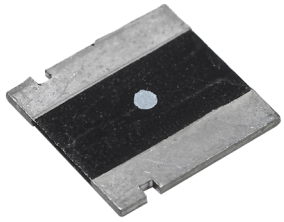
Ultra High Precision, Surface Mount 4-Terminal Precision Resistor

with Increased Power to 5W (50A max), Resistance Values from 2 mΩ to 100 mΩ, and TCR to ±15 ppm/°C

FEATURES

- Resistance range: 2 mΩ to 100 mΩ
- Temperature coefficient of resistance (TCR): 15 ppm/°C maximum
- Load life stability: ±0.2% (70°C, 2000 h at rated power)
- Power rating: to 5 W (see Table 1)
- Resistance tolerance: to ±0.1%
- Short time overload: ±0.2% typical
- Proprietary processing technique produces extremely low resistance values with improved stability
- All welded construction
- Solderable terminations
- Maximum current: up to 50 A
- Four terminal (Kelvin) design: allows for precise and accurate measurements
- Prototype quantities available in just 5 working days or sooner. For more information, please contact foil@vpgsensors.com
- For better performances, please contact us.



Pb-free Available

RoHS* COMPLIANT

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

INTRODUCTION

The CSM3637PY is a low value current sense resistor, providing power and precision in a four terminal, surface mount configuration. Its all welded construction is made up of a Bulk Metal® resistive element with plated copper terminations.

There are many current sense resistors on the market. Until now the combination of very stable and precise resistors with low TCR of ±15 ppm/°C maximum, tight tolerance of ±0.1%and load life stabilityof ±0.2% (2000h, +70°C at rated power) was not easily available.

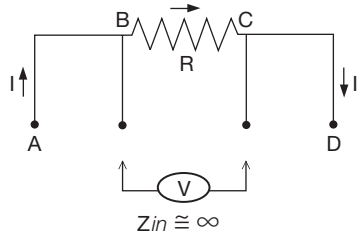
The key performance of the new CSM3637PY is its high rated power up to 5W.

These specifications are based on tests performed in accordance with methods prescribed by appropriate MIL-PRF standards (MIL-PRF-55342 and MIL-PRF-49465).

The four terminal device separates the current leads from the voltage sensing leads. This configuration eliminates the effect of the lead wire resistance from points A to B and C to D.

Our application engineering department is available to advise and make recommendations.

For non-standard technical requirements and special applications, please contact: 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.

Figure 1 – Power Derating Curve

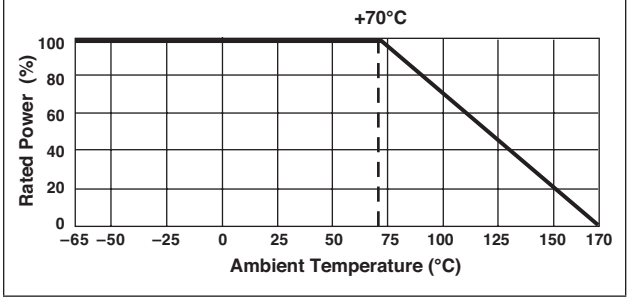
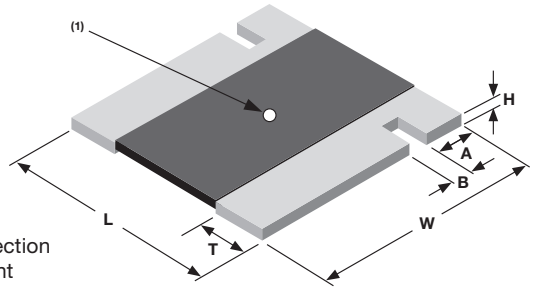


Table 1 – Specifications

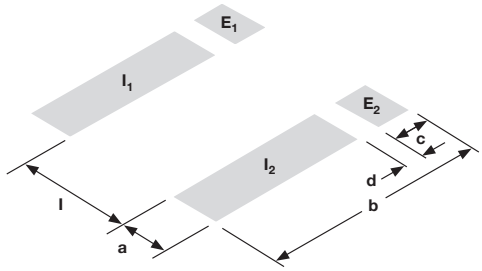
PARAMETER	CSM3637PY
Resistance Range	2 mΩ to 100 mΩ
Power Rating at 70°C in free air	5 W (2 mΩ to 19 mΩ) 4 W (20 mΩ to 100 mΩ)
Maximum Current	50 A
Tightest Tolerance	±0.5% (2 mΩ to 19 mΩ) ±0.1% (20 mΩ to 100 mΩ)
Temperature Coefficient Of Resistance (TCR) (–55°C to +125°C, +25°C ref.)	2 mΩ to 100 mΩ: 15 ppm/°C maximum
Operating Temperature Range	–65°C to +170°C
Weight (maximum)	0.44 g

Figure 2 – Dimensions and Imprinting in Inches (Millimeters)

CSM3637PY DIMENSIONS



CSM3637PY LAND PATTERN



Kelvin Connection
I_1, I_2 - Current
E_1, E_2 - Sense

Dimensions – Tolerances ±0.010 (±0.254)

RESISTANCE RANGE (mΩ)	L	W	H	T	A	B
2 to 100	0.360 (9.144))	0.370 (9.398)	0.031 (0.8)	0.086 (2.184)	0.061 (1.549)	0.032 (0.813)

Land Pattern Dimensions – Tolerances ±0.003 (±0.076)

RESISTANCE RANGE (mΩ)	l	b	d	a	c	d
2 to 100	0.178 (4.52)	0.390 (9.91)	0.024 (0.610)	0.116 (2.95)	0.066 (1.68)	0.024 (0.610)

Note

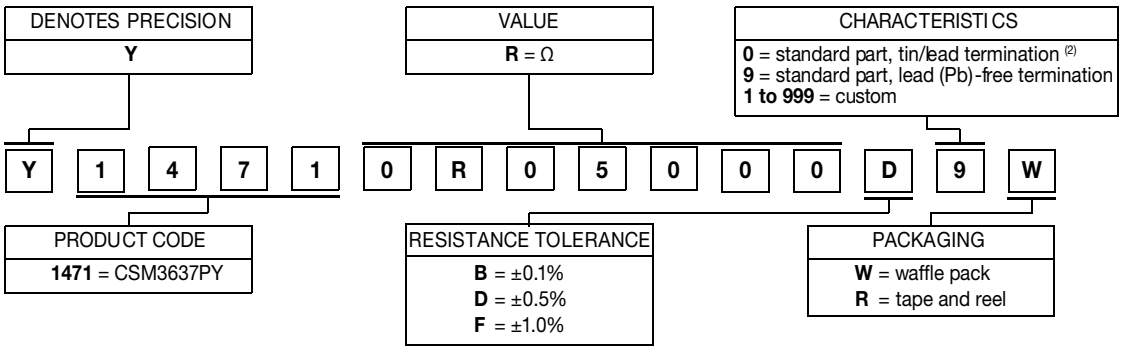
(1) White dot indicates top side of part for mounting purposes.

Table 2 – CSM3637PY Environmental Performance Comparison 2 mΩ to 100 mΩ				
TEST	**CONDITIONS**	**MIL-PRF-49465B ΔR LIMITS**	**TYPICAL ΔR LIMITS**	**MAXIMUM ΔR LIMITS[1]**
Thermal Cycling	–55°C to +125°C, 1000 cycles, 15 min at each extreme	±(0.5%+0.0005R)	0.1%	0.3%
Load Life Stability	2000 h, 70°C at rated power	±(1.0%+0.0005R)	0.2%	0.6%
Bias Humidity	85°C, 85% humidity, 10% bias, 1000 h	±(0.5%+0.0005R)	0.05%	0.2%
Short Time Overload	2.5 × rated power for 5 s	±(0.5%+0.0005R)	0.2%	0.5%
High Temperature Exposure	1000 h, 170°C	±(1.0%+0.0005R)	0.2%	0.3%
Low Temperature Storage	MIL-PRF-49465	±(0.5%+0.0005R)	0.05%	0.2%
Moisture Resistance	MIL-STD-202, method 106, 0% power, 7a and 7b not required	±(0.5%+0.0005R)	0.02%	0.05%
Shock	100 g, 6 ms	±(0.1%+0.0005R)	0.02%	0.05%
Vibration	(10 Hz to 2000 Hz) 20 g	±(0.1%+0.0005R)	0.02%	0.05%
Resistance to Soldering Heat	10 s to 12 s at +260°C	±(0.25%+0.0005R)	0.05%	0.1%
Solderability	MIL-STD-202	95% coverage	–	–

Note
(1) Add 0.0005R as per MIL-PRF-49465B

Table 3 – Global Part Number Information[1]

GLOBAL PART NUMBER: Y14710R05000D9W



FOR EXAMPLE: ABOVE GLOBAL ORDER Y1471 0R05000 D 9 W:
TYPE: CSM3637PY
VALUE: 50 mΩ
ABSOLUTE TOLERANCE: ±0.5%
TERMINATION: standard lead (Pb)-free
PACKAGING: waffle pack

Note
(1) For non-standard requests, please contact foil@vpgsensors.com.
(2) For the tin/lead termination option at standard performances, please contact foil@vpgsensors.com.