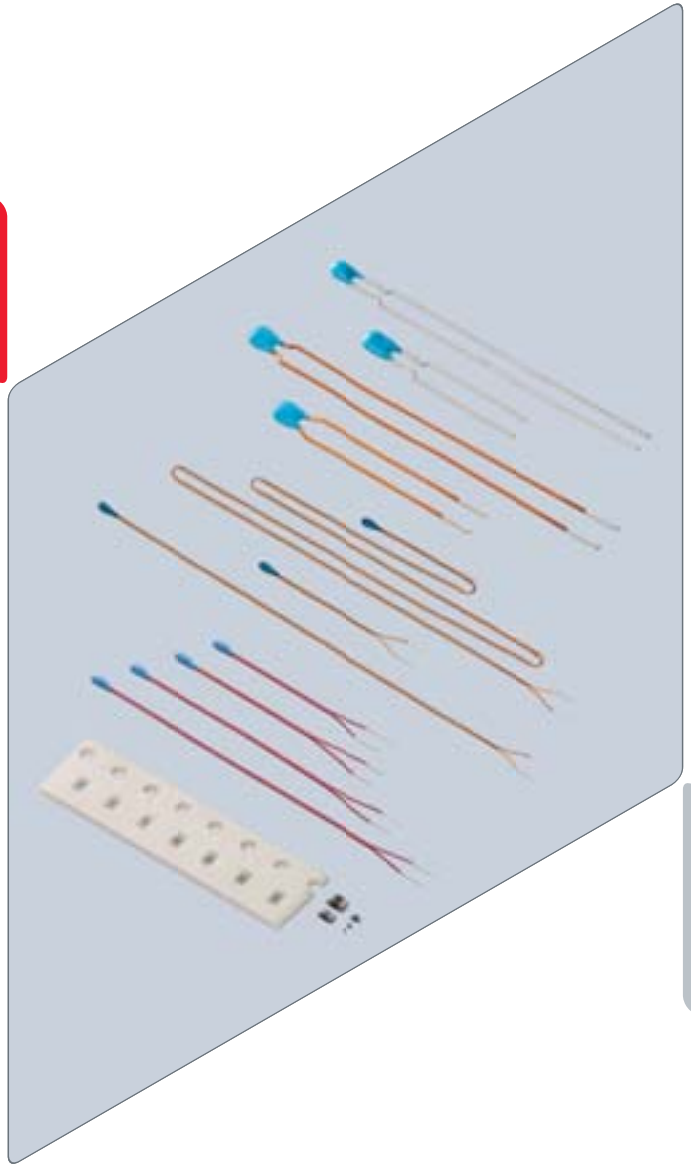


# NTC Thermistors





### **EU RoHS Compliant**

- All the products in this catalog comply with EU RoHS.
- EU RoHS is "the European Directive 2011/65/EU on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment."
- For more details, please refer to our web page, "Murata's Approach for EU RoHS" (<https://www.murata.com/en-eu/support/compliance/rohs>).

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Please check the MURATA website (<https://www.murata.com/>) if you cannot find a part number in this catalog.

## ● Part Numbering

### NTC Thermistors for Temp. Sensor and Compensation Chip Type

(Part Number)

NC	P	18	XH	103	J	03	RB
①	②	③	④	⑤	⑥	⑦	⑧

#### ① Product ID

Product ID	
NC	NTC Thermistors Chip Type

#### ② Series

Code	Series
P	Plated Termination Series
U	High Reliability Series

#### ③ Dimensions (L x W)

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

#### ④ Temperature Characteristics

Code	Temperature Characteristics
XC	Nominal B-Constant 3100–3149K
XF	Nominal B-Constant 3250–3299K
XH	Nominal B-Constant 3350–3399K
XM	Nominal B-Constant 3500–3549K
XQ	Nominal B-Constant 3650–3699K
XV	Nominal B-Constant 3900–3949K
XW	Nominal B-Constant 3950–3999K
WB	Nominal B-Constant 4050–4099K
WD	Nominal B-Constant 4150–4199K
WF	Nominal B-Constant 4250–4299K
WL	Nominal B-Constant 4450–4499K
WM	Nominal B-Constant 4500–4549K

#### ⑤ Resistance

Expressed by three-digit alphanumerics. The unit is ohm (Ω). The first and second figures are significant digits, and the third figure expresses the number of zeros that follow the two figures.

Ex.

Code	Resistance
102	1kΩ
103	10kΩ
104	100kΩ

#### ⑥ Resistance Tolerance

Code	Resistance Tolerance
D	±0.5%
F	±1%
E	±3%
J	±5%

#### ⑦ Individual Specifications

Structures and other specifications are expressed by two figures.

Ex.

Code	Individual Specifications
03/05/10/12/60	Standard Type
□S	Automotive Type

#### ⑧ Packaging

Code	Packaging
RA	Plastic Taping 4mm Pitch (4000 pcs.)
RB	Paper Taping 4mm Pitch (4000 pcs.)
RC	Paper Taping 2mm Pitch (10000 pcs.)
RL	Paper Taping 2mm Pitch (15000 pcs.)

## NTC Thermistor for Temperature Sensor Thermo String Type

(Part Number)    **NXF** **T** **15** **XH** **103** **F** **A** **2** **B** **025**  
                          ①    ②    ③    ④    ⑤    ⑥    ⑦    ⑧    ⑨    ⑩

### ① Product ID

Product ID	
<b>NXF</b>	NTC Thermistors Sensor Thermo String Type

### ② Individual Specifications

Code	Individual Specifications
<b>T</b>	Commercial Type

### ③ Chip Dimensions

Code	Dimensions (L x T)	EIA
<b>15</b>	1.00 x 0.50mm	0402

### ④ Temperature Characteristics

Code	Temperature Characteristics
<b>XH</b>	Nominal B-Constant 3350–3399K
<b>XV</b>	Nominal B-Constant 3900–3949K
<b>WB</b>	Nominal B-Constant 4050–4099K
<b>WF</b>	Nominal B-Constant 4250–4299K

### ⑤ Resistance

Expressed by three figures. The unit is (Ω). The first and second figures are significant digits, and the third figure expresses the number of zeros that follow the two figures.

Code	Resistance
<b>103</b>	10kΩ
<b>473</b>	47kΩ
<b>104</b>	100kΩ

### ⑥ Resistance Tolerance

Code	Resistance Tolerance
<b>F</b>	±1%

### ⑦ Lead Wire Type

Code	Lead Wire Type
<b>A</b>	∅0.3mm Copper Lead Wire with Polyurethane Coat
<b>E</b>	∅0.3mm Nickel Copper Lead Wire with Enamel Coat

### ⑧ Shape of the Lead Wire Kink

Code	Shape of the Lead Wire Kink
<b>1</b>	Twisted Lead Wire Type
<b>2</b>	Standard Type (Cooper Wire Type)
<b>A</b>	Standard Type (Nickel Copper Wire Type)

### ⑨ Packaging

Code	Packaging
<b>B</b>	Bulk

### ⑩ Dimensions (Full Length)

Code	Dimensions (Full Length)
<b>025</b>	25mm
<b>030</b>	30mm
<b>040</b>	40mm
<b>050</b>	50mm
<b>060</b>	60mm
<b>070</b>	70mm
<b>080</b>	80mm
<b>090</b>	90mm
<b>100</b>	100mm
<b>110</b>	110mm
<b>120</b>	120mm
<b>130</b>	130mm
<b>140</b>	140mm
<b>150</b>	150mm

### NTC Thermistor for Temperature Sensor/Lead Type

(Part Number) **NXR** **T** **15** **XH** **103** **F** **A** **1** **B** **040**

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

#### ① Product ID

Product ID	
<b>NXR</b>	NTC Thermistor Sensor/Lead Type

#### ② Individual Specifications

Code	Individual Specifications
<b>T</b>	Commercial Type

#### ③ Chip Dimensions

Code	Dimensions (L x T)
<b>15</b>	1.00 x 0.50mm

#### ④ Temperature Characteristics

Code	Temperature Characteristics
<b>XH</b>	Nominal B-Constant 3350–3399K
<b>XM</b>	Nominal B-Constant 3500–3549K
<b>XV</b>	Nominal B-Constant 3900–3949K
<b>WB</b>	Nominal B-Constant 4050–4099K
<b>WF</b>	Nominal B-Constant 4250–4299K

#### ⑤ Resistance

Expressed by three figures. The unit is (Ω). The first and second figures are significant digits, and the third figure expresses the number of zeros that follow the two figures.

Ex.

Code	Resistance
<b>202</b>	2.0kΩ
<b>103</b>	10kΩ
<b>104</b>	100kΩ

#### ⑥ Resistance Tolerance

Code	Resistance Tolerance
<b>F</b>	±1%
<b>E</b>	±3%
<b>J</b>	±5%

#### ⑦ Lead Wire Type

Code	Lead Wire Type
<b>A</b>	Lead Type: ø0.4mm Copper-clad Fe Wire, Tinned Lead Insulation Type: ø0.46mm Cu Wire with Coat

#### ⑧ Shape of the Lead Wire

Code	Shape of the Lead Wire
<b>1</b>	Lead Spacing 2.5mm
<b>3</b>	Lead Spacing 5.0mm
<b>5</b>	Lead Spacing 2.5mm (Insulation Type)

#### ⑨ Packaging

Code	Packaging
<b>A</b>	Ammo Pack Taping
<b>B</b>	Bulk

#### ⑩ Dimensions (Full Length)

Code	Lead Type	Lead Insulation Type
<b>010</b>	10mm	–
<b>020</b>	20mm	–
<b>025</b>	–	25mm
<b>030</b>	30mm	30mm
<b>035</b>	–	35mm
<b>040</b>	40mm	40mm
<b>045</b>	–	45mm
<b>050</b>	50mm	50mm
<b>016</b>	16mm (Taping Type)	–

## Basic Characteristics

### Basic Characteristics

#### 1. Zero-power Resistance of Thermistor: R

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

R: Resistance in ambient temperature T (K)  
 (K: absolute temperature)

R<sub>0</sub>: Resistance in ambient temperature T<sub>0</sub> (K)

B: B-Constant of Thermistor

#### 2. B-Constant

as (1) formula

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

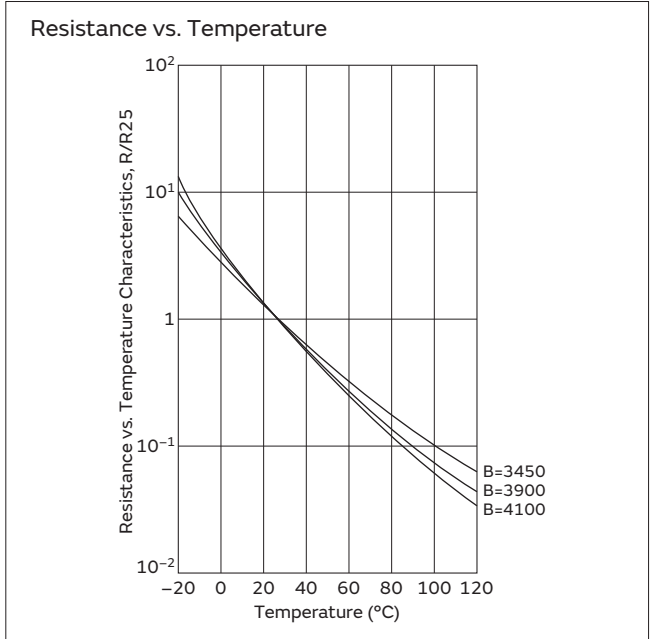
#### 3. Thermal Dissipation Constant

When electric power P (mW) is spent in ambient temperature T<sub>1</sub> and thermistor temperature rises T<sub>2</sub>, the formula is as follows

$$P = C (T_2 - T_1)$$

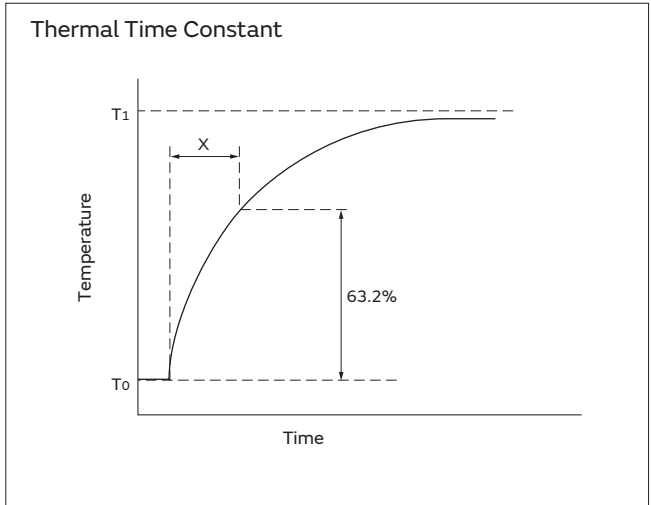
C: Thermal dissipation constant (mW/°C)

Thermal dissipation constant is varied with dimensions, measurement conditions, etc.



#### 4. Thermal Time Constant

Period in which the thermistor's temperature will change 63.2% of its temperature difference from ambient temperature T<sub>0</sub> (°C) to T<sub>1</sub> (°C).



### Performance

Item	Condition
Resistance	Measured by zero-power in specified ambient temperature.
B-Constant	Calculated between two specified ambient temperatures by the next formula. T and T <sub>0</sub> is absolute temperature (K). $B = \frac{\ln (R/R_0)}{1/T - 1/T_0}$
Thermal Dissipation Constant	Shows necessary electric power that Thermistor's temperature rises 1°C by self-heating. It is calculated by the next formula (mW/°C). $C = \frac{P}{T - T_0}$
Maximum Operating Current	It is possible to keep the thermistor's temperature rising max. 0.1°C.

Please inquire about test conditions and ratings.

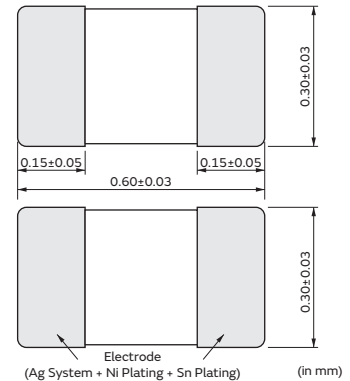
# NTC Thermistors

## Temperature Sensor and Compensation 0201 (0603) Size

Chip NTC Thermistors' Ni barrier termination provides excellent solderability and their unique construction offers high stability in the application's environment.

### Features

1. Excellent solderability and high stability in the application's environment
2. Excellent long-term stability
3. High accuracy in resistance and B-Constant
4. Reflow soldering possible
5. NCP series are recognized by UL/cUL.  
 (UL1434, File No.E137188)



Detailed are accessible from the following URL.  
<https://www.murata.com/en-global/products/thermistor/ntc/ncp>

### Applications

1. Temperature compensation for transistors, ICs, and crystal oscillators in mobile communications
2. Temperature sensor for rechargeable batteries

Part Number	Resistance (25°C) (ohm)	B-Constant (25-50°C) (K)	B-Constant (25-80°C) (Reference Value) (K)	B-Constant (25-85°C) (Reference Value) (K)	B-Constant (25-100°C) (Reference Value) (K)	Maximum Operating Current (25°C) (mA)	Maximum Voltage (V)	Typical Dissipation Constant (25°C) (mW/°C)
NCP03XM102□05RL	1.0k	3500 ±1%	3539	3545	3560	0.316	5	1
NCP03XM152□05RL	1.5k	3500 ±1%	3539	3545	3560	0.258	5	1
NCP03XM222□05RL	2.2k	3500 ±1%	3539	3545	3560	0.213	5	1
NCP03XM332□05RL	3.3k	3500 ±1%	3539	3545	3560	0.174	5	1
NCP03XM472□05RL	4.7k	3500 ±1%	3539	3545	3560	0.146	5	1
NCP03XH682□05RL	6.8k	3380 ±1%	3428	3434	3455	0.121	5	1
NCP03XH103F05RL	10k ±1%	3380 ±1%	3428	3434	3455	0.100	5	1
NCP03XH103□05RL	10k	3380 ±1%	3428	3434	3455	0.100	5	1
NCP03XV103□05RL	10k	3900 ±1%	3930	3934	3944	0.100	5	1
NCP03XH153□05RL	15k	3380 ±1%	3428	3434	3455	0.082	5	1
NCP03XH223□05RL	22k	3380 ±1%	3428	3434	3455	0.067	5	1
NCP03WF333□05RL	33k	4250 ±1%	4303	4311	4334	0.055	5	1
NCP03WB473□05RL	47k	4050 ±3%	4101	4108	4131	0.046	5	1
NCP03WL473□05RL	47k	4485 ±1%	4537	4543	4557	0.046	5	1
NCP03WF683□05RL	68k	4250 ±1%	4303	4311	4334	0.038	5	1
NCP03WL683□05RL	68k	4485 ±1%	4537	4543	4557	0.038	5	1
NCP03WF104F05RL	100k ±1%	4250 ±1%	4303	4311	4334	0.032	5	1
NCP03WF104□05RL	100k	4250 ±1%	4303	4311	4334	0.032	5	1
NCP03WL104□05RL	100k	4485 ±1%	4537	4543	4557	0.032	5	1
NCP03WL154□05RL	150k	4485 ±1%	4537	4543	4557	0.026	5	1
NCP03WL224□05RL	220k	4485 ±1%	4537	4543	4557	0.021	5	1

□ is filled with resistance tolerance codes (E: ±3%, J: ±5%).  
 Operating Temperature Range: -40°C to +125°C



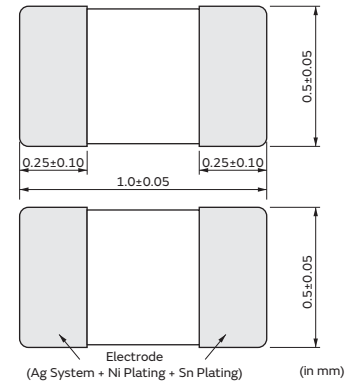
# NTC Thermistors

## Temperature Sensor and Compensation 0402 (1005) Size/NCP Series

Chip NTC Thermistors' Ni barrier termination provides excellent solderability and their unique construction offers high stability in the application's environment.

### Features

1. Excellent solderability and high stability in the application's environment
2. Excellent long-term stability
3. High accuracy in resistance and B-Constant
4. Reflow soldering possible
5. Same B-constant in the same resistance in the two sizes (0805 size/0603 size)  
Downsize is easy for design.
6. NCP series are recognized by UL/cUL.  
(UL1434, File No.E137188)



Detailed are accessible from the following URL.  
<https://www.murata.com/en-global/products/thermistor/ntc/ncp>

### Applications

1. Temperature compensation for transistors, ICs, and crystal oscillators in mobile communications
2. Temperature sensor for rechargeable batteries
3. Temperature compensation of LCD
4. Temperature compensation in general use of electric circuits

Part Number	Resistance (25°C) (ohm)	B-Constant (25-50°C) (K)	B-Constant (25-80°C) (Reference Value) (K)	B-Constant (25-85°C) (Reference Value) (K)	B-Constant (25-100°C) (Reference Value) (K)	Maximum Operating Current (25°C) (mA)	Maximum Voltage (V)	Typical Dissipation Constant (25°C) (mW/°C)
NCP15XM221□03RC	220	3500 ±3%	3539	3545	3560	0.674	5	1
NCP15XM331□03RC	330	3500 ±3%	3539	3545	3560	0.550	5	1
NCP15XQ471□03RC	470	3650 ±2%	3688	3693	3706	0.609	5	1
NCP15XQ681□03RC	680	3650 ±3%	3688	3693	3706	0.383	5	1
NCP15XQ102□03RC	1.0k	3650 ±2%	3688	3693	3706	0.316	5	1
NCP15XW152□03RC	1.5k	3950 ±3%	3982	3987	3998	0.258	5	1
NCP15XW222□03RC	2.2k	3950 ±3%	3982	3987	3998	0.213	5	1
NCP15XW332□03RC	3.3k	3950 ±3%	3982	3987	3998	0.174	5	1
NCP15XM472□03RC	4.7k	3500 ±2%	3539	3545	3560	0.146	5	1
NCP15XW472□03RC	4.7k	3950 ±3%	3982	3987	3998	0.146	5	1
NCP15XW682□03RC	6.8k	3950 ±3%	3982	3987	3998	0.121	5	1
NCP15XH103D03RC	10k ±0.5%	3380 ±0.7%	3428	3434	3455	0.100	5	1
NCP15XH103F03RC	10k ±1%	3380 ±1%	3428	3434	3455	0.100	5	1
NCP15XH103□03RC	10k	3380 ±1%	3428	3434	3455	0.100	5	1
NCP15XV103□03RC	10k	3900 ±3%	3930	3934	3944	0.100	5	1
NCP15XW153□03RC	15k	3950 ±3%	3982	3987	3998	0.082	5	1
NCP15XW223□03RC	22k	3950 ±3%	3982	3987	3998	0.067	5	1
NCP15WL223□03RC	22k	4485 ±1%	4537	4543	4557	0.067	5	1
NCP15WB333□03RC	33k	4050 ±3%	4101	4108	4131	0.055	5	1
NCP15WL333□03RC	33k	4485 ±1%	4537	4543	4557	0.055	5	1
NCP15WB473D03RC	47k ±0.5%	4050 ±0.5%	4101	4108	4131	0.046	5	1
NCP15WB473F03RC	47k ±1%	4050 ±1%	4101	4108	4131	0.046	5	1
NCP15WB473□03RC	47k	4050 ±1%	4101	4108	4131	0.046	5	1
NCP15WL473□03RC	47k	4485 ±1%	4537	4543	4557	0.046	5	1

□ is filled with resistance tolerance codes (E: ±3%, J: ±5%).  
 Operating Temperature Range: -40°C to +125°C

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Part Number	Resistance (25°C) (ohm)	B-Constant (25-50°C) (K)	B-Constant (25-80°C) (Reference Value) (K)	B-Constant (25-85°C) (Reference Value) (K)	B-Constant (25-100°C) (Reference Value) (K)	Maximum Operating Current (25°C) (mA)	Maximum Voltage (V)	Typical Dissipation Constant (25°C) (mW/°C)
<b>NCP15WD683□03RC</b>	68k	4150 ±3%	4201	4209	4232	0.038	5	1
<b>NCP15WL683□03RC</b>	68k	4485 ±1%	4537	4543	4557	0.038	5	1
<b>NCP15WF104D03RC</b>	100k ±0.5%	4250 ±0.5%	4303	4311	4334	0.032	5	1
<b>NCP15WF104F03RC</b>	100k ±1%	4250 ±1%	4303	4311	4334	0.032	5	1
<b>NCP15WF104□03RC</b>	100k	4250 ±1%	4303	4311	4334	0.032	5	1
<b>NCP15WL104□03RC</b>	100k	4485 ±1%	4537	4543	4557	0.032	5	1
<b>NCP15WL154□03RC</b>	150k	4485 ±1%	4537	4543	4557	0.026	5	1
<b>NCP15WM154□03RC</b>	150k	4500 ±3%	4571	4582	4614	0.026	5	1
<b>NCP15WM224□03RC</b>	220k	4500 ±3%	4571	4582	4614	0.021	5	1
<b>NCP15WM474□03RC</b>	470k	4500 ±3%	4571	4582	4614	0.015	5	1

□ is filled with resistance tolerance codes (E: ±3%, J: ±5%).  
 Operating Temperature Range: -40°C to +125°C

# NTC Thermistors

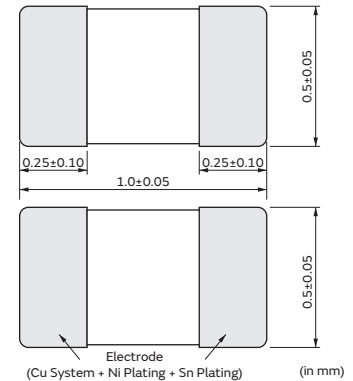
## Temperature Sensor and Compensation 0402 (1005) Size/NCU Series

0402/0603 sized Chip NTC Thermistors have Ni barrier termination, provide excellent solderability and offer high stability in environment due to unique inner construction.

This is new series, available market where request the high reliability for wide temperature sensing and compensation.

### Features

1. Excellent solderability and high stability in the application's environment
2. Excellent long-term 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)  
Downsize is easy for design.
6. NCU series are recognized by UL/cUL.  
(UL1434, File No.E137188)



Detailed are accessible from the following URL.  
<https://www.murata.com/en-global/products/thermistor/ntc/ncu>

### Applications

1. Temperature compensation for transistors, ICs, and crystal oscillators in mobile communications
2. Temperature sensor for rechargeable batteries
3. Temperature compensation of LCD
4. Temperature compensation in general use of electric circuits

Part Number	Resistance (25°C) (ohm)	B-Constant (25-50°C) (K)	B-Constant (25-80°C) (Reference Value) (K)	B-Constant (25-85°C) (Reference Value) (K)	B-Constant (25-100°C) (Reference Value) (K)	Maximum Operating Current (25°C) (mA)	Maximum Voltage (V)	Typical Dissipation Constant (25°C) (mW/°C)
NCU15XH103D60RC	10k ±0.5%	3380 ±0.7%	3428	3434	3455	0.100	5	1
NCU15XH103F60RC	10k ±1%	3380 ±1%	3428	3434	3455	0.100	5	1
NCU15XH103□60RC	10k	3380 ±1%	3428	3434	3455	0.100	5	1
NCU15WB473D60RC	47k ±0.5%	4050 ±0.5%	4101	4108	4131	0.046	5	1
NCU15WB473F60RC	47k ±1%	4050 ±1%	4101	4108	4131	0.046	5	1
NCU15WB473□60RC	47k	4050 ±1%	4101	4108	4131	0.046	5	1
NCU15WF104D60RC	100k ±0.5%	4250 ±0.5%	4303	4311	4334	0.032	5	1
NCU15WF104F60RC	100k ±1%	4250 ±1%	4303	4311	4334	0.032	5	1
NCU15WF104□60RC	100k	4250 ±1%	4303	4311	4334	0.032	5	1

□ is filled with resistance tolerance codes (E: ±3%, J: ±5%).

Operating Temperature Range: -40°C to +125°C

If there is any additionally electrical characteristics, please contact from close sales office or website.

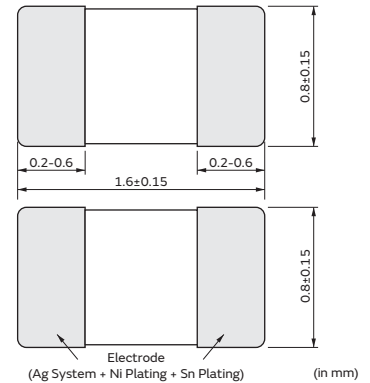
# NTC Thermistors

## Temperature Sensor and Compensation 0603 (1608) Size/NCP Series

Chip NTC Thermistors' Ni barrier termination provides excellent solderability and their unique construction offers high stability in the application's environment.

### Features

1. Excellent solderability and high stability in the application's environment
2. Excellent long-term stability
3. High accuracy in resistance and B-constant
4. Flow/Reflow soldering possible
5. Same B-Constant in the same resistance in the two sizes (0805 size/0603 size)  
Downsize is easy for design.
6. NCP series are recognized by UL/cUL.  
(UL1434, File No.E137188)



Detailed drawings are accessible from the following URL:  
<https://www.murata.com/en-global/products/thermistor/ntc/ncp>

### Applications

1. Temperature compensation for transistors, ICs, and crystal oscillators in mobile communications
2. Temperature sensor for rechargeable batteries
3. Temperature compensation of LCD
4. Temperature compensation in general use of electric circuits

Part Number	Resistance (25°C) (ohm)	B-Constant (25-50°C) (K)	B-Constant (25-80°C) (Reference Value) (K)	B-Constant (25-85°C) (Reference Value) (K)	B-Constant (25-100°C) (Reference Value) (K)	Maximum Operating Current (25°C) (mA)	Maximum Voltage (V)	Typical Dissipation Constant (25°C) (mW/°C)
NCP18XM221□03RB	220	3500 ±3%	3539	3545	3560	0.674	5	1
NCP18XM331□03RB	330	3500 ±3%	3539	3545	3560	0.550	5	1
NCP18XQ471□03RB	470	3650 ±2%	3688	3693	3706	0.609	5	1
NCP18XQ681□03RB	680	3650 ±3%	3688	3693	3706	0.383	5	1
NCP18XQ102□03RB	1.0k	3650 ±2%	3688	3693	3706	0.316	5	1
NCP18XW152□03RB	1.5k	3950 ±3%	3982	3987	3998	0.258	5	1
NCP18XW222□03RB	2.2k	3950 ±3%	3982	3987	3998	0.213	5	1
NCP18XW332□03RB	3.3k	3950 ±3%	3982	3987	3998	0.174	5	1
NCP18XM472□03RB	4.7k	3500 ±2%	3539	3545	3560	0.146	5	1
NCP18XW472□03RB	4.7k	3950 ±3%	3982	3987	3998	0.146	5	1
NCP18XW682□03RB	6.8k	3950 ±3%	3982	3987	3998	0.121	5	1
NCP18XH103D03RB	10k ±0.5%	3380 ±0.7%	3428	3434	3455	0.100	5	1
NCP18XH103F03RB	10k ±1%	3380 ±1%	3428	3434	3455	0.100	5	1
NCP18XH103□03RB	10k	3380 ±1%	3428	3434	3455	0.100	5	1
NCP18XV103□03RB	10k	3900 ±3%	3930	3934	3944	0.100	5	1
NCP18XW153□03RB	15k	3950 ±3%	3982	3987	3998	0.082	5	1
NCP18XW223□03RB	22k	3950 ±3%	3982	3987	3998	0.067	5	1
NCP18WB333□03RB	33k	4050 ±3%	4101	4108	4131	0.055	5	1
NCP18WB473D03RB	47k ±0.5%	4050 ±0.5%	4101	4108	4131	0.046	5	1
NCP18WB473F10RB	47k ±1%	4050 ±1%	4101	4108	4131	0.046	5	1
NCP18WB473□03RB	47k	4050 ±1%	4101	4108	4131	0.046	5	1
NCP18WD683□03RB	68k	4150 ±3%	4201	4209	4232	0.038	5	1
NCP18WF104D03RB	100k ±0.5%	4250 ±0.5%	4303	4311	4334	0.032	5	1

□ is filled with resistance tolerance codes (E: ±3%, J: ±5%).  
 Operating Temperature Range: -40°C to +125°C

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Part Number	Resistance (25°C) (ohm)	B-Constant (25-50°C) (K)	B-Constant (25-80°C) (Reference Value) (K)	B-Constant (25-85°C) (Reference Value) (K)	B-Constant (25-100°C) (Reference Value) (K)	Maximum Operating Current (25°C) (mA)	Maximum Voltage (V)	Typical Dissipation Constant (25°C) (mW/°C)
<b>NCP18WF104F12RB</b>	100k ±1%	4250 ±1%	4303	4311	4334	0.032	5	1
<b>NCP18WF104□03RB</b>	100k	4250 ±2%	4303	4311	4334	0.032	5	1
<b>NCP18WM154□03RB</b>	150k	4500 ±3%	4571	4582	4614	0.026	5	1
<b>NCP18WM224□03RB</b>	220k	4500 ±3%	4571	4582	4614	0.021	5	1
<b>NCP18WM474□03RB</b>	470k	4500 ±3%	4571	4582	4614	0.015	5	1

□ is filled with resistance tolerance codes (E: ±3%, J: ±5%).

Operating Temperature Range: -40°C to +125°C

# NTC Thermistors

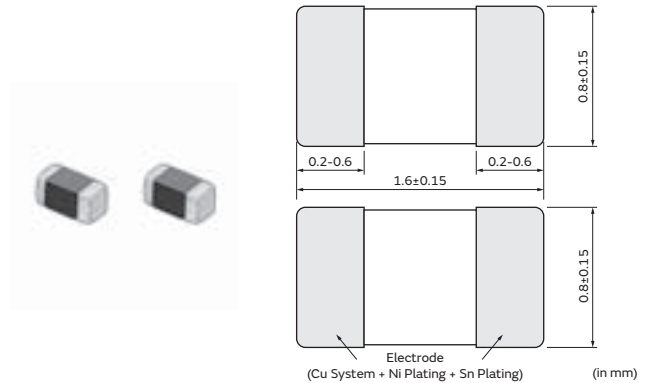
## Temperature Sensor and Compensation 0603 (1608) Size/NCU Series

0402/0603 sized Chip NTC Thermistors have Ni barrier termination, provide excellent solderability and offer high stability in environment due to unique inner construction.

This is new series, available market where request the high reliability for wide temperature sensing and compensation.

### Features

1. Excellent solderability and high stability in the application's environment
2. Excellent long-term stability
3. High accuracy in resistance and B-constant
4. Flow/Reflow soldering possible
5. Same B-Constant in the same resistance in the two sizes (0805 size/0603 size)  
Downsize is easy for design.
6. NCU series are recognized by UL/cUL.  
(UL1434, File No.E137188)



Detailed are accessible from the following URL.  
<https://www.murata.com/en-global/products/thermistor/ntc/ncu>

### Applications

1. Temperature compensation for transistors, ICs, and crystal oscillators in mobile communications
2. Temperature sensor for rechargeable batteries
3. Temperature compensation of LCD
4. Temperature compensation in general use of electric circuits

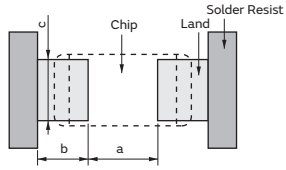
Part Number	Resistance (25°C) (ohm)	B-Constant (25-50°C) (K)	B-Constant (25-80°C) (Reference Value) (K)	B-Constant (25-85°C) (Reference Value) (K)	B-Constant (25-100°C) (Reference Value) (K)	Maximum Operating Current (25°C) (mA)	Maximum Voltage (V)	Typical Dissipation Constant (25°C) (mW/°C)
NCU18XH103D60RB	10k ±0.5%	3380 ±0.7%	3428	3434	3455	0.100	5	1
NCU18XH103F60RB	10k ±1%	3380 ±1%	3428	3434	3455	0.100	5	1
NCU18XH103□60RB	10k	3380 ±1%	3428	3434	3455	0.100	5	1
NCU18WB473D60RB	47k ±0.5%	4050 ±0.5%	4101	4108	4131	0.046	5	1
NCU18WB473F60RB	47k ±1%	4050 ±1%	4101	4108	4131	0.046	5	1
NCU18WB473□60RB	47k	4050 ±1%	4101	4108	4131	0.046	5	1
NCU18WF104D60RB	100k ±0.5%	4250 ±0.5%	4303	4311	4334	0.032	5	1
NCU18WF104F60RB	100k ±1%	4250 ±1%	4303	4311	4334	0.032	5	1
NCU18WF104□60RB	100k	4250 ±2%	4303	4311	4334	0.032	5	1
NCU18WM154□60RB	150k	4500 ± 3%	4571	4582	4614	0.026	5	1
NCU18WM224□60RB	220k	4500 ± 3%	4571	4582	4614	0.021	5	1
NCU18WM474□60RB	470k	4500 ± 3%	4571	4582	4614	0.015	5	1

□ is filled with resistance tolerance codes (E: ±3%, J: ±5%).

Operating Temperature Range: -40°C to +125°C

If there is any additionally electrical characteristics, please contact from close sales office or website.

## Temperature Sensor and Compensation Chip Type Standard Land Pattern Dimensions



Part Number	Soldering Methods	Dimensions (mm)			
		Chip (LxW)	a	b	c
<b>NCP03</b>	Reflow Soldering	0.6x0.3	0.25	0.3	0.3
<b>NCP15/NCU15</b>	Reflow Soldering	1.0x0.5	0.4	0.4-0.5	0.5
<b>NCP18</b>	Flow Soldering	1.6x0.8	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
<b>NCU18</b>	Flow Soldering	1.6x0.8	0.6-1.2	0.8-0.9	0.6-0.8
	Reflow Soldering		0.6-1.2	0.6-0.7	0.6-0.8

## Temperature Sensor and Compensation Chip Type Temperature Characteristics (Center Value)

Part Number	NCP□□XM221	NCP□□XM331	NCP□□XQ471	NCP□□XQ681	NCP□□XM102	NCP□□XQ102	NCP□□XM152	NCP□□XW152
Resistance	220Ω	330Ω	470Ω	680Ω	1.0kΩ	1.0kΩ	1.5kΩ	1.5kΩ
B-Constant	3500K	3500K	3650K	3650K	3500K	3650K	3500K	3950K
Temp. (°C)	Resistance (Ω)	Resistance (Ω)	Resistance (Ω)	Resistance (Ω)	Resistance (kΩ)	Resistance (kΩ)	Resistance (kΩ)	Resistance (kΩ)
-40	4947.904	7421.856	11822.473	17104.854	21.266	25.154	31.899	51.791
-35	3703.755	5555.632	8767.745	12685.248	16.150	18.655	24.225	37.172
-30	2798.873	4198.309	6570.224	9505.855	12.347	13.979	18.520	27.005
-25	2135.887	3203.831	4971.784	7193.219	9.503	10.578	14.255	19.843
-20	1645.037	2467.555	3796.933	5493.436	7.365	8.079	11.047	14.728
-15	1278.034	1917.051	2923.400	4229.599	5.747	6.220	8.621	11.044
-10	1000.620	1500.930	2269.599	3283.675	4.516	4.829	6.773	8.362
-5	789.612	1184.418	1775.225	2568.411	3.572	3.777	5.358	6.389
0	627.752	941.628	1399.050	2024.158	2.844	2.977	4.266	4.922
5	502.474	753.711	1110.220	1606.275	2.280	2.362	3.419	3.825
10	405.010	607.514	887.257	1283.691	1.839	1.888	2.758	2.994
15	328.480	492.720	713.463	1032.245	1.492	1.518	2.238	2.361
20	268.044	402.066	577.375	835.351	1.218	1.229	1.827	1.876
25	220.000	330.000	470.000	680.000	1.000	1.000	1.500	1.500
30	181.576	272.365	384.800	556.733	0.825	0.819	1.238	1.207
35	150.668	226.002	316.757	458.287	0.685	0.674	1.027	0.978
40	125.681	188.521	262.177	379.320	0.571	0.558	0.857	0.797
45	105.336	158.004	218.069	315.504	0.479	0.464	0.718	0.653
50	88.717	133.076	182.297	263.749	0.403	0.388	0.605	0.538
55	75.059	112.588	153.150	221.579	0.341	0.326	0.512	0.446
60	63.777	95.666	129.249	186.998	0.290	0.275	0.435	0.371
65	54.415	81.622	109.551	158.499	0.247	0.233	0.371	0.317
70	46.631	69.946	93.281	134.960	0.212	0.199	0.318	0.261
75	40.115	60.172	79.750	115.383	0.182	0.170	0.274	0.221
80	34.637	51.955	68.446	99.029	0.157	0.146	0.236	0.187
85	30.013	45.019	58.996	85.356	0.136	0.126	0.205	0.160
90	26.110	39.165	51.036	73.839	0.119	0.109	0.178	0.137
95	22.790	34.186	44.332	64.140	0.104	0.094	0.155	0.117
100	19.957	29.935	38.640	55.905	0.091	0.082	0.136	0.101
105	17.541	26.312	33.790	48.888	0.080	0.072	0.120	0.088
110	15.453	23.180	29.664	42.918	0.070	0.063	0.105	0.076
115	13.663	20.494	26.123	37.795	0.062	0.056	0.093	0.067
120	12.114	18.171	23.091	33.409	0.055	0.049	0.083	0.058
125	10.778	16.168	20.472	29.618	0.049	0.044	0.074	0.051

Part Number	NCP□□XM222	NCP□□XW222	NCP□□XM332	NCP□□XW332	NCP□□XM472	NCP□□XW472	NCP□□XH682	NCP□□XW682
Resistance	2.2kΩ	2.2kΩ	3.3kΩ	3.3kΩ	4.7kΩ	4.7kΩ	6.8kΩ	6.8kΩ
B-Constant	3500K	3950K	3500K	3950K	3500K	3950K	3380K	3950K
Temp. (°C)	Resistance (kΩ)	Resistance (kΩ)	Resistance (kΩ)	Resistance (kΩ)	Resistance (kΩ)	Resistance (kΩ)	Resistance (kΩ)	Resistance (kΩ)
-40	46.786	75.961	70.179	113.941	105.705	162.279	133.043	234.787
-35	35.530	54.520	53.295	81.779	79.126	116.474	100.756	168.515
-30	27.162	39.607	40.743	59.411	59.794	84.615	77.076	122.422
-25	20.907	29.103	31.360	43.654	45.630	62.173	59.540	89.953
-20	16.203	21.601	24.304	32.401	35.144	46.147	46.401	66.766
-15	12.644	16.198	18.966	24.297	27.303	34.604	36.482	50.066
-10	9.934	12.264	14.901	18.396	21.377	26.200	28.904	37.906
-5	7.858	9.370	11.787	14.055	16.869	20.018	23.047	28.963
0	6.257	7.219	9.386	10.829	13.411	15.423	18.509	22.313
5	5.015	5.609	7.523	8.414	10.735	11.984	14.974	17.338
10	4.045	4.391	6.067	6.586	8.653	9.380	12.189	13.571
15	3.283	3.463	4.924	5.195	7.018	7.399	9.978	10.705
20	2.680	2.751	4.019	4.126	5.726	5.877	8.215	8.503
25	2.200	2.200	3.300	3.300	4.700	4.700	6.800	6.800
30	1.816	1.771	2.724	2.656	3.879	3.783	5.654	5.474
35	1.507	1.434	2.260	2.152	3.219	3.064	4.725	4.434
40	1.257	1.169	1.885	1.753	2.685	2.497	3.967	3.613
45	1.053	0.958	1.580	1.437	2.250	2.046	3.344	2.961
50	0.887	0.789	1.331	1.184	1.895	1.686	2.829	2.440
55	0.751	0.654	1.126	0.981	1.604	1.397	2.404	2.022
60	0.638	0.545	0.957	0.817	1.363	1.164	2.050	1.683
65	0.544	0.456	0.816	0.684	1.163	0.974	1.759	1.409
70	0.466	0.383	0.700	0.575	0.996	0.819	1.515	1.185
75	0.401	0.324	0.602	0.486	0.857	0.692	1.309	1.001
80	0.346	0.275	0.520	0.412	0.740	0.587	1.135	0.849
85	0.300	0.234	0.450	0.351	0.641	0.500	0.988	0.724
90	0.261	0.200	0.392	0.301	0.558	0.428	0.862	0.620
95	0.228	0.172	0.342	0.258	0.487	0.368	0.755	0.532
100	0.200	0.149	0.299	0.223	0.426	0.318	0.662	0.459
105	0.175	0.129	0.263	0.193	0.375	0.275	0.583	0.398
110	0.155	0.112	0.232	0.168	0.330	0.239	0.515	0.346
115	0.137	0.098	0.205	0.146	0.292	0.208	0.457	0.302
120	0.121	0.085	0.182	0.128	0.259	0.182	0.406	0.264
125	0.108	0.075	0.162	0.113	0.230	0.160	0.361	0.232

Continued on the following page. ↗







## Temperature Sensor and Compensation Chip Type ⚠Caution/Notice

### ⚠Caution (Storage and Operating Conditions)

This product is designed for application in an ordinary environment (normal room temperature, humidity and atmospheric pressure).

Do not use under the following conditions because all of these factors can deteriorate the product characteristics or cause failures and burn-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 conditions
4. Under vacuum, or under high or low pressure
5. Wet or humid locations
6. Places with salt water, oils, chemical liquids or organic solvents
7. Strong vibrations
8. Other places where similar hazardous conditions exist

### ⚠Caution (Others)

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

### Notice (Storage and Operating Conditions)

To keep the solderability of the product from degrading, the following storage conditions are recommended.

1. Storage condition:  
Temperature -10 to +40°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. Storage place:  
Do not store this product in corrosive gas (Sulfuric acid gas, Chlorine gas, etc.) or in direct sunlight.

### 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 (Handling)

The ceramic of this product is fragile, and care must be taken not to load an excessive press-force or to cause a shock at handling.

Such forces may cause cracking or chipping.

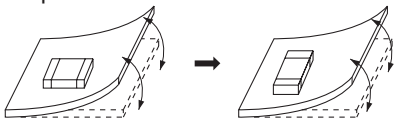
# Temperature Sensor and Compensation Chip Type ⚠️ Caution/Notice

## Notice (Soldering and Mounting)

### 1. Mounting Position

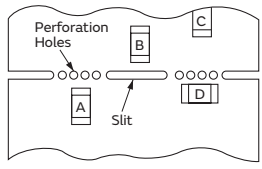
Choose a mounting position that minimizes the stress imposed on the chip during flexing or bending of the board.

**Component Direction**



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

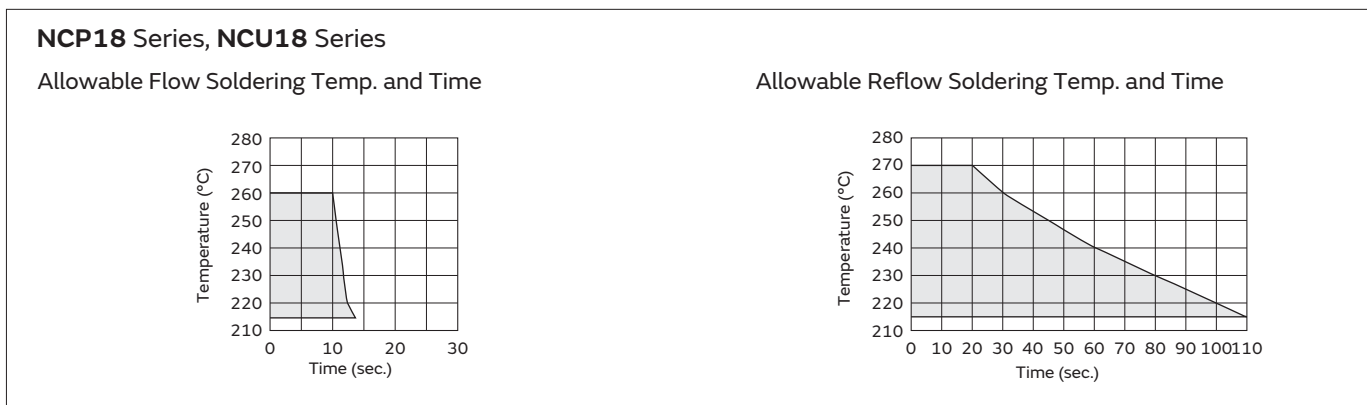
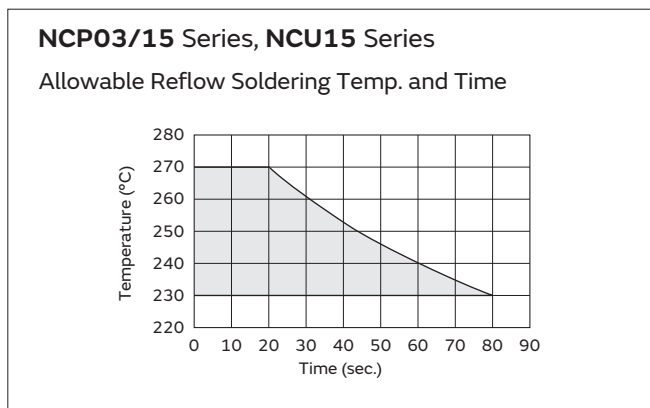
**Mounting Close to Board Separation Line**



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

### 2. Allowable Soldering Temperature and Time

- (a) Solder within the temperature and time combinations indicated by the slanted lines in the following graphs.
- (b) Excessive soldering conditions may cause dissolution of metallization or deterioration of solder-wetting on the external electrode.
- (c) In case of repeated soldering, the accumulated soldering time should be within the range shown in the figure below. (For example, Reflow peak temperature: 260°C, twice → The total accumulated soldering time at 260°C is within 30 seconds.)



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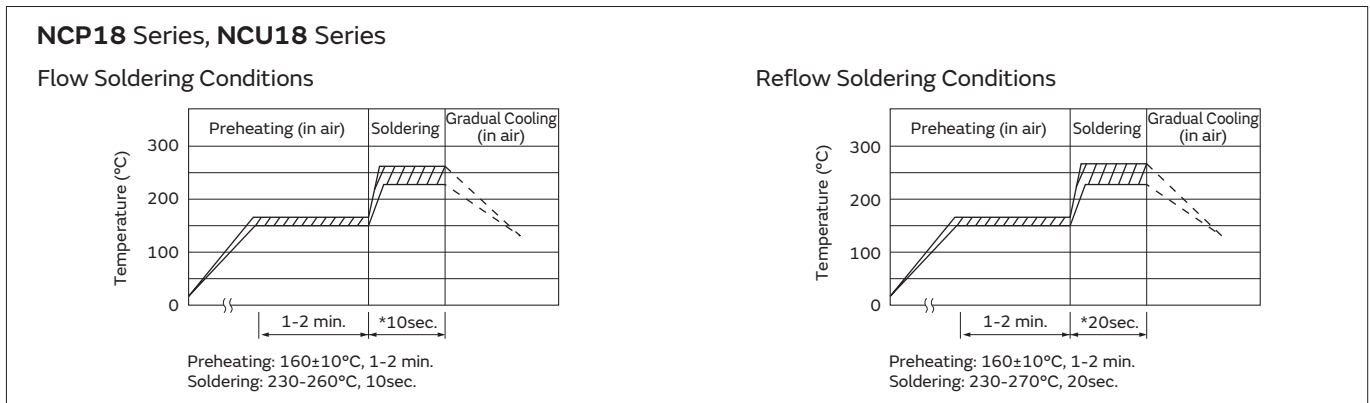
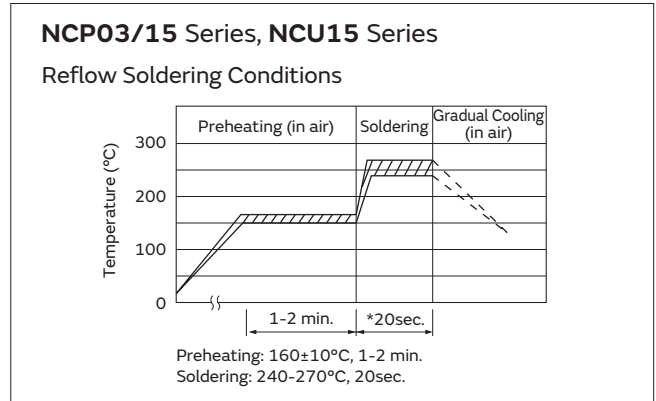
## Temperature Sensor and Compensation Chip Type ⚠Caution/Notice

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### 3. Recommended Temperature Profile for Soldering

- (a) Insufficient preheating may cause a crack on the ceramic body. The difference between preheating temperature and maximum temperature in the profile shall be 100 °C.  
 (b) Rapid cooling by dipping in solvent or by other means is not recommended.

\* In case of repeated soldering, the accumulated soldering time should be within the range shown in the figure of section 2.



### 4. Solder and Flux

#### (1) Solder and Paste

(a) Reflow Soldering: NCP03/15/18 Series, NCU15/18 Series  
 Use RA/RMA type or equivalent type of solder paste. For your reference, we use the solder paste below for any internal tests of this product.

- RMA9086 90-4-M20 (Sn:Pb=63wt%:37wt%)  
 (Manufactured by Alpha Metals Japan Ltd.)
- M705-221BM5-42-11 (Sn:Ag:Cu=96.5wt%:3.0wt%:0.5wt%)  
 (Manufactured by Senju Metal Industry Co., Ltd.)

(b) Flow Soldering: NCP18 Series, NCU18 Series

We use the solder paste below for any internal tests of this product.

- Sn:Pb=63wt%:37wt%
- Sn:Ag:Cu=96.5wt%:3.0wt%:0.5wt%

#### (2) Flux

Use rosin type flux in the soldering process.

If the flux listed below is used, some problems might be caused in the product characteristics and reliability.

Please do not use the following flux.

- Strong acidic flux (with halide content exceeding 0.1wt%).
- Water-soluble flux  
 (\*Water-soluble flux can be defined as non-rosin type flux including wash-type flux and non-wash-type flux.)

### 5. 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.

- Please keep mounted parts and a substrate from an occurrence of resonance in ultrasonic cleaning.
- Please do not clean the products in the case of using a non-wash-type flux.

	NCP03/15, NCU15	NCP18, NCU18
Solvent	Isopropyl Alcohol	Isopropyl Alcohol
Dipping Cleaning	Less than 5 minutes at room temp. or less than 2 minutes at 40°C max.	Less than 5 minutes at room temp. or less than 2 minutes at 40°C max.
Ultrasonic Cleaning	Less than 5 minutes and 20W/ℓ Frequency of 28kHz to 40kHz	Less than 1 minute and 20W/ℓ Frequency of several 10kHz to 100kHz

### 6. Drying

After cleaning, promptly dry this product.

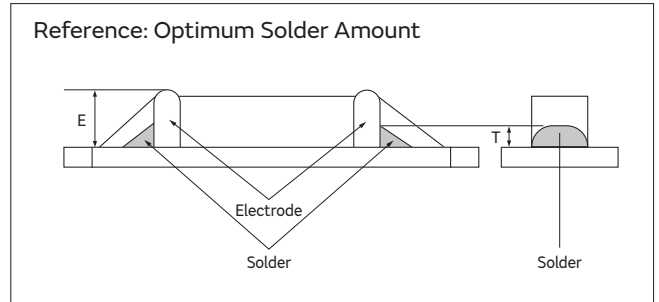
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## Temperature Sensor and Compensation Chip Type ⚠️Caution/Notice

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### 7. Printing Conditions of Solder Paste

- The amount of solder is critical. Standard height of fillet is shown in the table below.
- Too much solder may cause mechanical stress, resulting in cracking, mechanical and/or electronic damage.



Part Number	Solder Paste Thickness	T
NCP03	100μm	$1/3E \leq T \leq E$
NCP15, NCU15	150μm	$1/3E \leq T \leq E$
NCP18, NCU18	200μm	$0.2\text{mm} \leq T \leq E$

### 8. Adhesive Application and Curing

- Thin or insufficient adhesive may result in loose component contact with land during flow soldering.
- Low viscosity adhesive causes chips to slip after mounting.

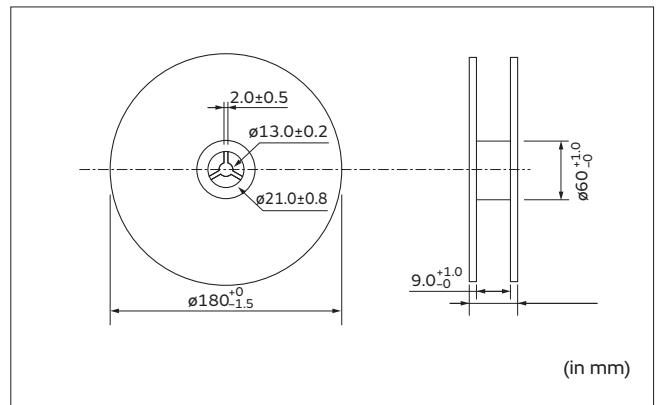
# Temperature Sensor and Compensation Chip Type Package

## Minimum Quantity Guide

Part Number	Quantity (pcs.)	
	Paper Tape	Embossed Tape
NCP03	15,000	-
NCP15, NCU15	10,000	
NCP18, NCU18	4,000	

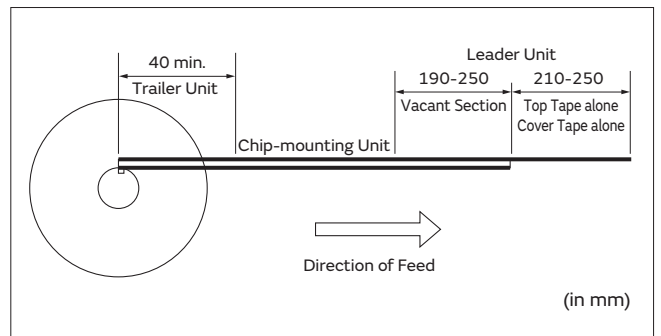
## Tape Carrier Packaging

### 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 to the figure at the right.)
- (2) The top and base tapes or plastic and cover tape are not stuck at the first five pitches minimum.
- (3) A label should be attached on the reel. (MURATA's part number, inspection number and quantity should be marked on the label.)
- (4) Taping reels are packed in a package.

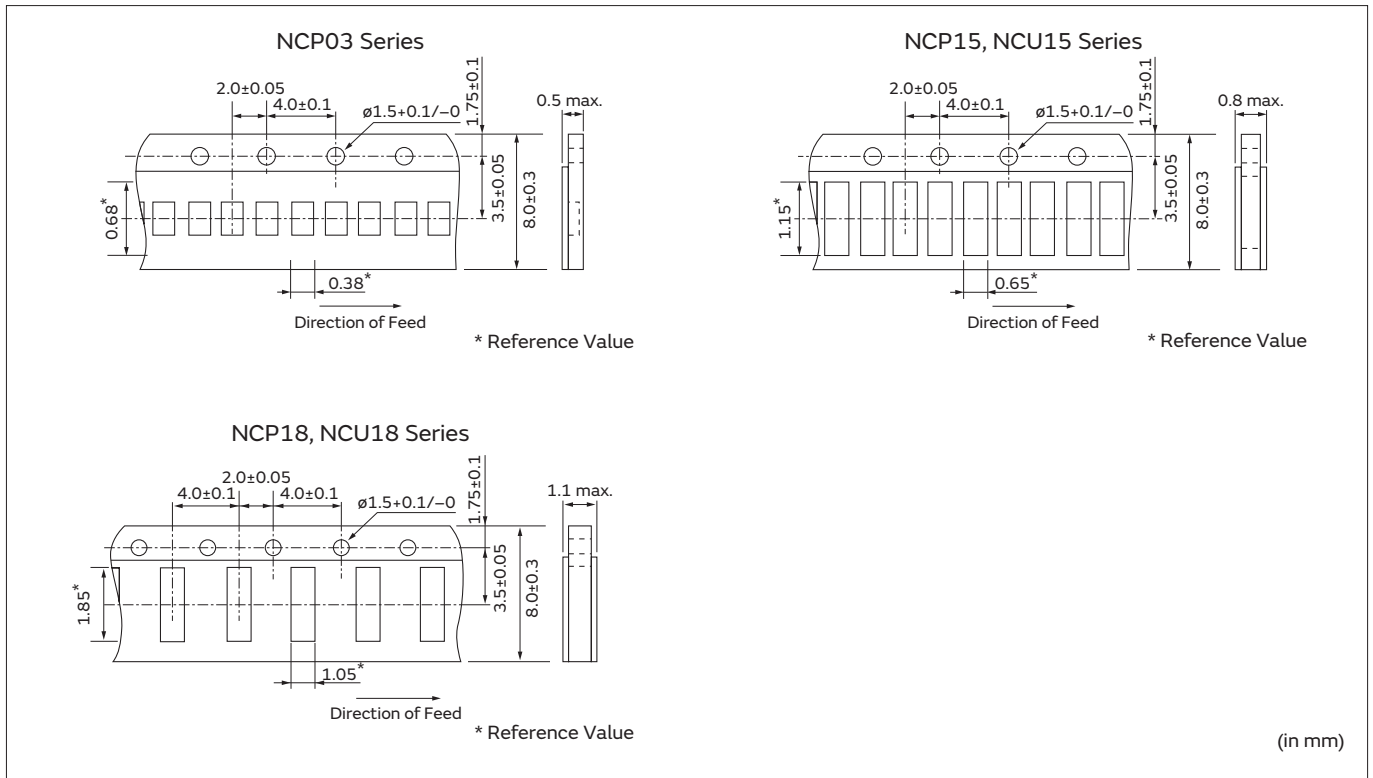


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## Temperature Sensor and Compensation Chip Type Package

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### 3. Paper Tape (NCP03/15/18 Series, NCU15/18 Series)



#### (1) Other Conditions

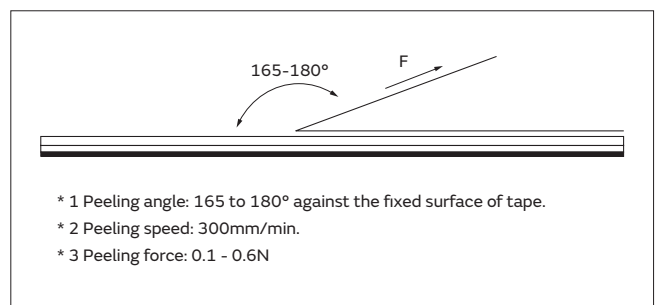
##### (a) Packaging

Products are packaged in the cavity of the base tape and sealed by a top tape and bottom tape.

##### (b) Tape

The top tape and bottom tape have no joints and products are 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 is specified at 10N minimum.

Pull strength of bottom tape should be specified 5N minimum.



# NTC Thermistors

## Temperature Sensor Thermo String Cooper Wire Type

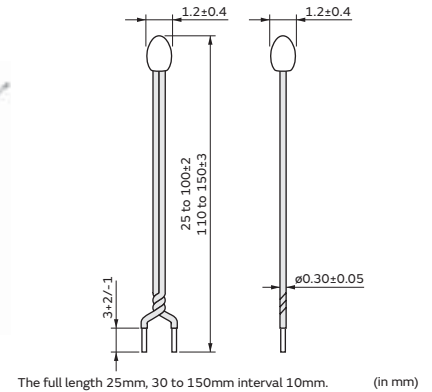
This product is a small flexible lead type NTC Thermistor with a small head and a thin lead wire.

### Features

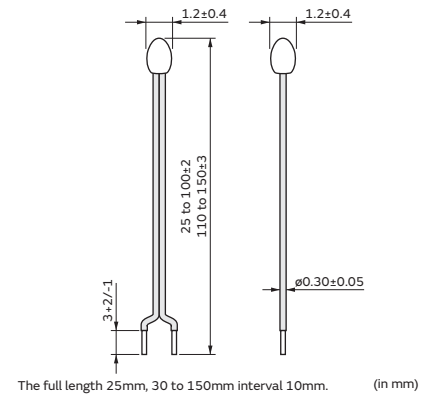
1. This small and highly accurate NTC Thermistor provides extremely precise temperature sensing.
2. The small sensing head and thin lead wire deliver temperature sensing in a narrow space.
3. Flexibility and a wide variety of lengths (25mm to 150mm) enable the design of flexible temperature sensing architectures.
4. This product is compatible with our 0402 (EIA) size chip Thermistor.
5. Excellent long-term stability
6. This is a halogen free product. \*  
 \* Cl= max.900ppm, Br=max.900ppm and Cl+Br=max.1500ppm
7. NXFT series are recognized by UL/cUL. (UL1434, File No.E137188).

### Applications

1. Temperature compensation for transistors, ICs, and crystal oscillators in mobile communications
2. Temperature sensor for rechargeable batteries
3. Temperature compensation of LCD
4. Temperature compensation in general use of electric circuits



NXFT15\_1B Type (twist)



NXFT15\_2B Type (without twist)

Detailed are accessible from the following URL.  
<https://www.murata.com/en-global/products/thermistor/ntc/nxf>

Part Number	Resistance (25°C) (ohm)	B-Constant (25-50°C) (K)	B-Constant (25-80°C) (Reference Value) (K)	B-Constant (25-85°C) (Reference Value) (K)	B-Constant (25-100°C) (Reference Value) (K)	Maximum Operating Current (25°C) (mA)	Rated Electric Power (25°C) (mW)	Typical Dissipation Constant (25°C) (mW/°C)	Thermal Time Constant (25°C) (s)
NXFT15XV302FA□B□□□	3k±1%	3936±1%	3971	3977	3988	0.22	7.5	1.5	4
NXFT15XH103FA□B□□□	10k±1%	3380±1%	3428	3434	3455	0.12	7.5	1.5	4
NXFT15XV103FA□B□□□	10k±1%	3936±1%	3971	3977	3988	0.12	7.5	1.5	4
NXFT15WB473FA□B□□□	47k±1%	4050±1%	4101	4108	4131	0.06	7.5	1.5	4
NXFT15WF104FA□B□□□	100k±1%	4250±1%	4303	4311	4334	0.04	7.5	1.5	4

□ is filled with lead shape (1: twist, 2: without twist).

□□ is filled with Total-length codes. (25mm, 30 to 150mm interval 10mm, ex. 050=50mm)

Maximum Operating Current rises Thermistor's temperature by 0.1°C

Rated Electric Power shows the required electric power that the thermistor's temperature rise to 30°C by self-heating, at ambient temperature of 25 °C.

Operating Temperature Range: -40°C to +125°C

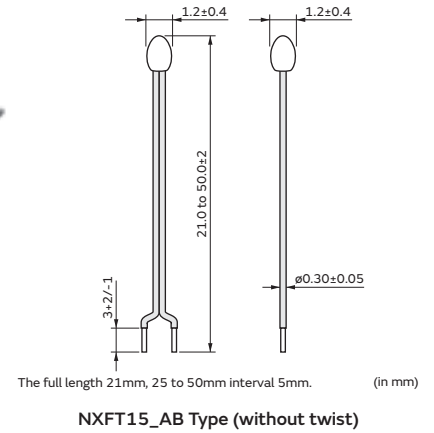
# NTC Thermistors

## Temperature Sensor Thermo String Nickel Copper Wire Type

This product is a small flexible lead type NTC Thermistor with a small head and a thin lead wire.

### Features

1. This small and highly accurate NTC Thermistor provides extremely precise temperature sensing. Nickel Copper Wire Type has high thermal response than the Cooper Wire Type.
2. The small sensing head and thin lead wire deliver temperature sensing in a narrow space.
3. Flexibility and a wide variety of lengths (21mm to 50mm) enable the design of flexible temperature sensing architectures.
4. This product is compatible with our 0402 (EIA) size chip Thermistor.
5. Excellent long-term stability
6. This is a halogen free product. \*  
 \* Cl= max.900ppm, Br=max.900ppm and Cl+Br=max.1500ppm
7. NXFT series are recognized by UL/cUL. (UL1434, File No.E137188).



Detailed are accessible from the following URL.  
<https://www.murata.com/en-global/products/thermistor/ntc/nxf>

4

### Applications

1. Temperature compensation for transistors, ICs, and crystal oscillators in mobile communications
2. Temperature sensor for rechargeable batteries
3. Temperature compensation of LCD
4. Temperature compensation in general use of electric circuits

Part Number	Resistance (25°C) (ohm)	B-Constant (25-50°C) (K)	B-Constant (25-80°C) (Reference Value) (K)	B-Constant (25-85°C) (Reference Value) (K)	B-Constant (25-100°C) (Reference Value) (K)	Maximum Operating Current (25°C) (mA)	Rated Electric Power (25°C) (mW)	Typical Dissipation Constant (25°C) (mW/°C)	Thermal Time Constant (25°C) (s)
NXFT15XV302FEAB□□□	3k±1%	3936±1%	3971	3977	3988	0.14	3	0.6	3
NXFT15XH103FEAB□□□	10k±1%	3380±1%	3428	3434	3455	0.077	3	0.6	3
NXFT15XV103FEAB□□□	10k±1%	3936±1%	3971	3977	3988	0.077	3	0.6	3
NXFT15WF104FEAB□□□	100k±1%	4250±1%	4303	4311	4334	0.024	3	0.6	3

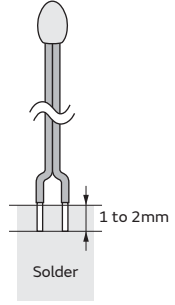
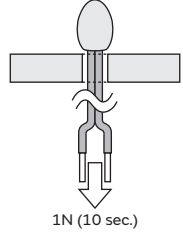
□□□ is filled with Total-length codes. (21mm, 25 to 50mm interval 5mm, ex. 050=50mm)

Maximum Operating Current rises Thermistor's temperature by 0.1°C

Rated Electric Power shows the required electric power that the thermistor's temperature rise to 30°C by self-heating, at ambient temperature of 25 °C.

Operating Temperature Range: -40°C to +125°C

## Temperature Sensor Thermo String Type Specifications and Test Methods

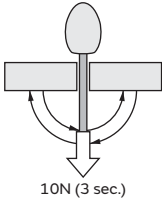
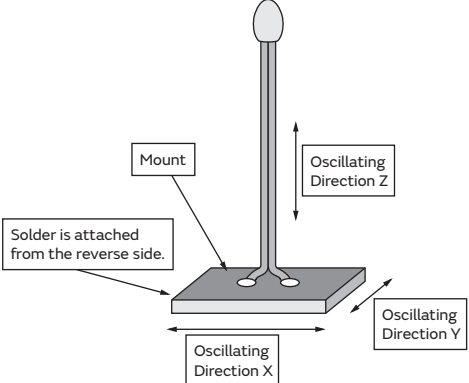
No.	Item	Specifications		Test Methods
		Except XV302	XV302	
1	High Temperature Storage Test	· Resistance (R25°C) fluctuation rate: less than ±1%. · B-Constant (B25/50°C) fluctuation rate: less than ±1%.	· Resistance (R25°C) fluctuation rate: less than ±3%. · B-Constant (B25/50°C) fluctuation rate: less than ±2%.	125±2°C in air, for 1000 +48/-0 hours without loading.
2	Low Temperature Storage Test		· Resistance (R25°C) fluctuation rate: less than ±1%. · B-Constant (B25/50°C) fluctuation rate: less than ±1%.	-40 +0/-3°C in air, for 1000 +48/-0 hours without loading.
3	Humidity Storage Test	· Resistance (R25°C) fluctuation rate: less than ±2%. · B-Constant (B25/50°C) fluctuation rate: less than ±1%.	· Resistance (R25°C) fluctuation rate: less than ±2%. · B-Constant (B25/50°C) fluctuation rate: less than ±1%.	60±2°C, 90 to 95%RH in air, for 1000 +48/-0 hours without loading.
4	Temperature Cycle		· Resistance (R25°C) fluctuation rate: less than ±3%. · B-Constant (B25/50°C) fluctuation rate: less than ±2%.	-40 +0/-3°C, 30 minutes in air +25±2°C, 10 to 15 minutes in air +125±2°C, 30 minutes in air +25 +2/-0°C, 10 to 15 minutes in air (1 cycle) Continuous 100 cycles, without loading.
5	High Temperature Load		· Resistance (R25°C) fluctuation rate: less than ±3%. · B-Constant (B25/50°C) fluctuation rate: less than ±2%.	85±2°C in air, with 'Operating Current for Sensor' for 1000 +48/-0 hrs.
6	Insulation Break - down Voltage	· No damage electrical characteristics at DC100 V, 1 min.		2mm length of coating resin from the top of Thermistor is to be dipped into beads of lead (Pb), and DC100V 1 minute is applied to circuit between beads of lead (Pb) and lead wire.
7	Resistance to Soldering Heat	· Resistance (R25°C) fluctuation rate: less than ±1%. · B-Constant (B25/50°C) fluctuation rate: less than ±1%.		Both lead wires are dipped into 350±10°C solder for 3.5±0.5 seconds, or 260±5°C solder for 10±1 seconds according to Fig-1 (solder <JIS Z 3282 SnAgCu>). 
8	Solderability	More than 90% of lead wire surface shall be covered by solder.		Both lead wires are dipped into flux (25wt% colophony <JIS K 5902> isopropyl alcohol <JIS K 8839>) for 5 to 10 seconds. Then both lead wires are dipped into 245±5°C solder <JIS Z 3282 SnAgCu> for 2±0.5 seconds according to Fig-1.
9	Lead Wire Pull Strength	· Resistance (R25°C) fluctuation rate: less than ±1%. · B-Constant (B25/50°C) fluctuation rate: less than ±1%.		The lead wire shall be inserted in a ø1.0mm hole until resin part contacts with a substrate as shown in fig.-2, and 1N force for 10 seconds shall be applied to the lead wire. 

\* · R25 is zero-power resistance at 25°C.  
 · B25/50 is calculated by zero-power resistance of Thermistor in 25°C-50°C.  
 · After each test, NTC Thermistor should be kept for 1 hour at room temperature (normal humidity and normal atmospheric pressure).

Continued on the following page. ↗

## Temperature Sensor Thermo String Type Specifications and Test Methods

Continued from the preceding page. ↘

No.	Item	Specifications	Test Methods
10	Lead Wire Bending Strength	<ul style="list-style-type: none"> <li>Lead wire does not break.</li> </ul>	<p>Hold the lead wires as in Fig-3. Bend by 90 degrees and again bend back to the initial position. Then bend to the other side by 90 degrees and again bend back to the initial position. After bending process, 10N force for 3 seconds shall be applied to the lead wire.</p>  <p style="text-align: center;">10N (3 sec.)</p> <p style="text-align: center;">Fig-3</p>
11	Free Fall		<p>NTC Thermistor shall be dropped without any force onto concrete floor from 1 meter height one time.</p>
12	Vibration	<ul style="list-style-type: none"> <li>Resistance (R25°C) fluctuation rate: less than ±1%.</li> <li>B-Constant (B25/50°C) fluctuation rate: less than ±1%.</li> <li>No visible damage at resin part.</li> </ul>	<p>NTC Thermistor shall be fixed to the vibration test equipment. Vibration of total 1.5 mm amplitude, Frequency sequence of 10Hz - 55Hz - 10Hz in 1 minute shall be applied for right angled 3 directions for 2 hours duration each.</p> 

- \* · R25 is zero-power resistance at 25°C.
- B25/50 is calculated by zero-power resistance of Thermistor in 25°C-50°C.
- After each test, NTC Thermistor should be kept for 1 hour at room temperature (normal humidity and normal atmospheric pressure).

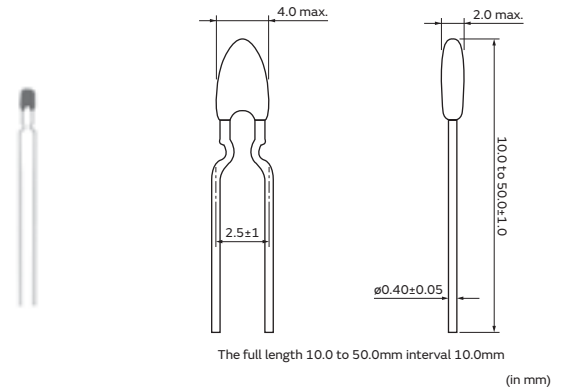
# NTC Thermistors

## Temperature Sensor Lead Type

This thermistor is for normal temperature level sensors having self-subsistence due to strong lead strength based on chip NTC.

### Features

1. This highly accurate NTC Thermistor provides extremely precise temperature sensing.
2. This product is compatible with 1005 (1.0mm x 0.5mm) size NTC Thermistor.
3. The variation per hour of this product is highly stable.
4. This product is produced with an automation line that was consistent from lead to packaging so that a product of uniform quality may be obtained at low cost in large quantities.
5. Since this product has strong lead intensity with original lead mounting technique, it is bent at the time of use and can withstand processing, etc., readily.  
Taping package can be supported.



Detailed are accessible from the following URL.  
<https://www.murata.com/en-global/products/thermistor/ntc/nxr>

### Applications

1. For temperature detection of a rechargeable battery pack
2. For temperature detection of a charge circuit
3. For temperature detection of a printer head
4. For temperature detection of a DC fan motor
5. For temperature detection of home electronics

Part Number	Resistance (25°C) (ohm)	B-Constant (25-50°C) (K)	B-Constant (25-80°C) (Reference Value) (K)	B-Constant (25-85°C) (Reference Value) (K)	B-Constant (25-100°C) (Reference Value) (K)	Maximum Operating Current (25°C) (mA)	Rated Electric Power (25°C) (mW)	Typical Dissipation Constant (25°C) (mW/°C)	Thermal Time Constant (25°C) (s)
NXRT15XM202EA1B□□□	2k ±3%	3500 ±1%	3539	3545	3560	0.27	7.5	1.5	4
NXRT15XV502FA1B□□□	5k ±1%	3936 ±1%	3972	3977	3989	0.17	7.5	1.5	4
NXRT15XH103FA1B□□□	10k ±1%	3380 ±1%	3428	3434	3455	0.12	7.5	1.5	4
NXRT15XV103FA1B□□□	10k ±1%	3936 ±1%	3971	3977	3988	0.12	7.5	1.5	4
NXRT15WB333JA1B□□□	33k ±5%	4050 ±3%	4101	4108	4131	0.07	7.5	1.5	4
NXRT15WB473FA1B□□□	47k ±1%	4050 ±1%	4101	4108	4131	0.06	7.5	1.5	4
NXRT15WF104FA1B□□□	100k ±1%	4250 ±1%	4303	4311	4334	0.04	7.5	1.5	4

□□□ is filled with Total-length codes. (10 to 50mm interval 10mm, ex. 040=40mm)

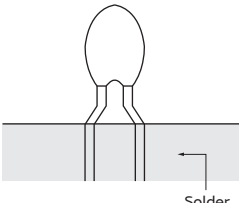
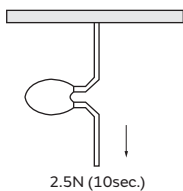
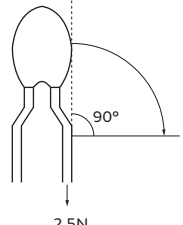
Maximum Operating Current rises Thermistor's temperature by 0.1°C.

Rated Electric Power is necessary electric power that thermistor's temperature rises 5°C by self-heating at 25°C in still air.

Taping type of part numbers with "3A016" is available (Lead Spacing=5mm).

Operating Temperature Range: -40°C to +125°C

## Temperature Sensor Lead Type Specifications and Test Methods

No.	Item	Specifications	Test Methods
1	Low Temperature Storage Test	<ul style="list-style-type: none"> <li>Resistance (R25°C) fluctuation rate: less than ±1%.</li> <li>B-Constant (B25/50°C) fluctuation rate: less than ±1%.</li> </ul>	-40 +0/-3°C in air, for 1000 +48/-0 hours without loading.
2	High Temperature Storage Test		125±2°C in air, for 1000 +48/-0 hours without loading.
3	High Temperature Load	<ul style="list-style-type: none"> <li>Resistance (R25°C) fluctuation rate: less than ±2%.</li> <li>B-Constant (B25/50°C) fluctuation rate: less than ±1%.</li> </ul>	85±2°C in air, with 'Operating Current for Sensor' for 1000 +48/-0 hrs.
4	Humidity Storage Test		60±2°C, 90 to 95%RH in air, for 1000 +48/-0 hours without loading.
5	Temperature Cycle	<ul style="list-style-type: none"> <li>Resistance (R25°C) fluctuation rate: less than ±1%.</li> <li>B-Constant (B25/50°C) fluctuation rate: less than ±1%.</li> </ul>	-40°C +0/-3°C, 30 minutes in air +25°C±2°C, 10 to 15 minutes in air +125°C +3/-0°C, 30 minutes in air +25°C +2/-0°C, 10 to 15 minutes in air (1 cycle) Continuous 100 cycles, without loading.
6	Insulation Break - down Voltage		<ul style="list-style-type: none"> <li>No damage electrical characteristics on D.C.100 V, 1 min.</li> </ul>
7	Resistance to Soldering Heat	<ul style="list-style-type: none"> <li>Resistance (R25°C) fluctuation rate: less than ±1%.</li> <li>B-Constant (B25/50°C) fluctuation rate: less than ±1%.</li> </ul>	Both lead wires are dipped into 350±10°C solder for 3.5±0.5 seconds, or 260±5°C solder for 10±1 seconds according to Fig-1. (solder <Sn-3Ag-0.5Cu>)  Fig-1
8	Solderability	<ul style="list-style-type: none"> <li>More than 90% of lead wire surface shall be covered by solder.</li> </ul>	Both lead wires are dipped into flux (25wt% colophony <JIS K 5902> isopropyl alcohol <JIS K 8839>) for 5 to 10 seconds. Then both lead wires are dipped into 245±5°C solder <Sn-3Ag-0.5Cu> for 2±0.5 seconds according to Fig-1.
9	Lead Wire Pull Strength	<ul style="list-style-type: none"> <li>Resistance(R25°C) fluctuation rate: less than ±1%.</li> <li>B-Constant(B25/50°C) fluctuation rate: less than ±1%.</li> <li>No visible damage at resin part.</li> </ul>	One end of a lead wire shall be fixed and 2.5N force for 10 seconds shall be applied to the other lead wire as shown in Fig-2.  Fig-2
10	Lead Wire Bending Strength	<ul style="list-style-type: none"> <li>Lead wire does not break.</li> </ul>	One lead wire is held and 2.5N force is applied. Then the body of NTC thermistor is bent by 90° and again bent back to the initial position. This sequence shall be completed twice. See Fig-3.  Fig-3
11	Free Fall	<ul style="list-style-type: none"> <li>Resistance (R25°C) fluctuation rate: less than ±1%.</li> <li>B-Constant (B25/50°C) fluctuation rate: less than ±1%.</li> <li>No visible damage at resin part.</li> </ul>	NTC thermistor shall be dropped without any force onto concrete floor from 1 meter height one time.
12	Vibration		NTC thermistor shall be fixed to the vibration test Equipment. Vibration of total 1.5mm amplitude, Frequency sequence of 10Hz – 55Hz – 10Hz in 1 minute, shall be applied for right angled 3 directions for 2 hours duration each.

\* · R25 is zero-power resistance at 25°C.  
 · B25/50 is calculated by zero-power resistance of Thermistor in 25°C-50°C.  
 · After each test, NTC Thermistor should be kept for 1 hour at room temperature (normal humidity and normal atmospheric pressure).

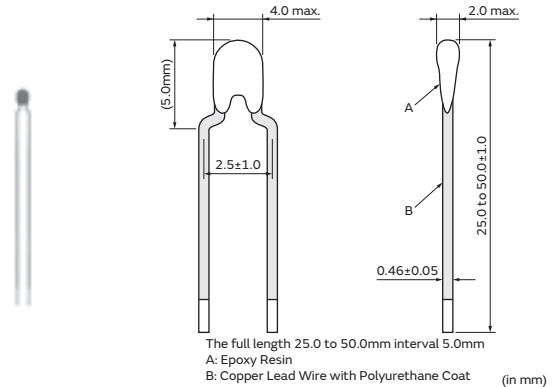
# NTC Thermistors

## Temperature Sensor Lead Insulation Type

This thermistor is for normal temperature level sensors having self-subsistence due to strong lead strength based on chip NTC.

### Features

1. NXR series can accurately detect temperature with NCP15 series on the head of parts.
2. The insulation coat with polyurethane on the surface of lead wire : 100VDC.
3. You can choose NTC characteristics from NCP15 series.
4. The resistance drift is low in the reliability test.
5. The production capacity is bigger and NXR is produced almost entirely in an automation line.
6. Adopt to Sb regulation



Detailed are accessible from the following URL.  
<https://www.murata.com/en-global/products/thermistor/ntc/nxr>

### Applications

1. Secondary battery
2. Temperature detection for charging
3. Temperature detection for DC fan motor
4. Temperature sensing for appliance
5. Self-standing temperature sensing for fire detector

Part Number	Resistance (25°C) (ohm)	B-Constant (25-50°C) (K)	B-Constant (25-80°C) (Reference Value) (K)	B-Constant (25-85°C) (Reference Value) (K)	B-Constant (25-100°C) (Reference Value) (K)	Maximum Operating Current (25°C) (mA)	Rated Electric Power (25°C) (mW)	Typical Dissipation Constant (25°C) (mW/°C)	Thermal Time Constant (25°C) (s)
NXRT15XM202EA5B□□□	2k ±3%	3500 ±1%	3539	3545	3560	0.36	13	2.6	4
NXRT15XV502FA5B□□□	5k ±1%	3936 ±1%	3972	3977	3989	0.22	13	2.6	4
NXRT15XH103FA5B□□□	10k ±1%	3380 ±1%	3428	3434	3455	0.16	13	2.6	4
NXRT15XV103FA5B□□□	10k ±1%	3936 ±1%	3971	3977	3988	0.16	13	2.6	4
NXRT15WB333JA5B□□□	33k ±5%	4050 ±3%	4101	4108	4131	0.08	13	2.6	4
NXRT15WB473FA5B□□□	47k ±1%	4050 ±1%	4101	4108	4131	0.07	13	2.6	4
NXRT15WF104FA5B□□□	100k ±1%	4250 ±1%	4303	4311	4334	0.05	13	2.6	4

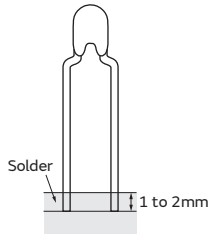
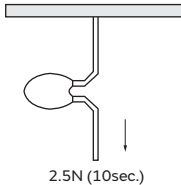
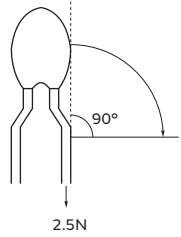
□□□ is filled with Total-length codes. (25 to 50mm interval 5mm, ex. 030=30mm)

Maximum Operating Current rises Thermistor's temperature by 0.1°C.

Rated Electric Power is necessary electric power that thermistor's temperature rises 5°C by self-heating at 25°C in still air.

Operating Temperature Range: -40°C to +125°C

## Temperature Sensor Lead Insulation Type Specifications and Test Methods

No.	Item	Specifications	Test Methods
1	Resistance to Soldering Heat (Flow)	<ul style="list-style-type: none"> <li>Resistance (R25°C) fluctuation rate: less than ±1%.</li> <li>B-Constant (B25/50°C) fluctuation rate: less than ±1%.</li> </ul>	<p>Both lead wires are dipped into 350±10°C solder for 3.5±0.5 seconds, or 260 ±5°C solder for 10±1 seconds according to Fig-1. (solder &lt;SnAgCu&gt;)</p>  <p>Fig-1</p>
2	Solderability (Flow)	<ul style="list-style-type: none"> <li>More than 90% of lead wire surface shall be covered by solder.</li> </ul>	<p>Both lead wires are dipped into flux (25wt% colophony &lt;JIS K 5902&gt; isopropyl alcohol &lt;JIS K 8839&gt;) for 5 to 10 seconds. Then both lead wire are dipped into 245±5°C solder &lt;SnAgCu&gt; for 2±0.5 seconds according to Fig-1.</p>
3	Lead Wire Breaking Strength	<ul style="list-style-type: none"> <li>Resistance (R25°C) fluctuation rate: less than ±1%.</li> <li>B-Constant (B25/50°C) fluctuation rate: less than ±1%.</li> </ul>	<p>One end of a lead wire shall be fixed and 2.5N force for 10 seconds shall be applied to the other lead wire as shown in Fig-2.</p>  <p>Fig-2</p>
4	Lead Wire Bending Strength	<ul style="list-style-type: none"> <li>Lead wire does not break.</li> </ul>	<p>One lead wire is held and 2.5N force is applied. Then the body of NTC thermistor is bent by 90° and again bent back to the initial position. This sequence shall be completed twice. See Fig-3.</p>  <p>Fig-3</p>
5	Free Fall		<p>NTC thermistor shall be dropped without any force onto concrete floor from 1 meter height one time.</p>
6	Vibration	<ul style="list-style-type: none"> <li>Resistance (R25°C) fluctuation rate: less than ±1%.</li> <li>B-Constant (B25/50°C) fluctuation rate: less than ±1%.</li> <li>No visible damage at resin part.</li> </ul>	<p>NTC thermistor shall be fixed to the vibration test equipment. Vibration of total 1.5 mm amplitude, frequency sequence of 10Hz - 55Hz - 10Hz in 1 minute, shall be applied for right angled 3 directions for 2 hours duration each.</p>
7	Cold		<p>-40 +0/-3°C in air, for 1000 +48/-0 hours without loading.</p>
8	Dry Heat	<ul style="list-style-type: none"> <li>Resistance (R25°C) fluctuation rate: less than ±1%.</li> <li>B-Constant (B25/50°C) fluctuation rate: less than ±1%.</li> </ul>	<p>125±2°C in air, for 1000 +48/-0 hours without loading.</p>
9	High Temperature with Continuous Load		<p>85±2°C in air, with 'Operating Current for Sensor' for 1000 +48/-0 hrs.</p>
10	Damp Heat	<ul style="list-style-type: none"> <li>Resistance (R25°C) fluctuation rate: less than ±2%.</li> <li>B-Constant (B25/50°C) fluctuation rate: less than ±1%.</li> </ul>	<p>60±2°C, 90 to 95%RH in air, for 1000 +48/-0 hours without loading.</p>
11	Change of Temperature		<p>-40°C +0/-3°C, 30 minutes in air                  +25°C±2°C, 10 to 15 minutes in air                  +125°C +3/-0°C, 30 minutes in air                  +25°C +2/-0°C, 10 to 15 minutes in air (1 cycle)                  Continuous 100 +4/-0 cycles, without loading.</p>
12	Dielectric Breakdown Voltage	<ul style="list-style-type: none"> <li>No damage electrical characteristics on D.C.100V, 1 min.</li> </ul>	<p>2mm length of coating resin from the top of thermistor is to be dipped into beads of lead (Pb), and DC100V 1 minute is applied to circuit between beads of lead (Pb) and lead wire.</p>





## Temperature Sensor Thermo String/Lead Type ⚠Caution/Notice

### ⚠Caution (Storage and Operating Conditions)

This product is designed for application in an ordinary environment (normal room temperature, humidity and atmospheric pressure).

Do not use under the following conditions because all of these factors can deteriorate the product characteristics or cause failures and burn-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 conditions
4. Under vacuum, or under high or low pressure
5. Wet or humid locations
6. Places with salt water, oils, chemical liquids or organic solvents
7. Strong vibrations
8. Other places where similar hazardous conditions exist

### ⚠Caution (Others)

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

### Notice (Storage and Operating Conditions)

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

1. Storage condition:  
Temperature -10 to +40°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 product promptly or store it in a sealed container with a drying agent.
4. Storage place:  
Do not store this product in corrosive gas (Sulfuric acid gas, Chlorine gas, etc.) or in direct sunlight.

### 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 (Soldering and Mounting) NXF Series

Please note as shown below when you mount this product.

1. Do not melt the solder in the resin head when you solder this product. If you do so, there is a possibility of wire breakage, electric short mode failure and wire coating breakage. If you cut the lead wire of this product less than 20mm from the resin head, the heat of the melted solder at the lead wire edge is propagated easily to the resin head along the lead wire.
2. Do not touch the resin head directly with the soldering iron. It may cause the melting of solder in the resin head.
3. Do not separate the parallel lead wires 10mm or less from the resin.
4. If you mold this product with resin, please evaluate the quality of this product before you use it.
5. Do not bend the lead wire radius 1mm or more.

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## Temperature Sensor Thermo String/Lead Type ⚠️Caution/Notice

Continued from the preceding page. ↘

### Notice (Soldering and Mounting) NXR Series

Please note as shown below when you mount this product.

1. Do not melt the solder in the resin head, when you solder this product. If you melt the solder in resin the head, the wire could break and short.

If you cut the lead wire of this product less than 8mm from the resin head, the heat of the melted solder at the lead wire edge is propagated easily to the resin head along the lead wire. Please do not cut this product below 9mm.

2. Do not touch the resin head directly with the solder iron. It may cause the melting of solder in the resin head.
3. If you mold this product with resin, please evaluate the quality of this product before you use it.

### Notice (Soldering and Mounting) NXR Series (Insulation Type)

Please note as shown below when you mount this product.

1. Do not melt the solder in the resin head when you solder this product. (more than 25mm in full length of the product).

If you melt the solder in the resin head, it has possibility that the wire could break and short.

2. Do not touch the resin head directly with the solder iron. It may cause the melting of solder in the resin head.
3. When additional processing is carried out on this product (such as bonding, resin molding, and resin coating, etc.), please perform an audit of quality level on an automated machine and only use the product after confirming its reliability.

Please talk to us if you have concern matter, like process it under the high temperature and the high pressure.

(For example, exposed to high-temperature and high-pressure environment as mold sealing with injection molding.)

### Notice (Handling) NXF/NXR Series

1. The ceramic element of this product is fragile, and care must be taken not to load an excessive press-force or not to cause a shock at handling.

Such forces may cause cracking or chipping.

2. Do not apply excessive force to the lead. Otherwise, it may cause the junction between lead and element to break or crack. Holding the element by the side lead wire is recommended when lead wire is bent or cut.

### Notice (Handling) NXR Series (Insulation Type)

1. The ceramic element of this product is fragile, and care must be taken not to load an excessive press-force or not to cause a shock at handling. Such forces may cause cracking or chipping. Especially under high-temperature environment, there is a possibility that epoxy resin will become soft. When you set up the processing environment, please examine the processing method after evaluating the quality of this product.

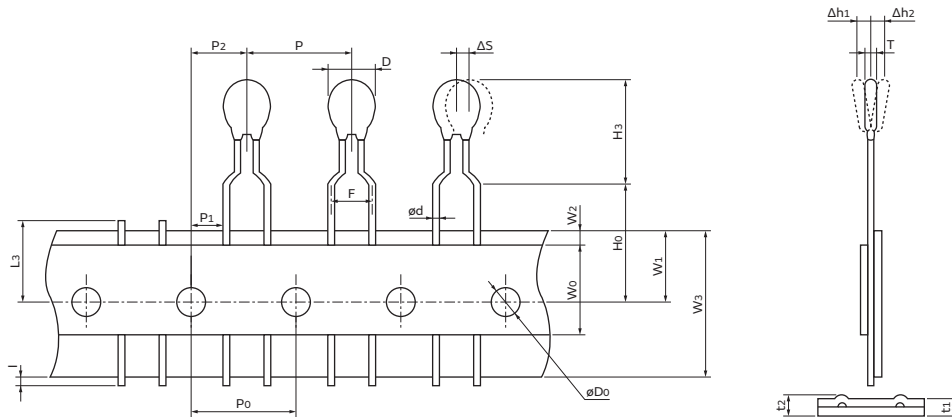
2. Do not apply excessive force to the lead. Otherwise, it may cause the junction between lead and element to break or crack. Holding the element by the side lead wire is recommended when lead wire is bent or cut. Handle the lead with care; there is a possibility that a crack may go into the polyurethane insulated coat when bending the lead.

## Temperature Sensor Thermo String/Lead Type Package

### Minimum Order Quantity

Bulk		Ammo Pack Taping	
Part Number	Minimum Quantity (pcs.)	Part Number	Minimum Quantity (pcs.)
NXF	1,000	-	-
NXR	500	NXRT_3A016	2,500

### Taping Dimensions (NXRT\_3A016 Series)



Item	Code	Dimensions (mm)
Pitch of Component	P	12.7±1.0
Pitch of Sprocket Hole	P0	12.7±0.3
Lead Spacing	F	5.0±1.0
Length from Hole Center to Component Center	P2	6.35±1.3
Length from Hole Center to Lead	P1	3.85±0.7
Body Diameter	D	4.0 max.
Deviation Along Tape, Left or Right	ΔS	0±2.0
Carrier Tape Width	W3	18.0±0.5
Position of Sprocket Hole	W1	9.0±0.5
Lead Distance between Reference and Bottom Planes	H0	16.0±1.0
Height of Component	H3	7.5±1.0
Protrusion Length	l	+0.5 to -1.0
Diameter of Sprocket Hole	øD0	4.0±0.1
Lead Diameter	ød	0.40±0.05
Total Tape Thickness	t1	0.6±0.3
Total Thickness, Tape and Lead Wire	t2	1.6 max.
Deviation Across Tape	Δh1, Δh2	1.0 max.
Portion to Cut in Case of Defect	L3	11.0 <sup>+0</sup> <sub>-2.0</sub>
Hold down Tape Width	W0	9.5 min.
Hold down Tape Position	W2	1.5±1.5
Thickness	T	2.0 max.

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- ⑧ Disaster prevention / crime prevention equipment
- ⑨ Data-processing equipment
- ⑩ Application of similar complexity and/or reliability requirements to the applications listed above

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