

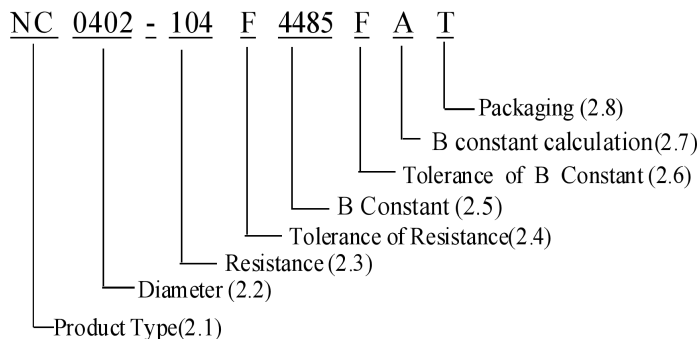
ALTERNATION HISTORY RECORDS 变更记录

Date 日期	Version 版本	Mark 标记	Page 页码	Description 描述	Drafter 制定者	Approver 审批者
2024-04-22	B	/		First release 首次发行	Robin Xiong	/

1. Application

This specification applies to negative temperature coefficient thermistor used in electronic equipment.

2. Part Number System



2.1 Product Type

Code	NC
Product Type	Negative Temperature Coefficient

2.2 Dimensions code

Code	0201	0402	0603	0805	1206
Dimensions(L×W×T)	0.60×0.30×0.30mm	1.00×0.50×0.50mm	1.60×0.80×0.80mm	2.00×1.25×0.85mm	3.20×1.60×0.85mm

2.3 Nominal Zero-Power Resistance code

Code	100	101	102	103	104
Resistance (Ω)	10	100	1000	10000	100000

2.4 Tolerance of Resistance

Code	F	G	H
Tolerance Range	±1%	±2%	±3%

2.5 B Constant

Code	2600	3000	4485
B Constant	2600K	3000K	4485K

2.6 Tolerance of B Constant

Code	F	H	J	K
Tolerance Range	±1%	±3%	±5%	±10%

2.7 **B constant calculation method**

Code	A	B
B constant calculation method	25℃&85℃	25℃&50℃

2.9 **Packaging**

Code	T	B
Packaging	braided packing	loose packing

3. Outline Dimension:

unit: mm

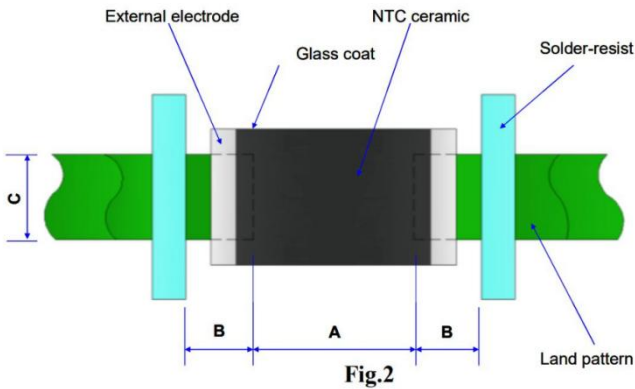
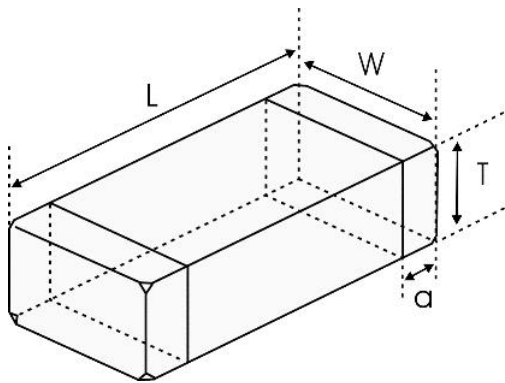


Fig.2

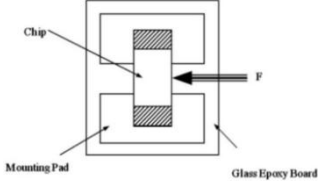
L	W	T	a	A	B	C
1.0±0.15	0.5±0.15	0.5±0.15	0.25±0.1	0.45~0.55	0.4~0.5	0.45~0.55

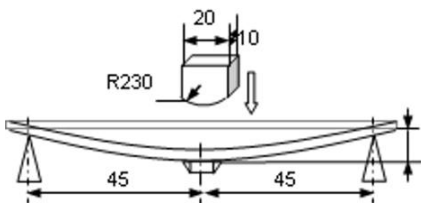
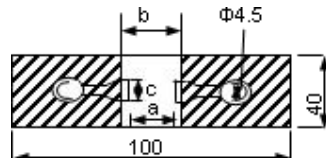
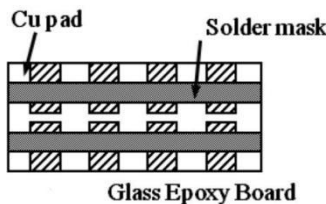
4. Electrical parameter

Items	Symbol	Test condition	unit	performance requirement
Nominal Zero-Power Resistance	R25°C	$A_{t=25\pm 0.05^{\circ}\text{C}} \leq 0.1\text{mW}$	K Ω	100k $\Omega \pm 1\%$
B Constant	B25/50	B value between $25\pm 0.05^{\circ}\text{C}$ and $50\pm 0.05^{\circ}\text{C}$ $B = \ln(R_i/R_2) / (1/T_i - 1/T_2)$; $T_1 = (273.15 + 25)\text{K}$, $T_2 = (273.15 + 50)\text{K}$ Note: 273.15 is the absolute temperature.	K	4474 $\pm 1\%$
B Constant	B25/75	B value between $25\pm 0.05^{\circ}\text{C}$ and $75\pm 0.05^{\circ}\text{C}$ $B = \ln(R_i/R_2) / (1/T_i - 1/T_2)$; $T_1 = (273.15 + 25)\text{K}$, $T_2 = (273.15 + 75)\text{K}$ Note: 273.15 is the absolute temperature.	K	4483 $\pm 1\%$
B Constant44	B25/85	B value between $25\pm 0.05^{\circ}\text{C}$ and $85\pm 0.05^{\circ}\text{C}$ $B = \ln(R_i/R_2) / (1/T_i - 1/T_2)$; $T_1 = (273.15 + 25)\text{K}$, $T_2 = (273.15 + 85)\text{K}$ Note: 273.15 is the absolute temperature.	K	4485 $\pm 1\%$
B Constant	B25/100	B value between $25\pm 0.05^{\circ}\text{C}$ and $100\pm 0.05^{\circ}\text{C}$ $B = \ln(R_i/R_2) / (1/T_i - 1/T_2)$; $T_1 = (273.15 + 25)\text{K}$, $T_2 = (273.15 + 100)\text{K}$ Note: 273.15 is the absolute temperature.	K	4487 $\pm 1\%$
Dissipation Factor	δ	The required power which makes the NTC thermistor body temperature raise 1°C through self-heated, normally expressed in milliwatts per degree Celsius ($\text{mW}/^{\circ}\text{C}$).	$\text{mW}/^{\circ}\text{C}$	≈ 1.0
Thermal Time Constant	τ	The total time for the temperature of the thermistor to change by 63.2% of the difference from ambient temperature $T_0 (^{\circ}\text{C})$ to $T_1 (^{\circ}\text{C})$ by the drastic change of the power applied to thermistor from Non-zero Power to Zero-Power state, normally expressed in second(S).	sec	$< 3\text{S}$
Rated Electric Power	P	The necessary electric power makes thermistor's temperature rise 100°C by self-heating at ambient temperature 25°C .	mW	100
Permissible Operating Current	I	The current that keep body temperature of chip NTC on the PC board instill air rising 1°C by self-heating.	mA	0.1
Operating ambient temperature	/	Temperature range under specified conditions of use	$^{\circ}\text{C}$	$-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$

Notes: When measured at 25°C in still air, as a single unit without mounting.

5. Reliability

Item	Standard	Test Method and Remarks	Requirements
Terminal Strength	IEC 60068-2-21	Solder the chip to the testing jig (glass epoxy board shown in the right) using eutectic solder. Then apply a force in the direction of the arrow.	No removal or split of the termination or other defects shall occur. 
		Size	
		F	
		Duration	
		0201	2N
		0402, 0603	5N
		0805, 1206	10N
			10 $\pm 1\text{s}$

Resistane 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  Flexure:Pressurizing Speed : <0.5mm/s, Duration : 10s±1	1.No visible damage. 2. ΔR25/R25 ≤2% <table><tr><th>Size</th><th>a</th><th>b</th><th>c</th></tr><tr><td>0201</td><td>0.25</td><td>0.3</td><td>0.3</td></tr><tr><td>0402</td><td>0.4</td><td>1.5</td><td>0.5</td></tr><tr><td>0603</td><td>1.0</td><td>3.0</td><td>1.2</td></tr><tr><td>0805</td><td>1.2</td><td>4.0</td><td>1.65</td></tr><tr><td>1206</td><td>2.0</td><td>5.8</td><td>1.9</td></tr></table> 	Size	a	b	c	0201	0.25	0.3	0.3	0402	0.4	1.5	0.5	0603	1.0	3.0	1.2	0805	1.2	4.0	1.65	1206	2.0	5.8	1.9
Size	a	b	c																								
0201	0.25	0.3	0.3																								
0402	0.4	1.5	0.5																								
0603	1.0	3.0	1.2																								
0805	1.2	4.0	1.65																								
1206	2.0	5.8	1.9																								
Vibration	IEC 60068-2-80	1.Solder the chip to the testing jig (glass epoxy board shown in the left) using eutectic solder. 2.The chip shall be subjected to a simple harmonic motion having total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 55 Hz. 3.The frequency ranges from 10 to 55 Hz and return to 10 Hz shall be traversed in approximately 1 minute. This motion shall be applied for a period of 2 hours in each 3mutually perpendicular directions (total of 6 hours).	No visible damage. 																								
Dropping	IEC 60068-2-32	Drop a chip 10 times on a concrete floor from aheight of 1 meter.	No visible damage.																								
Solder ability	IEC 60068-2-58	1.Solder temperature: 245±5°C. 2.Duration:3±0.3s. 3.Solder:Sn/3.0Ag/0.5Cu. 4.Flux(weight ratio):25% Rosin and 75% ethanol in weight.	1.No visible damage; 2.Wetting shall exceed 95% coverage.																								
Resistane 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.Flux(weight ratio):25% Rosin and 75% ethanol inweight. 5.The chip shall be stabilized at normal condition for 1~2 hours before measuring.	1.No visible damage; 2. ΔR25/R25 ≤2% 3. ΔB/B ≤1%																								
Temperature cycling	IEC 60068-2-14	1.5 cycles of following sequence without loading. <table><tr><th>Step</th><th>Temperature</th><th>ime</th></tr><tr><td>1</td><td>-40±5°C</td><td>30±3min</td></tr><tr><td>2</td><td>25±2°C</td><td>5±3min</td></tr><tr><td>3</td><td>125±5°C</td><td>30±3min</td></tr><tr><td>4</td><td>25±2°C</td><td>5±3min</td></tr></table> 2.The chip shall be stabilized at normal condition for1~2 hours before measuring.	Step	Temperature	ime	1	-40±5°C	30±3min	2	25±2°C	5±3min	3	125±5°C	30±3min	4	25±2°C	5±3min	1 No visible damage; 2. ΔR25/R25 ≤2% 3. ΔB/B ≤1%									
Step	Temperature	ime																									
1	-40±5°C	30±3min																									
2	25±2°C	5±3min																									
3	125±5°C	30±3min																									
4	25±2°C	5±3min																									
Resistance todry 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 for1~2 hours before measuring.	1 No visible damage; 2. ΔR25/R25 ≤2% 3. ΔB/B ≤1%																								
Resistance to cold	IEC 60068-2-1	1.-40±3°C in air, for 1000±24 hours without loading. 2.2.The chip shall be stabilized at normal condition for1~2 hours before measuring.	1 No visible damage; 2. ΔR25/R25 ≤2% 3. ΔB/B ≤1%																								
Resistance to damp heat	IEC 60068-2-78	1.60±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.	1 No visible damage; 2. ΔR25/R25 ≤2% 3. ΔB/B ≤1%																								

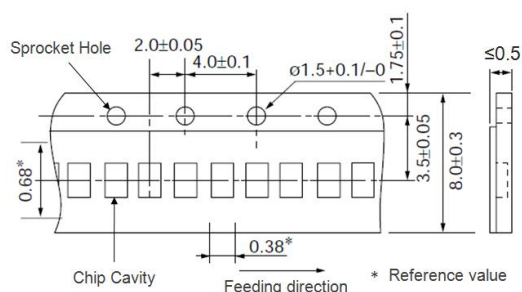
Resistane to high temperature load	IEC 60539-15.25.4	1.85±2°Cin air with permissive operating current for1000±48 hours 2.The chip shall be stabilized at normal condition for 1~2 hours before measuring.	1 No visible damage; 2. $\Delta R_{25}/R_{25}$ ≤2% 3. $\Delta B/B$ ≤1%
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6.Taping

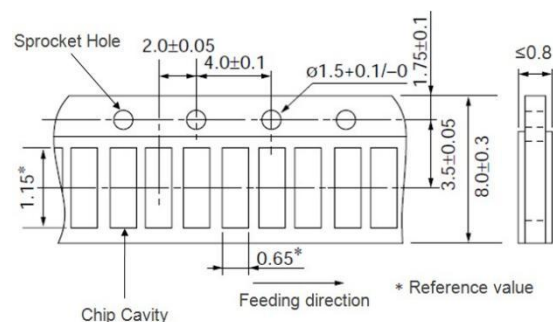
Type	0201	0402	0603	0805
Tape thickness(mm)	0.5±0.15	0.5±0.15	0.8±0.15	0.85±0.2
Tape material	Paper Tape			
Quantity per Reel	15K	10K	4K	4K

6.1 Paper Tape Dimensions (Unit : mm)

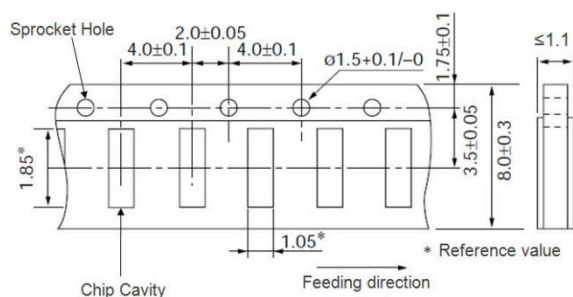
0201 series



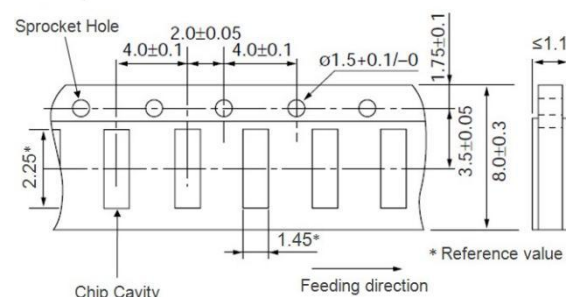
0402 series



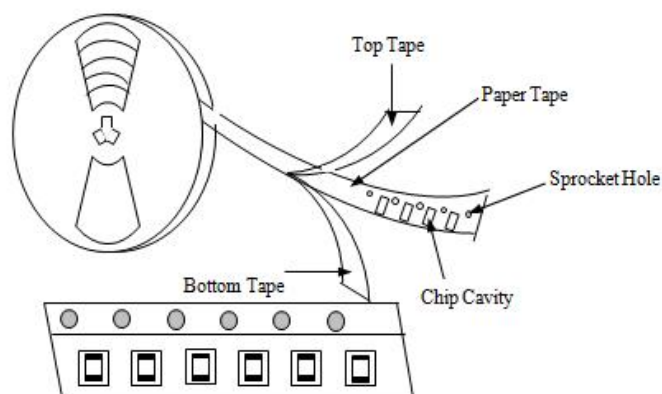
0603 series



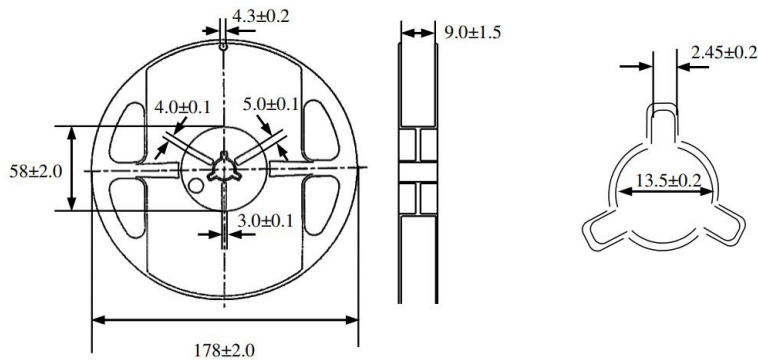
0805 series



6.2 Taping Drawings



6.3 Reel Dimensions(Unit : mm)



7. Storage

• Storage Conditions

- Storage Temperature: $-10^{\circ}\text{C} \sim 40^{\circ}\text{C}$
- Relative Humidity: $\leq 75\% \text{RH}$
- Keep away from corrosive atmosphere and sunlight.

• Period of Storage: 6 Months after delivery

8. Notes & Warnings

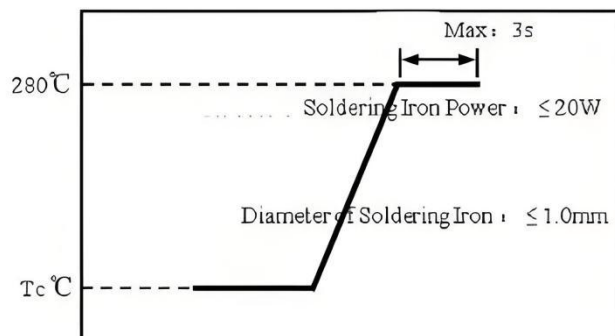
- The thermistors shall not be operated and stored under the following environmental condition:

- Corrosive or deoxidized atmospheres
(such as chlorine, sulfurated hydrogen, ammonia, sulfuric acid, nitric oxide and so on)
- Volatile or inflammable atmospheres
- Dusty condition
- Excessively high or low pressure condition
- Humid site
- Places with brine, oil, chemical liquid or organic solvent
- Intense vibration
- Places with analogously deleterious conditions

9. Recommended Soldering Technologies

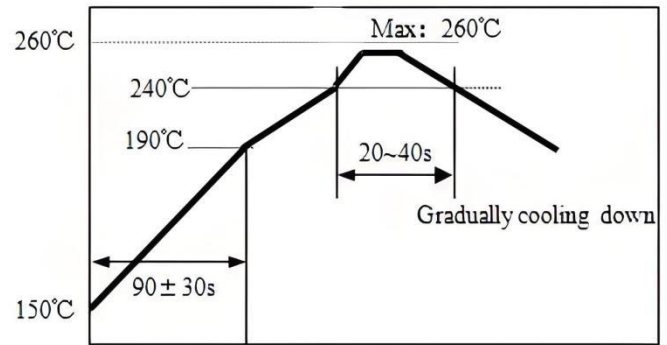
9.1 Re-flowing Profile

- 1~2 $^{\circ}\text{C}/\text{sec.}$ Ramp.
- Pre-heating: $150 \sim 190^{\circ}\text{C}/90 \pm 30 \text{ sec.}$
- Time above 240°C : 20~40 sec
- Peak temperature: 260°C Max./10 sec.
- Solder paste : 96.5Sn/3.0Ag/0.5Cu
- Max.2 times for re-flowing.



9.2 Iron Soldering Profile

- Iron soldering power: Max.20 W
- Pre-heating: 150°C/60sec.
- Soldering Tip temperature: 280°CMax
- Soldering time: 3 sec Max.
- Solder paste: 96.5wt%Sn/3.0wt%Ag/0.5wt%Cu
- Max.1 times for iron soldering



Appendix : R-T table

R25 =100 KOhm $\pm$ 1% B25/85 = 4485K $\pm$ 1%

Temp. (°C)	R_Min (Kohm)	R_Cent (Kohm)	R_Max (Kohm)	Res TOL.	Temp. TOL.(°C)
-40	5,517.566	5,804.300	6,105.324	5.19%	0.65
-39	5,113.694	5,375.310	5,649.747	5.11%	0.64
-38	4,741.802	4,980.592	5,230.885	5.03%	0.64
-37	4,399.185	4,617.223	4,845.583	4.95%	0.63
-36	4,083.381	4,282.543	4,490.969	4.87%	0.63
-35	3,792.146	3,974.131	4,164.434	4.79%	0.62
-34	3,523.435	3,689.785	3,863.602	4.71%	0.62
-33	3,275.383	3,427.494	3,586.310	4.63%	0.61
-32	3,046.290	3,185.428	3,330.587	4.56%	0.61
-31	2,834.604	2,961.917	3,094.639	4.48%	0.60
-30	2,638.906	2,755.438	2,876.829	4.41%	0.60
-29	2,457.902	2,564.600	2,675.662	4.33%	0.59
-28	2,290.408	2,388.132	2,489.776	4.26%	0.58
-27	2,135.342	2,224.873	2,317.927	4.18%	0.58
-26	1,991.713	2,073.763	2,158.977	4.11%	0.57
-25	1,858.614	1,933.830	2,011.888	4.04%	0.57
-24	1,735.217	1,804.187	1,875.710	3.96%	0.56
-23	1,620.760	1,684.019	1,749.573	3.89%	0.56
-22	1,514.547	1,572.584	1,632.681	3.82%	0.55
-21	1,415.939	1,469.197	1,524.306	3.75%	0.54
-20	1,324.348	1,373.234	1,423.781	3.68%	0.54
-19	1,239.238	1,284.120	1,330.494	3.61%	0.53
-18	1,160.113	1,201.329	1,243.884	3.54%	0.52
-17	1,086.521	1,124.377	1,163.436	3.47%	0.52
-16	1,018.043	1,052.821	1,088.678	3.41%	0.51
-15	954.296	986.252	1,019.176	3.34%	0.51
-14	894.927	924.295	954.531	3.27%	0.50
-13	839.611	866.605	894.377	3.20%	0.49
-12	788.050	812.865	838.379	3.14%	0.49
-11	739.967	762.783	786.224	3.07%	0.48
-10	695.109	716.090	737.630	3.01%	0.47
-9	653.242	672.537	692.332	2.94%	0.47
-8	614.150	631.896	650.090	2.88%	0.46
-7	577.633	593.956	610.679	2.82%	0.45
-6	543.508	558.523	573.896	2.75%	0.44
-5	511.606	525.418	539.550	2.69%	0.44
-4	481.768	494.475	507.466	2.63%	0.43
-3	453.851	465.540	477.483	2.57%	0.42

Appendix : R-T table

R25 =100 KOhm $\pm$ 1% B25/85 = 4485K $\pm$ 1%

Temp. (°C)	R_Min (Kohm)	R_Cent (Kohm)	R_Max (Kohm)	Res TOL.	Temp. TOL.(°C)
-2	427.719	438.473	449.452	2.50%	0.42
-1	403.250	413.142	423.236	2.44%	0.41
0	380.327	389.427	398.705	2.38%	0.40
1	358.846	367.216	375.744	2.32%	0.39
2	338.706	346.405	354.243	2.26%	0.39
3	319.818	326.898	334.101	2.20%	0.38
4	302.097	308.606	315.225	2.14%	0.37
5	285.463	291.448	297.528	2.09%	0.36
6	269.845	275.346	280.930	2.03%	0.36
7	255.175	260.230	265.358	1.97%	0.35
8	241.390	246.034	250.741	1.91%	0.34
9	228.432	232.697	237.017	1.86%	0.33
10	216.247	220.162	224.126	1.80%	0.32
11	204.785	208.377	212.012	1.74%	0.32
12	193.998	197.294	200.625	1.69%	0.31
13	183.843	186.865	189.917	1.63%	0.30
14	174.281	177.050	179.844	1.58%	0.29
15	165.272	167.808	170.365	1.52%	0.28
16	156.782	159.103	161.442	1.47%	0.28
17	148.779	150.901	153.039	1.42%	0.27
18	141.232	143.171	145.123	1.36%	0.26
19	134.111	135.882	137.662	1.31%	0.25
20	127.392	129.007	130.630	1.26%	0.24
21	121.049	122.521	123.997	1.21%	0.23
22	115.059	116.398	117.741	1.15%	0.23
23	109.401	110.618	111.837	1.10%	0.22
24	104.054	105.158	106.263	1.05%	0.21
25	99.000	100.000	101.000	1.00%	0.20
26	94.127	95.125	96.124	1.05%	0.21
27	89.522	90.516	91.512	1.10%	0.22
28	85.169	86.157	87.149	1.15%	0.23
29	81.053	82.034	83.018	1.20%	0.25
30	77.160	78.132	79.108	1.25%	0.26
31	73.476	74.438	75.404	1.30%	0.27
32	69.990	70.940	71.896	1.35%	0.28
33	66.689	67.626	68.570	1.40%	0.29
34	63.563	64.487	65.418	1.44%	0.31
35	60.601	61.511	62.429	1.49%	0.32

Appendix : R-T table

R25 =100 KOhm $\pm$ 1% B25/85 = 4485K $\pm$ 1%

Temp. (°C)	R_Min (Kohm)	R_Cent (Kohm)	R_Max (Kohm)	Res TOL.	Temp. TOL.(°C)
36	57.795	58.690	59.594	1.54%	0.33
37	55.134	56.015	56.904	1.59%	0.34
38	52.612	53.477	54.351	1.63%	0.35
39	50.219	51.068	51.927	1.68%	0.37
40	47.948	48.782	49.624	1.73%	0.38
41	45.794	46.611	47.438	1.77%	0.39
42	43.748	44.549	45.360	1.82%	0.40
43	41.806	42.590	43.385	1.87%	0.42
44	39.960	40.728	41.507	1.91%	0.43
45	38.207	38.959	39.721	1.96%	0.44
46	36.541	37.276	38.022	2.00%	0.46
47	34.956	35.675	36.405	2.05%	0.47
48	33.450	34.152	34.867	2.09%	0.48
49	32.016	32.703	33.402	2.14%	0.50
50	30.653	31.324	32.006	2.18%	0.51
51	29.355	30.010	30.677	2.22%	0.52
52	28.119	28.759	29.411	2.27%	0.54
53	26.942	27.567	28.204	2.31%	0.55
54	25.821	26.431	27.053	2.35%	0.56
55	24.753	25.348	25.956	2.40%	0.58
56	23.735	24.316	24.909	2.44%	0.59
57	22.765	23.332	23.910	2.48%	0.60
58	21.839	22.392	22.957	2.52%	0.62
59	20.957	21.496	22.048	2.56%	0.63
60	20.115	20.641	21.179	2.61%	0.65
61	19.311	19.824	20.349	2.65%	0.66
62	18.544	19.045	19.557	2.69%	0.67
63	17.812	18.300	18.799	2.73%	0.69
64	17.112	17.588	18.075	2.77%	0.70
65	16.444	16.908	17.384	2.81%	0.72
66	15.806	16.258	16.722	2.85%	0.73
67	15.196	15.637	16.089	2.89%	0.75
68	14.613	15.043	15.483	2.93%	0.76
69	14.055	14.474	14.904	2.97%	0.78
70	13.522	13.930	14.350	3.01%	0.79
71	13.012	13.410	13.819	3.05%	0.81
72	12.523	12.912	13.310	3.09%	0.82
73	12.056	12.435	12.823	3.13%	0.84

Appendix : R-T table

R25 =100 KOhm $\pm$ 1% B25/85 = 4485K $\pm$ 1%

Temp. (°C)	R_Min (Kohm)	R_Cent (Kohm)	R_Max (Kohm)	Res TOL.	Temp. TOL.(°C)
74	11.609	11.978	12.357	3.17%	0.85
75	11.181	11.540	11.910	3.20%	0.87
76	10.771	11.121	11.482	3.24%	0.88
77	10.378	10.719	11.071	3.28%	0.90
78	10.001	10.334	10.677	3.32%	0.91
79	9.641	9.965	10.300	3.36%	0.93
80	9.295	9.611	9.937	3.39%	0.94
81	8.963	9.272	9.590	3.43%	0.96
82	8.645	8.946	9.256	3.47%	0.98
83	8.340	8.633	8.936	3.50%	0.99
84	8.047	8.333	8.628	3.54%	1.01
85	7.767	8.045	8.333	3.58%	1.02
86	7.497	7.769	8.050	3.61%	1.04
87	7.238	7.503	7.777	3.65%	1.06
88	6.990	7.248	7.515	3.69%	1.07
89	6.751	7.003	7.264	3.72%	1.09
90	6.522	6.768	7.022	3.76%	1.10
91	6.302	6.542	6.790	3.79%	1.12
92	6.090	6.324	6.566	3.83%	1.14
93	5.887	6.115	6.351	3.86%	1.15
94	5.691	5.914	6.144	3.90%	1.17
95	5.503	5.720	5.945	3.93%	1.19
96	5.322	5.534	5.753	3.97%	1.20
97	5.148	5.355	5.569	4.00%	1.22
98	4.981	5.182	5.391	4.03%	1.24
99	4.820	5.016	5.220	4.07%	1.26
100	4.665	4.857	5.056	4.10%	1.27
101	4.516	4.703	4.897	4.14%	1.29
102	4.372	4.555	4.744	4.17%	1.31
103	4.233	4.412	4.597	4.20%	1.32
104	4.100	4.274	4.455	4.23%	1.34
105	3.972	4.142	4.318	4.27%	1.36
106	3.848	4.014	4.186	4.30%	1.38
107	3.729	3.891	4.059	4.33%	1.40
108	3.614	3.772	3.936	4.37%	1.41
109	3.503	3.657	3.818	4.40%	1.43
110	3.396	3.547	3.704	4.43%	1.45
111	3.293	3.440	3.594	4.46%	1.47

Appendix : R-T table

R25 =100 KOhm ± 1% B25/85 = 4485K ± 1%

Temp. (°C)	R_Min (Kohm)	R_Cent (Kohm)	R_Max (Kohm)	Res TOL.	Temp. TOL.(°C)
112	3.193	3.337	3.487	4.49%	1.49
113	3.097	3.238	3.384	4.52%	1.50
114	3.005	3.142	3.285	4.56%	1.52
115	2.916	3.050	3.190	4.59%	1.54
116	2.829	2.960	3.097	4.62%	1.56
117	2.746	2.874	3.008	4.65%	1.58
118	2.666	2.791	2.921	4.68%	1.60
119	2.588	2.710	2.838	4.71%	1.61
120	2.513	2.633	2.757	4.74%	1.63
121	2.441	2.557	2.679	4.77%	1.65
122	2.371	2.485	2.604	4.80%	1.67
123	2.303	2.415	2.531	4.83%	1.69
124	2.238	2.347	2.461	4.86%	1.71
125	2.174	2.281	2.393	4.89%	1.73