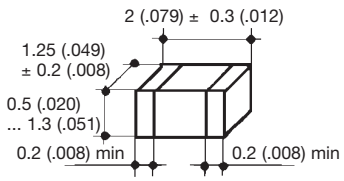
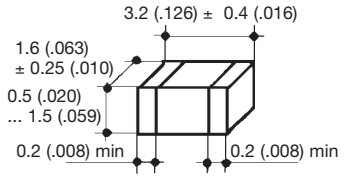
NTC SMD Thermistors

NC 12 – NC 20

Chip thermistors are a high quality and low cost device especially developed for surface mounting applications. They are widely used for temperature compensation but can also achieve temperature control of printed circuits. Its silver - palladium - platinum metallization provides a high degree of resistance to dewetting of the terminations during soldering (typically 260°C / 30 s).

Types	NC 12 IEC SIZE : 0805	NC 20 IEC SIZE : 1206
DIMENSIONS: millimeters (inches)		
Terminations	Silver – palladium – platinum metallization	
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	0.12 W	0.24 W
Thermal dissipation factor	2 mW/°C	4 mW/°C
Thermal time constant	5 s	7 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

NC 20
Type

K 0
Material Code
K
(See tables pages 11, 36-40)

0103
Resistance
10,000 Ω

M
Tolerance
M (±20%)
J (±5%)
K (±10%)

BA
Suffix: Packaging
– –: Bulk
BA: Plastic tape (180mm diam. reel)
BE: Plastic tape (1/2 reel)
BC: Plastic tape (330mm diam. reel)
BB: Cardboard tape (180mm diam. reel)
BF: Cardboard tape (1/2 reel)
BD: Cardboard tape (330mm diam. reel)

TABLE OF VALUES

NC 12 IEC SIZE : 0805				
Types	Rn at 25°C (Ω)	Material Code	B (K) (ΔB/B (1) ± 5% (2) ± 3%)	α at 25°C (%/°C)
NC 12 KC 0 180 NC 12 KC 0 220 NC 12 KC 0 270 NC 12 KC 0 330 NC 12 KC 0 390 NC 12 KC 0 470 NC 12 KC 0 560 NC 12 KC 0 680 NC 12 KC 0 820 NC 12 KC 0 101	18 22 27 33 39 47 56 68 82 100	KC	3470 ± 5%	– 3.9
NC 12 MC 0 121 NC 12 MC 0 151 NC 12 MC 0 181 NC 12 MC 0 221 NC 12 MC 0 271 NC 12 MC 0 331 NC 12 MC 0 391 NC 12 MC 0 471 NC 12 MC 0 561 NC 12 MC 0 681 NC 12 MC 0 821 NC 12 MC 0 102 NC 12 MC 0 122 NC 12 MC 0 152 NC 12 MC 0 182 NC 12 MC 0 222 NC 12 MC 0 272 NC 12 MC 0 332	120 150 180 220 270 330 390 470 560 680 820 1,000 1,200 1,500 1,800 2,200 2,700 3,300	MC	3910 ± 3%	– 4.4
NC 12 J 0 0332 NC 12 J 0 0392 NC 12 J 0 0472 NC 12 J 0 0562	3,300 3,900 4,700 5,600	J	3480 ± 3%	– 3.9
NC 12 K 0 0682 NC 12 K 0 0822 NC 12 K 0 0103 NC 12 K 0 0123	6,800 8,200 10,000 12,000	K	3630 ± 3%	– 4.0
NC 12 L 0 0153 NC 12 L 0 0183	15,000 18,000	L	3790 ± 3%	– 4.2
NC 12 M 0 0223 NC 12 M 0 0273 NC 12 M 0 0333 NC 12 M 0 0393	22,000 27,000 33,000 39,000	M	3950 ± 3%	– 4.4
NC 12 N 0 0473 NC 12 N 0 0563	47,000 56,000	N	4080 ± 3%	– 4.6
NC 12 L 2 0683	68,000	L2	3805 ± 3%	– 4.1
NC 12 N 0 0823	82,000	N	4080 ± 3%	– 4.6
NC 12 P 0 0104 NC 12 P 0 0124 NC 12 P 0 0154 NC 12 P 0 0184	100,000 120,000 150,000 180,000	P	4220 ± 3%	– 4.7
NC 12 Q 0 0224	220,000	Q	4300 ± 3%	-4.7

NC 20 IEC SIZE : 1206				
Types	Rn at 25°C (Ω)	Material Code	B (K) (ΔB/B (1) ± 5% (2) ± 3%)	α at 25°C (%/°C)
NC 20 KC 0 100 NC 20 KC 0 120 NC 20 KC 0 150 NC 20 KC 0 180 NC 20 KC 0 220 NC 20 KC 0 270 NC 20 KC 0 330 NC 20 KC 0 390 NC 20 KC 0 470 NC 20 KC 0 560 NC 20 KC 0 680 NC 20 KC 0 820 NC 20 KC 0 101	10 12 15 18 22 27 33 39 47 56 68 82 100	KC	3470 ± 5%	– 3.9
NC 20 MC 0 121 NC 20 MC 0 151 NC 20 MC 0 181 NC 20 MC 0 221 NC 20 MC 0 271 NC 20 MC 0 331 NC 20 MC 0 391 NC 20 MC 0 471 NC 20 MC 0 561 NC 20 MC 0 681 NC 20 MC 0 821 NC 20 MC 0 102 NC 20 MC 0 122 NC 20 MC 0 152	120 150 180 220 270 330 390 470 560 680 820 1,000 1,200 1,500	MC	3910 ± 3%	– 4.4
NC 20 I 0 0182 NC 20 I 0 0222 NC 20 I 0 0272 NC 20 I 0 0332	1,800 2,200 2,700 3,300	I	3250 ± 5%	– 3.7
NC 20 J 0 0392 NC 20 J 0 0472 NC 20 J 0 0562 NC 20 J 0 0682	3,900 4,700 5,600 6,800	J	3480 ± 3%	– 3.9
NC 20 K 0 0822 NC 20 K 0 0103 NC 20 K 0 0123 NC 20 K 0 0153	8,200 10,000 12,000 15,000	K	3630 ± 3%	– 4.0
NC 20 L 0 0183 NC 20 L 0 0223	18,000 22,000	L	3790 ± 3%	– 4.2
NC 20 M 0 0273 NC 20 M 0 0333 NC 20 M 0 0393 NC 20 M 0 0473	27,000 33,000 39,000 47,000	M	3950 ± 3%	– 4.4
NC 20 N 0 0563 NC 20 N 0 0683 NC 20 N 0 0823 NC 20 N 0 0104	56,000 68,000 82,000 100,000	N	4080 ± 3%	– 4.6
NC 20 P 0 0124 NC 20 P 0 0154 NC 20 P 0 0184 NC 20 P 0 0224	120,000 150,000 180,000 220,000	P	4220 ± 3%	– 4.7
NC 20 Q 0 0274 NC 20 Q 0 0334 NC 20 Q 0 0394 NC 20 Q 0 0474	270,000 330,000 390,000 470,000	Q	4300 ± 3%	– 4.7
NC 20 R 0 0564 NC 20 R 0 0684 NC 20 R 0 0824 NC 20 R 0 0105	560,000 680,000 820,000 1,000,000	R	4400 ± 3%	– 4.8

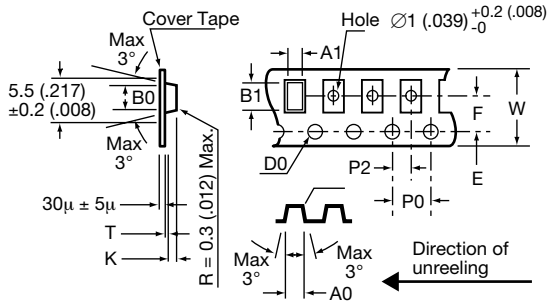
Packaging for Automatic Insertion

NTC Chip Thermistors / NC/NB Series

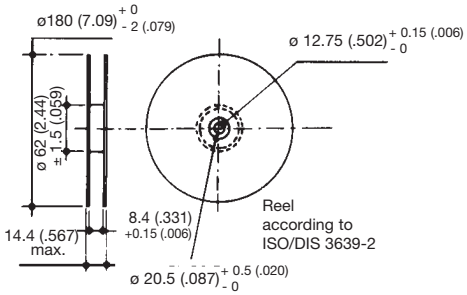
AUTOMATIC INSERTION

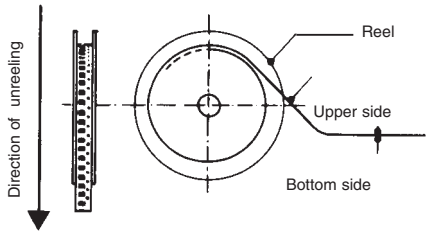
Super 8 Plastic Tape Packaging:

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	NC 12 (0805)	A0	1.5	±0.1
		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

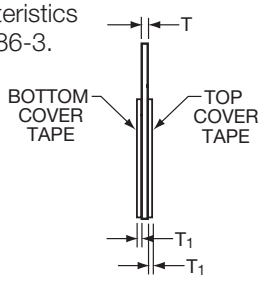
Packaging for Automatic Insertion

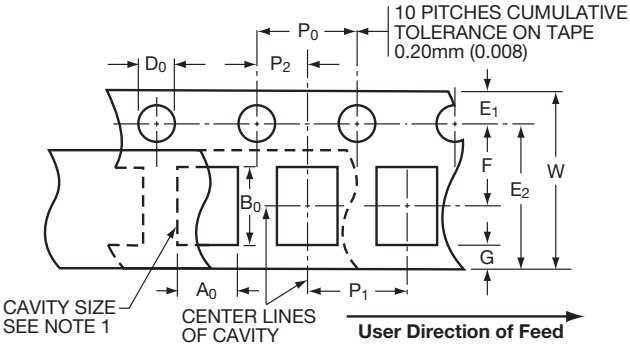
NTC Chip Thermistors / NC/NB Series

AUTOMATIC INSERTION

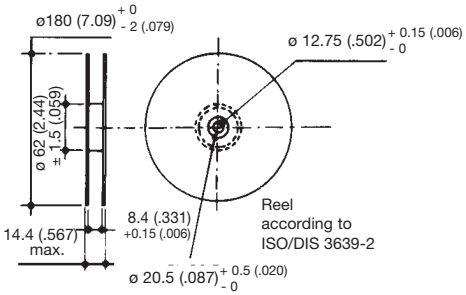
8mm Paper Tape Packaging:

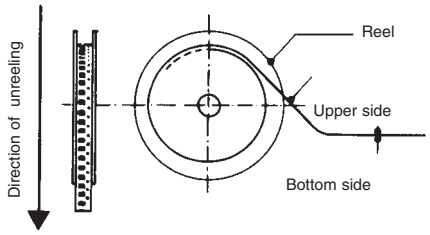
The mechanical and dimensional reel characteristics are in accordance with the IEC publication 286-3.





Designation		Symbol	Value	Tolerance
Tape width		W	8	-.0.1/+0.3
Tape thickness		T	1.1 max.	
Pitch of the sprocket holes		P_0	4	±0.1
Diameter of the sprocket holes		D_0	1.5 -0/+0.1	±0.1
Distance		E_1	1.75	±0.1
Distance (center to center)		F	3.5	±0.05
Distance (center to center)		P_2	2	±0.05
Cover tape thickness		T_1	0.10 max.	
Distance		E_2	6.25 min.	
Distance		G	0.75 min.	
Component pitch	0805/0603	P_1	4	±0.1
	0402		2	±0.1





QUANTITY PER REEL

Type	Suffix	Qty Per Reel
NB - NC 12	BB	4000
NB 21	BF	2000
NB 23	BB	10000
	BF	5000

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 ± 5°C for 2 ± 1 seconds.

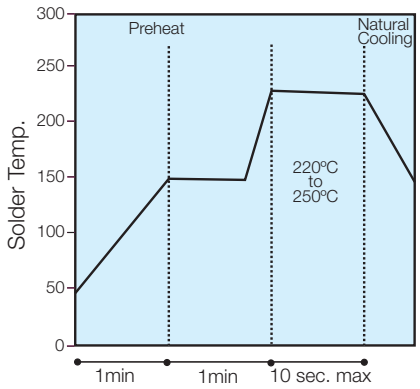
Terminations will resist leaching for at least the immersion times and conditions recommendations shown below.

P/N	Termination Type	Solder Tin/Lead	Solder Temp ºC	Immersion Time Seconds
NC	AgPdPt	60/40	260 ± 5	15 max
NB	Nickel Barrier	60/40	260 ± 5	30 ± 1

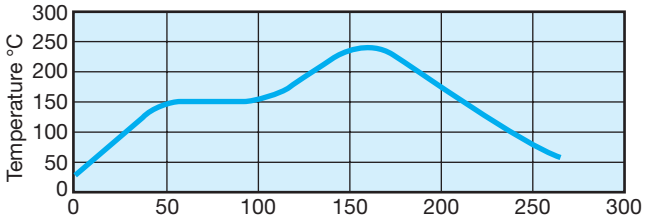
NB products are compatible with a wide range of soldering conditions consistent with good manufacturing practice for surface mount components. This includes Pb free reflow processes with peak temperatures up to 270ºC. Recommended profiles for reflow and wave soldering are shown below for reference.

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

Reflow

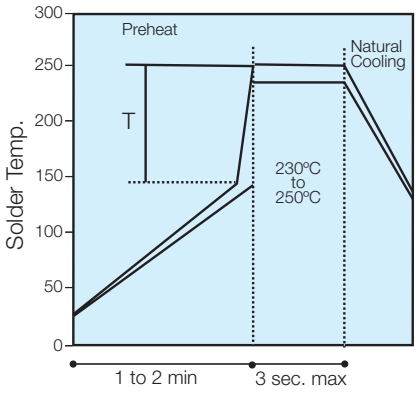


(Minimize soldering time)



- Pre-heating: 150°C ±15°C / 60-90s
- Max. Peak Gradient: 2.5°C/s
- Peak Temperature: 245°C ±5°C
- Time at >230°C: 40s Max.

Wave



(Preheat chips before soldering)
T/maximum 150°C

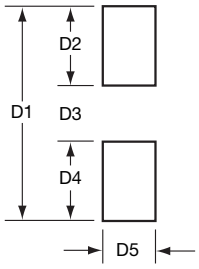
a) The visual standards used for evaluation of solder joints will need to be modified as lead free joints are not as bright as with tin-lead pastes and the fillet may not be as large.

b) Resin color may darken slightly due to the increase in temperature required for the new pastes.

c) 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 (0.31)	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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- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
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FORSTAR®

Телефон: 8 (812) 309-75-97 (многоканальный)
Факс: 8 (812) 320-03-32
Электронная почта: ocean@oceanchips.ru
Web: http://oceanchips.ru/
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А