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SPECIFICATION FOR APPROVAL

CUSTOMER	立創電子
CERTIFIED MODEL/TYPE	TSM1A334
PART NO.	TSM1A334J4153RZA (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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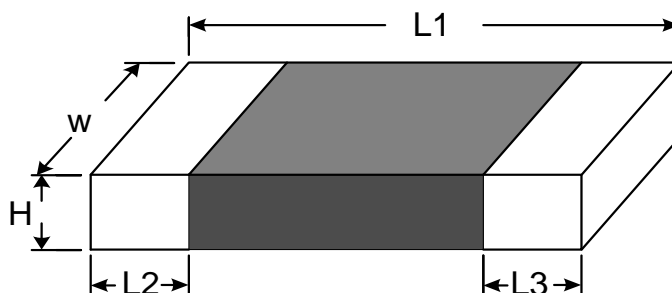
Part Number Code

Example :

TSM **1** **A** **334** **J** **415** **3** **R** **ZA**
 (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)	334	33 x 10 ⁴ Ω = 330 KΩ
(5)	Tolerance of R ₂₅	J	± 5%
(6)	B Value	415	4150K
(7)	Tolerance of B Value	3	± 3%
(8)	Packaging	R	Reel
(9)	Optional Suffix	ZA	RoHS+HF compliance

Structure and Dimensions



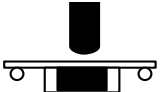
(unit : mm)

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 _{25/85} 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)
TSM1A334J4153RZA	330	5	4150	3	210	Approx. 2.1	Approx. 3.1	-40 ~ +125

Reliability

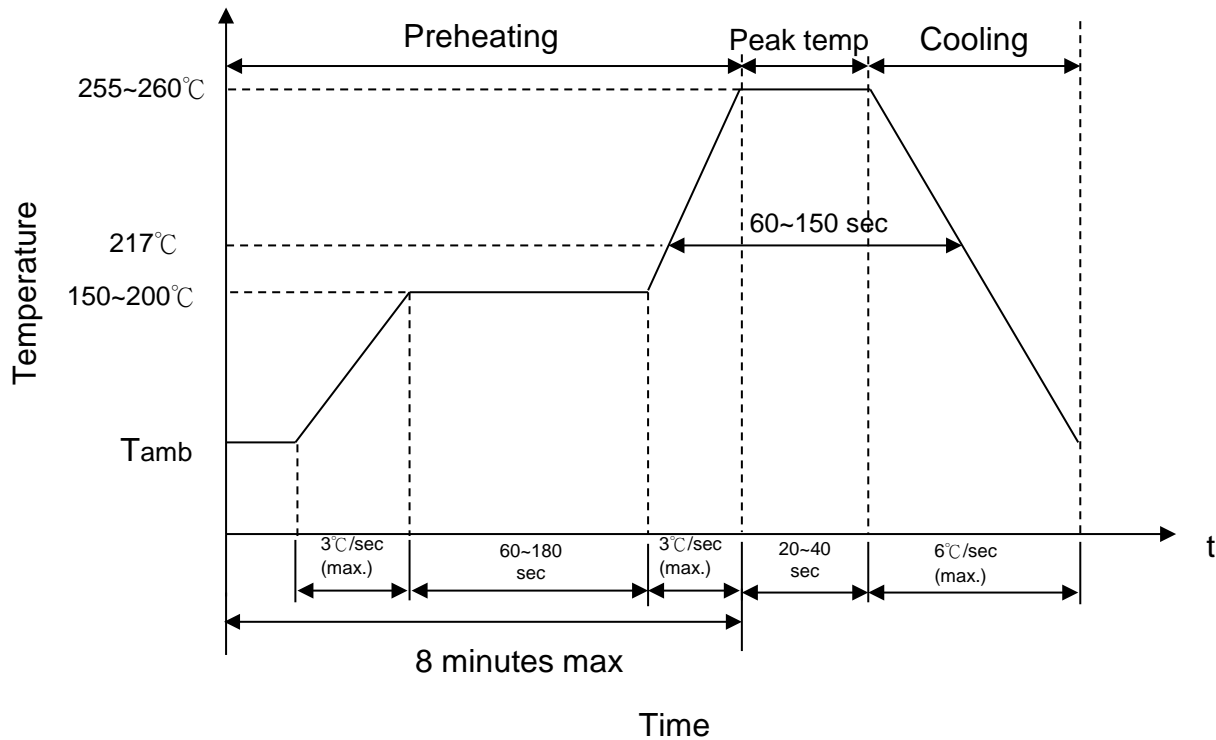
Item	Standard	Test conditions / Methods	Specifications															
Bending Strength	IEC 60068-2-21	Warp : 2mm ; Speed < 0.5mm/sec. Duration : 10 sec on PCB. 	No visible damage $ \Delta R_{25}/R_{25} \leq 5\%$															
Solderability	IEC60068-2-58	245 ± 5°C , 3 ± 0.3 sec	At least 95% of terminal 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

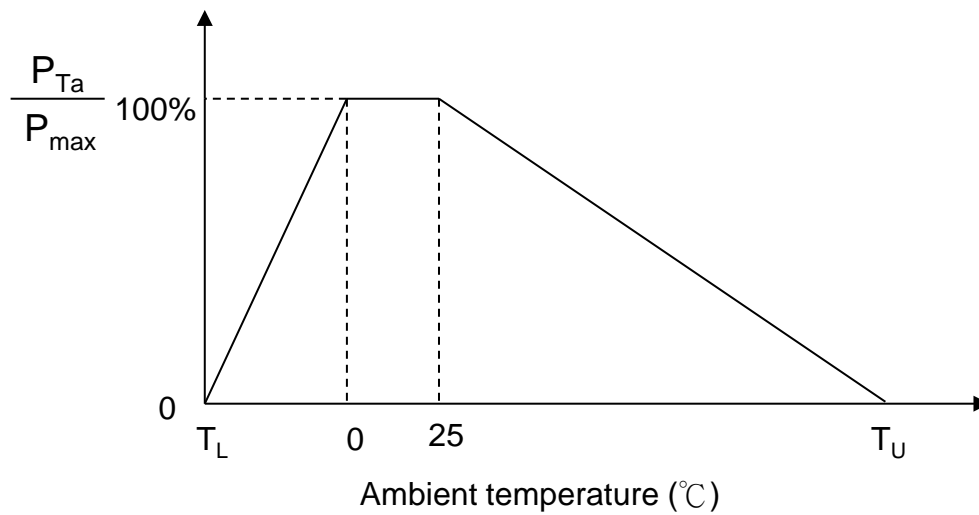
■ IR-Reflow Soldering Profile



■ 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)

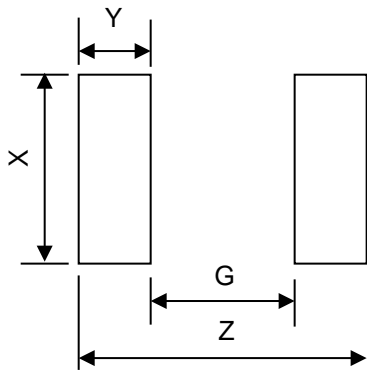
For example :

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

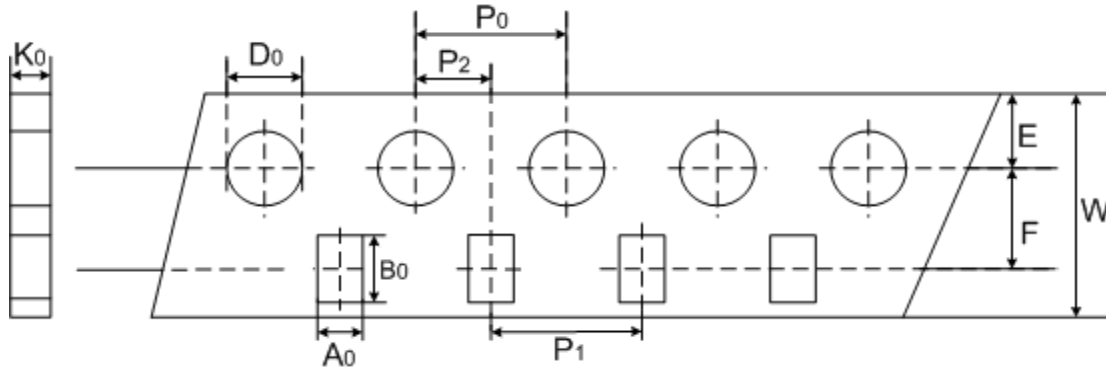
(I) Storage Conditions :

- 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

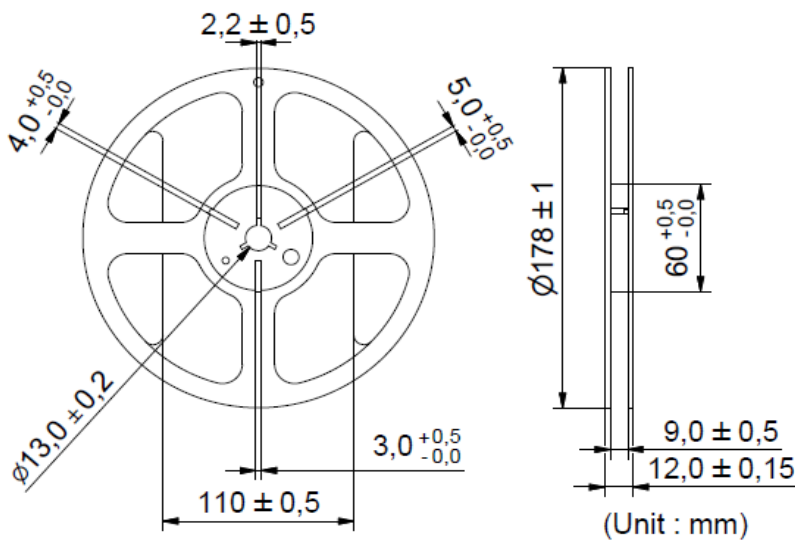
■ Taping Specification (0603 Series)



(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 : TSM1A334)



* 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. : TSM1A334J4153RZA

R25 =330 KOhm ± 5%

B25/85 = 4150 K ± 3%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol.		Resistance Tol.	
				(°C)		(%)	
-40	12,835	11,003	9,408.9	-2.45	2.30	16.6%	-14.5%
-39	12,004	10,311	8,834.3	-2.45	2.30	16.4%	-14.3%
-38	11,234	9,668.2	8,299.7	-2.44	2.29	16.2%	-14.2%
-37	10,519	9,070.4	7,801.5	-2.42	2.28	16.0%	-14.0%
-36	9,854.7	8,513.4	7,336.4	-2.41	2.26	15.8%	-13.8%
-35	9,235.6	7,993.7	6,901.6	-2.39	2.25	15.5%	-13.7%
-34	8,658.4	7,508.3	6,494.6	-2.37	2.23	15.3%	-13.5%
-33	8,119.8	7,054.4	6,113.4	-2.35	2.22	15.1%	-13.3%
-32	7,616.8	6,629.7	5,756.1	-2.32	2.20	14.9%	-13.2%
-31	7,146.9	6,232.2	5,421.1	-2.30	2.18	14.7%	-13.0%
-30	6,707.8	5,860.2	5,106.8	-2.28	2.16	14.5%	-12.9%
-29	6,297.5	5,511.8	4,812.1	-2.26	2.15	14.3%	-12.7%
-28	5,914.1	5,185.7	4,535.7	-2.23	2.13	14.0%	-12.5%
-27	5,555.8	4,880.4	4,276.4	-2.21	2.11	13.8%	-12.4%
-26	5,221.0	4,594.6	4,033.3	-2.19	2.10	13.6%	-12.2%
-25	4,908.1	4,327.1	3,805.3	-2.17	2.08	13.4%	-12.1%
-24	4,615.8	4,076.7	3,591.5	-2.15	2.07	13.2%	-11.9%
-23	4,342.7	3,842.2	3,391.0	-2.13	2.06	13.0%	-11.7%
-22	4,087.4	3,622.8	3,203.0	-2.12	2.04	12.8%	-11.6%
-21	3,848.8	3,417.3	3,026.6	-2.10	2.03	12.6%	-11.4%
-20	3,625.8	3,224.9	2,861.1	-2.08	2.02	12.4%	-11.3%
-19	3,417.2	3,044.6	2,705.8	-2.07	2.00	12.2%	-11.1%
-18	3,222.0	2,875.6	2,560.0	-2.05	1.99	12.0%	-11.0%
-17	3,039.3	2,717.2	2,423.1	-2.03	1.98	11.9%	-10.8%
-16	2,868.2	2,568.5	2,294.4	-2.02	1.97	11.7%	-10.7%
-15	2,707.9	2,429.0	2,173.5	-2.00	1.95	11.5%	-10.5%
-14	2,557.6	2,298.1	2,059.7	-1.98	1.94	11.3%	-10.4%
-13	2,416.6	2,175.0	1,952.6	-1.96	1.92	11.1%	-10.2%
-12	2,284.3	2,059.3	1,851.7	-1.95	1.91	10.9%	-10.1%
-11	2,160.1	1,950.4	1,756.7	-1.93	1.89	10.7%	-9.9%
-10	2,043.3	1,848.0	1,667.1	-1.91	1.87	10.6%	-9.8%
-9	1,933.5	1,751.5	1,582.6	-1.89	1.86	10.4%	-9.6%
-8	1,830.2	1,660.6	1,502.9	-1.87	1.84	10.2%	-9.5%
-7	1,733.0	1,574.8	1,427.6	-1.84	1.82	10.0%	-9.4%
-6	1,641.4	1,494.0	1,356.4	-1.82	1.80	9.9%	-9.2%
-5	1,555.1	1,417.7	1,289.2	-1.80	1.78	9.7%	-9.1%
-4	1,473.8	1,345.7	1,225.6	-1.78	1.76	9.5%	-8.9%
-3	1,397.1	1,277.6	1,165.5	-1.76	1.75	9.4%	-8.8%
-2	1,324.8	1,213.4	1,108.5	-1.73	1.73	9.2%	-8.6%
-1	1,256.5	1,152.6	1,054.7	-1.71	1.71	9.0%	-8.5%

R - T Table

Part No. : TSM1A334J4153RZA

R25 =330 KOhm ± 5%

B25/85 = 4150 K ± 3%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
0	1,192.1	1,095.2	1,003.6	-1.69	1.68	8.8%	-8.4%
1	1,131.2	1,040.8	955.30	-1.66	1.66	8.7%	-8.2%
2	1,073.7	989.44	909.51	-1.64	1.64	8.5%	-8.1%
3	1,019.4	940.80	866.11	-1.62	1.62	8.4%	-7.9%
4	968.05	894.77	824.97	-1.59	1.60	8.2%	-7.8%
5	919.52	851.19	785.97	-1.57	1.58	8.0%	-7.7%
6	873.64	809.93	748.98	-1.54	1.56	7.9%	-7.5%
7	830.26	770.85	713.90	-1.52	1.54	7.7%	-7.4%
8	789.22	733.83	680.62	-1.50	1.52	7.5%	-7.3%
9	750.39	698.75	649.04	-1.47	1.50	7.4%	-7.1%
10	713.65	665.52	619.08	-1.45	1.47	7.2%	-7.0%
11	678.88	634.01	590.63	-1.42	1.45	7.1%	-6.8%
12	645.97	604.15	563.62	-1.40	1.43	6.9%	-6.7%
13	614.81	575.83	537.98	-1.38	1.41	6.8%	-6.6%
14	585.30	548.98	513.63	-1.35	1.39	6.6%	-6.4%
15	557.34	523.51	490.49	-1.33	1.37	6.5%	-6.3%
16	530.86	499.34	468.52	-1.30	1.34	6.3%	-6.2%
17	505.77	476.41	447.63	-1.28	1.32	6.2%	-6.0%
18	481.99	454.64	427.78	-1.26	1.30	6.0%	-5.9%
19	459.44	433.98	408.91	-1.23	1.28	5.9%	-5.8%
20	438.06	414.36	390.96	-1.21	1.26	5.7%	-5.6%
21	417.78	395.72	373.89	-1.18	1.23	5.6%	-5.5%
22	398.54	378.02	357.66	-1.16	1.21	5.4%	-5.4%
23	380.28	361.19	342.21	-1.13	1.19	5.3%	-5.3%
24	362.95	345.20	327.50	-1.11	1.16	5.1%	-5.1%
25	346.50	330.00	313.50	-1.09	1.14	5.0%	-5.0%
26	331.77	315.54	299.36	-1.12	1.18	5.1%	-5.1%
27	317.73	301.79	285.93	-1.16	1.21	5.3%	-5.3%
28	304.36	288.71	273.17	-1.20	1.25	5.4%	-5.4%
29	291.62	276.25	261.04	-1.23	1.28	5.6%	-5.5%
30	279.47	264.40	249.51	-1.27	1.32	5.7%	-5.6%
31	267.89	253.11	238.55	-1.31	1.35	5.8%	-5.8%
32	256.84	242.36	228.12	-1.35	1.39	6.0%	-5.9%
33	246.31	232.11	218.19	-1.39	1.43	6.1%	-6.0%
34	236.25	222.35	208.75	-1.42	1.46	6.3%	-6.1%
35	226.66	213.05	199.76	-1.46	1.50	6.4%	-6.2%
36	217.49	204.18	191.19	-1.50	1.53	6.5%	-6.4%
37	208.75	195.71	183.04	-1.54	1.57	6.7%	-6.5%
38	200.39	187.64	175.27	-1.58	1.61	6.8%	-6.6%
39	192.41	179.94	167.86	-1.62	1.64	6.9%	-6.7%

R - T Table

Part No. : TSM1A334J4153RZA

R25 =330 KOhm ± 5%

B25/85 = 4150 K ± 3%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
40	184.78	172.59	160.81	-1.66	1.68	7.1%	-6.8%
41	177.49	165.58	154.08	-1.70	1.72	7.2%	-6.9%
42	170.52	158.88	147.66	-1.74	1.75	7.3%	-7.1%
43	163.86	152.48	141.54	-1.78	1.79	7.5%	-7.2%
44	157.48	146.37	135.70	-1.82	1.83	7.6%	-7.3%
45	151.39	140.53	130.13	-1.86	1.86	7.7%	-7.4%
46	145.55	134.95	124.81	-1.90	1.90	7.9%	-7.5%
47	139.97	129.62	119.73	-1.94	1.94	8.0%	-7.6%
48	134.62	124.52	114.88	-1.98	1.98	8.1%	-7.7%
49	129.51	119.64	110.25	-2.02	2.01	8.2%	-7.8%
50	124.61	114.98	105.83	-2.06	2.05	8.4%	-8.0%
51	119.92	110.52	101.60	-2.11	2.09	8.5%	-8.1%
52	115.42	106.25	97.565	-2.15	2.13	8.6%	-8.2%
53	111.12	102.17	93.704	-2.19	2.17	8.8%	-8.3%
54	106.99	98.258	90.014	-2.23	2.20	8.9%	-8.4%
55	103.04	94.516	86.485	-2.28	2.24	9.0%	-8.5%
56	99.245	90.934	83.110	-2.32	2.28	9.1%	-8.6%
57	95.611	87.503	79.883	-2.36	2.32	9.3%	-8.7%
58	92.126	84.217	76.795	-2.41	2.36	9.4%	-8.8%
59	88.784	81.069	73.840	-2.45	2.40	9.5%	-8.9%
60	85.579	78.054	71.012	-2.50	2.44	9.6%	-9.0%
61	82.503	75.164	68.305	-2.54	2.48	9.8%	-9.1%
62	79.553	72.394	65.714	-2.58	2.52	9.9%	-9.2%
63	76.721	69.739	63.233	-2.63	2.56	10.0%	-9.3%
64	74.003	67.193	60.857	-2.68	2.60	10.1%	-9.4%
65	71.394	64.752	58.581	-2.72	2.64	10.3%	-9.5%
66	68.889	62.411	56.401	-2.77	2.68	10.4%	-9.6%
67	66.483	60.165	54.312	-2.81	2.72	10.5%	-9.7%
68	64.172	58.011	52.310	-2.86	2.76	10.6%	-9.8%
69	61.953	55.943	50.391	-2.91	2.80	10.7%	-9.9%
70	59.820	53.959	48.551	-2.95	2.84	10.9%	-10.0%
71	57.771	52.055	46.787	-3.00	2.88	11.0%	-10.1%
72	55.802	50.226	45.095	-3.05	2.92	11.1%	-10.2%
73	53.909	48.470	43.472	-3.10	2.96	11.2%	-10.3%
74	52.088	46.784	41.915	-3.15	3.01	11.3%	-10.4%
75	50.338	45.165	40.421	-3.19	3.05	11.5%	-10.5%
76	48.655	43.608	38.987	-3.24	3.09	11.6%	-10.6%
77	47.036	42.113	37.611	-3.29	3.13	11.7%	-10.7%
78	45.478	40.676	36.290	-3.34	3.17	11.8%	-10.8%
79	43.979	39.295	35.021	-3.39	3.22	11.9%	-10.9%

R - T Table

Part No. : TSM1A334J4153RZA

R25 =330 KOhm ± 5%

B25/85 = 4150 K ± 3%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
80	42.537	37.966	33.803	-3.44	3.26	12.0%	-11.0%
81	41.148	36.689	32.632	-3.49	3.30	12.2%	-11.1%
82	39.811	35.461	31.507	-3.54	3.35	12.3%	-11.1%
83	38.523	34.279	30.426	-3.59	3.39	12.4%	-11.2%
84	37.284	33.142	29.388	-3.64	3.43	12.5%	-11.3%
85	36.089	32.048	28.389	-3.69	3.48	12.6%	-11.4%
86	34.938	30.995	27.429	-3.74	3.52	12.7%	-11.5%
87	33.830	29.982	26.505	-3.80	3.56	12.8%	-11.6%
88	32.761	29.006	25.617	-3.85	3.61	12.9%	-11.7%
89	31.731	28.066	24.762	-3.90	3.65	13.1%	-11.8%
90	30.737	27.161	23.940	-3.95	3.69	13.2%	-11.9%
91	29.780	26.289	23.149	-4.00	3.74	13.3%	-11.9%
92	28.856	25.448	22.387	-4.06	3.78	13.4%	-12.0%
93	27.965	24.639	21.654	-4.11	3.82	13.5%	-12.1%
94	27.105	23.858	20.948	-4.16	3.87	13.6%	-12.2%
95	26.276	23.106	20.267	-4.21	3.91	13.7%	-12.3%
96	25.475	22.380	19.612	-4.27	3.96	13.8%	-12.4%
97	24.702	21.681	18.981	-4.32	4.00	13.9%	-12.5%
98	23.956	21.006	18.373	-4.37	4.04	14.0%	-12.5%
99	23.235	20.355	17.787	-4.43	4.09	14.2%	-12.6%
100	22.540	19.727	17.222	-4.48	4.13	14.3%	-12.7%
101	21.867	19.120	16.677	-4.53	4.18	14.4%	-12.8%
102	21.218	18.535	16.151	-4.59	4.22	14.5%	-12.9%
103	20.591	17.971	15.645	-4.64	4.27	14.6%	-12.9%
104	19.985	17.426	15.156	-4.69	4.31	14.7%	-13.0%
105	19.399	16.899	14.685	-4.75	4.36	14.8%	-13.1%
106	18.832	16.391	14.230	-4.80	4.40	14.9%	-13.2%
107	18.285	15.900	13.791	-4.86	4.45	15.0%	-13.3%
108	17.756	15.425	13.368	-4.91	4.49	15.1%	-13.3%
109	17.244	14.967	12.959	-4.97	4.54	15.2%	-13.4%
110	16.748	14.524	12.564	-5.02	4.58	15.3%	-13.5%
111	16.270	14.096	12.183	-5.08	4.63	15.4%	-13.6%
112	15.806	13.683	11.815	-5.13	4.67	15.5%	-13.7%
113	15.358	13.283	11.459	-5.19	4.72	15.6%	-13.7%
114	14.924	12.896	11.116	-5.25	4.76	15.7%	-13.8%
115	14.504	12.522	10.784	-5.30	4.81	15.8%	-13.9%
116	14.098	12.161	10.464	-5.36	4.85	15.9%	-14.0%
117	13.705	11.811	10.154	-5.42	4.90	16.0%	-14.0%
118	13.324	11.473	9.8545	-5.47	4.95	16.1%	-14.1%
119	12.955	11.146	9.5652	-5.53	4.99	16.2%	-14.2%

