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SPECIFICATION FOR APPROVAL

CUSTOMER	Blume-Newmatik-AAA-LUX BV
CERTIFIED	TSM1A103
MODEL/TYPE	
PART NO.	TSM1A103J3983RZ (RoHS+HF)
APPLICATION	
CUSTOMER P/N	
ISSUE DATE	Aug. 29, 2023
REV. NO.	
REV. DATE	

FOR CUSTOMER APPROVAL	CHECKED BY
	<i>Shu Ling Fu</i>
	APPROVED BY
	<i>Chun Chu Tu</i>





NTC Thermistor TSM Type
Part No. :TSM1A103J3983RZ

REVISED RECORD SHEET

REV. NO	REV. DATE	REVISED CONTENT



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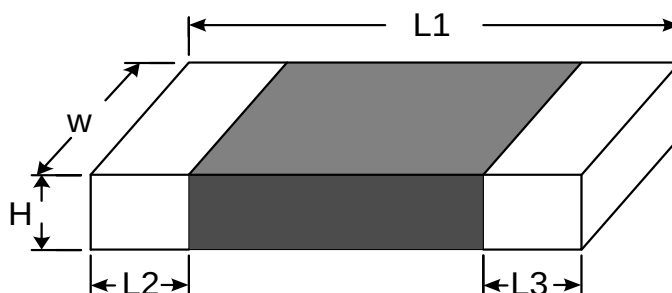
Part Number Code

Example :

TSM **1** **A** **103** **J** **398** **3** **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	J	± 5%
(6)	B Value	398	3980K
(7)	Tolerance of B Value	3	± 3%
(8)	Packaging	R	Reel
(9)	Optional Suffix	Z	RoHS+HF compliance

Structure and Dimensions



(unit : mm)

L1	W	H	L2 and L3
1.60±0.15	0.80±0.15	0.80±0.15	0.40±0.15

Electrical Characteristics

Part No.	Zero Power Resistance at 25℃	Tolerance of R ₂₅	B _{25/85} Value	Tolerance of B Value	Max. Power Dissipation at 25℃	Dissipation Factor	Thermal Time Constant	Operating Temperature Range
	R ₂₅ (KΩ)	(± %)	(K)	(± %)	P _{max} (mW)	δ (mW/℃)	τ (sec.)	T _L ~T _U (℃)
TSM1A103J3983RZ	10	5	3980	3	210	Approx. 2.1	Approx. 3.1	-40 ~ +125

Reliability

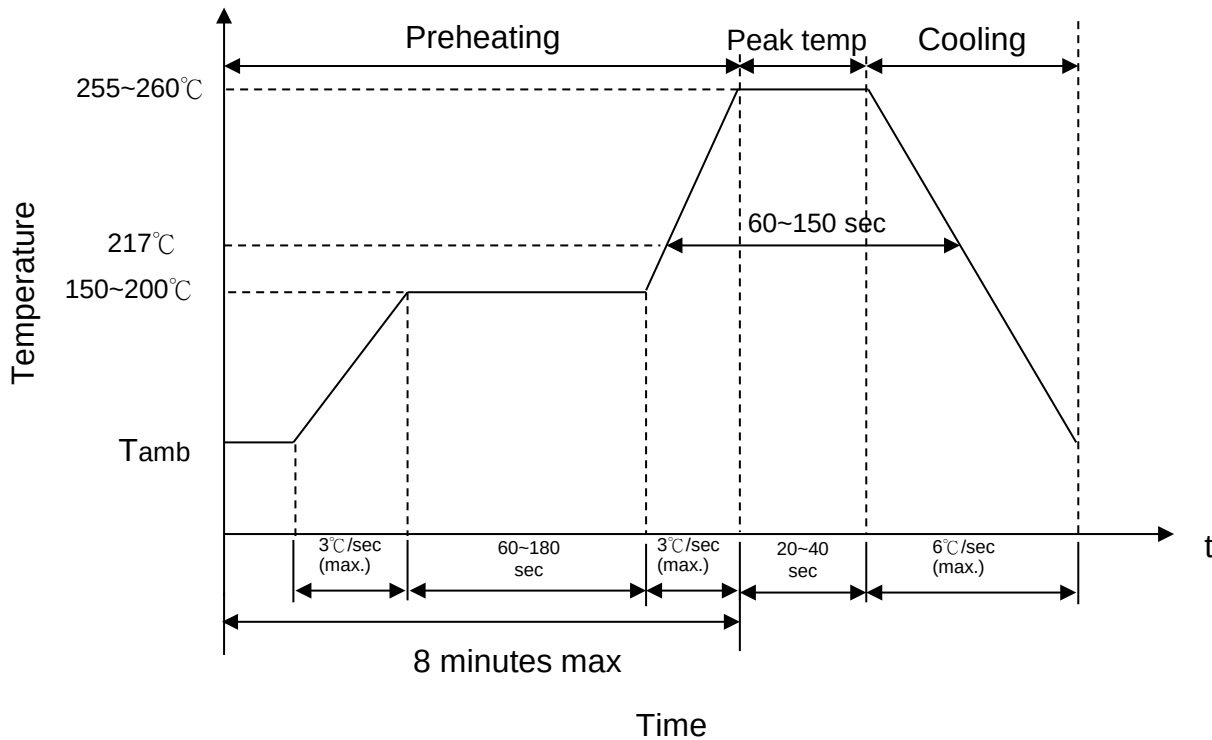
Item	Standard	Test conditions / Methods	Specifications															
Bending Strength	IEC 60068-2-21	Warp : 2mm ; Speed < 0.5mm/sec. Duration : 10 sec on PCB. 	No visible damage ΔR ₂₅ /R ₂₅ ≤ 5 %															
Solderability	IEC60068-2-58	245 ± 5℃ , 3 ± 0.3 sec	At least 95% of terminal electrode is 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	IEC60068-2-78	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><td>Step</td><td>Temperature (℃)</td><td>Period (minutes)</td></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 CTPD
(Client Test Data Program).

Soldering Recommendation

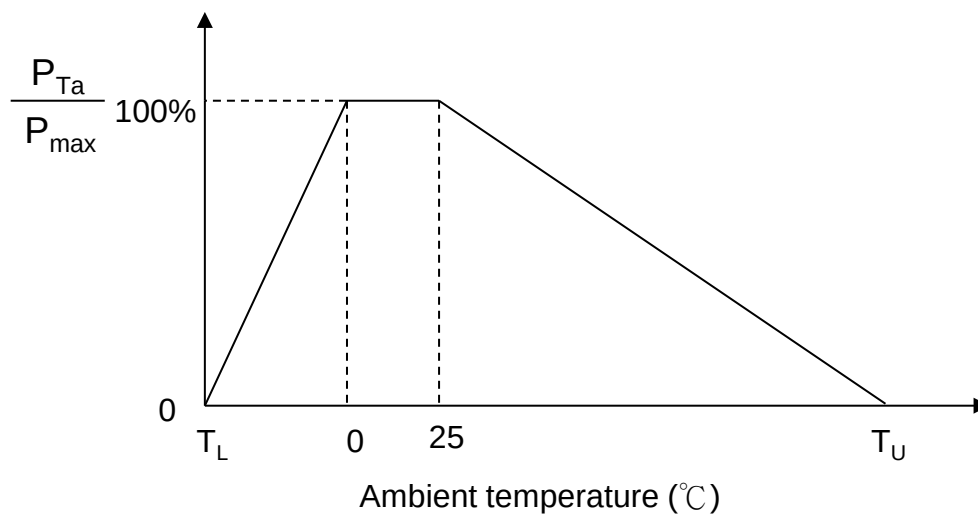
■ IR-Reflow Soldering Profile



■ 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 ($^{\circ}\text{C}$)

T_U = Maximum operating temperature ($^{\circ}\text{C}$)

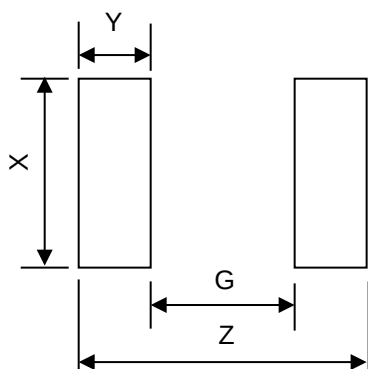
For example :

Ambient temperature(T_a)=55 $^{\circ}\text{C}$

Maximum operating temperature(T_u)=125 $^{\circ}\text{C}$

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

Recommended Soldering Pad Dimensions



Size (EIA)	0603
Z	2.8 mm
G	0.8 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 2015/863/EU.

Warehouse Storage Conditions of Products

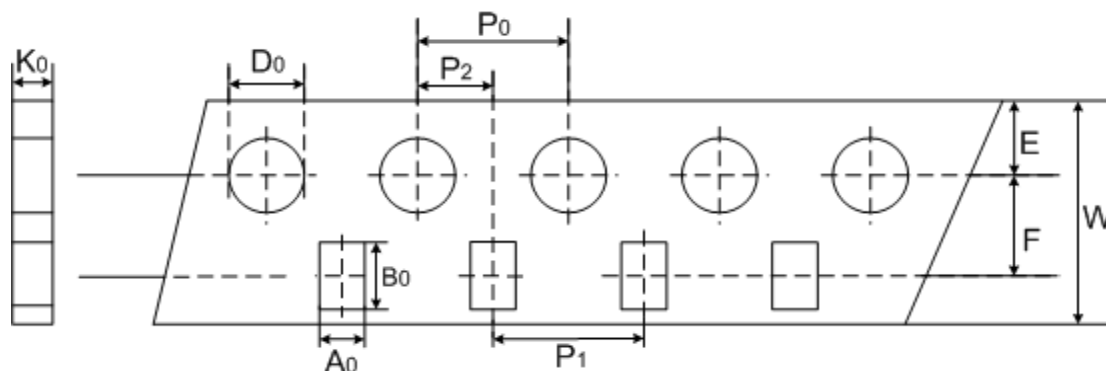
(I) Storage Conditions :

- 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

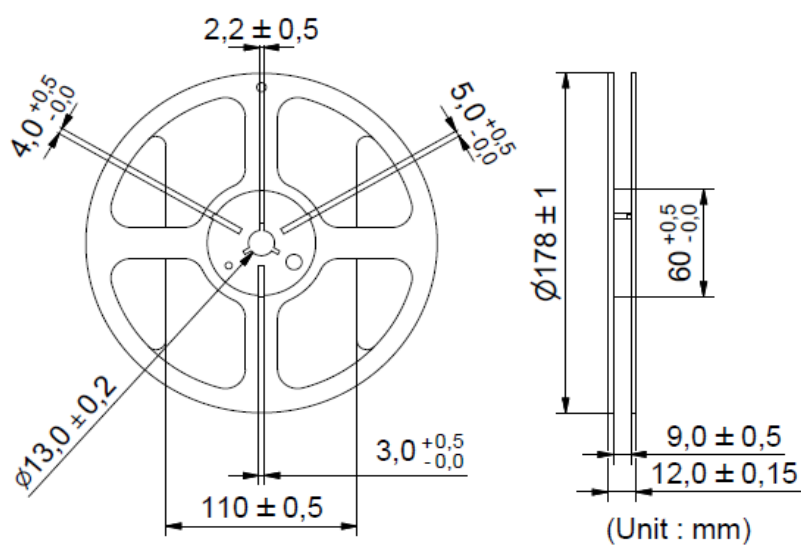
■ Taping Specification (0603 Series)



(Unit : mm)

Index	A_0	B_0	W	E	F	P_1	P_2	P_0	D_0	K_0
Size	± 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)



Safety Approvals (Certified Model/Type : TSM1A103)

* UL 1434 / cUL recognized (File # E138827)



* TUV recognized (File # R 50167657)



* CQC GB/T 6663.1-2007 recognized (File # CQC12001080962)

Certificates

- (1) IATF 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. : TSM1A103J3983RZ

R25 =10 KOhm $\pm$ 5%B25/85 = 3980 K $\pm$ 3%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
-40	441.98	377.49	321.60	-2.38	2.24	17.1%	-14.8%
-39	411.88	352.51	300.94	-2.38	2.23	16.8%	-14.6%
-38	384.09	329.39	281.78	-2.37	2.22	16.6%	-14.5%
-37	358.37	307.96	263.97	-2.35	2.21	16.4%	-14.3%
-36	334.54	288.06	247.41	-2.34	2.20	16.1%	-14.1%
-35	312.43	269.56	231.98	-2.32	2.18	15.9%	-13.9%
-34	291.90	252.34	217.60	-2.30	2.17	15.7%	-13.8%
-33	272.82	236.31	204.17	-2.28	2.15	15.4%	-13.6%
-32	255.07	221.37	191.64	-2.26	2.13	15.2%	-13.4%
-31	238.56	207.45	179.94	-2.23	2.12	15.0%	-13.3%
-30	223.20	194.46	169.00	-2.21	2.10	14.8%	-13.1%
-29	208.89	182.35	158.78	-2.19	2.09	14.6%	-12.9%
-28	195.57	171.05	149.23	-2.17	2.07	14.3%	-12.8%
-27	183.16	160.50	140.29	-2.15	2.05	14.1%	-12.6%
-26	171.61	150.66	131.94	-2.13	2.04	13.9%	-12.4%
-25	160.84	141.47	124.13	-2.11	2.02	13.7%	-12.3%
-24	150.80	132.90	116.83	-2.09	2.01	13.5%	-12.1%
-23	141.45	124.89	109.99	-2.07	1.99	13.3%	-11.9%
-22	132.74	117.41	103.60	-2.05	1.98	13.1%	-11.8%
-21	124.61	110.43	97.613	-2.03	1.96	12.8%	-11.6%
-20	117.03	103.90	92.012	-2.01	1.95	12.6%	-11.4%
-19	109.96	97.802	86.768	-1.99	1.94	12.4%	-11.3%
-18	103.37	92.101	81.858	-1.98	1.92	12.2%	-11.1%
-17	97.209	86.770	77.257	-1.96	1.91	12.0%	-11.0%
-16	91.460	81.783	72.947	-1.94	1.89	11.8%	-10.8%
-15	86.090	77.117	68.906	-1.92	1.88	11.6%	-10.6%
-14	81.072	72.749	65.117	-1.91	1.87	11.4%	-10.5%
-13	76.381	68.659	61.563	-1.89	1.85	11.2%	-10.3%
-12	71.994	64.827	58.227	-1.87	1.84	11.1%	-10.2%
-11	67.890	61.236	55.096	-1.85	1.82	10.9%	-10.0%
-10	64.048	57.868	52.155	-1.84	1.81	10.7%	-9.9%
-9	60.450	54.709	49.391	-1.82	1.79	10.5%	-9.7%
-8	57.078	51.745	46.792	-1.80	1.78	10.3%	-9.6%
-7	53.918	48.961	44.348	-1.78	1.76	10.1%	-9.4%
-6	50.954	46.346	42.049	-1.76	1.75	9.9%	-9.3%
-5	48.173	43.888	39.884	-1.74	1.73	9.8%	-9.1%
-4	45.562	41.577	37.845	-1.72	1.72	9.6%	-9.0%
-3	43.110	39.402	35.924	-1.71	1.70	9.4%	-8.8%
-2	40.806	37.356	34.113	-1.69	1.68	9.2%	-8.7%
-1	38.639	35.429	32.404	-1.67	1.67	9.1%	-8.5%

R - T Table

Part No. : TSM1A103J3983RZ

R25 =10 KOhm $\pm$ 5%B25/85 = 3980 K $\pm$ 3%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
0	36.602	33.614	30.793	-1.65	1.65	8.9%	-8.4%
1	34.684	31.903	29.271	-1.63	1.63	8.7%	-8.2%
2	32.879	30.290	27.834	-1.61	1.61	8.5%	-8.1%
3	31.179	28.768	26.477	-1.58	1.60	8.4%	-8.0%
4	29.577	27.332	25.194	-1.56	1.58	8.2%	-7.8%
5	28.067	25.976	23.980	-1.54	1.56	8.1%	-7.7%
6	26.643	24.695	22.833	-1.52	1.54	7.9%	-7.5%
7	25.299	23.485	21.747	-1.50	1.52	7.7%	-7.4%
8	24.031	22.342	20.719	-1.48	1.50	7.6%	-7.3%
9	22.834	21.260	19.745	-1.46	1.48	7.4%	-7.1%
10	21.703	20.237	18.823	-1.43	1.46	7.2%	-7.0%
11	20.635	19.269	17.949	-1.41	1.44	7.1%	-6.9%
12	19.625	18.353	17.121	-1.39	1.42	6.9%	-6.7%
13	18.671	17.486	16.335	-1.37	1.40	6.8%	-6.6%
14	17.768	16.664	15.590	-1.34	1.38	6.6%	-6.4%
15	16.913	15.886	14.884	-1.32	1.36	6.5%	-6.3%
16	16.105	15.148	14.213	-1.30	1.34	6.3%	-6.2%
17	15.340	14.449	13.576	-1.27	1.32	6.2%	-6.0%
18	14.615	13.786	12.971	-1.25	1.30	6.0%	-5.9%
19	13.929	13.157	12.396	-1.23	1.27	5.9%	-5.8%
20	13.278	12.560	11.851	-1.20	1.25	5.7%	-5.6%
21	12.662	11.994	11.332	-1.18	1.23	5.6%	-5.5%
22	12.078	11.456	10.839	-1.16	1.21	5.4%	-5.4%
23	11.524	10.945	10.370	-1.13	1.19	5.3%	-5.3%
24	10.998	10.461	9.9242	-1.11	1.16	5.1%	-5.1%
25	10.500	10.000	9.5000	-1.09	1.14	5.0%	-5.0%
26	10.054	9.5623	9.0720	-1.12	1.18	5.1%	-5.1%
27	9.6294	9.1463	8.6658	-1.16	1.22	5.3%	-5.3%
28	9.2252	8.7508	8.2800	-1.20	1.25	5.4%	-5.4%
29	8.8404	8.3747	7.9137	-1.24	1.29	5.6%	-5.5%
30	8.4738	8.0170	7.5658	-1.28	1.33	5.7%	-5.6%
31	8.1247	7.6767	7.2352	-1.32	1.36	5.8%	-5.8%
32	7.7920	7.3528	6.9210	-1.36	1.40	6.0%	-5.9%
33	7.4749	7.0445	6.6223	-1.40	1.44	6.1%	-6.0%
34	7.1726	6.7510	6.3383	-1.44	1.48	6.2%	-6.1%
35	6.8844	6.4715	6.0682	-1.48	1.51	6.4%	-6.2%
36	6.6095	6.2053	5.8113	-1.52	1.55	6.5%	-6.4%
37	6.3473	5.9517	5.5668	-1.56	1.59	6.6%	-6.5%
38	6.0971	5.7099	5.3340	-1.60	1.63	6.8%	-6.6%
39	5.8583	5.4795	5.1124	-1.64	1.67	6.9%	-6.7%

R - T Table

Part No. : TSM1A103J3983RZ

R25 =10 KOhm $\pm$ 5%B25/85 = 3980 K $\pm$ 3%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
40	5.6303	5.2598	4.9014	-1.69	1.71	7.0%	-6.8%
41	5.4126	5.0503	4.7005	-1.73	1.75	7.2%	-6.9%
42	5.2047	4.8504	4.5089	-1.77	1.79	7.3%	-7.0%
43	5.0060	4.6597	4.3264	-1.82	1.83	7.4%	-7.2%
44	4.8162	4.4776	4.1525	-1.86	1.87	7.6%	-7.3%
45	4.6348	4.3039	3.9866	-1.90	1.91	7.7%	-7.4%
46	4.4614	4.1379	3.8283	-1.95	1.95	7.8%	-7.5%
47	4.2955	3.9794	3.6774	-1.99	1.99	7.9%	-7.6%
48	4.1368	3.8280	3.5333	-2.04	2.04	8.1%	-7.7%
49	3.9850	3.6832	3.3958	-2.09	2.08	8.2%	-7.8%
50	3.8397	3.5449	3.2645	-2.13	2.12	8.3%	-7.9%
51	3.7007	3.4126	3.1390	-2.18	2.16	8.4%	-8.0%
52	3.5675	3.2860	3.0192	-2.22	2.20	8.6%	-8.1%
53	3.4399	3.1650	2.9047	-2.27	2.25	8.7%	-8.2%
54	3.3177	3.0492	2.7953	-2.32	2.29	8.8%	-8.3%
55	3.2007	2.9383	2.6907	-2.37	2.33	8.9%	-8.4%
56	3.0884	2.8321	2.5906	-2.41	2.38	9.1%	-8.5%
57	2.9808	2.7304	2.4948	-2.46	2.42	9.2%	-8.6%
58	2.8776	2.6330	2.4032	-2.51	2.46	9.3%	-8.7%
59	2.7786	2.5397	2.3155	-2.56	2.51	9.4%	-8.8%
60	2.6836	2.4502	2.2315	-2.61	2.55	9.5%	-8.9%
61	2.5924	2.3644	2.1511	-2.66	2.59	9.6%	-9.0%
62	2.5049	2.2822	2.0741	-2.71	2.64	9.8%	-9.1%
63	2.4208	2.2033	2.0003	-2.76	2.68	9.9%	-9.2%
64	2.3401	2.1276	1.9295	-2.81	2.73	10.0%	-9.3%
65	2.2625	2.0549	1.8617	-2.86	2.77	10.1%	-9.4%
66	2.1880	1.9851	1.7966	-2.91	2.81	10.2%	-9.5%
67	2.1163	1.9182	1.7342	-2.96	2.86	10.3%	-9.6%
68	2.0474	1.8538	1.6743	-3.01	2.90	10.4%	-9.7%
69	1.9812	1.7920	1.6168	-3.06	2.95	10.6%	-9.8%
70	1.9174	1.7326	1.5616	-3.11	2.99	10.7%	-9.9%
71	1.8561	1.6755	1.5086	-3.16	3.04	10.8%	-10.0%
72	1.7971	1.6206	1.4577	-3.21	3.08	10.9%	-10.0%
73	1.7402	1.5678	1.4088	-3.27	3.13	11.0%	-10.1%
74	1.6855	1.5170	1.3618	-3.32	3.17	11.1%	-10.2%
75	1.6328	1.4681	1.3167	-3.37	3.22	11.2%	-10.3%
76	1.5820	1.4210	1.2732	-3.42	3.26	11.3%	-10.4%
77	1.5331	1.3758	1.2315	-3.48	3.31	11.4%	-10.5%
78	1.4860	1.3322	1.1913	-3.53	3.36	11.5%	-10.6%
79	1.4405	1.2902	1.1526	-3.58	3.40	11.7%	-10.7%

R - T Table

Part No. : TSM1A103J3983RZ

R25 =10 KOhm $\pm$ 5%B25/85 = 3980 K $\pm$ 3%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
80	1.3967	1.2497	1.1154	-3.63	3.45	11.8%	-10.7%
81	1.3544	1.2108	1.0796	-3.69	3.49	11.9%	-10.8%
82	1.3137	1.1732	1.0452	-3.74	3.54	12.0%	-10.9%
83	1.2744	1.1370	1.0120	-3.79	3.58	12.1%	-11.0%
84	1.2364	1.1021	0.98001	-3.85	3.63	12.2%	-11.1%
85	1.1998	1.0685	0.94921	-3.90	3.68	12.3%	-11.2%
86	1.1644	1.0361	0.91954	-3.96	3.72	12.4%	-11.2%
87	1.1303	1.0048	0.89095	-4.01	3.77	12.5%	-11.3%
88	1.0973	0.97458	0.86338	-4.07	3.82	12.6%	-11.4%
89	1.0655	0.94544	0.83681	-4.12	3.86	12.7%	-11.5%
90	1.0348	0.91733	0.81119	-4.18	3.91	12.8%	-11.6%
91	1.0050	0.89019	0.78649	-4.23	3.96	12.9%	-11.6%
92	0.97635	0.86399	0.76266	-4.29	4.01	13.0%	-11.7%
93	0.94861	0.83870	0.73967	-4.35	4.05	13.1%	-11.8%
94	0.92179	0.81427	0.71749	-4.40	4.10	13.2%	-11.9%
95	0.89588	0.79068	0.69609	-4.46	4.15	13.3%	-12.0%
96	0.87082	0.76789	0.67543	-4.52	4.20	13.4%	-12.0%
97	0.84659	0.74587	0.65550	-4.58	4.25	13.5%	-12.1%
98	0.82317	0.72460	0.63625	-4.63	4.30	13.6%	-12.2%
99	0.80051	0.70405	0.61767	-4.69	4.35	13.7%	-12.3%
100	0.77859	0.68419	0.59973	-4.75	4.40	13.8%	-12.3%
101	0.75739	0.66499	0.58240	-4.81	4.45	13.9%	-12.4%
102	0.73688	0.64644	0.56567	-4.87	4.50	14.0%	-12.5%
103	0.71704	0.62850	0.54951	-4.94	4.55	14.1%	-12.6%
104	0.69784	0.61116	0.53390	-5.00	4.61	14.2%	-12.6%
105	0.67926	0.59439	0.51882	-5.06	4.66	14.3%	-12.7%
106	0.66128	0.57817	0.50425	-5.13	4.72	14.4%	-12.8%
107	0.64388	0.56250	0.49017	-5.19	4.77	14.5%	-12.9%
108	0.62704	0.54733	0.47657	-5.26	4.83	14.6%	-12.9%
109	0.61074	0.53267	0.46342	-5.32	4.88	14.7%	-13.0%
110	0.59495	0.51849	0.45072	-5.39	4.94	14.7%	-13.1%
111	0.57968	0.50477	0.43844	-5.46	5.00	14.8%	-13.1%
112	0.56489	0.49150	0.42657	-5.53	5.06	14.9%	-13.2%
113	0.55057	0.47866	0.41510	-5.60	5.12	15.0%	-13.3%
114	0.53671	0.46624	0.40401	-5.67	5.18	15.1%	-13.3%
115	0.52329	0.45422	0.39329	-5.75	5.24	15.2%	-13.4%
116	0.51029	0.44260	0.38293	-5.82	5.31	15.3%	-13.5%
117	0.49771	0.43136	0.37291	-5.90	5.37	15.4%	-13.5%
118	0.48553	0.42048	0.36323	-5.98	5.44	15.5%	-13.6%
119	0.47374	0.40995	0.35386	-6.06	5.51	15.6%	-13.7%

R - T Table

Part No. : TSM1A103J3983RZ

R25 =10 KOhm $\pm$ 5%

$$B_{25/85} = 3980 \text{ K} \pm 3\%$$
[illegible]