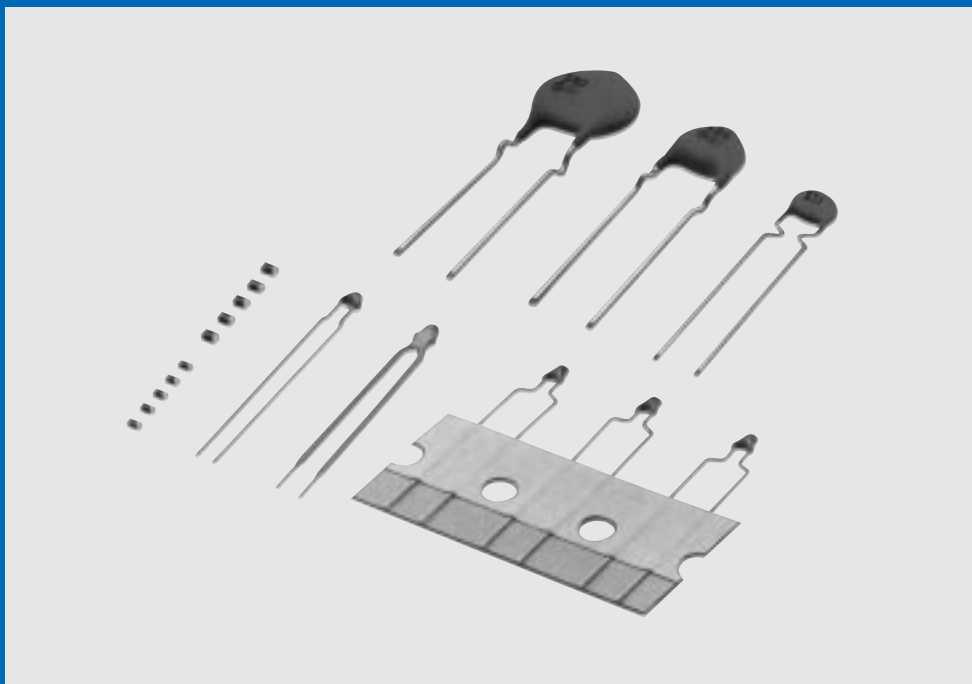


NTC Thermistors

NTC THERMISTORS



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● **Part Numbering** (The structure of the "Global Part Numbers" that have been adopted since June 2001 and the meaning of each code are described herein.)
If you have any questions about details, inquire at your usual Murata sales office or distributor.

NTC Thermistors for Temperature Compensation Chip Type

(Global Part Number)

NC	P	18	XH	103	J	03	RB
----	---	----	----	-----	---	----	----

①②③④⑤⑥⑦⑧

① Product ID

Product ID	
NC	NTC Thermistors Chip Type

② Series

Code	Series
P	Plated Termination Series

③ Dimensions (L×W)

Code	Dimensions (L×W)	EIA
03	0.60×0.30mm	0201
15	1.00×0.50mm	0402
18	1.60×0.80mm	0603
21	2.00×1.25mm	0805

④ Temperature Characteristics

Code	Temperature Characteristics
WB	Nominal B-Constant 4050—4099K
WD	Nominal B-Constant 4150—4199K
WF	Nominal B-Constant 4250—4299K
WM	Nominal B-Constant 4500—4549K
XF	Nominal B-Constant 3250—3299K
XQ	Nominal B-Constant 3650—3699K
XH	Nominal B-Constant 3350—3399K
XM	Nominal B-Constant 3500—3549K
XV	Nominal B-Constant 3900—3949K
XW	Nominal B-Constant 3950—3999K

⑤ Resistance

Expressed by three figures. The unit is ohm (Ω). The first and second figures are significant digits, and the third figure expresses the number of zeros which follow the two figures. If there is a decimal point, it is expressed by the capital letter "R". In this case, all figures are significant digits.

Ex.)

Code	Resistance
102	1k Ω
103</	

NTC Thermistors for Temperature Sensor Lead Type

(Global Part Number)

NT	SA0	XH	103	F	E1	B0
----	-----	----	-----	---	----	----

①②③④⑤⑥⑦

① Product ID

Product ID	
NT	NTC Thermistors

② Series

Code	Series
SA0	for Temperature Sensors No Lead-coating Type
SD0	for Temperature Sensors Lead-coating Type

③ Temperature Characteristics

Code	Temperature Characteristics
WB	Nominal B-Constant 4050—4099K
WC	Nominal B-Constant 4100—4149K
WD	Nominal B-Constant 4150—4199K
WF	Nominal B-Constant 4250—4299K
XM	Nominal B-Constant 3500—3549K
XH	Nominal B-Constant 3350—3399K
XR	Nominal B-Constant 3700—3749K
XV	Nominal B-Constant 3900—3949K

④ Resistance

Expressed by three figures. The unit is ohm (Ω). The first and second figures are significant digits, and the third figure expresses the number of zeros which follow the two figures. If there is a decimal point, it is expressed by the capital letter "R". In this case, all figures are significant digits.

Ex.)

Code	Resistance
202	2k Ω
203	20k Ω

⑤ Resistance Tolerance

Code	Resistance Tolerance
E	$\pm 3\%$
F	$\pm 1\%$

⑥ Individual Specifications

Code	Individual Specifications
E1	Lead Style, others

⑦ Packaging

Code	Packaging
A0	Ammo Pack
B0	Bulk

NTC Thermistors for Inrush Current Suppression

(Global Part Number)

NT	PD7	160	L	D7	B0
----	-----	-----	---	----	----

①

Basic Characteristics

■ Basic Characteristics

1. Zero-power Resistance of Thermistor : R

$$R = R_0 \exp B (1/T - 1/T_0) \quad \dots\dots\dots (1)$$

R : Resistance in ambient temperature T (K)

(K : absolute temperature)

R₀ : Resistance in ambient temperature T₀ (K)

B : B-constant of Thermistor

2. B-Constant

as (1) formula

$$B = \frac{\ln (R/R_0)}{(1/T - 1/T_0)} \quad \dots\dots\dots (2)$$

3. Thermal Dissipation Constant

When spend electric power P (mW) in ambient temperature T₁, if Thermistor's temperature rises T₂, there is a formula as follows

$$P = C (T_2 - T_1) \quad \dots\dots\dots (3)$$

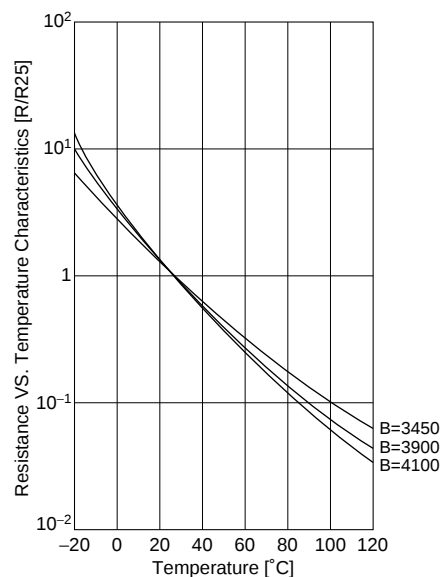
C : Thermal dissipation constant (mW/°C)

Thermal dissipation constant change by dimensions, measure, measured condition etc.

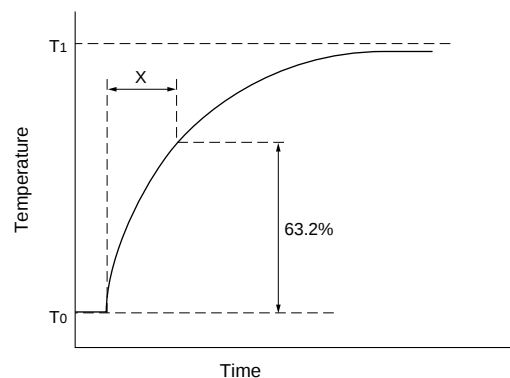
4. Thermal Time Constant

Period in which Thermistor's temperature will change 63.2% of its temperature difference from ambient temperature T₀ (°C) to T₁ (°C).

[Resistance vs. Temperature]



[Thermal Time Constant]



■ Performance

Item	Condition
Resistance	It measures by zero-power in specified ambient temperature.
B-Constant	It calculates between two specified ambient temperature by next formula. T and T ₀ is absolute temperature (K). $B = \frac{\ln (R/R_0)}{1/T - 1/T_0}$
Thermal Dissipation Constant	It shows necessary electric power that Thermistor's temperature rises

NTC Thermistors

1

for Temperature Compensation 0201(0603) Size

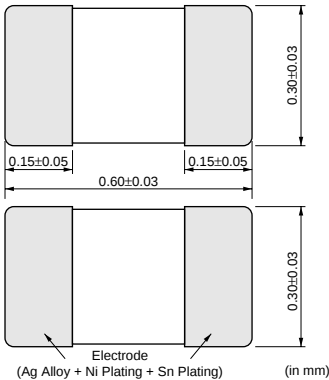
0201/0402/0603/0805 sized Chip NTC Thermistor have Ni barrier termination and provide excellent solderability and offer high stability in environment by unique inner construction.

■ Features

- 1. Excellent solderability and high stability in environment.
- 2. Excellent long time aging stability.
- 3. High accuracy in resistance and B-constant.
- 4. Reflow soldering possible.
- 5. Lead is not contained in the product.

■ Applications

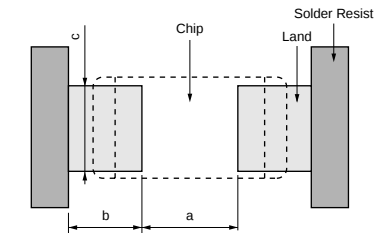
- Temperature compensation of transistor, IC, crystal oscillator of mobile communications equipments.
- Temperature sensor for rechargeable batteries.
- Temperature compensation of LCD.
- Temperature compensation and sensing of car audio equipments. (CD, MD, Tuner)
- Temperature compensation of several kinds of circuits.



Part Number	Resistance (25°C) (k ohm)	B-Constant (25-50°C) (K)	Max. Operating Current(25°C) (mA)	Rated Electric Power(25°C) (mW)	Thermal Dissipation Constant(25°C) (mW/°C)	Operating Temperature Range (°C)
NCP03XH103□05RD	10	3380 ±3%	0.31	100	1	-40 to 125

A blank column is filled with resistance tolerance codes. (J:±5%, K:±10%)

■ Standard Land Dimensions



Soldering Methods	a	b	c
Reflow Soldering	0.25	0.25	0.3

(in mm)

NTC Thermistors

muRata

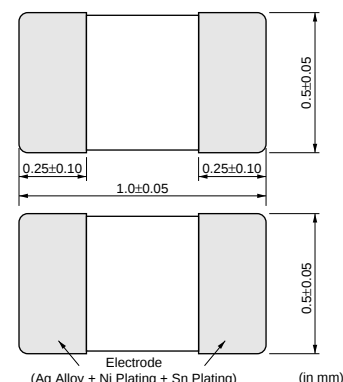
for Temperature Compensation 0402(1005) Size

2

0201/0402/0603/0805 sized Chip NTC Thermistor have Ni barrier termination and provide excellent solderability and offer high stability in environment by unique inner construction.

■ Features

1. Excellent solderability and high stability in environment.
2. Excellent long time aging stability.
3. High accuracy in resistance and B-constant.
4. Reflow soldering possible.
5. Same B-constant in the same resistance in the three sizes. (0805 size / 0603 size / 0402 size)
Easy to use smaller size in the circuits.
6. Lead is not contained in the product.

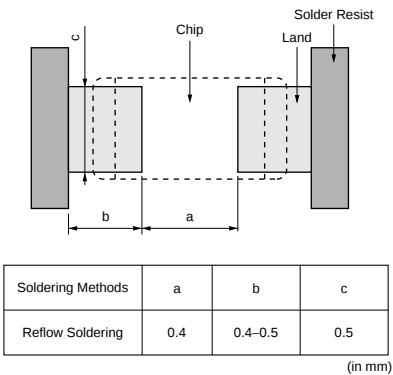


■ Applications

- Temperature compensation of transistor, IC, crystal oscillator of mobile communications equipments.
- Temperature sensor for rechargeable batteries.
- Temperature compensation of LCD.
- Temperature compensation and sensing of car audio equipments. (CD, MD, Tuner)
- Temperature compensation of several kinds of circuits.

Part Number	Resistance (25°C)	B-Constant (25-50°C) (K)	Max. Operating Current(25°C) (mA)	Rated Electric Power(25°C) (mW)	Thermal Dissipation Constant(25°C) (mW/°C)	Operating Temperature Range (°C)
NCP15XF101□03RC	100ohm	3250 ±3%	3.10	100	1	-40 to 125
NCP15XF151□03RC	150ohm	3250 ±3%	2.50	100	1	-40 to 125
NCP15XM221□03RC	220ohm	3500 ±3%	2.10	100	1	-40 to 125
NCP15XM331□03RC	330ohm	3500 ±3%	1.70	100	1	-40 to 125
NCP15XQ						

■ Standard Land Dimensions

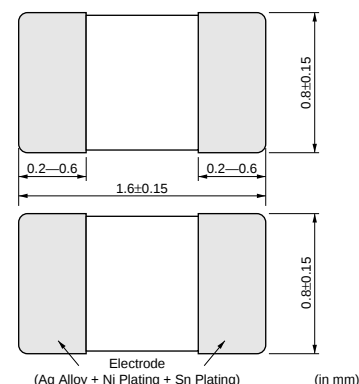


NTC Thermistors

muRata

for Temperature Compensation 0603(1608) Size

0201/0402/0603/0805 sized Chip NTC Thermistor have Ni barrier termination and provide excellent solderability and offer high stability in environment by unique inner construction.



■ Features

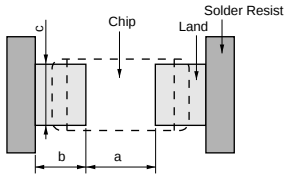
1. Excellent solderability and high stability in environment.
2. Excellent long time aging stability.
3. High accuracy in resistance and B-constant.
4. Flow / Reflow soldering possible
5. Same B-constant in the same resistance in the three sizes. (0805 size / 0603 size / 0402 size)
Easy to use smaller size in the circuits.
6. Lead is not contained in the product.

■ Applications

- Temperature compensation of transistor, IC, crystal oscillator of mobile communications equipments.
- Temperature sensor for rechargeable batteries.
- Temperature compensation of LCD.
- Temperature compensation and sensing of car audio equipments. (CD, MD, Tuner)
- Temperature compensation of several kinds of circuits.

Part Number	Resistance (25°C)	B-Constant (25-50°C) (K)	Max. Operating Current(25°C) (mA)	Rated Electric Power(25°C) (mW)	Thermal Dissipation Constant(25°C) (mW/°C)	Operating Temperature Range (°C)
NCP18XF101□03RB	100ohm	3250 ±3%	3.10	100	1	-40 to 125
NCP18XF151□03RB	150ohm	3250 ±3%	2.50	100	1	-40 to 125
NCP18XM221□03RB	220ohm	3500 ±3%	2.10	100	1	-40 to 125
NCP18XM331□03RB	330ohm	3500 ±3%	1.70	100	1	-40 to 125
NCP18XQ471□03RB	470ohm	365				

■ Standard Land Dimensions



Soldering Methods	a	b	c
Flow Soldering	0.6~1.0	0.8~0.9	0.6~0.8
Reflow Soldering	0.6~0.8	0.6~0.7	0.6~0.8

(in mm)

NTC Thermistors

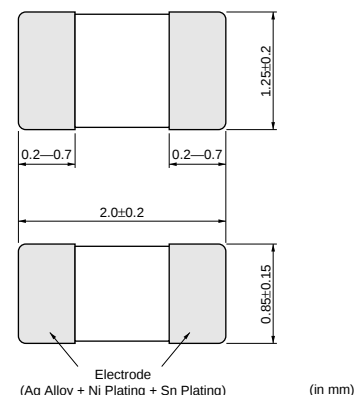
muRata

for Temperature Compensation 0805(2012) Size

0201/0402/0603/0805 sized Chip NTC Thermistor have Ni barrier termination and provide excellent solderability and offer high stability in environment by unique inner construction.

■ Features

1. Excellent solderability and high stability in environment.
2. Excellent long time aging stability.
3. High accuracy in resistance and B-constant.
4. Flow / Reflow soldering possible
5. Same B-constant in the same resistance in the three sizes. (0805 size / 0603 size / 0402 size)
Easy to use smaller size in the circuits.
6. Lead is not contained in the product.

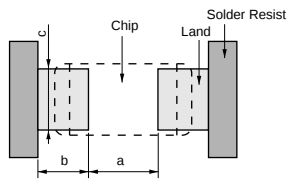


■ Applications

- Temperature compensation of transistor, IC, crystal oscillator of mobile communications equipments.
- Temperature sensor for rechargeable batteries.
- Temperature compensation of LCD.
- Temperature compensation and sensing of car audio equipments. (CD, MD, Tuner)
- Temperature compensation of several kinds of circuits.

Part Number	Resistance (25°C)	B-Constant (25-50°C) (K)	Max. Operating Current(25°C) (mA)	Rated Electric Power(25°C) (mW)	Thermal Dissipation Constant(25°C) (mW/°C)	Operating Temperature Range (°C)
NCP21XM221□03RA	220ohm	3500 ±3%	3.00	200	2.0	-40 to 125
NCP21XQ471□03RA	470ohm	3650 ±3%	2.00	200	2.0	-40 to 125
NCP21XQ102□03RA	1.0k ohm	3650 ±3%	1.40	200	2.0	-40 to 125
NCP21XW222□03RA	2.2k ohm	395				

■ Standard Land Dimensions



Soldering Methods	a	b	c
Flow Soldering	1.0~1.1	0.9~1.0	1.0~1.2
Reflow Soldering	1.0~1.1	0.6~0.7	1.0~1.2

(in mm)

for Temperature Compensation Temperature Characteristics (Reference Value)

Temp. (°C)	NCP**XF101J type			NCP**XF151J type			NCP**XM221J type			NCP**XM331J type		
	Resistance (Ω)			Resistance (Ω)			Resistance (Ω)			Resistance (Ω)		
	Low	Center	High	Low	Center	High	Low	Center	High	Low	Center	High
-40	1588.3934	1824.1748	2089.7183	2382.5901	2736.2622	3134.5775	4281.3910	4947.9037	5703.8815	6422.0865	7421.8556	8555.8223
-35	1220.8309	1390.6851	1580.2105	1831.2464	2086.0276	2370.3158						

for Temperature Compensation Temperature Characteristics (Reference Value)

 Continued from the preceding page.

Temp. (°C)	NCP**XW222J type			NCP**XW332J type			NCP**XM472J type			NCP**XW682J type		
	Resistance (kΩ)			Resistance (kΩ)			Resistance (kΩ)			Resistance (kΩ)		
	Low	Center	High	Low	Center	High	Low	Center	High	Low	Center	High
-40	64.8883	75.9605	88.6996	97.3324	113.9407	133.0495	91.4661	105.7052	121.8557	200.5638	234.7869	274.1625
-35	47.0383	54.5										

for Temperature Compensation Temperature Characteristics (Reference Value)

 Continued from the preceding page.

Temp. (°C)	NCP**WB473J type			NCP**WD683J type			NCP**WF104J type			NCP**WM224J type		
	Resistance (kΩ)			Resistance (kΩ)			Resistance (kΩ)			Resistance (kΩ)		
	Low	Center	High	Low	Center	High	Low	Center	High	Low	Center	High
-40	1489.8151	1747.9197	2045.6131	2325.9631	2735.3593	3208.7719	3729.0380	4397.1193	5171.9295	9772.5429	11585.8840	13701.3597
-35	1072.3720	1245.4275	1442.7942	1664.5604								

Chip Type ⚠Caution/Notice

■ ⚠Caution (Storage and Operating Conditions)

This product is designed for the applications under ordinary environment

(room temperature, normal humidity and atmospheric pressure).

Do not use under the following environments. Because all these factors can deteriorate the characteristics of product or can cause the failures and the burning-out.

1. Corrosive gas or deoxidizing gas.
(Chlorine gas, Hydrogen sulfide gas, Ammonia gas, Sulfuric acid gas, Nitric oxide gas, etc.)

2. Volatile or flammable gas
3. Dusty place
4. Under vacuum, reducing pressure or under high-pressure
5. Place with splashed water or under high humidity with dewing
6. Place with salt water, oils, chemical liquids or organic solvents
7. Place strongly vibrated
8. Other place, where is similar like the above-mentioned environments

■ ⚠Caution (Others)

Be sure to provide an appropriate fail-safe function on your product to prevent a second damage that may be caused by the abnormal function or the failure of our product.

■ Notice (Storage and Operating Conditions)

To keep solderability of product from declining, following storage condition is recommended.

1. Storage condition :
Temperature -10 to +40 degree C
Humidity less than 75%RH (not dewing condition)
2. Storage term :
Use this product within 6 months after delivery by first-in and first-out stocking system.

3. Handling after unpacking :
After unpacking, reseal promptly this product or store it in a sealed container with a drying agent.
4. Storage place :
Store this product in no corrosive gas (Sulfuric acid gas, Chlorine gas etc) nor directly under sunshine.

■ Notice (Rating)

Use this product within the specified temperature range.

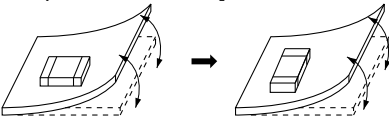
Higher temperature may cause deterioration of the characteristics or the material quality of this product.

Chip Type Notice (Soldering and Mounting)

■ Mounting Position

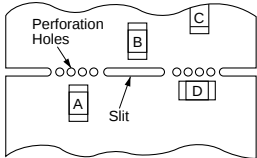
Choose a mounting position that minimize the stress imposed on the chip during flexing or bending of the board.

[Component Direction]



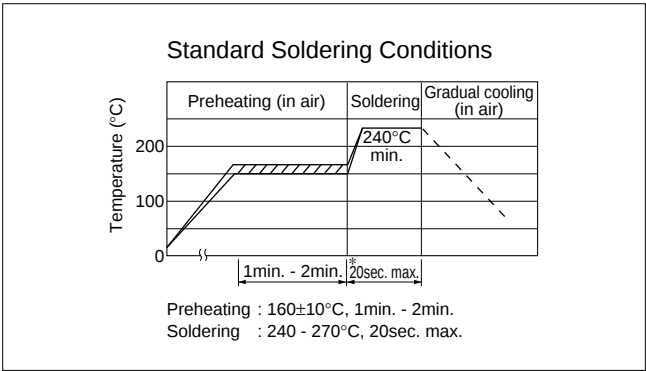
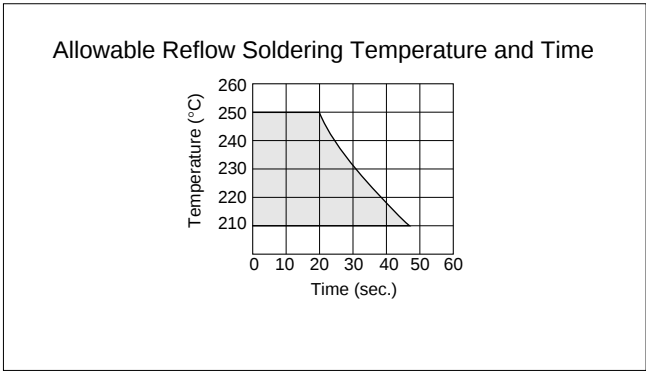
Locate this product horizontal to the direction in which stress acts.

[Mounting Close to Board Swparation Line]

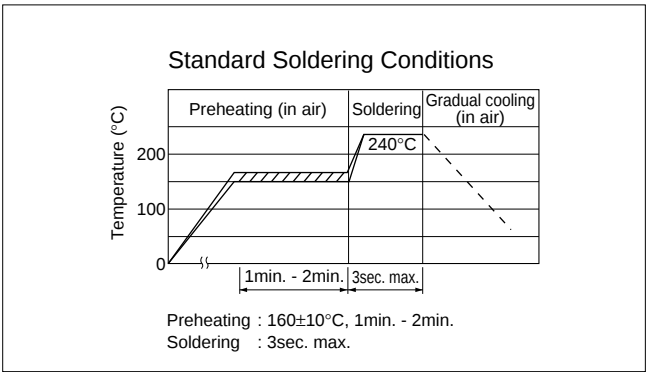
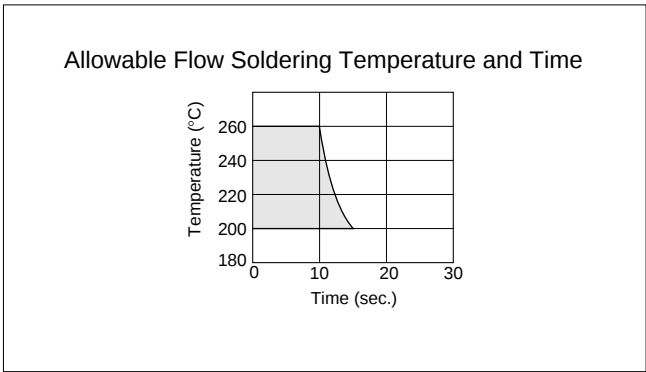


Keep this product on the PC Board away from the Separation Line.
Worst ← A-B-C-D → Better

■ Reflow Soldering Conditions



■ Flow Soldering Conditions (NCP18/21 Series only)



Chip Type Notice (Soldering and Mounting)

 Continued from the preceding page.

■ Solder and Flux

1. Solder and Paste

(1) Reflow Soldering : NCP03/15/18/21 Series

Use RA/RMA type or equivalent type of solder paste for your reference, we are using solder paste, manufactured by SENJI METAL INDUSTRY CO., LTD, for any Internal tests of this product.

- SPT-70-0F-2063 (Sn:Pb:Ag = 63:35:2wt%)
- M31-221CM5 (Sn:Ag:Cu = 95.8:3.5:0.7wt%)
- M42-381F4-11 (Sn:Ag:Bi:Cu = 94.3:2.0:3.0:0.7wt%)

(2) Flow Soldering : NCP18/21 Series

Use H60 type, H63 type or equivalent type of solder paste.

2. Flux

Use Rosin-based flux.

Do not use strong acidic flux (with halide content exceeding 0.2wt%)

■ Cleaning Conditions

For removing the flux after soldering, observe the following points in order to avoid deterioration of the characteristics or any change of the external electrodes quality.

	NCP03/15	NCP18/21
Solvent	Isopropyl Alcohol	Isopropyl Alcohol
Dipping Cleaning	Less than 5min. at room temp. or Less than 2min. at 40°C max.	Less than 5min. at room temp. or Less than 2min. at 40°C max.
Ultrasonic Cleaning	Less than 5min. 20W/ℓ Frequency of 28kHz to 40kHz.	Less than 1min. 20W/ℓ Frequency of several 10kHz to several 100kHz.

■ Drying

After cleaning, dry promptly this product.

Chip Type Package

■ Minimum Quantity Guide

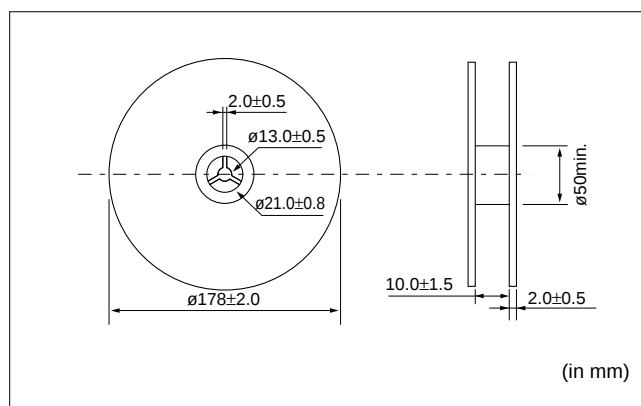
Part Number	Quantity (pcs.)	
	Paper Tape	Plastic Tape
NCP03	15000	-
NCP15	10000	
NCP18	4000	
NCP21	-	4000

■ Packaging Code

Packaging Tape	Plastic Taping	Paper Taping		
		2mm pitch		4mm pitch
Packaging Code	RA	RC	RD	RB

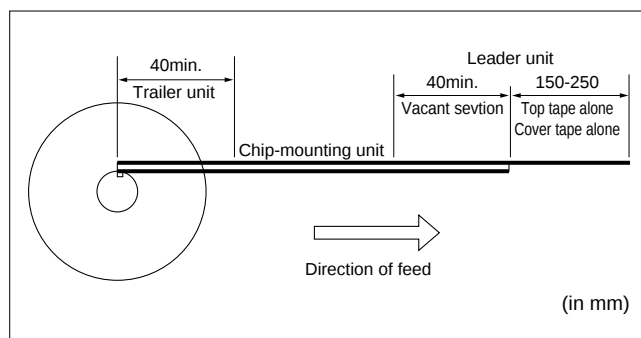
■ Tape Carrier Packaging

1. Dimensions of Reel



2. Taping Method

- (1) A tape in a reel contains Leader unit and Trailer unit where products are not packed. (Please refer the figure right.)
- (2) The top and base tapes or, plastic and cover tape are not stucked at the first five pitches minimum.
- (3) A label shall be attached on the reel. (MURATA's part number, inspection number and quantity shall be marked on the label.)
- (4) Taping reels shall be packed in a package.

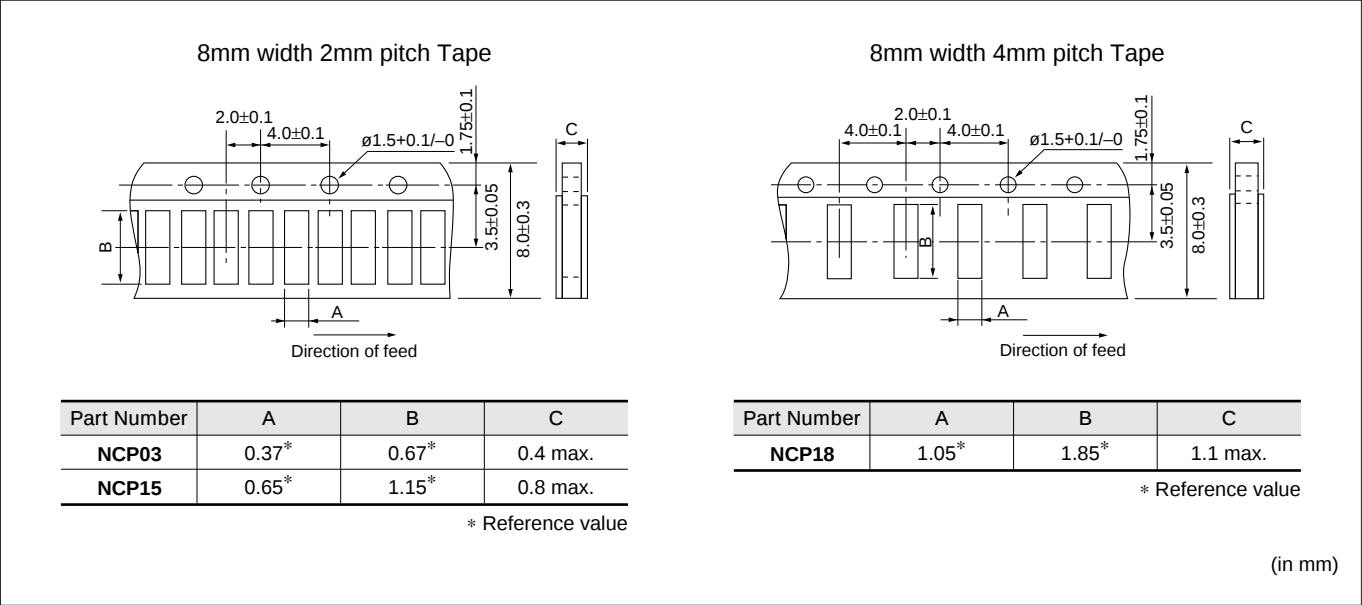


Continued on the following page.

Chip Type Package

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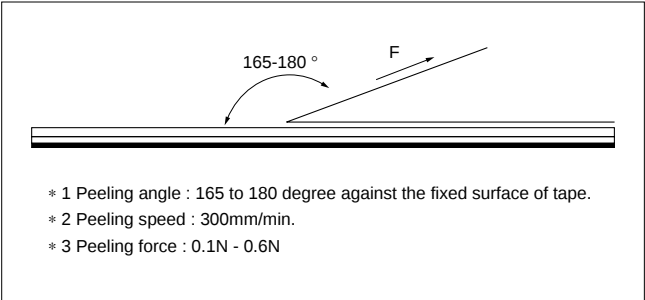
3. Paper Tape



(1) Other Conditions

- ① Packaging
- Products shall be packaged in the cavity of the base tape and sealed by top tape and bottom tape.
- ② Tape
- Top tape and bottom tape have no joints and products shall be packaged and sealed in the cavity of the base tape, continuously.

(2) Peeling force of top tape



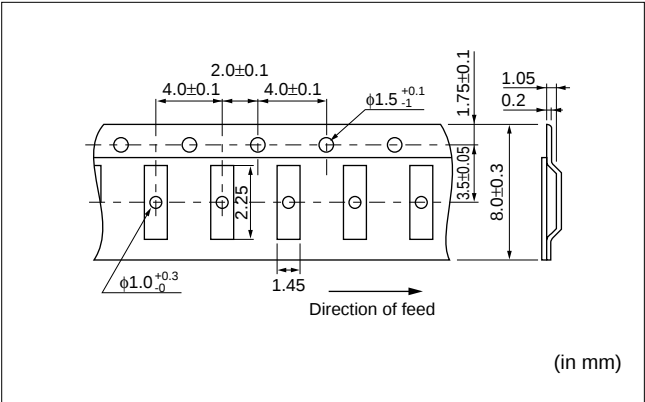
(3) Pull Strength

Pull strength of top tape and bottom tape shall be specified 5N minimum.

4. Plastic tape

(1) Other Conditions

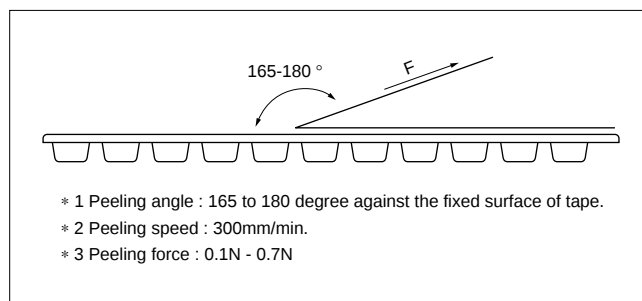
- ① Packaging
- Products shall be packaged in the each embossed cavity of plastic tape and sealed by cover tape.
- ② Tape
- Cover tape has no joints.



Chip Type Package

 Continued from the preceding page.

(2) Peeling of force cover tape



(3) Tape Strength

Pull strength of plastic tape shall be specified 5N minimum.

Pull strength of cover tape shall be specified 10N minimum.

NTC Thermistors

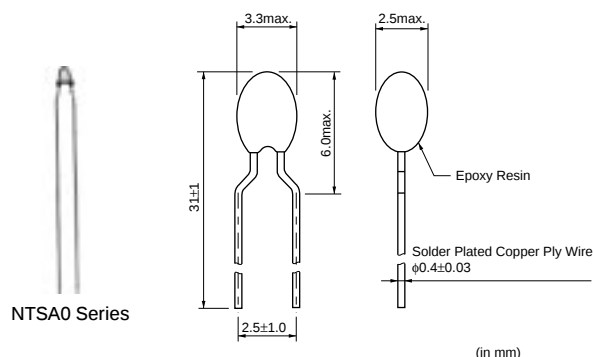
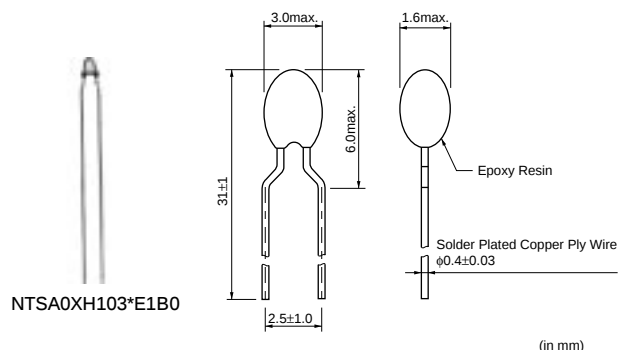
muRata

for Temperature Sensor Resin Coated Radial Lead Type

This product is sensor type NTC Thermistor to be useful in the normal temperature range developed by the unique ceramic technology and the automatic assembly.

■ Features

1. High-accuracy of $\pm 1\%$
 $\pm 1\%$ of resistance and B-Constant tolerance is realized due to uniform thickness by the precise sheet forming method.
2. Quick response
 This product provides faster response time due to its smaller size.
3. Taping type is available(Standard type)
4. Strong lead strength
 Original lead-wiring technique assures reliable connection. It can be formed and bent flexibly according to the mounting condition.
5. Lead Coating type
 The lead wires of Lead Coating type are coated with strong and flexible resin.



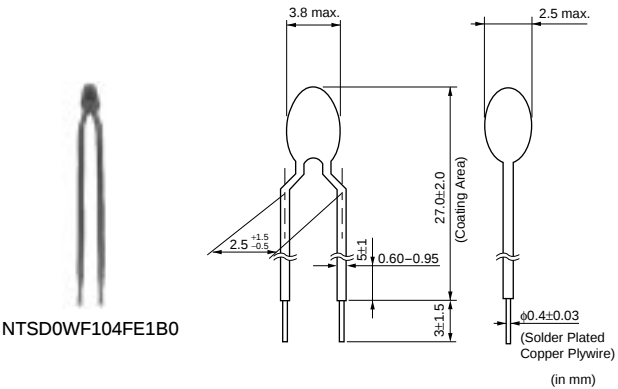
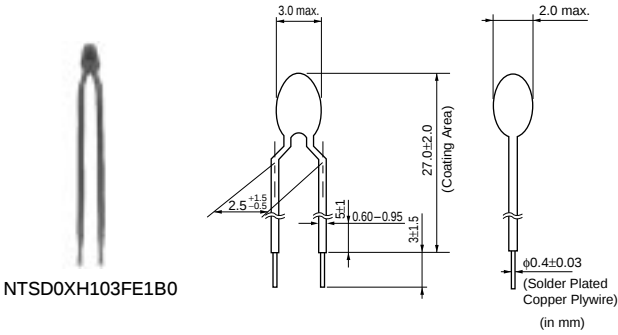
■ Applications

- Rechargeable batteries
- Battery charging circuits
- Head of printers
- DC fan motors
- Home appliance equipments

Lead-Coating Type

■ Features

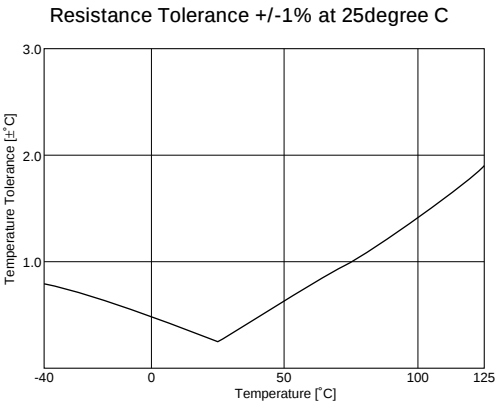
- 1. Electric insulation on lead wire.
- 2. Excellent bending resistant due to flexible resin.
- 3. Easy handling due to most suitable hardness of surface of coating.
- 4. Measurement accuracy of +1 (degree C) or less in the range from -40 to +70 (degree C).



Part Number	Resistance (25°C) (k ohm)	B-Constant (25-50°C) (K)	Max. Operating Current(25°C) (mA)	Rated Electric Power(25°C) (mW)	Thermal Dissipation Constant(25°C) (mW/°C)	Thermal Time Constant(s)	Operating Temperature Range (°C)
NTSD0XH103FE1B0	10 $\pm$ 1%	3380 $\pm$ 1%	0.38	15	1.5	less than 7	-40 to 125
NTSD0WF104FE1B0	100 $\pm$ 1%	4250 $\pm$ 1%	0.14	21	2.1	less than 7	-40 to 125

The order quantity should be an integral multiple of the "Minimum Quantity" shown in the shown in the "Package" page.

■ Temperature Tolerance-Temperature Characteristics



for Temperature Sensor Temperaute Characteristics (Reference Value)

Temp. (°C)	NTSA0XM202F type			NTSA0XR502F type			NTSA0XH103F type			NTSA0XV103F type		
	Resistance (kΩ)			Resistance (kΩ)			Resistance (kΩ)			Resistance (kΩ)		
	Low	Center	High	Low	Center	High	Low	Center	High	Low	Center	High
-40	42.859	44.657	46.526	118.390	123.484	128.781	188.021	195.652	203.573	332.325	347.808	363.977
-35	32.249	33.505	34.807	88.747	92.295	95.975	142.					

for Temperature Sensor Lead Type ⚠Caution/Notice

■ ⚠Caution (Storage and Operating Conditions)

This product is designed for the applications under ordinary environment

(room temperature, normal humidity and atmospheric pressure).

Do not use under the following environments. Because all these factors can deteriorate the characteristics of product or can cause the failures and the burning-out.

1. Corrosive gas or deoxidizing gas.
(Chlorine gas, Hydrogen sulfide gas, Ammonia gas, Sulfuric acid gas, Nitric oxide gas, etc.)

2. Volatile or flammable gas
3. Dusty place
4. Under vacuum, reducing pressure or under high-pressure
5. Place with splashed water or under high humidity with dewing
6. Place with salt water, oils, chemical liquids or organic solvents
7. Place strongly vibrated
8. Other place, where is similar like the above-mentioned environments

■ ⚠Caution (Others)

Be sure to provide an appropriate fail-safe function on your product to prevent a second damage that may be caused by the abnormal function or the failure of our product.

■ Notice (Rating)

Use this product within the specified temperature range.

Higher temperature may cause deterioration of the characteristics or the material quality of this product.

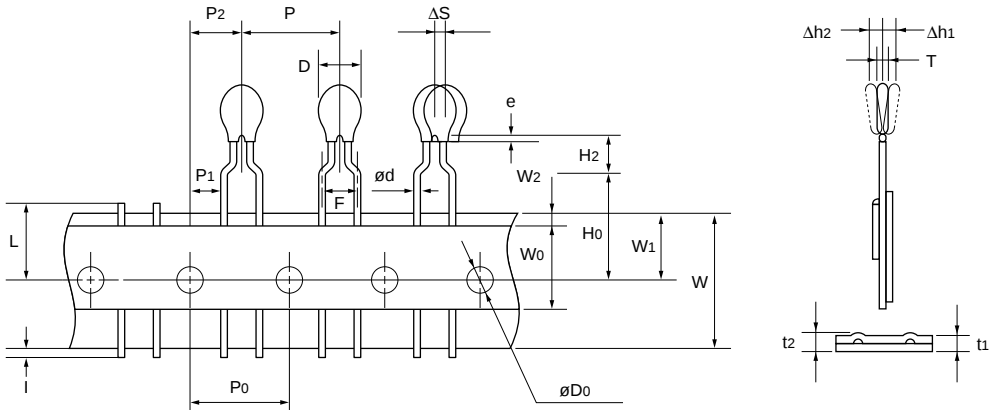
■ Notice (Storage and Operating Conditions)

for Temperature Sensor Lead Type NTSA Series Package

Minimum Quantity

Part Number	Minimum Quantity (pcs.)	
	Ammo Pack	Bulk
NTSA0	3000	100

Taping Dimension



Item	Coad	Dimension (mm)
Pitch of Component	P	12.7
Pitch of Sprocket Hole	P ₀	12.7±0.3
Lead Spacingd	F	5.0+0.8/-0.2
Lead Length from Hole Center to Component Center	P ₂	6.35±1.3
Lead Length from Hole Center to Lead	P ₁	3.85±0.8
Body Diameter	D	3.5 max.
Deviation along Tape, Left or Right	ΔS	0±2.0
Carrier Tape Width	W	18.0±0.5
Position of Sprocket Hole	W ₁	9.0±0.5
Lead Distance between Reference and Bottom Planes	H ₀	16.0±1.0
Height of Component		

NTC Thermistors

muRata

for Inrush Current Suppression Lead Type

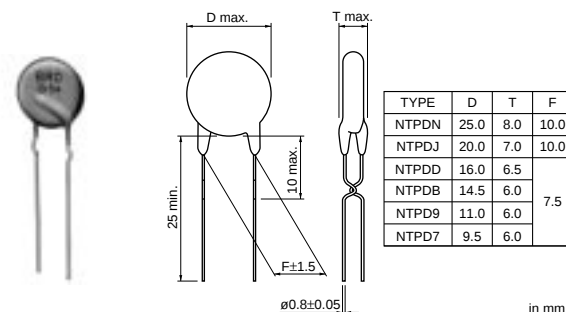
This product effectively suppress surge current which are generated when switching power regulators or similar switches are turned on.

■ Features

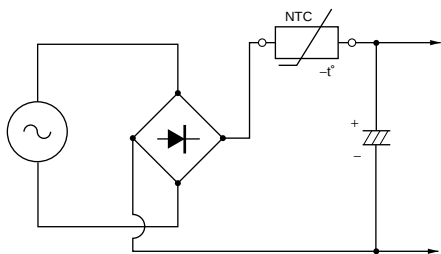
1. Lead type thermistors occupy a very small area and allow high-density packaging.
2. Most suitable for power supplies of less than 100W.
3. Excellent recovery characteristics due to resin coating with excellent heat characteristics.
4. Highly reliable.

■ Applications

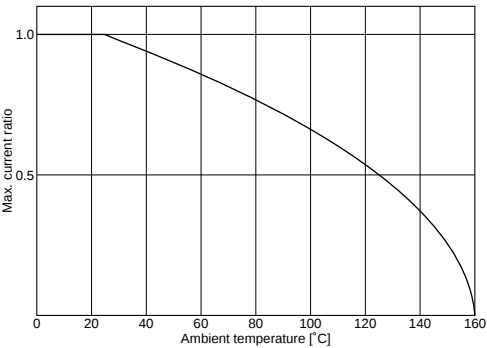
- Switching power supplies • CRT monitors
- Color televisions • VCR-Power supplies
- Other power circuits



■ Application Circuit

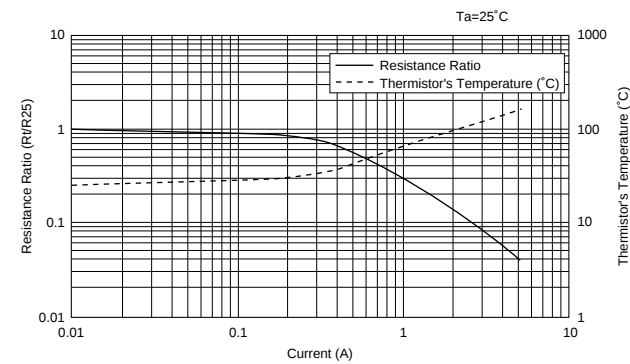


■ Determination of Allowable Current

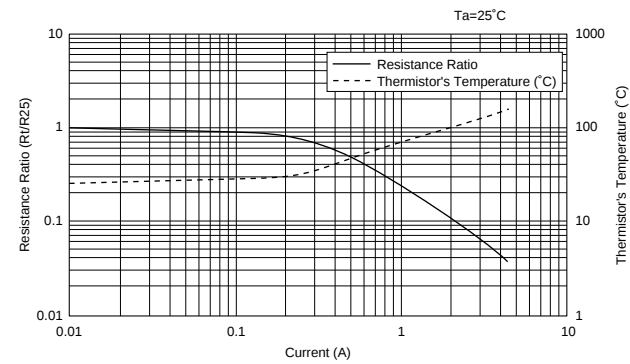


Current-R Ratio (RT/R25) / Current-Temperature Characteristics (Typical)

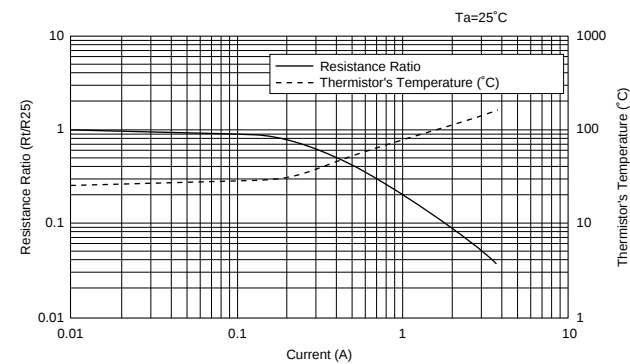
■ NTPDN3R0L Type



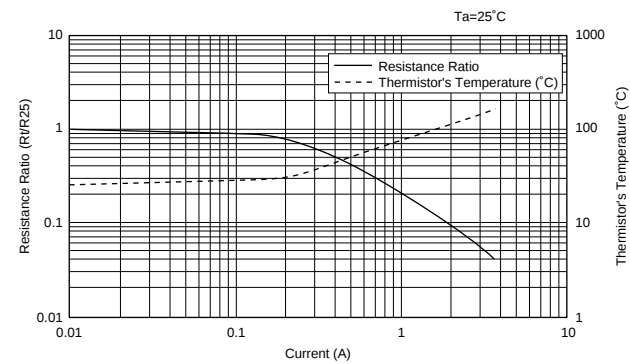
■ NTPDN4R0L Type



■ NTPDN6R0L Type



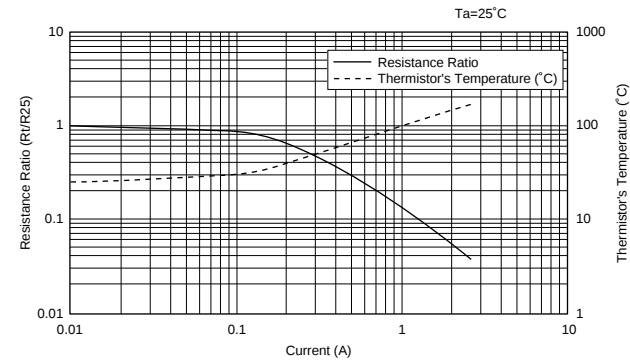
■ NTPDJ4R0L Type



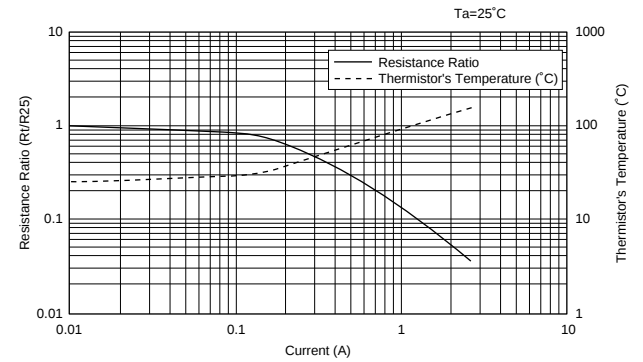
Current-R Ratio (RT/R25) / Current-Temperature Characteristics (Typical)

Continued from the preceding page.

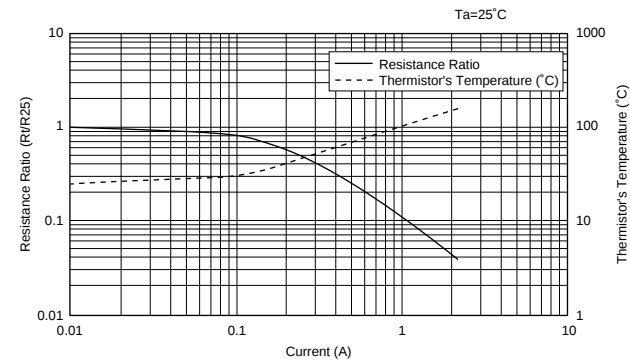
NTPDJ100L Type



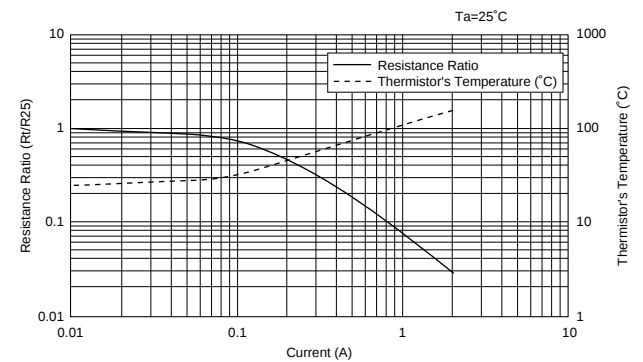
NTPDD8R0L Type



NTPDD100L Type



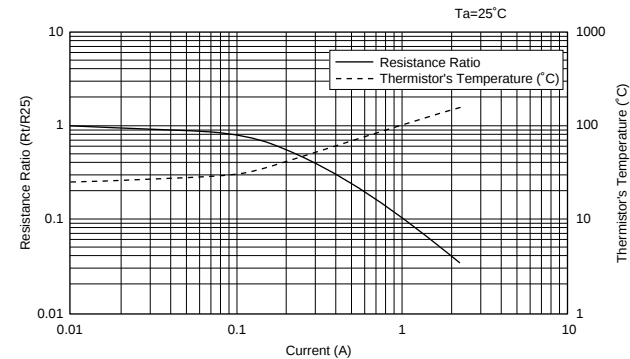
NTPDD160L Type



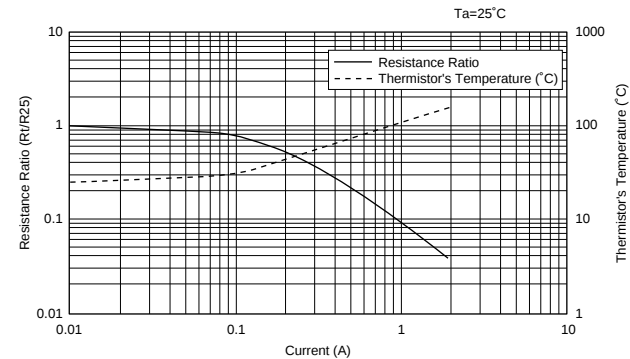
Current-R Ratio (RT/R25) / Current-Temperature Characteristics (Typical)

Continued from the preceding page.

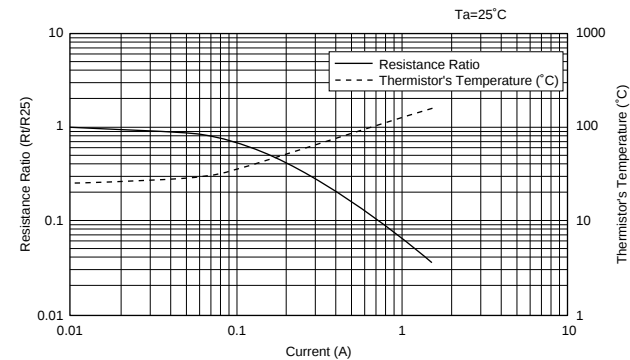
■ NTPDB100L Type



■ NTPD9100L Type



■ NTPD9160L Type

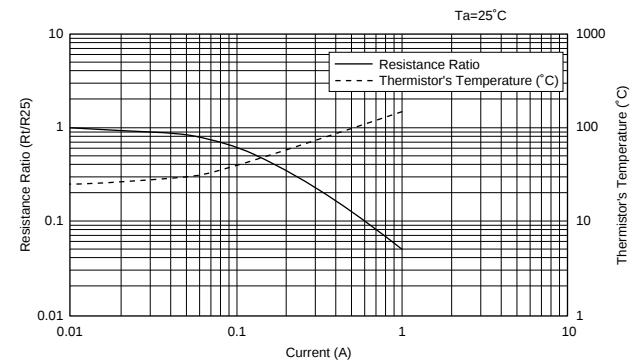


■ NTPD74T0L Type

Current-R Ratio (RT/R25) / Current-Temperature Characteristics (Typical)

 Continued from the preceding page.

■ NTPD7220L Type



for Inrush Current Suppression Lead Type ⚠Caution / Notice

■ ⚠Caution (Storage and Operating Conditions)

1. This product is designed for the Switching Power Supply with smoothing capacitors.
Other application of this product may result to catch fire in the worst case.
2. Use this product within the specified maximum current. Otherwise it may catch fire in the worst case.
3. Use this product with smoothing capacitor within the specified maximum capacitance value. Otherwise it may catch fire in the worst case.
4. This product is designed for the applications under ordinary environment (room temperature, normal humidity and atmospheric pressure).
Do not use under the following environments.
Because all these factors can deteriorate the

characteristics of product or can cause the failures and the burning-out.

- (1) Corrosive gas or deoxidizing gas.
(Chlorine gas, Hydrogen sulfide gas, Ammonia gas, Sulfuric acid gas, Nitric oxide gas, etc.)
- (2) Volatile or flammable gas
- (3) Dusty place
- (4) Under vacuum, reducing pressure or under high-pressure
- (5) Place with splashed water or under high humidity with dewing
- (6) Place with salt water, oils, chemical liquids or organic solvents
- (7) Place strongly vibrated
- (8) Other place, where is similar like the above-mentioned environments

■ ⚠Caution (Others)

Be sure to provide an appropriate fail-safe function on your product to prevent a second damage that may be caused by the abnormal function or the failure of our product.

■ Notice (Storage and Operating Conditions)

To keep solderability of product from declining, following storage condition is recommended.

1. Storage condition :
Temperature -10 to +40 degree C
Humidity less than 75%RH (not dewing condition

for Inrush Current Suppression Lead Type ⚠Caution / Notice**■ Notice (Handling)**

1. When this product is operated, temperature of some area may be about 160 (degree C).

Be sure that surround parts and material can be affected by the temperature of this product. If the surrounding part and material are kept under condition, they may deteriorated or may produce harmful gas. And, such harmful gas may deteriorate the element of this product.

2. This product does not have waterproof construction. A splashed water may cause failure mode such as deterioration of characteristic or current leak. So, do not apply cleaning to immerse it into water or

any solvent.

3. The ceramic element of this product is fragile, and care must be taken not to load a excessive press-force or not to give a shock at handling. Such forces may cause cracking or chipping to the element.

4. Do not apply an excessive force to the lead wire. Otherwise, it may cause break off junction between lead wire and element, or may crack element. So, fix lead wire of element side when lead wire is bent or cut.

■ Notice (Others)

1. Thermal time constant of this product may be relatively large. Care must be taken to confirm the rush current in ON-OFF period and the temperature range in the application before the usage. ON-OFF within short period may cause inrush current more than specified value.
2. The resin coating of this product is not for insulating purpose. Keep an adequate insulating distance to surrounding components.

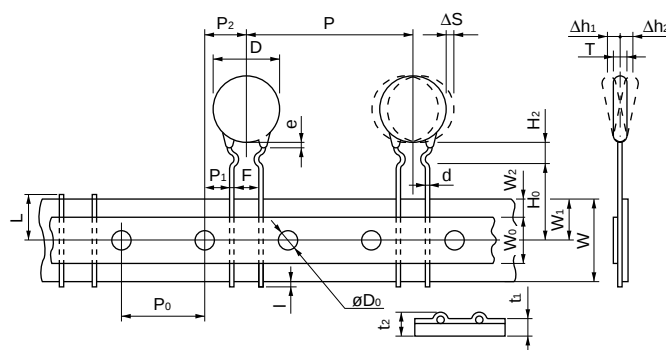
for Inrush Current Suppression Lead Type Package

■ Minimum Quantity

Part Number	Minimum Quantity (pcs.)	
	Ammo Pack (□□□: 6A0)	Bulk (□□□: 7B0)
NTPDD8R0LD□□□	400	100
NTPDD120LD□□□	400	100
NTPDD160LD□□□	400	100
NTPDB5R0LD□□□	400	100
NTPDB8R0LD□□□	750	100
NTPDB100LD□□□	750	100
NTPD9100LD□□□	750	100
NTPD9160LD□□□	750	100
NTPD74R0LD□□□	750	100
NTPD78R0LD□□□	750	100
NTPD7160LD□□□	750	100
NTPD7220LD□□□	750	100

Only bulk 100 pcs. is available for the parts other than above.

■ Taping Dimension



⚠ Note:**1. Export Control**

〈For customers outside Japan〉

Murata products should not be used or sold for use in the development, production, stockpiling or utilization of any conventional weapons or mass-destructive weapons (nuclear weapons, chemical or biological weapons, or missiles), or any other weapons.

〈For customers in Japan〉

For products which are controlled items subject to the "Foreign Exchange and Foreign Trade Law" of Japan, the export license specified by the law is required for export.

2. Please contact our sales representatives or product engineers before using our products listed in this catalog for the applications listed below which require especially high reliability for the prevention of defects which might directly cause damage to the third party's life, body or property, or when intending to use one of our products for other applications than specified in this catalog.

- ① Aircraft equipment
- ② Aerospace equipment
- ③ Undersea equipment
- ④ Power plant equipment
- ⑤ Medical equipment
- ⑥ Transportation equipment (vehicles, trains, ships, etc.)
- ⑦ Traffic signal equipment
- ⑧ Disaster prevention / crime prevention equipment
- ⑨ Data-processing equipment
- ⑩ Application of similar complexity and/or reliability requirements to the applications listed in the above

3. Product specifications in this catalog are as of July 2001. They are subject to change or our products in it may be discontinued without advance notice. Please check with our sales representatives or product engineers before your ordering. If there are any questions, please contact our sales representatives or product engineers.**4. The parts numbers and specifications listed in this catalog are for information only. You are requested to approve our product specification or to transact the approval sheet for product specification, before your ordering.****5. Please note that unless otherwise specified, we shall assume no responsibility whatsoever for any conflict or dispute that may occur in connection with the effect of our and/or third party's intellectual property rights and other related rights in consideration of your using our products and/or information described or contained in our catalogs. In this connection, no representation shall be made to the effect that any third parties are authorized to use the rights mentioned above**