APPROVAL SHEET

RY SERIES

METAL OXIDE FILM RESISTORS

PRODUCE	CHECK AND APPROVE	ACCEPTED BY
EM	CE	HONORABLE CUSTOMER
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Feb.21, 2022	Feb.21, 2022	

1. PRODUCT: METAL OXIDE FILM RESISTORS

FEATURES

· Low TCR: lower than ±100ppm/℃.
· High temperature working capability
· High power load reliability
· Small physical size
· Flameproof
· Low cost part with high cost performance
· Tighten tolerance is available on request
· Non-inductance performance is available upon request

APPLICATIONS

· Power supply with high reliability
· Components burn-in devices
· Special suited for circuitry where functions, environments and duty cycles demand power resistors

2. PART NUMBER: Part number of the metal oxide film resistor is identified by the series name, power and size code, tolerance, temperature coefficient, packing type and resistance value.

Example：

RY	17S	J	1	T	121
Series	**Power**	**Tol.**	**TCR**	**Packing**	**Resistance**

(1) Series: RY series metal oxide film resistors

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

M：tiny size; S：small size; " " : normal size

(3) Tolerance: F=±1.0%; G=±2.0%; J=±5.0%

(4) T.C.R.: 2= ±50ppm/℃; 1= ±100ppm/℃; 0= >±100ppm/℃

(5) Packaging Type: B = BULK/BOX ;

T = Tape on Box Packing

M = M type deforming

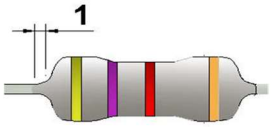
F = F type deforming

(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:

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



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

G(±2.0%)、J(±5.0%) and K(±10.0%) tolerance resistors have 2 bands for significant figures, the 3rd one is multiplier index, the 4th one is tolerance band.

COLOR	1st	2nd	3rd	Multiple	tolerance
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	C(±0.25%)
purple	7	7	7		B(±0.10%)
gray	8	8	8		W(±0.05%)
white	9	9	9		
golden				10^{-1}	J(±5.0%)
silver				10^{-2}	K(±10%)

F(±1.0%) tolerance resistors have 3 bands for significant figures, the 4rd one is multiplier index, the 5th one is tolerance band.

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/℃)	
					F; J C3;C2	F; J C1;C0
RY14S	0.25W	200V	400V	300V	10Ω to 47kΩ	1Ω to 1MΩ
RY14	0.25W	250V	500V	300V	10Ω to 1MΩ	1Ω to 1MΩ
RY15S	0.50W	250V	500V	300V	10Ω to 1MΩ	1Ω to 1MΩ
RY15	0.50W	300V	600V	500V	10Ω to 1MΩ	1Ω to 1MΩ
RY16S	1.00W	300V	600V	500V	10Ω to 1MΩ	1Ω to 1MΩ
RY16	1.00W	350V	700V	500V	10Ω to 1MΩ	1Ω to 1MΩ
RY17S	2.00W	350V	700V	500V	10Ω to 1MΩ	1Ω to 1MΩ
RY17	2.00W	400V	800V	700V	10Ω to 1MΩ	1Ω to 1MΩ
RY18S	3.00W	400V	800V	700V	10Ω to 1MΩ	1Ω to 1MΩ
RY18	3.00W	450V	1000V	700V	10Ω to 1MΩ	1Ω to 1MΩ
RY19S	5.00W	500V	1000V	700V	10Ω to 1MΩ	1Ω to 1MΩ
RY19	5.00W	500V	1000V	700V	10Ω to 1MΩ	1Ω to 1MΩ

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

  Temperature: 21℃ to 25℃; Relative humidity: 45% to 70%

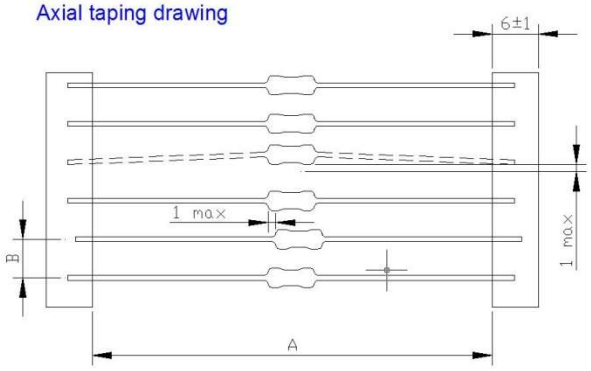
* Rated Continuous Working Voltage (RCWV)= $\sqrt{\text{Power Rating} \times \text{Resistance Value}}$

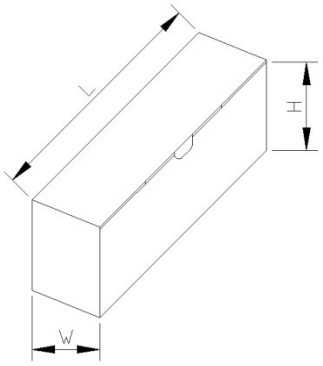
* Temperature coefficient out of range is available upon request.

5. Dimension and packing in tape/box

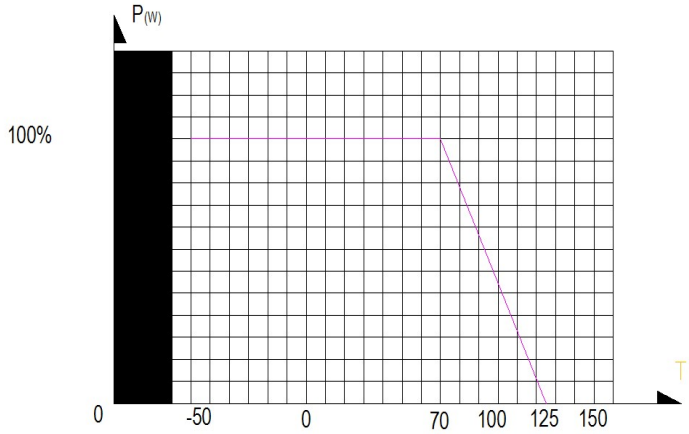
Type	L (mm)	D (mm)	d (mm)	TAPING		BOX (±10mm)			MPQ
				B (mm)	A (mm)	W (mm)	H (mm)	L (mm)	
RY14S	3.2±0.3	1.7±0.3	0.45±0.5	5.0±0.3	52±1.0	75	75	255	5000
RY14	5.9±0.5	2.3±0.3	0.60±0.5	5.0±0.3	52±1.0	75	100	255	5000
RY15S	5.9±0.5	2.3±0.3	0.60±0.5	5.0±0.3	52±1.0	75	100	255	5000
RY15	9.0±1.0	3.3±0.5	0.60±0.5	5.0±0.3	52±1.0	75	100	255	2500
RY16S	9.0±1.0	3.3±0.5	0.60±0.5	5.0±0.3	52±1.0	75	100	255	2500
RY16	11±1.0	4.2±0.8	0.75±0.5	5.0±0.5	52±1.0	75	75	255	1000
RY17S	11±1.0	4.2±0.8	0.75±0.5	5.0±0.5	52±1.0	75	75	255	1000
RY17	15±1.0	5.5±1.0	0.75±0.5	10±0.5	62±1.0	75	100	255	1000
RY18S	15±1.0	5.5±1.0	0.75±0.5	10±0.5	62±1.0	75	100	255	1000
RY18	18±1.0	6.0±1.0	0.75±0.6	10±0.5	80±1.0	95	70	255	500
RY19S	18±1.0	6.0±1.0	0.75±0.6	10±0.5	80±1.0	95	70	255	500
RY19	25±1.0	9.0±1.0	0.75±0.6	10±0.5	90±1.0	110	75	255	250

Axial taping drawing

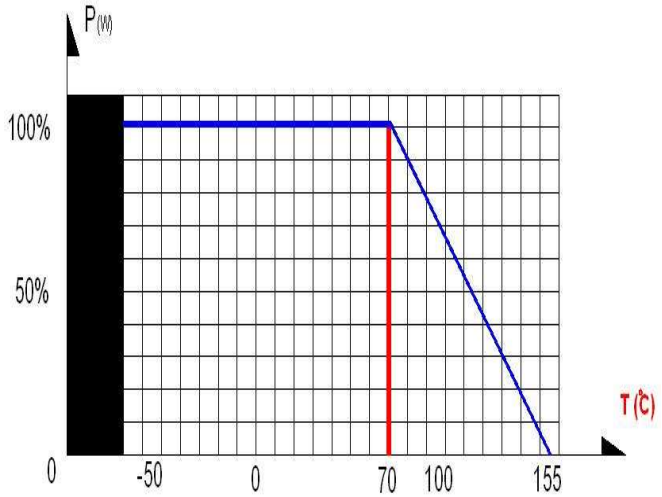




6. DERATING CURVE



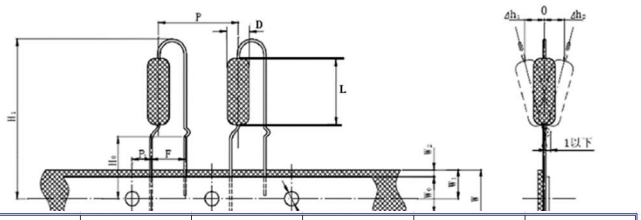
normal size resistors;



small size and mini size resistors

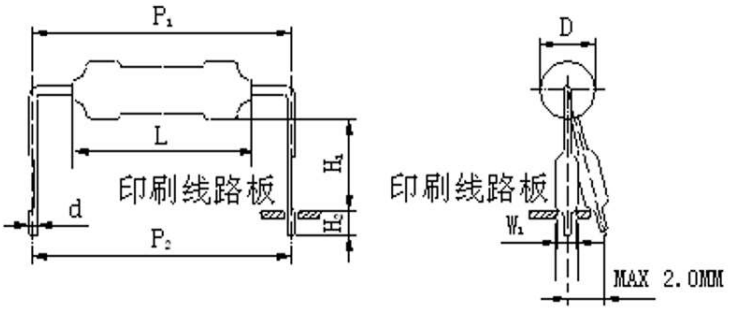
For resistors working at an ambiance temperature of 70℃ or above, the power rating shall be derated in accordance with the above curves.

7. FK type deforming for 1W and 2WS size



Power rating	P±1.0	P_0±0.3	P_1±0.7	F±0.5	W±0.5	W_1±0.5	H_0±1.0	D_0±0.2	L±1.0	D±0.5
2W	12.7	12.7	3.85	5	18	9	17.5	φ4.0	11.5	4.5

8. M type deforming



功率	L	P1	P2(成型跨距)	W1	D	d	H1	H2
2W	11.5±1.0	16.0±0.6	16.0±0.6	≥1.2	4.5±0.5	0.75±0.05	5±1mm	3.5±0.5
3W	15.5±1.0	18±0.6	18±0.6		5.0±0.5	0.75±0.05		
5W	20±1.0	27±0.6	27±0.6		6.0±0.5	0.80±0.05		

Different dimension of deforming is available upon request.

9. 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 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 ±(1.0%+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 ±(1.0%+0.05 Ω) for commercial type as compared with the value before the test.

(7) 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.

(8) 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.

(9) Accidental Overload Test

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

(10) Resistance to Solvent

IEC 60115-1, 4.30: IPA for 5±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.

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