

Chip NTC Thermistor for temperature sensor and temperature compensation 0603 size

1. Part Numbering

(ex.) NC P 18 XH 103 F 03 RB
 Product ID Series Dimensions Temperature Resistance Resistance Individual Packaging
 Characteristics Specifications Tolerance

2. Ratings

2.1 F SERIES

P/N	Resistance (ohm) at 25°C	B-constant (K) 25/50°C	Permissive Operating Current (mA) (*1,*2)	Rated Electric Power (mW) (*1,*3)	Thermal Dissipation Constant (mW/°C) (*1)	Operating Temperature Range (°C)
NCP18XH103F03RB	10k±1%	3380±1%	0.31	100	Approx. 1.0	-40 ~ +125
NCP18WB473F10RB	47k±1%	4050±1.5%	0.14			
NCP18WF104F12RB	100k±1%	4200±1%	0.10			

*1 : NTC thermistor is measured at 25°C in still air, as a single unit without mounting.

*2 : Permissive Operating Current raises NTC thermistor's temperature by 1°C.

The current less than 1/10 of the Permissive Operating Current value is recommended in order to prevent self heating of the NTC thermistor.

*3 : When Rated Electric Power (100mW) is applied to NTC thermistor at 25°C in still air, NTC thermistor's temperature rises by approx. 100°C.

2.2 E SERIES

P/N	Resistance (ohm) at 25°C	B-constant (K) 25/50°C	Permissive Operating Current (mA) (*1,*2)	Rated Electric Power (mW) (*1,*3)	Thermal Dissipation Constant (mW/°C) (*1)	Operating Temperature Range (°C)
NCP18XF101E03RB	100±3%	3250±3%	3.10	100	Approx. 1.0	-40 ~ +125
NCP18XF151E03RB	150±3%	3250±3%	2.50			
NCP18XM221E03RB	220±3%	3500±3%	2.10			
NCP18XM331E03RB	330±3%	3500±3%	1.70			
NCP18XQ471E03RB	470±3%	3650±2%	1.40			
NCP18XQ681E03RB	680±3%	3650±3%	1.20			
NCP18XQ102E03RB	1.0k±3%	3650±2%	1.00			
NCP18XW152E03RB	1.5k±3%	3950±3%	0.81			
NCP18XW222E03RB	2.2k±3%	3950±3%	0.67			
NCP18XW332E03RB	3.3k±3%	3950±3%	0.55			
NCP18XM472E03RB	4.7k±3%	3500±2%	0.46			
NCP18XW472E03RB	4.7k±3%	3950±3%	0.46			
NCP18XW682E03RB	6.8k±3%	3950±3%	0.38			
NCP18XH103E03RB	10k±3%	3380±1%	0.31			
NCP18XV103E03RB	10k±3%	3900±3%	0.31			
NCP18XW153E03RB	15k±3%	3950±3%	0.25			
NCP18XW223E03RB	22k±3%	3950±3%	0.21			
NCP18WB333E03RB	33k±3%	4050±3%	0.17			
NCP18WB473E03RB	47k±3%	4050±2%	0.14			
NCP18WD683E03RB	68k±3%	4150±3%	0.12			
NCP18WF104E03RB	100k±3%	4250±2%	0.10			
NCP18WM154E03RB	150k±3%	4500±3%	0.08			
NCP18WM224E03RB	220k±3%	4500±3%	0.06			
NCP18WM474E03RB	470k±3%	4500±3%	0.04			

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2.3 J SERIES

P/N	Resistance (ohm) at 25°C	B-constant (K) 25/50°C	Permissive Operating Current (mA) (*1,*2)	Rated Electric Power (mW) (*1,*3)	Thermal Dissipation Constant (mW/°C) (*1)	Operating Temperature Range (°C)
NCP18XF101J03RB	100±5%	3250±3%	3.10	100	Approx. 1.0	-40 ~ +125
NCP18XF151J03RB	150±5%	3250±3%	2.50			
NCP18XM221J03RB	220±5%	3500±3%	2.10			
NCP18XM331J03RB	330±5%	3500±3%	1.70			
NCP18XQ471J03RB	470±5%	3650±2%	1.40			
NCP18XQ681J03RB	680±5%	3650±3%	1.20			
NCP18XQ102J03RB	1.0k±5%	3650±2%	1.00			
NCP18XW152J03RB	1.5k±5%	3950±3%	0.81			
NCP18XW222J03RB	2.2k±5%	3950±3%	0.67			
NCP18XW332J03RB	3.3k±5%	3950±3%	0.55			
NCP18XM472J03RB	4.7k±5%	3500±2%	0.46			
NCP18XW472J03RB	4.7k±5%	3950±3%	0.46			
NCP18XW682J03RB	6.8k±5%	3950±3%	0.38			
NCP18XH103J03RB	10k±5%	3380±1%	0.31			
NCP18XV103J03RB	10k±5%	3900±3%	0.31			
NCP18XW153J03RB	15k±5%	3950±3%	0.25			
NCP18XW223J03RB	22k±5%	3950±3%	0.21			
NCP18WB333J03RB	33k±5%	4050±3%	0.17			
NCP18WB473J03RB	47k±5%	4050±2%	0.14			
NCP18WD683J03RB	68k±5%	4150±3%	0.12			
NCP18WF104J03RB	100k±5%	4250±2%	0.10			
NCP18WM154J03RB	150k±5%	4500±3%	0.08			
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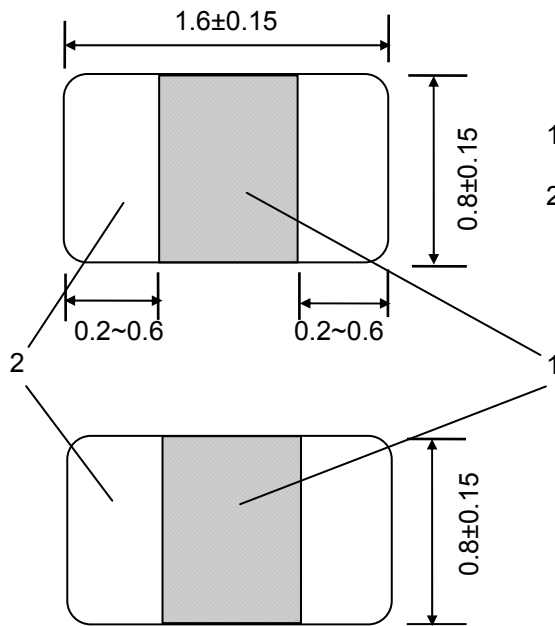
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3. Dimensions



1. Thermistor

2. Electrode (Ag System + Ni Plating + Sn Plating)

(Unit : mm)

4. Quantity (Standard Quantity)

Products quantity in a reel
4,000 pcs./1 reel

for users

⚠ CAUTION

1. Applying the power exceeding the specified 'Rated Electric Power' may causes deterioration of the characteristics or destruction of this product. Do not apply the power exceeding the 'Rated Electric Power'.
2. Do not use chip NTC Thermistor under the following environments because all these factors can deteriorate the characteristics of product or can cause the failures and the burning-out.
 - (1) volatile or flammable gas
(Ex. Resistance abnormality, Emit smoke, Ignition)
 - (2) dusty place
(Ex. Short)
 - (3) under vacuum, reducing pressure or under high-pressure
(Ex. Resistance abnormality)
 - (4) place with salt water, oils, chemical liquids or organic solvents
(Ex. Resistance abnormality, Short)
 - (5) place strongly vibrated
(Ex. Open)
 - (6) other place, where is similar like the above-mentioned environments
3. Please contact us before using this product for the under-mentioned applications requiring, especially high reliability, in order to prevent defects which might directly cause damage to other party's life, body or property. (Listed below.)
 - (1) Aircraft equipment
 - (2) Aerospace equipment
 - (3) Undersea equipment
 - (4) Power plant control equipment
 - (5) Medical equipment
 - (6) Transportation equipment (automobiles, trains, ships, etc.)
 - (7) Traffic signal equipment
 - (8) Disaster prevention / Crime prevention equipment
 - (9) Data-processing equipment
 - (10) Applications of similar complexity or with reliability requirements comparable to the applications listed in the above
4. 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

1. Use this product within the specified temperature range. Higher temperature may cause deterioration of the characteristics or the material quality of this product.
2. Following conditions should be kept in order to avoid deterioration of solderability of outer electrodes and the characteristics of this products.
 - (1) Storage Condition: Temperature : -10°C to +40°C
Humidity : less than 75 %RH, without dewing.
 - (2) Storage Term: Use this product within 6 months after delivery.
If 6 months or more elapsed, please check the solderability before use.
 - (3) Storage Place: Store this product in no corrosive gas (SO_x, Cl, etc.), nor directly under sunshine.

3. Solder and Flux

(1) Solder Paste

- i. Flow Soldering : We are using the following solder paste for any internal tests of this product.
 - Sn:Pb=63wt%:37wt%
 - Sn:Ag:Cu=96.5wt%:3.0wt%:0.5wt%

- ii. Reflow Soldering : Use RA/RMA type or equivalent type of solder paste. For your reference, we are using 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 Metals Industry Co., Ltd.)

- (2) Flux : Use rosin type flux in soldering process. If below flux is used, some problems might be caused in the product characteristics and reliability. Please do not use below 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.)

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

(1) Cleaning Conditions

Solvent	Dipping Cleaning	Ultrasonic Cleaning
Isopropyl Alcohol	Less than 5 min. at room temp. or Less than 2 min. at 40°C max.	Less than 1 min. 20W/L Frequency of several 10 KHz to several 100 KHz.

- 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-washed type flux.

- (2) Drying : Please fully perform cleaning and keep flux and cleaner components from remaining. After cleaning, dry promptly this product.

- 5. Do not give this product a strong press-force nor a mechanical shock. Because such mechanical forces may cause cracking or chipping of this ceramic product.

- 6. In your mounting process, observe the following points in order to avoid deterioration of the characteristics or destruction of this product. The mounting quality of this product may also be affected by the mounting conditions, shown the points below.

- (1) Please mount this product by soldering. When mounted by other methods, such as conductive adhesives, please contact us in advance.

(2) Recommendable Land Size

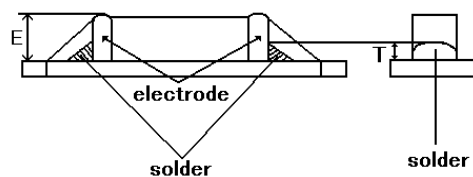
Too big land size gives too much solder paste on the land. It may cause destruction of this product, because of the mechanical stress especially in the case of board bending.

	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

(Unit : mm)

(3) Printing Conditions of Solder Paste

- i. Recommendable thickness of solder paste printing shall be 200 μm.
- ii. After soldering, the solder fillet shall be a height from 0.2 mm to the thickness of this product. (See the figures below.)



$$0.2\text{mm} \leq T \leq E$$

- iii. Too much solder gives too strong mechanical stress to this product, such stress may cause cracking or any mechanical damage. And also, it can destroy the electrical performance of this product.

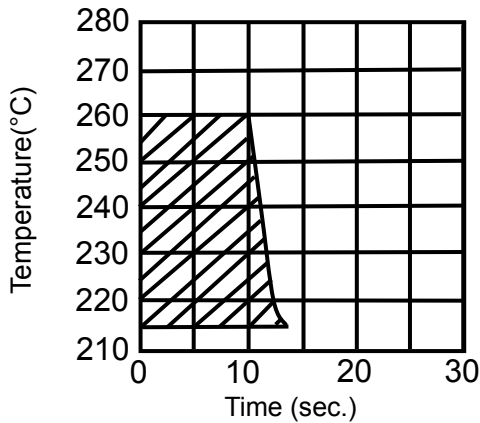
(4) Adhesive Application and Curing

- i. If insufficient adhesive is applied, or if the adhesive is not sufficiently hardened, this product may have a loose contact with the land, during flow soldering.
- ii. Too low viscosity of adhesive causes this product to slip on board, after mounting.

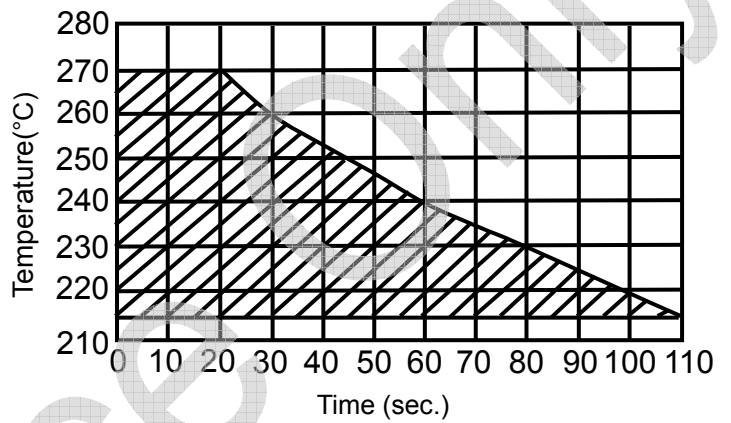
(5) Allowable Soldering Temperature and Time

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

<Allowable Flow Soldering Temp. and Time>



<Allowable Reflow Soldering Temp. and Time>

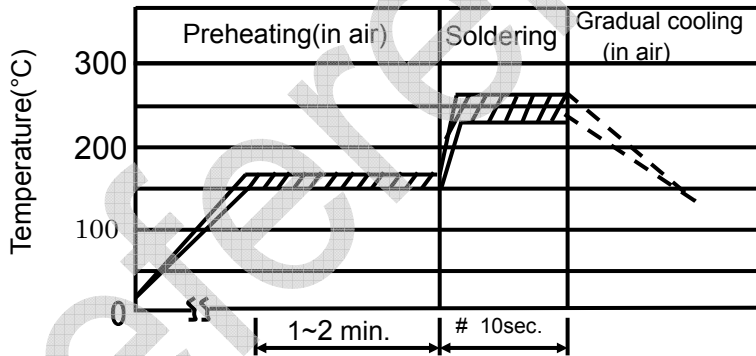


(6) Recommendable Temperature Profile for Soldering

- i. Insufficient preheating may cause a crack on ceramic body. The difference between preheating temperature and soldering temperature shall be less than 100°C.
- ii. Rapid cooling by dipping in solvent or by other means is not recommended.

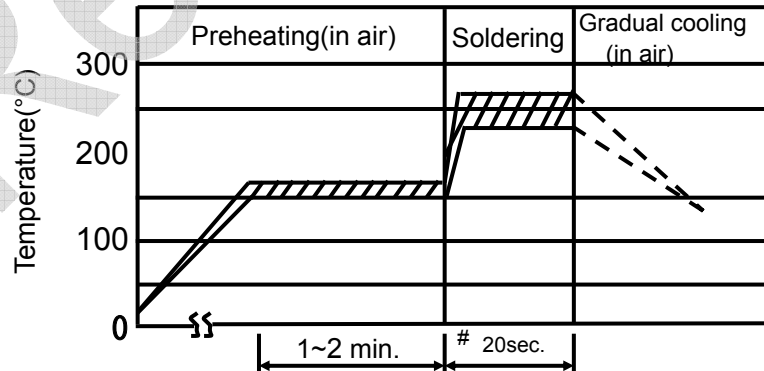
Recommended Soldering Condition

<Flow Soldering Condition>



Preheating: 160 +/- 10 °C
1min. to 2 min.
Soldering: 230~260°C
10sec.

<Reflow Soldering Condition>



Preheating: 160 +/- 10 °C
1min. to 2 min.
Soldering: 230~270°C
20sec.

#: In case of repeated soldering, the total accumulated soldering time should be within the range shown above figure (5).

(7) There is a fear of unexpected failures (tombstone, insufficient solder-wetting, etc.) in your mounting process, caused by the mounting conditions. Please evaluate if this product is correctly mounted under your mounting conditions.

(8) Reworking Conditions with Soldering Iron

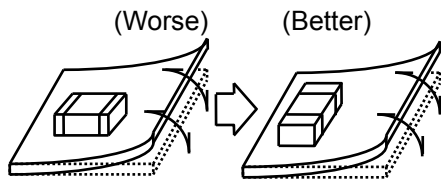
The following conditions must be strictly followed using a soldering iron.

Item	Conditions
Preheating	at 150°C for 1 to 2 minute
Temperature of Iron-tip	280°C max.
Soldering Iron Wattage	30W max.
Diameter of Iron-tip	3mm dia. max.
Soldering Time	10sec. max.
Caution	Do not allow the iron-tip to directly touch the ceramic body.

7. Location on Printed Circuit Board(PC Board)

<Component Direction>

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



<Mounting Close to Board Separation Line>

Put this product on the PC Board near the Slit, not near the Perforation Holes.

Keep this product on the PC Board away from the Separation Line.

