



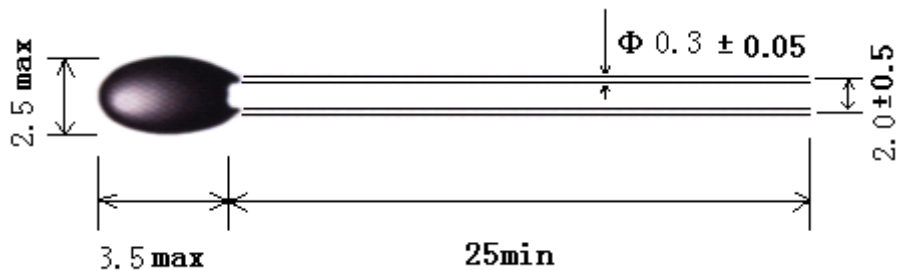
深圳市晶创和立科技有限公司

测温型热敏电阻主要技术参数

规格型号	MF52A <sub>1</sub> 104F3950
产品标准	Q/320115SHD03-2008

1、外形尺寸

(单位：mm)



2、材料

包封材料	颜色	引线材质
改性环氧树脂	黑色	镀锡钢线

3、型号说明

MF52	A <sub>1</sub>	104	F	3950
珠状测温型 NTC 热敏电阻器	引线为镀锡钢线	电阻值	阻值允差	B 值 (25/50)
		10×10 <sup>4</sup> =100K Ω	±1%	3950K

4、电气性能

	项目	符号	测试条件	单位	性能要求
4.1	25℃的零功率电阻值	R <sub>25</sub>	T <sub>a</sub> =25±0.05℃ 测试功率≤0.1mW 流动液体中测试	K Ω	100±1%
4.2	B 值	B <sub>25/50</sub>	$B = \frac{(T_a \times T_b) / (T_b - T_a)}{\ln(R_a/R_b)} \times$ T <sub>b</sub> =50℃±0.1℃	K	3950±1%
4.3	耗散系数	δ	静止空气中	mW/℃	≥2
4.4	时间常数	τ	静止空气中	sec	≤7
4.5	绝缘电阻	/	100V/DC 1min	M Ω	≥100
4.6	工作温度范围	/	/	℃	-55 ~ 125
4.7	阻温特性	/	/	/	见附表 1
4.8	阻值误差	/	/	/	见附表 2

## 5、可靠性能试验

	项目	测试条件及方法	技术要求
5.1	可焊性	将引线浸入 $235 \pm 5^\circ\text{C}$ 的锡液中, 锡面距本体下端 6mm 处, 时间 2~3 秒	焊料在引线浸入部分表面涂布均匀、光滑, 面积在 95%以上
5.2	耐焊接热	将引线浸入 $265 \pm 5^\circ\text{C}$ 的锡液中, 液面距电阻体 6mm, 时间 $5 \pm 1$ 秒	无可见性损伤, $R_{25} \Delta R/R \leq \pm 2\%$
5.3	引出端强度	拉力: 5N, 时间: 10 秒	无可见性损伤, $R_{25} \Delta R/R \leq \pm 2\%$
5.4	温度快速变化	$-55^\circ\text{C} 30\text{min} \rightarrow 25^\circ\text{C} 5\text{min} \rightarrow 125^\circ\text{C} 30\text{min} \rightarrow 25^\circ\text{C} 5\text{min}$ , 反复 5 次, 恢复 4 小时	无可见性损伤, $R_{25} \Delta R/R \leq \pm 2\%$
5.5	高温	温度: $125^\circ\text{C}$ , 时间: 16 小时	无可见性损伤, $R_{25} \Delta R/R \leq \pm 2\%$
5.6	寒冷	温度: $-55^\circ\text{C}$ , 时间: 2 小时	无可见性损伤, $R_{25} \Delta R/R \leq \pm 2\%$
5.7	低气压	气压: $40 \pm 0.1\text{kPa}$ , 时间: 4 小时	无可见性损伤, $R_{25} \Delta R/R \leq \pm 2\%$
5.8	稳态湿热	温度: $40^\circ\text{C}$ , 湿度: 93%, 时间: $500 \pm 12$ 小时	无可见性损伤, $R_{25} \Delta R/R \leq \pm 2\%$ , 耐电压 $\geq 700\text{V/AC}$ 1min 绝缘电阻 $\geq 100\text{M}\Omega$
5.9	交变湿热	温度: $25 \sim 40^\circ\text{C}$ , 湿度: 90%, 时间: 24 小时	无可见性损伤, $R_{25} \Delta R/R \leq \pm 2\%$ , 耐电压 $\geq 700\text{V/AC}$ 1min 绝缘电阻 $\geq 100\text{M}\Omega$
5.10	上限类别温度下零功耗的耐久性	温度: $125^\circ\text{C} \pm 2^\circ\text{C}$ , 时间: $1000 \pm 24$ 小时	无可见性损伤, $R_{25} \Delta R/R \leq \pm 2\%$
5.11	振动	频率范围: 10~500HZ, 振幅: 0.75mm 或 $98\text{m/S}^2$ , 时间 2 小时	无可见性损伤, $R_{25} \Delta R/R \leq \pm 2\%$
5.12	碰撞	加速度: $250\text{m/S}^2$ , 脉冲持续时间: 6mS, 碰撞次数: 4000 次	无可见性损伤, $R_{25} \Delta R/R \leq \pm 2\%$

## 6、焊接条件

焊接时, 焊接处距电阻体根部至少 6mm, 焊接温度应低于  $350^\circ\text{C}$ , 焊接时间应尽量短。

## 7、储存条件

7.1 储存温度:  $-10^\circ\text{C} \sim 40^\circ\text{C}$ ;

7.2 储存湿度:  $\leq 75\% \text{RH}$ ;

7.3 避免存放在具有腐蚀性气体及光照的环境下;

7.4 包装打开后需重新密封保存;

附表 1

### 阻温特性表

R25=100K  $\Omega$  精度:  $\pm 1\%$

B25/50=3950K 精度:  $\pm 1\%$ (P209-15A)

温度( $^{\circ}\text{C}$ )	电阻(K $\Omega$ )			电阻精度(%)		温度精度( $^{\circ}\text{C}$ )	
	最小值	中心值	最大值	$\Delta R$	$-\Delta R$	$\Delta T$	$-\Delta T$
-55	10477.600	11093.800	11745.000	5.869	-5.553	0.729	-0.690
-54	9600.550	10156.100	10742.700	5.776	-5.470	0.725	-0.687
-53	8809.950	9311.690	9841.020	5.684	-5.388	0.722	-0.684
-52	8096.030	8549.810	9028.120	5.594	-5.307	0.718	-0.681
-51	7450.220	7861.200	8294.020	5.505	-5.227	0.714	-0.678
-50	6865.020	7237.730	7629.920	5.418	-5.149	0.710	-0.675
-49	6333.860	6672.310	7028.140	5.332	-5.072	0.706	-0.671
-48	5850.990	6158.700	6481.950	5.248	-4.996	0.702	-0.668
-47	5411.340	5691.440	5985.430	5.165	-4.921	0.698	-0.665
-46	5010.440	5265.690	5533.390	5.083	-4.847	0.693	-0.661
-45	4644.340	4877.200	5121.230	5.003	-4.774	0.689	-0.657
-44	4309.570	4522.230	4744.900	4.924	-4.702	0.685	-0.654
-43	4003.020	4197.420	4400.820	4.845	-4.631	0.680	-0.650
-42	3721.950	3899.830	4085.810	4.768	-4.561	0.676	-0.646
-41	3463.920	3626.830	3797.030	4.692	-4.491	0.671	-0.642
-40	3226.740	3376.080	3531.980	4.617	-4.423	0.666	-0.638
-39	3008.480	3145.490	3288.420	4.543	-4.355	0.662	-0.634
-38	2807.390	2933.200	3064.330	4.470	-4.289	0.657	-0.630
-37	2621.920	2737.530	2857.940	4.398	-4.222	0.652	-0.626
-36	2450.670	2556.980	2667.630	4.327	-4.157	0.647	-0.622
-35	2292.390	2390.220	2491.970	4.257	-4.092	0.642	-0.618
-34	2145.940	2236.030	2329.670	4.187	-4.028	0.637	-0.613
-33	2010.310	2093.330	2179.550	4.118	-3.965	0.632	-0.609
-32	1884.580	1961.130	2040.570	4.051	-3.902	0.627	-0.604
-31	1767.930	1838.540	1911.790	3.983	-3.840	0.622	-0.599
-30	1659.590	1724.780	1792.340	3.917	-3.779	0.617	-0.595
-29	1558.890	1619.100	1681.460	3.851	-3.718	0.611	-0.590
-28	1465.210	1520.850	1578.440	3.786	-3.658	0.606	-0.585
-27	1378.000	1429.440	1482.650	3.722	-3.598	0.600	-0.580
-26	1296.740	1344.320	1393.510	3.658	-3.539	0.595	-0.575
-25	1220.960	1265.000	1310.480	3.595	-3.480	0.589	-0.570
-24	1150.260	1191.020	1233.100	3.533	-3.422	0.584	-0.565
-23	1084.220	1121.980	1160.930	3.471	-3.364	0.578	-0.560
-22	1022.520	1057.500	1093.560	3.410	-3.307	0.572	-0.555
-21	964.822	997.241	1030.640	3.349	-3.250	0.566	-0.549
-20	910.828	940.885	971.837	3.289	-3.194	0.560	-0.544
-19	860.271	888.148	916.835	3.230	-3.138	0.554	-0.539
-18	812.903	838.764	865.362	3.171	-3.083	0.548	-0.533
-17	768.495	792.494	817.161	3.112	-3.028	0.542	-0.527



## 阻温特性表

R25=100K  $\Omega$  精度:  $\pm 1\%$ B25/50=3950K 精度:  $\pm 1\%$ (P209-15A)

温度( $^{\circ}\text{C}$ )	电阻(K $\Omega$ )			电阻精度(%)		温度精度( $^{\circ}\text{C}$ )	
	最小值	中心值	最大值	$\Delta R$	$-\Delta R$	$\Delta T$	$-\Delta T$
-16	726.839	749.115	771.996	3.054	-2.973	0.536	-0.522
-15	687.740	708.422	729.653	2.996	-2.919	0.530	-0.516
-14	651.022	670.228	689.932	2.939	-2.865	0.523	-0.510
-13	616.520	634.359	652.649	2.883	-2.812	0.517	-0.504
-12	584.084	600.657	617.638	2.827	-2.759	0.511	-0.498
-11	553.574	568.973	584.741	2.771	-2.706	0.504	-0.492
-10	524.861	539.171	553.816	2.716	-2.654	0.497	-0.486
-9	497.827	511.127	524.729	2.661	-2.602	0.491	-0.480
-8	472.360	484.723	497.358	2.606	-2.550	0.484	-0.474
-7	448.360	459.851	471.590	2.552	-2.499	0.477	-0.467
-6	425.730	436.413	447.320	2.499	-2.447	0.471	-0.461
-5	404.383	414.316	424.450	2.445	-2.397	0.464	-0.455
-4	384.239	393.473	402.889	2.393	-2.346	0.457	-0.448
-3	365.220	373.806	382.555	2.340	-2.296	0.450	-0.441
-2	347.257	355.239	363.369	2.288	-2.247	0.443	-0.435
-1	330.284	337.705	345.259	2.236	-2.197	0.436	-0.428
0	314.240	321.140	328.157	2.185	-2.148	0.428	-0.421
1	299.069	305.482	312.002	2.134	-2.099	0.421	-0.414
2	284.718	290.679	296.735	2.083	-2.050	0.414	-0.407
3	271.136	276.676	282.301	2.033	-2.002	0.407	-0.400
4	258.279	263.427	268.651	1.983	-1.954	0.399	-0.393
5	246.103	250.886	255.737	1.933	-1.906	0.392	-0.386
6	234.569	239.012	243.514	1.883	-1.858	0.384	-0.379
7	223.638	227.764	231.943	1.834	-1.811	0.377	-0.372
8	213.275	217.106	220.984	1.786	-1.764	0.369	-0.364
9	203.449	207.005	210.601	1.737	-1.717	0.361	-0.357
10	195.201	198.530	201.895	1.695	-1.676	0.352	-0.348
11	185.283	188.343	191.434	1.641	-1.624	0.345	-0.342
12	176.887	179.724	182.589	1.593	-1.578	0.338	-0.334
13	168.916	171.545	174.198	1.546	-1.532	0.330	-0.327
14	161.344	163.780	166.236	1.499	-1.487	0.322	-0.319
15	154.152	156.407	158.679	1.452	-1.441	0.313	-0.311
16	147.316	149.403	151.504	1.406	-1.396	0.305	-0.303
17	140.818	142.748	144.690	1.360	-1.351	0.297	-0.295
18	134.640	136.423	138.216	1.314	-1.307	0.289	-0.287
19	128.764	130.410	132.064	1.268	-1.262	0.280	-0.279
20	123.173	124.692	126.217	1.223	-1.218	0.272	-0.271
21	117.852	119.253	120.658	1.177	-1.174	0.264	-0.263
22	112.788	114.078	115.370	1.133	-1.130	0.255	-0.254
23	107.966	109.152	110.341	1.088	-1.086	0.246	-0.246



阻温特性表

R25=100K  $\Omega$  精度:  $\pm 1\%$

B25/50=3950K 精度:  $\pm 1\%$ (P209-15A)

温度( $^{\circ}\text{C}$ )	电阻(K $\Omega$ )			电阻精度(%)		温度精度( $^{\circ}\text{C}$ )	
	最小值	中心值	最大值	$\Delta R$	$-\Delta R$	$\Delta T$	$-\Delta T$
24	103.374	104.464	105.555	1.044	-1.043	0.238	-0.238
25	99.000	100.000	101.000	1.000	-1.000	0.229	-0.229
26	94.749	95.747	96.747	1.043	-1.043	0.241	-0.240
27	90.701	91.697	92.694	1.087	-1.085	0.252	-0.252
28	86.846	87.837	88.830	1.131	-1.128	0.264	-0.263
29	83.172	84.157	85.146	1.174	-1.170	0.276	-0.275
30	79.672	80.650	81.632	1.217	-1.212	0.287	-0.286
31	76.335	77.305	78.280	1.260	-1.254	0.299	-0.298
32	73.154	74.115	75.081	1.302	-1.296	0.311	-0.309
33	70.121	71.072	72.028	1.345	-1.337	0.323	-0.321
34	67.227	68.167	69.113	1.387	-1.378	0.335	-0.333
35	64.467	65.395	66.330	1.429	-1.419	0.347	-0.345
36	61.833	62.749	63.672	1.471	-1.460	0.360	-0.357
37	59.318	60.222	61.134	1.513	-1.500	0.372	-0.369
38	56.918	57.809	58.708	1.555	-1.541	0.384	-0.381
39	54.626	55.503	56.389	1.596	-1.581	0.397	-0.393
40	52.436	53.300	54.173	1.637	-1.620	0.410	-0.405
41	50.345	51.195	52.054	1.678	-1.660	0.422	-0.418
42	48.346	49.183	50.028	1.719	-1.700	0.435	-0.430
43	46.437	47.259	48.090	1.759	-1.739	0.448	-0.442
44	44.611	45.419	46.236	1.800	-1.778	0.461	-0.455
45	42.865	43.659	44.462	1.840	-1.817	0.473	-0.467
46	41.196	41.975	42.764	1.880	-1.855	0.486	-0.480
47	39.600	40.364	41.139	1.920	-1.894	0.500	-0.493
48	38.072	38.822	39.583	1.960	-1.932	0.513	-0.505
49	36.611	37.346	38.093	1.999	-1.970	0.526	-0.518
50	35.159	35.881	36.613	2.040	-2.009	0.539	-0.531
51	33.873	34.580	35.299	2.078	-2.045	0.553	-0.544
52	32.591	33.284	33.989	2.117	-2.083	0.566	-0.557
53	31.363	32.043	32.734	2.156	-2.120	0.580	-0.570
54	30.188	30.853	31.530	2.194	-2.157	0.593	-0.583
55	29.061	29.713	30.377	2.233	-2.194	0.607	-0.596
56	27.982	28.620	29.271	2.271	-2.230	0.621	-0.610
57	26.948	27.573	28.210	2.309	-2.267	0.635	-0.623
58	25.956	26.568	27.192	2.347	-2.303	0.649	-0.636
59	25.006	25.605	26.216	2.385	-2.339	0.663	-0.650
60	24.095	24.681	25.279	2.423	-2.375	0.677	-0.664
61	23.221	23.794	24.380	2.460	-2.411	0.691	-0.677
62	22.382	22.944	23.517	2.497	-2.446	0.705	-0.691



阻温特性表

R25=100K  $\Omega$  精度:  $\pm 1\%$

B25/50=3950K 精度:  $\pm 1\%$ (P209-15A)

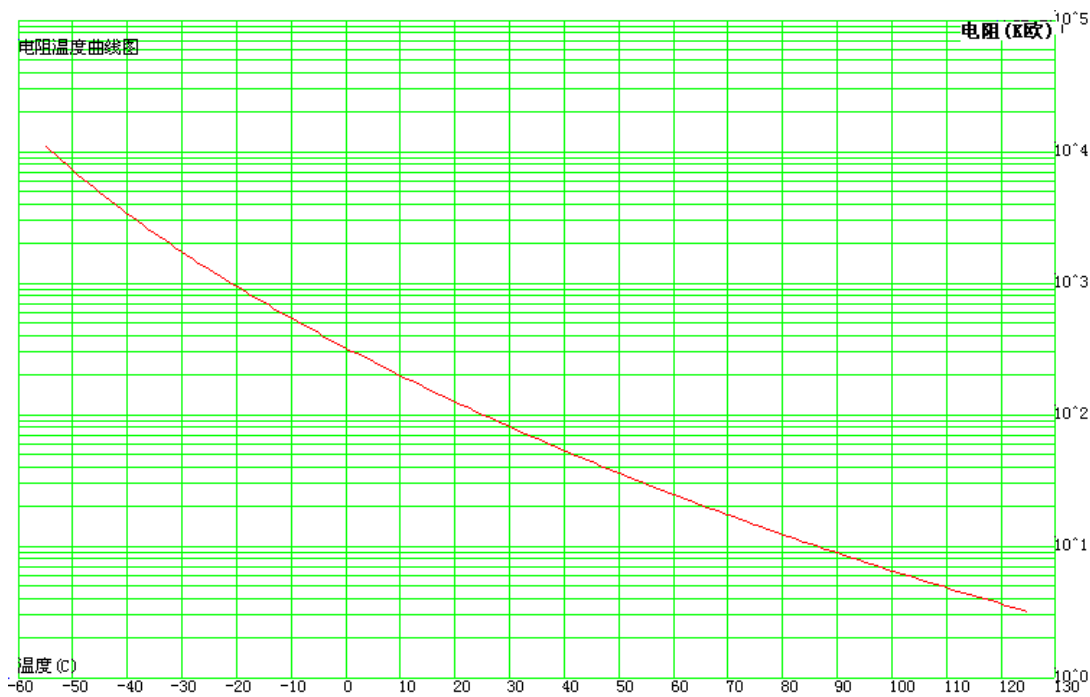
温度( $^{\circ}\text{C}$ )	电阻(K $\Omega$ )			电阻精度(%)		温度精度( $^{\circ}\text{C}$ )	
	最小值	中心值	最大值	$\Delta R$	$-\Delta R$	$\Delta T$	$-\Delta T$
63	21.578	22.127	22.688	2.534	-2.482	0.720	-0.705
64	20.807	21.344	21.893	2.571	-2.517	0.734	-0.718
65	20.066	20.592	21.129	2.608	-2.552	0.748	-0.732
66	19.355	19.869	20.395	2.645	-2.586	0.763	-0.746
67	18.673	19.175	19.690	2.681	-2.621	0.778	-0.760
68	18.017	18.509	19.012	2.718	-2.656	0.792	-0.774
69	17.388	17.869	18.361	2.754	-2.690	0.807	-0.788
70	16.783	17.253	17.735	2.790	-2.724	0.822	-0.803
71	16.203	16.662	17.133	2.826	-2.758	0.837	-0.817
72	15.645	16.094	16.555	2.861	-2.792	0.852	-0.831
73	15.108	15.548	15.998	2.897	-2.825	0.867	-0.846
74	14.593	15.022	15.463	2.932	-2.858	0.882	-0.860
75	14.097	14.517	14.948	2.968	-2.892	0.897	-0.875
76	13.621	14.031	14.453	3.003	-2.925	0.913	-0.889
77	13.163	13.564	13.976	3.037	-2.958	0.928	-0.904
78	12.722	13.114	13.517	3.072	-2.990	0.944	-0.919
79	12.298	12.681	13.075	3.107	-3.023	0.959	-0.933
80	11.890	12.265	12.650	3.141	-3.055	0.975	-0.948
81	11.498	11.864	12.241	3.176	-3.087	0.991	-0.963
82	11.120	11.478	11.846	3.210	-3.120	1.006	-0.978
83	10.756	11.106	11.467	3.244	-3.151	1.022	-0.993
84	10.406	10.748	11.101	3.277	-3.183	1.038	-1.008
85	10.069	10.404	10.748	3.311	-3.215	1.054	-1.024
86	9.744	10.071	10.408	3.345	-3.246	1.070	-1.039
87	9.432	9.751	10.081	3.378	-3.277	1.087	-1.054
88	9.130	9.443	9.765	3.411	-3.308	1.103	-1.070
89	8.840	9.146	9.461	3.444	-3.339	1.119	-1.085
90	8.560	8.859	9.167	3.477	-3.370	1.136	-1.101
91	8.291	8.583	8.884	3.510	-3.401	1.152	-1.116
92	8.031	8.316	8.611	3.543	-3.431	1.169	-1.132
93	7.781	8.060	8.348	3.575	-3.461	1.185	-1.148
94	7.539	7.812	8.094	3.608	-3.492	1.202	-1.163
95	7.306	7.573	7.849	3.640	-3.522	1.219	-1.179
96	7.081	7.342	7.612	3.672	-3.551	1.236	-1.195
97	6.865	7.120	7.383	3.704	-3.581	1.253	-1.211
98	6.656	6.905	7.163	3.735	-3.611	1.270	-1.227
99	6.454	6.698	6.950	3.767	-3.640	1.287	-1.243
100	6.259	6.498	6.744	3.799	-3.669	1.304	-1.260
101	6.071	6.304	6.546	3.830	-3.698	1.321	-1.276
102	5.890	6.118	6.354	3.861	-3.727	1.339	-1.292



阻温特性表

R25=100K Ω 精度:±1%                      B25/50=3950K 精度:±1%(P209-15A)

温度(℃)	电阻(K Ω)			电阻精度(%)		温度精度(℃)	
	最小值	中心值	最大值	△R	-△R	△T	-△T
103	5.714	5.937	6.169	3.892	-3.756	1.356	-1.309
104	5.545	5.763	5.990	3.923	-3.785	1.374	-1.325
105	5.382	5.595	5.817	3.954	-3.813	1.391	-1.342
106	5.224	5.433	5.649	3.985	-3.841	1.409	-1.358
107	5.072	5.276	5.488	4.015	-3.870	1.427	-1.375
108	4.924	5.124	5.331	4.045	-3.898	1.444	-1.392
109	4.782	4.977	5.180	4.076	-3.926	1.462	-1.408
110	4.644	4.836	5.034	4.106	-3.953	1.480	-1.425
111	4.511	4.698	4.893	4.136	-3.981	1.498	-1.442
112	4.383	4.566	4.756	4.165	-4.008	1.516	-1.459
113	4.258	4.438	4.624	4.195	-4.036	1.535	-1.476
114	4.138	4.314	4.496	4.225	-4.063	1.553	-1.493
115	4.022	4.194	4.372	4.254	-4.090	1.571	-1.511
116	3.910	4.077	4.252	4.283	-4.117	1.590	-1.528
117	3.801	3.965	4.136	4.312	-4.144	1.608	-1.545
118	3.696	3.856	4.024	4.341	-4.170	1.627	-1.563
119	3.594	3.751	3.915	4.370	-4.197	1.646	-1.580
120	3.495	3.649	3.810	4.399	-4.223	1.664	-1.598
121	3.400	3.551	3.708	4.428	-4.249	1.683	-1.615
122	3.307	3.455	3.609	4.456	-4.276	1.702	-1.633
123	3.218	3.363	3.513	4.484	-4.302	1.721	-1.651
124	3.131	3.273	3.421	4.513	-4.327	1.740	-1.669
125	3.048	3.186	3.331	4.541	-4.353	1.759	-1.687



附表 2

阻值误差曲线图

