



# APPROVAL SHEET

## RJ SERIES

## PRECISION

## METAL FILM RESISTORS

PRODUCE	CHECK AND APPROVE	ACCEPTED BY
EM	CE	HONORABLE CUSTOMER
Edison Chen	Charles Chen	
Dec. 19, 2023	Dec. 20, 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 Name	Power Rating	Resistance Tolerance	Temperature Coefficient	Packing Type	Resistance 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\*\*00TR000 with resistance lower than 30mΩ

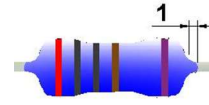
3. Standard applied:

Thunder Enterprise standard: Q/SLC005-2011

Thunder Enterprise standard: Q/SLC006-2011



## 4. COLOR BAND-CODE:



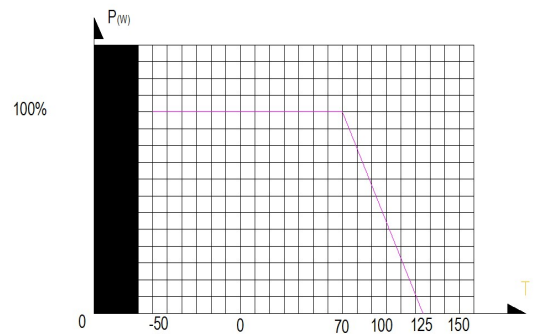
COLOR	1st	2nd	3rd	multiple	tolerance	TCR
black	0	0	0	1		
brown	1	1	1	10	F(±1.0%)	100ppm/°C
red	2	2	2	10 <sup>2</sup>	G(±2.0%)	50ppm/°C
orange	3	3	3	10 <sup>3</sup>		15ppm/°C
yellow	4	4	4	10 <sup>4</sup>		25ppm/°C
green	5	5	5	10 <sup>5</sup>	D(±0.50%)	15ppm/°C
blue	6	6	6	10 <sup>6</sup>	C(±0.25%)	10ppm/°C
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.

Digital marking is available upon request.

## 5. DERATING CURVE

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



The working temperature range is from -55°C to +125°C.



## 6. 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 <sub>DC</sub>	10Ω to 300kΩ	10Ω to 1M Ω	10Ω to 1.5MΩ	1Ω to 10MΩ
RJ73S	0.25W	200V	500V	300V <sub>DC</sub>	10Ω to 300kΩ	10Ω to 1M Ω	10Ω to 1.5MΩ	1Ω to 10MΩ
RJ74M	0.50W	200V	400V	300V <sub>DC</sub>	10Ω to 300kΩ	10Ω to 1M Ω	10Ω to 1.5MΩ	1Ω to 10MΩ
RJ73	0.25W	250V	500V	500V <sub>DC</sub>	19Ω to 1MΩ	10Ω to 1M Ω	10Ω to 2MΩ	1Ω to 10MΩ
RJ74S	0.60W	350V	700V	500V <sub>DC</sub>	19Ω to 1MΩ	10Ω to 1M Ω	10Ω to 2MΩ	1Ω to 10MΩ
RJ16M	1.00W	350V	700V	500V <sub>DC</sub>	19Ω to 1MΩ	10Ω to 1M Ω	10Ω to 2MΩ	1Ω to 10MΩ
RJ74	0.50W	350V	700V	500V <sub>DC</sub>	10Ω to 1MΩ	10Ω to 1M5 Ω	10Ω to 2MΩ	1Ω to 10MΩ
RJ16S	1.00W	400V	800V	500V <sub>DC</sub>	10Ω to 1MΩ	10Ω to 1M5 Ω	10Ω to 2MΩ	1Ω to 10MΩ
RJ17M	2.00W	500V	1000V	500V <sub>DC</sub>	10Ω to 1MΩ	10Ω to 1M5 Ω	10Ω to 2MΩ	1Ω to 10MΩ
RJ16	1.00W	500V	1000V	700V <sub>DC</sub>	10Ω to 1MΩ	10Ω to 1M5Ω	10Ω to 2MΩ	1Ω to 10MΩ
RJ17S	2.00W	500V	1000V	700V <sub>DC</sub>	10Ω to 1MΩ	10Ω to 1M5Ω	10Ω to 2MΩ	1Ω to 10MΩ
RJ18M	3.00W	600V	1200V	700V <sub>DC</sub>	10Ω to 1MΩ	10Ω to 1M5Ω	10Ω to 2MΩ	1Ω to 10MΩ
RJ17	2.00W	750V	1500V	750V <sub>DC</sub>	10Ω to 1MΩ	10Ω to 1M5Ω	10Ω to 2.5MΩ	1Ω to 10MΩ
RJ18S	3.00W	750V	1500V	750V <sub>DC</sub>	10Ω to 1MΩ	10Ω to 1M5Ω	10Ω to 1.5MΩ	1Ω to 10MΩ
RJ19M	5.00W	750V	1500V	750V <sub>DC</sub>	10Ω to 1MΩ	10Ω to 1M5Ω	10Ω to 1.5MΩ	1Ω to 10MΩ
RJ18	3.00W	750V	1500V	750V <sub>DC</sub>	10Ω to 1MΩ	10Ω to 1M5Ω	10Ω to 2.5MΩ	1Ω to 10MΩ
RJ19S	5.00W	750V	1500V	750V <sub>DC</sub>	10Ω to 1MΩ	10Ω to 1M5Ω	10Ω to 2.5MΩ	1Ω to 10MΩ
RJ19	5.00W	800V	1600V	750V <sub>DC</sub>	10Ω to 1MΩ	10Ω to 1M5Ω	10Ω to 2.5MΩ	1Ω to 10MΩ

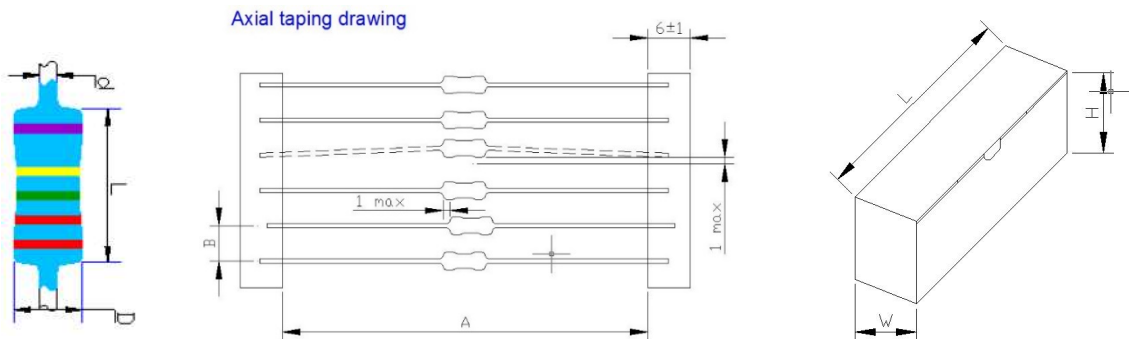
Unless otherwise specified, all values are tested at the following condition:  
 Temperature: 21°C to 25°C;  
 Relative humidity: 45% to 70%  
 Resistance out of range in available upon request  
 High insulation requirements are available upon request.  
 RJ\*\*00TR000 is the part number of jumpers with resistance lower than 30mΩ.



## 7. DIMENSION

Type	L (mm)	D (mm)	d (mm)	Weight (mg)	TAPING		BOX (±10mm)			MPQ
					B (mm)	A (mm)	W (mm)	H (mm)	L (mm)	
RJ72	3.2±0.5	1.7±0.5	0.45±0.1	125	5.0±0.3	52±1.0	70	70	255	5000
RJ73S	3.2±0.5	1.7±0.5	0.45±0.1	125	5.0±0.3	52±1.0	70	70	255	5000
RJ74M	3.2±0.5	1.7±0.5	0.45±0.1	125	5.0±0.3	52±1.0	70	70	255	5000
RJ73	5.9±0.5	2.3±0.5	0.60±0.1	230	5.0±0.3	52±1.0	72	108	255	5000
RJ74S	5.9±0.5	2.3±0.3	0.60±0.1	250	5.0±0.3	52±1.0	72	108	255	5000
RJ16M	6.0±0.5	2.3±0.3	0.60±0.1	270	5.0±0.3	52±1.0	72	108	255	5000
RJ74	9.0±1.0	3.3±0.5	0.60±0.1	460	5.0±0.3	52±1.0	72	108	255	2500
RJ16S	9.0±1.0	3.3±0.5	0.60±0.1	490	5.0±0.3	52±1.0	72	108	255	2500
RJ17M	9.0±1.0	3.3±0.5	0.60±0.1	510	5.0±0.3	52±1.0	72	108	255	2500
RJ16	11±1.0	4.2±0.5	0.80±0.1	760	10±0.5	62±2.0	70	70	255	1000
RJ17S	11±1.0	4.2±0.5	0.80±0.1	790	10±0.5	62±2.0	70	70	255	1000
RJ18M	11±1.0	4.2±0.5	0.80±0.1	820	10±0.5	62±2.0	70	70	255	1000
RJ17	15±1.0	5.0±0.5	0.80±0.1	1320	10±0.5	62±2.0	80	105	255	1000
RJ18S	15±1.0	5.0±0.5	0.80±0.1	1380	10±0.5	62±2.0	80	105	255	1000
RJ19M	15±1.0	5.0±0.5	0.80±0.1	1450	10±0.5	62±2.0	80	105	255	1000
RJ19S	25±1.0	8±0.5	0.80±0.1	1380	10±0.5	62±2.0	80	105	255	1000

The leads of the resistors are all tinned copper wire. 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: Apply 500V<sub>DC</sub> on resistor and V-block for 60 seconds, the test resistance should be high than 1,000 M Ohm.

### (2) Dielectric Withstanding Voltage

IEC 60115-1 4.7: Place resistors in V-block, applied dielectric withstanding voltage listed in the characteristic form for 60 Seconds, no breakdown or flashover and leak current less than 10mA.

### (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. The temperature coefficient is calculated by the following equation and the 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°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 tighten tolerance resistors and  $\pm(2.5\% + 0.05 \Omega)$  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  $\pm(2.5\% + 0.05 \Omega)$  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.*