THUNDER PRECISION RESISTORS

HIGH PRECISION MELF RESISTORS

RJM73P, RJM74P
RJM16M, RJM17M, RJM18M

FEATURES

· Advanced thin film technology
· **Low TCR: lower than ±5ppm/℃.**
· **Tolerance up to ±0.05%**
· Power dissipation rating up to 3W
· Excellent overall stability: **Class 0.25**
· Wide resistance range: **0.1Ω to 10MΩ** is available under request
· **very high ratio of performance to price**

APPLICATIONS

· Test and measuring instruments
· Automotive equipments
· Industrial electronics
· Medical equipments.
· Military electronics
· Telecommunication equipments

DESCRIPTION

RJM series professional metal film high precision MELF type resistors are the perfect choice for most fields of modern professional electronics where high precision, low temperature coefficient and high stability is of major concern as well as very high ratio of performance to price. It also used in a lot of power supply to meet the requirement of high reliability.

PRODUCTION

Production is strictly controlled and follows and extensive set of instructions established in production procedure for reproducibility. A homogeneous film of metal alloy is deposited on a high grade ceramic rods (85%~96% AL2O3) and conditioned to achieve the desired temperature coefficient and stability. A professional laser is used for high resistance to not only achieve the target value but also perfect electronics performance by smoothly cutting a helical groove in the resistance layer on the ceramic rods. The resistor elements are covered by a protective coating designed for electrical, mechanical and climatic protection. The terminals are covered with final pure tin plating for keeping perfect solderability and wonderful outlooking. Four color code rings for 0204 size designate the resistance value and and five color code rings for 0207 or larger size designate the resistance value and tolerance in accordance with IEC 60062.

ASSEMBLY

The resistors are suitable for processing on automatic SMD assembly systems. They are suitable for automatic soldering using wave, reflow or vapour phase as shown in IEC 61760-1 (3). The encapsulation is resistant to all cleaning solvents commonly used in the electronics industry, including alcohols, esters and aqueous solutions.

RoHS complaint

The resistors are RoHS compliant, the pure tin plating on Ni barrier layer provides compatibility with lead (Pb)-free and lead containing soldering processes.

All products comply with the GADSL (1) and the CEFIC-EECA-EICTA (2) list of legal restrictions on hazardous substances. This includes full compliance with the following directives:
• 2000/53/EC End of Vehicle life Directive (ELV) and Annex II (ELV II)
• 2002/95/EC Restriction of the use of Hazardous Substances Directive (RoHS)
• 2002/96/EC Waste Electrical and Electronic Equipment Directive (WEEE)

TIN WHISKER FREE

The immunity of the plating against tin whisker growth has been specially treated and guaranteed.

TEST

The resistors are tested in accordance within the IECQ-CECC Quality Assessment System for Electronic Components to the detail specification EN 140401-803 which refers to EN 60115-1, EN 140400 and the variety of environmental test procedures of the IEC 60068* series.

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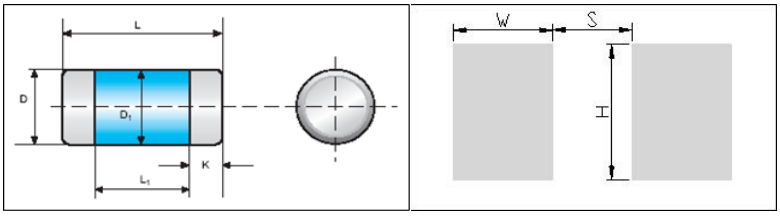
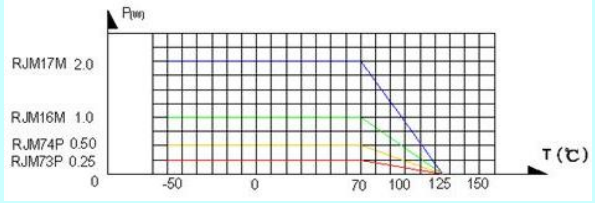
QUICK REFERENCE DATA

Type		RJM73P	RJM74M	RJM74P	RJM16M	RJM17M	RJM18M
Metric type		DIN: 0204		DIN: 0207		DIN: 0411	DIN: 0516
CECC type		RC 3715M		RC 6123M		RC8633	
Vishay' Type		MMA0204/SMM0204	MMA0204-P/HT	MMB0207	MMB0207-P/CMB0207		
Resistance range		10Ω to 10MΩ					
Resistance tolerance	(%)	W(±0.05); B(±0.10); C(±0.25); D(±0.5); F(±1); J(±5%)					
Temperature coefficient	(ppm/℃)	C7(±5); C6(±10); C5(±15); C3(±25); C2(±50)					
Climatic category	(LCT/UCT/days)	55/125/56					
Rated dissipation, P_{70}		0.25W	0.50W	0.50W	1.0W	2.0W	3.0W
Operating voltage U_{max}		200V	250V	300V	350V	400V	500V
Temperature range		-55℃ to 125℃					
Insulation voltage	$V_{dc/ac\ peak}$	300V	300V	600V	700V	800V	1000V
Weight	(mg)	19	19	79	86	225	354
Dimension	±0.2mm	L=3.5;L_1=1.5; D=1.3	L=3.5;L_1=1.5; D=1.3	L=5.7; L1=3.2; D=2.1	L=6.0; L_1=3.5; D=2.1	L=8.7; D=3.1	L=11.6; D=3.6
	(mm)	K≥0.6; D_1≥D-0.15	K≥0.6; D_1≥D-0.15	K≥0.8; D_1≥D-0.2	K≥0.8; D_1≥D-0.2	K≥1.2; D_1≥D-0.3	K≥1.3; D_1≥D-0.4
Solder pad (recommended)	(mm)	S=1.5; W=2.5; H=2.5	S=1.5; W=2.8; H=2.8	S=2.9; W=3.2; H=3.2	S=3.2; W=3.5; H=3.5	S=5.6; W=4.5; H=4.5	S=8.2; W=5; H=5
Outlines							
Derating 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.

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TEST PROCEDURE AND REQUIREMENTS

IEC 60115-1 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE (ΔR/R)		
		type		RJM73P, RJM74P	RJM73P, RJM74P	RJM74M, RJM16M RJM17M, RJM18M
		resistance range[1]		47Ω to 332kΩ	R≤47Ω & R≥332kΩ	47Ω to 332kΩ
4.5		tolerance	(%)	±0.05;±0.10;±0.25;±0.5;±1.0; ±5.0		
4.8	—	temperature coefficient	at 25/ 85/ 25℃ or under request at 25/ -55/ 25℃ or at 25 / 125 /25℃	±5ppm/℃; ±10ppm/℃; ±15ppm/℃; ±25ppm/℃; ±50ppm/℃; ±100ppm/℃		
4.13	—	short time overload;	room temperature; $U = 2.5 \times \sqrt{P_{70} \times R} \leq 2U_{max}$; 5s	±0.10%+0.05Ω for normal tol. ±0.05%+0.05Ω for ultra high precision	±0.10%+0.05Ω for normal tol.	±0.25%+0.05Ω for normal tol.
4.17.2	58 (Td)	solderability	solder bath method; 235℃; 2s ± 0.3s	good tinning (≥95% covered); no visible damage		
4.18.2	58 (Td)	resistance to soldering heat	solder bath method; 260 ±5℃; 5s ± 1s	±0.10%+0.05Ω for normal tol. ±0.05%+0.05Ω for ultra high precision	±0.25%+0.05Ω for normal tol.	±0.25%+0.05Ω for normal tol.
4.19	14 (Na)	Thermal shock	30 minutes at LCT-55℃; 30 minutes at UCT+155℃; 5 cycles	±0.10%+0.05Ω for normal tol. ±0.05%+0.05Ω for ultra high precision	±0.25%+0.05Ω for normal tol.	±0.10%+0.05Ω for normal tol.
4.22	6(B4)	vibration	6h 10 to 2000Hz 1.5mm or 196 m/s	±0.10%+0.05Ω for normal tol. ±0.05%+0.05Ω for ultra high precision	±0.10%+0.05Ω	±0.10%+0.05Ω
4.23		climatic sequence;				
4.23.2	2(Ba)	dry heat	UCT; 16 h			
4.23.3	30(Db)	damp heat, cyclic	55℃;24h; ≥90% RH			
			1 cycle;			
4.23.4	1 (Aa)	cold	LCT; 2 h			
4.23.5	13 (M)	low air pressure	8.5 kPa 25±10℃ 2h;			
4.23.6	30(Db)	damp heat cyclic	55℃;24h; ≥90% RH ;	±0.25%+0.05Ω for normal tol. ±0.10%+0.05Ω for ultra high precision	±0.50%+0.05Ω	±0.50%+0.05Ω
			5 cycles			
			LCT=-55℃;			
			UCT=125℃			
4.24	3(Ca)	damp heat, steady state	40±2℃;56 days 93 +2/-3% RH	±0.25%+0.05Ω	±0.25%+0.05Ω	±0.25%+0.05Ω
4.25.1	—	endurance; standard operation mode	$U = \sqrt{P_{70} \times R} \leq U_{max}$; 1.5 h on; 0.5h off; 70℃; 1000 h	±0.25%+0.05Ω for normal tol. ±0.10%+0.05Ω for ultra high precision	±0.50%+0.05Ω	±0.50%+0.05Ω
4.29	45 (XA)	component solvent resistance	isopropyl alcohol; +23℃; toothbrush method	marking legible; no visible damage		

Remark

Unliss otherwise specified, all values are tested at the following condition:
Temperature: 21℃ to 25℃; Relative humidity: 45% to 60%

[1] Limits for change of resistance at test according to CECC 40401-803