APPROVAL SHEET

RX and RXS SERIES

PERCISION WIREWOUND RESISTORS

PRODUCE	CHECK AND APPROVE	ACCEPTED BY
EM	CE	HONORABLE CUSTOMER
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1. PRODUCT: PRECISION WIRE WOUND RESISTORS

FEATURES

- Advanced American alloy technology
- Very low TCR: lower than ±10ppm/℃.
- Tolerance up to ±0.05%
- Excellent overall stability: Class 0.25
- Very low noise and voltage coefficient
- Non-inductance winding available under request
- Perfect pulse loading capability

APPLICATIONS

- Current sensor for test and measuring instruments
- Power supply with high reliability
- Components burn-in devices
- Pulse load and in rush current protector
- Medical equipment
- Military electronics

2. PART NUMBER: Part number is identified by the series name, power rating, size code, tolerance, temperature coefficient, packing style and resistance value.

Example：

RX	17	S	F	2	T	1R80
Series Name	**Power rating**	**Size Code**	**Tolerance**	**Temperature Coefficient**	**Packing Style**	**Resistance Value**

(1) Series name: RX SERIES

(2) Power Rating: 15=1/2W; 16=1.0W; 17=2.0W; 18=3.0W; 19=5.0W; 6~30=6~30W

Size code: Blank = normal size; S：small size; M = tiny size

(3) Tolerance: W±0.05%; B=±0.1%; C=±0.25%; D=±0.50%; F=±1.0%; J=±5.0%

(4) T.C.R.: 7 = ±5ppm/℃; 6 = ±10ppm/℃; 5 = ±15ppm/℃; 4 = ±20ppm/℃;
3 = ±25ppm/℃; 2 = ±50ppm/℃; 1 = ±100ppm/℃; 0=±250ppm/℃

(5) Packaging Type: B = Bulk/Box; T = Tape on Box Packing
M = M type deforming; F = Vertical deforming

(6) Resistance Value for J tolerance: R47、1R0、100、101、102、333、104……

(7) Resistance Value for tighten tolerance: R470、1R00、10R0、1000、1001、1002

3. COLOR-CODE MARKING:

G(±2.0%), J(±5.0%) and K(±10.0%) tolerance resistors may have 2 bands for significant figures. Tight tolerance resistors have three bands for significant figures. An additional band could indicate temperature coefficient for TCR<=25ppm/℃ is available upon request. One special identification black ring is available upon request.

Resistors manufactured for military user may also include a fifth band which indicates component failure rate (reliability); refer to MIL-HDBK-199 for further details.

All coded components will have at least two value bands and a multiplier; other bands are optional

The standard color code per EN 60062:2005 is as follows

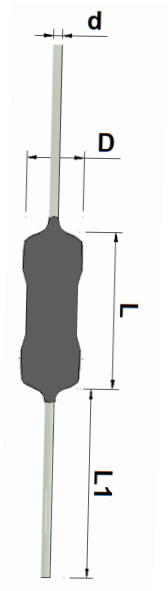
COLOR	1st	2nd	Multiple	tolerance	TCR
black	0	0	1		
brown	1	1	10		100ppm/℃
red	2	2	10^2	G(±2.0%)	50ppm/℃
orange	3	3	10^3		15ppm/℃
yellow	4	4	10^4		25ppm/℃
green	5	5	10^5		15ppm/℃
blue	6	6	10^6		10ppm/℃
purple	7	7			5ppm/℃
gray	8	8			
white	9	9			
golden			10^{-1}	J(±5.0%)	
silver			10^{-2}	K(±10%)	

Digital marking is available upon request.

Digital marking with full part number for power rating over 5W.

4. ELECTRICAL CHARACTERISTICS

Type	Rated dissipation at 70℃	Max. working voltage U_{max}	Maximum short time overload voltage	Dielectric withstanding voltage	Resistance range Resistance tolerance (%) Temperature coefficient (ppm/℃) ±0.1%; ±0.25%; ±0.5%; ±1% ±25ppm/℃; ±50ppm/℃; ±100 ppm/℃; ±250 ppm/℃	L (mm)	D (mm)	d (mm)
RX15S	0.50W	35V	70V	300V_{DC}	1Ω to 2.5kΩ	5.9±0.5	2.5±0.5	0.6±0.05
RX15	0.50W	42V	84V	400V_{DC}	1Ω to3.5kΩ	9.0±1.0	3.3±0.5	0.6±0.05
RX16S	1.0W	60V	120V	400V_{DC}	1Ω to 3.5kΩ	9.0±1.0	3.3±0.5	0.6±0.05
RX16	1.0W	110V	220V	500V_{DC}	1Ω to 12kΩ	11±1.0	4.5±0.8	0.8±0.1
RX17S	2.0W	155V	310V	500V_{DC}	1Ω to 12kΩ	11±1.0	4.5±0.8	0.8±0.1
RX17	2.0W	210V	420V	500V_{DC}	1Ω to 22kΩ	15±1.0	5.5±1.0	0.8±0.1
RX18S	3.0W	257V	500V	500V_{DC}	1Ω to 22kΩ	15±1.0	5.5±1.0	0.8±0.1
RX18	3.0W	342V	600V	700V_{DC}	1Ω to 27kΩ	17±1.0	6.0±1.0	0.8±0.1
RX19S	5.0W	440V	600V	700V_{DC}	1Ω to 27kΩ	17±1.0	6.0±1.0	0.8±0.1
RX19	5.0W	440V	600V	700V_{DC}	1Ω to 39kΩ	24±1.0	8.0±1.0	0.8±0.1
RX21-6	6.0W	500V	1000V	700V_{DC}	1Ω to 85kΩ	24±1.0	8.0±1.0	0.8±0.1
RX21-8	8.0W	600V	1000V	700V_{DC}	1Ω to 100kΩ	32±1.0	8.5±1.0	0.8±0.1
RX21-10	10W	600V	1000V	700V_{DC}	1Ω to 100kΩ	32±1.0	8.5±1.0	0.8±0.1
RX21-15	15W	700V	1400V	700V_{DC}	10Ω to 100kΩ	42±1.0	8.5±1.0	0.8±0.1
RX21-20	20W	800V	1600V	700V_{DC}	1Ω to 100kΩ	52±1.0	8.5±1.0	0.8±0.1
RX21-30	30W	1000V	1600V	700V_{DC}	10Ω to 100kΩ	77±1.0	8.5±1.0	0.8±0.1



* Unless otherwise specified, all values are tested at the following condition:
Temperature: 21℃ to 25℃; Relative humidity: 45% to 70%;

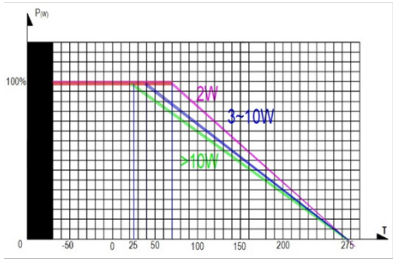
* Rated Continuous Working Voltage (RCWV) = $\sqrt{\text{Power Rating} \times \text{Resistance Value}}$

* Resistance out of range is available upon request.

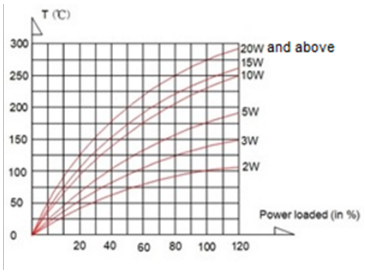
* High insulating requirement is available upon request.

* Non-inductance wound is available on request.

5. Derating curve and temperature rising curve



Derating curve



Temperature rising curve

The power dissipation on the resistor generates a temperature rise against the local ambient, depending on the heat flow support of the printed-circuit board (thermal resistance). The rated dissipation applies only if the permitted film temperature is not exceeded. These resistors do not feature a limited lifetime when operated within the permissible limits. However, resistance value drift increasing over operating time may result in exceeding a limit acceptable to the specific application, thereby establishing a functional lifetime.

For resistors working at an ambiance temperature of 70℃ or above, the power rating shall be derated in accordance with the following curve.

6. 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.

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

R = Resistance value under the testing temperature
R_0 = Resistance value at the room temperature
t = the 2nd testing temperature
t_0 = Room temperature

(4) Short Time Overload Test

IEC60115-1 4.13: At 10 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 ±(0.25%+0.05 Ω) for precision type and ±(0.5%+0.05 Ω) for commercial type as compared with the value before the test.

(5) Solderability

IEC 60115-1, 4.17: 235±5°C for 3±0.5 Seconds, there are at least 95% solder coverage on the termination.

(6) Resistance to soldering heat:

IEC 60115-1, 4.18: 260±3°C for 10±1 Seconds, immersed to a point 3±0.5mm from the body. The change of the resistance value should be within ±(0.25%+0.05 Ω) for precision type and ±(0.5%+0.05 Ω) for commercial type as compared with the value before the test.

(7) Climatic sequence

IEC 60115-1, 4.19: -55°C to Room Temp. to +155°C to Room Temp. (5 cycles). The change of the resistance value shall be within ±(0.25%+0.05 Ω) for precision type and ±(1.0%+0.05 Ω) for commercial type as compared with the value before the test.

(8) Damp Heat Steady State

IEC 60115-1, 4.24: 40±2°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 ±(0.50%+0.05 Ω) for precision type and ±(5.0%+0.05 Ω) for commercial type as compared with the value before the test.

(9) Load Life Test

IEC 60115-1, 4.25: 70±2°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 ±(0.50%+0.05 Ω) for precision type and ±(5.0%+0.05 Ω) for commercial type 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±0.5 Min. with ultrasonic. No deterioration of coating and color code occurred.

(12) High voltage high pulse overload

Apply 10 pulses with 2500V to the resistor, the pulses parameter is 1.2/50μs. The change of the resistance shall be within ±(0.25%+0.05 Ω) for precision type and ±(1.0%+0.05 Ω) for commercial type as compared with the value before the load.

Apply 10 pulses with 2500V to the resistor, the pulses parameter is 10μs/700μs. The change of the resistance shall be within ±(0.25%+0.05 Ω) for precision type and ±(1.0%+0.05 Ω) for commercial type as compared with the value before the load.

(13)Electrostatic discharge (Human Body Model)

IEC 60115-1, 4.38: IEC 61340-3-1 (1); 3 pos. + 3 neg. discharges.

RX15 & RX16S: 4kV; RX16 & types over 1W power rating: 6kV

The change of the resistance value should be within ±(0.50%+0. 05Ω) as compared with the value before the load.

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.