 |



| L | W | H |
|-------|-------|------|
| 345mm | 275mm | 55mm |

■ 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