ELITALIA

TKS

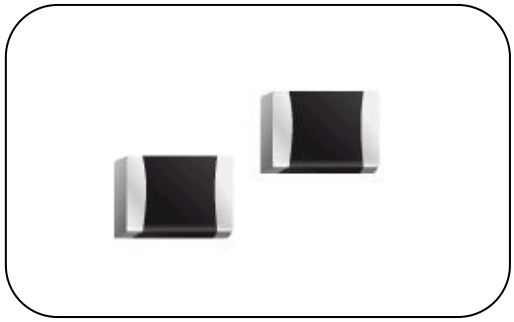
DHT
SCK
TGM
TSM
TSM-C
TTC03
TTC05
TTF
TTS

NTC THERMISTORS INDEX

NTC Thermistor for Automotive: TSM-C Series

SMD NTC Thermistor for Temperature Sensing

■ Features



1. Qualification based on AEC-Q200 Rev-C
2. Operating temperature range: -50 ~ +150 ℃
3. Superior stability in high-temperature and high-humidity environment
4. RoHS compliant

■ Recommended Applications

1. Car audio, car navigation
2. Various engine control units
3. Circuits for ETC equipment
4. Various motor driving circuits
5. Temperature compensation for various circuits

■ Part Number Code

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Product Type

TSM	THINKING NTC Thermistor TSM Series

Size (EIA)

A	0201
0	0402
1	0603
2	0805

Definition of B Value

C	$B_{25/85}$
D	$B_{25/50}$

Zero Power Resistance at 25℃ (R_{25})

102	$10x10^2\Omega$= 1 KΩ
103	$10x10^3\Omega$=10 KΩ
473	$47x10^3\Omega$=47KΩ

Tolerance of R_{25}

F	±1%
G	±2%
H	±3%
J	±5%
K	±10%

First Two Digits of B Value

30	30
31	31
32	32
:	:
:	:
40	40
41	41
:	:

Last Two Digits of B Value

0	00
A	05
1	10
B	15
2	20
:	:
H	75
8	80
J	85
9	90
K	95

Tolerance of B Value

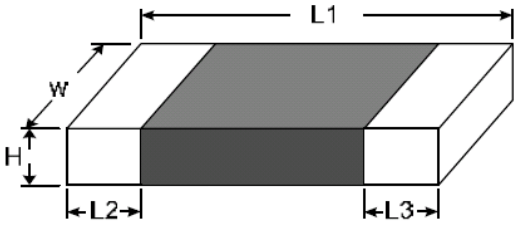
1	±1%
2	±2%
3	±3%

Packaging

R	Reel
B	Bulk

Optional Suffix

■ Structure and Dimensions



(Unit: mm)

Part No.	Size	L1.	W	H max.	L2 & L3
TSM1	0603	1.60±0.15	0.80±0.15	0.95	0.40±0.15
TSM2	0805	2.00±0.20	1.25±0.20	1.20	0.40±0.20

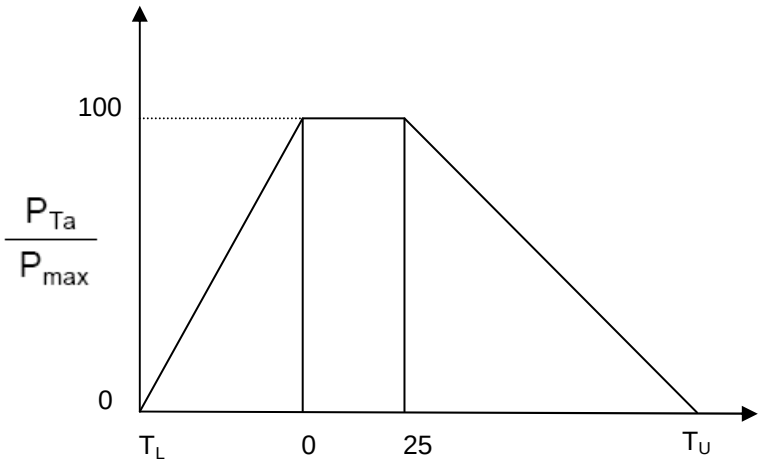
■ Electrical Characteristics

Part No.	Zero Power Resistance at 25℃	Tolerance of R_{25}	B Value		Tolerance of B value	Max. Power Dissipation at 25℃	Dissipation Factor	Thermal Time Constant	Operating Temperature Range
	R_{25}(KΩ)	(±%)	(K)		(±%)	P_{max}(mW)	δ(mW/℃)	τ(Sec.)	T_L~T_U(℃)
TSM1C103F34D3R	10	1、2、3	25/85	3435	3	210	Approx. 2.1	Approx. 3.1	-50 ~ +150
TSM1C103F39H3R	10		25/85	3975					
TSM1C473F39H3R	47		25/85	3975					
TSM2C103F34D3R	10	1、2、3	25/85	3435	3	240	Approx. 2.4	Approx. 5.4	-50 ~ +150
TSM2C103F39H3R	10		25/85	3975					
TSM2C473F39H3R	47		25/85	3975					

Note 1: □ = Tolerance of R_{25}

*Special specifications are available upon request

■ Max. Power Dissipation Derating Curve



T_U：Maximum operating temperature (℃)

T_L：Minimum operating temperature (℃)

For example：

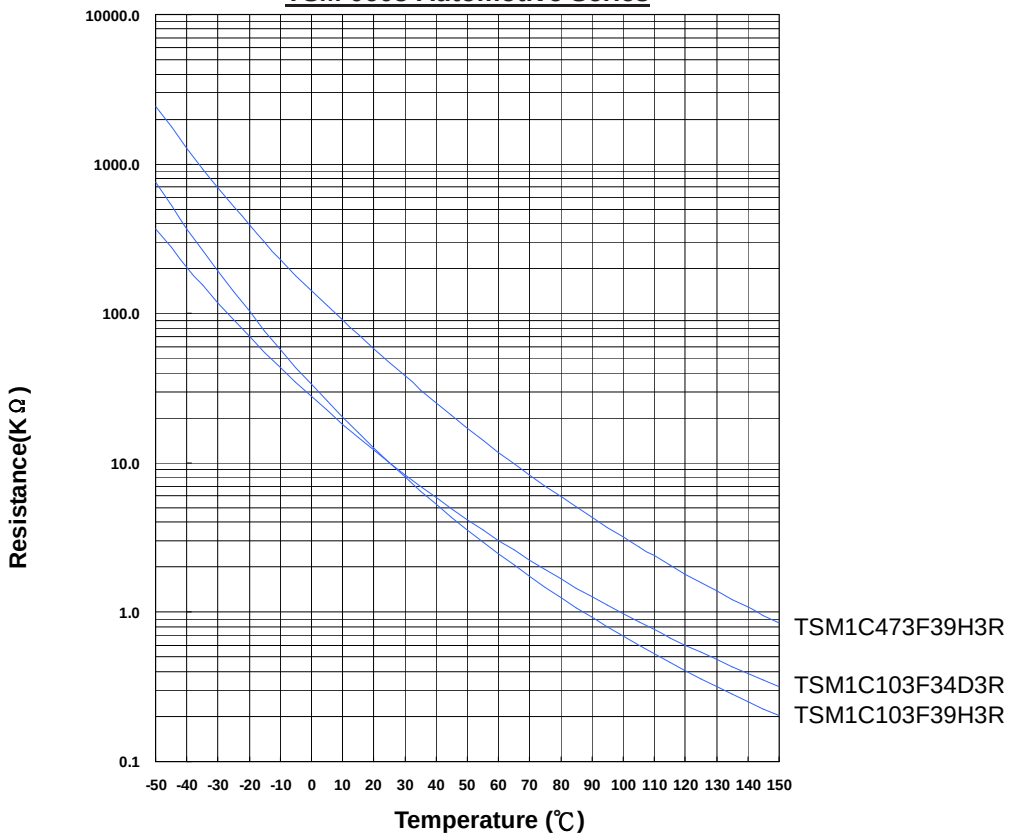
Ambient temperature (Ta)=55℃

Maximum operating temperature (T_U)＝150℃

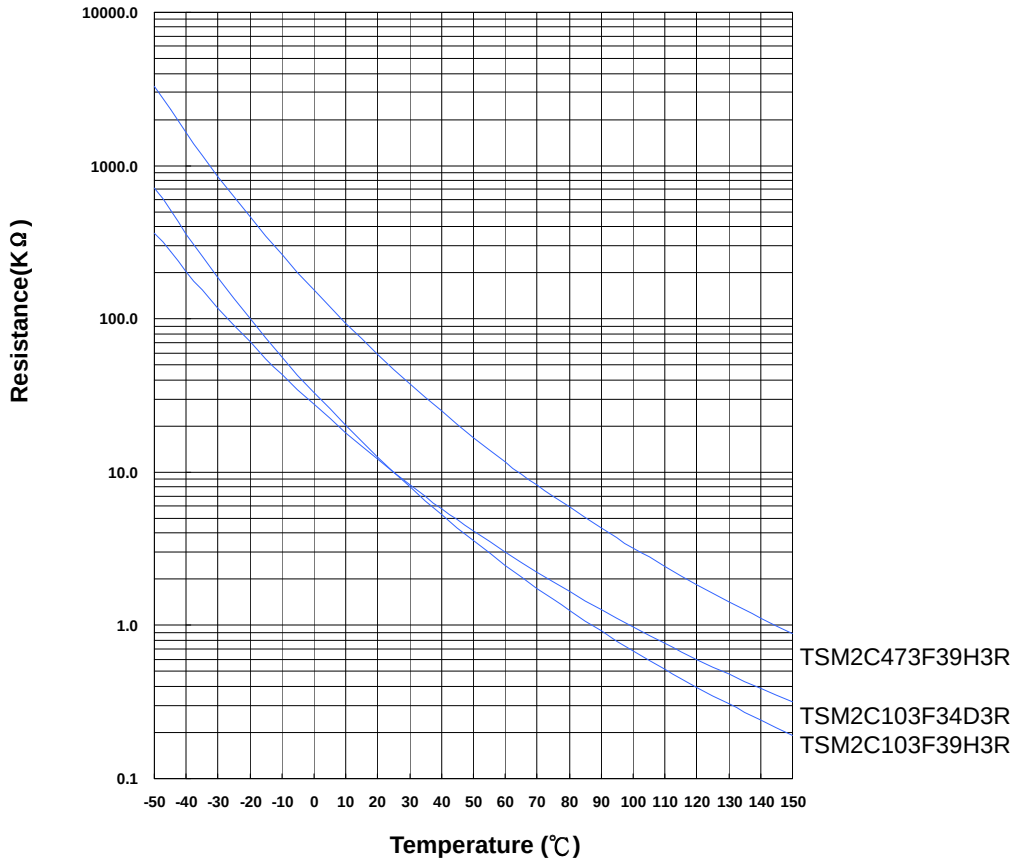
P_{Ta}=(T_U-Ta)/(T_U-25)×Pmax＝76% Pmax

■ R-T Characteristic Curves (representative)

TSM 0603 Automotive Series

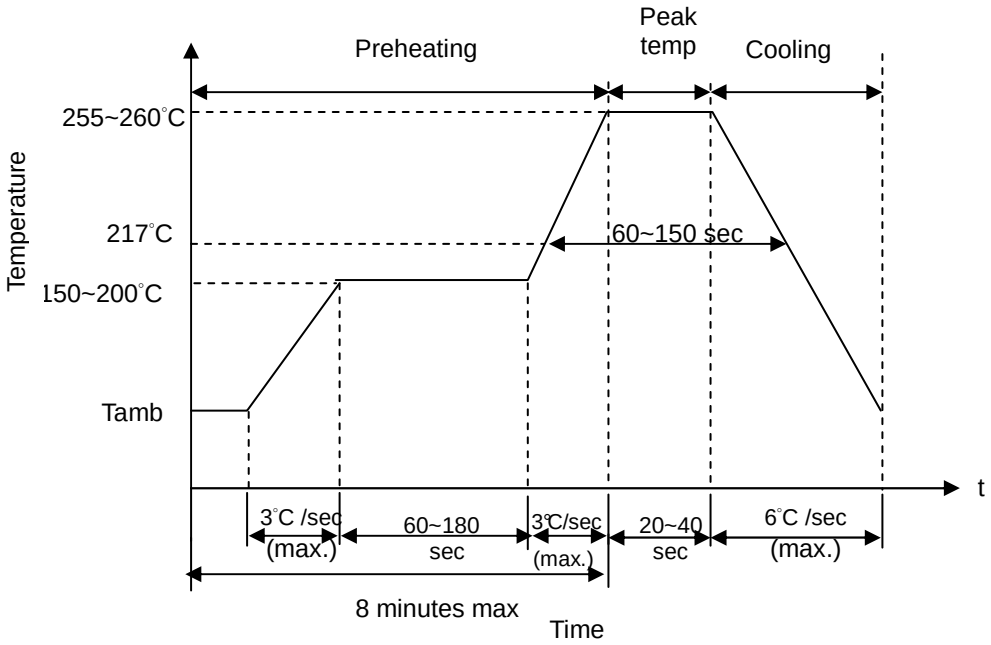


TSM 0805 Automotive Series



■ Soldering Recommendation

● IR-reflow Soldering Profile

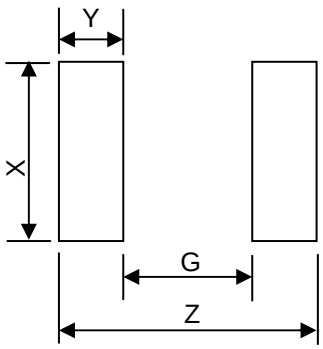


● Reworking Conditions with Soldering Iron

Item	Conditions
Temperature of Soldering Iron-tip	360℃(max.)
Soldering Time	3 sec (max.)
Diameter of Soldering Iron-tip	Φ3mm (max.)

Caution: Do not touch the component surface with soldering iron directly to prevent it from damage.

■ Recommended Soldering Pad Dimensions



Size	Z (mm)	G (mm)	X (mm)	Y (mm)
0603	3.0	1.0	1.0	1.0
0805	3.4	1.0	1.4	1.2

Reliability (based on AEC-Q200 Rev-C)

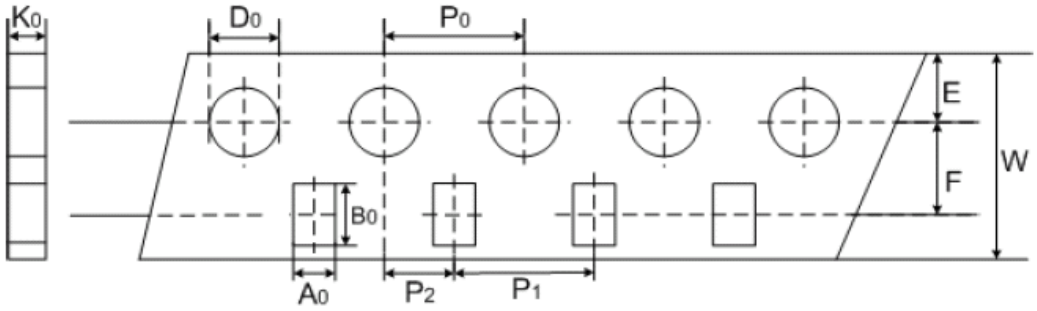
<table>
<tr><th>Item</th><th>Standard</th><th>Test conditions / Methods</th><th>Specifications</th></tr>
<tr><td>High Temperature Exposure (Storage)</td><td>MIL-STD-202 Method 108</td><td>Test temp. ：150 +3/-0℃
Duration: 1000 h Unpowered
Measurement at 24±2 hours after test conclusion.</td><td>No visible damage
$|\triangle R_{25}/R_{25}| \leqq 5\ \%$</td></tr>
<tr><td>Temperature Cycling</td><td>JESD22 Method JA-104</td><td>Lower test temp.：-55 +0/-3℃
Upper test temp.：150 +3/-0℃
Soak Time at Lower or Upper Temperature：1 min
Cycle time：2 Cycles/hr
Number of cycles：1000
Measurement at 24±2 hours after test conclusion.</td><td>No visible damage
$|\triangle R_{25}/R_{25}| \leqq 5\ \%$</td></tr>
<tr><td>Moisture Resistance</td><td>MIL-STD-202 Method 106</td><td>Duration of 1 cycle: 24 h
Number of cycles: 10，Unpowered
Measurement at 24±2 hours after test conclusion.
<table>
<tr><th rowspan="2">Step</th><th colspan="2">Temp.</th><th>humidity</th><th>Period</th></tr>
<tr><th>Start</th><th>Finish</th><th>(%)</th><th>(hr)</th></tr>
<tr><td>1</td><td>25</td><td>65</td><td>90~100</td><td>2.5</td></tr>
<tr><td>2</td><td>65</td><td>65</td><td>90~100</td><td>3</td></tr>
<tr><td>3</td><td>65</td><td>25</td><td>80~100</td><td>2.5</td></tr>
<tr><td>4</td><td>25</td><td>65</td><td>90~100</td><td>2.5</td></tr>
<tr><td>5</td><td>65</td><td>65</td><td>90~100</td><td>3</td></tr>
<tr><td>6</td><td>65</td><td>25</td><td>80~100</td><td>2.5</td></tr>
<tr><td>7</td><td>25</td><td>25</td><td>80~100</td><td>8</td></tr>
</table></td><td>No visible damage
$|\triangle R_{25}/R_{25}| \leqq 5\ \%$</td></tr>
<tr><td>Biased Humidity</td><td>MIL-STD-202 Method 103</td><td>Test temp.：85℃
Rel. humidity of air： 85%
Duration: 1000 h
10% Rated Power.
Measurement at 24±2 hours after test conclusion.</td><td>No visible damage
$|\triangle R_{25}/R_{25}| \leqq 5\ \%$</td></tr>
</table>

Item	Standard	Test conditions / Methods	Specifications
Operational Life	MIL-STD-202 Method 108	Test temp.: 150 +3/-0℃ Duration: 1000 h Test Power：1mW Measurement at 24±2 hours after test conclusion.	No visible damage $\lvert \triangle R_{25}/R_{25} \rvert \leqq 5\ \%$
External Visual	MIL-STD-883 Method 2009	Inspect device construction, marking and workmanship.	No visible damage
Physical Dimension	JESD22 Method JB-100	Verify physical dimensions to the applicable device specification.	Within the specified values
Resistance to Solvents	MIL-STD-202 Method 215	Per MIL-STD-202 Method 215 Solvent 1: 1 part (by volume) of isopropyl alcohol 3 part (by volume) of mineral spirits.	No visible damage
Mechanical Shock	MIL-STD -202-213	Test Condition F Peak value：1500g's Half sine Waveform Normal duration (D)： 0.5ms In 3 directions perpendicularly intersecting each other (total 18 times).	No visible damage $\lvert \triangle R_{25}/R_{25} \rvert \leqq 5\ \%$
Vibration	MIL-STD-202 Method 204	Acceleration：5 g's Sweep time: 20 min Frequency range: 10 to 2000 Hz 3×12 cycles	No visible damage $\lvert \triangle R_{25}/R_{25} \rvert \leqq 5\ \%$
Resistance to Soldering Heat	MIL-STD-202 Method 210	Condition B No pre-heat of samples. Temperature：260±5℃,Time ：10±1s Immersion and emersion rate：25mm/s ±6 mm/s Number of heat cycles：1	No visible damage $\lvert \triangle R_{25}/R_{25} \rvert \leqq 5\ \%$
Thermal Shock	MIL-STD-202 Method 107	Lower test temp.：-55 +0/-3℃ Upper test temp.：150 +3/-0℃ Maximum transfer time：20 seconds. Dwell time：15 minutes. Air-Air. Number of cycles：300	No visible damage $\lvert \triangle R_{25}/R_{25} \rvert \leqq 5\ \%$

Item	Standard	Test conditions / Methods	Specifications
ESD	AEC-Q200 -002	Discharge capacitance：150 pF Charging voltage: 6 kV Contact discharge 1 pulse in each polarity	No visible damage $\lvert \triangle R_{25}/R_{25} \rvert \leqq 5\ \%$
Solderability	J-STD-002	a) 4 h @ 155℃ dry heat Dip @235±5℃ 5 +0/-0.5sec b)Steam aging 8 h±15min @93±3℃ Dip @260±5℃ 7±0.5sec	95% of termination wetted
Electrical Characterization	Specifications	R(-50℃) 、R(25℃) 、R(150℃) B(R25℃/R85℃)	Within the specified values
Board Flex	AEC-Q200 -005 (JIS-C-6429)	Bend the board：2mm (Min.) Duration of the applied forces ：60 (+5) Sec	No visible damage $\lvert \triangle R_{25}/R_{25} \rvert \leqq 5\ \%$
Terminal Strength	AEC-Q200 -006 (JIS-C-6429)	Apply force： 0603=1.0kg (10 N) 0805=1.8kg (17.7 N) Duration of the applied forces ：60 (+1) Sec	No visible damage $\lvert \triangle R_{25}/R_{25} \rvert \leqq 5\ \%$

■ Package

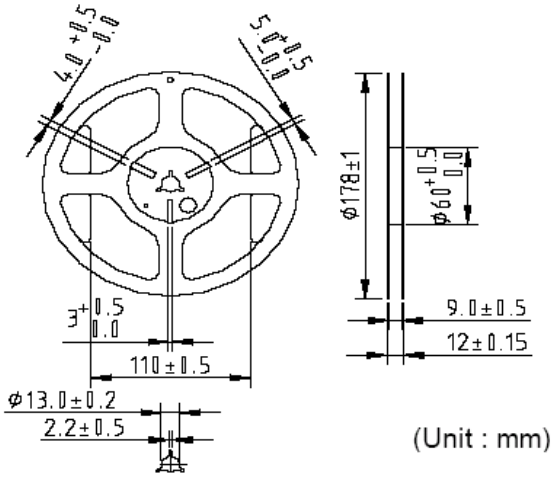
● Taping Specification



(Unit: mm)

Type \ Index	A_0 ±0.2	B_0 ±0.2	W ±0.2	E ±0.1	F ±0.05	P_1 ±0.1	P_2 ±0.05	P_0 ±0.1	D_0 ±0.1	K_0 ±0.1
0603	1.1	1.9	8	1.75	3.5	4	2	4	1.55	0.95
0805	1.5	2.3	8	1.75	3.5	4	2	4	1.55	0.95

■ Quantity



(Unit : mm)

Type	Quantity (pcs/reel)
0603	4,000
0805	3,500

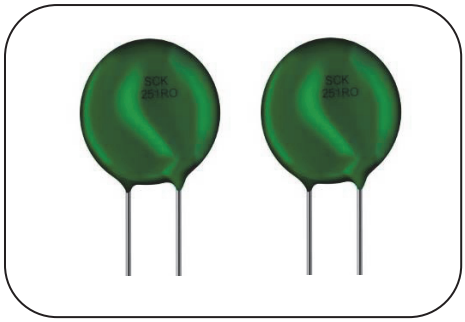
■ Storage Conditions of Products

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

NTC Thermistor：SCK Series

Power Thermistor for Limiting Inrush Current

■ Features



1. RoHS & Halogen Free (HF) compliant
2. Body size: Φ5mm ~ Φ30mm
3. Radial lead resin coated
4. High power rating
5. Wide resistance range
6. Cost effective
7. Operating temperature range:
   Φ5mm: -40℃~+150℃
   Φ8~ Φ10mm: -40℃~+170℃
   Φ13mm~ Φ30mm: -40℃~+200℃
8. Agency recognition: UL / cUL / TUV / CSA / CQC

■ Recommended Applications

1. Switch mode power supply
2. Electric motor
3. Transformer
4. Adapter
5. Projector
6. Halogen lamp
7. LED driver circuit

■ Part Number Code

● Φ5mm~ Φ15mm

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Product Type	
SCK	THINKING NTC Thermistor SCK Series

Body Size	
05	Φ5mm
08	Φ8mm
10	Φ10mm
13	Φ13mm
15	Φ15mm

Zero Power Resistance at 25℃ (R_{25})	
0R5	0.5Ω
2R5	2.5Ω
08	8Ω
20	20Ω
120	120Ω

Max Steady State Current at 25℃	
X3	0.3A
2X	2.5A
8	8A
10	10A

Tolerance of R_{25}	
L	±15%
M	±20%
N	±25%

Appearance	
S	Straight lead
F	Y kink lead
T	L kink lead

Optional Suffix	
Y	RoHS & HF Compliant

● Φ20mm~ Φ30mm

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Product Type	
SCK	THINKING NTC Thermistor SCK Series

Body Size	
20	Φ20mm
25	Φ25mm
30	Φ30mm

Zero Power Resistance at 25℃ (R_{25})
R_{25}＜10Ω 0R7:0.7Ω 2R5:2.5Ω
R_{25}≧10Ω 100:10Ω 470:47Ω 471:470Ω

Tolerance of R_{25}	
L	±15%
M	±20%
N	±25%

Appearance	
S	Straight lead
F	Y kink lead
T	L kink lead

Packaging	
B	Bulk

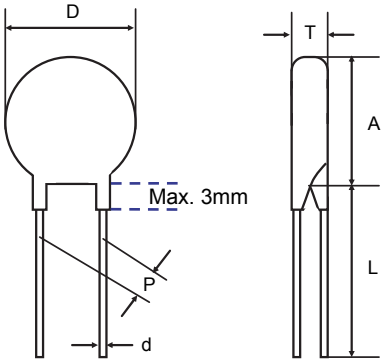
Optional Suffix	
Y	RoHS & HF Compliant
H	RoHS & HF Compliant (For SCK25 and SCK30 only)

NTC Thermistor：SCK Series

Power Thermistor for Limiting Inrush Current

■ Structure and Dimensions

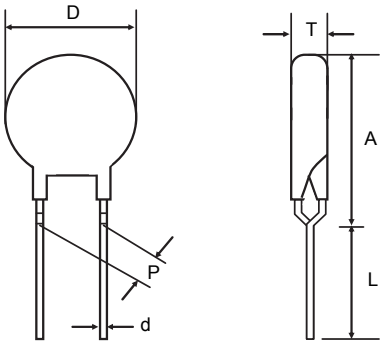
S Type (Straight lead)



(Unit: mm)

Series	Dmax.	P.	d	Amax.	Lmin.	Tmax.
SCK05	6.5	4±0.6	0.8±0.02	6.5	31	5
SCK08	9.5	5±0.8	0.8±0.02	9.5	31	5
SCK10	11.5	5±0.8	0.8±0.02	11.5	31	5
SCK13	14.5	7.5±1	0.8±0.02	14.5	30	6
SCK15	16.5	7.5±1	1.0±0.02	16.5	29	6
SCK20	21.5	7.5±1	1.0±0.02	21.5	26	6
SCK25	29	7.5±1	1.0±0.02	29.0	25	7
SCK30	36	7.5±1	1.0±0.02	36.0	23	8

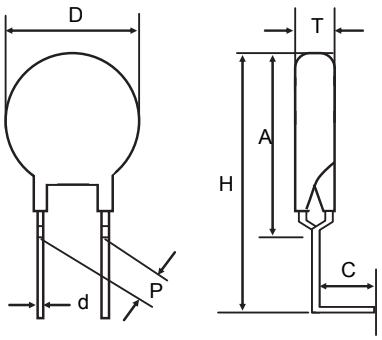
F Type (Y kink lead)



(Unit: mm)

Series	Dmax.	P	d	Amax.	Lmin.	Tmax.
SCK05	6.5	4±0.6	0.8±0.02	11.0	29	5
SCK08	9.5	5±0.8	0.8±0.02	13.0	29	5
SCK10	11.5	5±0.8	0.8±0.02	15.0	29	5
SCK13	14.5	7.5±1	0.8±0.02	17.5	27	6
SCK15	16.5	7.5±1	1±0.02	19.0	26	6
SCK20	21.5	7.5±1	1±0.02	24.5	25	6
SCK25	29	7.5±1	1±0.02	35.0	22	7
SCK30	36	7.5±1	1±0.02	42.0	22	8

T Type (L kink lead)



(Unit: mm)

Series	Dmax.	P	d	Amax.	Hmax.	C.	Tmax.
SCK05	6.5	4±0.6	0.8±0.02	11.0	15.5	4.0±1	5
SCK08	9.5	5±0.8	0.8±0.02	13.0	17.5	4.0±1	5
SCK10	11.5	5±0.8	0.8±0.02	15.0	19.5	4.0±1	5
SCK13	14.5	7.5±1	0.8±0.02	17.5	21.5	4.0±1	6
SCK15	16.5	7.5±1	1±0.02	19.0	23.5	4.0±1	6
SCK20	21.5	7.5±1	1±0.02	24.5	28.5	4.0±1	6

NTC Thermistor：SCK Series

Power Thermistor for Limiting Inrush Current

■ Electrical Characteristics

Part No.	Zero Power Resistance at 25°C	Max. Current at 25℃	Residual Resistance at 25℃ Imax	Recommend Capacitance @240Vac	Max. Power Rating at 25°C	Dissipation Factor	Thermal Time Constant	Operating Temperature Range
	R_{25}(Ω)	I_{max}(A)	R_{Imax}(Ω)	C_{th}(μF)	P_{max}(W)	δ(mW/°C)	τ (Sec.)	T_L~T_U(°C)
SCK05052□	5	2	0.429	100	1.8	Approx. 15	Approx. 17	-40 ~ +150
SCK05081□	8	1	1.089	68				
SCK05101□	10	1	1.126	100				
SCK05121□	12	1	1.184	68				
SCK0520X3□	20	0.3	5.560	100				
SCK08042□	4	2	0.441	220	2.3	Approx. 16	Approx. 38	-40 ~ +170
SCK084R72□	4.7	2	0.445	220				
SCK08053□	5	3	0.261	220				
SCK08063□	6	3	0.283	220				
SCK08073□	7	3	0.287	220				
SCK08082□	8	2	0.520	220				
SCK08102□	10	2	0.542	220				
SCK08152□	15	2	0.548	100				
SCK08201□	20	1	1.544	100				
SCK0830X□	30	0.5	4.094	100				
SCK10015□	1	5	0.091	470	2.4	Approx. 17	Approx. 43	-40 ~ +170
SCK101R35□	1.3	5	0.095	330				
SCK101R55□	1.5	5	0.101	330				
SCK102R55A□	2.5	5	0.120	470				
SCK10035□	3	5	0.127	560				
SCK10044□	4	4	0.161	560				
SCK10054□	5	4	0.180	470				
SCK106R83□	6.8	3	0.270	330				
SCK10083□	8	3	0.278	330				
SCK10103□	10	3	0.297	330				
SCK10123□	12	3	0.301	470				
SCK10133□	13	3	0.356	330				
SCK10152X□	15	2.5	0.442	330				
SCK10162X□	16	2.5	0.471	330				
SCK10202□	20	2	0.646	330				
SCK10222□	22	2	0.659	220				
SCK10252□	25	2	0.674	330				
SCK10302□	30	2	0.700	330				
SCK10472□	47	2	0.720	330				
SCK10502□	50	2	0.813	330				
SCK10801□	80	1	2.236	220				
SCK101001□	100	1	2.318	200				
SCK101201□	120	1	2.406	200				

Note 1: □ = Tolerance of R_{25}

Note 2: Special specifications are available upon request.

NTC Thermistor：SCK Series

Power Thermistor for Limiting Inrush Current

■ Electrical Characteristics

Part No.	Zero Power Resistance at 25°C	Max. Current at 25℃	Residual Resistance at 25℃ Imax	Recommend Capacitance @240Vac	Max. Power Rating at 25°C	Dissipation Factor	Thermal Time Constant	Operating Temperature Range
	R_{25}(Ω)	I_{max}(A)	R_{Imax}(Ω)	C_{th}(μF)	P_{max}(W)	δ(mW/°C)	τ (Sec.)	T_L~T_U(°C)
SCK13013☐	1	3	0.174	560	3.1	Approx. 18	Approx. 66	-40 ~ +200
SCK131R37☐	1.3	7	0.070	470				
SCK132R56☐	2.5	6	0.094	560				
SCK13045☐	4	5	0.132	560				
SCK134R74☐	4.7	4	0.168	560				
SCK13055☐	5	5	0.166	560				
SCK13074☐	7	4	0.184	470				
SCK13084☐	8	4	0.206	470				
SCK13104☐	10	4	0.217	470				
SCK13124☐	12	4	0.230	560				
SCK13153☐	15	3	0.343	560				
SCK13163☐	16	3	0.348	560				
SCK13183☐	18	3	0.365	560				
SCK13203☐	20	3	0.410	470				
SCK150R78A☐	0.7	8	0.051	680	3.6	Approx. 21	Approx. 75	-40 ~ +200
SCK15018☐	1	8	0.054	680				
SCK151R38☐	1.3	8	0.064	680				
SCK151R58☐	1.5	8	0.068	800				
SCK15028☐	2	8	0.078	680				
SCK152R58☐	2.5	8	0.086	680				
SCK15037☐	3	7	0.091	820				
SCK15046☐	4	6	0.117	800				
SCK15056☐	5	6	0.121	820				
SCK15065☐	6	5	0.159	680				
SCK15075☐	7	5	0.161	820				
SCK15085☐	8	5	0.165	680				
SCK15105☐	10	5	0.178	820				
SCK15125☐	12	5	0.185	680				
SCK15154☐	15	4	0.261	820				
SCK15164☐	16	4	0.265	820				
SCK15184☐	18	4	0.273	680				
SCK15204☐	20	4	0.283	820				
SCK15224☐	22	4	0.308	560				
SCK15253☐	25	3	0.425	680				
SCK15303☐	30	3	0.461	680				
SCK15333☐	33	3	0.484	560				
SCK15403☐	40	3	0.511	680				
SCK15473☐	47	3	0.517	680				
SCK15802X☐	80	2.5	0.693	560				
SCK151202☐	120	2	1.010	560				

Note 1: ☐ = Tolerance of R_{25}

Note 2: Special specifications are available upon request.

■ Electrical Characteristics

Part No.	Zero Power Resistance at 25°C	Max. Current at 25℃	Residual Resistance at 25℃ Imax	Recommend Capacitance @240Vac	Max. Power Rating at 25°C	Dissipation Factor	Thermal Time Constant	Operating Temperature Range
	R_{25}(Ω)	I_{max}(A)	R_{Imax}(Ω)	C_{th}(μF)	P_{max}(W)	δ(mW/°C)	τ (Sec.)	T_L~T_U(°C)
SCK200R7□	0.7	15	0.035	1000	4.9	Approx. 28	Approx. 113	-40 ~ +200
SCK201R0□	1	13	0.034					
SCK201R5□	1.5	10.5	0.041					
SCK202R0□	2	10	0.062					
SCK202R5□	2.5	9	0.083					
SCK203R0□	3	8.5	0.078					
SCK204R0□	4	8	0.080					
SCK204R7□	4.7	7.5	0.114					
SCK205R0□	5	7.5	0.118					
SCK206R0□	6	7	0.120					
SCK206R8□	6.8	6.5	0.130					
SCK207R0□	7	6.5	0.132					
SCK208R0□	8	6	0.161					
SCK20100□	10	5.5	0.196					
SCK20120□	12	5	0.197					
SCK20130□	13	5	0.213					
SCK20150□	15	4.5	0.258					
SCK20160□	16	4.5	0.276					
SCK20180□	18	4	0.280					
SCK20200□	20	4	0.306					
SCK251R0□	1	20	0.020	1200	7.0	Approx. 30	Approx. 130	-40 ~ +200
SCK251R5□	1.5	18.5	0.023					
SCK252R0□	2	18	0.025					
SCK252R5□	2.5	15	0.032					
SCK253R0□	3	14.5	0.042					
SCK254R0□	4	14	0.044					
SCK254R7□	4.7	13	0.052					
SCK255R0□	5	12	0.061					
SCK256R8□	6.8	10.5	0.082					
SCK257R0□	7	10	0.092					
SCK258R0□	8	9	0.115					
SCK25100□	10	8	0.141					
SCK25120□	12	7.5	0.164					
SCK25150□	15	6.5	0.210					
SCK25180□	18	5.5	0.231					
SCK25200□	20	5	0.270					

Note 1: □ = Tolerance of R_{25}

Note 2: Special specifications are available upon request.

■ Electrical Characteristics

Part No.	Zero Power Resistance at 25°C	Max. Current at 25℃	Residual Resistance at 25℃ Imax	Recommend Capacitance @240Vac	Max. Power Rating at 25°C	Dissipation Factor	Thermal Time Constant	Operating Temperature Range
	R_{25}(Ω)	I_{max}(A)	R_{Imax}(Ω)	C_{th}(μF)	P_{max}(W)	δ(mW/°C)	τ (Sec.)	T_L~T_U(°C)
SCK301R0□	1	30	0.016	1500	8.0	Approx. 40	Approx. 190	-40 ~ +200
SCK301R5□	1.5	25	0.020					
SCK302R0□	2	23	0.022					
SCK302R5□	2.5	18	0.030					
SCK303R0□	3	17	0.035					
SCK304R0□	4	16	0.048					
SCK304R7□	4.7	15	0.055					
SCK305R0□	5	14	0.057					
SCK306R8□	6.8	12	0.077					
SCK307R0□	7	11.5	0.084					
SCK308R0□	8	10.5	0.100					
SCK30100□	10	10	0.115					
SCK30120□	12	9	0.142					
SCK30150□	15	8	0.175					
SCK30180□	18	7	0.210					
SCK30200□	20	6	0.233					

Note 1: □ = Tolerance of R_{25}

Note 2: Special specifications are available upon request.

NTC Thermistor：SCK Series

Power Thermistor for Limiting Inrush Current

■ Safety Approvals

- UL&cUL File No: E138827
- CSA File No: 97495
- TUV File No: R 50050155
- CQC File No:CQC05001011984,993,985,942,943,944, CQC05001011988,989,990,963,964,965

Body Size	Certified Model No.	Safety Approvals				
		UL	cUL	CSA	TUV	CQC
5mm	SCK-052	√	√	√	√	√
	SCK-081	√	√		√	√
	SCK-101	√	√	√	√	√
	SCK-121	√	√		√	√
	SCK-20X3	√	√	√	√	√
8mm	SCK-042	√	√	√	√	√
	SCK-4R72	√	√	√	√	√
	SCK-053	√	√	√	√	√
	SCK-063	√	√	√	√	√
	SCK-073	√	√		√	√
	SCK-082	√	√	√	√	√
	SCK-102	√	√	√	√	√
	SCK-152	√	√	√	√	√
	SCK-201	√	√	√	√	√
	SCK-30X	√	√	√	√	√
10mm	SCK-015	√	√		√	√
	SCK-1R35	√	√		√	√
	SCK-1R55	√	√		√	√
	SCK-2R55A	√	√	√	√	√
	SCK-035	√	√	√	√	√
	SCK-044	√	√	√	√	√
	SCK-054	√	√	√	√	√
	SCK-6R83	√	√	√	√	√
	SCK-083	√	√	√	√	√
	SCK-103	√	√	√	√	√
	SCK-123	√	√	√	√	√
	SCK-133	√	√	√	√	√
	SCK-152X	√	√	√	√	√
	SCK-162X	√	√	√	√	√
	SCK-202	√	√	√	√	√
	SCK-222	√	√		√	√
	SCK-252	√	√	√	√	√
	SCK-302	√	√	√	√	√
	SCK-472	√	√	√	√	√
	SCK-502	√	√	√	√	√
	SCK-801	√	√	√	√	√
	SCK-1001	√	√	√	√	√
	SCK-1201	√	√	√	√	√

Body Size	Certified Model No.	Safety Approvals				
		UL	cUL	CSA	TUV	CQC
13mm	SCK-013	√	√		√	√
	SCK-1R37	√	√		√	√
	SCK-2R56	√	√	√	√	√
	SCK-045	√	√		√	√
	SCK-4R74	√	√		√	√
	SCK-055	√	√	√	√	√
	SCK-074	√	√		√	√
	SCK-084	√	√	√	√	√
	SCK-104	√	√	√	√	√
	SCK-124	√	√	√	√	√
	SCK-153	√	√	√	√	√
	SCK-163	√	√	√	√	√
	SCK-183	√	√	√	√	√
	SCK-203	√	√	√	√	√
15mm	SCK-0R78A	√	√		√	√
	SCK-018	√	√		√	
	SCK-1R38	√	√	√	√	√
	SCK-1R58	√	√	√	√	√
	SCK-028	√	√		√	√
	SCK-2R58	√	√	√	√	√
	SCK-037	√	√	√	√	√
	SCK-046	√	√	√	√	√
	SCK-056	√	√	√	√	√
	SCK-065	√	√	√	√	√
	SCK-075	√	√	√	√	√
	SCK-085	√	√		√	√
	SCK-105	√	√	√	√	√
	SCK-125	√	√	√	√	√
	SCK-154	√	√	√	√	√
	SCK-164	√	√	√	√	√
	SCK-184	√	√	√	√	√
	SCK-204	√	√	√	√	√
	SCK-224	√	√		√	√
	SCK-253	√	√	√	√	√
	SCK-303	√	√	√	√	√
	SCK-333	√	√		√	√
	SCK-403	√	√	√	√	√
	SCK-473	√	√	√	√	√

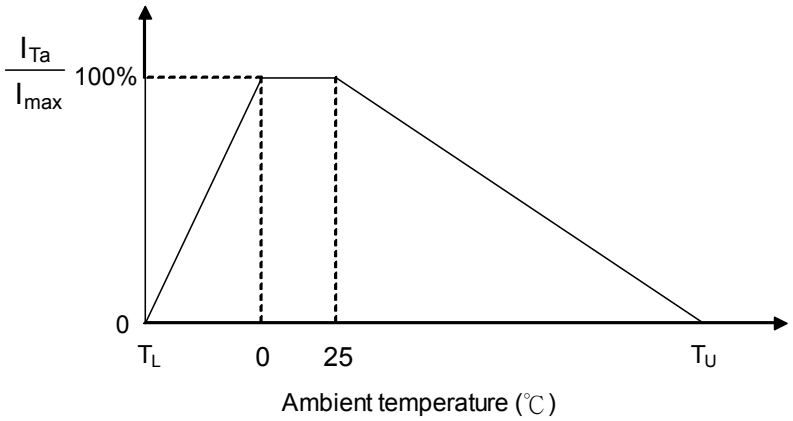
NTC Thermistor：SCK Series

Power Thermistor for Limiting Inrush Current

Body Size	Certified Model No.	Safety Approvals			
		UL	cUL	TUV	CQC
20mm	SCK200R7	√	√	√	√
	SCK201R0	√	√	√	√
	SCK201R5	√	√	√	√
	SCK202R0	√	√	√	√
	SCK202R5	√	√	√	√
	SCK203R0	√	√	√	√
	SCK204R0	√	√	√	√
	SCK204R7	√	√	√	√
	SCK205R0	√	√	√	√
	SCK206R0	√	√	√	√
	SCK206R8	√	√	√	√
	SCK207R0	√	√	√	√
	SCK208R0	√	√	√	√
	SCK20100	√	√	√	√
	SCK20120	√	√	√	√
	SCK20130	√	√	√	√
	SCK20150	√	√	√	√
	SCK20160	√	√	√	√
	SCK20180	√	√	√	√
	SCK20200	√	√	√	√
25mm	SCK251R0	√	√	√	√
	SCK251R5	√	√	√	√
	SCK252R0	√	√	√	√
	SCK252R5	√	√	√	√
	SCK253R0	√	√	√	√
	SCK254R0	√	√	√	√
	SCK254R7	√	√	√	√
	SCK255R0	√	√	√	√
	SCK256R8	√	√	√	√
	SCK257R0	√	√	√	√
	SCK258R0	√	√	√	√
	SCK25100	√	√	√	√
	SCK25120	√	√	√	√
	SCK25150	√	√	√	√
	SCK25180	√	√	√	√
	SCK25200	√	√	√	√

Body Size	Certified Model No.	Safety Approvals			
		UL	cUL	TUV	CQC
30mm	SCK301R0	√	√	√	√
	SCK301R5	√	√	√	√
	SCK302R0	√	√	√	√
	SCK302R5	√	√	√	√
	SCK303R0	√	√	√	√
	SCK304R0	√	√	√	√
	SCK304R7	√	√	√	√
	SCK305R0	√	√	√	√
	SCK306R8	√	√	√	√
	SCK307R0	√	√	√	√
	SCK308R0	√	√	√	√
	SCK30100	√	√	√	√
	SCK30120	√	√	√	√
	SCK30150	√	√	√	√
	SCK30180	√	√	√	√
	SCK30200	√	√	√	√

■ Max. Current Derating Curve



T_U: Maximum operating temperature (℃)

T_L: Minimum operating temperature (℃)

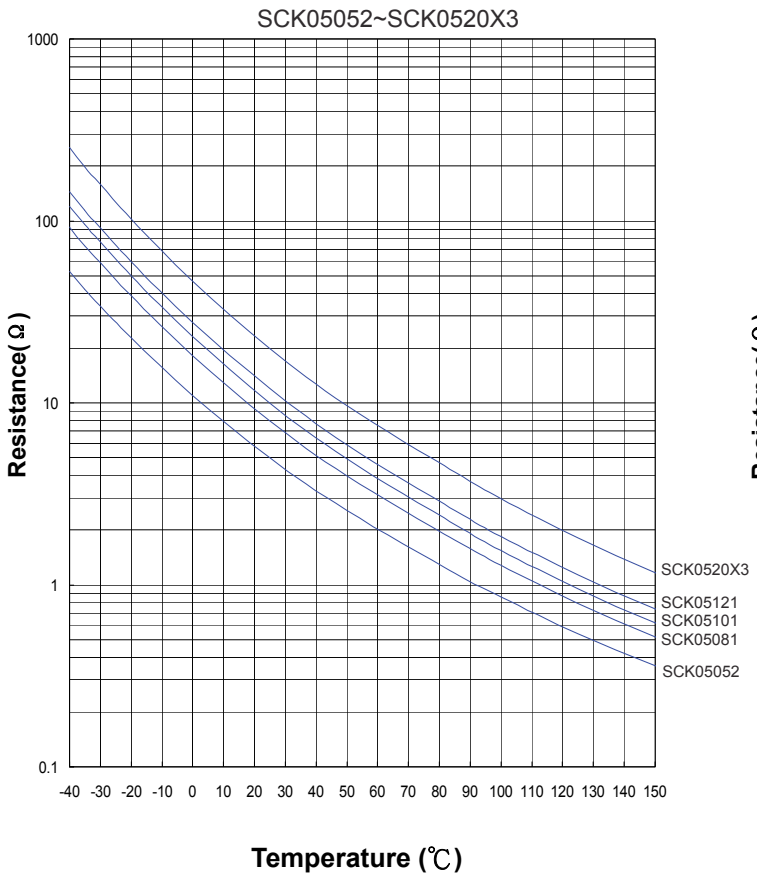
For example:

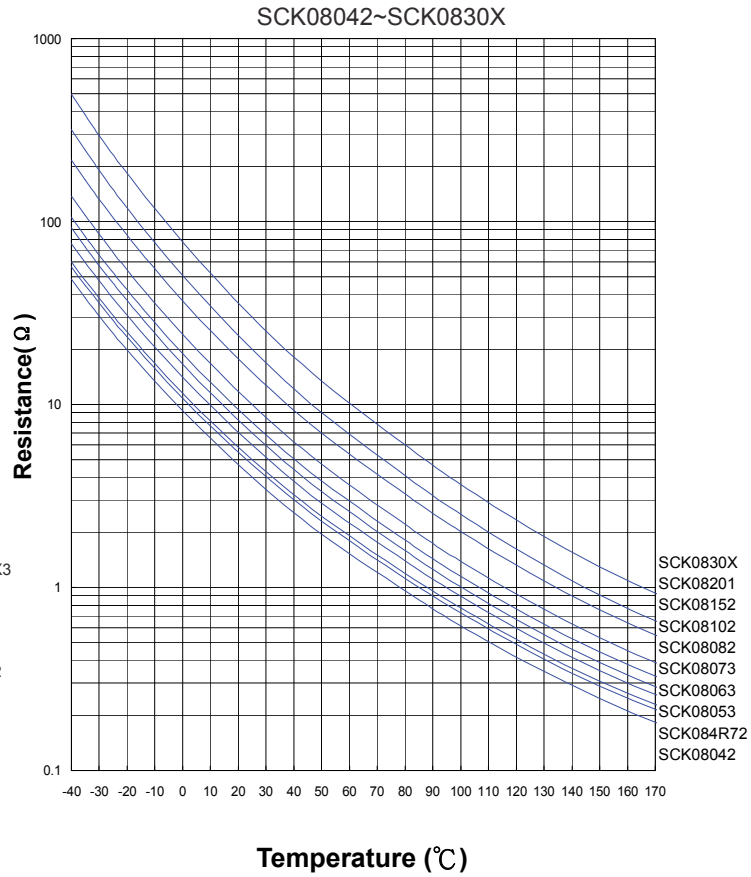
Ambient temperature(Ta) = 60℃

Maximum operating temperature(T_U) = 200℃

I_{Ta} = [1-(Ta-25)/(Tu-25)]×Imax = 80%Imax

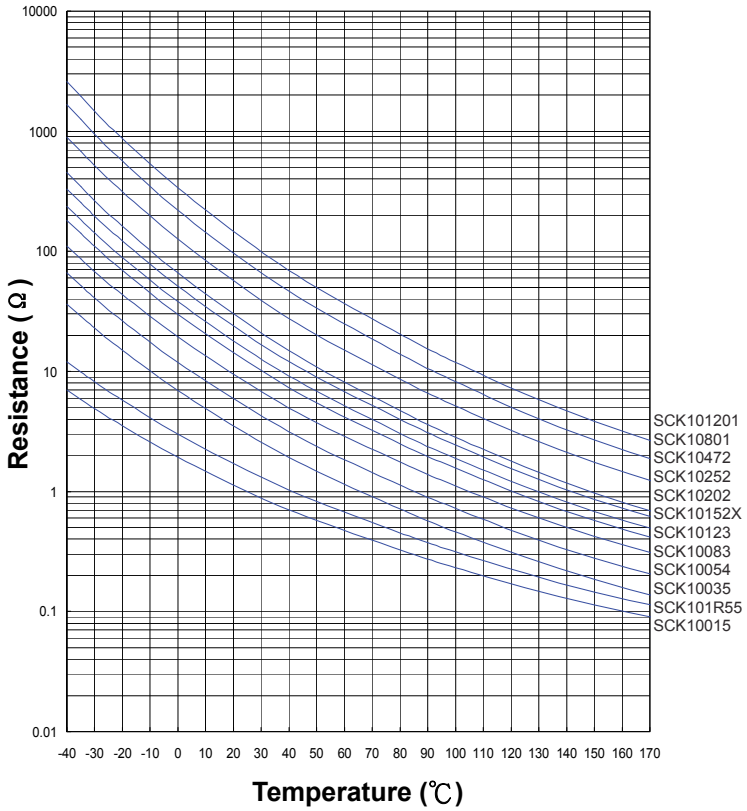
■ R-T Characteristic Curves



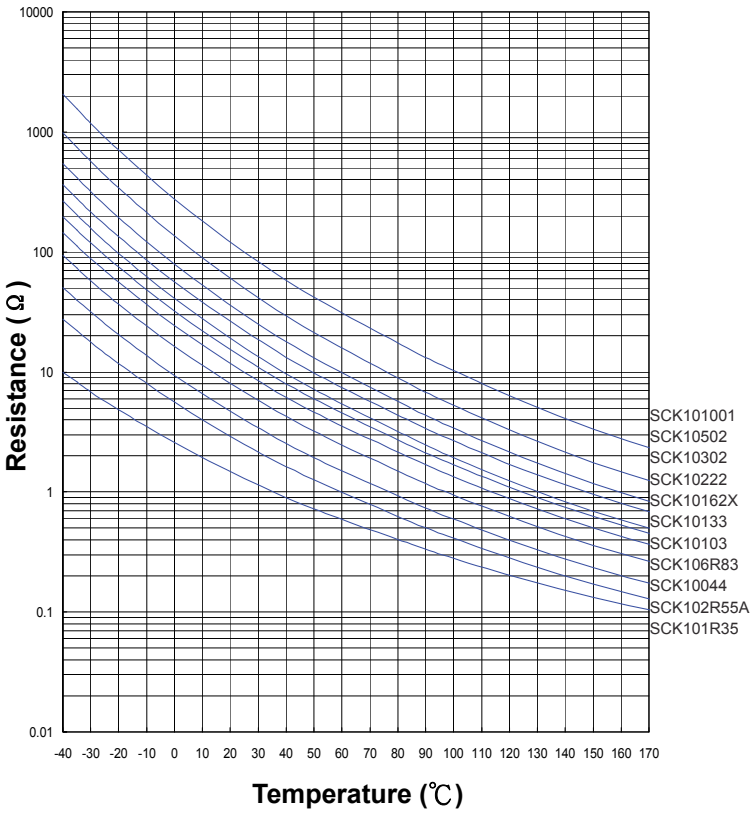


■ R-T Characteristic Curves

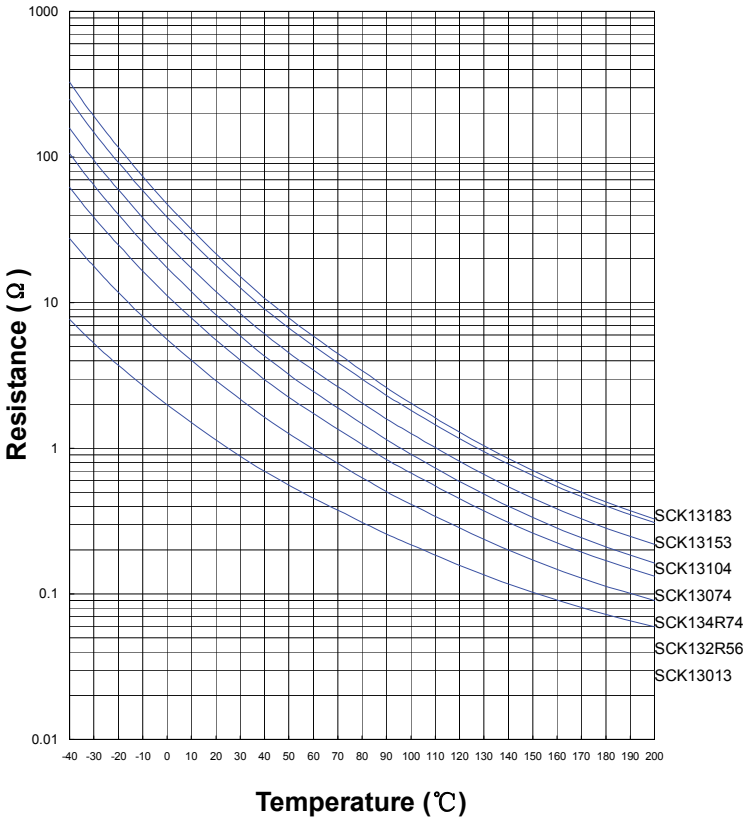
SCK10015~SCK101201



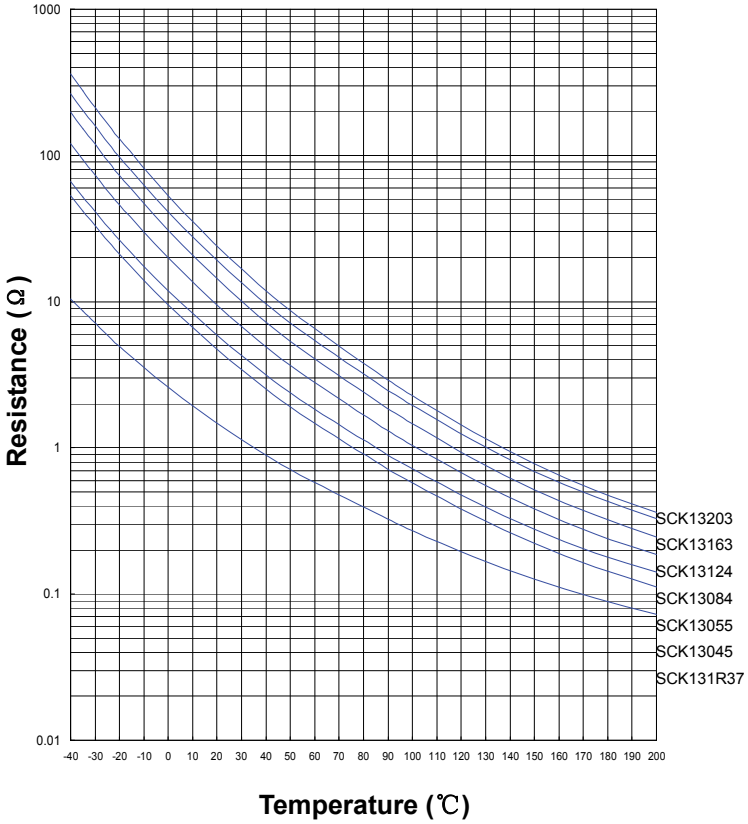
SCK101R35~SCK101001



SCK13013~SCK13183

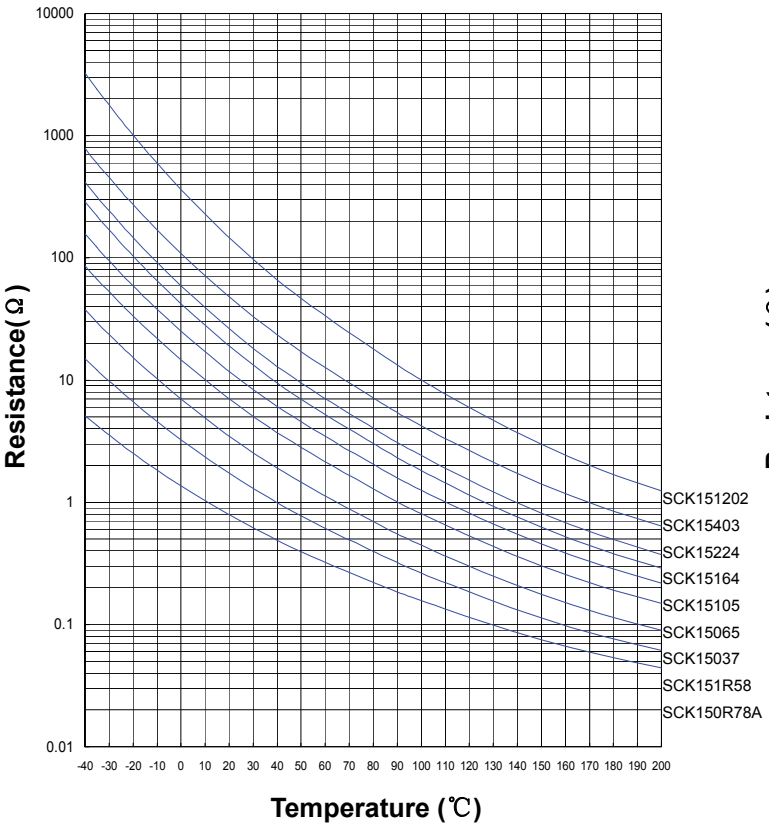


SCK131R37~SCK13203

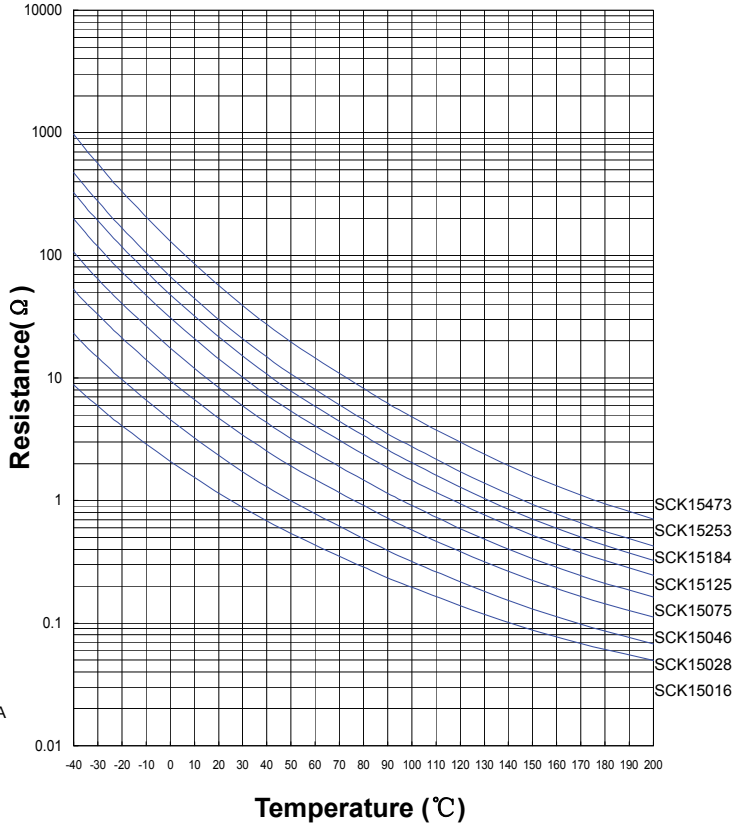


■ R-T Characteristic Curves

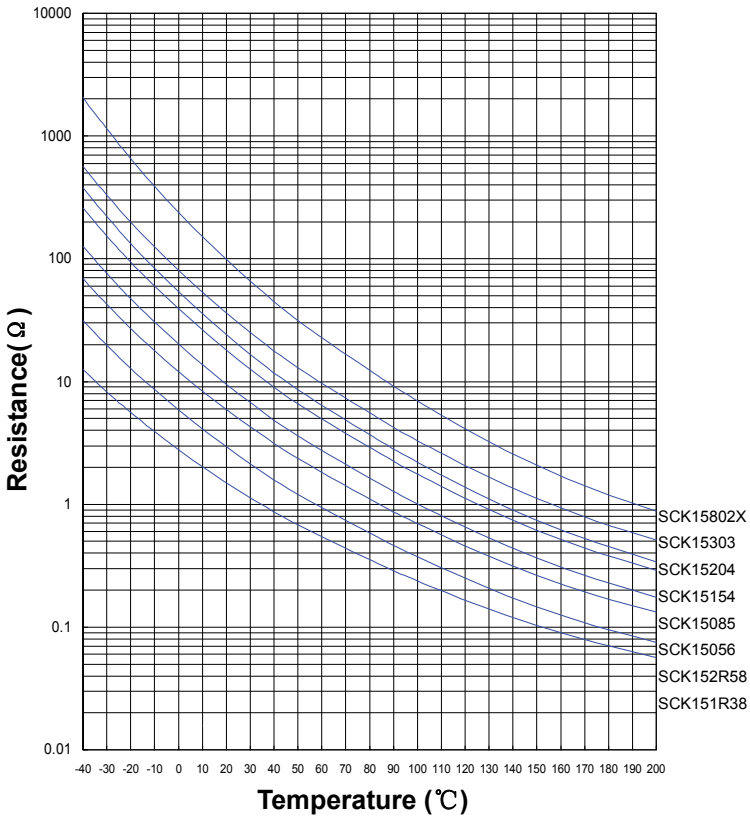
SCK150R78A~SCK151202



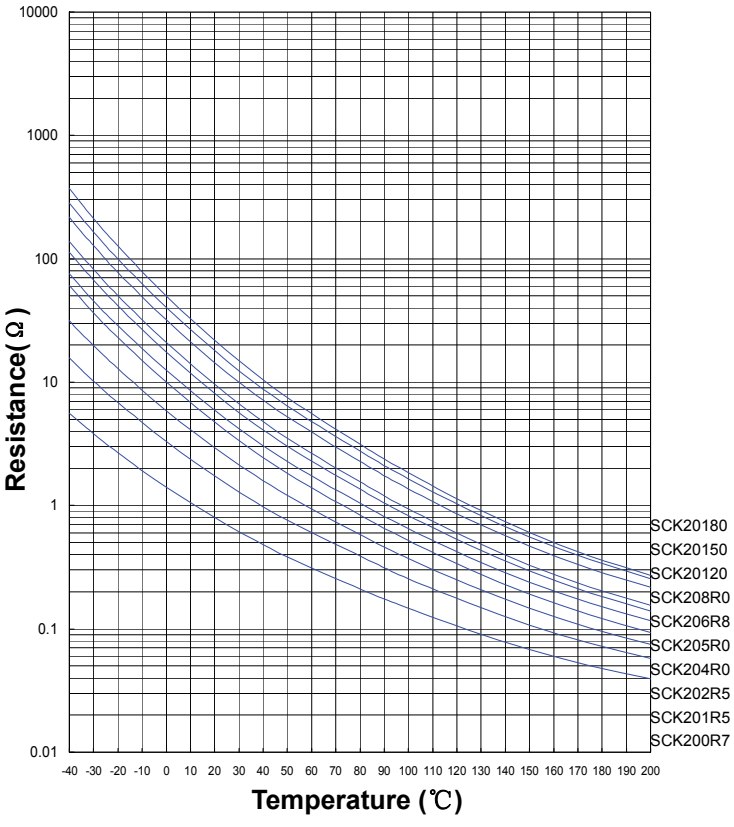
SCK15016~SCK15473



SCK151R38~SCK15802X

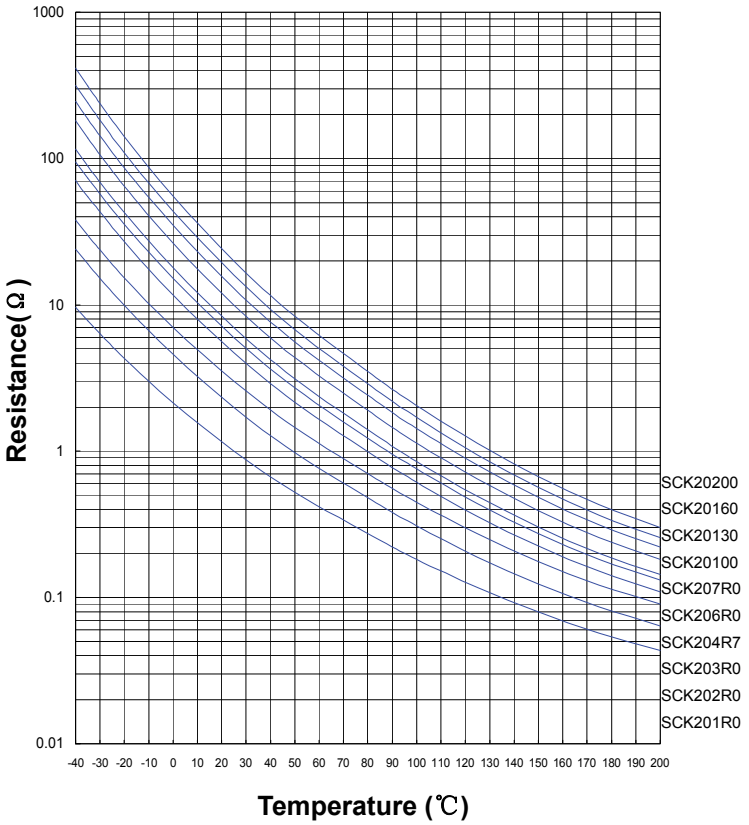


SCK200R7~SCK20180

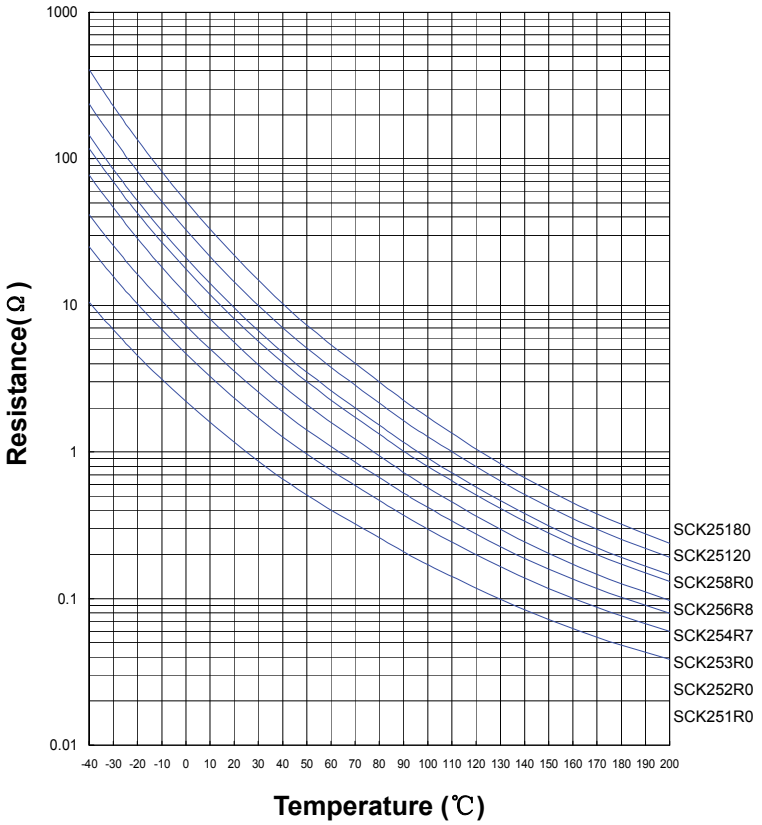


■ R-T Characteristic Curves

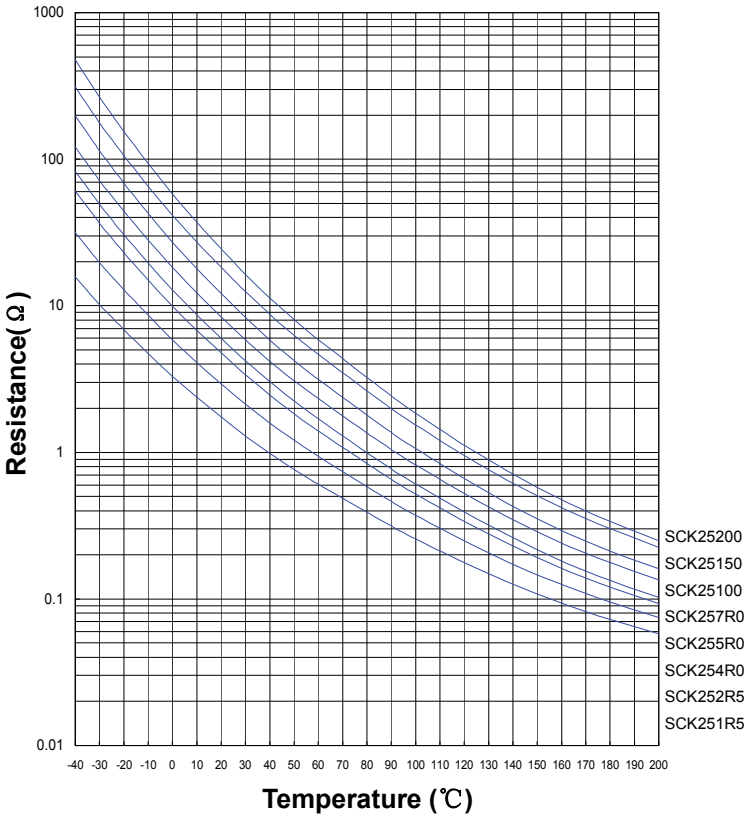
SCK201R0~SCK20200



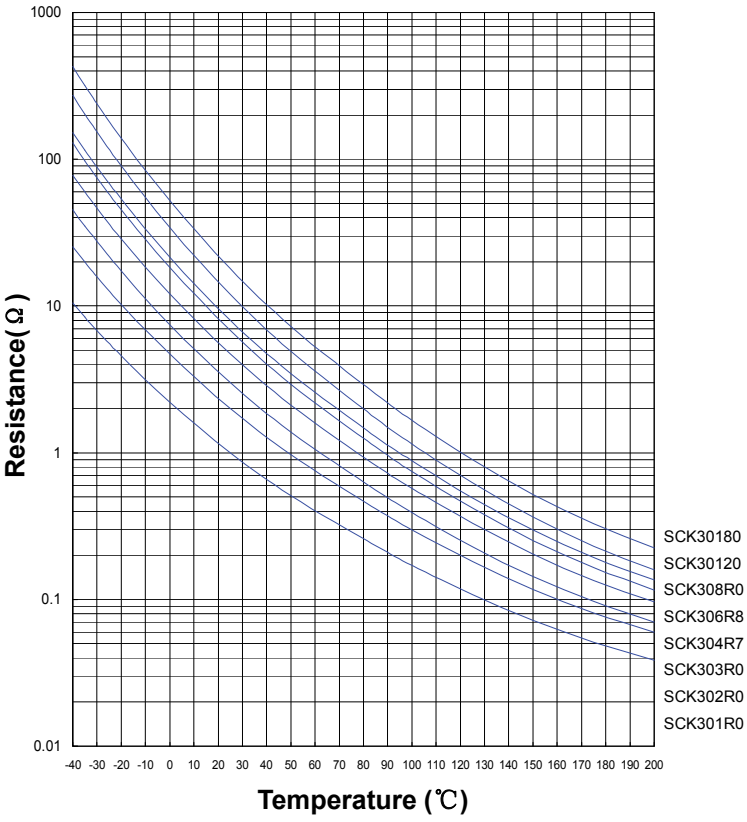
SCK251R0~SCK25180



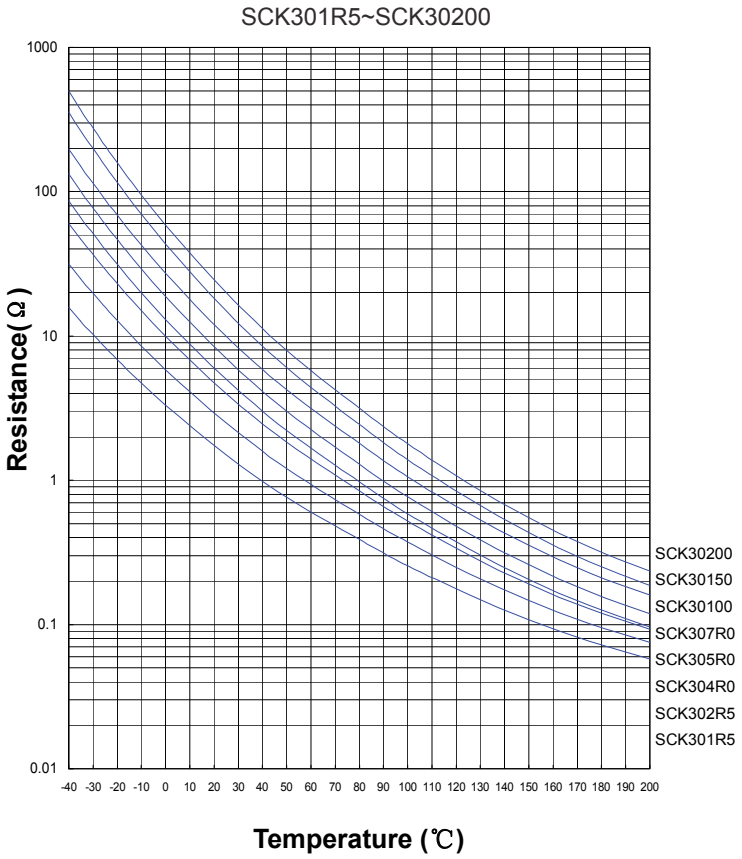
SCK251R5~SCK25200



SCK301R0~SCK30180

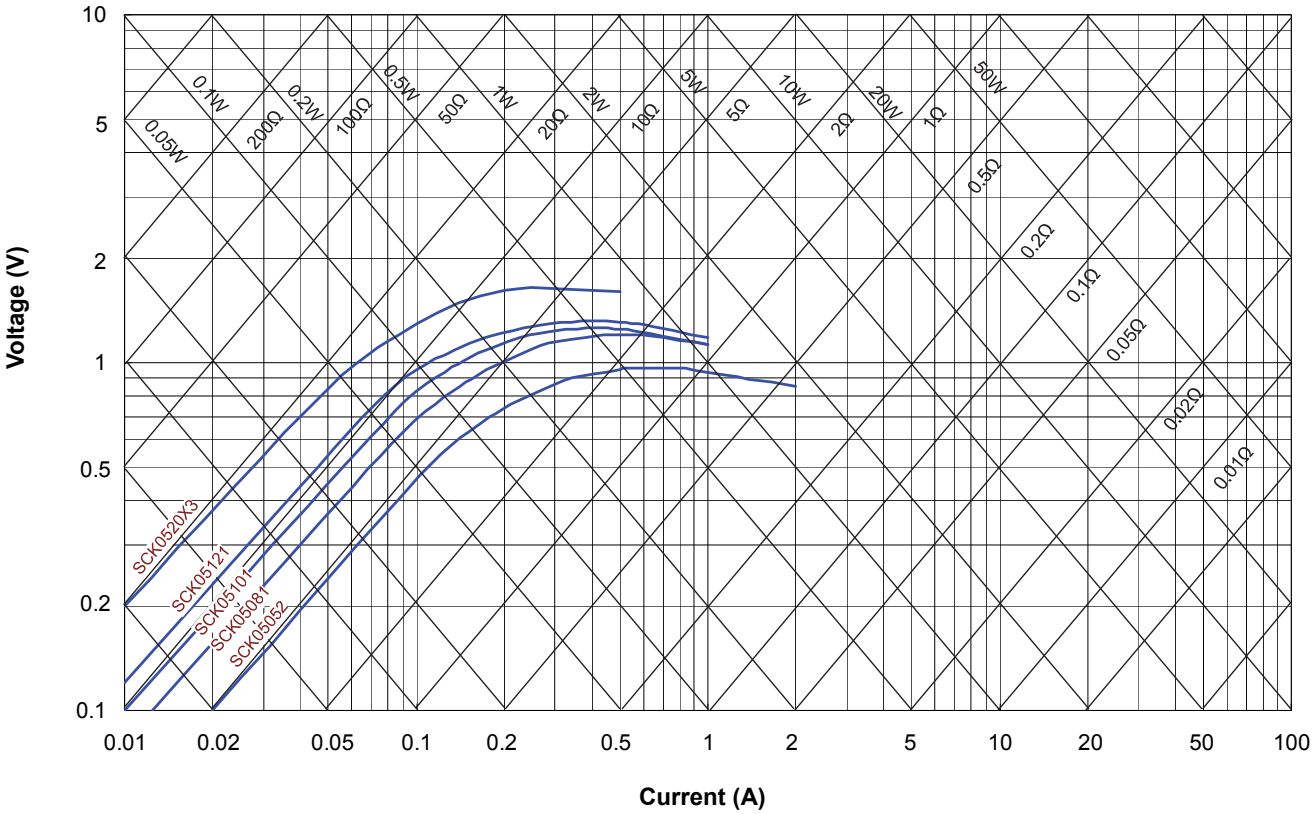


■ R-T Characteristic Curves

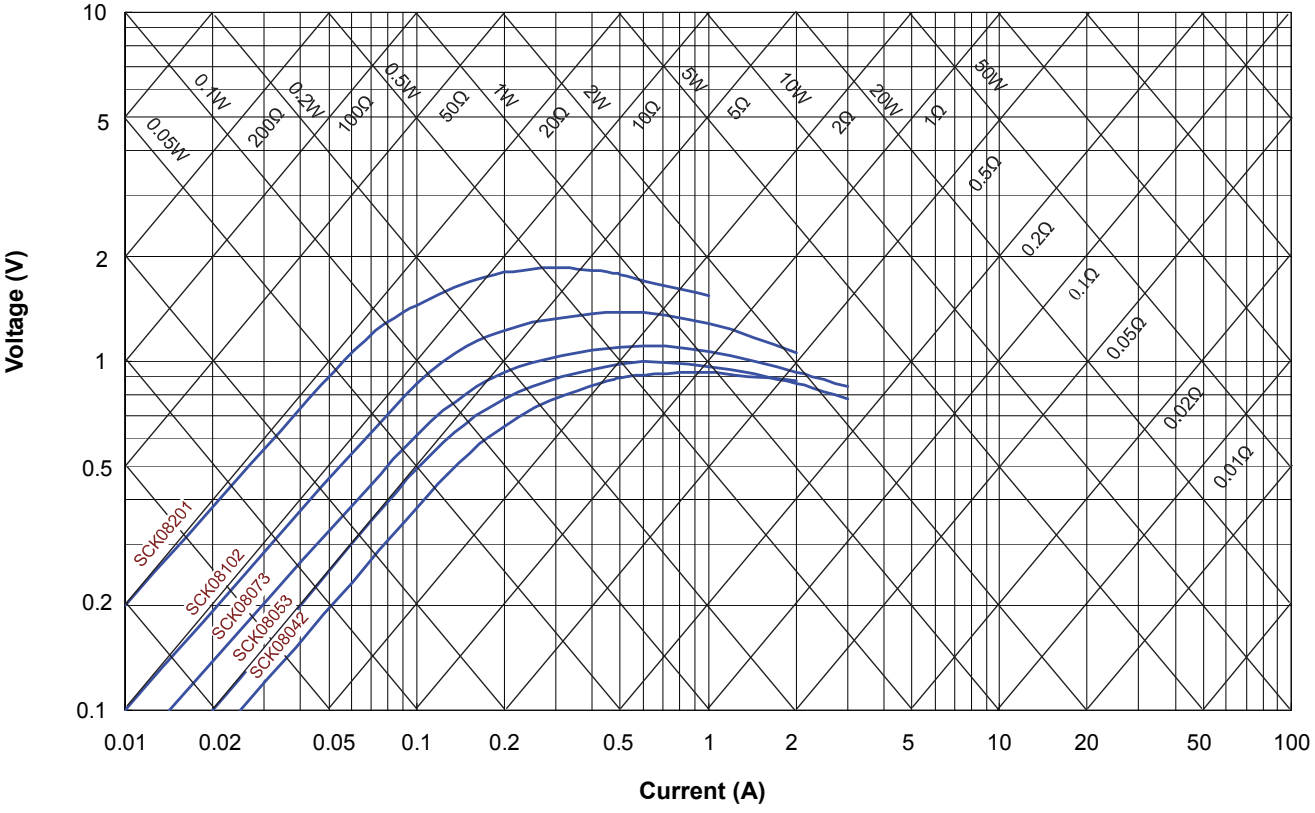


■ V-I Characteristic Curves (representative)

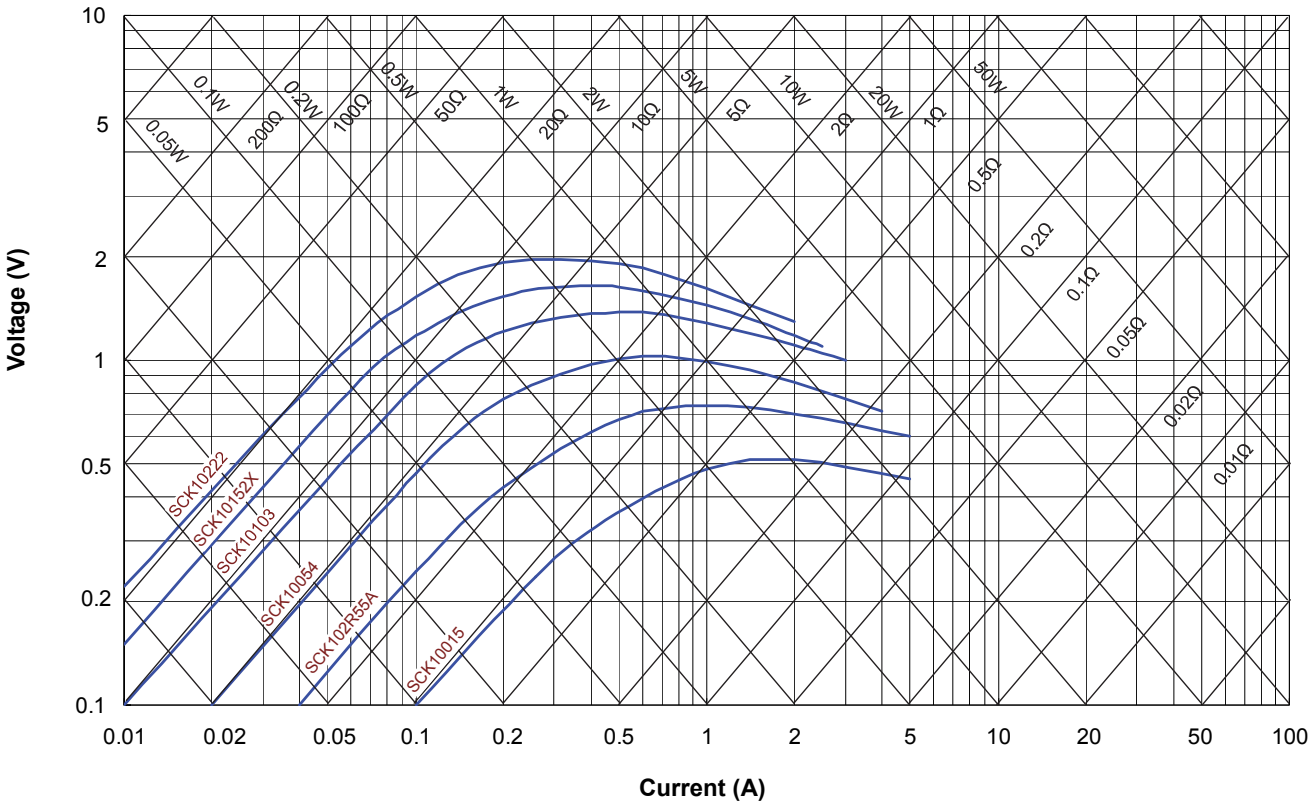
SCK05052~SCK0520X3



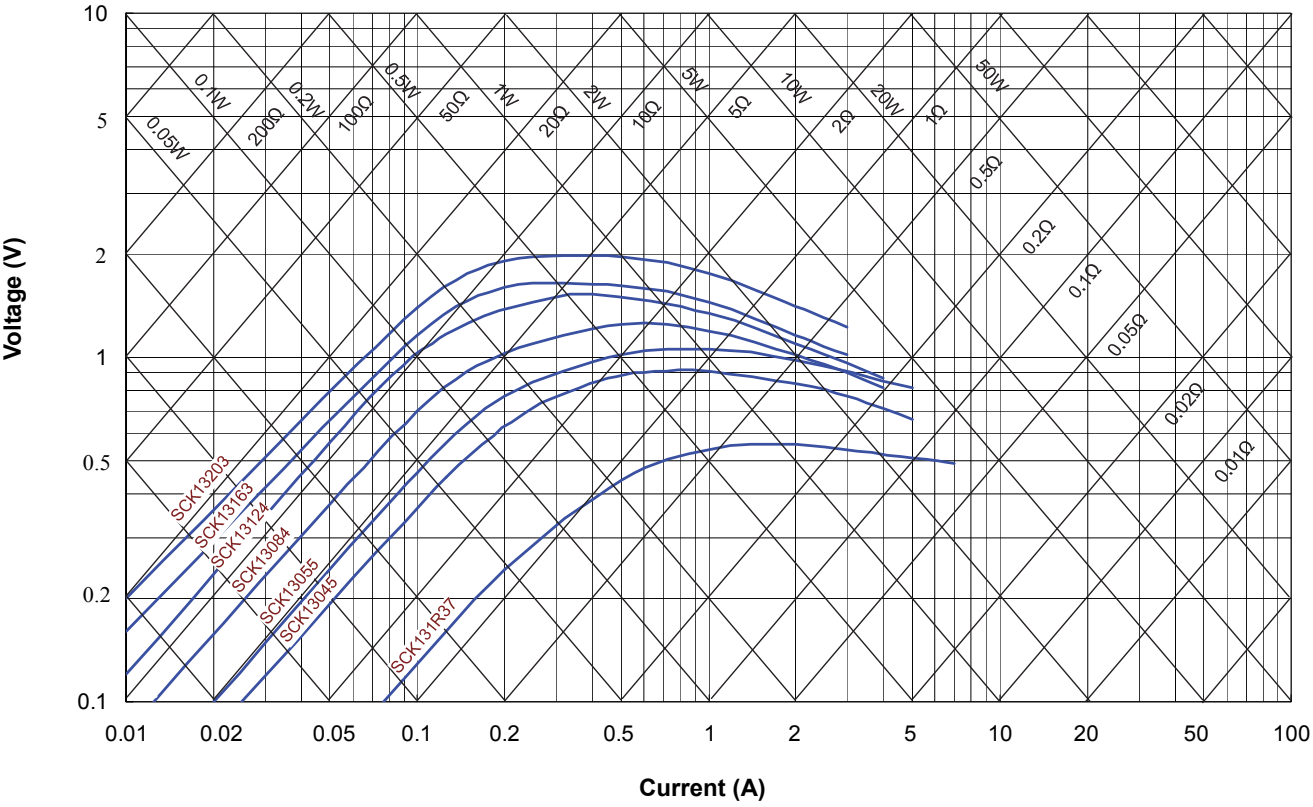
SCK08042~SCK08201



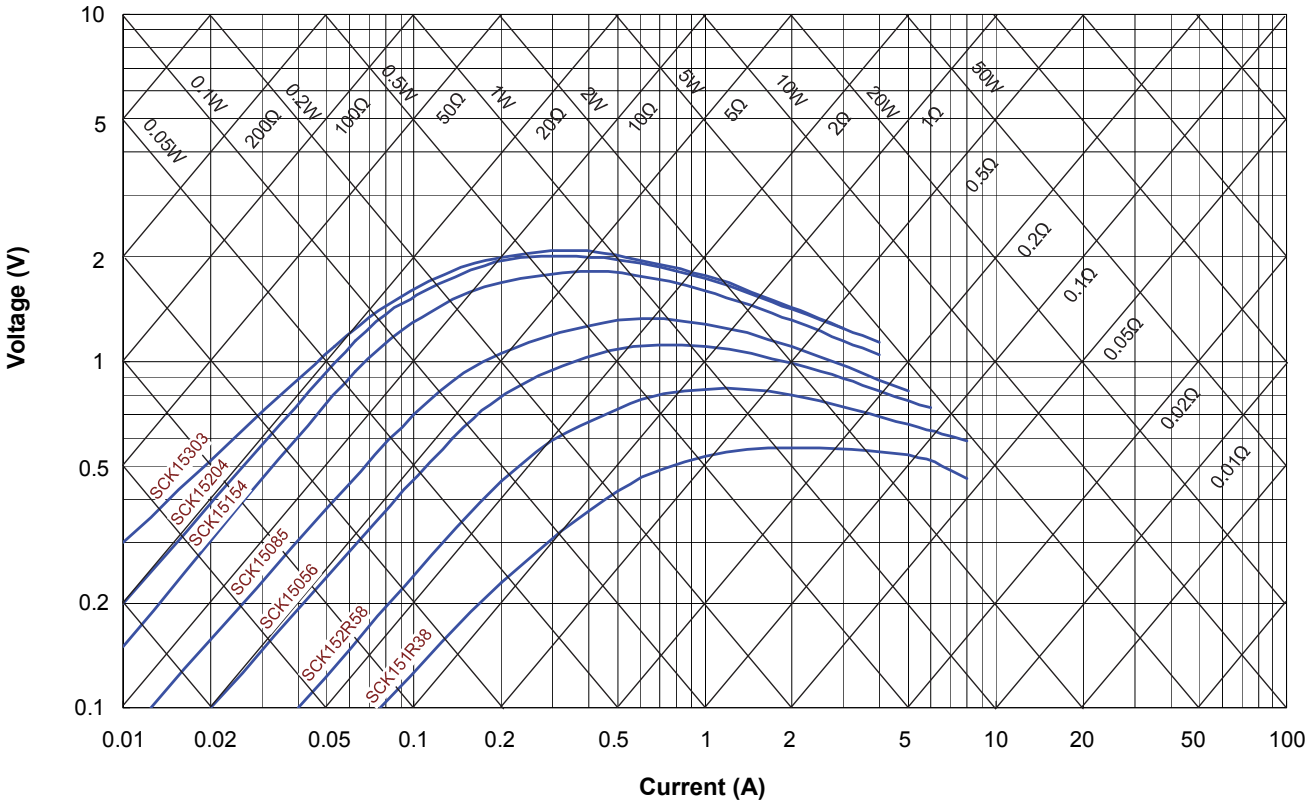
SCK10015~SCK10222



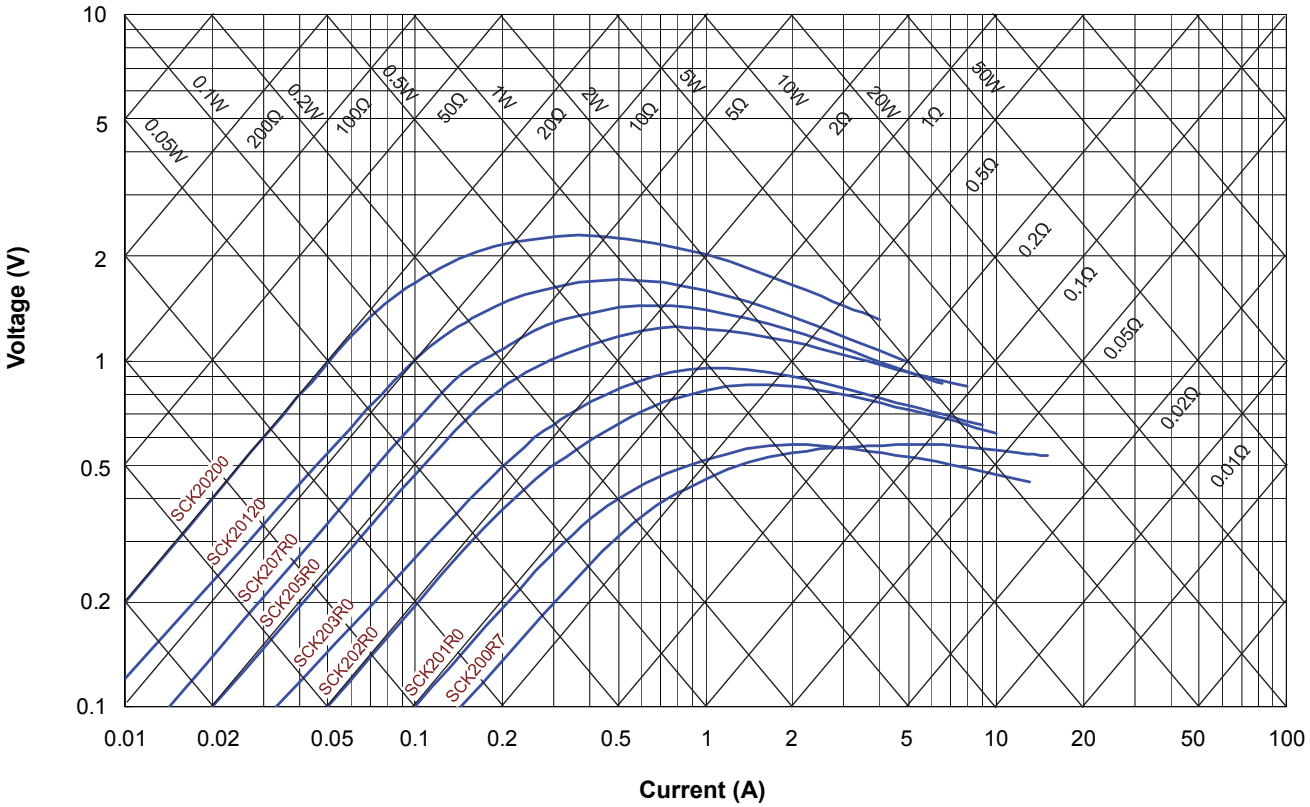
SCK131R37~SCK13203



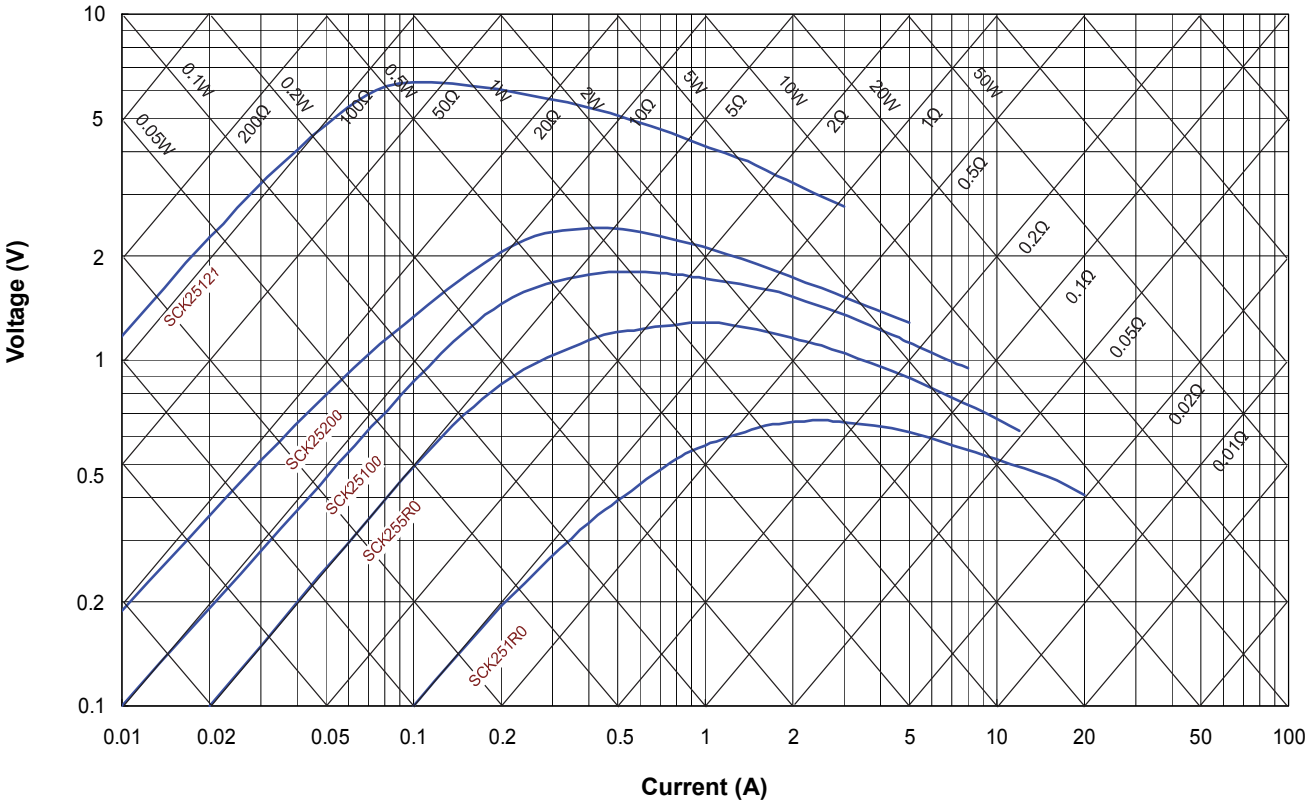
SCK151R38~SCK15303



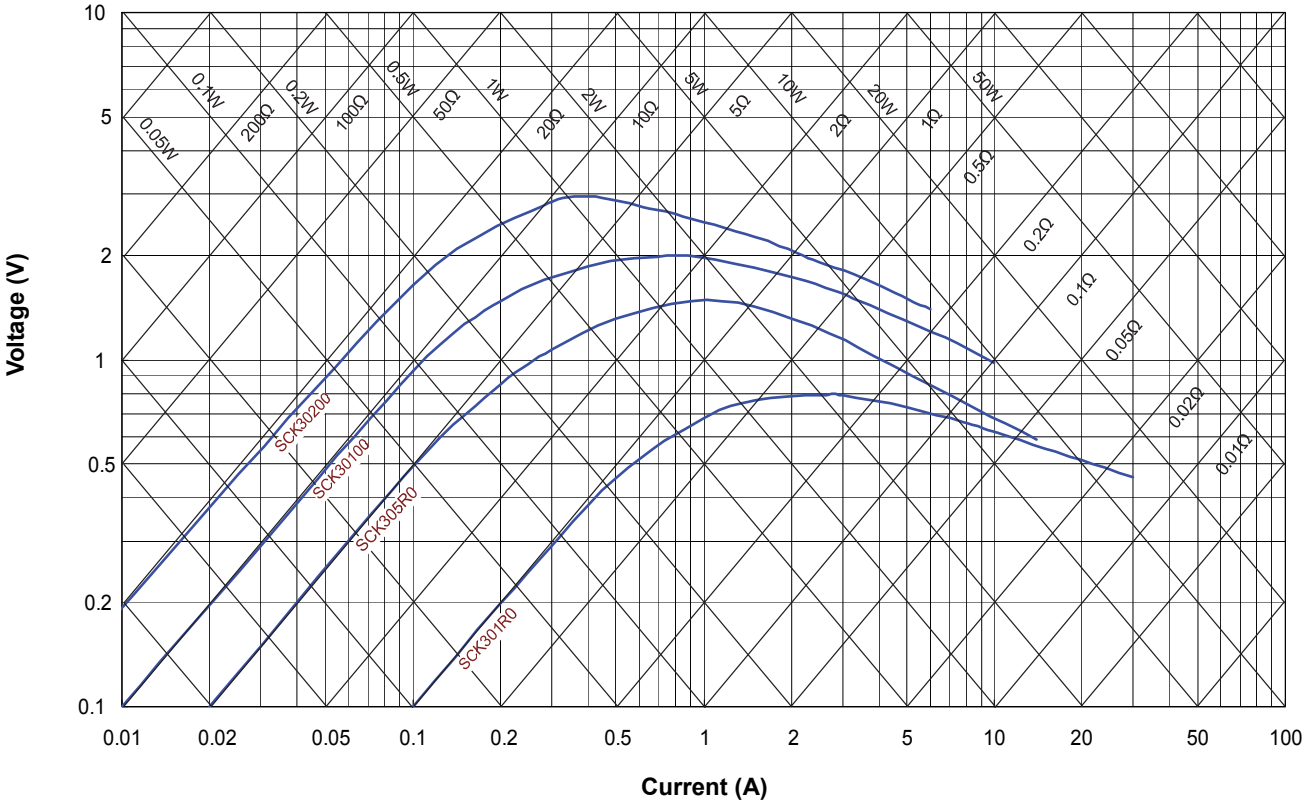
SCK200R7~SCK20200



SCK251R0~SCK25121

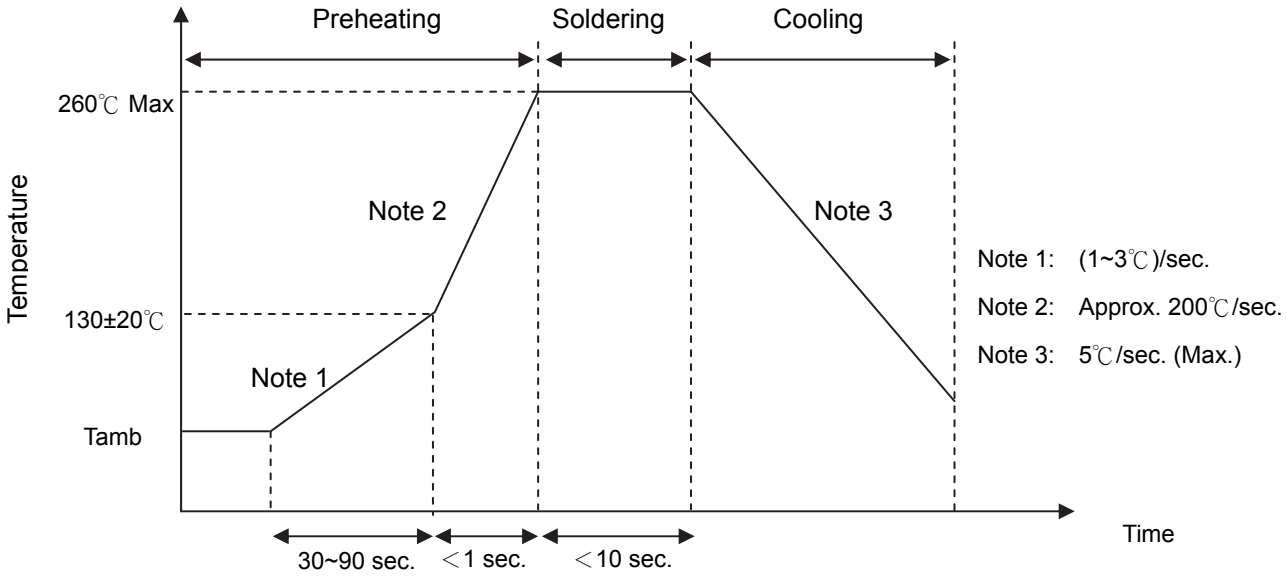


SCK301R0~SCK30200



■ Soldering Recommendation

● Wave Soldering Profile



● Recommended Reworking Conditions with Soldering Iron

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

■ Reliability

<table>
<tr><th>Item</th><th>Standard</th><th>Test conditions / Methods</th><th>Specifications</th></tr>
<tr><td>Tensile Strength of Terminals</td><td>IEC 60068-2-21</td><td>Gradually apply the specified force and keep the unit fixed for 10±1 sec.
<table><tr><th>Terminal diameter (mm)</th><th>Force (Kg)</th></tr><tr><td>0.5<d≦0.80</td><td>1.0</td></tr><tr><td>0.8<d≦1.25</td><td>2.0</td></tr></table></td><td>No visible damage</td></tr>
<tr><td>Solderability</td><td>IEC 60068-2-20</td><td>245 ±3℃, 3 ± 0.3 sec.</td><td>At least 95% of terminal electrode is covered by new solder</td></tr>
<tr><td>Resistance to Soldering Heat</td><td>IEC 60068-2-20</td><td>260 ± 3℃, 10 ± 1 sec.</td><td>No visible damage
$|\triangle R_{25}/R_{25}| \leqq 10\ \%$</td></tr>
<tr><td>High Temperature Storage</td><td>IEC 60068-2-2</td><td>Tu ± 5 ℃ , 1000± 24 hrs</td><td>No visible damage
$|\triangle R_{25}/R_{25}| \leqq 20\ \%$</td></tr>
<tr><td>Damp Heat, Steady State</td><td>IEC 60068-2-78</td><td>40 ± 2℃, 90~95% RH, 1000 ± 24 hrs</td><td>No visible damage
$|\triangle R_{25}/R_{25}| \leqq 20\ \%$</td></tr>
<tr><td>Rapid Change of Temperature</td><td>IEC 60068-2-14</td><td>The conditions shown below shall be repeated 5 cycles.
<table><tr><th>Step</th><th>Temperature (℃)</th><th>Period (minutes)</th></tr><tr><td>1</td><td>T_L ± 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>T_U ± 5</td><td>30 ± 3</td></tr><tr><td>4</td><td>Room temperature</td><td>5 ± 3</td></tr></table></td><td>No visible damage
$|\triangle R_{25}/R_{25}| \leqq 20\ \%$</td></tr>
<tr><td>Max. Current</td><td>IEC 60539-1</td><td>25 ± 5℃, Imax. , 1000± 24 hrs</td><td>No visible damage
$|\triangle R_{25}/R_{25}| \leqq 20\ \%$</td></tr>
<tr><td>Endurance</td><td>Specification Standard</td><td>25 ± 5℃, Imax. , C_{th}, 1min ON / 5 mins OFF x 1000 cycles
C_{th}= Capacitance at 240 Vac</td><td>No visible damage
$|\triangle R_{25}/R_{25}| \leqq 20\ \%$</td></tr>
<tr><td>Insulation Test</td><td>MIL-STD-202F -Method 302</td><td>1000 V_{DC} , 1 min</td><td>No visible damage
≧500 MΩ</td></tr>
</table>

■ Packaging

● Taping Specification

S (Straight lead) Type

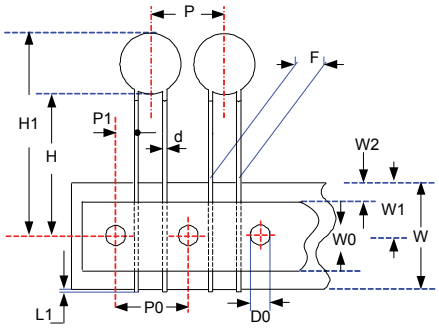


Figure A

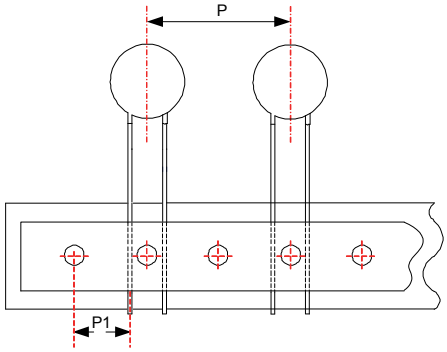


Figure B

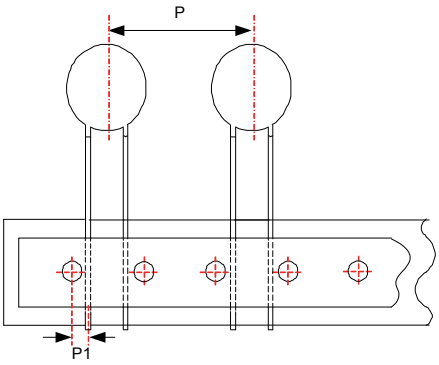
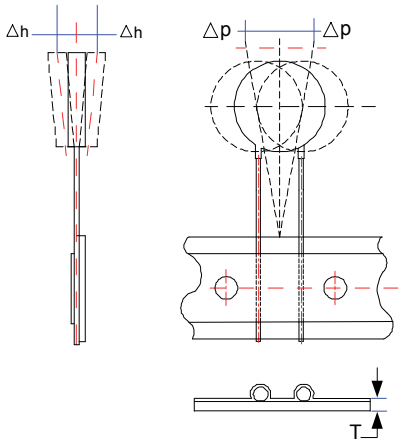


Figure C



(Unit: mm)

Taping Dimension	Disc Size	P_0	F	P	P_1	H	H_1	d	W_0	W_1	W_2	W	△P	△h	L_1	D_0	T	Figure
		±0.3	±1	±1	±0.7	+2/-0	Max.	±0.02	±1	+0.75 /-0.5	Max.	+1/ -0.5	Max.	Max.	Max.	±0.2	±0.2	
P_0:12.7	05	12.7	4.0	12.7	4.35	18	28	0.8	12	9	3	18	1	2	0.5	4	0.6	A
	08	12.7	5.0	12.7	3.85	18	30	0.8	12	9	3	18	1	2	0.5	4	0.6	A
	10	12.7	5.0	12.7	3.85	18	32	0.8	12	9	3	18	1	2	0.5	4	0.6	A
	13	12.7	7.5	25.4	8.95	18	35	0.8	12	9	3	18	1	2	0.5	4	0.6	B
	15	12.7	7.5	25.4	8.95	18	37	1.0	12	9	3	18	1	2	0.5	4	0.6	B
	20	12.7	7.5	25.4	8.95	18	42	1.0	12	9	3	18	1	2	0.5	4	0.6	B
P_0:15.0	05	15.0	4.0	15.0	5.50	18	28	0.8	12	9	3	18	1	2	0.5	4	0.6	A
	08	15.0	5.0	15.0	5.00	18	30	0.8	12	9	3	18	1	2	0.5	4	0.6	A
	10	15.0	5.0	15.0	5.00	18	32	0.8	12	9	3	18	1	2	0.5	4	0.6	A
	13	15.0	7.5	30.0	3.75	18	35	0.8	12	9	3	18	1	2	0.5	4	0.6	C
	15	15.0	7.5	30.0	3.75	18	37	1.0	12	9	3	18	1	2	0.5	4	0.6	C
	20	15.0	7.5	30.0	3.75	18	42	1.0	12	9	3	18	1	2	0.5	4	0.6	C

F Kink Type

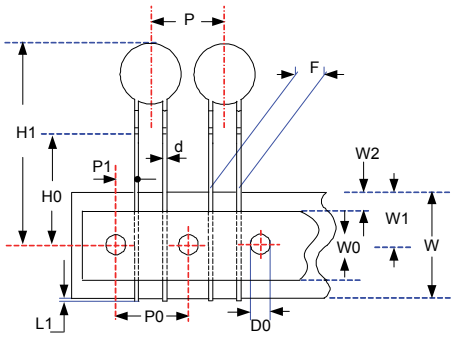


Figure A

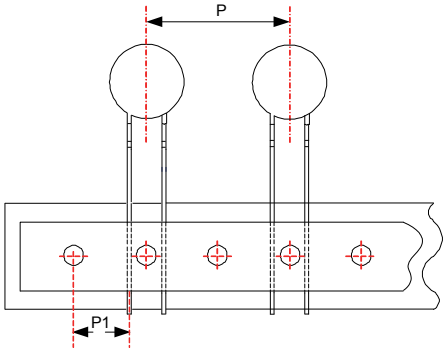


Figure B

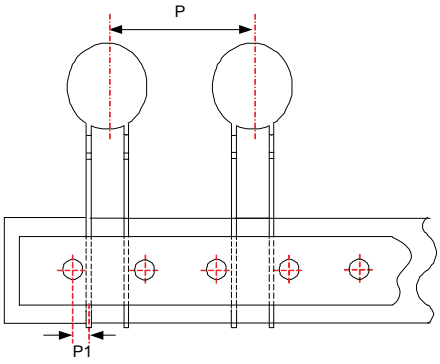
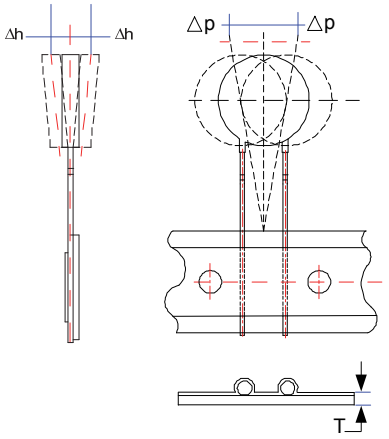


Figure C



(Unit: mm)

Taping Dimension	Disc Size	P_0	F	P	P_1	H_0	H_1	d	W_0	W_1	W_2	W	△P	△h	L_1	D_0	T	Figure
		±0.3	±1	±1	±0.7	±0.5	Max.	±0.02	±1	+0.75 /-0.5	Max.	+1/ -0.5	Max.	Max.	Max.	±0.2	±0.2	
P_0:12.7	05	12.7	4.0	12.7	4.35	16	28	0.8	12	9	3	18	1	2	0.5	4	0.6	A
	08	12.7	5.0	12.7	3.85	16	30	0.8	12	9	3	18	1	2	0.5	4	0.6	A
	10	12.7	5.0	12.7	3.85	16	32	0.8	12	9	3	18	1	2	0.5	4	0.6	A
	13	12.7	7.5	25.4	8.95	16	35	0.8	12	9	3	18	1	2	0.5	4	0.6	B
	15	12.7	7.5	25.4	8.95	16	37	1.0	12	9	3	18	1	2	0.5	4	0.6	B
	20	12.7	7.5	25.4	8.95	16	42	1.0	12	9	3	18	1	2	0.5	4	0.6	B
P_0:15.0	05	15.0	4.0	15.0	5.50	16	28	0.8	12	9	3	18	1	2	0.5	4	0.6	A
	08	15.0	5.0	15.0	5.00	16	30	0.8	12	9	3	18	1	2	0.5	4	0.6	A
	10	15.0	5.0	15.0	5.00	16	32	0.8	12	9	3	18	1	2	0.5	4	0.6	A
	13	15.0	7.5	30.0	3.75	16	35	0.8	12	9	3	18	1	2	0.5	4	0.6	C
	15	15.0	7.5	30.0	3.75	16	37	1.0	12	9	3	18	1	2	0.5	4	0.6	C
	20	15.0	7.5	30.0	3.75	16	42	1.0	12	9	3	18	1	2	0.5	4	0.6	C

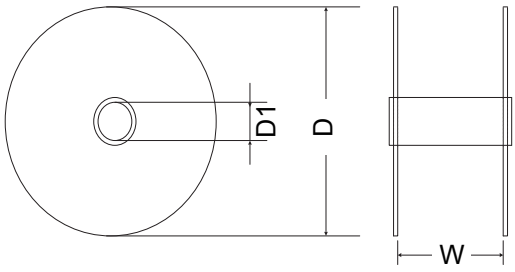
■ Quantity

● Bulk Packing

Series	Standard Lead Type Quantity (pcs/bag)	Cut Lead Type Quantity (pcs/bag)	L kink Type Quantity (pcs/bag)
SCK05	250	500	---
SCK08	250	250	200
SCK10	200	250	200
SCK13	100	200	100
SCK15	100	100	100
SCK20	500 (pcs/box)	50	50
SCK25	168 (pcs/box)	168 (pcs/box)	---
SCK30	168 (pcs/box)	168 (pcs/box)	---

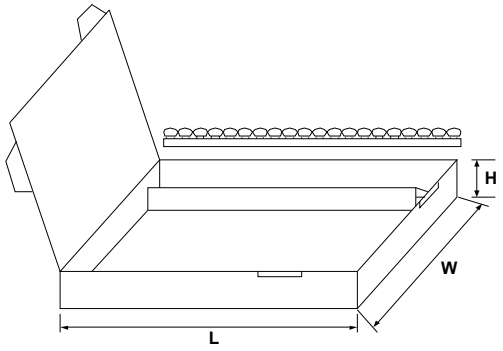
● Reel Packing

Series	D (mm)	D1 (mm)	W (mm)	Quantity (pcs/reel)
SCK05	340±10	31±1	55±1	2,500
SCK08				1,500
SCK10				1,500
SCK13				750
SCK15				750
SCK20				500



● Ammo Packing

Series	Quantity (pcs/box)
SCK05	1,000
SCK08	1,000
SCK10	1,000
SCK13	500
SCK15	500
SCK20	500



(Unit: mm)

Body Size	L	W	H
Φ5~Φ20	348	275	60

■ Warehouse Storage Conditions of Products

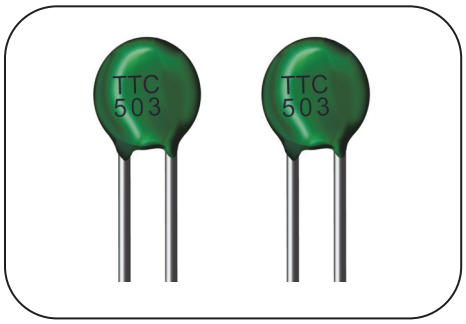
- Storage Conditions:
  1. Storage Temperature: -10℃~+40℃
  2. Relative Humidity: ≦75%RH
  3. Keep away from corrosive atmosphere and sunlight.
- Period of Storage: 1 year

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℃~+125℃
6. Wide resistance range
7. Cost effective
8. Agency recognition: UL / cUL / CSA / TUV / CQC



■ Recommended Applications

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

■ Part Number Code

1	2	3	4	5	6	7	8	9	10	11	12	13	14

Product Type

TTC	THINKING NTC Thermistor TTC Series

Body Size

05	Φ5mm

Zero Power Resistance at 25℃ (R_{25})

R_{25}＜100Ω 005: 5Ω 015:15Ω 050:50Ω
R_{25}≧100Ω 101:100Ω 682:6800Ω 474:470000Ω

Tolerance of R_{25}

J	±5%
K	±10%
L	±15%

Appearance

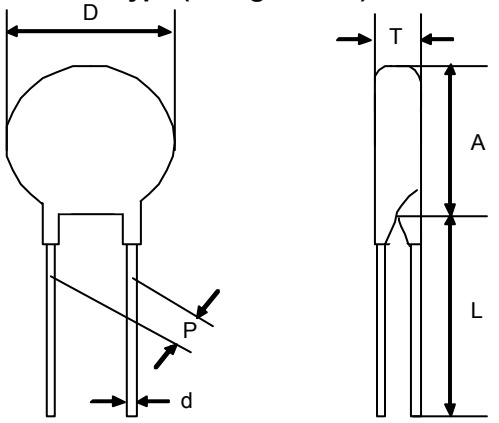
S	Straight lead
I	Kink lead

Optional Suffix

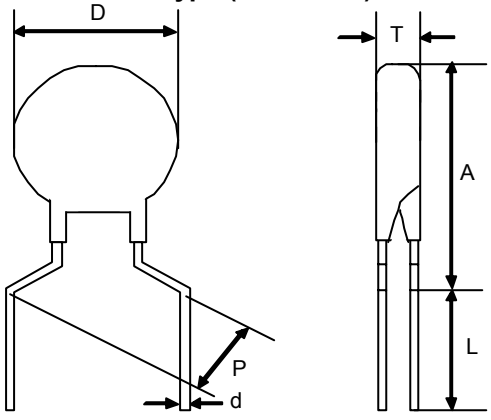
Y	RoHS Compliant
E	RoHS & HF Compliant

■ Structure and Dimensions

S type (Straight Lead)



I type (Kink Lead)



(Unit: mm)

Type	D max.	P	d	A max.	L min.	T max.
S Type	6.5	3.5± 0.5	0.5±0.02	6.5	31	5
I Type	6.5	5± 0.8	0.5±0.02	10	29	5

NTC Thermistor：TTC05 Series

Φ5 mm Lead Type for Temperature Sensing/Compensation

■ Electrical Characteristics

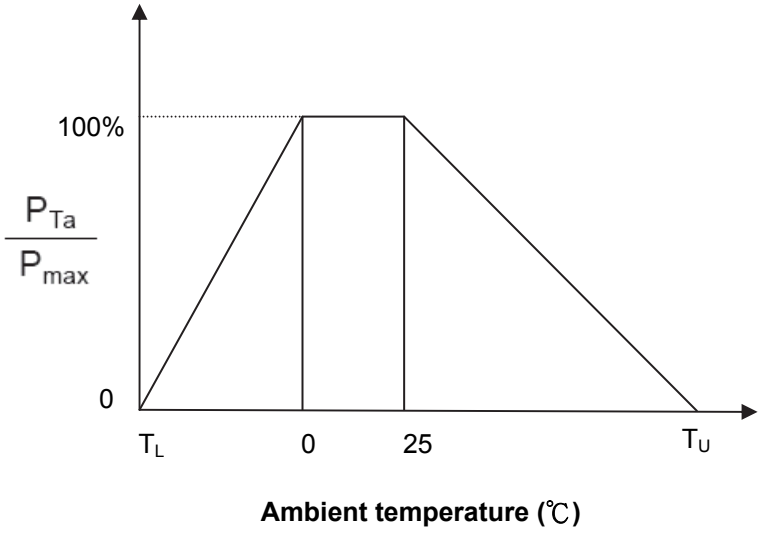
Part No.	Zero Power Resistance at 25°C	Tolerance of R_{25}	$B_{25/50}$ Value	Max. Power Dissipation at 25℃	Dissipation Factor	Thermal Time Constant	Operating Temperature Range	Safety Approvals			
								UL /cUL	CSA	TUV	CQC
	R_{25}(Ω)	(±%)	(K)	P_{max}(mW)	δ(mW/°C)	τ (Sec.)	T_L~T_U(°C)				
TTC05005□	5	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		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 R_{25}

Note 2: UL 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.

■ Max. Power Dissipation Derating Curve



T_U : Maximum operating temperature (℃)

T_L : Minimum operating temperature (℃)

For example:

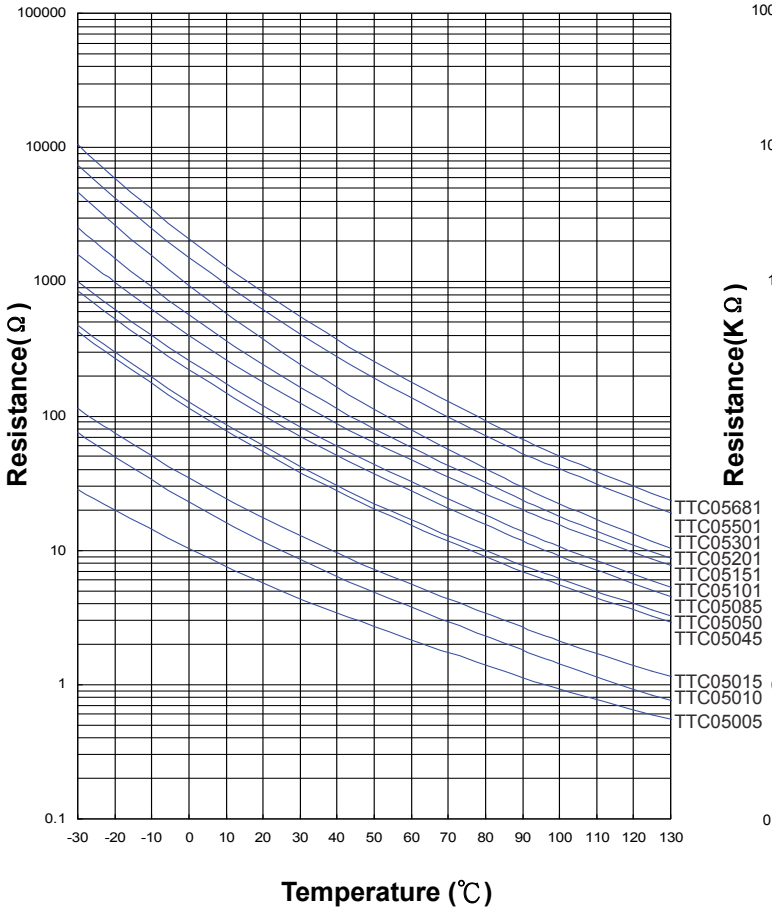
Ambient temperature (Ta) = 55℃

Maximum operating temperature (T_U) = 125℃

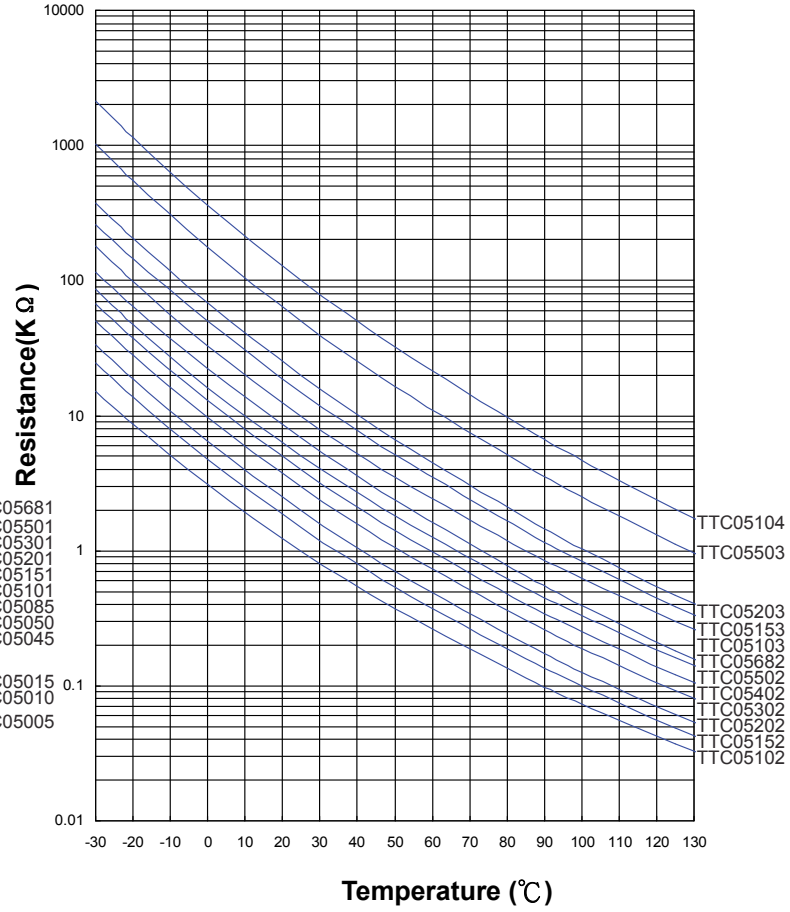
P_{Ta} = (T_U-Ta)/(T_U-25)×Pmax = 70% Pmax

■ R-T Characteristic Curves (representative)

TTC05005~TTC05681

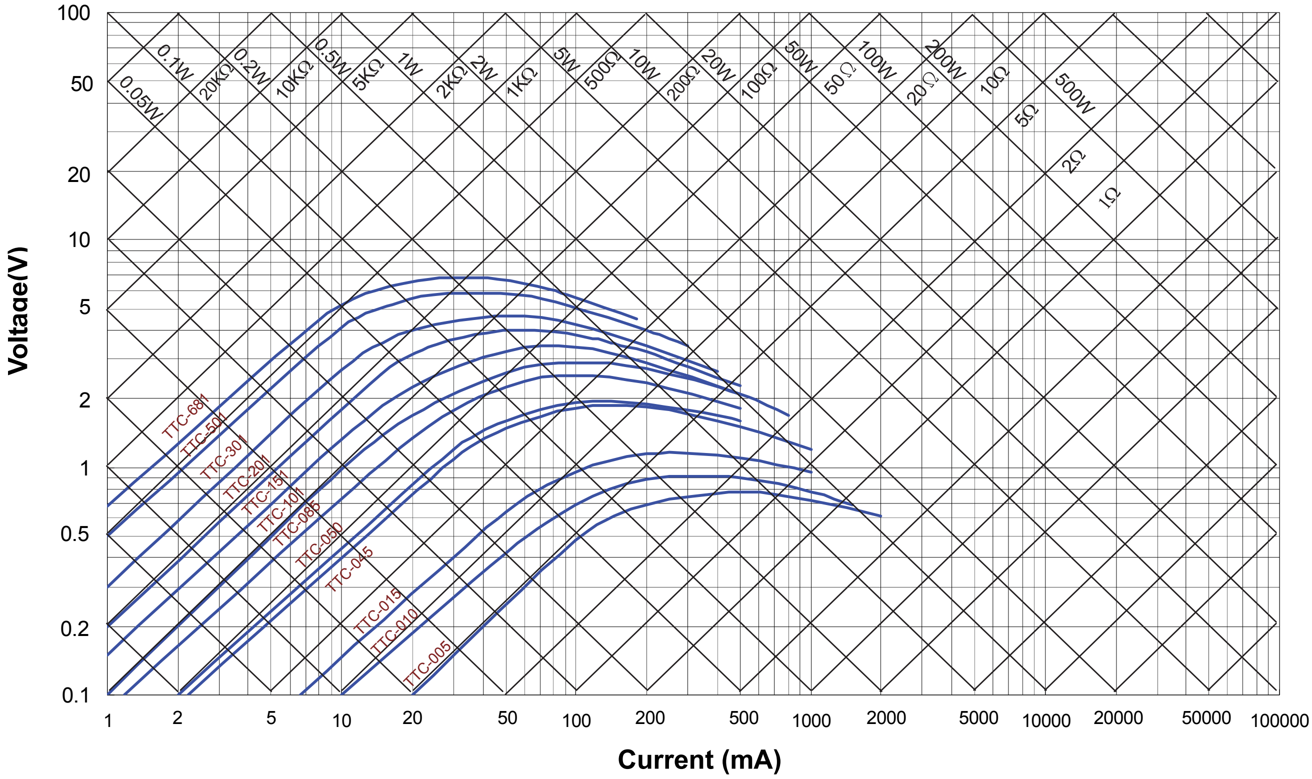


TTC05102~TTC05104

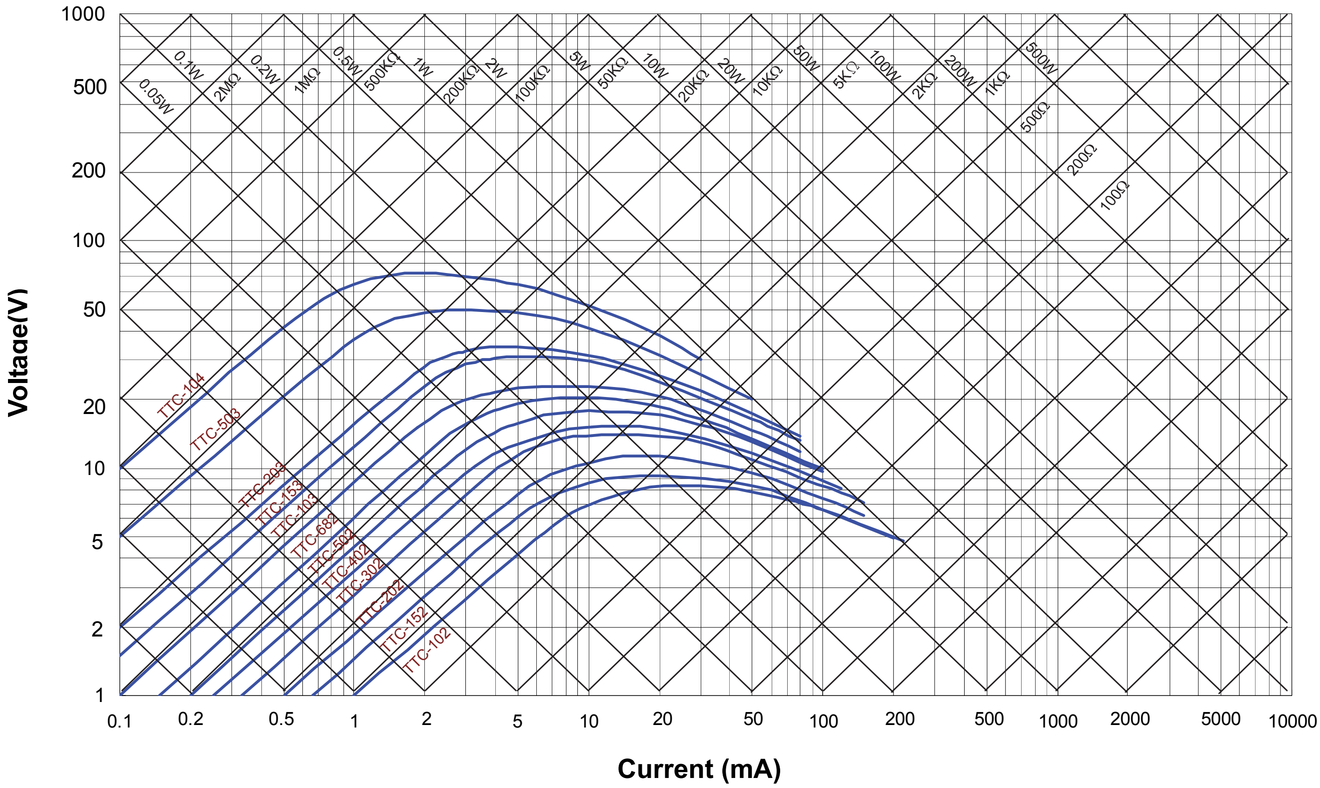


V-I Characteristic Curves (representative)

TTC05005~TTC05681

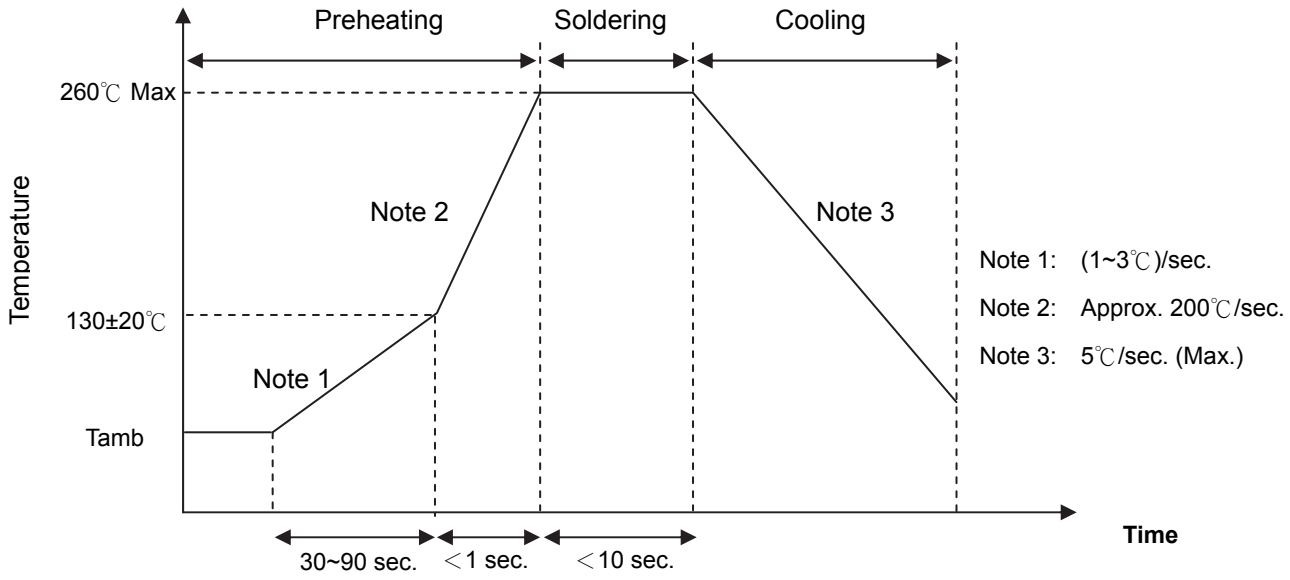


TTC05102~TTC05104



■ Soldering Recommendation

● Wave Soldering Profile



● Recommended Reworking Conditions with Soldering Iron

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

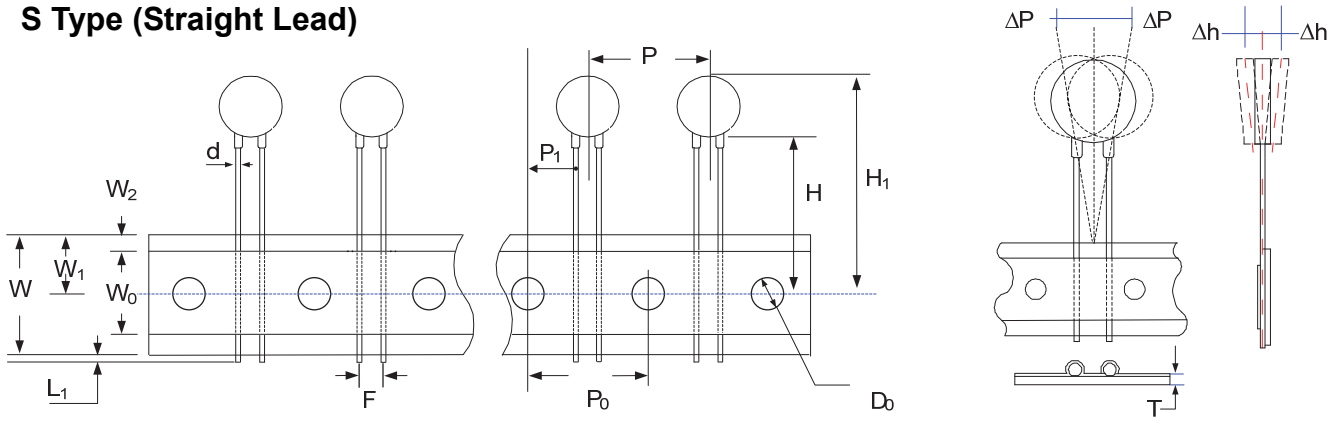
■ Reliability

<table>
<tr><th>Item</th><th>Standard</th><th>Test conditions / Methods</th><th>Specifications</th></tr>
<tr><td>Tensile Strength of Terminals</td><td>IEC 60068-2-21</td><td>Gradually apply the specified force and keep the unit fixed for 10±1 sec.
<table><tr><th>Terminal diameter (mm)</th><th>Force (Kg)</th></tr><tr><td>0.3<d≦0.5</td><td>0.5</td></tr></table></td><td>No visible damage</td></tr>
<tr><td>Bending Strength of Terminals</td><td>IEC 60068-2-21</td><td>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.
<table><tr><th>Terminal diameter (mm)</th><th>Force (Kg)</th></tr><tr><td>0.3<d≦0.5</td><td>0.25</td></tr></table></td><td>No visible damage</td></tr>
<tr><td>Solderability</td><td>IEC 60068-2-20</td><td>245 ± 3 ℃ , 3 ± 0.3 sec.</td><td>At least 95% of terminal electrode is covered by new solder</td></tr>
<tr><td>Resistance to Soldering Heat</td><td>IEC 60068-2-20</td><td>260 ± 3 ℃ , 10 ± 1 sec.</td><td>No visible damage
$|\triangle R_{25}/R_{25}| \leqq 3\ \%$</td></tr>
<tr><td>High Temperature Storage</td><td>IEC 600068-2-2</td><td>125 ± 5 ℃, 1000± 24 hrs</td><td>No visible damage
$|\triangle R_{25}/R_{25}| \leqq 5\ \%$</td></tr>
<tr><td>Damp Heat, Steady State</td><td>IEC 60068-2-78</td><td>40 ± 2℃ , 90~95% RH, 1000 ± 24 hrs</td><td>No visible damage
$|\triangle R_{25}/R_{25}| \leqq 3\ \%$</td></tr>
<tr><td>Rapid Change of Temperature</td><td>IEC 60068-2-14</td><td>The conditions shown below shall be repeated 5 cycles.
<table><tr><th>Step</th><th>Temperature (℃)</th><th>Period (minutes)</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 visible damage
$|\triangle R_{25}/R_{25}| \leqq 3\ \%$</td></tr>
<tr><td>Max. Power Dissipation</td><td>IEC 60539-1</td><td>25 ± 5℃, Pmax. , 1000± 24 hrs</td><td>No visible damage
$|\triangle R_{25}/R_{25}| \leqq 5\ \%$</td></tr>
<tr><td>Insulation Test</td><td>MIL-STD-202F -Method 302</td><td>1000 V_{DC} , 1 min</td><td>No visible damage
≧500 MΩ</td></tr>
</table>

■ Packaging

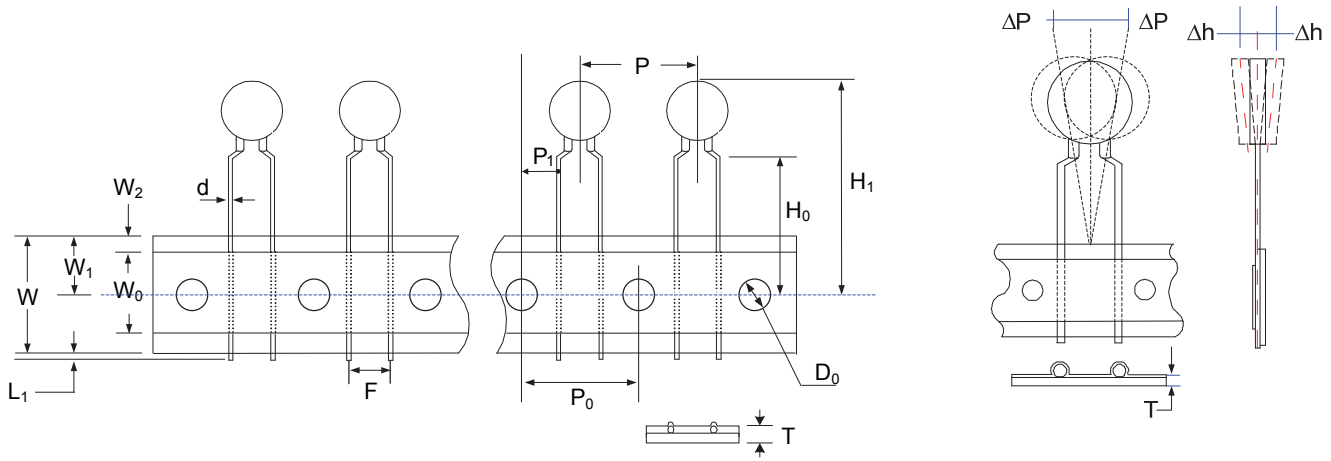
● Taping Specification :

S Type (Straight Lead)



Taping Dimension	P_0	F	P	P_1	H	H_1	d	W_0	W_1	W_2	W	△P	△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.	Max.	±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	0.5	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	0.5	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	△P	△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.	Max.	±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	0.5	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	0.5	4	0.6

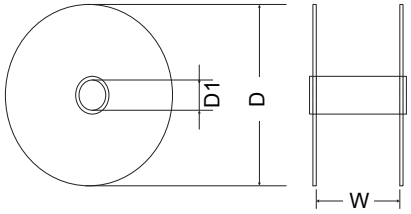
■ Quantity

● Bulk Packing

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

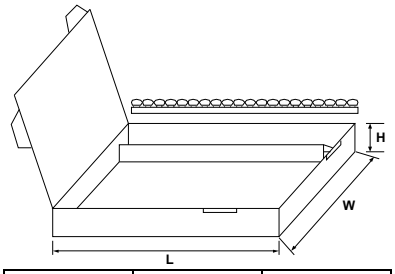
● Reel Packing:

Series	D (mm)	D1 (mm)	W (mm)	Quantity (pcs/reel)
TTC05	340±10	31±1	55±1	2,500



● Ammo Packing:

Series	Quantity (pcs/box)
TTC05	2,000



L	W	H
348mm	275mm	60mm

■ Warehouse Storage Conditions of Products

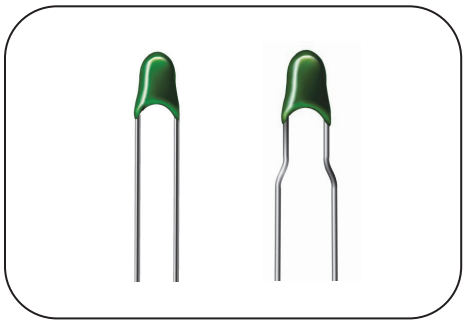
- Storage Conditions:
  1. Storage Temperature: -10℃~+40℃
  2. Relative Humidity: ≦75%RH
  3. Keep away from corrosive atmosphere and sunlight.
- Period of Storage: 1 year

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℃~+125℃
6. Wide resistance range
7. Cost effective
8. Agency recognition: UL / TUV / CQC



■ Recommended Applications

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

■ Part Number Code

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Product Type

TTC	THINKING NTC Thermistor TTC Series

Body Size

3	Φ3mm

Definition of B Value

A	$B_{25/85}$
B	$B_{25/50}$

Zero Power Resistance at 25℃ (R_{25})

102	1KΩ
103	10KΩ
473	47KΩ

Tolerance of R_{25}

F	±1%
G	±2%
H	±3%
J	±5%
K	±10%

B Value

374	3740
39D	3935
395	3950
39H	3975
520	5200

Tolerance of B Value

1	±1%
2	±2%
3	±3%

Optional Suffix

Y	RoHS Compliant
A	RoHS & HF Compliant

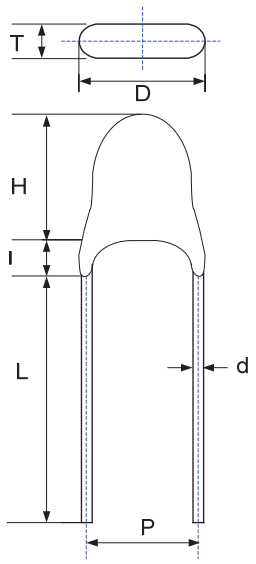
Appearance

E	Straight lead, pitch 2.54mm, Φ0.5mm
P	Straight lead, pitch 5mm, Φ0.5mm
L	Wider Kink, pitch 2.54mm, Φ0.5mm
Q	Wider Kink, pitch 5mm, Φ0.5mm
F	Outer Kink, pitch 2.54mm, Φ0.5mm

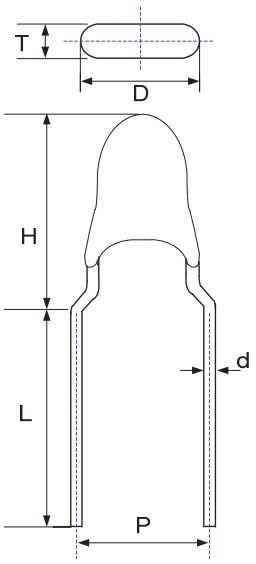
NTC Thermistor：TTC3 Series

Φ3 mm Lead Type for Temperature Sensing/Compensation

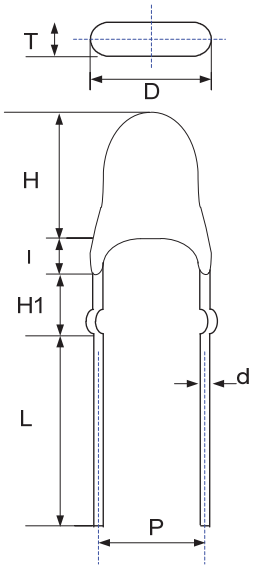
■ Structure and Dimensions



Straight Lead



Wider Kink



Outer Kink

(Unit: mm)

Lead Type	P	Dmax.	Tmax.	Hmax.	H1max.	Imax.	L	d
Straight Lead	2.54±1	4	3	5	--	3	30~40	0.5±0.02
	5±1	6.5	5	7	--	3		
Wider Kink	2.54±1	4	3	6	--	--		
	5±1	4	3	10	--	--		
Outer Kink	2.54±1	4	3	5	5.5	3	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_{25}	B Value		Tolerance of B value	Max. Power Dissipation at 25℃	Dissipation Factor	Thermal Time Constant	Operating Temperature Range	Safety Approvals		
										UL cUL	TUV	CQC
	R_{25} (KΩ)	(±%)	(K)		(±%)	P_{max}(mW)	δ(mW/°C)	τ (Sec.)	T_L~T_U(°C)			
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	1、2、3					√	√	√
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	2、3					√	√	√
TTC3A203□426*	20			4260						√	√	√
TTC3A223□374*	22			3740						√	√	√
TTC3A333□409*	33			4090	1、2、3					√	√	√
TTC3A473□409*	47			4090						√	√	√
TTC3A503□39H*	50			3975						√	√	√
TTC3A503□406*	50			4060						√	√	√
TTC3A683□419*	68			4190	2、3					√	√	√
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	3					√	√	√
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_{25}

* = Tolerance of B value

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

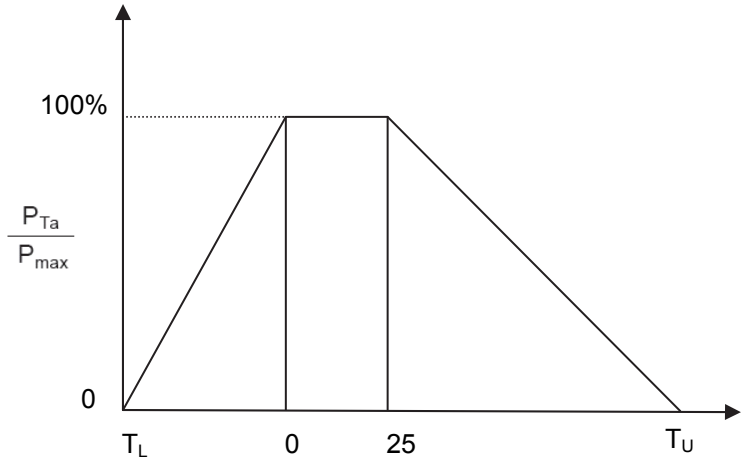
CQC File No: CQC04001011945, CQC04001011966

Note 3: Special specifications are available upon request.

NTC Thermistor：TTC3 Series

Φ3 mm Lead Type for Temperature Sensing/Compensation

■ Max. Power Dissipation Derating Curve



Ambient temperature (℃)

T_U : Maximum operating temperature (℃)

T_L : Minimum operating temperature (℃)

For example:

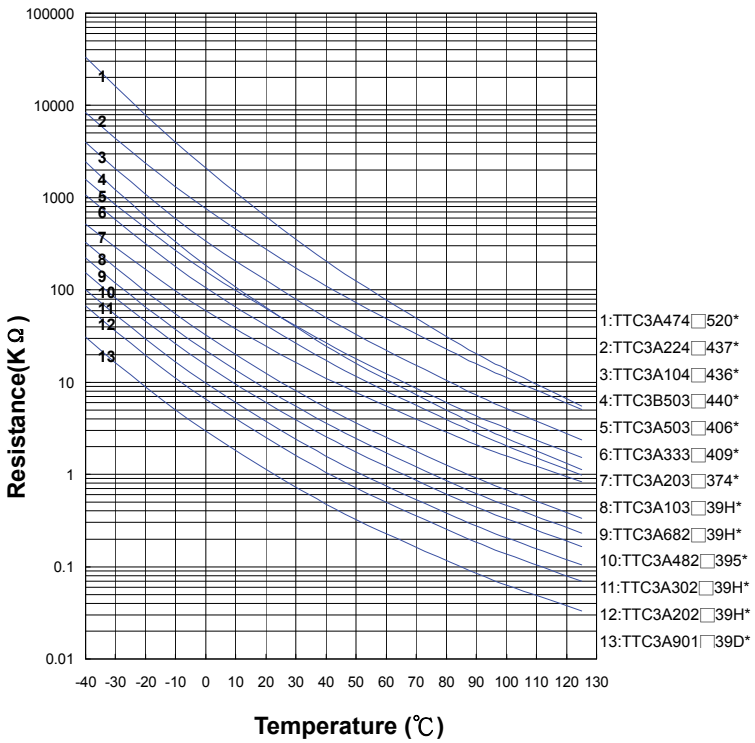
Ambient temperature(Ta) = 55℃

Maximum operating temperature(T_U) = 125℃

P_{Ta} = (T_U-Ta)/(T_U-25)×Pmax = 70% Pmax

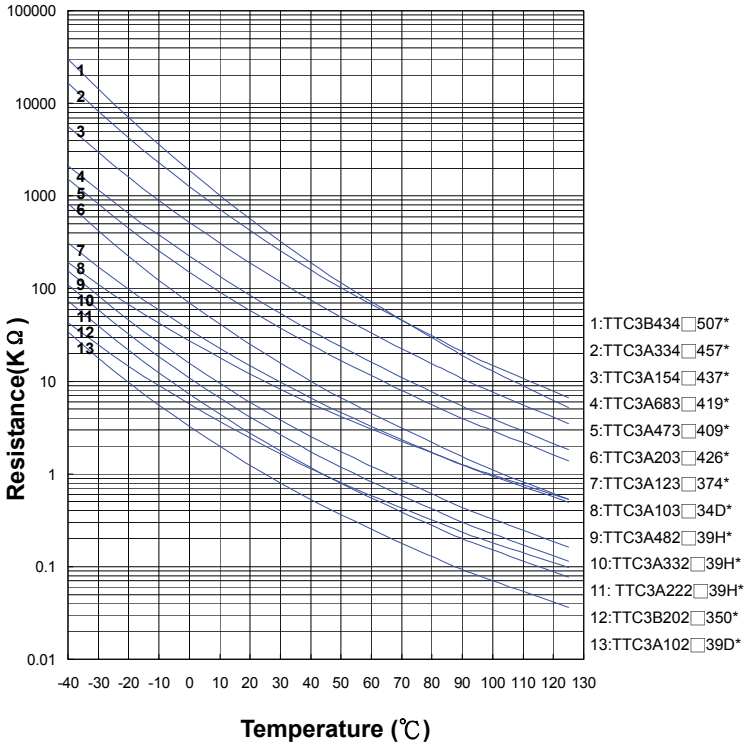
■ R-T Characteristic Curves

TTC3A901□39D*~ TTC3A474□520*

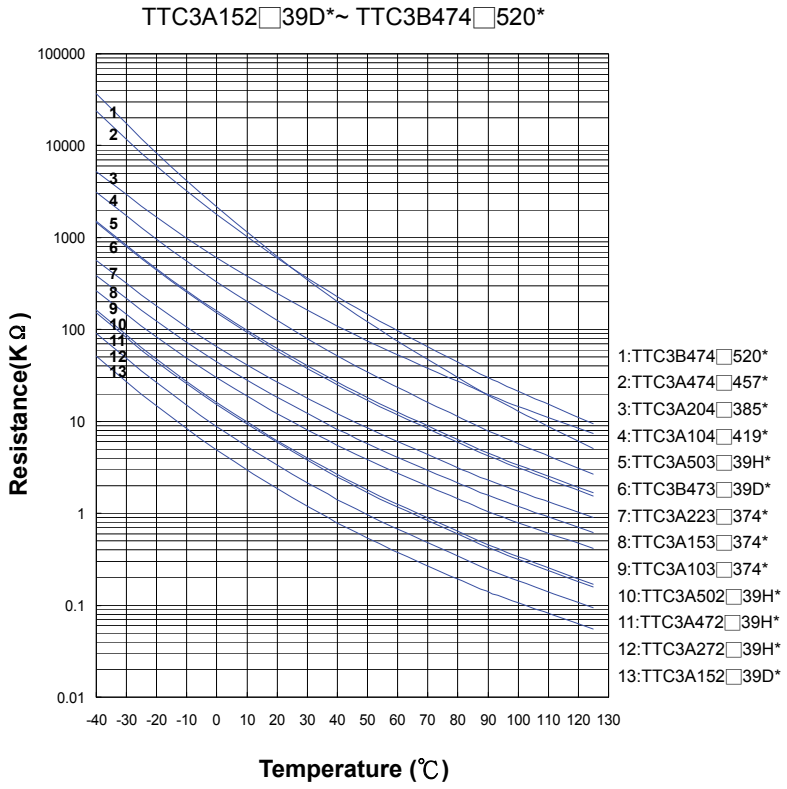


Temperature (℃)

TTC3A102□39D*~ TTC3B434□507*

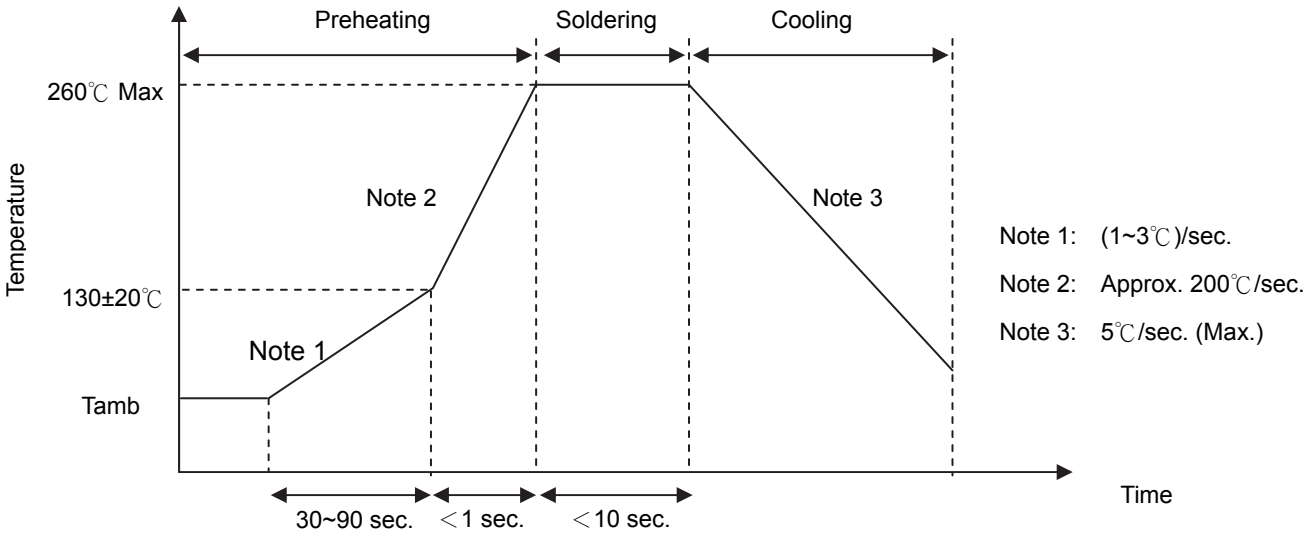


Temperature (℃)



■ Soldering Recommendation

● Wave Soldering Profile



● Recommended Reworking Conditions with Soldering Iron

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

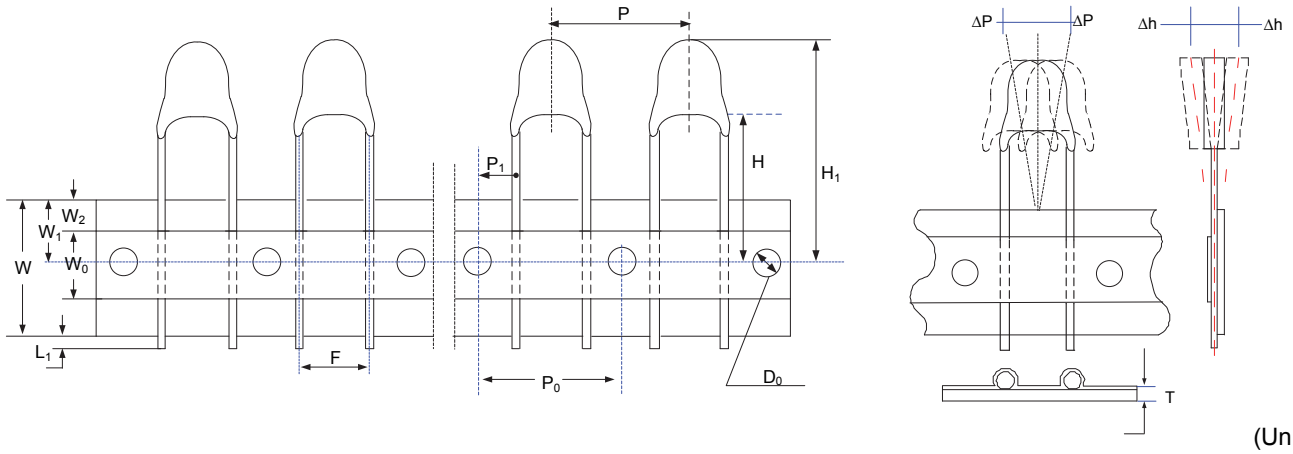
■ Reliability

<table>
<tr><th>Item</th><th>Standard</th><th>Test conditions / Methods</th><th>Specifications</th></tr>
<tr><td>Tensile Strength of Terminations</td><td>IEC 60068-2-21</td><td>Gradually apply the specified force and keep the unit fixed for 10±1 sec.
<table><tr><th>Terminal diameter (mm)</th><th>Force (Kg)</th></tr><tr><td>0.3<d≦0.5</td><td>0.5</td></tr></table></td><td>No visible damage</td></tr>
<tr><td>Bending Strength of Terminations</td><td>IEC 60068-2-21</td><td>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.
<table><tr><th>Terminal diameter (mm)</th><th>Force (Kg)</th></tr><tr><td>0.3<d≦0.5</td><td>0.25</td></tr></table></td><td>No visible damage</td></tr>
<tr><td>Solderability</td><td>IEC 60068-2-20</td><td>245±3 ℃, 3±0.3 sec.</td><td>At least 95% of terminal electrode is covered by new solder</td></tr>
<tr><td>Resistance to Soldering Heat</td><td>IEC 60068-2-20</td><td>260 ± 3℃, 10 ± 1 sec.</td><td>No visible damage
$|\triangle R_{25}/R_{25}| \leqq 3\ \%$</td></tr>
<tr><td>High Temperature Storage</td><td>IEC 60068-2-2</td><td>125 ± 5℃ , 1000 ± 24 hrs</td><td>No visible damage
$|\triangle R_{25}/R_{25}| \leqq 5\ \%$</td></tr>
<tr><td>Damp Heat, Steady State</td><td>IEC 60068-2-3</td><td>40 ± 2℃ , 90~95% RH , 1000 ± 24 hrs</td><td>No visible damage
$|\triangle R_{25}/R_{25}| \leqq 3\ \%$</td></tr>
<tr><td>Rapid Change of Temperature</td><td>IEC 60068-2-14</td><td>The conditions shown below shall be repeated 5 cycles
<table><tr><th>Step</th><th>Temperature (℃)</th><th>Period (minutes)</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 visible damage
$|\triangle R_{25}/R_{25}| \leqq 3\ \%$</td></tr>
<tr><td>Max. Power Dissipation</td><td>IEC 60539-1</td><td>25 ± 5℃, Pmax. , 1000 ± 24 hrs</td><td>No visible damage
$|\triangle R_{25}/R_{25}| \leqq 5\ \%$</td></tr>
</table>

■ Packaging

● Taping Specification

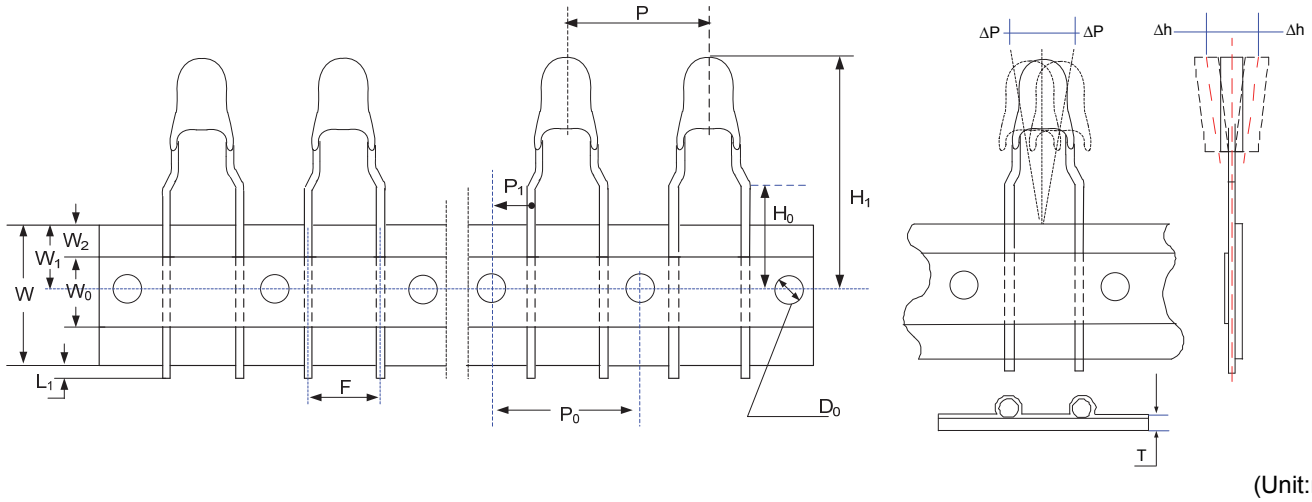
Straight Lead



(Unit:mm)

Taping Dimension	P_0	F	P	P_1	H	H_1	d	W_0	W_1	W_2	W	△P	△h	L_1	D_0	T
	±0.3	±1	±1	±0.7	+2/-0	Max.	±0.02	±1	+0.75 /-0.5	Max.	+1/ -0.5	Max.	Max.	Max.	±0.2	±0.2
P_0=12.7	12.7	2.54	12.7	5.08	18	25	0.5	12	9	3	18	1	2	0.5	4	0.6
	12.7	5	12.7	3.85	18	25	0.5	12	9	3	18	1	2	0.5	4	0.6
P_0=15.0	15	2.54	15	6.23	18	25	0.5	12	9	3	18	1	2	0.5	4	0.6
	15	5	15	5.00	18	25	0.5	12	9	3	18	1	2	0.5	4	0.6

Wider Kink



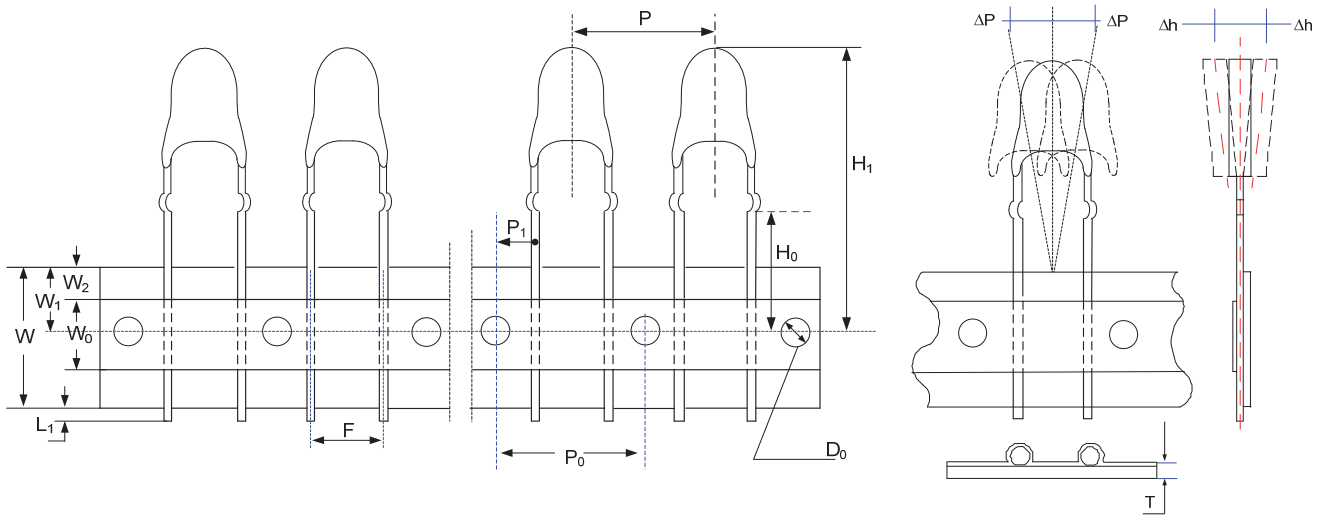
(Unit:mm)

Taping Dimension	P_0	F	P	P_1	H_0	H_1	d	W_0	W_1	W_2	W	△P	△h	L_1	D_0	T
	±0.3	±1	±1	±0.7	±0.5	Max.	±0.02	±1	+0.75 /-0.5	Max.	+1/ -0.5	Max.	Max.	Max.	±0.2	±0.2
P_0=12.7	12.7	2.54	12.7	5.08	16	26	0.5	12	9	3	18	1	2	0.5	4	0.6
	12.7	5	12.7	3.85	16	26	0.5	12	9	3	18	1	2	0.5	4	0.6

NTC Thermistor：TTC3 Series

Φ3 mm Lead Type for Temperature Sensing/Compensation

Outer Kink



(Unit:mm)

Taping Dimension	P_0	F	P	P_1	H_0	H_1	d	W_0	W_1	W_2	W	△P	△h	L_1	D_0	T
	±0.3	±1	±1	±0.7	±0.5	Max.	±0.02	±1	+0.75 /-0.5	Max.	+1/ -0.5	Max.	Max.	Max.	±0.2	±0.2
P_0=12.7	12.7	2.54	12.7	5.08	16	26	0.5	12	9	3	18	1	2	0.5	4	0.6

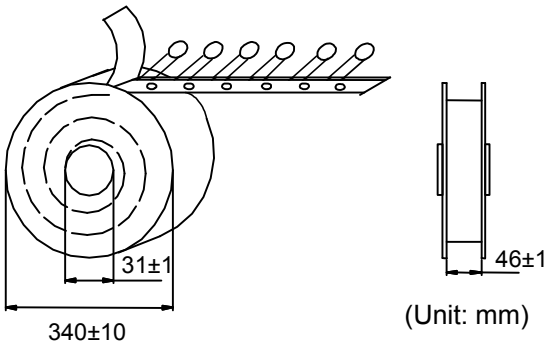
■ Quantity

● Bulk Packing

Series	Quantity (pcs/bag)
TTC3	500

● Reel Packing

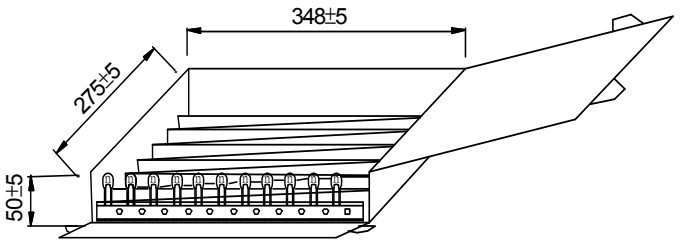
Series	Quantity (pcs/reel)
TTC3	2,500



(Unit: mm)

● Ammo Packing

Series	Quantity (pcs/box)
TTC3	2,500



■ Warehouse Storage Conditions of Products

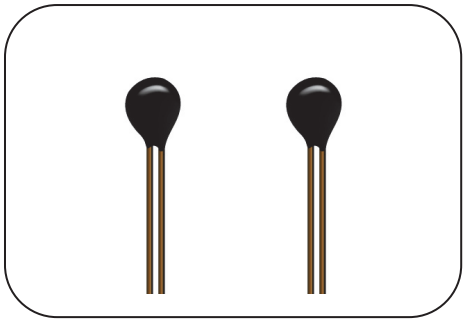
- Storage Conditions:
  1. Storage Temperature: -10℃~+40℃
  2. Relative Humidity: ≦75%RH
  3. Keep away from corrosive atmosphere and sunlight.
- Period of Storage : 1 year

NTC Thermistor：TTS Series

Epoxy Bead Type for Temperature Sensing/Compensation

Features

1. RoHS compliant
2. Halogen-Free (HF) series are available
3. Body size: Φ1.8mm, Φ2.6mm
4. Radial lead resin coated
5. Long leads for easy sensor placement
6. Operating temperature range: -40℃~+100℃
7. Wide resistance range
8. Agency recognition: UL / cUL



Recommended Applications

1. Home appliances
2. Computers
3. Battery packs
4. Thermometers

Part Number Code

1	2	3	.4	5	6	7	8	9	10	11	12	13	14	15	16

Product Type	
TTS	THINKING NTC Thermistor TTS Series

Size	
1	Φ1.8mm x 6.0 mm (max.)
2	Φ2.6mm x 6.0mm (max.)

Definition of B Value	
A	$B_{25/85}$
B	$B_{25/50}$

Zero Power Resistance at 25℃ (R_{25})	
102	1KΩ
103	10KΩ
473	47KΩ

Tolerance of R_{25}	
F	±1%
G	±2%
H	±3%
J	±5%
K	±10%

B Value	
338	3380
34D	3435
395	3950
39H	3975
405	4050

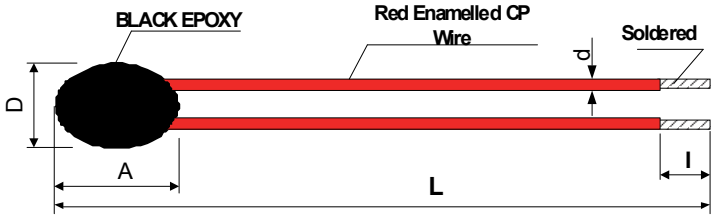
Tolerance of B Value	
1	±1%
2	±2%
3	±3%

Optional Suffix	
Y	RoHS Compliant
H	RoHS + HF Compliant

Appearance	
R	Φ0.30mm Red Enamelled CP Wire
G	Φ0.30mm Sn Plated CP Wire
T	Φ0.30mm Blue Teflon CP Wire

Structure and Dimensions

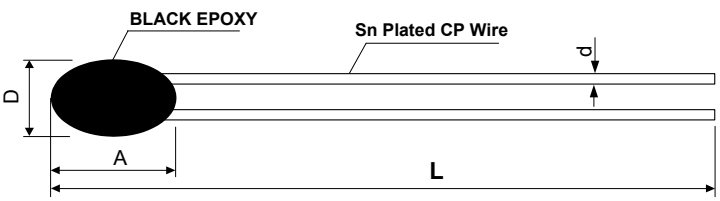
R Type



(Unit: mm)

Series	Dmax.	Amax.	d	L	l
TTS1	1.8	6.0	0.30±0.02	70±5	2±0.5
TTS2	2.6	6.0			

G Type



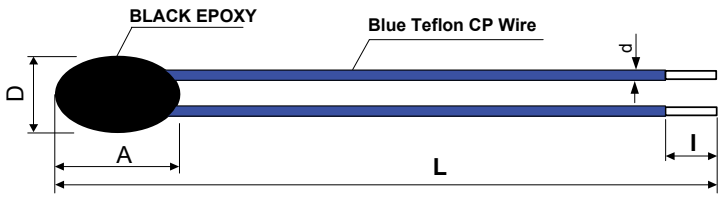
(Unit: mm)

Series	Dmax.	Amax.	d	L
TTS1	1.8	6.0	0.30±0.02	70±5
TTS2	2.6	6.0		

NTC Thermistor：TTS Series

Epoxy Bead Type for Temperature Sensing/Compensation

T Type



(Unit: mm)

Series	Dmax.	Amax.	d	L	l
TTS1	1.8	6.0	0.30±0.02	70±5	2±0.5

■ Electrical Characteristics

Part No.	Zero Power Resistance at 25°C	Tolerance of R_{25}	B Value		Tolerance of B value	Max. Power Dissipation at 25°C	Dissipation Factor	Thermal Time Constant	Operating Temperature Range	Safety Approvals	
	R_{25} (KΩ)	(±%)	(K)		(±%)	P_{max}(mW)	δ(mW/°C)	τ (Sec.)	T_L~T_U(°C)	UL	cUL
TTS1A103□34D*	10	1, 2, 3, 5	25/85	3435	1, 2, 3	45	≧1	≦10	-40 ~ +100	√	√
TTS1A103□395*	10			3950						√	√
TTS1A103□39H*	10			3975						√	√
TTS1A103□425*	10			4250	2, 3					√	√
TTS1A223□370*	22			3700						√	√
TTS1A333□405*	33			4050	1, 2, 3					√	√
TTS1A104□436*	100			4360	2, 3					√	√
TTS1B104□410*	100		25/50	4100	1, 2, 3					√	√
TTS2A502□39H*	5	1, 2, 3, 5	25/85	3975	1, 2, 3					√	√
TTS2A103□34D*	10			3435						√	√
TTS2A103□396*	10			3960						√	√
TTS2A103□39H*	10			3975						√	√
TTS2A203□34D*	20			3435						√	√
TTS2A104□436*	100			4360	2, 3					√	√
TTS2B102□392*	1		25/50	3920	1, 2, 3					√	√
TTS2B502□39D*	5			3935						√	√
TTS2B104□410*	100			4100						√	√
TTS2B104□419*	100			4190	2, 3					√	√
TTS2B474□439*	470			4390						√	√

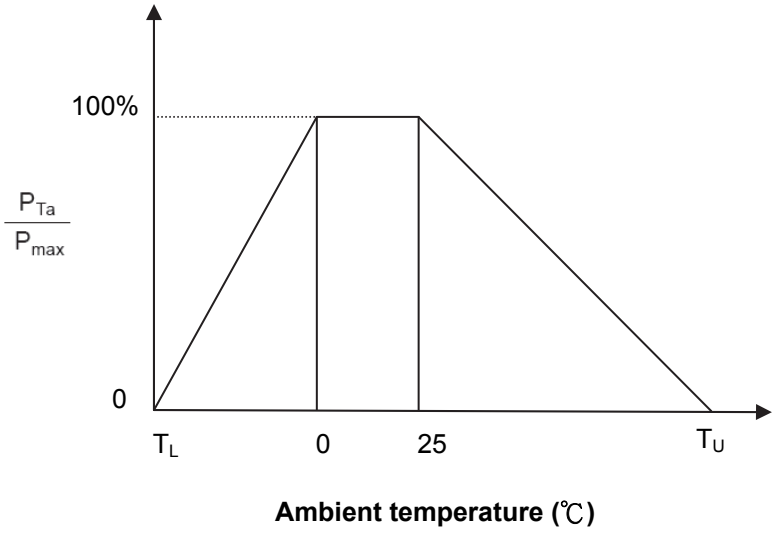
Note 1: □ = Tolerance of R_{25}

* = Tolerance of B value

Note 2: UL/cUL File No: E138827

Note 3: Special specifications are available upon request.

■ Max. Power Dissipation Derating Curve



T_U : Maximum operating temperature (℃)

T_L : Minimum operating temperature (℃)

For example:

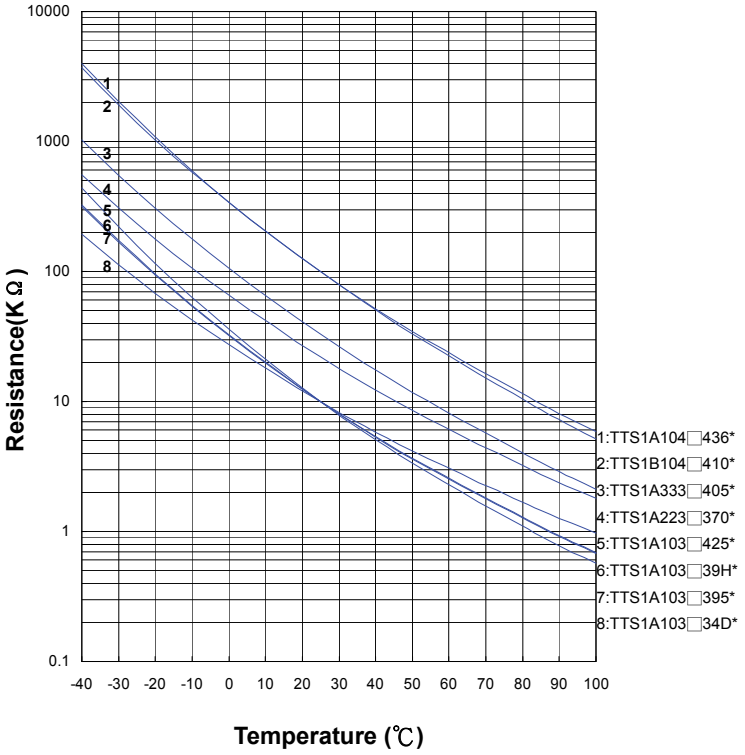
Ambient temperature(Ta) = 55℃

Maximum operating temperature(T_U) = 100℃

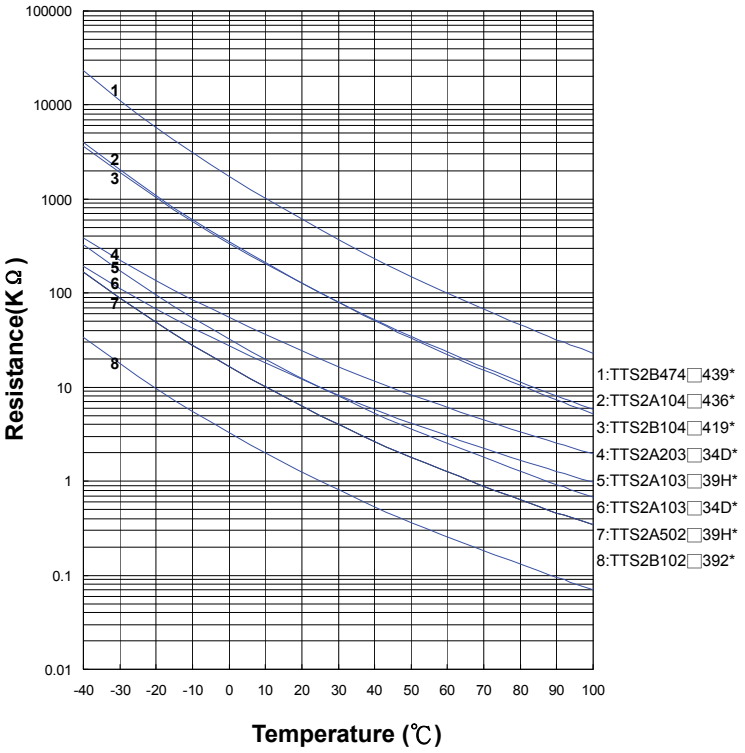
$P_{Ta}=(T_U-Ta)/(T_U-25)\times Pmax$ = 60% Pmax

■ R-T Characteristic Curves

TTS1A103□34D*~ TTS1B104□436*

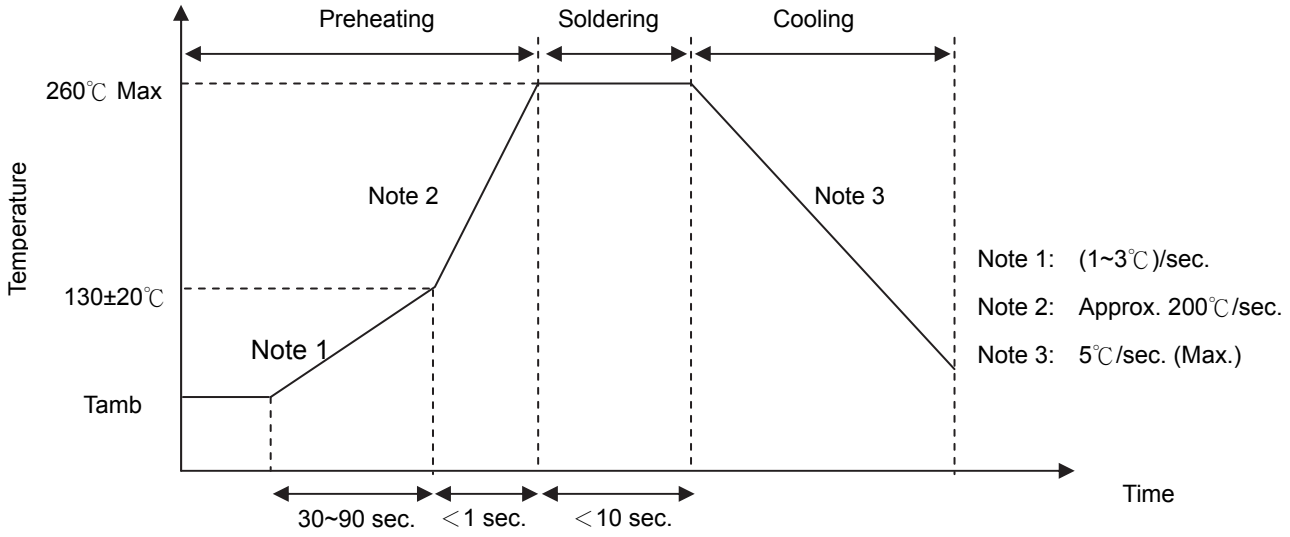


TTS2B102□392*~ TTS2B474□439*



■ Soldering Recommendation

● Wave Soldering Profile



● Recommended Reworking Conditions With Soldering Iron

Item	Conditions
Temperature of Soldering Iron-tip	360℃ (max.)
Soldering Time	3 sec. (max.)
Distance from Thermistor	10 mm (min.)

■ Reliability

Item	Standard	Test conditions / Methods	Specifications
Tensile Strength of Terminations	IEC 60068-2-21	Gradually apply the specified force and keep the unit fixed for 10±1 sec. Terminal diameter (mm) / Force (Kg) d≦0.25 — 0.10 0.25<d≦0.3 — 0.25 0.3<d≦0.5 — 0.5	No visible damage
Bending Strength of Terminations	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) / Force (Kg) d≦0.25 — 0.05 0.25<d≦0.3 — 0.125 0.3<d≦0.5 — 0.25	No visible damage
Solderability	IEC 60068-2-20	245 ± 3℃, 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℃, 10 ± 1 sec.	No visible damage $\lvert \triangle R_{25}/R_{25} \rvert \leqq 3\ \%$
High Temperature Storage	IEC 60068-2-2	100 ± 5℃ , 1000 ± 24 hrs	No visible damage $\lvert \triangle R_{25}/R_{25} \rvert \leqq 5\ \%$
Damp Heat, Steady State	IEC 60068-2-78	40 ± 2℃, 90~95% RH, 1000 ± 24 hrs	No visible damage $\lvert \triangle R_{25}/R_{25} \rvert \leqq 3\ \%$
Rapid Change of Temperature	IEC 60068-2-14	The conditions shown below shall be repeated 5 cycles. Step 1: -40 ± 5, 30 ± 3 Step 2: Room temperature, 5 ± 3 Step 3: 100 ± 5, 30 ± 3 Step 4: Room temperature, 5 ± 3	No visible damage $\lvert \triangle R_{25}/R_{25} \rvert \leqq 3\ \%$
Max. Power Dissipation	IEC 60539-1	25 ± 5℃, Pmax. , 1000 ± 24 hrs	No visible damage $\lvert \triangle R_{25}/R_{25} \rvert \leqq 5\ \%$

■ Packaging

- Bulk Packing: 500 pcs/bag

■ Warehouse Storage Conditions of Products

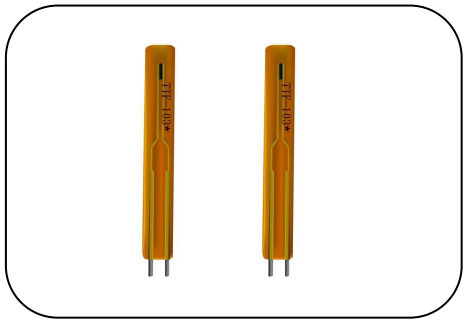
- Storage Conditions :
  1. Storage Temperature: -10℃~+40℃
  2. Relative Humidity: ≦75%RH
  3. Keep away from corrosive atmosphere and sunlight.
- Period of Storage : 1 year

NTC Thermistor：TTF Series

Insulation Film Type for Temperature Sensing/Compensation

Features

1. RoHS compliant
2. Halogen-Free (HF) series are available
3. Radial leaded insulation film coated
4. Operating temperature range: -40℃~+100℃
5. Agency recognition: UL / cUL



Recommended Applications

1. Home appliances
2. Computers
3. Battery packs

Part Number Code

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Product Type	
TTF	THINKING NTC Thermistor TTF Series

Size	
3	W:3.6mm

Definition of B Value	
A	$B_{25/85}$
B	$B_{25/50}$

Zero Power Resistance at 25℃ (R_{25})	
102	1KΩ
103	10KΩ
473	47KΩ

Tolerance of R_{25}	
F	±1%
G	±2%
H	±3%
J	±5%
K	±10%

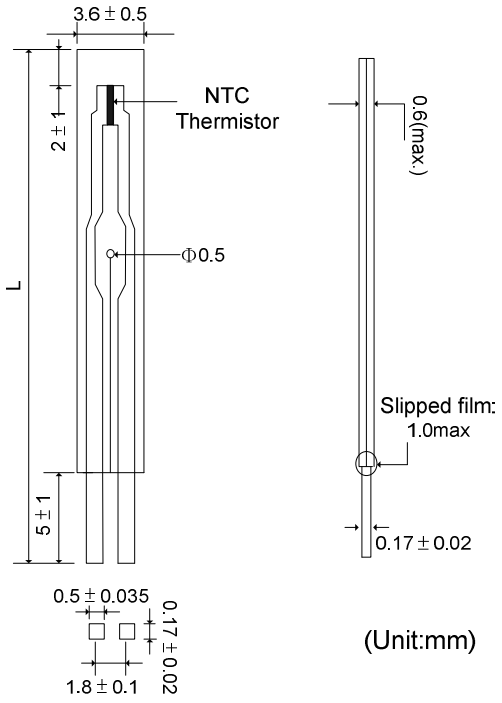
B Value	
338	3380
34D	3435
395	3950
39H	3975
405	4050

Tolerance of B Value	
1	±1%
2	±2%
3	±3%

Optional Suffix	
Y	RoHS Compliant
H	RoHS & HF Compliant

Appearance	
A	L:25mm solder part 5mm
B	L:50mm solder part 5mm

Structure and Dimensions



(Unit:mm)

NTC Thermistor：TTF Series

Insulation Film Type for Temperature Sensing/Compensation

■ Electrical Characteristics

Part No.	Zero Power Resistance at 25℃	Tolerance of R_{25}	B Value		Tolerance of B value	Max. Power Dissipation at 25℃	Dissipation Factor	Thermal Time Constant	Operating Temperature Range	Safety Approvals	
										UL	cUL
	R_{25} (KΩ)	(±%)	(K)		(±%)	P_{max}(mW)	δ(mW/℃)	τ (Sec.)	T_L~T_U(℃)		
TTF3A502□34D*	5	1, 2, 3, 5	25/85	3435	2, 3	3.5	Approx. 0.7	Approx. 5	-40 ~ +100	√	√
TTF3A103□34D*	10			3435	1, 2, 3					√	√
TTF3A203□34D*	20			3435						√	√
TTF3A223□34D*	22			3435						√	√
TTF3A303□39H*	30			3975						√	√
TTF3A104□34D*	100			3435	2,3					√	√

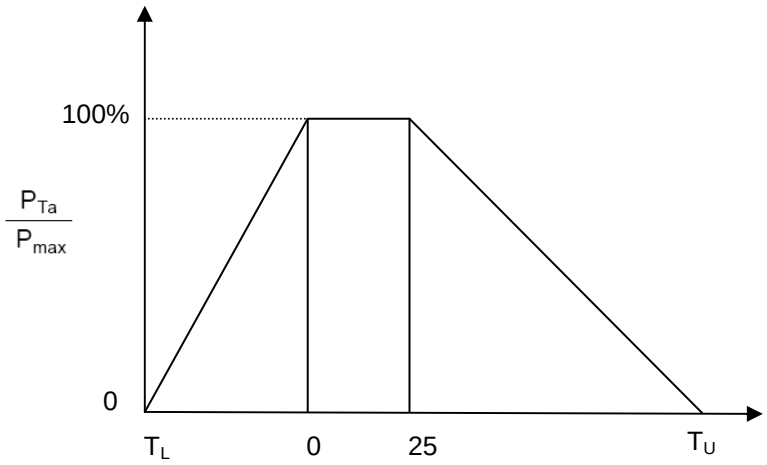
Note 1: □ = Tolerance of R_{25}

* = Tolerance of B value

Note 2: UL/cUL File No: E138827

Note 3: Special specifications are available upon request.

■ Max. Power Dissipation Derating Curve



Ambient temperature (℃)

T_U: Maximum operating temperature (℃)

T_L : Minimum operating temperature (℃)

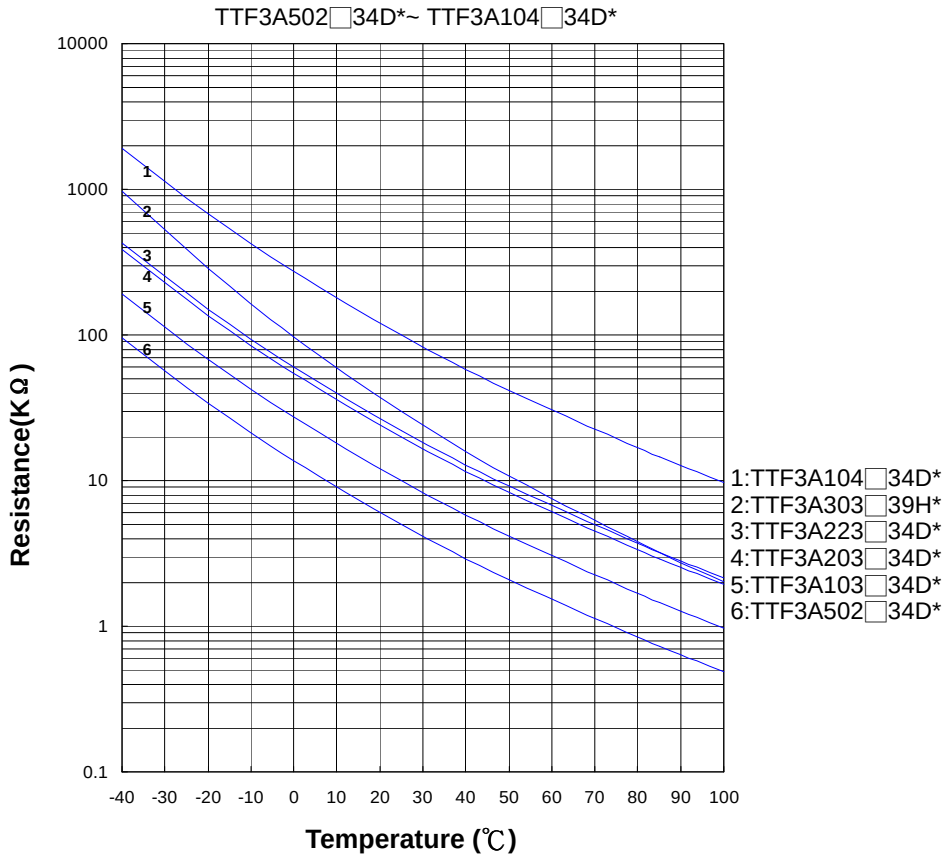
For example:

Ambient temperature(Ta) = 55℃

Maximum operating temperature(T_U) = 100℃

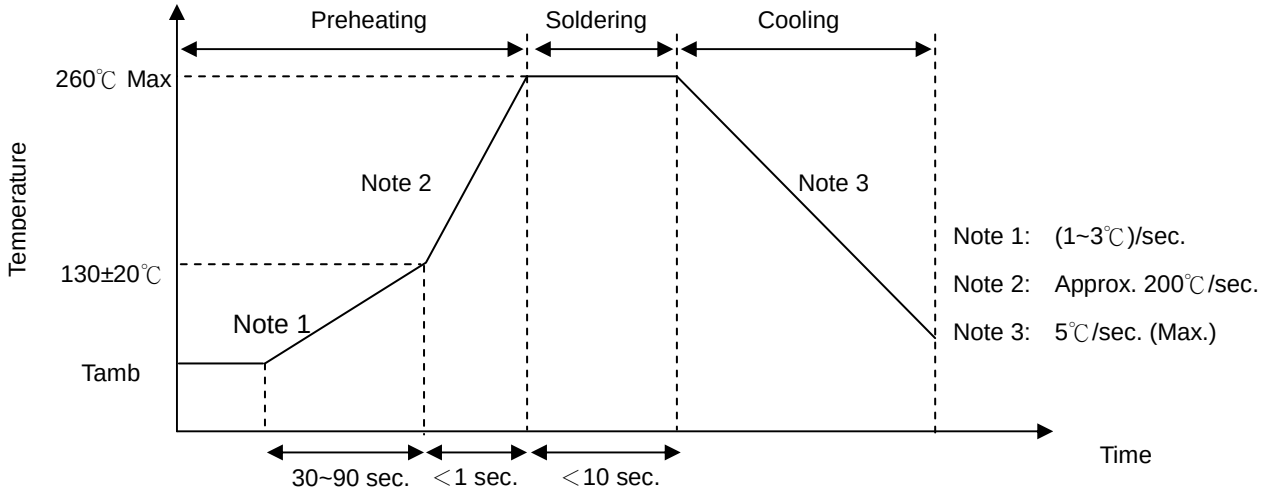
$P_{Ta} = (T_U\text{-}Ta)/(T_U\text{-}25) \times Pmax$ = 60% Pmax

■ R-T Characteristic Curves



■ Soldering Recommendation

● Wave Soldering Profile



● Recommended Reworking Conditions with Soldering Iron

Item	Conditions
Temperature of Soldering Iron-tip	360℃ (max.)
Soldering Time	3 sec. (max.)
Distance from Coating	Do not touch film bottom

NTC Thermistor：TTF Series

Insulation Film Type for Temperature Sensing/Compensation

■ 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 cross-sectional area (mm^2) / Force (Kg) 0.05<S≦0.1 / 0.25	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 cross-sectional area (mm^2) / Force (Kg) 0.05<S≦0.1 / 0.125	No visible damage
Solderability	IEC 60068-2-20	245 ± 3℃, 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℃, 10 ± 1 sec.	No visible damage $\lvert \triangle R_{25}/R_{25} \rvert \leqq 3\ \%$
High Temperature Storage	IEC 600C68-2-2	100 ± 5℃, 1000 ± 24 hrs	No visible damage $\lvert \triangle R_{25}/R_{25} \rvert \leqq 5\ \%$
Damp Heat, Steady State	IEC 60068-2-78	40 ± 2℃, 90~95% RH, 1000 ± 24 hrs	No visible damage $\lvert \triangle R_{25}/R_{25} \rvert \leqq 3\ \%$
Rapid Change of Temperature	IEC 60068-2-14	The conditions shown below shall be repeated 5 cycles. Step / Temperature (℃) / Period (minutes) 1 / -40 ± 5 / 30 ± 3 2 / Room temperature / 5 ± 3 3 / 100 ± 5 / 30 ± 3 4 / Room temperature / 5 ± 3	No visible damage $\lvert \triangle R_{25}/R_{25} \rvert \leqq 3\ \%$
Max. Power Dissipation	IEC 60539-1	25 ± 5℃, Pmax. , 1000 ± 24 hrs	No visible damage $\lvert \triangle R_{25}/R_{25} \rvert \leqq 5\ \%$

■ Packaging

- **Bulk Packing**: 500 pcs/ bag

■ Warehouse Storage Conditions of Products

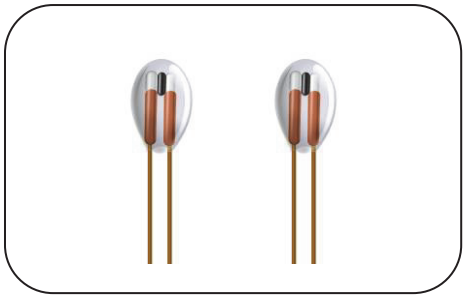
- Storage Conditions:
  1. Storage Temperature: -10℃~+40℃
  2. Relative Humidity: ≦75%RH
  3. Keep away from corrosive atmosphere and sunlight.
- Period of Storage: 1 year

NTC Thermistor：TGM Series

Glass Encapsulated Type for Temperature Sensing/Compensation

■ Features

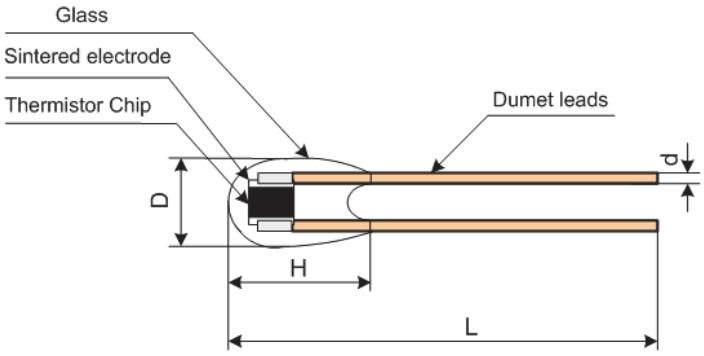
1. RoHS compliant
2. Glass-encapsulated and heat-resistive
3. Body size: Φ2.5mm
4. Operating temperature range: -40℃~+250 ℃



■ Recommended Applications

1. Home appliances
2. Automotive electronics

■ Structure and Dimensions



(Unit: mm)

Series	D	H	L	d
TGMA	2.5±0.2	3.8±0.5	≧40	0.30±0.02

NTC Thermistor：TGM Series

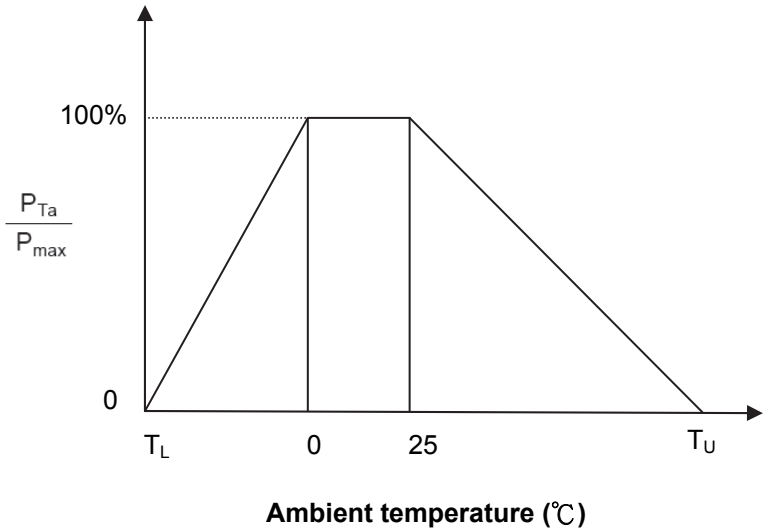
Glass Encapsulated Type for Temperature Sensing/Compensation

■ Electrical Characteristics

Part No.	Zero Power Resistance	B Value	RT Curve	Max. Power Dissipation at 25℃	Dissipation Factor	Thermal Time Constant	Operating Temperature Range
	(KΩ)	(K)	--	P_{max}(mW)	δ(mW/°C)	τ (Sec.)	T_L~T_U(°C)
TGMAA503F3993DA6	R100=3.3K±2%	B0/100=3970±3%	A	70	Approx. 1.4	Approx. 14	-40 ~ +250
TGMAA503F3993DA5	R100=3.3K±3%						
TGMAA503F3993DA1	R100=3.3K±5%						
TGMAA503G4013DA1	R25=50K±2%						
TGMAA503H4013DA1	R25=50K±3%						
TGMAA503J4013DA1	R25=50K±5%						
TGMAA104G4113DA1	R25=100K±2%	B100/200=4300±3%	B				
TGMAA104H4113DA1	R25=100K±3%						
TGMAA104J4113DA1	R25=100K±5%						
TGMAA104F4113DA2	R200=0.55K±2%						
TGMAA104F4113DA3	R200=0.55K±3%						
TGMAA104F4113DA5	R200=0.55K±5%						
TGMAA103G39HAD	R25=10K±2%	B25/85= 3975±1.5%	C				
TGMAA103H39HAD	R25=10K±3%						
TGMAA103J39HAD	R25=10K±5%						

Note 1: Special specifications are available upon request.

■ Max. Power Dissipation Derating Curve



T_U : Maximum operating temperature (℃)

T_L : Minimum operating temperature (℃)

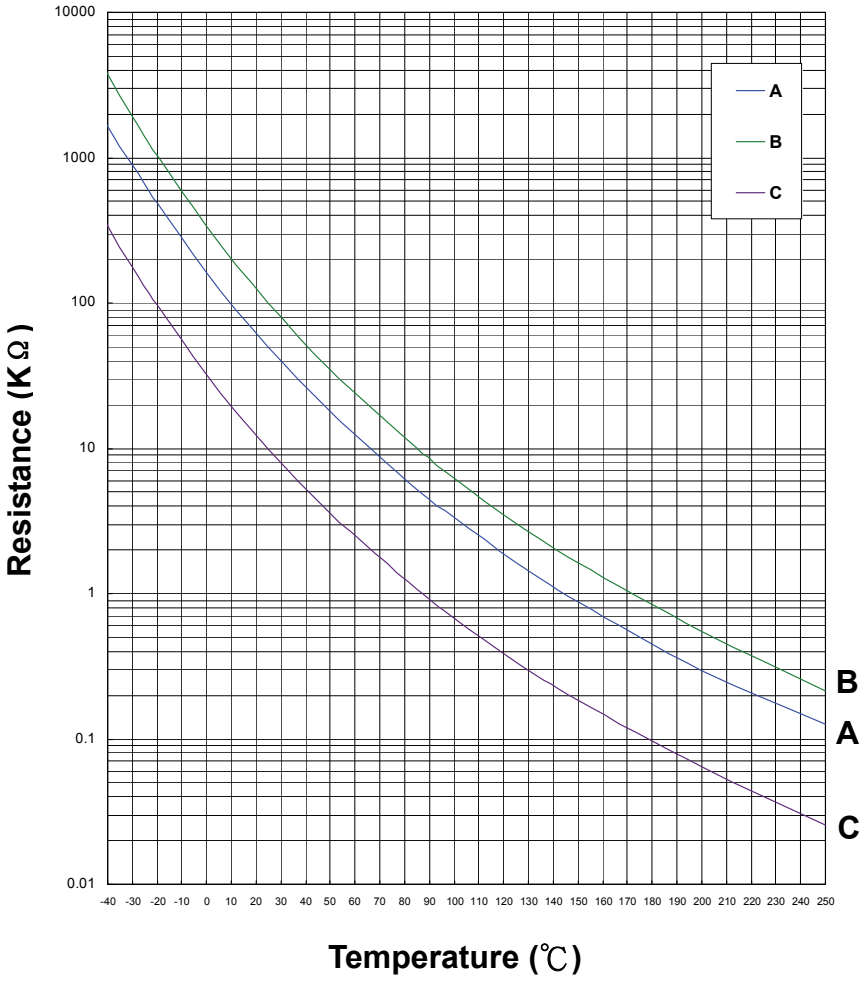
For example:

Ambient temperature (Ta) = 60℃

Maximum operating temperature (T_U) = 200℃

P_{Ta} = (T_U-Ta)/(T_U-25)×Pmax = 80% Pmax

■ R-T Characteristic Curves (representative)



■ Reliability

<table>
<tr><th>Item</th><th>Standard</th><th>Test conditions / Methods</th><th>Specifications</th></tr>
<tr><td>High Temperature Storage</td><td>IEC 60068-2-2</td><td>Tu ± 5℃, 1000 ± 24 hrs</td><td>No visible damage
| △R_{25}/R_{25} | ≦ 5 %</td></tr>
<tr><td>Damp Heat, Steady State</td><td>IEC 60068-2-78</td><td>40 ± 2℃, 90~95% RH, 1000 ± 24 hrs</td><td>No visible damage
| △R_{25}/R_{25} | ≦ 5 %</td></tr>
<tr><td>Rapid Change of Temperature</td><td>IEC 60068-2-14</td><td>The conditions shown below shall be repeated 5 cycles.
<table>
<tr><th>Step</th><th>Temperature (℃)</th><th>Period (minutes)</th></tr>
<tr><td>1</td><td>T_L ± 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>T_U ± 5</td><td>30 ± 3</td></tr>
<tr><td>4</td><td>Room temperature</td><td>5 ± 3</td></tr>
</table></td><td>No visible damage
| △R_{25}/R_{25} | ≦ 5 %</td></tr>
<tr><td>Max. Power Dissipation</td><td>IEC 60539-1</td><td>25 ± 5℃, Pmax. X 1000 ± 24 hrs</td><td>No visible damage
| △R_{25}/R_{25} | ≦ 5 %</td></tr>
</table>

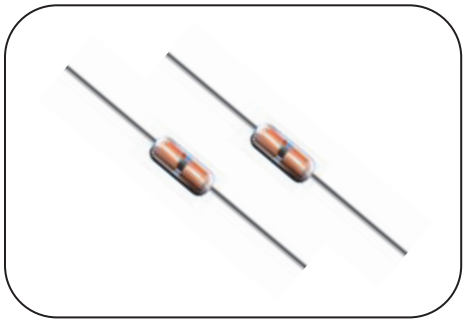
■ Warehouse Storage Conditions of Products

- 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

NTC Thermistor：DHT Type

Glass Axial Type for Temperature Sensing/Compensation

■ Features



1. RoHS compliant
2. Body size Φ2mm X 4mm
3. Axial lead glass-sealed
4. Operating temperature range: -40℃~+200℃
5. Agency recognition: UL / cUL

■ Recommended Applications

1. Home appliances (air conditioner, refrigerator, electric fan, electric cooker, washing machine, microwave oven, drinking machine, CTV, radio.)
2. Automotive electronics
3. Heaters

■ Part Number Code

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Product Type

DHT	THINKING NTC Thermistor DHT Series

Size

0	Φ2 xL4max

Definition of B Value

A	$B_{25/85}$
B	$B_{25/50}$

Zero Power Resistance at 25℃ (R_{25})

102	1KΩ
103	10KΩ
473	47KΩ

Tolerance of R_{25}

F	±1%
G	±2%
H	±3%
J	±5%
K	±10%

B Value

34D	3435
355	3550
39H	3975
435	4350

Tolerance of B Value

2	±2%
3	±3%

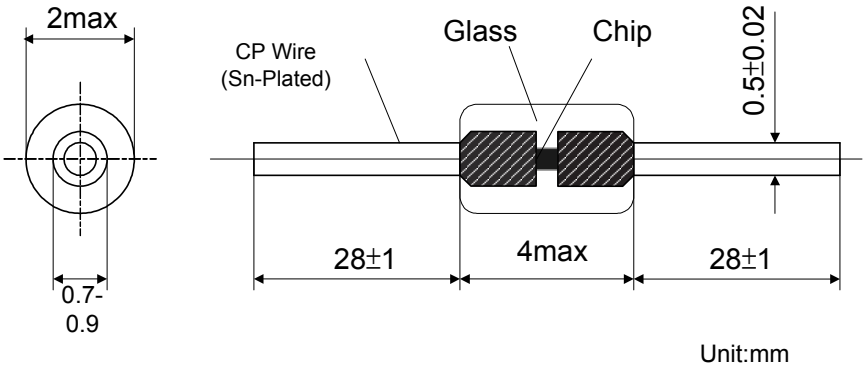
Optional Suffix

Y	RoHS Compliant

Appearance

S	Sn-plated CP wire

■ Structure and Dimensions



Unit:mm

NTC Thermistor：DHT Type

Glass Axial Type for Temperature Sensing/Compensation

■ Electrical Characteristics

Part No.	Zero Power Resistance at 25°C	Tolerance of R_{25}	B Value		Tolerance of B Value	Max. Power Dissipation at 25℃	Dissipation Factor	Thermal Time Constant	Operating Temperature Range	Safety Approvals	
	R_{25} (KΩ)	(±%)	(K)		(±%)	P_{max}(mW)	δ(mW/°C)	τ (Sec.)	T_L~T_U(°C)	UL	cUL
DHT0A502□355*	5	1、2、3、5、10	25/85	3550	2、3	120	≧2	≦10	-40～+200	√	√
DHT0B103□355*	10		25/50	3550						√	√
DHT0A103□34D*	10		25/85	3435						√	√
DHT0A103□347*	10		25/85	3470						√	√
DHT0A103□39H*	10		25/85	3975						√	√
DHT0B203□395*	20		25/50	3950						√	√
DHT0B303□395*	30		25/50	3950						√	√
DHT0B473□395*	47		25/50	3950						√	√
DHT0B503□395*	50		25/50	3950						√	√
DHT0B104□400*	100		25/50	4000						√	√
DHT0A104□39H*	100		25/85	3975						√	√
DHT0A104□430*	100		25/85	4300						√	√
DHT0B204□395*	200		25/50	3950						√	√
DHT0A204□400*	200		25/85	4000						√	√
DHT0B204□435*	200		25/50	4350						√	√

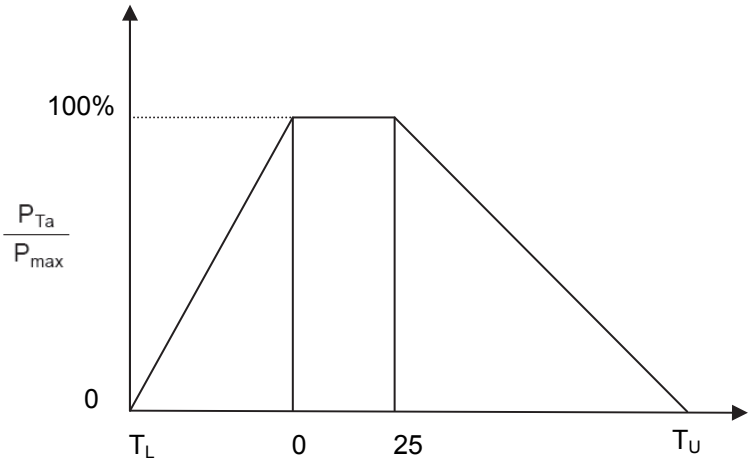
Note 1: □ = Tolerance of R_{25}

* = Tolerance of B value

Note 2: UL/cUL File No: E138827

Note 3: Special specifications are available upon request.

■ Max. Power Dissipation Derating Curve



T_U : Maximum operating temperature (℃)

T_L : Minimum operating temperature (℃)

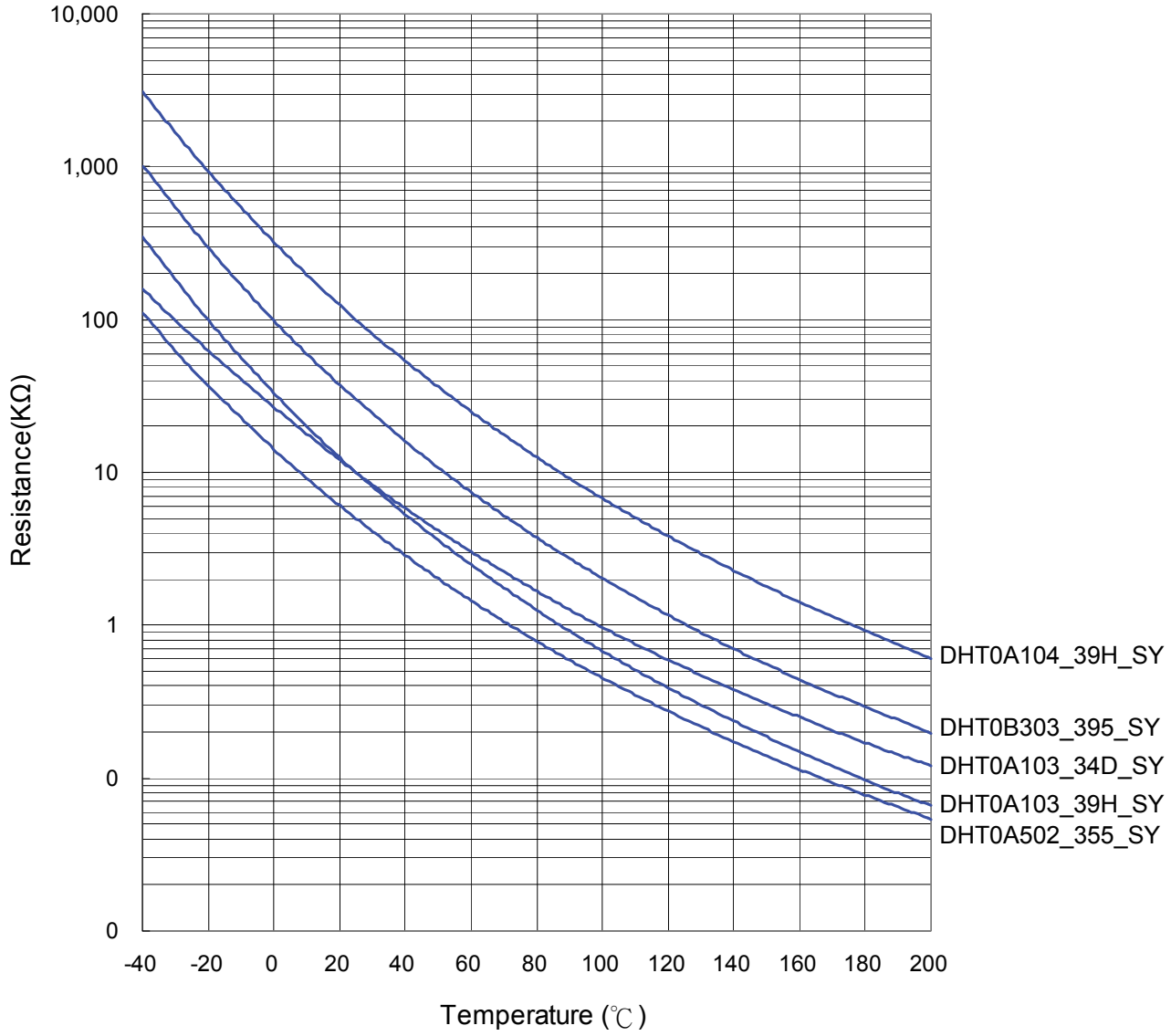
For example:

Ambient temperature (Ta) = 55℃

Maximum operating temperature (T_U) = 200℃

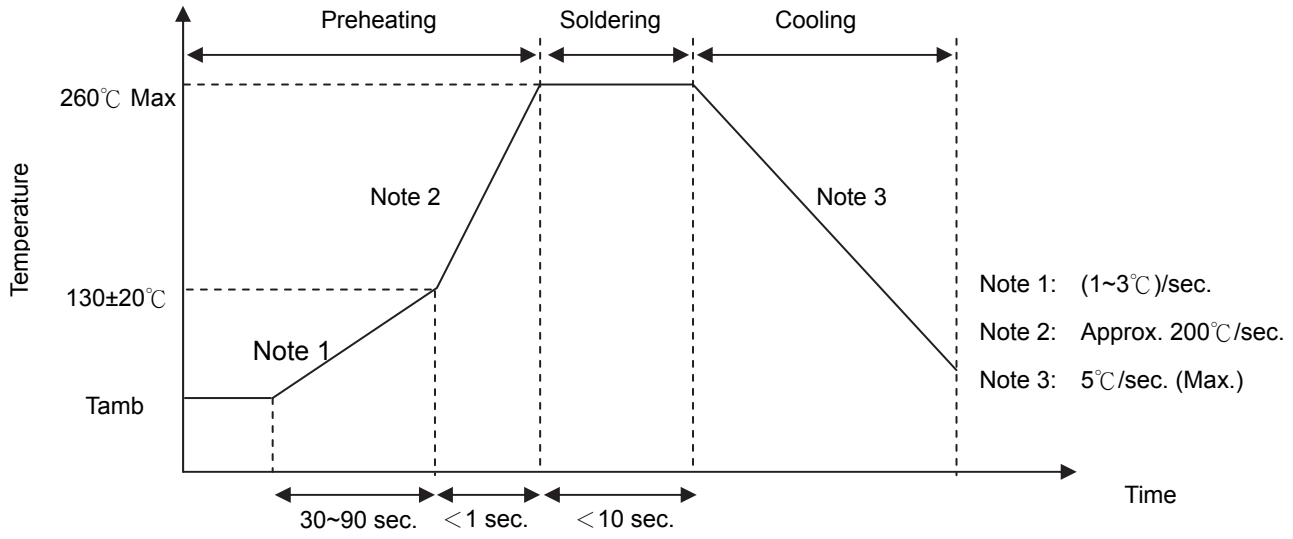
P_{Ta} = (T_U-Ta)/(T_U-25)×Pmax ≅ 83% Pmax

■ R-T Characteristic Curves



■ Soldering Recommendation

● Wave Soldering Profile



● Recommended Reworking Conditions With Soldering Iron

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

■ Reliability

<table>
<tr><th>Item</th><th>Standard</th><th>Test conditions / Methods</th><th>Specifications</th></tr>
<tr><td>Tensile Strength of Terminations</td><td>IEC 60068-2-21</td><td>Gradually apply the force specified and keep the unit fixed for 10±1 sec.

Terminal diameter (mm): 0.3<d≦0.5
Force (Kg): 0.5</td><td>No visible damage</td></tr>
<tr><td>Bending Strength of Terminations</td><td>IEC 60068-2-21</td><td>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.

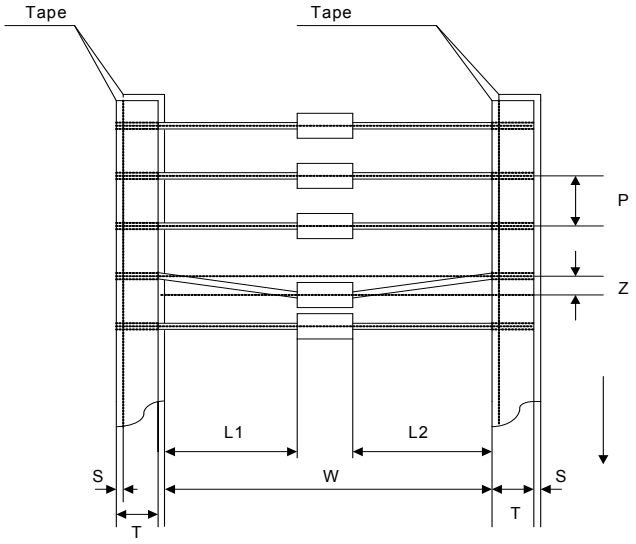
Terminal diameter (mm): 0.3<d≦0.5
Force (Kg): 0.25</td><td>No visible damage</td></tr>
<tr><td>Solderability</td><td>IEC 60068-2-20</td><td>245 ± 3 ℃, 3 ± 0.3 sec</td><td>At least 95% of terminal electrode is covered by new solder</td></tr>
<tr><td>Resistance to Soldering Heat</td><td>IEC 60068-2-20</td><td>260 ± 3 ℃, 10 ± 1 sec</td><td>No visible damage
$|\triangle R_{25}/R_{25}| \leqq 3\ \%$</td></tr>
<tr><td>High Temperature Storage</td><td>IEC 60068-2-2</td><td>200 ± 5 ℃ , 1000 ± 24 hrs</td><td>No visible damage
$|\triangle R_{25}/R_{25}| \leqq 5\ \%$</td></tr>
<tr><td>Damp Heat, Steady State</td><td>IEC 60068-2-78</td><td>40 ± 2℃ , 90~95% RH , 1000 ± 24 hrs</td><td>No visible damage
$|\triangle R_{25}/R_{25}| \leqq 3\ \%$</td></tr>
<tr><td>Rapid Change of Temperature</td><td>IEC 60068-2-14</td><td>The conditions shown below shall be repeated 5 cycles.
<table><tr><th>Step</th><th>Temperature (℃)</th><th>Period (minutes)</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>200 ± 5</td><td>30 ± 3</td></tr><tr><td>4</td><td>Room temperature</td><td>5 ± 3</td></tr></table></td><td>No visible damage
$|\triangle R_{25}/R_{25}| \leqq 3\ \%$</td></tr>
<tr><td>Max. Power Dissipation</td><td>IEC 60539-1</td><td>25 ± 5℃, Pmax., 1000 ± 24 hrs</td><td>No visible damage
$|\triangle R_{25}/R_{25}| \leqq 5\ \%$</td></tr>
</table>

NTC Thermistor：DHT Type

Glass Axial Type for Temperature Sensing/Compensation

■ Packaging

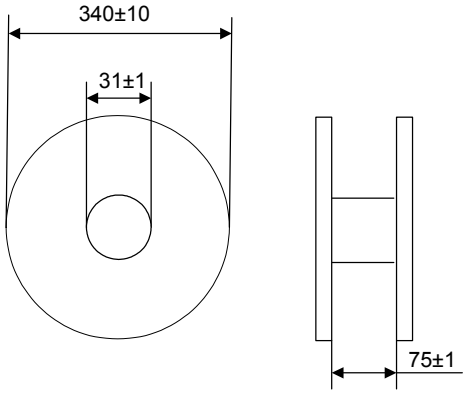
● Taping Specification

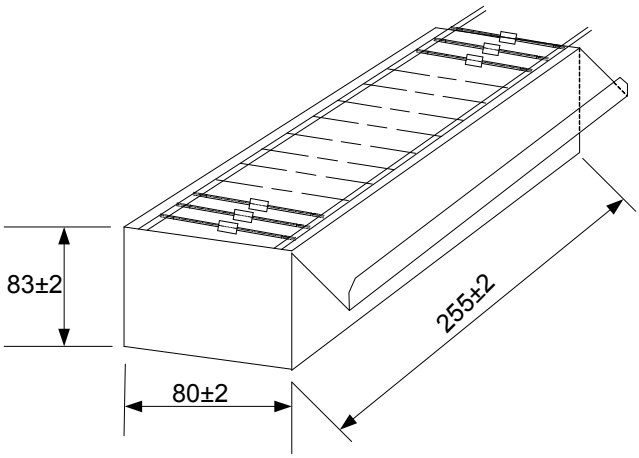


Item	W	P	|L1-L2|	T	Z	S
Max.	53	5.5	1	7	1.2	0.8
Min.	51	4.5	0	5	0	0

■ Quantity

- **Bulk Packing: 500 pcs/bag**
- **Reel Packing: 5,000 pcs/reel**
- **Ammo Packing: 5,000 pcs/box**





■ Warehouse Storage Conditions of Products

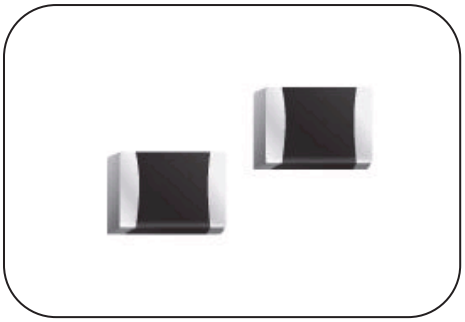
- Storage Conditions :
  1. Storage Temperature: -10℃~+40℃
  2. Relative Humidity: ≦75%RH
  3. Keep away from corrosive atmosphere and sunlight.
- Period of Storage : 1 year

NTC Thermistor：TSM Series

SMD Type NTC Thermistor for Temperature Sensing

Features

1. RoHS & Halogen Free (HF) compliant
2. EIA size: 0201, 0402, 0603, 0805
3. Highly reliable structure
4. Operating temperature range: -40℃~+125℃
5. Wide resistance range
6. Cost effective
7. Agency recognition: UL / cUL / TUV



Recommended Applications

1. Battery pack
2. Motherboard, notebook and personal computer device
3. Liquid crystal display
4. Cellular phone
5. Bluetooth headset
6. Wi-Fi module

Part Number Code

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Product Type

TSM	THINKING NTC Thermistor TSM Series

Size (EIA)

A	0201
0	0402
1	0603
2	0805

Definition of B Value

A	$B_{25/85}$
B	$B_{25/50}$

Zero Power Resistance at 25℃ (R_{25})

102	$10x10^2\Omega$= 1 KΩ
103	$10x10^3\Omega$=10 KΩ
473	$47x10^3\Omega$= 47KΩ

Tolerance of R_{25}

F	±1%
G	±2%
H	±3%
J	±5%
K	±10%

B Value

338	3380
34D	3435
395	3950
39H	3975
405	4050

Tolerance of B Value

1	±1%
2	±2%
3	±3%

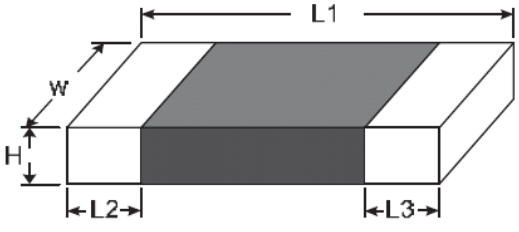
Optional Suffix

Z	RoHS & HF Compliant

Packaging

R	Reel
B	Bulk

Structure and Dimensions



(Unit: mm)

Part No.	Size	L1	W	H max.	L2 & L3
TSMA	0201	0.60±0.05	0.30±0.05	0.35	0.15±0.05
TSM0	0402	1.00±0.15	0.50±0.10	0.60	0.20±0.10
TSM1	0603	1.60±0.15	0.80±0.15	0.95	0.40±0.15
TSM2	0805	2.00±0.20	1.25±0.20	1.00	0.40±0.20

NTC Thermistor：TSM Series

SMD Type NTC Thermistor for Temperature Sensing

■ Electrical Characteristics

Part No.	Size	Zero Power Resistance at 25°C	Tolerance of R_{25}	B Value		Tolerance of B value	Max. Power Dissipation at 25℃	Dissipation Factor	Thermal Time Constant	Operating Temperature Range	Safety Approvals		
											UL/ cUL	TUV	CQC
		R_{25}(KΩ)	(±%)	(K)		(±%)	P_{max}(mW)	δ(mW/°C)	τ (Sec.)	T_L~T_U(°C)			
TSMAB103□338*	0201	10	1, 2, 3, 5, 10	25/50	3380	1, 2, 3	140	Approx. 1.4	Approx. 1.2	-40 ~ +125	√	√	√
TSMAB683□425*		68			4250						√	√	√
TSMAB104□425*		100			4250						√	√	√
TSM0A103□34D*	0402	10	1, 2, 3, 5, 10	25/85	3435	1, 2, 3	170	Approx. 1.7	Approx. 2.0	-40 ~ +125	√	√	√
TSM0A103□395*		10			3950						√	√	√
TSM0A223□395*		22			3950						√	√	√
TSM0A333□405*		33			4050						√	√	√
TSM0A683□410*		68			4100						√	√	√
TSM0A104□405*		100			4050						√	√	√
TSM0A104□436*		100			4360						√	√	√
TSM0B103□338*		10		25/50	3380						√	√	√
TSM0B473□405*		47			4050						√	√	√
TSM0B104□354*		100			3540						√	√	√
TSM0B104□480*		100			4800						√	√	√
TSM0B224□470*		220			4700						√	√	√
TSM0B474□470*		470	5, 10		4700	3					√	√	√
TSM1A202□340*	0603	2	1, 2, 3, 5, 10	25/85	3400	1, 2, 3	210	Approx. 2.1	Approx. 3.1	-40~+125	√	√	√
TSM1A472□34D*		4.7			3435						√	√	√
TSM1A472□370*		4.7			3700						√	√	√
TSM1A502□34D*		5			3435						√	√	√
TSM1A502□385*		5			3850						√	√	√
TSM1A682□34D*		6.8			3435						√	√	√
TSM1A682□395*		6.8			3950						√	√	√
TSM1A103□34D*		10			3435						√	√	√
TSM1A103□39H*		10			3975						√	√	√
TSM1A103□430*		10	5, 10		4300	3					√	√	√
TSM1A223□392*		22	1, 2, 3, 5, 10		3920	1, 2, 3					√	√	√
TSM1A473□39H*		47			3975						√	√	√
TSM1A683□39H*		68			3975						√	√	√
TSM1A104□405*		100			4050						√	√	√
TSM1A104□436*		100			4360						√	√	√
TSM1A154□406*		150			4060						√	√	√
TSM1A204□410*		200			4100						√	√	√
TSM1A474□415*		470			4150						√	√	√
TSM1B221□350*		0.22	5, 10	25/50	3500	3					√	√	√
TSM1B222□395*		2.2			3950						√	√	√
TSM1B472□425*		4.7			4250						√	√	√
TSM1B103□338*		10	1, 2, 3, 5, 10		3380	1, 2, 3					√	√	√
TSM1B103□420*		10			4200						√	√	√
TSM1B104□355*		100			3550						√	√	√
TSM1B224□460*		220			4600						√	√	√
TSM2A 502□34D*	0805	5	1, 2, 3, 5, 10	25/85	3435	1, 2, 3	240	Approx. 2.4	Approx. 5.4	-40~+125	√	√	√
TSM2A103□34D*		10			3435						√	√	√
TSM2A103□395*		10			3950						√	√	√
TSM2A473□39H*		47			3975						√	√	√
TSM2A104□405*		100			4050						√	√	√
TSM2A684□450*		680	5, 10		4500	3					√	√	√

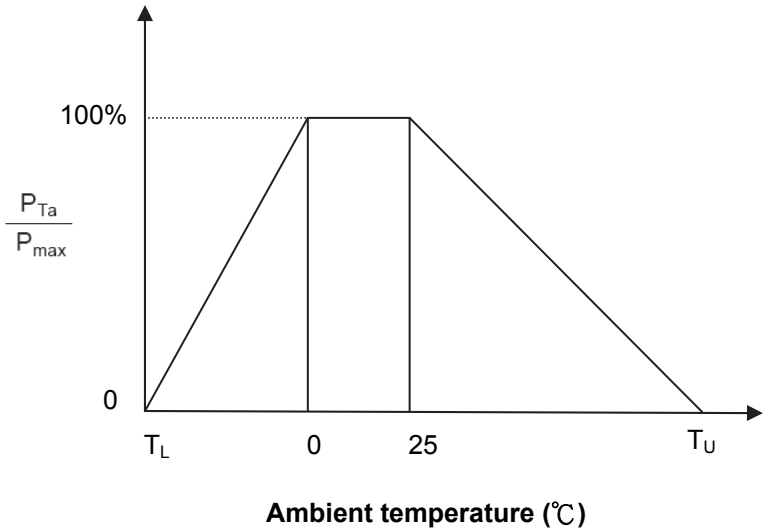
Note 1: □ = Tolerance of R_{25}

* = Tolerance of B value

Note 2: UL&cUL File No. E138827 / TUV File No. R 50167657

Note 3: Special specifications are available upon request

■ Max. Power Dissipation Derating Curve



T_U : Maximum operating temperature (℃)

T_L : Minimum operating temperature (℃)

For example:

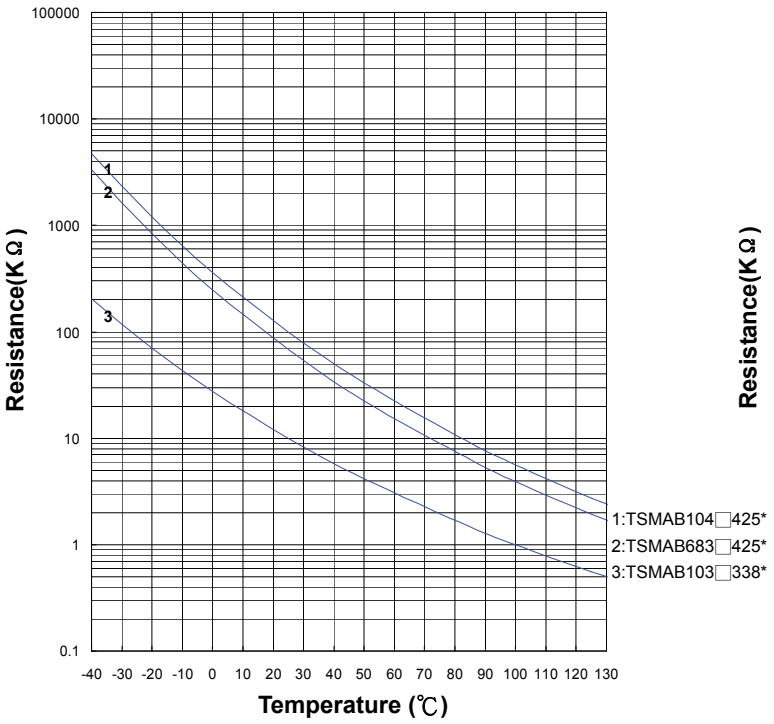
Ambient temperature (Ta) = 55℃

Maximum operating temperature (T_U) = 125℃

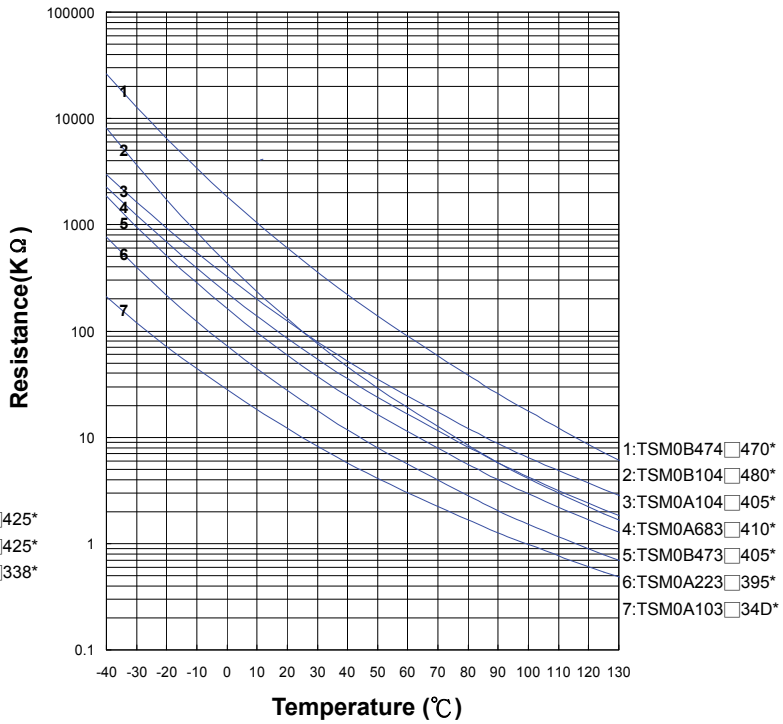
$P_{Ta}=(T_U-Ta)/(T_U-25)\times Pmax$ = 70% Pmax

■ R-T Characteristic Curves

TSMAB103□338* ~ TSMAB104□425*



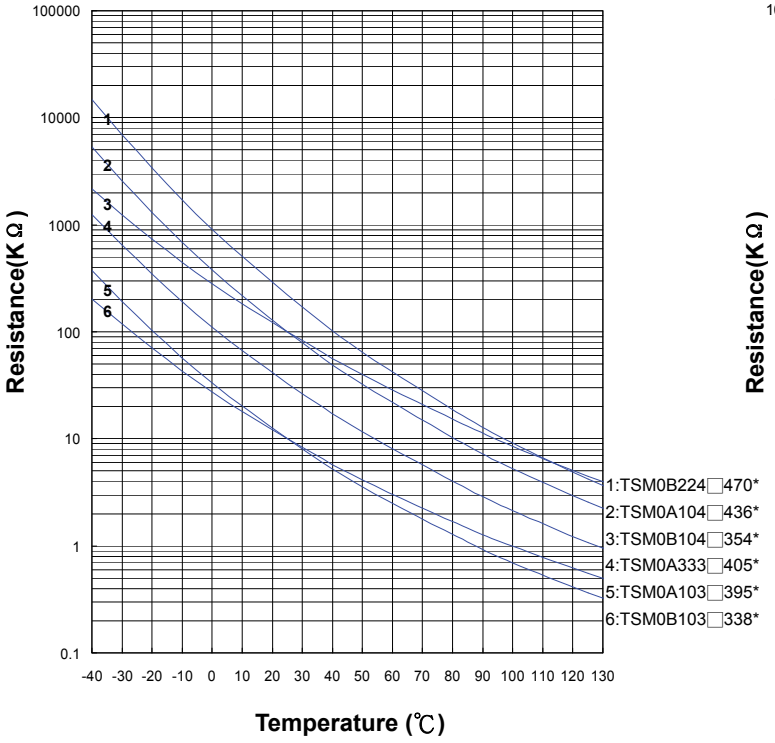
TSM0A103□34D* ~ TSM0B474□470*



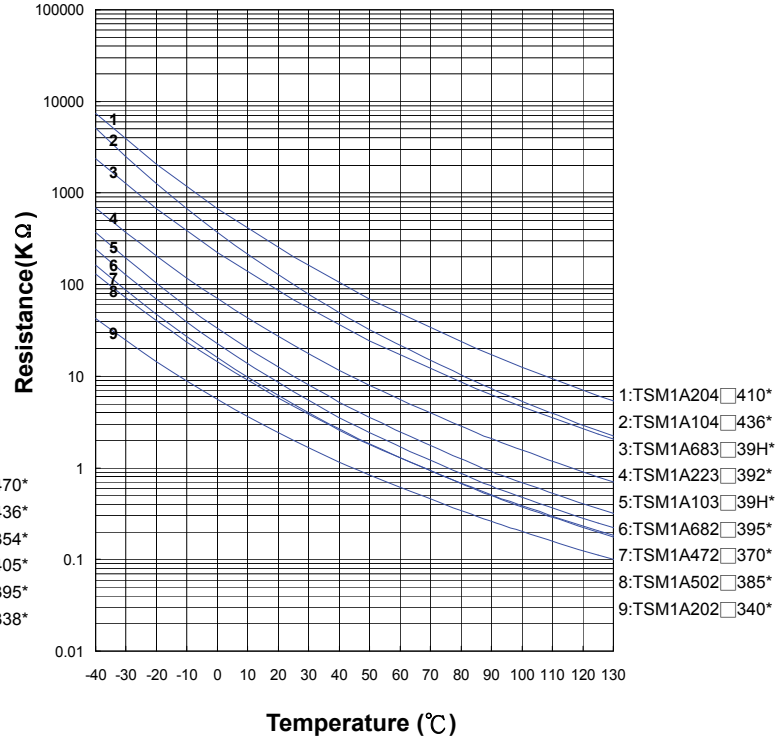
NTC Thermistor：TSM Series

SMD Type NTC Thermistor for Temperature Sensing

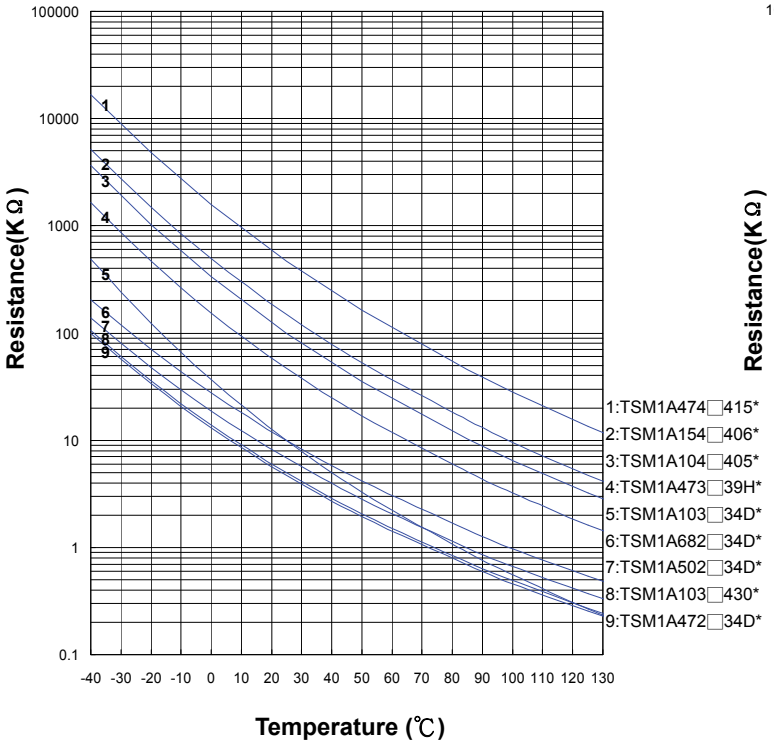
TSM0B103□338* ~ TSM0B224□470*



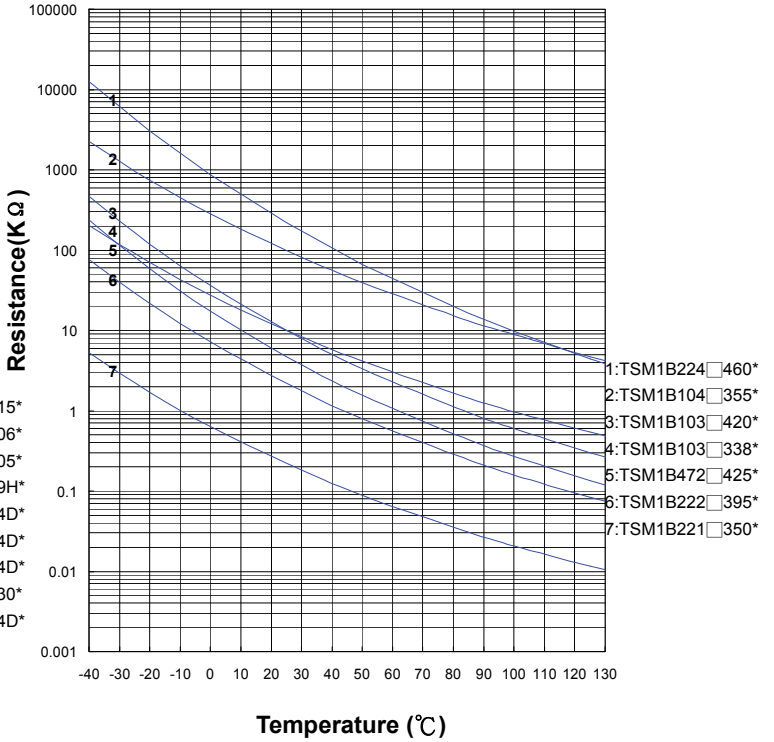
TSM1A202□340* ~ TSM1A204□410*

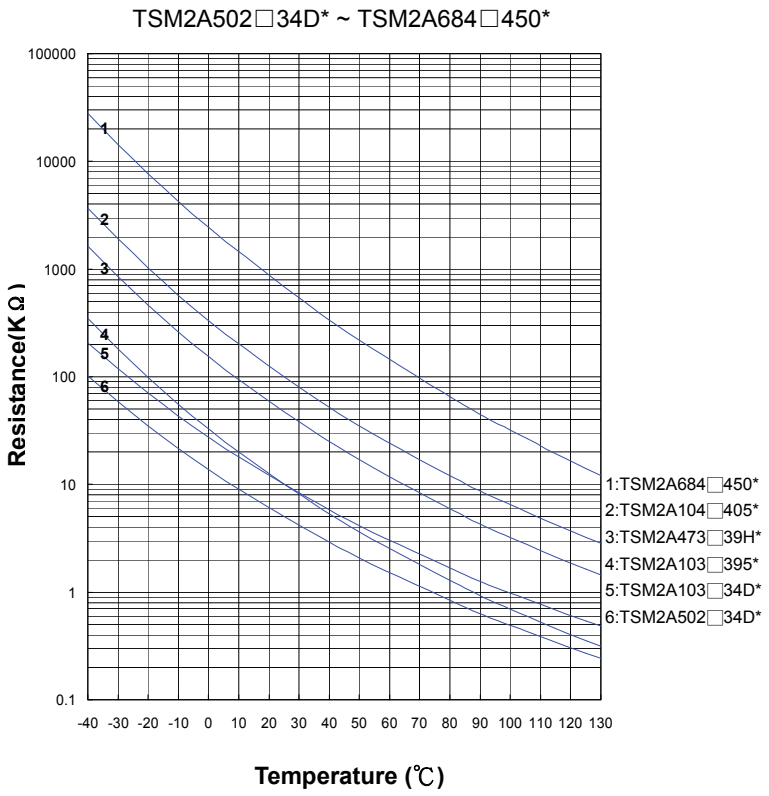


TSM1A472□34D* ~ TSM1A474□415*



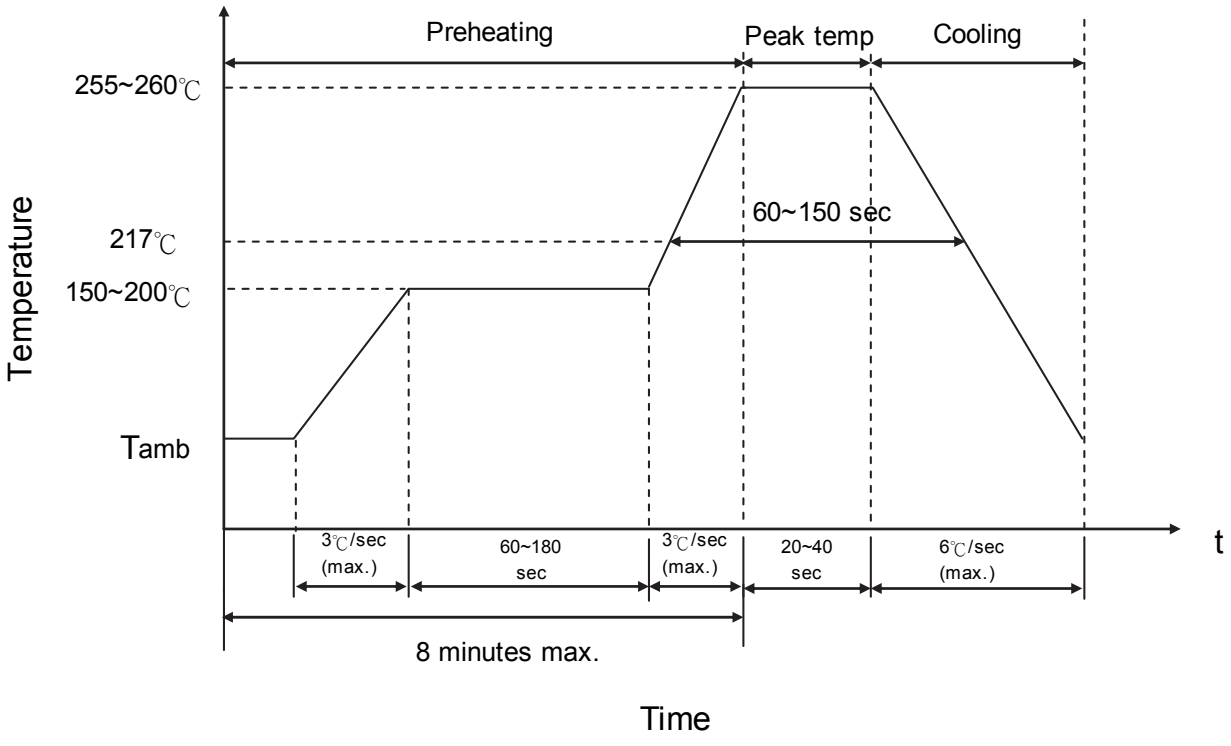
TSM1B221□350* ~ TSM1B224□460*





■ Soldering Recommendation

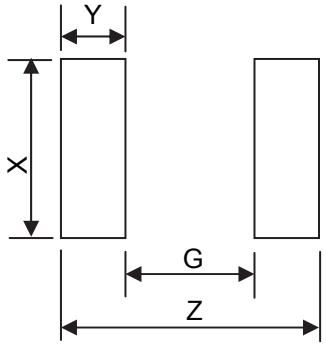
● IR-reflow Soldering Profile



- **Recommended Reworking Conditions with Soldering Iron**

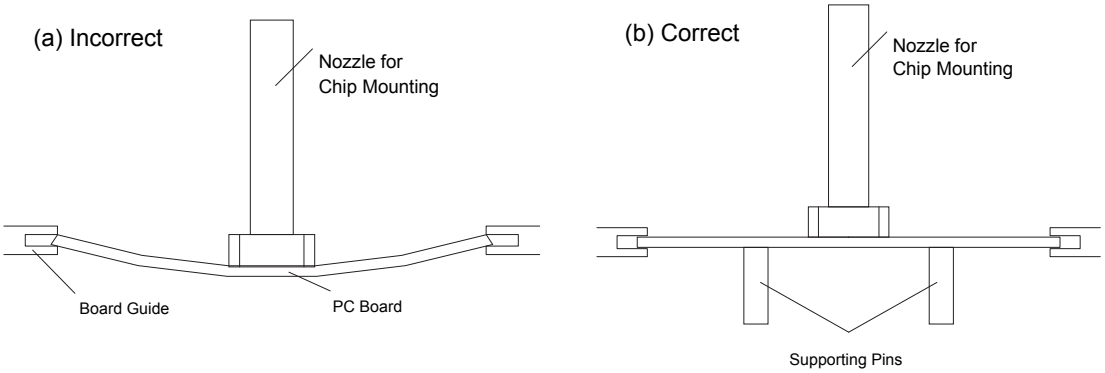
Item	Conditions
Temperature of Soldering Iron-tip	360℃ (max.)
Soldering Time	3 sec. (max.)
Diameter of Soldering Iron-tip	Φ3mm (max.)
Caution: Please do not touch the component surface with soldering iron directly to avoid its damage.	

■ Recommended Soldering Pad Dimensions

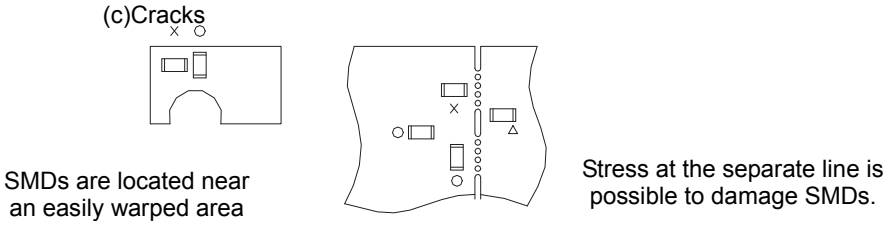


Size	Z (mm)	G (mm)	X (mm)	Y (mm)
0201	0.8	0.3	0.3	0.25
0402	1.7	0.5	0.6	0.6
0603	3.0	1.0	1.0	1.0
0805	3.4	1.0	1.4	1.2

■ Notice of Soldering and Mounting on PC Board



For mounting SMDs on a PC board, supporting pin is suggested for use (refer to figure b) to avoid cracks caused by external stress (refer to figure a).



If circuit bending is needed for PC board design, please refer to figure (c) for mounting positions to avoid cracks caused by stress imposed on the product. O means better, △ is acceptable, and X is worst.

(d) Component Orientation

Locate SMDs horizontally to the direction that stress acts

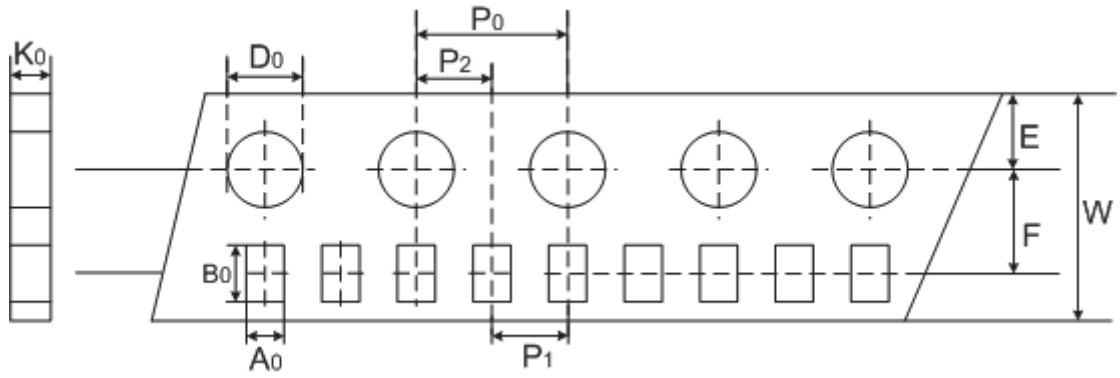
During circuit bending, please locate SMDs horizontally to the direction in which stress act to avoid its cracks (refer to figure d).

■ Reliability

Item	Standard	Test conditions / Methods	Specifications
Bending Strength	IEC 60068-2-21	Warp : 2mm for 0402,0603 and 0805 1mm for 0201 Speed ＜ 0.5mm/sec. Duration: 10 sec. on PCB 	No visible damage $\lvert \triangle R_{25}/R_{25} \rvert \leqq 5\ \%$
Solderability	IEC 60068-2-58	245 ± 5℃, 3 ± 0.3 sec.	At least 95% of terminal electrode is covered by new solder
Resistance to Soldering Heat	IEC 60068-2-58	260 ± 5℃, 10 ± 1 sec.	No visible damage $\lvert \triangle R_{25}/R_{25} \rvert \leqq 3\ \%$
High Temperature Storage	IEC 60068-2-2	125 ± 5℃, 1000 ± 24 hrs	No visible damage $\lvert \triangle R_{25}/R_{25} \rvert \leqq 5\ \%$
Damp Heat, Steady State	IEC 60068-2-78	40 ± 2℃, 90~95% RH , 1000 ± 24 hrs	No visible damage $\lvert \triangle R_{25}/R_{25} \rvert \leqq 3\ \%$
Rapid Change of Temperature	IEC 60068-2-14	The conditions shown below shall be repeated 5 cycles on PCB. Step 1: -40 ± 5, 30 ± 3 Step 2: Room temperature, 5 ± 3 Step 3: 125 ± 5, 30 ± 3 Step 4: Room temperature, 5 ± 3	No visible damage $\lvert \triangle R_{25}/R_{25} \rvert \leqq 3\ \%$
Max. Power Dissipation	IEC 60539-1	25 ± 5℃, Pmax. , 1000 ± 24 hrs	No visible damage $\lvert \triangle R_{25}/R_{25} \rvert \leqq 5\ \%$

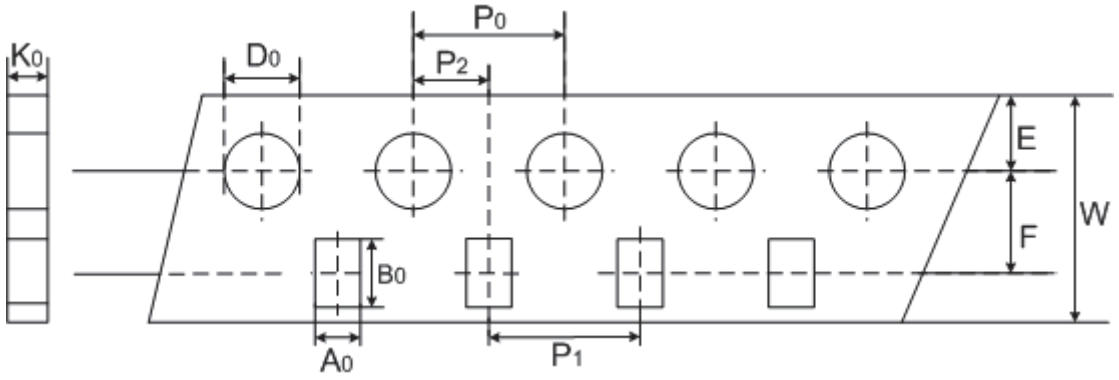
■ Package

● Taping Specification



(Unit: mm)

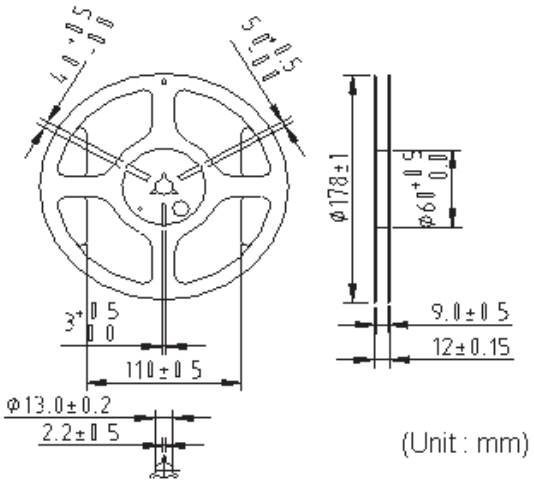
Index / Size	A_0 ±0.05	B_0 ±0.12	W ±0.2	E ±0.1	F ±0.05	P_1 ±0.1	P_2 ±0.05	P_0 ±0.1	D_0 ±0.1	K_0 ±0.1
0201	0.38	0.68	8	1.75	3.5	2	2	4	1.55	0.38
0402	0.62	1.12	8	1.75	3.5	2	2	4	1.55	0.60



(Unit: mm)

Index / Size	A_0 ±0.2	B_0 ±0.2	W ±0.2	E ±0.1	F ±0.05	P_1 ±0.1	P_2 ±0.05	P_0 ±0.1	D_0 ±0.1	K_0 ±0.1
0603	1.1	1.9	8	1.75	3.5	4	2	4	1.55	0.95
0805	1.5	2.3	8	1.75	3.5	4	2	4	1.55	1.0

■ Quantity



(Unit : mm)

Size	Quantity (pcs/reel)
0201	15,000
0402	10,000
0603	4,000
0805	3,500

■ 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