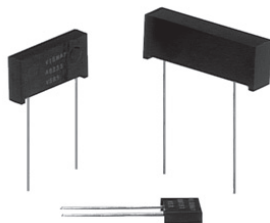


Bulk Metal® Foil Technology Industrial Precision Resistors with TCR of $\pm 4 \text{ ppm}/^\circ\text{C}$ and Tolerance of $\pm 0.01 \%$



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.

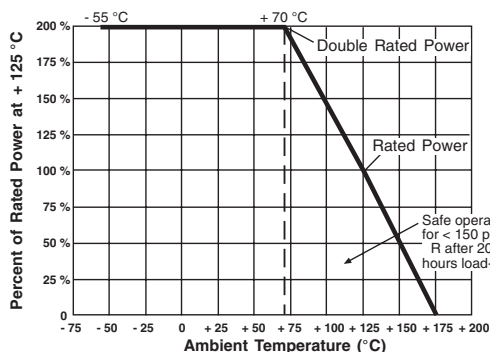
Generally Bulk Metal Foil technology allows us to produce customer orientated products designed to satisfy challenging and specific technical requirements.

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.

FIGURE 1 - POWER DERATING CURVE



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

FEATURES

- Temperature coefficient of resistance (TCR) ⁽¹⁾:
 $\pm 4 \text{ ppm}/^\circ\text{C}$ (0 °C to + 60 °C)
 $\pm 8 \text{ ppm}/^\circ\text{C}$ (- 55 °C to + 125 °C, + 25 °C ref.)
- Resistance range: 0.5 Ω to 1 M Ω (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 $\pm 0.01 \%$ (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 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



RoHS*
COMPLIANT

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 2 - TRIMMING TO VALUES
(Conceptual Illustration)

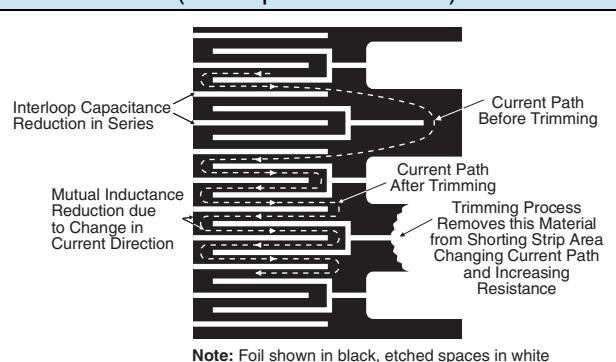
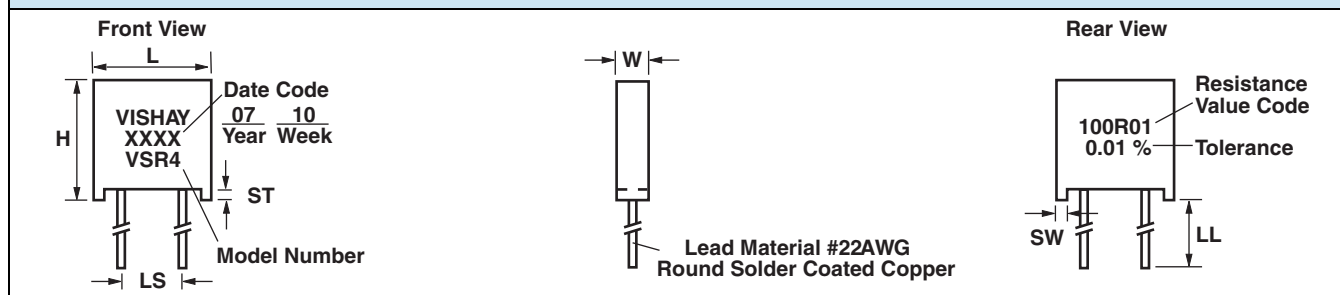


FIGURE 3 - IMPRINTING AND DIMENSIONS**TABLE 1 - MODEL SELECTION**

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 $\pm$ 0.010	2.67 $\pm$ 0.25	0.05 % 2000 hours at +125 °C	0 °C to +60 °C $\pm$ 4 ppm/°C -55 °C to +125 °C $\pm$ 8 ppm/°C	$\pm$ 0.01/50 $\pm$ 0.02/30 $\pm$ 0.05/5 $\pm$ 0.1/2 $\pm$ 0.5/1
VSRJ ⁽¹⁾		up to 100K	0.15 W		L: 0.300 $\pm$ 0.010	7.62 $\pm$ 0.25			
		0.25 W	0.15 W		H: 0.326 $\pm$ 0.010	8.28 $\pm$ 0.25			
		over 100K			ST: 0.010 minimum	0.254 minimum			
					SW: 0.040 $\pm$ 0.005	1.02 $\pm$ 0.13			
					LL: 1.000 $\pm$ 0.125	25.4 $\pm$ 3.18			
					LS: 0.150 $\pm$ 0.005 ⁽¹⁾	3.81 $\pm$ 0.13			
VSR4	1 to 500K	0.5 W	0.4 W	350	W: 0.160 maximum	4.06 maximum			$\pm$ 0.005/100 $\pm$ 0.01/50 $\pm$ 0.02/30 $\pm$ 0.05/5 $\pm$ 0.1/2 $\pm$ 0.5/1
		up to 200K	0.2 W		L: 0.575 maximum	14.61 maximum			
		0.25 W	0.2 W		H: 0.413 maximum	10.49 maximum			
		over 200K			ST: 0.035 $\pm$ 0.005	0.89 $\pm$ 0.13			
					SW: 0.050 $\pm$ 0.005	1.27 $\pm$ 0.13			
					LL: 1.000 $\pm$ 0.125	25.4 $\pm$ 3.18			
					LS: 0.400 $\pm$ 0.020	10.16 $\pm$ 0.51			
VSR5	1 to 750K	0.75 W	0.6 W	350	W: 0.160 maximum	4.06 maximum			
		up to 300K	0.3 W		L: 0.820 maximum	20.83 maximum			
		0.4 W	0.3 W		H: 0.413 maximum	10.49 maximum			
		over 300K			ST: 0.035 $\pm$ 0.005	0.89 $\pm$ 0.13			
					SW: 0.050 $\pm$ 0.005	1.27 $\pm$ 0.13			
					LL: 1.000 $\pm$ 0.125	25.4 $\pm$ 3.18			
					LS: 0.650 $\pm$ 0.020	16.51 $\pm$ 0.51			
VSR6	0.5 to 1M	1.0 W	0.8 W	500	W: 0.260 maximum	6.60 maximum			
		up to 400K	0.4 W		L: 1.200 maximum	30.48 maximum			
		0.5 W	0.4 W		H: 0.413 maximum	10.49 maximum			
		over 400K			ST: 0.035 $\pm$ 0.005	0.89 $\pm$ 0.13			
					SW: 0.050 $\pm$ 0.005	1.27 $\pm$ 0.13			
					LL: 1.000 $\pm$ 0.125	25.4 $\pm$ 3.18			
					LS: 0.900 $\pm$ 0.020	22.86 $\pm$ 0.51			

Note

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

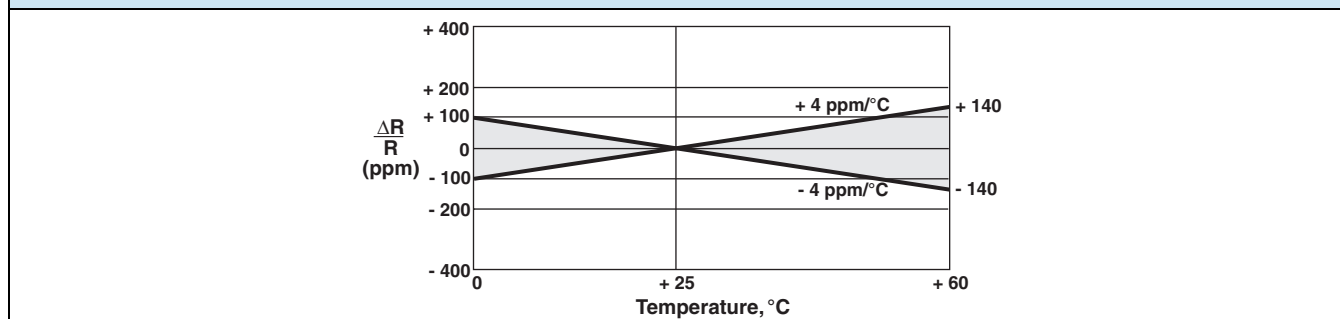
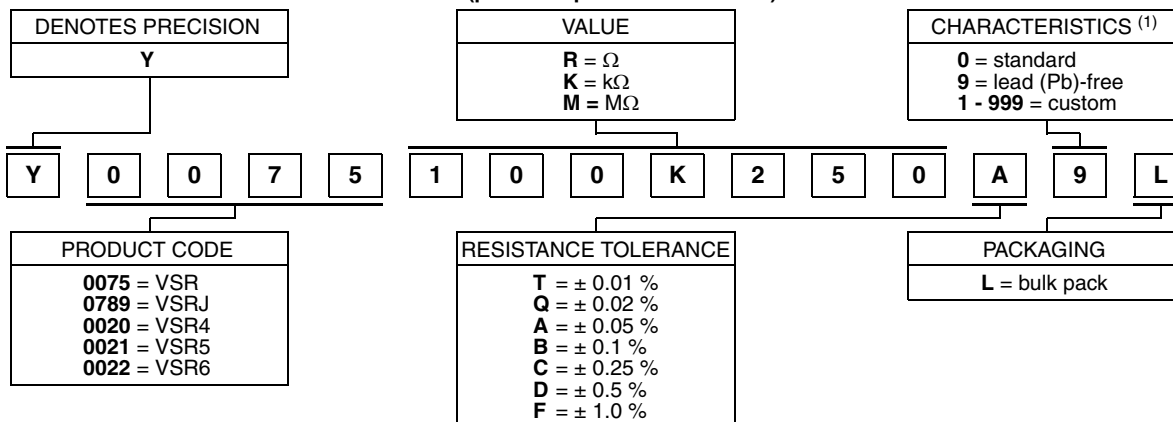
FIGURE 4 - TEMPERATURE COEFFICIENT OF RESISTANCE

TABLE 2 - GLOBAL PART NUMBER INFORMATION

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



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

TYPE: VSR

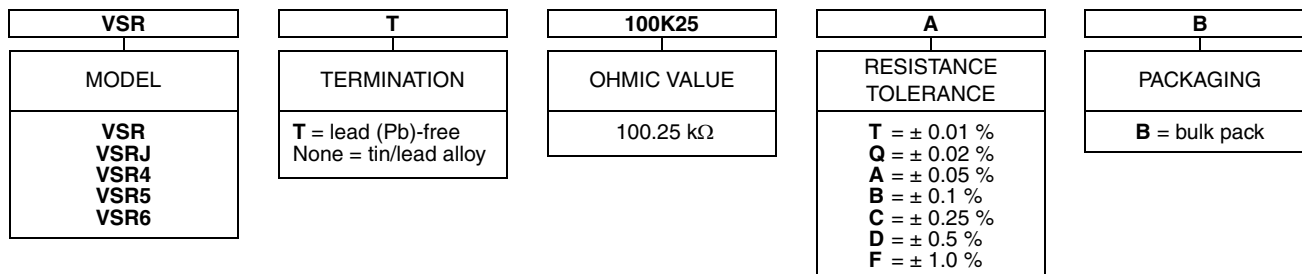
VALUE: 100.25 $k\Omega$

ABSOLUTE TOLERANCE: $\pm 0.05\%$

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.

Disclaimer

ALL PRODUCTS, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE.

Vishay Precision Group, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "VPG"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

The product specifications do not expand or otherwise modify VPG's terms and conditions of purchase, including but not limited to, the warranty expressed therein.

VPG makes no warranty, representation or guarantee other than as set forth in the terms and conditions of purchase.

To the maximum extent permitted by applicable law, VPG disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Information provided in datasheets and/or specifications may vary from actual results in different applications and performance may vary over time. Statements regarding the suitability of products for certain types of applications are based on VPG's knowledge of typical requirements that are often placed on VPG products. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. You should ensure you have the current version of the relevant information by contacting VPG prior to performing installation or use of the product, such as on our website at vpgsensors.com.

No license, express, implied, or otherwise, to any intellectual property rights is granted by this document, or by any conduct of VPG.

The products shown herein are not designed for use in life-saving or life-sustaining applications unless otherwise expressly indicated. Customers using or selling VPG products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify VPG for any damages arising or resulting from such use or sale. Please contact authorized VPG personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.

Copyright Vishay Precision Group, Inc., 2014. All rights reserved.