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## SPECIFICATION FOR APPROVAL

CUSTOMER	立創電子
CERTIFIED MODEL/TYPE	TTC03-103
PART NO.	TTC3C103F34D1W16 (RoHS+HF)
APPLICATION	
CUSTOMER P/N	
ISSUE DATE	Dec.30.2020
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



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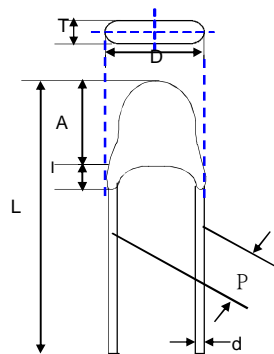
Part Number Code

Example :

**TTC**    **3**    **C**    **103**    **F**    **34D**    **1**    **W16**  
 (1)    (2)    (3)    (4)    (5)    (6)    (7)    (8)

No.	Item	Digit	Specification
(1)	Product Type	TTC	Thinking NTC thermistor TTC type
(2)	Body Size	3	Φ4 mm x H 5.0 mm (max.)
(3)	Definition of B Value	C	Automobile; B <sub>25/85</sub>
(4)	Zero Power Resistance at 25°C	103	Refer to "Optional Suffix"
(5)	Tolerance of R <sub>25°C</sub>	F	Refer to "Optional Suffix"
(6)	B Value	34D	3435K
(7)	Tolerance of B Value	1	± 1%
(8)	Optional Suffix	W16	RoHS+HF compliance R25:10KΩ±0.8%

Structure and Dimensions



(unit:mm)

Item	D	d	P	A	L	T	l
Max	2.8	0.37	2.3	5	6.5	2.8	3
Min	----	0.33	1.3	----	5.5	----	----

Electrical Characteristics

Part No.	Zero Power Resistance at 25°C	Tolerance of $R_{25°C}$	$B_{25/85}$ Value	Tolerance of B Value	Max. Power Dissipation at 25°C	Dissipation Factor	Thermal Time Constant	Operating Temperature Range
	$R_{25°C}$ (K $\Omega$ )	( $\pm$ %)	(K)	( $\pm$ %)	$P_{max}$ (mW)	$\delta$ (mW/°C)	$\tau$ (sec.)	$T_L \sim T_U$ (°C)
TTC3C103F34D1W16	10	0.8	3435	1	150	$\geq 2.5$	$\leq 18$	-40 ~ +125

## Reliability

Tests of TTC03 NTC thermistors are based on AEC-Q200 Rev-D.

Table of Test Methods

Item	Standard	Test conditions / Methods	Specifications
High Temperature Exposure (Storage)	MIL-STD-202 Method 108	Test temp.: 150 +3/-0°C Duration: 1000 h Unpowered Measurement at 24±2 hours after test conclusion.	No visible damage $ \Delta R_{25}/R_{25}  \leq 5\%$
Temperature Cycling	JESD22 Method JA-104	1000 Cycles (-55°C to +125°C) Measurement at 24±2 hours after test conclusion. 30min maximum dwell time at each temperature extreme. 1 min. maximum transition time.	No visible damage $ \Delta R_{25}/R_{25}  \leq 5\%$
Biased Humidity	MIL-STD-202 Method 103	1000 hours 85°C/85%RH. 1mW power. Measurement at 24±2 hours after test conclusion.	No visible damage $ \Delta R_{25}/R_{25}  \leq 5\%$
Operational Life	MIL-STD-202 Method 108	Test temp.: 150 +3/-0°C Duration: 1000 h. 1mW power. Measurement at 24±2 hours after test conclusion.	No visible damage $ \Delta R_{25}/R_{25}  \leq 5\%$
External Visual	MIL-STD-883 Method 2009	Inspect device construction, marking and workmanship. Electrical Test not required.	Within the specified values.
Dissipation Factor ( $\delta$ )	Specification	Dissipation factor is ration of thermistor's temperature change caused by its dissipation power under specific ambient temperature. which stands for dissipation power for thermistor's increase of 1°C. $\delta = V \cdot I / T_2 - T_1$ (mW/°C)	$\geq 2.5 \text{ mW/}^\circ\text{C}$
Thermal Time Constant ( $\tau$ )	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.	$\leq 18 \text{ Sec}$

**Reliability**

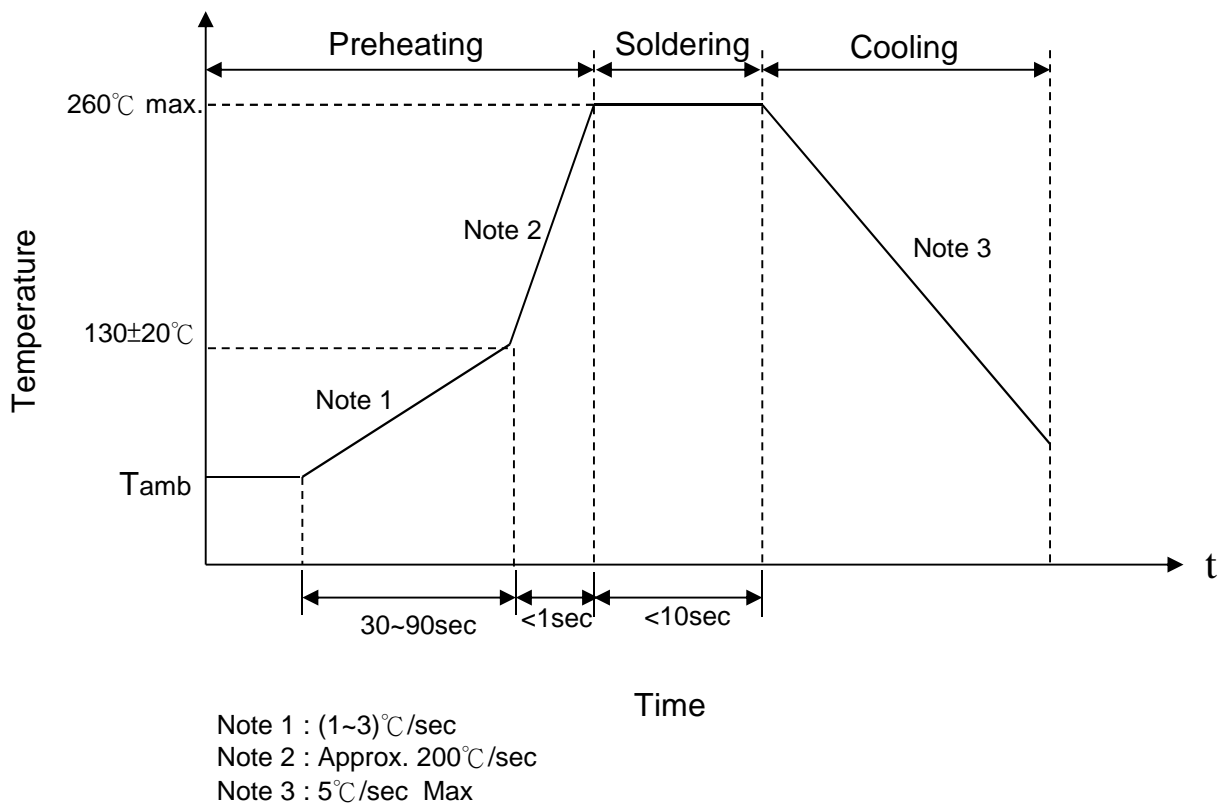
Tests of TTC03 NTC thermistors are based on AEC-Q200 Rev-D.

Table of Test Methods

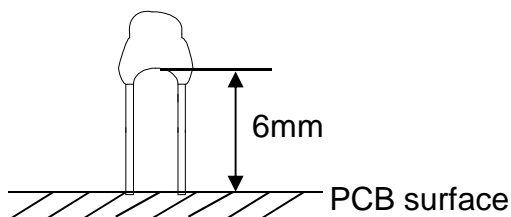
Item	Standard	Test conditions / Methods	Specifications
Physical Dimension	JESD22 Method JB-100	Verify physical dimensions to the applicable device specification.	Within the specified values.
Resistance to Solvents	MIL-STD-202 Method 215	Also aqueous wash chemical - OKEM Clean or equivalent. Do not use banned solvents.	No visible damage.
Mechanical Shock	MIL-STD-202 Method 213	Figure 1 of Method 213 LEADED:Condition C	No visible damage. $ \Delta R_{25}/R_{25}  \leq 5\%$
Vibration	MIL-STD-202 Method 204	5 g's for 20 minutes, 12 cycles each of 3 orientations. Note: Use 8"X5" PCB .031" thick with 7 secure points on one 8" side and 2 secure points on corners of opposite sides. Parts mounted within 2" from any secure point. Test from 10-2000 Hz.	No visible damage. $ \Delta R_{25}/R_{25}  \leq 5\%$
Resistance to Soldering Heat	MIL-STD-202 Method 210	260+/-5°C 10+/-1s,25mm/s+/-6mm/s, 1cycle.	No visible damage. $ \Delta R_{25}/R_{25}  \leq 5\%$
Flammability	UL-94	V-0 or V-1 are acceptable. Electrical test not required.	V-0 or V-1 are acceptable.
ESD	AEC-Q200 -002	Discharge capacitance : 150 pF Charging voltage: 6 kV ,Contact discharge 1 pulse in each polarity	No visible damage $ \Delta R_{25}/R_{25}  \leq 5\%$
Solderability	J-STD-002	Dipping Method Temperature : 235±5°C Time : 2±0.5sec	95% of termination wetted
Electrical Characterization	user spec	R(-40°C) / R(25°C) / R(125°C) B25/85 or B25/50	Within the specified values.
Terminal Strength	MIL-STD-202 Method 211	The terminal shall gradually be bent by 90° in one direction, then 90° in the opposite direction, and again back to the original position for three times.	No visible damage.

## Soldering Recommendation

### Wave Soldering Profile



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

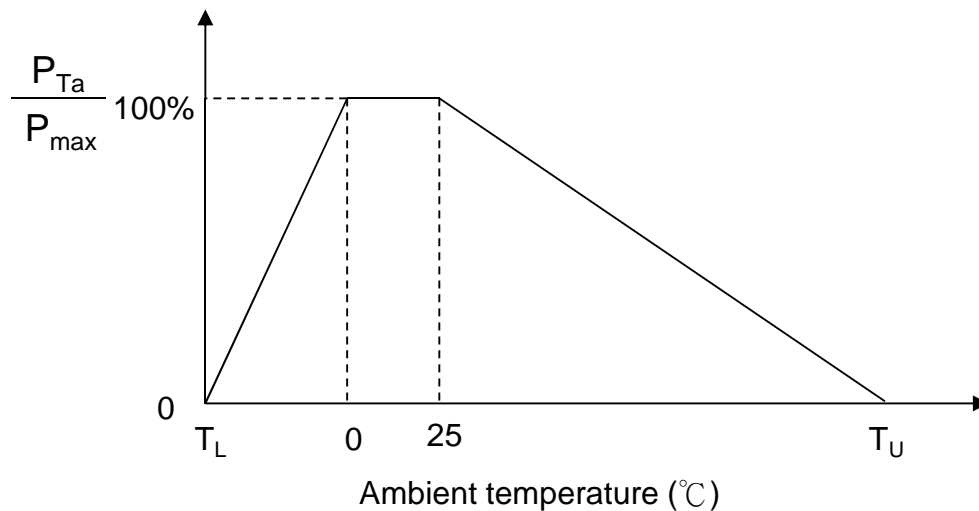


### Recommended Reworking Conditions with Soldering Iron

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)

Note: Application temperature of Safety Regulation : (-40 ~ 125°C)

Certificates

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

Test Report

- (1) RoHS test report
- (2) Halogen-free test report

R - T Table

Part No. : TTC3C103F34D1W16

R25=10KOhm ±0.8%

B25/85 = 3435 K ± 1%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
-40	200.680	193.278	186.137	-0.67	0.69	3.8%	-3.7%
-39	189.846	182.944	176.281	-0.67	0.68	3.8%	-3.6%
-38	179.650	173.213	166.996	-0.66	0.68	3.7%	-3.6%
-37	170.055	164.051	158.249	-0.66	0.67	3.7%	-3.5%
-36	161.026	155.425	150.009	-0.65	0.67	3.6%	-3.5%
-35	152.529	147.302	142.246	-0.64	0.66	3.5%	-3.4%
-34	144.530	139.652	134.930	-0.64	0.66	3.5%	-3.4%
-33	136.997	132.444	128.033	-0.63	0.65	3.4%	-3.3%
-32	129.902	125.650	121.530	-0.63	0.64	3.4%	-3.3%
-31	123.215	119.245	115.395	-0.62	0.64	3.3%	-3.2%
-30	116.911	113.202	109.605	-0.61	0.63	3.3%	-3.2%
-29	110.965	107.501	104.138	-0.61	0.62	3.2%	-3.1%
-28	105.354	102.118	98.9740	-0.60	0.62	3.2%	-3.1%
-27	100.058	97.0334	94.0944	-0.59	0.61	3.1%	-3.0%
-26	95.0563	92.2299	89.4818	-0.59	0.61	3.1%	-3.0%
-25	90.3315	87.6898	85.1199	-0.58	0.60	3.0%	-2.9%
-24	85.8666	83.3973	80.9939	-0.58	0.59	3.0%	-2.9%
-23	81.6460	79.3377	77.0897	-0.57	0.59	2.9%	-2.8%
-22	77.6553	75.4973	73.3946	-0.56	0.58	2.9%	-2.8%
-21	73.8811	71.8634	69.8963	-0.56	0.57	2.8%	-2.7%
-20	70.3106	68.4240	66.5837	-0.55	0.57	2.8%	-2.7%
-19	66.9322	65.1680	63.4462	-0.54	0.56	2.7%	-2.6%
-18	63.7348	62.0850	60.4740	-0.54	0.55	2.7%	-2.6%
-17	60.7082	59.1652	57.6577	-0.53	0.55	2.6%	-2.5%
-16	57.8425	56.3993	54.9886	-0.52	0.54	2.6%	-2.5%
-15	55.1287	53.7788	52.4586	-0.52	0.53	2.5%	-2.5%
-14	52.5581	51.2954	50.0598	-0.51	0.52	2.5%	-2.4%
-13	50.1227	48.9415	47.7850	-0.50	0.52	2.4%	-2.4%
-12	47.8147	46.7097	45.6273	-0.50	0.51	2.4%	-2.3%
-11	45.6270	44.5932	43.5801	-0.49	0.50	2.3%	-2.3%
-10	43.5528	42.5856	41.6372	-0.48	0.50	2.3%	-2.2%
-9	41.5855	40.6806	39.7929	-0.48	0.49	2.2%	-2.2%
-8	39.7192	38.8726	38.0416	-0.47	0.48	2.2%	-2.1%
-7	37.9481	37.1560	36.3782	-0.46	0.48	2.1%	-2.1%
-6	36.2669	35.5258	34.7977	-0.45	0.47	2.1%	-2.0%
-5	34.6704	33.9771	33.2956	-0.45	0.46	2.0%	-2.0%
-4	33.1539	32.5054	31.8674	-0.44	0.46	2.0%	-2.0%
-3	31.7129	31.1062	30.5092	-0.43	0.45	2.0%	-1.9%
-2	30.3432	29.7757	29.2169	-0.43	0.44	1.9%	-1.9%
-1	29.0406	28.5099	27.9871	-0.42	0.43	1.9%	-1.8%



R - T Table

Part No. : TTC3C103F34D1W16

R25=10KOhm ±0.8%

B25/85 = 3435 K ± 1%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
0	27.8016	27.3053	26.8162	-0.41	0.43	1.8%	-1.8%
1	26.6227	26.1586	25.7010	-0.40	0.42	1.8%	-1.7%
2	25.5003	25.0666	24.6386	-0.40	0.41	1.7%	-1.7%
3	24.4316	24.0262	23.6260	-0.39	0.40	1.7%	-1.7%
4	23.4136	23.0348	22.6606	-0.38	0.40	1.6%	-1.6%
5	22.4435	22.0896	21.7399	-0.37	0.39	1.6%	-1.6%
6	21.5188	21.1883	20.8616	-0.37	0.38	1.6%	-1.5%
7	20.6371	20.3286	20.0234	-0.36	0.37	1.5%	-1.5%
8	19.7961	19.5082	19.2232	-0.35	0.36	1.5%	-1.5%
9	18.9936	18.7251	18.4591	-0.34	0.36	1.4%	-1.4%
10	18.2278	17.9774	17.7293	-0.33	0.35	1.4%	-1.4%
11	17.4967	17.2633	17.0319	-0.33	0.34	1.4%	-1.3%
12	16.7985	16.5811	16.3655	-0.32	0.33	1.3%	-1.3%
13	16.1316	15.9292	15.7284	-0.31	0.32	1.3%	-1.3%
14	15.4944	15.3061	15.1192	-0.30	0.31	1.2%	-1.2%
15	14.8855	14.7104	14.5365	-0.29	0.31	1.2%	-1.2%
16	14.3034	14.1408	13.9792	-0.29	0.30	1.1%	-1.1%
17	13.7469	13.5960	13.4458	-0.28	0.29	1.1%	-1.1%
18	13.2147	13.0748	12.9354	-0.27	0.28	1.1%	-1.1%
19	12.7057	12.5760	12.4468	-0.26	0.27	1.0%	-1.0%
20	12.2187	12.0987	11.9791	-0.25	0.26	1.0%	-1.0%
21	11.7528	11.6418	11.5311	-0.24	0.25	1.0%	-1.0%
22	11.3068	11.2044	11.1021	-0.23	0.24	0.9%	-0.9%
23	10.8800	10.7855	10.6911	-0.23	0.24	0.9%	-0.9%
24	10.4713	10.3843	10.2973	-0.22	0.23	0.8%	-0.8%
25	10.0800	10.0000	9.92000	-0.21	0.22	0.8%	-0.8%
26	9.71252	9.63182	9.55119	-0.22	0.23	0.8%	-0.8%
27	9.36027	9.27903	9.19791	-0.23	0.24	0.9%	-0.9%
28	9.02255	8.94092	8.85947	-0.24	0.25	0.9%	-0.9%
29	8.69871	8.61684	8.53519	-0.25	0.26	1.0%	-0.9%
30	8.38814	8.30614	8.22441	-0.26	0.27	1.0%	-1.0%
31	8.09024	8.00823	7.92654	-0.28	0.29	1.0%	-1.0%
32	7.80446	7.72253	7.64098	-0.29	0.30	1.1%	-1.1%
33	7.53024	7.44850	7.36718	-0.30	0.31	1.1%	-1.1%
34	7.26708	7.18562	7.10462	-0.31	0.32	1.1%	-1.1%
35	7.01450	6.93339	6.85278	-0.32	0.33	1.2%	-1.2%
36	6.77202	6.69134	6.61119	-0.33	0.34	1.2%	-1.2%
37	6.53921	6.45901	6.37939	-0.35	0.36	1.2%	-1.2%
38	6.31563	6.23598	6.15695	-0.36	0.37	1.3%	-1.3%
39	6.10088	6.02184	5.94344	-0.37	0.38	1.3%	-1.3%



R - T Table

Part No. : TTC3C103F34D1W16

R25=10KOhm ±0.8%

B25/85 = 3435 K ± 1%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol.		Resistance Tol.	
				(°C)		(%)	
40	5.89457	5.81618	5.73847	-0.38	0.39	1.3%	-1.3%
41	5.69635	5.61865	5.54166	-0.39	0.41	1.4%	-1.4%
42	5.50584	5.42888	5.35265	-0.41	0.42	1.4%	-1.4%
43	5.32273	5.24653	5.17110	-0.42	0.43	1.5%	-1.4%
44	5.14668	5.07128	4.99667	-0.43	0.44	1.5%	-1.5%
45	4.97739	4.90282	4.82905	-0.44	0.46	1.5%	-1.5%
46	4.81458	4.74085	4.66795	-0.46	0.47	1.6%	-1.5%
47	4.65795	4.58509	4.51308	-0.47	0.48	1.6%	-1.6%
48	4.50724	4.43527	4.36416	-0.48	0.49	1.6%	-1.6%
49	4.36221	4.29113	4.22094	-0.49	0.51	1.7%	-1.6%
50	4.22260	4.15243	4.08317	-0.51	0.52	1.7%	-1.7%
51	4.08819	4.01894	3.95062	-0.52	0.53	1.7%	-1.7%
52	3.95876	3.89044	3.82305	-0.53	0.54	1.8%	-1.7%
53	3.83409	3.76670	3.70026	-0.54	0.56	1.8%	-1.8%
54	3.71398	3.64753	3.58204	-0.56	0.57	1.8%	-1.8%
55	3.59825	3.53274	3.46820	-0.57	0.58	1.9%	-1.8%
56	3.48671	3.42214	3.35856	-0.58	0.60	1.9%	-1.9%
57	3.37918	3.31556	3.25292	-0.60	0.61	1.9%	-1.9%
58	3.27550	3.21282	3.15113	-0.61	0.62	2.0%	-1.9%
59	3.17552	3.11377	3.05303	-0.62	0.64	2.0%	-2.0%
60	3.07907	3.01826	2.95846	-0.64	0.65	2.0%	-2.0%
61	2.98602	2.92614	2.86728	-0.65	0.66	2.0%	-2.0%
62	2.89623	2.83728	2.77934	-0.66	0.68	2.1%	-2.0%
63	2.80957	2.75153	2.69452	-0.68	0.69	2.1%	-2.1%
64	2.72590	2.66878	2.61269	-0.69	0.70	2.1%	-2.1%
65	2.64512	2.58891	2.53372	-0.70	0.72	2.2%	-2.1%
66	2.56711	2.51179	2.45751	-0.72	0.73	2.2%	-2.2%
67	2.49176	2.43733	2.38394	-0.73	0.74	2.2%	-2.2%
68	2.41896	2.36542	2.31291	-0.74	0.76	2.3%	-2.2%
69	2.34862	2.29595	2.24431	-0.76	0.77	2.3%	-2.2%
70	2.28065	2.22884	2.17806	-0.77	0.78	2.3%	-2.3%
71	2.21494	2.16398	2.11406	-0.79	0.80	2.4%	-2.3%
72	2.15142	2.10131	2.05223	-0.80	0.81	2.4%	-2.3%
73	2.09000	2.04072	1.99248	-0.81	0.82	2.4%	-2.4%
74	2.03061	1.98215	1.93473	-0.83	0.84	2.4%	-2.4%
75	1.97317	1.92552	1.87891	-0.84	0.85	2.5%	-2.4%
76	1.91760	1.87076	1.82494	-0.86	0.86	2.5%	-2.4%
77	1.86384	1.81779	1.77276	-0.87	0.88	2.5%	-2.5%
78	1.81182	1.76655	1.72230	-0.88	0.89	2.6%	-2.5%
79	1.76148	1.71698	1.67349	-0.90	0.91	2.6%	-2.5%



R - T Table

Part No. : TTC3C103F34D1W16

R25=10KOhm ±0.8%

B25/85 = 3435 K ± 1%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
80	1.71276	1.66901	1.62628	-0.91	0.92	2.6%	-2.6%
81	1.66559	1.62260	1.58061	-0.93	0.93	2.6%	-2.6%
82	1.61994	1.57767	1.53642	-0.94	0.95	2.7%	-2.6%
83	1.57573	1.53419	1.49366	-0.96	0.96	2.7%	-2.6%
84	1.53292	1.49210	1.45227	-0.97	0.98	2.7%	-2.7%
85	1.49147	1.45135	1.41221	-0.98	0.99	2.8%	-2.7%
86	1.45132	1.41189	1.37344	-1.00	1.01	2.8%	-2.7%
87	1.41243	1.37368	1.33590	-1.01	1.02	2.8%	-2.7%
88	1.37475	1.33667	1.29956	-1.03	1.04	2.8%	-2.8%
89	1.33825	1.30082	1.26437	-1.04	1.05	2.9%	-2.8%
90	1.30288	1.26610	1.23028	-1.06	1.06	2.9%	-2.8%
91	1.26861	1.23247	1.19728	-1.07	1.08	2.9%	-2.9%
92	1.23540	1.19988	1.16531	-1.09	1.09	3.0%	-2.9%
93	1.20320	1.16830	1.13434	-1.11	1.11	3.0%	-2.9%
94	1.17200	1.13770	1.10433	-1.12	1.13	3.0%	-2.9%
95	1.14175	1.10805	1.07526	-1.14	1.14	3.0%	-3.0%
96	1.11243	1.07930	1.04710	-1.15	1.16	3.1%	-3.0%
97	1.08400	1.05144	1.01980	-1.17	1.17	3.1%	-3.0%
98	1.05643	1.02444	0.99335	-1.18	1.19	3.1%	-3.0%
99	1.02970	0.99825	0.96771	-1.20	1.20	3.1%	-3.1%
100	1.00377	0.97287	0.94286	-1.22	1.22	3.2%	-3.1%
101	0.97862	0.94825	0.91876	-1.23	1.24	3.2%	-3.1%
102	0.95423	0.92438	0.89541	-1.25	1.25	3.2%	-3.1%
103	0.93056	0.90123	0.87276	-1.27	1.27	3.3%	-3.2%
104	0.90761	0.87877	0.85080	-1.28	1.28	3.3%	-3.2%
105	0.88533	0.85699	0.82950	-1.30	1.30	3.3%	-3.2%
106	0.86372	0.83586	0.80884	-1.32	1.32	3.3%	-3.2%
107	0.84274	0.81535	0.78881	-1.34	1.33	3.4%	-3.3%
108	0.82238	0.79546	0.76937	-1.35	1.35	3.4%	-3.3%
109	0.80262	0.77615	0.75051	-1.37	1.37	3.4%	-3.3%
110	0.78343	0.75741	0.73221	-1.39	1.39	3.4%	-3.3%
111	0.76480	0.73923	0.71446	-1.41	1.40	3.5%	-3.4%
112	0.74672	0.72157	0.69722	-1.42	1.42	3.5%	-3.4%
113	0.72915	0.70443	0.68050	-1.44	1.44	3.5%	-3.4%
114	0.71209	0.68778	0.66426	-1.46	1.46	3.5%	-3.4%
115	0.69552	0.67162	0.64849	-1.48	1.47	3.6%	-3.4%
116	0.67942	0.65592	0.63318	-1.50	1.49	3.6%	-3.5%
117	0.66378	0.64067	0.61832	-1.52	1.51	3.6%	-3.5%
118	0.64858	0.62585	0.60387	-1.53	1.53	3.6%	-3.5%
119	0.63381	0.61145	0.58985	-1.55	1.54	3.7%	-3.5%

