

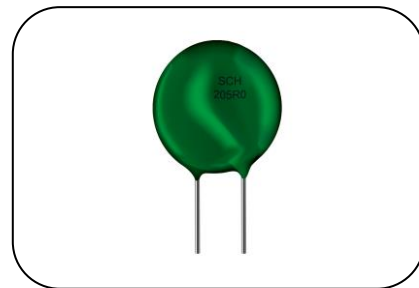
NTC Thermistor: SCH Series

High Power Type NTC Thermistor for Inrush Current Limiting



■ Features

1. RoHS & Halogen Free (HF) compliant
2. Body size: $\Phi 20\text{mm}$
3. Radial lead resin coated
4. Higher steady state current
5. Reduction of 50% installation space comparing with similar components



■ Recommended Applications

1. High power switching mode power supply (SMPS), uninterruptible power supply (UPS), power conversion equipment
2. Charger and charging station of electric vehicle
3. Motor drive system, high power plasma welding machine, cutting machine, high power lighting application
4. Magnetic resonance imaging (MRI) equipment, professional high power audio receiver, high power toroidal transformer, high capacity power inverter
5. Industrial robot driven by high voltage power supply, smart low-voltage power distribution unit

■ Part Number Code

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Product Type		Body Size		Zero Power Resistance at 25°C (R ₂₅)		Tolerance of R ₂₅		Appearance		Packaging		Optional Suffix		Special Specification			
SCH	THINKING High Power Type NTC Thermistor SCH Series	20	Φ20mm	2R5	2.5 Ω	K	±10%	S	Straight lead	B	Bulk						
				100	10x10 ⁰ Ω=10Ω	L	±15%	A	Straight P10.0mm lead	C	Bulk & Cut lead						
				471	47x10 ¹ Ω=470Ω	M	±20%	I	Inner kink lead	A	Tape & ammo box packing (hole pitch: 12.7mm)						
						N	±25%	E	Inner kink P10.0mm lead	E	Tape & ammo box packing (hole pitch: 15.0 mm)						
						P	±30%	F	Y kink lead	R	Tape & reel packing (hole pitch: 12.7mm)						
								K	Y kink P10.0mm lead	G	Tape & reel packing (hole pitch: 15.0mm)						
								O	Outer kink lead								
								P	Outer kink P10.0mm lead								
								T	Y kink & 90° bend & outer kink lead								

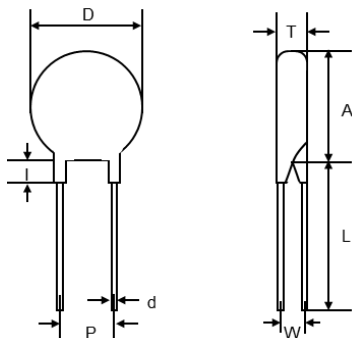
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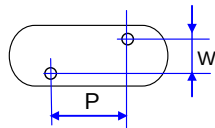
■ Structure and Dimensions

S Type (Straight lead)



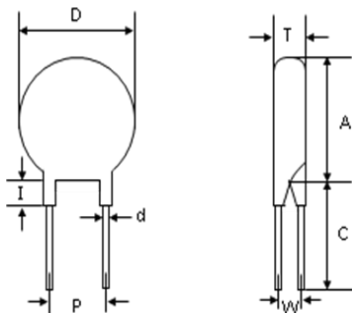
(Unit: mm)

Body Size	D	P	d	l max.	A max.	L min.	T	W
Φ20	18.0~21.5	7.5±0.5	1±0.02	3	21.5	26	3.5~6.0	3.1±0.5



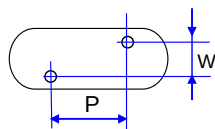
P: horizontal projection distance of lead wires center

SC Type (Straight cut lead)



(Unit: mm)

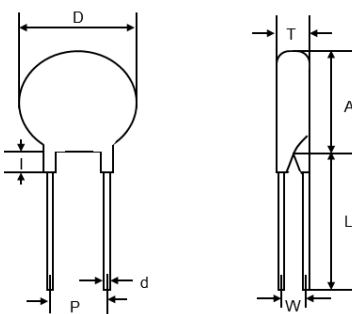
Body Size	D	P	d	l max.	A max.	C nor.	T	W
Φ20	18.0~21.5	7.5±0.5	1±0.02	3	21.5	□±1	3.5~6.0	3.1±0.5



P: horizontal projection distance of lead wires center

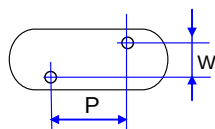
□ for C nor.: Length is according to customer's request

A Type (Straight P10.0mm lead)



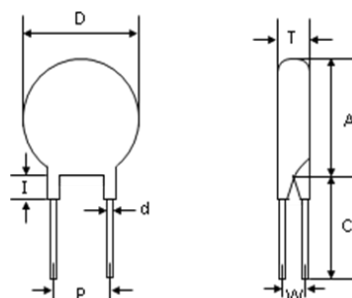
(Unit: mm)

Body Size	D	P	d	l max.	A max.	L min.	T	W
Φ20	18.0~21.5	10.0±0.5	1.0±0.02	3	21.5	26	3.5~6.0	3.1±0.5



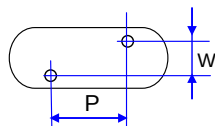
P: horizontal projection distance of lead wires center

AC Type (Straight P10.0mm cut lead)



(Unit: mm)

Body Size	D	P	d	l max.	A max.	C nor.	T	W
Φ20	18.0~21.5	10±0.5	1±0.02	3	21.5	□±1	3.5~6.0	3.1±0.5



P: horizontal projection distance of lead wires center

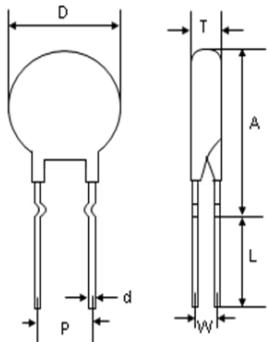
□ for C nor.: Length is according to customer's request

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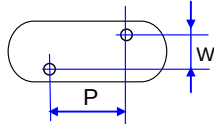


I Type (Inner kink lead)



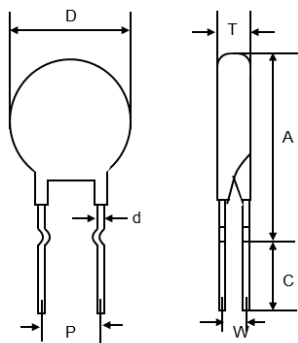
(Unit: mm)

Body Size	D	P	d	A max.	L min.	T	W
Φ20	18.0~21.5	7.5±0.5	1.0±0.02	28	24	3.5~6.0	3.1±0.5



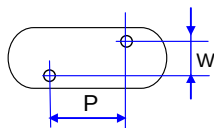
P: horizontal projection distance of lead wires center

IC Type (Inner kink cut lead)



(Unit: mm)

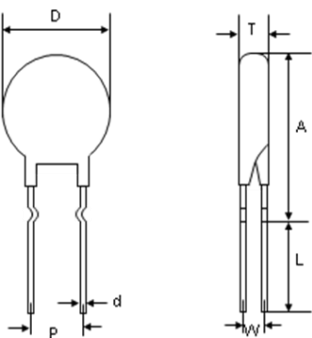
Body Size	D	P	d	A max.	C nor.	T	W
Φ20	18.0~21.5	7.5±0.5	1±0.02	28	□±1	3.5~6.0	3.1±0.5



P: horizontal projection distance of lead wires center

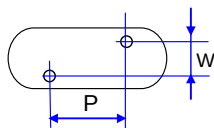
□ for C nor.: Length is according to customer's request

E Type (Inner kink P10.0mm lead)



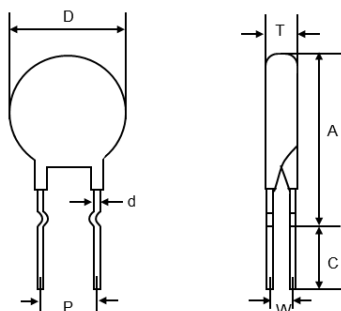
(Unit: mm)

Body Size	D	P	d	A max.	L min.	T	W
Φ20	18.0~21.5	10.0±0.5	1.0±0.02	28	24	3.5~6.0	3.1±0.5



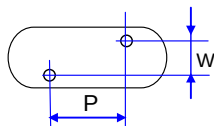
P: horizontal projection distance of lead wires center

EC Type (Inner kink P10.0mm cut lead)



(Unit: mm)

Body Size	D	P	d	A max.	C nor.	T	W
Φ20	18.0~21.5	10.0±0.5	1±0.02	28	□±1	3.5~6.0	3.1±0.5



P: horizontal projection distance of lead wires center

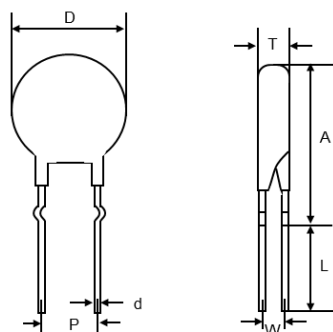
□ for C nor.: Length is according to customer's request

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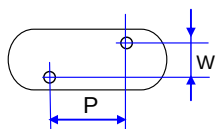


O Type (Outer kink lead)



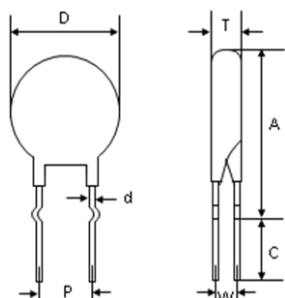
(Unit: mm)

Body Size	D	P	d	A max.	L min.	T	W
Φ20	18.0~21.5	7.5±0.5	1.0±0.02	30	24	3.5~6.0	3.1±0.5



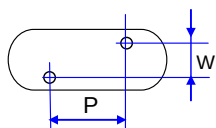
P: horizontal projection distance of lead wires center

OC Type (Outer kink cut lead)



(Unit: mm)

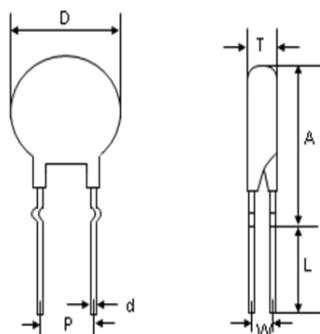
Body Size	D	P	d	A max.	C nor.	T	W
Φ20	18.0~21.5	7.5±0.5	1±0.02	30	□±1	3.5~6.0	3.1±0.5



P: horizontal projection distance of lead wires center

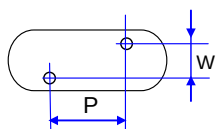
□ for C nor.: Length is according to customer's request

P Type (Outer kink P10.0mm lead)



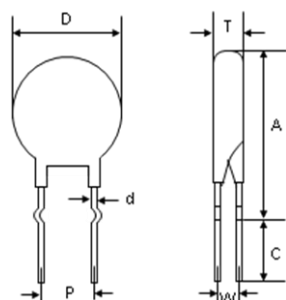
(Unit: mm)

Body Size	D	P	d	A max.	L min.	T	W
Φ20	18.0~21.5	10.0±0.5	1.0±0.02	28	24	3.5~6.0	3.1±0.5



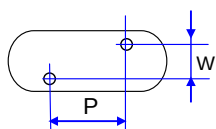
P: horizontal projection distance of lead wires center

PC Type (Outer kink P10.0mm cut lead)



(Unit: mm)

Body Size	D	P	d	A max.	C nor.	T	W
Φ20	18.0~21.5	10.0±0.5	1±0.02	28	□±1	3.5~6.0	3.1±0.5



P: horizontal projection distance of lead wires center

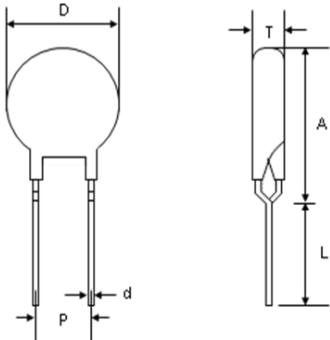
□ for C nor.: Length is according to customer's request

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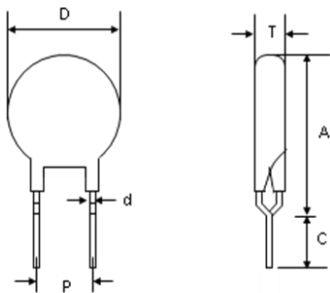
F Type (Y kink lead)



(Unit: mm)

Body Size	D	P	d	A max.	L min.	T
Φ20	18.0~21.5	7.5±0.5	1.0±0.02	24.5	25	3.5~6.0

FC Type (Y kink cut lead)

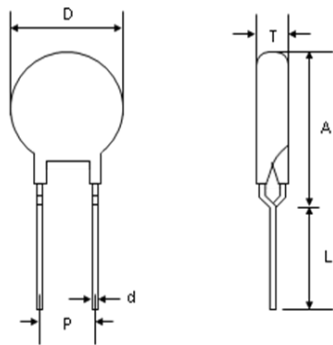


(Unit: mm)

Body Size	D	P	d	A max.	C nor.	T
Φ20	18.0~21.5	7.5±0.5	1±0.02	24.5	□±1	3.5~6.0

Note: □ for C nor.: Length is according to customer's request

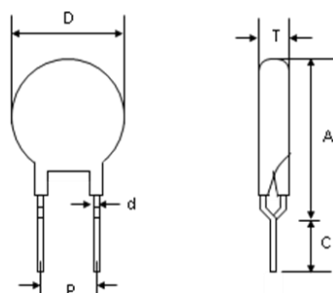
K Type (Y kink P10.0mm lead)



(Unit: mm)

Body Size	D.	P	d	A max.	L min.	T
Φ20	18.0~21.5	10.0±0.5	1.0±0.02	24.5	25	3.5~6.0

KC Type (Y kink P10.0mm cut lead)



(Unit: mm)

Body Size	D	P	d	A max.	C nor.	T
Φ20	18.0~21.5	10.0±0.5	1±0.02	24.5	□±1	3.5~6.0

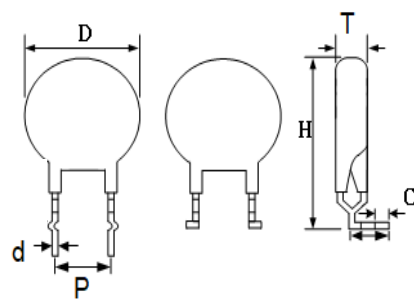
Note: □ for C nor.: Length is according to customer's request

NTC Thermistor: SCH Series

High Power Type NTC Thermistor for Inrush Current Limiting



T Type (Y kink and 90° bend and outer kink lead)

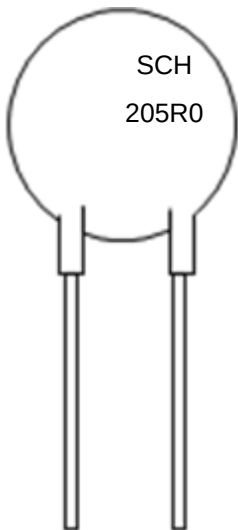


(Unit: mm)

Body Size	D	P	d	T	Hmax	C
Φ20	18.0~21.5	7.5±0.5	1.0±0.02	3.5~6.0	26	□±0.5

Note: □ for C nor.: Length is according to customer's request

■ Marking



- Product Type
- The first two codes are body size, and the rest codes are for R₂₅.

NTC Thermistor: SCH Series

High Power Type NTC Thermistor for Inrush Current Limiting



Electrical Characteristics

Part No.	Zero Power Resistance at 25°C		Max. Current at 65°C	Residual Resistance at 25°C I _{max}	B _{25/50} Value		Recommend Capacitance @240Vac	Max. Power Rating at 25°C	Dissipation Factor	Thermal Time Constant
	R ₂₅ (Ω)	(±%)	I _{max} (A)	R _{I_{max}} (Ω)	(K)	(±%)	C _{th} (μF)	P _{max} (W)	δ(mW/°C)	τ (Sec.)
SCH200R7	0.7	15 20	18	0.018	2300	7	1200	4.9	Around 28	Around 113
SCH201R0	1	15 20	16	0.023	2500					
SCH201R5	1.5	15 20	13	0.035	2600					
SCH202R0	2	15 20	12	0.042	2750					
SCH202R5	2.5	15 20	11	0.050	2750					
SCH203R0	3	15 20	11	0.052	2800					
SCH204R0	4	15 20	9.5	0.067	3000					
SCH204R7	4.7	15 20	9.5	0.074	3000					
SCH205R0	5	15 20	9.5	0.076	3000					
SCH206R0	6	15 20	9	0.083	3050					
SCH206R8	6.8	15 20	8.5	0.093	3100					
SCH207R0	7	15 20	8.5	0.095	3100					
SCH208R0	8	15 20	8	0.101	3150					
SCH20100	10	15 20	7.5	0.126	3200					
SCH20120	12	15 20	7.5	0.123	3200					
SCH20130	13	15 20	7.5	0.125	3250					
SCH20150	15	15 20	7	0.145	3250					

NTC Thermistor: SCH Series

High Power Type NTC Thermistor for Inrush Current Limiting



■ Electrical Characteristics

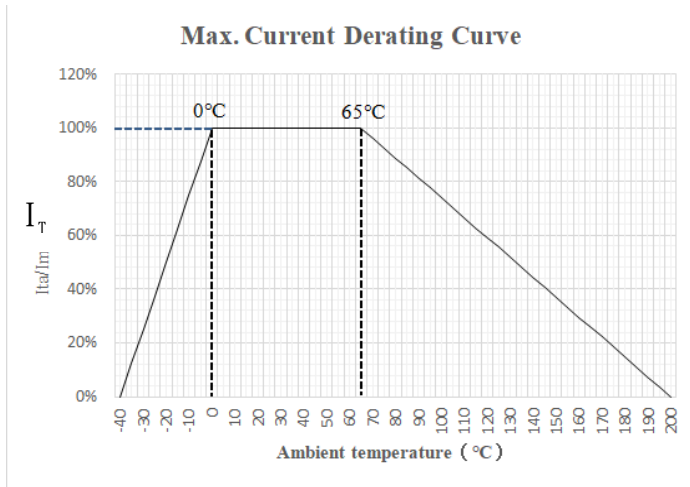
Part No	Zero Power Resistance at 25°C		Max. Current at 65°C	Residual Resistance at 25°C I _{max}	B _{25/50} Value		Recommend Capacitance @240Vac	Max. Power Rating at 25°C	Dissipation Factor	Thermal Time Constant
	R ₂₅ (Ω)	(±%)	I _{max} (A)	R _{I_{max}} (Ω)	(K)	(±%)	C _{th} (μF)	P _{max} (W)	δ(mW/°C)	τ (Sec.)
SCH20160	16	15	6.5	0.158	3300	7	1200	4.9	Around 28	Around 113
		20								
SCH20180	18	15	6	0.159	3350					
		20								
SCH20200	20	15	6	0.185	3350					
		20								
SCH20470	47	15	4.5	0.336	3550					
		20								
SCH20550	55	15	4	0.409	3550					
		20								
SCH20121	120	15	3	0.697	3550					
		20								

NTC Thermistor: SCH Series

High Power Type NTC Thermistor for Inrush Current Limiting



■ Max. Current Derating Curve



T_U : Maximum operating temperature (°C)

T_L : Minimum operating temperature (°C)

For example:

● Ambient temperature (T_a) = 85°C

Maximum operating temperature(T_U) = 200°C

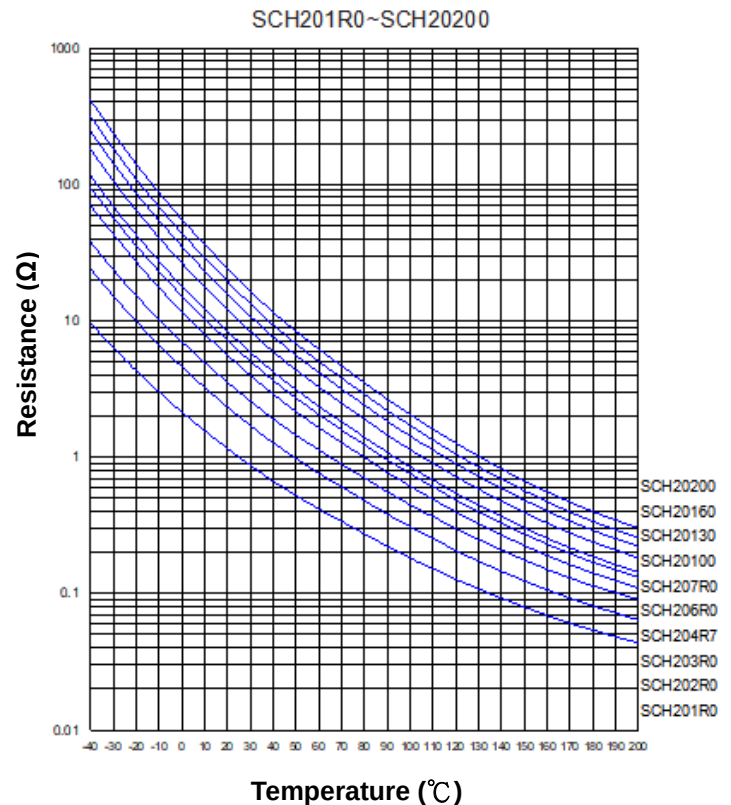
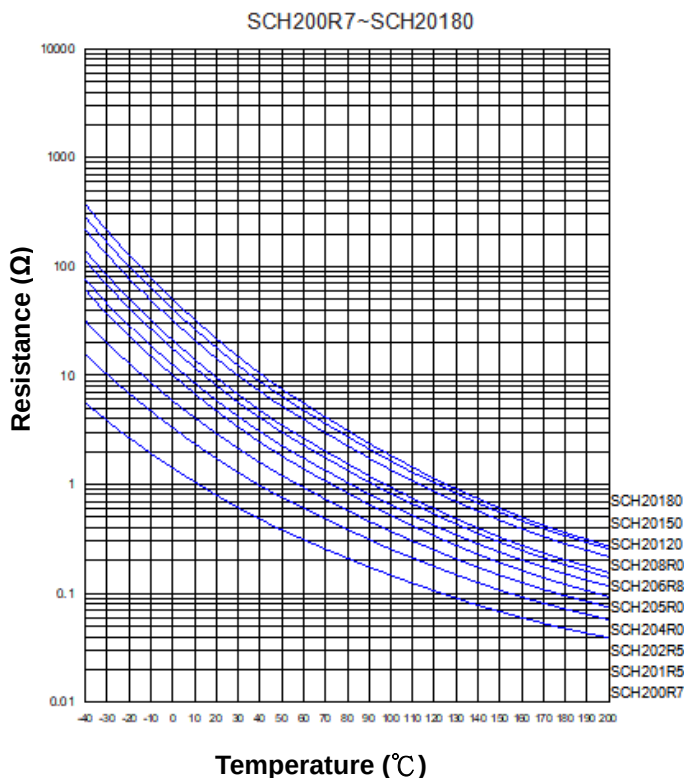
$I_{Ta} = [1 - (T_a - 65)/(T_U - 65)] \times I_{max} = 85.2\% I_{max}$

● Ambient temperature (T_a) = -10°C

Minimum operating temperature(T_L) = -40°C

$I_{Ta} = (1 - T_a/T_L) \times I_{max} = 75\% I_{max}$

■ R-T Characteristic Curves

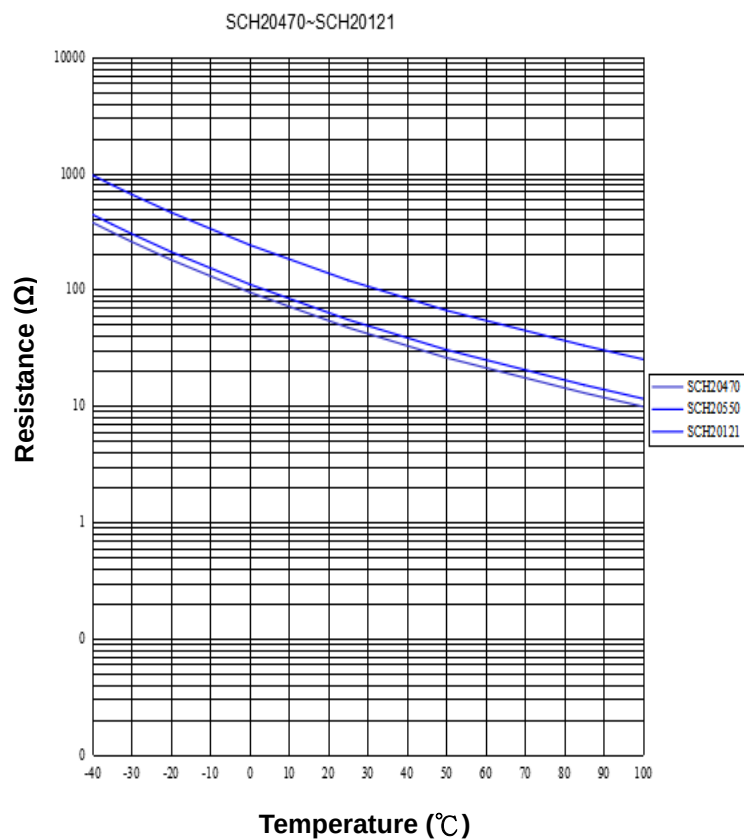


NTC Thermistor: SCH Series

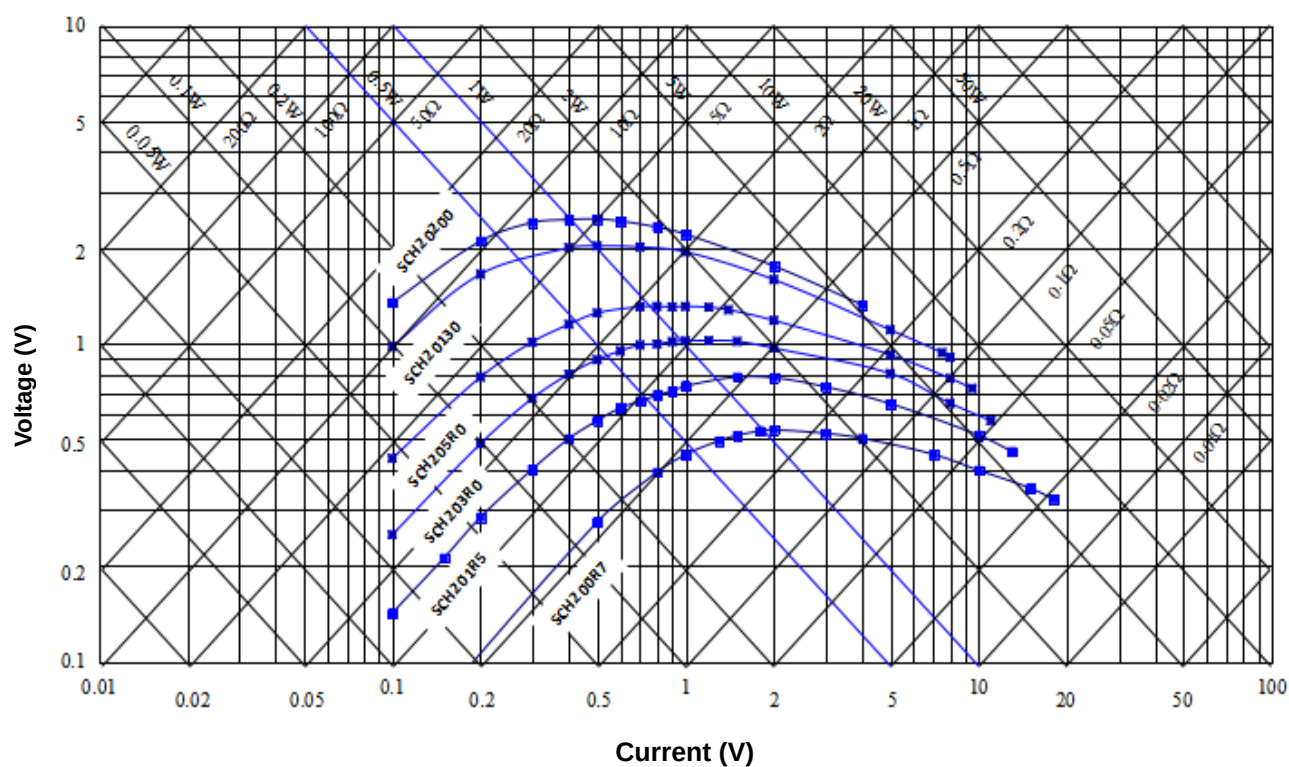
High Power Type NTC Thermistor for Inrush Current Limiting



■ R-T Characteristic Curves



■ V-I Characteristic Curves (representative)



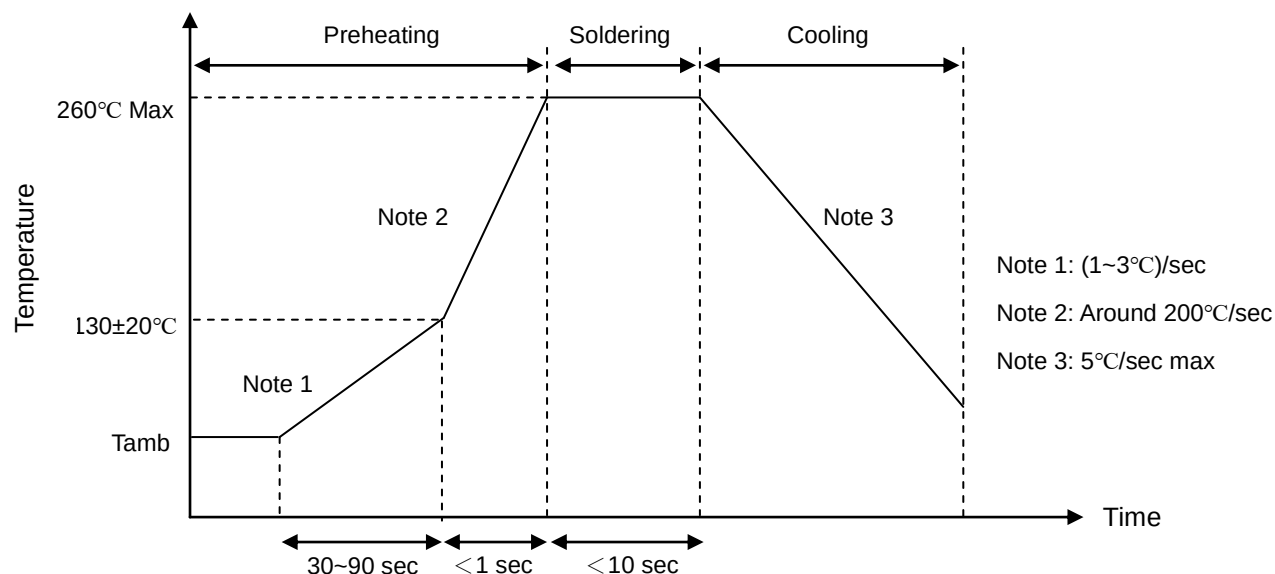
NTC Thermistor: SCH Series

High Power Type NTC Thermistor for Inrush Current Limiting



■ Soldering Recommendation

● Wave Soldering Profile



● Recommended Reworking Conditions with Soldering Iron

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

NTC Thermistor: SCH Series

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■ Reliability

Item	Standard	Test conditions/Method	Specification		
Tensile Strength of Terminals	IEC 60068-2-21	2kg, 10±1 sec	No visible damage		
Solderability	IEC 60068-2-20	245 ± 3℃, 3 ± 0.3 sec	Terminal electrode covered by new solder ≥ 95%		
Resistance to Soldering Heat	IEC 60068-2-20	260± 3℃, 10 ± 1 sec (Soaking Method)	No visible damage ΔR ₂₅ /R ₂₅ ≤ 10 %		
High Temperature Storage	IEC 60068-2-2	T _u ±5℃, 1000±24 hrs	No visible damage ΔR ₂₅ /R ₂₅ ≤ 20 %		
Damp Heat, Steady State	IEC 60068-2-78	40±2℃, 90~95% RH, 1000 ± 24 hrs	No visible damage ΔR ₂₅ /R ₂₅ ≤ 20 %		
Rapid Change of Temperature	IEC 60068-2-14	The conditions shown below shall be repeated 5 cycles.		No visible damage ΔR ₂₅ /R ₂₅ ≤ 20 %	
		Step	Temperature (℃)		Period (minutes)
		1	T _L ± 5		30 ± 3
		2	Room temperature		5 ± 3
		3	T _U ± 5		30 ± 3
		4	Room temperature		5 ± 3
Max. Current (I _{max})	IEC 60539-1 4.26.1	25 ± 5℃, I _{max.} , 1000± 24 hrs	No visible damage ΔR ₂₅ /R ₂₅ ≤ 20 %		
Endurance (OnOff)	Specification Standard	25 ± 5℃, I _{max.} , C _{th} , 1min ON / 5 mins OFF x 1000 cycles C _{th} = Capacitance at 240 Vac	No visible damage ΔR ₂₅ /R ₂₅ ≤ 20 %		
Insulation Test	MIL-STD-202F -Method 302	1000 V _{DC} , 1 min	≥ 500 MΩ		

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High Power Type NTC Thermistor for Inrush Current Limiting



■ Packaging

● Taping Specification

S Type (Straight lead)

Figure A

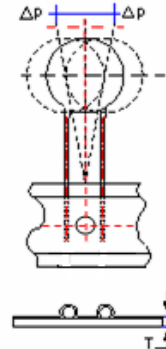
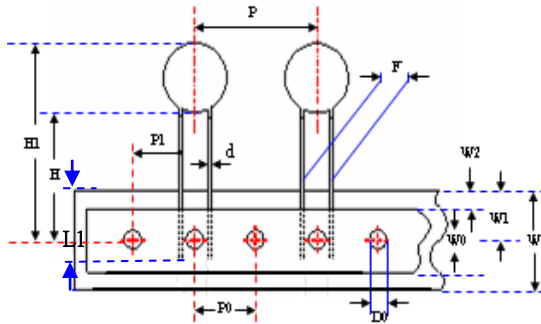
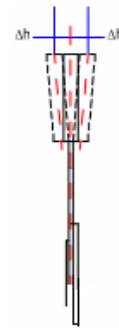
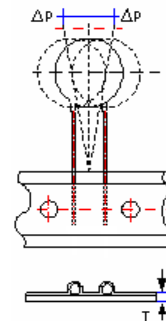
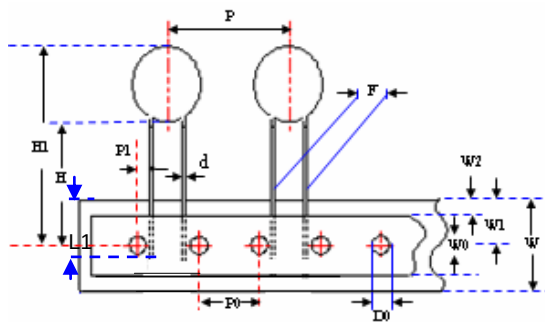


Figure B

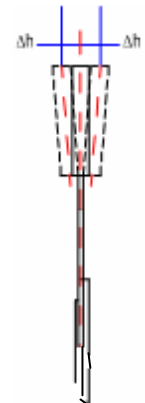
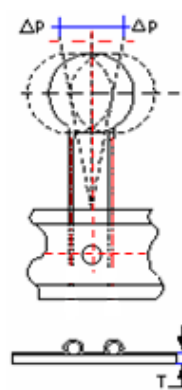
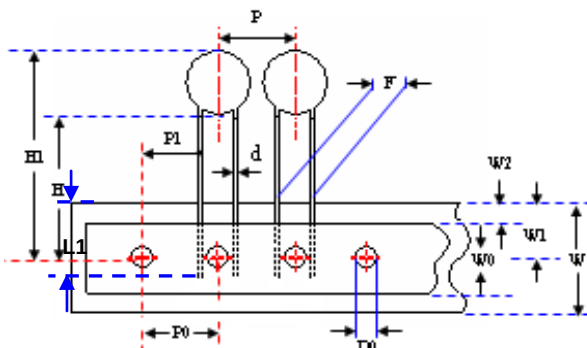


(Unit: mm)

Taping Dimension	Disc Size	P0	F	P	P1	H	H1	d	W0	W1	W2	W	ΔP	Δh	L1	D0	T	Figure
		±0.3	±0.5	±1	±0.7	+2/-0	Max.	±0.02	±1.5	+0.75/-0.5	Max.	+1/-0.5	Max.	Max.	Min	±0.2	±0.2	
P0:12.7	20	12.7	7.5	25.4	8.95	18	42	1.0	12	9	3	18	1	2	9	4	0.6	A
P0:15.0	20	15.0	7.5	30.0	3.75	18	42	1.0	12	9	3	18	1	2	9	4	0.6	B

A Type (Straight P10.0mm lead)

Figure A



(Unit: mm)

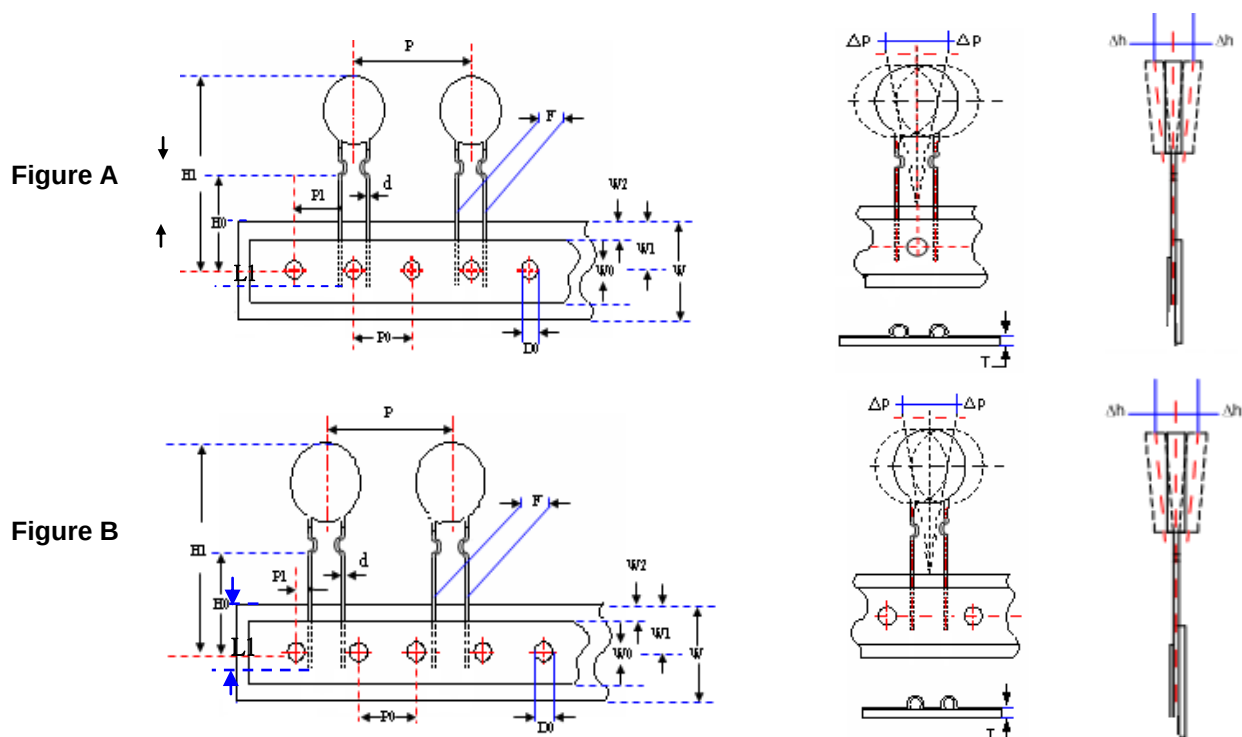
Taping Dimension	Disc Size	P0	F	P	P1	H	H1	d	W0	W1	W2	W	ΔP	Δh	L1	D0	T	Figure
		±0.3	±0.5	±1	±0.7	+2/-0	Max.	±0.02	±1.5	+0.75/-0.5	Max.	+1/-0.5	Max.	Max.	Min	±0.2	±0.2	
P0:12.7	20	12.7	10.0	12.7	7.70	18	42	1.0	12	9	3	18	1	2	9	4	0.6	A
P0:15.0	20	15.0	10.0	15.0	10.0	18	42	1.0	12	9	3	18	1	2	9	4	0.6	A

NTC Thermistor: SCH Series

High Power Type NTC Thermistor for Inrush Current Limiting



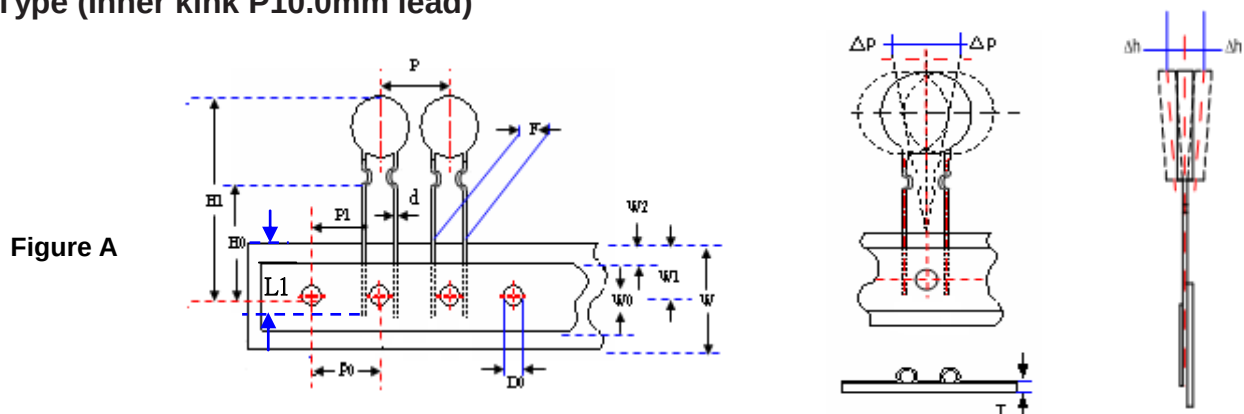
I Type (Inner kink lead)



(Unit: mm)

Taping Dimension	Disc Size	P0	F	P	P1	H	H1	d	W0	W1	W2	W	ΔP	Δh	L1	D0	T	Figure
		±0.3	±0.5	±1	±0.7	+2/-0	Max.	±0.02	±1.5	+0.75/-0.5	Max.	+1/-0.5	Max.	Max.	Min	±0.2	±0.2	
P0:12.7	20	12.7	7.5	25.4	8.95	16	44	1.0	12	9	3	18	1	2	9	4	0.6	A
P0:15.0	20	15.0	7.5	30.0	3.75	16	44	1.0	12	9	3	18	1	2	9	4	0.6	B

E Type (Inner kink P10.0mm lead)



(Unit: mm)

Taping Dimension	Disc Size	P0	F	P	P1	H	H1	d	W0	W1	W2	W	ΔP	Δh	L1	D0	T	Figure
		±0.3	±0.5	±1	±0.7	+2/-0	Max.	±0.02	±1.5	+0.75/-0.5	Max.	+1/-0.5	Max.	Max.	Min	±0.2	±0.2	
P0:12.7	20	12.7	10.0	12.7	7.70	16	44	1.0	12	9	3	18	1	2	9	4	0.6	A
P0:15.0	20	15.0	10.0	15.0	10.0	16	44	1.0	12	9	3	18	1	2	9	4	0.6	A

NTC Thermistor: SCH Series

High Power Type NTC Thermistor for Inrush Current Limiting



O Type (Outer kink lead)

Figure A

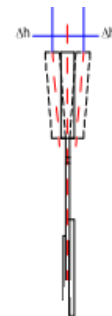
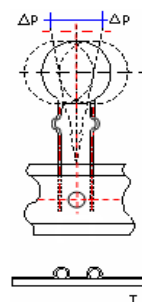
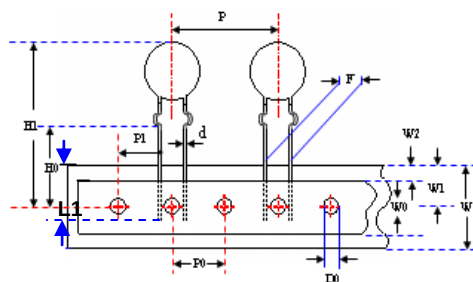
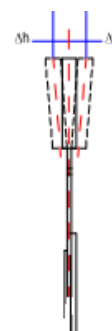
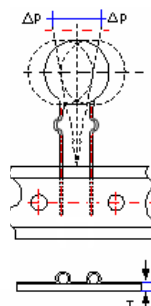
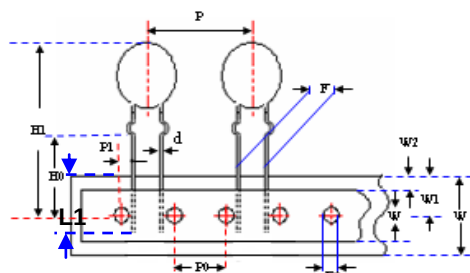


Figure B

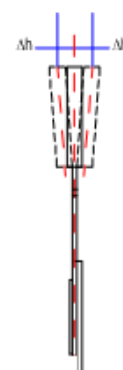
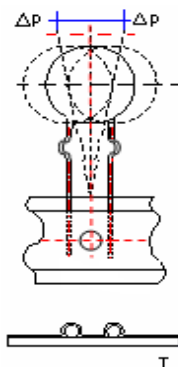
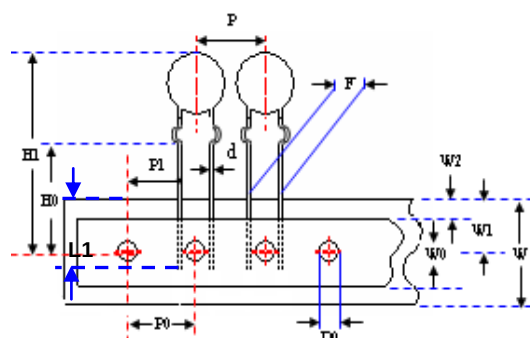


(Unit: mm)

Taping Dimension	Disc Size	P0	F	P	P1	H	H1	d	W0	W1	W2	W	ΔP	Δh	L1	D0	T	Figure
		±0.3	±0.5	±1	±0.7	+2/-0	Max.	±0.02	±1.5	+0.75/-0.5	Max.	+1/-0.5	Max.	Max.	Min	±0.2	±0.2	
P0:12.7	20	12.7	7.5	25.4	8.95	16	46	1.0	12	9	3	18	1	2	9	4	0.6	A
P0:15.0	20	15.0	7.5	30.0	3.75	16	46	1.0	12	9	3	18	1	2	9	4	0.6	B

P Type (Outer kink P10.0mm lead)

Figure A



(Unit: mm)

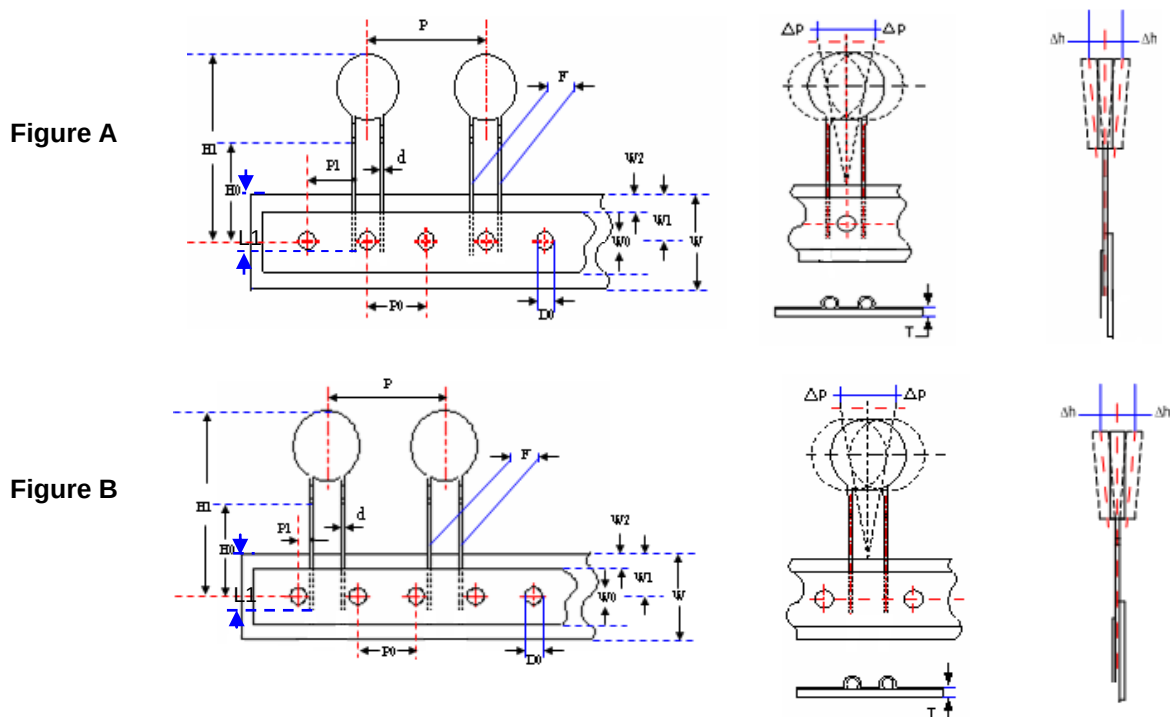
Taping Dimension	Disc Size	P0	F	P	P1	H	H1	d	W0	W1	W2	W	ΔP	Δh	L1	D0	T	Figure
		±0.3	±0.5	±1	±0.7	+2/-0	Max.	±0.02	±1.5	+0.75/-0.5	Max.	+1/-0.5	Max.	Max.	Min	±0.2	±0.2	
P0:12.7	20	12.7	10.0	12.7	7.70	16	44	1.0	12	9	3	18	1	2	9	4	0.6	A
P0:15.0	20	15.0	10.0	15.0	10.0	16	44	1.0	12	9	3	18	1	2	9	4	0.6	A

NTC Thermistor: SCH Series

High Power Type NTC Thermistor for Inrush Current Limiting



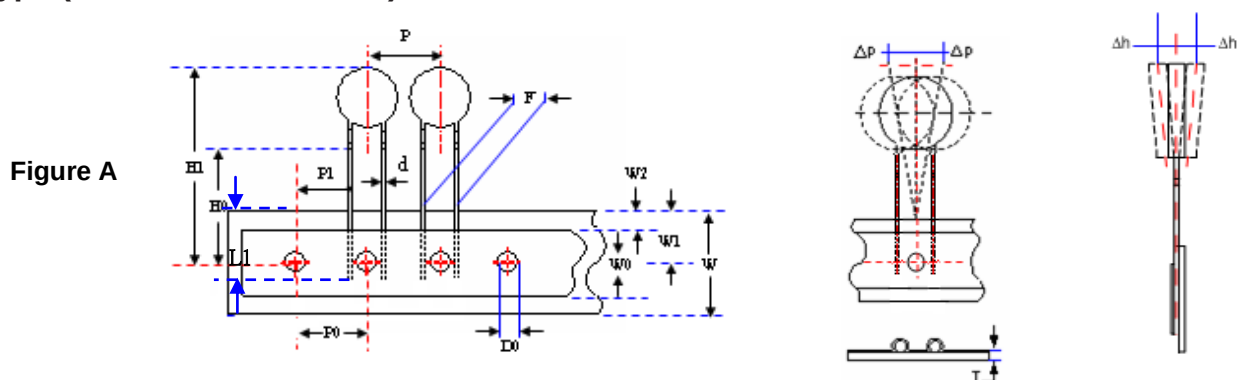
F Type (Y kink lead)



(Unit: mm)

Taping Dimension	Disc Size	P0	F	P	P1	H	H1	d	W0	W1	W2	W	ΔP	Δh	L1	D0	T	Figure
		±0.3	±0.5	±1	±0.7	+2/-0	Max.	±0.02	±1.5	+0.75/-0.5	Max.	+1/-0.5	Max.	Max.	Min	±0.2	±0.2	
P0:12.7	20	12.7	7.5	25.4	8.95	16	42	1.0	12	9	3	18	1	2	9	4	0.6	A
P0:15.0	20	15.0	7.5	30.0	3.75	16	42	1.0	12	9	3	18	1	2	9	4	0.6	B

K Type (Y kink P10.0mm lead)



(Unit: mm)

Taping Dimension	Disc Size	P0	F	P	P1	H	H1	d	W0	W1	W2	W	ΔP	Δh	L1	D0	T	Figure
		±0.3	±0.5	±1	±0.7	+2/-0	Max.	±0.02	±1.5	+0.75/-0.5	Max.	+1/-0.5	Max.	Max.	Min	±0.2	±0.2	
P0:12.7	20	12.7	10.0	12.7	7.70	16	42	1.0	12	9	3	18	1	2	9	4	0.6	A
P0:15.0	20	15.0	10.0	15.0	10.0	16	42	1.0	12	9	3	18	1	2	9	4	0.6	A

NTC Thermistor: SCH Series

High Power Type NTC Thermistor for Inrush Current Limiting



■ Quantity

- Bulk: Packing of $\Phi 20$ products with 90° bend (cut lead products are included)

Size	Product quantity per bag	Bag quantity per box	Product quantity per box	Box quantity per carton	Product quantity per carton	Lead structure	Ammo box dimensions	Carton dimensions
	(pcs)	(bags)	(pcs)	(carton)	(pcs)		(LxWxH) (Unit: mm)	(LxWxH) (Unit: mm)
$\Phi 20$	50	4	200	8	1600	90° bend	160x160x65	350x350x140
	50	4	200	8	1600	Cut lead		

● Ammo packing

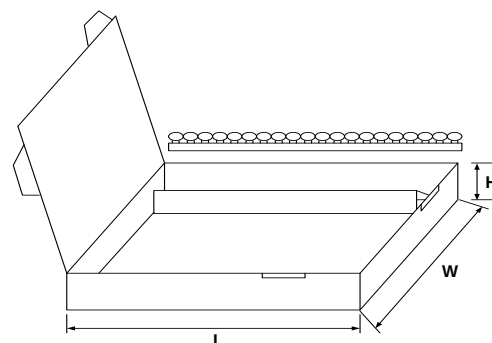
1. Cardboard strips

Packing Method: 20pcs/strip, 30 strips/box, 600pcs/box

Box Dimensions: 340x340x62mm

Dimension and packing method of carton

Box quantity per carton	Product quantity per carton (pcs/carton)	Carton dimensions (LxWxH) (Unit: mm)
2 boxes	1200pcs	350x350x140



2. Ammo Box Taping

Disc Size	Product quantity per box	Box dimensions	Carton dimensions	Box quantity of per carton
	(pcs)	(LxWxH) (Unit: mm)	(LxWxH) (Unit: mm)	(Box)
$\Phi 20$	400	345x275x55	350x310x290	5

NTC Thermistor: SCH Series

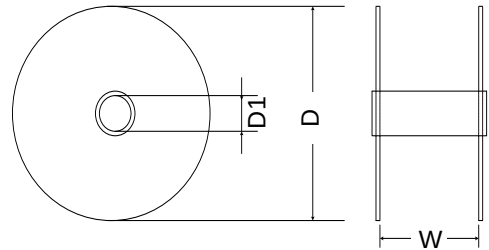
High Power Type NTC Thermistor for Inrush Current Limiting



● Reel Packing

1. Second Reel Packing

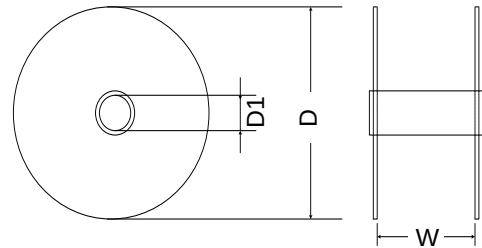
Dimensions of Cardboard Reels			
Disc Size	D	D1	W
Φ20	340±10mm	31±1mm	55±1mm
Note: Reels for products with customized height are available			



Disc Size	Product quantity per reel	Box dimensions	Carton dimensions	Reel quantity per carton (Reel and outer box)
	(pcs)	(LxWxH) (Unit: mm)	(LxWxH) (Unit: mm)	
Φ20	400	No inner box	350x350x290	4

2. First Reel Packing

Dimensions of Cardboard Reels			
Disc Size	D	D1	W
Φ20	340±10mm	31±1mm	55±1mm
Note: Reels for products with customized height are available			



Disc Size	Product quantity per reel	Box dimensions	Carton dimensions	Reels quantity per carton (Reel and outer box)
	(pcs/reel)	(LxWxH) (Unit: mm)	(LxWxH) (Unit: mm)	
Φ20	400	No inner box	350x350x290	4

■ Warehouse Storage Conditions of Products

- Storage Conditions:
 1. Storage Temperature: -10℃~+40℃
 2. Relative Humidity: ≤75%RH
 3. Keep away from corrosive atmosphere and sunlight.
- Period of Storage: 1 year