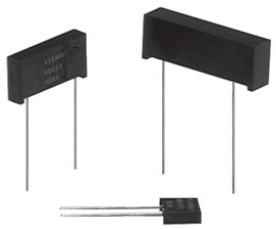
Bulk Metal® Foil Technology Industrial Precision Resistors with TCR of ± 4 ppm/°C and Tolerance of ± 0.01 %



INTRODUCTION

Bulk Metal® 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 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" 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 available to advise and to make recommendations for non standard technical requirements and special applications, please contact us.

FEATURES

Pb-free Available

RoHS* COMPLIANT

- Temperature coefficient of resistance (TCR) (1):
  ± 4 ppm/°C (0 °C to + 60 °C)
  ± 8 ppm/°C (- 55 °C to + 125 °C, + 25 °C ref.)
- Resistance range: 0.5 Ω to 1 MΩ (higher or lower values of resistance are available)
- Vishay Foil resistors are not restricted to standard values, we can supply specific “as required” values at no extra cost or delivery (e.g. 1K2345 vs. 1K)
- Tolerance: to ± 0.01 % (100 ppm)
- Load life stability: to ± 0.005 % at 70 °C, 2000 h at rated power
- Electrostatic discharge up to 25 000 V
- Non inductive, non capacitive design
- Rise time: 1 ns effectively no ringing
- Current noise: - 40 dB
- Thermal EMF: 0.05 µV/°C typical
- Voltage coefficient: < 0.1 ppm/V
- Inductance: 0.08 µH
- Matched sets available
- Terminal finish: lead (Pb)-free
  tin/lead alloy
- Prototype samples available from 72 h. For more information, please contact foil@vishay.com
- For better performances please review the **S Series** datasheet

Note

(1) For values below 50 Ω please contact application engineering

APPLICATIONS

- Industrial
- Medical
- Audio (high end stereo equipment)
- Test and measurement equipment
- Precision amplifiers

FIGURE 1 - POWER DERATING CURVE

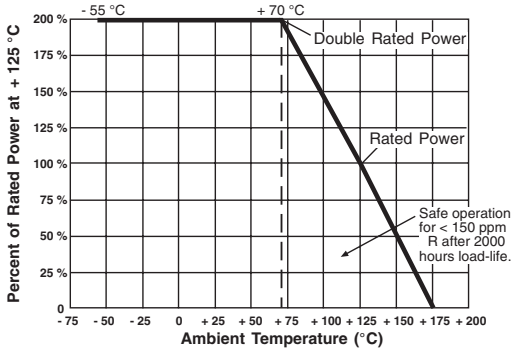
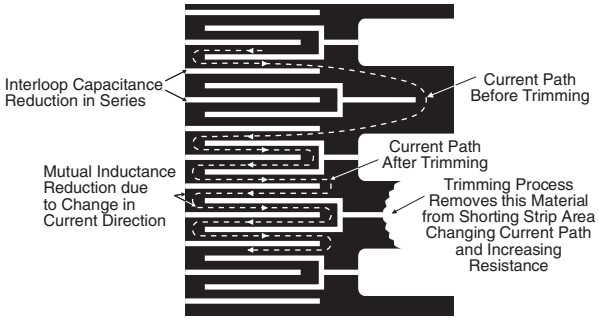


FIGURE 2 - TRIMMING TO VALUES
(Conceptual Illustration)



Note: Foil shown in black, etched spaces in white

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

FIGURE 3 - IMPRINTING AND DIMENSIONS

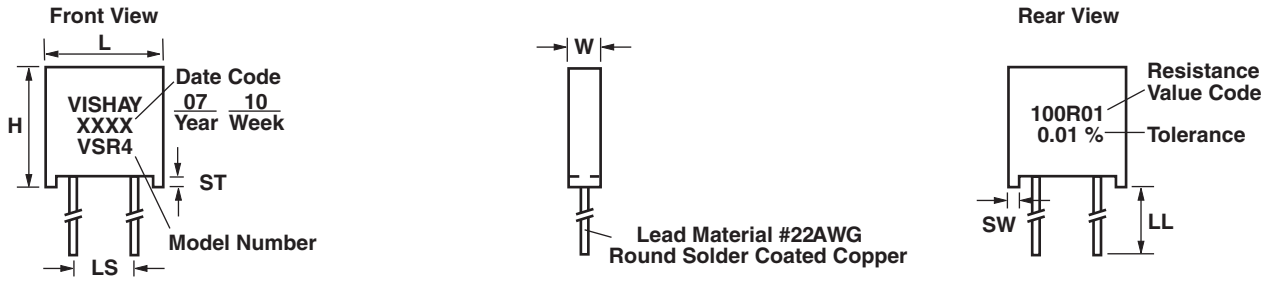


TABLE 1 - MODEL SELECTION

MODEL NUMBER	RESISTANCE (Ω)	POWER at + 70 °C	POWER at + 125 °C	MAXIMUM WORKING VOLTAGE	DIMENSIONS INCHES	DIMENSIONS mm	LOAD LIFE STABILITY (MAXIMUM ΔR)	MAXIMUM TEMPERATURE COEFFICIENT OF RESISTANCE (+ 25 °C REF.)	TIGHTEST TOLERANCE % VS. LOWEST RESISTANCE VALUE (Ω)
VSR VSRJ [1].	1 to 150K	0.3 W	0.2 W	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[1)]	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	0.05 % 2000 hours at + 125 °C	0 °C to + 60 °C ± 4 ppm/°C - 55 °C to + 125 °C ± 8 ppm/°C	± 0.01/50 ± 0.02/30 ± 0.05/5 ± 0.1/2 ± 0.5/1
		up to 100K							
		0.25 W	0.15 W						
		over 100K							
VSR4	1 to 500K	0.5 W	0.4 W	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 0.89 ± 0.13 1.27 ± 0.13 25.4 ± 3.18 10.16 ± 0.51			± 0.005/100
		up to 200K							
		0.25 W	0.2 W						
		over 200K							
VSR5	1 to 750K	0.75 W	0.6 W	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 0.89 ± 0.13 1.27 ± 0.13 25.4 ± 3.18 16.51 ± 0.51			± 0.01/50
		up to 300K							
		0.4 W	0.3 W						± 0.02/30
		over 300K							
VSR6	0.5 to 1M	1.0 W	0.8 W	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 0.89 ± 0.13 1.27 ± 0.13 25.4 ± 3.18 22.86 ± 0.51			± 0.05/5
		up to 400K							
		0.5 W	0.4 W						± 0.1/2
		over 400K							
									± 0.5/1

Note

[1] 0.200" (5.08 mm) lead spacing available - specify VSRJ.

FIGURE 4 - TEMPERATURE COEFFICIENT OF RESISTANCE

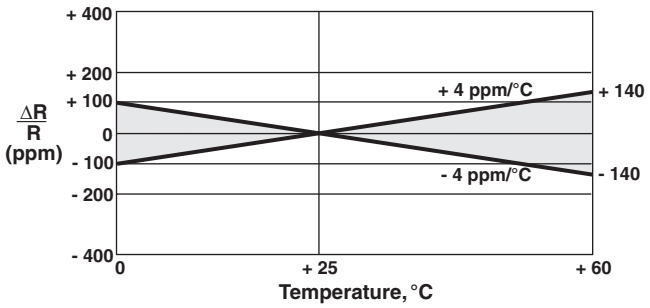


TABLE 2 - GLOBAL PART NUMBER INFORMATION

NEW GLOBAL PART NUMBER: Y0075100K250A9L (preferred part number format)

DENOTES PRECISION	VALUE	CHARACTERISTICS (1)
Y	**R** = Ω **K** = kΩ **M** = MΩ	**0** = standard **9** = lead (Pb)-free **1 - 999** = custom

Y	0	0	7	5	1	0	0	K	2	5	0	A	9	L

PRODUCT CODE	RESISTANCE TOLERANCE	PACKAGING
0075 = VSR **0789** = VSRJ **0020** = VSR4 **0021** = VSR5 **0022** = VSR6	**T** = ± 0.01 % **Q** = ± 0.02 % **A** = ± 0.05 % **B** = ± 0.1 % **C** = ± 0.25 % **D** = ± 0.5 % **F** = ± 1.0 %	**L** = bulk pack

FOR EXAMPLE: ABOVE GLOBAL ORDER Y0075 100K250 A 9 L:

TYPE: VSR
VALUE: 100.25 kΩ
ABSOLUTE TOLERANCE: ± 0.05 %
TERMINATION: lead (Pb)-free
PACKAGING: bulk pack

HISTORICAL PART NUMBER EXAMPLE: VSRT 100K25 A B (will continue to be used)

VSR	T	100K25	A	B
MODEL	TERMINATION	OHMIC VALUE	RESISTANCE TOLERANCE	PACKAGING
VSR **VSRJ** **VSR4** **VSR5** **VSR6**	**T** = lead (Pb)-free None = tin/lead alloy	100.25 kΩ	**T** = ± 0.01 % **Q** = ± 0.02 % **A** = ± 0.05 % **B** = ± 0.1 % **C** = ± 0.25 % **D** = ± 0.5 % **F** = ± 1.0 %	**B** = bulk pack

Note

(1) For non-standard requests, please contact application engineering.

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