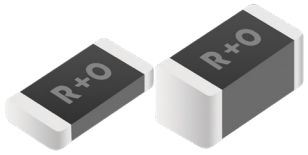
Chip NTC Thermistor Datasheet

Features

- Leadless , Size 0603
- SMD type suitable for high density mounting
- B constant tolerance ±1%
- Excellent solder ability
- Operating temperature: -40°C to +125°C
- RoHS compliant & Lead-Free & Halogen Free

HNTC0603 Series

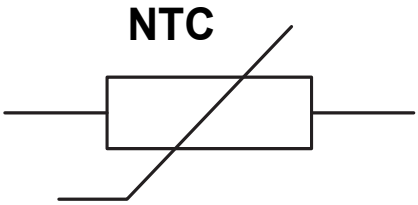


Applications

- Consumer Electronics，mobile phone，wearable device，TWS headphones，etc.
- Office automation such as printer ，facsimile,word processor，etc.
- Industrial Power Supplies
- Medical Electronics
- IoT Sensor Nodes

Part Number Code

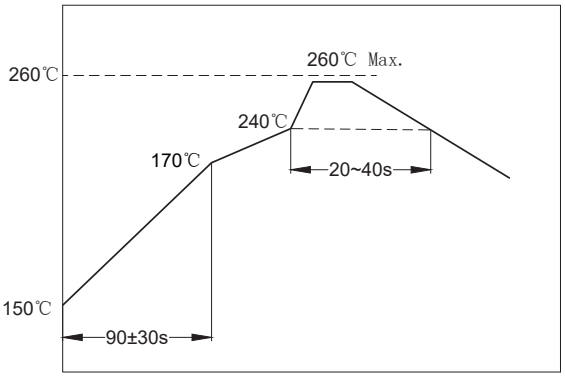
H NTC □□□□ - □□□ F □□□□ F B
① ② ③ ④ ⑤ ⑥ ⑦ ⑧



① "HJC" Brand Code
② Chip NTC Thermistor
③ Chip Size/package
④ Rated Zero-Power Resistance : 103=10000Ω, 503=50000Ω, 104=100000Ω
⑤ Resistance Tolerance F: 1% G: 2% H: 3% J:5%
⑥ B Constant
⑦ B Constant Tolerance F: 1% H: 3%
⑧ B Constant calculation method A: 25℃/85℃ B: 25℃/50℃

Recommended Soldering Conditions

Reflow Soldering Recommendation



Profile Feature		Condition
Pre-heat	Temperature Min	+150°C
	Temperature Max	+170°C
	Pre-heat Time	90±30 secs.
ramp up rate		3°C /sec. Max
Time above 240°C		20~40 secs
Peak Temperature		+260°C，10 secs. Max
Ramp-down Rate		6°C /sec. Max
Time 25°C to Peak Temp (T_P)		8 min. Max
Do not exceed		+260°C

Iron Soldering Recommendation

Item	Conditions
Temperature of Soldering Iron-tip	280°C Max
Soldering Time	3 secs. Max
Times for iron soldering	1 time Max
Note: Take care not to apply the tip of the soldering iron to the terminal electrodes.	

Electrical Characteristics (Ta=25°C Unless otherwise specified)

PARAMETER	CONDITION	VALUE	UNIT
Rated Zero-Power Resistance	T_a=25°C ±0.1°C	10±1%	KΩ
B Constant (Material Constant)	25°C /85°C	3450±1%	K
Permissible Operating Current	T_a=25°C ±0.1°C	0.31	mA
Thermal Dissipation Constant	T_a=25°C ±0.1°C	1.0	mW/°C
Thermal Time Constant	T_a=25°C ±0.1°C	＜5	sec
Rated Electric Power	T_a=25°C ±0.1°C	100	mW
Operating Temperature Range	/	-40 to + 125	°C

Test and Measurement Procedures

Unless otherwise specified, the standard atmospheric conditions for measurement/test as:

Items	Condition
Ambient Temperature:	20±15°C
Relative Humidity:	65±20%
Air Pressure:	86kPa to 106kPa

If any doubt on the results, measurements/tests should be made within the following limits:

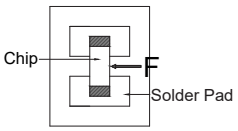
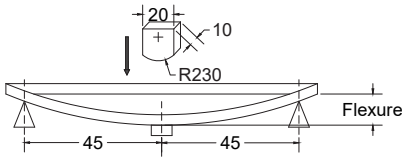
Items	Condition
Ambient Temperature:	25±2°C
Relative Humidity:	65±5%
Air Pressure:	86kPa to 106kPa

Inspection Equipment
1.Visual Examination: 20×magnifier
2.Resistance value test: Thermistor resistance tester

Electrical Test

Items	Test Methods and Remarks
Nominal Zero-Power Resistance at 25°C	Ambient temperature：25±0.05°C ; Measuring electric power：≤ 0.1mW
Nominal B Constant	Measure the resistance at the ambient temperature of 25±0.05°C , 50±0.05°C or 85±0.05°C . $B_{(25/50℃)} = \frac{\ln R_{25}-\ln R_{50}}{1/T_{25}-1/T_{50}}$ $B_{(25/85℃)} = \frac{\ln R_{25}-\ln R_{85}}{1/T_{25}-1/T_{85}}$
Thermal Time Constant	The total time for the temperature of the thermistor to change by 63.2% of the difference from ambient temperature T0 (°C) to T1 (°C) by the drastic change of the power applied to thermistor from Non-zero Power to Zero-Power state, normally expressed in second(S)
Dissipation Factor	The required power which makes the NTC thermistor body temperature raise 1 °C through self-heated, normally expressed in milliwatts per degree Celsius (mW/°C). It can be calculated by the following formula: $\delta = \frac{W}{T-T_0}$
Rated Power	The necessary electric power makes thermistor’ s temperature rise 100°C by self-heating at ambient temperature 25°C .
Permissible operating current	The current that keep body temperature of chip NTC on the PC board in still air rising 1° C by self-heating.

Reliability Test

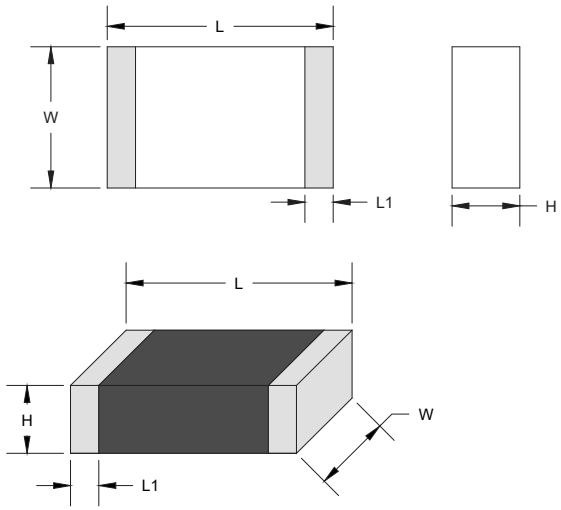
<table>
<tr><th>Items</th><th>Standard</th><th>Test Methods and Remarks</th><th>Requirements</th></tr>
<tr><td>Terminal Strength</td><td>IEC 60068-2-21</td><td>Solder the chip to the testing jig using eutectic solder. Then apply a force in the direction of the arrow.
<table>
<tr><th>Size</th><th>F</th><th>Duration</th></tr>
<tr><td>0402, 0603</td><td>5N</td><td>10±1s</td></tr>
<tr><td>0805</td><td>10N</td><td>10±1s</td></tr>
</table></td><td>No removal or split of the termination or other defects shall occur.
 
</td></tr>
<tr><td>Resistance to Flexure</td><td>IEC 60068-2-21</td><td>Solder the chip to the test jig (glass epoxy board shown in the right) using a eutectic solder. Then apply a force in the direction shown as follow;
 

<table>
<tr><th>Size</th><th>Flexure</th><th>Speed</th><th>Duration</th></tr>
<tr><td>0402, 0603</td><td>1mm</td><td>＜0.5mm/s</td><td>10±1s</td></tr>
<tr><td>0805</td><td>2mm</td><td>＜0.5mm/s</td><td>10±1s</td></tr>
</table></td><td>No visible damage.
| Δ R25/R25 | ⩽ 5%</td></tr>
<tr><td>Dropping</td><td>IEC 60068-2-32</td><td>Drop a chip 10 times on a concrete floor from a height of 1 meter.</td><td>No visible damage.</td></tr>
<tr><td>Solderability</td><td>IEC 60068-2-58</td><td>1. Solder temperature: 245±5°C
2. Duration: 3±0.3s
3. Solder: Sn/3.0Ag/0.5Cu
4. 25% Resin and 75% ethanol in weight</td><td>No visible damage
Wetting shall exceed 95% coverage.</td></tr>
<tr><td>Resistance to Soldering Heat</td><td>IEC 60068-2-58</td><td>1. Solder temperature: 260±5°C
2. Duration: 10±1s
3. Solder: Sn/3.0Ag/0.5Cu
4. 25% Resin and 75% ethanol in weight
5. The chip shall be stabilized at normal condition for 1~2 hours before measuring</td><td>No visible damage.
| Δ R25/R25 | ⩽ 5%
| Δ B/B | ⩽ 2%</td></tr>
<tr><td>Temperature cycling</td><td>IEC 60068-2-14</td><td>1. 5 cycles of following sequence without loading.
<table>
<tr><th>Step</th><th>Temperature</th><th>Period</th></tr>
<tr><td>1</td><td>-40±5°C</td><td>30±3min</td></tr>
<tr><td>2</td><td>Room Temperature</td><td>5±3min</td></tr>
<tr><td>3</td><td>125±2°C</td><td>30±3min</td></tr>
<tr><td>4</td><td>Room Temperature</td><td>5±3min</td></tr>
</table>
2. The chip shall be stabilized at normal condition for 1~2 hours before measuring.</td><td>No visible damage
| Δ R25/R25 | ⩽ 3%
| Δ B/B | ⩽ 2%</td></tr>
<tr><td>Resistance to dry heat</td><td>IEC 60068-2-2</td><td>1. 125±5°C in air, for 1000±24 hours without loading
2. The chip shall be stabilized at normal condition for 1~2 hours before measuring</td><td>No visible damage.
| Δ R25/R25 | ⩽ 5%
| Δ B/B | ⩽ 2%</td></tr>
<tr><td>Resistance to cold</td><td>IEC 60068-2- 1</td><td>1. -40±3°C in air, for 1000±24 hours without loading.
2. The chip shall be stabilized at normal condition for 1~2 hours before measuring.</td><td>No visible damage.
| Δ R25/R25 | ⩽ 5%
| Δ B/B | ⩽ 2%</td></tr>
<tr><td>Resistance to damp heat</td><td>IEC 60068-2-78</td><td>1. 40±2°C , 90~95%RH in air, for 1000±24 hours without loading
2. The chip shall be stabilized at normal condition for 1~2 hours before measuring.</td><td>No visible damage.
| Δ R25/R25 | ⩽ 3%
| Δ B/B | ⩽ 2%</td></tr>
<tr><td>Resistance to high temperature load</td><td>IEC 60539-1 5.25.4</td><td>1. 85±2°C in air with permissive operating current for 1000±48 hours
2. The chip shall be stabilized at normal condition for 1~2 hours before measuring</td><td>No visible damage.
| Δ R25/R25 | ⩽ 5%
| Δ B/B | ⩽ 2%</td></tr>
</table>

Environmental Specification

Storage temperature:	-10°C to +40°C
Storage Conditions:	Light-proof, Hermetically Sealed, Moisture-proof; The components should be left in their original packing to avoid soldering problems due to oxidized contacts.
Relative humidity:	< 75 % RH
Storage period	The components should be employed within 6 months after delivery

Physical Dimensions

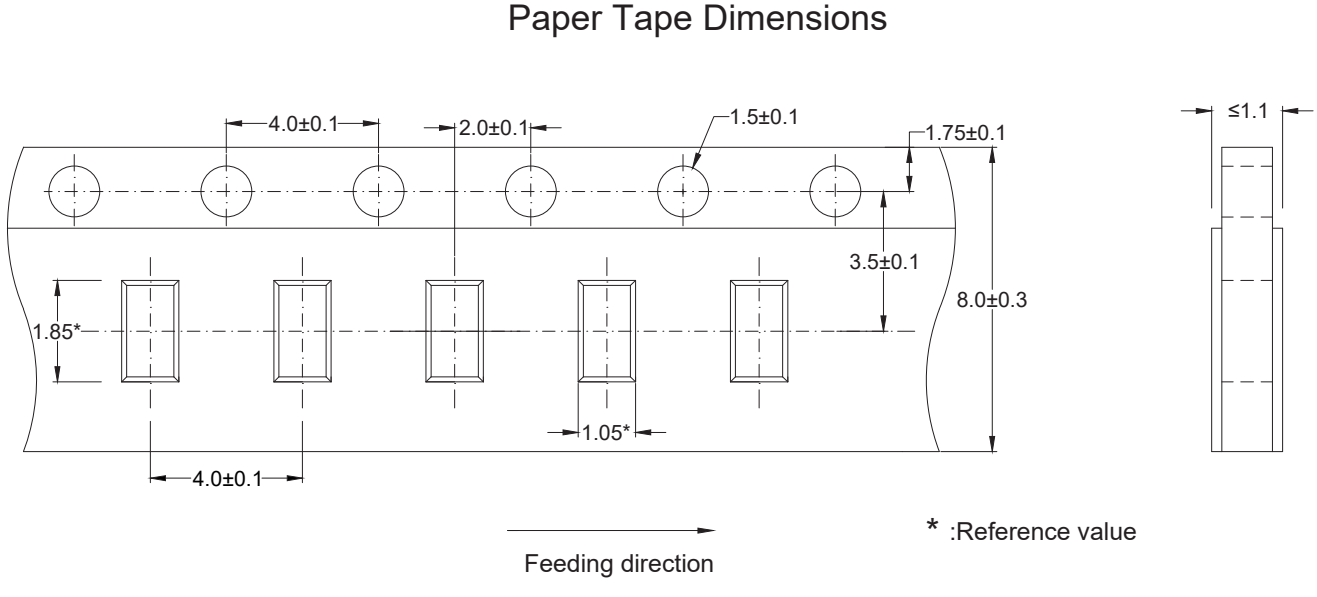


Part Package	L	W	H	L1
	(mm)	(mm)	(mm)	(mm)
0603	1.60±0.15	0.80±0.15	0.80±0.15	0.3±0.20

Ordering Information

PACKAGE	Part Number	DELIVERY MODE	MPQ(PCS)
0603	HNTC0603-103F3450FB	7''REEL	4,000

Packaging Information



R-T Chart

Temp.(℃)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(℃)
-40	189.674	197.390	205.400	4.06%	0.69
-39	179.349	186.540	194.000	4.00%	0.69
-38	169.647	176.350	183.299	3.94%	0.68
-37	160.550	166.800	173.276	3.88%	0.68
-36	151.990	157.820	163.857	3.83%	0.67
-35	143.951	149.390	155.019	3.77%	0.67
-34	136.431	141.510	146.763	3.71%	0.66
-33	129.347	134.090	138.993	3.66%	0.66
-32	122.680	127.110	131.687	3.60%	0.65
-31	116.391	120.530	124.804	3.55%	0.65
-30	110.472	114.340	118.332	3.49%	0.64
-29	104.913	108.530	112.260	3.44%	0.64
-28	99.658	103.040	106.526	3.38%	0.63
-27	94.706	97.870	101.129	3.33%	0.63
-26	90.029	92.989	96.037	3.28%	0.62
-25	85.611	88.381	91.231	3.23%	0.62
-24	81.443	84.036	86.702	3. 17%	0.61
-23	77.504	79.931	82.426	3. 12%	0.60
-22	73.779	76.052	78.387	3.07%	0.60
-21	70.256	72.384	74.569	3.02%	0.59
-20	66.922	68.915	70.961	2.97%	0.59
-19	63.767	65.634	67.549	2.92%	0.58
-18	60.779	62.529	64.323	2.87%	0.58
-17	57.949	59.589	61.269	2.82%	0.57
-16	55.268	56.804	58.377	2.77%	0.56
-15	52.726	54. 166	55.640	2.72%	0.56
-14	50.315	51.665	53.046	2.67%	0.55
-13	48.029	49.294	50.588	2.62%	0.55
-12	45.860	47.046	48.258	2.58%	0.54
-11	43.801	44.913	46.049	2.53%	0.53
-10	41.846	42.889	43.953	2.48%	0.53
-9	39.989	40.967	41.964	2.43%	0.52
-8	38.225	39. 142	40.077	2.39%	0.51
-7	36.549	37.408	38.284	2.34%	0.51
-6	34.955	35.761	36.582	2.30%	0.50
-5	33.440	34. 196	34.965	2.25%	0.49
-4	31.998	32.707	33.428	2.20%	0.49
-3	30.627	31.291	31.966	2. 16%	0.48
-2	29.322	29.945	30.578	2. 11%	0.47
-1	28.080	28.664	29.257	2.07%	0.47
0	26.898	27.445	28.001	2.02%	0.46
1	25.770	26.283	26.804	1.98%	0.45
2	24.696	25. 177	25.665	1.94%	0.45
3	23.673	24. 124	24.581	1.89%	0.44
4	22.699	23. 121	23.549	1.85%	0.43
5	21.769	22. 165	22.566	1.81%	0.42
6	20.882	21.253	21.628	1.76%	0.42

R-T Chart

Temp.(℃)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(℃)
7	20.037	20.384	20.735	1.72%	0.41
8	19.230	19.555	19.883	1.68%	0.40
9	18.460	18.764	19.071	1.64%	0.39
10	17.725	18.010	18.297	1.60%	0.39
11	17.024	17.290	17.559	1.55%	0.38
12	16.353	16.602	16.853	1.51%	0.37
13	15.713	15.946	16.181	1.47%	0.36
14	15.101	15.319	15.538	1.43%	0.36
15	14.517	14.720	14.925	1.39%	0.35
16	13.958	14.148	14.339	1.35%	0.34
17	13.424	13.601	13.779	1.31%	0.33
18	12.913	13.078	13.244	1.27%	0.32
19	12.424	12.578	12.733	1.23%	0.32
20	11.955	12.099	12.243	1. 19%	0.31
21	11.508	11.642	11.776	1. 15%	0.30
22	11.079	11.204	11.329	1. 11%	0.29
23	10.669	10.785	10.901	1.08%	0.28
24	10.276	10.384	10.492	1.04%	0.27
25	9.900	10.000	10.100	1.00%	0.27
26	9.532	9.632	9.732	1.04%	0.28
27	9. 180	9.280	9.380	1.08%	0.29
28	8.843	8.943	9.042	1. 11%	0.30
29	8.520	8.619	8.718	1. 15%	0.31
30	8.211	8.309	8.408	1. 19%	0.33
31	7.914	8.012	8.110	1.22%	0.34
32	7.630	7.727	7.824	1.26%	0.35
33	7.357	7.453	7.550	1.30%	0.36
34	7.096	7. 191	7.287	1.33%	0.37
35	6.845	6.939	7.034	1.37%	0.39
36	6.604	6.698	6.792	1.41%	0.40
37	6.373	6.466	6.559	1.44%	0.41
38	6. 152	6.243	6.335	1.48%	0.43
39	5.939	6.029	6. 120	1.51%	0.44
40	5.735	5.824	5.914	1.55%	0.45
41	5.538	5.627	5.716	1.58%	0.46
42	5.350	5.437	5.525	1.62%	0.48
43	5. 169	5.255	5.342	1.65%	0.49
44	4.995	5.080	5.165	1.69%	0.50
45	4.828	4.911	4.996	1.72%	0.52
46	4.667	4.749	4.832	1.75%	0.53
47	4.512	4.593	4.675	1.79%	0.54
48	4.363	4.443	4.524	1.82%	0.56
49	4.220	4.299	4.379	1.86%	0.57
50	4.083	4. 160	4.239	1.89%	0.58
51	3.950	4.027	4. 104	1.92%	0.60
52	3.823	3.898	3.974	1.96%	0.61
53	3.700	3.774	3.849	1.99%	0.63

R-T Chart

Temp.(℃)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(℃)
54	3.582	3.654	3.728	2.02%	0.64
55	3.468	3.539	3.612	2.05%	0.65
56	3.358	3.429	3.500	2.09%	0.67
57	3.252	3.322	3.392	2. 12%	0.68
58	3. 151	3.219	3.288	2. 15%	0.70
59	3.052	3.119	3. 188	2. 18%	0.71
60	2.958	3.024	3.091	2.22%	0.72
61	2.867	2.931	2.997	2.25%	0.74
62	2.779	2.842	2.907	2.28%	0.75
63	2.694	2.756	2.820	2.31%	0.77
64	2.612	2.673	2.736	2.34%	0.78
65	2.533	2.593	2.655	2.37%	0.80
66	2.457	2.516	2.576	2.40%	0.81
67	2.383	2.441	2.501	2.43%	0.83
68	2.312	2.369	2.428	2.46%	0.84
69	2.244	2.300	2.357	2.50%	0.86
70	2. 177	2.233	2.289	2.53%	0.87
71	2. 113	2. 168	2.223	2.56%	0.89
72	2.052	2. 105	2. 159	2.59%	0.90
73	1.992	2.044	2.098	2.62%	0.92
74	1.934	1.986	2.038	2.65%	0.93
75	1.879	1.929	1.981	2.68%	0.95
76	1.825	1.874	1.925	2.71%	0.96
77	1.773	1.821	1.871	2.73%	0.98
78	1.722	1.770	1.819	2.76%	1.00
79	1.673	1.720	1.768	2.79%	1.01
80	1.626	1.673	1.720	2.82%	1.03
81	1.581	1.626	1.672	2.85%	1.04
82	1.537	1.581	1.627	2.88%	1.06
83	1.494	1.538	1.582	2.91%	1.08
84	1.453	1.496	1.540	2.94%	1.09
85	1.413	1.455	1.498	2.97%	1.11
86	1.374	1.416	1.458	2.99%	1.13
87	1.337	1.377	1.419	3.02%	1.14
88	1.300	1.340	1.381	3.05%	1.16
89	1.265	1.304	1.345	3.08%	1.17
90	1.231	1.270	1.309	3. 11%	1.19
91	1.198	1.236	1.275	3. 13%	1.21
92	1.167	1.204	1.242	3. 16%	1.23
93	1.136	1.172	1.209	3. 19%	1.24
94	1.106	1. 141	1.178	3.22%	1.26
95	1.076	1.112	1.148	3.24%	1.28
96	1.048	1.083	1.118	3.27%	1.29
97	1.021	1.055	1.090	3.30%	1.31
98	0.995	1.028	1.062	3.32%	1.33
99	0.969	1.002	1.035	3.35%	1.35
100	0.944	0.976	1.009	3.38%	1.36

R-T Chart

Temp.(℃)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(℃)
101	0.920	0.951	0.984	3.40%	1.38
102	0.897	0.927	0.959	3.43%	1.40
103	0.874	0.904	0.935	3.46%	1.42
104	0.852	0.882	0.912	3.48%	1.43
105	0.830	0.860	0.890	3.51%	1.45
106	0.810	0.838	0.868	3.53%	1.47
107	0.790	0.818	0.847	3.56%	1.49
108	0.770	0.798	0.826	3.59%	1.50
109	0.751	0.778	0.806	3.61%	1.52
110	0.733	0.759	0.787	3.64%	1.54
111	0.715	0.741	0.768	3.66%	1.56
112	0.697	0.723	0.750	3.69%	1.58
113	0.680	0.706	0.732	3.71%	1.60
114	0.664	0.689	0.715	3.74%	1.61
115	0.648	0.673	0.698	3.76%	1.63
116	0.633	0.657	0.682	3.79%	1.65
117	0.618	0.641	0.666	3.81%	1.67
118	0.603	0.626	0.650	3.84%	1.69
119	0.589	0.612	0.635	3.86%	1.71
120	0.575	0.598	0.621	3.89%	1.73
121	0.562	0.584	0.607	3.91%	1.75
122	0.549	0.570	0.593	3.93%	1.77
123	0.536	0.557	0.579	3.96%	1.79
124	0.524	0.545	0.566	3.98%	1.80
125	0.512	0.532	0.554	4.01%	1.82