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SPECIFICATION FOR APPROVAL

CUSTOMER

CERTIFIED
MODEL/TYPE

TTC03-473

PART NO.

TTC3B473F4051LY (RoHS)

APPLICATION

CUSTOMER P/N

ISSUE DATE

Sep.22.2020

REV. NO.

REV. DATE

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





NTC Thermistor TTC 03 Type
Part No.: TTC3B473F4051LY

REVISED RECORD SHEET

REV. NO	REV. DATE	REVISED CONTENT



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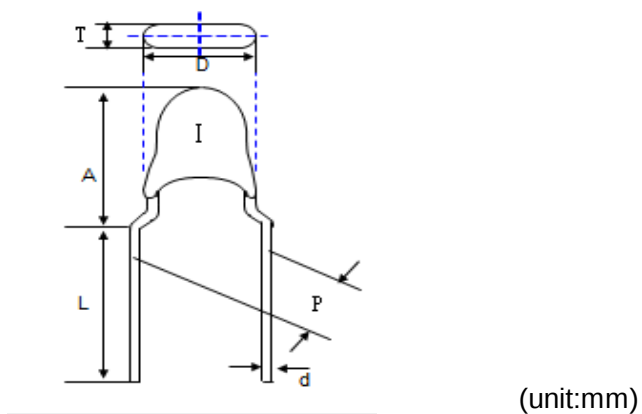
Part Number Code

Example :

TTC **3** **B** **473** **F** **405** **1** **L** **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	B	B _{25/50}
(4)	Zero Power Resistance at 25°C	473	47x 10 ³ Ω = 47 KΩ
(5)	Tolerance of R _{25°C}	F	± 1%
(6)	B Value	405	4050K
(7)	Tolerance of B Value	1	± 1%
(8)	Appearance	L	Wider kink lead epoxy coating (Green)
(9)	Optional Suffix	Y	RoHS compliance

Structure and Dimensions



Item	D	d	P	T	A	L
Max	4	0.52	3.04	3	6	40
Min	2	0.48	2.04	1.5	---	30

Electrical Characteristics

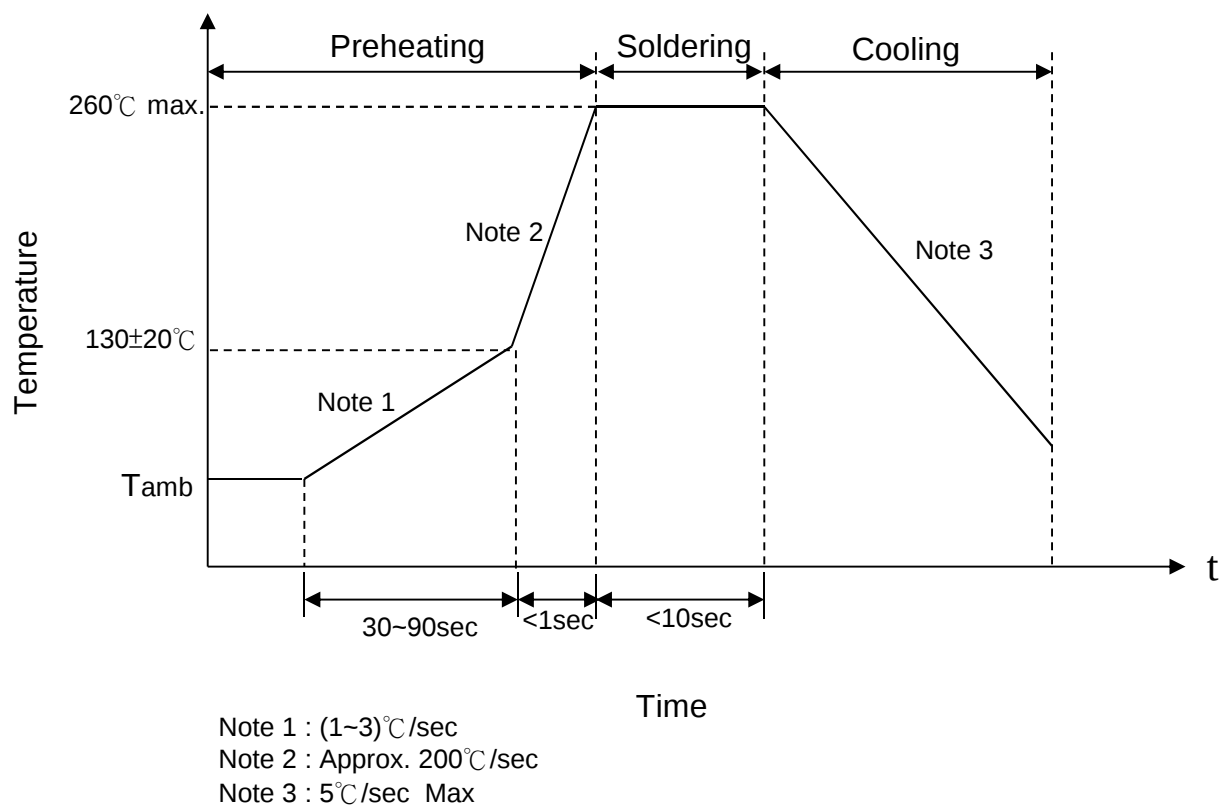
Part No.	Zero Power Resistance at 25°C	Tolerance of $R_{25^\circ\text{C}}$	$B_{25/50}$ Value	Tolerance of B Value	Max. Power Dissipation at 25°C	Dissipation Factor	Thermal Time Constant	Operating Temperature Range
	$R_{25^\circ\text{C}}$ (K Ω)	($\pm$ %)	(K)	($\pm$ %)	P_{max} (mW)	δ (mW/°C)	τ (sec.)	$T_L \sim T_U$ (°C)
TTC3B473F4051LY	47	1	4050	1	150	≥ 2.5	≤ 18	-40 ~+125

Reliability

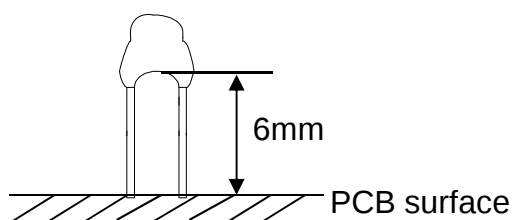
Item	Standard	Test conditions / Methods	Specifications															
Tensile Strength of Terminals	IEC60068-2-21	Gradually applying the force specified and keeping the unit fixed for 10±1 sec. <table><tr><td>Terminal diameter (mm)</td><td>Force (Kg)</td></tr><tr><td>$0.3 < d \leq 0.5$</td><td>0.5</td></tr><tr><td>$0.5 < d \leq 0.8$</td><td>1.0</td></tr></table>	Terminal diameter (mm)	Force (Kg)	$0.3 < d \leq 0.5$	0.5	$0.5 < d \leq 0.8$	1.0	No visible damage									
Terminal diameter (mm)	Force (Kg)																	
$0.3 < d \leq 0.5$	0.5																	
$0.5 < d \leq 0.8$	1.0																	
Bending Strength of Terminals	IEC60068-2-21	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. <table><tr><td>Terminal diameter (mm)</td><td>Force (Kg)</td></tr><tr><td>$0.3 < d \leq 0.5$</td><td>0.25</td></tr><tr><td>$0.5 < d \leq 0.8$</td><td>0.50</td></tr></table>	Terminal diameter (mm)	Force (Kg)	$0.3 < d \leq 0.5$	0.25	$0.5 < d \leq 0.8$	0.50	No visible damage									
Terminal diameter (mm)	Force (Kg)																	
$0.3 < d \leq 0.5$	0.25																	
$0.5 < d \leq 0.8$	0.50																	
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 ₂₅ /R ₂₅ ≤ 3 %															
High Temperature Storage	IEC60068-2-2	125 ± 5 °C , 1000 ± 24 hrs	No visible damage ΔR ₂₅ /R ₂₅ ≤ 5 %															
Damp Heat, Steady State	IEC 60068-2-78	40 ± 2 °C , 9 0 ~ 95 % RH , 1000 ± 24 hrs	No visible damage ΔR ₂₅ /R ₂₅ ≤ 3 %															
Rapid Change of Temperature	IEC60068-2-14	The conditions shown below shall be repeated 5 cycles <table><tr><td>Step</td><td>Temperature (°C)</td><td>Period (minutes)</td></tr><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></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 ₂₅ /R ₂₅ ≤ 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 ₂₅ /R ₂₅ ≤ 5 %															
Dissipation Factor (δ)	Specifcation	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. δ =V*I / T2-T1(mW/°C)	≥ 2.5mW/°C															
Thermal Time Constant(τ)	Specifcation	The thermal time constant is a 63.2% change of thermistor's body temperature from its initial temperature (T0) tospecific temperature (T1) under zero-power conditions.	≤ 18Sec															

Soldering Recommendation

Wave Soldering Profile



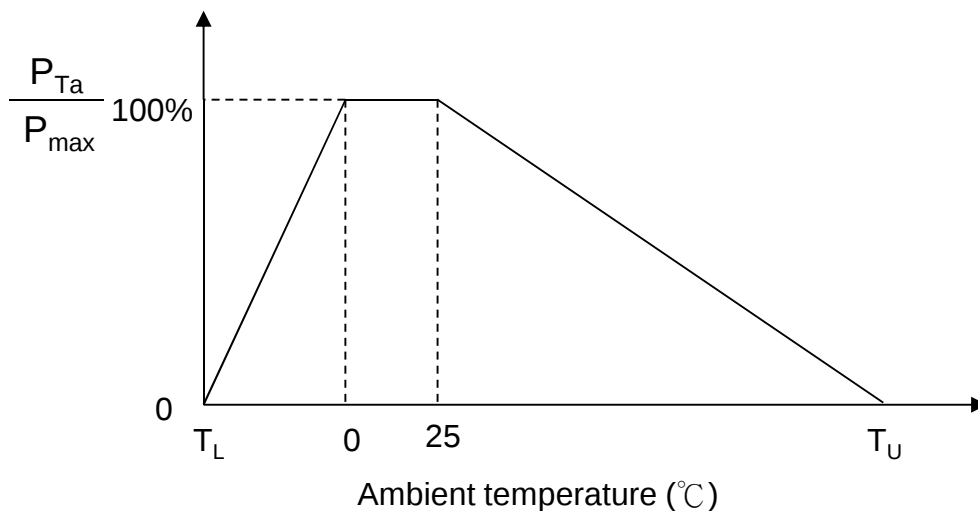
Caution: It has been better to keep the minimum distance as 6mm between the bottom of the thermistor body and PCB surface to prevent component damage.



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 : TTC03-473)



* UL 1434 / cUL recognized (File # E138827)



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

* CQC GB6663-86 recognized (File# CQC04001011966)



* TUV recognized (File # R 50050155)

Certificates

(1) IATF 16949 certificate

(2) ISO 9001 certificate

Test Report

(1) RoHS test report

R - T Table

Part No. : TTC3B473F4051LY

R25=47KOhm $\pm 1\%$

B25/50 = 4050 K $\pm 1\%$

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
-40	1651.60	1578.78	1509.02	-0.80	0.74	4.6%	-4.4%
-39	1551.58	1484.09	1419.39	-0.71	0.69	4.5%	-4.4%
-38	1452.87	1390.57	1330.82	-0.67	0.67	4.5%	-4.3%
-37	1358.46	1301.08	1245.99	-0.64	0.66	4.4%	-4.2%
-36	1269.84	1217.01	1166.27	-0.63	0.65	4.3%	-4.2%
-35	1187.54	1138.89	1092.13	-0.62	0.65	4.3%	-4.1%
-34	1111.52	1066.69	1023.56	-0.62	0.65	4.2%	-4.0%
-33	1041.46	1000.09	960.276	-0.62	0.65	4.1%	-4.0%
-32	976.856	938.653	901.854	-0.62	0.65	4.1%	-3.9%
-31	917.195	881.875	847.831	-0.62	0.65	4.0%	-3.9%
-30	861.962	829.279	797.756	-0.62	0.65	3.9%	-3.8%
-29	810.688	780.423	751.213	-0.62	0.64	3.9%	-3.7%
-28	762.957	734.915	707.834	-0.62	0.64	3.8%	-3.7%
-27	718.410	692.418	667.299	-0.61	0.63	3.8%	-3.6%
-26	676.740	652.642	629.339	-0.61	0.62	3.7%	-3.6%
-25	637.692	615.346	593.723	-0.60	0.62	3.6%	-3.5%
-24	601.046	580.324	560.260	-0.59	0.61	3.6%	-3.5%
-23	566.618	547.403	528.786	-0.58	0.60	3.5%	-3.4%
-22	534.252	516.435	499.163	-0.58	0.59	3.5%	-3.3%
-21	503.812	487.293	471.269	-0.57	0.58	3.4%	-3.3%
-20	475.178	459.864	445.000	-0.56	0.58	3.3%	-3.2%
-19	448.243	434.048	420.261	-0.55	0.57	3.3%	-3.2%
-18	422.910	409.753	396.966	-0.54	0.56	3.2%	-3.1%
-17	399.089	386.895	375.037	-0.53	0.55	3.2%	-3.1%
-16	376.696	365.395	354.398	-0.53	0.54	3.1%	-3.0%
-15	355.650	345.177	334.979	-0.52	0.54	3.0%	-3.0%
-14	335.876	326.170	316.713	-0.51	0.53	3.0%	-2.9%
-13	317.301	308.305	299.535	-0.50	0.52	2.9%	-2.8%
-12	299.855	291.517	283.383	-0.50	0.52	2.9%	-2.8%
-11	283.471	275.742	268.197	-0.49	0.51	2.8%	-2.7%
-10	268.084	260.919	253.920	-0.48	0.50	2.7%	-2.7%
-9	253.634	246.991	240.497	-0.48	0.50	2.7%	-2.6%
-8	240.061	233.901	227.875	-0.47	0.49	2.6%	-2.6%
-7	227.311	221.597	216.005	-0.46	0.48	2.6%	-2.5%
-6	215.329	210.029	204.839	-0.46	0.48	2.5%	-2.5%
-5	204.065	199.149	194.331	-0.45	0.47	2.5%	-2.4%
-4	193.474	188.912	184.439	-0.45	0.46	2.4%	-2.4%
-3	183.509	179.276	175.123	-0.44	0.46	2.4%	-2.3%
-2	174.131	170.202	166.346	-0.43	0.45	2.3%	-2.3%
-1	165.299	161.653	158.071	-0.43	0.44	2.3%	-2.2%

R - T Table

Part No. : TTC3B473F4051LY

R25=47KOhm $\pm 1\%$ B25/50 = 4050 K $\pm 1\%$

Temperature (°C)	Rmax. (K Ω)	Rnor. (K Ω)	Rmin. (K Ω)	Temperature Tol. (°C)		Resistance Tol. (%)	
0	156.977	153.593	150.267	-0.42	0.44	2.2%	-2.2%
1	149.132	145.991	142.902	-0.41	0.43	2.2%	-2.1%
2	141.731	138.817	135.948	-0.41	0.42	2.1%	-2.1%
3	134.747	132.042	129.378	-0.40	0.42	2.0%	-2.0%
4	128.151	125.641	123.167	-0.39	0.41	2.0%	-2.0%
5	121.919	119.590	117.293	-0.38	0.40	1.9%	-1.9%
6	116.027	113.866	111.734	-0.38	0.39	1.9%	-1.9%
7	110.453	108.449	106.470	-0.37	0.39	1.8%	-1.8%
8	105.178	103.320	101.484	-0.36	0.38	1.8%	-1.8%
9	100.183	98.4604	96.7577	-0.35	0.37	1.7%	-1.7%
10	95.4512	93.8548	92.2759	-0.35	0.36	1.7%	-1.7%
11	90.9664	89.4876	88.0241	-0.34	0.35	1.7%	-1.6%
12	86.7138	85.3447	83.9887	-0.33	0.34	1.6%	-1.6%
13	82.6800	81.4129	80.1572	-0.32	0.34	1.6%	-1.5%
14	78.8522	77.6801	76.5179	-0.31	0.33	1.5%	-1.5%
15	75.2185	74.1351	73.0600	-0.31	0.32	1.5%	-1.5%
16	71.7680	70.7672	69.7734	-0.30	0.31	1.4%	-1.4%
17	68.4905	67.5667	66.6487	-0.29	0.30	1.4%	-1.4%
18	65.3764	64.5243	63.6770	-0.28	0.29	1.3%	-1.3%
19	62.4168	61.6315	60.8501	-0.27	0.28	1.3%	-1.3%
20	59.6033	58.8803	58.1603	-0.26	0.28	1.2%	-1.2%
21	56.9281	56.2632	55.6004	-0.25	0.27	1.2%	-1.2%
22	54.3839	53.7730	53.1636	-0.25	0.26	1.1%	-1.1%
23	51.9637	51.4032	50.8436	-0.24	0.25	1.1%	-1.1%
24	49.6611	49.1475	48.6343	-0.23	0.24	1.0%	-1.0%
25	47.4700	47.0000	46.5300	-0.22	0.23	1.0%	-1.0%
26	45.4250	44.9552	44.4859	-0.23	0.24	1.0%	-1.0%
27	43.4766	43.0079	42.5401	-0.24	0.25	1.1%	-1.1%
28	41.6200	41.1532	40.6876	-0.25	0.26	1.1%	-1.1%
29	39.8505	39.3863	38.9235	-0.26	0.27	1.2%	-1.2%
30	38.1638	37.7028	37.2436	-0.27	0.29	1.2%	-1.2%
31	36.5559	36.0985	35.6434	-0.29	0.30	1.3%	-1.3%
32	35.0227	34.5696	34.1189	-0.30	0.31	1.3%	-1.3%
33	33.5606	33.1121	32.6664	-0.31	0.32	1.4%	-1.3%
34	32.1661	31.7226	31.2822	-0.32	0.33	1.4%	-1.4%
35	30.8358	30.3977	29.9629	-0.33	0.34	1.4%	-1.4%
36	29.5666	29.1342	28.7052	-0.34	0.36	1.5%	-1.5%
37	28.3554	27.9289	27.5061	-0.35	0.37	1.5%	-1.5%
38	27.1995	26.7791	26.3626	-0.37	0.38	1.6%	-1.6%
39	26.0960	25.6820	25.2720	-0.38	0.39	1.6%	-1.6%

R - T Table

Part No. : TTC3B473F4051LY

R25=47KOhm $\pm 1\%$ B25/50 = 4050 K $\pm 1\%$

Temperature (°C)	Rmax. (K Ω)	Rnor. (K Ω)	Rmin. (K Ω)	Temperature Tol. (°C)		Resistance Tol. (%)	
40	25.0425	24.6349	24.2315	-0.39	0.40	1.7%	-1.6%
41	24.0365	23.6355	23.2388	-0.40	0.42	1.7%	-1.7%
42	23.0756	22.6813	22.2915	-0.41	0.43	1.7%	-1.7%
43	22.1577	21.7702	21.3872	-0.43	0.44	1.8%	-1.8%
44	21.2807	20.9000	20.5240	-0.44	0.45	1.8%	-1.8%
45	20.4426	20.0686	19.6996	-0.45	0.46	1.9%	-1.8%
46	19.6414	19.2744	18.9123	-0.46	0.48	1.9%	-1.9%
47	18.8754	18.5153	18.1601	-0.47	0.49	1.9%	-1.9%
48	18.1430	17.7897	17.4415	-0.49	0.50	2.0%	-2.0%
49	17.4424	17.0959	16.7547	-0.50	0.51	2.0%	-2.0%
50	16.7721	16.4325	16.0981	-0.51	0.53	2.1%	-2.0%
51	16.1308	15.7979	15.4704	-0.52	0.54	2.1%	-2.1%
52	15.5170	15.1908	14.8700	-0.54	0.55	2.1%	-2.1%
53	14.9294	14.6099	14.2958	-0.55	0.56	2.2%	-2.2%
54	14.3668	14.0538	13.7463	-0.56	0.58	2.2%	-2.2%
55	13.8279	13.5215	13.2206	-0.58	0.59	2.3%	-2.2%
56	13.3118	13.0118	12.7173	-0.59	0.60	2.3%	-2.3%
57	12.8172	12.5236	12.2355	-0.60	0.62	2.3%	-2.3%
58	12.3433	12.0559	11.7741	-0.61	0.63	2.4%	-2.3%
59	11.8890	11.6078	11.3321	-0.63	0.64	2.4%	-2.4%
60	11.4534	11.1783	10.9087	-0.64	0.65	2.5%	-2.4%
61	11.0358	10.7667	10.5031	-0.65	0.67	2.5%	-2.4%
62	10.6352	10.3720	10.1142	-0.67	0.68	2.5%	-2.5%
63	10.2509	9.99346	9.74153	-0.68	0.69	2.6%	-2.5%
64	9.88215	9.63043	9.38418	-0.69	0.71	2.6%	-2.6%
65	9.52828	9.28215	9.04148	-0.71	0.72	2.7%	-2.6%
66	9.18861	8.94798	8.71277	-0.72	0.73	2.7%	-2.6%
67	8.86252	8.62727	8.39743	-0.73	0.75	2.7%	-2.7%
68	8.54939	8.31944	8.09486	-0.75	0.76	2.8%	-2.7%
69	8.24867	8.02390	7.80448	-0.76	0.77	2.8%	-2.7%
70	7.95982	7.74013	7.52575	-0.77	0.79	2.8%	-2.8%
71	7.68231	7.46760	7.25817	-0.79	0.80	2.9%	-2.8%
72	7.41566	7.20584	7.00125	-0.80	0.81	2.9%	-2.8%
73	7.15940	6.95436	6.75451	-0.82	0.83	2.9%	-2.9%
74	6.91310	6.71273	6.51752	-0.83	0.84	3.0%	-2.9%
75	6.67632	6.48054	6.28986	-0.84	0.85	3.0%	-2.9%
76	6.44867	6.25737	6.07113	-0.86	0.87	3.1%	-3.0%
77	6.22976	6.04284	5.86095	-0.87	0.88	3.1%	-3.0%
78	6.01922	5.83660	5.65895	-0.89	0.90	3.1%	-3.0%
79	5.81672	5.63828	5.46478	-0.90	0.91	3.2%	-3.1%

R - T Table

Part No. : TTC3B473F4051LY

R25=47KOhm $\pm 1\%$ B25/50 = 4050 K $\pm 1\%$

Temperature (°C)	Rmax. (K Ω)	Rnor. (K Ω)	Rmin. (K Ω)	Temperature Tol. (°C)		Resistance Tol. (%)	
80	5.62190	5.44757	5.27812	-0.91	0.92	3.2%	-3.1%
81	5.43446	5.26414	5.09865	-0.93	0.94	3.2%	-3.1%
82	5.25410	5.08770	4.92607	-0.94	0.95	3.3%	-3.2%
83	5.08052	4.91794	4.76009	-0.96	0.97	3.3%	-3.2%
84	4.91344	4.75460	4.60044	-0.97	0.98	3.3%	-3.2%
85	4.75260	4.59742	4.44686	-0.99	1.00	3.4%	-3.3%
86	4.59775	4.44613	4.29909	-1.00	1.01	3.4%	-3.3%
87	4.44864	4.30051	4.15690	-1.02	1.02	3.4%	-3.3%
88	4.30504	4.16031	4.02005	-1.03	1.04	3.5%	-3.4%
89	4.16672	4.02532	3.88833	-1.05	1.05	3.5%	-3.4%
90	4.03349	3.89533	3.76152	-1.06	1.07	3.5%	-3.4%
91	3.90512	3.77012	3.63943	-1.08	1.08	3.6%	-3.5%
92	3.78142	3.64952	3.52186	-1.09	1.10	3.6%	-3.5%
93	3.66221	3.53332	3.40862	-1.11	1.11	3.6%	-3.5%
94	3.54731	3.42136	3.29955	-1.12	1.13	3.7%	-3.6%
95	3.43653	3.31345	3.19446	-1.14	1.14	3.7%	-3.6%
96	3.32972	3.20945	3.09321	-1.16	1.16	3.7%	-3.6%
97	3.22672	3.10918	2.99562	-1.17	1.17	3.8%	-3.7%
98	3.12737	3.01250	2.90155	-1.19	1.19	3.8%	-3.7%
99	3.03153	2.91925	2.81086	-1.20	1.21	3.8%	-3.7%
100	2.93905	2.82931	2.72340	-1.22	1.22	3.9%	-3.7%
101	2.84979	2.74254	2.63905	-1.24	1.24	3.9%	-3.8%
102	2.76364	2.65880	2.55768	-1.25	1.25	3.9%	-3.8%
103	2.68045	2.57797	2.47917	-1.27	1.27	4.0%	-3.8%
104	2.60012	2.49995	2.40339	-1.28	1.28	4.0%	-3.9%
105	2.52252	2.42460	2.33024	-1.30	1.30	4.0%	-3.9%
106	2.44755	2.35182	2.25960	-1.32	1.31	4.1%	-3.9%
107	2.37509	2.28150	2.19138	-1.33	1.33	4.1%	-4.0%
108	2.30505	2.21355	2.12546	-1.35	1.34	4.1%	-4.0%
109	2.23732	2.14786	2.06177	-1.36	1.36	4.2%	-4.0%
110	2.17181	2.08434	2.00020	-1.38	1.37	4.2%	-4.0%
111	2.10843	2.02291	1.94066	-1.39	1.38	4.2%	-4.1%
112	2.04709	1.96347	1.88308	-1.41	1.40	4.3%	-4.1%
113	1.98770	1.90594	1.82736	-1.42	1.41	4.3%	-4.1%
114	1.93019	1.85024	1.77344	-1.44	1.42	4.3%	-4.2%
115	1.87447	1.79630	1.72122	-1.45	1.44	4.4%	-4.2%
116	1.82047	1.74404	1.67065	-1.46	1.45	4.4%	-4.2%
117	1.76812	1.69339	1.62166	-1.48	1.46	4.4%	-4.2%
118	1.71735	1.64428	1.57417	-1.49	1.47	4.4%	-4.3%
119	1.66809	1.59665	1.52812	-1.50	1.48	4.5%	-4.3%

R - T Table

Part No. : TTC3B473F4051LY

R25=47KOhm $\pm 1\%$

$$B_{25/50} = 4050 \text{ K} \pm 1\%$$
[illegible]