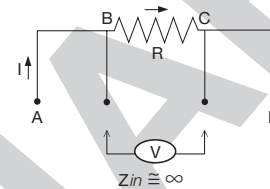
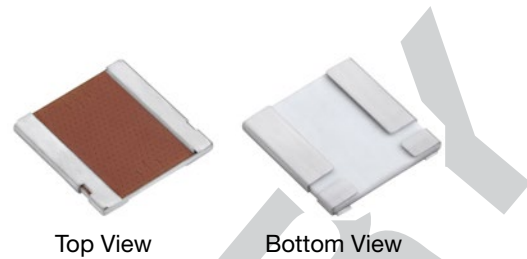


Model 303337 Bulk Metal® Foil Technology CSM3637F, with Screen/Test Flow in Compliance with EEE-INST-002 (Tables 2A and 3A, Film/Foil, Level 1) MIL-PRF-55342 and MIL-PRF-49465

FEATURES

- Temperature coefficient of resistance (TCR):
5 ppm/°C max. (-55°C to +125°C, +25°C ref.)
For tighter TCR please contact us.
- Power rating: 3 W
- Resistance tolerance: to ±0.1%
- Resistance range: 100 mΩ to 200 mΩ
- Load-life stability: to ±0.02% typical
(70°C, 2000 h at rated power)
- Short-time overload: 0.005% typical
- Power coefficient of resistance (PCR), “ΔR due to self heating”: 5 ppm/W at rated power
- Electrostatic discharge (ESD): at least to 25 kV
- Solderable terminations
- For prototype units, append a “U” to the model number (example: 303337U). These units have all of the table 2A (page 3) 100% tests performed, with no destructive qualification testing required (table 3A, page 3). For more information, please contact foil@vpgsensors.com
- For oriented performances please contact Application Engineering



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

INTRODUCTION

Model 303337 (CSM3637F with screen/test flow in compliance with EEE-INST-002) 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

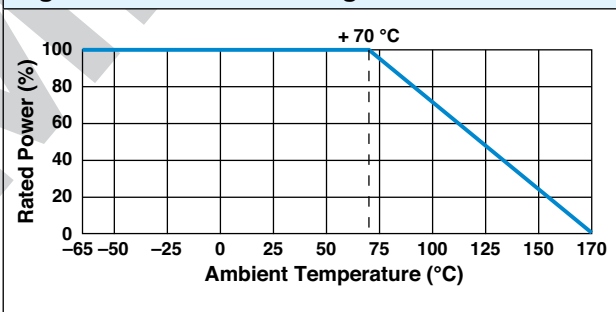
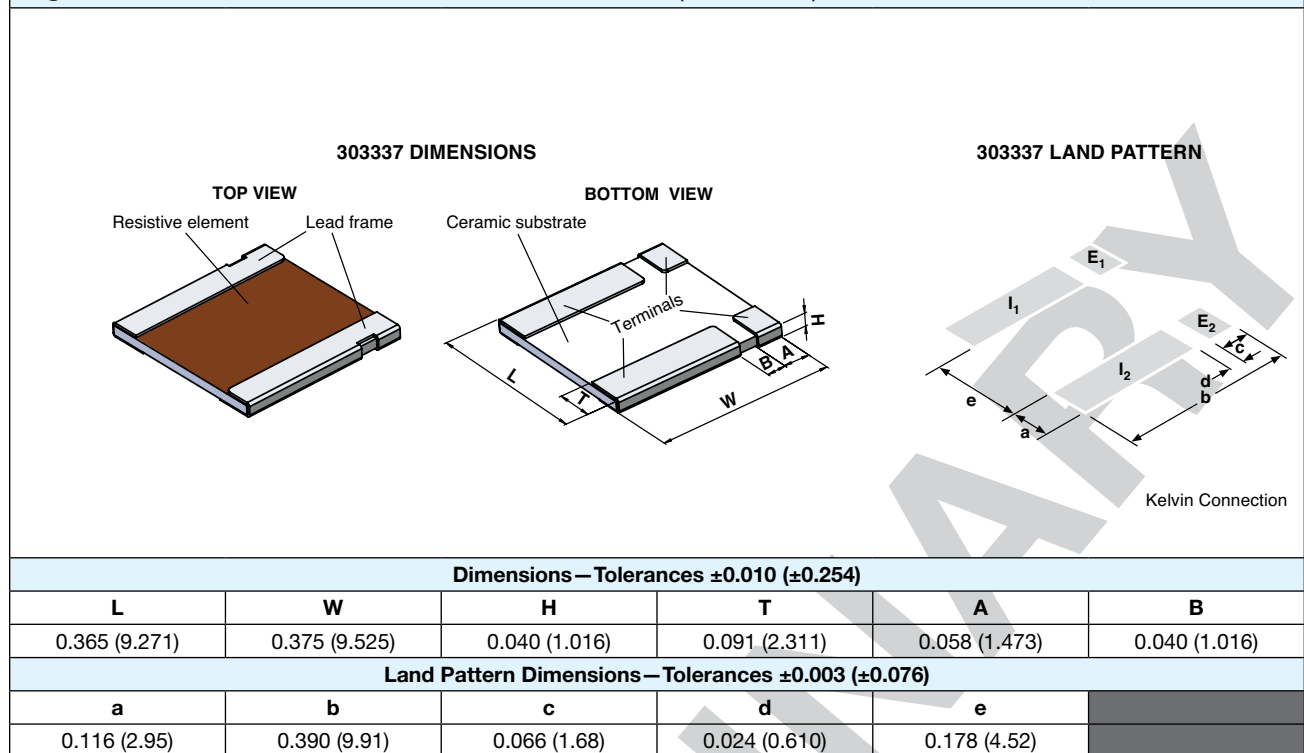


Table 1 – Specifications

Parameter	Value
Resistance range	100 mΩ to 200 mΩ ⁽¹⁾
Power rating at 70°C	3 W
Maximum current ⁽²⁾	5.5 A
Tolerance	±0.1
Temperature coefficient maximum (-55°C to +125°C, +25°C Ref.)	±5 ppm/°C ⁽³⁾
Operating temperature range	-65°C to +170°C
Maximum working voltage	$(P \times R)^{1/2}$
Weight (maximum)	0.29 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 .	

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

- Tightest absolute tolerance: 0.1% for any value within the pertinent ohmic value range.
- Measurement error allowed for ΔR limits: 0.0005 Ω .
- For prototype units, append a “U” to the model number (example: 303337U). These units have all of the table 2A 100% tests performed, with no destructive qualification testing required.

Table 2 – EEE-INST-002 (Table 2A Film/Foil, Level 1) 100% Tests/Inspections⁽¹⁾

RC Record	In tolerance
Thermal Shock	25 x (–65°C to +150°C)
RC Record	$\Delta R = 0.1\%$
High Temperature Exposure	+170°C, 100 h, no power
RC Record	In tolerance $\Delta R = 0.1\%$
Final Inspection	5% PDA on ΔR , 10% PDA on out of tolerance
Visual Inspection	Magnification 30 x to 60 x
Mechanical Inspection	Dimensions, workmanship, 3 units sample size
Note	
⁽¹⁾ Vishay Foil Resistors will perform a pre-cap visual inspection 100% in the production flow prior to overcoating	

Table 3 – EEE-INST-002 (Table 3A Film/Foil, Level 1) Destructive Tests – MIL-PRF-49465 AND 55342 ⁽¹⁾

Group 2	Sample size: 3(0) Solderability	MIL-STD-202, method 208
Group 3	Sample size: 10(0) – mounted on FR4 TCR measurement per MIL-STD-202, method 304 Low temperature storage per MIL-PRF-49465 Low temperature operation per MIL-PRF-55342 Short time overload per MIL-STD-49465	± 5 ppm/ $^{\circ}\text{C}$ (-55°C / $+25^{\circ}\text{C}$ / $+125^{\circ}\text{C}$) $\Delta R = 0.02\%$ $-55^{\circ}\text{C} \pm 2^{\circ}\text{C}$, 24 h ± 4 h ambient no load dwell for 2 h to 8 h at $+25^{\circ}\text{C}$ $\Delta R = 0.02\%$ -65°C ambient no load dwell for 1 h, rated power for 45 min no load dwell at $+25^{\circ}\text{C}$ for 24 h ± 4 h $\Delta R = 0.05\%$ $5 \times$ rated power at $+25^{\circ}\text{C}$ for 5 s, not to exceed maximum current rating
Group 4	Sample size: 9(0) – mounted on FR4 Resistance to soldering heat Moisture resistance per MIL-STD-202, method 106 (7a and 7b not required)	$\Delta R = 0.05\%$ performed per MIL-PRF-55342 para. 4.8.8.1 $\Delta R = 0.02\%$ 240 h, no power
Group 5	Sample size: 9(0) Shock per MIL-STD-202, method 213, condition I Vibration per MIL-STD-202, method 204, condition D	$\Delta R = 0.05\%$ 100G, 6 ms axes Z and Y, 10 shocks per axis $\Delta R = 0.05\%$ 10 Hz to 2000 Hz, 20G 2 axes, 6 h per axis
Group 6	Sample size: 12(0) – mounted on FR4 Life test per MIL-PRF-49465	$\Delta R = 0.1\%$ 2000 h, $+70^{\circ}\text{C}$, rated power
Group 7B	Sample Size: 10(0) – mounted on FR4 Solder mounting integrity per MIL-PRF-55342	5 kg force, 30 s
Group 9	Sample size: 5(0) – mounted on FR4 High temperature exposure per MIL-PRF-49465	$\Delta R = 0.3\%$ 1000 h, $+170^{\circ}\text{C} \pm 7^{\circ}\text{C}$, no power
Group 10⁽²⁾	Sample size: 4	Per ASTM E595
<p>Notes ⁽¹⁾ Units selected randomly from lots which successfully passed the table 2A testing ⁽²⁾ Optional, per customer request. Measurement error allowed for ΔR limits: 0.0005 Ω.</p>		

Figure 3 – Global Part Number Information

Model #	303337
Base Model	CSM3637F
Value Range	100 mΩ to 200 mΩ

Part Number:

{Model} - {Value} - {Tolerance} - {Termination} - {Packaging}

Absolute Tolerance	Code
0.1%	B
0.2%	E
0.25%	C
0.5%	D
1.0%	F

Termination	Code
Tin/lead	B

Packaging	Code
Waffle	W
Tape and reel	T

Example: 303337 - 0R123 - EBW

303337, 123 mΩ, 0.2%, tin/lead termination, waffle packaging



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