RG SERIES

ULTRA HIGH OHM VALUE METAL GLAZE FILM RESISTORS

ULTRA HIGH VOLTAGE METAL GLAZE FILM RESISTORS

Feature

Advanced metal glaze film technology

Very low TCR: up to ±25ppm/℃

Exceptionally low noise and voltage coefficient up to 5ppm

High pulse loading capability

Maximum working voltage up to 7,000V

TÜV certificate in 2009

Description

Production is strictly controlled and follow an extensive set of instructions established in production procedure for reproducibility. A special homogeneous film of metal glaze is sintered on high-grade ceramic rods (85%~96% AL2O3) and conditioned to achieve the desired stability and reliability.

The resistor elements are covered by a protective silicon coating designed for electrical, mechanical, and climatic protection. The leads are covered with a final pure tin plating for keeping perfect solderability and wonderful outlooking.

Color code rings designate the resistance value and tolerance in accordance with IEC60062 but the yellow and white color rings are used to replace gold and silver rings for better high voltage performance.

Digital marking is available upon request

Applications

High resistance, high stability, high reliability at high voltage circumstances

Municipal electricity input pulse especially electricity surges protecting

High temperature and high humidity environments

1. PRODUCT: METAL GLAZE FILM RESISTORS PROFESSIONAL TYPE
2. PART NUMBER: Part number of the metal glaze film resistor is identified by the series name, power rating and size code, tolerance, temperature coefficient, packing type, and resistance value. For example: RG17F3T1003

RG	18S	F	3	T	1004
Series Name	Power Rating	Resistance Tolerance	TCR	Packing Type	Resistance Value

(1) Series name: RG series

(2) Power rating: 73=1/4W,74=1/2W,16=1.0W,17=2.0W,18=3.0W, 19=5.0W

(3) Size code: M= Tiny size; S= small size; " "= normal size

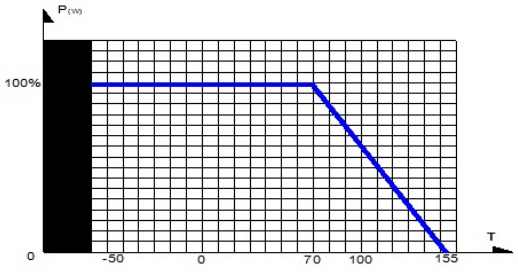
(3) Tolerance: B=±0.10%; C=±0.25%; D=±0.50%; F=±1.0%; J=±5%

(4) T.C.R.: C3=±25ppm/℃; C2=±50ppm/℃;
C1=±100ppm/℃; 0=>±100ppm/℃

(5) Packaging Type: B＝BULK/BOX;T＝Tape/Box;
M type and F type forming are available upon request

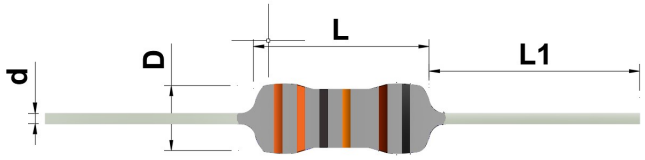
(6) Resistance Value: 1002=10k; 2003=200k; 3304=3M3; 4705=47M;……

3. Derating curves



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.

4. Marking color code (the 6th code is the identify code for RG series and Yellow code and gray code is used to replace the golden code and silver code for protecting high voltage performance.)



COLOR	1st	2nd	3rd	Multiple	tolerance	ID
black	0	0	0	1		
brown	1	1	1	10	F(±1.0%)	
red	2	2	2	10^2	G(±2.0%)	
orange	3	3	3	10^3		
yellow	4	4	4	10^4		
green	5	5	5	10^5	D(±0.50%)	
blue	6	6	6	10^6		
purple	7	7	7			
gray	8	8	8			
white	9	9	9			
golden				10^{-1}	J(±5.0%)	
silver				10^{-2}	K(±10%)	

Digital marking is available upon request.

5. ELECTRICAL CHARACTERISTICS

Type	Resistance range	Resistance tolerance	Temperature coefficient	Power rating	Max. operating voltage	Insulation voltage	Noise	Dimension		
								L (mm)	D (mm)	d (mm)
RG73	1kΩ to 1GΩ	D(±0.5%); F(±1%); J(±5.0%); K(±10%)	±25ppm/°C; ±50ppm/°C; ±100ppm/°C; ±250ppm/°C	0.25W	1600V_{DC}	500V_{DC}	per IEC 60195 ⩽5μV/V	6±1.0	2.3±0.3	0.6±0.1
RG74S	1kΩ to 1GΩ			0.50W	1600V_{DC}	500V_{DC}		6±1.0	2.3±0.3	0.6±0.1
RG74	1kΩ to 1GΩ			0.50W	3500V_{DC}	500V_{DC}		9.0±1.0	3.3±0.5	0.6±0.1
RG16S	1kΩ to 1GΩ			1.0W	3500V_{DC}	500V_{DC}		9.0±1.0	3.3±0.5	0.6±0.1
RG16	1kΩ to 1GΩ			1.0W	5000V_{DC}	700V_{DC}		11±1.0	4.2±0.8	0.8±0.1
RG17S	1kΩ to 1GΩ			1.0W	5000V_{DC}	700V_{DC}		11±1.0	4.2±0.8	0.8±0.1
RG17	1kΩ to 2GΩ			2.0W	6000V_{DC}	700V_{DC}		15±1.0	5.5±1.0	0.8±0.1
RG18S	1kΩ to 2GΩ			3W	6000V_{DC}	700V_{DC}		15±1.0	5.5±1.0	0.8±0.1
RG18	1kΩ to 2GΩ			3W	7000V_{DC}	700V_{DC}		17±1.0	6.0±1.0	0.8±0.1
RG19S	1kΩ to 2GΩ			5W	7000V_{DC}	700V_{DC}		17±1.0	6.0±1.0	0.8±0.1
RG19	1kΩ to 2GΩ			5W	7000V_{DC}	>1000V		24±1.0	8.0±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 60%
* Final calibration of the resistance is tested at 100V.
* Deforming types are available upon request.
* Resistance, tolerance, temperature coefficient and the size out of range is available upon request.
* High insulation requirements are available upon request

6. ENVIRONMENTAL CHARACTERISTICS

(1) Insulation Resistance

IEC 60115-1, 4.6: in 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 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 Over Load Test

IEC60115-1 4.13: At 2.5 times rated voltage or 2 times the maximum working voltage whichever is lower, 5 seconds on and 45 seconds off, 10 cycles. The resistor should be free from defects. The change of the resistance value should be within ±(0.5%+0.05 Ω) 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 ±(0.50%+0.05 Ω) as compared with the value before the test.

(7) Climatic sequence

IEC 60115-1, 4.19: The climatic sequence test cycle is shown in the following table. The measurement of the resistance value is done before the first cycle at room temperature and 1 hours leaving in the room temperature after the fifth cycle, the change of the resistance shall be within ± (2.50%+0.05Ω). After the test the resistors shall be free from the electrical or mechanical damage.

dry heat	UCT; 16 h
damp heat,	55℃;24h; ≥90% RH
cyclic	1 cycle;
cold	LCT; 2 h
low air	8.5 kPa
pressure	25±10℃ 2h;
damp heat	55℃;24h; ≥90% RH ;
cyclic	5 cycles
	LCT=-55℃;
	UCT=155℃

(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 ±(5%+0.05 Ω) 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 ±(5%+0.05 Ω) 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) High voltage high pulse overload

IEC 60115-1, 4.28: Apply 10 pulses with 10 times rated voltage or 2 times the maximum working voltage whichever is lower to the resistor, the pulses parameter is 10μs/700μs. The change of the resistance shall be within ± (2.0%+0.05Ω).

(12) Resistance to Solvent

IEC 60115-1, 4.30: IPA for 5±0.5 Min. with ultrasonic. No deterioration occurred.

(13) Electrostatic discharge (ESD human body mode)

IEC 60115-1, 4.40: Apply 3 negative and 3 positive discharges on resistors, discharge voltage 6000V on 0204 size and 16,000V on 0207 size and 0411 size and 0617 size (equivalent to MIL-STD-883, method 3015). The change of the resistance value should be within ±(0.50%+0.05 Ω) as compared with the value before the test.

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.