NANJING SHIHENG ELECTRONICS CO., LTD.

APPROVAL SHEET

CUSTOMER _____

PARTNAME CWF Precision NTC Temperature Sensor

PART NUMBER CWF1-103F3950(A)

DATE 2022-04-15

CONFIRM

CLIENT	MANUFACTOR
Quality Dep.: _____	Design: Hannah Zhong
Production Dep.: _____	Check by sales: _____
Engineering Dep.: _____	Check by R&D: Pong. CH
	Check by QA: Lishao yuan

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CWF Precision NTC Temperature Sensor

版本 2.0

Part No: CWF1 103F3950 (A)

NANJING SHIHENG ELECTRONICS CO., LTD.

This detailed specification provide CWF series NTC Thermistor's structure size、 product performance、test conditions、use requirement and other parameters, please confirm. If you have any doubt with this specification, please contact us (025-52121868). If no doubt, please confirm back. If you don't confirm back, we think you accept it. Your company if change product application and usage method, please contact us.	Customer：		
	customer confirm	Confirm:	Date:
		Approve:	Date:

1、Electrical Characteristics

	Item	Symbol	Test conditions	Unit	Specification
1.1	Zero Power Resistance at 25℃	R_{25}	Ta=25±0.01℃ Test Power≤0.1mW	KΩ	10KΩ±1%
1.2	B-value	$B_{25/50}$	$B=[(T_a\times T_b)/(T_b-T_a)]\times \ln(R_a/R_b)$ T_a=25℃±0.01℃ T_b=50℃±0.01℃	K	3950K±1%
1.3	Thermal dissipation Coefficient	δ	In still air	Mw/℃	≥2.2
1.4	Thermal time constant	τ	In still air	sec	≤70
1.5	Withstand Voltage	/	1500V/AC 1min	/	No breakdown or flash-over
1.6	Insulation resistance	/	100V/DC 1min	MΩ	≥500
1.7	NTC core element temperature	/	/	℃	-40℃ ～ 125℃
1.8	Sensor Operating temperature	/	/	℃	-20℃ ～ 105℃
1.9	Maximum rated power	Pmax	/	mW	50
1.10	R&T-table	/	/	/	See attached table
1.11	Resistance tolerance	/	/	/	See attached curve

2、Reliability

	Item	Test conditions and methods	Technical requirements
2.1	Terminal strength	Fixed resistor end, Pull strength：20±1 N, time：10±1 sec	No obvious damage, R25 ΔR/R≤±2%
2.2	Solderability	temperature : 245±5℃ for 2-3sec	coverage area ≥ 95%.
2.3	Steady humidity and heat	Temp：40℃±2℃, humidity：93±2%, Time ： 1000hrs	R25 ΔR/R≤±2%,
2.4	Rapid changes in temperature	-40℃30min→25℃5min→105℃30min→25℃5min , 5cycles	R25 ΔR/R≤±2%
2.5	High temperature storage	Temp : 105℃±5℃, Time :1000hrs	R25 ΔR/R≤±2%
2.6	Low temperature storage	Temp : -40℃, Time :1000hrs	R25 ΔR/R≤±2%

3、Matters need attention

3.1 This product uses: Temperature measurement and control;

3.2 Avoid measurement error when current through the thermistor chip resulted in heating element itself;

3.3 NTC core elements are not recommended to be heated by hot air guns or other heaters. In the process using heat-shrink tube, blown by hair dryer is not allowed, we suggest put the product into the constant temperature oven and heat shrinkable at 110 ℃ /10-12min.

3.4 Storage temp：-10℃ ～ 40℃; storage humidity ：≤75% RH;

3.5 Avoid putting in air corrosion or sunlight environment;

3.6 Remake sealed storage after package opening. The storage life is 1 year. Exceed storage period, can re-inspect per as the items stipulated in the standard. If it meets the requirements, it can still be used.

3.7 Installation notes: because of high hardness of epoxy resin encapsulation, we recommend customers using, terminals and wire connections can only be used along the terminal parallel direction force, not in the vertical direction, to avoid breaking.

4. Certificate

4.1 Quality Management System ISO9001：2015
IATF16949:2016

4.2 Environment Management System ISO14001：2015

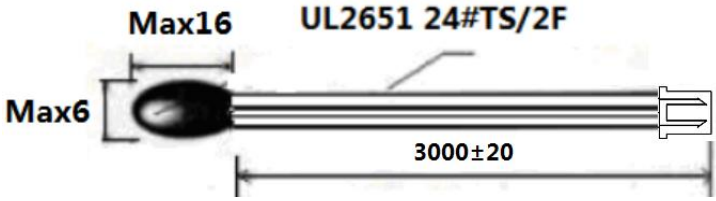
4.3 NTC core element pass UL, AEC-Q200 test

4.4 Environment Test Report RoHS

4.5 CQC Safe Certification

4.6 The Hi&Tech Product of Jiangsu Province

5、Dimensions(mm)



No.	Name	Material specifications	Quantity	note
1.	Element	NTC Thermistor	1	MF52A
2.	Epoxy resin	Epoxy potting class	1	Black
3.	Lead wire	UL2651 24#TS/2F	1	Black
4.	Connector	HX25002-2Y	1	White

6、 Product model specification

CWF 1 - 103 F 3950 (A)
① ② ③ ④ ⑤ ⑥

①CWF： Precision NTC Temperature Sensor Series
②1: Epoxy potting class
③ 103： Zero Power Resistance at 25℃is 10KΩ
④ F： Resistance precision code F-±1% G-±2% H-±3% J-±5%
⑤ 3950： B25/50=3950K
⑥Core element (NTC P/N): A-MF52A

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版本 2.0

Part No: CWF1 103F3950(A)

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	customer confirm	Confirm:	Date:
		Approve:	Date:

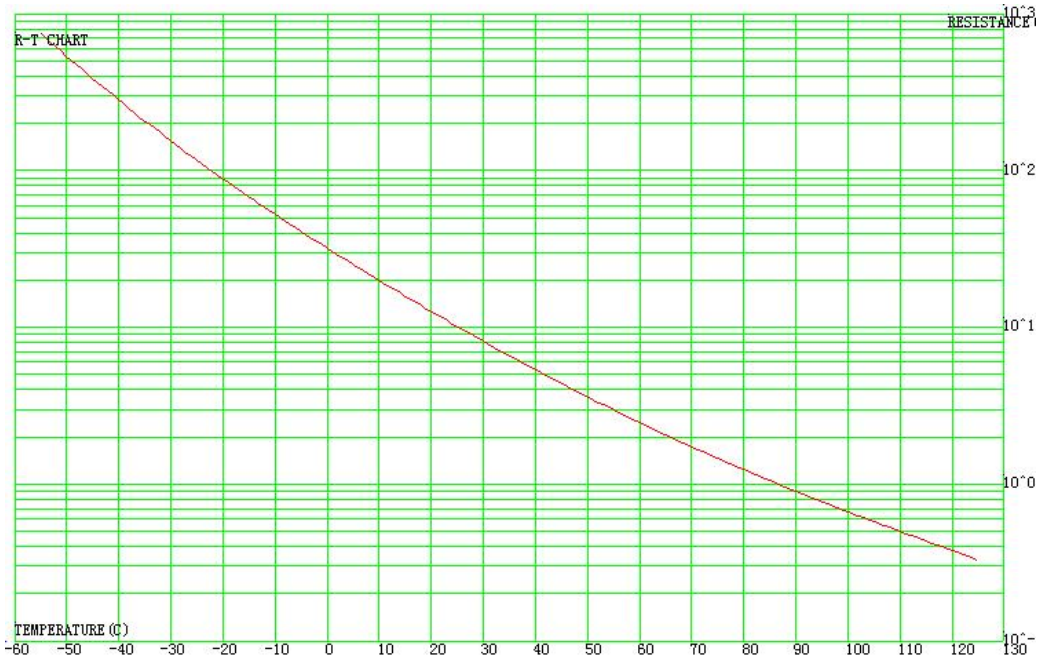
R&T Table

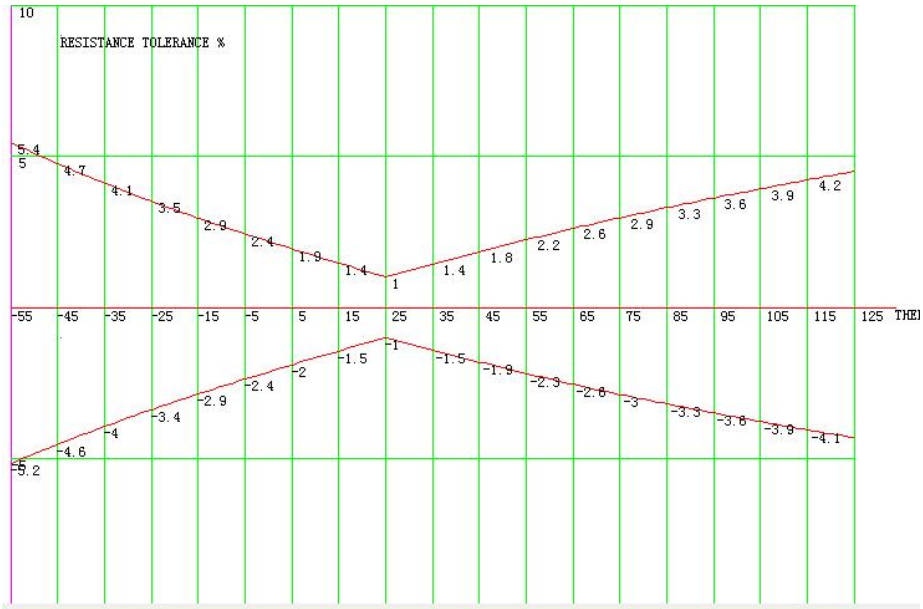
NANJING SHIHENG							
R25=10KΩ TOLERANCE:±1% B25/50=3950K TOLERANCE:±1% P477-4B							
TEMP(℃)	RESISTANCE(KΩ)			RESISST-TOL(%)		TEMP-TOL(℃)	
	MIN	CENTER	MAX	△R	-△R	△T	-△T
-40	268.740	280.660	293.078	4.424	-4.246	0.674	-0.647
-39	252.745	263.791	275.292	4.359	-4.187	0.669	-0.643
-38	237.806	248.046	258.702	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	-0.630
-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	163.260	169.563	3.860	-3.726	0.628	-0.606
-30	148.407	154.062	159.917	3.800	-3.670	0.623	-0.602
-29	140.187	145.446	150.886	3.740	-3.615	0.617	-0.597
-28	132.478	137.369	142.426	3.681	-3.560	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	116.020	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	103.870	107.393	3.391	-3.290	0.583	-0.566
-22	95.154	98.338	101.618	3.335	-3.237	0.577	-0.560
-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	-3.080	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	0.540	-0.526
-15	65.757	67.704	69.701	2.950	-2.875	0.534	-0.520
-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	59.590	2.790	-2.724	0.514	-0.502
-11	53.608	55.082	56.590	2.738	-2.674	0.507	-0.496
-10	50.975	52.350	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	45.010	46.149	2.530	-2.478	0.480	-0.470
-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	37.880	38.785	39.708	2.378	-2.332	0.459	-0.450
-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	2.080	-2.047	0.415	-0.408
3	27.064	27.617	28.178	2.031	-2.000	0.407	-0.401
4	25.816	26.330	26.853	1.982	-1.953	0.399	-0.393
5	24.630	25.109	25.594	1.934	-1.907	0.391	-0.386
6	23.503	23.948	24.400	1.885	-1.860	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	1.790	-1.768	0.368	-0.363
9	20.444	20.802	21.165	1.742	-1.722	0.360	-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	-0.340
12	17.812	18.099	18.389	1.601	-1.585	0.335	-0.332
13	17.018	17.285	17.553	1.554	-1.540	0.327	-0.324
14	16.263	16.510	16.759	1.507	-1.495	0.318	-0.315
15	15.544	15.773	16.003	1.461	-1.450	0.309	-0.307
16	14.859	15.071	15.284	1.415	-1.405	0.301	-0.299
17	14.207	14.403	14.600	1.369	-1.360	0.292	-0.290
18	13.586	13.767	13.950	1.323	-1.316	0.282	-0.281
19	12.995	13.162	13.330	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	0.240	-0.240
23	10.894	11.015	11.136	1.097	-1.095	0.225	-0.225
24	10.429	10.540	10.651	1.053	-1.052	0.199	-0.199
25	9.900	10.000	10.100	1.000	-1.000	0.190	-0.190
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	-1.120	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	1.210	-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	6.760	6.854	6.949	1.382	-1.373	0.339	-0.337
35	6.480	6.573	6.666	1.424	-1.414	0.350	-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	5.480	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	4.650	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	1.880	-1.855	0.487	-0.480
47	3.959	4.036	4.113	1.920	-1.894	0.500	-0.493
48	3.805	3.880	3.956	1.960	-1.932	0.513	-0.505
49	3.658	3.732	3.806	2.000	-1.970	0.526	-0.518
50	3.517	3.590	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	-0.570
54	3.013	3.079	3.147	2.196	-2.159	0.593	-0.583
55	2.900	2.965	3.032	2.235	-2.196	0.607	-0.596
56	2.792	2.856	2.921	2.273	-2.232	0.620	-0.609
57	2.689	2.751	2.815	2.311	-2.269	0.634	-0.623
58	2.590	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	-0.650
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	2.290	2.347	2.499	-2.448	0.705	-0.690
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	2.110	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	-0.760
68	1.801	1.850	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	2.860	-2.790	0.852	-0.831
73	1.514	1.558	1.603	2.895	-2.823	0.867	-0.846

74	1.463	1.506	1.550	2.929	-2.856	0.883	-0.860
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	-0.890
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	3.100	-3.017	0.960	-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	-3.080	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	1.040	-1.010
85	1.018	1.052	1.086	3.300	-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	0.820	0.850	3.556	-3.444	1.188	-1.150
94	0.768	0.796	0.825	3.588	-3.473	1.204	-1.166
95	0.745	0.772	0.800	3.619	-3.502	1.221	-1.182
96	0.723	0.749	0.777	3.650	-3.531	1.238	-1.198
97	0.701	0.727	0.754	3.681	-3.560	1.255	-1.214
98	0.681	0.706	0.732	3.712	-3.589	1.273	-1.230
99	0.661	0.685	0.711	3.742	-3.617	1.290	-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	0.610	0.633	3.864	-3.730	1.359	-1.312
104	0.570	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


R-T CHART
RESISTANCE
10^3
10^2
10^1
10^0
10^-
TEMPERATURE (C)
-60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80 90 100 110 120 130


10
RESISTANCE TOLERANCE %
5.4
5
4.7
4.1
3.5
2.9
2.4
1.9
1.4
1
1.4
1.8
2.2
2.6
2.9
3.3
3.6
3.9
4.2
-55 -45 -35 -25 -15 -5 5 15 25 35 45 55 65 75 85 95 105 115 125 THE
-4.6
-4
-3.4
-2.9
-2.4
-2
-1.5
-1
-1.5
-1.9
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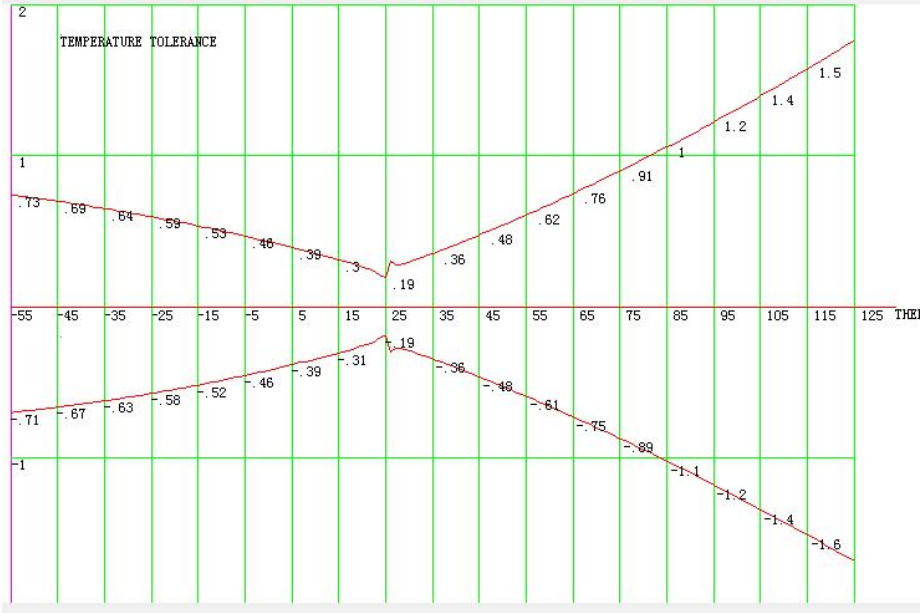
-5
-5.2


2
TEMPERATURE TOLERANCE
1.5
1.4
1.2
1
.91
.76
.62
.48
.36
.19
.73
.69
.64
.59
.53
.46
.39
.3
1
-55 -45 -35 -25 -15 -5 5 15 25 35 45 55 65 75 85 95 105 115 125 THE
.19
.36
.48
.61
.75
.89
1.1
1.2
1.4
1.6
.71
.67
.63
.58
.52
.46
.39
.31
-1