

Description

This is a Negative Temperature Coefficient Resistor Whose resistance changes with ambient temperature changes. Thermistor comprises 2 or 4 kinds of metal oxides of iron, nickel, cobalt, manganese and copper, being shaped and Sintered at high temperature(1200°C to 1500°C)

Features

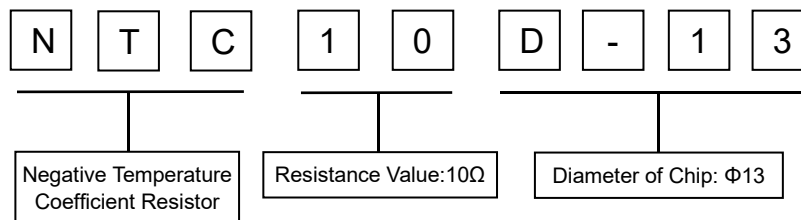
- Small size, large power, strong capacity of suppression of inrush current
- MSL level 2
- Fast response
- Big material constant(B value),small residual resistance
- Long life and high reliability
- Complete series, wide applications



Applications

- Switching power-supply, switch power ,ups power
- Electronic energy saving lamps electronic ballast and all kinds of electric heater
- All kinds of RT, display
- Bulb and other lighting lamps

Part Number Code



Materials

| Item | name |
|---------------|-------------------------|
| Wrapper | Modified phenolic resin |
| Down-lead | CP Wire |
| Coating color | Black |

Parameters of Technology

| Model | R ₂₅ (Ω) | Max. steady State current (A) | Residual Resistance (Ω) | Dissipation factor (mw/°C) | Thermal time Constant (s) | Max. allowable capacity value 240V/120V (μF) | B (K) | Operating Temperature (°C) |
|------------|---------------------|-------------------------------|-------------------------|----------------------------|---------------------------|--|-------|----------------------------|
| NTC5D-5 | 5 | 1 | 0.35 | ≈6 | ≈20 | 150/560 | 2700 | -40~+150 |
| NTC8D-5 | 8 | 0.7 | 0.77 | ≈6 | ≈20 | 100/390 | 2700 | |
| NTC10D-5 | 10 | 0.7 | 0.77 | ≈6 | ≈20 | 68/270 | 2700 | |
| NTC20D-5 | 20 | 0.5 | 0.997 | ≈6 | ≈20 | 39/150 | 2800 | |
| NTC33D-5 | 33 | 0.5 | 1.88 | ≈6 | ≈20 | 39/150 | 2950 | |
| NTC3D-7 | 3 | 3 | 0.25 | ≈10 | ≈30 | 100/390 | 2700 | |
| NTC5D-7 | 5 | 2 | 0.28 | ≈9 | ≈30 | 100/390 | 2700 | |
| NTC8D-7 | 8 | 1 | 0.54 | ≈9 | ≈30 | 100/390 | 2700 | |
| NTC10D-7 | 10 | 1 | 0.62 | ≈9 | ≈30 | 100/390 | 2700 | |
| NTC12D-7 | 12 | 1 | 0.82 | ≈9 | ≈30 | 82/330 | 2700 | |
| NTC16D-7 | 16 | 0.7 | 1.00 | ≈9 | ≈30 | 82/330 | 2800 | |
| NTC20D-7 | 20 | 0.6 | 1.11 | ≈9 | ≈30 | 82/330 | 2800 | |
| NTC22D-7 | 22 | 0.6 | 1.11 | ≈9 | ≈30 | 68/270 | 2800 | |
| NTC33D-7 | 33 | 0.5 | 1.49 | ≈9 | ≈30 | 68/270 | 2950 | |
| NTC3D-9 | 3 | 4 | 0.12 | ≈11 | ≈35 | 220/820 | 2600 | |
| NTC5D-9 | 5 | 3 | 0.21 | ≈11 | ≈35 | 220/820 | 2700 | |
| NTC6D-9 | 6 | 2 | 0.32 | ≈11 | ≈35 | 220/820 | 2700 | |
| NTC8D-9 | 8 | 2 | 0.40 | ≈11 | ≈35 | 150/560 | 2700 | |
| NTC10D-9 | 10 | 2 | 0.46 | ≈11 | ≈35 | 150/560 | 2700 | |
| NTC12D-9 | 12 | 1 | 0.66 | ≈11 | ≈35 | 150/560 | 2700 | |
| NTC15D-9 | 15 | 1 | 0.80 | ≈11 | ≈35 | 150/560 | 2800 | |
| NTC16D-9 | 16 | 1 | 0.80 | ≈11 | ≈35 | 82/330 | 2800 | |
| NTC20D-9 | 20 | 1 | 0.88 | ≈11 | ≈35 | 82/330 | 2800 | |
| NTC22D-9 | 22 | 1 | 0.95 | ≈11 | ≈35 | 82/330 | 2800 | |
| NTC33D-9 | 33 | 1 | 1.12 | ≈11 | ≈35 | 68/270 | 2950 | |
| NTC50D-9 | 50 | 1 | 1.25 | ≈11 | ≈35 | 68/270 | 2950 | |
| NTC100D-9 | 100 | 0.8 | 3.02 | ≈11 | ≈35 | 68/270 | 3200 | |
| NTC120D-9 | 120 | 0.8 | 3.02 | ≈11 | ≈35 | 68/270 | 3200 | |
| NTC2.5D-11 | 2.5 | 5 | 0.10 | ≈14 | ≈50 | 680/2700 | 2700 | |
| NTC3D-11 | 3 | 5 | 0.10 | ≈14 | ≈50 | 680/2700 | 2700 | |
| NTC5D-11 | 5 | 4 | 0.16 | ≈14 | ≈50 | 470/1800 | 2700 | |
| NTC8D-11 | 8 | 3 | 0.25 | ≈14 | ≈50 | 470/1800 | 2800 | |
| NTC10D-11 | 10 | 3 | 0.28 | ≈14 | ≈50 | 220/820 | 2800 | |
| NTC12D-11 | 12 | 2 | 0.46 | ≈14 | ≈50 | 220/820 | 2800 | |
| NTC15D-11 | 15 | 2 | 0.47 | ≈14 | ≈50 | 150/560 | 2800 | |
| NTC16D-11 | 16 | 2 | 0.47 | ≈14 | ≈50 | 150/560 | 2800 | |
| NTC20D-11 | 20 | 2 | 0.51 | ≈14 | ≈50 | 100/390 | 2950 | |
| NTC22D-11 | 22 | 2 | 0.56 | ≈14 | ≈50 | 100/390 | 2950 | |
| NTC33D-11 | 33 | 1.5 | 0.67 | ≈14 | ≈50 | 100/390 | 2950 | |
| NTC47D-11 | 47 | 1.5 | 1.02 | ≈14 | ≈50 | 100/390 | 2950 | |
| NTC50D-11 | 50 | 1.5 | 1.02 | ≈14 | ≈50 | 100/390 | 2950 | |

Parameters of Technology

| Model | R ₂₅ (Ω) | Max. steady State current (A) | Residual Resistance (Ω) | Dissipation factor (mW/°C) | Thermal time Constant (s) | Max. allowable capacity value 240V/120V (μF) | B (K) | Operating Temperature (°C) |
|------------|------------------------|-------------------------------------|-------------------------------|----------------------------------|---------------------------------|--|-------|----------------------------------|
| NTC1.5D-13 | 1.5 | 6.5 | 0.085 | ≈15 | ≈68 | 680/2700 | 2600 | -40~+200 |
| NTC2.5D-13 | 2.5 | 6 | 0.088 | ≈15 | ≈68 | 680/2700 | 2600 | |
| NTC3D-13 | 3 | 6 | 0.092 | ≈15 | ≈68 | 680/2700 | 2600 | |
| NTC4.7D-13 | 4.7 | 5 | 0.12 | ≈15 | ≈68 | 680/2700 | 2700 | |
| NTC5D-13 | 5 | 5 | 0.125 | ≈15 | ≈68 | 680/2700 | 2700 | |
| NTC8D-13 | 8 | 4 | 0.194 | ≈15 | ≈68 | 330/1200 | 2800 | |
| NTC10D-13 | 10 | 4 | 0.206 | ≈15 | ≈68 | 330/1200 | 2800 | |
| NTC16D-13 | 16 | 3 | 0.335 | ≈15 | ≈68 | 220/820 | 2800 | |
| NTC18D-13 | 18 | 3 | 0.372 | ≈15 | ≈68 | 220/820 | 2800 | |
| NTC20D-13 | 20 | 3 | 0.372 | ≈15 | ≈68 | 220/820 | 2800 | |
| NTC30D-13 | 30 | 2.5 | 0.517 | ≈15 | ≈68 | 150/560 | 2950 | |
| NTC47D-13 | 47 | 2 | 0.81 | ≈15 | ≈68 | 150/560 | 2950 | |
| NTC1.3D-15 | 1.3 | 8 | 0.052 | ≈18 | ≈86 | 820/3300 | 2600 | |
| NTC1.5D-15 | 1.5 | 8 | 0.071 | ≈18 | ≈86 | 820/3300 | 2600 | |
| NTC2.5D-15 | 2.5 | 8 | 0.071 | ≈18 | ≈86 | 820/3300 | 2600 | |
| NTC3D-15 | 3 | 7 | 0.075 | ≈18 | ≈86 | 820/3300 | 2600 | |
| NTC5D-15 | 5 | 6 | 0.112 | ≈18 | ≈86 | 680/2700 | 2800 | |
| NTC7D-15 | 7 | 5 | 0.173 | ≈18 | ≈86 | 680/2700 | 2800 | |
| NTC8D-15 | 8 | 5 | 0.178 | ≈18 | ≈86 | 680/2700 | 2950 | |
| NTC10D-15 | 10 | 5 | 0.18 | ≈18 | ≈86 | 560/2200 | 2950 | |
| NTC15D-15 | 15 | 4 | 0.268 | ≈18 | ≈86 | 560/2200 | 2950 | |
| NTC16D-15 | 16 | 4 | 0.268 | ≈18 | ≈86 | 560/2200 | 2950 | |
| NTC18D-15 | 18 | 4 | 0.288 | ≈18 | ≈86 | 330/1200 | 2950 | |
| NTC20D-15 | 20 | 4 | 0.288 | ≈18 | ≈86 | 220/820 | 2950 | |
| NTC30D-15 | 30 | 3.5 | 0.438 | ≈18 | ≈86 | 220/820 | 2950 | |
| NTC47D-15 | 47 | 3 | 0.68 | ≈18 | ≈86 | 220/820 | 3200 | |
| NTC50D-15 | 50 | 3 | 0.72 | ≈18 | ≈86 | 220/820 | 3200 | |
| NTC1.3D-20 | 1.3 | 9 | 0.037 | ≈24 | ≈113 | 820/3300 | 2600 | |
| NTC1.5D-20 | 1.5 | 9 | 0.037 | ≈24 | ≈113 | 820/3300 | 2600 | |
| NTC2.5D-20 | 2.5 | 8 | 0.049 | ≈24 | ≈113 | 820/3300 | 2700 | |
| NTC3D-20 | 3 | 8 | 0.055 | ≈24 | ≈113 | 820/3300 | 2700 | |
| NTC5D-20 | 5 | 7 | 0.087 | ≈24 | ≈113 | 820/3300 | 2800 | |
| NTC8D-20 | 8 | 6 | 0.142 | ≈24 | ≈113 | 820/3300 | 2950 | |
| NTC10D-20 | 10 | 6 | 0.162 | ≈24 | ≈113 | 820/3300 | 2950 | |
| NTC16D-20 | 16 | 5 | 0.212 | ≈24 | ≈113 | 820/3300 | 3200 | |
| NTC20D-20 | 20 | 4 | 0.231 | ≈24 | ≈113 | 820/3300 | 3200 | |

Storage condition

| | |
|-------------|--|
| Temperature | -10°C ~ +40°C |
| Humidity | ≤70%RH |
| Term | ≤12 months (First-in/ First-out) |
| Place | <ol style="list-style-type: none"> 1. Do not exposing the components to the following conditions, otherwise, it may result in deterioration of characteristics 2. Corrosive gas or deoxidizing gas 3. Flammable and explosive gases 4. Oil, water and chemical liquid 5. Under the sunlight |

Notes: Do not apply the components under the following conditions, otherwise, it may result in deterioration of characteristics, destruction of components or in the worst case to catching fire: 1. Exceeding I_{max} 2. Exceeding rated temperature range 3. Inferior thermal dissipation. Due to badly inferior thermal dissipation, some part of the components body will become overheated and then be damaged

properties of products

| Mechanical Characteristics | | |
|------------------------------|--|---|
| Item | Specification | Test Conditions & Methods |
| Solder-ability | The terminals shall be uniformly tinned, and its area ≥95% | Dipping the NTC terminals to a depth of 15mm in a soldering bath of 240-245°C and to the place of 6mm far from NTC body for 2-3s (See IEC68-2-20 /GB2423.28 Ta) |
| Resistance To Soldering Heat | No visible mechanical damage. $\Delta R/RN \leq 20\%$ ($\Delta R = RN - RN' $) | Dipping the NTC terminals to a depth of 15mm in a soldering bath of 265±5°C and to the place for 6mm below from NTC body for 10±1s. After recovering 4-5h under 25±2°C. The rated zero power resistance value RN' shall be measured. (See IEC68-2-20 /GB2423.28 Tb) |
| Strength of lead terminal | No break out $\Delta R/RN \leq 20\%$ ($\Delta R = RN - RN' $) | Fasten the body and apply a force gradually to each lead until 10N and then keep for 10sec, Hold body and apply a force to each lead until 90° slowly at 5N in the direction of lead axis and then keep for 10sec, and do this in the opposite direction repeat for other terminal. After recovering 4-5h under 25±2°C, the rated zero power resistance value RN' shall be measured. (See IEC68-2-21/GB2423.29 Ua / Ub) |

| Electrical Characteristics | | |
|--|--|--|
| Item | Specification | Test Conditions & Methods |
| Rated Zero-Power Resistance RN (Ω) | RN±20% | Ambient temp. Range:25°C±2°C(TA). Testing voltage: 1.5VDC After placing for 1~2 hours under TA, the resistance value shall be measured |
| Thermal Dissipation Constant δ (mW/°C) | See the main technical parameter list | The thermal dissipation constant(δ) could be calculated by the ratio of a change in power dissipation(ΔP) of the thermistor to a change in temperature(ΔT) of the thermistor at a specified ambient temperature |
| Thermal Time Constant T(s) | See the main technical parameter list | The time(τ shall be measured within which the temperature change of NTC thermistor is reached at 63.2% of the ambient temperature change under zero power condition |
| Material Constant B | $B=T_1T_2/(T_2-T_1) \times \ln(R_1/R_2)$ | R1 , R2 is zero-power resistance at T1 , T2 T1 = 298.15 K(25°C) T2 = 323.15 K(50°C) |
| Max. Steady State Current (A) | visible mechanical damage. $\Delta RN / RN \leq 20\%$ ($\Delta R = RN-RN' $) | ambient temperature:25°C±2°C Testing Time: min 100h |
| Reliability Test | | |
| Item | Specification | Test Conditions & Methods |
| Temp. Cycling Testing | No visible mechanical damage. $\Delta RN / RN \leq 20\%$ ($\Delta R = RN-RN' $) | Ta:-40±3°C/ 30min→25±2°C/ 5min→Tb:200±3°C/30min→25±2°C/ 5min Cycles: 5times After recovering 4~5 h under 25±2°C, the rated zero power resistance value RN' shall be measured. |
| Electrical Cycling Testing | No visible mechanical damage. $\Delta RN / RN \leq 20\%$ ($\Delta R = RN-RN' $) | Ambient temp. Range:25°C±2°C. Cycles: 1,000times On / Off: 1m / 5m Test Current: Max. steady state Current After recovering 4~5h under 25±2°C, the rated zero power resistance value RN' shall be measured. |
| LoadLife (Endurance) Testing | No visible mechanical damage. $\Delta RN / RN \leq 20\%$ ($\Delta R = RN-RN' $) | Ambient temp. Range:25°C±2°C; Max. steady state Current/ 1,000±24h After recovering 4~5 h under 25±2°C, the rated zero power resistance value RN' shall be measured. |
| Humidity Testing | No visible mechanical damage. $\Delta RN / RN \leq 20\%$ ($\Delta R = RN-RN' $) | Ambient temp. range : 40°C±2°C,R.H.:93±3% , Energized time:1000±24 h After recovering 4~5 h under 25±2°C, the rated zero power resistance value RN' shall be measured |

Graph of Characteristics

Figure 1 - Graph of Resistance vs. Temperature

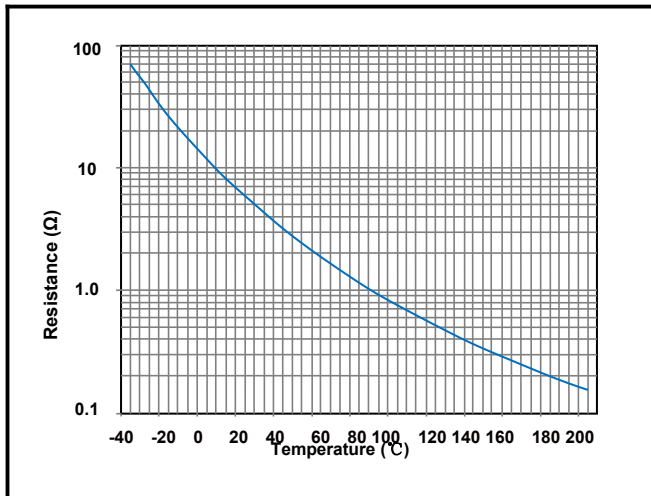
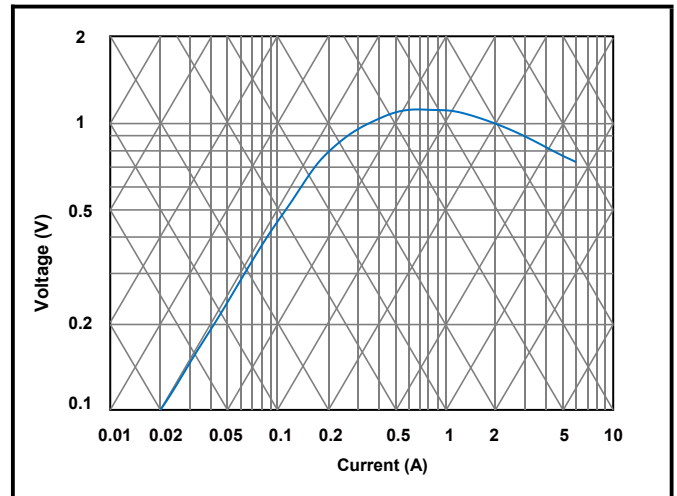
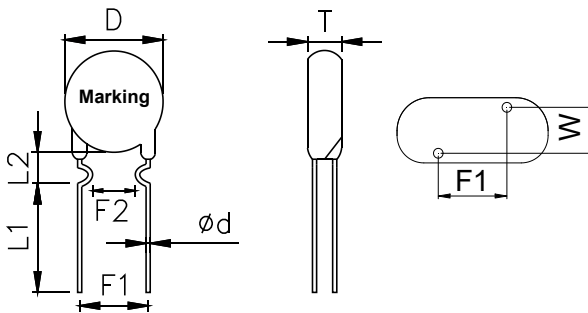


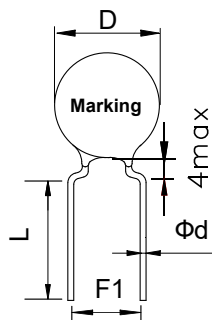
Figure 2 - Graph of Voltage vs. Current



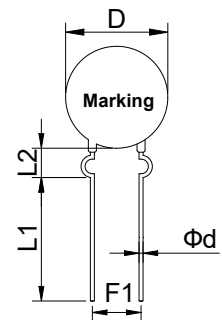
Product Dimensions



I Type (内弯脚)



S Type (直线脚)



O Type (外弯脚)

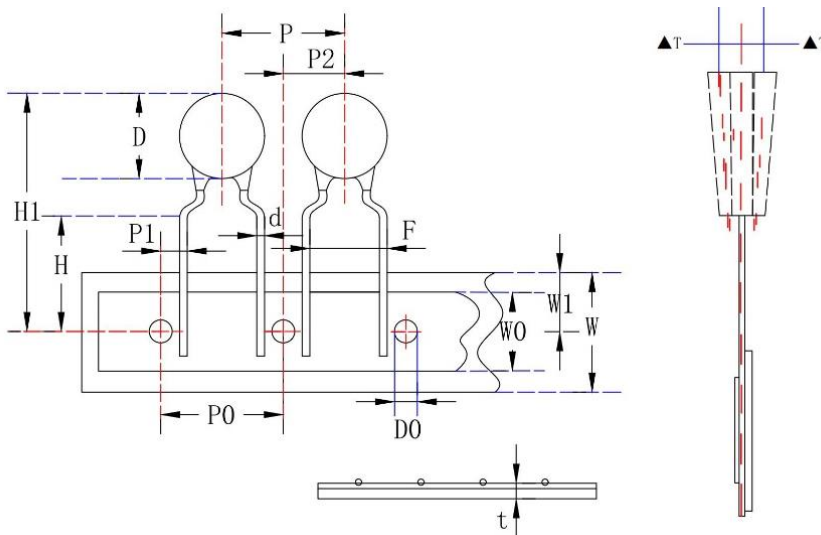
| Dimension | Dimensions (mm) | | | | | | | | | | |
|-----------|-----------------|--------|--------|---------|------|--------|-----------|--------------------|--------|------------------|--|
| | Type | D(max) | T(max) | Φd±0.05 | F1±1 | F2±1.5 | W | Straight Lead Wire | | Curved Lead Wire | |
| | | | | | | | | L ±1 | L1±0.5 | L2±2 | |
| NTCxxD-5 | S | 7 | 5 | 0.55 | 5.0 | / | 1.46-1.55 | 20~25 | / | / | |
| NTCxxD-7 | I | 9 | 5 | 0.55 | 5.0 | 3 | 1.91-1.99 | / | 20~25 | 4 | |
| NTCxxD-9 | I | 11 | 5.5 | 0.75 | 7.5 | 5 | 2.30-2.40 | / | 20~25 | 4 | |
| NTCxxD-11 | I | 13 | 6 | 0.75 | 7.5 | 5 | 2.49-2.60 | / | 20~25 | 4 | |
| NTCxxD-13 | I | 15.5 | 6 | 0.75 | 7.5 | 5 | 2.60-2.70 | / | 20~25 | 4 | |
| NTCxxD-15 | I | 17.5 | 6 | 0.75 | 7.5 | 5 | 2.75-2.90 | / | 20~25 | 4 | |
| NTCxxD-20 | S | 22.5 | 7 | 1.00 | 10.0 | / | 3.65-3.88 | 20~25 | / | / | |

Normal Quantities Per Bulk Packaging

| Dimension | Bag (pcs) | Inside the box (pcs) | Carton (pcs) |
|-----------|-----------|----------------------|--------------|
| NTCxxD-5 | 1000 | 3000 | 18000 |
| NTCxxD-7 | 1000 | 3000 | 18000 |
| NTCxxD-9 | 500 | 2000 | 12000 |
| NTCxxD-11 | 500 | 1500 | 9000 |
| NTCxxD-13 | 250 | 1000 | 6000 |
| NTCxxD-15 | 250 | 1000 | 6000 |
| NTCxxD-20 | 100 | 400 | 2400 |

Normal Tape Packaging Information

NTCxxxD-5 Normal Tape Packaging Style



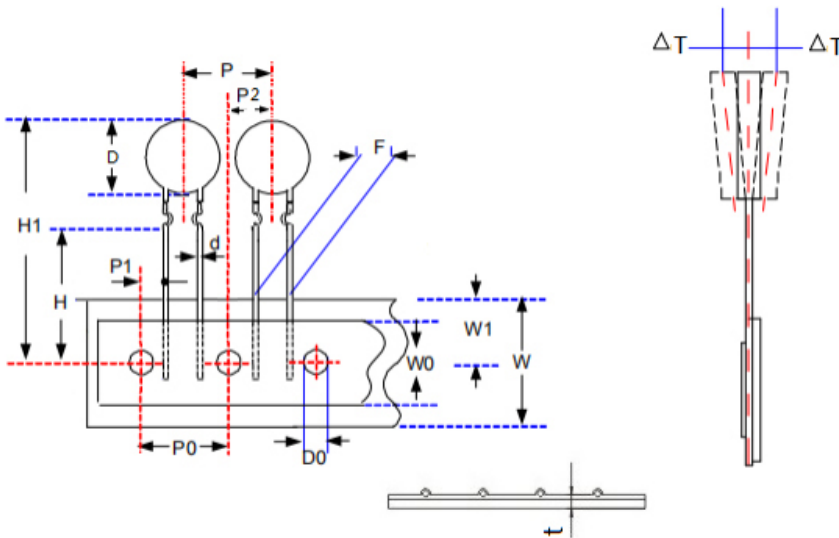
Quantity:

| Inside the box | Carton |
|----------------|--------|
| PCS | PCS |
| 1500 | 18000 |

Unit: mm

| Symbol | P | P0 | P1 | P2 | H | H1 | W | W0 | W1 | ∅ D0 | ∅ D | ∅ d | ΔT | t | F |
|------------|------|------|------|------|------|------|------|------|------|------|-----|-------|-----|------|------|
| | ±1 | ±1 | ±0.7 | ±1.3 | ±1.0 | max | ±1 | max | ±0.5 | ±0.3 | max | ±0.05 | max | ±0.2 | ±1.0 |
| Dimensions | 12.7 | 12.7 | 3.75 | 6.35 | 18.0 | 29.0 | 18.0 | 10.0 | 9.0 | 4.0 | 7.0 | 0.55 | 2.0 | 0.7 | 5.0 |

NTCxxxD-7 Normal Tape Packaging Style



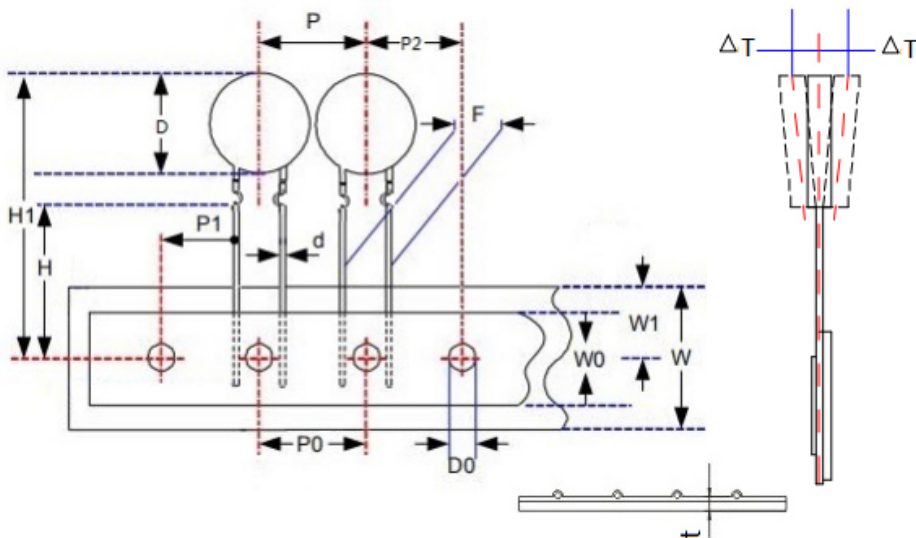
Quantity:

| | |
|----------------|--------|
| Inside the box | Carton |
| PCS | PCS |
| 1500 | 18000 |

Unit: mm

| Symbol | P | P0 | P1 | P2 | H | H1 | W | W0 | W1 | ∅ D0 | ∅ D | ∅ d | ΔT | t | F |
|------------|------|------|------|------|------|------|------|------|-----|------|------|------|-------|-----|------|
| | | ±1 | ±1 | ±0.7 | ±1.3 | ±1.0 | max | ±1 | max | ±0.5 | ±0.3 | max | ±0.05 | max | ±0.2 |
| Dimensions | 12.7 | 12.7 | 3.75 | 6.35 | 18.0 | 32.0 | 18.0 | 10.0 | 9.0 | 4.0 | 9.0 | 0.55 | 2.0 | 0.7 | 5.0 |

NTCxxxD-9 Normal Tape Packaging Style



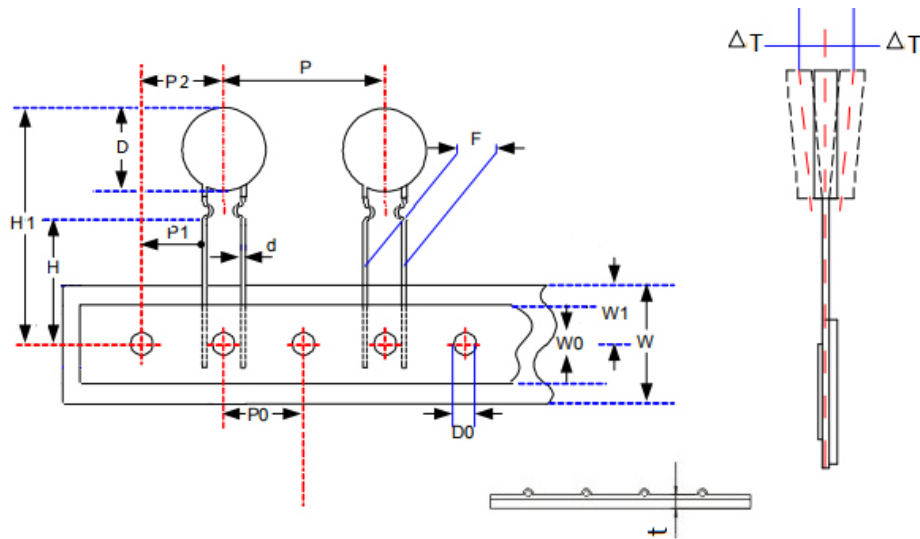
Quantity:

| | |
|----------------|--------|
| Inside the box | Carton |
| PCS | PCS |
| 1000 | 12000 |

Unit: mm

| Symbol | P | P0 | P1 | P2 | H | H1 | W | W0 | W1 | ∅ D0 | ∅ D | ∅ d | ΔT | t | F |
|------------|------|------|------|------|------|------|------|------|-----|------|------|------|-------|-----|------|
| | | ±1 | ±1 | ±0.7 | ±1.3 | ±1.0 | max | ±1 | max | ±0.5 | ±0.3 | max | ±0.05 | max | ±0.2 |
| Dimensions | 12.7 | 12.7 | 8.95 | 12.7 | 18.0 | 34.0 | 18.0 | 10.0 | 9.0 | 4.0 | 11.0 | 0.75 | 2.0 | 0.7 | 7.5 |

NTCxxxD-11 Normal Tape Packaging Style



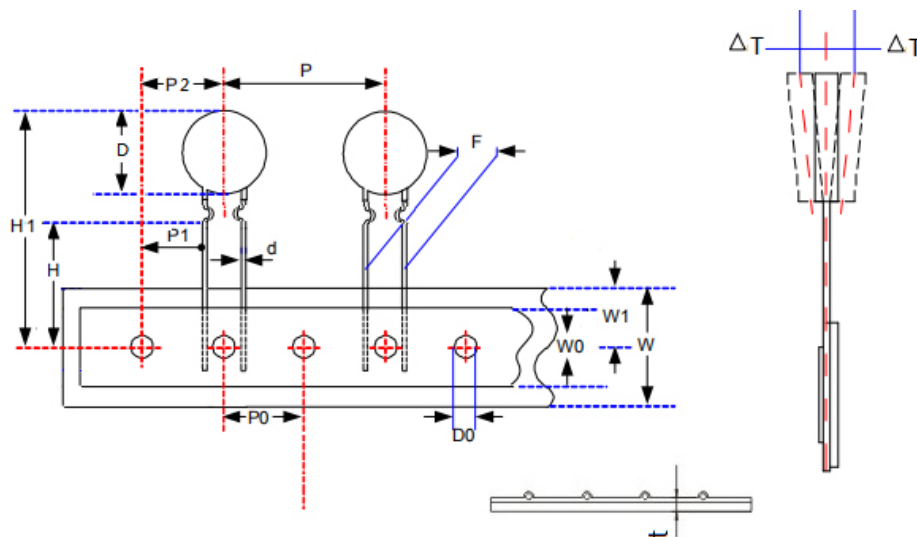
Quantity:

| | |
|----------------|--------|
| Inside the box | Carton |
| PCS | PCS |
| 1000 | 12000 |

Unit: mm

| Symbol | P | P0 | P1 | P2 | H | H1 | W | W0 | W1 | ∅ D0 | ∅ D | ∅ d | ΔT | t | F |
|------------|------|------|------|------|------|------|------|------|-----|------|------|------|-------|-----|------|
| | | ±1 | ±1 | ±0.7 | ±1.3 | ±1.0 | max | ±1 | max | ±0.5 | ±0.3 | max | ±0.05 | max | ±0.2 |
| Dimensions | 25.4 | 12.7 | 8.95 | 12.7 | 18.0 | 36.0 | 18.0 | 10.0 | 9.0 | 4.0 | 13.0 | 0.75 | 2.0 | 0.7 | 7.5 |

NTCxxxD-13 Normal Tape Packaging Style



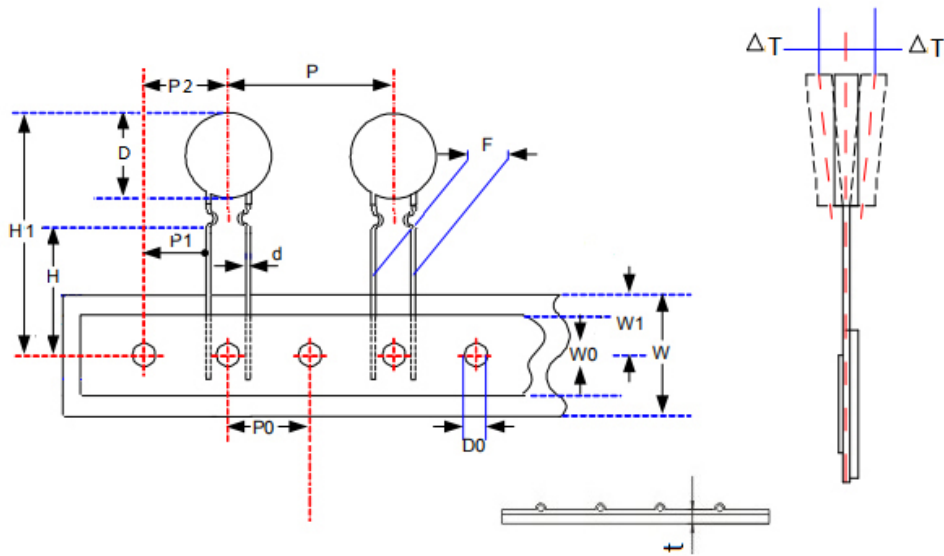
Quantity:

| | |
|----------------|--------|
| Inside the box | Carton |
| PCS | PCS |
| 500 | 6000 |

Unit: mm

| Symbol | P | P0 | P1 | P2 | H | H1 | W | W0 | W1 | ∅ D0 | ∅ D | ∅ d | ΔT | t | F |
|------------|------|------|------|------|------|------|------|------|-----|------|------|------|-------|-----|------|
| | | ±1 | ±1 | ±0.7 | ±1.3 | ±1.0 | max | ±1 | max | ±0.5 | ±0.3 | max | ±0.05 | max | ±0.2 |
| Dimensions | 25.4 | 12.7 | 8.95 | 12.7 | 18.0 | 40.0 | 18.0 | 10.0 | 9.0 | 4.0 | 15.5 | 0.75 | 2.0 | 0.7 | 7.5 |

NTCxxxD-15 Normal Tape Packaging Style



Quantity:

| | |
|----------------|--------|
| Inside the box | Carton |
| PCS | PCS |
| 500 | 4000 |

Unit: mm

| Symbol | P | P0 | P1 | P2 | H | H1 | W | W0 | W1 | ∅ D0 | ∅ D | ∅ d | ΔT | t | F |
|------------|----|----|------|------|------|-----|----|-----|------|------|-----|-------|-----|------|------|
| Dimensions | ±1 | ±1 | ±0.7 | ±1.3 | ±1.0 | max | ±1 | max | ±0.5 | ±0.3 | max | ±0.05 | max | ±0.2 | ±1.0 |