

Vishay Foil Resistors

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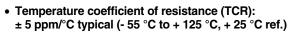
# High Precision Bulk Metal<sup>®</sup> Foil with Tolerance of $\pm 0.005$ % and Qualified to ESA Specification 4001/011



Due to the unique performance of the Bulk Metal<sup>®</sup> foil resistive elements, these resistors are very well adapted to high reliability applications.

Our application engineering department is available to advise and to make recommendations. For non-standard technical requirements and special applications, please contact us.

#### **FEATURES**



• Rated power: to 0.5 W at + 70 °C

• Tolerance: ± 0.005 %

Load life stability: to ± 0.005 % at 70 °C, 2000 h at rated power

• Resistance range: 33  $\Omega$  to 100  $k\Omega$ 

 Vishay Foil resistors are not restricted to standard values, we can supply specific "as required" values at no extra cost or delivery (e.g. 100K1234 vs 100K)

• Electrostatic discharge up to 25 kV

• Non inductive, non capacitive design

• Rise time: 1 ns effectively no ringing

• Current noise: < - 40 dB

Thermal EMF: 0.05 μV/°C typical

Voltage coefficient: < 0.1 ppm/V</li>

• Low inductance: < 0.08 μH typical

• Non hot spot design

• Terminal finishes available: tin/lead alloy

 Matched sets are available per request (TCR Tracking: to 0.5 ppm/°C)

 For better TCR and PCR performances please review the RNC90Z and Z555 datasheets

Four variants are available, two reliability levels are proposed:

 Level B: part individualization and test measurements provided

 Level C: not part individualization and no test measurements provided

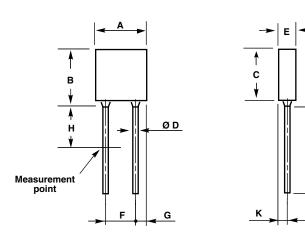
ESA/SCC 4001

• Lot acceptance test level 3 (LAT3): 10 additional parts needed

• Lot acceptance test level 2 (LAT2): 25 additional parts needed

• Lot acceptance test level 1 (LAT1): 31 additional parts needed

## **DIMENSIONS** in millimeters



SERIES	RCK HR 02			
	VARIANTS	DIM. IN mm		
DIM.	VARIANTS	MIN.	MAX.	
Α	-	-	7.5	
В	-	-	8	
С	-	-	7.5	
ØD	03 - 04 - 07 - 08	0.55	0.65	
E	-	-	2.5	
F	03 - 07	4.8	5.35	
I I	04 - 08	3.55	4.1	
G	03 - 07	1	1.5	
G	04 - 08	1.6	2.1	
Н	-	4	6	
J	03 - 04	6	-	
J	07 - 08	20	-	
K	-	-	1.5	

## **RCK HR 02, 02A**

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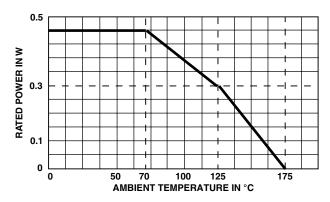
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ELECTRICAL SPECIFICATIONS				
VISHAY SFERNICE DESIGNATION	RCK HR			
Qualified Designation	RNC 90			
ESA Specification	4001/011			
Power Rating at + 70 °C	0.5 W			
Limiting Element Voltage	300 V			
Temperature Coefficient	± 5 ppm/°C (- 55 °C + 125 °C, + 25 °C ref.) ± 10 ppm/°C (+ 125 °C to + 175 °C)			
Ohmic Value Range     33 $\Omega$ to 100 k $\Omega$ available range       50 $\Omega$ to 100 k $\Omega$ qualified range				
Tolerance	$\pm$ 0.005 % to $\pm$ 1 % available range $\pm$ 0.02 % to $\pm$ 1 % qualified range			
Temperature Limits	- 55 °C to + 175 °C			
Dielectric Voltage	425 V <sub>RMS</sub>			
Soldering Temperature	260 °C, immersion 10 s at a distance of no less than 1.6 mm from the device body			

TYPICAL PERFORMANCE SPECIFICATIONS						
TESTS	CONDITIONS	REQUIREMENTS ESA/SCC 4001/11	TYPICAL VALUES AND DRIFTS			
Short Time Overload	$U = \sqrt{2 \cdot R_n} / 5 \text{ s}$ $U \text{ max.} < 450 \text{ V}$	± (0.05 + (0.01 Ω x 100)) % R <sub>n</sub>	± 0.002 %			
Rapid Temperature Change	- 55 °C/+ 175 °C 5 cycles IEC 60068-2-14 test Na	± (0.05 + (0.01 Ω x 100)) % R <sub>n</sub>	± 0.002 %			
Terminal Strength	IEC 60068-2-21 test Ua, test U21 (tensile)	$\pm$ (0.002 + (0.01 $\Omega$ x 100)) % R <sub>n</sub>	± 0.001 %			
Soldering (Thermal Shock)	260 °C/10 s IEC 60068-2-20 A test Tb (met. 1A)	$\pm$ (0.002 + (0.01 $\Omega$ x 100)) % R <sub>n</sub>	± 0.002 %			
Vibration	10 Hz to 2000 Hz 1.5 mm or 20 g 6 h (met. B4) IEC 60068-2-6 test Fc	$\pm$ (0.002 + (0.01 $\Omega$ x 100)) % R <sub>n</sub>	± 0.002 %			
Humidity (Steady State)	56 days 95 % H.R. 40 °C IEC 60068-2-3	N/a	$\pm$ 0.003 % Insulation resistance > 10 <sup>4</sup> MΩ			
Climatic Sequence	IEC 60068-2-2/IEC 60068-2-30 IEC 60068-2-1/IEC 60068-2-13	± (0.05 + (0.01 Ω x 100)) % R <sub>n</sub>	$\pm~0.003~\%$ Insulation resistance > $10^4~\text{M}\Omega$			
Load Life	1000 h P <sub>n</sub> at + 70 °C 90'/30' cycle	± (0.05 + (0.01 Ω x 100)) % R <sub>n</sub>	± 0.005 %			
High Temperature Exposure	1000 h at + 175 °C IEC 60068-2-20A Test B	± (0.05 + (0.01 Ω x 100)) % R <sub>n</sub>	± 0.01 %			

## **POWER RATING CHART**





## High Precision Bulk Metal® Foil with Tolerance of ± 0.005 % and Qualified to ESA Specification 4001/011

# Vishay Foil Resistors

TOLERANCE CODE								
Tolerance ± %	0.005	0.01	0.02	0.05	0.1	0.2	0.5	1
Code SCC	E	L	Р	W	В	С	D	F

### **PACKAGING**

Resistors are packed in sealed blisters, up to 10 resistors per blister pack.
The following information is printed on the blister pack:

- order reference
- date code
- ESA specification reference
- quality level
- review number

### **MARKING**

Ohmic value is printed on the top side, 3 to 6 digits are used, R stands for  $\Omega$  and K for  $k\Omega$ .

The front side is printed as follows:

- tolerance (letter code)
- ESA specification reference
- quality level
- variant
- manufacturing date (2 digits for the year, 2 digits for the
- a letter to differentiate manufacturing sequence.

ESA logo and serialization number are printed on the back

ORDERING INFORMATION						
RCK HR	02 - 03	<b>10 k</b> Ω	± 1 %	B1		
MODEL	VERSION - VARIANT	OHMIC VALUE	TOLERANCE	QUALITY LEVEL		
	02 - 03 02 - 07 02A - 04 02A - 08		± 0.005 % ± 0.01 % ± 0.02 % ± 0.05 % ± 0.1 % ± 0.2 % ± 0.5 % ± 1 %	B1 C1 B2 C2 B3 C3		



Vishay

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