Specifications Approval Sheet

CUSTOMER: _____

CUSTOMER P/N: _____

PART NAME: IT Series - NTC Thermistor

SPECIFICATION: IT103F3950A-L20

DATE: _____

For Customer Approval:

For Manufacturer Approval:

Formulation	Audit	Approval

EXSENSE Electronics Technology Co., Ltd.

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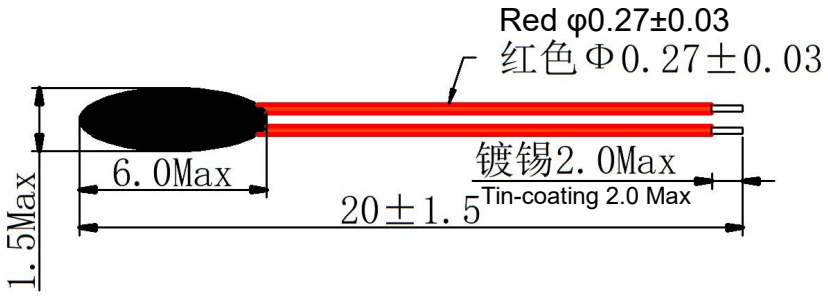
1. Range of Application

The specification approval sheet is applicable to IT series NTC thermistor produced by EXSENSE Electronics Technology Co., Ltd.

This product is complied with the EU RoHS Directive.

2. Product Structure and Size

Unit: mm



3. Material

No.	Material Name	SPEC/Module	Place of Origin
1	Thermistor	R25=10KΩ±1% B25/50=3950K±1%	EXSENSE
2	Epoxy Resin	GU108/GU-Mz	KW
3	Varnished Wire	Total Length 20±1.5mm, red, copper-clad steel varnished wire	GD

4. Part Number

IT	103	F	3950	A	L20
①	②	③	⑥	⑦	⑧
Product Series Code	Resistance @25℃	Tolerance @25℃	Beta	Test temp. of B	Total Length
IT Series NTC Thermistor	10×10^3 Ω	±1%	3950K	25/50℃	20mm

5. Electrical Performance

No.	Item	Symbol	Test Condition	Scope	Unit
1	Resistance @25℃	R_{25}	T=25±0.01℃	10±1%	KΩ
2	Beta	$B_{25/85}$	$B=\frac{\ln(R_{T1})-\ln(R_{T2})}{(1/T1-1/T2)}$	3950±1%	K
3	Thermal time constant	τ	50℃→25℃, in the oil	≤3	sec
4	Dissipation Factor	δ	Ta=25±0.5℃	≈0.7	mW/℃
5	Max. Rated Power	Pr	Ta=25±0.5℃	≤30	mW
6	Operating Temp. Range	/	/	-40~+105	℃

5.1 Resistance Value ($R_{25℃}$)

Requirement: R_{25}＝10KΩ±1%

Test method: Measuring in high-precision thermostatic oil tank of 25℃±0.05℃, high precision resistance measuring instrument is used, and the measuring power of the measuring instrument should be zero power. (That is, the self-heat generated by the current flowing through the product can be negligible.)

5.2 Beta

Requirement: $B_{25/50}$=3435K±1%

Test method: The resistance values of 25±0.05℃ and 50±0.05℃ are measured in high-precision thermostatic oil tank, then calculate according to the following formula:

$B_{T1/T2}=\ln(R_{T1}/R_{T2})/(1/(T1+273.15)-1/(T2+273.15))$

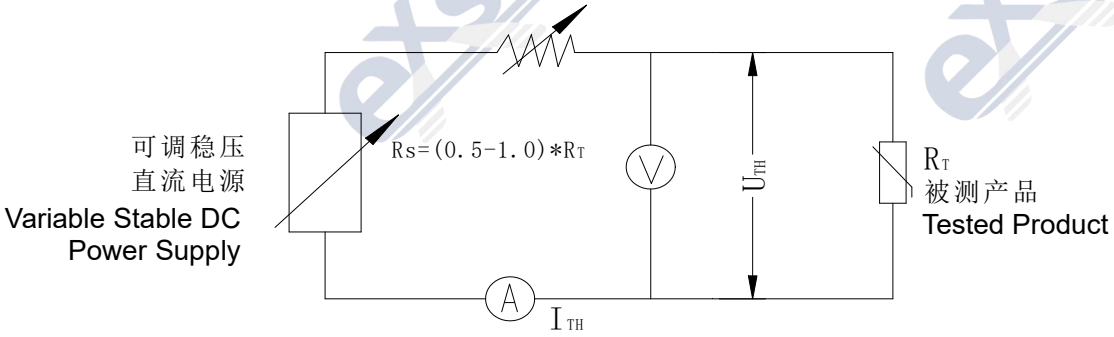
5.3 Thermal Time Constant (τ)

Thermal time constant: T1=50-(50-25)*63.2%=34.2℃, max 3 seconds (in oil tank)

Test method: the time required for the product to quickly convert from the 50℃ oil tank to the 25℃ oil tank to reach the resistance value corresponding to 34.2℃.

5.4 Dissipation Factor (δ)

Test method: the product under test is connected to the following circuit in the still air of 25±0.5℃.



Adjust I_{TH} for $\frac{U_{TH}}{I_{TH}}$ = R_{85}, then calculate by the following formula:

$$\delta=\frac{U_{TH}\cdot I_{TH}}{85-25℃}\ (mw/℃)$$

5.5 Max. Rated Power (Pr)

Requirement: Ta=25±0.5℃, max 30mW.

5.6 Operating temp. Range

-40℃~+105℃. (All materials used to assemble must meet the highest operating temperature)

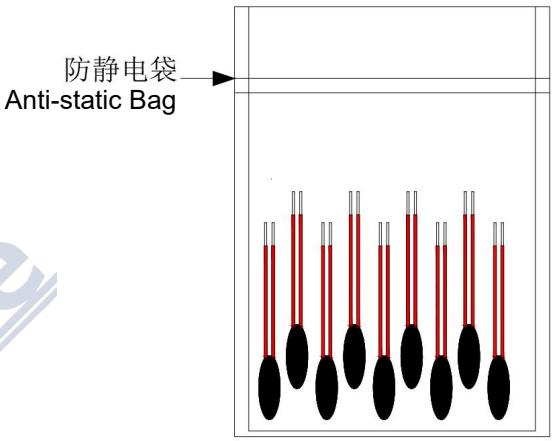
6. Reliability

Item	Standard	Test Method
Soldering Test	△ Change rate of resistance value≤±1% △ Change rate of Beta≤±1% △ Appearance without damage	Soldering temperature: 265±3℃, Tin immersion time: 1±0.5 seconds
Drop Test		Free drop 3 times from a height of 1 meter to the concrete floor.
Lead Strength Test		Fix the head of the product and apply a force of 1N along the lead for 10 seconds.
Vibration Test		Vibration frequency range:10~55Hz Total amplitude: 1.52mm Time: X, Y, Z direction each 2hrs.
Temperature Cycling Test		-40℃×30min→room temperature×5min→100℃×30min→room temperature×5min, 10 cycle times.
Bending Test		Cycle 10 times for 180° bending of the leads and epoxy binding site.
High Temperature Against Test		Thermistor placed at 105±5℃ air for 1000h±24hrs
Low Temperature Storage Test		Thermistor placed at -40±5℃ air for 1000h±24hrs
Load Test		Thermistor operates at room temperature with DC 0.2mA working current for 1000h±24hrs.
Moisture Resistance Test		Thermistor placed at 40±2℃, 90-95%RH air for 1000h±24hrs

7. Packing

Bulk

The thermistor is vacuumized and packed in an . The packing quantity is 1K pcs/ bag.



8. Transportation and Storage

8.1 The height of each stack shall not exceed 4 boxes during storage and transportation, products must be vacuumed and stored in anti-oxidation packaging.

8.2 Select packing cases according to the quantity of shipment, any method of transportation is allowed; But need to avoid the directly or indirectly drenched hit of dirt, rain, snow and mechanical damage in transport process

8.3 The storage environment of product must be free from acidic and alkaline substances, corrosive gases or radiation sources, avoid storing in environment with light.

8.4 Storage temperature: -10℃~+40℃.

8.5 Relative humidity: ≤75%RH.

9. Storage Life

9.1 Under the guarantee of the integrity of the sealed package and the above storage conditions, the vacuum-sealed package of bulk can be stored for 2 years.

9.2 After opening the package, please use it within 7 days under indoor conditions of room temperature and humidity. If not, please immediately vacuum again and keep according to storage method to avoid the oxidation of product leads.

10. Attention

Thermistor may be damaged or misused. Please strictly observe as following:

10.1 Thermistor is designed for the specified purpose. Do not use them for other purposes.

10.2 After designed to be sensor, the reliability evaluation test should be carried out to confirm that there is no abnormality before use.

10.3 Do not use the thermistor exceed the maximum rated power of it.

10.4 Please use the thermistor within the applicable temperature range.

10.5 Measuring power of the measuring instrument should be zero power. (That is, the self-heat generated by the current flowing through the product can be negligible.)

10.6 Soldering iron head should not touch the product head.

10.7 Do not touch the thermistor leads directly with hands to avoid leads oxidation, thus affect the solderability.

10.8 Do not use in the following environment:

A. Corrosive air ($C1_2$, NH_3, SO_X, N_{OX}, etc.)

B. Acid, alkali, organic solvent

C. Medium with high electrical conductivity (electrolyte, water, salt water)

D. Places with lots of dust

11. R-T Table

Part No: IT103F3950A R25=10KΩ±1% B25/50=3950K±1%

Temperature (℃)	Rmin (KΩ)	Rnor (KΩ)	Rmax (KΩ)	Temperature (℃)	Rmin (KΩ)	Rnor (KΩ)	Rmax (KΩ)
-40	294.6	307.9	321.8	3	27.46	28.03	28.60
-39	277.1	289.5	302.4	4	26.14	26.66	27.20
-38	260.8	272.3	284.3	5	24.89	25.37	25.87
-37	245.6	256.2	267.3	6	23.70	24.15	24.61
-36	231.3	241.2	251.5	7	22.58	23.00	23.42
-35	217.9	227.1	236.6	8	21.52	21.91	22.30
-34	205.4	213.9	222.8	9	20.51	20.87	21.24
-33	193.6	201.5	209.7	10	19.56	19.89	20.23
-32	182.6	189.9	197.6	11	18.66	18.96	19.28
-31	172.2	179.1	186.2	12	17.80	18.08	18.37
-30	162.5	168.9	175.5	13	16.99	17.25	17.52
-29	153.4	159.3	165.4	14	16.21	16.46	16.71
-28	144.9	150.4	156.0	15	15.48	15.71	15.94
-27	136.8	141.9	147.2	16	14.79	15.00	15.21
-26	129.3	134.0	138.9	17	14.13	14.32	14.52
-25	122.2	126.6	131.1	18	13.50	13.68	13.86
-24	115.5	119.6	123.8	19	12.91	13.07	13.24
-23	109.2	113.0	117.0	20	12.34	12.49	12.65
-22	103.3	106.9	110.5	21	11.80	11.94	12.08
-21	97.75	101.1	104.4	22	11.29	11.42	11.55
-20	92.52	95.58	98.74	23	10.80	10.92	11.04
-19	87.44	90.29	93.22	24	10.34	10.45	10.56
-18	82.68	85.32	88.04	25	9.900	10.000	10.100
-17	78.20	80.65	83.18	26	9.472	9.572	9.672
-16	73.99	76.27	78.61	27	9.065	9.164	9.264
-15	70.03	72.15	74.32	28	8.677	8.776	8.876
-14	66.30	68.27	70.29	29	8.308	8.407	8.506
-13	62.80	64.63	66.50	30	7.957	8.055	8.153
-12	59.50	61.20	62.94	31	7.622	7.719	7.817
-11	56.39	57.97	59.59	32	7.304	7.400	7.496
-10	53.46	54.93	56.43	33	7.000	7.095	7.190
-9	50.70	52.07	53.46	34	6.710	6.804	6.898
-8	48.10	49.37	50.66	35	6.434	6.527	6.620
-7	45.65	46.82	48.03	36	6.170	6.262	6.354
-6	43.33	44.43	45.54	37	5.919	6.009	6.101
-5	41.15	42.16	43.20	38	5.679	5.768	5.858
-4	39.08	40.03	40.99	39	5.451	5.538	5.627
-3	37.13	38.01	38.91	40	5.232	5.318	5.406
-2	35.29	36.11	36.94	41	5.023	5.108	5.194
-1	33.55	34.31	35.09	42	4.824	4.908	4.992
0	31.91	32.61	33.33	43	4.634	4.716	4.799
1	30.34	31.00	31.66	44	4.452	4.533	4.614
2	28.86	29.47	30.09	45	4.278	4.357	4.438

Temperature (℃)	Rmin (KΩ)	Rnor (KΩ)	Rmax (KΩ)	Temperature (℃)	Rmin (KΩ)	Rnor (KΩ)	Rmax (KΩ)
46	4.112	4.190	4.268	76	1.388	1.429	1.472
47	3.953	4.029	4.107	77	1.343	1.383	1.425
48	3.801	3.876	3.952	78	1.299	1.339	1.380
49	3.655	3.729	3.803	79	1.257	1.296	1.336
50	3.516	3.588	3.661	80	1.217	1.255	1.294
51	3.384	3.455	3.526	81	1.178	1.215	1.253
52	3.258	3.327	3.397	82	1.140	1.177	1.214
53	3.136	3.204	3.273	83	1.104	1.140	1.176
54	3.021	3.087	3.155	84	1.069	1.104	1.140
55	2.910	2.975	3.041	85	1.036	1.070	1.105
56	2.803	2.867	2.932	86	1.003	1.037	1.071
57	2.701	2.764	2.828	87	0.9723	1.005	1.039
58	2.604	2.665	2.728	88	0.9423	0.9743	1.007
59	2.510	2.570	2.631	89	0.9134	0.9446	0.9769
60	2.420	2.479	2.539	90	0.8855	0.9160	0.9476
61	2.334	2.392	2.451	91	0.8585	0.8884	0.9193
62	2.252	2.308	2.366	92	0.8325	0.8618	0.8920
63	2.173	2.228	2.284	93	0.8075	0.8361	0.8657
64	2.097	2.151	2.206	94	0.7833	0.8113	0.8403
65	2.024	2.077	2.131	95	0.7599	0.7873	0.8157
66	1.954	2.005	2.058	96	0.7374	0.7642	0.7920
67	1.886	1.937	1.989	97	0.7156	0.7419	0.7690
68	1.822	1.871	1.922	98	0.6946	0.7203	0.7469
69	1.760	1.808	1.858	99	0.6742	0.6994	0.7254
70	1.700	1.748	1.796	100	0.6546	0.6793	0.7047
71	1.643	1.689	1.737	101	0.6357	0.6598	0.6847
72	1.588	1.633	1.680	102	0.6173	0.6409	0.6654
73	1.535	1.579	1.625	103	0.5996	0.6227	0.6467
74	1.484	1.527	1.572	104	0.5825	0.6051	0.6286
75	1.435	1.477	1.521	105	0.5659	0.5881	0.6110