

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

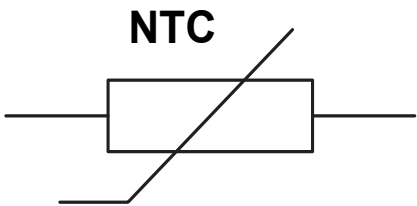
Applications

- 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

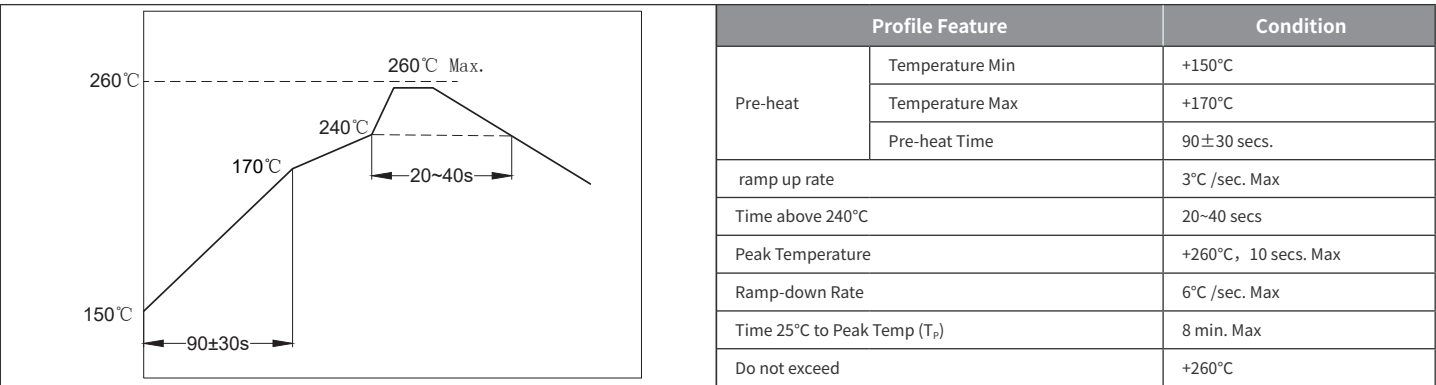
H NTC - F F B
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

- 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



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±1%	KΩ
B Constant (Material Constant)	25°C /50°C	3950±1%	K
Permissible Operating Current	T _a =25°C ±0.1°C	0.10	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

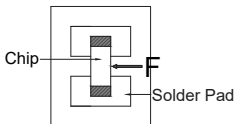
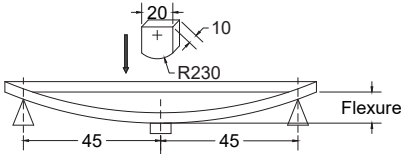
● Test and Measurement Procedures

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 . $B(25/50^{\circ}C) = \frac{\ln R_{25} - \ln R_{50}}{1/T_{25} - 1/T_{50}} \quad B(25/85^{\circ}C) = \frac{\ln R_{25} - \ln R_{85}}{1/T_{25} - 1/T_{85}}$
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.

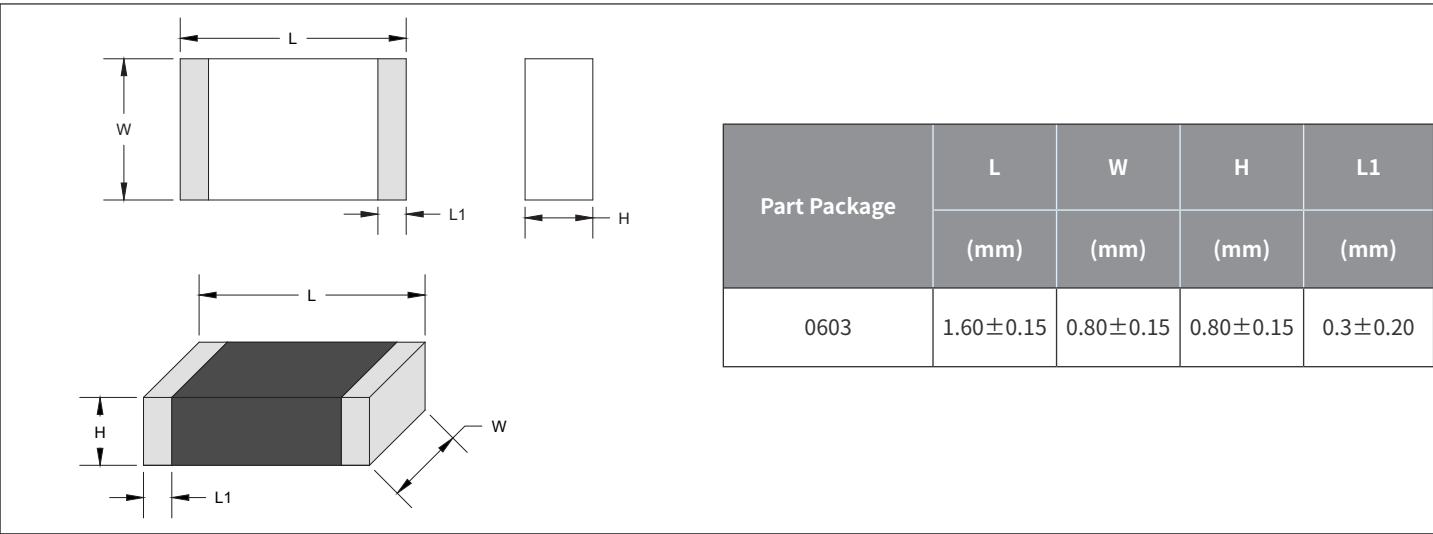
Reliability Test

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 ≤ 5% 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

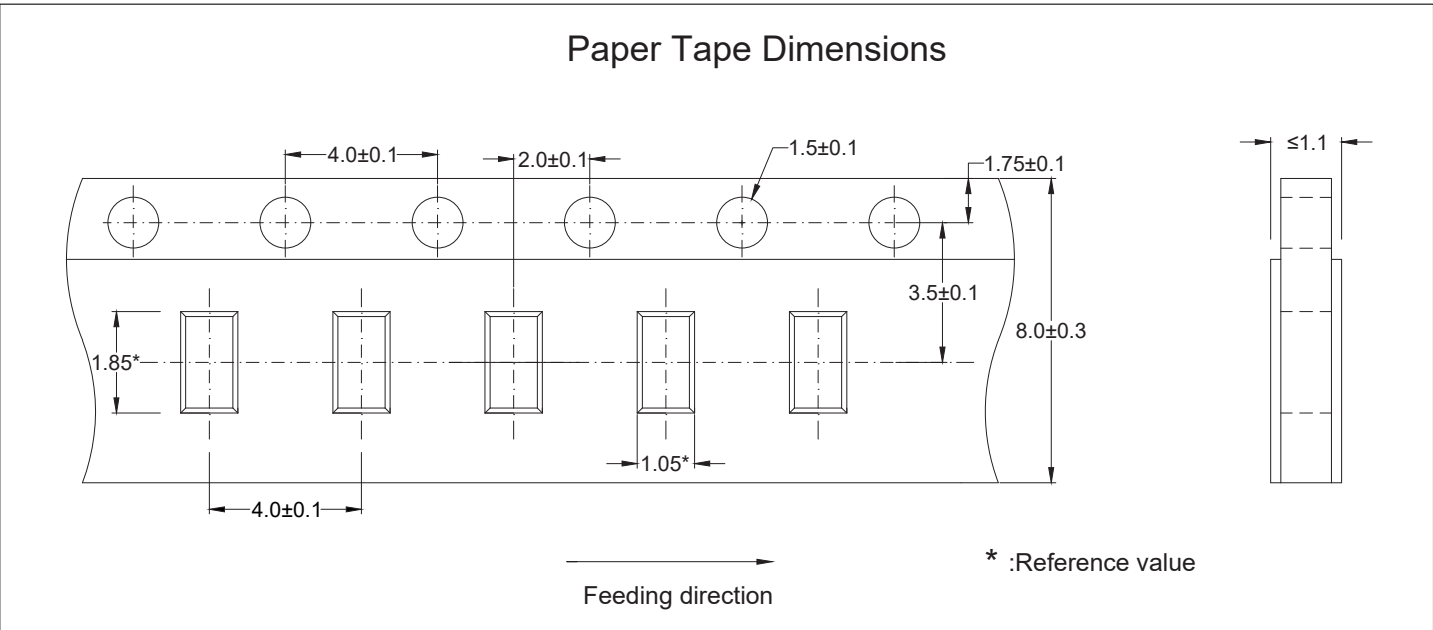
Physical Dimensions



Ordering Information

PACKAGE	Part Number	DELIVERY MODE	MPQ(PCS)
0603	HNTC0603-104F3950FB	7" REEL	4,000

Packaging Information



● R-T Chart

Temp.(°C)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(°C)
-40	3084.269	3225.545	3372.955	4.57%	0.67
-39	2892.785	3023.332	3, 159.454	4.50%	0.66
-38	2714.318	2834.987	2960.724	4.44%	0.66
-37	2547.912	2659.483	2775.662	4.37%	0.65
-36	2392.685	2495.874	2603.252	4.30%	0.65
-35	2247.826	2343.289	2442.561	4.24%	0.64
-34	2, 112.585	2200.924	2292.728	4. 17%	0.64
-33	1986.272	2068.041	2, 152.960	4. 11%	0.63
-32	1868.248	1943.955	2022.527	4.04%	0.63
-31	1757.924	1828.036	1900.755	3.98%	0.62
-30	1654.757	1719.704	1787.021	3.91%	0.62
-29	1558.243	1618.419	1680.751	3.85%	0.61
-28	1467.918	1523.686	1581.415	3.79%	0.61
-27	1383.351	1435.046	1488.524	3.73%	0.6
-26	1,304. 144	1352.073	1401.624	3.66%	0.59
-25	1229.928	1274.376	1320.298	3.60%	0.59
-24	1, 160.363	1201.59	1244.157	3.54%	0.58
-23	1095.132	1, 133.379	1, 172.844	3.48%	0.58
-22	1033.942	1069.43	1, 106.026	3.42%	0.57
-21	976.52	1009.455	1043.396	3.36%	0.57
-20	922.616	953. 185	984.67	3.30%	0.56
-19	871.994	900.373	929.583	3.24%	0.55
-18	824.437	850.787	877.89	3. 19%	0.55
-17	779.744	804.212	829.365	3. 13%	0.54
-16	737.728	760.451	783.797	3.07%	0.54
-15	698.212	719.319	740.99	3.01%	0.53
-14	661.037	680.643	700.761	2.96%	0.52
-13	626.05	644.265	662.943	2.90%	0.52
-12	593. 112	610.035	627.379	2.84%	0.51
-11	562.091	577.816	593.921	2.79%	0.5
-10	532.867	547.478	562.435	2.73%	0.5
-9	505.325	518.903	532.793	2.68%	0.49
-8	479.36	491.979	504.879	2.62%	0.48
-7	454.874	466.601	478.582	2.57%	0.48
-6	431.775	442.674	453.801	2.51%	0.47
-5	409.977	420. 105	430.441	2.46%	0.46
-4	389.4	398.813	408.412	2.41%	0.46
-3	369.97	378.717	387.631	2.35%	0.45
-2	351.616	359.744	368.023	2.30%	0.44
-1	334.274	341.826	349.514	2.25%	0.43
0	317.882	324.899	332.037	2.20%	0.43
1	302.384	308.903	315.53	2. 15%	0.42
2	287.726	293.781	299.934	2.09%	0.41
3	273.859	279.483	285. 193	2.04%	0.41
4	260.735	265.958	271.258	1.99%	0.40
5	248.312	253. 161	258.078	1.94%	0.39
6	236.548	241.049	245.611	1.89%	0.38

● R-T Chart

Temp.(°C)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(°C)
7	225.405	229.582	233.813	1.84%	0.38
8	214.847	218.722	222.645	1.79%	0.37
9	204.841	208.435	212.071	1.74%	0.36
10	195.354	198.687	202.056	1.70%	0.35
11	186.358	189.447	192.568	1.65%	0.34
12	177.824	180.686	183.576	1.60%	0.34
13	169.727	172.377	175.052	1.55%	0.33
14	162.041	164.495	166.969	1.50%	0.32
15	154.745	157.015	159.302	1.46%	0.31
16	147.816	149.914	152.028	1.41%	0.30
17	141.233	143.173	145.124	1.36%	0.30
18	134.979	136.770	138.571	1.32%	0.29
19	129.035	130.688	132.348	1.27%	0.28
20	123.384	124.908	126.437	1.22%	0.27
21	118.010	119.413	120.822	1.18%	0.26
22	112.898	114.190	115.485	1.13%	0.25
23	108.035	109.222	110.412	1.09%	0.25
24	103.406	104.497	105.588	1.04%	0.24
25	99.000	100.000	101.000	1.00%	0.23
26	94.722	95.720	96.720	1.04%	0.24
27	90.650	91.646	92.643	1.09%	0.25
28	86.775	87.766	88.760	1.13%	0.26
29	83.086	84.071	85.059	1.18%	0.27
30	79.572	80.550	81.532	1.22%	0.29
31	76.225	77.195	78.169	1.26%	0.30
32	73.036	73.997	74.962	1.30%	0.31
33	69.997	70.947	71.903	1.35%	0.32
34	67.100	68.039	68.985	1.39%	0.33
35	64.337	65.265	66.200	1.43%	0.35
36	61.703	62.618	63.541	1.47%	0.36
37	59.189	60.092	61.003	1.52%	0.37
38	56.791	57.681	58.579	1.56%	0.38
39	54.502	55.379	56.264	1.60%	0.40
40	52.317	53.180	54.052	1.64%	0.41
41	50.230	51.080	51.938	1.68%	0.42
42	48.237	49.073	49.918	1.72%	0.43
43	46.334	47.155	47.986	1.76%	0.45
44	44.515	45.321	46.138	1.80%	0.46
45	42.776	43.569	44.371	1.84%	0.47
46	41.114	41.892	42.681	1.88%	0.49
47	39.525	40.289	41.063	1.92%	0.50
48	38.005	38.755	39.515	1.96%	0.51
49	36.551	37.286	38.033	2.00%	0.53
50	35.160	35.881	36.613	2.04%	0.54
51	33.829	34.536	35.254	2.08%	0.55
52	32.555	33.248	33.952	2.12%	0.57
53	31.335	32.014	32.704	2.16%	0.58

● R-T Chart

Temp.(°C)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(°C)
54	30.166	30.832	31.508	2.20%	0.59
55	29.047	29.699	30.362	2.23%	0.61
56	27.975	28.614	29.264	2.27%	0.62
57	26.948	27.573	28.210	2.31%	0.64
58	25.963	26.576	27.199	2.35%	0.65
59	25.020	25.619	26.230	2.38%	0.66
60	24.115	24.701	25.300	2.42%	0.68
61	23.247	23.821	24.407	2.46%	0.69
62	22.415	22.976	23.550	2.50%	0.71
63	21.616	22.166	22.727	2.53%	0.72
64	20.850	21.388	21.937	2.57%	0.73
65	20.114	20.641	21.179	2.61%	0.75
66	19.408	19.923	20.450	2.64%	0.76
67	18.731	19.234	19.749	2.68%	0.78
68	18.080	18.572	19.076	2.71%	0.79
69	17.454	17.936	18.430	2.75%	0.81
70	16.854	17.325	17.808	2.79%	0.82
71	16.277	16.738	17.210	2.82%	0.84
72	15.722	16.173	16.635	2.86%	0.85
73	15.189	15.630	16.082	2.89%	0.87
74	14.676	15.108	15.550	2.93%	0.88
75	14.184	14.605	15.038	2.96%	0.90
76	13.710	14.122	14.545	3.00%	0.91
77	13.254	13.657	14.071	3.03%	0.93
78	12.815	13.209	13.614	3.07%	0.95
79	12.393	12.779	13.175	3.10%	0.96
80	11.987	12.364	12.751	3.13%	0.98
81	11.596	11.965	12.344	3.17%	0.99
82	11.220	11.580	11.951	3.20%	1.01
83	10.857	11.210	11.572	3.23%	1.02
84	10.508	10.853	11.207	3.27%	1.04
85	10.172	10.509	10.856	3.30%	1.06
86	9.848	10.177	10.517	3.33%	1.07
87	9.536	9.858	10.190	3.37%	1.09
88	9.235	9.550	9.875	3.40%	1.10
89	8.945	9.253	9.571	3.43%	1.12
90	8.666	8.967	9.277	3.47%	1.14
91	8.396	8.691	8.995	3.50%	1.15
92	8.136	8.424	8.722	3.53%	1.17
93	7.885	8.167	8.458	3.56%	1.19
94	7.644	7.919	8.204	3.59%	1.20
95	7.410	7.680	7.958	3.63%	1.22
96	7.185	7.449	7.721	3.66%	1.24
97	6.968	7.226	7.492	3.69%	1.25
98	6.758	7.010	7.271	3.72%	1.27
99	6.556	6.802	7.057	3.75%	1.29
100	6.360	6.601	6.851	3.78%	1.31

HNTC0603-104F3950FB

Chip NTC Thermistor

● R-T Chart

Temp.(°C)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(°C)
101	6.171	6.407	6.652	3.81%	1.32
102	5.989	6.220	6.459	3.84%	1.34
103	5.813	6.039	6.273	3.88%	1.36
104	5.643	5.864	6.093	3.91%	1.38
105	5.478	5.694	5.918	3.94%	1.39
106	5.319	5.531	5.750	3.97%	1.41
107	5.166	5.373	5.587	4.00%	1.43
108	5.017	5.220	5.430	4.03%	1.45
109	4.873	5.072	5.277	4.06%	1.46
110	4.735	4.929	5.130	4.09%	1.48
111	4.600	4.790	4.987	4.12%	1.50
112	4.470	4.656	4.849	4.15%	1.52
113	4.345	4.527	4.716	4.18%	1.54
114	4.223	4.401	4.586	4.20%	1.56
115	4.105	4.280	4.461	4.23%	1.57
116	3.992	4.162	4.340	4.26%	1.59
117	3.881	4.048	4.222	4.29%	1.61
118	3.775	3.938	4.108	4.32%	1.63
119	3.671	3.831	3.998	4.35%	1.65
120	3.571	3.728	3.891	4.38%	1.67
121	3.474	3.628	3.788	4.41%	1.69
122	3.381	3.531	3.687	4.43%	1.70
123	3.290	3.437	3.590	4.46%	1.72
124	3.202	3.346	3.496	4.49%	1.74
125	3.116	3.257	3.405	4.52%	1.76