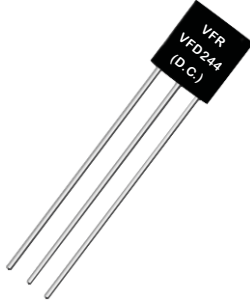




**THE DATASHEET OF
Y0114V0438VB9L**

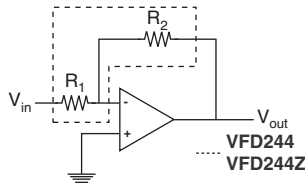


Bulk Metal® Foil Technology High Precision Voltage Divider Resistors with TCR Tracking to 0.5 ppm/°C and Tolerance Match to 0.005 % (50 ppm)



APPLICATIONS

- Instrumentation amplifiers
- Bridge networks
- Differential amplifiers
- Military
- Space
- Medical
- Automatic test equipment
- Down-hole (high temperature)



FEATURES

- Temperature coefficient of resistance (TCR) absolute: $\pm 2 \text{ ppm/}^\circ\text{C}$ typical (-55 °C to +125 °C, +25 °C ref.)
TCR tracking: 0.5 ppm/°C
- Tolerance: absolute and matching to 0.005 % (50 ppm)
- Resistance range: 1 Ω to 150 k Ω per resistive element
- Vishay Foil resistors are not restricted to standard values/ratios; specific “as requested” values/ratios can be supplied at no extra cost or delivery (e.g. 1K2345 vs. 1K)
- Power rating: up to 1 W at 70 °C, for the entire package, divided proportionally between the two values
- Load life ratio stability: < 0.005 % (50 ppm) 1 W at 70 °C for 2000 h
- Maximum working voltage: 350 V
- Electrostatic discharge (ESD) up to 25 000 V
- Non-inductive, non-capacitive design
- Rise time: 1 ns effectively no ringing
- Thermal stabilization time < 1 s (nominal value achieved within 10 ppm of steady state value)
- 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
- Non-inductive: < 0.08 μH
- Non hot spot design
- Terminal finish: lead (Pb)-free or tin/lead alloy
- Compliant to RoHS directive 2002/95/EC
- Prototype quantities available in just 5 working days or sooner. For more information, please contact foil@vpgsensors.com
- For better performances see VFD244Z (Z-Foil) datasheet



TABLE 1 - RATED POWER PER ELEMENT		
RESISTANCE ELEMENT VALUE	MAXIMUM POWER RATING AT 70 °C PER ENTIRE PACKAGE	MAXIMUM POWER RATING AT 125 °C PER ENTIRE PACKAGE
1 Ω to < 100 k Ω	1 W (not exceed 0.6 W per element)	0.5 W (not exceed 0.3 W per element)
100 k Ω to 150 k Ω	0.6 W (not exceed 0.4 W per element)	0.3 W (not exceed 0.2 W per element)

TABLE 2 - MODEL VFD244 SPECIFICATIONS						
MODEL	RESISTANCE VALUES	ABSOLUTE TCR (-55 °C to +125 °C, +25 °C ref.)	TOLERANCE		TCR TRACKING (MAX.)	
		TYPICAL AND MAX. SPREAD	ABSOLUTE	MATCH	SAME VALUES	DIFFERENT VALUES
VFD244	500 Ω to 150 k Ω	$\pm 2 \text{ ppm/}^\circ\text{C} \pm 2.5 \text{ ppm/}^\circ\text{C}$	$\pm 0.005 \%$	0.005 %	0.5 ppm/°C	1.5 ppm/°C
	100 Ω to 500 Ω		$\pm 0.005 \%$	0.01 %	1.0 ppm/°C	2.0 ppm/°C
	50 Ω to 100 Ω	$\pm 2 \text{ ppm/}^\circ\text{C} \pm 3.5 \text{ ppm/}^\circ\text{C}$	$\pm 0.01 \%$	0.02 %	1.5 ppm/°C	2.5 ppm/°C
	25 Ω to 50 Ω	$\pm 2 \text{ ppm/}^\circ\text{C} \pm 4.0 \text{ ppm/}^\circ\text{C}$	$\pm 0.01 \%$	0.02 %	2.0 ppm/°C	3.0 ppm/°C
	10 Ω to 25 Ω		$\pm 0.02 \%$	0.04 %	2.5 ppm/°C	3.5 ppm/°C
	5 Ω to 10 Ω	$\pm 2 \text{ ppm/}^\circ\text{C} \pm 4.5 \text{ ppm/}^\circ\text{C}$	$\pm 0.05 \%$	0.05 %	3.0 ppm/°C	4.0 ppm/°C
	2 Ω to 5 Ω	$\pm 2 \text{ ppm/}^\circ\text{C} \pm 5.0 \text{ ppm/}^\circ\text{C}$	$\pm 0.1 \%$	0.1 %	3.5 ppm/°C	4.5 ppm/°C
1 Ω to 2 Ω	$\pm 2 \text{ ppm/}^\circ\text{C} \pm 6.0 \text{ ppm/}^\circ\text{C}$	$\pm 0.5 \%$	0.2 %	4.0 ppm/°C	5.0 ppm/°C	

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

INTRODUCTION

Today, designers of analog circuits are demanding voltage dividers that approach the ideal in Performance ... stable, high speed, high accuracy components that will operate with assured, predictable reliability for years in a variety of environments. Vishay Foil Resistors (VFR) is meeting those demands with the VFD244 of unequalled performance. VFR also adds the dimensions of convenience and economy to resistors needs. Our long experience relieves the circuit designer of the complicated, costly and wasteful procedure of calculating the value of individual resistor components, ordering and then stabilizing, aging or matching these units, and literally assembling and testing his own resistor arrays.

The VFR approach to dividers is simple and straight forward, our solution consists of any combination of resistors, and the end result is what matters. As a consequence, the only data VFR requires is the overall electrical performance specifications, the environment operational, and the desired physical requirements.

These four fundamental factors determine how "ideal" a precision divider resistor will be:

1. Initial absolute resistance value or how closely the absolute resistance value can be achieved
2. How precisely the value of individual resistors can be controlled
3. How precisely the end of life tolerance is maintained under a wide range of operating conditions and stress factors (temperature, humidity, load, etc.)

4. Fast response without ringing and fast thermal stabilization - and the ability of the resistor to react to rapid switching without adversely affecting the circuit function. Until the development of Vishay Foil resistors, precise control of all four factors was virtually impossible. Vishay Foil resistors are designed and manufactured to eliminate the inter-parameter compromise inherent in all other types of resistors. All important characteristics: tolerance, long term stability, temperature coefficient, power coefficient, ESD, noise, capacitance and inductance – are optimized, approaching the theoretical ideal in total performance. Resistor technologies before the development of Bulk Metal® Foil resistors all compromised the theoretical ideal performance in one or more ways. For example, the winding of wire and the evaporation or the sputtering of extremely thin metal each produce metallurgical changes in the resistance materials and these noticeably deteriorate the electrical characteristics. Such changes are not predictable, and thus randomly alter performance parameters. The form factor of other units also introduces losses in high frequency performance, limits power dissipation and prohibits size reduction.

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

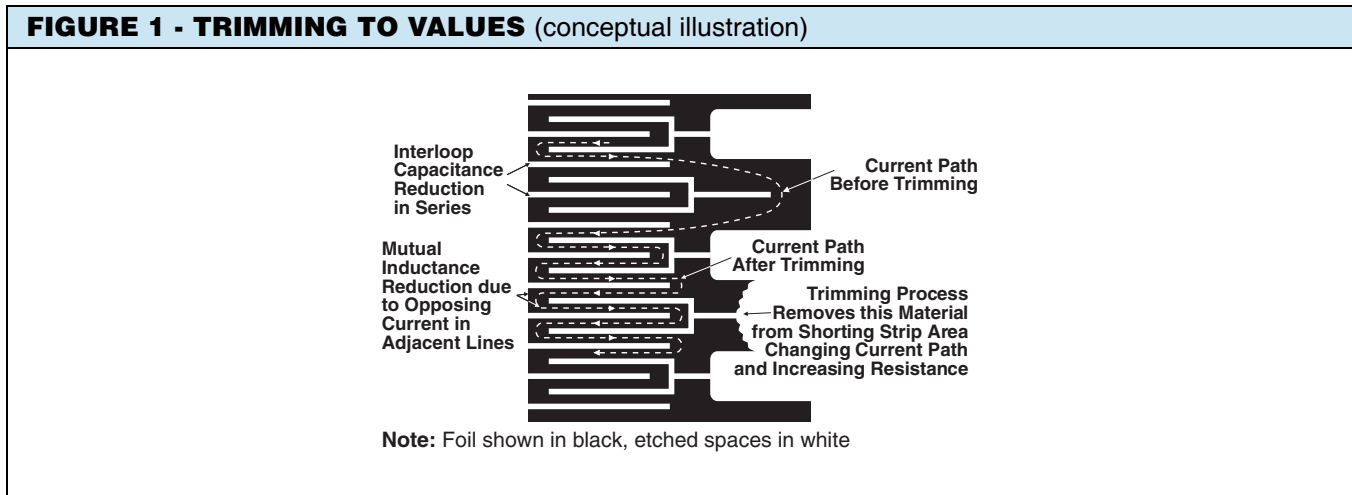
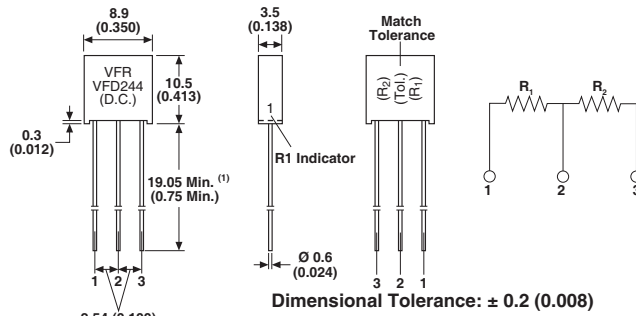


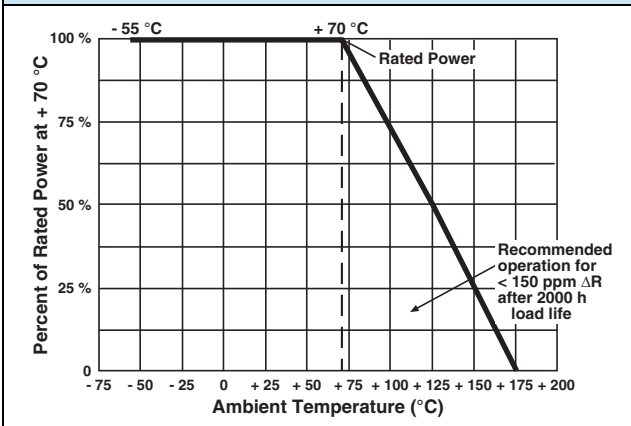
FIGURE 2 - STANDARD PRINTING AND DIMENSIONS in millimeters (inches)

Model VFD244 and Schematic (2)



- (1) Lead wires: #22 AWG solder coated copper
- (2) Each resistor contains 2 chips of two resistive elements

FIGURE 3 - POWER DERATING CURVE VFD244



Note

- Power is divided proportionally between the 2 values (see table 1)

FIGURE 4 - TYPICAL RESISTANCE/TEMPERATURE CURVE

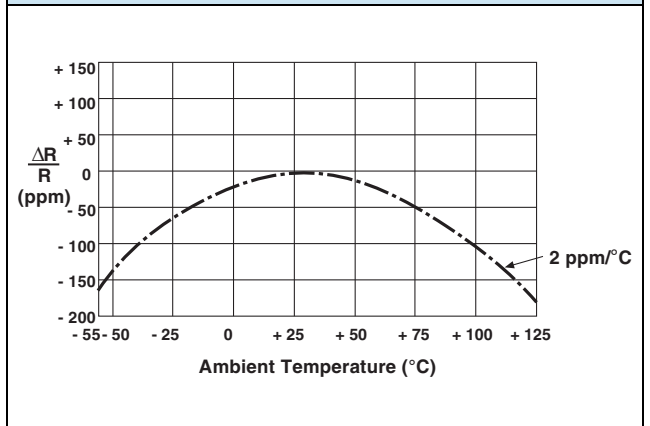
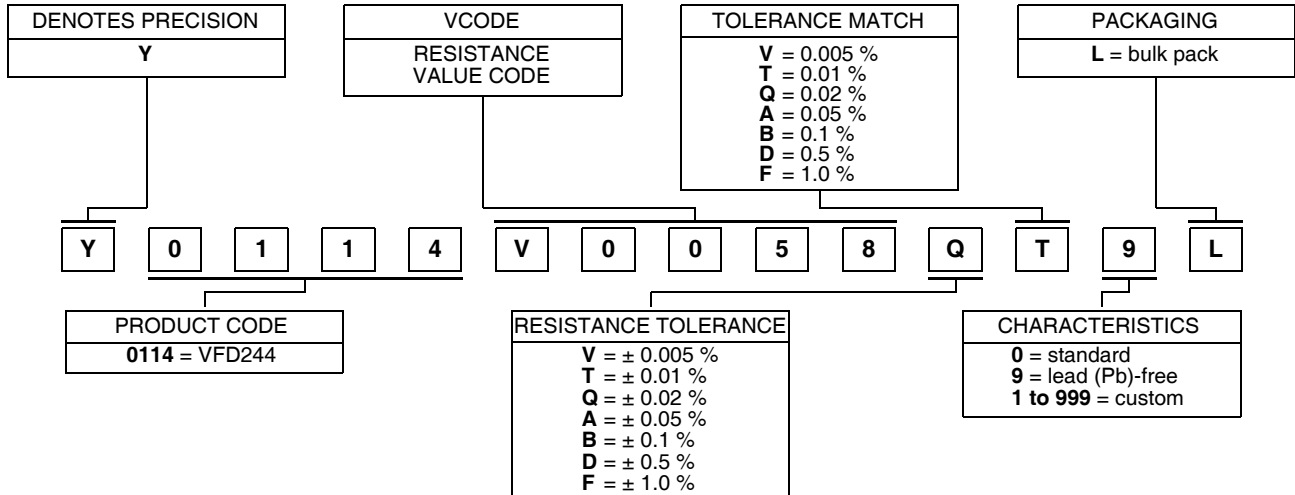


TABLE 3 - GLOBAL PART NUMBER INFORMATION (1)

NEW GLOBAL PART NUMBER: Y0114V0058QT9L (preferred part number format)



FOR EXAMPLE: ABOVE GLOBAL ORDER Y0114 V0058 Q T 9 L:

TYPE: VFD244
VALUES: 2K/20K
ABSOLUTE TOLERANCE: ± 0.02 %
TOLERANCE MATCH: 0.01 %
TERMINATION: lead (Pb)-free
PACKAGING: bulk pack

HISTORICAL PART NUMBER: VFD244T 2K/20K TCR2 Q T B (will continue to be used)

VFD244	T	2K/20K	TCR2	Q	T	B
MODEL	TERMINATION	OHMIC VALUE	TCR CHARACTERISTIC	ABSOLUTE TOLERANCE	TOLERANCE MATCH	PACKAGING
VFD244	T = lead (Pb)-free None = tin/lead alloy	R ₁ = 2 kΩ R ₂ = 20 kΩ		V = ± 0.005 % T = ± 0.01 % Q = ± 0.02 % A = ± 0.05 % B = ± 0.1 % D = ± 0.5 % F = ± 1.0 %	V = 0.005 % T = 0.01 % Q = 0.02 % A = 0.05 % B = 0.1 % D = 0.5 % F = 1.0 %	B = bulk pack

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.





Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

 [View Y0114V0438VB9L on WIN SOURCE](#)

 [Vishay Information](#)

Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management