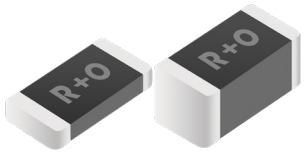
Chip NTC Thermistor Datasheet

Features

- Leadless , Size 0603
- SMD type suitable for high density mounting
- B constant tolerance ±3%
- Excellent solder ability
- Operating temperature：-40℃ to +125℃
- RoHS compliant & Lead-Free & Halogen Free

HNTC0603 Series

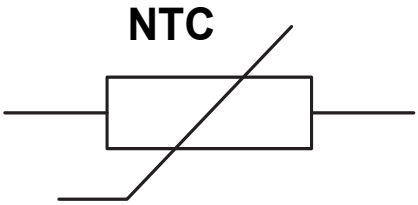


Applications

- 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

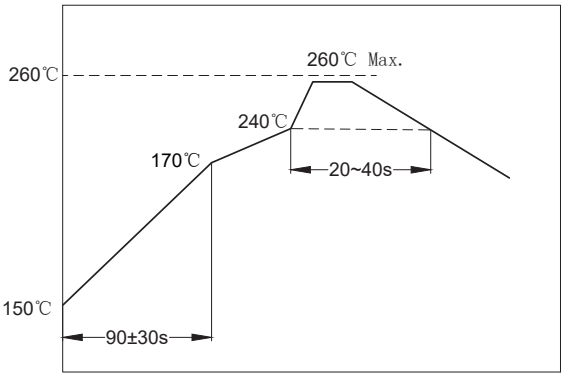
H NTC □□□□ - □□□ J □□□□ H B
① ② ③ ④ ⑤ ⑥ ⑦ ⑧



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	100±5%	KΩ
B Constant (Material Constant)	25°C /50°C	3950±3%	K
Permissible Operating Current	T_a=25°C ±0.1°C	0.1	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:

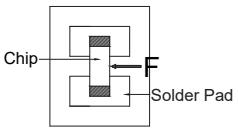
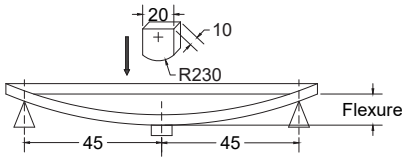
Items	Condition
Ambient Temperature:	25±2°C
Relative Humidity:	65±5%
Air Pressure:	86kPa to 106kPa

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

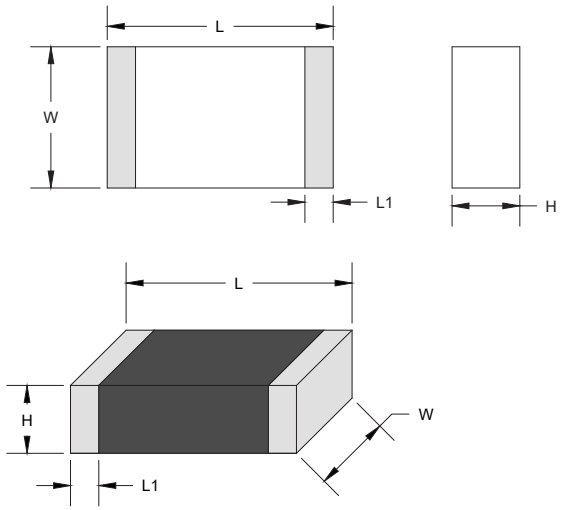
<table>
<tr><th>Items</th><th>Standard</th><th>Test Methods and Remarks</th><th>Requirements</th></tr>
<tr><td>Terminal Strength</td><td>IEC 60068-2-21</td><td>Solder the chip to the testing jig using eutectic solder. Then apply a force in the direction of the arrow.
<table><tr><th>Size</th><th>F</th><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

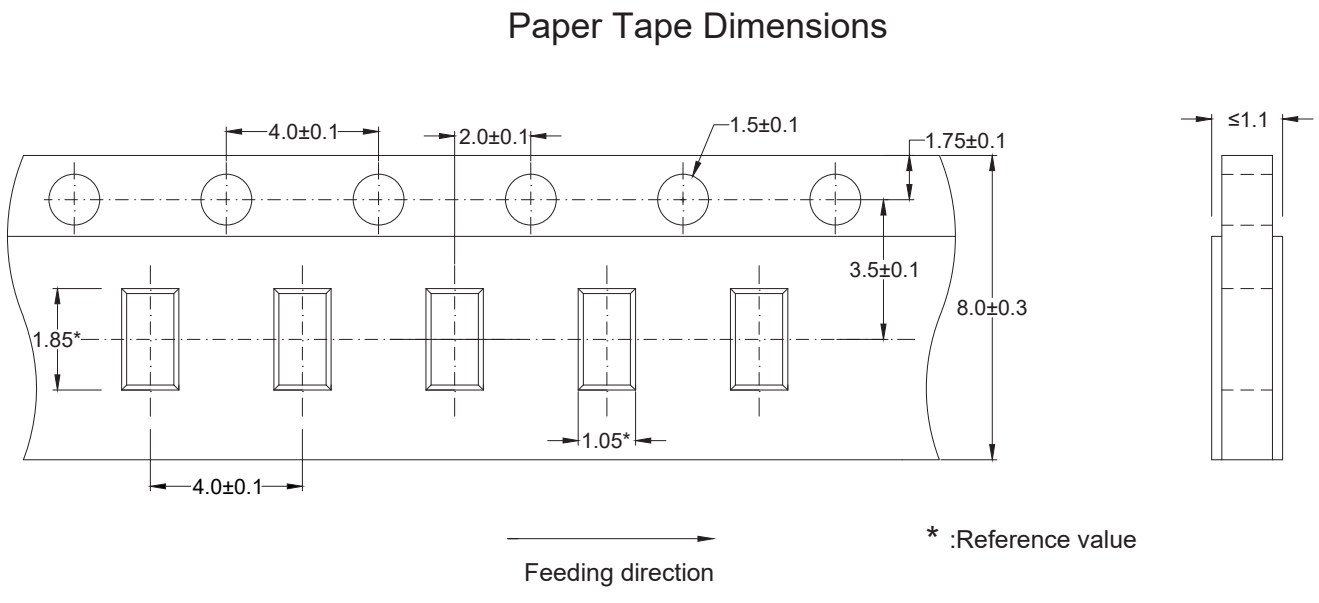


Part Package	L	W	H	L1
	(mm)	(mm)	(mm)	(mm)
0603	1.60±0.15	0.80±0.15	0.80±0.15	0.3±0.20

Ordering Information

PACKAGE	Part Number	DELIVERY MODE	MPQ(PCS)
0603	HNTC0603-104J3950HB	7''REEL	4,000

Packaging Information



R-T Chart

Temp.(℃)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(℃)
-40	3165.97	3452.748	3756.089	8.79%	1.26
-39	2961.799	3227.909	3509.132	8.71%	1.26
-38	2772. 192	3019.247	3280.099	8.64%	1.26
-37	2596.014	2825.494	3067.571	8.57%	1.26
-36	2432.227	2645.486	2870.251	8.50%	1.26
-35	2279.879	2,478. 161	2686.954	8.43%	1.26
-34	2138.098	2322.542	2516.591	8.35%	1.26
-33	2006.083	2177.736	2,358. 168	8.29%	1.26
-32	1883.098	2042.922	2210.77	8.22%	1.26
-31	1768.468	1917.347	2073.562	8. 15%	1.25
-30	1661.574	1800.319	1945.773	8.08%	1.25
-29	1561.843	1691.203	1826.699	8.01%	1.25
-28	1468.751	1589.414	1715.689	7.94%	1.25
-27	1381.814	1494.413	1612.147	7.88%	1.25
-26	1300.587	1405.707	1515.525	7.81%	1.25
-25	1224.66	1322.839	1425.317	7.75%	1.25
-24	1153.501	1245.222	1340.876	7.68%	1.25
-23	1086.938	1172.662	1261.984	7.62%	1.25
-22	1024.646	1104.798	1188.242	7.55%	1.24
-21	966.324	1041.298	1119.284	7.49%	1.24
-20	911.696	981.854	1054.767	7.43%	1.24
-19	860.504	926.182	994.381	7.36%	1.24
-18	812.512	874.02	937.834	7.30%	1.24
-17	767.5	825. 125	884.86	7.24%	1.24
-16	725.265	779.274	835.211	7. 18%	1.24
-15	685.619	736.257	788.658	7. 12%	1.23
-14	648.387	695.883	744.991	7.06%	1.23
-13	613.409	657.974	704.012	7.00%	1.23
-12	580.535	622.365	665.541	6.94%	1.23
-11	549.625	588.902	629.409	6.88%	1.23
-10	520.551	557.444	595.46	6.82%	1.23
-9	493. 192	527.858	563.549	6.76%	1.22
-8	467.437	500.023	533.542	6.70%	1.22
-7	443. 184	473.824	505.315	6.65%	1.22
-6	420.336	449. 155	478.751	6.59%	1.22
-5	398.803	425.92	453.744	6.53%	1.22
-4	378.474	403.995	430. 160	6.48%	1.21
-3	359.305	383.332	407.944	6.42%	1.21
-2	341.222	363.85	387.009	6.36%	1.21
-1	324.158	345.475	367.274	6.31%	1.21
0	308.049	328.139	348.664	6.26%	1.21
1	292.854	311.793	331.127	6.20%	1.2
2	278.497	296.357	314.574	6. 15%	1.20
3	264.928	281.775	298.945	6.09%	1.20
4	252.098	267.995	284. 183	6.04%	1.20
5	239.964	254.969	270.235	5.99%	1.19
6	228.462	242.628	257.027	5.93%	1.19

R-T Chart

Temp.(℃)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(℃)
7	217.580	230.956	244.543	5.88%	1.19
8	207.280	219.915	232.738	5.83%	1.19
9	197.528	209.467	221.572	5.78%	1.18
10	188.291	199.576	211.008	5.73%	1.18
11	179.547	190.215	201.015	5.68%	1.18
12	171.258	181.348	191.552	5.63%	1.18
13	163.398	172.943	182.588	5.58%	1.17
14	155.944	164.976	174.094	5.53%	1.17
15	148.872	157.420	166.043	5.48%	1.17
16	142.158	150.250	158.407	5.43%	1.16
17	135.785	143.448	151.165	5.38%	1.16
18	129.732	136.991	144.294	5.33%	1.16
19	123.985	130.862	137.775	5.28%	1.15
20	118.524	125.041	131.587	5.23%	1.15
21	113.334	119.511	125.711	5. 19%	1.15
22	108.400	114.257	120.130	5. 14%	1.15
23	103.709	109.264	114.829	5.09%	1.14
24	99.246	104.515	109.790	5.05%	1.14
25	95.000	100.000	105.000	5.00%	1.14
26	90.879	95.704	100.533	5.05%	1.15
27	86.960	91.617	96.282	5.09%	1.17
28	83.231	87.726	92.233	5. 14%	1.19
29	79.681	84.021	88.376	5. 18%	1.21
30	76.303	80.493	84.701	5.23%	1.22
31	73.087	77. 133	81.200	5.27%	1.24
32	70.024	73.932	77.864	5.32%	1.26
33	67. 106	70.881	74.682	5.36%	1.28
34	64.325	67.973	71.647	5.41%	1.30
35	61.675	65. 199	68.752	5.45%	1.32
36	59. 148	62.554	65.990	5.49%	1.34
37	56.738	60.030	63.354	5.54%	1.35
38	54.439	57.621	60.837	5.58%	1.37
39	52.246	55.322	58.433	5.62%	1.39
40	50. 153	53. 127	56. 138	5.67%	1.41
41	48. 154	51.030	53.944	5.71%	1.43
42	46.246	49.028	51.848	5.75%	1.45
43	44.423	47. 115	49.844	5.79%	1.47
44	42.682	45.285	47.928	5.84%	1.49
45	41.018	43.537	46.096	5.88%	1.51
46	39.429	41.867	44.345	5.92%	1.53
47	37.911	40.270	42.670	5.96%	1.55
48	36.458	38.743	41.067	6.00%	1.57
49	35.069	37.281	39.533	6.04%	1.59
50	33.740	35.882	38.064	6.08%	1.61
51	32.469	34.543	36.657	6. 12%	1.63
52	31.252	33.260	35.310	6. 16%	1.65
53	30.086	32.032	34.019	6.20%	1.67

R-T Chart

Temp.(℃)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(℃)
54	28.970	30.856	32.782	6.24%	1.69
55	27.902	29.729	31.596	6.28%	1.71
56	26.878	28.649	30.459	6.32%	1.73
57	25.897	27.613	29.369	6.36%	1.75
58	24.957	26.620	28.324	6.40%	1.77
59	24.056	25.669	27.321	6.44%	1.79
60	23. 192	24.755	26.359	6.48%	1.81
61	22.364	23.881	25.437	6.51%	1.84
62	21.571	23.042	24.552	6.55%	1.86
63	20.810	22.237	23.702	6.59%	1.88
64	20.079	21.464	22.886	6.63%	1.90
65	19.378	20.721	22. 103	6.67%	1.92
66	18.703	20.007	21.348	6.70%	1.94
67	18.056	19.321	20.623	6.74%	1.96
68	17.433	18.661	19.926	6.78%	1.99
69	16.835	18.028	19.256	6.81%	2.01
70	16.261	17.419	18.612	6.85%	2.03
71	15.712	16.836	17.996	6.89%	2.05
72	15.184	16.276	17.403	6.92%	2.08
73	14.677	15.738	16.833	6.96%	2. 10
74	14.189	15.220	16.284	7.00%	2. 12
75	13.720	14.721	15.756	7.03%	2. 14
76	13.267	14.240	15.247	7.07%	2. 17
77	12.832	13.777	14.756	7. 10%	2. 19
78	12.413	13.332	14.283	7. 14%	2.21
79	12.009	12.903	13.828	7. 17%	2.23
80	11.621	12.490	13.390	7.21%	2.26
81	11.248	12.093	12.969	7.24%	2.28
82	10.889	11.711	12.563	7.28%	2.30
83	10.544	11.343	12.172	7.31%	2.33
84	10.211	10.988	11.795	7.34%	2.35
85	9.890	10.646	11.431	7.38%	2.37
86	9.580	10.316	11.081	7.41%	2.40
87	9.282	9.999	10.743	7.45%	2.42
88	8.995	9.692	10.417	7.48%	2.45
89	8.718	9.396	10.102	7.51%	2.47
90	8.450	9.111	9.798	7.55%	2.49
91	8.193	8.836	9.506	7.58%	2.52
92	7.944	8.570	9.223	7.61%	2.54
93	7.704	8.314	8.950	7.64%	2.57
94	7.473	8.066	8.686	7.68%	2.59
95	7.249	7.828	8.431	7.71%	2.62
96	7.034	7.598	8.186	7.74%	2.64
97	6.827	7.376	7.949	7.77%	2.67
98	6.627	7.162	7.721	7.81%	2.69
99	6.433	6.955	7.500	7.84%	2.72
100	6.246	6.755	7.286	7.87%	2.74

R-T Chart

Temp.(℃)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(℃)
101	6.066	6.561	7.080	7.90%	2.77
102	5.891	6.374	6.880	7.93%	2.79
103	5.723	6. 194	6.687	7.96%	2.82
104	5.559	6.019	6.500	7.99%	2.84
105	5.402	5.850	6.319	8.02%	2.87
106	5.249	5.686	6. 144	8.05%	2.89
107	5.102	5.528	5.975	8.08%	2.92
108	4.960	5.375	5.812	8. 11%	2.95
109	4.821	5.227	5.653	8. 15%	2.97
110	4.688	5.084	5.500	8. 18%	3.00
111	4.559	4.945	5.351	8.21%	3.02
112	4.434	4.811	5.207	8.23%	3.05
113	4.313	4.681	5.068	8.26%	3.08
114	4. 196	4.555	4.933	8.29%	3.10
115	4.082	4.433	4.802	8.32%	3.13
116	3.973	4.316	4.676	8.35%	3.16
117	3.867	4.202	4.554	8.38%	3.18
118	3.765	4.092	4.436	8.41%	3.21
119	3.666	3.985	4.321	8.44%	3.24
120	3.569	3.881	4.210	8.47%	3.26
121	3.476	3.781	4. 102	8.50%	3.29
122	3.386	3.684	3.998	8.52%	3.32
123	3.298	3.589	3.896	8.55%	3.35
124	3.213	3.498	3.798	8.58%	3.37
125	3. 131	3.409	3.703	8.61%	3.40