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

with Rated Power up to 1 W and TCR ±10 ppm/°C

FEATURES

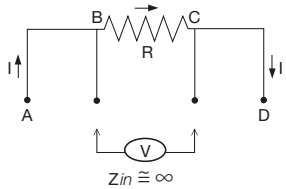
- Temperature coefficient of resistance (TCR): 10 ppm/°C max. (–55°C to +125°C, +25°C ref.) For tighter TCR please contact us.
- Power rating: 1 W
- Resistance tolerance: to ±0.1%
- Resistance range: 50 mΩ to 200 mΩ
- Load-life stability: to ±0.05% typical (70°C, 2000 h at rated power)
- Short-time overload: 0.005% typical
- 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 CSM2512F 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

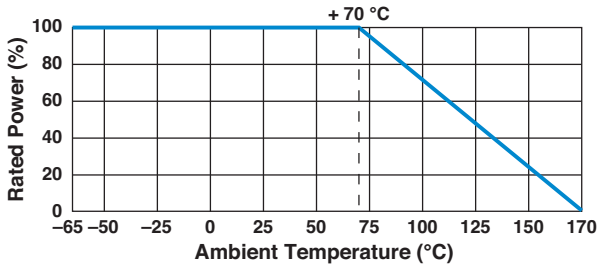


Table 1—Specifications

Parameter	Value
Resistance range	50 mΩ to 200 mΩ(1)
Power rating at 70°C	1 W
Maximum current(2)	4.5 A
Tolerance	±0.1%
Temperature coefficient maximum (–55°C to +125°C, +25°C Ref.)	±10 ppm/°C(3)
Operating temperature range	–65°C to +170°C
Maximum working voltage	$(P \times R)^{1/2}$
Weight (maximum)	0.063 g

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.

ABOUT CSM2512F

The CSM2512F 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 CSM2512F is used where the emphasis is on accuracy and repeatability under stress conditions in applications requiring precision resistor performance up to 1 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.

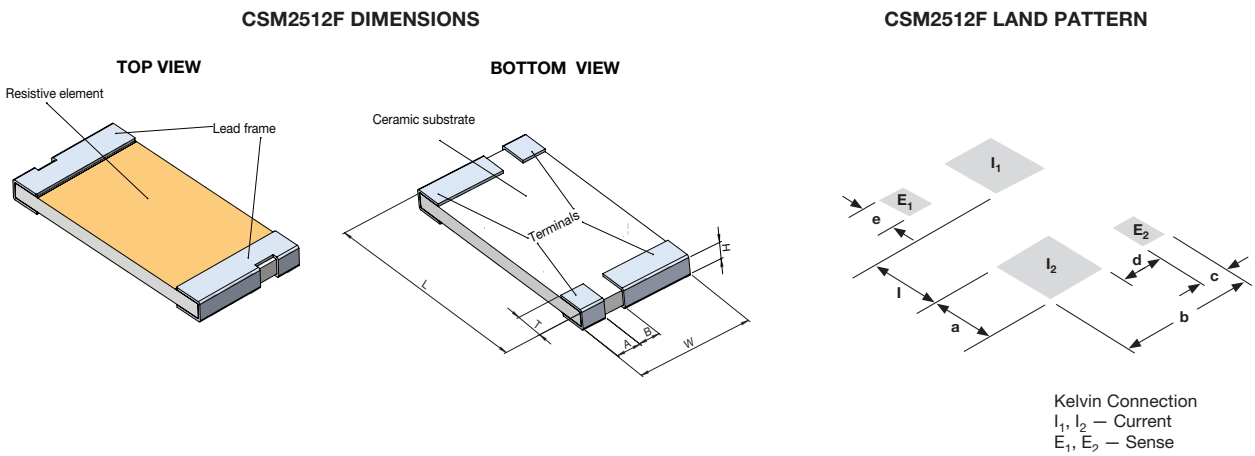
The 4-pad CSM2512F Bulk Metal® Foil surface mount resistor features an improved load-life stability of max ±0.05% at + 70°C for 2000 h (rated power), a TCR of ±10 ppm/°C maximum from –55°C to +125°C, +25°C ref., and a tolerance of ±0.1%.

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)



Dimensions—Tolerances ±0.010 (±0.254)					
L	**W**	**H**	**T**	**A**	**B**
0.270 (6.858)	0.126 (3.2004)	0.035 (0.889)	0.040 (1.016)	0.024 (0.6096)	0.035 (0.889)
Land Pattern Dimensions—Tolerances ±0.003 (±0.076)					
a	**b**	**c**	**d**	**e**	**l**
0.065 (1.65)	0.145 (3.68)	0.045 (1.14)	0.021 (0.53)	0.055 (1.39)	0.160 (4.06)

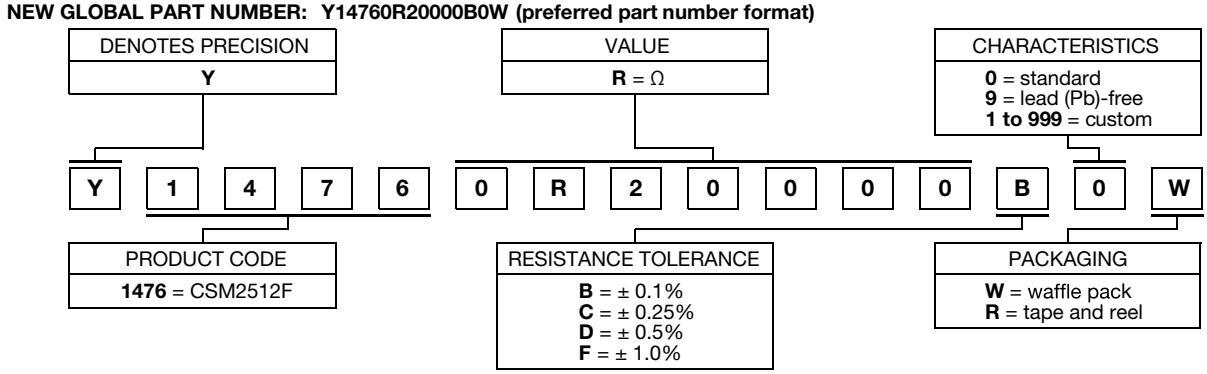
Table 2—Performance Specifications

Test/Condition	MIL-PRF-49465B ΔR LIMITS	Resistance Value	Typical ΔR Limits[1]	Max ΔR Limits[1]
Thermal shock –65°C to +150°C, 5 cycles, 15 min at each extreme	±(0.5% +0.0005R)	50 mΩ to 200 mΩ	0.005%	0.01%
Thermal shock -65°C to +150°C, 100 cycles, 15 min at each extreme	±(0.05% +0.0005R)	50 mΩ to 200 mΩ	0.05%	0.1%
Load-life stability 2000 h, +70°C at rated power	±(1.0% +0.0005R)	50 mΩ to 200 mΩ	0.05%	0.1%
Load-life stability 2000 h, +70°C at 2 W	±(1.0% +0.0005R)	50 mΩ to 200 mΩ	0.1%	1.0%
Short-time overload 5 x rated power, 5 s	±(0.5% +0.0005R)	50 mΩ to 200 mΩ	0.005%	0.01%
High temperature exposure 1000 h, 170°C	±(1.0% +0.0005R)	50 mΩ to 200 mΩ	0.1%	0.2%

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

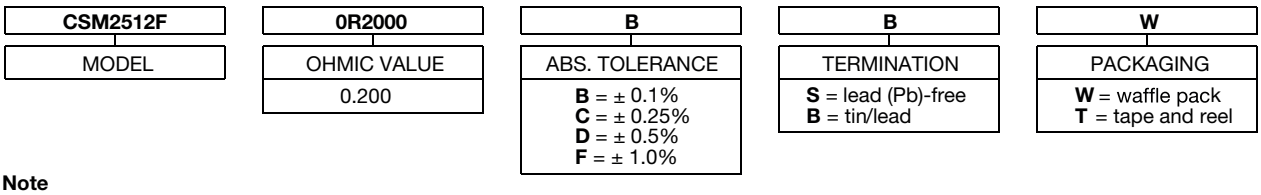
Figure 3—Global Part Number Information[1]

NEW GLOBAL PART NUMBER: Y14760R20000B0W (preferred part number format)



FOR EXAMPLE: ABOVE GLOBAL ORDER Y1476 0R20000 B 0 W:
TYPE: CSM2512F
VALUE: 200.0 mΩ
ABSOLUTE TOLERANCE: ± 0.1%
TERMINATION: standard tin/lead
PACKAGING: waffle pack

HISTORICAL PART NUMBER STYLE: CSM2512F 0R2000 B B W (will continue to be used)



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

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