

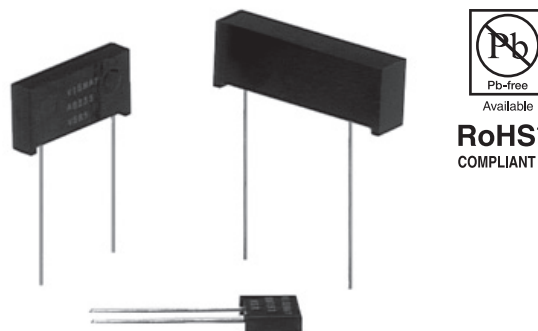
Bulk Metal® Foil Technology Industrial Precision Resistors with TCR of $\pm 4 \text{ ppm/}^\circ\text{C}$ and Tolerance of $\pm 0.01\%$

FEATURES

- Temperature coefficient of resistance (TCR)⁽¹⁾:
 $\pm 4 \text{ ppm/}^\circ\text{C}$ (0°C to $+60^\circ\text{C}$)
 $\pm 8 \text{ ppm/}^\circ\text{C}$ (-55°C to $+125^\circ\text{C}$, $+25^\circ\text{C}$ ref.)
- Resistance range: 0.5Ω to $1 \text{ M}\Omega$ (higher or lower values of resistance are available)
- VFR resistors are not restricted to standard values, we can supply specific “as required” values at no extra cost or delivery (e.g., $1\text{K}2345$ vs. 1K)
- Tolerance: to $\pm 0.01\%$ (100 ppm)
- Load life stability: to $\pm 0.005\%$ 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: $0.05 \mu\text{V/}^\circ\text{C}$ typical
- Voltage coefficient: $< 0.1 \text{ ppm/V}$
- Inductance: $0.08 \mu\text{H}$
- Matched sets available
- Terminal finish: lead (Pb)-free; tin/lead alloy
- Prototype samples available from 72 h.
 For more information, please contact:
foil@vpgsensors.com
- For better performances, please review the S Series datasheet

APPLICATIONS

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



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 VFR, 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.

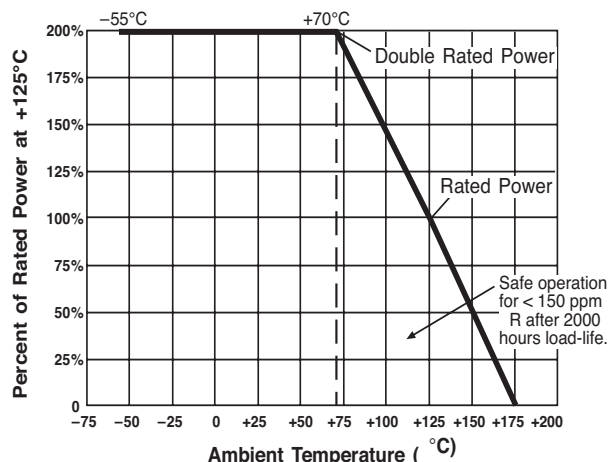
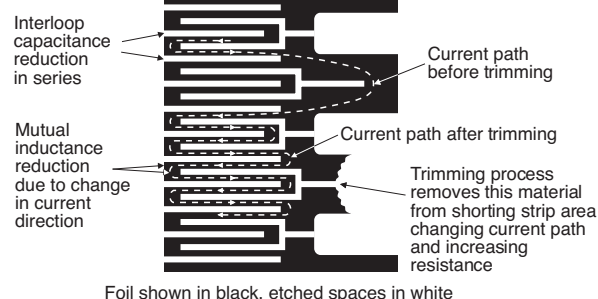
Standoffs are dimensioned to provide a minimum lead clearance of 0.010 in between the resistor body and the printed circuit board, when the standoffs are seated on the board. This allows for proper cleaning after the soldering process.

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

Notes

* This datasheet provides information about parts that are RoHS-compliant and/or parts that are non-RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS compliant. Please see the information/tables in this datasheet for details.

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

Figure 1 – Power Derating Curve**Figure 2 – Trimming to Values****Note**

To acquire a precision resistance value, the Bulk Metal® Foil chip is trimmed by selectively removing built-in “shorting bars.” To increase the resistance in known increments, marked areas are cut, producing progressively smaller increases in resistance. This method reduces the effect of “hot spots” and improves the long-term stability of Bulk Metal® Foil resistors.

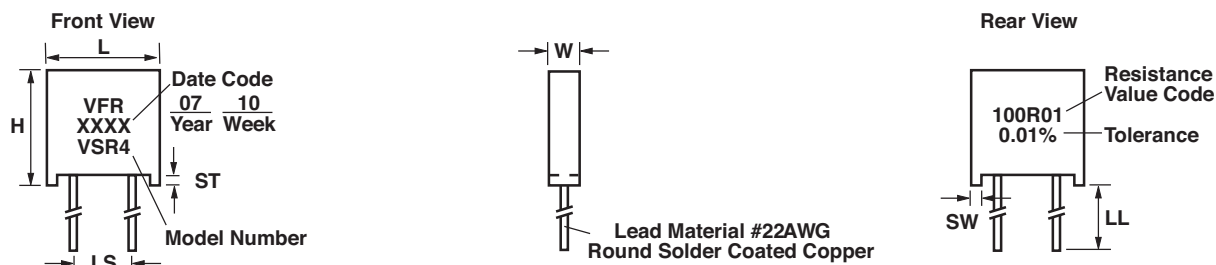
Figure 3 – Imprinting and Dimensions

Table 1 – Model Selection

MODEL NUMBER	RESISTANCE (Ω)	POWER at +70°C	POWER at +125°C	MAXIMUM WORKING VOLTAGE	DIMENSIONS		LOAD LIFE STABILITY (MAXIMUM ΔR)	MAXIMUM TEMPERATURE COEFFICIENT OF RESISTANCE (+25°C REF.)	TIGHTEST TOLERANCE % VS. LOWEST RESISTANCE VALUE (Ω)
					INCHES	mm			
VSR	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
VSRJ ⁽¹⁾		up to 100 K							
		0.25 W	0.15 W						
		over 100 K							
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			
		up to 200 K							
		0.25 W	0.2 W						
		over 200 K							
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			
		up to 300 K							
		0.4 W	0.3 W						
		over 300 K							
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			
		up to 400 K							
		0.5 W	0.4 W						
		over 400 K							

Note

⁽¹⁾ 0.200 in (5.08 mm) lead spacing available – specify VSRJ.

Figure 4 – Temperature Coefficient of Resistance

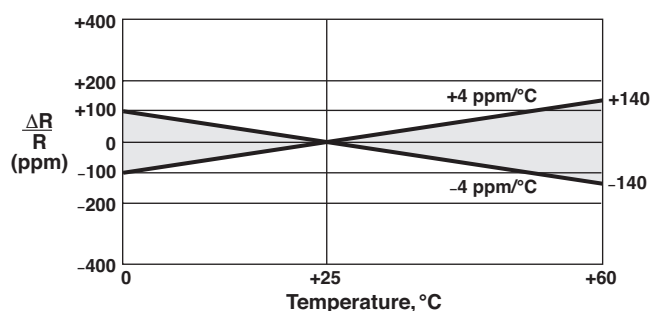
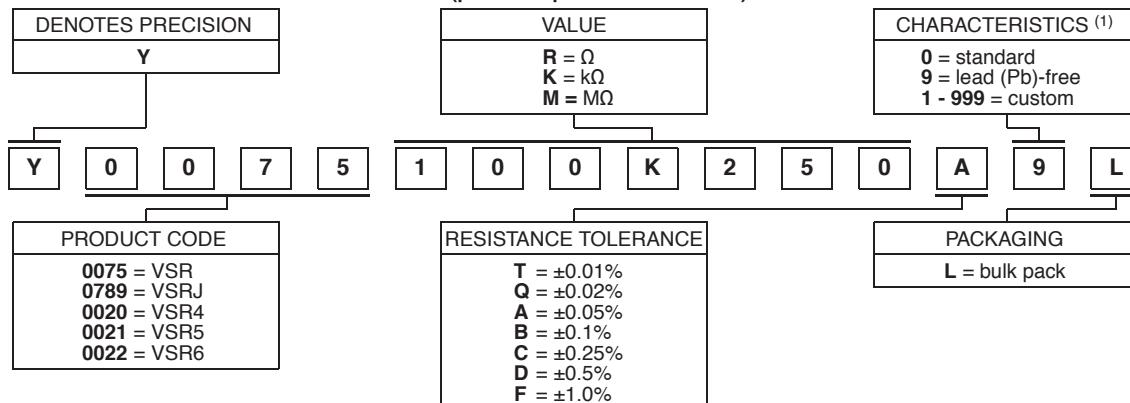


Table 2 – Global Part Number Information
NEW GLOBAL PART NUMBER: Y0075100K250A9L (preferred part number format)


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

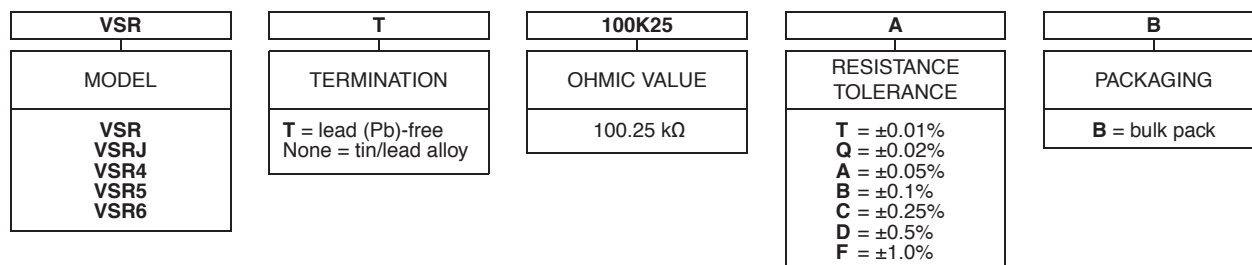
TYPE: VSR

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