

承 認 書

SPECIFICATION FOR APPROVAL

廠 商： 明曜科技股份有限公司

CUSTOMER:

料 號：

PART NO.: TSM1A103F34D1RZ

型 號：

ITEM NO. 0603 10K Ω $\pm$ 1%

日 期：

ISSUE DATE: 2011年12月08日

充泰科技有限公司

FULL THAI TECHNOLOGY LTD

◎ 總公司：台北市民生東路五段36巷8弄58號1F

OFFICE：1F, No.58, Alley 8, Lane 36, Sec.5,

Min-Sheng E. Rd., Taipei, Taiwan, R.O.C.

TEL：886-2-27152392 . 27658476

FAX：886-2-27151392 . 27658554

客 戶 簽 收

Date:

承 辦 人

衛勤娟

Date:120811



INDEX	Page
■ Part Number Code	1
■ Structure and Dimensions	2
■ Electrical Characteristics	2
■ Reliability	3
■ Soldering Recommendation	4
■ Max. Power Dissipation Derating Curve	5
■ Recommended Soldering Pad Dimensions	6
■ RoHS Compliant Declaration	6
■ Storage Conditions of Products	6
■ Packaging	7
■ Safety Approvals & Certificates & Test Report	8
■ R-T Table	9 ~ 13

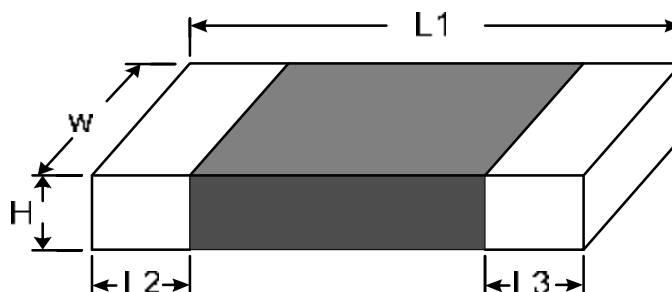
Part Number Code

Example :

TSM **1** **A** **103** **F** **34D** **1** **R** **Z**
 (1) (2) (3) (4) (5) (6) (7) (8) (9)

No.	Item	Digit	Specification
(1)	Product Type	TSM	Thinking NTC thermistor TSM type
(2)	Size (EIA)	1	0603
(3)	Definition of B Value	A	B _{25/85}
(4)	Zero Power Resistance at 25°C (R ₂₅)	103	10 x 10 ³ Ω = 10 KΩ
(5)	Tolerance of R ₂₅	F	± 1%
(6)	B Value	34D	3435K
(7)	Tolerance of B Value	1	± 1%
(8)	Packaging	R	Reel
(9)	Optional Suffix	Z	RoHS+HF compliance

Structure and Dimensions



(unit : mm)

L1	W	H max.	L2 and L3
1.60±0.15	0.80±0.15	0.95	0.40±0.15

Electrical Characteristics

Part No.	Zero Power Resistance at 25°C	Tolerance of R ₂₅	B _{25/85} Value	Tolerance of B Value	Max. Power Dissipation at 25°C	Dissipation Factor	Thermal Time Constant	Operating Temperature Range
	R ₂₅ (KΩ)	(± %)	(K)	(± %)	P _{max} (mW)	δ (mW/°C)	τ (sec.)	T _L ~T _U (°C)
TSM1A103F34D1RZ	10	1	3435	1	210	Approx. 2.1	Approx. 3.1	-40 ~ +125

Reliability

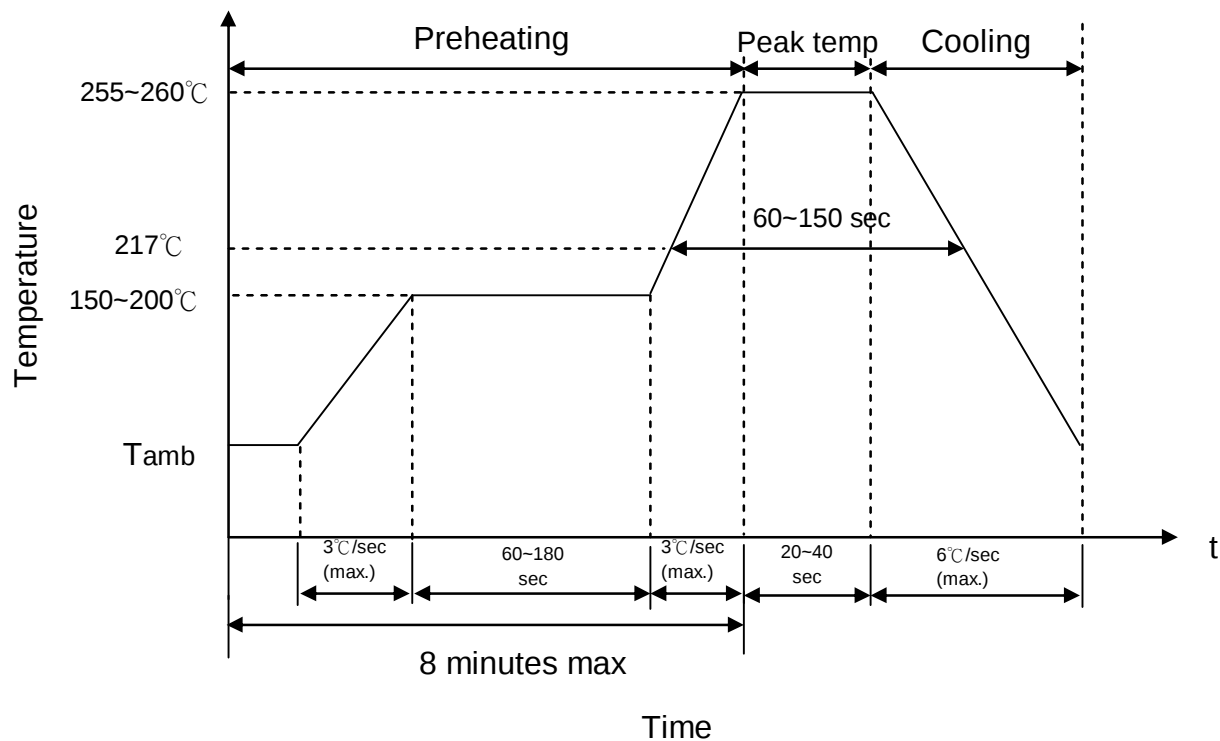
Item	Standard	Test conditions / Methods	Specifications															
Solderability	IEC60068-2-58	245 ± 5℃ , 3 ± 0.3 sec	At least 95% of terminal electrode is covered by new solder															
Resistance to Soldering Heat	IEC60068-2-58	260 ± 5℃ , 10 ±1 sec	No visible damage ΔR ₂₅ /R ₂₅ ≤ 3 %															
High Temperature Storage	IEC60068-2-2	125 ± 5℃ , 1000 ± 24 hrs	No visible damage ΔR ₂₅ /R ₂₅ ≤ 5 %															
Damp Heat, Steady State	IEC60068-2-3	40 ± 2℃ , 9 0 ~ 95 % RH , 1000 ± 24 hrs	No visible damage ΔR ₂₅ /R ₂₅ ≤ 3 %															
Rapid Change of Temperature	IEC60068-2-14	The conditions shown below shall be repeated 5 cycles on PCB<table><tr><th>Step</th><th>Temperature (℃)</th><th>Period (minutes)</th></tr><tr><td>1</td><td>-40 ± 5</td><td>30 ± 3</td></tr><tr><td>2</td><td>Room temperature</td><td>5 ± 3</td></tr><tr><td>3</td><td>125 ± 5</td><td>30 ± 3</td></tr><tr><td>4</td><td>Room temperature</td><td>5 ± 3</td></tr></table>	Step	Temperature (℃)	Period (minutes)	1	-40 ± 5	30 ± 3	2	Room temperature	5 ± 3	3	125 ± 5	30 ± 3	4	Room temperature	5 ± 3	No visible damage ΔR ₂₅ /R ₂₅ ≤ 3 %
Step	Temperature (℃)	Period (minutes)																
1	-40 ± 5	30 ± 3																
2	Room temperature	5 ± 3																
3	125 ± 5	30 ± 3																
4	Room temperature	5 ± 3																
Max. Power Dissipation	IEC60539-1 4.26.3	25 ± 5℃, P _{max.} , 1000 ± 24 hrs	No visible damage ΔR ₂₅ /R ₂₅ ≤ 5 %															

Products have been tested at Thinking Electronic

Industrial Co.,Ltd. Laboratory recognized by UL (Underwriters Laboratories Inc.) under CTD
(Client Test Data Program).

Soldering Recommendation

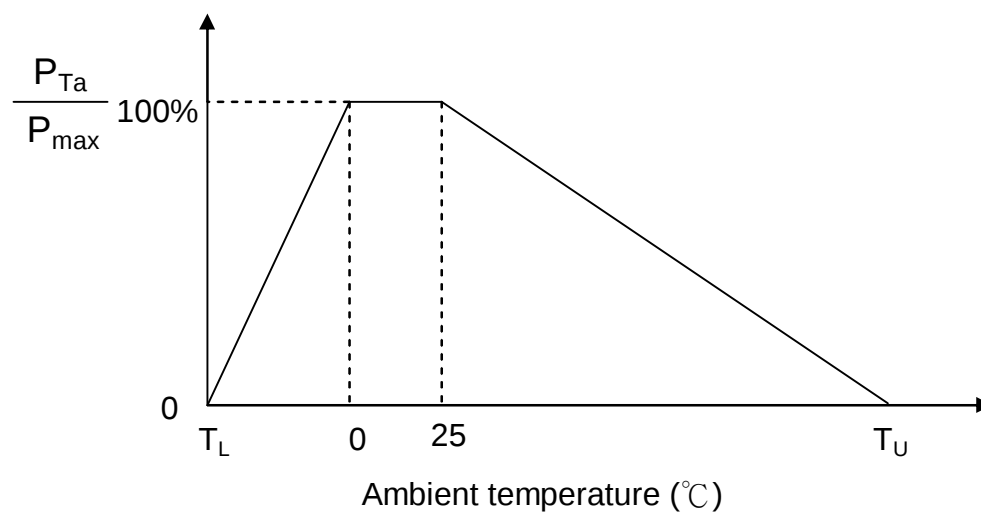
IR-Reflow Soldering Profile



Recommended Reworking Conditions with Soldering Iron

Item	Conditions
Temperature of Soldering Iron-tip	360°C (max.)
Soldering Time	3 sec (max.)
Diameter of Soldering Iron-tip	φ 3mm (max.)
Caution:Not to touch the component surface with soldering iron directly to prevent component damage.	

Max. Power Dissipation Derating Curve



Note: T_L = Minimum operating temperature (°C)

T_U = Maximum operating temperature (°C)

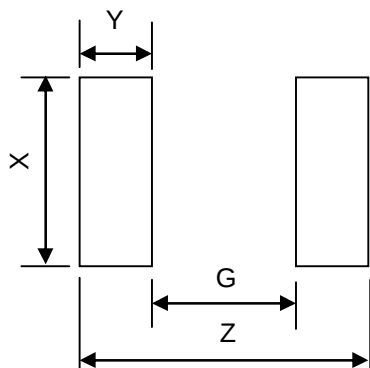
For example :

Ambient temperature(T_a)=55°C

Maximum operating temperature(T_u)=125°C

$P_{Ta} = (T_u - T_a) / (T_u - 25) \times P_{max} = 70\% P_{max}$

Recommended Soldering Pad Dimensions



Size (EIA)	0603
Z	3.0 mm
G	1.0 mm
X	1.0 mm
Y	1.0 mm

RoHS Compliant Declaration

We hereby declare that the components delivered to your company are compliant with RoHS directive 2002/95/EC.

Storage Conditions of Products

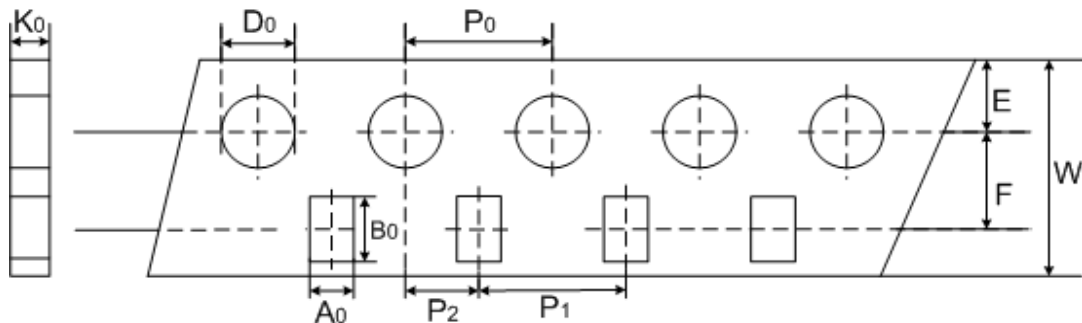
(I) Storage Conditions :

- 1.Storage Temperature : -10°C ~+40°C
- 2.Relative Humidity : $\leq 75\%RH$
- 3.Keep away from corrosive atmosphere and sunlight.

(II) Period of Storage : 1 year

Packaging

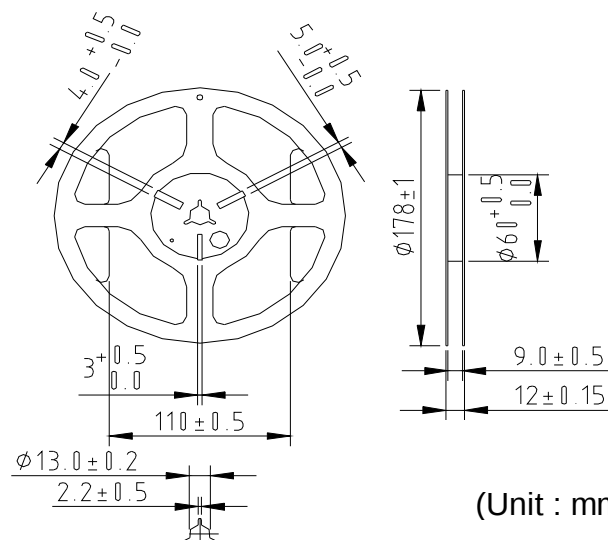
■ Taping Specification (0603 type)



(Unit : mm)

Index	A ₀	B ₀	W	E	F	P ₁	P ₂	P ₀	D ₀	K ₀
Type	±0.2	±0.2	±0.2	±0.1	±0.05	±0.1	±0.05	±0.1	±0.1	±0.1
0603	1.1	1.9	8	1.75	3.5	4	2	4	1.55	0.95

■ Quantity (4000 pcs / reel)



(Unit : mm)

Safety Approvals



* UL 1434 / cUL recognized (File # E138827)



* TUV recognized (File # R R 50167657)

Certificates

- (1) TS 16949 certificate
- (2) ISO 9001 certificate
- (3) QC 080000 certificate

Test Report

- (1) RoHS test report
- (2) Halogen-free test report

R - T Table

Part No. : TSM1A103F34D1RZ

R25 =10 KOhm $\pm$ 1%B25/85 = 3435 K $\pm$ 1%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
-40	212.30	203.96	195.92	-0.68	0.71	4.1%	-3.9%
-39	200.33	192.57	185.09	-0.68	0.70	4.0%	-3.9%
-38	189.17	181.94	174.97	-0.68	0.70	4.0%	-3.8%
-37	178.74	172.01	165.51	-0.68	0.70	3.9%	-3.8%
-36	168.99	162.71	156.66	-0.68	0.70	3.9%	-3.7%
-35	159.86	154.01	148.36	-0.67	0.69	3.8%	-3.7%
-34	151.30	145.84	140.57	-0.67	0.69	3.7%	-3.6%
-33	143.26	138.17	133.24	-0.66	0.68	3.7%	-3.6%
-32	135.71	130.95	126.35	-0.66	0.68	3.6%	-3.5%
-31	128.59	124.15	119.85	-0.65	0.67	3.6%	-3.5%
-30	121.89	117.74	113.73	-0.65	0.66	3.5%	-3.4%
-29	115.57	111.70	107.94	-0.64	0.66	3.5%	-3.4%
-28	109.60	105.99	102.48	-0.63	0.65	3.4%	-3.3%
-27	103.98	100.60	97.318	-0.63	0.64	3.4%	-3.3%
-26	98.660	95.503	92.439	-0.62	0.64	3.3%	-3.2%
-25	93.640	90.691	87.826	-0.61	0.63	3.3%	-3.2%
-24	88.899	86.144	83.466	-0.61	0.62	3.2%	-3.1%
-23	84.421	81.847	79.342	-0.60	0.62	3.1%	-3.1%
-22	80.191	77.785	75.444	-0.59	0.61	3.1%	-3.0%
-21	76.196	73.947	71.758	-0.59	0.60	3.0%	-3.0%
-20	72.422	70.320	68.272	-0.58	0.60	3.0%	-2.9%
-19	68.858	66.892	64.977	-0.57	0.59	2.9%	-2.9%
-18	65.490	63.653	61.861	-0.57	0.59	2.9%	-2.8%
-17	62.309	60.591	58.914	-0.56	0.58	2.8%	-2.8%
-16	59.303	57.696	56.126	-0.56	0.57	2.8%	-2.7%
-15	56.462	54.959	53.490	-0.55	0.57	2.7%	-2.7%
-14	53.777	52.371	50.995	-0.54	0.56	2.7%	-2.6%
-13	51.239	49.922	48.635	-0.54	0.56	2.6%	-2.6%
-12	48.838	47.606	46.400	-0.53	0.55	2.6%	-2.5%
-11	46.566	45.413	44.283	-0.53	0.54	2.5%	-2.5%
-10	44.416	43.336	42.278	-0.52	0.54	2.5%	-2.4%
-9	42.380	41.369	40.378	-0.51	0.53	2.4%	-2.4%
-8	40.452	39.505	38.576	-0.51	0.53	2.4%	-2.4%
-7	38.624	37.737	36.867	-0.50	0.52	2.4%	-2.3%
-6	36.892	36.061	35.245	-0.50	0.51	2.3%	-2.3%
-5	35.248	34.470	33.705	-0.49	0.51	2.3%	-2.2%
-4	33.688	32.959	32.243	-0.48	0.50	2.2%	-2.2%
-3	32.207	31.524	30.852	-0.48	0.49	2.2%	-2.1%
-2	30.800	30.160	29.531	-0.47	0.49	2.1%	-2.1%
-1	29.463	28.864	28.274	-0.46	0.48	2.1%	-2.0%

R - T Table

Part No. : TSM1A103F34D1RZ

R25 =10 KOhm $\pm$ 1%B25/85 = 3435 K $\pm$ 1%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
0	28.192	27.630	27.077	-0.46	0.47	2.0%	-2.0%
1	26.982	26.457	25.938	-0.45	0.46	2.0%	-2.0%
2	25.832	25.339	24.854	-0.44	0.46	1.9%	-1.9%
3	24.736	24.275	23.820	-0.43	0.45	1.9%	-1.9%
4	23.693	23.261	22.835	-0.43	0.44	1.9%	-1.8%
5	22.700	22.295	21.896	-0.42	0.43	1.8%	-1.8%
6	21.753	21.374	21.001	-0.41	0.43	1.8%	-1.7%
7	20.850	20.496	20.146	-0.40	0.42	1.7%	-1.7%
8	19.990	19.658	19.331	-0.40	0.41	1.7%	-1.7%
9	19.169	18.859	18.552	-0.39	0.40	1.6%	-1.6%
10	18.386	18.096	17.809	-0.38	0.39	1.6%	-1.6%
11	17.639	17.368	17.100	-0.37	0.39	1.6%	-1.5%
12	16.926	16.673	16.422	-0.36	0.38	1.5%	-1.5%
13	16.245	16.009	15.774	-0.36	0.37	1.5%	-1.5%
14	15.595	15.375	15.156	-0.35	0.36	1.4%	-1.4%
15	14.975	14.769	14.564	-0.34	0.35	1.4%	-1.4%
16	14.382	14.190	13.999	-0.33	0.35	1.4%	-1.3%
17	13.816	13.637	13.458	-0.32	0.34	1.3%	-1.3%
18	13.275	13.108	12.942	-0.32	0.33	1.3%	-1.3%
19	12.758	12.602	12.447	-0.31	0.32	1.2%	-1.2%
20	12.264	12.119	11.975	-0.30	0.31	1.2%	-1.2%
21	11.791	11.657	11.522	-0.29	0.30	1.2%	-1.2%
22	11.340	11.215	11.090	-0.28	0.30	1.1%	-1.1%
23	10.908	10.792	10.676	-0.27	0.29	1.1%	-1.1%
24	10.495	10.387	10.279	-0.27	0.28	1.0%	-1.0%
25	10.100	10.000	9.9000	-0.26	0.27	1.0%	-1.0%
26	9.7294	9.6294	9.5295	-0.27	0.28	1.0%	-1.0%
27	9.3745	9.2747	9.1751	-0.28	0.29	1.1%	-1.1%
28	9.0346	8.9351	8.8358	-0.29	0.31	1.1%	-1.1%
29	8.7090	8.6099	8.5110	-0.30	0.32	1.2%	-1.1%
30	8.3970	8.2983	8.2000	-0.32	0.33	1.2%	-1.2%
31	8.0979	7.9999	7.9022	-0.33	0.34	1.2%	-1.2%
32	7.8113	7.7139	7.6170	-0.34	0.35	1.3%	-1.3%
33	7.5365	7.4398	7.3437	-0.35	0.37	1.3%	-1.3%
34	7.2729	7.1771	7.0818	-0.36	0.38	1.3%	-1.3%
35	7.0201	6.9251	6.8307	-0.38	0.39	1.4%	-1.4%
36	6.7775	6.6834	6.5900	-0.39	0.40	1.4%	-1.4%
37	6.5448	6.4516	6.3592	-0.40	0.42	1.4%	-1.4%
38	6.3213	6.2292	6.1378	-0.41	0.43	1.5%	-1.5%
39	6.1068	6.0157	5.9253	-0.43	0.44	1.5%	-1.5%

R - T Table

Part No. : TSM1A103F34D1RZ

R25 =10 KOhm $\pm$ 1%B25/85 = 3435 K $\pm$ 1%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
40	5.9007	5.8107	5.7214	-0.44	0.45	1.5%	-1.5%
41	5.7028	5.6138	5.5257	-0.45	0.47	1.6%	-1.6%
42	5.5126	5.4248	5.3378	-0.46	0.48	1.6%	-1.6%
43	5.3298	5.2431	5.1573	-0.48	0.49	1.7%	-1.6%
44	5.1541	5.0685	4.9839	-0.49	0.50	1.7%	-1.7%
45	4.9851	4.9007	4.8172	-0.50	0.52	1.7%	-1.7%
46	4.8226	4.7394	4.6571	-0.52	0.53	1.8%	-1.7%
47	4.6663	4.5842	4.5031	-0.53	0.54	1.8%	-1.8%
48	4.5158	4.4349	4.3550	-0.54	0.56	1.8%	-1.8%
49	4.3709	4.2912	4.2125	-0.56	0.57	1.9%	-1.8%
50	4.2315	4.1529	4.0754	-0.57	0.58	1.9%	-1.9%
51	4.0972	4.0198	3.9435	-0.58	0.60	1.9%	-1.9%
52	3.9678	3.8916	3.8165	-0.59	0.61	2.0%	-1.9%
53	3.8432	3.7682	3.6943	-0.61	0.62	2.0%	-2.0%
54	3.7231	3.6492	3.5765	-0.62	0.63	2.0%	-2.0%
55	3.6073	3.5346	3.4631	-0.63	0.65	2.1%	-2.0%
56	3.4956	3.4241	3.3538	-0.65	0.66	2.1%	-2.1%
57	3.3880	3.3176	3.2484	-0.66	0.67	2.1%	-2.1%
58	3.2842	3.2150	3.1469	-0.67	0.69	2.2%	-2.1%
59	3.1840	3.1159	3.0490	-0.69	0.70	2.2%	-2.1%
60	3.0873	3.0204	2.9546	-0.70	0.71	2.2%	-2.2%
61	2.9940	2.9282	2.8635	-0.71	0.73	2.2%	-2.2%
62	2.9040	2.8393	2.7757	-0.73	0.74	2.3%	-2.2%
63	2.8171	2.7534	2.6910	-0.74	0.75	2.3%	-2.3%
64	2.7331	2.6706	2.6092	-0.75	0.77	2.3%	-2.3%
65	2.6521	2.5906	2.5303	-0.77	0.78	2.4%	-2.3%
66	2.5737	2.5133	2.4541	-0.78	0.79	2.4%	-2.4%
67	2.4981	2.4387	2.3805	-0.80	0.81	2.4%	-2.4%
68	2.4250	2.3666	2.3095	-0.81	0.82	2.5%	-2.4%
69	2.3544	2.2970	2.2408	-0.82	0.84	2.5%	-2.4%
70	2.2861	2.2298	2.1746	-0.84	0.85	2.5%	-2.5%
71	2.2201	2.1648	2.1106	-0.85	0.86	2.6%	-2.5%
72	2.1563	2.1019	2.0487	-0.87	0.88	2.6%	-2.5%
73	2.0947	2.0412	1.9890	-0.88	0.89	2.6%	-2.6%
74	2.0350	1.9825	1.9312	-0.89	0.90	2.6%	-2.6%
75	1.9774	1.9258	1.8754	-0.91	0.92	2.7%	-2.6%
76	1.9216	1.8709	1.8214	-0.92	0.93	2.7%	-2.6%
77	1.8676	1.8179	1.7693	-0.94	0.95	2.7%	-2.7%
78	1.8154	1.7666	1.7189	-0.95	0.96	2.8%	-2.7%
79	1.7649	1.7170	1.6701	-0.97	0.98	2.8%	-2.7%

R - T Table

Part No. : TSM1A103F34D1RZ

R25 =10 KOhm $\pm$ 1%B25/85 = 3435 K $\pm$ 1%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
80	1.7161	1.6690	1.6229	-0.98	0.99	2.8%	-2.8%
81	1.6688	1.6225	1.5773	-1.00	1.01	2.9%	-2.8%
82	1.6231	1.5776	1.5332	-1.01	1.02	2.9%	-2.8%
83	1.5788	1.5341	1.4906	-1.03	1.04	2.9%	-2.8%
84	1.5359	1.4921	1.4493	-1.04	1.05	2.9%	-2.9%
85	1.4944	1.4513	1.4094	-1.06	1.07	3.0%	-2.9%
86	1.4543	1.4119	1.3707	-1.07	1.08	3.0%	-2.9%
87	1.4154	1.3738	1.3333	-1.09	1.10	3.0%	-2.9%
88	1.3777	1.3369	1.2971	-1.11	1.11	3.1%	-3.0%
89	1.3412	1.3011	1.2621	-1.12	1.13	3.1%	-3.0%
90	1.3059	1.2665	1.2282	-1.14	1.14	3.1%	-3.0%
91	1.2717	1.2330	1.1954	-1.15	1.16	3.1%	-3.1%
92	1.2385	1.2006	1.1636	-1.17	1.17	3.2%	-3.1%
93	1.2064	1.1691	1.1328	-1.19	1.19	3.2%	-3.1%
94	1.1753	1.1387	1.1030	-1.20	1.21	3.2%	-3.1%
95	1.1452	1.1092	1.0742	-1.22	1.22	3.2%	-3.2%
96	1.1159	1.0806	1.0462	-1.24	1.24	3.3%	-3.2%
97	1.0876	1.0529	1.0191	-1.25	1.26	3.3%	-3.2%
98	1.0602	1.0260	0.99291	-1.27	1.27	3.3%	-3.2%
99	1.0335	1.0000	0.96748	-1.29	1.29	3.4%	-3.3%
100	1.0077	0.97480	0.94284	-1.31	1.31	3.4%	-3.3%
101	0.98271	0.95035	0.91896	-1.32	1.32	3.4%	-3.3%
102	0.95844	0.92665	0.89582	-1.34	1.34	3.4%	-3.3%
103	0.93490	0.90366	0.87338	-1.36	1.36	3.5%	-3.4%
104	0.91207	0.88137	0.85162	-1.38	1.38	3.5%	-3.4%
105	0.88991	0.85974	0.83052	-1.40	1.39	3.5%	-3.4%
106	0.86841	0.83876	0.81005	-1.41	1.41	3.5%	-3.4%
107	0.84755	0.81841	0.79020	-1.43	1.43	3.6%	-3.4%
108	0.82729	0.79866	0.77094	-1.45	1.45	3.6%	-3.5%
109	0.80763	0.77949	0.75225	-1.47	1.46	3.6%	-3.5%
110	0.78854	0.76088	0.73412	-1.49	1.48	3.6%	-3.5%
111	0.77000	0.74281	0.71651	-1.51	1.50	3.7%	-3.5%
112	0.75200	0.72527	0.69943	-1.52	1.52	3.7%	-3.6%
113	0.73451	0.70824	0.68283	-1.54	1.54	3.7%	-3.6%
114	0.71752	0.69169	0.66672	-1.56	1.55	3.7%	-3.6%
115	0.70101	0.67561	0.65108	-1.58	1.57	3.8%	-3.6%
116	0.68496	0.66000	0.63587	-1.60	1.59	3.8%	-3.7%
117	0.66937	0.64482	0.62111	-1.62	1.61	3.8%	-3.7%
118	0.65420	0.63006	0.60675	-1.64	1.63	3.8%	-3.7%
119	0.63946	0.61572	0.59281	-1.66	1.64	3.9%	-3.7%

R - T Table

Part No. : TSM1A103F34D1RZ

R25 =10 KOhm $\pm$ 1%

$$B_{25/85} = 3435 \text{ K} \pm 1\%$$
[illegible]