VISHAY

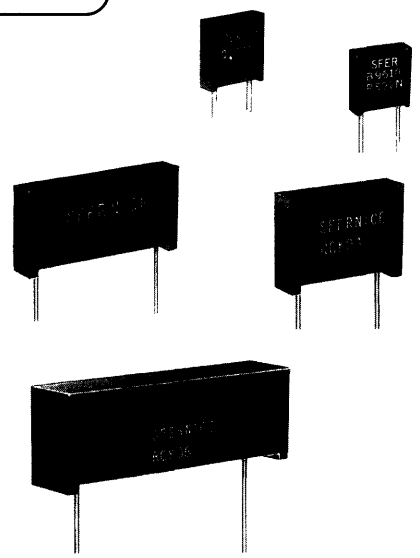
SFERNICE

RCK 02-02A 04 05-05A 06

very high precision and stability metal foil resistor

– bulk metal®

5 W to 1,5 W
to 70°C
NF C/UTE 83-220
CECC 40300
CECC 40302-001
BS CECC 40302-004
MIL-R-55182J
ESA/SCC 4001 011



The ultra-high precision planar resistors of the RCK series are produced according to a special process.
The technology used is unique and based on an etched nickel-chromium foil bonded on to an alumina substrate.
The resistor's small size (thickness 2,5 mm) enables compact side by side mounting on a 2,54 mm PCB grid and their unmatched performances make them particularly well suited for all military and high performance applications.

- **VERY TIGHT TOLERANCE ±0,005 % to ±1%**
  Matching to 0,01%
- **VERY LOW TEMPERATURE COEFFICIENT**
  typical ≤ +3 ppm/°C (–55°C to +155°C) ±1 ppm/°C (0°C to +60°C)
  tracking to 0,5 ppm/°C
- **ELECTRICAL INSULATION >10^6 MΩ**
- **VERY HIGH STABILITY < 25 ppm/year or <50 ppm/3 years (shelf life)**
- **NEGLIGIBLE RISE TIME approx. 1-10^{-9} s.**
- **CLIMATIC CATEGORY**
  CECC : –55°C / +155°C / 56 days
  RCK 02 : –55°C / +175°C / 56 days

RCK02 - RS92 N

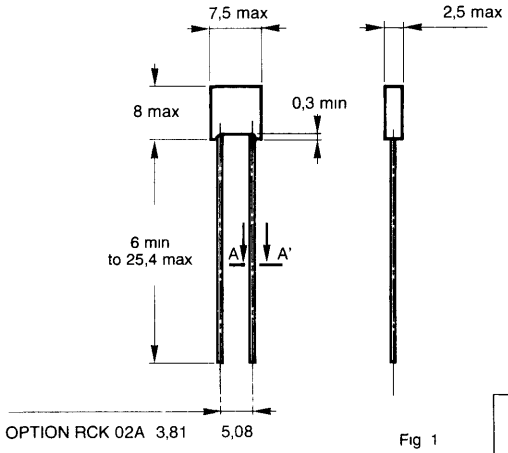


Fig 1

RCK04

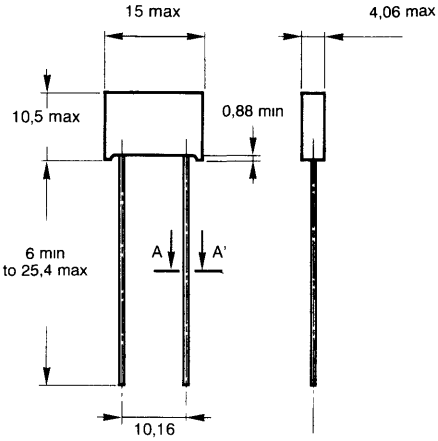
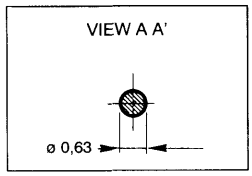


Fig 2



RCK05

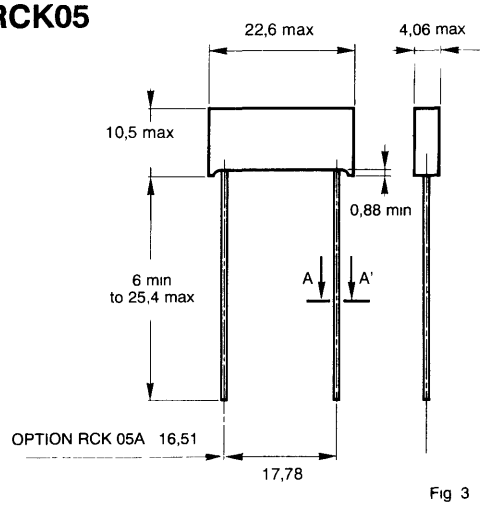


Fig 3

RCK06

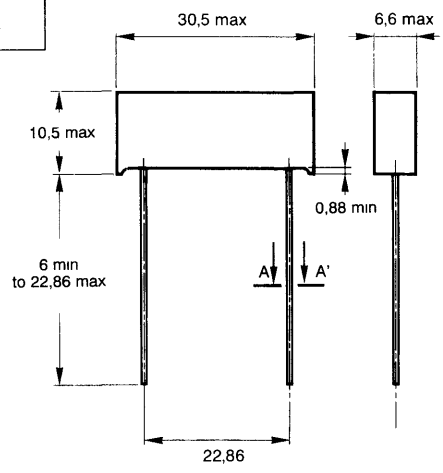


Fig 4

Dimensions in mm

Undergoes European Quality Insurance System (CECC)

European Space Agency approved

Precision resistors

SPECIFICATIONS

MECHANICAL

MECHANICAL PROTECTION... insulated case
RESISTIVE ELEMENT... nickel-chromium
TERMINAL LEADS... tinned copper
weldable solderable
type C MIL-STD 1276
UNIT WEIGHT... 0,3 - 1 - 2 - 4 g

ENVIRONMENTAL

TEMPERATURE LIMITS... –55°C + 175°C
CLIMATIC CATEGORY... 55 / 155 / 56

ELECTRICAL

RESISTANCE VALUE RANGE... 1 Ω ... 1 MΩ
RESISTANCE TOLERANCE... ± 0,005% to ± 1%
POWER RATING... 0,25 W... 2 W
TEMPERATURE COEFFICIENT... see diagram
fig. 6 and fig. 7
DIELECTRIC VOLTAGE... 750 V RMS
INSULATION RESISTANCE... > 10^6 MΩ
THERMAL RESISTANCE... 0,14°C/mW
THERMAL EMF... < 0,5 µV for 1°C of
difference between leads
NOISE... non measurable (> –32dB)

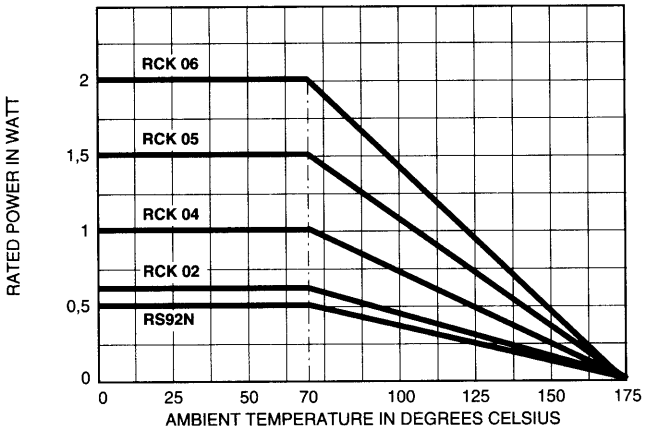
CHARACTERISTICS PER RESISTOR

Table 1

SERIES		RCK 02 / RS 92N	RCK 02 / 02A	RCK 04	RCK 05 / 05A	RCK 06
POWER RATING IN RELATION TO OHMIC VALUES AND AMBIENT TEMPERATURE		80,6 Ω to 120 kΩ 0,5 W at +70°C 0,25 W at +125°C	1 Ω to 100 kΩ 0,6 W at +70°C 0,3 W at +125°C 101 kΩ to 167 kΩ 0,2 W at +125°C	1 Ω to 200 kΩ 1 W at +70°C 0,5 W at +125°C 201 kΩ to 500 kΩ 0,3 W at +125°C	1 Ω to 300 kΩ 1,5 W at +70°C 0,75 W at +125°C 301 kΩ to 750 kΩ 0,4 W at +125°C	0,5 Ω to 400 kΩ 2 W at +70°C 1 W at +125°C 401 kΩ to 1 MΩ 0,5 W at +125°C
TOLERANCES IN RELATION TO OHMIC VALUES	+0,005 %	–	25 Ω 167 kΩ	30 Ω 500 kΩ	30 Ω 750 kΩ	30 Ω 1 MΩ
	+0,02 % + 0,01 %	80,6 Ω to 120 kΩ	12 Ω 167 kΩ 25 Ω 167 kΩ	10 Ω 500 kΩ 20 Ω 500 kΩ	10 Ω 750 kΩ 20 Ω 750 kΩ	40 Ω 1 MΩ 20 Ω 1 MΩ
	+0,05 %		5 Ω 167 kΩ	5 Ω 500 kΩ	5 Ω 750 kΩ	5 Ω 1 MΩ
	+0,1 % ± 0,2% +0,5 % ± 1 %		2 Ω 167 kΩ 2 Ω 167 kΩ	1 Ω 500 kΩ	1 Ω 750 kΩ	1 Ω 1 MΩ 0,5 Ω 1 MΩ
LIMITING ELEMENT VOLTAGE		200 V	300 V	350 V	350 V	500 V
CRITICAL RESISTANCE AT +70°C		80 kΩ	80 kΩ	122,5 kΩ	208,3 kΩ	281,6 kΩ
TEMPERATURE COEFFICIENT		± 5 ppm/°C	See diagram fig. 6 and fig. 7			

POWER RATING CHART

Fig. 5



POWER RATING

In order to increase stability, it is recommended to reduce the nominal power (Pr) in relation with tolerance.
For ± 0,1% to ±0,05% Power = Pr x 0,75
For ± 0,02% to ±0,01% Power = Pr x 0,5
For ± 0,005% Power = Pr x 0,25.

NOISE

< 0,025 µV/V RMS (> –32 dB).

HIGH FREQUENCY CHARACTERISTICS

Very low reactance.
Shunt capacitance is approximately 1 pF
Total inductance is approximately 100 nH

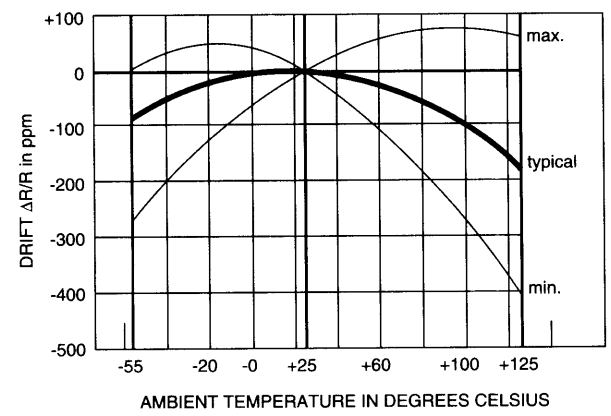
RISE TIME

Approximately 1 nanosecond.
Allows very high performance in the field of very fast electronics (totally oscillation-free).

TEMPERATURE COEFFICIENTS

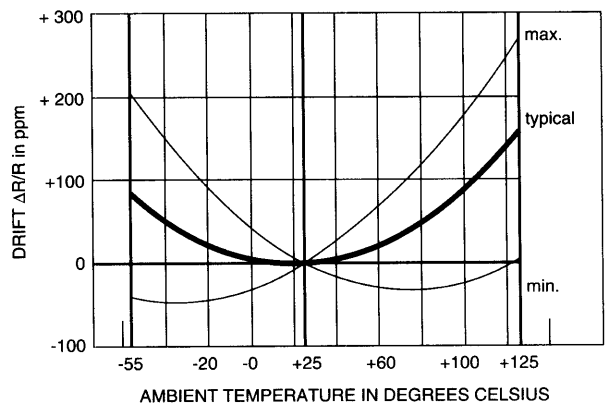
RCK...

Fig. 6



RCK... S 223

Fig. 7



Precision resistors

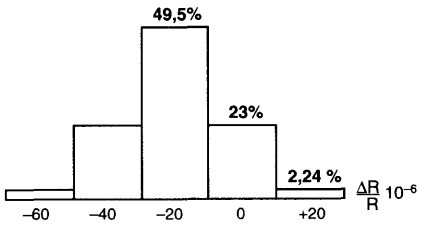
PERFORMANCE

Table 2

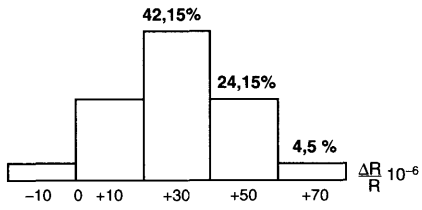
TESTS	CONDITIONS	REQUIREMENTS		TYPICAL DRIFTS
		NF C 83-220 CECC 40300	MIL-R-55182J	
OVERLOAD	2,5 un / 5 s U max. <2 Un	± 0,01 %	± 0,2 %	± 0,002 %
TEMPERATURE CYCLING	–55°C +155°C 5 cycles CEI 68-2-14 Test Na	± 0,01 %	± 0,05 %	± 0,002 %
TERMINALS STRENGTH	CEI 68-2-21 Test Ua (pulling) Ub (bending) Uc (twisting)	± 0,01 %	± 0,2 %	± 0,002 %
RESISTANCE TO SOLDERING HEAT	260°C/10 s CEI 68-2-20A Test Tb (met. 1A)	± 0,01 %	± 0,1 %	± 0,002 %
VIBRATIONS	10 Hz to 500 Hz 0,75 mm or 10 g 6 h met. B4 CEI 68-2-6 Test Fc	± 0,01 %	± 0,2 %	± 0,002 %
CLIMATIC SEQUENCE	–55°C +155°C 6 cycles 95% R.H. 85 mbar CEI 68-1	± 0,05 % Insulation R>10^2 MΩ	–	± 0,003 % Insulation R>10^4 MΩ
HUMIDITY (STEADY STATE)	56 days 95% R.H. 40°C CEI 68-2-3	± 0,05 % Insulation R>10^2 MΩ	–	± 0,003 % Insulation R>10^4 MΩ
MOISTURE RESISTANCE	Method 106 MIL-STD-202	–	± 0,4 % Insulation R>10^2 MΩ	± 0,02 % Insulation R>10^4 MΩ
LOAD LIFE	1000 h Pr at 70°C 90'/30' cycle	± 0,05 %	± 0,5 %	± 0,05 %
HIGH TEMPERATURE EXPOSURE	1000 h/155°C CEI 68-2-20A Test B	± 0,05 %	± 0,5 %	± 0,01 %
	100 h/175°C Sfernice RCK 02	–	± 0,5 %	± 0,05 %

TYPICAL RESISTANCE DRIFT DIAGRAMS

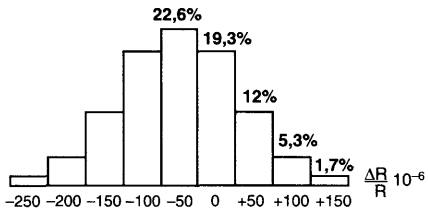
Temperature cycles
(5 cycles from –55°C to +155°C)



Humidity
(56 days at 95% H.R. 40°C)



Load life
(0,33 W at 125°C for 1000 hours)



Precision resistors

GENERAL APPLICATIONS

Discrete components : any circuits requiring high precision and high stability, standard resistors, fast rise time applications, high stability applications even under severe temperature variations, circuits for analog computers, etc.
Resistor networks : ladder networks (R-2R), Kelvin-Varley dividers, current source networks, any type of voltage dividers, etc.

MARKING

SFERNICE trademark (except 02 style), series, style, NF style if applicable, nominal resistance (in Ω, kΩ), tolerance (in %), manufacturing date.

ORDERING PROCEDURE

SERIES	STYLE	OPTION	OHMIC VALUE	TOLERANCE
RCK	02	A	32 kΩ	±0,005%