

Chip NTC Thermistor Datasheet

Features

- Leadless , Size 0402
- SMD type suitable for high density mounting
- B constant tolerance $\pm 3\%$
- Excellent solder ability
- Operating temperature: -40°C to $+125^{\circ}\text{C}$
- RoHS compliant & Lead-Free & Halogen Free

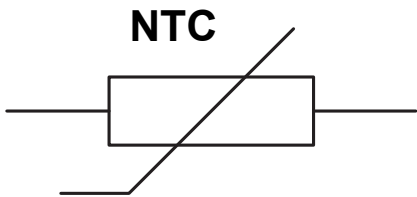
Applications

- 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

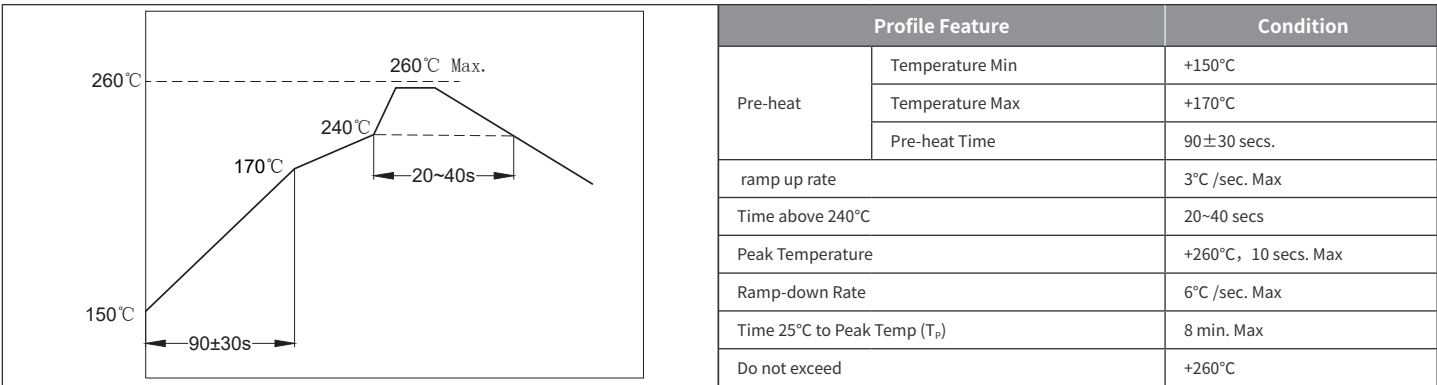
H NTC □□□□ - □□□ J □□□□ H B
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

- 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: $25^{\circ}\text{C}/85^{\circ}\text{C}$ B: $25^{\circ}\text{C}/50^{\circ}\text{C}$



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	10±5%	KΩ
B Constant (Material Constant)	25°C /50°C	3950±3%	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	< 3	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

Inspection Equipment
1.Visual Examination: 20× magnifier
2.Resistance value test: Thermistor resistance tester

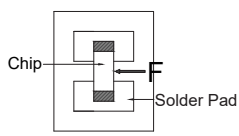
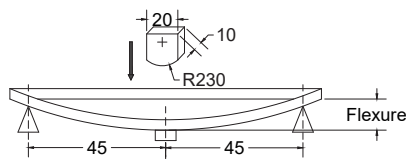
If any doubt on the results, measurements/tests should be made within the following limits:

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

● 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:
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.

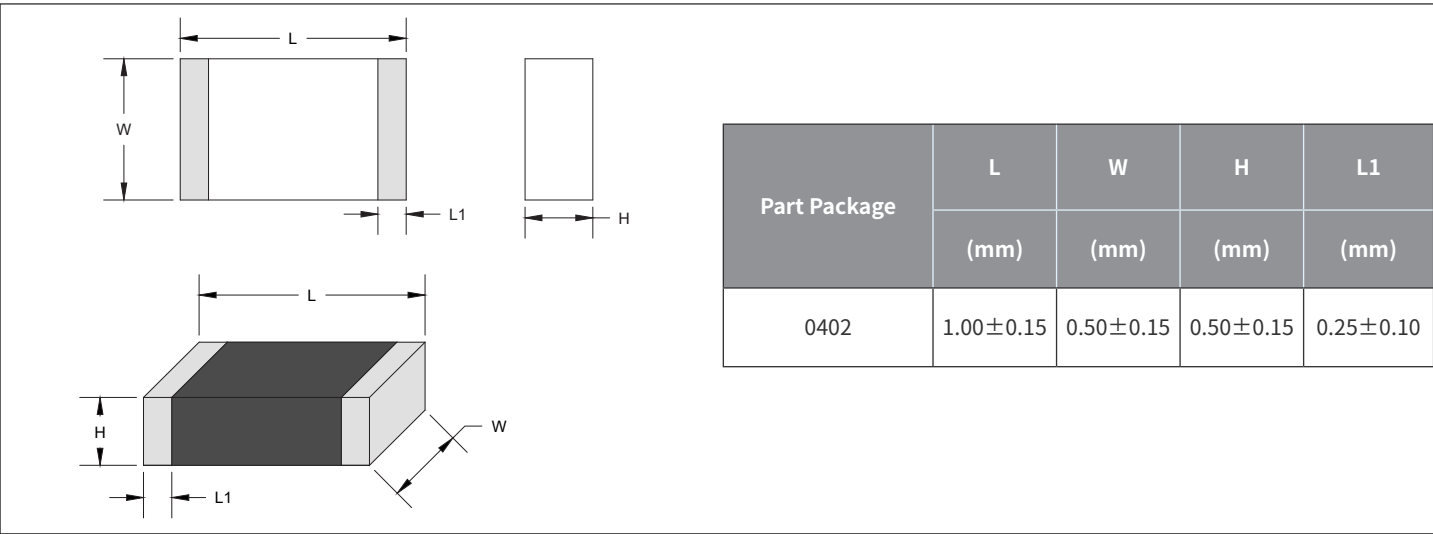
● Reliability Test

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

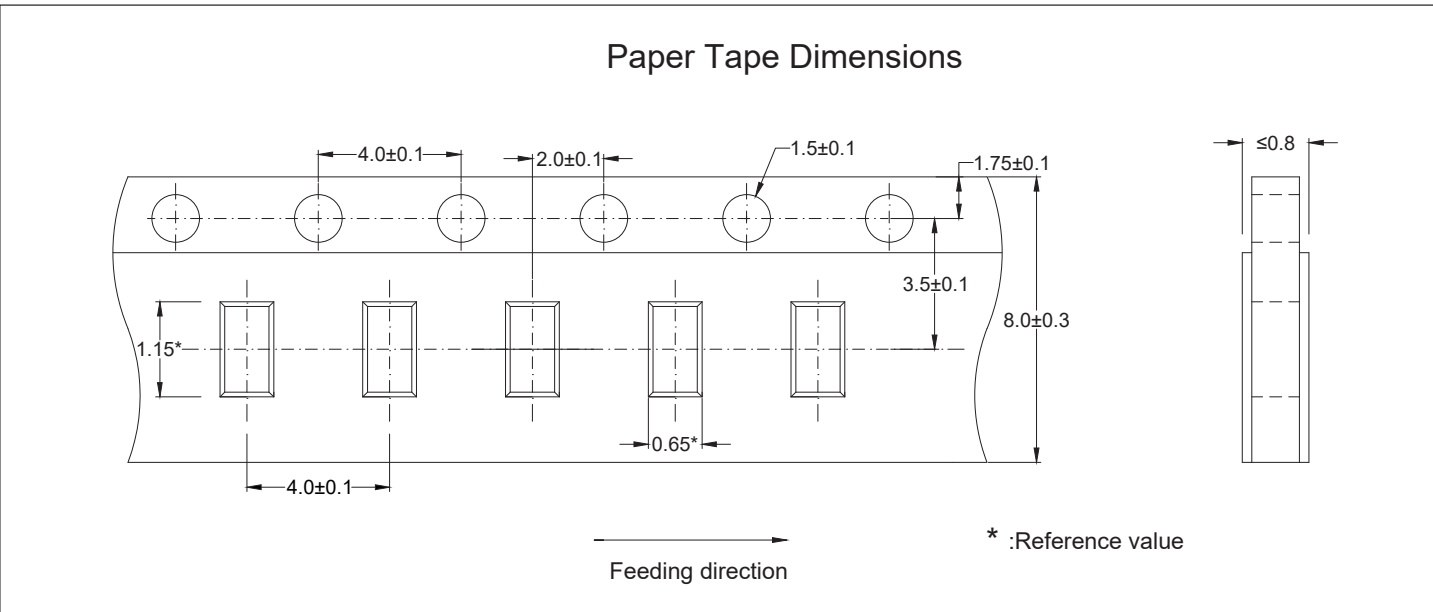
● Physical Dimensions



● Ordering Information

PACKAGE	Part Number	DELIVERY MODE	MPQ(PCS)
0402	HNTC0402-103J3950HB	7" REEL	10,000

● Packaging Information



● R-T Chart

Temp.(°C)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(°C)
-40	316.597	345.275	375.609	8.79%	1.26
-39	296.180	322.791	350.913	8.71%	1.26
-38	277.219	301.925	328.010	8.64%	1.26
-37	259.601	282.549	306.757	8.57%	1.26
-36	243.223	264.549	287.025	8.50%	1.26
-35	227.988	247.816	268.695	8.43%	1.26
-34	213.810	232.254	251.659	8.35%	1.26
-33	200.608	217.774	235.817	8.29%	1.26
-32	188.310	204.292	221.077	8.22%	1.26
-31	176.847	191.735	207.356	8.15%	1.25
-30	166.157	180.032	194.577	8.08%	1.25
-29	156.184	169.120	182.670	8.01%	1.25
-28	146.875	158.941	171.569	7.94%	1.25
-27	138.181	149.441	161.215	7.88%	1.25
-26	130.059	140.571	151.553	7.81%	1.25
-25	122.466	132.284	142.532	7.75%	1.25
-24	115.350	124.522	134.088	7.68%	1.25
-23	108.694	117.266	126.198	7.62%	1.25
-22	102.465	110.480	118.824	7.55%	1.24
-21	96.632	104.130	111.928	7.49%	1.24
-20	91.170	98.185	105.477	7.43%	1.24
-19	86.050	92.618	99.438	7.36%	1.24
-18	81.251	87.402	93.783	7.30%	1.24
-17	76.750	82.513	88.486	7.24%	1.24
-16	72.526	77.927	83.521	7.18%	1.24
-15	68.562	73.626	78.866	7.12%	1.23
-14	64.839	69.588	74.499	7.06%	1.23
-13	61.341	65.797	70.401	7.00%	1.23
-12	58.053	62.237	66.554	6.94%	1.23
-11	54.962	58.890	62.941	6.88%	1.23
-10	52.055	55.744	59.546	6.82%	1.23
-9	49.319	52.786	56.355	6.76%	1.22
-8	46.744	50.002	53.354	6.70%	1.22
-7	44.318	47.382	50.531	6.65%	1.22
-6	42.034	44.916	47.875	6.59%	1.22
-5	39.880	42.592	45.374	6.53%	1.22
-4	37.847	40.400	43.016	6.48%	1.21
-3	35.930	38.333	40.794	6.42%	1.21
-2	34.122	36.385	38.701	6.36%	1.21
-1	32.416	34.548	36.727	6.31%	1.21
0	30.805	32.814	34.866	6.26%	1.21
1	29.285	31.179	33.113	6.20%	1.20
2	27.850	29.636	31.457	6.15%	1.20
3	26.493	28.178	29.895	6.09%	1.20
4	25.210	26.800	28.418	6.04%	1.20
5	23.996	25.497	27.023	5.99%	1.19
6	22.846	24.263	25.703	5.93%	1.19

● R-T Chart

Temp.(°C)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(°C)
7	21.758	23.096	24.454	5.88%	1.19
8	20.728	21.992	23.274	5.83%	1.19
9	19.753	20.947	22.157	5.78%	1.18
10	18.829	19.958	21.101	5.73%	1.18
11	17.955	19.022	20.101	5.68%	1.18
12	17.126	18.135	19.155	5.63%	1.18
13	16.340	17.294	18.259	5.58%	1.17
14	15.594	16.498	17.409	5.53%	1.17
15	14.887	15.742	16.604	5.48%	1.17
16	14.216	15.025	15.841	5.43%	1.16
17	13.578	14.345	15.116	5.38%	1.16
18	12.973	13.699	14.429	5.33%	1.16
19	12.398	13.086	13.777	5.28%	1.15
20	11.852	12.504	13.159	5.23%	1.15
21	11.333	11.951	12.571	5.19%	1.15
22	10.840	11.426	12.013	5.14%	1.15
23	10.371	10.926	11.483	5.09%	1.14
24	9.925	10.452	10.979	5.05%	1.14
25	9.500	10.000	10.500	5.00%	1.14
26	9.088	9.570	10.053	5.05%	1.15
27	8.696	9.162	9.628	5.09%	1.17
28	8.323	8.773	9.223	5.14%	1.19
29	7.968	8.402	8.838	5.18%	1.21
30	7.630	8.049	8.470	5.23%	1.22
31	7.309	7.713	8.120	5.27%	1.24
32	7.002	7.393	7.786	5.32%	1.26
33	6.711	7.088	7.468	5.36%	1.28
34	6.433	6.797	7.165	5.41%	1.30
35	6.167	6.520	6.875	5.45%	1.32
36	5.915	6.255	6.599	5.49%	1.34
37	5.674	6.003	6.335	5.54%	1.35
38	5.444	5.762	6.084	5.58%	1.37
39	5.225	5.532	5.843	5.62%	1.39
40	5.015	5.313	5.614	5.67%	1.41
41	4.815	5.103	5.394	5.71%	1.43
42	4.625	4.903	5.185	5.75%	1.45
43	4.442	4.711	4.984	5.79%	1.47
44	4.268	4.529	4.793	5.84%	1.49
45	4.102	4.354	4.610	5.88%	1.51
46	3.943	4.187	4.435	5.92%	1.53
47	3.791	4.027	4.267	5.96%	1.55
48	3.646	3.874	4.107	6.00%	1.57
49	3.507	3.728	3.953	6.04%	1.59
50	3.374	3.588	3.806	6.08%	1.61
51	3.247	3.454	3.666	6.12%	1.63
52	3.125	3.326	3.531	6.16%	1.65
53	3.009	3.203	3.402	6.20%	1.67

● R-T Chart

Temp.(°C)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(°C)
54	2.897	3.086	3.278	6.24%	1.69
55	2.790	2.973	3.160	6.28%	1.71
56	2.688	2.865	3.046	6.32%	1.73
57	2.590	2.761	2.937	6.36%	1.75
58	2.496	2.662	2.832	6.40%	1.77
59	2.406	2.567	2.732	6.44%	1.79
60	2.319	2.476	2.636	6.48%	1.81
61	2.236	2.388	2.544	6.51%	1.84
62	2.157	2.304	2.455	6.55%	1.86
63	2.081	2.224	2.370	6.59%	1.88
64	2.008	2.146	2.289	6.63%	1.90
65	1.938	2.072	2.210	6.67%	1.92
66	1.870	2.001	2.135	6.70%	1.94
67	1.806	1.932	2.062	6.74%	1.96
68	1.743	1.866	1.993	6.78%	1.99
69	1.684	1.803	1.926	6.81%	2.01
70	1.626	1.742	1.861	6.85%	2.03
71	1.571	1.684	1.800	6.89%	2.05
72	1.518	1.628	1.740	6.92%	2.08
73	1.468	1.574	1.683	6.96%	2.10
74	1.419	1.522	1.628	7.00%	2.12
75	1.372	1.472	1.576	7.03%	2.14
76	1.327	1.424	1.525	7.07%	2.17
77	1.283	1.378	1.476	7.10%	2.19
78	1.241	1.333	1.428	7.14%	2.21
79	1.201	1.290	1.383	7.17%	2.23
80	1.162	1.249	1.339	7.21%	2.26
81	1.125	1.209	1.297	7.24%	2.28
82	1.089	1.171	1.256	7.28%	2.30
83	1.054	1.134	1.217	7.31%	2.33
84	1.021	1.099	1.180	7.34%	2.35
85	0.989	1.065	1.143	7.38%	2.37
86	0.958	1.032	1.108	7.41%	2.40
87	0.928	1.000	1.074	7.45%	2.42
88	0.899	0.969	1.042	7.48%	2.45
89	0.872	0.940	1.010	7.51%	2.47
90	0.845	0.911	0.980	7.55%	2.49
91	0.819	0.884	0.951	7.58%	2.52
92	0.794	0.857	0.922	7.61%	2.54
93	0.770	0.831	0.895	7.64%	2.57
94	0.747	0.807	0.869	7.68%	2.59
95	0.725	0.783	0.843	7.71%	2.62
96	0.703	0.760	0.819	7.74%	2.64
97	0.683	0.738	0.795	7.77%	2.67
98	0.663	0.716	0.772	7.81%	2.69
99	0.643	0.695	0.750	7.84%	2.72
100	0.625	0.675	0.729	7.87%	2.74

HNTC0402-103J3950HB

Chip NTC Thermistor

● R-T Chart

Temp.(°C)	R_Min(KΩ)	R_Typ(KΩ)	R_Max(KΩ)	R_Tolerance	Temp._Tolerance(°C)
101	0.607	0.656	0.708	7.90%	2.77
102	0.589	0.637	0.688	7.93%	2.79
103	0.572	0.619	0.669	7.96%	2.82
104	0.556	0.602	0.650	7.99%	2.84
105	0.540	0.585	0.632	8.02%	2.87
106	0.525	0.569	0.614	8.05%	2.89
107	0.510	0.553	0.598	8.08%	2.92
108	0.496	0.538	0.581	8.11%	2.95
109	0.482	0.523	0.565	8.15%	2.97
110	0.469	0.508	0.550	8.18%	3.00
111	0.456	0.495	0.535	8.21%	3.02
112	0.443	0.481	0.521	8.23%	3.05
113	0.431	0.468	0.507	8.26%	3.08
114	0.420	0.456	0.493	8.29%	3.10
115	0.408	0.443	0.480	8.32%	3.13
116	0.397	0.432	0.468	8.35%	3.16
117	0.387	0.420	0.455	8.38%	3.18
118	0.376	0.409	0.444	8.41%	3.21
119	0.367	0.399	0.432	8.44%	3.24
120	0.357	0.388	0.421	8.47%	3.26
121	0.348	0.378	0.410	8.50%	3.29
122	0.339	0.368	0.400	8.52%	3.32
123	0.330	0.359	0.390	8.55%	3.35
124	0.321	0.350	0.380	8.58%	3.37
125	0.313	0.341	0.370	8.61%	3.40