

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
2023-10-04	B	/	/	First release 首次发行	Doris Chang	/

1 外形尺寸 Shape and Dimensions

- 尺寸：见图 1 和表 1
- PCB 焊盘：见图 2 和表 1
- Dimensions: See Fig.1 and Table 1.
- Recommended PCB pattern for reflow soldering: See Fig.2 and Table 1

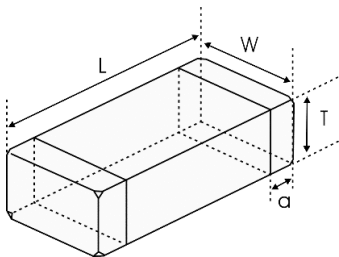


图 1 Fig.1

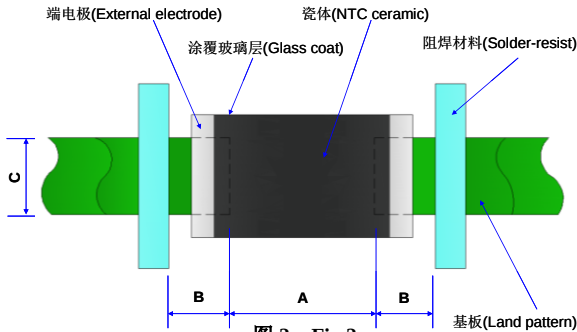


图 2 Fig.2

表 1 (Table 1) 单位 unit: inch[mm]

类别 Type	L	W	T	a	A	B	C
0603 [1608]	0.063±0.006 [1.6±0.15]	0.031±0.006 [0.8±0.15]	0.031±0.006 [0.8±0.15]	0.012±0.008 [0.3±0.2]	[0.6-0.8]	[0.6-0.7]	[0.6-0.8]
0805 [2012]	0.079±0.008 [2.0±0.2]	0.049±0.008 [1.25±0.2]	0.033±0.008 [0.85±0.2]	0.020±0.012 [0.5±0.3]	[1.0-1.1]	[0.6-0.7]	[1.0-1.2]

2 产品标识 (料号) Product Identification(Part Number)

NC **0603** **-** **473** **J** **4050** **G** **B** **T**
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

① 类别 Type	
NC	片式 NTC 热敏电阻器 Chip NTC Thermistor
② 外形尺寸(mm) External Dimensions (L×W×T)	
0201[0603]	0.60×0.30×0.30
0402[1005]	1.00×0.50×0.50
0603[1608]	1.60×0.80×0.80
0805[2012]	2.00×1.25×0.85
③ 分隔符 Delimiter	
-	

④ 25℃的零功率电阻 Nominal Zero-Power Resistance	
222	2.2kΩ
473	47kΩ
104	100kΩ
⑤ 电阻值公差 Tolerance of Resistance	
F	±1%
G	±2%
H	±3%
J	±5%

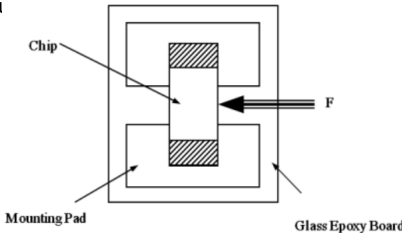
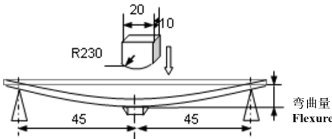
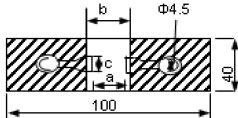
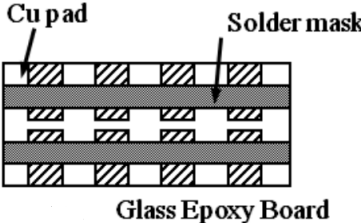
⑥ B 值常数 B Constant	
3380	3380K
3950	3950K
4250	4250K
⑦ B 值公差 Tolerance of B Constant	
F	±1%
H	±3%
⑧ B 值计算方式 B constant calculation method	
A	25℃&85℃
B	25℃&50℃
⑨ Packing code	
T	braided packing
B	oos packing

3. Electrical Characteristics

Items	Symbol	Test condition	unit	performance requirement
Nominal Zero-Power Resistance	R ₂₅ °C	At=25±0.05°C P≤0.1mW	K Ω	47±5%
B Constant	B25/50	B value between 25±0.05°C and 85±0.05°C B=Ln (R ₂₅ /R ₅₀)/(1/T ₂₅ -1/T ₅₀); T ₁ = (273.15+25)K,T ₂ = (273.15+50) K Note:273.15 is the absolute temperature。	K	4050±2%
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 (mW/°C).	mW/°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 (°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).	sec	<5S
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 in still air rising 1 ° C by self-heating.	mA	0.14
Operating ambient temperature	/	Temperature range under specified conditions of use	°C	-40°C ~+125°C

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

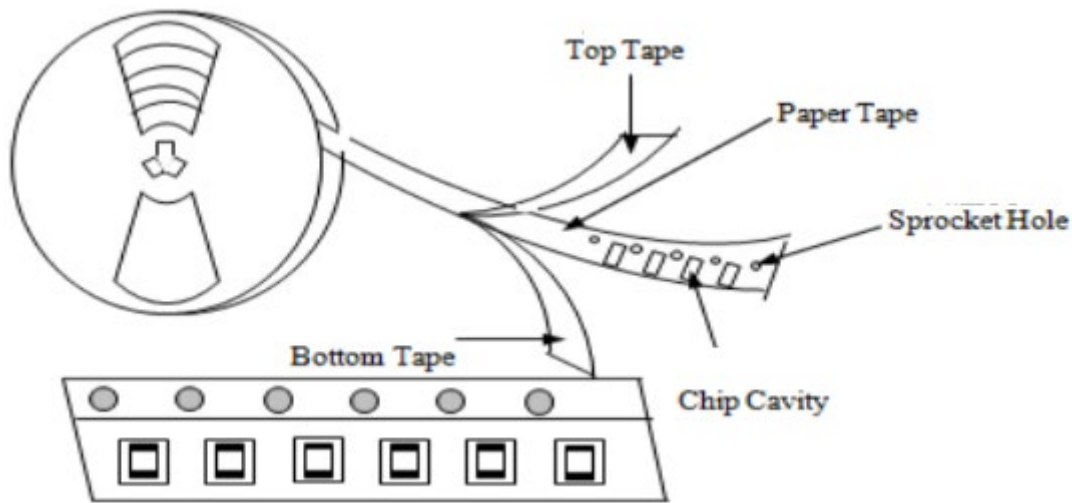
4. Reliability Test (一)

Item	Standard	Test Method and Remarks	Requirements																				
Terminal Strength	IEC 60068-2-21	1.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. 2.Apply a force of 5N 3 .Duration: 10±1S	No removal or split of the termination or other defects shall occur 																				
Resistance to Flexure	IEC 60068-2-21	1.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;  2 Flexure:Pressurizing Speed : <0.5mm/s, 3.Duration: 10s	1.No visible damage. 2. ΔR25/R25 ≤2% 单位 unit: mm <table border="1"> <thead> <tr> <th>类型 Type</th><th>a</th><th>b</th><th>c</th></tr> </thead> <tbody> <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> </tbody> </table> 	类型 Type	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
类型 Type	a	b	c																				
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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 of6 hours).。	No visible damage. 																				
Dropping	IEC 60068-2-32	Drop a chip 10 times on a concrete floor from a height of 1 meter.。	No visible damage.																				

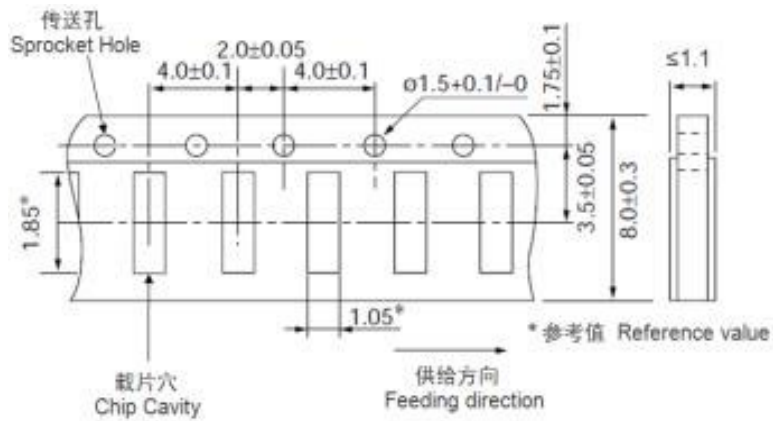
Solderability	IEC 60068-2-58	1.Solder temperature: 245±5°C. 2.Duration: 3±0.3s.. 3.Solder: 96.5wt%Sn/3.0wt%Ag/0.5wt%Cu. 4.Flux(weight ratio): 25% Rosin and 75% ethanol in weight.	1.No visible damage; 2.Wetting shall exceed 95% coverage..															
Resistance to Soldering Heat	IEC 60068-2-58	1.Solder temperature: 260±5°C. 2.Duration: 10±1s.. 3.Solder: 96.5wt%Sn/3.0wt%Ag/0.5wt%Cu. 4.Flux(weight ratio):25% Rosin and 75% ethanol in weight. 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 border="1"><tr><td>Step</td><td>Temperature</td><td>ime</td></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 for 1~2 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 to dry heat	IEC 60068-2-2	1.125±5°Cin 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%															
Resistance to cold	IEC 60068-2-1	1.-40±3°Cin 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%															
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%															
Resistance to high temperature load	IEC 60539-15.25.4	1.85±2°Cin air with permissive operating current for 1000±48 hours 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%															

5. Taping

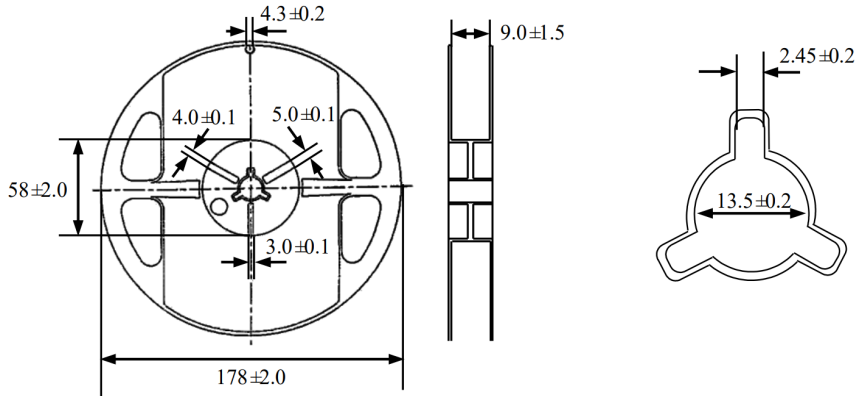
5.1 Taping Drawings



5.2 Paper Tape Dimensions (0603series) (Unit: mm)



5. 3Reel Dimensions (Unit: mm) /Quantity per Reel: (4K)



6. 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

7. Notes & Warnings

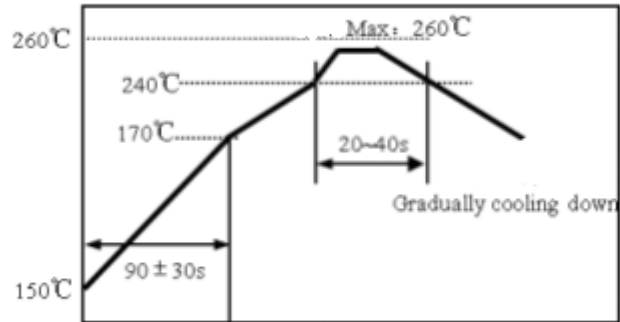
The Chengdu Shunkang SANSEN series thermistors shall not be operated and stored under the following environmental condition:

- 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 condition

8. Recommended Soldering Technologies

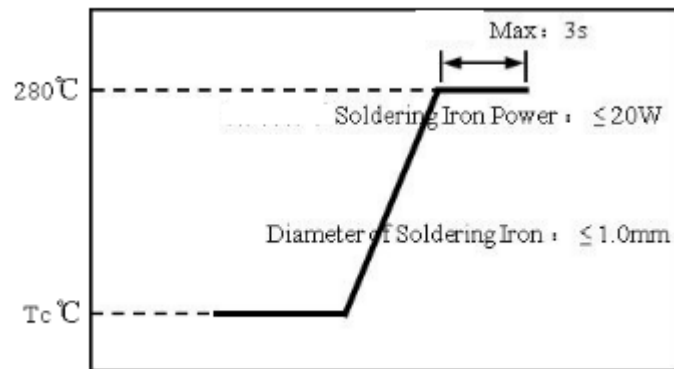
8.1 Re-flowing Profile

- 1~2°C/sec. Ramp.
- Pre-heating: 150~170°C/90±30 sec.
- Time above 240°C: 20~40 sec.
- Peak temperature: 260°C Max./10 sec.
- Solder paste: 96.5wt%Sn/3.0wt%Ag/0.5wt%Cu.
- Max.2 times for re-flowing.



8.2 Iron Soldering Profile

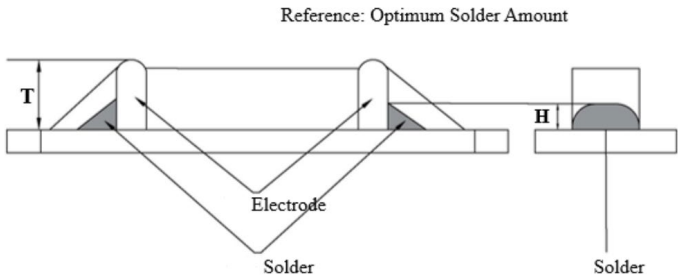
- Iron soldering power: Max.20W
- Pre-heating: 150°C/60sec.
- Soldering Tip temperature: 280°CMax.
- Soldering time: 3 sec Max.
- Solder paste: 96.5wt%Sn/3.0wt%Ag/0.5wt%Cu
- Max.1 times for iron soldering



[Note: Take care not to apply the tip of the soldering iron to the terminal electrodes.]

8.3 Printing Conditions of Solder Paste

- The amount of solder is critical . Standard height of fillet is shown in the table below.
- Too much solder may cause mechanical stress , resulting in cracking , mechanical and / or electronic damage.



Type	Solder Paste Thickness	H
0201	100μm	1/3T≤H≤T
0402	150μm	1/3T≤H≤T
0603, 0805	200μm	0.2mm≤H≤T

● After Soldering

For removing the flux after soldering, observe the following points in order to avoid deterioration of the characteristics or any change of the external electrodes quality.

- 1)Please keep mounted parts and a substrate from an occurrence of resonance in ultrasonic cleaning.
- 2)Please do not clean the products in the case of using a non-wash-type flux

Type	0201 , 0402	0603 , 0805
Solvent	Isopropyl Alcohol	
Dipping cleaning	Less than 5 min.at room temp. or Less than 2 min. at 40°C max.	
Ultrasonic cleaning	Less than 5 min, 20W/L Frequency of several 28kHz to several 40kHz.	Less than 1 min, 20W/L Frequency of several 10kHzto several 100kHz

Appose: R-T table

R25 =47 KOhm ± 5%

B25/50= 4050 K ± 2%

Temp. (°C)	R_Min (Kohm)	R_Cent (Kohm)	R_Max (Kohm)	Res TOL.	Temp. TOL.(°C)
-40	1,544.673	1,747.920	1,972.964	12.88%	1.81
-39	1,443.928	1,631.671	1,839.216	12.72%	1.80
-38	1,350.445	1,523.950	1,715.448	12.57%	1.79
-37	1,263.653	1,424.076	1,600.851	12.41%	1.79
-36	1,183.030	1,331.424	1,494.687	12.26%	1.78
-35	1,108.097	1,245.428	1,396.279	12.11%	1.77
-34	1,038.415	1,165.564	1,305.011	11.96%	1.76
-33	973.583	1,091.357	1,220.320	11.82%	1.76
-32	913.233	1,022.370	1,141.688	11.67%	1.75
-31	857.025	958.202	1,068.645	11.53%	1.74
-30	804.649	898.485	1,000.757	11.38%	1.73
-29	755.819	842.884	937.628	11.24%	1.72
-28	710.274	791.088	878.894	11.10%	1.71
-27	667.771	742.813	824.223	10.96%	1.70
-26	628.088	697.798	773.306	10.82%	1.70
-25	591.021	655.802	725.865	10.68%	1.69
-24	556.381	616.605	681.639	10.55%	1.68
-23	523.993	580.001	640.390	10.41%	1.67
-22	493.699	545.805	601.902	10.28%	1.66
-21	465.349	513.842	565.970	10.14%	1.65
-20	438.807	483.954	532.411	10.01%	1.64
-19	413.946	455.992	501.053	9.88%	1.63
-18	390.650	429.822	471.739	9.75%	1.62
-17	368.812	405.317	444.323	9.62%	1.61
-16	348.330	382.362	418.670	9.50%	1.60
-15	329.113	360.850	394.657	9.37%	1.59
-14	311.075	340.680	372.170	9.24%	1.58
-13	294.137	321.762	351.102	9.12%	1.57
-12	278.225	304.011	331.355	8.99%	1.56
-11	263.271	287.347	312.839	8.87%	1.55
-10	249.212	271.697	295.470	8.75%	1.54
-9	235.989	256.995	279.171	8.63%	1.53
-8	223.547	243.176	263.868	8.51%	1.52
-7	211.835	230.184	249.496	8.39%	1.51
-6	200.807	217.963	235.992	8.27%	1.50
-5	190.419	206.463	223.299	8.15%	1.49
-4	180.618	195.624	211.348	8.04%	1.48
-3	171.379	185.419	200.109	7.92%	1.46
-2	162.668	175.808	189.533	7.81%	1.45
-1	154.452	166.751	179.580	7.69%	1.44
0	146.699	158.214	170.207	7.58%	1.43
1	139.381	150.165	161.379	7.47%	1.42

Temp. (°C)	R_Min (Kohm)	R_Cent (Kohm)	R_Max (Kohm)	Res TOL.	Temp. TOL.(°C)
2	132.471	142.573	153.061	7.36%	1.41
3	125.944	135.408	145.219	7.25%	1.40
4	119.776	128.645	137.825	7.14%	1.38
5	113.947	122.259	130.850	7.03%	1.37
6	108.435	116.227	124.269	6.92%	1.36
7	103.221	110.528	118.056	6.81%	1.35
8	98.287	105.140	112.189	6.70%	1.33
9	93.618	100.045	106.647	6.60%	1.32
10	89.197	95.227	101.410	6.49%	1.31
11	85.009	90.667	96.460	6.39%	1.30
12	81.042	86.352	91.779	6.29%	1.28
13	77.283	82.266	87.352	6.18%	1.27
14	73.718	78.396	83.163	6.08%	1.26
15	70.338	74.730	79.198	5.98%	1.25
16	67.132	71.256	75.444	5.88%	1.23
17	64.089	67.962	71.888	5.78%	1.22
18	61.202	64.839	68.520	5.68%	1.21
19	58.460	61.876	65.328	5.58%	1.19
20	55.856	59.065	62.302	5.48%	1.18
21	53.381	56.396	59.432	5.38%	1.17
22	51.030	53.863	56.710	5.29%	1.15
23	48.796	51.457	54.128	5.19%	1.14
24	46.671	49.172	51.677	5.09%	1.12
25	44.650	47.000	49.350	5.00%	1.11
26	42.651	44.936	47.225	5.09%	1.14
27	40.752	42.974	45.203	5.19%	1.17
28	38.948	41.108	43.279	5.28%	1.19
29	37.233	39.332	41.446	5.37%	1.22
30	35.603	37.643	39.701	5.47%	1.25
31	34.052	36.035	38.038	5.56%	1.28
32	32.577	34.504	36.454	5.65%	1.31
33	31.174	33.046	34.944	5.74%	1.34
34	29.838	31.657	33.504	5.83%	1.37
35	28.566	30.334	32.131	5.92%	1.40
36	27.356	29.073	30.822	6.01%	1.43
37	26.203	27.872	29.573	6.10%	1.46
38	25.105	26.726	28.381	6.19%	1.49
39	24.058	25.633	27.243	6.28%	1.52
40	23.060	24.591	26.157	6.37%	1.55
41	22.109	23.596	25.120	6.46%	1.58
42	21.202	22.647	24.129	6.54%	1.61
43	20.337	21.740	23.182	6.63%	1.64
44	19.512	20.875	22.277	6.72%	1.67
45	18.724	20.048	21.412	6.80%	1.70
46	17.972	19.258	20.585	6.89%	1.74

Temp. (°C)	R_Min (Kohm)	R_Cent (Kohm)	R_Max (Kohm)	Res TOL.	Temp. TOL.(°C)
47	17.253	18.503	19.794	6.98%	1.77
48	16.567	17.782	19.037	7.06%	1.80
49	15.912	17.092	18.313	7.15%	1.83
50	15.286	16.433	17.621	7.23%	1.86
51	14.688	15.802	16.957	7.31%	1.90
52	14.116	15.198	16.322	7.40%	1.93
53	13.569	14.621	15.714	7.48%	1.96
54	13.046	14.068	15.132	7.56%	2.00
55	12.545	13.539	14.574	7.65%	2.03
56	12.067	13.032	14.039	7.73%	2.06
57	11.608	12.547	13.526	7.81%	2.10
58	11.170	12.082	13.035	7.89%	2.13
59	10.750	11.636	12.564	7.97%	2.16
60	10.348	11.209	12.112	8.05%	2.20
61	9.963	10.801	11.679	8.13%	2.23
62	9.595	10.409	11.264	8.21%	2.27
63	9.242	10.034	10.866	8.29%	2.30
64	8.904	9.673	10.483	8.37%	2.34
65	8.579	9.328	10.116	8.45%	2.37
66	8.269	8.996	9.764	8.53%	2.41
67	7.970	8.678	9.425	8.61%	2.44
68	7.684	8.373	9.100	8.69%	2.48
69	7.410	8.080	8.788	8.76%	2.51
70	7.147	7.798	8.487	8.84%	2.55
71	6.893	7.527	8.198	8.92%	2.59
72	6.650	7.266	7.920	8.99%	2.62
73	6.416	7.016	7.652	9.07%	2.66
74	6.192	6.776	7.395	9.15%	2.69
75	5.977	6.544	7.148	9.22%	2.73
76	5.770	6.323	6.911	9.30%	2.77
77	5.572	6.110	6.682	9.37%	2.81
78	5.381	5.905	6.462	9.45%	2.84
79	5.198	5.708	6.251	9.52%	2.88
80	5.022	5.518	6.047	9.60%	2.92
81	4.853	5.336	5.852	9.67%	2.96
82	4.691	5.161	5.664	9.74%	2.99
83	4.535	4.992	5.482	9.82%	3.03
84	4.384	4.830	5.308	9.89%	3.07
85	4.240	4.674	5.139	9.96%	3.11
86	4.100	4.523	4.976	10.03%	3.15
87	3.965	4.377	4.819	10.11%	3.19
88	3.836	4.237	4.668	10.18%	3.23
89	3.711	4.102	4.522	10.25%	3.27
90	3.591	3.972	4.382	10.32%	3.31
91	3.476	3.846	4.246	10.39%	3.35

Temp. (°C)	R_Min (Kohm)	R_Cent (Kohm)	R_Max (Kohm)	Res TOL.	Temp. TOL.(°C)
92	3.364	3.725	4.115	10.46%	3.39
93	3.257	3.609	3.989	10.53%	3.43
94	3.153	3.496	3.867	10.60%	3.47
95	3.053	3.388	3.749	10.67%	3.51
96	2.958	3.284	3.636	10.74%	3.55
97	2.865	3.183	3.527	10.81%	3.59
98	2.776	3.086	3.422	10.88%	3.63
99	2.690	2.992	3.320	10.95%	3.67
100	2.607	2.902	3.222	11.01%	3.71
101	2.527	2.815	3.127	11.08%	3.75
102	2.450	2.730	3.035	11.15%	3.80
103	2.376	2.649	2.946	11.22%	3.84
104	2.304	2.570	2.860	11.28%	3.88
105	2.234	2.494	2.777	11.35%	3.92
106	2.167	2.421	2.697	11.42%	3.96
107	2.102	2.349	2.619	11.48%	4.01
108	2.039	2.281	2.544	11.55%	4.05
109	1.979	2.214	2.471	11.62%	4.09
110	1.920	2.150	2.401	11.68%	4.14
111	1.864	2.088	2.333	11.75%	4.18
112	1.809	2.028	2.267	11.81%	4.22
113	1.756	1.970	2.204	11.88%	4.27
114	1.705	1.914	2.142	11.94%	4.31
115	1.656	1.860	2.083	12.01%	4.36
116	1.609	1.808	2.026	12.07%	4.40
117	1.563	1.757	1.970	12.13%	4.44
118	1.519	1.708	1.917	12.20%	4.49
119	1.476	1.661	1.865	12.26%	4.53
120	1.434	1.615	1.814	12.32%	4.58
121	1.394	1.571	1.765	12.39%	4.62
122	1.355	1.528	1.718	12.45%	4.67
123	1.317	1.486	1.672	12.51%	4.72
124	1.281	1.445	1.627	12.57%	4.76
125	1.245	1.406	1.584	12.63%	4.81