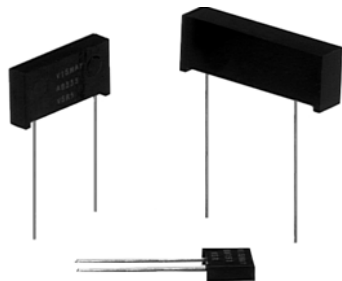


### Bulk Metal<sup>®</sup> Foil Technology Industrial Precision Resistors



Noise Free  
Component

#### INTRODUCTION

Bulk Metal<sup>®</sup> Foil Technology out performs 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.

Generally Bulk Metal<sup>®</sup> Foil technology allows us to produce customer orientated products designed to satisfy challenging and specific technical requirements.

The VSR series of resistors is a low cost version of the well established S-Series of resistors. These resistors are made of foil elements so all of the inherent performance of foil is retained. They do not however, have the same TCR or tolerance ranges (see table 1 for details). These products find a wide range of usage in high end stereo equipment and some grades of test and measurement equipment.

Standoffs are dimensioned to provide a minimum lead clearance of 0.010 inches between the resistor body and the printed circuit board, when the standoffs are seated on the board. This allows for proper cleaning after the soldering process\*\*.

Our Applications Engineering Department is prepared to advise and to make recommendations for non standard technical requirements and special applications, please contact us.

#### FEATURES

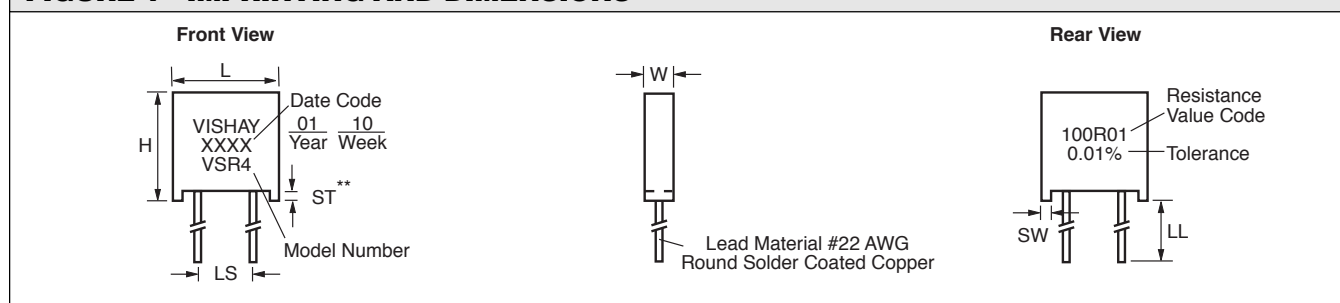
- Temperature Coefficient of Resistance (TCR)\*:
  - ± 4ppm/°C (0°C to + 60°C, + 25°C Ref.)
  - ± 8ppm/°C (- 55°C to + 125°C, + 25°C Ref.)
- Resistance Range: 0.5Ω to 1MΩ
- Resistance Tolerance: to ± 0.01%
- Long Term Stability: Typical Foil Performance
- Very Low Current Noise: - 40 dB
- Non Inductive: 0.08μH Typical
- Low Thermal EMF: 0.05μV/°C Typical
- Low Voltage Coefficient: < 0.1ppm/V
- Matched Sets Available
- Terminal Finishes Available:
  - Lead (Pb)-free (100% Sn)
  - Tin/Lead Alloy (Sn 60%, Pb 40%)

\* For values below 50Ω please contact Application Engineering

#### APPLICATIONS

- Industrial
- Medical
- Audio (high end stereo equipment)
- Test and Measurement equipment
- Precision Amplifiers

**FIGURE 1 - IMPRINTING AND DIMENSIONS**



SALES

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THROUGH HOLE



TABLE 1 - MODEL SELECTION										
MODEL NUMBER	RESISTANCE (Ω)	POWER AT +70°C	POWER AT +125°C	MAXIMUM WORKING VOLTAGE	DIMENSIONS		SHELF LIFE STABILITY (MAXIMUM ΔR)	LOAD LIFE STABILITY (MAXIMUM ΔR)	MAXIMUM TEMPERATURE COEFFICIENT OF RESISTANCE (+ 25°C Ref.)	TIGHTEST TOLERANCE% VS. LOWEST RESISTANCE VALUE Ω
					Inches	mm				
VSR  VSRJ (0.20 LS)	1 to 150K	0.25W up to 100K	0.125W 0.1W over 100K	300	W: 0.105 ± 0.010 L: 0.300 ± 0.010 H: 0.326 ± 0.010 ST: 0.010 Minimum SW: 0.040 ± 0.005 LL: 1.000 ± 0.125 LS: 0.150 ± 0.005*	2.67 ± 0.25 7.62 ± 0.25 8.28 ± 0.25 0.254 Minimum 1.02 ± 0.13 25.4 ± 3.18 3.81 ± 0.13	25 ppm after 1 year	0.05% 2,000 hours @ + 125°C	0°C to + 60°C ± 4 ppm/°C  - 55°C to + 125°C ± 8 ppm/°C	± 0.01 / 25  ± 0.02 / 12  ± 0.05 / 5
VSR4	1 to 500K	0.5W up to 200K	0.4W 0.2W over 200K	350	W: 0.160 Maximum L: 0.575 Maximum H: 0.413 Maximum ST: 0.035 ± 0.005 SW: 0.050 ± 0.005 LL: 1.000 ± 0.125 LS: 0.400 ± 0.020	4.06 Maximum 14.61 Maximum 10.49 Maximum 0.889 ± 0.13 1.27 ± 0.13 25.4 ± 3.18 10.16 ± 0.51			± 0.5 / 1  ± 1 / 0.5	
VSR5	1 to 750K	0.75W up to 300K	0.6W 0.4W 0.3W over 300K	350	W: 0.160 Maximum L: 0.820 Maximum H: 0.413 Maximum ST: 0.035 ± 0.005 SW: 0.050 ± 0.005 LL: 1.000 ± 0.125 LS: 0.650 ± 0.020	4.06 Maximum 20.83 Maximum 10.49 Maximum 0.889 ± 0.13 1.27 ± 0.13 25.4 ± 3.18 16.51 ± 0.51				
VSR6	0.5 to 1M	1.0W up to 400K	0.8W 0.5W 0.4W over 400K	500	W: 0.260 Maximum L: 1.200 Maximum H: 0.413 Maximum ST: 0.035 ± 0.005 SW: 0.050 ± 0.005 LL: 1.000 ± 0.125 LS: 0.900 ± 0.020	6.60 Maximum 30.48 Maximum 10.49 Maximum 0.889 ± 0.13 1.27 ± 0.13 25.4 ± 3.18 22.86 ± 0.51				

\* 0.200 inches (5.08 mm) lead spacing available— specify VSRJ. Note Minor Outline Dimension Variations:

INCHES	mm
W: 0.098 Maximum	2.49 Maximum
L: 0.295 Maximum	7.49 Maximum
H: 0.315 Maximum	8.00 Maximum
ST: 0.015 ± 0.0015	0.381 ± 0.038
LL: 1.000 ± 0.125	25.4 ± 3.18
LS: 0.200 ± 0.003	5.08 ± 0.076

THROUGH HOLE

TABLE 2 - ORDERING INFORMATION			
Please specify Vishay "VSR" Series as follows:			
Example:			
VSR	T = Lead (Pb)-free, (none) = Tin/Lead Alloy	100R01	T = ± 0.01% Q = ± 0.02% A = ± 0.05% B = ± 0.1% C = ± 0.25% D = ± 0.5% F = ± 1%
MODEL NO.	TERMINATION	RESISTANCE VALUE	TOLERANCE
Resistance Value, in ohms, is expressed by a series of 6 characters, 5 of which represent significant digits while the 6th is a dual purpose letter that designates both the multiplier and the location of the comma or decimal.			
RESISTANCE RANGE	LETTER DESIGNATOR	MULTIPLIER FACTOR	EXAMPLE
0.5Ω to < 1KΩ 1KΩ to < 1MΩ 1MΩ	R K M	x 1 x 10 <sup>3</sup> x 10 <sup>6</sup>	100R01 = 100.01Ω 15K231 = 15,231Ω 1M0000 = 1,000,000Ω
For example: VSRT100K00D - Model: VSR; Termination: Lead (Pb)-free; Value: 100KΩ; Tolerance: 0.5%.			

SALES

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