



REVISED RECORD SHEET

REV. NO	REV. DATE	REVISED CONTENT



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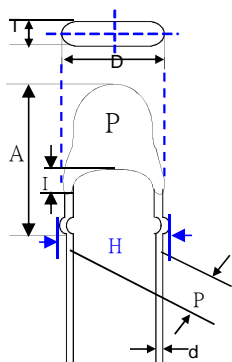
Part Number Code

Example :

TTC **3** **A** **204** **F** **437** **1** **F** **A1**
(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	204	$20 \times 10^4 \Omega = 200K\Omega$
(5)	Tolerance of R25°C	F	±1%
(6)	B Value	437	4370K
(7)	Tolerance of B Value	1	±1%
(8)	Appearance	F	Out kink lead epoxy coating (Green)
(9)	Optional Suffix	A1	RoHS+HF compliance Taping 12.7mm&Box H:4±0.5mm

Structure and Dimensions



(unit:mm)

Item	D	d	P	A	T	H	I
Max	4	0.52	3.04	7	3	4.5	3
Min	2	0.48	2.04	5	2	3.5	---

Electrical Characteristics

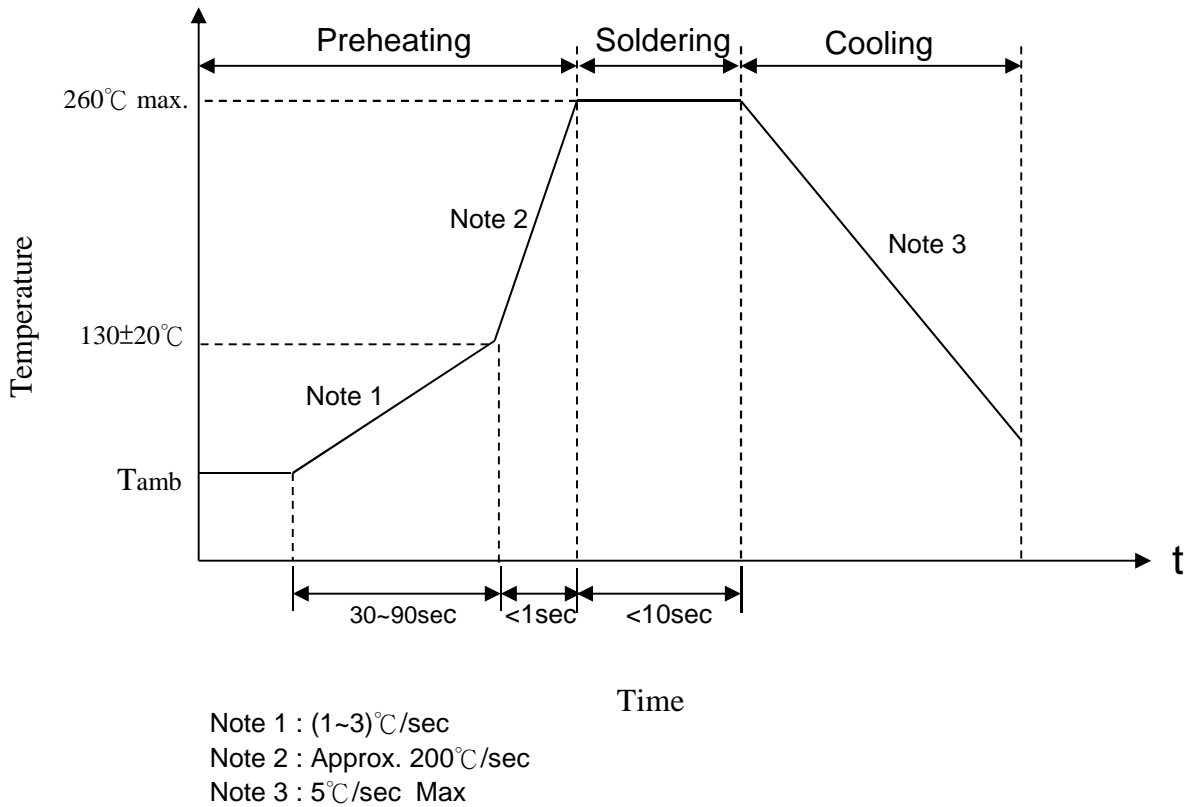
Part No.	Zero Power Resistance at 25°C	Tolerance of R _{25°C}	B _{25/85} Value	Tolerance of B Value	Max. Power Dissipation at 25°C	Dissipation Factor	Thermal Time Constant	Operating Temperature Range
	R _{25°C} (KΩ)	(± %)	(K)	(± %)	P _{max} (mW)	δ(mW/°C)	τ (sec.)	T _L ~T _U (°C)
TTC3A204F4371FA1	200	1	4370	1	150	≥2.5	≤18	-40 ~+125

Reliability

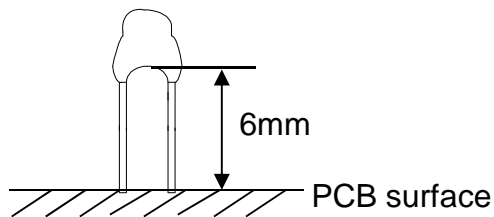
Item	Standard	Test conditions / Methods	Specifications															
Tensile Strength of Terminals	IEC60068-2-21	<p>Gradually applying the force specified and keeping the unit fixed for 10±1 sec.</p> <table style="width: 100%; border: none;"> <tr> <td style="text-align: center; border: none;">Terminal diameter (mm)</td> <td style="text-align: center; border: none;">Force (Kg)</td> </tr> <tr> <td style="text-align: center; border: none;"><u>0.3<d≤0.5</u></td> <td style="text-align: center; border: none;"><u>0.5</u></td> </tr> <tr> <td style="text-align: center; border: none;">0.5<d≤0.8</td> <td style="text-align: center; border: none;">1.0</td> </tr> </table>	Terminal diameter (mm)	Force (Kg)	<u>0.3<d≤0.5</u>	<u>0.5</u>	0.5<d≤0.8	1.0	No visible damage									
Terminal diameter (mm)	Force (Kg)																	
<u>0.3<d≤0.5</u>	<u>0.5</u>																	
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 style="width: 100%; border: none;"> <tr> <td style="text-align: center; border: none;">Terminal diameter (mm)</td> <td style="text-align: center; border: none;">Force (Kg)</td> </tr> <tr> <td style="text-align: center; border: none;"><u>0.3<d≤0.5</u></td> <td style="text-align: center; border: none;"><u>0.25</u></td> </tr> <tr> <td style="text-align: center; border: none;">0.5<d≤0.8</td> <td style="text-align: center; border: none;">0.50</td> </tr> </table>	Terminal diameter (mm)	Force (Kg)	<u>0.3<d≤0.5</u>	<u>0.25</u>	0.5<d≤0.8	0.50	No visible damage									
Terminal diameter (mm)	Force (Kg)																	
<u>0.3<d≤0.5</u>	<u>0.25</u>																	
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%; border-collapse: collapse;"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Period (minutes)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">-40 ± 5</td> <td style="text-align: center;">30 ± 3</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">Room temperature</td> <td style="text-align: center;">5 ± 3</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">125 ± 5</td> <td style="text-align: center;">30 ± 3</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">Room temperature</td> <td style="text-align: center;">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> $\delta = V \cdot I / (T_2 - T_1) \text{ (mW/°C)}$	≥ 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



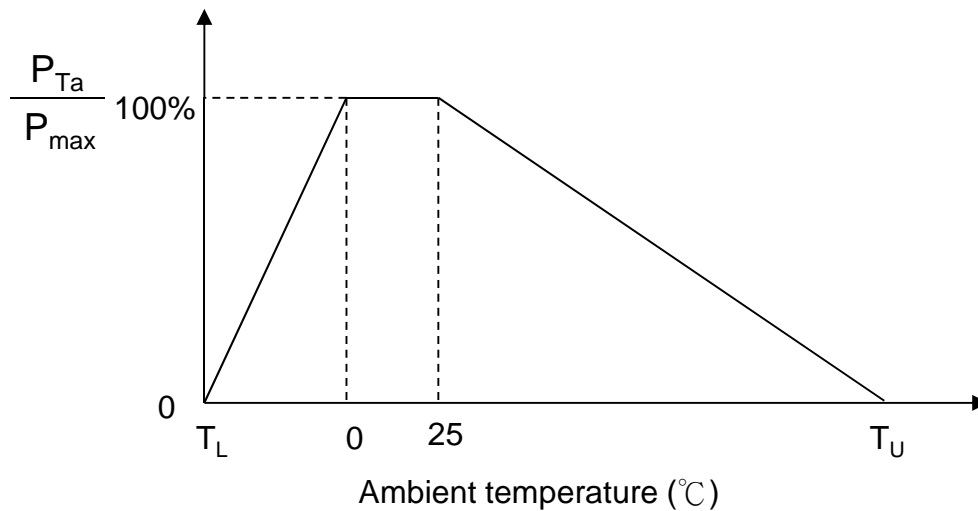
Caution: It has been better to keep the minimum distance as 6mm between the bottom of the thermistor body and PCB surface to prevent component damage.



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 : $\leq 75\%RH$ (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 2mm 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.

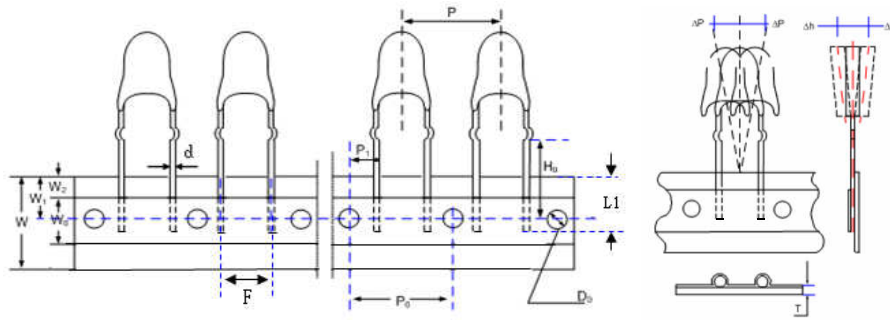
Warn and note item

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.
10. This series is manufactured and promoted for applying in general electronics devices such as audio-video equipment, home electric appliance, office automation equipment, communication equipment, power module, LED lighting, measurement hardware, machine accessory, etc.
11. This series cannot be applied in area like automotive product, military, aerospace, etc. except general electronic device, Thinking shall not be held liable for any malfunction or breakdown caused by using product in the condition which is inconsistent with that recommended by Thinking.

Taping and Dimensions

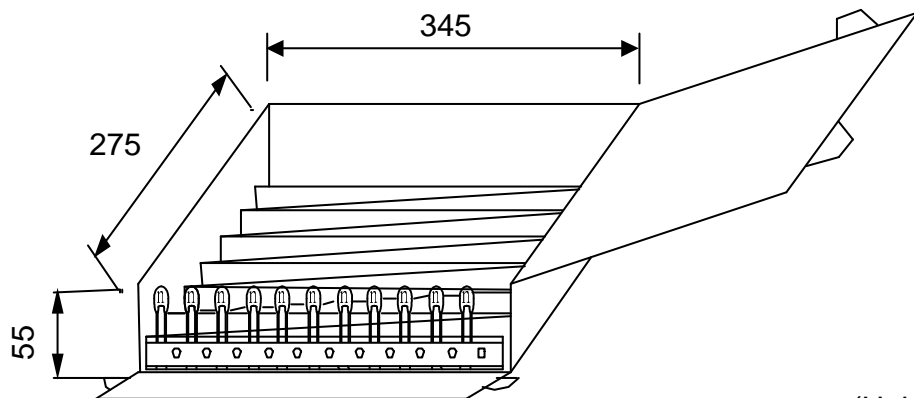


(Unit:mm)

Item	P0	F	P	P1	H0	H1	d	W0	W1	W2	W	ΔP	Δh	L1	D0	T
	±0.3	±0.5	±1	±0.7	±0.5	Max	±0.02	±1.5	$\begin{matrix} +0.75 \\ -0.5 \end{matrix}$	Max	$\begin{matrix} +1 \\ -0.5 \end{matrix}$	Max	Max.	±1	±0.2	±0.2
	12.7	2.54	12.7	5.08	16	26	0.5	12	9	3	18	1	2	10	4	0.6

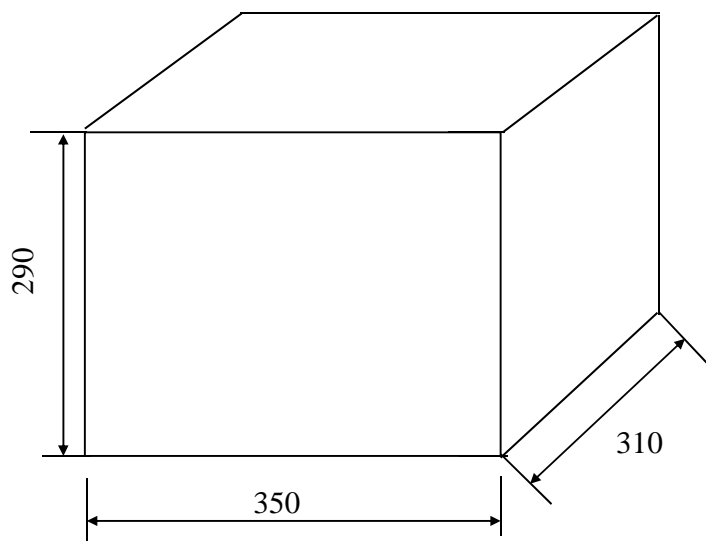
Standard Packing

(1) Quantity (2500pcs /Ammo box)



(Unit:mm)

(2) : Quantity (5 boxes /Carton)



(Unit:mm)

Safety Approvals (Certified Model/Type :TTC03-204)



* UL 1434 / cUL recognized (File # E138827)



* 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. : TTC3A204F4371FA1

R25=200KOhm ±1%

B25/85 = 4370 K ± 1%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
-40	7899.426	7542.397	7200.784	-0.75	0.73	4.7%	-4.5%
-39	7404.036	7073.932	6757.869	-0.70	0.70	4.7%	-4.5%
-38	6930.142	6625.504	6333.623	-0.68	0.69	4.6%	-4.4%
-37	6483.856	6202.922	5933.567	-0.66	0.68	4.5%	-4.3%
-36	6067.264	5808.198	5559.638	-0.66	0.68	4.5%	-4.3%
-35	5680.108	5441.124	5211.674	-0.65	0.67	4.4%	-4.2%
-34	5320.880	5100.309	4888.392	-0.65	0.67	4.3%	-4.2%
-33	4987.516	4783.827	4587.998	-0.64	0.67	4.3%	-4.1%
-32	4677.793	4489.602	4308.551	-0.64	0.66	4.2%	-4.0%
-31	4389.562	4215.621	4048.167	-0.63	0.66	4.1%	-4.0%
-30	4120.860	3960.042	3805.119	-0.63	0.65	4.1%	-3.9%
-29	3869.946	3721.234	3577.879	-0.62	0.64	4.0%	-3.9%
-28	3635.311	3497.781	3365.117	-0.62	0.63	3.9%	-3.8%
-27	3415.653	3288.462	3165.690	-0.61	0.63	3.9%	-3.7%
-26	3209.852	3092.226	2978.612	-0.60	0.62	3.8%	-3.7%
-25	3016.935	2908.162	2803.031	-0.59	0.61	3.7%	-3.6%
-24	2836.051	2735.474	2638.201	-0.58	0.60	3.7%	-3.6%
-23	2666.443	2573.452	2483.456	-0.57	0.59	3.6%	-3.5%
-22	2507.427	2421.456	2338.198	-0.57	0.58	3.6%	-3.4%
-21	2358.375	2278.896	2201.8753	-0.56	0.58	3.5%	-3.4%
-20	2218.700	2145.2245	2073.9750	-0.55	0.57	3.4%	-3.3%
-19	2087.8523	2019.9255	1954.0132	-0.54	0.56	3.4%	-3.3%
-18	1965.3090	1902.5081	1841.5297	-0.53	0.55	3.3%	-3.2%
-17	1850.5710	1792.5038	1736.0850	-0.53	0.55	3.2%	-3.1%
-16	1743.1609	1689.4639	1637.2572	-0.52	0.54	3.2%	-3.1%
-15	1642.6215	1592.9582	1544.6420	-0.51	0.53	3.1%	-3.0%
-14	1548.5158	1502.5751	1457.8516	-0.51	0.53	3.1%	-3.0%
-13	1460.4263	1417.9211	1376.5153	-0.50	0.52	3.0%	-2.9%
-12	1377.9561	1338.6213	1300.2793	-0.50	0.52	2.9%	-2.9%
-11	1300.7281	1264.3196	1228.8074	-0.49	0.51	2.9%	-2.8%
-10	1228.3860	1194.6791	1161.7810	-0.48	0.50	2.8%	-2.8%
-9	1160.5940	1129.3819	1098.8993	-0.48	0.50	2.8%	-2.7%
-8	1097.0364	1068.1291	1039.8794	-0.47	0.49	2.7%	-2.6%
-7	1037.4180	1010.6406	984.4559	-0.47	0.49	2.6%	-2.6%
-6	981.4628	956.6548	932.3805	-0.46	0.48	2.6%	-2.5%
-5	928.9142	905.9278	883.4219	-0.45	0.47	2.5%	-2.5%
-4	879.5336	858.2332	837.3649	-0.45	0.47	2.5%	-2.4%
-3	833.1000	813.3608	794.0098	-0.44	0.46	2.4%	-2.4%
-2	789.4088	771.1159	753.1717	-0.43	0.45	2.4%	-2.3%
-1	748.2711	731.3190	714.6794	-0.43	0.44	2.3%	-2.3%



R - T Table

Part No. : TTC3A204F4371FA1

R25=200KOhm ±1%

B25/85 = 4370 K ± 1%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
0	709.5127	693.8039	678.3751	-0.42	0.44	2.3%	-2.2%
1	672.9729	658.4177	644.1129	-0.41	0.43	2.2%	-2.2%
2	638.5037	625.0193	611.7584	-0.40	0.42	2.2%	-2.1%
3	605.9688	593.4787	581.1879	-0.40	0.41	2.1%	-2.1%
4	575.2426	563.6762	552.2871	-0.39	0.40	2.1%	-2.0%
5	546.2096	535.5015	524.9508	-0.38	0.40	2.0%	-2.0%
6	518.7633	508.8529	499.0819	-0.37	0.39	1.9%	-1.9%
7	492.8052	483.6364	474.5908	-0.36	0.38	1.9%	-1.9%
8	468.2447	459.7656	451.3948	-0.36	0.37	1.8%	-1.8%
9	444.9979	437.1601	429.4173	-0.35	0.36	1.8%	-1.8%
10	422.9871	415.7457	408.5875	-0.34	0.35	1.7%	-1.7%
11	402.1405	395.4538	388.8394	-0.33	0.34	1.7%	-1.7%
12	382.3910	376.2202	370.1121	-0.32	0.33	1.6%	-1.6%
13	363.6766	357.9856	352.3485	-0.31	0.33	1.6%	-1.6%
14	345.9392	340.6944	335.4956	-0.30	0.32	1.5%	-1.5%
15	329.1248	324.2949	319.5040	-0.29	0.31	1.5%	-1.5%
16	313.1828	308.7386	304.3270	-0.29	0.30	1.4%	-1.4%
17	298.0658	293.9801	289.9213	-0.28	0.29	1.4%	-1.4%
18	283.7292	279.9766	276.2460	-0.27	0.28	1.3%	-1.3%
19	270.1313	266.6882	263.2627	-0.26	0.27	1.3%	-1.3%
20	257.2327	254.0771	250.9351	-0.25	0.26	1.2%	-1.2%
21	244.9963	242.1076	239.2290	-0.24	0.25	1.2%	-1.2%
22	233.3870	230.7460	228.1121	-0.23	0.24	1.1%	-1.1%
23	222.3718	219.9607	217.5540	-0.22	0.24	1.1%	-1.1%
24	211.9193	209.7215	207.52580	-0.21	0.23	1.0%	-1.0%
25	202.0000	200.00000	198.00000	-0.21	0.22	1.0%	-1.0%
26	192.7679	190.76913	188.77222	-0.22	0.23	1.0%	-1.0%
27	183.99678	182.00334	180.01348	-0.23	0.24	1.1%	-1.1%
28	175.66285	173.67836	171.69911	-0.24	0.25	1.1%	-1.1%
29	167.74346	165.77117	163.80569	-0.25	0.26	1.2%	-1.2%
30	160.21713	158.25993	156.31102	-0.26	0.27	1.2%	-1.2%
31	153.06347	151.12392	149.19403	-0.27	0.28	1.3%	-1.3%
32	146.26312	144.34346	142.43476	-0.28	0.30	1.3%	-1.3%
33	139.79768	137.89990	136.01427	-0.29	0.31	1.4%	-1.4%
34	133.64972	131.77551	129.91460	-0.31	0.32	1.4%	-1.4%
35	127.80265	125.95351	124.11872	-0.32	0.33	1.5%	-1.5%
36	122.24077	120.41797	118.61049	-0.33	0.34	1.5%	-1.5%
37	116.94916	115.15379	113.37463	-0.34	0.36	1.6%	-1.5%
38	111.91369	110.14664	108.39665	-0.35	0.37	1.6%	-1.6%
39	107.12094	105.38296	103.66282	-0.36	0.38	1.6%	-1.6%

R - T Table

Part No. : TTC3A204F4371FA1

R25=200KOhm ±1%
B25/85 = 4370 K ± 1%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)		Resistance Tol. (%)	
40	102.55822	100.84992	99.16015	-0.38	0.39	1.7%	-1.7%
41	98.21348	96.53533	94.87637	-0.39	0.40	1.7%	-1.7%
42	94.07533	92.42769	90.79982	-0.40	0.42	1.8%	-1.8%
43	90.13297	88.51609	86.91953	-0.41	0.43	1.8%	-1.8%
44	86.37619	84.79023	83.22507	-0.43	0.44	1.9%	-1.8%
45	82.79532	81.24036	79.70663	-0.44	0.45	1.9%	-1.9%
46	79.38122	77.85726	76.35491	-0.45	0.47	2.0%	-1.9%
47	76.12525	74.63221	73.16114	-0.46	0.48	2.0%	-2.0%
48	73.01923	71.55699	70.11703	-0.48	0.49	2.0%	-2.0%
49	70.05544	68.62382	67.21475	-0.49	0.50	2.1%	-2.1%
50	67.22657	65.82536	64.44690	-0.50	0.52	2.1%	-2.1%
51	64.52574	63.15465	61.80652	-0.51	0.53	2.2%	-2.1%
52	61.94642	60.60517	59.28702	-0.53	0.54	2.2%	-2.2%
53	59.48247	58.17071	56.88219	-0.54	0.55	2.3%	-2.2%
54	57.12808	55.84545	54.58617	-0.55	0.57	2.3%	-2.3%
55	54.87775	53.62388	52.39341	-0.56	0.58	2.3%	-2.3%
56	52.72631	51.50078	50.29871	-0.58	0.59	2.4%	-2.3%
57	50.66885	49.47126	48.29713	-0.59	0.61	2.4%	-2.4%
58	48.70077	47.53066	46.38403	-0.60	0.62	2.5%	-2.4%
59	46.81768	45.67462	44.55502	-0.62	0.63	2.5%	-2.5%
60	45.01547	43.89901	42.80595	-0.63	0.64	2.5%	-2.5%
61	43.29025	42.19991	41.13292	-0.64	0.66	2.6%	-2.5%
62	41.63831	40.57363	39.53222	-0.65	0.67	2.6%	-2.6%
63	40.05620	39.01671	38.00038	-0.67	0.68	2.7%	-2.6%
64	38.54061	37.52583	36.53410	-0.68	0.69	2.7%	-2.6%
65	37.08844	36.09788	35.13027	-0.69	0.71	2.7%	-2.7%
66	35.69674	34.72993	33.78592	-0.71	0.72	2.8%	-2.7%
67	34.36271	33.41918	32.49830	-0.72	0.73	2.8%	-2.8%
68	33.08373	32.16299	31.26474	-0.73	0.75	2.9%	-2.8%
69	31.85730	30.95887	30.08277	-0.75	0.76	2.9%	-2.8%
70	30.68104	29.80446	28.95002	-0.76	0.77	2.9%	-2.9%
71	29.55271	28.69750	27.86425	-0.77	0.78	3.0%	-2.9%
72	28.47017	27.63587	26.82334	-0.79	0.80	3.0%	-2.9%
73	27.43142	26.61756	25.82527	-0.80	0.81	3.1%	-3.0%
74	26.43452	25.64065	24.86813	-0.81	0.82	3.1%	-3.0%
75	25.47765	24.70331	23.95012	-0.83	0.84	3.1%	-3.0%
76	24.55908	23.80383	23.06950	-0.84	0.85	3.2%	-3.1%
77	23.67715	22.94055	22.22464	-0.85	0.86	3.2%	-3.1%
78	22.83031	22.11192	21.41399	-0.87	0.88	3.2%	-3.2%
79	22.01704	21.31643	20.63605	-0.88	0.89	3.3%	-3.2%

R - T Table

Part No. : TTC3A204F4371FA1

R25=200KOhm $\pm 1\%$ B25/85 = 4370 K $\pm 1\%$

Temperature (°C)	Rmax. (K Ω)	Rnor. (K Ω)	Rmin. (K Ω)	Temperature Tol. (°C)		Resistance Tol. (%)	
80	21.23594	20.55268	19.88942	-0.89	0.90	3.3%	-3.2%
81	20.48563	19.81931	19.17275	-0.91	0.92	3.4%	-3.3%
82	19.76483	19.11503	18.48476	-0.92	0.93	3.4%	-3.3%
83	19.07229	18.43862	17.82422	-0.94	0.95	3.4%	-3.3%
84	18.40684	17.78889	17.18998	-0.95	0.96	3.5%	-3.4%
85	17.76734	17.16474	16.58091	-0.97	0.97	3.5%	-3.4%
86	17.15272	16.56507	15.99596	-0.98	0.99	3.5%	-3.4%
87	16.56195	15.98888	15.43409	-0.99	1.00	3.6%	-3.5%
88	15.99404	15.43518	14.89435	-1.01	1.02	3.6%	-3.5%
89	15.44804	14.90303	14.37581	-1.02	1.03	3.7%	-3.5%
90	14.92306	14.39154	13.87756	-1.04	1.05	3.7%	-3.6%
91	14.41821	13.89984	13.39876	-1.05	1.06	3.7%	-3.6%
92	13.93267	13.42711	12.93860	-1.07	1.07	3.8%	-3.6%
93	13.46565	12.97257	12.49629	-1.08	1.09	3.8%	-3.7%
94	13.01638	12.53545	12.07109	-1.10	1.10	3.8%	-3.7%
95	12.58413	12.11504	11.66227	-1.12	1.12	3.9%	-3.7%
96	12.16819	11.71063	11.26914	-1.13	1.13	3.9%	-3.8%
97	11.76789	11.32156	10.89106	-1.15	1.15	3.9%	-3.8%
98	11.38259	10.94718	10.52738	-1.16	1.17	4.0%	-3.8%
99	11.01165	10.58689	10.17749	-1.18	1.18	4.0%	-3.9%
100	10.65448	10.24009	9.84083	-1.19	1.20	4.0%	-3.9%
101	10.31051	9.90621	9.51681	-1.21	1.21	4.1%	-3.9%
102	9.97918	9.58471	9.20492	-1.23	1.23	4.1%	-4.0%
103	9.65998	9.27508	8.90462	-1.24	1.24	4.1%	-4.0%
104	9.35237	8.97680	8.61544	-1.26	1.26	4.2%	-4.0%
105	9.05589	8.68939	8.33689	-1.28	1.27	4.2%	-4.1%
106	8.77006	8.41240	8.06852	-1.29	1.29	4.3%	-4.1%
107	8.49442	8.14538	7.80990	-1.31	1.30	4.3%	-4.1%
108	8.22855	7.88790	7.56059	-1.32	1.32	4.3%	-4.1%
109	7.97203	7.63955	7.32021	-1.34	1.33	4.4%	-4.2%
110	7.72445	7.39994	7.08835	-1.35	1.35	4.4%	-4.2%
111	7.48544	7.16869	6.86466	-1.37	1.36	4.4%	-4.2%
112	7.25462	6.94544	6.64878	-1.38	1.38	4.5%	-4.3%
113	7.03164	6.72984	6.44036	-1.40	1.39	4.5%	-4.3%
114	6.81616	6.52156	6.23907	-1.41	1.40	4.5%	-4.3%
115	6.60785	6.32027	6.04461	-1.43	1.42	4.6%	-4.4%
116	6.40640	6.12568	5.85667	-1.44	1.43	4.6%	-4.4%
117	6.21151	5.93747	5.67496	-1.46	1.44	4.6%	-4.4%
118	6.02289	5.75538	5.49920	-1.47	1.45	4.6%	-4.5%
119	5.84027	5.57913	5.32914	-1.48	1.46	4.7%	-4.5%

