



RTX Thin Film Chip Resistors Product Specification

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1 Scope:

- 1.1 This specification is applicable to lead and halogen free RTX(H) series thin film chip resistors.
- 1.2 Lead free products mean lead free termination meets RoHS requirement.

2 Explanation Of Part Numbers:

(EX)

	<u>RTX</u>	<u>0402</u>	<u>T</u>	<u>1002</u>	<u>B</u>	<u>D</u>
Type	Size	Packaging	Normal Resistance (4 Digit)	Tolerance	T.C.R	
Thin Film Chip Resistors	0201 0402 0603 0805 1206 1210 2010 2512	T : Taping	EX. 10.2Ω=10R2 10KΩ=1002	L=± 0.01% P=± 0.02% W=± 0.05% B=± 0.1% C=± 0.25% D=± 0.5% F=± 1.0%	A=±5ppm/°C B=±10ppm/°C C=± 15ppm/°C D=± 25ppm/°C E=± 50ppm/°C	

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3 General Specifications:

Type	Rated Power	Max. Working Voltage	Max. Overload Voltage	T.C.R. (ppm/°C)	Resistance Range							
					L(±0.01%) E-96、E-24	P(±0.02%) E-96、E-24	W(±0.05%) E-96、E-24	B(±0.1%) E-96、E-24	C(±0.25%) E-96、E-24	D(±0.5%) E-96、E-24	F(±1%) E-96、E-24	
RTX0201	1/20 W	25V	50V	±50、±25	---	---	---	22Ω~75KΩ				
				±15、±10	---	---	---	22Ω~5KΩ		---	---	
RTX0402	1/16 W	50V	100V	±50、±25	50.1Ω~12KΩ		20Ω~12KΩ		4.7Ω~240KΩ			
				±15、±10	20Ω~12KΩ			20Ω~200KΩ		---	---	
				±5	20Ω~10KΩ			---	---			
RTX0603	1/10 W	75V	150V	±50、±25	50.1Ω~30KΩ		4.7Ω~100KΩ		1Ω~1MΩ			
				±15、±10	50.1Ω~100KΩ		4.7Ω~100KΩ		4.7Ω~680KΩ		---	---
				±5	20Ω~30KΩ			---	---			
RTX0805	1/8 W	150V	300V	±50、±25	50.1Ω~30KΩ		4.7Ω~200KΩ		1Ω~1.5MΩ			
				±15、±10	50.1Ω~200KΩ		4.7Ω~200KΩ		4.7Ω~1MΩ		---	---
				±5	20Ω~50KΩ			---	---			
RTX1206	1/4 W	200V	400V	±50、±25	50.1Ω~30KΩ		5.6Ω~500KΩ		1Ω~1.5MΩ			
				±15、±10	50.1Ω~500KΩ		5.6Ω~500KΩ		5.6Ω~1.5MΩ		---	---
				±5	20Ω~100KΩ			---	---			
RTX1210	1/4 W	200V	400V	±50、±25	---	---	4.7Ω~1MΩ					
				±15、±10	---	---	100Ω~100KΩ		4.7Ω~100KΩ		---	---
RTX2010	1/2 W	200V	400V	±50、±25	---	---	4.7Ω~1MΩ					
				±15、±10	---	---	100Ω~100KΩ		4.7Ω~100KΩ		---	---
RTX2512	3/4 W	200V	400V	±50、±25	---	---	4.7Ω~1MΩ					
				±15、±10	---	---	100Ω~100KΩ		4.7Ω~100KΩ		---	---
	1W	200V	400V	±50、±25	---	---	10Ω~1MΩ					
Operating Temperature Range				RTX01/12/20/25:-55°C ~ +125°C RTX02/03/05/06:-55°C ~ +155°C								

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3.1 Power Derating Curve:

Type	RTX0201/1210/2010/2512	RTX0402/0603/0805/1206
Operating Temperature Range	-55°C ~ +125°C	-55°C ~ +155°C
Explain	For resistors operated in ambient temperatures above 70°C, power rating shall be derated in accordance with figure below.	For resistors operated in ambient temperatures above 70°C, power rating shall be derated in accordance with figure below.
Figure		

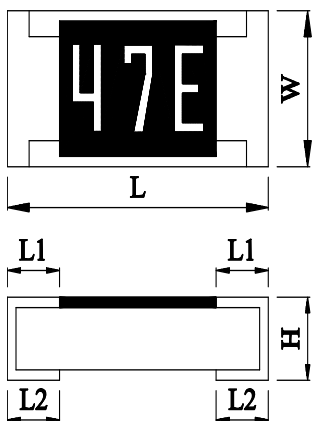
3.2 Voltage Rating:

Rated Voltage: The resistor shall have a DC continuous working voltage or a rms. AC continuous working voltage at commercial-line frequency and wave form corresponding to the power rating, as determined from the following

$$E = \sqrt{R \times P}$$

E= Rated voltage (V)
P= Power rating (W)
R=Nominal resistance(Ω)

4 Dimension



Dimension		Unit:mm				
Type	Size Code	L	W	H	L1	L2
RTX	0201	0.60±0.03	0.30±0.03	0.23±0.03	0.10±0.05	0.15±0.05
RTX	0402	1.00±0.10	0.50±0.05	0.30±0.05	0.20±0.10	0.25±0.10
RTX	0603	1.60±0.10	0.80±0.10	0.45±0.10	0.25±0.15	0.25±0.15
RTX	0805	2.00±0.10	1.25±0.10	0.50±0.10	0.35±0.20	0.35±0.20
RTX	1206	3.10±0.10	1.60±0.10	0.55±0.10	0.45±0.20	0.40±0.20
RTX	1210	3.10±0.10	2.60±0.15	0.55±0.10	0.50±0.20	0.50±0.20
RTX	2010	5.00±0.10	2.50±0.15	0.55±0.10	0.60±0.20	0.50±0.20
RTX	2512	6.35±0.10	3.20±0.15	0.55±0.10	0.60±0.20	0.50±0.20

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5 Reliability Test:

5.1 Electrical Performance Test

Item	Conditions	Specifications
		Resistors
Temperature Coefficient of Resistance	$TCR \text{ (ppm/}^\circ\text{C)} = \frac{(R2 - R1)}{R1 (T2 - T1)} \times 10^6$ R1: Resistance at room temperature R2: Resistance at -55°C or +125°C T1: Room temperature T2: Temperature -55°C or +125°C Refer to JIS-C5201-1 4.8	Refer to item 3. general specifications
Short Time Overload	Applied 2.5 times rated voltage for 5 seconds and release the load for about 30 minutes, then measure its resistance variance rate. (Rated voltage refer to item 3. general specifications) Refer to JIS-C5201-1 4.13	±(0.5%+0.05Ω) No evidence of mechanical damage. No short or burned on the appearance.
Insulation Resistance	Put the resistor in the fixture, add 100 VDC in +, - terminal for 60 sec then measured the insulation resistance between electrodes and insulating enclosure or between electrodes and base material. Refer to JIS-C5201-1 4.6 <div style="text-align: center; margin-top: 10px;"> </div>	≥ 10 ⁹ Ω
Dielectric Withstand Voltage	Put the resistor in the fixture, apply the maximum voltage VAC in +, - terminal for 1 minute. Refer to JIS-C5201-1 4.7	No short or burned on the appearance.

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5.2 Mechanical Performance Test

Item	Conditions	Specifications
Solderability	<p>Preconditioning: At a temperature of 155°C, aging duration of 4 hours. Then after left the tested resistor in room temperature for 2 hours or more.</p> <p>Test method: The resistor be immersed into solder pot in temperature 245±3°C for 3±0.5 sec, then the resistor is left as placed under microscope to observed its solder area.</p> <p>Refer to J-STD-002 B</p>	<p style="text-align: center;">Resistors</p> <p>Solder coverage over 95%</p>
Resistance to Soldering Heat	<p>Test method (Solder pot test): The tested resistor be immersed into molten solder of 260+5/-0°C for 10 seconds. Then the resistor is left in the room for 1 hour.</p> <p>Refer to JIS-C5201-1 4.18</p>	<p>(1).Variance rate on resistance $\Delta R\% = \pm(1.0\% + 0.05\Omega)$</p> <p>(2).No evidence of electrode damage. No side conductive peeling off.</p>
Joint Strength of Solder	<p>Test item (Bending Strength): Solder tested resistor on to PC board add force in the middle down, and under load measured its resistance variance rate.</p> <p>Amount of Bend(D) RTX0402,0603,0805:5mm RTX0201,1206,1210:3mm RTX2010,2512:1mm</p> <div style="text-align: center;"> </div> <p>Refer to JIS-C5201-1 4.33</p>	<p>(1).Variance rate on resistance : $\pm(0.25\% + 0.05\Omega)$</p> <p>(2).No evidence of mechanical damage. No terminal peeling off and core body cracked.</p>

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5.3 Environmental Test

Item	Conditions	Specifications								
		Resistors								
Resistance to Dry Heat	Put tested resistor in chamber under temperature $125\pm 5^{\circ}\text{C}$ for 1000 +48/-0 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.25	$\pm(0.5\%+0.05\Omega)$								
Thermal Shock	Put the tested resistor in the thermal shock chamber under the temperature cycle which shown in the following table shall be repeated 300 times consecutively. Then leaving the tested resistor in the room temperature for 1 hours, and measure its resistance variance rate. <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">Testing Condition</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Lowest Temperature</td> <td style="text-align: center;">$-55\pm 5^{\circ}\text{C}$</td> </tr> <tr> <td style="text-align: center;">Highest Temperature</td> <td style="text-align: center;">$125\pm 5^{\circ}\text{C}$</td> </tr> <tr> <td style="text-align: center;">Temperature-retaining time</td> <td style="text-align: center;">15 minutes each</td> </tr> </tbody> </table> Refer to MIL-STD 202 Method 107	Testing Condition		Lowest Temperature	$-55\pm 5^{\circ}\text{C}$	Highest Temperature	$125\pm 5^{\circ}\text{C}$	Temperature-retaining time	15 minutes each	$\pm(0.5\%+0.05\Omega)$
Testing Condition										
Lowest Temperature	$-55\pm 5^{\circ}\text{C}$									
Highest Temperature	$125\pm 5^{\circ}\text{C}$									
Temperature-retaining time	15 minutes each									
Loading Life in Moisture	Put the tested resistor in the chamber under temperature $40\pm 2^{\circ}\text{C}$, relative humidity 90~95% and load the rated voltage for 90 minutes on, 30 minutes off, total 1000 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.24	$\pm(0.5\%+0.05\Omega)$								
Load Life	Put the tested resistor in chamber under temperature $70\pm 5^{\circ}\text{C}$ and load the rated voltage for 90 minutes on, 30 minutes off, total 1000 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.25	$\pm(0.5\%+0.05\Omega)$								

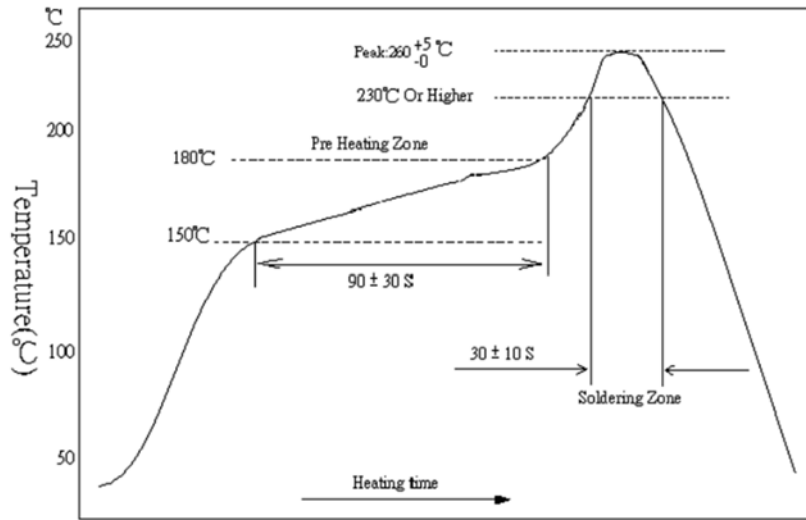
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6 Technical application notes: (This is for recommendation, please customer perform adjustment according to actual application)

6.1 Recommend Soldering Method:

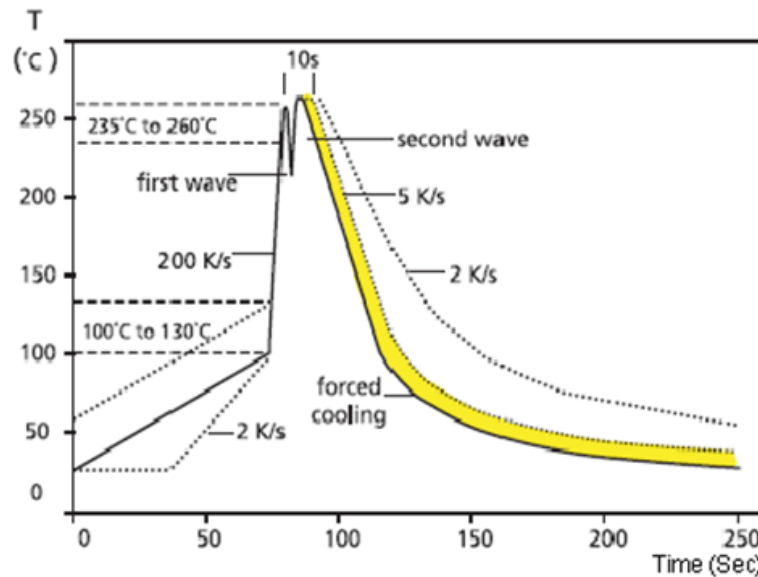
Surface-mount components are tested for solderability at a temperature of 245 °C for 3 seconds. Typical examples of soldering processes that provide reliable joints without any damage are given in below:

6.1.1 Lead Free IR Reflow Soldering Profile (MEET J-STD-020D)



Remark: The peak temperature of soldering heat is 260 +5/-0 °C for 10 seconds

6.1.2 Lead Free Double-Wave Soldering Profile. (This applies to 0603 size inclusive above products)



6.1.3 Soldering Iron: temperature 350°C ± 10°C , dwell time shall be less than 3 sec

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6.2 Environment Precautions:

This specification product is for general electronic use, ABCO will not be responsible for any damage, cost or loss caused by using this specification product in any special environment. If other applications need to confirm with ABCO.

If consumer intends to use our Company product in special environment or condition (including but not limited to those mentioned below), then will need to make individual recognition of product features and reliability accordingly.

- (a) Used in high temperature and humidity environment;
- (b) Exposed to sea breeze or other corrosive gas, such as Cl₂、H₂S、NH₃、SO₂ and NO₂;
- (c) Used in non-verified liquids including water, oil, chemical and organic solvents;
- (d) Using non-verified resin or other coating material to seal or coat our Company product;
- (e) After soldering, it is necessary to use water-soluble detergents to clean residual solder fluxes, even though no-clean fluxes are recommended.

6.3 Momentary Overload Precautions:

The product might be out of function when momentary overloaded. Please make sure to avoid momentary overloading while using and preserving.

6.4 Operation and Processing Precautions:

- (a) Avoid damage to the edge of resistor and protective layer caused by mechanical stress.
- (b) Handle with care when printing circuit board (PCB) is divided or fixed on support body, because bending of printing circuit board (PCB) mounting will make mechanical stress for resistors.
- (c) Make sure the power rating is under the limit when using the resistor. When power rating is over the limit, the resistor will be overloaded. There might be machinery damage due to the climbing temperature.
- (d) If the resistor will be exposed under massive impact load (shock wave) in a short period of time, the working environment must be set up well before use.
- (e) Please make evaluation and confirmation when the product is well used in your company and have a through consideration of it's fail-safe design to ensure the system safety.

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7 Stock period:

- 7.1 The temperature condition must be controlled at $25 \pm 5^{\circ}\text{C}$, the R.H. must be controlled at $60 \pm 15\%$. The stock can maintain quality level in two years.
- 7.2 Please avoid the mentioned harsh environment below when storing to ensure product performance and its' weldability. Places exposed to sea breeze or other corrosive gas, such as Cl_2 、 H_2S 、 NH_3 、 SO_2 and NO_2 .
- 7.3 When the product is moved and stored, please ensure the correct orientation of the box. Do not drop or squeeze the box. Otherwise, the electrode or the body of the product may be damaged.

8 The carton packaged for electronic-information products is made by the symbol as follows: (For china)

	
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