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**SPECIFICATION FOR APPROVAL**

CUSTOMER	Codico
CERTIFIED MODEL/TYPE	TSM2A334
PART NO.	TSM2A334J4103RZ (RoHS+HF)
APPLICATION	
CUSTOMER P/N	
ISSUE DATE	Mar. 11, 2016
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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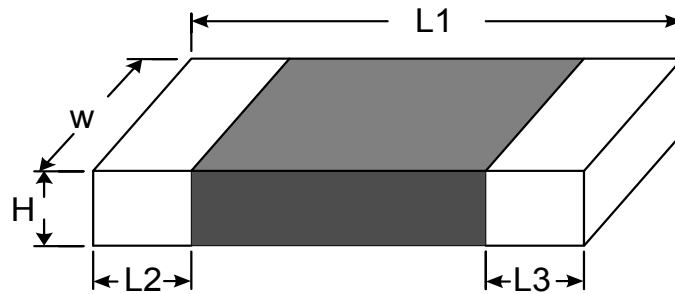
Part Number Code

Example :

TSM **2** **A** **334** **J** **410** **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)	2	0805
(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	410	4100K
(7)	Tolerance of B Value	3	± 3%
(8)	Packaging	R	Reel
(9)	Optional Suffix	Z	RoHS+HF compliance

Structure and Dimensions



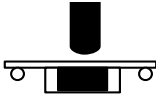
(unit : mm)

L1	W	H max.	L2 and L3
2.00±0.20	1.25±0.20	1.00	0.40±0.20

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)
TSM2A334J4103RZ	330	5	4100	3	240	Approx. 2.4	Approx. 5.4	-40 ~ +125

Reliability

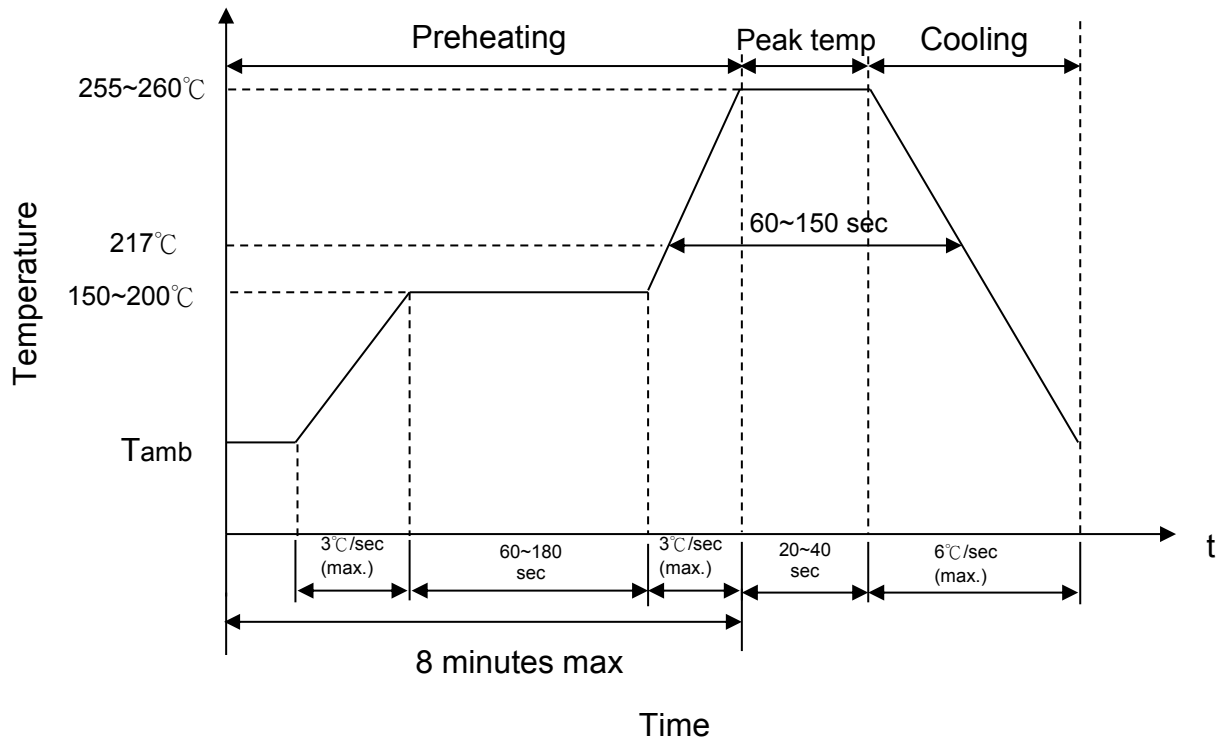
Item	Standard	Test conditions / Methods	Specifications															
Bending Strength	IEC 60068-2-21	Warp : 2mm ; Speed < 0.5mm/sec. Duration : 10 sec on PCB. 	No visible damage $ \Delta R_{25}/R_{25} \leq 5\%$															
Solderability	IEC60068-2-58	245 ± 5°C , 3 ± 0.3 sec	At least 95% of terminal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

Soldering Recommendation

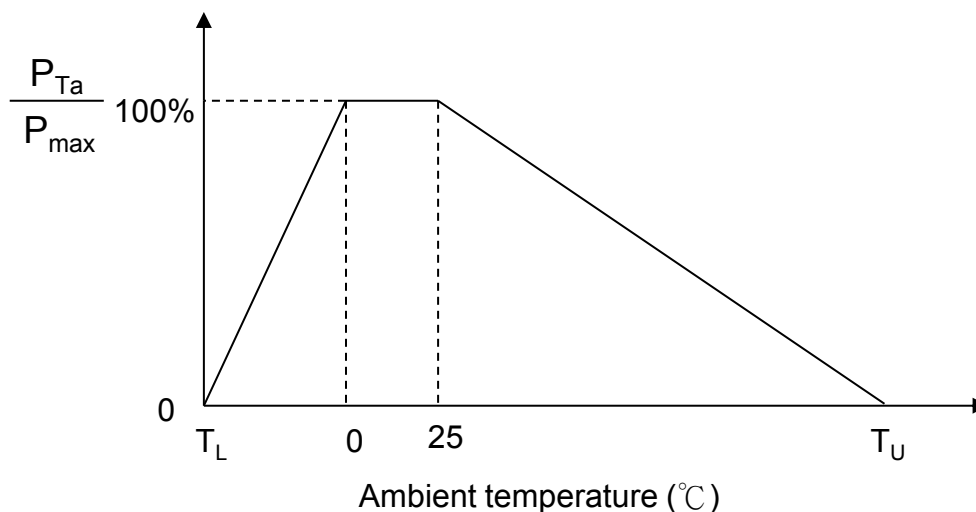
■ IR-Reflow Soldering Profile



■ 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)

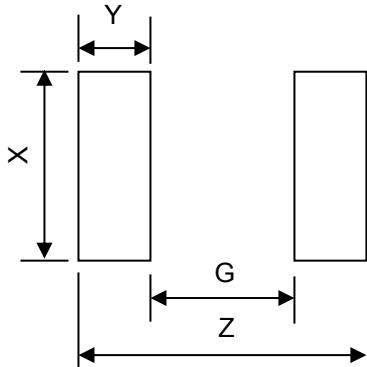
For example :

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)	0805
Z	3.4 mm
G	1.0 mm
X	1.4 mm
Y	1.2 mm

RoHS Compliant Declaration

We hereby declare that the components delivered to your company are compliant with RoHS directive 2011/65/EU.

Warehouse Storage Conditions of Products

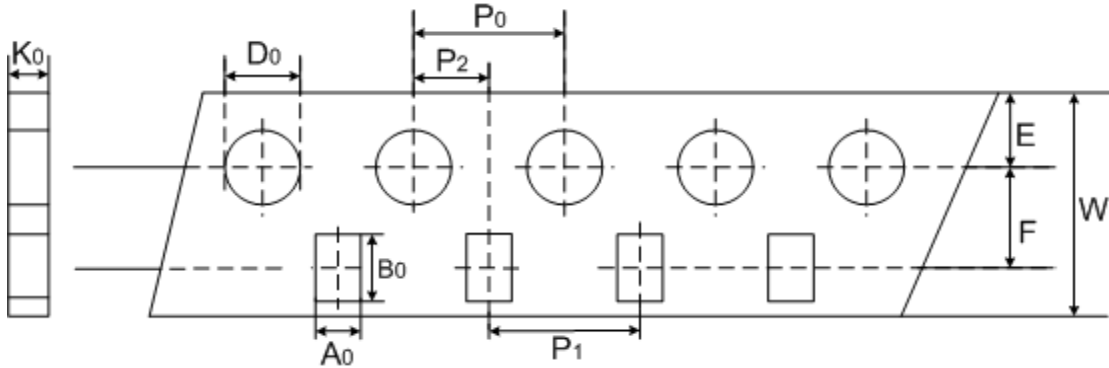
(I) Storage Conditions :

- 1.Storage Temperature : $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$
- 2.Relative Humidity : $\leq 75\% \text{RH}$
- 3.Keep away from corrosive atmosphere and sunlight.

(II) Period of Storage : 1 year

Packaging

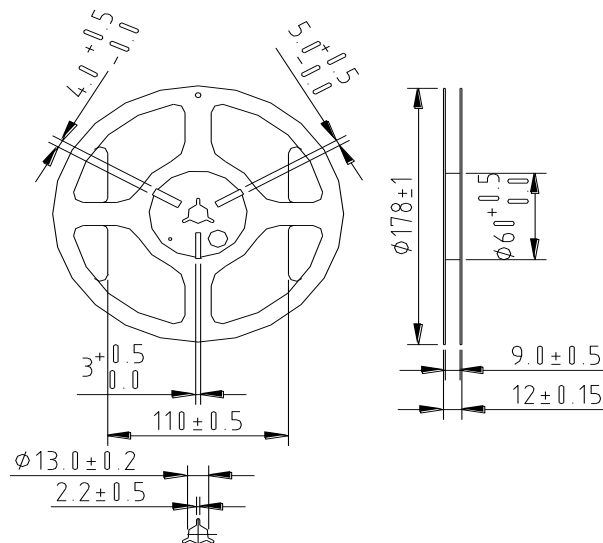
■ Taping Specification (0805 Series)



(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
0805	1.5	2.3	8	1.75	3.5	4	2	4	1.55	1

■ Quantity (3500 pcs / reel)



Safety Approvals (Certified Model/Type : TSM2A334)



* UL 1434 / cUL recognized (File # E138827)



* TÜV recognized (File # R 50167657)



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

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. : TSM2A334J4103RZ

R25 = 330 KΩ ± 5%

B25/85 = 4100 K ± 3%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol.		Resistance Tol.	
				(°C)		(%)	
-40	12,992	11,134	9,517.4	-2.48	2.31	16.7%	-14.5%
-39	12,152	10,434	8,937.1	-2.46	2.29	16.5%	-14.4%
-38	11,370	9,781.8	8,394.3	-2.43	2.28	16.2%	-14.2%
-37	10,642	9,172.7	7,886.8	-2.41	2.26	16.0%	-14.0%
-36	9,962.9	8,604.2	7,412.2	-2.39	2.25	15.8%	-13.9%
-35	9,330.6	8,073.5	6,968.3	-2.37	2.23	15.6%	-13.7%
-34	8,741.4	7,578.1	6,553.2	-2.35	2.22	15.4%	-13.5%
-33	8,192.3	7,115.5	6,164.8	-2.33	2.20	15.1%	-13.4%
-32	7,680.5	6,683.5	5,801.4	-2.31	2.19	14.9%	-13.2%
-31	7,203.2	6,279.9	5,461.2	-2.29	2.17	14.7%	-13.0%
-30	6,758.0	5,902.7	5,142.8	-2.27	2.16	14.5%	-12.9%
-29	6,342.6	5,550.1	4,844.5	-2.25	2.14	14.3%	-12.7%
-28	5,954.9	5,220.4	4,565.1	-2.23	2.13	14.1%	-12.6%
-27	5,592.9	4,912.1	4,303.4	-2.21	2.11	13.9%	-12.4%
-26	5,254.9	4,623.6	4,058.0	-2.19	2.10	13.7%	-12.2%
-25	4,939.2	4,353.7	3,828.0	-2.17	2.08	13.4%	-12.1%
-24	4,644.2	4,101.0	3,612.3	-2.15	2.07	13.2%	-11.9%
-23	4,368.4	3,864.3	3,409.9	-2.13	2.05	13.0%	-11.8%
-22	4,110.5	3,642.7	3,220.0	-2.11	2.04	12.8%	-11.6%
-21	3,869.4	3,435.0	3,041.8	-2.09	2.02	12.6%	-11.4%
-20	3,643.8	3,240.4	2,874.5	-2.07	2.01	12.4%	-11.3%
-19	3,432.6	3,057.9	2,717.4	-2.05	1.99	12.3%	-11.1%
-18	3,235.0	2,886.8	2,569.7	-2.03	1.98	12.1%	-11.0%
-17	3,049.8	2,726.3	2,431.0	-2.02	1.96	11.9%	-10.8%
-16	2,876.4	2,575.7	2,300.6	-2.00	1.94	11.7%	-10.7%
-15	2,713.9	2,434.2	2,178.0	-1.98	1.93	11.5%	-10.5%
-14	2,561.5	2,301.4	2,062.6	-1.96	1.91	11.3%	-10.4%
-13	2,418.6	2,176.7	1,954.0	-1.94	1.90	11.1%	-10.2%
-12	2,284.5	2,059.4	1,851.9	-1.92	1.88	10.9%	-10.1%
-11	2,158.6	1,949.2	1,755.6	-1.90	1.87	10.7%	-9.9%
-10	2,040.5	1,845.5	1,665.0	-1.88	1.85	10.6%	-9.8%
-9	1,929.5	1,748.0	1,579.6	-1.86	1.83	10.4%	-9.6%
-8	1,825.2	1,656.2	1,499.0	-1.84	1.82	10.2%	-9.5%
-7	1,727.2	1,569.7	1,423.1	-1.82	1.80	10.0%	-9.3%
-6	1,635.0	1,488.3	1,351.4	-1.80	1.78	9.9%	-9.2%
-5	1,548.2	1,411.6	1,283.8	-1.78	1.77	9.7%	-9.1%
-4	1,466.6	1,339.3	1,220.0	-1.76	1.75	9.5%	-8.9%
-3	1,389.8	1,271.1	1,159.7	-1.74	1.73	9.3%	-8.8%
-2	1,317.4	1,206.8	1,102.7	-1.72	1.71	9.2%	-8.6%
-1	1,249.2	1,146.1	1,048.8	-1.70	1.70	9.0%	-8.5%

R - T Table

Part No. : TSM2A334J4103RZ

R25 =330 KOhm ± 5%

B25/85 = 4100 K ± 3%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
0	1,184.9	1,088.7	997.92	-1.68	1.68	8.8%	-8.3%
1	1,124.2	1,034.6	949.75	-1.66	1.66	8.7%	-8.2%
2	1,067.0	983.46	904.18	-1.63	1.64	8.5%	-8.1%
3	1,013.0	935.12	861.04	-1.61	1.62	8.3%	-7.9%
4	962.09	889.42	820.19	-1.59	1.60	8.2%	-7.8%
5	913.97	846.20	781.50	-1.57	1.58	8.0%	-7.6%
6	868.50	805.30	744.83	-1.55	1.56	7.8%	-7.5%
7	825.54	766.60	710.08	-1.52	1.54	7.7%	-7.4%
8	784.92	729.95	677.13	-1.50	1.52	7.5%	-7.2%
9	746.51	695.25	645.88	-1.48	1.50	7.4%	-7.1%
10	710.18	662.37	616.23	-1.45	1.48	7.2%	-7.0%
11	675.79	631.21	588.10	-1.43	1.46	7.1%	-6.8%
12	643.25	601.67	561.38	-1.41	1.44	6.9%	-6.7%
13	612.43	573.67	536.02	-1.38	1.42	6.8%	-6.6%
14	583.24	547.10	511.92	-1.36	1.40	6.6%	-6.4%
15	555.58	521.90	489.03	-1.34	1.37	6.5%	-6.3%
16	529.37	497.98	467.28	-1.31	1.35	6.3%	-6.2%
17	504.53	475.27	446.59	-1.29	1.33	6.2%	-6.0%
18	480.97	453.71	426.93	-1.26	1.31	6.0%	-5.9%
19	458.62	433.23	408.22	-1.24	1.29	5.9%	-5.8%
20	437.42	413.78	390.43	-1.22	1.26	5.7%	-5.6%
21	417.30	395.29	373.49	-1.19	1.24	5.6%	-5.5%
22	398.21	377.71	357.38	-1.17	1.22	5.4%	-5.4%
23	380.08	361.00	342.03	-1.14	1.19	5.3%	-5.3%
24	362.86	345.11	327.42	-1.12	1.17	5.1%	-5.1%
25	346.50	330.00	313.50	-1.09	1.15	5.0%	-5.0%
26	331.84	315.62	299.44	-1.13	1.18	5.1%	-5.1%
27	317.88	301.94	286.08	-1.17	1.22	5.3%	-5.3%
28	304.57	288.91	273.37	-1.20	1.25	5.4%	-5.4%
29	291.88	276.51	261.29	-1.24	1.29	5.6%	-5.5%
30	279.78	264.70	249.81	-1.28	1.32	5.7%	-5.6%
31	268.24	253.45	238.88	-1.31	1.36	5.8%	-5.7%
32	257.23	242.74	228.49	-1.35	1.40	6.0%	-5.9%
33	246.73	232.53	218.59	-1.39	1.43	6.1%	-6.0%
34	236.71	222.80	209.18	-1.43	1.47	6.2%	-6.1%
35	227.14	213.52	200.21	-1.47	1.50	6.4%	-6.2%
36	218.01	204.67	191.67	-1.51	1.54	6.5%	-6.4%
37	209.29	196.24	183.54	-1.55	1.58	6.7%	-6.5%
38	200.96	188.19	175.79	-1.59	1.61	6.8%	-6.6%
39	193.00	180.51	168.41	-1.63	1.65	6.9%	-6.7%

R - T Table

Part No. : TSM2A334J4103RZ

R25 =330 KOhm \pm 5%B25/85 = 4100 K \pm 3%

Temperature (°C)	Rmax. (K Ω)	Rnor. (K Ω)	Rmin. (K Ω)	Temperature Tol. (°C)		Resistance Tol. (%)	
40	185.39	173.18	161.37	-1.67	1.69	7.1%	-6.8%
41	178.13	166.19	154.67	-1.71	1.73	7.2%	-6.9%
42	171.18	159.51	148.27	-1.75	1.76	7.3%	-7.0%
43	164.54	153.14	142.17	-1.79	1.80	7.4%	-7.2%
44	158.19	147.05	136.35	-1.83	1.84	7.6%	-7.3%
45	152.12	141.23	130.80	-1.87	1.88	7.7%	-7.4%
46	146.31	135.67	125.50	-1.91	1.92	7.8%	-7.5%
47	140.75	130.36	120.44	-1.96	1.95	8.0%	-7.6%
48	135.43	125.29	115.61	-2.00	1.99	8.1%	-7.7%
49	130.34	120.43	111.00	-2.04	2.03	8.2%	-7.8%
50	125.46	115.79	106.60	-2.08	2.07	8.4%	-7.9%
51	120.79	111.35	102.39	-2.13	2.11	8.5%	-8.0%
52	116.32	107.10	98.369	-2.17	2.15	8.6%	-8.2%
53	112.03	103.04	94.525	-2.21	2.19	8.7%	-8.3%
54	107.93	99.146	90.851	-2.26	2.23	8.9%	-8.4%
55	103.99	95.422	87.338	-2.30	2.27	9.0%	-8.5%
56	100.22	91.856	83.978	-2.35	2.31	9.1%	-8.6%
57	96.604	88.440	80.764	-2.39	2.35	9.2%	-8.7%
58	93.136	85.169	77.689	-2.44	2.39	9.4%	-8.8%
59	89.810	82.035	74.746	-2.48	2.43	9.5%	-8.9%
60	86.618	79.031	71.928	-2.53	2.47	9.6%	-9.0%
61	83.556	76.152	69.231	-2.57	2.51	9.7%	-9.1%
62	80.617	73.392	66.648	-2.62	2.55	9.8%	-9.2%
63	77.795	70.745	64.174	-2.66	2.59	10.0%	-9.3%
64	75.086	68.207	61.803	-2.71	2.63	10.1%	-9.4%
65	72.484	65.772	59.532	-2.76	2.67	10.2%	-9.5%
66	69.985	63.435	57.355	-2.80	2.71	10.3%	-9.6%
67	67.584	61.193	55.268	-2.85	2.75	10.4%	-9.7%
68	65.277	59.040	53.266	-2.90	2.79	10.6%	-9.8%
69	63.059	56.974	51.347	-2.94	2.84	10.7%	-9.9%
70	60.928	54.989	49.506	-2.99	2.88	10.8%	-10.0%
71	58.878	53.083	47.739	-3.04	2.92	10.9%	-10.1%
72	56.907	51.252	46.044	-3.09	2.96	11.0%	-10.2%
73	55.011	49.493	44.417	-3.14	3.00	11.1%	-10.3%
74	53.187	47.802	42.854	-3.18	3.04	11.3%	-10.3%
75	51.432	46.176	41.354	-3.23	3.09	11.4%	-10.4%
76	49.742	44.613	39.913	-3.28	3.13	11.5%	-10.5%
77	48.116	43.111	38.529	-3.33	3.17	11.6%	-10.6%
78	46.550	41.665	37.199	-3.38	3.21	11.7%	-10.7%
79	45.043	40.275	35.921	-3.43	3.25	11.8%	-10.8%

R - T Table

Part No. : TSM2A334J4103RZ

R25 =330 KOhm ± 5%

B25/85 = 4100 K ± 3%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
80	43.591	38.937	34.693	-3.48	3.30	12.0%	-10.9%
81	42.192	37.649	33.512	-3.53	3.34	12.1%	-11.0%
82	40.844	36.410	32.376	-3.58	3.38	12.2%	-11.1%
83	39.545	35.217	31.284	-3.63	3.42	12.3%	-11.2%
84	38.293	34.068	30.233	-3.68	3.47	12.4%	-11.3%
85	37.086	32.962	29.222	-3.73	3.51	12.5%	-11.3%
86	35.923	31.896	28.250	-3.78	3.55	12.6%	-11.4%
87	34.800	30.869	27.314	-3.83	3.59	12.7%	-11.5%
88	33.718	29.880	26.413	-3.88	3.64	12.8%	-11.6%
89	32.674	28.927	25.545	-3.93	3.68	13.0%	-11.7%
90	31.667	28.008	24.710	-3.98	3.72	13.1%	-11.8%
91	30.695	27.122	23.905	-4.03	3.77	13.2%	-11.9%
92	29.757	26.268	23.130	-4.08	3.81	13.3%	-11.9%
93	28.851	25.444	22.383	-4.14	3.85	13.4%	-12.0%
94	27.977	24.650	21.664	-4.19	3.90	13.5%	-12.1%
95	27.133	23.883	20.970	-4.24	3.94	13.6%	-12.2%
96	26.318	23.144	20.302	-4.29	3.98	13.7%	-12.3%
97	25.530	22.431	19.658	-4.35	4.03	13.8%	-12.4%
98	24.770	21.742	19.036	-4.40	4.07	13.9%	-12.4%
99	24.035	21.077	18.437	-4.45	4.12	14.0%	-12.5%
100	23.325	20.436	17.860	-4.50	4.16	14.1%	-12.6%
101	22.639	19.817	17.302	-4.56	4.20	14.2%	-12.7%
102	21.976	19.218	16.765	-4.61	4.25	14.3%	-12.8%
103	21.335	18.641	16.246	-4.66	4.29	14.5%	-12.8%
104	20.716	18.083	15.745	-4.72	4.34	14.6%	-12.9%
105	20.116	17.544	15.262	-4.77	4.38	14.7%	-13.0%
106	19.537	17.023	14.796	-4.83	4.43	14.8%	-13.1%
107	18.977	16.520	14.346	-4.88	4.47	14.9%	-13.2%
108	18.435	16.034	13.911	-4.94	4.52	15.0%	-13.2%
109	17.911	15.564	13.492	-4.99	4.56	15.1%	-13.3%
110	17.404	15.110	13.086	-5.05	4.61	15.2%	-13.4%
111	16.913	14.671	12.695	-5.11	4.66	15.3%	-13.5%
112	16.438	14.247	12.317	-5.16	4.70	15.4%	-13.5%
113	15.979	13.837	11.952	-5.22	4.75	15.5%	-13.6%
114	15.534	13.440	11.599	-5.28	4.80	15.6%	-13.7%
115	15.104	13.056	11.258	-5.34	4.85	15.7%	-13.8%
116	14.687	12.685	10.928	-5.39	4.89	15.8%	-13.8%
117	14.284	12.326	10.610	-5.45	4.94	15.9%	-13.9%
118	13.893	11.979	10.302	-5.51	4.99	16.0%	-14.0%
119	13.515	11.643	10.005	-5.57	5.04	16.1%	-14.1%

