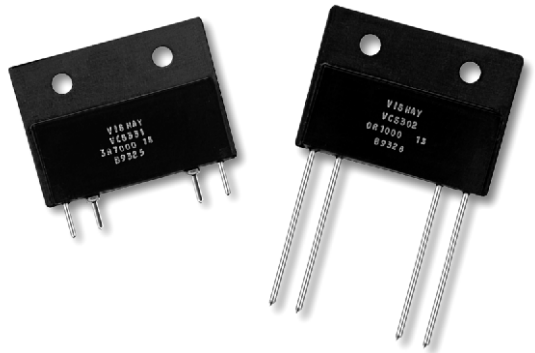
Bulk Metal® Foil Technology High Precision 4-Terminal Power Current Sensing Resistors with TCR as low as ± 1 ppm/°C and Tolerance ± 0.1 %



Any value at any tolerance available within resistance range

The 300 Series offers precision Bulk Metal® Foil technology resistors as low as 5 mΩ with a temperature coefficient down to 1 ppm/°C and unmatched long term stability. The 4 terminal current sensing resistors, when mounted on a heat sink, can sustain 10 watts continuously without an appreciable change in resistance (0.15 % maximum). The typical 50 % power derating specification associated with other technologies is not necessary. A choice of lead configurations is available.

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

FEATURES

Pb-free Available

RoHS* COMPLIANT

- Temperature Coefficient of Resistance (TCR): down to ± 1 ppm/°C Max. (see table 2)
- Tolerance: to ± 0.1 % (see table 1)
- Power Rating (heat-sinked): 10 W
- Load Life Stability: ± 0.05 % at 25 °C, 2000 hours at Rated Power
- Resistance Range: 0.005 Ω to 500 Ω
- Electrostatic Discharge (ESD) above 25 000 V
- Non Inductive, Non Capacitive Design
- Rise Time: 1.0 ns without ringing
- Current Noise: < - 40 dB
- Thermal EMF: 0.05 µV/°C typical
- Voltage Coefficient: < 0.1 ppm/V
- Non Inductive: 0.08 µH
- Non Hot Spot Design
- Terminal Finishes available: Lead (Pb)-free
  Tin/Lead Alloy
- Any value available within resistance range (e.g. 1K2345)
- Prototype samples available from 48 hours. For more information, please contact foil@vishay.com
- For better performances, please contact Application Engineering

TABLE 1 - CHARACTERISTICS

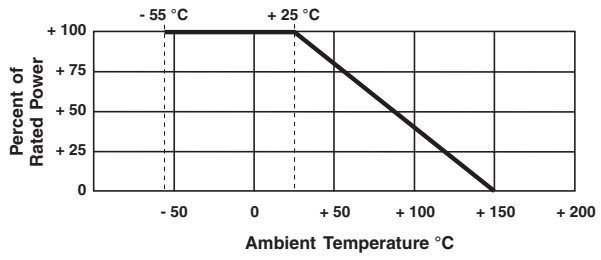
MODEL NUMBER	RESISTANCE RANGE	TOLERANCE[1]	POWER RATING[2] at + 25 °C	MAXIMUM CURRENT[2]
VCS301, VCS302	0.005 Ω < R < 0.1 Ω 0.1 Ω ≤ R < 0.25 Ω	± 1 % ± 0.5 %	10 W on Heat Sink[3] or 3 W in Free Air	15 A
VCS331, VCS332	0.25 Ω < R < 500 Ω	± 0.1 %		5 A

Notes
1. Tighter tolerance is available - for more details contact Application Engineering
2. The lower of the two limitations (Power or Current) is decisive
3. Heatsink - Aluminum (6 inches length x 4 inches width x 2 inches height x 0.04 inches thick)

TABLE 2 - TCR CHART (MAXIMUM)

(0 °C TO + 60 °C)			
≥ 0.005 Ω	to	< 0.01 Ω	± 15 ppm/°C
≥ 0.01 Ω	to	< 0.05 Ω	± 10 ppm/°C
≥ 0.05 Ω	to	< 0.1 Ω	± 5 ppm/°C
≥ 0.1 Ω	to	< 1 Ω	± 3 ppm/°C
≥ 1 Ω	to	< 10 Ω	± 2 ppm/°C
≥ 10 Ω	to	< 500 Ω	± 1 ppm/°C

FIGURE 1 - POWER DERATING CURVE



(Further Derating Not Necessary)

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

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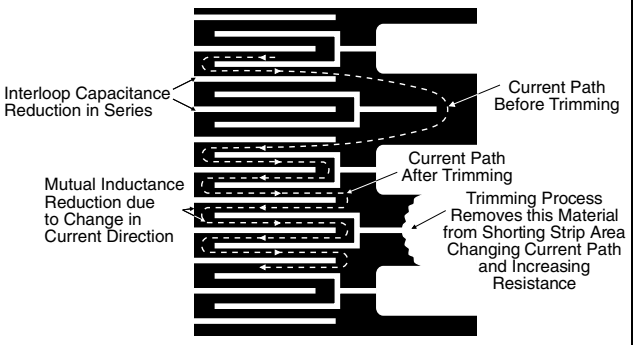
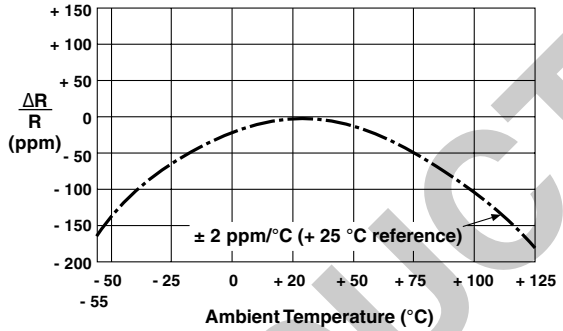
FIGURE 2 - TRIMMING TO VALUES
(Conceptual Illustration)



Note: Foil shown in black, etched spaces in white

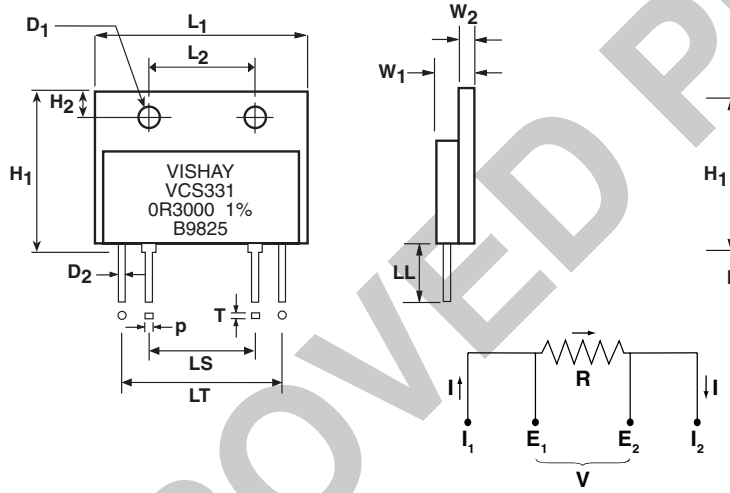
FIGURE 3 - TYPICAL TCR CURVE



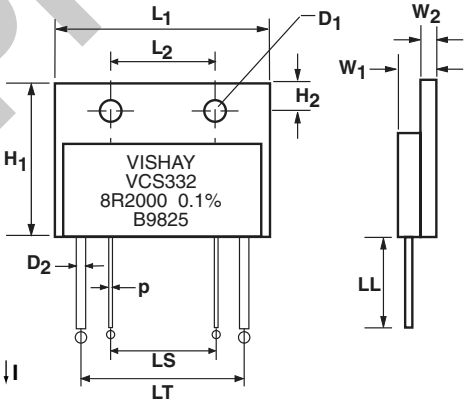
(For more details, see table 2)

FIGURE 4 - DIMENSIONS in inches (millimeters) AND SCHEMATIC

Model VCS301 and VCS331 (E Lead Rectangular)



Model VCS302 and VCS332 (Round Leads)



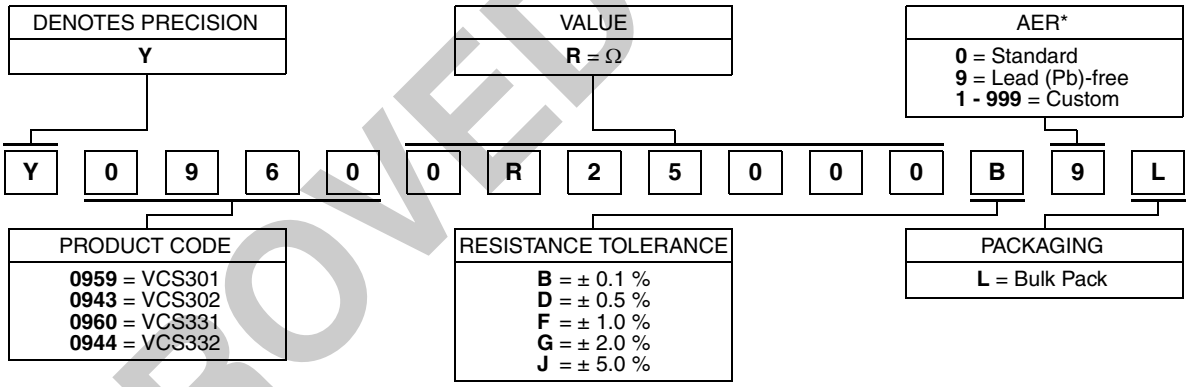
MODEL	L_1 ± 0.008 (± 0.20)	L_2 ± 0.008 (± 0.20)	H_1 MAXIMUM	H_2 ± 0.008 (± 0.20)	W_1 MAXIMUM	W_2 MAXIMUM	LL MINIMUM	LS ± 0.020 (± 0.51)	LT ± 0.020 (± 0.51)	D_1 NOMINAL	D_2 NOMINAL	P NOMINAL	T NO
VCS301 **VCS331**	1.340 (34.04)	0.701 (17.81)	1.063 (27.00)	0.197 (5.00)	0.210 (5.33)	0.087 (2.21)	0.216 (5.49)	0.689 (17.50)	1.083 (27.51)	0.138 (3.51)	0.040 (1.02)	0.040 (1.02)	0.016 (0.41)
VCS302 **VCS332**	1.340 (34.04)	0.701 (17.81)	1.024 (26.01)	0.197 (5.00)	0.210 (5.33)	0.087 (2.21)	1.000 (25.40)	0.689 (17.50)	1.083 (27.51)	0.138 (3.51)	0.040 (1.02)	0.032 (0.81)	-

TABLE 3 - VISHAY VCS301, VCS302, VCS331, VCS332 PERFORMANCE	
TEST OR CONDITION	**VCS301, VCS302, VCS331, VCS332 PERFORMANCE[1)]**
Maximum Ambient Temperature at Rated Power	± 25 °C
Maximum Ambient Temperature at Zero Power	± 150 °C
Temperature Coefficient	see table 2
Thermal Shock	± 0.05 %
Short Time Overload (5 x Rated Power for 5 seconds)	± 0.02 %
Terminal Strength	± 0.05 %
High Temperature Exposure	± 0.05 % (2000 hours at 150 °C)
Moisture Resistance	± 0.05 %
Low Temperature Storage (24 hours at - 55 °C)	± 0.05 %
Shock (Specified Pulse)	± 0.1 %
Vibration (High Frequency)	± 0.1 %
Load Life (Rated Power, + 25 °C, 2000 hours)	± 0.05 %
Resistance Tolerance	0.1 %, 0.5 %, 1 %, 2 %, 5 %
Thermal EMF	0.2 µV/°C Max. (E Terminal)
Weight	8.1 g maximum
Case Temperature Rise	17 °C/W[2)] (VCS301, VCS302) - 9 °C/W[2)] (VCS331, VCS332)
Thermal Resistance	8 °C/W[2)] (VCS301, VCS302) - 12.5 °C/W[2)] (VCS331, VCS332)

Notes
1. ΔR's plus additional 0.0005 Ω for measurement error
2. All measurements done in free air

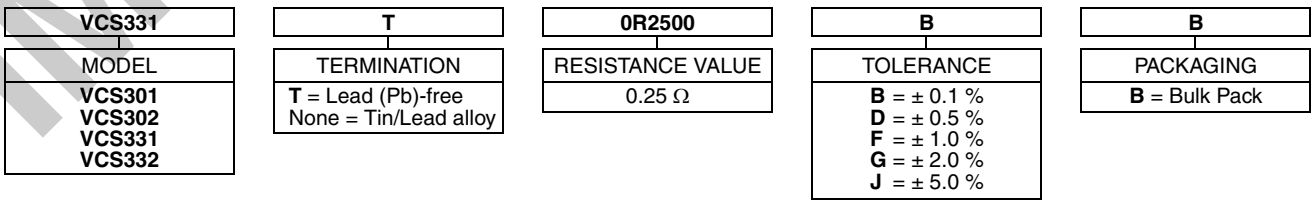
TABLE 4 - GLOBAL PART NUMBER INFORMATION

NEW GLOBAL PART NUMBER: Y09600R25000B9L (preferred part number format)



FOR EXAMPLE: ABOVE GLOBAL ORDER Y0960 0R25000 B 9 L:
TYPE: VCS331
VALUE: 0.25 Ω
ABSOLUTE TOLERANCE: ± 0.1 %
TERMINATION: Lead (Pb)-free
PACKAGING: Bulk

HISTORICAL PART NUMBER: VCS331T 0R2500 B B (will continue to be used)



Note
* For non-standard requests, please contact Application Engineering.

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