1. General

✧ Description

NTC thermistor is a ceramic semiconductor, which shows non-linear resistance - temperature behavior. CMF series is a SMD(surface mounting device) type NTC thermistor, that is designed for mounting on PCB (printed circuit board).

✧ Type designation (example)

CMF	B		3950	103		J		N		T	
Chip NTC Thermistor	Size Code		B-value (25/85℃)	Resistance at 25℃ (Ω)		Tolerance		Termination		Packaging	
	Code	Inches	3950K	103	10x103	F	±1%	P	Pd	B	T
	C	1206		104	10x104	G	±2%	N	Nickel Barrier	Bulk	Tape & Reel
	B	0805				H	±3%				
	A	0603				J	±4%				
	X	0402				K	±10%				

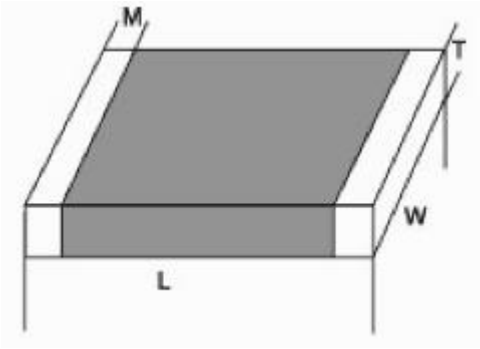
✧ Characteristics

- Miniature size
- No lead Ideal for high density
- SMT installation
- Superior solderability and resistance to soldering heat
- Ideal for wave or reflow soldering

✧ Application

- Temperature compensation of IC, LCD
- Transistor
- Crystal oscillator of mobile communications equipments
- Temperature sensor for rechargeable batteries
- Temperature sensor for CPU
- Temperature compensation of several kind

✧ Dimension (mm)



Size	L (Length)	W (Width)	T (Thickness)	M (Width of termination Point)
0402 (1005)	.04± .006 (1.0± 0.15)	.02± .004 (0.5± 0.10)	.024 max (0.60 max)	.004 min (0.10 min)
0603 (1608)	.063± .006 (1.6± 0.15)	.031± .006 (0.8± 0.15)	.037 max (0.95 max)	.004 min (0.10 min)
0805 (2012)	.08± .008 (2.0± 0.20)	.05± .008 (1.25± 0.2)	.05 max (1.25 max)	.006 min (0.15 min)
1206 (3216)	.126± .008 (3.2± 0.20)	.063± .008 (1.6± 0.20)	.063 max (1.60 max)	.008 min (0.20 min)

✧ Specifications

0402 Series		
Part No.	Resistance at 25°C (KΩ)	B-Constant 25/85°C (KΩ)
CMFX3950103	10	3950
CMFX4050473	47	4050
CMFX4050104	100	4050

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0603 Series		
Part No.	Resistance at 25℃ (KΩ)	B-Constant 25/85℃ (KΩ)
CMFA3450103	10	3450
CMFA3970103	10	3970
CMFA3900223	22	3900
CMFA3950473	47	3950
CMF3950104	100	3950
CMFA3950224	220	3950
CMFA3550103	10	3550
CMFA3950683	68	3950
CMFA4100564	560	4100
0805 Series		
Part No.	Resistance at 25℃ (KΩ)	B-Constant 25/85℃ (KΩ)
CMFB3435472	4.7	3435
CMFB3435103	10	3435
CMFB3550103	10	3550
CMFB390023	22	3900
CMFB4000473	47	4000
CMFB4000104	100	4000
CMFB3970103	10	3970
CMFB3200202	2	3200
CMFB3650153	15	3650
CMFB4050333	33	4050

1206 Series

Part No.	Resistance at 25℃C (KΩ)	B-Constant 25/50℃ (KΩ)
CMFC3200221	0.22	3200
CMFC3200331	0.33	3200
CMFC3250471	0.47	3250
CMFC3250681	0.68	3250
CMFC3350102	1.0	3350
CMFC3400222	2.2	3400
CMFC3400332	3.3	3400
CMFC3400472	4.7	3400
CMFC3400682	6.8	3400
CMFC3500103	10	3500
CMFC3900103	10	3900
CMFC3900153	15	3900
CMFC3950223	22	3950
CMFC4000333	33	4000
CMFC4100473	47	4100
CMFC4200683	68	4100
CMFC4200104	100	4200
CMFC4300224	220	4300

✧ Reliability Test

NO.	Item	Standard	Test Method
1	Operating Temperature Range	-40℃～+120℃	
2	Solder ability	At least 90% of terminal electrode should be covered with solder	Preheating Temp. :100℃～150℃ Preheating Time: 2～3min. Soldering Temp. : 255±5℃ Immersion Time: 5±0.5s
3	Resistance to Soldering	At least 75% of terminal electrode should be covered with solder.No mechanical damage. R_{25} change shall be less than±5%; B-constant($B_{25/50}$)change shall be less than ±2%.	Preheating Temp. : 100℃～150℃ Preheating Time:2～3min. Soldering Temp. : 285±5℃ Immersion Time: 10±1s

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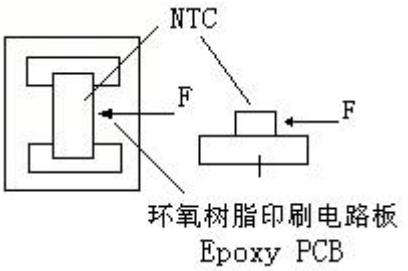
<td>External Electrode Strength</td>
<td>Ceramic and termination shall not be damaged.</td>
<td>


<table>
<tr><th>Type</th><th>Force (N)</th><th>Time (s)</th></tr>
<tr><td>0402</td><td>10</td><td>5±1</td></tr>
<tr><td>0603</td><td>15</td><td>5±1</td></tr>
<tr><td>0805</td><td>20</td><td>5±1</td></tr>
<tr><td>1206</td><td>20</td><td>5±1</td></tr>
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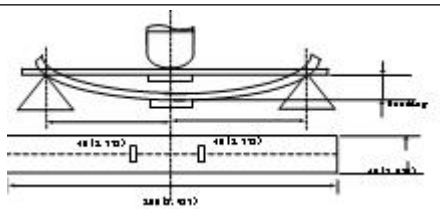
NO.	Item	Standard	Test Method
5	Vibration	Novisible mechanical damage； R_{25} change shall be less than±5%; B-constant($B_{25/50}$)change shall be less than ±2%.	Frequency:10 ～55Hz Amplitude: 1.52mm Time: Vibrated for a period of 2hrs,in three directions perpendicularly intersecting each other.
6	Resistance to flexure	No visible mechanical damage； R_{25} change shall be less than ±5%; B-constant($B_{25/50}$)change shall be less than ±2%.	 Size code / h (mm) Camber (mm) 0402、0603 — 0.7 0805、1206 — 1.0 Condition: print circuit board. Pressing speed: 0.5 mm/s
7	Drop	No visible mechanical damage; R_{25} change shall be less than±5%; B-constant($B_{25/50}$)change shall be less than ±2%.	Drop 10 times on a concrete floor from a high of 1m.

8	Resistance to High Temperature	No visible damage； R_{25} change shall be less than±5%; B-constant($B_{25/50}$)change shall be less than ±2%.	Temp.：125±2℃(No Load) Time：500±2hrs

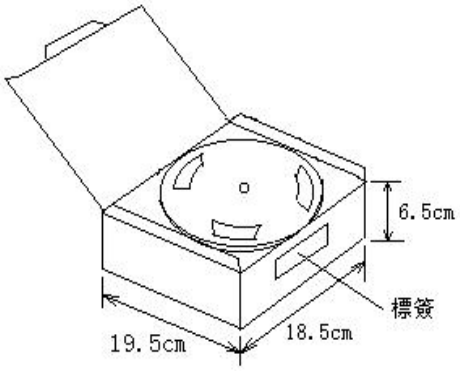
NO.	Item	Standard	Test Method
9	Resistance to High Temperature	No visible mechanical damage; R_{25} change shall be less than±5%; B-constant($B_{25/50}$)change shall be less than ±2%.	Temp.：-40±2℃ Time ：500±2hrs
10	Resistance to Humidity	No visible mechanical damage; R_{25} change shall be less than±5%; B-constant($B_{25/50}$)change shall be less than ±2%.	Temp.：55±2℃ Humidity：90～95%RH Time：500±2hrs
11	Temperature cycling	No visible damage； R_{25} change shall be less than ±5%; B-constant($B_{25/50}$)change shall be less than ±2%.	cycles without load

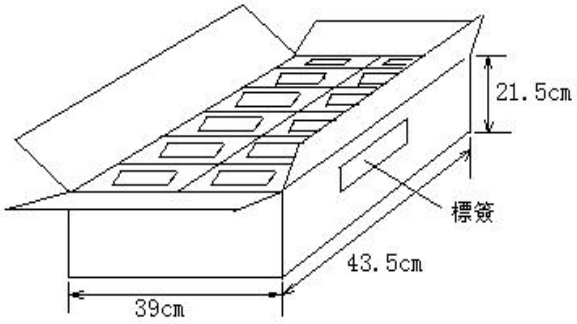
Step	Temp.	Time (Min.)
1	-40℃	30±3
2	Room Temp	10±2
3	+125℃	30±3
4	Room Temp	10±2

✧ Package

➢ Outer Package

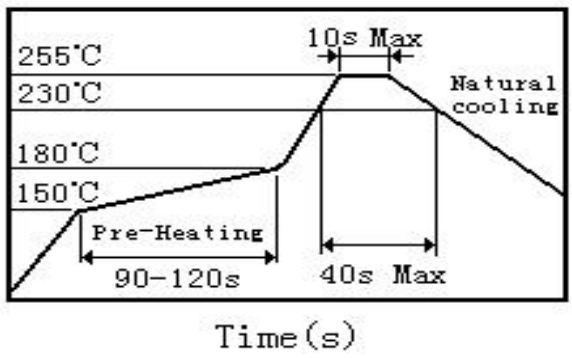
➢ Type 1:Box Quantity 5 reels
➢ Type 2:Case Quantity12 boxes



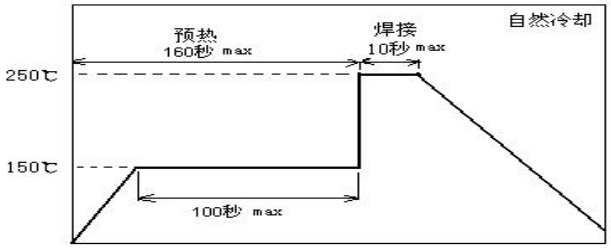


✧ Recommended Soldering Condition

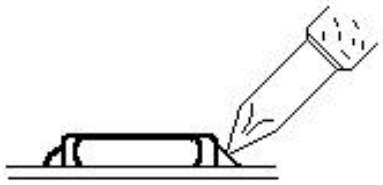
➢ Re-flow soldering



➢ Wave soldering



➢ Iron soldering



Temp. of iron-tip：350℃ Max
Iron wattage： 30W Max
Soldering time：5s sec Max

Caution: Do not allow the iron-tip to directly touch the ceramic body.

- Flux. 25% Rosin，75% Alcohol
- Cleaning Time：1min Power of ultrasonic Cleaner： 200W/L Max.
- Operating temperature range：-40℃~+120℃

✧ Recommend Soldering Conditions

✧ PCB design

① When chip thermistors are mounted on a PCB, the amount of solder used(size of fillet) can directly affect thermistor performance Therefore, when design land- patterns it is necessary to consider the appropriate size and configuration of the solder pads, which determines the amount of solder necessary to form the fillets. Excess solder can affect the ability of chips to withstand mechanical stress.

② Pattern configurations: After chip thermistor have been mounted on the board, chips can be subject to mechanical stresses in subsequent manufacturing process , for this reason, planning pattern configurations and the position of SMD thermistors should be carefully performed to minimize stress.

Considerations for automatic placement.

① Excessive impact load should not be imposed on the thermistor when mounting on the PCB .

② The maintenance and inspection of the mounting devices should be conducted periodically .

③ When beating PCB along their perforations, the amount of mechanical stress on the thermistor can vary according to the method used .The following methods are listed in order from least stressful to most stressful: push-back, slit, v-grooving, and perforation. Thus, any ideal SMD thermistor layout must also consider the PCB splitting procedure.

Printing solder paste

① Recommendable thickness of solder paste printing should from 150μm to 200μm.

② After soldering, the solder fillet shall be a height from 0.2mm to the thickness of chip thermistor.

③Too much solder gives too strong mechanical stress to chip thermistor, such stress may cause cracking or any mechanical damage. And also, it can destroy the electrical performance of this product.

Adhesive Application and curing

① 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.

② Too low viscosity of adhesive causes chip thermistor to slip on broad, after mounting.

✧ Storage Conditions

① Temperature: -10℃～40℃

② Humidity: 45～75% RH

③ Storage Term: Use this product within 6 months after delivery. If 6 months or more elapsed, please check the solderability before use.

④Handling after unpacking: After unpacking, reseal promptly this product or store it in a sealed container with a drying agent.

⑤Storage place: store this product in no corrosive gas (SOx, Cl, etc).Avoid direct sunlight.

✧ Note

1 The recognition of the guarantee of our products as a single body quality, when our product is mounted to your product, please make sure that your product is according to your specifications are evaluated and confirmed.

2 If your company on the Division I products trial has been more than the test specifications defined by the product features, for this triggered by the failure of Division I will not guarantee.