

## Very High Precision and Stability Metal Foil Resistors, Bulk Metal<sup>®</sup> CECC Qualified

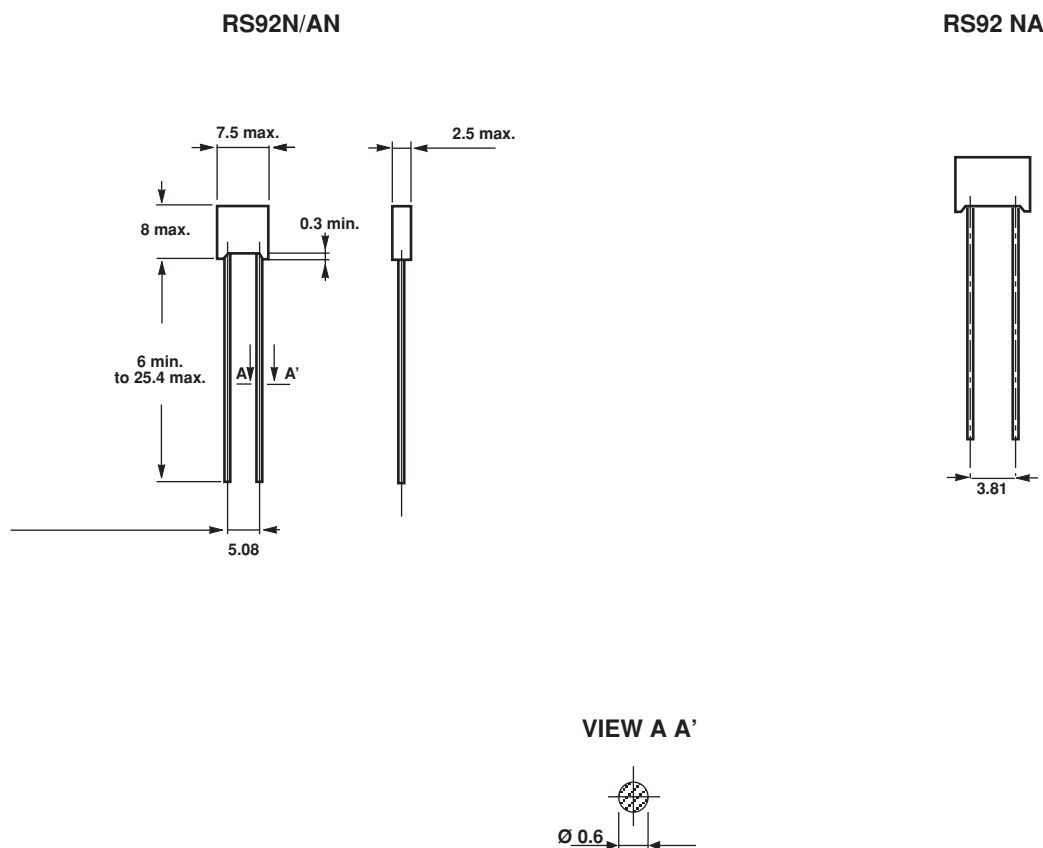


The ultra-high precision planar resistors of the RS92N/AN series are produced according to a special process. The technology used is unique and based on an etched nickel-chromium foil bonded on to an alumina substrate. The resistor's small size (thickness 2.5mm) enables compact side by side mounting on a 2.54mm PCB grid and their unmatched performances make them particularly well suited for all military and high performance applications.

### FEATURES

- Very tight tolerance  $\pm 0.01\%$  to  $\pm 1\%$   
Matching to 0.01%
- Very low temperature coefficient  
+ 0.6ppm/°C (0°C to + 25°C, - 0.6ppm/°C (+ 25°C to 60°C), + 2.2ppm/°C (- 55°C to + 20°C), - 1.8ppm/°C (+ 20°C to + 125°C) tracking to 0.5ppm/°C
- Electrical insulation >  $10^6\text{M}\Omega$
- Very high stability < 25ppm/year or < 50ppm/3 years (shelf life)
- Negligible rise time approx.  $1\text{-}10^{-9}\text{s}$ .
- Climatic category  
CECC: - 55°C/+ 155°C/56 days

### DIMENSIONS in millimeters



## MECHANICAL SPECIFICATIONS

|                       |                                                             |
|-----------------------|-------------------------------------------------------------|
| Mechanical Protection | Insulated case                                              |
| Resistive Element     | Nickel-chromium                                             |
| Terminal Leads        | Tinned copper<br>weldable solderable<br>type C MIL-STD 1276 |
| Unit Weight           | 0.3 g                                                       |

## ENVIRONMENTAL SPECIFICATIONS

|                    |                |
|--------------------|----------------|
| Temperature Limits | – 55°C + 175°C |
| Climatic Category  | 55 / 155 / 56  |

## ELECTRICAL SPECIFICATIONS

|                         |             |                                             |
|-------------------------|-------------|---------------------------------------------|
| Qualified Ohmic Range*  | RS92N<br>AN | 80R6 to 120K<br>80R6 to 92K                 |
| Qualified Tolerances*   |             | 0.01% to 1%                                 |
| Power Rating            |             | 0.5W @ 70°C<br>0.25W @ 125°C                |
| Temperature Coefficient |             | See diagram                                 |
| Dielectric Strength     |             | 750VRMS                                     |
| Insulation Resistance   |             | > 10 <sup>6</sup> M                         |
| Thermal EMF             |             | < 0.5µV for 1°C of difference between leads |
| Noise                   |             | Non measurable (> - 32dB)                   |
| Thermal Resistance      |             | 0.14°C/mW                                   |

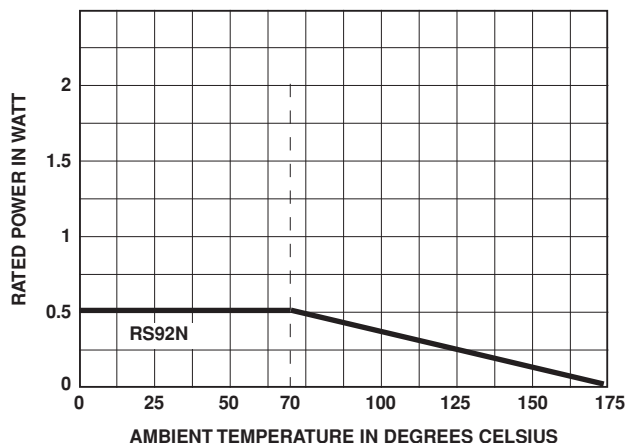
\*For non qualified product, extended ohmic range and tighter tolerance, refer to S102 series in Bulk Metal Foil catalogue (VSD-DB0022)

## PERFORMANCE

| TESTS                        | CONDITIONS                                                      | REQUIREMENTS                                 |                                           | TYPICAL DRIFTS                               |
|------------------------------|-----------------------------------------------------------------|----------------------------------------------|-------------------------------------------|----------------------------------------------|
|                              |                                                                 | NF C 83-220<br>CECC 40300                    | MIL-R-55182J                              |                                              |
| Overload                     | 2.5un/5 s<br>U max. < 2Un                                       | ± 0.01%                                      | ± 0.2%                                    | ± 0.002%                                     |
| Temperature Cycling          | - 55°C + 155°C 5 cycles<br>CEI 68-2-14 Test Na                  | ± 0.01%                                      | ± 0.05%                                   | ± 0.002%                                     |
| Terminals Strength           | CEI 68-2-21<br>Test Ua (pulling) Ub (bending)<br>Uc (twisting)  | ± 0.01%                                      | ± 0.2%                                    | ± 0.002%                                     |
| Resistance to Soldering Heat | 260°C/10s<br>CEI 68-2-20A Test Tb (met. 1A)                     | ± 0.01%                                      | ± 0.1%                                    | ± 0.002%                                     |
| Vibrations                   | 10Hz to 500Hz<br>0.75mm or 10g 6h met. B4<br>CEI 68-2-6 Test Fc | ± 0.01%                                      | ± 0.2%                                    | ± 0.002%                                     |
| Climatic Sequence            | - 55°C + 155°C<br>6 cycles 95% R.H. 85mbar<br>CEI 68-1          | ± 0.05 %<br>Insulation R >10 <sup>2</sup> MΩ | –                                         | ± 0.003%<br>Insulation R >10 <sup>4</sup> MΩ |
| Humidity (Steady State)      | 56 days 95% R.H. 40°C<br>CEI 68-2-3                             | ± 0.05%<br>Insulation R >10 <sup>2</sup> MΩ  | –                                         | ± 0.003%<br>Insulation R >10 <sup>4</sup> MΩ |
| Moisture Resistance          | Method 106<br>MIL-STD-202                                       | –                                            | ± 0.4%<br>Insulation R >10 <sup>2</sup> M | ± 0.02 %<br>Insulation R >10 <sup>4</sup> MΩ |
| Load Life                    | 1000h Pr at 70°C<br>90'/30' cycle                               | ± 0.05%                                      | ± 0.5%                                    | ± 0.05%                                      |
| High Temperature Exposure    | 1000h/155°C CEI 68-2-20A<br>Test B                              | ± 0.05%                                      | ± 0.5%                                    | ± 0.01%                                      |



## POWER RATING CHART



## POWER RATING

In order to increase stability, it is recommended to reduce the nominal power ( $P_r$ ) in relation with tolerance.

For  $\pm 0.1\%$  to  $\pm 0.05\%$  Power =  $P_r \times 0.75$

For  $\pm 0.02\%$  to  $\pm 0.01\%$  Power =  $P_r \times 0.5$

For  $\pm 0.005\%$  Power =  $P_r \times 0.25$ .

## NOISE

$< 0.025 \mu\text{V/V RMS}$  ( $> -32\text{dB}$ ).

## HIGH FREQUENCY CHARACTERISTICS

Very low reactance.

Shunt capacitance is approximately 1pF

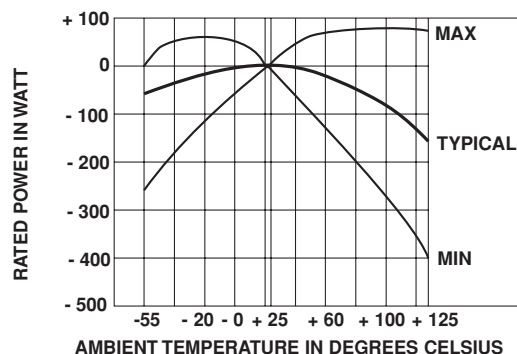
Total inductance is approximately 100 nH

## RISE TIME

Approximately 1 nanosecond.

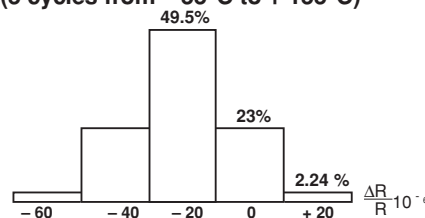
Allows very high performance in the field of very fast electronics (totally oscillation-free).

## TEMPERATURE COEFFICIENTS

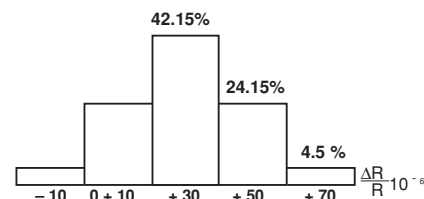


## TYPICAL RESISTANCE DRIFT DIAGRAMS

Temperature cycles  
(5 cycles from  $-55^\circ\text{C}$  to  $+155^\circ\text{C}$ )



Humidity  
(56 days at 95% H.R.  $40^\circ\text{C}$ )



## MARKING

- Top Marking:  $\Omega$  value with minimum 3 digits (R stated for  $\Omega$  and K for Kohm)

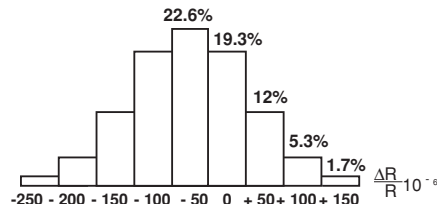
- Side Marking:

Line 1: Tolerance

Line 2: Model

Line 3: 4 Digit date code (year and week) and SFERNICE trademark

Load life  
(0.33W at  $125^\circ\text{C}$  for 1000 hours)



## 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.

## ORDERING INFORMATION

RS92  
or  
AN

N or NA  
OPTION

32k  
OHMIC VALUE

$\pm 0.01\%$   
TOLERANCE



### Disclaimer

All product specifications and data are subject to change without notice.

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