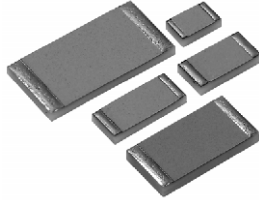


**Z Foil Flip Chip Resistor with TCR of ± 0.05 ppm/ $^{\circ}$ C,
35% Space Saving versus Wrap Around Design
and Load Life Stability to $\pm 0.005\%$ (50 ppm)**



Bottom View

Any value at tolerance available within resistance range

INTRODUCTION

Bulk Metal[®] Foil (BMF) Technology out-performs all other resistor technologies available today for applications that require high precision and high stability.

This technology has been invented, patented and pioneered by Vishay. Products based on this technology are the most suitable for a wide range of analog applications.

BMF technology allows to produce customer oriented products designed to satisfy challenging and specific technical requirements.

One of the important parameters influencing stability is the Temperature Coefficient of Resistance (TCR). Although the TCR of Foil resistors is considered extremely low, this characteristic has been further refined over the years.

The VFCP Series utilizes ultra precision Bulk Metal[®] Z-Foil (BMZF).

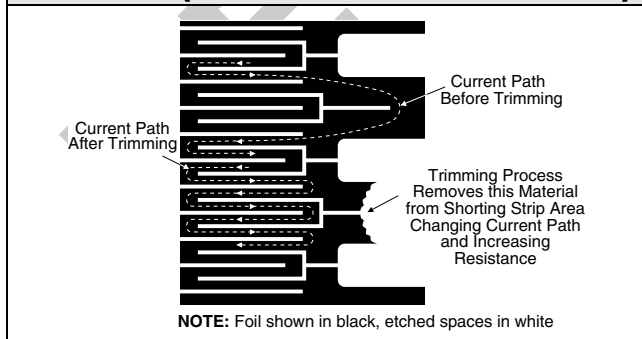
The new Z-Foil technology provides a significant reduction of the resistive element sensitivity to changes of temperature due to ambient temperature variations (TCR) and to self heating when power is applied (power coefficient).

The Z-Foil technology provides inherently an extremely low and predictable Temperature Coefficient of Resistance (TCR), a remarkably improved load life stability, low noise and availability of tight tolerance.

The Flip Chip configuration provides a significant PCB space saving of more than 35 % vs. the surface mount chip with wrap-around terminations. The VFCP is available in any value within the specified resistance range.

Our Application Engineering Department is available to advise and make recommendations for non-standard technical requirements and special applications, please contact us.

FIGURE 1 - TRIMMING TO VALUES (CONCEPTUAL ILLUSTRATION)



* Pb containing terminations are not RoHS compliant, exemptions may apply

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FEATURES

- Temperature Coefficient of Resistance (TCR): ± 0.05 ppm/ $^{\circ}$ C (Industrial range) ± 0.2 ppm/ $^{\circ}$ C (MIL range)
- Power Coefficient “ ΔR due to self heating” 5 ppm at rated power
- Load Life Stability (70 $^{\circ}$ C for 2000 hours): $\pm 0.005\%$ (50 ppm)
- Power Rating to: 600 mW at + 70 $^{\circ}$ C
- Electrostatic Discharge (ESD) above 25 000 Volts
- Resistance Range: 10 Ω to 150K Ω (for lower and higher values, please contact us)
- Non Inductive/Capacitive design
- Short time overload $\leq \pm 0.005\%$ (50 ppm)
- Tolerance: to $\pm 0.01\%$ (100 ppm)
- Non hot spot design
- Rise time: 1ns without ringing
- Current Noise: - 40dB
- Voltage Coefficient < 0.1 ppm/V
- Non Inductive: < 0.08 μ H
- Thermal EMF: < 0.05 μ V/ $^{\circ}$ C
- Terminal Finishes Available:
 - Lead (Pb)-Free
 - Tin/Lead Alloy
- Matched sets are available per request
- For better performances please contact us



RoHS* COMPLIANT

TABLE 1 - TOLERANCE AND TCR VS RESISTANCE VALUE

RESISTANCE VALUE (Ω)	TOLERANCE (%)	TYPICAL TCR AND MAX. SPREAD MIL RANGE (ppm/ $^{\circ}$ C)
250 to 150K	± 0.01	$\pm 0.2 \pm 1.6$
100 to < 250	± 0.02	$\pm 0.2 \pm 1.6$
50 to < 100	± 0.05	$\pm 0.2 \pm 1.8$
25 to < 50	± 0.1	$\pm 0.2 \pm 2.8$
10 to < 25	± 0.25	$\pm 0.2 \pm 2.8$

APPLICATIONS

- Automatic Test Equipment (ATE)
- High Precision Instrumentation
- Laboratory, Industrial and Medical
- Audio
- EB Applications (electron beam scanning and recording equipment, electron microscopes)
- Military and Space
- Airborne
- Down Hole instrumentation
- Communication



VFCP Series (0805, 1206, 1506, 2010, 2512)

Z Foil Flip Chip Resistor with TCR of $\pm 0.05 \text{ ppm}/^\circ\text{C}$. Vishay Foil Resistors
 35% Space Saving versus Wrap Around Design
 and Load Life Stability to $\pm 0.005\%$ (50 ppm)

CHIP SIZE	RATED POWER (mW) at +70°C	MAXIMUM VOLTAGE RATING ($\leq \sqrt{P \times R}$)	RESISTANCE RANGE (Ω)	MAXIMUM WEIGHT (mg)
0805	100 mW	34V	10 to 12K	5.2
1206	250 mW	86V	10 to 30K	10.3
1506	300 mW	109V	10 to 40K	12
2010	400 mW	200V	10 to 100K	25
2512	600 mW	220V	10 to 150K	35

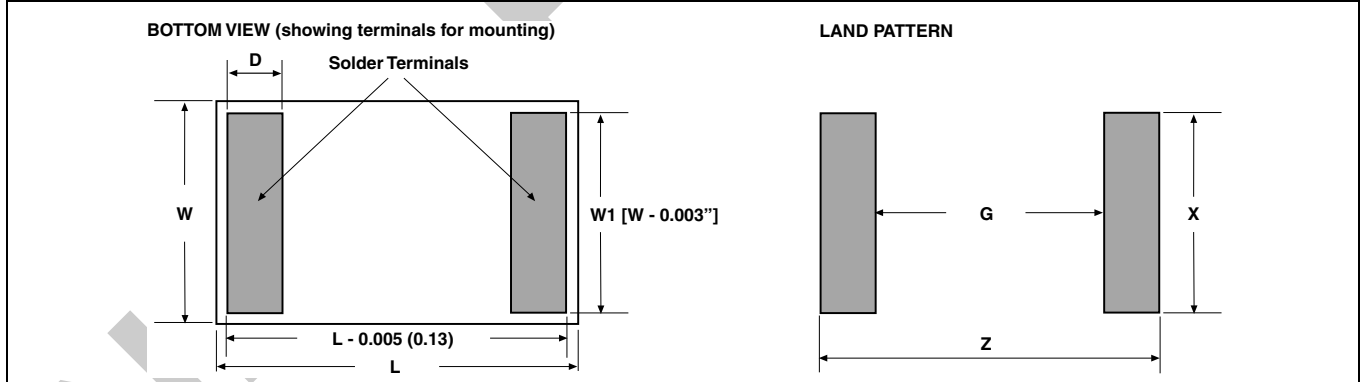
CHIP SIZE	MAXIMUM ΔR LIMITS
0805	$\pm 0.005\%$ at 50 mW $\pm 0.01\%$ at 100 mW
1206	$\pm 0.005\%$ at 150 mW $\pm 0.01\%$ at 250 mW
1506	$\pm 0.005\%$ at 150 mW $\pm 0.01\%$ at 300 mW
2010	$\pm 0.005\%$ at 200mW $\pm 0.01\%$ at 400 mW
2512	$\pm 0.005\%$ at 500 mW $\pm 0.01\%$ at 600 mW

TEST OR CONDITION	MIL-PRF-55342 H CHARACTERISTIC E ΔR LIMITS	TYPICAL ΔR LIMITS	MAXIMUM ΔR LIMITS*
Thermal Shock	$\pm 0.1\%$	$\pm 0.005\%$ (50 ppm)	$\pm 0.01\%$ (100 ppm)
Low Temperature Operation	$\pm 0.1\%$	$\pm 0.005\%$ (50 ppm)	$\pm 0.01\%$ (100 ppm)
Short Time Overload	$\pm 0.1\%$	$\pm 0.005\%$ (50 ppm)	$\pm 0.01\%$ (100 ppm)
High Temperature Exposure	$\pm 0.1\%$	$\pm 0.01\%$ (100 ppm)	$\pm 0.02\%$ (200 ppm)
Resistance to Soldering Heat	$\pm 0.2\%$	$\pm 0.005\%$ (50 ppm)	$\pm 0.015\%$ (150 ppm)
Moisture Resistance	$\pm 0.2\%$	$\pm 0.005\%$ (50 ppm)	$\pm 0.02\%$ (200 ppm)
Load Life Stability +70°C for 2000 hours at Rated Power	$\pm 0.5\%$	$\pm 0.005\%$ (50 ppm)	$\pm 0.01\%$ (100 ppm)

*As shown + 0.01 Ω to allow for measurement errors at low values.

CHIP SIZE	L	W	THICKNESS MAXIMUM	D	Z** MAXIMUM	G** MINIMUM	X** MAXIMUM
0805	± 0.005 (0.13)	± 0.005 (0.13)	0.025 (0.64)	± 0.005 (0.13)	0.078 (2.07)	0.053 (1.35)	0.049 (1.25)
1206	0.126 (3.20)	0.062 (1.57)	0.025 (0.64)	0.015 (0.38)	0.125 (3.20)	0.090 (2.29)	0.062 (1.57)
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 (3.84)	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)

**Land Pattern Dimensions are per IPC-782



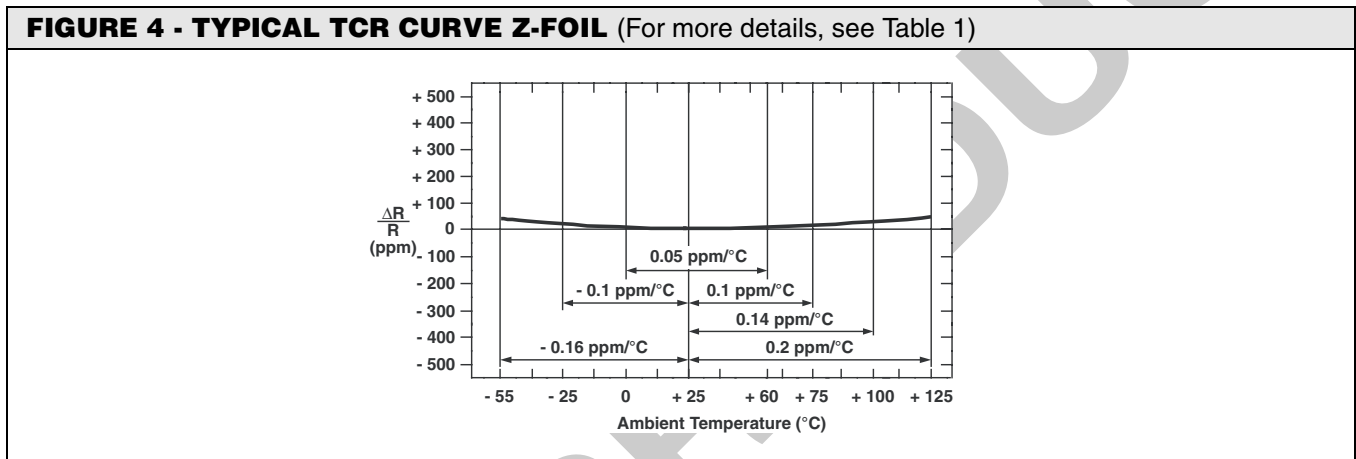
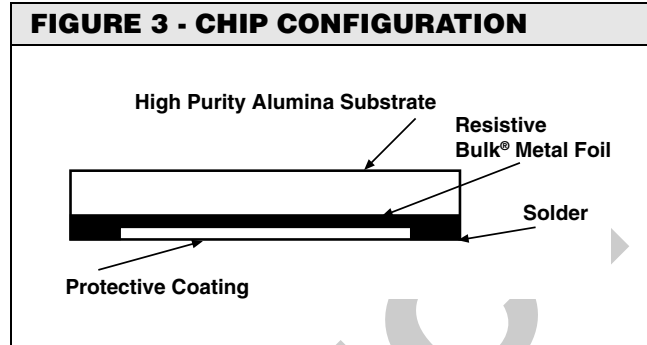
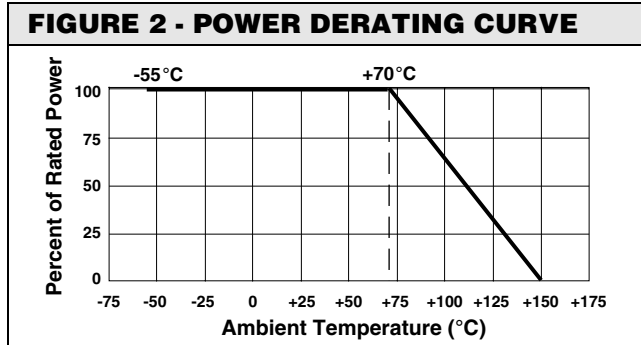
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VFCP Series (0805, 1206, 1506, 2010, 2512)



Vishay Foil Resistors Z Foil Flip Chip Resistor with TCR of $\pm 0.05 \text{ ppm}/^\circ\text{C}$,
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Note: The TCR values for $< 100\Omega$ are influenced by the termination composition and result in deviation from this curve

TABLE 6 - ORDERING INFORMATION

MODEL	CHIP SIZE	RESISTANCE VALUE			TCR	TOLERANCE	TERMINATION	PACKAGING
		RESISTANCE RANGE	LETTER DESIGNATOR	MULTIPLIER FACTOR				
VFCP	0805	10Ω to $< 1\text{K}\Omega$	R	X 1.0	TCR0.2	T = 0.01% Q = 0.02% A = 0.05% B = 0.1% C = 0.25% D = 0.5% F = 1.0%	S = Lead (Pb)-free B = Tin/Lead	T = Tape and Reel W = Waffle Pack
	1206							
	1506	Example: 249R00 = 249Ω						
	2010	Example: 10K000 = 10.0KΩ						
	2512	Example: 10K000 = 10.0KΩ						

Example:
VFCP0805 10K000 TCR0.2 TSW
Model: VFCP0805
Value: 10KΩ
TCR0.2: 0.2 ppm/°C typical refers to any value in the resistance range (see table 1)
Tolerance: $\pm 0.01\%$
Termination: Lead (Pb)-free
Packaging: Waffle Pack

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