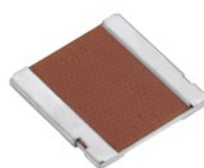


# Bulk Metal® Foil Technology High Precision, Current Sensing, Power Surface Mount Resistor

with Rated Power up to 3 W and TCR  $\pm 10$  ppm/°C

## FEATURES

- Temperature coefficient of resistance (TCR): 10 ppm/°C max. (–55°C to +125°C, +25°C ref.)  
For tighter TCR please contact us.
- Power rating: 3 W
- Resistance tolerance: to  $\pm 0.1\%$
- Resistance range: 20 m $\Omega$  to 200 m $\Omega$
- Load-life stability: to  $\pm 0.05\%$  typical (70°C, 2000 h at rated power)
- Short-time overload: 0.02% typical
- Power coefficient of resistance (PCR), “ $\Delta R$  due to self heating”: 5 ppm/W at rated power
- Electrostatic discharge (ESD): at least to 25 kV
- Solderable terminations
- Terminal finish available: lead (Pb)-free, tin/lead alloy
- Quick prototype quantities available; please contact [foil@vpgsensors.com](mailto:foil@vpgsensors.com)



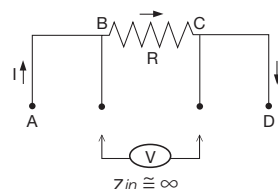
Top View



Bottom View



RoHS\*  
COMPLIANT

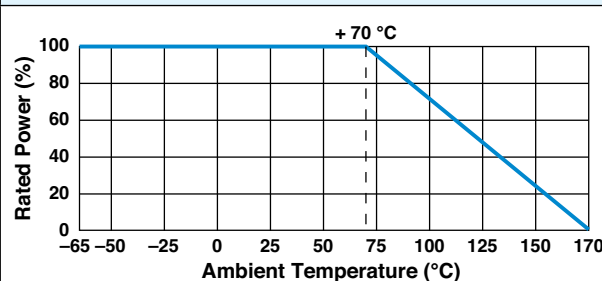


**Four terminal (Kelvin) design:**  
allows for precise and accurate measurements.

## INTRODUCTION

Model CSM3637F is a surface mount chip resistor designed with 4 pads for Kelvin connection. Utilizing Bulk Metal® Foil as the resistance element, it provides enhanced characteristic capabilities resulting in superior performance when compared with other resistor technologies. The unique combination of Z Foil technology along with the designed 4 pads lead frame configuration results in significant reduction of the component's sensitivity to applied power changes such as power coefficient of resistance (PCR) and thermal resistance.

**Figure 1 – Power Derating Curve**



**Table 1 – Specifications**

Parameter	Value
Resistance range	20 m $\Omega$ to 200 m $\Omega$ <sup>(1)</sup>
Power rating at 70°C	2 W: 20 m $\Omega$ to <50 m $\Omega$ ; 3 W: 50 m $\Omega$ to 200 m $\Omega$
Maximum current <sup>(2)</sup>	10 A
Tolerance	$\pm 0.1$
Temperature coefficient maximum (–55°C to +125°C, +25°C Ref.)	$\pm 15$ ppm/°C, R <100 m $\Omega$ ; $\pm 10$ ppm/°C <sup>(3)</sup> R $\geq 100$ m $\Omega$
Operating temperature range	–65°C to +170°C
Maximum working voltage	$(P \times R)^{1/2}$
Weight (maximum)	0.29 g
<b>Notes</b> <sup>(1)</sup> Contact application engineering for values outside this range. <sup>(2)</sup> Maximum current for a given resistance value is calculated using $I = \sqrt{P/R}$ . <sup>(3)</sup> For tighter TCR, please contact application engineering: <a href="mailto:foil@vpgsensors.com">foil@vpgsensors.com</a> .	

## Note

\* 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.

## ABOUT CSM3637F

The CSM3637F is a current sensing solution that was developed with a low TCR to meet demands for stable resistive product solutions in the industry. As it is critical for this resistor to reach thermal equilibrium quickly in circuits that require fast response or where the current changes swiftly, the CSM3637F is used where the emphasis is on accuracy and repeatability under stress conditions in applications requiring precision resistor performance up to 3 W. Applications as EB systems, switching power supplies, force-balanced scales all rely on current sense resistors to develop a precise voltage proportional to the current.

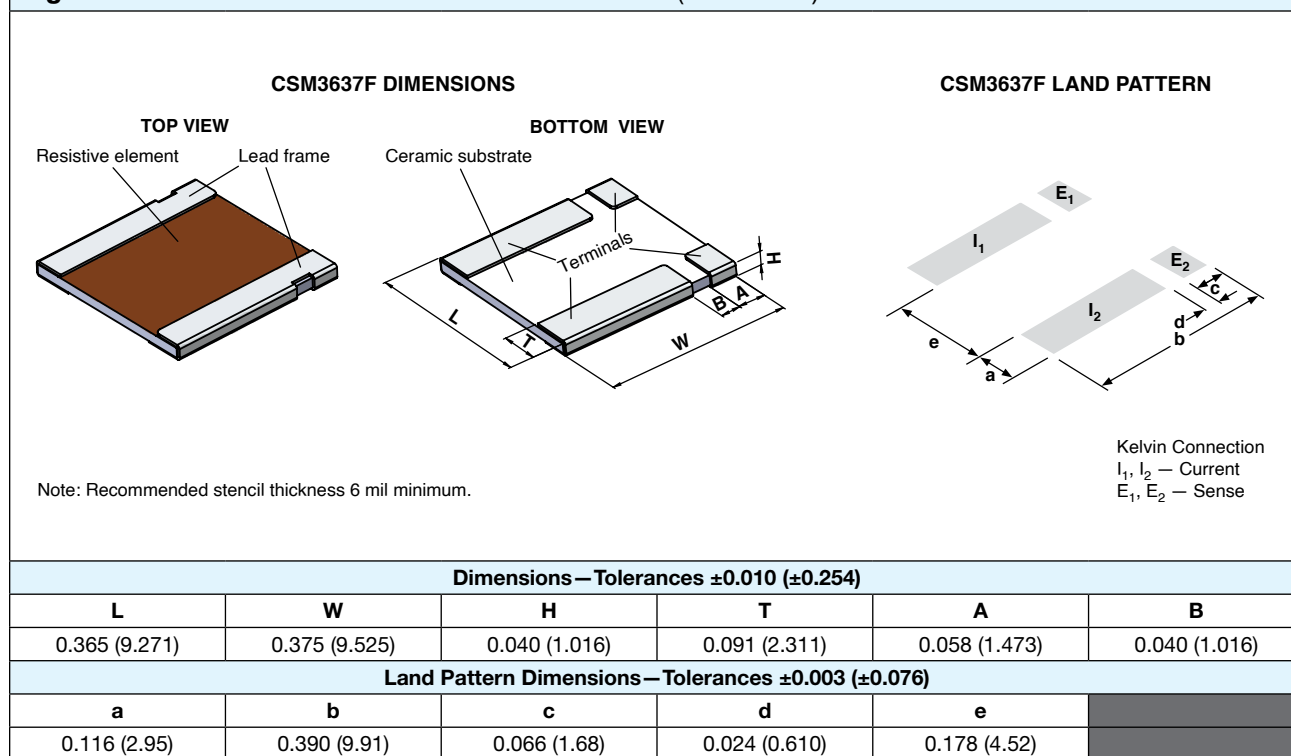
The 4-pad CSM3637F Bulk Metal® Foil surface mount resistor features an improved load-life stability of max  $\pm 0.05\%$  at  $+70^{\circ}\text{C}$  for 2000 h (rated power), a TCR of  $\pm 10 \text{ ppm}/^{\circ}\text{C}$  maximum from  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ ,  $+25^{\circ}\text{C}$  ref., and a tolerance of  $\pm 0.1\%$ .

## The Key Applications

Applications requiring accuracy and repeatability under stress conditions such as the following:

- Switching and linear power supplies
- Precision current-sensing
- Power management systems
- Feedback circuits
- Power amplifiers
- Measurement instrumentation
- Precision instrumentation amplifiers
- Medical and automatic test equipment
- Satellites and aerospace systems
- Commercial and Military avionics
- Test and measurement equipment
- Electronic scales

**Figure 2—Dimensions and Land Pattern in Inches (Millimeters)**



**Table 3—Performance Specifications**

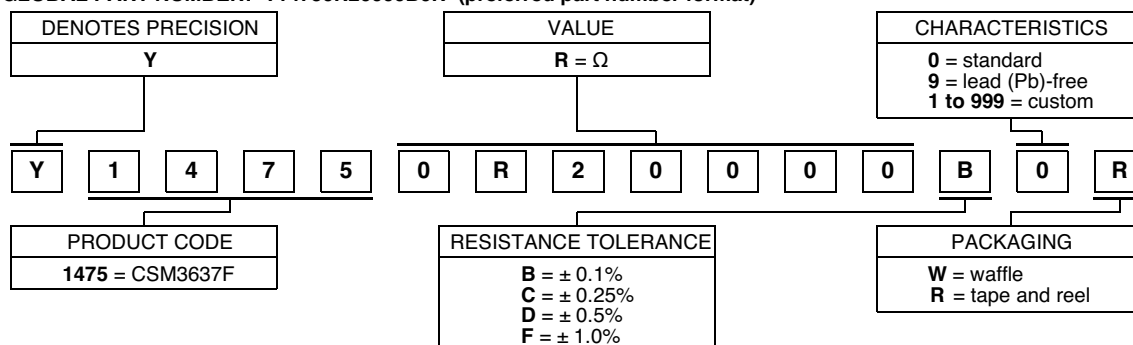
Test/Condition	MIL-PRF-49465B $\Delta R$ LIMITS	Resistance Value	Typical $\Delta R$ Limits <sup>(1)</sup>	Max $\Delta R$ Limits <sup>(1)</sup>
<b>Thermal shock</b> –65°C to +150°C, 5 cycles, 15 min at each extreme	$\pm(0.5\% + 0.0005R)$	50 mΩ to 200 mΩ	0.03%	0.05%
		20 mΩ to <50 mΩ	0.05%	0.1%
<b>Load-life stability</b> 2000 h, +70°C at rated power	$\pm(1.0\% + 0.0005R)$	$\geq 100$ mΩ	0.05%	0.1%
		50 mΩ to <100 mΩ	0.2%	0.5%
		20 mΩ to <50 mΩ	0.5%	1%
<b>Short-time overload</b> 5 x rated power, 5 s	$\pm(0.5\% + 0.0005R)$	20 mΩ to 200 mΩ	0.02%	0.03%
<b>High temperature exposure</b> 1000 h, 170°C	$\pm(1.0\% + 0.0005R)$	20 mΩ to 200 mΩ	0.2%	0.3%
<b>Moisture resistance</b> MIL-STD-202, method 106, 0 power, 7a and 7b not required	$\pm(0.5\% + 0.0005R)$	20 mΩ to 200 mΩ	0.005%	0.01%
<b>Shock</b> 100 g, 6 ms, 5 pulses	$\pm(0.1\% + 0.0005R)$	20 mΩ to 200 mΩ	0.02%	0.05%
<b>Resistance to soldering heat</b> 10 s to 12 s at +260°C	$\pm(0.25\% + 0.0005R)$	20 mΩ to 200 mΩ	0.03%	0.05%

**Note**

<sup>(1)</sup> Measurement error allowed for  $\Delta R$  limits: 0.0005 Ω.

**Figures 3—Global Part Number Information<sup>(1)</sup>**

**NEW GLOBAL PART NUMBER: Y14750R20000B0R (preferred part number format)**



FOR EXAMPLE: ABOVE GLOBAL ORDER Y1487 0R20000 B 0 R:

TYPE: CSM3637F

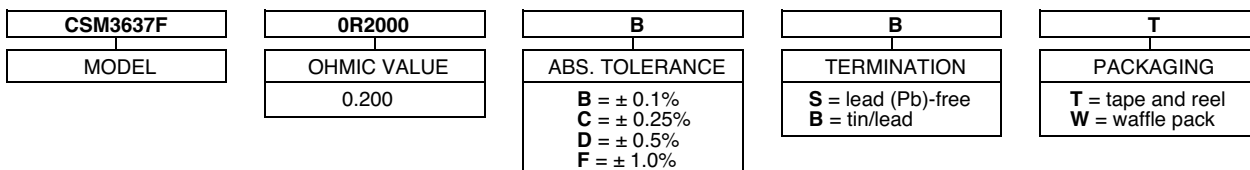
VALUE: 200.0 mΩ

ABSOLUTE TOLERANCE: ± 0.1%

TERMINATION: standard tin/lead

PACKAGING: tape and reel

**HISTORICAL PART NUMBER STYLE: CSM3637F 0R2000 B B T (will continue to be used)**



**Note**

<sup>(1)</sup> 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](http://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.

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Vishay Precision Group:](#)

[Y14750R10000F9W](#) [Y14750R10000B9R](#) [Y14750R20000B0R](#)