

# NTC SMD Thermistors

## With Nickel Barrier Termination NB 21



Chip thermistors are high quality and low cost devices especially developed for surface mounting applications. They are widely used for temperature compensation but can also achieve temperature control of printed circuits.

A nickel barrier metallization provides outstanding qualities of solderability and enables this chip to meet the requirements of the most severe soldering processes.

Types	NB 21 IEC SIZE : 0603
<b>DIMENSIONS:</b> millimeters (inches)	
Terminations	Nickel Barrier
Marking	On packaging only
Climatic category	40/125/56
Operating temperature	-55°C to +150°C
Tolerance on Rn (25°C)	±5%, ±10%, ±20%
Maximum dissipation at 25°C	0.07 W
Thermal dissipation factor	1 mW/°C
Thermal time constant	4 s

Resistance - Temperature characteristics: pages 36 to 40.

## APPLICATIONS

- LCD compensation
- Battery packs
- Mobile phones
- CD players
- Heating systems
- Air-conditioning systems
- Temperature control of Switch Mode Power Supplies
- Compensation of pressure sensors
- Protection of power transistors in various electronic circuits

## HOW TO ORDER

**NB 21**  
T

Type

**K 0**  
T

Material Code

K  
(See tables page 15)

**0103**  
T

Resistance  
10,000 Ω

**M**  
T

Tolerance  
M (±20%)  
J (±5%)  
K (±10%)

**BB**  
T

Suffix: Packaging

– : Bulk  
BB: Cardboard tape  
(180mm diam. reel)  
BF: Cardboard tape (1/2 reel)  
BD: Cardboard tape  
(330mm diam. reel)

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### TABLE OF VALUES

NB 21 IEC SIZE : 0603				
Types	R <sub>n</sub> at 25°C (Ω)	Material Code	B (K) ( $\Delta B/B$ (1) ± 5% (2) ± 3%)	α at 25°C (%/°C)
NB 21 KC 0 470	47		3470 ± 5%	- 3.9
NB 21 KC 0 101	100			
NB 21 KC 0 471	470	KC		
NB 21 MC 0 102	1,000	MC	3910 ± 3%	- 4.4
NB 21 J 0 0472	4,700	J	3480 ± 3%	- 3.9
NB 21 J 5 0682	6,800		3480 ± 3%	- 3.9
NB 21 J 5 0103	10,000		3480 ± 3%	- 3.9
NB 21 K 0 0103	10,000	K	3630 ± 3%	- 4.0
NB 21 K 0 0153	15,000			
NB 21 L 0 0223	22,000	L	3790 ± 3%	- 4.2
NB 21 M 0 0333	33,000		3950 ± 3%	- 4.4
NB 21 M 0 0473	47,000	M		
NB 21 L 2 0683	68,000	L2	3805 ± 3%	- 4.1
NB 21 N 0 0683	68,000	N	4080 ± 3%	- 4.6
NB 21 N 5 0104	100,000	N5	4160 ± 3%	- 4.7
NB 21 P 0 0154	150,000	P	4220 ± 3%	- 4.7
NB 21 Q 0 0334	330,000		4300 ± 3%	- 4.7
NB 21 Q 0 0474	470,000	Q		



# Packaging for Automatic Insertion

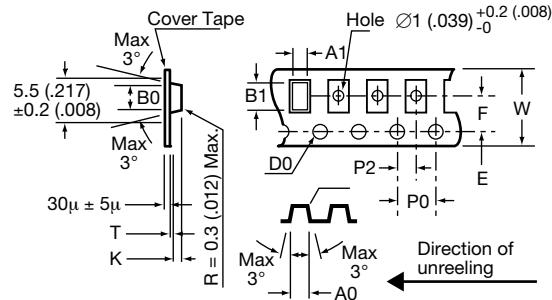
## NTC Chip Thermistors / NC/NB Series



### AUTOMATIC INSERTION

#### Super 8 Plastic Tape Packaging:

The mechanical and dimensional reel characteristics are in accordance with the IEC publication 286-3.



Designation	Symbol	Value	Tolerance
Tape width	W	8	±0.2
Tape thickness	T	0.4 max.	
Pitch of the sprocket holes	P0	4	±0.1
Diameter of the sprocket holes	D0	1.5 -0	±0.1
Distance	E	1.75	±0.1
Distance (center to center)	F	3.5	±0.05
Distance (center to center)	P2	2	±0.1
Sizes of the cavities	A0	1.5	±0.1
NC 12 (0805)	B0	2.4	±0.1
	K	1.4 max.	K ±0.1 (size is adjustable) (K = t1 +0.2)
NC 20 (1206)	A0	1.95	±0.1
	B0	3.55	±0.1
	K	1.5 max.	K ±0.1 (size is adjustable) (K = t1 +0.2)



### QUANTITY PER REEL

Type	Suffix	Qty Per Reel
NC - NB 12	BA	4000
	BE	2000
NC 20 - NB 20	BA	3000
	BE	1500

# Packaging for Automatic Insertion

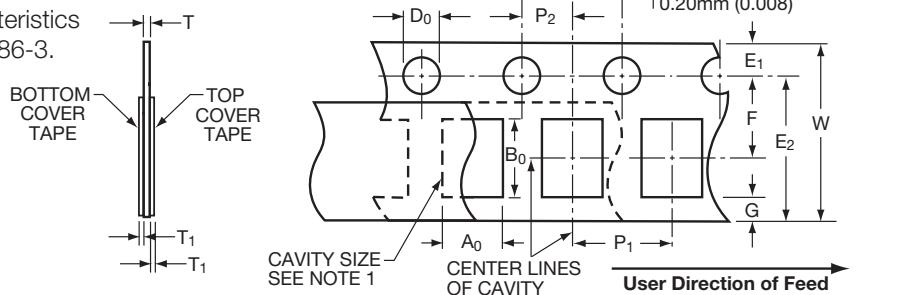
## NTC Chip Thermistors / NC/NB Series



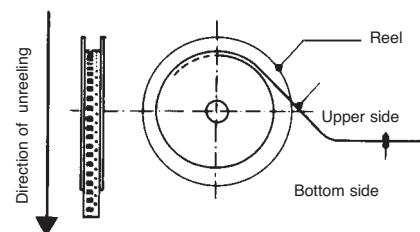
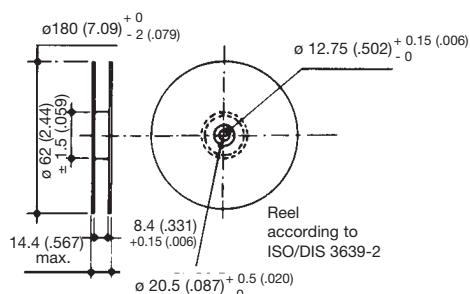
### AUTOMATIC INSERTION

#### 8mm Paper Tape Packaging:

The mechanical and dimensional reel characteristics are in accordance with the IEC publication 286-3.



Designation	Symbol	Value	Tolerance
Tape width	W	8	-.1/+0.3
Tape thickness	T	1.1 max.	
Pitch of the sprocket holes	P <sub>0</sub>	4	±0.1
Diameter of the sprocket holes	D <sub>0</sub>	1.5 -0/+0.1	±0.1
Distance	E <sub>1</sub>	1.75	±0.1
Distance (center to center)	F	3.5	±0.05
Distance (center to center)	P <sub>2</sub>	2	±0.05
Cover tape thickness	T <sub>1</sub>	0.10 max.	
Distance	E <sub>2</sub>	6.25 min.	
Distance	G	0.75 min.	
Component pitch	P <sub>1</sub>	4	±0.1
0402		2	±0.1



### QUANTITY PER REEL

Type	Suffix	Qty Per Reel
NB - NC 12	BB	4000
NB 21	BF	2000

# Surface Mounting Guide

## Chip Thermistor – Application Notes



### STORAGE

Good solderability is maintained for at least twelve months, provided the components are stored in their "as received" packaging at less than 40°C and 70% RH.

### SOLDERABILITY / LEACHING

Terminations to be well soldered after immersion in a 60/40 tin/lead solder bath at  $235 \pm 5^\circ\text{C}$  for  $2 \pm 1$  seconds.

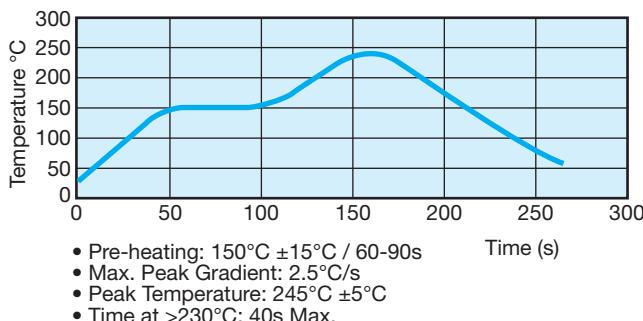
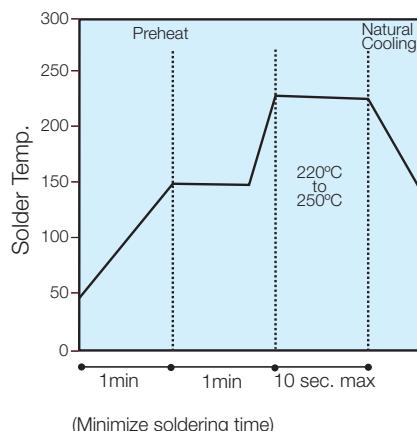
Terminations will resist leaching for at least the immersion times and conditions recommendations shown below.

P/N	Termination Type	Solder Tin/Lead	Solder Temp °C	Immersion Time Seconds
NC	AgPdPt	60/40	$260 \pm 5$	15 max
NB	Nickel Barrier	60/40	$260 \pm 5$	$30 \pm 1$

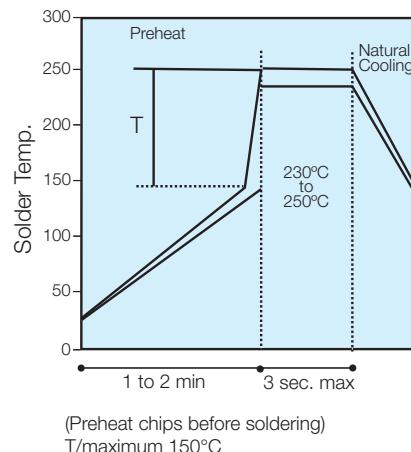
NB products are compatible with a wide range of soldering conditions consistent with good manufacturing practice for surface mount components. This includes Pb free reflow processes with peak temperatures up to  $270^\circ\text{C}$ . Recommended profiles for reflow and wave soldering are shown below for reference.

NC products are recommended for lead soldering application or gluing techniques.

### Reflow



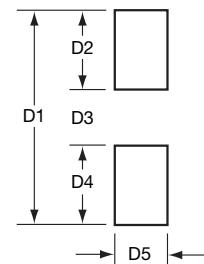
### Wave



- The visual standards used for evaluation of solder joints will need to be modified as lead free joints are not as bright as with tin-lead pastes and the fillet may not be as large.
- Resin color may darken slightly due to the increase in temperature required for the new pastes.
- Lead-free solder pastes do not allow the same self alignment as lead containing systems. Standard mounting pads are acceptable, but machine set up may need to be modified.

### RECOMMENDED SOLDERING PAD LAYOUT

Dimensions in mm (inches)



### REFLOW SOLDERING

Case Size	P/N	D1	D2	D3	D4	D5
0402	NB23	1.70 (.067)	0.60 (.024)	0.50 (.020)	0.60 (.024)	0.50 (.020)
0603	NB21	2.30 (.091)	0.80 (.031)	0.70 (.028)	0.80 (.031)	0.75 (.030)
0805	NB12	3.00 (.118)	1.00 (.039)	1.00 (.039)	1.00 (.039)	1.25 (.049)
1206	NB20	4.00 (.157)	1.00 (.039)	2.00 (.079)	1.00 (.039)	2.50 (.098)

### WAVE SOLDERING

Case Size	P/N	D1	D2	D3	D4	D5
0603	NB21	3.10 (.122)	1.20 (.047)	0.70 (.028)	1.20 (.047)	0.75 (.030)
0805	NB12	4.00 (.157)	1.50 (.059)	1.00 (.039)	1.50 (.059)	1.25 (.049)
1206	NB20	5.00 (.197)	1.50 (.059)	2.00 (.079)	1.50 (.059)	1.60 (.063)

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