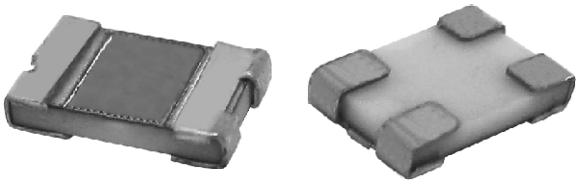
High Precision Foil Surface Mount Current Sensing Chip Resistors with TCR of ± 2 ppm/°C, Load Life Stability of ± 0.02 %, ESD Immunity up to 25 kV and Fast Thermal Stabilization



Any value at any tolerance available within resistance range

INTRODUCTION

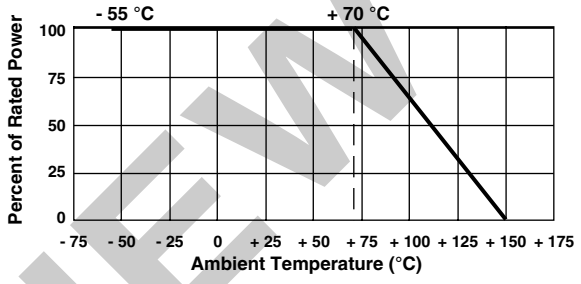
Model VCS1610 is a surface mount resistor designed with 4 pads for Kelvin connection. Utilizing Vishay Bulk Metal® Foil as the resistance element, it provides performance capabilities far greater than other resistor technologies can supply in a product of comparable size. Low TCR removes errors due to temperature gradients.

The VCS1610 has improved load life stability of ± 0.02 % at + 70 °C for 2000 h at rated power. Other technologies of current sensing resistors offer a load life stability of ≥ 0.5 % through a 1000 h workload.

This small device dissipates heat almost entirely through the pads so surface mount users are encouraged to be generous with the board's pads and traces. Gold terminations are available on special order.

Our application engineering department is available to advise and to make recommendations. For non standard technical requirements and special applications, please contact us.

FIGURE 1 - POWER DERATING CURVE



FEATURES

- Temperature coefficient of resistance (TCR): ± 2.0 ppm/°C typical (- 55 °C to + 125 °C, + 25 °C ref.) (see table 1)
- Tolerance: to ± 0.5 %
- Load life stability: ± 0.02 % at 70 °C, 2000 h at rated power
- Power rating: 0.25 W at + 70 °C
- Electrostatic discharge (ESD) above 25 000 V
- **Fast thermal stabilization due to proprietary processing technique**
- Short time overload ≤ 0.005 %
- Ohmic values: 0.2 Ω to 0.5 Ω (for higher or lower values please contact us)
- Non inductive, non capacitive design
- Thermal EMF: 0.05 µV/°C typical
- Current noise: < - 42 dB
- Rise time: 1 ns without ringing
- Voltage coefficient: < 0.1 ppm/V
- Non inductive: < 0.08 µH
- Weight: 0.027 mg

Pb-free Available

RoHS*
COMPLIANT

TERMINATIONS

- Two lead (Pb)-free options are available: Gold plated or tin plated
- Tin/lead plated

APPLICATIONS

- Automatic test equipment (ATE)
- Airborne (in heads-up display systems)
- High precision instrumentation
- Electron beam recording equipment
- Electron microscopes
- Current sensing applications
- Force balance electronic scales
- Military
- Medical
- Down-hole (high temperature)

Electrical Schematic

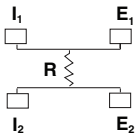


TABLE 1 - TOLERANCE AND TCR VS. RESISTANCE VALUE (- 55 °C to + 125 °C, + 25° Ref.)

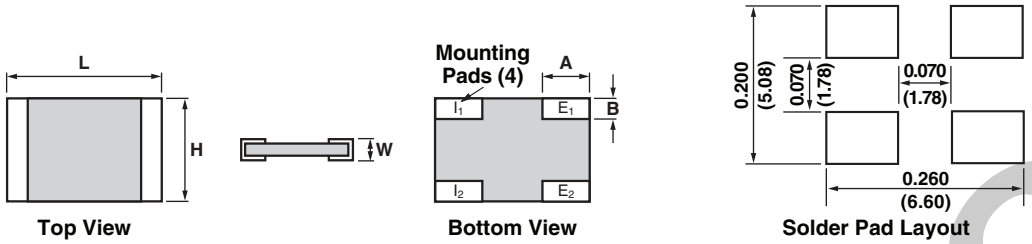
VALUE (Ω)	TOLERANCE	TYPICAL TCR	MAXIMUM TCR
0R200 to 0R500	0.5 %, 1 %	± 2 ppm/°C	± 15 ppm/°C

Note

• Tighter tolerances and higher values are available. Please contact application engineering foil@vishay.com

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

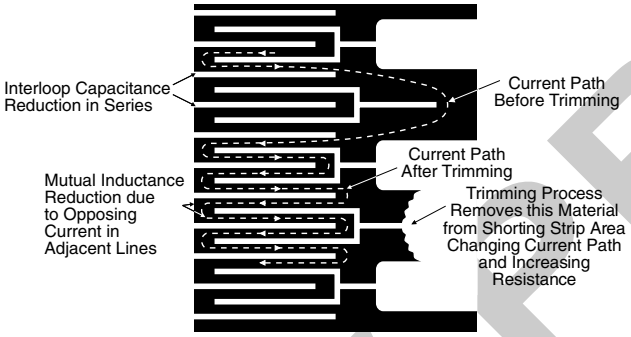
FIGURE 2 - DIMENSIONS in inches (millimeters)



Top View — Bottom View — Solder Pad Layout

	INCHES	MILLIMETERS
L	0.160 ± 0.010	4.06 ± 0.25
H	0.100 ± 0.010	2.54 ± 0.25
W	0.040 maximum	1.02 maximum
A	0.045 ± 0.005	1.14 ± 0.13
B	0.030 ± 0.010	0.76 ± 0.25

FIGURE 3 - TRIMMING TO VALUES
(Conceptual Illustration)



Note: Foil shown in black, etched spaces in white

FIGURE 4 - TYPICAL TCR CURVE

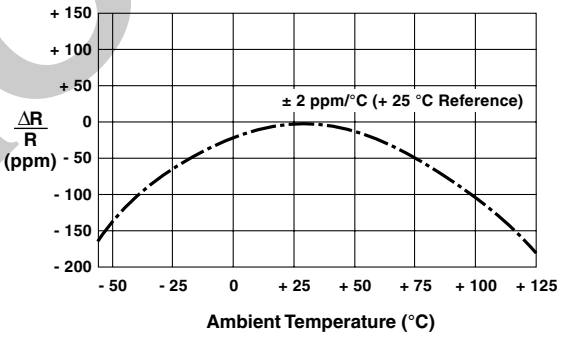


TABLE 2 - PERFORMANCE SPECIFICATIONS

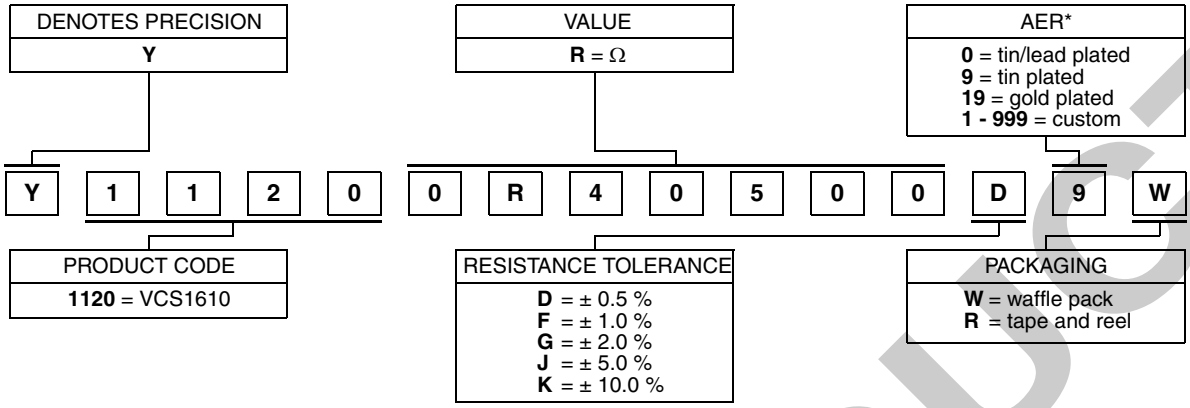
TEST	MIL-PRF-55342 ΔR LIMITS	TYPICAL ΔR LIMITS
Thermal Shock 5 x (- 65 °C to + 150 °C)	± 0.10 %	± 0.005 % (50 ppm)
Low Temperature Operation	± 0.10 %	± 0.005 % (50 ppm)
Short Time Overload	± 0.10 %	± 0.005 % (50 ppm)
High Temperature Exposure	± 0.10 %	± 0.01 % (100 ppm)
Resistance to Soldering Heat	± 0.2 %	± 0.01 % (100 ppm)
Moisture Resistance	± 0.2 %	± 0.01 % (100 ppm)
Load Life 2000 h at 70 °C	± 0.5 %	± 0.02 % (200 ppm)

Note

* Measurement error 0.001 R

TABLE 3 - GLOBAL PART NUMBER INFORMATION

NEW GLOBAL PART NUMBER: Y11200R40500D9W (preferred part number format)



FOR EXAMPLE: ABOVE GLOBAL ORDER Y1120 0R40500 D 9 W:
TYPE: VCS1610
VALUES: 0.405 Ω
ABSOLUTE TOLERANCE: ± 0.5 %
TERMINATION: lead (Pb)-free
PACKAGING: waffle pack

Note

* For non-standard requests or additional values, please contact application engineering.

Disclaimer

All product specifications and data are subject to change without notice.

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