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**SPECIFICATION FOR APPROVAL**

CUSTOMER	Codico
CERTIFIED MODEL/TYPE	TSM1A103
PART NO.	TSM1A103H34D1RZ (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



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

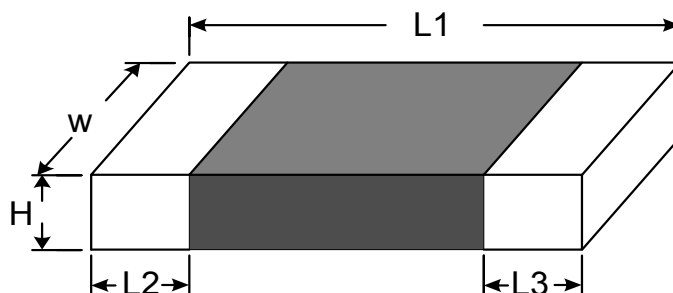
Part Number Code

Example :

**TSM** **1** **A** **103** **H** **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 <sub>25/85</sub>
(4)	Zero Power Resistance at 25°C (R <sub>25</sub> )	103	10 x 10 <sup>3</sup> Ω = 10 KΩ
(5)	Tolerance of R <sub>25</sub>	H	± 3%
(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



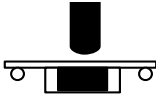
( unit : mm )

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 <sub>25</sub>	B <sub>25/85</sub> Value	Tolerance of B Value	Max. Power Dissipation at 25°C	Dissipation Factor	Thermal Time Constant	Operating Temperature Range
	R <sub>25</sub> (KΩ)	(± %)	(K)	(± %)	P <sub>max</sub> (mW)	δ (mW/°C)	τ (sec.)	T <sub>L</sub> ~T <sub>U</sub> (°C)
TSM1A103H34D1RZ	10	3	3435	1	210	Approx. 2.1	Approx. 3.1	-40 ~ +125

Reliability

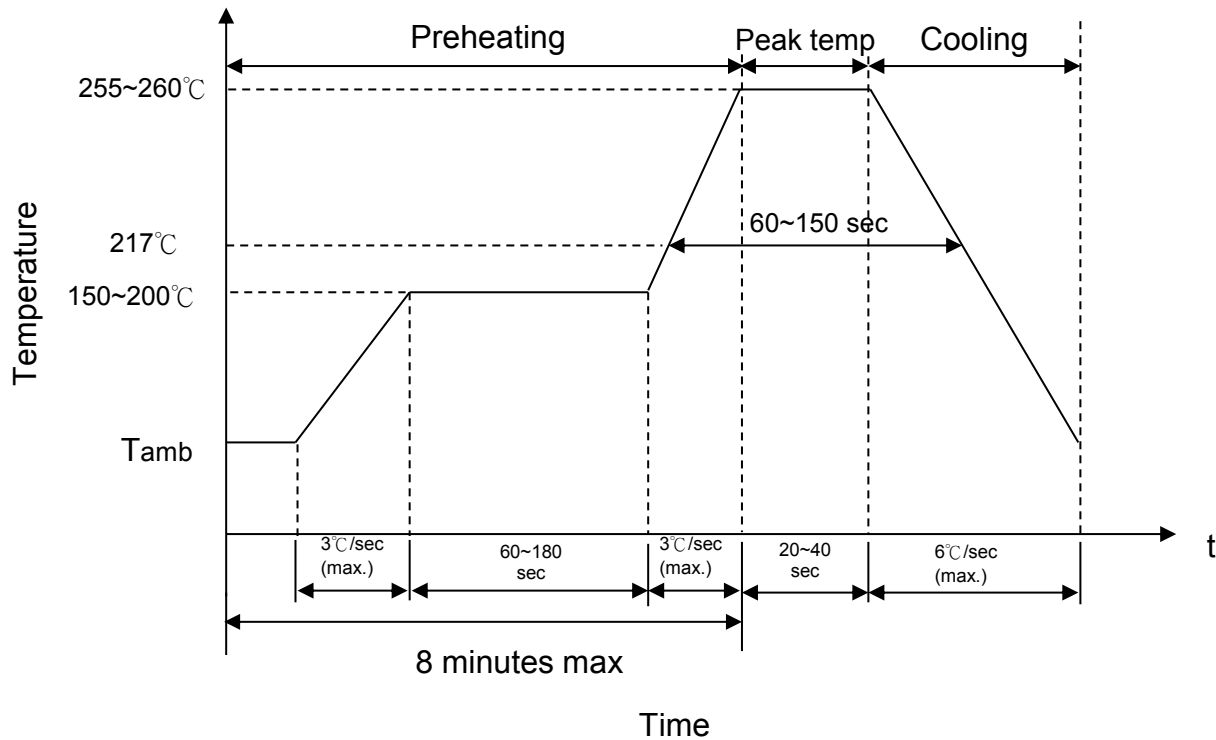
Item	Standard	Test conditions / Methods	Specifications															
Bending Strength	IEC 60068-2-21	Warp : 2mm ; Speed < 0.5mm/sec. Duration : 10 sec on PCB. 	No visible damage $ \Delta R_{25}/R_{25}  \leq 5\%$															
Solderability	IEC60068-2-58	245 ± 5°C , 3 ± 0.3 sec	At least 95% of terminal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

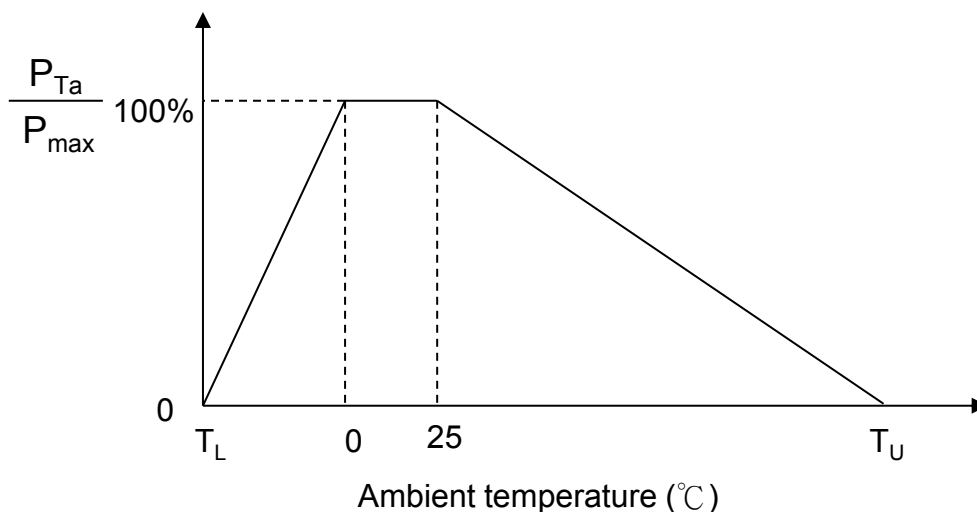
### ■ IR-Reflow Soldering Profile



### ■ 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 :

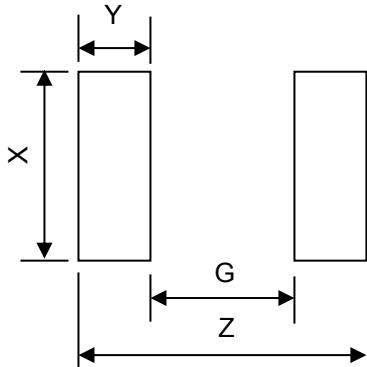
Ambient temperature( $T_a$ )=55°C

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)	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 2011/65/EU.

Warehouse Storage Conditions of Products

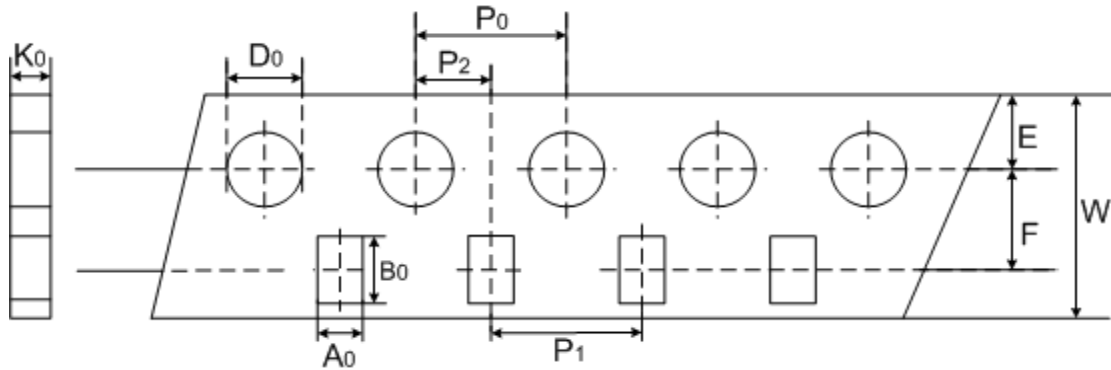
(I) Storage Conditions :

- 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

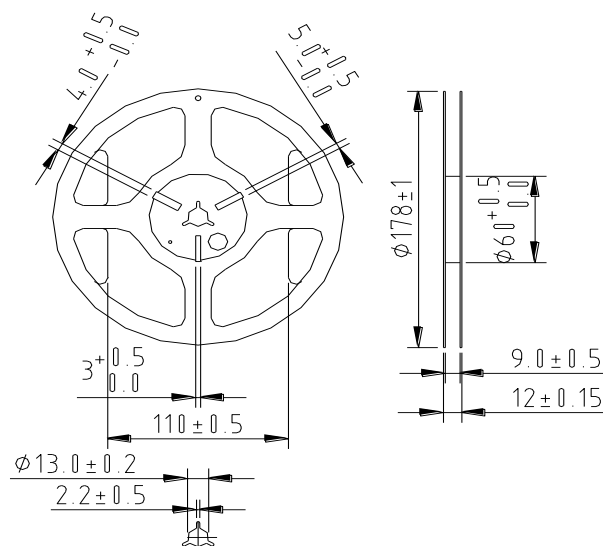
### ■ Taping Specification ( 0603 Series)



(Unit : mm)

Index	$A_0$	$B_0$	$W$	$E$	$F$	$P_1$	$P_2$	$P_0$	$D_0$	$K_0$
Size	$\pm 0.2$	$\pm 0.2$	$\pm 0.2$	$\pm 0.1$	$\pm 0.05$	$\pm 0.1$	$\pm 0.05$	$\pm 0.1$	$\pm 0.1$	$\pm 0.1$
0603	1.1	1.9	8	1.75	3.5	4	2	4	1.55	0.95

### ■ Quantity ( 4000 pcs / reel )



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**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) 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. : TSM1A103H34D1RZ

R25 = 10 KOhm ± 3%  
B25/85 = 3435 K ± 1%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol.		Resistance Tol.	
				(°C)		(%)	
-40	217.06	204.47	192.44	-1.05	1.07	6.2%	-5.9%
-39	205.04	193.26	182.00	-1.05	1.07	6.1%	-5.8%
-38	193.80	182.76	172.20	-1.05	1.07	6.0%	-5.8%
-37	183.25	172.91	163.01	-1.05	1.07	6.0%	-5.7%
-36	173.34	163.65	154.37	-1.05	1.07	5.9%	-5.7%
-35	164.03	154.94	146.23	-1.04	1.06	5.9%	-5.6%
-34	155.26	146.74	138.57	-1.04	1.06	5.8%	-5.6%
-33	147.01	139.02	131.34	-1.03	1.05	5.7%	-5.5%
-32	139.23	131.73	124.53	-1.03	1.05	5.7%	-5.5%
-31	131.90	124.87	118.10	-1.02	1.04	5.6%	-5.4%
-30	124.99	118.39	112.03	-1.02	1.04	5.6%	-5.4%
-29	118.48	112.28	106.31	-1.01	1.04	5.5%	-5.3%
-28	112.33	106.51	100.90	-1.01	1.03	5.5%	-5.3%
-27	106.54	101.07	95.795	-1.00	1.03	5.4%	-5.2%
-26	101.07	95.932	90.974	-1.00	1.02	5.4%	-5.2%
-25	95.911	91.083	86.420	-1.00	1.02	5.3%	-5.1%
-24	91.043	86.505	82.118	-0.99	1.01	5.2%	-5.1%
-23	86.449	82.182	78.055	-0.99	1.01	5.2%	-5.0%
-22	82.114	78.100	74.216	-0.98	1.01	5.1%	-5.0%
-21	78.021	74.245	70.588	-0.98	1.00	5.1%	-4.9%
-20	74.157	70.603	67.160	-0.98	1.00	5.0%	-4.9%
-19	70.508	67.163	63.919	-0.97	1.00	5.0%	-4.8%
-18	67.061	63.911	60.854	-0.97	0.99	4.9%	-4.8%
-17	63.804	60.838	57.956	-0.97	0.99	4.9%	-4.7%
-16	60.727	57.932	55.215	-0.96	0.99	4.8%	-4.7%
-15	57.818	55.183	52.621	-0.96	0.99	4.8%	-4.6%
-14	55.067	52.583	50.166	-0.96	0.98	4.7%	-4.6%
-13	52.465	50.123	47.842	-0.95	0.98	4.7%	-4.6%
-12	50.004	47.794	45.640	-0.95	0.98	4.6%	-4.5%
-11	47.673	45.588	43.555	-0.95	0.97	4.6%	-4.5%
-10	45.467	43.499	41.578	-0.94	0.97	4.5%	-4.4%
-9	43.377	41.518	39.704	-0.94	0.97	4.5%	-4.4%
-8	41.397	39.641	37.926	-0.94	0.96	4.4%	-4.3%
-7	39.519	37.861	36.239	-0.93	0.96	4.4%	-4.3%
-6	37.739	36.172	34.638	-0.93	0.96	4.3%	-4.2%
-5	36.050	34.569	33.118	-0.92	0.95	4.3%	-4.2%
-4	34.447	33.047	31.674	-0.92	0.95	4.2%	-4.2%
-3	32.926	31.601	30.302	-0.92	0.95	4.2%	-4.1%
-2	31.480	30.227	28.998	-0.91	0.94	4.1%	-4.1%
-1	30.107	28.921	27.757	-0.91	0.94	4.1%	-4.0%

R-T Table

Part No. : TSM1A103H34D1RZ

R25 =10 KOhm ± 3%  
B25/85 = 3435 K ± 1%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
0	28.802	27.680	26.577	-0.90	0.93	4.1%	-4.0%
1	27.561	26.499	25.454	-0.90	0.93	4.0%	-3.9%
2	26.381	25.375	24.385	-0.89	0.92	4.0%	-3.9%
3	25.257	24.305	23.367	-0.89	0.92	3.9%	-3.9%
4	24.188	23.286	22.398	-0.89	0.92	3.9%	-3.8%
5	23.171	22.316	21.473	-0.88	0.91	3.8%	-3.8%
6	22.201	21.391	20.592	-0.88	0.91	3.8%	-3.7%
7	21.278	20.510	19.752	-0.87	0.90	3.7%	-3.7%
8	20.398	19.670	18.951	-0.87	0.90	3.7%	-3.7%
9	19.558	18.869	18.187	-0.86	0.89	3.7%	-3.6%
10	18.758	18.104	17.457	-0.86	0.89	3.6%	-3.6%
11	17.995	17.375	16.761	-0.85	0.88	3.6%	-3.5%
12	17.267	16.679	16.096	-0.85	0.88	3.5%	-3.5%
13	16.572	16.014	15.461	-0.84	0.87	3.5%	-3.5%
14	15.909	15.379	14.854	-0.83	0.87	3.4%	-3.4%
15	15.276	14.773	14.274	-0.83	0.86	3.4%	-3.4%
16	14.671	14.194	13.720	-0.82	0.86	3.4%	-3.3%
17	14.093	13.640	13.190	-0.82	0.85	3.3%	-3.3%
18	13.541	13.111	12.683	-0.81	0.85	3.3%	-3.3%
19	13.014	12.605	12.199	-0.81	0.84	3.2%	-3.2%
20	12.509	12.122	11.735	-0.80	0.83	3.2%	-3.2%
21	12.027	11.659	11.292	-0.80	0.83	3.2%	-3.1%
22	11.566	11.217	10.868	-0.79	0.82	3.1%	-3.1%
23	11.125	10.793	10.461	-0.78	0.82	3.1%	-3.1%
24	10.704	10.388	10.072	-0.78	0.81	3.0%	-3.0%
25	10.300	10.000	9.7000	-0.77	0.81	3.0%	-3.0%
26	9.9213	9.6286	9.3362	-0.79	0.82	3.0%	-3.0%
27	9.5584	9.2730	8.9881	-0.80	0.84	3.1%	-3.1%
28	9.2108	8.9325	8.6547	-0.82	0.85	3.1%	-3.1%
29	8.8777	8.6062	8.3355	-0.83	0.87	3.2%	-3.1%
30	8.5585	8.2937	8.0298	-0.85	0.88	3.2%	-3.2%
31	8.2524	7.9941	7.7369	-0.86	0.90	3.2%	-3.2%
32	7.9589	7.7070	7.4564	-0.88	0.91	3.3%	-3.3%
33	7.6775	7.4318	7.1875	-0.89	0.93	3.3%	-3.3%
34	7.4076	7.1679	6.9298	-0.91	0.94	3.3%	-3.3%
35	7.1486	6.9148	6.6827	-0.92	0.96	3.4%	-3.4%
36	6.9001	6.6721	6.4458	-0.94	0.97	3.4%	-3.4%
37	6.6616	6.4392	6.2186	-0.96	0.99	3.5%	-3.4%
38	6.4327	6.2157	6.0006	-0.97	1.00	3.5%	-3.5%
39	6.2129	6.0012	5.7916	-0.99	1.02	3.5%	-3.5%

R-T Table

Part No. : TSM1A103H34D1RZ

R25 =10 KOhm ± 3%  
B25/85 = 3435 K ± 1%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
40	6.0019	5.7954	5.5909	-1.00	1.03	3.6%	-3.5%
41	5.7992	5.5977	5.3983	-1.02	1.05	3.6%	-3.6%
42	5.6044	5.4079	5.2135	-1.04	1.07	3.6%	-3.6%
43	5.4173	5.2255	5.0360	-1.05	1.08	3.7%	-3.6%
44	5.2375	5.0504	4.8655	-1.07	1.10	3.7%	-3.7%
45	5.0647	4.8820	4.7017	-1.09	1.11	3.7%	-3.7%
46	4.8985	4.7203	4.5444	-1.10	1.13	3.8%	-3.7%
47	4.7387	4.5648	4.3932	-1.12	1.15	3.8%	-3.8%
48	4.5850	4.4152	4.2479	-1.14	1.16	3.8%	-3.8%
49	4.4372	4.2714	4.1082	-1.15	1.18	3.9%	-3.8%
50	4.2949	4.1331	3.9739	-1.17	1.20	3.9%	-3.9%
51	4.1580	4.0000	3.8447	-1.19	1.21	3.9%	-3.9%
52	4.0262	3.8720	3.7204	-1.20	1.23	4.0%	-3.9%
53	3.8993	3.7487	3.6008	-1.22	1.25	4.0%	-3.9%
54	3.7770	3.6301	3.4857	-1.24	1.26	4.0%	-4.0%
55	3.6593	3.5158	3.3749	-1.26	1.28	4.1%	-4.0%
56	3.5459	3.4058	3.2682	-1.27	1.30	4.1%	-4.0%
57	3.4366	3.2997	3.1655	-1.29	1.31	4.1%	-4.1%
58	3.3313	3.1976	3.0665	-1.31	1.33	4.2%	-4.1%
59	3.2297	3.0991	2.9712	-1.33	1.35	4.2%	-4.1%
60	3.1318	3.0043	2.8793	-1.34	1.37	4.2%	-4.2%
61	3.0374	2.9128	2.7907	-1.36	1.38	4.3%	-4.2%
62	2.9463	2.8245	2.7054	-1.38	1.40	4.3%	-4.2%
63	2.8584	2.7394	2.6231	-1.40	1.42	4.3%	-4.2%
64	2.7736	2.6573	2.5437	-1.42	1.43	4.4%	-4.3%
65	2.6917	2.5781	2.4671	-1.43	1.45	4.4%	-4.3%
66	2.6126	2.5016	2.3932	-1.45	1.47	4.4%	-4.3%
67	2.5363	2.4278	2.3219	-1.47	1.49	4.5%	-4.4%
68	2.4626	2.3565	2.2530	-1.49	1.50	4.5%	-4.4%
69	2.3913	2.2877	2.1866	-1.51	1.52	4.5%	-4.4%
70	2.3225	2.2212	2.1224	-1.52	1.54	4.6%	-4.4%
71	2.2560	2.1570	2.0604	-1.54	1.56	4.6%	-4.5%
72	2.1918	2.0949	2.0005	-1.56	1.57	4.6%	-4.5%
73	2.1296	2.0349	1.9427	-1.58	1.59	4.7%	-4.5%
74	2.0695	1.9769	1.8868	-1.60	1.61	4.7%	-4.6%
75	2.0114	1.9209	1.8328	-1.61	1.63	4.7%	-4.6%
76	1.9552	1.8667	1.7805	-1.63	1.64	4.7%	-4.6%
77	1.9008	1.8142	1.7300	-1.65	1.66	4.8%	-4.6%
78	1.8482	1.7635	1.6812	-1.67	1.68	4.8%	-4.7%
79	1.7973	1.7144	1.6339	-1.69	1.70	4.8%	-4.7%

R-T Table

Part No. : TSM1A103H34D1RZ

R25 =10 KOhm ± 3%  
B25/85 = 3435 K ± 1%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
80	1.7480	1.6669	1.5882	-1.71	1.71	4.9%	-4.7%
81	1.7003	1.6210	1.5440	-1.73	1.73	4.9%	-4.7%
82	1.6541	1.5765	1.5012	-1.74	1.75	4.9%	-4.8%
83	1.6093	1.5334	1.4598	-1.76	1.77	4.9%	-4.8%
84	1.5660	1.4917	1.4197	-1.78	1.78	5.0%	-4.8%
85	1.5240	1.4513	1.3809	-1.80	1.80	5.0%	-4.9%
86	1.4834	1.4122	1.3433	-1.82	1.82	5.0%	-4.9%
87	1.4440	1.3744	1.3069	-1.84	1.84	5.1%	-4.9%
88	1.4058	1.3376	1.2717	-1.86	1.86	5.1%	-4.9%
89	1.3688	1.3021	1.2375	-1.88	1.87	5.1%	-5.0%
90	1.3329	1.2676	1.2045	-1.89	1.89	5.1%	-5.0%
91	1.2981	1.2342	1.1724	-1.91	1.91	5.2%	-5.0%
92	1.2644	1.2019	1.1414	-1.93	1.93	5.2%	-5.0%
93	1.2317	1.1705	1.1113	-1.95	1.95	5.2%	-5.1%
94	1.2001	1.1401	1.0821	-1.97	1.97	5.3%	-5.1%
95	1.1693	1.1106	1.0538	-1.99	1.98	5.3%	-5.1%
96	1.1395	1.0820	1.0264	-2.01	2.00	5.3%	-5.1%
97	1.1106	1.0543	0.99988	-2.03	2.02	5.3%	-5.2%
98	1.0825	1.0274	0.97413	-2.05	2.04	5.4%	-5.2%
99	1.0553	1.0013	0.94915	-2.07	2.06	5.4%	-5.2%
100	1.0289	0.97599	0.92494	-2.09	2.08	5.4%	-5.2%
101	1.0033	0.95145	0.90145	-2.11	2.10	5.5%	-5.3%
102	0.97847	0.92765	0.87868	-2.13	2.12	5.5%	-5.3%
103	0.95435	0.90456	0.85659	-2.16	2.14	5.5%	-5.3%
104	0.93095	0.88215	0.83516	-2.18	2.16	5.5%	-5.3%
105	0.90824	0.86042	0.81438	-2.20	2.18	5.6%	-5.4%
106	0.88619	0.83932	0.79422	-2.22	2.20	5.6%	-5.4%
107	0.86480	0.81886	0.77466	-2.24	2.23	5.6%	-5.4%
108	0.84403	0.79900	0.75569	-2.27	2.25	5.6%	-5.4%
109	0.82387	0.77973	0.73728	-2.29	2.27	5.7%	-5.4%
110	0.80431	0.76103	0.71942	-2.31	2.29	5.7%	-5.5%
111	0.78532	0.74288	0.70210	-2.34	2.32	5.7%	-5.5%
112	0.76688	0.72526	0.68529	-2.36	2.34	5.7%	-5.5%
113	0.74898	0.70817	0.66897	-2.39	2.36	5.8%	-5.5%
114	0.73161	0.69158	0.65315	-2.41	2.39	5.8%	-5.6%
115	0.71475	0.67548	0.63779	-2.44	2.41	5.8%	-5.6%
116	0.69838	0.65985	0.62289	-2.47	2.44	5.8%	-5.6%
117	0.68248	0.64469	0.60843	-2.49	2.46	5.9%	-5.6%
118	0.66706	0.62997	0.59441	-2.52	2.49	5.9%	-5.6%
119	0.65208	0.61568	0.58079	-2.55	2.52	5.9%	-5.7%

