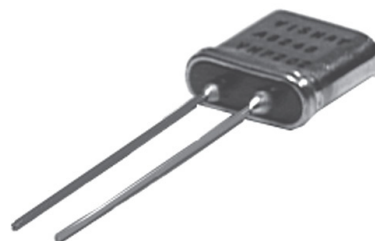


## Hermetically Sealed Miniature Ultra High Precision Z-Foil Technology Resistors

with TCR of 0.05 ppm/°C, Tolerance of ±0.001% and  
Load Life Stability of ±0.005%, Unaffected by Humidity

### FEATURES

- Temperature coefficient of resistance (TCR): ±0.05 ppm/°C (0°C to 60°C)
- Power coefficient "ΔR due to self heating": 5 ppm at rated power
- Tolerance: to ±0.001% (10 ppm)
- Load life stability: ±0.002% maximum ΔR (60°C for 2000 h at 0.1 W per chip)
- Resistance range: 10 Ω to 150 kΩ
- Power rating: 0.3 W at +25°C
- Shelf life stability: 2 ppm for at least 6 years



**RoHS\***  
COMPLIANT

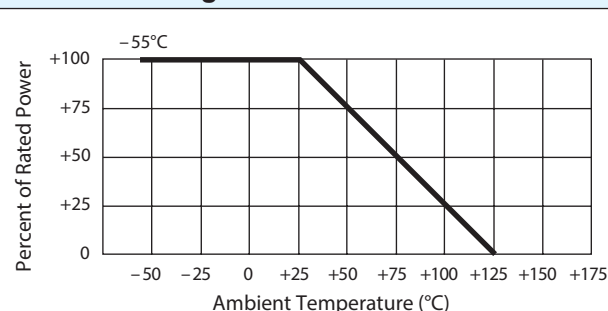
### TCR Vs. Resistance Value

RESISTANCE VALUE (Ω)	TYPICAL TCR AND MAX. SPREAD (-55°C to +125°C, +25°C ref.) (ppm/°C) <sup>(1)</sup>
100 to <150K	±0.2±2
50 to <100	±0.2±3
10 to <50	±0.2±4

#### Note

<sup>(1)</sup> For lower TCR and for selected TCR tracking, please contact us

### Power Derating Curve



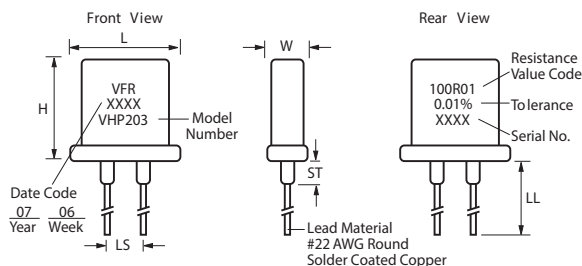
### Model Selection

MODEL NUMBER	RESISTANCE RANGE (Ω)	MAXIMUM WORKING VOLTAGE <sup>(1)</sup>	POWER RATING at +25°C	AVERAGE WEIGHT (g)	CONSTRUCTION BRIEF	DIMENSIONS	
						INCHES	MILLIMETERS
VHP203	10 to 66K 66K to 150K	300	0.2 W	1.4	Oil-filled, tinned copper leads, nickel shell, kovar and glass header	W: 0.162±0.020 L: 0.415±0.020 H: 0.375±0.020 LL: 1.000±0.125 LS: 0.150±0.010 <sup>(2)</sup> ST: 0.095 max.	4.11±0.51 10.54±0.51 9.52±0.51 25.4±3.18 3.81±0.25 2.41 max.
VHP203J			0.3 W				

#### Note

See next page for numbered footnotes

### Standard Imprinting and Dimensions



## Standard Resistance Tolerance

TIGHTTEST ( $\Omega$ )	LOOSEST (%)
1K to 150K	$\pm 0.001$
500R to 1K	$\pm 0.0025$
50R to 500R	$\pm 0.005$
30R to 50R	$\pm 0.01$
20R to 30R	$\pm 0.02$
10R to 20R	$\pm 0.05$

## “H” Series Specifications

<b>Stability<sup>(6)</sup></b> Load life at 2000 h Shelf life	$\pm 0.002\%$ maximum $\Delta R$ at 0.1 W per chip and at +60°C $\pm 2$ ppm (0.0002%) after at least 6 years
<b>Current Noise</b>	$< 0.010 \mu V_{RMS}/V$ of applied voltage (–40 dB)
<b>High Frequency Operation</b> Rise time Inductance (L) <sup>(3)</sup> Capacitance (C)	1.0 ns without ringing 0.1 $\mu H$ maximum; 0.08 $\mu H$ typical 1.0 pF maximum; 0.5 pF typical
<b>Voltage Coefficient</b>	$< 0.1$ ppm/V <sup>(4)</sup>
<b>Thermal EMF<sup>(5)</sup></b>	0.1 $\mu V/^\circ C$ maximum; 0.05 $\mu V/^\circ C$ typical; 1 $\mu V/W$ maximum
<b>Hermeticity</b>	$10^{-7}$ atmospheric cc/s maximum

## Notes

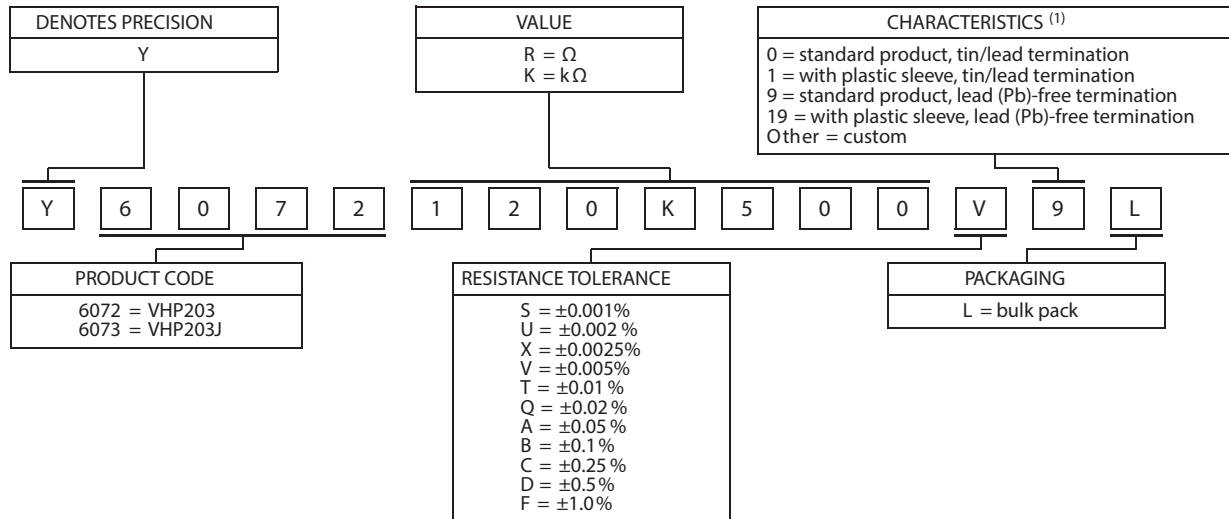
- (1) Not to exceed power rating of resistor
- (2) 0.200 in (5.08 mm) lead spacing available – specify VHP203J
- (3) Inductance (L) due mainly to the leads
- (4) The resolution limit of existing test equipment (within measurement capability of the equipment, or “essentially zero”)
- (5)  $\mu V/^\circ C$  relates to EMF due to lead temperature difference and  $\mu V/W$  due to power applied to the resistor
- (6) Load life  $\Delta R$  max. can be reduced through in-house oriented processes

## Environmental Performance Comparison

	MIL-PRF-55182 CHAR J	VHP203 MAXIMUM $\Delta R$	VHP203 TYPICAL $\Delta R$
<b>Test Group I</b> Thermal shock, 5 x (–55°C to +125°C) Short time overload, 6.25 x rated power, 5 s	$\pm 0.2\%$ $\pm 0.2\%$	$\pm 0.01\%$ (100 ppm) $\pm 0.01\%$ (100 ppm)	$\pm 0.002\%$ (20 ppm) $\pm 0.003\%$ (30 ppm)
<b>Test Group II</b> Resistance temperature characteristics Characteristic Low temperature storage (24 h at –65°C) Low temperature operation (45 min, rated power at –65°C) Terminal strength	$\pm 25$ ppm/°C  $\pm 0.15\%$ $\pm 0.15\%$ $\pm 0.2\%$	TCR Vs. Resistance Value table  $\pm 0.01\%$ (100 ppm) $\pm 0.01\%$ (100 ppm) $\pm 0.01\%$ (100 ppm)	$\pm 0.05$ ppm/°C  $\pm 0.002\%$ (20 ppm) $\pm 0.002\%$ (20 ppm) $\pm 0.002\%$ (20 ppm)
<b>Test Group III</b> DWV Resistance to solder heat, 20 s at +260°C Moisture resistance	$\pm 0.15\%$ $\pm 0.1\%$ $\pm 0.4\%$	$\pm 0.01\%$ (100 ppm) $\pm 0.01\%$ (100 ppm) $\pm 0.005\%$ (50 ppm)	$\pm 0.002\%$ (20 ppm) $\pm 0.005\%$ (50 ppm) $\pm 0.001\%$ (10 ppm)
<b>Test Group IV</b> Shock Vibration	$\pm 0.2\%$ $\pm 0.2\%$	$\pm 0.01\%$ (100 ppm) $\pm 0.01\%$ (100 ppm)	$\pm 0.002\%$ (20 ppm) $\pm 0.002\%$ (20 ppm)
<b>Test Group V</b> Life test at 0.3 W at +25°C, 2000 h	$\pm 0.5\%$	$\pm 0.008\%$ (80 ppm)	$\pm 0.002\%$ (20 ppm)
<b>Test Group Va</b> Life test at 0.1 W at +60°C	$\pm 0.5\%$	$\pm 0.008\%$ (80 ppm)	$\pm 0.002\%$ (20 ppm)
<b>Test Group VI</b> High temperature exposure (2000 h at +125°C)	$\pm 2.0\%$	$\pm 0.02\%$ (200 ppm)	$\pm 0.005\%$ (50 ppm)
<b>Test Group VII</b> Voltage coefficient	5 ppm/V	$< 0.1$ ppm/V	$< 0.1$ ppm/V

## Global Part Number Information

NEW GLOBAL PART NUMBER: Y6072120 K500V9L (preferred part number format)



FOR EXAMPLE: ABOVE GLOBAL ORDER Y6072 120K500 V 9 L:

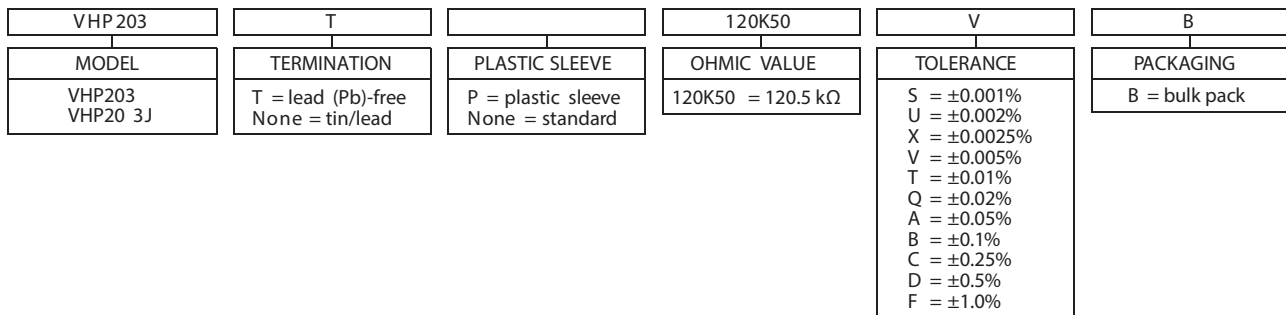
TYPE: VHP203

VALUE: 120.5 k $\Omega$ ABSOLUTE TOLERANCE:  $\pm 0.005\%$ 

TERMINATION: lead (Pb)-free

PACKAGING: bulk pack

HISTORICAL PART NUMBER: VHP203T 120K50 V B (will continue to be used)



## Note

<sup>(1)</sup> For non-standard requests, please contact application engineering.