Specifications Approval Sheet

CUSTOMER: _____

CUSTOMER P/N: _____

PART NAME: TS Series NTC Temperature Sensor

PART NUMBER: TS103F25C3950FA-ML200A

DATE: _____

Manufacturer:

Drawn by	Checked by	Approved by

For Customer Approval:

Add: Xida Science Park, Duanzhou 7th RD, Zhaoqing City, Guangdong Prov, China 526020
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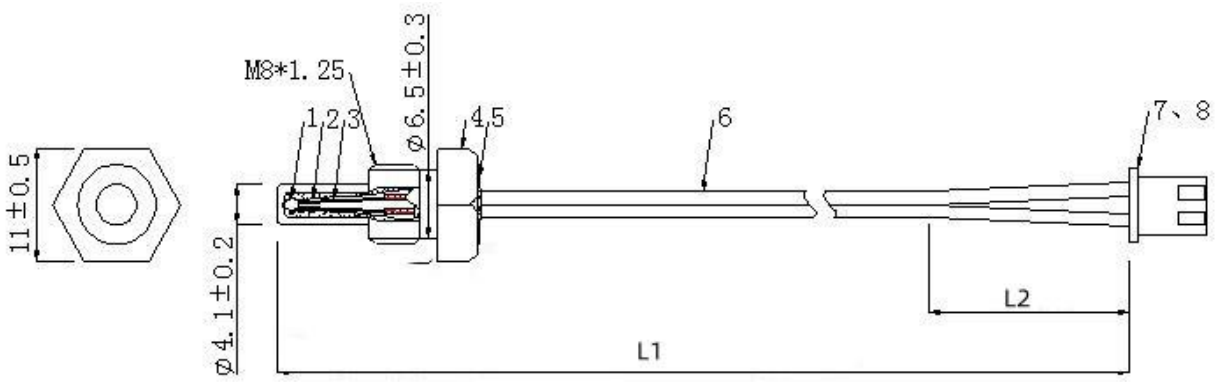
1. Structure, Dimensions & Material

Unit: mm



NO.	Parts	Specification
1	NTC chip	R25=10KΩ±1%　B(25/50)=3950K±1%
2	Tube	Polyimide
3	Epoxy	Black
4	Housing	Nickle plated brass
5	Epoxy	Black
6	Cable	UL2651#26AWG Black
7	Terminal	XH-T
8	Connector	XH-2P in White

2. Part Number Identification

TS	103	F	25C	3950	F	A	–	M	L200	A
①	②	③	④	⑤	⑥	⑦		⑧	⑨	⑩

①

Product Series Code	
TS	NTC Thermistor Sensor

②

Resistance @ ④℃	
103	10×10^{3}Ω

③

Resistance Tolerance	
F	±1%

④

Test Temp. of Resistance	
25C	25℃

⑤

B-value	
3950	B=3950K

⑥

B-value Tolerance	
F	±1%

⑦

Test Temp. of B-value	
A	25℃/50℃

⑧

Head Meterial	
M	Metal

⑨

Length	
L200	200mm

⑩

Distinguishing Code	
A	First

3. Electronic Performance

No.	Item	Symbol	Test Condition	Min	Nor	Max	Unit
(1)	Resistance @25℃	R_{25}	Ta=25±0.05℃ P_T≦0.1mw	9.9	10.0	10.1	KΩ
(2)	Beta Value	$B_{25/50}$	$B=LN\frac{R_{T1}}{R_{T2}}/(\frac{1}{T1}-\frac{1}{T2})$	3910.5	3950	3989.5	K
(3)	Dissipation Factor	δ	Ta=25±0.5℃	2.6	/	/	mw/℃
(4)	Thermal Time Constant	τ	Ta=25±0.5℃	/	/	10	Sec
(5)	Insulation Resistance	/	500VDC	100	/	/	MΩ
(6)	Resistance to Voltage	/	AC 750V 2mA	/	/	1	Sec
(7)	Operating Range	/	/	0	/	50	℃

Test condition:

(1). Resistance @25℃: 25℃±0.05℃ high precision oil tank for 10 minutes.

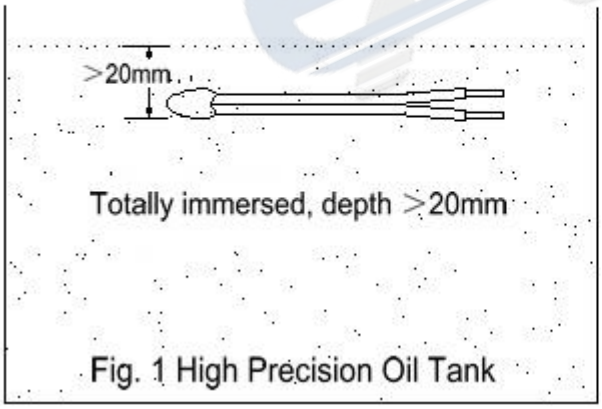


Fig. 1 High Precision Oil Tank

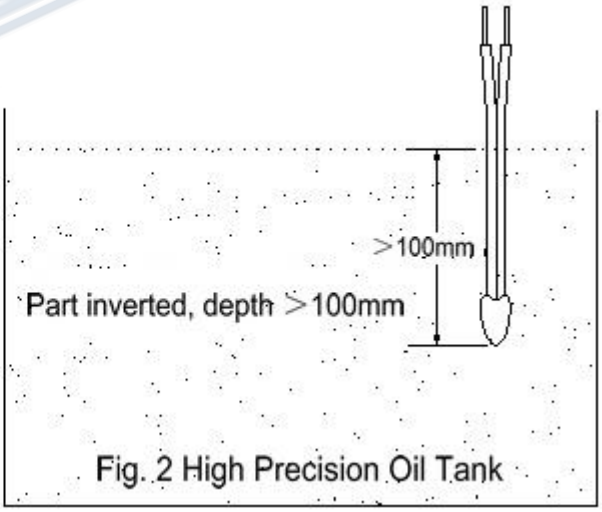
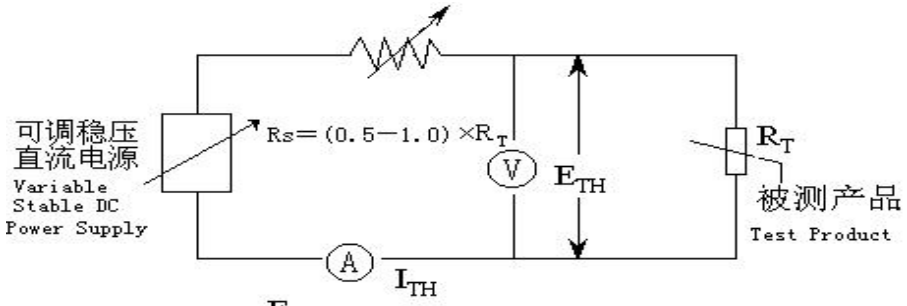


Fig. 2 High Precision Oil Tank

(2). Beta Value: High precision oil tank, according to the part No., test the resistance at T1 and T2, B-value is an index of the thermal sensitivity expressed by the formula:

Bt1/t2=ln (Rt1/Rt2)/(1/(t1+273.15)-1/(t2+273.15))

(3). Dissipation Factor (δ): The product will be join with the following circuit at 25±0.5℃ in still air.



调整 I_{TH} 使 $\frac{E_{TH}}{I_{TH}} = R_{85℃}$，然后按下式计算：

Adjust I_{TH} for then:

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

(4). Thermal Time Constant (τ):

Test equipment: 25±0.5℃ thermostatic water tank & 85±0.5℃thermostatic water tank

Connect the product to the resistance meter, place it in the 25℃ water until the resistance become stable, and then move it to 85℃ water from 25℃ water, in the meanwhile, set off the timer when the product be take out of the 25℃ water tank, once the product has raise to the temperature which is 63.2% of the temperature difference, timer should be stopped, this time period represents the thermal time constant.

(5). Insulation Resistance: Apply the apparatus to 500V between one electrode for the leads and the other electrode for the epoxy, then start to test. Insulation resistance: R≥100MΩ.

(6). Apply the apparatus to AC 750V, 2mA, 1sec between one electrode for the leads and the other electrode for the epoxy, then start to test. There shall be no spark-over or arcing.

(7). Operating range: 0℃-50℃

4. Reliability Characteristics

No.	Testing item	Requirement	Testing method and condition
4-1	High temp test	ΔR/R25≤±1% ΔB/B≤±1% No changes of resistance to voltage and insulation. No damage of appearance.	50±5℃ in air for 1000hrs, stay at room temp. for 1hrs.
4-2	Low temp test		0±5℃ in air for 1000hrs, stay at room temp. for 1hrs.
4-3	Temperature cycling		0℃×30min→room temp.×10min→100℃ ×30min 10 cycles, stay at room temp. for 1hrs.
4-4	Electric charge test		Charged DC0.2mA, 1000 hours in normal temp. and humidity, stay at room temp. for 1hrs.
4-5	Lead strength test		Loaded 20N force for 1 minute.
4-6	Tension between terminal and wire		Loaded 20N force to single wire
4-7	Drop test		From height 1m drops on concrete floor.

5. Method of the Stockpile

1) The height of each pile should be no more than 4 levels during storage and transportation.
2) Put desiccant in each packing bag; Protect it from the rain, snow and mechanical damage.
3) ROHS label should be placed in the each packing bag and self-adhesive label should be pasted outside.
4) Should not close to the acidoid, alkali and corrosion gas or radioactive source.
   Storage temperature: 15℃~40℃, working humidity ≤75%.

6. R-T Table

Part No.:TS103F25C3950FA-ML200A R25=10KΩ±1% B25/50=3950K±1%

T_{emp}(℃)	R_{min}(KΩ)	R_{nor}(KΩ)	R_{max}(KΩ)	T_{emp}(℃)	R_{min}(KΩ)	R_{nor}(KΩ)	R_{max}(KΩ)
-20	98.82	102.2	105.6	22	11.30	11.43	11.56
-19	93.02	96.11	99.29	23	10.81	10.93	11.05
-18	87.60	90.45	93.39	24	10.34	10.45	10.56
-17	82.53	85.17	87.89	25	9.900	10.00	10.10
-16	77.80	80.24	82.75	26	9.471	9.570	9.670
-15	73.37	75.63	77.95	27	9.062	9.162	9.262
-14	69.23	71.32	73.46	28	8.674	8.773	8.872
-13	65.36	67.29	69.27	29	8.304	8.403	8.501
-12	61.72	63.51	65.34	30	7.952	8.050	8.148
-11	58.32	59.98	61.67	31	7.617	7.714	7.811
-10	55.13	56.66	58.23	32	7.298	7.394	7.490
-9	52.14	53.56	55.01	33	6.994	7.089	7.184
-8	49.33	50.65	51.99	34	6.704	6.798	6.893
-7	46.70	47.91	49.16	35	6.428	6.521	6.614
-6	44.22	45.35	46.50	36	6.165	6.256	6.349
-5	41.89	42.94	44.00	37	5.914	6.004	6.095
-4	39.71	40.68	41.66	38	5.674	5.763	5.853
-3	37.65	38.55	39.46	39	5.446	5.533	5.622
-2	35.71	36.55	37.39	40	5.227	5.314	5.401
-1	33.89	34.66	35.45	41	5.019	5.104	5.190
0	32.18	32.89	33.62	42	4.820	4.904	4.988
1	30.58	31.24	31.92	43	4.630	4.712	4.795
2	29.07	29.69	30.31	44	4.449	4.530	4.611
3	27.65	28.22	28.80	45	4.275	4.355	4.435
4	26.31	26.84	27.37	46	4.110	4.188	4.266
5	25.03	25.53	26.02	47	3.951	4.028	4.105
6	23.83	24.29	24.75	48	3.800	3.875	3.951
7	22.69	23.12	23.54	49	3.655	3.728	3.803
8	21.62	22.01	22.41	50	3.516	3.588	3.661
9	20.60	20.96	21.33	51	3.384	3.454	3.526
10	19.63	19.97	20.31	52	3.257	3.326	3.397
11	18.72	19.03	19.35	53	3.136	3.204	3.273
12	17.85	18.14	18.43	54	3.020	3.086	3.154
13	17.03	17.30	17.57	55	2.909	2.974	3.040
14	16.26	16.50	16.75	56	2.802	2.866	2.931
15	15.52	15.75	15.97	57	2.700	2.763	2.827
16	14.82	15.03	15.24	58	2.602	2.664	2.726
17	14.15	14.35	14.54	59	2.509	2.569	2.630
18	13.52	13.70	13.88	60	2.419	2.478	2.537
19	12.92	13.09	13.25	61	2.333	2.390	2.449
20	12.35	12.50	12.66	62	2.250	2.306	2.364
21	11.81	11.95	12.09	63	2.171	2.226	2.282

T_{emp}(℃)	R_{min}(KΩ)	R_{nor}(KΩ)	R_{max}(KΩ)	T_{emp}(℃)	R_{min}(KΩ)	R_{nor}(KΩ)	R_{max}(KΩ)
64	2.094	2.148	2.203	100	0.655	0.680	0.705
65	2.021	2.074	2.128	101	0.636	0.660	0.685
66	1.951	2.003	2.056	102	0.618	0.641	0.666
67	1.884	1.934	1.986	103	0.600	0.623	0.647
68	1.819	1.869	1.919	104	0.583	0.605	0.629
69	1.757	1.805	1.855	105	0.566	0.588	0.611
70	1.697	1.745	1.793	106	0.550	0.572	0.594
71	1.640	1.686	1.734	107	0.535	0.556	0.578
72	1.585	1.630	1.676	108	0.519	0.540	0.562
73	1.532	1.576	1.621	109	0.505	0.525	0.546
74	1.481	1.524	1.568	110	0.491	0.511	0.532
75	1.432	1.474	1.518	111	0.477	0.497	0.517
76	1.384	1.426	1.468	112	0.464	0.483	0.503
77	1.339	1.380	1.421	113	0.451	0.470	0.490
78	1.295	1.335	1.376	114	0.439	0.457	0.476
79	1.253	1.292	1.332	115	0.427	0.445	0.464
80	1.213	1.251	1.290	116	0.416	0.433	0.451
81	1.174	1.211	1.250	117	0.404	0.422	0.439
82	1.137	1.173	1.211	118	0.393	0.410	0.428
83	1.101	1.137	1.173	119	0.383	0.400	0.417
84	1.067	1.101	1.137	120	0.373	0.389	0.406
85	1.033	1.067	1.102	121	0.363	0.379	0.395
86	1.001	1.035	1.069	122	0.354	0.369	0.385
87	0.970	1.003	1.037	123	0.345	0.360	0.376
88	0.941	0.972	1.005	124	0.336	0.351	0.366
89	0.912	0.943	0.975	125	0.327	0.342	0.357
90	0.884	0.915	0.946	126	0.319	0.333	0.348
91	0.857	0.887	0.918	127	0.311	0.325	0.340
92	0.832	0.861	0.891	128	0.303	0.317	0.331
93	0.807	0.835	0.865	129	0.295	0.309	0.323
94	0.783	0.811	0.840	130	0.288	0.301	0.315
95	0.760	0.787	0.815	131	0.281	0.294	0.308
96	0.737	0.764	0.792	132	0.274	0.287	0.300
97	0.716	0.742	0.769	133	0.267	0.280	0.293
98	0.695	0.720	0.747	134	0.261	0.273	0.286
99	0.674	0.700	0.726	135	0.254	0.267	0.279