南京时恒电子科技有限公司

Nanjing Shiheng Electronics Co.,Ltd.

规格承认书

APPROVAL SHEET

客户名称 CUSTOMER：	
产品名称 PART NAME：	MF52 测温型 NTC 热敏电阻器 MF52 Series Temp Measurement NTC Thermistor
产品规格 PART NUMBER：	MF52A 103F3950(A1) (UL:E240991)
产品编号 PRODUCTCODE：	
版次 REV.NO：	B0
日期 DATE：	

确认

CONFIRM

客户 CLIENT			供货商/制造商 MANUFACTOR	
品保部 Quality Dep.			规格书制作 Design	吴仪
制造部 Production Dep.			业务部审核 Checked by sales	
工程部 Engineering Dep.			技术部审核 Checked by R&D	程鹏
			品质部审核 Checked by QA	李少媛

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变 更 记 录 表

REVISED RECORD SHEET

版次 REV. NO	变更日期 REV.DATE	变更内容 CHANGE CONTENT	申请人 APPLICANT	批准人 APPROVED
A0	2015/10/11	版本制定。 Version formulation	王月婷	李少媛
B0	2022/4/1	更新规格书版本格式，增加版次管控，细化规格纸。 Update for version form of datasheet,add to management and control for number of edition,refine to PN and draw.	王月婷	李少媛

1、产品型号说明 Product model specification

MF52	A	103	F	3950	(A1)
①	②	③	④	⑤	⑥

① MF52：测温型 NTC 热敏电阻器系列 (Series Temp Measurement NTC Thermistor)

② A：指引线为镀锡线 (Refers to tinned lead)

③ 103： 25℃的零功率电阻值 10KΩ(Zero Power Resistance at 25℃is 10KΩ)

④ F：阻值精度代码 F-±1% G-±2% H-±3% J-±5%（Resistance precision code F-±1% G-±2% H-±3% J-±5%）

⑤ 3950：B25/50 值 3950K（B25/50:3950K）

⑥ （A1）：线材规格：引线外径Φ0.3mm（Wire dimension: The outer diameter of lead wire is Φ0.3mm）

2、电气性能 Electrical Characteristics

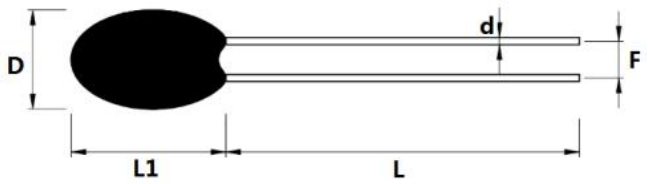
No.	项目 Item	符号 Symbol	测试条件 Test conditions	单位 Unit	性能要求 Requirements
2.1	25℃的零功率电阻值 Zero Power Resistance at 25℃	$R_{25℃}$	Ta=25±0.01℃ Test Power≤0.1mW	KΩ	10KΩ±1%
2.2	B 值 B-value	$B_{25/50}$	$B=[(T_a\times T_b)/(T_b-T_a)]\times\ln(R_a/R_b)$ Ta=25±0.01℃ T_b=50℃±0.01℃	K	3950±1%
2.3	耗散系数 Thermal dissipation Coefficient	δ	静止空气中 In still air	mW/℃	≥2
2.4	时间常数 Thermal time constant	τ	静止空气中 In still air	sec	≤7
2.5	绝缘电阻 Insulation resistance	/	100V/DC 1min	MΩ	≥100
2.6	工作温度范围 Operating temperature range	/	/	℃	-55℃～125℃
2.7	最大额定功率 Maximum rated power	Pmax	/	mW	50
2.8	阻温特性 R&T-table	/	/	/	见附表Ⅰ See attached table I
2.9	阻值误差&B 值误差 Resistance tolerance& B-value tolerance	/	/	/	见附表Ⅱ See attached table II

3、产品图纸 Product drawing

产品图纸 Product drawing		客户确认 Customer confirm	客户名称 Customer：			
			确认 Confirm		日期 DATE	
产品型号 MODEL NO.	MF52A 103F3950(A1)		审核 Approve:		日期 DATE	

尺寸 Dimensions：

（Unit：mm）



D±0.4	L1±1.0	L±2.0	d±0.05	F±0.5
2.1	3.0	27	0.3	1.7

技术要求 Technical requirements：

1）零功率阻值：R25：10KΩ±1%(Zero Power Resistance: R25：10KΩ±1%)；
2）B25/50 数值：3950K±1%(B-value:B25/50: 3950K±1%)；
3）线材：φ0.3 镀锡铜包钢线(Φ0.3 tinned copper-weld steel wire)；
4）封装：黑色改性环氧树脂包封（Black function improvement Epoxy resin）；
5）符合 RoHS 环保要求（Meet environmental protection requirements:RoHS）。

更新履历 Revised record sheet

版本 REV. NO	更新时间 REV.DATE	更新内容 Change content	申请人 Applicant	批准人 Approved
B0		版本发行	王月婷	李少媛

4、可靠性 Reliability

No.	项目 Item	试验标准	试验条件及方法 Test conditions and methods	性能要求 Requirements
4.1	引出端强度 Terminal strength	IEC60068-2-21	固定电阻端，拉力：5±1 N，时间：10±1 秒 Fixed resistor end, Pull strength：5±1 N， time：10±1 sec	无可见性损伤 No obvious damage R_{25} ΔR/R≤±2%
4.2	可焊性 Solderability	IEC60068-2-20	温度 245±5℃时间 2-3 秒 temperature : 245±5℃ for 2-3sec	着锡面积≥95% Coverage area ≥ 95%.
4.3	耐焊接热 Withstand weiling temp	IEC60068-2-20	锡锅温度：260±5℃，浸入深度距电阻体 6mm，时间 5±1 秒 Temperature of tin pot:260±5℃, insert deepth from body of resistance 6mm, time 5±1senconds	R_{25} ΔR/R≤±2%
4.3	稳态湿热 Steady humidity and heat	IEC60068-2-78	温度：40℃±2℃，湿度：93±2%，时间：500 小时 Temp：40℃±2℃，humidity：93±2%， Time ： 500hrs	R_{25} ΔR/R≤±2%
4.4	温度快速变化 Rapid changes in temperature	IEC60068-2-14	-55℃30min→25℃5min→125℃ 30min→25℃5min，5cycles	R_{25} ΔR/R≤±2%
4.5	高温储存 High temperature storage	IEC60068-2-2	温度: 125℃±5℃ 时间:1000 小时 Temp : 125℃±5℃, Time :1000hrs	R_{25} ΔR/R≤±2%
4.6	低温储存 Low temperature storage	IEC60068-2-1	温度:-55℃时间:1000 小时 Temp : -55℃, Time :1000hrs	R_{25} ΔR/R≤±2%

▲注： 1）稳态湿热及温度快速变化试验结束后，样品需在常温环境下静置 2 小时后再做性能测试;

▲Note： 1) After the test of steady-state humid heat and rapid temperature change, the sample should be kept for 2 hours at room temperature before performance test ;

2）高温存储及低温存储结束后，需随测试环境自然恢复至常温，再取出做性能测试。

2) After the test of high - and low-temperature storage is complete, and then take it out for performance test when the test environment naturally regain to normal temperature.

5、产品包装 Product packaging

5.1 包装方式 Packing Type

■ 散装方式 Bulk Type □ 编编带方式 Reel Type

5.2 包装规格 Packing specification

No.	包装规格 Packing specification	包装材料、尺寸 Packing material, size	产品数量 Quantity
1	包装袋 Packing bag	自封口袋(self sealing bag) W×H＝11mm×12mm	**500**

6、安装&使用注意事项 Installation & Use precautions

6.1 本产品的用途：温度测量与控制；application:test and control for temperature

6.2 避免过大的电流引起元件自身发热而产生测量误差；To avoid of testing tolerance caused by huge current upon the self-heat of component.

6.3 烙铁焊接时，焊接处距包封头部距离至少 2mm，焊接温度应低于 360℃，焊接时间＜3ses；

When welded by soldering iron,weld spot should be 2mm at least from head,weld temperature should be under 360℃,time＜3ses

6.4 储存温度：-10℃ ～ 40℃；储存湿度：≤75% RH；storage temp:-10℃ ～ 40℃；storage humidity:≤75% RH

6.5 避免存放在具有腐蚀性气体及光照的环境下；To avoid of leaving with such environment as corrosive gases and illumination

6.6 包装打开后需重新密封保存，贮存期 1 年，超过贮存期，可按本标准规定的项目重新检验，如符合要求仍可使用；

The packing need to be resealed since opened,storage period 1 year.once valid,it should be retest according to regulated of criterion and can be still used if meet the requirement.

6.7 如在加工过程中需使用热缩管，热缩管热缩时不可使用电吹风进行吹制，建议热缩工艺，将套好热缩管后的产品放入恒温烘箱中，按 110℃/10-12min 进行热缩；

In case of useing heat-shrink tube,hair drier is prohibited.we suggest that put the product with heat shrink into constant-temperature box and heat shrink under 110℃/10-12min

7、产品认证 Product certification

No.	项目 Projects	产品认证 Product certification
8.1	质量管理体系认证 Quality Management System Certification	ISO9001:2015
		IATF16949：2016
8.2	环境管理体系认证 Environmental Management System Certification	ISO14001:2015
8.3	环保检测报告 Environmental test report	RoHS 2.0
8.4	CQC 认证 CQC certificate	
8.5	苏省高新技术产品认证 High-tech product certificate in Jiangsu Province	
8.6	产品通过 AEC-Q200 测试 Passed by AECQ-200	
8.7	UL 认证 UL certificate	E240991
8.8	TUV 认证 TUV certificate	

附表Ⅰ（Attachment I）

南京时恒阻温特性表 SHIHENG R-T Table

R25=10KΩ 精度: ±1%　　B25/50=3950K 精度: ±1%(P477-4B)

温度(℃) TEMP(℃	电阻(KΩ) RESISTANCE(KΩ)			电阻精度(%) RESISST-TOL(%)		温度精度(℃) TEMP-TOL(℃)	
	最小值	中心值	最大值	△R	-△R	△T	-△T
-55	710.373	749.2	790.069	5.455	-5.182	0.739	-0.702
-54	663.713	699.508	737.161	5.382	-5.117	0.735	-0.699
-53	620.439	653.455	688.16	5.31	-5.052	0.731	-0.696
-52	580.267	610.733	642.734	5.239	-4.988	0.727	-0.692
-51	542.945	571.067	600.586	5.169	-4.924	0.723	-0.689
-50	508.246	534.215	561.455	5.098	-4.861	0.719	-0.685
-49	475.969	499.957	525.102	5.029	-4.798	0.715	-0.682
-48	445.929	468.095	491.313	4.96	-4.735	0.71	-0.678
-47	417.959	438.448	459.895	4.891	-4.672	0.706	-0.675
-46	391.907	410.851	430.668	4.823	-4.61	0.702	-0.671
-45	367.632	385.154	403.47	4.755	-4.549	0.697	-0.667
-44	345.005	361.217	378.153	4.688	-4.488	0.693	-0.663
-43	323.908	338.913	354.577	4.621	-4.427	0.688	-0.659
-42	304.232	318.123	332.616	4.555	-4.366	0.683	-0.655
-41	285.874	298.739	312.152	4.489	-4.306	0.679	-0.651
-40	268.74	280.66	293.078	4.424	-4.246	0.674	-0.647
-39	252.745	263.791	275.292	4.359	-4.187	0.669	-0.643
-38	237.806	248.046	258.702	4.295	-4.128	0.664	-0.638
-37	223.849	233.346	243.221	4.232	-4.069	0.659	-0.634
-36	210.805	219.615	228.771	4.168	-4.011	0.654	-0.63
-35	198.609	206.785	215.276	4.106	-3.953	0.649	-0.625
-34	187.202	194.792	202.669	4.044	-3.896	0.644	-0.621
-33	176.527	183.576	190.886	3.982	-3.839	0.639	-0.616

-32	166.535	173.082	179.869	3.921	-3.782	0.634	-0.611
-31	157.176	163.26	169.563	3.86	-3.726	0.628	-0.606
-30	148.407	154.062	159.917	3.8	-3.67	0.623	-0.602
-29	140.187	145.446	150.886	3.74	-3.615	0.617	-0.597
-28	132.478	137.369	142.426	3.681	-3.56	0.612	-0.592
-27	125.245	129.795	134.497	3.622	-3.505	0.606	-0.587
-26	118.455	122.689	127.062	3.564	-3.451	0.601	-0.581
-25	112.078	116.02	120.087	3.506	-3.397	0.595	-0.576
-24	106.086	109.756	113.541	3.448	-3.343	0.589	-0.571
-23	100.453	103.87	107.393	3.391	-3.29	0.583	-0.566
-22	95.154	98.338	101.618	3.335	-3.237	0.577	-0.56
-21	90.168	93.135	96.189	3.279	-3.184	0.571	-0.555
-20	85.474	88.238	91.083	3.223	-3.132	0.565	-0.549
-19	81.053	83.629	86.279	3.167	-3.08	0.559	-0.544
-18	76.887	79.288	81.756	3.113	-3.028	0.553	-0.538
-17	72.959	75.197	77.497	3.058	-2.977	0.546	-0.532
-16	69.253	71.341	73.484	3.004	-2.926	0.54	-0.526
-15	65.757	67.704	69.701	2.95	-2.875	0.534	-0.52
-14	62.456	64.272	66.134	2.896	-2.824	0.527	-0.514
-13	59.339	61.032	62.768	2.843	-2.774	0.521	-0.508
-12	56.393	57.972	59.59	2.79	-2.724	0.514	-0.502
-11	53.608	55.082	56.59	2.738	-2.674	0.507	-0.496
-10	50.975	52.35	53.756	2.685	-2.625	0.501	-0.489
-9	48.484	49.766	51.077	2.633	-2.576	0.494	-0.483
-8	46.127	47.322	48.544	2.582	-2.526	0.487	-0.477
-7	43.895	45.01	46.149	2.53	-2.478	0.48	-0.47
-6	41.781	42.821	43.883	2.479	-2.429	0.473	-0.463

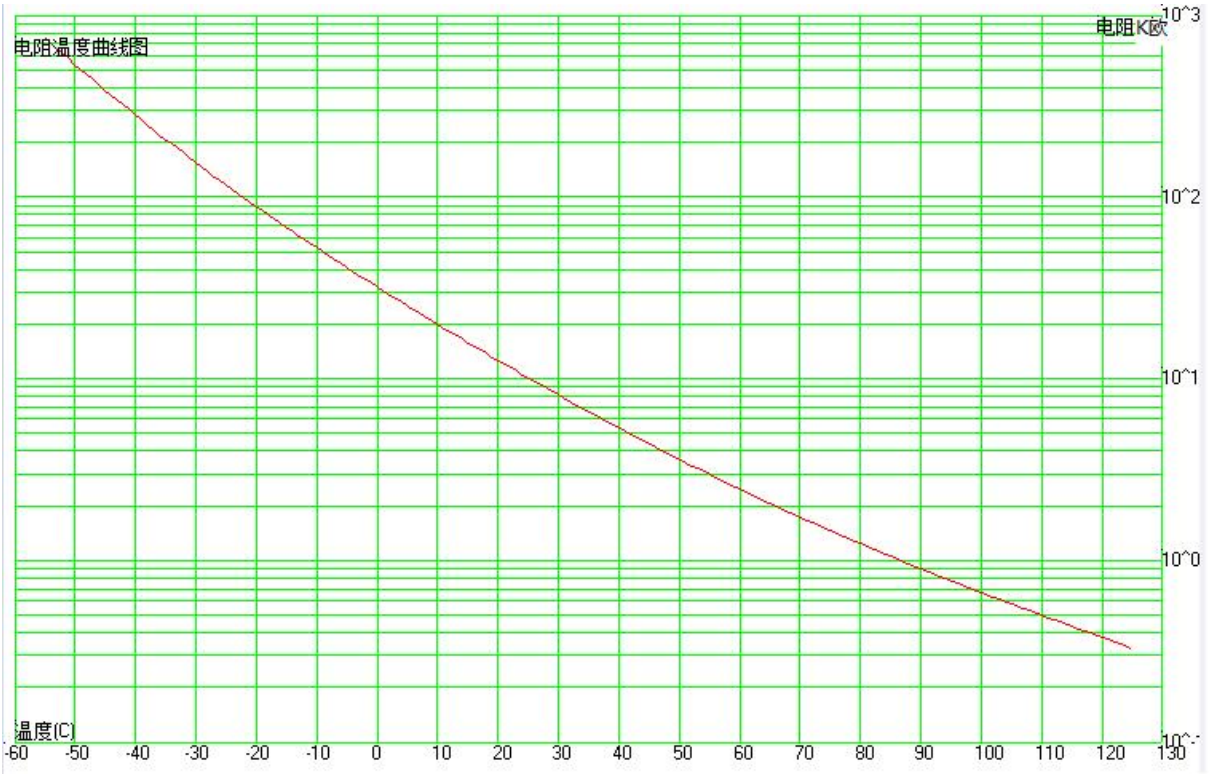
-5	39.778	40.748	41.738	2.428	-2.381	0.466	-0.457
-4	37.88	38.785	39.708	2.378	-2.332	0.459	-0.45
-3	36.081	36.925	37.784	2.328	-2.284	0.452	-0.443
-2	34.375	35.161	35.962	2.277	-2.237	0.444	-0.436
-1	32.756	33.489	34.236	2.228	-2.189	0.437	-0.429
0	31.362	32.049	32.749	2.183	-2.146	0.429	-0.422
1	29.763	30.399	31.047	2.129	-2.094	0.422	-0.415
2	28.379	28.972	29.575	2.08	-2.047	0.415	-0.408
3	27.064	27.617	28.178	2.031	-2	0.407	-0.401
4	25.816	26.33	26.853	1.982	-1.953	0.399	-0.393
5	24.63	25.109	25.594	1.934	-1.907	0.391	-0.386
6	23.503	23.948	24.4	1.885	-1.86	0.384	-0.379
7	22.431	22.846	23.266	1.837	-1.814	0.376	-0.371
8	21.413	21.798	22.188	1.79	-1.768	0.368	-0.363
9	20.444	20.802	21.165	1.742	-1.722	0.36	-0.356
10	19.523	19.856	20.192	1.695	-1.676	0.352	-0.348
11	18.646	18.955	19.268	1.647	-1.631	0.343	-0.34
12	17.812	18.099	18.389	1.601	-1.585	0.335	-0.332
13	17.018	17.285	17.553	1.554	-1.54	0.327	-0.324
14	16.263	16.51	16.759	1.507	-1.495	0.318	-0.315
15	15.544	15.773	16.003	1.461	-1.45	0.309	-0.307
16	14.859	15.071	15.284	1.415	-1.405	0.301	-0.299
17	14.207	14.403	14.6	1.369	-1.36	0.292	-0.29
18	13.586	13.767	13.95	1.323	-1.316	0.282	-0.281
19	12.995	13.162	13.33	1.277	-1.271	0.273	-0.272
20	12.431	12.585	12.741	1.232	-1.227	0.263	-0.262
21	11.894	12.036	12.179	1.187	-1.183	0.252	-0.251

22	11.382	11.513	11.645	1.142	-1.139	0.24	-0.24
23	10.894	11.015	11.136	1.097	-1.095	0.225	-0.225
24	10.429	10.54	10.651	1.053	-1.052	0.199	-0.199
25	9.9	10	10.1	1	-1	0.19	-0.19
26	9.556	9.656	9.756	1.035	-1.034	0.297	-0.297
27	9.146	9.245	9.345	1.079	-1.077	0.277	-0.276
28	8.754	8.853	8.953	1.123	-1.12	0.279	-0.278
29	8.381	8.479	8.578	1.166	-1.163	0.286	-0.285
30	8.025	8.123	8.221	1.21	-1.205	0.296	-0.294
31	7.686	7.783	7.881	1.253	-1.247	0.306	-0.304
32	7.363	7.459	7.556	1.296	-1.289	0.316	-0.315
33	7.054	7.149	7.245	1.339	-1.331	0.327	-0.326
34	6.76	6.854	6.949	1.382	-1.373	0.339	-0.337
35	6.48	6.573	6.666	1.424	-1.414	0.35	-0.348
36	6.212	6.304	6.396	1.467	-1.455	0.362	-0.359
37	5.957	6.047	6.138	1.509	-1.496	0.374	-0.371
38	5.713	5.802	5.892	1.551	-1.537	0.386	-0.383
39	5.48	5.568	5.657	1.593	-1.577	0.398	-0.395
40	5.258	5.345	5.432	1.634	-1.618	0.411	-0.406
41	5.046	5.131	5.217	1.676	-1.658	0.423	-0.419
42	4.844	4.927	5.012	1.717	-1.698	0.436	-0.431
43	4.65	4.733	4.816	1.758	-1.737	0.448	-0.443
44	4.466	4.546	4.628	1.799	-1.777	0.461	-0.455
45	4.289	4.368	4.449	1.839	-1.816	0.474	-0.468
46	4.121	4.198	4.277	1.88	-1.855	0.487	-0.48
47	3.959	4.036	4.113	1.92	-1.894	0.5	-0.493
48	3.805	3.88	3.956	1.96	-1.932	0.513	-0.505

49	3.658	3.732	3.806	2	-1.97	0.526	-0.518
50	3.517	3.59	3.663	2.039	-2.009	0.539	-0.531
51	3.383	3.453	3.525	2.079	-2.046	0.552	-0.544
52	3.254	3.323	3.394	2.118	-2.084	0.566	-0.557
53	3.131	3.199	3.268	2.157	-2.121	0.579	-0.57
54	3.013	3.079	3.147	2.196	-2.159	0.593	-0.583
55	2.9	2.965	3.032	2.235	-2.196	0.607	-0.596
56	2.792	2.856	2.921	2.273	-2.232	0.62	-0.609
57	2.689	2.751	2.815	2.311	-2.269	0.634	-0.623
58	2.59	2.651	2.713	2.349	-2.305	0.648	-0.636
59	2.495	2.555	2.616	2.387	-2.341	0.662	-0.65
60	2.404	2.463	2.523	2.425	-2.377	0.676	-0.663
61	2.317	2.375	2.433	2.462	-2.413	0.691	-0.677
62	2.234	2.29	2.347	2.499	-2.448	0.705	-0.69
63	2.154	2.209	2.265	2.536	-2.483	0.719	-0.704
64	2.077	2.131	2.186	2.573	-2.518	0.734	-0.718
65	2.004	2.056	2.11	2.609	-2.553	0.748	-0.732
66	1.933	1.985	2.037	2.646	-2.587	0.763	-0.746
67	1.866	1.916	1.968	2.682	-2.622	0.778	-0.76
68	1.801	1.85	1.901	2.718	-2.656	0.792	-0.774
69	1.739	1.787	1.836	2.754	-2.689	0.807	-0.788
70	1.679	1.726	1.774	2.789	-2.723	0.822	-0.803
71	1.622	1.668	1.715	2.824	-2.757	0.837	-0.817
72	1.567	1.612	1.658	2.86	-2.79	0.852	-0.831
73	1.514	1.558	1.603	2.895	-2.823	0.867	-0.846
74	1.463	1.506	1.55	2.929	-2.856	0.883	-0.86
75	1.414	1.456	1.499	2.964	-2.888	0.898	-0.875

76	1.367	1.408	1.451	2.998	-2.921	0.913	-0.89
77	1.322	1.362	1.404	3.033	-2.953	0.929	-0.905
78	1.279	1.318	1.359	3.067	-2.985	0.944	-0.919
79	1.237	1.276	1.315	3.1	-3.017	0.96	-0.934
80	1.197	1.235	1.273	3.134	-3.049	0.976	-0.949
81	1.158	1.195	1.233	3.168	-3.08	0.992	-0.964
82	1.121	1.157	1.194	3.201	-3.111	1.008	-0.979
83	1.085	1.121	1.157	3.234	-3.142	1.024	-0.995
84	1.051	1.085	1.121	3.267	-3.173	1.04	-1.01
85	1.018	1.052	1.086	3.3	-3.204	1.056	-1.025
86	0.986	1.019	1.053	3.332	-3.235	1.072	-1.041
87	0.955	0.987	1.021	3.365	-3.265	1.088	-1.056
88	0.925	0.957	0.989	3.397	-3.295	1.105	-1.071
89	0.897	0.928	0.959	3.429	-3.325	1.121	-1.087
90	0.869	0.899	0.931	3.461	-3.355	1.138	-1.103
91	0.843	0.872	0.903	3.493	-3.385	1.154	-1.118
92	0.817	0.846	0.876	3.525	-3.414	1.171	-1.134
93	0.792	0.82	0.85	3.556	-3.444	1.188	-1.15
94	0.768	0.796	0.825	3.588	-3.473	1.204	-1.166
95	0.745	0.772	0.8	3.619	-3.502	1.221	-1.182
96	0.723	0.749	0.777	3.65	-3.531	1.238	-1.198
97	0.701	0.727	0.754	3.681	-3.56	1.255	-1.214
98	0.681	0.706	0.732	3.712	-3.589	1.273	-1.23
99	0.661	0.685	0.711	3.742	-3.617	1.29	-1.246
100	0.641	0.666	0.691	3.773	-3.645	1.307	-1.263
101	0.622	0.646	0.671	3.804	-3.674	1.324	-1.279
102	0.604	0.628	0.652	3.834	-3.702	1.342	-1.296

103	0.587	0.61	0.633	3.864	-3.73	1.359	-1.312
104	0.57	0.592	0.615	3.894	-3.758	1.377	-1.329
105	0.553	0.575	0.598	3.924	-3.786	1.395	-1.345
106	0.538	0.559	0.581	3.954	-3.813	1.412	-1.362
107	0.522	0.543	0.565	3.984	-3.841	1.43	-1.379
108	0.507	0.528	0.549	4.014	-3.868	1.448	-1.395
109	0.493	0.513	0.534	4.043	-3.896	1.466	-1.412
110	0.479	0.499	0.519	4.073	-3.923	1.484	-1.429
111	0.466	0.485	0.505	4.102	-3.95	1.502	-1.446
112	0.452	0.471	0.491	4.132	-3.977	1.52	-1.463
113	0.44	0.458	0.477	4.161	-4.004	1.538	-1.48
114	0.427	0.445	0.464	4.19	-4.031	1.557	-1.498
115	0.416	0.433	0.451	4.219	-4.058	1.575	-1.515
116	0.404	0.421	0.439	4.248	-4.085	1.593	-1.532
117	0.393	0.41	0.427	4.277	-4.111	1.612	-1.549
118	0.382	0.398	0.416	4.306	-4.138	1.631	-1.567
119	0.371	0.388	0.404	4.335	-4.165	1.649	-1.584
120	0.361	0.377	0.393	4.364	-4.191	1.668	-1.602
121	0.351	0.367	0.383	4.393	-4.217	1.687	-1.619
122	0.342	0.357	0.373	4.421	-4.244	1.706	-1.637
123	0.332	0.347	0.363	4.45	-4.27	1.725	-1.655
124	0.323	0.338	0.353	4.479	-4.296	1.744	-1.673
125	0.314	0.329	0.343	4.507	-4.323	1.763	-1.69


电阻温度曲线图
电阻K欧
10^3
10^2
10^1
10^0
温度(C)
-60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80 90 100 110 120 130

附表Ⅱ（Attachment Ⅱ）