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## SPECIFICATION FOR APPROVAL

CUSTOMER \_\_\_\_\_

CERTIFIED  
MODEL/TYPE

TTC03-103

PART NO.

TTC3A103F39HAEY(RoHS)

APPLICATION \_\_\_\_\_

CUSTOMER P/N \_\_\_\_\_

ISSUE DATE

Feb.03.2021

REV. NO. \_\_\_\_\_

REV. DATE \_\_\_\_\_

FOR CUSTOMER APPROVAL	CHECKED BY
	<i>Haili Gong</i>
	APPROVED BY
	<i>Huaifang Zhang</i>





**REVISED RECORD SHEET**

REV. NO	REV. DATE	REVISED CONTENT



<b>INDEX</b>	<b>Page</b>
■ Part Number Code	1
■ Structure and Dimensions	2
■ Electrical Characteristics	2
■ Reliability	3
■ Soldering Recommendation	4
■ Max. Power Dissipation Derating Curve	5
■ RoHS Compliant Declaration	5
■ Warehouse Storage Conditions of Products	5
■ Safety Approvals	6
■ Certificates	6
■ R-T Table	7~11

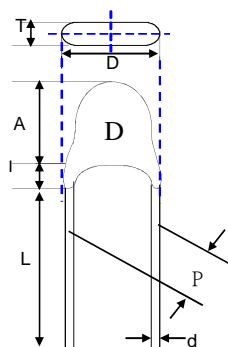
Part Number Code

Example :

TTC    3        A        103    F        39H    A        E        Y  
 (1)    (2)        (3)        (4)        (5)        (6)        (7)        (8)        (9)

No.	Item	Digit	Specification
(1)	Product Type	TTC	Thinking NTC thermistor TTC type
(2)	Body Size	3	φ 4 mm x H 5.0 mm (max.)
(3)	Definition of B Value	A	B <sub>25/85</sub>
(4)	Zero Power Resistance at 25°C	103	10 x 10 <sup>3</sup> Ω = 10 KΩ
(5)	Tolerance of R <sub>25°C</sub>	F	±1%
(6)	B Value	39H	3975K
(7)	Tolerance of B Value	A	±1.5%
(8)	Appearance	E	Straight lead epoxy coating (Green)
(9)	Optional Suffix	Y	RoHS compliance

### Structure and Dimensions



(unit:mm)

D	d	P	A	l max	L	T
2.5~4.0	0.5±0.02	2.54± 0.5	2.5~5.0	3.0	30~40	1.5~3.0

### Electrical Characteristics

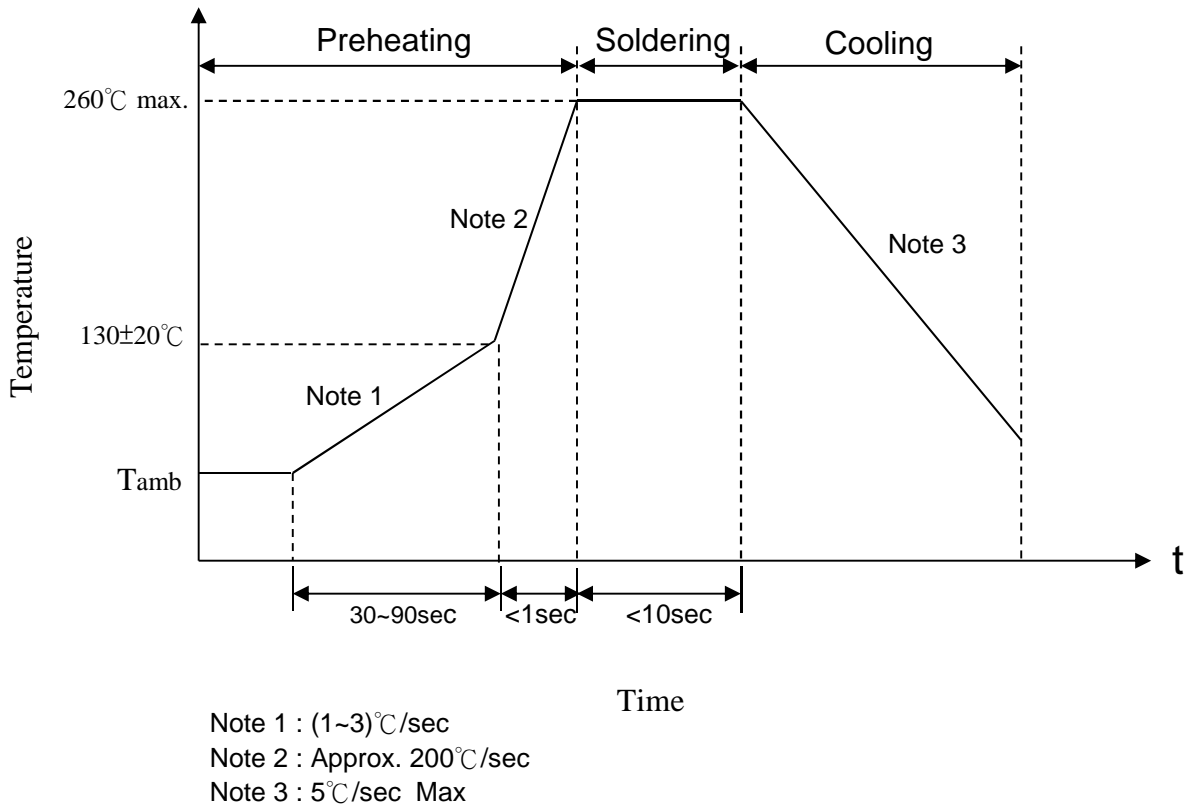
Part No.	Zero Power Resistance at 25°C	Tolerance of R <sub>25°C</sub>	B <sub>25/85</sub> Value	Tolerance of B Value	Max. Power Dissipation at 25°C	Dissipation Factor	Thermal Time Constant	Operating Temperature Range
	R <sub>25°C</sub> (KΩ)	(± %)	(K)	(± %)	P <sub>max</sub> (mW)	δ(mW/°C)	τ (sec.)	T <sub>L</sub> ~T <sub>U</sub> (°C)
TTC3A103F39HAEY	10	1	3975	1.5	150	≥2.5	≤18	-40 ~+125

Reliability

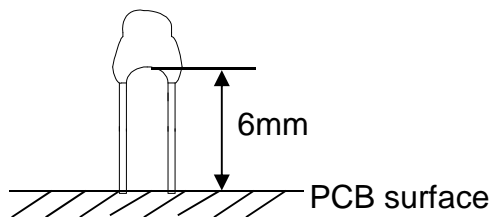
Item	Standard	Test conditions / Methods	Specifications															
Tensile Strength of Terminals	IEC60068-2-21	<p>Gradually applying the force specified and keeping the unit fixed for 10±1 sec.</p> <table border="0"> <tr> <td style="text-align: center;">Terminal diameter (mm)</td> <td style="text-align: center;">Force (Kg)</td> </tr> <tr> <td style="text-align: center;"><u>0.3&lt;d≤0.5</u></td> <td style="text-align: center;"><u>0.5</u></td> </tr> <tr> <td style="text-align: center;"><u>0.5&lt;d≤0.8</u></td> <td style="text-align: center;"><u>1.0</u></td> </tr> </table>	Terminal diameter (mm)	Force (Kg)	<u>0.3&lt;d≤0.5</u>	<u>0.5</u>	<u>0.5&lt;d≤0.8</u>	<u>1.0</u>	No visible damage									
Terminal diameter (mm)	Force (Kg)																	
<u>0.3&lt;d≤0.5</u>	<u>0.5</u>																	
<u>0.5&lt;d≤0.8</u>	<u>1.0</u>																	
Bending Strength of Terminals	IEC60068-2-21	<p>Hold specimen and apply the force specified below to each lead. Bend the specimen to 90°, then return to the original position. Repeat the procedure in the opposite direction.</p> <table border="0"> <tr> <td style="text-align: center;">Terminal diameter (mm)</td> <td style="text-align: center;">Force (Kg)</td> </tr> <tr> <td style="text-align: center;"><u>0.3&lt;d≤0.5</u></td> <td style="text-align: center;"><u>0.25</u></td> </tr> <tr> <td style="text-align: center;"><u>0.5&lt;d≤0.8</u></td> <td style="text-align: center;"><u>0.50</u></td> </tr> </table>	Terminal diameter (mm)	Force (Kg)	<u>0.3&lt;d≤0.5</u>	<u>0.25</u>	<u>0.5&lt;d≤0.8</u>	<u>0.50</u>	No visible damage									
Terminal diameter (mm)	Force (Kg)																	
<u>0.3&lt;d≤0.5</u>	<u>0.25</u>																	
<u>0.5&lt;d≤0.8</u>	<u>0.50</u>																	
Solderability	IEC60068-2-20	245 ± 3 °C , 3 ± 0.3 sec	At least 95% of terminal electrode is covered by new solder															
Resistance to Soldering Heat	IEC60068-2-20	260 ± 3 °C , 10 ± 1 sec	No visible damage   ΔR <sub>25</sub> /R <sub>25</sub>   ≤ 3 %															
High Temperature Storage	IEC60068-2-2	125 ± 5 °C , 1000 ± 24 hrs	No visible damage   ΔR <sub>25</sub> /R <sub>25</sub>   ≤ 5 %															
Damp Heat, Steady State	IEC 60068-2-78	40 ± 2 °C , 90 ~ 95 % RH , 1000 ± 24 hrs	No visible damage   ΔR <sub>25</sub> /R <sub>25</sub>   ≤ 3 %															
Rapid Change of Temperature	IEC60068-2-14	<p>The conditions shown below shall be repeated 5 cycles</p> <table border="1"> <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   ΔR <sub>25</sub> /R <sub>25</sub>   ≤ 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 , Pmax. , 1000 ±24 hrs	No visible damage   ΔR <sub>25</sub> /R <sub>25</sub>   ≤ 5 %															
Dissipation Factor (δ)	Specification	<p>Dissipation factor is ration of thermistor's temperature change caused by its dissipation power under specific ambienttemperature. which stands for dissipation power for thermistor's increase of 1°C.</p> $\delta = V \cdot I / T_2 - T_1 (\text{mW}/^\circ\text{C})$	≥ 2.5mW/°C															
Thermal Time Constant(τ)	Specification	The thermal time constant is a 63.2% change of thermistor's body temperature from its initial temperature (T0) to specific temperature (T1) under zero-power conditions.	≤ 18Sec															

## Soldering Recommendation

### Wave Soldering Profile



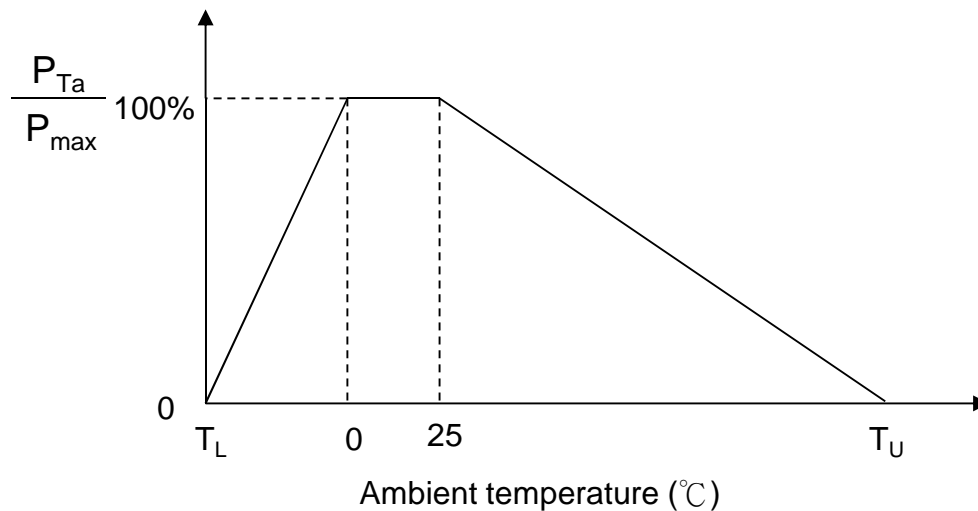
Caution: It has be better to keep the minimum distance as 6mm between the bottom of the thermistor body and PCB surface to prevent component damage.



### Recommended Reworking Conditions with Soldering Iron

Item	Conditions
Temperature of Soldering Iron-tip	360°C (max.)
Soldering Time	3 sec (max.)
Distance from Thermistor	6 mm (min.)

### 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

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

### 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



Safety Approvals (Certified Model/Type : TTC03-103)

\* UL 1434 / cUL recognized (File # E138827)



\* CQC GB/T 6663.1-2007 recognized (File# CQC04001011945)

\* CQC GB6663-86 recognized (File# CQC04001011966)



\* TÜV recognized (File # R 50050155)

Certificates

- (1) IATF 16949 certificate
- (2) ISO 9001 certificate

Test Report

- (1) RoHS test report



R - T Table

Part No. : TTC3A103F39HAEY

R25=10KOhm ±1%

B25/85 = 3975 K ± 1.5%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
-40	346.340	325.457	305.803	-0.99	0.98	6.4%	-6.0%
-39	324.597	305.318	287.155	-0.96	0.96	6.3%	-5.9%
-38	304.088	286.303	269.531	-0.94	0.94	6.2%	-5.9%
-37	284.867	268.465	252.982	-0.92	0.93	6.1%	-5.8%
-36	266.924	251.797	237.504	-0.91	0.92	6.0%	-5.7%
-35	250.211	236.257	223.059	-0.90	0.91	5.9%	-5.6%
-34	234.658	221.781	209.590	-0.89	0.90	5.8%	-5.5%
-33	220.185	208.299	197.034	-0.88	0.90	5.7%	-5.4%
-32	206.714	195.737	185.324	-0.87	0.89	5.6%	-5.3%
-31	194.164	184.024	174.396	-0.87	0.88	5.5%	-5.2%
-30	182.463	173.093	164.188	-0.86	0.87	5.4%	-5.1%
-29	171.544	162.883	154.644	-0.85	0.86	5.3%	-5.1%
-28	161.345	153.338	145.713	-0.84	0.85	5.2%	-5.0%
-27	151.810	144.406	137.349	-0.83	0.84	5.1%	-4.9%
-26	142.890	136.042	129.510	-0.82	0.83	5.0%	-4.8%
-25	134.539	128.206	122.159	-0.81	0.82	4.9%	-4.7%
-24	126.717	120.859	115.260	-0.80	0.81	4.8%	-4.6%
-23	119.387	113.968	108.784	-0.79	0.80	4.8%	-4.5%
-22	112.515	107.502	102.703	-0.78	0.79	4.7%	-4.5%
-21	106.071	101.434	96.9897	-0.76	0.78	4.6%	-4.4%
-20	100.027	95.7367	91.6215	-0.75	0.77	4.5%	-4.3%
-19	94.3558	90.3870	86.5764	-0.74	0.76	4.4%	-4.2%
-18	89.0344	85.3626	81.8340	-0.73	0.75	4.3%	-4.1%
-17	84.0401	80.6430	77.3754	-0.72	0.74	4.2%	-4.1%
-16	79.3519	76.2090	73.1832	-0.71	0.73	4.1%	-4.0%
-15	74.9505	72.0426	69.2406	-0.70	0.72	4.0%	-3.9%
-14	70.8176	68.1271	65.5323	-0.69	0.71	3.9%	-3.8%
-13	66.9360	64.4467	62.0437	-0.68	0.69	3.9%	-3.7%
-12	63.2898	60.9865	58.7612	-0.67	0.68	3.8%	-3.6%
-11	59.8639	57.7327	55.6719	-0.65	0.67	3.7%	-3.6%
-10	56.6441	54.6723	52.7638	-0.64	0.66	3.6%	-3.5%
-9	53.6174	51.7929	50.0255	-0.63	0.65	3.5%	-3.4%
-8	50.7712	49.0831	47.4464	-0.62	0.64	3.4%	-3.3%
-7	48.0941	46.5322	45.0166	-0.61	0.63	3.4%	-3.3%
-6	45.5750	44.1301	42.7267	-0.60	0.62	3.3%	-3.2%
-5	43.2040	41.8672	40.5678	-0.59	0.61	3.2%	-3.1%
-4	40.9714	39.7349	38.5318	-0.58	0.60	3.1%	-3.0%
-3	38.8684	37.7247	36.6110	-0.57	0.59	3.0%	-3.0%
-2	36.8867	35.8290	34.7982	-0.56	0.58	3.0%	-2.9%
-1	35.0185	34.0406	33.0866	-0.55	0.57	2.9%	-2.8%



R - T Table

Part No. : TTC3A103F39HAEY

R25=10KOhm ±1%

B25/85 = 3975 K ± 1.5%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
0	33.2567	32.3526	31.4700	-0.54	0.55	2.8%	-2.7%
1	31.5945	30.7589	29.9424	-0.52	0.54	2.7%	-2.7%
2	30.0257	29.2536	28.4985	-0.51	0.53	2.6%	-2.6%
3	28.5444	27.8311	27.1330	-0.50	0.52	2.6%	-2.5%
4	27.1450	26.4864	25.8413	-0.49	0.51	2.5%	-2.4%
5	25.8227	25.2148	24.6187	-0.48	0.50	2.4%	-2.4%
6	24.5726	24.0117	23.4613	-0.47	0.48	2.3%	-2.3%
7	23.3902	22.8730	22.3650	-0.45	0.47	2.3%	-2.2%
8	22.2716	21.7949	21.3263	-0.44	0.46	2.2%	-2.2%
9	21.2129	20.7738	20.3417	-0.43	0.45	2.1%	-2.1%
10	20.2104	19.8062	19.4082	-0.42	0.43	2.0%	-2.0%
11	19.2609	18.8891	18.5227	-0.41	0.42	2.0%	-1.9%
12	18.3612	18.0195	17.6825	-0.39	0.41	1.9%	-1.9%
13	17.5084	17.1947	16.8849	-0.38	0.40	1.8%	-1.8%
14	16.6999	16.4121	16.1277	-0.37	0.38	1.8%	-1.7%
15	15.9330	15.6693	15.4085	-0.35	0.37	1.7%	-1.7%
16	15.2054	14.9641	14.7252	-0.34	0.36	1.6%	-1.6%
17	14.5149	14.2943	14.0758	-0.33	0.34	1.5%	-1.5%
18	13.8593	13.6581	13.4584	-0.32	0.33	1.5%	-1.5%
19	13.2368	13.0534	12.8713	-0.30	0.32	1.4%	-1.4%
20	12.6454	12.4787	12.3129	-0.29	0.30	1.3%	-1.3%
21	12.0835	11.9322	11.7817	-0.28	0.29	1.3%	-1.3%
22	11.5495	11.4125	11.2760	-0.26	0.28	1.2%	-1.2%
23	11.0419	10.9182	10.7947	-0.25	0.26	1.1%	-1.1%
24	10.5591	10.4477	10.3365	-0.24	0.25	1.1%	-1.1%
25	10.1000	10.0000	9.90000	-0.22	0.23	1.0%	-1.0%
26	9.67581	9.57376	9.47183	-0.24	0.25	1.1%	-1.1%
27	9.27163	9.16787	9.06438	-0.26	0.27	1.1%	-1.1%
28	8.88641	8.78129	8.67655	-0.27	0.28	1.2%	-1.2%
29	8.51919	8.41301	8.30731	-0.29	0.30	1.3%	-1.3%
30	8.16904	8.06207	7.95570	-0.30	0.32	1.3%	-1.3%
31	7.83510	7.72759	7.62079	-0.32	0.33	1.4%	-1.4%
32	7.51655	7.40872	7.30171	-0.34	0.35	1.5%	-1.4%
33	7.21260	7.10466	6.99764	-0.35	0.37	1.5%	-1.5%
34	6.92253	6.81467	6.70783	-0.37	0.39	1.6%	-1.6%
35	6.64564	6.53803	6.43153	-0.39	0.40	1.6%	-1.6%
36	6.38128	6.27407	6.16805	-0.41	0.42	1.7%	-1.7%
37	6.12881	6.02215	5.91675	-0.42	0.44	1.8%	-1.8%
38	5.88767	5.78166	5.67700	-0.44	0.46	1.8%	-1.8%
39	5.65728	5.55205	5.44823	-0.46	0.47	1.9%	-1.9%



R - T Table

Part No. : TTC3A103F39HAEY

R25=10KOhm ±1%

B25/85 = 3975 K ± 1.5%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol.		Resistance Tol.	
				(°C)		(%)	
40	5.43712	5.33276	5.22988	-0.48	0.49	2.0%	-1.9%
41	5.22669	5.12329	5.02143	-0.49	0.51	2.0%	-2.0%
42	5.02552	4.92315	4.82239	-0.51	0.53	2.1%	-2.0%
43	4.83315	4.73189	4.63229	-0.53	0.54	2.1%	-2.1%
44	4.64916	4.54907	4.45068	-0.55	0.56	2.2%	-2.2%
45	4.47315	4.37427	4.27715	-0.57	0.58	2.3%	-2.2%
46	4.30473	4.20712	4.11130	-0.58	0.60	2.3%	-2.3%
47	4.14354	4.04723	3.95276	-0.60	0.62	2.4%	-2.3%
48	3.98924	3.89426	3.80117	-0.62	0.64	2.4%	-2.4%
49	3.84149	3.74788	3.65618	-0.64	0.65	2.5%	-2.4%
50	3.70000	3.60777	3.51749	-0.66	0.67	2.6%	-2.5%
51	3.56445	3.47363	3.38478	-0.68	0.69	2.6%	-2.6%
52	3.43458	3.34517	3.25777	-0.70	0.71	2.7%	-2.6%
53	3.31012	3.22214	3.13619	-0.72	0.73	2.7%	-2.7%
54	3.19081	3.10427	3.01977	-0.73	0.75	2.8%	-2.7%
55	3.07643	2.99132	2.90828	-0.75	0.77	2.8%	-2.8%
56	2.96673	2.88307	2.80148	-0.77	0.79	2.9%	-2.8%
57	2.86151	2.77928	2.69915	-0.79	0.81	3.0%	-2.9%
58	2.76056	2.67977	2.60108	-0.81	0.82	3.0%	-2.9%
59	2.66368	2.58432	2.50707	-0.83	0.84	3.1%	-3.0%
60	2.57070	2.49276	2.41694	-0.85	0.86	3.1%	-3.0%
61	2.48143	2.40490	2.33050	-0.87	0.88	3.2%	-3.1%
62	2.39571	2.32058	2.24758	-0.89	0.90	3.2%	-3.1%
63	2.31338	2.23964	2.16803	-0.91	0.92	3.3%	-3.2%
64	2.23428	2.16192	2.09169	-0.93	0.94	3.3%	-3.2%
65	2.15829	2.08728	2.01842	-0.95	0.96	3.4%	-3.3%
66	2.08525	2.01559	1.94807	-0.97	0.98	3.5%	-3.4%
67	2.01504	1.94671	1.88051	-0.99	1.00	3.5%	-3.4%
68	1.94754	1.88052	1.81563	-1.01	1.02	3.6%	-3.5%
69	1.88262	1.81690	1.75330	-1.03	1.04	3.6%	-3.5%
70	1.82018	1.75574	1.69341	-1.05	1.06	3.7%	-3.6%
71	1.76011	1.69693	1.63585	-1.07	1.08	3.7%	-3.6%
72	1.70231	1.64037	1.58052	-1.10	1.10	3.8%	-3.6%
73	1.64668	1.58596	1.52733	-1.12	1.12	3.8%	-3.7%
74	1.59314	1.53362	1.47618	-1.14	1.14	3.9%	-3.7%
75	1.54158	1.48325	1.42698	-1.16	1.16	3.9%	-3.8%
76	1.49194	1.43477	1.37965	-1.18	1.18	4.0%	-3.8%
77	1.44413	1.38810	1.33411	-1.20	1.20	4.0%	-3.9%
78	1.39807	1.34316	1.29028	-1.22	1.22	4.1%	-3.9%
79	1.35369	1.29989	1.24810	-1.24	1.24	4.1%	-4.0%



R - T Table

Part No. : TTC3A103F39HAEY

R25=10KOhm ±1%

B25/85 = 3975 K ± 1.5%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol.		Resistance Tol.	
				(°C)		(%)	
80	1.31092	1.25821	1.20749	-1.26	1.26	4.2%	-4.0%
81	1.26971	1.21805	1.16839	-1.29	1.28	4.2%	-4.1%
82	1.22997	1.17937	1.13073	-1.31	1.30	4.3%	-4.1%
83	1.19167	1.14209	1.09446	-1.33	1.33	4.3%	-4.2%
84	1.15473	1.10615	1.05952	-1.35	1.35	4.4%	-4.2%
85	1.11910	1.07151	1.02585	-1.37	1.37	4.4%	-4.3%
86	1.08473	1.03812	0.99340	-1.40	1.39	4.5%	-4.3%
87	1.05158	1.00591	0.96213	-1.42	1.41	4.5%	-4.4%
88	1.01959	0.97485	0.93198	-1.44	1.43	4.6%	-4.4%
89	0.98871	0.94489	0.90291	-1.46	1.45	4.6%	-4.4%
90	0.95892	0.91598	0.87489	-1.49	1.47	4.7%	-4.5%
91	0.93015	0.88809	0.84785	-1.51	1.50	4.7%	-4.5%
92	0.90238	0.86118	0.82178	-1.53	1.52	4.8%	-4.6%
93	0.87556	0.83520	0.79662	-1.55	1.54	4.8%	-4.6%
94	0.84966	0.81012	0.77235	-1.58	1.56	4.9%	-4.7%
95	0.82464	0.78591	0.74893	-1.60	1.58	4.9%	-4.7%
96	0.80047	0.76253	0.72632	-1.62	1.60	5.0%	-4.7%
97	0.77712	0.73996	0.70450	-1.65	1.63	5.0%	-4.8%
98	0.75456	0.71815	0.68343	-1.67	1.65	5.1%	-4.8%
99	0.73276	0.69709	0.66309	-1.69	1.67	5.1%	-4.9%
100	0.71168	0.67674	0.64345	-1.72	1.69	5.2%	-4.9%
101	0.69131	0.65708	0.62447	-1.74	1.72	5.2%	-5.0%
102	0.67161	0.63807	0.60615	-1.76	1.74	5.3%	-5.0%
103	0.65257	0.61971	0.58844	-1.79	1.76	5.3%	-5.0%
104	0.63415	0.60195	0.57134	-1.81	1.78	5.3%	-5.1%
105	0.61633	0.58479	0.55480	-1.84	1.81	5.4%	-5.1%
106	0.59910	0.56819	0.53883	-1.86	1.83	5.4%	-5.2%
107	0.58243	0.55215	0.52338	-1.89	1.85	5.5%	-5.2%
108	0.56630	0.53663	0.50846	-1.91	1.88	5.5%	-5.2%
109	0.55069	0.52161	0.49402	-1.94	1.90	5.6%	-5.3%
110	0.53559	0.50709	0.48006	-1.96	1.92	5.6%	-5.3%
111	0.52097	0.49304	0.46656	-1.99	1.95	5.7%	-5.4%
112	0.50681	0.47945	0.45351	-2.01	1.97	5.7%	-5.4%
113	0.49311	0.46629	0.44088	-2.04	2.00	5.8%	-5.4%
114	0.47984	0.45355	0.42866	-2.06	2.02	5.8%	-5.5%
115	0.46699	0.44122	0.41684	-2.09	2.04	5.8%	-5.5%
116	0.45455	0.42929	0.40539	-2.12	2.07	5.9%	-5.6%
117	0.44249	0.41773	0.39432	-2.14	2.09	5.9%	-5.6%
118	0.43081	0.40654	0.38360	-2.17	2.12	6.0%	-5.6%
119	0.41950	0.39570	0.37322	-2.20	2.14	6.0%	-5.7%

