

Chip NTC Thermistor Datasheet

● Features

- Leadless , Size 0805
- 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

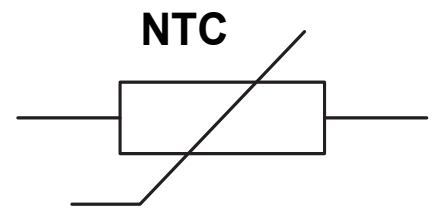
● Applications

- 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

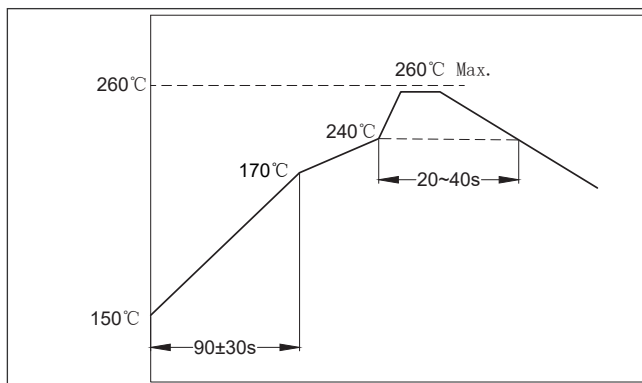
H **NTC** □□□□ - □□□ **F** □□□□ **F** **B**
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

- 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 (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	220±1%	KΩ
B Constant (Material Constant)	25°C /50°C	4250±1%	K
Permissible Operating Current	T _a =25°C ±0.1°C	0.14	mA
Thermal Dissipation Constant	T _a =25°C ±0.1°C	2.0	mW/°C
Thermal Time Constant	T _a =25°C ±0.1°C	< 5	sec
Rated Electric Power	T _a =25°C ±0.1°C	200	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 . $B(25/50^{\circ}\text{C}) = \frac{\ln R_{25} - \ln R_{50}}{1/T_{25} - 1/T_{50}} \quad B(25/85^{\circ}\text{C}) = \frac{\ln R_{25} - \ln R_{85}}{1/T_{25} - 1/T_{85}}$
Thermal Time Constant	The total time for the temperature of the thermistor to change by 63.2% of the difference from ambient temperature T ₀ (°C) to T ₁ (°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.

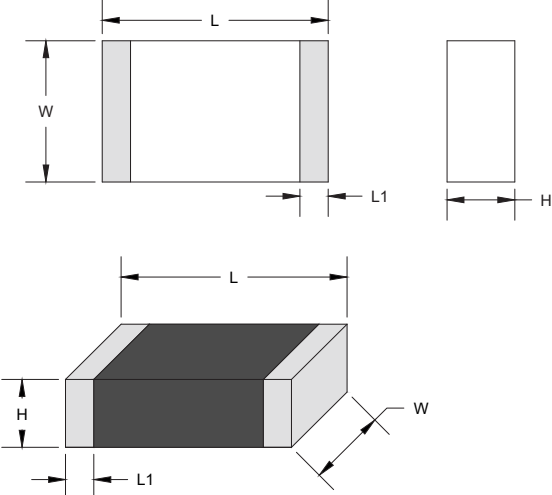
● Reliability Test

Items	Standard	Test Methods and Remarks	Requirements															
Terminal Strength	IEC 60068-2-21	<p>Solder the chip to the testing jig using eutectic solder. Then apply a force in the direction of the arrow.</p> <table border="1"> <thead> <tr> <th>Size</th> <th>F</th> <th>Duration</th> </tr> </thead> <tbody> <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> </tbody> </table>	Size	F	Duration	0402, 0603	5N	10±1s	0805	10N	10±1s	<p>No removal or split of the termination or other defects shall occur.</p>						
Size	F	Duration																
0402, 0603	5N	10±1s																
0805	10N	10±1s																
Resistance to Flexure	IEC 60068-2-21	<p>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;</p> <table border="1"> <thead> <tr> <th>Size</th> <th>Flexure</th> <th>Speed</th> <th>Duration</th> </tr> </thead> <tbody> <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> </tbody> </table>	Size	Flexure	Speed	Duration	0402, 0603	1mm	< 0.5mm/s	10±1s	0805	2mm	< 0.5mm/s	10±1s	<p>No visible damage. Δ R25/R25 ≤ 5%</p>			
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	<ol style="list-style-type: none"> Solder temperature: 245±5°C Duration: 3±0.3s Solder: Sn/3.0Ag/0.5Cu 25% Resin and 75% ethanol in weight 	<p>No visible damage Wetting shall exceed 95% coverage.</p>															
Resistance to Soldering Heat	IEC 60068-2-58	<ol style="list-style-type: none"> Solder temperature: 260±5°C Duration: 10±1s Solder: Sn/3.0Ag/0.5Cu 25% Resin and 75% ethanol in weight The chip shall be stabilized at normal condition for 1~2 hours before measuring 	<p>No visible damage. Δ R25/R25 ≤ 5% Δ B/B ≤ 2%</p>															
Temperature cycling	IEC 60068-2-14	<ol style="list-style-type: none"> 5 cycles of following sequence without loading. <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature</th> <th>Period</th> </tr> </thead> <tbody> <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> </tbody> </table> <ol style="list-style-type: none"> 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	<p>No visible damage Δ R25/R25 ≤ 3% Δ B/B ≤ 2%</p>
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	<ol style="list-style-type: none"> 125±5°C in air, for 1000±24 hours without loading The chip shall be stabilized at normal condition for 1~2 hours before measuring 	<p>No visible damage. Δ R25/R25 ≤ 5% Δ B/B ≤ 2%</p>															
Resistance to cold	IEC 60068-2-1	<ol style="list-style-type: none"> -40±3°C in air, for 1000±24 hours without loading. The chip shall be stabilized at normal condition for 1~2 hours before measuring. 	<p>No visible damage. Δ R25/R25 ≤ 5% Δ B/B ≤ 2%</p>															
Resistance to damp heat	IEC 60068-2-78	<ol style="list-style-type: none"> 40±2°C, 90~95%RH in air, for 1000±24 hours without loading The chip shall be stabilized at normal condition for 1~2 hours before measuring. 	<p>No visible damage. Δ R25/R25 ≤ 3% Δ B/B ≤ 2%</p>															
Resistance to high temperature load	IEC 60539-1 5.25.4	<ol style="list-style-type: none"> 85±2°C in air with permissive operating current for 1000±48 hours The chip shall be stabilized at normal condition for 1~2 hours before measuring 	<p>No visible damage. Δ R25/R25 ≤ 5% Δ B/B ≤ 2%</p>															

● 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



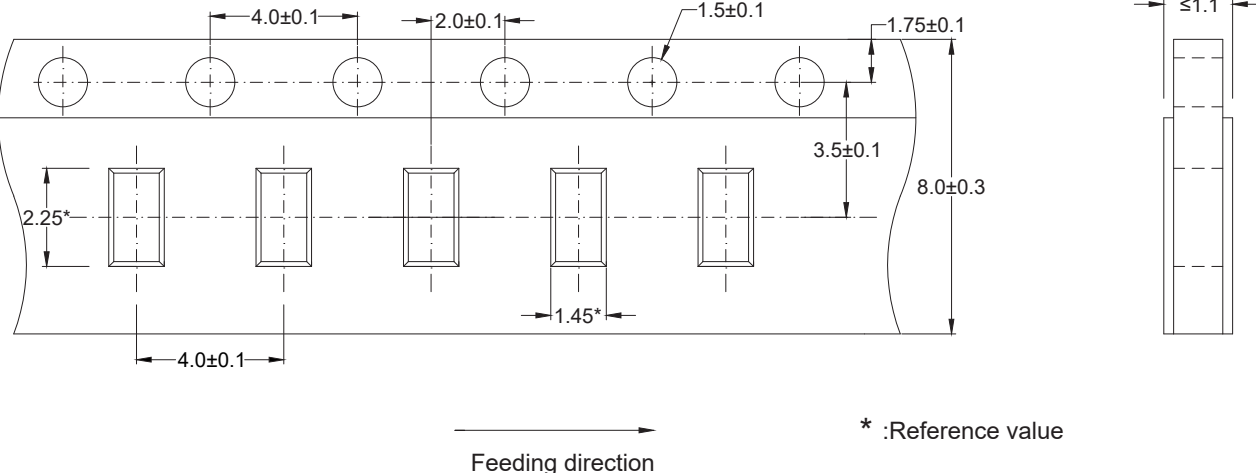
Part Package	L	W	H	L1
	(mm)	(mm)	(mm)	(mm)
0805	2.00±0.20	1.25±0.20	0.85±0.20	0.5±0.30

● Ordering Information

PACKAGE	Part Number	DELIVERY MODE	MPQ(PCS)
0805	HNTC0805-224F4250FB	7" REEL	4,000

● Packaging Information

Paper Tape Dimensions



Feeding direction

* :Reference value

● R-T Chart

Temp.(°C)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(°C)
-40	9,221.349	9,673.662	10,147.148	4.89%	0.66
-39	8,589.461	9,004.322	9,438.276	4.82%	0.65
-38	8,005.110	8,385.777	8,783.668	4.74%	0.65
-37	7,464.413	7,813.847	8,178.821	4.67%	0.64
-36	6,963.829	7,284.719	7,619.633	4.60%	0.64
-35	6,500.126	6,794.918	7,102.368	4.52%	0.63
-34	6,070.353	6,341.271	6,623.617	4.45%	0.63
-33	5,671.813	5,920.881	6,180.269	4.38%	0.62
-32	5,302.039	5,531.101	5,769.483	4.31%	0.62
-31	4,958.775	5,169.511	5,388.664	4.24%	0.61
-30	4,639.954	4,833.895	5,035.439	4.17%	0.61
-29	4,343.684	4,522.227	4,707.638	4.10%	0.60
-28	4,068.231	4,232.650	4,403.273	4.03%	0.59
-27	3,812.003	3,963.461	4,120.524	3.96%	0.59
-26	3,573.541	3,713.101	3,857.725	3.89%	0.58
-25	3,351.505	3,480.137	3,613.345	3.83%	0.58
-24	3,144.246	3,262.819	3,385.525	3.76%	0.57
-23	2,951.119	3,060.449	3,173.512	3.69%	0.57
-22	2,771.075	2,871.908	2,976.113	3.63%	0.56
-21	2,603.148	2,696.168	2,792.232	3.56%	0.55
-20	2,446.449	2,532.281	2,620.862	3.50%	0.55
-19	2,300.160	2,379.377	2,461.076	3.43%	0.54
-18	2,163.527	2,236.655	2,312.023	3.37%	0.53
-17	2,035.856	2,103.375	2,172.917	3.31%	0.53
-16	1,916.504	1,978.857	2,043.035	3.24%	0.52
-15	1,804.881	1,862.473	1,921.711	3.18%	0.52
-14	1,700.441	1,753.644	1,808.331	3.12%	0.51
-13	1,602.679	1,651.835	1,702.329	3.06%	0.50
-12	1,511.129	1,556.552	1,603.181	3.00%	0.50
-11	1,425.360	1,467.339	1,510.403	2.93%	0.49
-10	1,344.974	1,383.774	1,423.551	2.87%	0.48
-9	1,269.492	1,305.353	1,342.092	2.81%	0.48
-8	1,198.701	1,231.848	1,265.785	2.75%	0.47
-7	1,132.283	1,162.924	1,194.274	2.70%	0.46
-6	1,069.942	1,098.267	1,127.229	2.64%	0.46
-5	1,011.405	1,037.591	1,064.347	2.58%	0.45
-4	956.487	980.698	1,005.420	2.52%	0.44
-3	904.871	927.255	950.098	2.46%	0.43
-2	856.340	877.035	898.140	2.41%	0.43
-1	810.691	829.824	849.323	2.35%	0.42
0	767.739	785.426	803.440	2.29%	0.41
1	727.265	743.613	760.252	2.24%	0.41
2	689.159	704.268	719.635	2.18%	0.40
3	653.270	667.231	681.421	2.13%	0.39
4	619.455	632.354	645.456	2.07%	0.38
5	587.584	599.499	611.594	2.02%	0.38
6	557.534	568.538	579.701	1.96%	0.37

● R-T Chart

Temp.(°C)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(°C)
7	529.191	539.352	549.652	1.91%	0.36
8	502.449	511.828	521.330	1.86%	0.35
9	477.209	485.864	494.626	1.80%	0.34
10	453.378	461.362	469.439	1.75%	0.34
11	430.870	438.232	445.675	1.70%	0.33
12	409.604	416.390	423.245	1.65%	0.32
13	389.506	395.757	402.069	1.59%	0.31
14	370.504	376.261	382.068	1.54%	0.30
15	352.534	357.831	363.172	1.49%	0.30
16	335.526	340.398	345.306	1.44%	0.29
17	319.433	323.911	328.418	1.39%	0.28
18	304.201	308.312	312.448	1.34%	0.27
19	289.778	293.551	297.343	1.29%	0.26
20	276.118	279.576	283.050	1.24%	0.25
21	263.178	266.345	269.523	1.19%	0.25
22	250.913	253.810	256.715	1.14%	0.24
23	239.286	241.933	244.585	1.10%	0.23
24	228.260	230.675	233.092	1.05%	0.22
25	217.800	220.000	222.200	1.00%	0.21
26	207.679	209.876	212.074	1.05%	0.22
27	198.082	200.271	202.464	1.09%	0.23
28	188.978	191.156	193.339	1.14%	0.25
29	180.341	182.503	184.673	1.19%	0.26
30	172.143	174.288	176.441	1.24%	0.27
31	164.362	166.485	168.620	1.28%	0.28
32	156.973	159.073	161.186	1.33%	0.29
33	149.954	152.029	154.118	1.37%	0.31
34	143.285	145.334	147.397	1.42%	0.32
35	136.947	138.968	141.004	1.47%	0.33
36	130.922	132.913	134.920	1.51%	0.34
37	125.193	127.153	129.131	1.56%	0.35
38	119.744	121.672	123.619	1.60%	0.37
39	114.560	116.455	118.371	1.64%	0.38
40	109.626	111.489	113.371	1.69%	0.39
41	104.933	106.762	108.612	1.73%	0.40
42	100.465	102.260	104.077	1.78%	0.42
43	96.210	97.972	99.755	1.82%	0.43
44	92.157	93.884	95.634	1.86%	0.44
45	88.295	89.988	91.704	1.91%	0.46
46	84.611	86.269	87.951	1.95%	0.47
47	81.098	82.722	84.371	1.99%	0.48
48	77.748	79.338	80.953	2.04%	0.49
49	74.553	76.110	77.691	2.08%	0.51
50	71.505	73.028	74.576	2.12%	0.52
51	68.600	70.090	71.605	2.16%	0.53
52	65.827	67.285	68.767	2.20%	0.55
53	63.180	64.605	66.056	2.25%	0.56

● R-T Chart

Temp.(°C)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(°C)
54	60.653	62.046	63.464	2.29%	0.57
55	58.238	59.600	60.987	2.33%	0.59
56	55.932	57.262	58.619	2.37%	0.60
57	53.728	55.028	56.354	2.41%	0.62
58	51.622	52.892	54.187	2.45%	0.63
59	49.608	50.848	52.114	2.49%	0.64
60	47.682	48.893	50.131	2.53%	0.66
61	45.840	47.023	48.232	2.57%	0.67
62	44.078	45.234	46.414	2.61%	0.69
63	42.393	43.520	44.674	2.65%	0.70
64	40.779	41.880	43.006	2.69%	0.72
65	39.235	40.310	41.409	2.73%	0.73
66	37.759	38.808	39.882	2.77%	0.74
67	36.346	37.370	38.419	2.81%	0.76
68	34.993	35.992	37.016	2.85%	0.77
69	33.696	34.671	35.671	2.88%	0.79
70	32.453	33.405	34.381	2.92%	0.80
71	31.260	32.188	33.141	2.96%	0.82
72	30.115	31.021	31.951	3.00%	0.83
73	29.018	29.902	30.810	3.04%	0.85
74	27.966	28.828	29.714	3.07%	0.86
75	26.956	27.798	28.663	3.11%	0.88
76	25.991	26.812	27.656	3.15%	0.89
77	25.064	25.865	26.689	3.19%	0.91
78	24.174	24.956	25.760	3.22%	0.92
79	23.321	24.083	24.868	3.26%	0.94
80	22.501	23.245	24.011	3.30%	0.96
81	21.713	22.439	23.187	3.33%	0.97
82	20.957	21.665	22.395	3.37%	0.99
83	20.231	20.922	21.634	3.40%	1.00
84	19.533	20.207	20.902	3.44%	1.02
85	18.862	19.520	20.198	3.48%	1.03
86	18.217	18.859	19.521	3.51%	1.05
87	17.597	18.223	18.870	3.55%	1.07
88	17.001	17.612	18.243	3.58%	1.08
89	16.428	17.024	17.640	3.62%	1.10
90	15.877	16.458	17.060	3.65%	1.12
91	15.348	15.916	16.503	3.69%	1.13
92	14.840	15.394	15.967	3.72%	1.15
93	14.350	14.891	15.450	3.76%	1.17
94	13.879	14.406	14.953	3.79%	1.18
95	13.425	13.940	14.474	3.83%	1.20
96	12.987	13.490	14.010	3.86%	1.22
97	12.565	13.055	13.563	3.89%	1.23
98	12.158	12.637	13.133	3.93%	1.25
99	11.766	12.233	12.718	3.96%	1.27
100	11.388	11.845	12.318	3.99%	1.28

● R-T Chart

Temp.(°C)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(°C)
101	11.026	11.471	11.934	4.03%	1.30
102	10.677	11.112	11.563	4.06%	1.32
103	10.340	10.765	11.205	4.09%	1.34
104	10.016	10.430	10.860	4.13%	1.35
105	9.703	10.107	10.528	4.16%	1.37
106	9.401	9.796	10.207	4.19%	1.39
107	9.110	9.495	9.897	4.22%	1.41
108	8.829	9.205	9.597	4.26%	1.42
109	8.557	8.925	9.308	4.29%	1.44
110	8.296	8.655	9.029	4.32%	1.46
111	8.043	8.394	8.760	4.35%	1.48
112	7.800	8.142	8.499	4.38%	1.49
113	7.564	7.899	8.248	4.42%	1.51
114	7.337	7.664	8.005	4.45%	1.53
115	7.117	7.437	7.770	4.48%	1.55
116	6.906	7.219	7.544	4.51%	1.57
117	6.703	7.008	7.326	4.54%	1.59
118	6.506	6.804	7.115	4.57%	1.60
119	6.315	6.607	6.911	4.60%	1.62
120	6.131	6.416	6.713	4.63%	1.64
121	5.953	6.231	6.521	4.66%	1.66
122	5.780	6.052	6.336	4.70%	1.68
123	5.613	5.878	6.156	4.73%	1.70
124	5.451	5.711	5.982	4.76%	1.72
125	5.294	5.548	5.814	4.79%	1.74