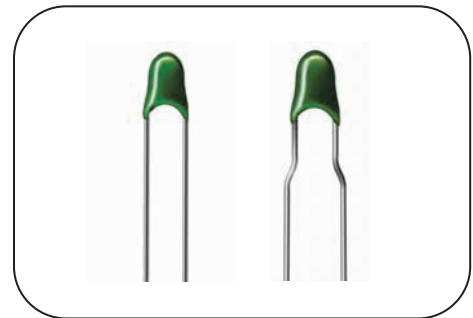


# NTC Thermistor : TTC3 Series

## Φ3 mm Lead Type for Temperature Sensing/Compensation

### ■ Features

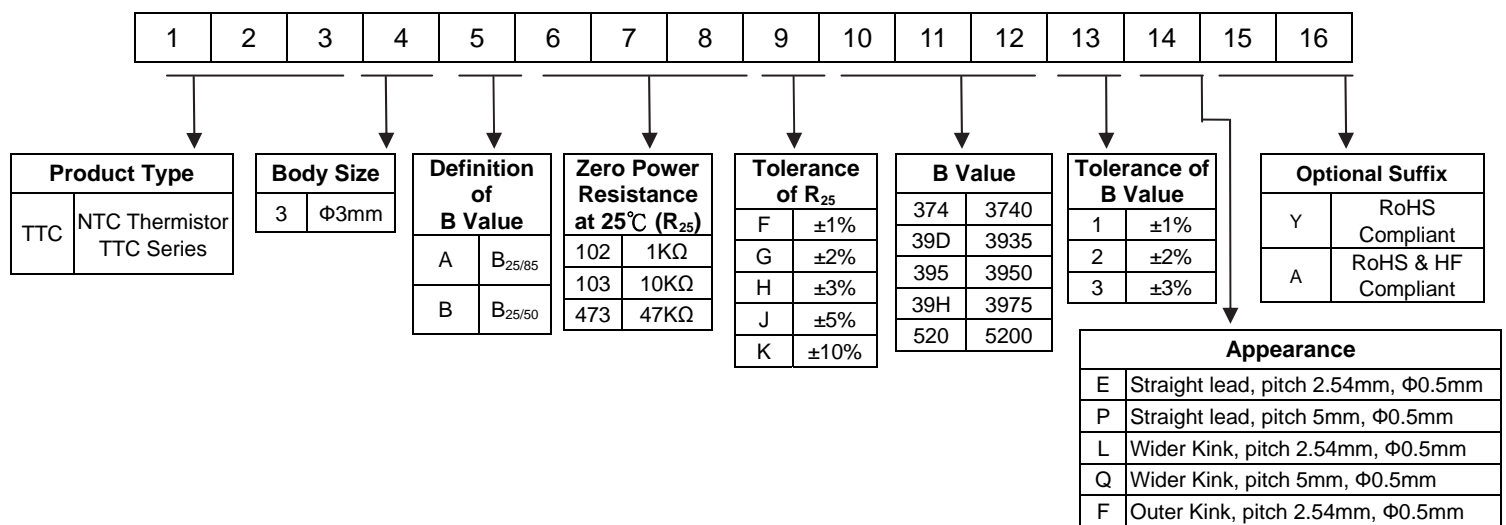
1. RoHS compliant
2. Halogen-Free(HF) series are available
3. Body size: Φ3mm
4. Radial lead resin coated
5. Operating temperature range: -40°C ~ +125°C
6. Wide resistance range
7. Cost effective
8. Agency recognition: UL / cUL / TUV / CQC



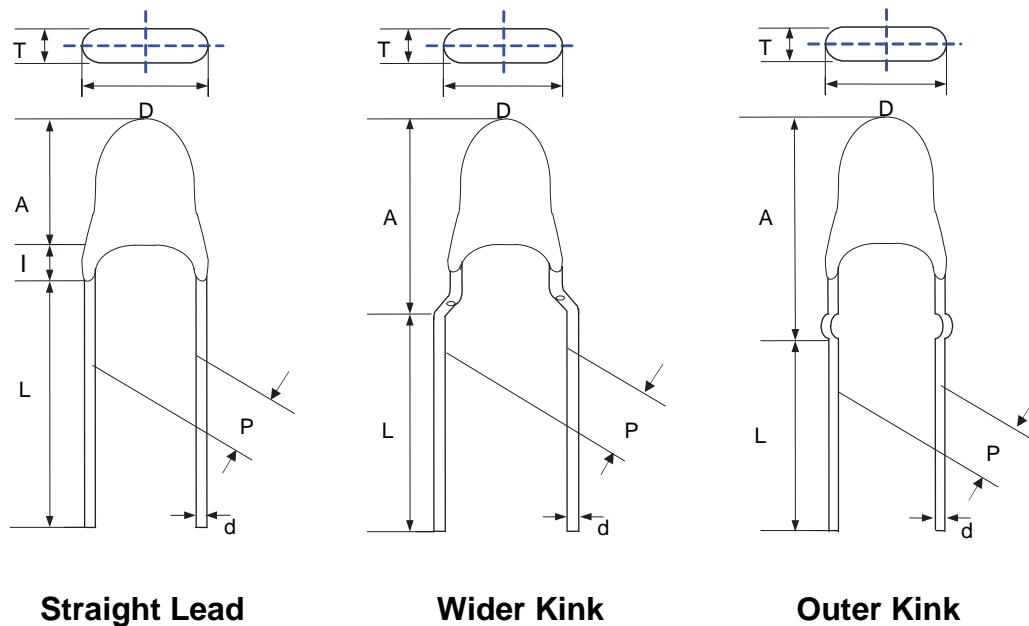
### ■ Recommended Applications

1. Home appliances
2. Computers
3. Digital meters
4. Switch mode power supplies
5. Adapters

### ■ Part Number Code



### ■ Structure and Dimensions



(Unit: mm)

| Lead Type     | P        | D <sub>max.</sub> | T <sub>max.</sub> | A <sub>max.</sub> | I <sub>max.</sub> | L         | d        |
|---------------|----------|-------------------|-------------------|-------------------|-------------------|-----------|----------|
| Straight Lead | 2.54±0.5 | 4                 | 3                 | 5                 | 3                 | 30~40     | 0.5±0.02 |
|               | 5±0.5    | 6.5               | 5                 | 7                 | 3                 |           |          |
| Wider Kink    | 2.54±0.5 | 4                 | 3                 | 6                 | --                |           |          |
|               | 5±0.5    | 4                 | 3                 | 10                | --                |           |          |
| Outer Kink    | 2.54±0.5 | 4                 | 3                 | 13.5              | --                | 24.5~34.5 |          |

# NTC Thermistor : TTC3 Series

## Φ3 mm Lead Type for Temperature Sensing/Compensation

### ■ Electrical Characteristics

| Part No.      | Zero Power Resistance at 25°C | Tolerance of R <sub>25</sub> | B Value |       | Tolerance of B value | Max. Power Dissipation at 25°C | Dissipation Factor | Thermal Time Constant | Operating Temperature Range         | Safety Approvals |     |     |
|---------------|-------------------------------|------------------------------|---------|-------|----------------------|--------------------------------|--------------------|-----------------------|-------------------------------------|------------------|-----|-----|
|               | R <sub>25</sub> (KΩ)          | (±%)                         | (K)     |       | (±%)                 | P <sub>max</sub> (mW)          | δ(mW/°C)           | τ (Sec.)              | T <sub>L</sub> ~T <sub>U</sub> (°C) | UL cUL           | TUV | CQC |
| TTC3A901□39D* | 0.9                           | 1、2、3、5                      | 25/85   | 3935  | 2、3                  | 150                            | ≧2.5               | ≦18                   | -40~+125                            | √                | √   | √   |
| TTC3A102□39D* | 1                             |                              |         | 3935  |                      |                                |                    |                       |                                     | √                | √   | √   |
| TTC3A152□39D* | 1.5                           |                              |         | 3935  |                      |                                |                    |                       |                                     | √                | √   | √   |
| TTC3A202□39H* | 2                             |                              |         | 3975  |                      |                                |                    |                       |                                     | √                | √   | √   |
| TTC3A222□39H* | 2.2                           |                              |         | 3975  |                      |                                |                    |                       |                                     | √                | √   | √   |
| TTC3A272□39H* | 2.7                           |                              |         | 3975  |                      |                                |                    |                       |                                     | √                | √   | √   |
| TTC3A302□39H* | 3                             |                              |         | 3975  |                      |                                |                    |                       |                                     | √                | √   | √   |
| TTC3A332□39H* | 3.3                           |                              |         | 3975  |                      |                                |                    |                       |                                     | √                | √   | √   |
| TTC3A472□39H* | 4.7                           |                              |         | 3975  |                      |                                |                    |                       |                                     | √                | √   | √   |
| TTC3A482□395* | 4.8                           |                              |         | 3950  |                      |                                |                    |                       |                                     | √                | √   |     |
| TTC3A482□39H* | 4.8                           |                              |         | 3975  | √                    |                                |                    |                       |                                     | √                |     |     |
| TTC3A502□39H* | 5                             |                              |         | 3975  | √                    |                                |                    |                       |                                     | √                | √   |     |
| TTC3A682□39H* | 6.8                           |                              |         | 3975  | √                    |                                |                    |                       |                                     | √                | √   |     |
| TTC3A103□34D* | 10                            |                              |         | 3435  | √                    |                                |                    |                       |                                     | √                | √   |     |
| TTC3A103□374* | 10                            |                              |         | 3740  | √                    |                                |                    |                       |                                     | √                | √   |     |
| TTC3A103□39H* | 10                            |                              |         | 3975  | √                    |                                |                    |                       |                                     | √                | √   |     |
| TTC3A123□374* | 12                            |                              |         | 3740  | √                    |                                |                    |                       |                                     | √                | √   |     |
| TTC3A153□374* | 15                            |                              |         | 3740  | √                    |                                |                    |                       |                                     | √                | √   |     |
| TTC3A203□374* | 20                            |                              |         | 3740  | √                    |                                |                    |                       |                                     | √                | √   |     |
| TTC3A203□426* | 20                            |                              |         | 4260  | √                    |                                |                    |                       |                                     | √                | √   |     |
| TTC3A223□374* | 22                            |                              |         | 3740  | √                    |                                |                    |                       |                                     | √                | √   |     |
| TTC3A333□409* | 33                            |                              |         | 4090  | √                    |                                |                    |                       |                                     | √                | √   |     |
| TTC3A473□409* | 47                            |                              |         | 4090  | √                    |                                |                    |                       |                                     | √                | √   |     |
| TTC3A503□39H* | 50                            |                              |         | 3975  | √                    |                                |                    |                       |                                     | √                | √   |     |
| TTC3A503□406* | 50                            |                              |         | 4060  | √                    |                                |                    |                       |                                     | √                | √   |     |
| TTC3A683□419* | 68                            | 4190                         | √       | √     | √                    |                                |                    |                       |                                     |                  |     |     |
| TTC3A104□419* | 100                           | 4190                         | √       | √     | √                    |                                |                    |                       |                                     |                  |     |     |
| TTC3A104□436* | 100                           | 4360                         | √       | √     | √                    |                                |                    |                       |                                     |                  |     |     |
| TTC3A154□437* | 150                           | 4370                         | √       | √     | √                    |                                |                    |                       |                                     |                  |     |     |
| TTC3A204□385* | 200                           | 3850                         | √       | √     |                      |                                |                    |                       |                                     |                  |     |     |
| TTC3A224□437* | 220                           | 4370                         | √       | √     | √                    |                                |                    |                       |                                     |                  |     |     |
| TTC3A334□457* | 330                           | 4570                         | √       | √     | √                    |                                |                    |                       |                                     |                  |     |     |
| TTC3A474□457* | 470                           | 4570                         | √       | √     | √                    |                                |                    |                       |                                     |                  |     |     |
| TTC3A474□520* | 470                           | 5200                         | √       | √     | √                    |                                |                    |                       |                                     |                  |     |     |
| TTC3B202□350* | 2                             | 25/50                        | 3500    | 2、3   | √                    | √                              | √                  |                       |                                     |                  |     |     |
| TTC3B473□39D* | 47                            |                              | 3935    | 1、2、3 | √                    | √                              | √                  |                       |                                     |                  |     |     |
| TTC3B503□440* | 50                            |                              | 4400    | 2、3   | √                    | √                              | √                  |                       |                                     |                  |     |     |
| TTC3B434□507* | 430                           |                              | 5070    |       | √                    | √                              |                    |                       |                                     |                  |     |     |
| TTC3B474□520* | 470                           |                              | 5200    | 3     | √                    | √                              | √                  |                       |                                     |                  |     |     |

Note 1: □ = Tolerance of R<sub>25</sub>

\* = Tolerance of B value

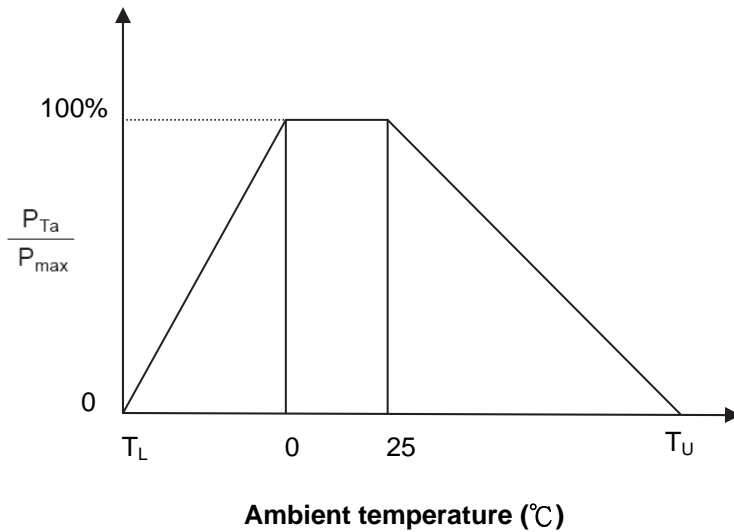
Note 2: UL/cUL File No: E138827, TUV File No: R50050155

CQC File No: CQC04001011945, CQC04001011966

Note 3: Special specifications are available upon request.

## Φ3 mm Lead Type for Temperature Sensing/Compensation

### ■ Max. Power Dissipation Derating Curve



$T_U$  : Maximum operating temperature (°C)

$T_L$  : Minimum operating temperature (°C)

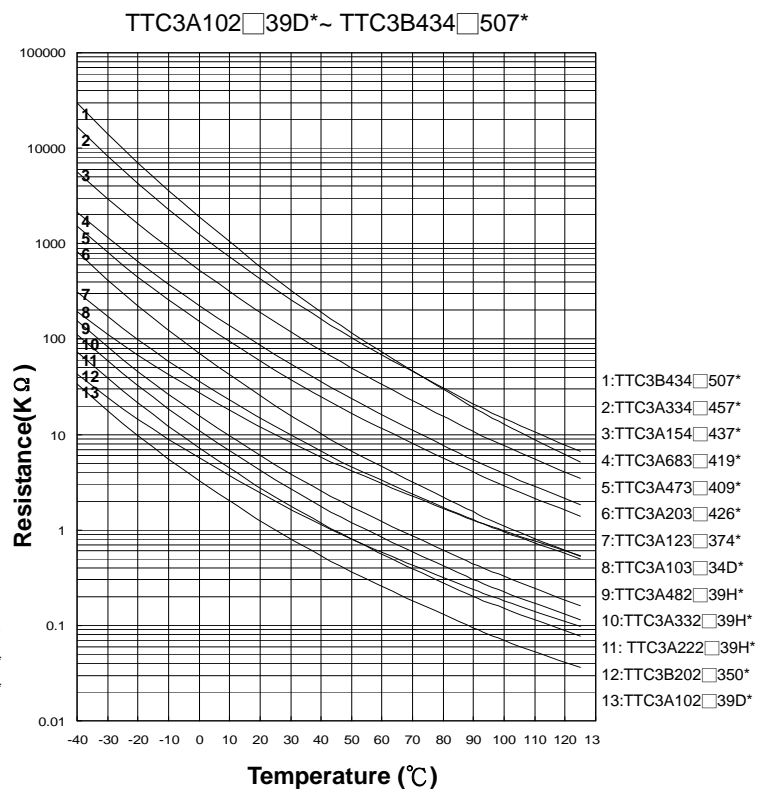
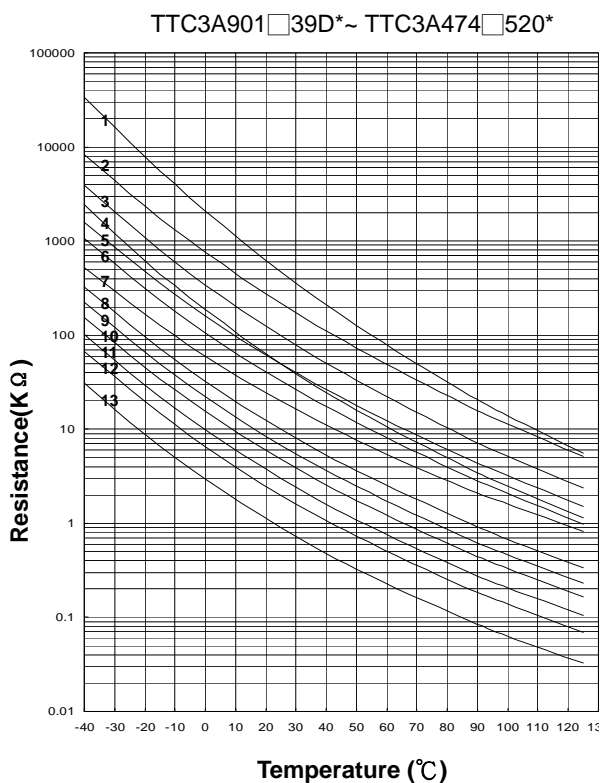
For example:

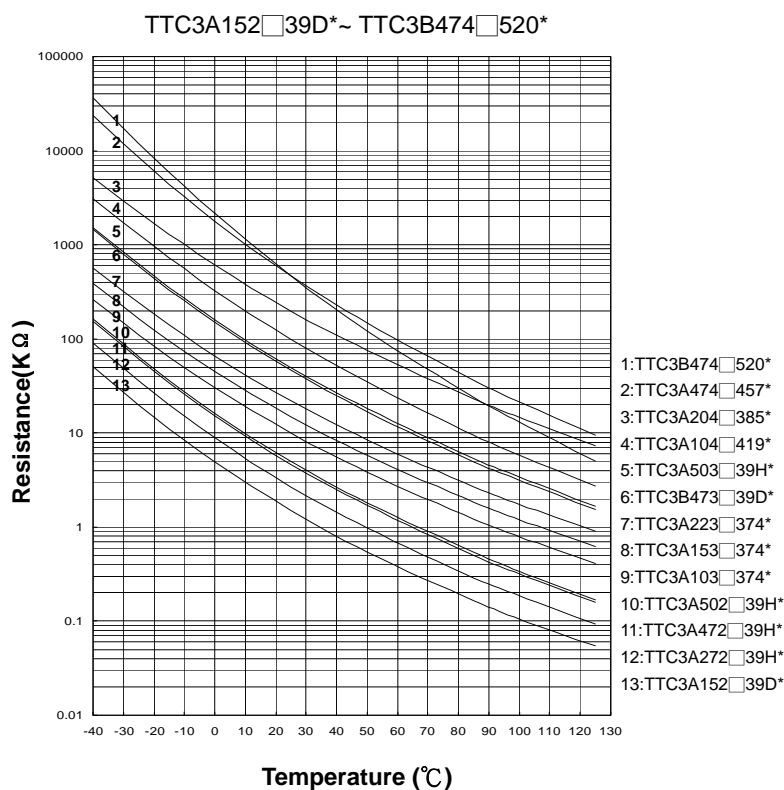
Ambient temperature( $T_a$ ) = 55°C

Maximum operating temperature( $T_U$ ) = 125°C

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

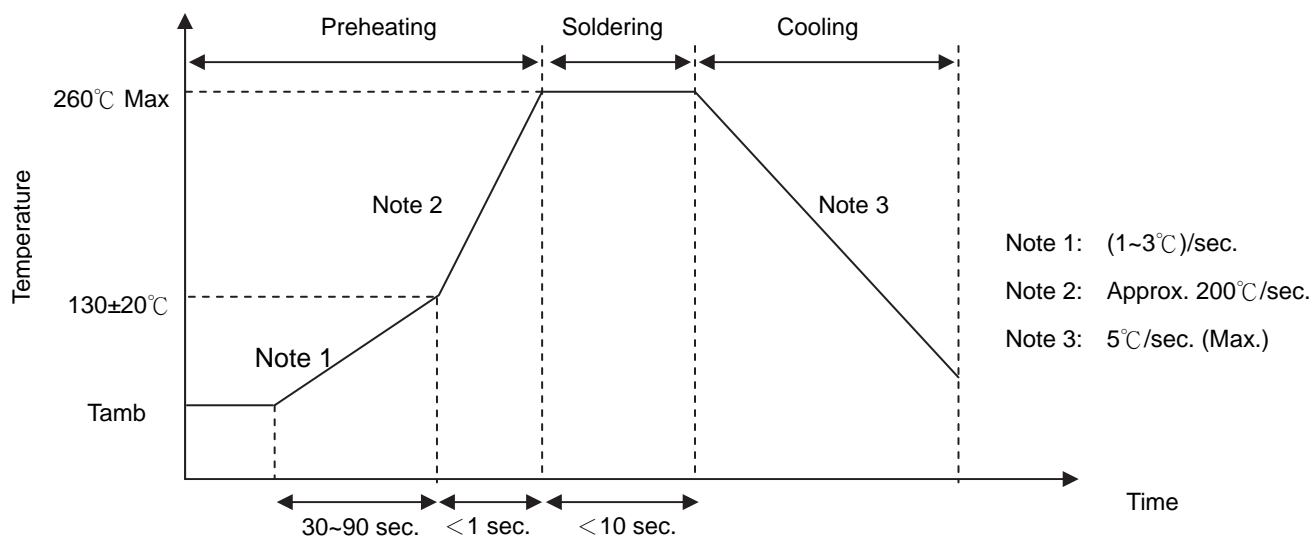
### ■ R-T Characteristic Curves





### ■ Soldering Recommendation

#### ● Wave Soldering Profile



#### ● 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.)   |

### ■ Reliability

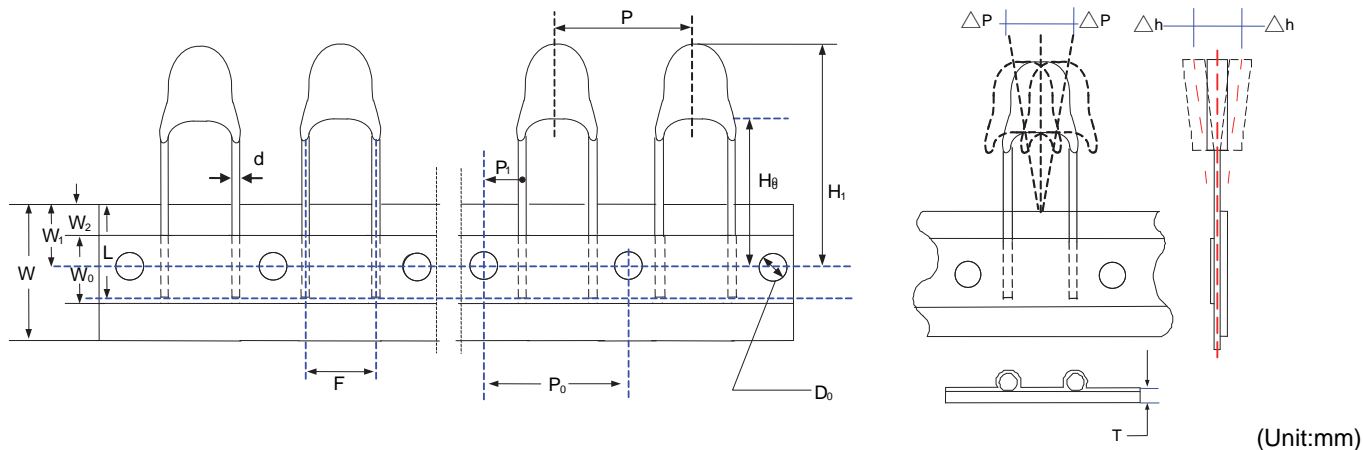
| Item                             | Standard                   | Test conditions / Methods   | Specifications   |                  |                  |      |                            |                            |           |                  |                   |   |         |        |   |                  |       |  |
|----------------------------------|----------------------------|---|--|------------------|------------------|------|----------------------------|----------------------------|-----------|------------------|-------------------|---|---------|--------|---|------------------|-------|--|
| Tensile Strength of Terminations | IEC 60068-2-21             | <p>Gradually apply the specified force and keep the unit fixed for 10±1 sec.</p> <table border="0" style="width: 100%; text-align: center;"> <tr> <td>Terminal diameter</td> <td>Force</td> </tr> <tr> <td>(mm)</td> <td>(Kg)</td> </tr> <tr> <td><hr style="width: 100%;"/></td> <td><hr style="width: 100%;"/></td> </tr> <tr> <td>0.3&lt;d≤0.5</td> <td>0.5</td> </tr> </table>  | Terminal diameter  | Force            | (mm)             | (Kg) | <hr style="width: 100%;"/> | <hr style="width: 100%;"/> | 0.3<d≤0.5 | 0.5              | No visible damage |   |         |        |   |                  |       |  |
| Terminal diameter                | Force                      |   |  |                  |                  |      |                            |                            |           |                  |                   |   |         |        |   |                  |       |  |
| (mm)                             | (Kg)                       |   |  |                  |                  |      |                            |                            |           |                  |                   |   |         |        |   |                  |       |  |
| <hr style="width: 100%;"/>       | <hr style="width: 100%;"/> |   |  |                  |                  |      |                            |                            |           |                  |                   |   |         |        |   |                  |       |  |
| 0.3<d≤0.5                        | 0.5                        |   |  |                  |                  |      |                            |                            |           |                  |                   |   |         |        |   |                  |       |  |
| Bending Strength of Terminations | IEC 60068-2-21             | <p>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.</p> <table border="0" style="width: 100%; text-align: center;"> <tr> <td>Terminal diameter</td> <td>Force</td> </tr> <tr> <td>(mm)</td> <td>(Kg)</td> </tr> <tr> <td><hr style="width: 100%;"/></td> <td><hr style="width: 100%;"/></td> </tr> <tr> <td>0.3&lt;d≤0.5</td> <td>0.25</td> </tr> </table> | Terminal diameter  | Force            | (mm)             | (Kg) | <hr style="width: 100%;"/> | <hr style="width: 100%;"/> | 0.3<d≤0.5 | 0.25             | No visible damage |   |         |        |   |                  |       |  |
| Terminal diameter                | Force                      |   |  |                  |                  |      |                            |                            |           |                  |                   |   |         |        |   |                  |       |  |
| (mm)                             | (Kg)                       |   |  |                  |                  |      |                            |                            |           |                  |                   |   |         |        |   |                  |       |  |
| <hr style="width: 100%;"/>       | <hr style="width: 100%;"/> |   |  |                  |                  |      |                            |                            |           |                  |                   |   |         |        |   |                  |       |  |
| 0.3<d≤0.5                        | 0.25                       |   |  |                  |                  |      |                            |                            |           |                  |                   |   |         |        |   |                  |       |  |
| 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<br>  ΔR <sub>25</sub> /R <sub>25</sub>   ≤ 3 % |                  |                  |      |                            |                            |           |                  |                   |   |         |        |   |                  |       |  |
| High Temperature Storage         | IEC 60068-2-2              | 125 ± 5°C, 1000 ± 24 hrs  | No visible damage<br>  ΔR <sub>25</sub> /R <sub>25</sub>   ≤ 5 % |                  |                  |      |                            |                            |           |                  |                   |   |         |        |   |                  |       |  |
| Damp Heat, Steady State          | IEC 60068-2-78             | 40 ± 2°C, 90~95% RH, 1000 ± 24 hrs  | No visible damage<br>  ΔR <sub>25</sub> /R <sub>25</sub>   ≤ 3 % |                  |                  |      |                            |                            |           |                  |                   |   |         |        |   |                  |       |  |
| Rapid Change of Temperature      | IEC 60068-2-14             | <p>The conditions shown below shall be repeated 5 cycles</p> <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Period (minutes)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-40 ± 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    | -40 ± 5                    | 30 ± 3                     | 2         | Room temperature | 5 ± 3             | 3 | 125 ± 5 | 30 ± 3 | 4 | Room temperature | 5 ± 3 | No visible damage<br>  ΔR <sub>25</sub> /R <sub>25</sub>   ≤ 3 % |
| Step                             | Temperature (°C)           | Period (minutes)  |  |                  |                  |      |                            |                            |           |                  |                   |   |         |        |   |                  |       |  |
| 1                                | -40 ± 5                    | 30 ± 3  |  |                  |                  |      |                            |                            |           |                  |                   |   |         |        |   |                  |       |  |
| 2                                | Room temperature           | 5 ± 3   |  |                  |                  |      |                            |                            |           |                  |                   |   |         |        |   |                  |       |  |
| 3                                | 125 ± 5                    | 30 ± 3  |  |                  |                  |      |                            |                            |           |                  |                   |   |         |        |   |                  |       |  |
| 4                                | Room temperature           | 5 ± 3   |  |                  |                  |      |                            |                            |           |                  |                   |   |         |        |   |                  |       |  |
| Max. Power Dissipation           | IEC 60539-1<br>4.26.3      | 25 ± 5°C, Pmax., 1000 ± 24 hrs  | No visible damage<br>  ΔR <sub>25</sub> /R <sub>25</sub>   ≤ 5 % |                  |                  |      |                            |                            |           |                  |                   |   |         |        |   |                  |       |  |

## Φ3 mm Lead Type for Temperature Sensing/Compensation

### ■ Packaging

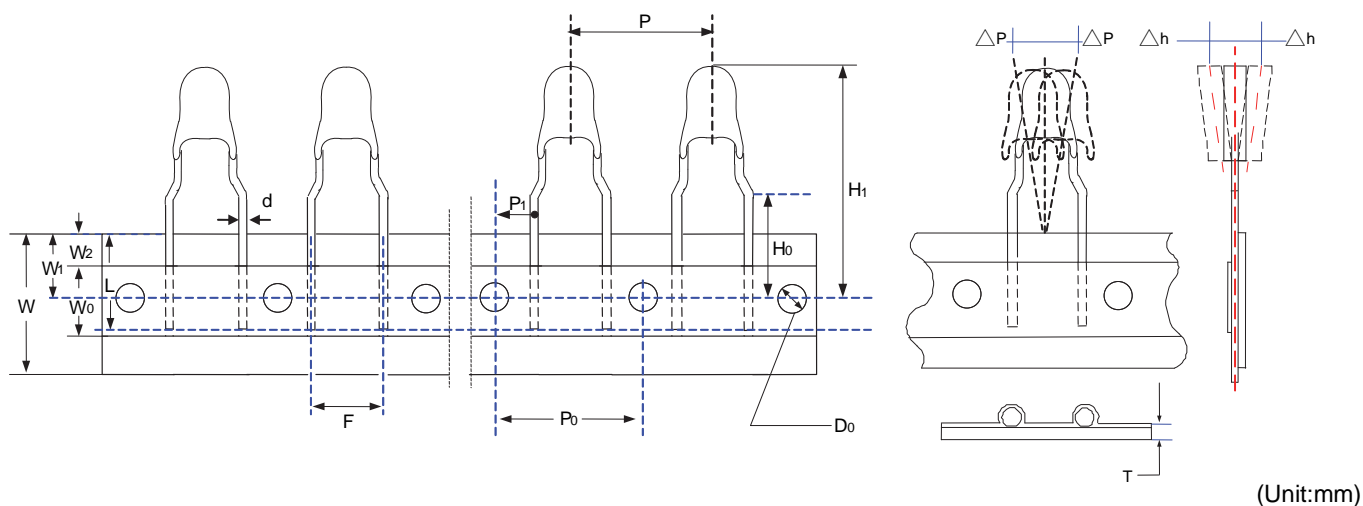
#### ● Taping Specification

#### Straight Lead



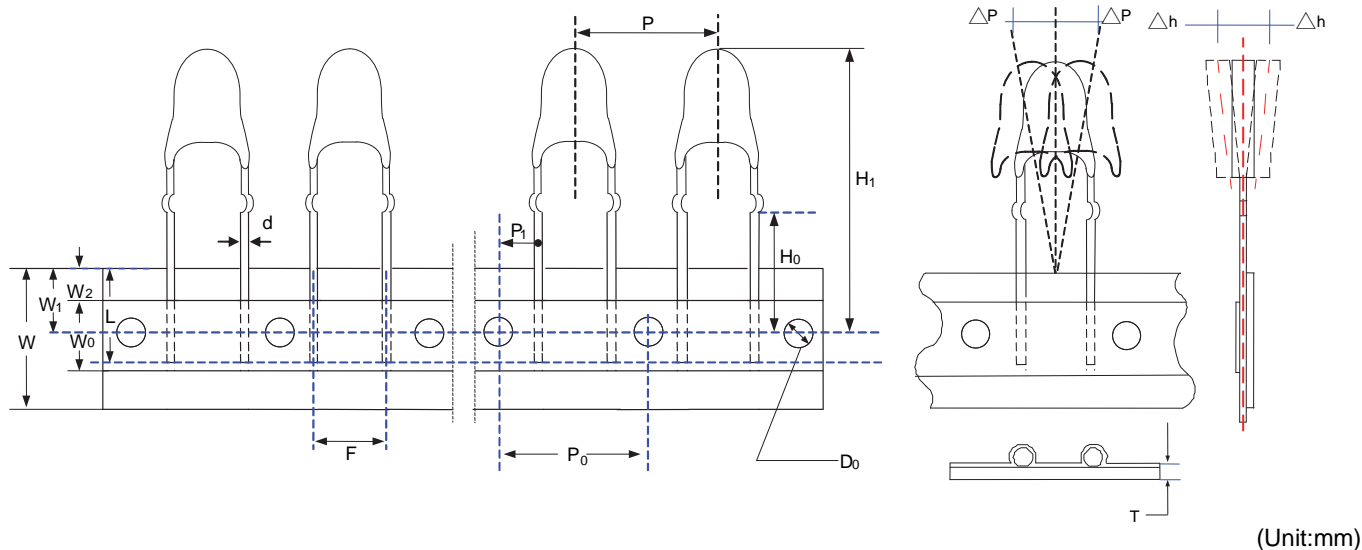
| Taping Dimension     | P <sub>0</sub> | F    | P    | P <sub>1</sub> | H <sub>0</sub> | H <sub>1</sub> | d     | W <sub>0</sub> | W <sub>1</sub> | W <sub>2</sub> | W           | ΔP   | Δh   | L  | D <sub>0</sub> | T    |
|----------------------|----------------|------|------|----------------|----------------|----------------|-------|----------------|----------------|----------------|-------------|------|------|----|----------------|------|
|                      | ±0.3           | ±0.5 | ±1   | ±0.7           | +2/-0          | Max.           | ±0.02 | ±1             | +0.75<br>/-0.5 | Max.           | +1/<br>-0.5 | Max. | Max. | ±1 | ±0.2           | ±0.2 |
| P <sub>0</sub> =12.7 | 12.7           | 2.54 | 12.7 | 5.08           | 18             | 25             | 0.5   | 12             | 9              | 3              | 18          | 1    | 2    | 10 | 4              | 0.6  |
|                      | 12.7           | 5.00 | 12.7 | 3.85           | 18             | 25             | 0.5   | 12             | 9              | 3              | 18          | 1    | 2    | 10 | 4              | 0.6  |
| P <sub>0</sub> =15.0 | 15.0           | 2.54 | 15.0 | 6.23           | 18             | 25             | 0.5   | 12             | 9              | 3              | 18          | 1    | 2    | 10 | 4              | 0.6  |
|                      | 15.0           | 5.00 | 15.0 | 5.00           | 18             | 25             | 0.5   | 12             | 9              | 3              | 18          | 1    | 2    | 10 | 4              | 0.6  |

#### Wider Kink



| Taping Dimension     | P <sub>0</sub> | F    | P    | P <sub>1</sub> | H <sub>0</sub> | H <sub>1</sub> | d     | W <sub>0</sub> | W <sub>1</sub> | W <sub>2</sub> | W           | ΔP   | Δh   | L  | D <sub>0</sub> | T    |
|----------------------|----------------|------|------|----------------|----------------|----------------|-------|----------------|----------------|----------------|-------------|------|------|----|----------------|------|
|                      | ±0.3           | ±0.5 | ±1   | ±0.7           | ±0.5           | Max.           | ±0.02 | ±1             | +0.75<br>/-0.5 | Max.           | +1/<br>-0.5 | Max. | Max. | ±1 | ±0.2           | ±0.2 |
| P <sub>0</sub> =12.7 | 12.7           | 2.54 | 12.7 | 5.08           | 16             | 26             | 0.5   | 12             | 9              | 3              | 18          | 1    | 2    | 10 | 4              | 0.6  |
|                      | 12.7           | 5.00 | 12.7 | 3.85           | 16             | 26             | 0.5   | 12             | 9              | 3              | 18          | 1    | 2    | 10 | 4              | 0.6  |

### Outer Kink



(Unit:mm)

| Taping Dimension     | P <sub>0</sub> | F    | P    | P <sub>1</sub> | H <sub>0</sub> | H <sub>1</sub> | d     | W <sub>0</sub> | W <sub>1</sub> | W <sub>2</sub> | W           | ΔP   | Δh   | L  | D <sub>0</sub> | T    |
|----------------------|----------------|------|------|----------------|----------------|----------------|-------|----------------|----------------|----------------|-------------|------|------|----|----------------|------|
|                      | ±0.3           | ±0.5 | ±1   | ±0.7           | ±0.5           | Max.           | ±0.02 | ±1             | +0.75<br>/-0.5 | Max.           | +1/<br>-0.5 | Max. | Max. | ±1 | ±0.2           | ±0.2 |
| P <sub>0</sub> =12.7 | 12.7           | 2.54 | 12.7 | 5.08           | 16             | 26             | 0.5   | 12             | 9              | 3              | 18          | 1    | 2    | 10 | 4              | 0.6  |

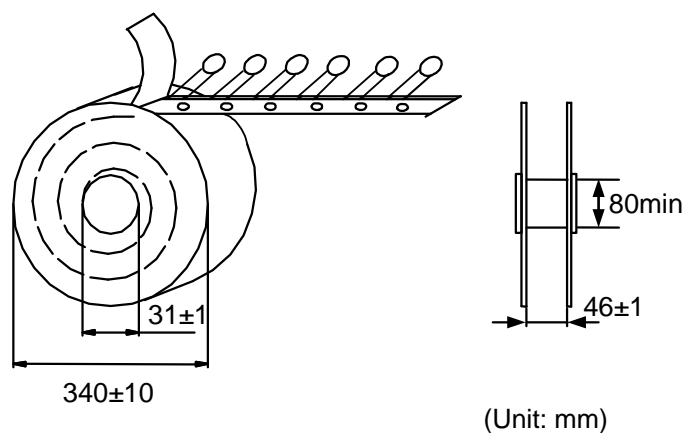
### Quantity

#### ● Bulk Packing

| Series | Quantity (pcs/bag) |
|--------|--------------------|
| TTC3   | 500                |

#### ● Reel Packing

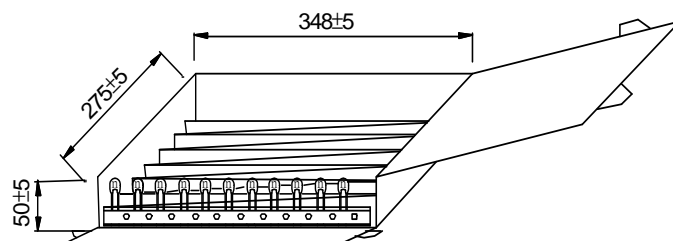
| Series | Quantity (pcs/reel) |
|--------|---------------------|
| TTC3   | 2,500               |



(Unit: mm)

#### ● Ammo Packing

| Series | Quantity (pcs/box) |
|--------|--------------------|
| TTC3   | 2,500              |



### 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