

THINKING ELECTRONIC INDUSTRIAL CO., LTD.

HEAD OFFICE: 12F, No.93, Dashun 1st Rd., Zuoying Dist., Kaohsiung, Taiwan

TEL: 886-7-5577660 FAX: 886-7-5570560

MANUFACTURING SITE

- KAOHSIUNG FACTORY 1: No. 51, Kaifa Rd., N.E.P.Z, Kaohsiung City 81170, Taiwan
TEL: 886-7-9616668 FAX: 886-7-9616698
- KAOHSIUNG FACTORY 2: No. 2-2, Xinjian S. Rd., N.E.P.Z., Kaohsiung City 81170, Taiwan
TEL: 886-7-9630001 FAX: 886-7-3635113
- CHANGZHOU FACTORY: No.6 Longmen Rd., Wujin High & New-Tech Industrial
Development Zone, Changzhou, Jiangsu, China 213161
TEL: 86-519-86578999 FAX: 86-519-86558643
- DONG GUAN FACTORY: No.45, East Rd., Sha-Tao Dist., Chang-An Town,
Dongguan City, Guangdong, China 523863
TEL: 86-769-85542016 FAX: 86-769-85546890
- YICHANG FACTORY: No. 283 Xiaoting Avenue, Xiaoting Dist., Yichang
City 443007, Hubei, China
TEL: 86-717-6510010 FAX: 86-717-6511430



SPECIFICATION FOR APPROVAL

CUSTOMER	立創電子
CERTIFIED MODEL/TYPE	TSM1B153
PART NO.	TSM1B153J3953RZ (RoHS+HF)
APPLICATION	
CUSTOMER P/N	
ISSUE DATE	Jul. 22, 2022
REV. NO.	
REV. DATE	

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





REVISED RECORD SHEET

REV. NO	REV. DATE	REVISED CONTENT



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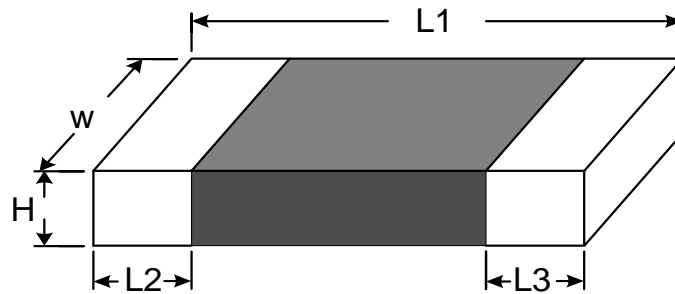
Part Number Code

Example :

TSM **1** **B** **153** **J** **395** **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	B	$B_{25/50}$
(4)	Zero Power Resistance at 25°C (R_{25})	153	$15 \times 10^3 \Omega = 15 \text{ K}\Omega$
(5)	Tolerance of R_{25}	J	$\pm 5\%$
(6)	B Value	395	3950K
(7)	Tolerance of B Value	3	$\pm 3\%$
(8)	Packaging	R	Reel
(9)	Optional Suffix	Z	RoHS+HF compliance

Structure and Dimensions



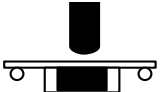
(unit : mm)

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°C	Tolerance of R ₂₅	B _{25/50} 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)
TSM1B153J3953RZ	15	5	3950	3	210	Approx. 2.1	Approx. 3.1	-40 ~ +125

Reliability

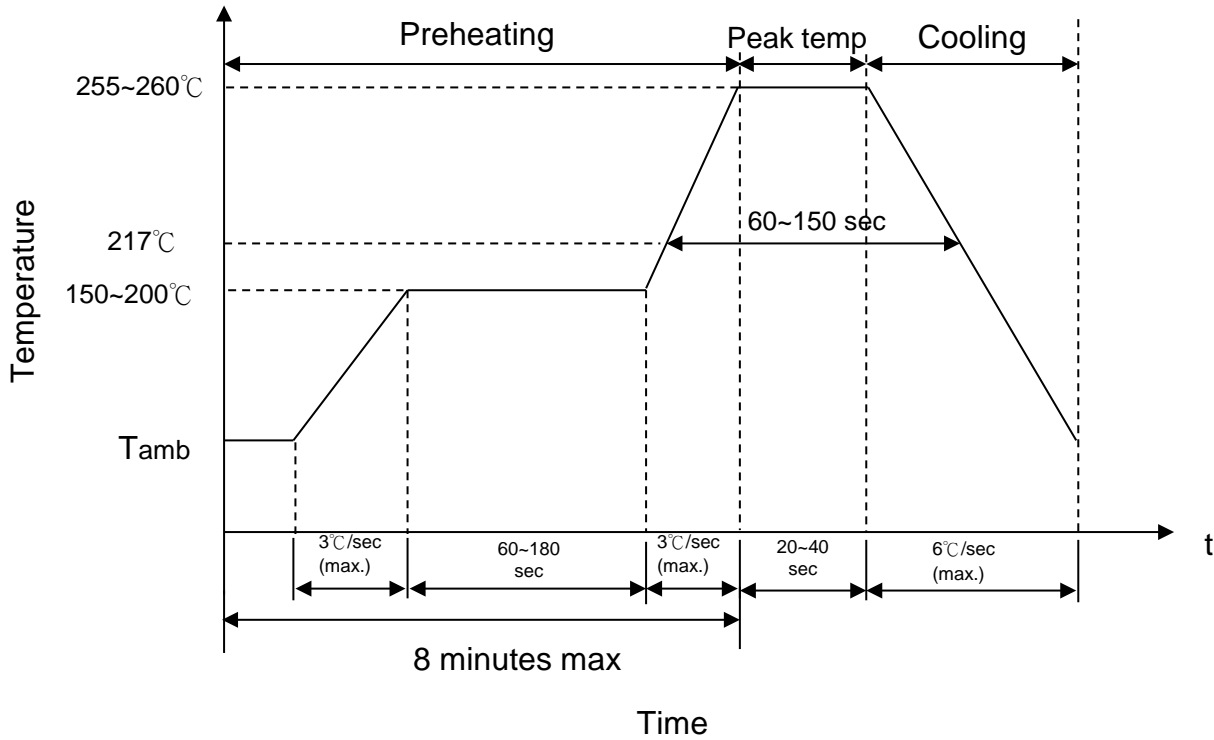
Item	Standard	Test conditions / Methods	Specifications															
Bending Strength	IEC 60068-2-21	Warp : 2mm ; Speed < 0.5mm/sec. Duration : 10 sec on PCB. 	No visible damage $ \Delta R_{25}/R_{25} \leq 5\%$															
Solderability	IEC60068-2-58	245 ± 5°C , 3 ± 0.3 sec	At least 95% of terminal electrode is covered by new solder															
Resistance to Soldering Heat	IEC60068-2-58	260 ± 5°C , 10 ± 1 sec	No visible damage $ \Delta R_{25}/R_{25} \leq 3\%$															
High Temperature Storage	IEC60068-2-2	125 ± 5°C , 1000 ± 24 hrs	No visible damage $ \Delta R_{25}/R_{25} \leq 5\%$															
Damp Heat, Steady State	IEC60068-2-78	40 ± 2°C , 90 ~ 95 % RH , 1000 ± 24 hrs	No visible damage $ \Delta R_{25}/R_{25} \leq 3\%$															
Rapid Change of Temperature	IEC60068-2-14	The conditions shown below shall be repeated 5 cycles on PCB <table border="1" data-bbox="523 1220 1168 1534"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Period (minutes)</th> </tr> </thead> <tbody> <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> </tbody> </table>	Step	Temperature (°C)	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 $ \Delta R_{25}/R_{25} \leq 3\%$
Step	Temperature (°C)	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°C , P _{max.} , 1000 ± 24 hrs	No visible damage $ \Delta R_{25}/R_{25} \leq 5\%$															

Products have been tested at Thinking Electronic

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

Soldering Recommendation

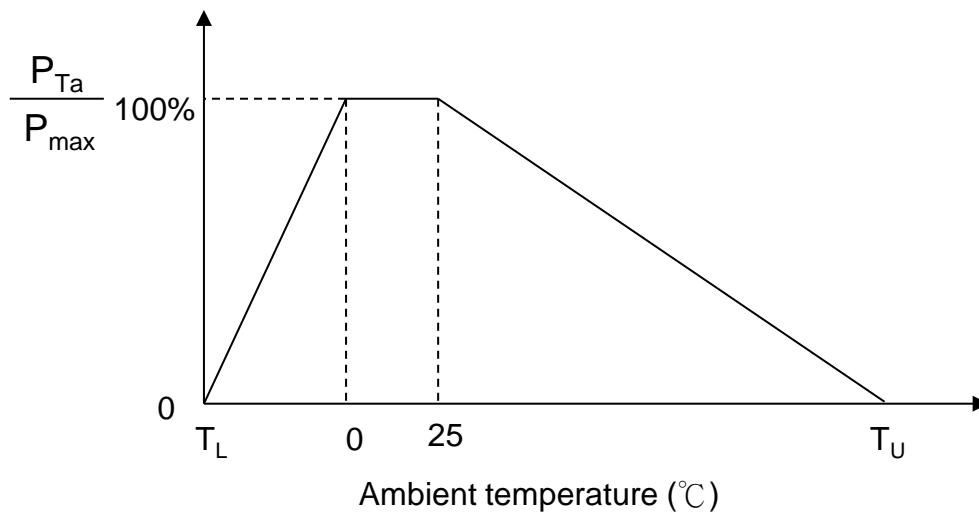
■ IR-Reflow Soldering Profile



■ 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)

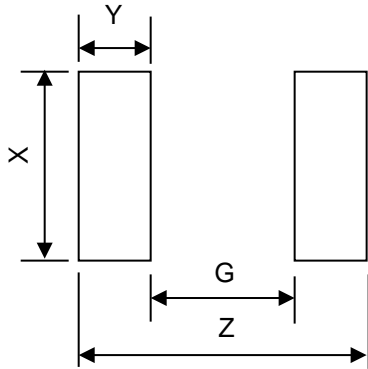
For example :

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	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

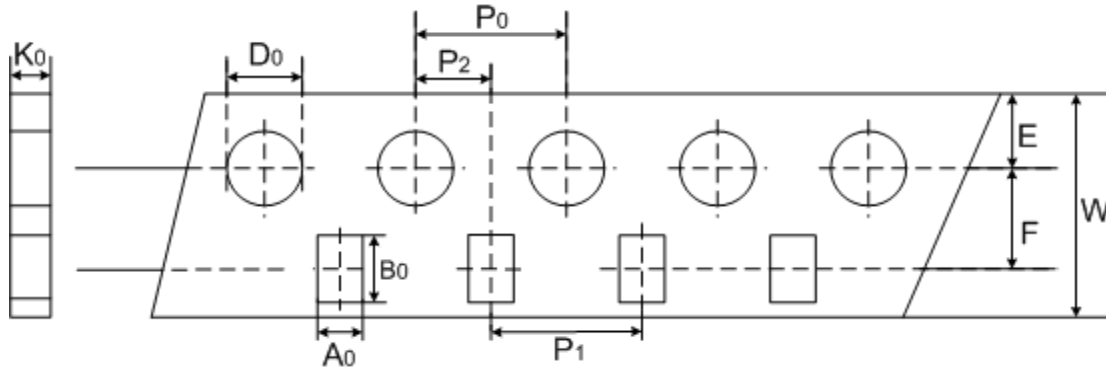
(I) Storage Conditions :

- 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

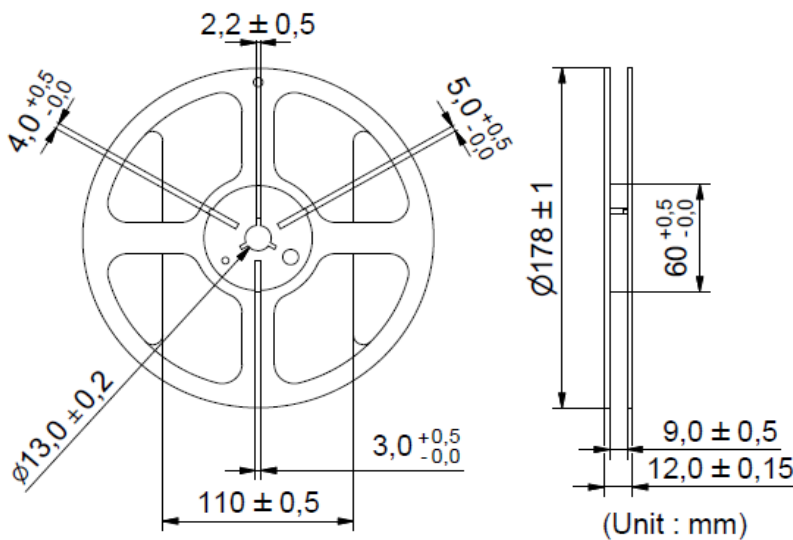
■ Taping Specification (0603 Series)



(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)



(Unit : mm)

Safety Approvals (Certified Model/Type : TSM1B153)



* 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. : TSM1B153J3953RZ

R25 =15 KOhm ± 5%
B25/50 = 3950 K ± 3%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol.		Resistance Tol.	
				(°C)		(%)	
-40	608.60	521.09	445.06	-2.72	2.39	16.8%	-14.6%
-39	570.33	489.25	418.65	-2.55	2.29	16.6%	-14.4%
-38	533.40	458.46	393.07	-2.43	2.23	16.3%	-14.3%
-37	498.31	429.16	368.68	-2.36	2.19	16.1%	-14.1%
-36	465.34	401.56	345.66	-2.31	2.17	15.9%	-13.9%
-35	434.57	375.76	324.09	-2.28	2.15	15.7%	-13.7%
-34	405.98	351.73	303.97	-2.26	2.14	15.4%	-13.6%
-33	379.48	329.42	285.25	-2.24	2.13	15.2%	-13.4%
-32	354.95	308.72	267.85	-2.23	2.13	15.0%	-13.2%
-31	332.24	289.53	251.68	-2.23	2.13	14.8%	-13.1%
-30	311.21	271.72	236.65	-2.22	2.12	14.5%	-12.9%
-29	291.72	255.18	222.66	-2.21	2.11	14.3%	-12.7%
-28	273.63	239.81	209.64	-2.20	2.11	14.1%	-12.6%
-27	256.82	225.49	197.49	-2.19	2.10	13.9%	-12.4%
-26	241.19	212.15	186.15	-2.18	2.09	13.7%	-12.3%
-25	226.63	199.71	175.54	-2.16	2.08	13.5%	-12.1%
-24	213.04	188.08	165.62	-2.15	2.06	13.3%	-11.9%
-23	200.36	177.20	156.32	-2.13	2.05	13.1%	-11.8%
-22	188.52	167.02	147.60	-2.11	2.04	12.9%	-11.6%
-21	177.43	157.48	139.41	-2.09	2.02	12.7%	-11.5%
-20	167.06	148.53	131.72	-2.07	2.00	12.5%	-11.3%
-19	157.35	140.14	124.50	-2.05	1.99	12.3%	-11.2%
-18	148.25	132.26	117.71	-2.03	1.97	12.1%	-11.0%
-17	139.72	124.87	111.32	-2.01	1.95	11.9%	-10.9%
-16	131.72	117.92	105.30	-1.99	1.93	11.7%	-10.7%
-15	124.21	111.39	99.644	-1.96	1.91	11.5%	-10.5%
-14	117.17	105.26	94.317	-1.94	1.90	11.3%	-10.4%
-13	110.57	99.491	89.301	-1.92	1.88	11.1%	-10.2%
-12	104.37	94.070	84.577	-1.90	1.86	10.9%	-10.1%
-11	98.546	88.972	80.128	-1.88	1.84	10.8%	-9.9%
-10	93.082	84.178	75.937	-1.86	1.83	10.6%	-9.8%
-9	87.950	79.669	71.988	-1.84	1.81	10.4%	-9.6%
-8	83.130	75.427	68.266	-1.82	1.79	10.2%	-9.5%
-7	78.602	71.435	64.759	-1.80	1.78	10.0%	-9.3%
-6	74.348	67.678	61.453	-1.78	1.76	9.9%	-9.2%
-5	70.350	64.142	58.335	-1.76	1.74	9.7%	-9.1%
-4	66.591	60.812	55.395	-1.74	1.73	9.5%	-8.9%
-3	63.056	57.675	52.622	-1.72	1.71	9.3%	-8.8%
-2	59.732	54.721	50.005	-1.70	1.69	9.2%	-8.6%
-1	56.603	51.936	47.535	-1.68	1.68	9.0%	-8.5%

R - T Table

Part No. : TSM1B153J3953RZ

R25 =15 KOhm ± 5%
B25/50 = 3950 K ± 3%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
0	53.659	49.312	45.203	-1.66	1.66	8.8%	-8.3%
1	50.887	46.837	43.000	-1.64	1.64	8.6%	-8.2%
2	48.276	44.502	40.920	-1.62	1.63	8.5%	-8.0%
3	45.816	42.298	38.953	-1.60	1.61	8.3%	-7.9%
4	43.497	40.218	37.093	-1.58	1.59	8.2%	-7.8%
5	41.311	38.254	35.335	-1.56	1.57	8.0%	-7.6%
6	39.248	36.398	33.671	-1.54	1.55	7.8%	-7.5%
7	37.302	34.644	32.096	-1.52	1.54	7.7%	-7.4%
8	35.464	32.986	30.604	-1.49	1.52	7.5%	-7.2%
9	33.728	31.417	29.192	-1.47	1.50	7.4%	-7.1%
10	32.088	29.933	27.853	-1.45	1.48	7.2%	-6.9%
11	30.537	28.528	26.584	-1.43	1.46	7.0%	-6.8%
12	29.071	27.197	25.380	-1.41	1.44	6.9%	-6.7%
13	27.684	25.936	24.238	-1.39	1.42	6.7%	-6.5%
14	26.371	24.741	23.154	-1.36	1.40	6.6%	-6.4%
15	25.129	23.609	22.125	-1.34	1.38	6.4%	-6.3%
16	23.951	22.534	21.148	-1.32	1.36	6.3%	-6.2%
17	22.836	21.515	20.219	-1.30	1.34	6.1%	-6.0%
18	21.779	20.547	19.336	-1.27	1.32	6.0%	-5.9%
19	20.777	19.628	18.497	-1.25	1.30	5.9%	-5.8%
20	19.826	18.756	17.699	-1.23	1.27	5.7%	-5.6%
21	18.924	17.927	16.939	-1.20	1.25	5.6%	-5.5%
22	18.068	17.139	16.217	-1.18	1.23	5.4%	-5.4%
23	17.255	16.390	15.529	-1.16	1.21	5.3%	-5.3%
24	16.483	15.677	14.874	-1.13	1.19	5.1%	-5.1%
25	15.750	15.000	14.250	-1.11	1.16	5.0%	-5.0%
26	15.093	14.355	13.620	-1.14	1.20	5.1%	-5.1%
27	14.467	13.742	13.021	-1.18	1.24	5.3%	-5.2%
28	13.870	13.158	12.451	-1.22	1.27	5.4%	-5.4%
29	13.301	12.602	11.909	-1.26	1.31	5.6%	-5.5%
30	12.759	12.072	11.394	-1.30	1.34	5.7%	-5.6%
31	12.241	11.568	10.904	-1.33	1.38	5.8%	-5.7%
32	11.747	11.087	10.437	-1.37	1.42	6.0%	-5.9%
33	11.276	10.629	9.9934	-1.41	1.45	6.1%	-6.0%
34	10.826	10.192	9.5707	-1.45	1.49	6.2%	-6.1%
35	10.397	9.7754	9.1681	-1.49	1.53	6.4%	-6.2%
36	9.9868	9.3782	8.7846	-1.53	1.57	6.5%	-6.3%
37	9.5953	8.9993	8.4193	-1.57	1.60	6.6%	-6.4%
38	9.2212	8.6379	8.0712	-1.61	1.64	6.8%	-6.6%
39	8.8638	8.2929	7.7394	-1.65	1.68	6.9%	-6.7%

R - T Table

Part No. : TSM1B153J3953RZ

R25 =15 KOhm ± 5%
B25/50 = 3950 K ± 3%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
40	8.5222	7.9637	7.4232	-1.70	1.72	7.0%	-6.8%
41	8.1958	7.6494	7.1216	-1.74	1.76	7.1%	-6.9%
42	7.8837	7.3493	6.8339	-1.78	1.80	7.3%	-7.0%
43	7.5852	7.0626	6.5596	-1.82	1.84	7.4%	-7.1%
44	7.2998	6.7888	6.2978	-1.87	1.88	7.5%	-7.2%
45	7.0268	6.5272	6.0480	-1.91	1.92	7.7%	-7.3%
46	6.7656	6.2772	5.8095	-1.95	1.96	7.8%	-7.5%
47	6.5156	6.0382	5.5818	-2.00	2.00	7.9%	-7.6%
48	6.2763	5.8097	5.3644	-2.04	2.04	8.0%	-7.7%
49	6.0472	5.5912	5.1567	-2.09	2.08	8.2%	-7.8%
50	5.8279	5.3823	4.9583	-2.13	2.12	8.3%	-7.9%
51	5.6178	5.1824	4.7687	-2.18	2.16	8.4%	-8.0%
52	5.4165	4.9910	4.5875	-2.22	2.20	8.5%	-8.1%
53	5.2236	4.8079	4.4143	-2.27	2.25	8.6%	-8.2%
54	5.0388	4.6327	4.2486	-2.32	2.29	8.8%	-8.3%
55	4.8616	4.4648	4.0901	-2.36	2.33	8.9%	-8.4%
56	4.6917	4.3040	3.9385	-2.41	2.37	9.0%	-8.5%
57	4.5288	4.1500	3.7934	-2.46	2.42	9.1%	-8.6%
58	4.3725	4.0024	3.6546	-2.51	2.46	9.2%	-8.7%
59	4.2225	3.8610	3.5216	-2.56	2.50	9.4%	-8.8%
60	4.0786	3.7254	3.3943	-2.60	2.55	9.5%	-8.9%
61	3.9404	3.5953	3.2723	-2.65	2.59	9.6%	-9.0%
62	3.8077	3.4706	3.1554	-2.70	2.63	9.7%	-9.1%
63	3.6803	3.3509	3.0434	-2.75	2.68	9.8%	-9.2%
64	3.5578	3.2360	2.9360	-2.80	2.72	9.9%	-9.3%
65	3.4402	3.1258	2.8330	-2.85	2.77	10.1%	-9.4%
66	3.3271	3.0199	2.7342	-2.90	2.81	10.2%	-9.5%
67	3.2184	2.9182	2.6395	-2.95	2.85	10.3%	-9.6%
68	3.1138	2.8206	2.5485	-3.00	2.90	10.4%	-9.6%
69	3.0133	2.7267	2.4612	-3.05	2.94	10.5%	-9.7%
70	2.9165	2.6365	2.3774	-3.10	2.99	10.6%	-9.8%
71	2.8234	2.5497	2.2968	-3.16	3.03	10.7%	-9.9%
72	2.7338	2.4663	2.2195	-3.21	3.08	10.8%	-10.0%
73	2.6475	2.3861	2.1452	-3.26	3.12	11.0%	-10.1%
74	2.5644	2.3089	2.0737	-3.31	3.17	11.1%	-10.2%
75	2.4843	2.2346	2.0050	-3.36	3.21	11.2%	-10.3%
76	2.4071	2.1631	1.9390	-3.41	3.26	11.3%	-10.4%
77	2.3328	2.0943	1.8754	-3.46	3.30	11.4%	-10.4%
78	2.2611	2.0280	1.8143	-3.52	3.34	11.5%	-10.5%
79	2.1920	1.9641	1.7555	-3.57	3.39	11.6%	-10.6%

R - T Table

Part No. : TSM1B153J3953RZ

R25 =15 KOhm ± 5%
B25/50 = 3950 K ± 3%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
80	2.1253	1.9025	1.6988	-3.62	3.43	11.7%	-10.7%
81	2.0610	1.8432	1.6443	-3.67	3.48	11.8%	-10.8%
82	1.9989	1.7860	1.5918	-3.72	3.52	11.9%	-10.9%
83	1.9391	1.7309	1.5412	-3.78	3.57	12.0%	-11.0%
84	1.8813	1.6777	1.4925	-3.83	3.61	12.1%	-11.0%
85	1.8255	1.6264	1.4455	-3.88	3.66	12.2%	-11.1%
86	1.7716	1.5769	1.4002	-3.93	3.70	12.3%	-11.2%
87	1.7195	1.5292	1.3566	-3.99	3.75	12.4%	-11.3%
88	1.6692	1.4831	1.3145	-4.04	3.79	12.5%	-11.4%
89	1.6206	1.4386	1.2739	-4.09	3.84	12.7%	-11.5%
90	1.5737	1.3957	1.2347	-4.14	3.88	12.8%	-11.5%
91	1.5283	1.3542	1.1970	-4.20	3.93	12.9%	-11.6%
92	1.4844	1.3142	1.1605	-4.25	3.97	13.0%	-11.7%
93	1.4420	1.2755	1.1253	-4.30	4.02	13.1%	-11.8%
94	1.4010	1.2381	1.0914	-4.36	4.06	13.2%	-11.8%
95	1.3614	1.2020	1.0586	-4.41	4.11	13.3%	-11.9%
96	1.3230	1.1671	1.0270	-4.47	4.15	13.4%	-12.0%
97	1.2859	1.1334	0.99641	-4.52	4.20	13.5%	-12.1%
98	1.2500	1.1008	0.96690	-4.58	4.25	13.6%	-12.2%
99	1.2153	1.0692	0.93841	-4.63	4.30	13.7%	-12.2%
100	1.1817	1.0388	0.91088	-4.69	4.34	13.8%	-12.3%
101	1.1492	1.0093	0.88429	-4.75	4.39	13.9%	-12.4%
102	1.1177	0.98086	0.85861	-4.81	4.44	14.0%	-12.5%
103	1.0873	0.95333	0.83379	-4.86	4.49	14.0%	-12.5%
104	1.0578	0.92670	0.80982	-4.92	4.54	14.1%	-12.6%
105	1.0293	0.90095	0.78666	-4.98	4.59	14.2%	-12.7%
106	1.0017	0.87606	0.76427	-5.05	4.64	14.3%	-12.8%
107	0.97496	0.85198	0.74265	-5.11	4.70	14.4%	-12.8%
108	0.94910	0.82869	0.72175	-5.17	4.75	14.5%	-12.9%
109	0.92407	0.80617	0.70155	-5.24	4.80	14.6%	-13.0%
110	0.89985	0.78439	0.68204	-5.30	4.86	14.7%	-13.0%
111	0.87640	0.76333	0.66318	-5.37	4.92	14.8%	-13.1%
112	0.85371	0.74296	0.64496	-5.44	4.98	14.9%	-13.2%
113	0.83174	0.72326	0.62736	-5.51	5.04	15.0%	-13.3%
114	0.81049	0.70422	0.61035	-5.58	5.10	15.1%	-13.3%
115	0.78992	0.68580	0.59391	-5.65	5.16	15.2%	-13.4%
116	0.77002	0.66799	0.57804	-5.73	5.22	15.3%	-13.5%
117	0.75076	0.65077	0.56270	-5.81	5.29	15.4%	-13.5%
118	0.73213	0.63413	0.54788	-5.89	5.36	15.5%	-13.6%
119	0.71410	0.61804	0.53357	-5.97	5.43	15.5%	-13.7%

