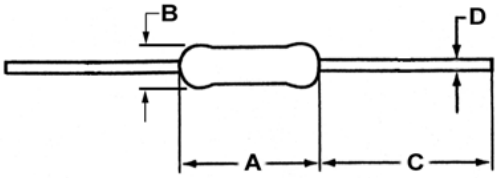
Features:

- Miniature metal film for tight size constraints
- Superior electrical, TCR performances
- Flame-retardant coatings are standard
- 1/2-watt in standard 1/8-watt package, 1-watt part in 1/4-watt package, 2-watt part in 1/2-watt package
- RoHS compliant



Electrical Specifications

Type / Code	Power Rating (Watts) @ 70ºC	Maximum Working Voltage①	Maximum Pulse Voltage	Resistance Temperature Coefficient	Ohmic Range (Ω) and Tolerance	
					0.5%	1%
RNS 1/2	0.5W	200V	400V	±50 ppm/ºC ±100 ppm/ºC	10 - 1M	4.99 - 1M
RNS 1	1.0W	350V	600V	±25 ppm/ºC ±50 ppm/ºC ±100 ppm/ºC	100 - 511K	10 - 1M
RNS 2	2.0W	350V	700V	±25 ppm/ºC ±50 ppm/ºC ±100 ppm/ºC	100 - 511K	10 - 1M

①Lesser of√PR or maximum working voltage

Please refer to the High Power Resistor Application Note (page 3) for more information on designing and implementing high power resistor types.

Mechanical Specifications

Type / Code	A Body Length	B Body Diameter	C Lead Length (Bulk)	D Lead Diameter	Units
RNS 1/2	0.13 ± 0.01 3.40 ± 0.40	0.07 ± 0.01 1.80 ± 0.30	1.10 ± 0.08 28.0 ± 2.0	0.017 ± 0.002 0.43 ± 0.05	inches mm
RNS 1	0.26 ± 0.02 6.50 ± 0.50	0.09 ± 0.006 2.30 ± 0.20	1.10 ± 0.08 28.0 ± 2.0	0.022 ± 0.002 0.56 ± 0.05	inches mm
RNS 2	0.35 ± 0.02 9.00 ± 0.50	0.14 ± 0.02 3.50 ± 0.50	1.10 ± 0.08 28.0 ± 2.0	0.31 ± 0.004 0.80 ± 0.10	inches mm

Operating Temperature Range: -55ºC to +155ºC

Performance Characteristics

Test	Standard / Method	Requirement
Biased Humidity	MIL-STD 202, Method 103	± 1.5%
Resistance to Solder Heat	MIL-STD 202, Method 210	± 0.5%
Insulation Resistance	JIS C 5202 5.6	± 0.5%
Load Life	MIL-STD 202, Method 208	± 1.0%
Terminal Strength	MIL-STD 202, Method 211	± 0.2%
Temperature Cycling	JESD22 Method JA-104	± 1.0%
Moisture Resistance	MIL-STD 202, Method 106	± 0.5%

How to Order

SEI Type	Code	TCR	Nominal Resistance	Tolerance	Packaging
RNS	1	T1	4.75K	1%	R

Type	Description
RNS	Ultra Mini

Code	Wattage
1/2	0.5W
1	1W
2	2W

TCR	
T1	100ppm
T2	50ppm
T9	25ppm

Tolerance	Values
0.5%	E96
1%	E96, E24

Types	Qty	Description	Code
RNS 1/2, RNS 1	5,000	Tape and Reel	R
RNS 2	2,500		
RNS 1/2, RNS 1, RNS 2	5,000	Ammo	T
RNS 1/2, RNS 1, RNS 2	1,000	Bulk	A

New part number format starting January 3rd, 2011:

How to Order

1	2	3	4	5	6	7	8	9	10	11
R	N	S	1	F	T	D	4	K	7	5

Product Series	
RNS	Ultra Mini

Size	Power
12	0.5W
1	1W
2	2W

Tolerance	
Code	Tol
D	0.5%
F	1%

Packaging			
Code	Description	Size	Quantity
T	tape and reel	RNS12, RNS1	5,000
		RNS2	2,500
A	ammo	RNS12, RNS1, RNS2	5,000
B	bulk	RNS12, RNS1, RNS2	1,000

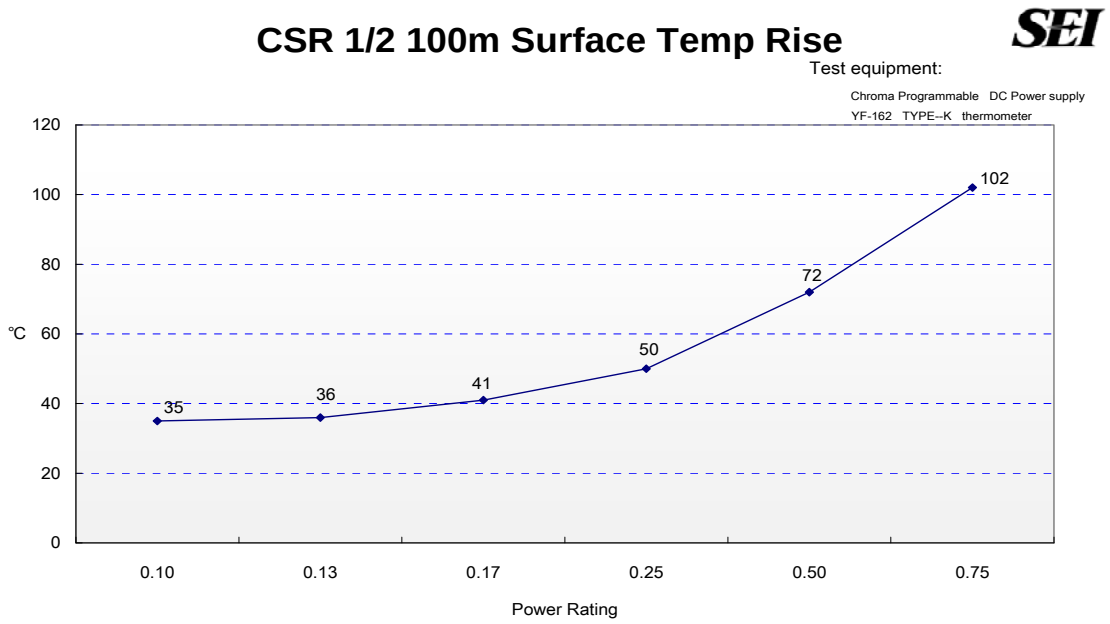
TCR	
Code	ppm
E	25
C	50
D	100

Resistance Value
Four characters with the multiplier used as the decimal holder.
4.99 ohms = 4R99 10.2 Kohm = 10K2 1 Mohm = 1M00

High Power Chip Resistors and Thermal Management

Stackpole has developed several surface mount resistor series in addition to our current sense resistors, which have had higher power ratings than standard resistor chips. This has caused some uncertainty and even confusion by users as to how to reliably use these resistors at the higher power ratings in their designs.

The data sheets for the RHC, RMCP, RNCP, CSR, CSRN, CSRF, CSS, and CSSH state that the rated power assumes an ambient temperature of no more than 100 degrees C for the CSS / CSSH series and 70 degrees C for all other high power resistor series. In addition, IPC and UL best practices dictate that the combined temperature on any resistor due to power dissipated and ambient air shall be no more than 105C. At first glance this wouldn't seem too difficult, however the graph below shows typical heat rise for the CSR ½ 100 milliohm at full rated power. The heat rise for the RMCP and RNCP would be similar. The RHC with its unique materials, design, and processes would have less heat rise and therefore would be easier to implement for any given customer.



The 102 degrees C heat rise shown here would indicate there will be additional thermal reduction techniques needed to keep this part under 105C total hot spot temperature if this part is to be used at 0.75 watts of power. However, this same part at the usual power rating for this size would have a heat rise of around 72 degrees C. This additional heat rise may be dealt with using wider conductor traces, larger solder pads and land patterns under the solder mask, heavier copper in the conductors, vias through PCB, air movement, and heat sinks, among many other techniques. Because of the variety of methods customers can use to lower the effective heat rise of the circuit, resistor manufacturers simply specify power ratings with the limitations on ambient air temperature and total hot spot temperatures and leave the details of how to best accomplish this to the design engineers. Design guidelines for products in various market segments can vary widely so it would be unnecessarily constraining for a resistor manufacturer to recommend the use of any of these methods over another.

Note: The final resistance value can be affected by the board layout and assembly process, especially the size of the mounting pads and the amount of solder used. This is especially notable for resistance values ≤ 50 mΩ. This should be taken into account when designing.