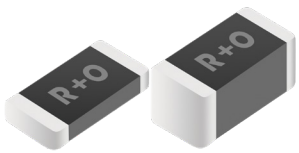
Chip NTC Thermistor Datasheet

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



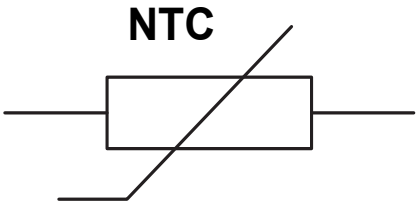
Applications

- 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

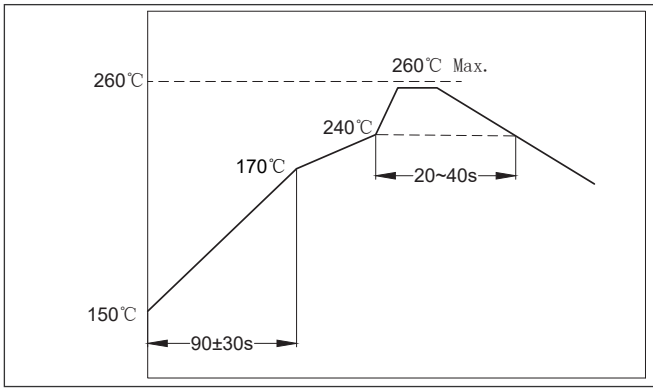
H NTC □□□□ - □□□ F □□□□ F B
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

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°C/85°C B: 25°C/50°C



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	50±1%	KΩ
B Constant (Material Constant)	25°C /50°C	4150±1%	K
Permissible Operating Current	T_a=25°C ±0.1°C	0.13	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:

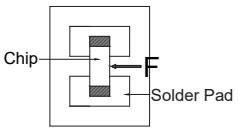
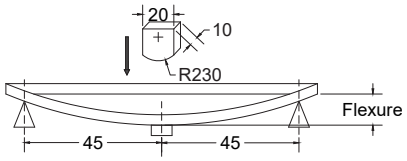
Items	Condition
Ambient Temperature:	25±2°C
Relative Humidity:	65±5%
Air Pressure:	86kPa to 106kPa

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

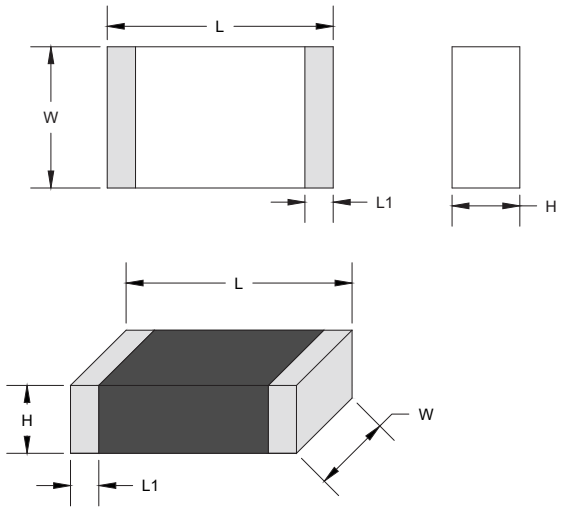
<table>
<tr><th>Items</th><th>Standard</th><th>Test Methods and Remarks</th><th>Requirements</th></tr>
<tr><td>Terminal Strength</td><td>IEC 60068-2-21</td><td>Solder the chip to the testing jig using eutectic solder. Then apply a force in the direction of the arrow.
<table><tr><th>Size</th><th>F</th>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

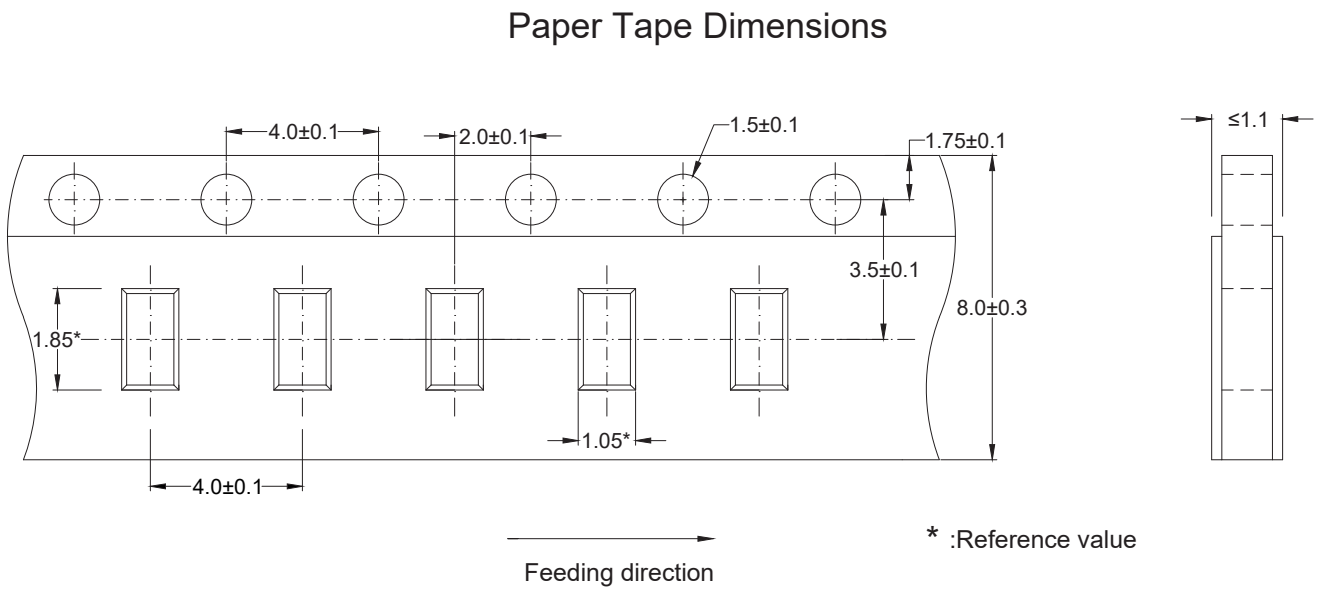


Part Package	L	W	H	L1
	(mm)	(mm)	(mm)	(mm)
0603	1.60±0.15	0.80±0.15	0.80±0.15	0.3±0.20

Ordering Information

PACKAGE	Part Number	DELIVERY MODE	MPQ(PCS)
0603	HNTC0603-503F4150FB	7''REEL	4,000

Packaging Information



R-T Chart

Temp.(℃)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(℃)
-40	1918.959	2011.294	2107.861	4.80%	0.66
-39	1786.274	1870.871	1959.277	4.73%	0.66
-38	1663.778	1741.323	1822.3	4.65%	0.65
-37	1550.615	1621.731	1695.939	4.58%	0.65
-36	1446.007	1511.259	1579.298	4.50%	0.64
-35	1363.849	1424.552	1487.808	4.44%	0.64
-34	1273.04	1328.776	1386.813	4.37%	0.63
-33	1188.959	1240.158	1293.431	4.30%	0.62
-32	1111.061	1158.112	1207.035	4.22%	0.62
-31	1038.848	1082.106	1127.053	4. 15%	0.61
-30	981.303	1021.577	1063.397	4.09%	0.61
-29	918.335	955.384	993.829	4.02%	0.6
-28	859.873	893.969	929.325	3.95%	0.6
-27	805.563	836.954	869.481	3.89%	0.59
-26	755.082	783.993	813.93	3.82%	0.59
-25	714.255	741.187	769.057	3.76%	0.58
-24	670.052	694.869	720.533	3.69%	0.57
-23	628.906	651.781	675.421	3.63%	0.57
-22	590.585	611.677	633.46	3.56%	0.56
-21	554.875	574.33	594.408	3.50%	0.56
-20	525.25	543.366	562.05	3.44%	0.55
-19	493.884	510.601	527.83	3.37%	0.54
-18	464.616	480.045	495.937	3.31%	0.54
-17	437.29	451.535	466.198	3.25%	0.53
-16	411.766	424.921	438.453	3. 18%	0.53
-15	390.289	402.541	415.135	3. 13%	0.52
-14	367.784	379.102	390.729	3.07%	0.51
-13	346.735	357.192	367.928	3.01%	0.51
-12	327.038	336.703	346.618	2.94%	0.5
-11	308.598	317.531	326.69	2.88%	0.49
-10	292.858	301.176	309.7	2.83%	0.49
-9	276.541	284.231	292.106	2.77%	0.48
-8	261.246	268.356	275.633	2.71%	0.47
-7	246.902	253.478	260.202	2.65%	0.47
-6	233.445	239.526	245.741	2.59%	0.46
-5	221.708	227.365	233.143	2.54%	0.45
-4	209.767	214.999	220.34	2.48%	0.45
-3	198.55	203.39	208.326	2.43%	0.44
-2	188.009	192.486	197.049	2.37%	0.43
-1	178.1	182.24	186.459	2.31%	0.42
0	169.39	173.24	177.16	2.26%	0.42
1	160.563	164.124	167.747	2.21%	0.41
2	152.255	155.548	158.897	2. 15%	0.40
3	144.433	147.478	150.573	2. 10%	0.40
4	137.064	139.880	142.740	2.04%	0.39
5	130.460	133.074	135.726	1.99%	0.38
6	123.880	126.296	128.746	1.94%	0.37

R-T Chart

Temp.(℃)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(℃)
7	117.675	119.908	122.171	1.89%	0.36
8	111.822	113.885	115.975	1.83%	0.36
9	106.299	108.205	110.134	1.78%	0.35
10	101.278	103.044	104.829	1.73%	0.34
11	96.331	97.961	99.608	1.68%	0.33
12	91.658	93.162	94.681	1.63%	0.33
13	87.242	88.629	90.029	1.58%	0.32
14	83.067	84.346	85.636	1.53%	0.31
15	79.219	80.400	81.590	1.48%	0.30
16	75.469	76.557	77.653	1.43%	0.29
17	71.921	72.922	73.930	1.38%	0.29
18	68.563	69.483	70.410	1.33%	0.28
19	65.382	66.229	67.079	1.28%	0.27
20	62.405	63.183	63.964	1.24%	0.26
21	59.542	60.256	60.972	1. 19%	0.25
22	56.828	57.482	58.138	1. 14%	0.24
23	54.255	54.854	55.454	1.09%	0.23
24	51.815	52.363	52.911	1.05%	0.23
25	49.500	50.000	50.500	1.00%	0.22
26	47.254	47.753	48.253	1.05%	0.23
27	45.124	45.621	46.120	1.09%	0.24
28	43.102	43.598	44.094	1. 14%	0.25
29	41.184	41.676	42.170	1. 18%	0.26
30	39.341	39.829	40.318	1.23%	0.27
31	37.608	38.092	38.577	1.28%	0.29
32	35.963	36.441	36.922	1.32%	0.30
33	34.399	34.872	35.348	1.36%	0.31
34	32.913	33.380	33.850	1.41%	0.32
35	31.466	31.927	32.391	1.45%	0.34
36	30.121	30.575	31.033	1.50%	0.35
37	28.841	29.289	29.740	1.54%	0.36
38	27.624	28.064	28.509	1.58%	0.37
39	26.465	26.898	27.336	1.63%	0.38
40	25.321	25.747	26.177	1.67%	0.40
41	24.269	24.688	25.111	1.72%	0.41
42	23.268	23.679	24.095	1.76%	0.42
43	22.313	22.717	23.126	1.80%	0.44
44	21.404	21.800	22.202	1.84%	0.45
45	20.498	20.886	21.280	1.89%	0.46
46	19.671	20.052	20.438	1.93%	0.47
47	18.882	19.256	19.635	1.97%	0.49
48	18.130	18.496	18.867	2.01%	0.50
49	17.411	17.770	18.135	2.05%	0.51
50	16.683	17.034	17.390	2.09%	0.53
51	16.028	16.372	16.721	2. 13%	0.54
52	15.403	15.740	16.082	2. 17%	0.55
53	14.806	15.136	15.471	2.21%	0.57

R-T Chart

Temp.(℃)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(℃)
54	14.236	14.558	14.887	2.25%	0.58
55	13.653	13.968	14.289	2.30%	0.59
56	13.132	13.441	13.754	2.34%	0.61
57	12.635	12.936	13.243	2.37%	0.62
58	12.158	12.453	12.754	2.41%	0.64
59	11.703	11.991	12.285	2.45%	0.65
60	11.231	11.512	11.800	2.49%	0.66
61	10.814	11.089	11.370	2.53%	0.68
62	10.415	10.684	10.959	2.57%	0.69
63	10.033	10.296	10.565	2.61%	0.71
64	9.668	9.924	10.187	2.65%	0.72
65	9.284	9.534	9.791	2.69%	0.74
66	8.949	9.193	9.444	2.73%	0.75
67	8.627	8.867	9.111	2.76%	0.77
68	8.319	8.553	8.793	2.80%	0.78
69	8.024	8.252	8.486	2.84%	0.79
70	7.714	7.936	8.165	2.88%	0.81
71	7.443	7.660	7.883	2.91%	0.82
72	7.182	7.395	7.613	2.95%	0.84
73	6.933	7.140	7.354	2.98%	0.85
74	6.693	6.896	7.104	3.02%	0.87
75	6.435	6.633	6.836	3.06%	0.88
76	6.215	6.408	6.606	3. 10%	0.90
77	6.003	6.192	6.386	3. 13%	0.92
78	5.800	5.984	6.174	3. 17%	0.93
79	5.605	5.785	5.970	3.20%	0.95
80	5.394	5.570	5.750	3.24%	0.96
81	5.214	5.386	5.562	3.28%	0.98
82	5.041	5.209	5.381	3.31%	0.99
83	4.875	5.039	5.207	3.34%	1.01
84	4.715	4.875	5.040	3.38%	1.03
85	4.541	4.696	4.857	3.42%	1.04
86	4.393	4.545	4.702	3.45%	1.06
87	4.251	4.400	4.553	3.48%	1.07
88	4.114	4.260	4.410	3.52%	1.09
89	3.983	4.125	4.271	3.55%	1.11
90	3.838	3.976	4.119	3.59%	1.12
91	3.716	3.851	3.991	3.62%	1.14
92	3.599	3.731	3.867	3.66%	1.16
93	3.486	3.615	3.748	3.69%	1.17
94	3.377	3.503	3.634	3.72%	1.19
95	3.258	3.381	3.508	3.76%	1.21
96	3.157	3.277	3.401	3.79%	1.22
97	3.060	3.178	3.299	3.82%	1.24
98	2.967	3.081	3.200	3.85%	1.26
99	2.876	2.988	3.105	3.89%	1.27
100	2.774	2.884	2.997	3.92%	1.29

R-T Chart

Temp.(℃)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(℃)
101	2.691	2.797	2.908	3.95%	1.31
102	2.610	2.714	2.823	3.99%	1.33
103	2.532	2.634	2.740	4.02%	1.34
104	2.457	2.557	2.660	4.05%	1.36
105	2.373	2.470	2.571	4.08%	1.38
106	2.303	2.398	2.496	4. 11%	1.40
107	2.235	2.328	2.425	4. 15%	1.41
108	2.170	2.261	2.356	4. 18%	1.43
109	2.107	2.196	2.289	4.21%	1.45
110	2.036	2.123	2.213	4.24%	1.47
111	1.978	2.062	2.150	4.27%	1.48
112	1.921	2.004	2.090	4.30%	1.50
113	1.867	1.948	2.032	4.33%	1.52
114	1.814	1.893	1.976	4.36%	1.54
115	1.753	1.830	1.911	4.40%	1.56
116	1.704	1.780	1.858	4.43%	1.58
117	1.656	1.730	1.808	4.46%	1.59
118	1.610	1.683	1.758	4.48%	1.61
119	1.566	1.637	1.711	4.51%	1.63
120	1.516	1.585	1.657	4.55%	1.65
121	1.474	1.542	1.612	4.58%	1.67
122	1.434	1.500	1.569	4.60%	1.69
123	1.395	1.460	1.527	4.63%	1.71
124	1.357	1.421	1.487	4.66%	1.73
125	1.313	1.375	1.440	4.70%	1.74