CTC Series

Disc-shaped for temperature sensing/compensation (φ3mm/φ5mm)

◆ Product Introduction

NTC (Negative Temperature Coefficient) thermistors—also known as negative temperature coefficient thermistors—are semiconductor resistor components made by sintering metal oxides such as manganese, cobalt, nickel, and copper using ceramic processing techniques. Their key characteristic is that their resistance value decreases significantly as the temperature rises. They are mainstream temperature-sensing components that offer low cost and high sensitivity.

◆ Features

1. RoHS requirements
2. A series of products that meet halogen-free requirements is available.
3. Body dimensions: Φ3mm/Φ5mm
4. Radial lead resin encapsulation
5. Operating temperature range: -30℃ to +125℃
6. Wide resistance range
7. Low cost
8. Safety certifications: UL/cUL/CSA/TUV/CQC

◆Applications

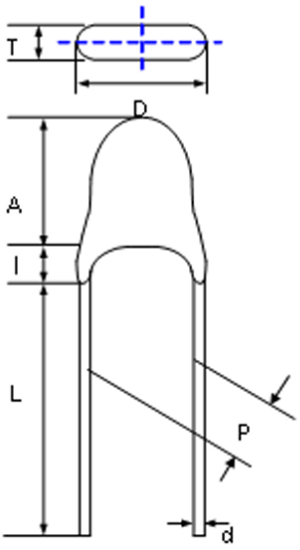
1. Household appliances
2. Automotive Electronics
3. Computer
4. Switch-mode power supply
5. Adapter

◆ Coding Principles

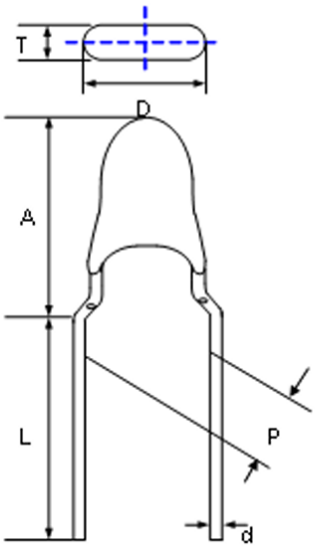
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Product type			Body size		25℃(R_{25}) Zore power resistance			Resistance value tolerance	B Value				B value calculation method	B value toleration	Package style		Lead length		Package method	
CTC	NTC temperature thermistor		03	Φ3	050	5Ω	F:±1% G:±2% H:±3% J:±5% K:±10%	3450	B(25/50)=3450			A	25℃/50℃	F:±1% G:±2% H:±3% J:±5%	S	Straight lead	A	The code does not represent a specific length unit. It is only used to distinguish different length options.	R	Reel
			05	Φ5	150	15Ω		3800	B(25/50)=3800				B	25℃/85℃	I	Inward bent lead			blank	Bulk
					500	50Ω		3950	B(25/50)=3950						O	Outward folded lead				
					101	100Ω		4250	B(25/50)=4250						E	Outward bent lead				
					682	6.8KΩ		3380	B(25/50)=3380						Y	Y Kink				
					474	470KΩ		3435	B(25/85)=3435											

◆ structure and dimension (φ3mm)

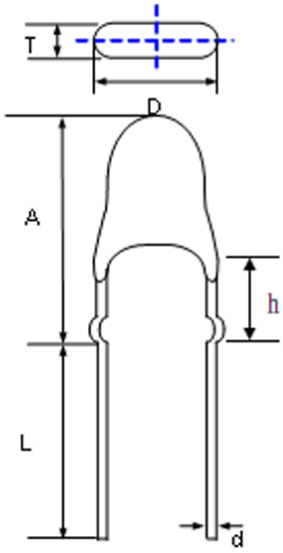
Straight lead



Ward bent



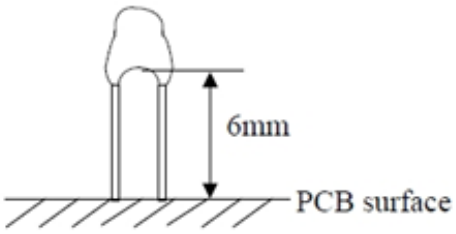
Outward bent



Series	P	D	T	$A_{max.}$	$I_{max.}$	h	L	d
Straight lead	2.54±0.5	2.5~4.0	1.5~3.0	5	3	note*	30~40	0.5±0.02
	5±0.5	2.0~6.5	1.5~5.0	7	3			
Ward bent	2.54±0.5	2.0~4.0	1.5~3.0	6	--	--		
	5±0.5	2.0~4.0	1.5~3.0	10	--			
Outward bent	2.54±0.5	2.0~4.0	1.5~3.0	13.5	--	5~7	24.5~34.5	

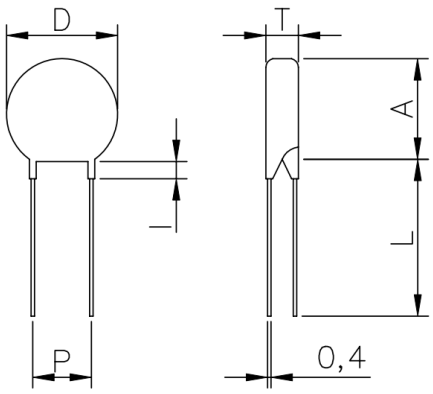
Note:*

For through-hole components, it is recommended to maintain a minimum body-to-PCB standoff height of 6mm to prevent component failure after soldering (including reflow and wave soldering).

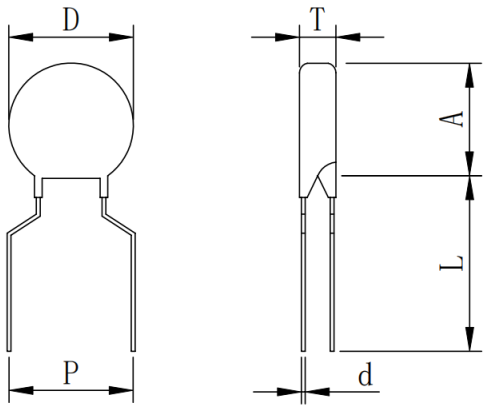


◆ structure and dimension (φ5mm)

S type (Straight lead)



O type (Ward bent)



Series	D	P	d	I max.	A max..	L min.	T
S type	4.0~6.5	3.5±0.5	φ0.5±0.02	3	6.5	31	2.5~5.0
O type	4.0~6.5	5±0.5	φ0.5±0.02	—	10	29	2.5~5.0

◆ electrical characteristics

Part No	Zero power resistance @25°C	R_{25} tolerance	(25/50) B value		B tolerance	Max power dissipation @25℃	Dissipation factor	Thermal time consistence	Operation temperature range	Safety approval		
	R_{25}(Ω)	(±%)	(K)		(±%)	P_{max}(mW)	δ(mW	τ(Sec.)	T_L~T_U(°C)	UL	TU	CQC
CTC0390□	0.9			3935	2,3					√	√	√
CTC0310□	1			3935						√	√	√
CTC0315□	1.5			3935						√	√	√
CTC0320□	2			3975						√	√	√
CTC0322□	2.2			3975						√	√	√
CTC0327□	2.7			3975						√	√	√
CTC0330□	3			3975						√	√	√
CTC0333□	3.3			3975						√	√	√
CTC0347□	4.7			3975	1,2,3,					√	√	√
CTC0348□	4.8			3950						√	√	
CTC0348□	4.8			3975						√	√	
CTC0350□	5			3975						√	√	√
CTC0368□	6.8			3975						√	√	√
CTC0310□	10			3435						√	√	√
CTC0310□	10			3740						√	√	√
CTC0310□	10	1,2,3	25/	3975		150	≥2.5	≦18	-40~+125	√	√	√
CTC0312□	12	,5	85	3740						√	√	√
CTC0315□	15			3740						√	√	√
CTC0320□	20			3740						√	√	√
CTC0320□	20			4260						√	√	√
CTC0322□	22			3740						√	√	√
CTC0333□	33			4090						√	√	√
CTC0347□	47			4090						√	√	√
CTC0350□	50			3975						√	√	√
CTC0350□	50			4060						√	√	√
CTC0368□	68			4190						√	√	√
CTC0310□	100			4190						√	√	√
CTC0310□	100			4360						√	√	√
CTC0315□	150			4370						√	√	√
CTC0320□	200			3850						√	√	
CTC0322□	220			4370						√	√	√
CTC0333□	330			4570						√	√	√

Note:□=R_{25} tolerance

◆ electrical characteristics

Part No	Zero power resistance @25°C	R_{25} tolerance	(25/50) B value		B tolerance	Max power dissipation @25℃	Dissipation factor	Thermal time consistence	Operation temperature range	Safety approval		
	R_{25}(Ω)	(±%)	(K)		(±%)	P_{max}(mW)	δ(mW/°	τ(Sec.)	T_L~T_U(°C)	UL	TU	CQ
CTC03474□	470	1,2,3,5	25/85	4570	1,2,3	150	≥2.5	≦18	-40~+125	√	√	√
CTC03474□	470			5200	3					√	√	√
CTC03202□	2		25/50	3500	2,3					√	√	√
CTC03473□	47			3735	1,2,3					√	√	√
CTC03503□	50			4400	2,3					√	√	√
CTC03434□	430			5070						√	√	
CTC03474□	470			5200	3					√	√	√

Note:□=R_{25} tolerance

◆ electrical characteristics

Part No	Zero power resistance @25°C	R_{25} tolerance	(25/50) B value	B tolerance	Max power dissipation @25°C	Dissipation factor	Thermal time consistence	Operation temperature range			
	R_{25}(Ω)	(±%)	(K)	P_{max}(mW)	δ(mW/°C)	τ(Sec.)	T_L~T_U(°C)	UL/cUL	CSA	TUV	CQC
CTC05050□	5	10, 15	2400	450	Approx. 4.5	Approx. 20	-30~±125		√	√	√
CTC05100□	10		2800						√	√	√
CTC05150□	15		2800					√	√	√	√
CTC05200□	20		2800					√	√	√	√
CTC05250□	25		2900					√	√	√	√
CTC05450□	45		3100					√	√	√	√
CTC05500□	50		3100					√	√	√	√
CTC05600□	60		3100					√	√	√	√
CTC05800□	80		3200					√	√	√	√
CTC05900□	90		3200					√		√	√
CTC05101□	100		3200					√	√	√	√
CTC05121□	120		3300					√	√	√	√
CTC05151□	150		3300					√	√	√	√
CTC05201□	200		3500					√	√	√	√
CTC05221□	220		3500					√	√	√	√
CTC05251□	250		3500					√	√	√	√
CTC05301□	300		3800					√	√	√	√
CTC05471□	470		3500					√	√	√	√
CTC05501□	500		3700					√	√	√	√
CTC05681□	680		3800					√	√	√	√
CTC05701□	700		3800					√	√	√	√
CTC05102□	1000		3800					√	√	√	√
CTC05152□	1500		3950					√	√	√	√
CTC05202□	2000		4000					√	√	√	√
CTC05222□	2200		4000					√	√	√	√
CTC05252□	2500		4000					√	√	√	√
CTC05302□	3000		4000					√	√	√	√
CTC05332□	3300		4000					√	√	√	√
CTC05402□	4000		4000					√	√	√	√
CTC05472□	4700		4050					√	√	√	√
CTC05502□	5000		3950					√	√	√	√
CTC05602□	6000		4050					√	√	√	√

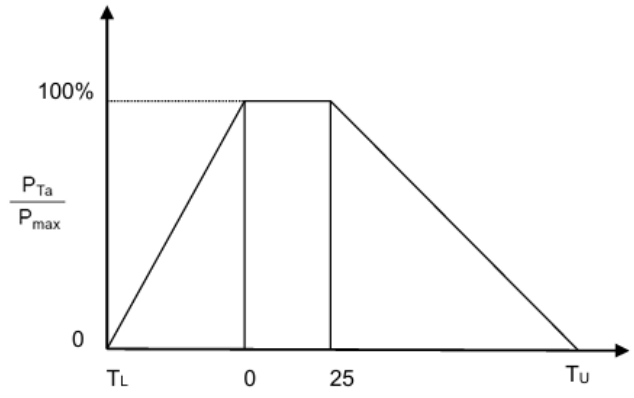
Note:□=R_{25} tolerance

◆ electrical characteristics

Part No	Zero power resistance @25°C	R_{25} tolerance	(25/50) B value	B tolerance	Max power dissipation @25℃	Dissipation factor	Thermal time consistence	Operation temperature range			
	R_{25}(Ω)	(±%)	(K)	P_{max}(mW)	δ(mW/°C)	τ(Sec.)	T_L~T_U(°C)	UL/cUL	CSA	TUV	CQC
CTC05682□	6800	10,15	4050	450	Approx. 4.5	Approx. 20	-30+125	√	√	√	√
CTC05802□	8000		4050					√	√	√	√
CTC05103□	10000	5,10,15	4050					√	√	√	√
CTC05123□	15000		4050					√	√	√	√
CTC05153□	15000		4150					√	√	√	√
CTC05203□	20000		4250					√	√	√	√
CTC05303□	30000		4250					√	√	√	√
CTC05473□	47000		4300					√	√	√	√
CTC05503□	50000		4300					√	√	√	√
CTC05104□	100000		4400					√	√	√	√
CTC05154□	150000		4500					√	√	√	√
CTC05204□	200000		4600					√	√	√	√
CTC05224□	220000		4600					√		√	√
CTC05474□	470000		4750					√		√	√

Note:□=R_{25} tolerance

◆ Maximum Power Derating Curve



T_U: Upper Operating Temperature Limit (℃)

T_L: Lower Operating Temperature Limit (℃)

For example:

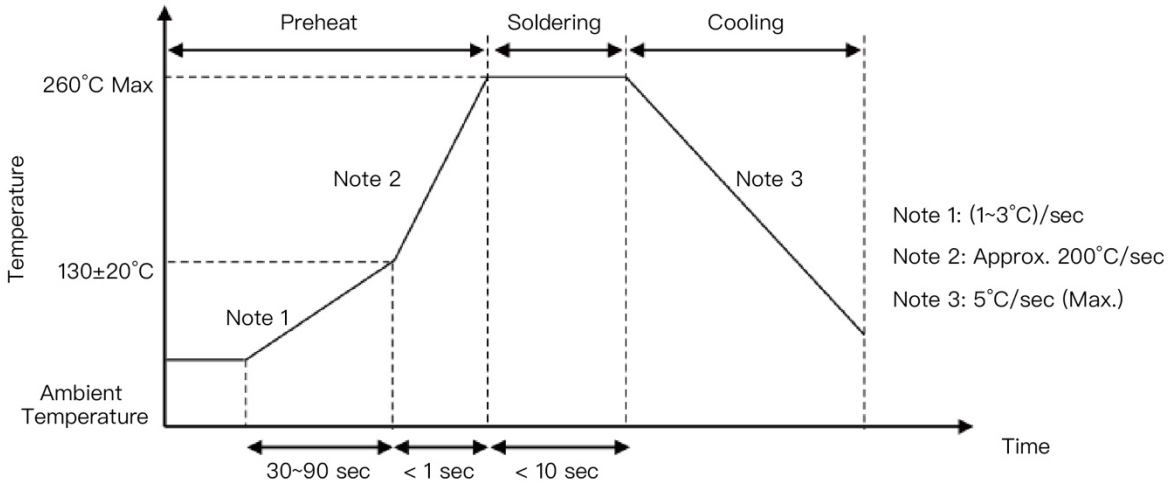
Ambient Temperature (Ta) = 55℃

Upper Operating Temperature Limit (Tu) = 125℃

PTa = (Tu - Ta) / (Tu - 25) × Pmax = 70% Pmax

◆ Maximum Power Dissipation Derating Curve

● Wave Soldering Curve



● Soldering Iron Rework Soldering Conditions

Item	**Condition**
Soldering Iron Tip Temperature	360℃ (max.)
Soldering Time	3 sec. (max.)
Distance Between Soldering Position and Coating Layer	2 mm (min.)

◆ Reliability (φ3mm)

<table>
<tr><th>Test Item</th><th>Test Standard</th><th>Test Conditions/Method</th><th>Performance Requirements</th></tr>
<tr><td>Terminal Strength (Bending)</td><td>IEC 60068-2-21</td><td>Apply the specified weight in a gradual manner and maintain it at a fixed position for 10 ± 1 seconds.

Wire Diameter (mm): 0.3<d≦0.5
Direct Tensile Force on Lead (Kg): 0.5</td><td>No visual damage</td></tr>
<tr><td>Bending Strength</td><td>IEC 60068-2-58</td><td>Apply the specified weight to one lead of the sample, bend it 90° in one direction, and then return it to its original position. Then bend it 90° in the opposite direction and proceed in the same manner.

Wire Diameter (mm): 0.3<d≦0.5
Bending Test Force (Kg): 0.25</td><td>No visual damage</td></tr>
<tr><td>Solderability</td><td>IEC 60068-2-58</td><td>245 ± 3℃, 3 ± 0.3 sec</td><td>Solder coverage area ≥ 95%</td></tr>
<tr><td>Resistance to Soldering Heat</td><td>IEC 60068-2-2</td><td>260 ± 3 ℃, 10 ± 1sec</td><td>No visual damage
|ΔR25/R25|≦ 3 %</td></tr>
<tr><td>High Temperature Storage</td><td>IEC 60068-2-78</td><td>125 ± 5℃, 1000 ± 24 hour</td><td>No visual damage
|ΔR25/R25|≦ 5 %</td></tr>
<tr><td>Steady State Damp Heat</td><td>IEC 60068-2-78</td><td>40 ± 2℃, 90~95% RH, 1000 ± 24 hour</td><td>No visual damage
|ΔR25/R25|≦ 3 %</td></tr>
<tr><td>Rapid Temperature Change</td><td>IEC 60068-2-14</td><td>Subject the device to five cycles on a PCB under the conditions specified in the table below.
<table><tr><th>Step</th><th>Temperature (℃)</th><th>Cycle (min)</th></tr><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></table></td><td>No visual damage
|ΔR25/R25|≦ 3 %</td></tr>
<tr><td>Maximum Power Dissipation</td><td>IEC 60539-14.26.3</td><td>25 ± 5℃, Pmax., 1000 ± 24 hour</td><td>No visual damage
|ΔR25/R25|≦ 5 %</td></tr>
</table>

◆ Reliability (φ5mm)

<table>
<tr><th>Test Item</th><th>Test Standard</th><th>Test Conditions/Method</th><th>Performance Requirements</th></tr>
<tr><td>Terminal Strength (Bending)</td><td>IEC 60068-2-21</td><td>Apply the specified weight in a gradual manner and maintain it at a fixed position for 10 ± 1 seconds.

Wire Diameter (mm): 0.3<d≦0.5
Direct Tensile Force on Lead (Kg): 0.5</td><td>No visual damage</td></tr>
<tr><td>Bending Strength</td><td>IEC 60068-2-58</td><td>Apply the specified weight to one lead of the sample, bend it 90° in one direction, and then return it to its original position. Then bend it 90° in the opposite direction and proceed in the same manner.

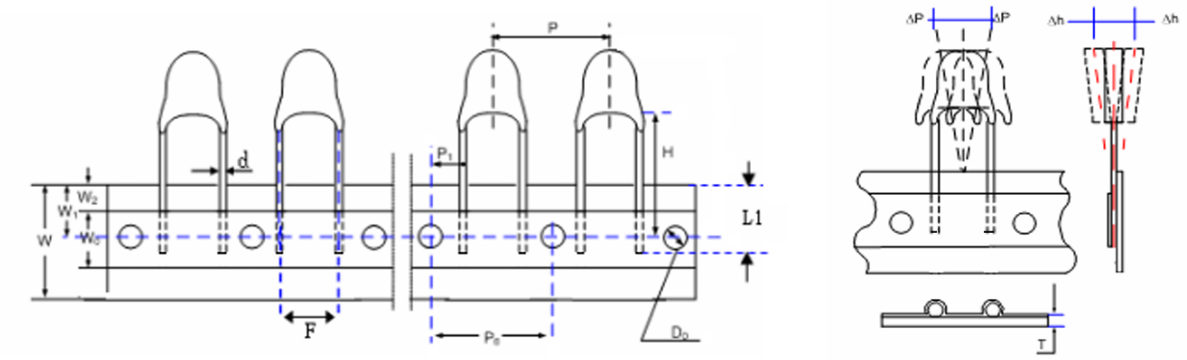
Wire Diameter (mm): 0.3<d≦0.5
Bending Test Force (Kg): 0.25</td><td>No visual damage</td></tr>
<tr><td>Solderability</td><td>IEC 60068-2-58</td><td>260 ± 5℃, 10 ± 1 sec</td><td>Solder coverage area ≥ 95%</td></tr>
<tr><td>Resistance to Soldering Heat</td><td>IEC 60068-2-2</td><td>245 ± 3 ℃, 3 ± 0.3sec</td><td>No visual damage
|ΔR25/R25|≦ 3 %</td></tr>
<tr><td>High Temperature Storage</td><td>IEC 60068-2-78</td><td>125 ± 5℃, 1000 ± 24 hour</td><td>No visual damage
|ΔR25/R25|≦ 5 %</td></tr>
<tr><td>Steady State Damp Heat</td><td>IEC 60068-2-78</td><td>40 ± 2℃, 90~95% RH, 1000 ± 24 hour</td><td>No visual damage
|ΔR25/R25|≦ 3 %</td></tr>
<tr><td>Rapid Temperature Change</td><td>IEC 60068-2-14</td><td>Subject the device to five cycles on a PCB under the conditions specified in the table below.

<table>
<tr><th>Step</th><th>Temperature (℃)</th><th>Cycle (min)</th></tr>
<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>
</table>
</td><td>No visual damage
|ΔR25/R25|≦ 3 %</td></tr>
<tr><td>Maximum Power Dissipation</td><td>IEC 60539-14.26.3</td><td>25 ± 5℃, Pmax., 1000 ± 24 hour</td><td>No visual damage
|ΔR25/R25|≦ 5 %</td></tr>
<tr><td>Insulation Test</td><td>MIL-STD-202F-Method 302</td><td>1000VDC,1 min</td><td>≥500MΩ</td></tr>
</table>

◆ Packaging Method（φ3mm）

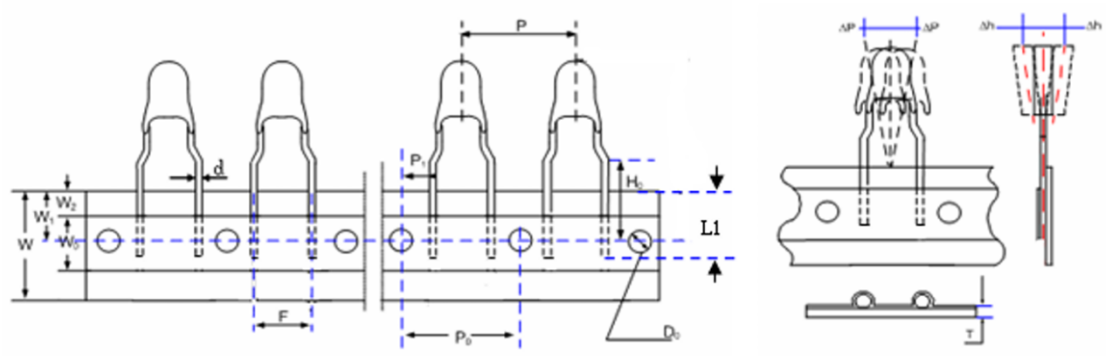
● Tape Packaging

S type（Straight lead）



Tape Dimension	P_0	F	P	P_1	H	d	W_0	W_1	W_2	W	ΔP	Δh	L_1	D_0	T
	±0.3	±0.5	±1	±0.7	±2/-0	±0.02	±1.5	+0.75/-0.5	Max.	+1/-0.5	Max.	Max.	±1	±0.2	±0.2
P_0=12.7	12.7	2.54	12.7	5.08	18	0.5	12	9	3	18	1	2	10	4	0.6
	12.7	5.00	12.7	3.85	18	0.5	12	9	3	18	1	2	10	4	0.6
P_0=15.0	15.0	2.54	15.0	6.23	18	0.5	12	9	3	18	1	2	10	4	0.6
	15.0	5.00	15.0	5.00	18	0.5	12	9	3	18	1	2	10	4	0.6

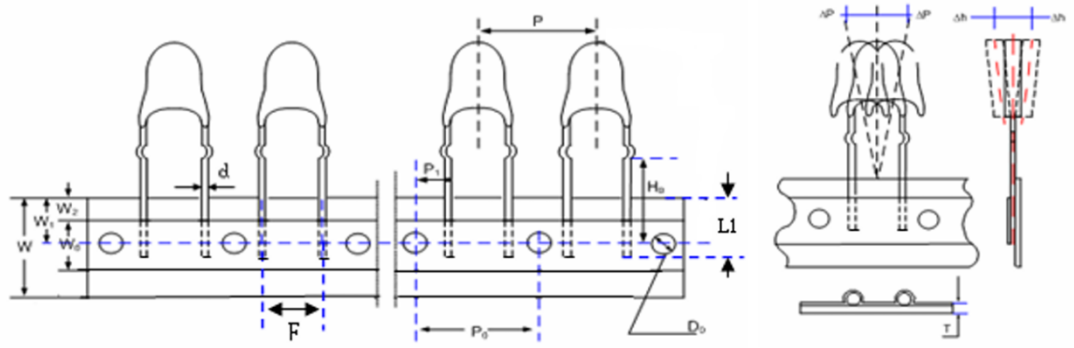
O type（Ward bent）



Tape Dimension	P_0	F	P	P_1	H_0	d	W_0	W_1	W_2	W	ΔP	Δh	L_1	D_0	T
	±0.3	±0.5	±1	±0.7	±0.5	±0.02	±1.5	+0.75/-0.5	Max.	+1/-0.5	Max.	Max.	±1	±0.2	±0.2
P_0=12.7	12.7	2.54	12.7	5.08	16	0.5	12	7	3	18	1	2	10	4	0.6
	12.7	5.00	12.7	3.85	16	0.5	12	9	3	18	1	2	10	4	0.6

（Unit：mm）

E type (Outward bent)

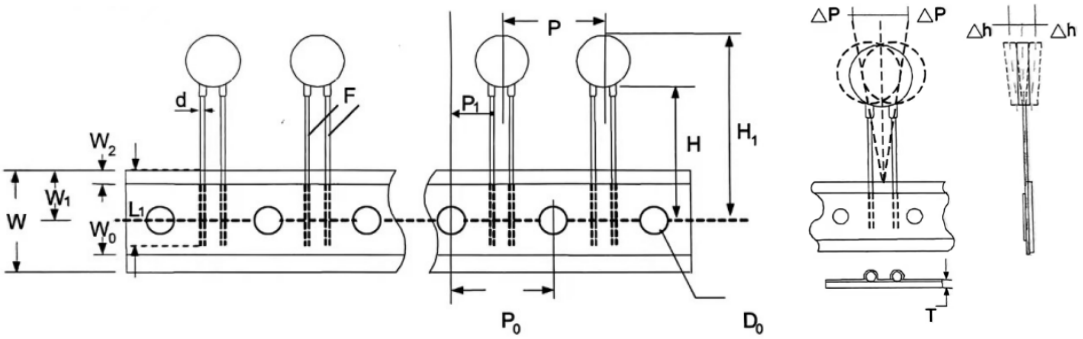


Tape Dimension	P_0	F	P	P_1	H_0	d	W_0	W_1	W_2	W	ΔP	Δh	L_1	D_0	T
	±0.3	±0.5	±1	±0.7	±0.5	±0.02	±1.5	+0.75 /-0.5	Max.	+1/ -0.5	Max.	Max.	±1	±0.2	±0.2
P_0=12.7	12.7	2.54	12.7	5.08	16	0.5	12	9	3	18	1	2	10	4	0.6

◆ Packaging Method（φ5mm）

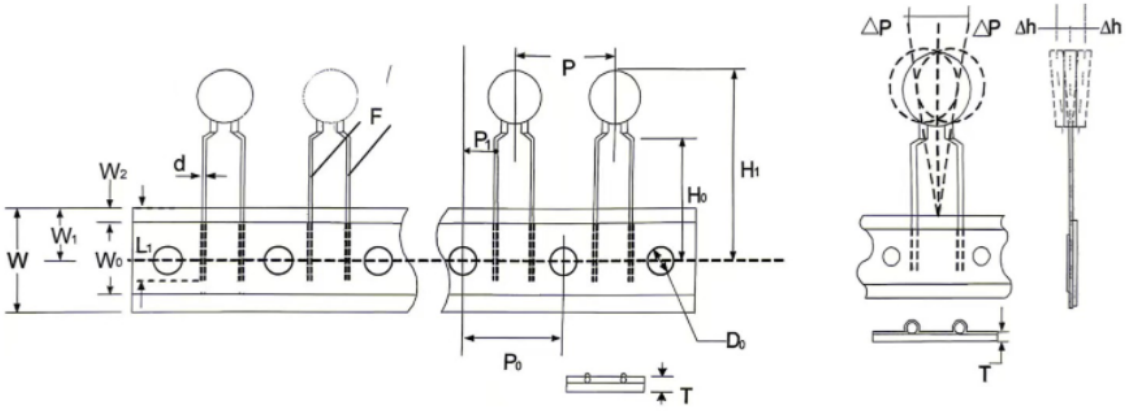
● Tape Packaging

S type（Straight lead）



Tape Dimension	P_0	F	P	P_1	H	H_1	d	W_0	W_1	W_2	W	ΔP	Δh	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

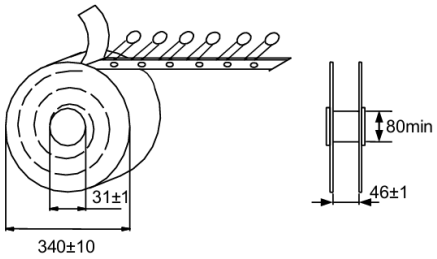
ο type（Ward bent）



Tape Dimension	P_0	F	P	P_1	H	H_1	d	W_0	W_1	W_2	W	ΔP	Δh	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

◆ Packaging Quantity（φ3mm）

● Bulk

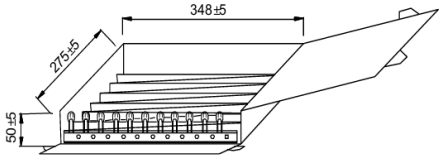


Series	Quantity（pcs/ bag）
CTC03	500

● Reel Packaging

Series	Quantity（pcs/ Reel）
CTC03	2500

● Box



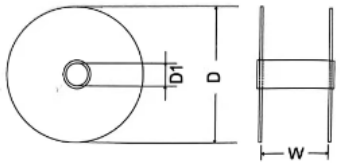
Series	Quantity (pcs/ Box)
CTC03	2500

（Unit：mm）

◆ Packaging Quantity（φ5mm）

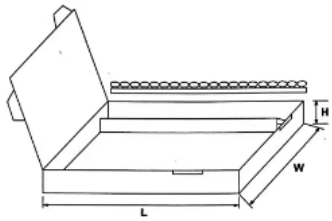
- Bulk

Series	Straight Type Quantity (pcs/bag)	Cut Angle Type Quantity (pcs/bag)
CTC05	250	250



- Reel Packaging

Series	D (mm)	D1 (mm)	W (mm)	Quantity (pcs/Reel)
CTC05	340±10	31±1	46±1	2500



- Box

Series	Quantity (pcs/ Box)
CTC05	2000

L	W	H
345mm	275mm	55mm

（Unit：mm）

◆ Storage Conditions

- Storage Conditions:
  1. Storage Temperature: -10°C ~ +40°C
  2. Relative Humidity: ≤ 75% RH
  3. Do not store this product in environments with corrosive gases or direct sunlight.

- Storage Period: 1 Year