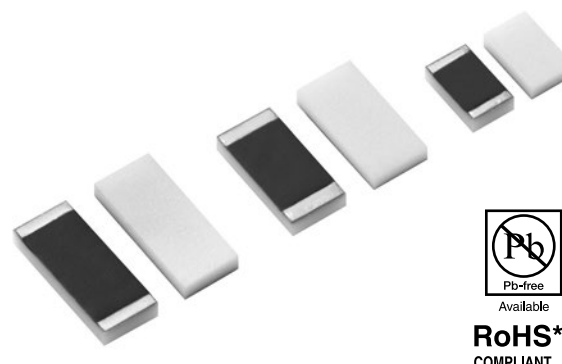


High-Precision Bulk Metal® Foil Flip Chip Resistor with Extended Range for Low Ohmic Values

FEATURES

- Temperature coefficient of resistance (TCR):
 $\pm 15 \text{ ppm}/^\circ\text{C}$ (-55°C to $+125^\circ\text{C}$, $+25^\circ\text{C}$ ref.)
- Tolerance: to $\pm 0.5\%$
- Power rating to: 1 W at $+70^\circ\text{C}$
- Electrostatic discharge (ESD): to 25 kV
- Resistance range: 0.5 Ω to 10 k Ω (for lower and higher values, please contact us)
- Bulk Metal® Foil resistors are not restricted to standard values; specific “as required” values can be supplied at no extra cost or delivery (e.g., 1K2345 vs. 1K)
- Non-inductive, non-capacitive design
- Thermal stabilization time: $<1 \text{ s}$ (within 10 ppm of steady state value)
- Non hot spot design
- Rise time: 1 ns effectively no ringing
- Current noise: $<0.010 \mu\text{V}_{\text{rms}} / \text{V}$ of applied voltage ($<-40 \text{ dB}$)
- Voltage coefficient: $<0.1 \text{ ppm/V}$
- Non-inductive: $<0.08 \mu\text{H}$
- Terminal finishes available: lead (Pb)-free, tin/lead alloy
- Compliant to RoHS directive 2011/65/EU*
- Matched sets are available per request
- Rapid prototype sample quantities are available.
 For more information, please contact us at
 foil@vpgsensors.com



ohmic values to 0.5 ohm. The device's solid element alloy is matched to the substrate, forming a single entity with balanced resistance versus temperature characteristics for a low and predictable TCR over a wide temperature range from -55°C to more than $+125^\circ\text{C}$. The adhesive that holds the Bulk Metal® Foil to the flat substrate withstands high temperatures, pulsing power, moisture incursions, shock and vibration, and low-temperature exposure while still holding securely to the Bulk Metal® Foil element.

FIGURE 1 – POWER DERATING CURVE

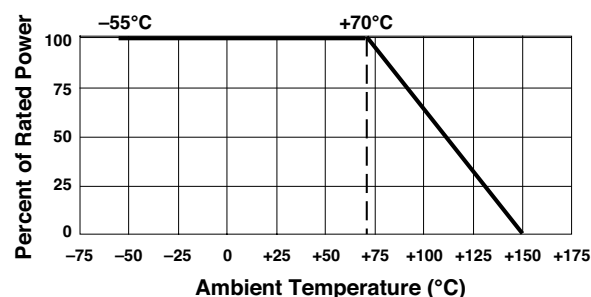
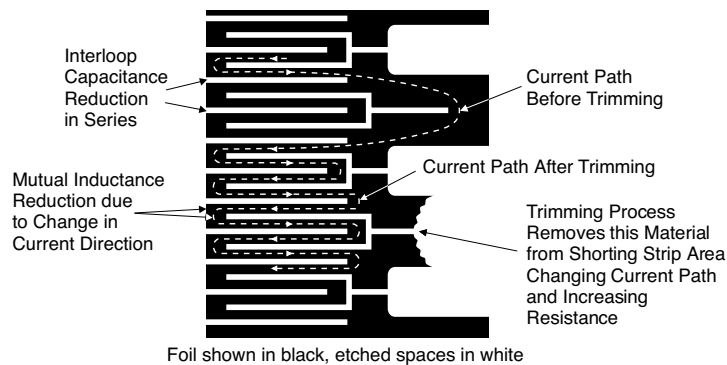


TABLE 1 – SPECIFICATIONS

Chip Size	Rated Power at $+70^\circ\text{C}$ (mW)	Maximum Voltage Rating ($\leq \sqrt{P \times R}$)	Resistance Range (Ω)	Tolerance (%)	TCR Max. Spread (-55°C to $+125^\circ\text{C}$, $+25^\circ\text{C}$ Ref.) (ppm/ $^\circ\text{C}$)	Max. Weight (mg)
1506	300 mW	55 V	0.5 to 10k	$\pm 0.5, \pm 1$	± 15	12
2010	500 mW	70 V	0.5 to 10k	$\pm 0.5, \pm 1$	± 15	25
2512	1,000 mW	100 V	0.5 to 10k	$\pm 0.5, \pm 1$	± 15	35

* 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 2—TRIMMING TO VALUES (conceptual illustration)



Note

To acquire a precision resistance value, the Bulk Metal® Foil chip is trimmed by selectively removing built-in "shorting bars." To increase the resistance in known increments, marked areas are cut, producing progressively smaller increases in resistance. This method reduces the effect of "hot spots" and improves the long-term stability of Bulk Metal® Foil resistors.

TABLE 2—PERFORMANCE SPECIFICATIONS

Test	Conditions of Test	Test Limits
Thermal Shock	-55°C to +150°C, 100 cycles, 15 min at each extreme	±0.20% ±0.01 Ω
Short Time Overload	5x rated power for 5 s	±0.20% ±0.01 Ω
Low Temperature Operation	-65°C for 24 h	±0.20% ±0.01 Ω
High Temperature Exposure	1000 h at +150°C	±0.50% ±0.01 Ω
Moisture Resistance	MIL-STD-202, method 106, 0% power, 7a and 7b not required	±0.50% ±0.01 Ω
Load Life	1000 h at rated power, +70°C, 1.5 h "ON", 0.5 h "OFF"	±0.50% ±0.01 Ω
Vibration	MIL-STD-202, method 204D	±0.10% ±0.01 Ω
Mechanical Shock	100 g for 6 ms, 5 pulses	±0.10% ±0.01 Ω
Resistance to Soldering Heat	+260°C solder, 10 s to 12 s dwell, 25 mm/s emergence	±0.50% ±0.01 Ω

TABLE 3—DIMENSIONS AND LAND PATTERN in inches (millimeters)

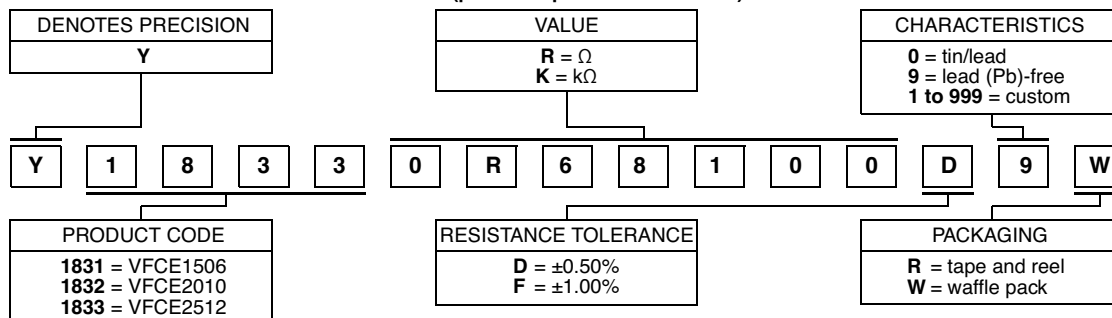
BOTTOM VIEW (showing terminals for mounting)					LAND PATTERN		
Chip Size	L ±0.005 (0.13)	W ±0.005 (0.13)	Thickness Maximum	D ±0.005 (0.13)	Z	G	X
1506	0.150 (3.81)	0.062 (1.57)	0.025 (0.64)	0.012 (0.30)	0.150 (3.81)	0.120 (3.05)	0.062 (1.57)
2010	0.200 (5.08)	0.100 (2.54)	0.025 (0.64)	0.020 (0.51)	0.199 (5.05)	0.153 (3.89)	0.100 (2.54)
2512	0.250 (6.35)	0.126 (3.20)	0.025 (0.64)	0.024 (0.61)	0.250 (6.35)	0.196 (4.98)	0.126 (3.20)

Notes

Avoid the use of those cleaning agents that could attack epoxy resins, which form part of the resistor construction.
Vacuum pick-up is recommended for handling.
Soldering iron not recommended.

TABLE 4—GLOBAL PART NUMBER INFORMATION⁽¹⁾

NEW GLOBAL PART NUMBER: Y18330R68100D9W (preferred part number format)



FOR EXAMPLE: ABOVE GLOBAL ORDER Y1833 0R68100 D 9 W:

TYPE: VFCE2512

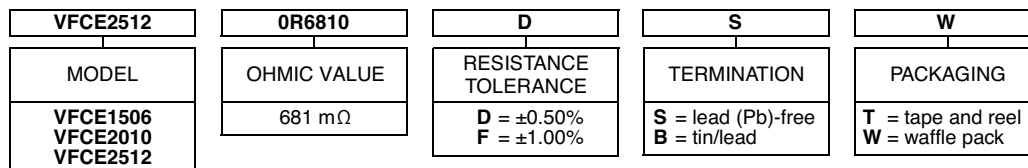
VALUE: 681 m Ω

ABSOLUTE TOLERANCE: $\pm 0.5\%$

TERMINATION: lead (Pb)-free

PACKAGING: waffle pack

HISTORICAL PART NUMBER FORMAT: VFCE2512 0R6810 D S W (will continue to be used)



Note

⁽¹⁾ For non-standard requests, please contact Application Engineering