Chip NTC Thermistor for temperature sensor and temperature compensation 0201 size

1. Part Numbering

(ex.) NC	P	03	XH	103	F	05	RL
Product ID	Series	Dimensions	Temperature Characteristics	Resistance	Resistance Specifications	Tolerance	Individual	Packaging

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)
NCP03XH103F05RL	10k±1%	3380±1%	0.31	100	Approx. 1.0	-40 ~ +125
NCP03WF104F05RL	100k±1%	4250±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)
NCP03XM102E05RL	1.0k±3%	3500±1%	1.00	100	Approx. 1.0	-40 ~ +125
NCP03XM152E05RL	1.5k±3%	3500±1%	0.81			
NCP03XM222E05RL	2.2k±3%	3500±1%	0.67			
NCP03XM332E05RL	3.3k±3%	3500±1%	0.55			
NCP03XM472E05RL	4.7k±3%	3500±1%	0.46			
NCP03XH682E05RL	6.8K±3%	3380±1%	0.38			
NCP03XH103E05RL	10k±3%	3380±1%	0.31			
NCP03XV103E05RL	10k±3%	3900±1%	0.31			
NCP03XH153E05RL	15k±3%	3380±1%	0.25			
NCP03XH223E05RL	22k±3%	3380±1%	0.21			
NCP03WF333E05RL	33k±3%	4250±1%	0.17			
NCP03WB473E05RL	47k±3%	4050±3%	0.14			
NCP03WL473E05RL	47k±3%	4485±1%	0.14			
NCP03WF683E05RL	68k±3%	4250±1%	0.12			
NCP03WL683E05RL	68k±3%	4485±1%	0.12			
NCP03WF104E05RL	100k±3%	4250±1%	0.10			
NCP03WL104E05RL	100k±3%	4485±1%	0.10			
NCP03WL154E05RL	150k±3%	4485±1%	0.08			
NCP03WL224E05RL	220k±3%	4485±1%	0.06			

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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)
NCP03XM102J05RL	1.0k±5%	3500±1%	1.00	100	Approx. 1.0	-40 ~ +125
NCP03XM152J05RL	1.5k±5%	3500±1%	0.81			
NCP03XM222J05RL	2.2k±5%	3500±1%	0.67			
NCP03XM332J05RL	3.3k±5%	3500±1%	0.55			
NCP03XM472J05RL	4.7k±5%	3500±1%	0.46			
NCP03XH682J05RL	6.8K±5%	3380±1%	0.38			
NCP03XH103J05RL	10k±5%	3380±1%	0.31			
NCP03XV103J05RL	10k±5%	3900±1%	0.31			
NCP03XH153J05RL	15k±5%	3380±1%	0.25			
NCP03XH223J05RL	22k±5%	3380±1%	0.21			
NCP03WF333J05RL	33k±5%	4250±1%	0.17			
NCP03WB473J05RL	47k±5%	4050±3%	0.14			
NCP03WL473J05RL	47k±5%	4485±1%	0.14			
NCP03WF683J05RL	68k±5%	4250±1%	0.12			
NCP03WL683J05RL	68k±5%	4485±1%	0.12			
NCP03WF104J05RL	100k±5%	4250±1%	0.10			
NCP03WL104J05RL	100k±5%	4485±1%	0.10			
NCP03WL154J05RL	150k±5%	4485±1%	0.08			
NCP03WL224J05RL	220k±5%	4485±1%	0.06			

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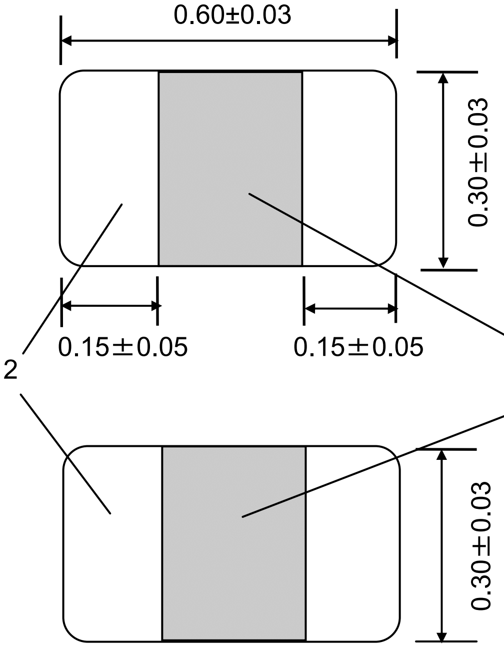
3.Dimensions



1.Thermistor

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

(Unit : mm)

4. Quantity (Standard Quantity)

Products quantity in a reel
15,000 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

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 5 min. 20W/L Frequency of 28 KHz to 40 KHz.

- Please keep mounted parts and a substrate from an occurance of resonace 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.

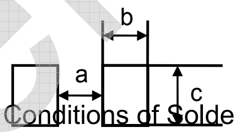
5. Do not give this product a strong press-force nor a mechanical shock. Because such mechanical forces may cause cracking or chipping of this ceramic product.

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.

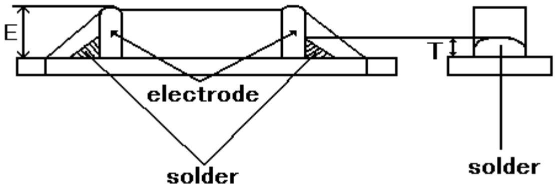


	a	b	c
Reflow Soldering	0.25	0.30	0.30

(3) Printing Conditions of Solder Paste

i. Recommendable thickness of solder paste printing shall be 100 μm.

ii. After soldering, the solder fillet shall be a height from 1/3E to the thickness of this product. (See the figures below.)



1/3E≦T≦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.

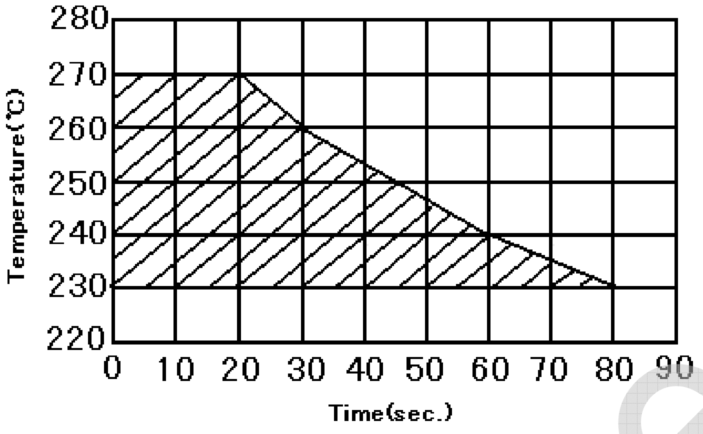
(4) Allowable Soldering Temperature and Time

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 Reflow Soldering Temp. and Time>



(5) Recommendable Temperature Profile for Soldering

i. Insufficient preheating may cause a crack on ceramic body. The deference between Preheating temperature and soldering temperature shall be less than 100°C.

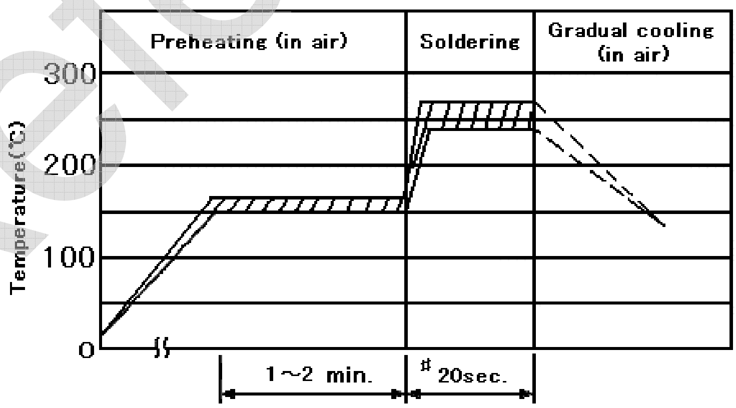
ii. Insufficient soldering temperature may cause deterioration of solder-wetting on the outer electrode. The soldering temperature of reflow soldering shall be from 240°C to 270°C.

iii. Rapid cooling by dipping in solvent or by other means is not recommended.

If you can not use the above-mentioned conditions, please evaluate if this product is correctly mounted under your mounting and soldering conditions.

Recommended Soldering Condition

<Reflow Soldering Condition>



Preheating: 160 +/- 10 °C
1min. ~ 2 min.
Soldering: 240 °C~270°C
20sec.

#: In case of repeated soldering, the total accumulated soldering time should be within the range shown above figure (4).

(6) 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.

(7) 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	20W 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.

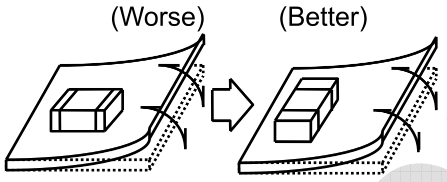
(8) Printed Circuit Board (PC Board) and Thickness

Since a crack may be caused by mechanical stress like bending, please use a glass epoxy board (FR-4) or equivalent type and a thickness 0.8tmm or below.

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.

Worst ← "A"-"C"-"B"-"D" → Better