



THINKING ELECTRONIC INDUSTRIAL CO., LTD.

HEAD OFFICE: 12F, No.93, Dashun 1st Rd., Zuoying Dist., Kaohsiung, Taiwan
TEL: 886-7-5577660 FAX: 886-7-5570560

MANUFACTURING SITE

- KAOHSIUNG FACTORY 1: No. 51, Kaifa Rd., N.E.P.Z, Kaohsiung City 81170, Taiwan
TEL: 886-7-9616668 FAX: 886-7-9616698
- KAOHSIUNG FACTORY 2: No. 2-2, Xinjian S. Rd., N.E.P.Z., Kaohsiung City 81170, Taiwan
TEL: 886-7-9630001 FAX: 886-7-3635113
- CHANGZHOU FACTORY: No.6 Longmen Rd., Wujin High & New-Tech Industrial
Development Zone, Changzhou, Jiangsu, China 213161
TEL:86-519-86578999 FAX:86-519-86558643
- DONG GUAN FACTORY: No.45, East Rd., Sha-Tao Dist., Chang-An Town,
Dongguan City, Guangdong, China 523863
TEL:86-769-85542016 FAX:86-769-85546890
- YICHANG FACTORY: No. 283 Xiaoting Avenue, Xiaoting Dist., Yichang
City 443007, Hubei, China
TEL:86-717-6510010 FAX:86-717-6511430



SPECIFICATION FOR APPROVAL

CUSTOMER _____

CERTIFIED
MODEL/TYPE

TTC03-502

PART NO.

TTC3A502G39HAEY(RoHS+HF)

APPLICATION _____

CUSTOMER P/N _____

ISSUE DATE

Nov.01.2021

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



INDEX	Page
■ 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
■ Install and use&Storage place condition&Warn and note item	6
■ Safety Approvals	7
■ Certificates	7
■ R-T Table	8~12

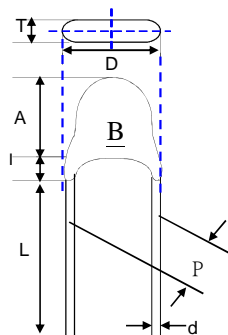
Part Number Code

Example :

TTC **3** **A** **502** **G** **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	$B_{25/85}$
(4)	Zero Power Resistance at 25°C	502	$50 \times 10^2 \Omega = 5 \text{ K}\Omega$
(5)	Tolerance of R25°C	G	±2%
(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+HF compliance

Structure and Dimensions



(unit:mm)

D	d	P	A	I 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

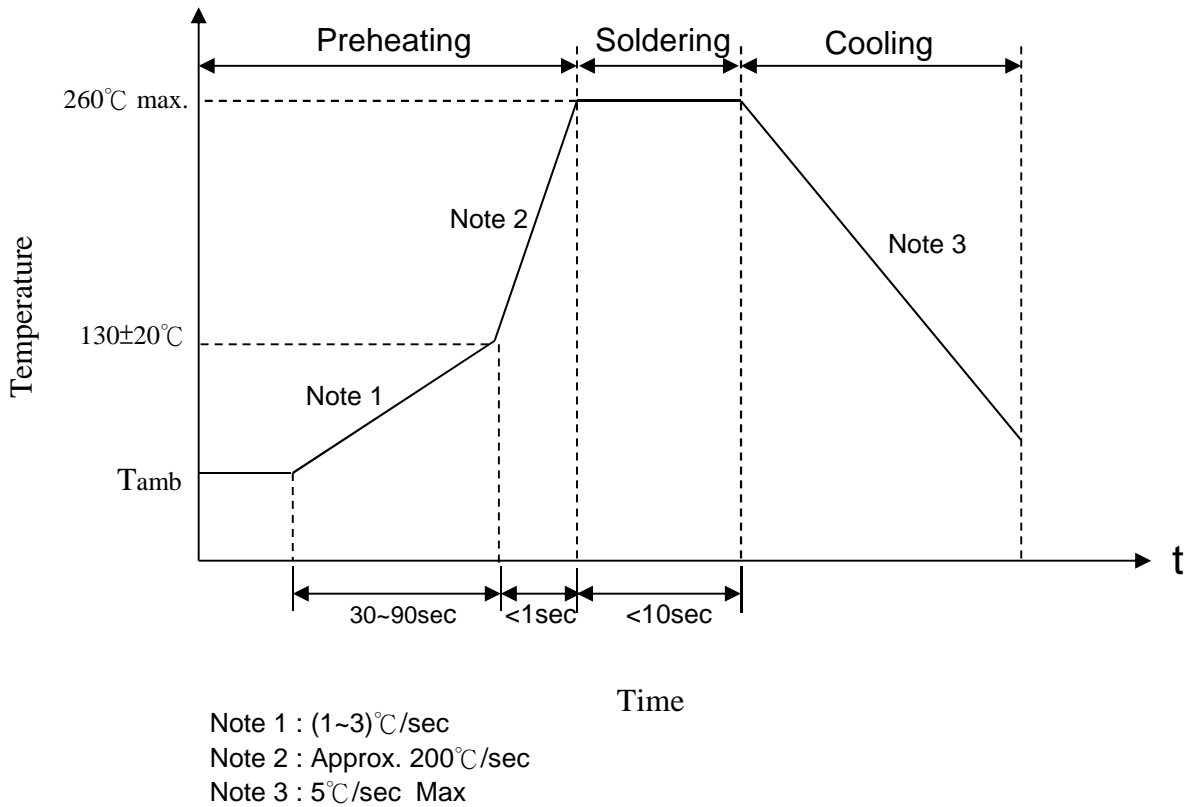
Part No.	Zero Power Resistance at 25°C	Tolerance of R _{25°C}	B _{25/85} Value	Tolerance of B Value	Max. Power Rating at 25°C	Dissipation Factor	Thermal Time Constant	Operating Temperature Range
	R _{25°C} (KΩ)	(± %)	(K)	(± %)	P _{max} (mW)	δ(mW/°C)	τ (sec.)	T _L ~T _U (°C)
TTC3A502G39HAEY	5	2	3975	1.5	150	≥2.5	≤18	-40 ~+125

Reliability

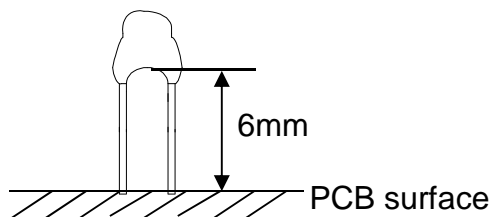
Item	Standard	Test conditions / Methods	Specifications															
Tensile Strength of Terminals	IEC60068-2-21	<p>Gradually applying the force specified and keeping the unit fixed for 10±1 sec.</p> <table border="0" style="width: 100%; text-align: center;"> <tr> <td style="border-bottom: 1px solid black;">Terminal diameter (mm)</td> <td style="border-bottom: 1px solid black;">Force (Kg)</td> </tr> <tr> <td>0.3<d≤0.5</td> <td>0.5</td> </tr> <tr> <td>0.5<d≤0.8</td> <td>1.0</td> </tr> </table>	Terminal diameter (mm)	Force (Kg)	0.3<d≤0.5	0.5	0.5<d≤0.8	1.0	No visible damage									
Terminal diameter (mm)	Force (Kg)																	
0.3<d≤0.5	0.5																	
0.5<d≤0.8	1.0																	
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" style="width: 100%; text-align: center;"> <tr> <td style="border-bottom: 1px solid black;">Terminal diameter (mm)</td> <td style="border-bottom: 1px solid black;">Force (Kg)</td> </tr> <tr> <td>0.3<d≤0.5</td> <td>0.25</td> </tr> <tr> <td>0.5<d≤0.8</td> <td>0.50</td> </tr> </table>	Terminal diameter (mm)	Force (Kg)	0.3<d≤0.5	0.25	0.5<d≤0.8	0.50	No visible damage									
Terminal diameter (mm)	Force (Kg)																	
0.3<d≤0.5	0.25																	
0.5<d≤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 , 90 ~ 95 % RH , 1000 ± 24 hrs	No visible damage ΔR ₂₅ /R ₂₅ ≤ 3 %															
Rapid Change of Temperature	IEC60068-2-14	<p>The conditions shown below shall be repeated 5 cycles</p> <table border="1" style="width: 100%; text-align: center;"> <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 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)	Specification	<p>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.</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



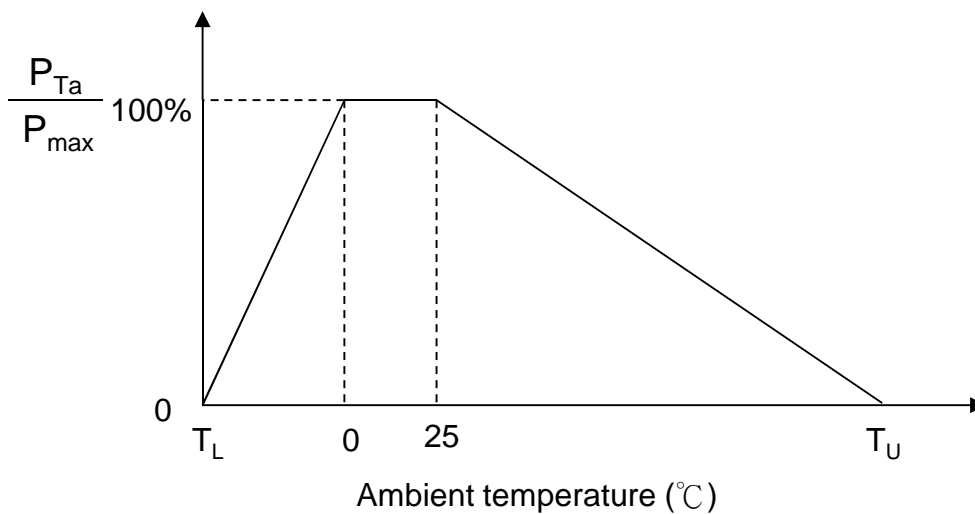
Caution: It has be better to keep the minimum distance as 6mm between the bottom of the thermistor body and PCB surface to prevent component damage.



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 : $\leq 75\%RH$ (not dewing condition)
3. Keep away from corrosive atmosphere and sunlight

(II) Period of Storage : 1 year

Install and use

1. Use this product within the specified temperature range.
2. Higher temperature may cause deterioration of the characteristics or the material quality of this product.
3. Do not melt the solder in resin head, when you solder this product. If you melt the solder in resin head, it has possibility that the break of wire, short and insulation damage.
4. Do not touch the resin head directly by solder iron. It may cause the melt of solder in resin head.
5. At least away from resin head 10mm above when lead dividing.
6. In case you cut the lead wire of this product less than 10mm from resin head, the heat of melted solder at lead wire edge is propagated easily to the resin head along the lead wire.
7. Radius of lead bending should be more than 1mm when lead bending.
Holding element by side lead wire is recommended when lead wire is bent or cut.
8. Do not apply an excessive force to the lead. Otherwise, it may cause junction between lead and element to break or crack.
9. The ceramic element of this product is fragile, and care must be taken not to load an excessive press-force or not to give a shock at handling. Such forces may cause cracking or chipping.
10. If you mold by resin this product, please evaluate the quality of this product before you use it.

Storage place condition

To keep solderability of product from declining, the following storage condition is recommended.

1. Storage condition:

Temperature -10°C to +40°C

Humidity less than 75%RH (not dewing condition)

2. Storage term:

Use this product within 1 year after delivery by first-in and first-out stocking system.

3. Handling after unpacking:

After unpacking, reseal product promptly or store it in a sealed container with a drying agent.

4. Storage place:

Do not store this product in corrosive gas (Sulfuric acid gas, Chlorine gas, etc.) or in direct sunlight.

Warn and note item

This product is designed for application in an ordinary environment (normal room temperature, humidity and atmospheric pressure).

Do not use under the following conditions because all of these factors can deteriorate the product characteristics or cause failures and burn-out.

1. Corrosive gas or deoxidizing gas (Chlorine gas, Hydrogen sulfide gas, Ammonia gas, Sulfuric acid gas, Nitric oxide gas, etc.)
2. Volatile or flammable gas
3. Dusty conditions
4. Under vacuum, or under high or low pressure
5. Wet or humid locations; soak in the liquid or wash with liquid
6. Places with salt water, oils, chemical liquids or organic solvents and do not use directly with quick-drying glue.
7. Strong vibrations
8. Other places where similar hazardous conditions exist
9. Be sure to provide an appropriate fail-safe function on your product to prevent secondary damages that may be caused by the abnormal function or the failure of our product.

Safety Approvals (Certified Model/Type : TTC03-502)



* 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
- (2) Halogen-free test report



R - T Table

Part No. : TTC3A502G39HAEY

R25=5KOhm ±2%

B25/85 = 3975 K ± 1.5%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
-40	174.885	162.729	151.357	-1.15	1.13	7.5%	-7.0%
-39	163.906	152.659	142.127	-1.12	1.11	7.4%	-6.9%
-38	153.549	143.151	133.404	-1.09	1.09	7.3%	-6.8%
-37	143.844	134.232	125.213	-1.08	1.08	7.2%	-6.7%
-36	134.784	125.899	117.552	-1.07	1.07	7.1%	-6.6%
-35	126.344	118.128	110.403	-1.06	1.07	7.0%	-6.5%
-34	118.491	110.891	103.737	-1.05	1.06	6.9%	-6.5%
-33	111.183	104.149	97.5220	-1.04	1.06	6.8%	-6.4%
-32	104.380	97.8684	91.7262	-1.04	1.05	6.7%	-6.3%
-31	98.0432	92.0119	86.3171	-1.03	1.04	6.6%	-6.2%
-30	92.1349	86.5466	81.2647	-1.02	1.03	6.5%	-6.1%
-29	86.6212	81.4416	76.5410	-1.01	1.03	6.4%	-6.0%
-28	81.4711	76.6688	72.1207	-1.01	1.02	6.3%	-5.9%
-27	76.6565	72.2030	67.9810	-1.00	1.01	6.2%	-5.8%
-26	72.1523	68.0212	64.1011	-0.99	1.00	6.1%	-5.8%
-25	67.9355	64.1030	60.4624	-0.98	0.99	6.0%	-5.7%
-24	63.9858	60.4295	57.0481	-0.97	0.98	5.9%	-5.6%
-23	60.2845	56.9841	53.8428	-0.96	0.97	5.8%	-5.5%
-22	56.8146	53.7512	50.8327	-0.95	0.96	5.7%	-5.4%
-21	53.5607	50.7170	48.0050	-0.94	0.95	5.6%	-5.3%
-20	50.5085	47.8684	45.3480	-0.93	0.94	5.5%	-5.3%
-19	47.6450	45.1935	42.8509	-0.92	0.93	5.4%	-5.2%
-18	44.9580	42.6813	40.5037	-0.91	0.92	5.3%	-5.1%
-17	42.4361	40.3215	38.2969	-0.90	0.91	5.2%	-5.0%
-16	40.0688	38.1045	36.2220	-0.89	0.90	5.2%	-4.9%
-15	37.8463	36.0213	34.2706	-0.88	0.89	5.1%	-4.9%
-14	35.7594	34.0636	32.4352	-0.87	0.88	5.0%	-4.8%
-13	33.7994	32.2233	30.7085	-0.86	0.88	4.9%	-4.7%
-12	31.9582	30.4933	29.0838	-0.85	0.87	4.8%	-4.6%
-11	30.2283	28.8664	27.5548	-0.84	0.86	4.7%	-4.5%
-10	28.6025	27.3361	26.1154	-0.83	0.85	4.6%	-4.5%
-9	27.0741	25.8964	24.7601	-0.82	0.84	4.5%	-4.4%
-8	25.6370	24.5416	23.4836	-0.81	0.83	4.5%	-4.3%
-7	24.2851	23.2661	22.2809	-0.80	0.82	4.4%	-4.2%
-6	23.0131	22.0650	21.1475	-0.79	0.81	4.3%	-4.2%
-5	21.8159	20.9336	20.0790	-0.78	0.80	4.2%	-4.1%
-4	20.6885	19.8674	19.0713	-0.77	0.79	4.1%	-4.0%
-3	19.6266	18.8623	18.1206	-0.76	0.78	4.1%	-3.9%
-2	18.6259	17.9145	17.2233	-0.75	0.77	4.0%	-3.9%
-1	17.6826	17.0203	16.3762	-0.74	0.76	3.9%	-3.8%



R - T Table

Part No. : TTC3A502G39HAEY

R25=5KOhm ±2%

B25/85 = 3975 K ± 1.5%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol.		Resistance Tol.	
				(°C)		(%)	
0	16.7930	16.1763	15.5760	-0.73	0.75	3.8%	-3.7%
1	15.9537	15.3795	14.8200	-0.72	0.74	3.7%	-3.6%
2	15.1615	14.6268	14.1053	-0.71	0.73	3.7%	-3.6%
3	14.4135	13.9156	13.4295	-0.70	0.72	3.6%	-3.5%
4	13.7069	13.2432	12.7901	-0.69	0.71	3.5%	-3.4%
5	13.0392	12.6074	12.1850	-0.68	0.70	3.4%	-3.4%
6	12.4079	12.0058	11.6121	-0.67	0.69	3.3%	-3.3%
7	11.8109	11.4365	11.0695	-0.66	0.68	3.3%	-3.2%
8	11.2461	10.8975	10.5554	-0.65	0.67	3.2%	-3.1%
9	10.7114	10.3869	10.0681	-0.64	0.66	3.1%	-3.1%
10	10.2053	9.90311	9.60607	-0.62	0.65	3.1%	-3.0%
11	9.72579	9.44456	9.16779	-0.61	0.64	3.0%	-2.9%
12	9.27150	9.00977	8.75192	-0.60	0.63	2.9%	-2.9%
13	8.84090	8.59736	8.35719	-0.59	0.61	2.8%	-2.8%
14	8.43262	8.20606	7.98240	-0.58	0.60	2.8%	-2.7%
15	8.04538	7.83467	7.62642	-0.57	0.59	2.7%	-2.7%
16	7.67797	7.48205	7.28821	-0.56	0.58	2.6%	-2.6%
17	7.32929	7.14717	6.96679	-0.54	0.57	2.5%	-2.5%
18	6.99826	6.82903	6.66123	-0.53	0.56	2.5%	-2.5%
19	6.68391	6.52671	6.37066	-0.52	0.54	2.4%	-2.4%
20	6.38531	6.23935	6.09428	-0.51	0.53	2.3%	-2.3%
21	6.10159	5.96612	5.83133	-0.50	0.52	2.3%	-2.3%
22	5.83194	5.70627	5.58107	-0.48	0.51	2.2%	-2.2%
23	5.57560	5.45908	5.34285	-0.47	0.49	2.1%	-2.1%
24	5.33185	5.22387	5.11603	-0.46	0.48	2.1%	-2.1%
25	5.10000	5.00000	4.90000	-0.45	0.47	2.0%	-2.0%
26	4.88581	4.78688	4.68808	-0.46	0.49	2.1%	-2.1%
27	4.68171	4.58394	4.48641	-0.48	0.50	2.1%	-2.1%
28	4.48720	4.39065	4.29445	-0.50	0.52	2.2%	-2.2%
29	4.30177	4.20650	4.11170	-0.52	0.54	2.3%	-2.3%
30	4.12496	4.03103	3.93767	-0.54	0.56	2.3%	-2.3%
31	3.95634	3.86379	3.77190	-0.55	0.58	2.4%	-2.4%
32	3.79548	3.70436	3.61398	-0.57	0.59	2.5%	-2.4%
33	3.64201	3.55233	3.46348	-0.59	0.61	2.5%	-2.5%
34	3.49553	3.40734	3.32004	-0.61	0.63	2.6%	-2.6%
35	3.35572	3.26902	3.18328	-0.63	0.65	2.7%	-2.6%
36	3.22223	3.13703	3.05287	-0.65	0.67	2.7%	-2.7%
37	3.09475	3.01107	2.92849	-0.66	0.69	2.8%	-2.7%
38	2.97298	2.89083	2.80983	-0.68	0.71	2.8%	-2.8%
39	2.85665	2.77602	2.69660	-0.70	0.72	2.9%	-2.9%

R - T Table

Part No. : TTC3A502G39HAEY

R25=5KOhm ±2%

B25/85 = 3975 K ± 1.5%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol.		Resistance Tol.	
				(°C)		(%)	
40	2.74548	2.66638	2.58853	-0.72	0.74	3.0%	-2.9%
41	2.63922	2.56164	2.48535	-0.74	0.76	3.0%	-3.0%
42	2.53764	2.46158	2.38684	-0.76	0.78	3.1%	-3.0%
43	2.44050	2.36594	2.29275	-0.78	0.80	3.2%	-3.1%
44	2.34760	2.27453	2.20286	-0.80	0.82	3.2%	-3.2%
45	2.25872	2.18714	2.11697	-0.82	0.84	3.3%	-3.2%
46	2.17368	2.10356	2.03489	-0.84	0.86	3.3%	-3.3%
47	2.09228	2.02362	1.95642	-0.86	0.88	3.4%	-3.3%
48	2.01437	1.94713	1.88138	-0.88	0.90	3.5%	-3.4%
49	1.93976	1.87394	1.80962	-0.90	0.92	3.5%	-3.4%
50	1.86832	1.80388	1.74098	-0.92	0.94	3.6%	-3.5%
51	1.79987	1.73681	1.67529	-0.94	0.96	3.6%	-3.5%
52	1.73429	1.67259	1.61243	-0.96	0.98	3.7%	-3.6%
53	1.67145	1.61107	1.55225	-0.98	1.00	3.7%	-3.7%
54	1.61120	1.55214	1.49463	-1.00	1.02	3.8%	-3.7%
55	1.55344	1.49566	1.43945	-1.02	1.04	3.9%	-3.8%
56	1.49805	1.44153	1.38659	-1.04	1.06	3.9%	-3.8%
57	1.44492	1.38964	1.33594	-1.07	1.08	4.0%	-3.9%
58	1.39395	1.33988	1.28740	-1.09	1.10	4.0%	-3.9%
59	1.34503	1.29216	1.24087	-1.11	1.12	4.1%	-4.0%
60	1.29808	1.24638	1.19626	-1.13	1.14	4.1%	-4.0%
61	1.25300	1.20245	1.15348	-1.15	1.16	4.2%	-4.1%
62	1.20971	1.16029	1.11244	-1.17	1.18	4.3%	-4.1%
63	1.16814	1.11982	1.07307	-1.19	1.20	4.3%	-4.2%
64	1.12820	1.08096	1.03528	-1.22	1.22	4.4%	-4.2%
65	1.08983	1.04364	0.99901	-1.24	1.24	4.4%	-4.3%
66	1.05295	1.00780	0.96419	-1.26	1.27	4.5%	-4.3%
67	1.01750	0.97336	0.93076	-1.28	1.29	4.5%	-4.4%
68	0.98341	0.94026	0.89865	-1.30	1.31	4.6%	-4.4%
69	0.95063	0.90845	0.86780	-1.33	1.33	4.6%	-4.5%
70	0.91910	0.87787	0.83815	-1.35	1.35	4.7%	-4.5%
71	0.88877	0.84847	0.80966	-1.37	1.37	4.8%	-4.6%
72	0.85958	0.82019	0.78228	-1.39	1.39	4.8%	-4.6%
73	0.83149	0.79298	0.75595	-1.42	1.41	4.9%	-4.7%
74	0.80446	0.76681	0.73063	-1.44	1.44	4.9%	-4.7%
75	0.77842	0.74162	0.70628	-1.46	1.46	5.0%	-4.8%
76	0.75336	0.71738	0.68286	-1.48	1.48	5.0%	-4.8%
77	0.72921	0.69405	0.66032	-1.51	1.50	5.1%	-4.9%
78	0.70595	0.67158	0.63863	-1.53	1.52	5.1%	-4.9%
79	0.68355	0.64994	0.61775	-1.55	1.54	5.2%	-5.0%



R - T Table

Part No. : TTC3A502G39HAEY

R25=5KOhm ±2%

B25/85 = 3975 K ± 1.5%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol.		Resistance Tol.	
				(°C)		(%)	
80	0.66195	0.62910	0.59765	-1.58	1.57	5.2%	-5.0%
81	0.64114	0.60903	0.57829	-1.60	1.59	5.3%	-5.0%
82	0.62108	0.58968	0.55965	-1.62	1.61	5.3%	-5.1%
83	0.60173	0.57104	0.54170	-1.65	1.63	5.4%	-5.1%
84	0.58308	0.55308	0.52441	-1.67	1.66	5.4%	-5.2%
85	0.56509	0.53576	0.50774	-1.69	1.68	5.5%	-5.2%
86	0.54774	0.51906	0.49168	-1.72	1.70	5.5%	-5.3%
87	0.53100	0.50295	0.47620	-1.74	1.72	5.6%	-5.3%
88	0.51484	0.48742	0.46128	-1.77	1.75	5.6%	-5.4%
89	0.49925	0.47244	0.44690	-1.79	1.77	5.7%	-5.4%
90	0.48421	0.45799	0.43302	-1.81	1.79	5.7%	-5.5%
91	0.46968	0.44405	0.41964	-1.84	1.81	5.8%	-5.5%
92	0.45566	0.43059	0.40674	-1.86	1.84	5.8%	-5.5%
93	0.44211	0.41760	0.39429	-1.89	1.86	5.9%	-5.6%
94	0.42904	0.40506	0.38227	-1.91	1.88	5.9%	-5.6%
95	0.41640	0.39296	0.37068	-1.94	1.91	6.0%	-5.7%
96	0.40420	0.38127	0.35949	-1.96	1.93	6.0%	-5.7%
97	0.39241	0.36998	0.34869	-1.99	1.95	6.1%	-5.8%
98	0.38102	0.35908	0.33826	-2.01	1.98	6.1%	-5.8%
99	0.37001	0.34854	0.32820	-2.04	2.00	6.2%	-5.8%
100	0.35936	0.33837	0.31847	-2.06	2.02	6.2%	-5.9%
101	0.34908	0.32854	0.30908	-2.09	2.05	6.3%	-5.9%
102	0.33913	0.31904	0.30001	-2.11	2.07	6.3%	-6.0%
103	0.32951	0.30985	0.29125	-2.14	2.10	6.3%	-6.0%
104	0.32021	0.30098	0.28278	-2.17	2.12	6.4%	-6.0%
105	0.31122	0.29239	0.27460	-2.19	2.14	6.4%	-6.1%
106	0.30252	0.28410	0.26669	-2.22	2.17	6.5%	-6.1%
107	0.29410	0.27607	0.25905	-2.25	2.19	6.5%	-6.2%
108	0.28595	0.26831	0.25166	-2.27	2.22	6.6%	-6.2%
109	0.27807	0.26081	0.24452	-2.30	2.24	6.6%	-6.2%
110	0.27045	0.25355	0.23761	-2.33	2.27	6.7%	-6.3%
111	0.26306	0.24652	0.23093	-2.35	2.29	6.7%	-6.3%
112	0.25592	0.23972	0.22446	-2.38	2.32	6.8%	-6.4%
113	0.24900	0.23314	0.21821	-2.41	2.34	6.8%	-6.4%
114	0.24230	0.22678	0.21216	-2.44	2.37	6.8%	-6.4%
115	0.23581	0.22061	0.20631	-2.47	2.40	6.9%	-6.5%
116	0.22952	0.21464	0.20065	-2.49	2.42	6.9%	-6.5%
117	0.22344	0.20887	0.19517	-2.52	2.45	7.0%	-6.6%
118	0.21754	0.20327	0.18986	-2.55	2.47	7.0%	-6.6%
119	0.21183	0.19785	0.18472	-2.58	2.50	7.1%	-6.6%

