

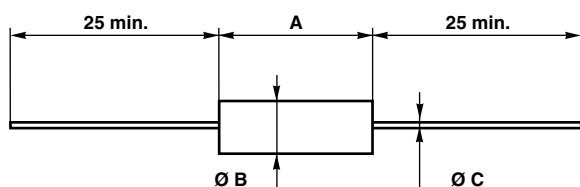
# Molded Metal Film Very High Stability (< 0.25 % after 1000 h) and Precision (up to 0.1 %) Resistors

## FEATURES

- 0.1 W to 2 W at 70 °C
- EN140-201
- CECC 40 100
- Very high stability: drift < 0.25 % after 1000 h
- Reduced total excursion: high initial precision (to  $\pm 0.1$  %) with low temperature coefficient (down to  $\pm 15$  ppm/°C)
- The models in this series are the first ones qualified by the CNES for spatial applications (certificate N°4 dated October 22, 1972)
- Wide range ohmic values 1  $\Omega$  to 5 M $\Omega$
- Accurate dimensions, high insulation and great mechanical strength
- High climatic performances: - 65 °C/+ 155 °C/56 days
- Matching tolerance: 0.1 %
- Tracking TCR: 5 ppm/°C
- Termination: pure matte tin
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)





**RoHS**  
COMPLIANT


## DIMENSIONS in millimeters






SERIES	A max.	Ø B max.	Ø C	WEIGHT in g
RCMA02	6.7	2.5	0.6	0.26
RCMA05	10.4	4.2	0.6	0.46
RCMA08	16.5	6.4	0.8	1.3
RCMA1	19.3	6.4	0.8	1.5
RCMA2	29	10.2	0.8	4.4
RCMA4	54	10.2	0.8	13

## STANDARD ELECTRICAL SPECIFICATIONS

MODEL	RESISTANCE RANGE $\Omega$	RATED POWER $P_{70\text{ }^{\circ}\text{C}}$ W	LIMITING ELEMENT VOLTAGE V	TOLERANCE $\pm$ %	TEMPERATURE COEFFICIENT $\pm$ ppm/°C
RCMA02 	1 to 1M	0.125	300	0.1, 0.2, 0.5, 1	15, 50
RCMA05 	1 to 1M	0.250	350	0.1, 0.2, 0.5, 1	15, 50
RCMA08 	1 to 1.5M	0.500	400	0.1, 0.2, 0.5, 1	15, 50
RCMA1	1 to 2M	0.75	500	0.1, 0.2, 0.5, 1	15, 25
RCMA2	1 to 2.5M	1.0	600	0.1, 0.2, 0.5, 1	15, 25
RCMA4	1 to 5M	2.0	800	0.1, 0.2, 0.5, 1	15, 25

### Note

-  Undergoes European Quality Insurance System (CECC)

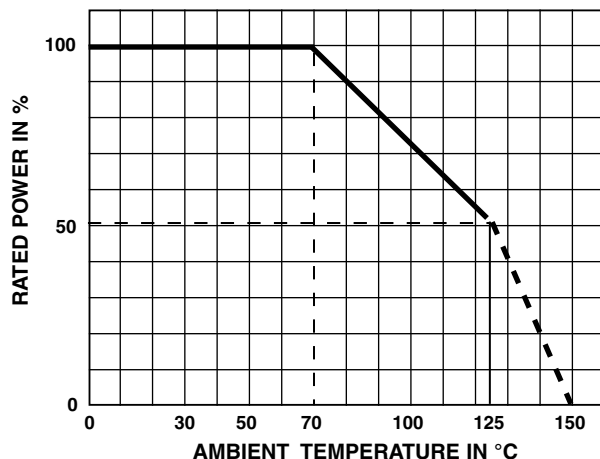
TECHNICAL SPECIFICATIONS								
VISHAY SFERNICE SERIES		RCMA02	RCMA05	RCMA08	RCMA1	RCMA2	RCMA4	
NF C 83-230		 K4 RS58P	 K4 RS63P	 RS68P	-	-	-	
CECC 40 100-803		BE	CE	DE	-	-	-	
Power Rating at 70 °C		0.125 W	0.250 W	0.500 W	0.75 W	1 W	2 W	
Resistance Value Range in Relation to - Tolerance - Temperature Coefficient	K3	± 0.2 %	10 Ω to 332 kΩ	10 Ω to 332 kΩ	10 Ω to 1 MΩ	10 Ω to 1 MΩ	10 Ω to 2.5 MΩ	
		± 0.5 % ± 1 %	1 Ω to 1 MΩ	1 Ω to 1 MΩ	1 Ω to 1.5 MΩ	1 Ω to 2 MΩ	1 Ω to 2.5 MΩ	1 W to 5 MΩ
	K4	± 0.1 % ± 0.2 %	10 Ω to 332 kΩ	10 Ω to 332 kΩ	10 Ω to 1 MΩ	10 Ω to 1 MΩ	10 Ω to 1 MΩ	10 Ω to 2.5 MΩ
		± 0.5 % ± 1 %	1 Ω to 1 MΩ	1 Ω to 1 MΩ	1 Ω to 1.5 MΩ	1 Ω to 2 MΩ	1 Ω to 2.5 MΩ	1Ω to 5 MΩ
	K5	± 0.1 % ± 0.2 %	10 Ω to 332 kΩ	10 Ω to 332 kΩ	10 Ω to 750 kΩ	10 Ω to 750 kΩ	10 Ω to 100 kΩ	10 Ω to 100 kΩ
		± 0.5 % ± 1 %	10 Ω to 1 MΩ	10 Ω to 1 MΩ	10 Ω to 1.5 MΩ	10 Ω to 2 MΩ		
Maximum Voltage		300 V	350 V	400 V	500 V	600 V	800 V	
Critical Resistance		720 kΩ	490 kΩ	320 kΩ	333 kΩ	360 kΩ	320 kΩ	
Temperature Coefficient	Rated in the range - 55 °C to + 155 °C	K3 ≤ ± 50 ppm/°C			K4 ≤ ± 25 ppm/°C			
	Typical in the range 0 °C to + 155 °C	K5 ≤ ± 15 ppm/°C						
Insulation Resistance		> 10 <sup>7</sup> MΩ						
Voltage Coefficient		0.0001 %/V						
Environmental Specifications		- 65 °C/+ 155 °C/56 days						

**Note**

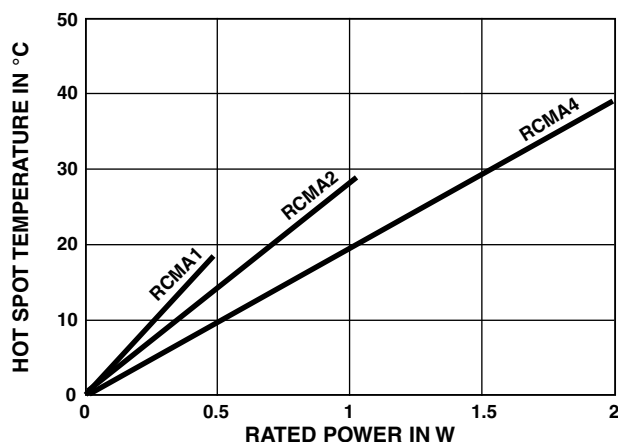
-  Undergoes European Quality Insurance System (CECC)

PERFORMANCE			
CECC 40 100		EN 140-201	TYPICAL VALUES AND DRIFTS
TESTS	CONDITIONS STD 202	REQUIREMENTS	
Load Life at Maximum Category Temperature	1000 h at 125 °C 50 % of $P_n$	≤ ± 1 % Insulation resistance > 1 GΩ	± 0.25 % or 0.05 Ω
Short Time Overload	2.5 $U_m/5$ s limited to 2 $U_n$	≤ ± (0.25 % + 0.05 Ω)	± 0.1 % or 0.05 Ω
Damp Heat Humidity (Steady State)	56 days with low load	≤ ± (1 % + 0.05 Ω) Insulation resistance > 1 GΩ	± 0.2 % or 0.05 Ω
Rapid Temperature Change	- 55 °C to + 155 °C	≤ ± (0.25 % + 0.05 Ω)	± 0.1 % or 0.05 Ω
Climatic Sequence	- 65 °C to + 155 °C	≤ ± (1 % + 0.05 Ω) Insulation resistance > 1 GΩ	± 0.25 % or 0.05 Ω Insulation resistance 10 <sup>6</sup> MΩ
Terminal Strength	Pull - twist - 2 bends	≤ ± (0.25 % + 0.05 Ω)	± 0.05 % or 0.05 Ω
Vibration	10 Hz to 500 Hz	≤ ± (0.25 % + 0.05 Ω)	± 0.05 % or 0.05 Ω
Soldering (Thermal Shock)	+ 260 °C 10 s	≤ ± (0.25 % + 0.05 Ω)	± 0.05 % or 0.05 Ω
Load Life	Cycle 90'/30' 1000 h at $P_n$ at 70 °C	≤ ± (1 % + 0.05 Ω) Insulation resistance > 1 GΩ	± 0.1 % or 0.05 Ω
Shelf Life	1 year ambient temperature	-	± 0.1 % or 0.05 Ω

## POWER RATING



## TEMPERATURE RISE



## PRACTICAL OPERATING TOLERANCES

Table 2 and 3 show the basic characteristics and maximum values under different stresses. In fact, the values and drifts are maintained to within narrower limits.

Temperature coefficient between - 10 °C and + 70 °C	K5 $\leq \pm 10$ ppm/°C K4 $\leq \pm 15$ ppm/°C	
LONG LIFE 90'/30' cycles ambient temperature 70 °C	1000 h at $P_r$	$\pm 0.05$ %
	10 000 h at $P_r$	$\pm 0.15$ %

So, in operation under the specified conditions ( $P_r$  at 70 °C) the total drift (load life + TCR) of a RCMA K4 does not exceed  $\pm 0.25$  %.

## SPECIAL APPLICATIONS

Temperature coefficient tracking to 5 ppm/°C.

Tolerance matching to 0.05 %.

Selection of positive or negative TCR in temperature range of - 20 °C to + 125 °C.

For these applications and other requirements consult Vishay Sfernice.

## MARKING

Printed: Vishay Sfernice trademark, series, style (due to lack of space RCMA02 is printed MA02), ohmic value (in  $\Omega$ ), tolerance (in %), temperature coefficient, manufacturing date.

## GLOBAL PART NUMBER INFORMATION

R	C	M	A	0	2		1	3	0	0	1	F	H	S	1	4
GLOBAL MODEL		SIZE		SPECIAL		OHMIC VALUE				TOLERANCE		TEMPERATURE COEFFICIENT		PACKAGING		
RCMA		02 05 08 10 20 40		As applicable. Contact us.		The first four digits are significant figures and the last digit specifies the number of zeros to follow. R designates decimal point. 13001 = 13 kΩ 33001 = 33 kΩ 220R0 = 220 Ω 1R220 = 1.22 Ω				B = 0.1 % A = 0.2 % D = 0.5 % F = 1 %		H = K3, 50 ppm/K E = K4, 25 ppm/K D = K5, 15 ppm/K		AM500 = A20 BAG100 = S14 BAG50 = S09 BAG10 = S03 BO50* = B25  *: possible in N/A		



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**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

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