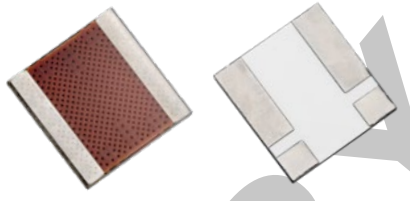
Bulk Metal® Foil Technology High Precision, Current Sensing, Power Surface Mount Resistor with Wrap-Around Terminals

with Rated Power up to 3 W and TCR ±10 ppm/°C

FEATURES

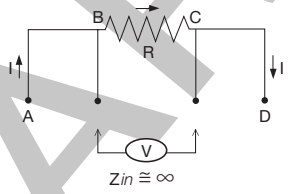
- Temperature coefficient of resistance (TCR): 10 ppm/°C max. (–55°C to +125°C, +25°C ref.)
- Power rating: to 3 W
- Resistance tolerance: to ±0.1%
- Resistance range: 20 mΩ to 500 mΩ
- Load-life stability: to ±0.05% typical (70°C, 2000 h at rated power)
- Short-time overload: 0.02% typical
- Power coefficient of resistance (PCR), "ΔR due to self heating": 5 ppm/W at rated power
- Electrostatic discharge (ESD): up to 25 kV
- Solderable terminations
- Terminal finish available: lead (Pb)-free, tin/lead alloy
- Quick prototype quantities available; please contact foil@vpgsensors.com



Top View Bottom View

Pb-free Available

RoHS* COMPLIANT



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

INTRODUCTION

Model FRCS3637 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-pad wrap-around terminals provides high reliability of solder mounting connections.

Figure 1—Power Derating Curve

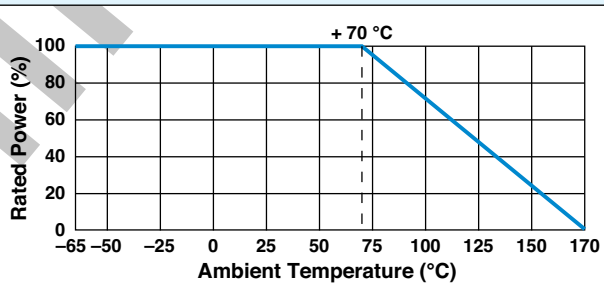


Table 1—Specifications

Parameter	Value
Resistance range	20 mΩ to 500 mΩ(1)
Power rating at 70°C	2 W: 20 mΩ to <50 mΩ; 3 W: 50 mΩ to 500 mΩ
Maximum current(2)	10 A
Tolerance	to±0.1
Temperature coefficient maximum (–55°C to +125°C, +25°C Ref.)	±15 ppm/°C, R <50 mΩ; ±10 ppm/°C(3) R ≥50 mΩ
Operating temperature range	–65°C to +170°C
Maximum working voltage	$(P \times R)^{1/2}$

Notes
(1) Contact application engineering for values outside this range.
(2) Maximum current for a given resistance value is calculated using $I = \sqrt{P/R}$.
(3) For tighter TCR, please contact application engineering: foil@vpgsensors.com.

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.

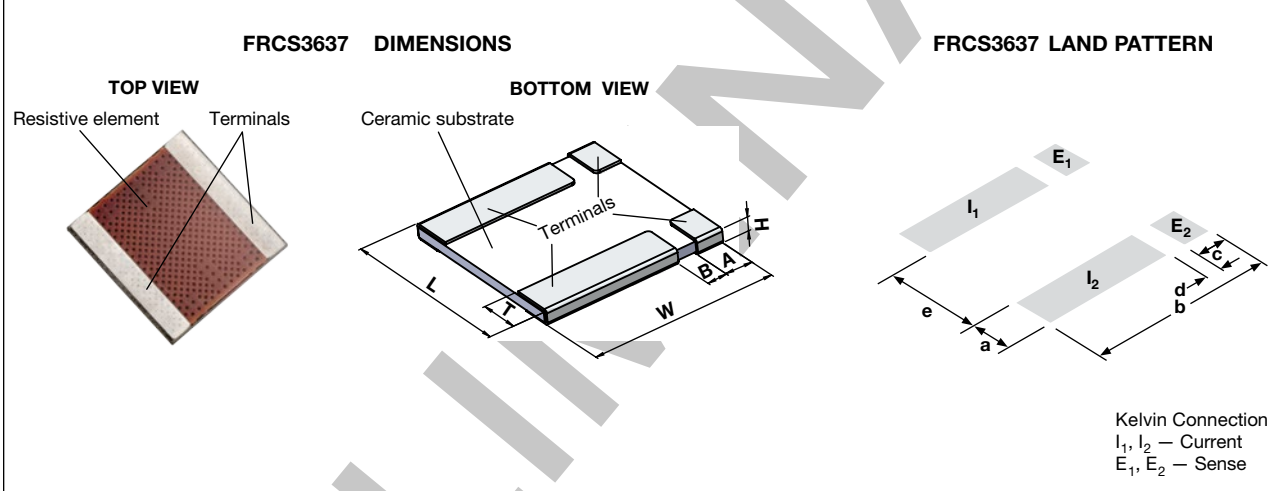
VFR RESISTORS
A VPG Brand

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
- Battery Management
- 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)



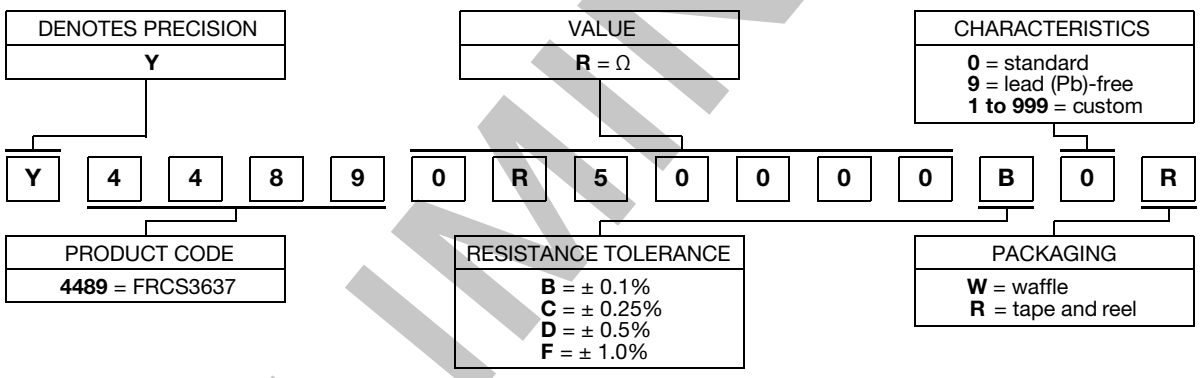
Dimensions—Tolerances ±0.010 (±0.254)					
L	**W**	**H**	**T**	**A**	**B**
0.365 (9.271)	0.375 (9.525)	0.040 (1.016)	0.091 (2.311)	0.058 (1.473)	0.040 (1.016)
Land Pattern Dimensions—Tolerances ±0.003 (±0.076)					
a	**b**	**c**	**d**	**e**	
0.116 (2.95)	0.390 (9.91)	0.066 (1.68)	0.024 (0.610)	0.178 (4.52)	

Table 3—Performance Specifications

Test/Condition	MIL-PRF-49465B ΔR LIMITS	Resistance Value	Typical ΔR Limits[1]
Thermal shock –65°C to +150°C, 5 cycles, 15 min at each extreme	±(0.5% +0.0005R)	50 mΩ to 500 mΩ	0.03%
		20 mΩ to <50 mΩ	0.05%
Load-life stability 2000 h, +70°C at rated power	±(1.0% +0.0005R)	≥100 mΩ	0.05%
		50 mΩ to <100 mΩ	0.2%
		20 mΩ to <50 mΩ	0.5%
Short-time overload 5 x rated power, 5 s	±(0.5% +0.0005R)	20 mΩ to 500 mΩ	0.02%
High temperature exposure 1000 h, 170°C	±(1.0% +0.0005R)	20 mΩ to 500 mΩ	0.2%
Moisture resistance MIL-STD-202, method 106, 0 power, 7a and 7b not required	±(0.5% +0.0005R)	20 mΩ to 500 mΩ	0.005%
Shock 100 g, 6 ms, 5 pulses	±(0.1% +0.0005R)	20 mΩ to 500 mΩ	0.02%
Resistance to soldering heat 10 s to 12 s at +260°C	±(0.25% +0.0005R)	20 mΩ to 500 mΩ	0.03%

Note
[1] Measurement error allowed for ΔR limits: 0.0005 Ω.

Figures 3—Global Part Number Information[1]



FOR EXAMPLE: ABOVE GLOBAL ORDER Y4489 0R50000 B 0 R:

TYPE: FRCS3637
VALUE: 500.0 mΩ
ABSOLUTE TOLERANCE: ± 0.1%
TERMINATION: standard tin/lead
PACKAGING: tape and reel

Note
[1] For non-standard requests, please contact application engineering

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