

Chip NTC Thermistor Datasheet

Features

- Leadless , Size 0603
- SMD type suitable for high density mounting
- B constant tolerance $\pm 1\%$
- Excellent solder ability
- Operating temperature: -40°C to $+125^{\circ}\text{C}$
- RoHS compliant & Lead-Free & Halogen Free

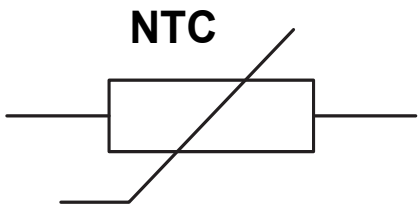
Applications

- 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

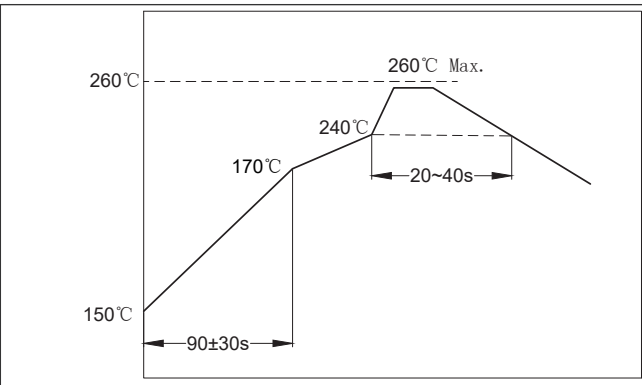
H NTC - F F B
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

- 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 (Tp)		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 /50°C	3380±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

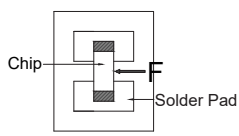
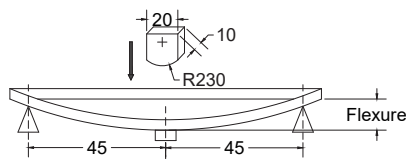
● Test and Measurement Procedures

Unless otherwise specified, the standard atmospheric conditions for measurement/test as: <table><tr><th>Items</th><th>Condition</th></tr><tr><td>Ambient Temperature:</td><td>20±15°C</td></tr><tr><td>Relative Humidity:</td><td>65±20%</td></tr><tr><td>Air Pressure:</td><td>86kPa to 106kPa</td></tr></table> Inspection Equipment 1.Visual Examination: 20× magnifier 2.Resistance value test: Thermistor resistance tester	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: <table><tr><th>Items</th><th>Condition</th></tr><tr><td>Ambient Temperature:</td><td>25±2°C</td></tr><tr><td>Relative Humidity:</td><td>65±5%</td></tr><tr><td>Air Pressure:</td><td>86kPa to 106kPa</td></tr></table>	Items	Condition	Ambient Temperature:	25±2°C	Relative Humidity:	65±5%	Air Pressure:	86kPa to 106kPa
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● 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 . $B(25/50^{\circ}\text{C}) = \frac{\ln R_{25} - \ln R_{50}}{1/T_{25} - 1/T_{50}} \quad B(25/85^{\circ}\text{C}) = \frac{\ln R_{25} - \ln R_{85}}{1/T_{25} - 1/T_{85}}$
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

Items	Standard	Test Methods and Remarks	Requirements															
Terminal Strength	IEC 60068-2-21	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>	Size	F	Duration	0402, 0603	5N	10±1s	0805	10N	10±1s	No removal or split of the termination or other defects shall occur. 						
Size	F	Duration																
0402, 0603	5N	10±1s																
0805	10N	10±1s																
Resistance to Flexure	IEC 60068-2-21	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>	Size	Flexure	Speed	Duration	0402, 0603	1mm	< 0.5mm/s	10±1s	0805	2mm	< 0.5mm/s	10±1s	No visible damage. Δ R25/R25 ≤ 5%			
Size	Flexure	Speed	Duration															
0402, 0603	1mm	< 0.5mm/s	10±1s															
0805	2mm	< 0.5mm/s	10±1s															
Dropping	IEC 60068-2-32	Drop a chip 10 times on a concrete floor from a height of 1 meter.	No visible damage.															
Solderability	IEC 60068-2-58	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	No visible damage Wetting shall exceed 95% coverage.															
Resistance to Soldering Heat	IEC 60068-2-58	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	No visible damage. Δ R25/R25 ≤ 5% Δ B/B ≤ 2%															
Temperature cycling	IEC 60068-2-14	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.	Step	Temperature	Period	1	-40±5°C	30±3min	2	Room Temperature	5±3min	3	125±2°C	30±3min	4	Room Temperature	5±3min	No visible damage Δ R25/R25 ≤ 3% Δ B/B ≤ 2%
Step	Temperature	Period																
1	-40±5°C	30±3min																
2	Room Temperature	5±3min																
3	125±2°C	30±3min																
4	Room Temperature	5±3min																
Resistance to dry heat	IEC 60068-2-2	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	No visible damage. Δ R25/R25 ≤ 5% Δ B/B ≤ 2%															
Resistance to cold	IEC 60068-2- 1	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.	No visible damage. Δ R25/R25 ≤ 5% Δ B/B ≤ 2%															
Resistance to damp heat	IEC 60068-2-78	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.	No visible damage. Δ R25/R25 ≤ 3% Δ B/B ≤ 2%															
Resistance to high temperature load	IEC 60539-1 5.25.4	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	No visible damage. Δ R25/R25 ≤ 5% Δ B/B ≤ 2%															

● 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

Top view: L, W, L1
Side view: H
Perspective view: L, W, H, L1

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	HNTC0603-103F3380FB	7" REEL	4,000

● Packaging Information

Paper Tape Dimensions

Top view dimensions: 4.0±0.1, 2.0±0.1, 1.5±0.1, 1.75±0.1, 3.5±0.1, 8.0±0.3, 1.85*, 1.05*, 4.0±0.1
Side view dimension: ≤1.1

Feeding direction →

* :Reference value

● R-T Chart

Temp.(°C)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(°C)
-40	195.784	203.814	212.153	4.09%	0.69
-39	185.358	192.854	200.633	4.03%	0.69
-38	175.541	182.539	189.798	3.98%	0.68
-37	166.293	172.828	179.603	3.92%	0.68
-36	157.580	163.684	170.007	3.86%	0.67
-35	149.368	155.070	160.973	3.81%	0.67
-34	141.626	146.953	152.466	3.75%	0.66
-33	134.325	139.303	144.452	3.70%	0.66
-32	127.439	132.091	136.900	3.64%	0.65
-31	120.941	125.290	129.783	3.59%	0.65
-30	114.808	118.874	123.072	3.53%	0.64
-29	109.018	112.820	116.743	3.48%	0.63
-28	103.550	107.106	110.773	3.42%	0.63
-27	98.385	101.711	105.139	3.37%	0.62
-26	93.505	96.616	99.821	3.32%	0.62
-25	88.892	91.803	94.800	3.26%	0.61
-24	84.531	87.255	90.057	3.21%	0.61
-23	80.407	82.956	85.577	3.16%	0.60
-22	76.506	78.892	81.343	3.11%	0.60
-21	72.815	75.048	77.341	3.06%	0.59
-20	69.321	71.411	73.557	3.01%	0.58
-19	66.013	67.970	69.979	2.95%	0.58
-18	62.881	64.713	66.593	2.90%	0.57
-17	59.914	61.630	63.388	2.85%	0.57
-16	57.103	58.709	60.355	2.80%	0.56
-15	54.438	55.943	57.484	2.75%	0.55
-14	51.912	53.321	54.764	2.70%	0.55
-13	49.517	50.837	52.187	2.66%	0.54
-12	47.244	48.481	49.745	2.61%	0.54
-11	45.088	46.247	47.430	2.56%	0.53
-10	43.042	44.127	45.235	2.51%	0.52
-9	41.100	42.117	43.154	2.46%	0.52
-8	39.256	40.208	41.179	2.42%	0.51
-7	37.504	38.396	39.305	2.37%	0.50
-6	35.840	36.675	37.527	2.32%	0.50
-5	34.258	35.041	35.838	2.27%	0.49
-4	32.755	33.488	34.234	2.23%	0.48
-3	31.326	32.012	32.711	2.18%	0.48
-2	29.966	30.609	31.263	2.14%	0.47
-1	28.673	29.276	29.888	2.09%	0.46
0	27.443	28.007	28.580	2.05%	0.45
1	26.272	26.800	27.336	2.00%	0.45
2	25.157	25.651	26.153	1.96%	0.44
3	24.095	24.558	25.027	1.91%	0.43
4	23.084	23.517	23.956	1.87%	0.43
5	22.120	22.526	22.937	1.82%	0.42
6	21.202	21.582	21.966	1.78%	0.41

● R-T Chart

Temp.(°C)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(°C)
7	20.327	20.682	21.041	1.74%	0.40
8	19.493	19.825	20.161	1.69%	0.40
9	18.697	19.008	19.322	1.65%	0.39
10	17.938	18.229	18.522	1.61%	0.38
11	17.214	17.485	17.759	1.57%	0.37
12	16.523	16.777	17.032	1.52%	0.37
13	15.863	16.100	16.339	1.48%	0.36
14	15.234	15.455	15.677	1.44%	0.35
15	14.632	14.838	15.046	1.40%	0.34
16	14.057	14.250	14.443	1.36%	0.33
17	13.508	13.688	13.868	1.32%	0.33
18	12.984	13.151	13.319	1.28%	0.32
19	12.482	12.638	12.794	1.24%	0.31
20	12.003	12.148	12.293	1.20%	0.30
21	11.544	11.679	11.814	1.16%	0.29
22	11.106	11.231	11.356	1.12%	0.29
23	10.686	10.802	10.919	1.08%	0.28
24	10.284	10.392	10.500	1.04%	0.27
25	9.900	10.000	10.100	1.00%	0.26
26	9.525	9.625	9.725	1.04%	0.27
27	9.166	9.265	9.365	1.08%	0.28
28	8.822	8.921	9.021	1.12%	0.30
29	8.493	8.592	8.691	1.15%	0.31
30	8.178	8.276	8.375	1.19%	0.32
31	7.876	7.974	8.072	1.23%	0.33
32	7.587	7.684	7.781	1.27%	0.34
33	7.310	7.406	7.503	1.30%	0.36
34	7.045	7.140	7.236	1.34%	0.37
35	6.790	6.885	6.979	1.38%	0.38
36	6.547	6.640	6.734	1.41%	0.39
37	6.313	6.405	6.498	1.45%	0.41
38	6.088	6.180	6.271	1.49%	0.42
39	5.873	5.963	6.054	1.52%	0.43
40	5.667	5.756	5.846	1.56%	0.44
41	5.469	5.556	5.645	1.60%	0.46
42	5.278	5.365	5.453	1.63%	0.47
43	5.096	5.181	5.268	1.67%	0.48
44	4.921	5.005	5.090	1.70%	0.50
45	4.752	4.835	4.919	1.74%	0.51
46	4.590	4.672	4.755	1.77%	0.52
47	4.435	4.515	4.597	1.81%	0.54
48	4.285	4.365	4.445	1.84%	0.55
49	4.142	4.220	4.299	1.88%	0.56
50	4.004	4.081	4.159	1.91%	0.58
51	3.871	3.947	4.023	1.94%	0.59
52	3.743	3.818	3.893	1.98%	0.60
53	3.621	3.694	3.768	2.01%	0.62

● R-T Chart

Temp.(°C)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(°C)
54	3.502	3.574	3.647	2.04%	0.63
55	3.389	3.459	3.531	2.08%	0.65
56	3.279	3.349	3.419	2.11%	0.66
57	3.174	3.242	3.312	2.14%	0.67
58	3.072	3.140	3.208	2.18%	0.69
59	2.975	3.041	3.108	2.21%	0.70
60	2.881	2.945	3.011	2.24%	0.72
61	2.790	2.854	2.918	2.27%	0.73
62	2.702	2.765	2.829	2.31%	0.75
63	2.618	2.680	2.742	2.34%	0.76
64	2.537	2.598	2.659	2.37%	0.78
65	2.459	2.518	2.579	2.40%	0.79
66	2.384	2.442	2.501	2.43%	0.81
67	2.311	2.368	2.426	2.47%	0.82
68	2.241	2.297	2.354	2.50%	0.84
69	2.173	2.228	2.284	2.53%	0.85
70	2.108	2.162	2.217	2.56%	0.87
71	2.045	2.098	2.152	2.59%	0.88
72	1.984	2.036	2.089	2.62%	0.90
73	1.925	1.976	2.029	2.65%	0.91
74	1.868	1.919	1.970	2.68%	0.93
75	1.814	1.863	1.914	2.71%	0.94
76	1.761	1.809	1.859	2.74%	0.96
77	1.710	1.757	1.806	2.77%	0.97
78	1.660	1.707	1.755	2.80%	0.99
79	1.613	1.658	1.705	2.83%	1.00
80	1.567	1.612	1.658	2.86%	1.02
81	1.522	1.566	1.611	2.89%	1.04
82	1.479	1.522	1.567	2.92%	1.05
83	1.437	1.480	1.523	2.95%	1.07
84	1.397	1.439	1.482	2.98%	1.09
85	1.358	1.399	1.441	3.01%	1.10
86	1.320	1.361	1.402	3.03%	1.12
87	1.284	1.324	1.364	3.06%	1.13
88	1.249	1.288	1.327	3.09%	1.15
89	1.215	1.253	1.292	3.12%	1.17
90	1.182	1.219	1.257	3.15%	1.18
91	1.150	1.186	1.224	3.18%	1.20
92	1.119	1.155	1.192	3.20%	1.22
93	1.089	1.124	1.160	3.23%	1.23
94	1.060	1.094	1.130	3.26%	1.25
95	1.032	1.066	1.101	3.29%	1.27
96	1.004	1.038	1.072	3.31%	1.29
97	0.978	1.011	1.045	3.34%	1.30
98	0.952	0.985	1.018	3.37%	1.32
99	0.928	0.959	0.992	3.40%	1.34
100	0.904	0.935	0.967	3.42%	1.36

● R-T Chart

Temp.(°C)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(°C)
101	0.880	0.911	0.942	3.45%	1.37
102	0.858	0.888	0.918	3.48%	1.39
103	0.836	0.865	0.895	3.50%	1.41
104	0.815	0.843	0.873	3.53%	1.43
105	0.794	0.822	0.852	3.56%	1.44
106	0.774	0.802	0.831	3.58%	1.46
107	0.755	0.782	0.810	3.61%	1.48
108	0.736	0.763	0.790	3.63%	1.50
109	0.718	0.744	0.771	3.66%	1.52
110	0.700	0.726	0.752	3.68%	1.53
111	0.683	0.708	0.734	3.71%	1.55
112	0.666	0.691	0.717	3.74%	1.57
113	0.650	0.674	0.700	3.76%	1.59
114	0.634	0.658	0.683	3.79%	1.61
115	0.619	0.642	0.667	3.81%	1.63
116	0.604	0.627	0.651	3.84%	1.65
117	0.589	0.612	0.636	3.86%	1.66
118	0.575	0.598	0.621	3.89%	1.68
119	0.562	0.584	0.607	3.91%	1.70
120	0.549	0.570	0.593	3.93%	1.72
121	0.536	0.557	0.579	3.96%	1.74
122	0.523	0.544	0.566	3.98%	1.76
123	0.511	0.532	0.553	4.01%	1.78
124	0.499	0.519	0.540	4.03%	1.80
125	0.488	0.508	0.528	4.06%	1.82