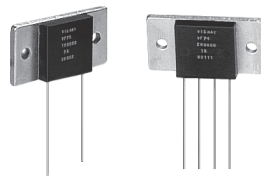


Bulk Metal® Foil Technology Power and Current Sensing Resistors

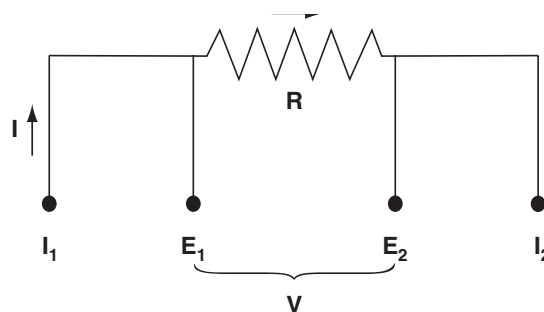
with TCR of 2 ppm/°C, Tolerance to ±0.01% and power up to 10 W

FEATURES

- Temperature coefficient of resistance (TCR): ±2 ppm/°C typical (–55°C to +125°C, +25°C Ref.)
- Tolerance: to ±0.01%
- Power rating (heat-sinked): 10 W
- Load life stability: ±0.005% at 25°C, 2000 hours at rated power
- Resistance range: 0.05 Ω to 80 kΩ
- Electrostatic discharge (ESD) up to 25 000 V
- Non Inductive, non capacitive design



RoHS*
COMPLIANT



VFP-3⁽¹⁾ Specifications

RESISTANCE RANGE (Ω)	STANDARD TOLERANCE	TYPICAL TCR ⁽³⁾	MAXIMUM TCR ⁽³⁾
50 to 80K	±0.01%	±2 ppm/°C	±5 ppm/°C
25 to <50	±0.02%		±7 ppm/°C
10 to <25	±0.05%		±10 ppm/°C
5 to <10	±0.1%		±13 ppm/°C
2 to <5	±0.25%		±20 ppm/°C
1 to <2	±0.5%		±25 ppm/°C
0.5 to <1	±1.0%		±50 ppm/°C
0.25 to <0.5	±2.0%		
0.1 to <0.25	±5.0%		

VFP-4^{(1),(2)} Specifications

RESISTANCE RANGE (Ω)	STANDARD TOLERANCE	TYPICAL TCR ⁽³⁾	MAXIMUM TCR ⁽³⁾
10 to 500	±0.01%	±2 ppm/°C	±5 ppm/°C
5 to <10	±0.02%		±6 ppm/°C
2 to <5	±0.05%		±8 ppm/°C
1 to <2	±0.1%		±10 ppm/°C
0.5 to <1	±0.25%		±15 ppm/°C
0.25 to <0.5	±0.5%		±20 ppm/°C
0.1 to <0.25	±1.0%		±25 ppm/°C
0.05 to <0.1	±2.0%		±30 ppm/°C

Notes

* 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.

⁽¹⁾ Weight = 15 g Max

⁽²⁾ VFP-4 available up to 500 Ω.

⁽³⁾ –55°C to +125°C, +25°C Ref.

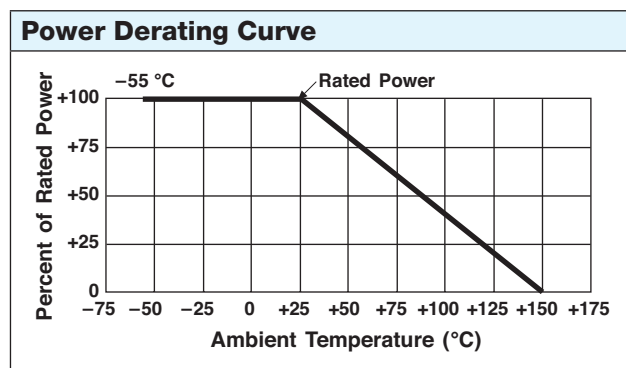
Specifications	
Stability Load Life at 2000 hours	±0.05% maximum ΔR under full rated power (3 W at +25°C)
Power Rating At +25°C	10 W or 3 A ⁽¹⁾ on heat sink ⁽²⁾ 3 W or 3 A ⁽¹⁾ in free air Power rating based on ΔR . Further derating not necessary.
Current Noise	<0.010 $\mu V_{RMS}/V$ of applied voltage (–40 dB)
High Frequency Operation Rise Time Inductance (L) ⁽³⁾ Capacitance (C)	1.0 ns at 1 k Ω 0.1 μH maximum; 0.08 μH typical 1.0 pF maximum; 0.5 pF typical
Voltage Coefficient	<0.1 ppm/V ⁽⁴⁾
Operating Temp. Range	–55°C to +150°C
Maximum Working Voltage⁽⁵⁾	350 V
Thermal EMF⁽⁶⁾	0.5 $\mu V/^\circ C$ typical (lead effect)

Notes

- (1) Whichever is lower.
 (2) Heat sink chassis dimensions and requirements per MIL-PRF-39009:

	INCHES	MILLIMETERS
L	6.00	152.4
W	4.00	101.6
H	2.00	50.8
T	0.04	1.0

- (3) Inductance (L) due mainly to the leads.
 (4) The resolution limit of existing test equipment (within the measurement capability of the equipment, or “essentially zero”).
 (5) Not to exceed power rating of resistor.
 (6) $\mu V/^\circ C$ relates to EMF due to lead temperature difference and $\mu V/watt$ due to power applied to the resistor.



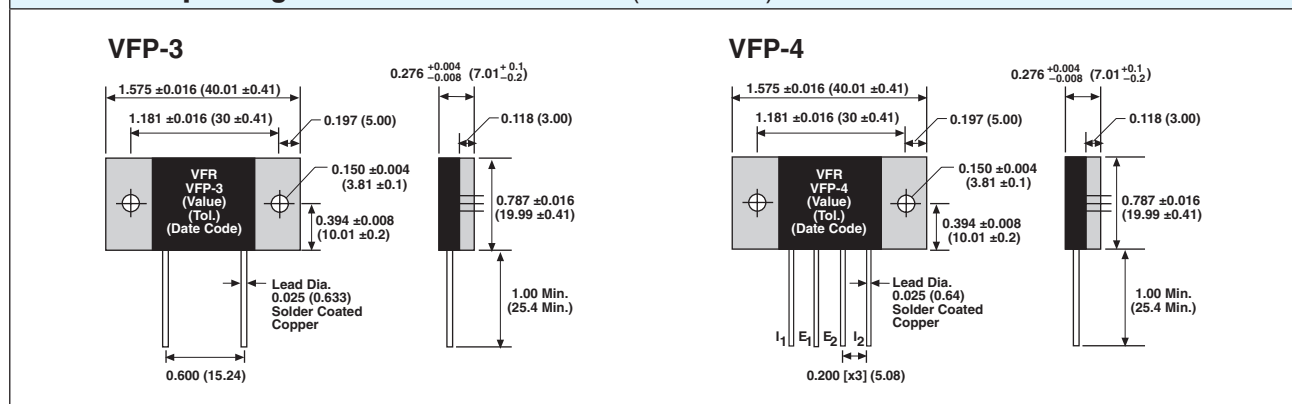
Power Resistor Environmental Performance Comparison

	METHOD PARAGRAPH ⁽¹⁾	MIL-PRF-39009 ΔR LIMITS	VFP-3, VFP-4 MAXIMUM TEST DATA ⁽⁴⁾
Test Group I Conditioning	4.8.2	$\pm 0.2\% + 0.01 \Omega$	$\pm 0.03\%$
Test Group II Resistance Temperature Characteristic (-55°C to +125°C)	4.8.4	<1 Ω : ± 100 ppm/°C; 1 Ω to 19.6 Ω : ± 50 ppm/°C; $\geq 20 \Omega$: ± 30 ppm/°C	See tables 1 and 2
Low Temp Storage	4.8.16	$\pm 0.3\% + 0.01 \Omega$	$\pm 0.01\%$
DWV (750 V at atmosphere pressure)	4.8.5	$\pm 0.2\% + 0.01 \Omega$	$\pm 0.005\%$
Insulation Resistance	4.8.6	$10^4 M\Omega$	$> 10^4 M\Omega$
Low Temp Operation	4.8.7	$\pm 0.3\% + 0.01 \Omega$	$\pm 0.01\%$
Short time Overload ⁽³⁾	4.8.8	$\pm 0.3\% + 0.01 \Omega$	$\pm 0.01\%$
Moisture Resistance	4.8.9	$\pm 0.5\% + 0.01 \Omega$	$\pm 0.05\%$
Terminal Strength	4.8.10	$\pm 0.2\% + 0.01 \Omega$	$\pm 0.005\%$
Test Group III Shock – Specified Pulse	4.8.11	$\pm 0.2\% + 0.01 \Omega$	$\pm 0.01\%$
Vibration – High Frequency	4.8.12	$\pm 0.2\% + 0.01 \Omega$	$\pm 0.005\%$
Test Group IV Life Test 10 W at +25°C for 2000 hours 60% power at +70°C for 2000 hours	4.8.13 –	$\pm 1.0\% + 0.01 \Omega$ –	$\pm 0.05\%$ $\pm 0.05\%$
Test Group V High Temp Exposure (2000 hours at +150°C)	4.8.14	$\pm 1.0\% + 0.01 \Omega$	$\pm 0.03\%$

Notes

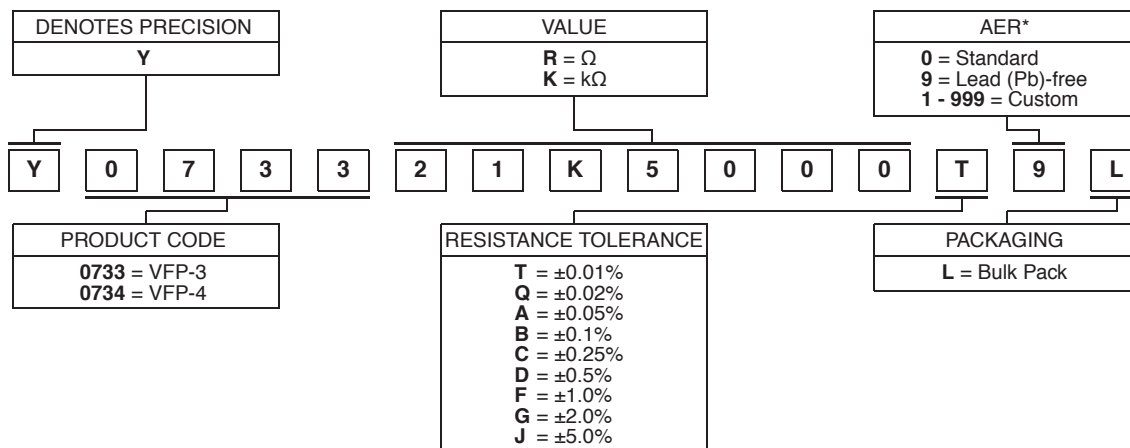
- ⁽¹⁾ VFR test data as compared to MIL-PRF-39009 is shown for illustration purposes, VFR test conditions that deviate from the MIL test method are noted within parentheses.
- ⁽²⁾ Maximum ambient temperature rating is +150°C.
- ⁽³⁾ Maximum overload rating is 15 W (5 x rated power in free air; 1.5 x rated power on heat sink), with applied voltage not to exceed 750 V.
- ⁽⁴⁾ ΔR 's are as shown plus 0.001 Ω to allow for measurement errors at low resistance values.

Standard Imprinting and Dimensions in inches (millimeters)



Global Part Number Information

NEW GLOBAL PART NUMBER: Y073321K5000T9L (preferred part number format)



FOR EXAMPLE: ABOVE GLOBAL ORDER Y0733 21K5000 T 9 L:

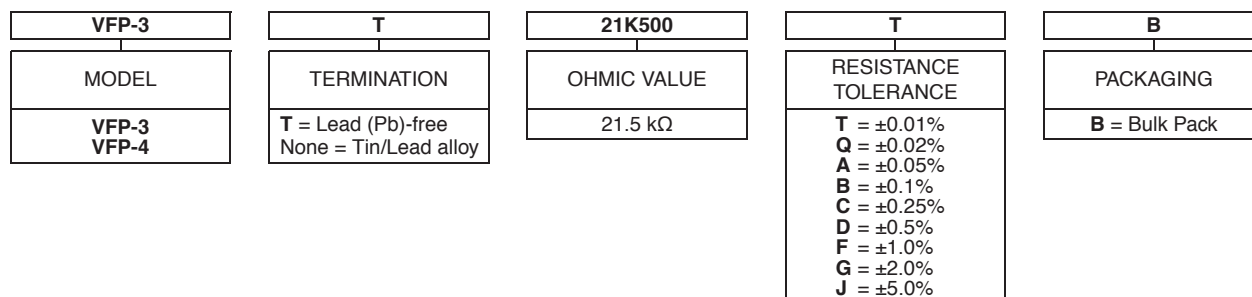
TYPE: VFP-3

VALUE: 21.5 k Ω ABSOLUTE TOLERANCE: $\pm 0.01\%$

TERMINATION: Lead (Pb)-free

PACKAGING: Bulk Pack

HISTORICAL PART NUMBER: VFP-3T 21K500 T B (will continue to be used)



Note

(1) For non-standard requests, please contact application engineering.