



# APPROVAL SHEET

## RJ SERIES

## PRECISION

## METAL FILM RESISTORS

PRODUCE	CHECK AND APPROVE	ACCEPTED BY
EM	CE	HONORABLE CUSTOMER
Edison Chen	Charles Chen	
Dec.18, 2023	Dec.18, 2023	

1. PRODUCT: METAL FILM PRECISION RESISTORS TYPE
2. PART NUMBER: Part number of the precision metal film resistor is identified by the series, power rating and size code, tolerance, temperature coefficient, packing type and resistance value.

Example:

<u>RJ</u>	<u>73</u>	<u>B</u>	<u>3</u>	<u>T</u>	<u>1004</u>
Series	Power	Resistance	Temperature	Packing	Resistance
Name	Rating	Tolerance	Coefficient	Type	Value

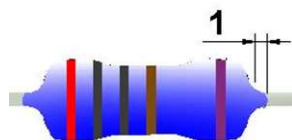
- (1) Style: RJ series precision metal film resistors
- (2) Power Rating: see electrical characteristics
- (3) Tolerance:  
B=±0.1%; C=±0.25%; D=±0.50%; F=±1.0%; G=±2.0%; J=±5.0%;
- (4) T.C.R.: 7=±5ppm/°C; 6=±10ppm/°C; 5=±15ppm/°C; 4=±20ppm/°C;  
3=±25ppm/°C; 2=±50ppm/°C; 1=±100ppm/°C; 0>±100ppm/°C;
- (5) Packaging Type: B=BULK/BOX; T=Tape on Box Packing;  
F type and M type forming are available upon request
- (6) Resistance Value: 1R00、20R0、1000、1001、1002、3303、1004.....
- (7) The part number of jumper is RJ\*\*00T0000 with resistance lower than 15mΩ.

3. Standard applied:

Thunder Enterprise standard: Q/SLC005-2011

Thunder Enterprise standard: Q/SLC006-2011

#### 4. COLOR BAND-CODE:



COLOR	1st	2nd	3rd	multiple	tolerance	TCR
black	0	0	0	1		
brown	1	1	1	10	F(±1.0%)	100ppm/°C
red	2	2	2	10 <sup>2</sup>	G(±2.0%)	50ppm/°C
orange	3	3	3	10 <sup>3</sup>		15ppm/°C
yellow	4	4	4	10 <sup>4</sup>		25ppm/°C
green	5	5	5	10 <sup>5</sup>	D(±0.50%)	15ppm/°C
blue	6	6	6	10 <sup>6</sup>	C(±0.25%)	10ppm/°C
purple	7	7	7		B(±0.10%)	5ppm/°C
gray	8	8	8			
white	9	9	9			
golden				10 <sup>-1</sup>	J(±5.0%)	
silver				10 <sup>-2</sup>	K(±10%)	

Five or six color code rings designate the resistance value and tolerance and temperature coefficient in accordance with IEC 60062. Temperature coefficient marked for small TCR on request as the sixth ring in accordance with IEC 60062.

Digital marking is available upon request.



## 5. ELECTRICAL CHARACTERISTICS

Type	Rated dissipation at 70°C	Max. working voltage $U_{max}$	Max. short time overload voltage	Dielectric withstanding voltage	Resistance tolerance via Temperature coefficient			
					B; C; D; F C7; C6; C5	B; C; D; F C3	C; D; F C3;C2	F; J C2;C1
RJ72	0.16W	200V	400V	300V	10Ω to 300kΩ	10Ω to 1M Ω	10Ω to 2M2Ω	1Ω to 10MΩ
RJ73S	0.25W	250V	500V	300V	10Ω to 300kΩ	10Ω to 1M Ω	10Ω to 2M2Ω	1Ω to 10MΩ
RJ74M	0.50W	200V	400V	300V			10Ω to 2M2Ω	1Ω to 10MΩ
RJ73	0.25W	250V	500V	500V	19Ω to 1MΩ	10Ω to 2M5Ω	10Ω to 5MΩ	1Ω to 10MΩ
RJ74S	0.60W	350V	700V	500V	19Ω to 1MΩ	10Ω to 5M5Ω	10Ω to 5MΩ	1Ω to 10MΩ
RJ74	0.50W	350V	700V	700V	10Ω to 1MΩ	10Ω to 2M5Ω	10Ω to 5MΩ	1Ω to 10MΩ
RJ16M	1.00W	350V	700V	500V			10Ω to 5MΩ	1Ω to 10MΩ
RJ16S	1.00W	400V	800V	700V	10Ω to 1MΩ	10Ω to 2M5Ω	10Ω to 5MΩ	1Ω to 10MΩ
RJ16	1.00W	500V	1000V	800V	10Ω to 1MΩ	10Ω to 2M5Ω	10Ω to 5MΩ	1Ω to 10MΩ
RJ17M	2.00W	500V	1000V	700V			10Ω to 5MΩ	1Ω to 10MΩ
RJ17S	2.00W	500V	1000V	800V	10Ω to 1MΩ	10Ω to 2M5Ω	10Ω to 5MΩ	1Ω to 10MΩ
RJ17	2.00W	500V	1000V	800V	10Ω to 1MΩ	10Ω to 2M5Ω	10Ω to 5MΩ	1Ω to 10MΩ
RJ18M	3.00W	600V	1200V	800V			10Ω to 5MΩ	1Ω to 10MΩ
RJ18S	3.00W	500V	1000V	800V	10Ω to 1MΩ	10Ω to 2M5Ω	10Ω to 5MΩ	1Ω to 10MΩ
RJ18	3.00W	600V	1200V	800V	10Ω to 1MΩ	10Ω to 2M5Ω	10Ω to 5MΩ	1Ω to 10MΩ
RJ19M	5.00W	500V	1000V	800V			10Ω to 5MΩ	1Ω to 10MΩ
RJ19S	5.00W	600V	1200V	800V	10Ω to 1MΩ	10Ω to 2M5Ω	10Ω to 5MΩ	1Ω to 10MΩ

Unless otherwise specified, all values are tested at the following condition:

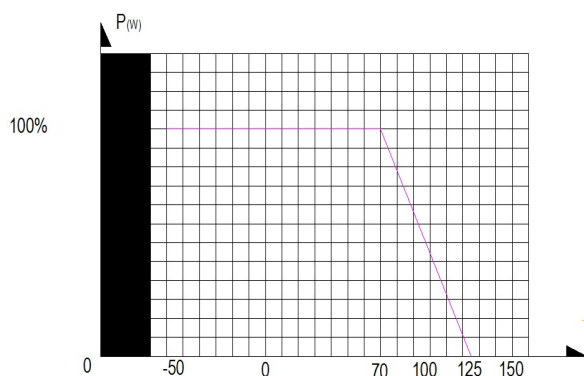
Temperature: 21°C to 25°C;

Relative humidity: 45% to 70%

RJ\*\*00R0000 is the part number of jumpers with resistance lower than 15mΩ.

## 6. DERATING CURVE

For resistors working at an ambience temperature of 70°C or above, the power shall be derated in accordance with the curve.

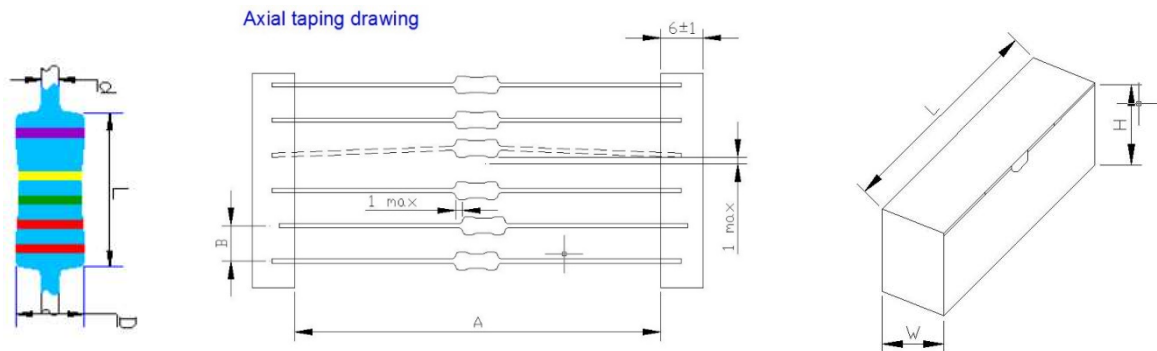




## 7. DIMENSION

Type	L (mm)	D (mm)	d (mm)	TAPING		BOX (±10mm)			MPQ
				A (mm)	B (mm)	L (mm)	W (mm)	H (mm)	
RJ72	3.2±0.5	1.7±0.5	0.45±0.1	52±1.0	5.0±0.3	255	70	70	5000
RJ73S	3.2±0.5	1.7±0.5	0.45±0.1	52±1.0	5.0±0.3	255	70	70	5000
RJ74M	3.2±0.5	1.7±0.5	0.45±0.1	52±1.0	5.0±0.3	255	70	70	5000
RJ73	5.9±0.5	2.3±0.5	0.60±0.1	52±1.0	5.0±0.3	255	72	108	5000
RJ74S	5.9±0.5	2.3±0.3	0.60±0.1	52±1.0	5.0±0.3	255	72	108	5000
RJ16M	6.0±0.5	2.3±0.3	0.60±0.1	52±1.0	5.0±0.3	255	72	108	5000
RJ74	9.0±1.0	3.3±0.5	0.60±0.1	52±1.0	5.0±0.3	255	72	108	2500
RJ16S	9.0±1.0	3.3±0.5	0.60±0.1	52±1.0	5.0±0.3	255	72	108	2500
RJ17M	9.0±1.0	3.3±0.5	0.60±0.1	52±1.0	5.0±0.3	255	72	108	2500
RJ16	11±1.0	4.2±0.5	0.70±0.1	52±1.0	5.0±0.3	255	70	70	1000
RJ17S	11±1.0	4.2±0.5	0.70±0.1	52±1.0	5.0±0.3	255	70	70	1000
RJ18M	11±1.0	4.2±0.5	0.70±0.1	52±1.0	5.0±0.3	255	70	70	1000
RJ17	15±1.0	5.0±0.5	0.70±0.1	62±2.0	10±0.5	255	80	105	1000
RJ18S	15±1.0	5.0±0.5	0.70±0.1	62±2.0	10±0.5	255	80	105	1000
RJ19M	15±1.0	5.0±0.5	0.70±0.1	62±2.0	10±0.5	255	80	105	1000
RJ19S	17±1.0	6±0.5	0.70±0.1	85±5.0	10±0.5	260	100	70	500
RJ19	25±1.0	8±0.5	0.70±0.1	95±2.0	10±0.5	260	110	75	250

The inner dimension of taping for type size could be adjusted upon the request of customers.





## 8. ENVIRONMENTAL CHARACTERISTICS

### (1) Insulation Resistance

IEC 60115-1, 4.6: in V-block for 60 seconds, the test resistance should be high than 10,000 M Ohm.

### (2) Dielectric Withstanding Voltage

IEC 60115-1 4.7: Place resistors in V-block for 60 Seconds, no breakdown or flashover.

### (3) Temperature Coefficient Test

IEC 60115-1, 4.8: Test of resistors at room temperature and 60°C or 100°C on request above room temperature. Then measure the resistance. The Temperature Coefficient is calculated by the following equation and its value should be within the range requested.

$$\text{Resistor Temperature Coefficient} = \frac{R - R_0}{R_0} \times \frac{1}{t - t_0} \times 10^6$$

R = Resistance value under the testing temperature

R<sub>0</sub> = Resistance value at the room temperature

t = the 2<sup>nd</sup> testing temperature

t<sub>0</sub> = Room temperature

### (4) Short Time Overload Test

IEC60115-1 4.13: At 2.5 times rated voltage or 2 times the maximum working voltage whichever is lower for 5 seconds, the resistor should be free from defects. The change of the resistance value should be within  $\pm(0.10\%+0.05\Omega)$  as compared with the value before the test.



(5) Solderability

IEC 60115-1, 4.17:  $235 \pm 5^{\circ}\text{C}$  for  $3 \pm 0.5$  Seconds, there are at least 95% solder coverage on the termination.

(6) Resistance to soldering heat:

IEC 60115-1, 4.18:  $260 \pm 3^{\circ}\text{C}$  for  $10 \pm 1$  Seconds, immersed to a point  $3 \pm 0.5\text{mm}$  from the body. The change of the resistance value should be within  $\pm(0.15\% + 0.05 \Omega)$  as compared with the value before the test.

(7) Climatic sequence

IEC 60115-1, 4.19:  $-55^{\circ}\text{C}$  to Room Temp. to  $+155^{\circ}\text{C}$  to Room Temp. (5 cycles). The change of the resistance value shall be within  $\pm(0.50\% + 0.05 \Omega)$  as compared with the value before the test.

(8) Damp Heat Steady State

IEC 60115-1, 4.24:  $40 \pm 2^{\circ}\text{C}$ , 90-95% RH for 56 days, loaded with 0.1 times RCWV or the maximum working voltage whichever is lower. The change of the resistance value should be within  $\pm(0.50\% + 0.05 \Omega)$  for tight tolerance resistors and  $\pm(1\% + 0.05 \Omega)$  for tight tolerance resistors and  $\pm(1\% + 0.05 \Omega)$  for normal tolerance resistors and small size and tiny size resistors as compared with the value before the test.



## (9) Load Life Test

IEC 60115-1, 4.25:  $70 \pm 2^{\circ}\text{C}$  at RCWV or the maximum working voltage whichever is lower for 1,000+48/-0 Hr. (1.5Hr. on, 0.5Hr. off).

The resistors shall be arranged not much effected mutually by the temperature of others and the excessive ventilation shall not be performed. The change of the resistance value should be within  $\pm(0.50\%+0.05 \Omega)$  for tighten tolerance resistors and normal tolerance resistors and small size and tiny size resistors and  $\pm(2\%+0.05 \Omega)$  for normal tolerance resistors and small size and tiny size resistors.as compared with the value before the test.

## (10) Accidental Overload Test

IEC 60115-1, 4.26: 4 times RCWV for 1 Minute. No evidence of flaming or arcing

## (11) Resistance to Solvent

IEC 60115-1, 4.30: IPA for  $5 \pm 0.5$  Min. with ultrasonic. No deterioration of coating and color code occurred.





## Disclaimer

*All products, product specifications and data are subject to change without notice to improve reliability, function or design or otherwise.*

*Thunder Precision Resistors makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product to the maximum extent permitted by applicable law.*