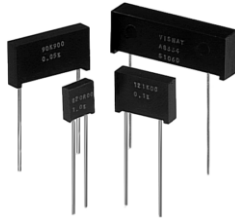


## High Precision Foil Resistor with TCR of $\pm 2.0 \text{ ppm}/^\circ\text{C}$ , Tolerance of $\pm 0.005 \%$ and Load Life Stability of $\pm 0.005 \%$



### INTRODUCTION

Bulk Metal® Foil (BMF) technology outperforms all other resistor technologies available today for applications that require high precision and high stability.

This technology has been pioneered and developed by VISHAY, and products based on this technology are the most suitable for a wide range of applications. BMF technology allows us to produce customer orientated products, designed to satisfy challenging and specific technical requirements.

Model S series made from Vishay BMF offers low TCR, excellent load life stability, tight tolerance, fast response time, low current noise, low thermal EMF and low voltage coefficient, all in one resistor.

The S series is virtually insensitive to destabilizing factors. The resistor element is a solid alloy that displays the desirable bulk properties of its parent material, thus it is inherently stable and noise free.

Vishay's Bulk Metal® S series resistors are the modern generation of precision resistors. The standard design of these resistors provides a unique combination of characteristics found in no other single resistor.

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

TABLE 1 - RESISTANCE VERSUS TCR (- 55 °C to + 125 °C, + 25 °C ref.)		
RESISTOR	RESISTANCE VALUE ( $\Omega$ )	TYPICAL TCR AND MAX SPREAD ( $\text{ppm}/^\circ\text{C}$ )
S102(C)	80 to < 150K	$\pm 2 \pm 2.5$
S102(K)	80 to < 100K	$\pm 1 \pm 2.5$
S102(C)	50 to < 80	$\pm 2 \pm 3.5$
S102(K)		$\pm 1 \pm 3.5$
S102(C)	1 to < 50	$\pm 2 \pm 4.5$
S102(K)		$\pm 1 \pm 4.5$

### FEATURES

- Temperature coefficient of resistance (TCR):
  - 55 °C to + 125 °C, 25 °C ref.
  - S102C series:  $\pm 2 \text{ ppm}/^\circ\text{C}$  typical (see table 1)
  - S102K series:  $\pm 1 \text{ ppm}/^\circ\text{C}$  typical (see table 1)
- Rated power: to 1 W at + 125 °C
- Tolerance:  $\pm 0.005 \%$  (50 ppm)
- Load life stability: to  $\pm 0.005 \%$  at 70 °C, 2000 h at rated power
- Resistance range: 0.5  $\Omega$  to 1 M $\Omega$  (higher or lower values of resistance are available)
- Vishay Foil resistors are not restricted to standard values; specific "as required" values can be supplied at no extra cost or delivery (e.g. 1K2345 vs. 1K)
- Electrostatic discharge up to 25 000 V
- Non inductive, non capacitive design
- Rise time: 1 ns effectively no ringing
- Current noise: 0.010  $\mu\text{V}_{\text{RMS}}/\text{V}$  of applied voltage (< - 40 dB)
- Thermal EMF: 0.05  $\mu\text{V}/^\circ\text{C}$  typical
- Voltage coefficient: < 0.1 ppm/V
- Low inductance: < 0.08  $\mu\text{H}$  typical
- Non hot spot design
- Terminal finish: lead (Pb)-free or tin/lead alloy
- Matched sets are available per request (TCR tracking: to 0.5 ppm/°C)
- Prototype quantities available in just 5 working days or sooner. For more information, please contact [foil@vishay.com](mailto:foil@vishay.com)
- For better TCR and PCR performances please review the [Z201](#) datasheet

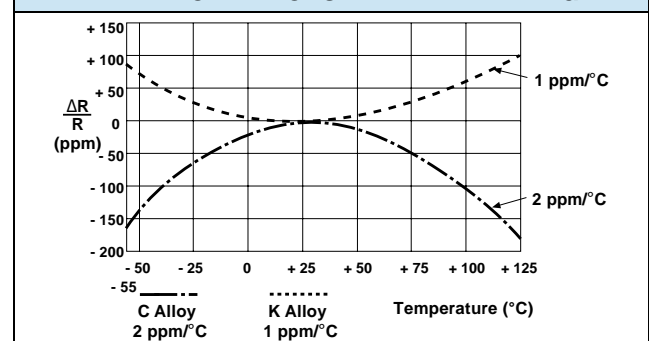


RoHS\*  
COMPLIANT

### APPLICATIONS

- High precision amplifiers
- Down-hole (high temperature)
- High precision instrumentation
- Medical and test equipment
- Industrial
- Audio (high end stereo equipment)
- EB applications (electron beam scanning and recording equipment, electron microscopes)
- Military, airborne
- Measurement instrumentation

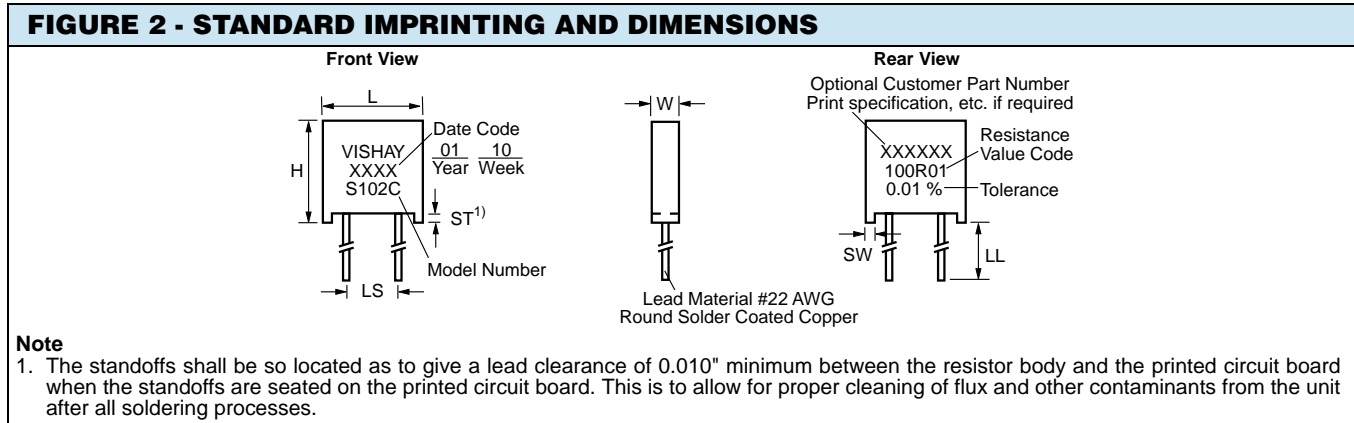
FIGURE 1 - FOIL RESISTOR TCR COMPARISON OF FOIL ALLOYS IN MILITARY RANGE



\* Pb containing terminations are not RoHS compliant, exemptions may apply

# S Series

## Vishay Foil Resistors



**TABLE 2 - MODEL SELECTION**

MODEL NUMBER	RESISTANCE RANGE (Ω)	MAXIMUM WORKING VOLTAGE	AMBIENT POWER RATING		AVERAGE WEIGHT IN GRAMS	DIMENSIONS			TIGHTEST TOLERANCE VS. LOWEST RESISTANCE VALUE
			at + 70 °C	at + 125 °C		INCHES	mm	F <sup>(1)</sup> (INCHES)	
S102C (S102J) <sup>(2)</sup>	1 to 150K	300	0.6 W	0.3 W	0.6	W: 0.105 ± 0.010	2.67 ± 0.25		0.005 %/50 Ω 0.01 %/25 Ω 0.02 %/12 Ω 0.05 %/5 Ω 0.1 %/2 Ω 0.50 %/1 Ω
S102K (S102L) <sup>(2)</sup>	1 to 100K		up to 100K	0.4 W		0.2 W	L: 0.300 ± 0.010		
S104D (S104F) <sup>(1)</sup>	1 to 500K	350	1.0 W	0.5 W	1.4	H: 0.326 ± 0.010	8.28 ± 0.25	(0.138) (0.565) (0.413)	
S104K	1 to 300K		0.6 W	0.3 W		ST: 0.010 min.	0.254 min.		
S105D (S105F) <sup>(1)</sup>	1 to 750K	350	1.5 W	0.75 W	1.9	SW: 0.035 ± 0.010	1.02 ± 0.13	(0.138) (0.890) (0.413)	
S105K	1 to 500K		up to 300K	0.8 W		0.4 W	LL: 1.000 ± 0.125		
S106D	0.5 to 1M	500	2.0 W	1.0 W	4.0	LS: 0.400 ± 0.020	10.16 ± 0.51	(0.7 ± 0.05)	
S106K	0.5 to 600K		up to 400K	1.0 W		0.5 W	W: 0.160 max.		
						L: 0.575 max.	14.61 max.		
						H: 0.413 max.	10.49 max.		
						ST: 0.035 ± 0.005	0.889 ± 0.13		
						SW: 0.050 ± 0.005	1.27 ± 0.13		
						LL: 1.000 ± 0.125	25.4 ± 3.18		
						LS: 0.650 ± 0.020	16.51 ± 0.51		
						W: 0.260 max.	6.60 max.		
						L: 1.200 max.	30.48 max.		
						H: 0.413 max.	10.49 max.		
						ST: 0.035 ± 0.005	0.889 ± 0.13		
						SW: 0.050 ± 0.005	1.27 ± 0.13		
						LL: 1.000 ± 0.125	25.4 ± 3.18		
						LS: 0.900 ± 0.020	22.86 ± 0.51		

**Notes**

<sup>(1)</sup> S104F and S105F have different package dimensions (see last column). All other specifications are the same.

<sup>(2)</sup> 0.200" (5.08 mm) lead spacing available - specify S102J for S102C, and S102L for S102K.