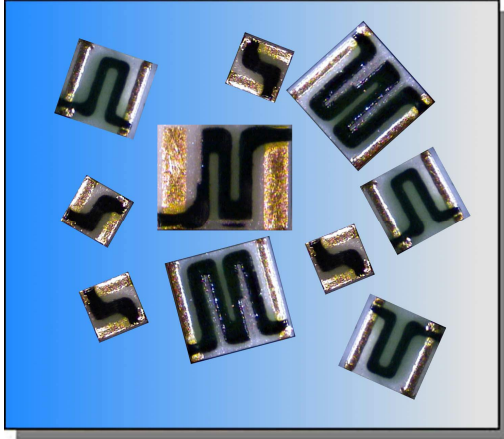


HC Series

Bondable Chip Resistors



Ohmcraft's revolutionary fine line, thick film technology provides an entirely new level of performance and stability in chip resistors.



- ◆ Ultra High Stability
- ◆ Ohmic Values to 500 Gigohms
- ◆ Very Small Package Sizes
- ◆ Tight Tolerances (to 0.1%)
- ◆ Low TCR (to 25 ppm/°C)
- ◆ Low VCR (to 1 ppm/V)
- ◆ Very Low noise
- ◆ Custom Configurations

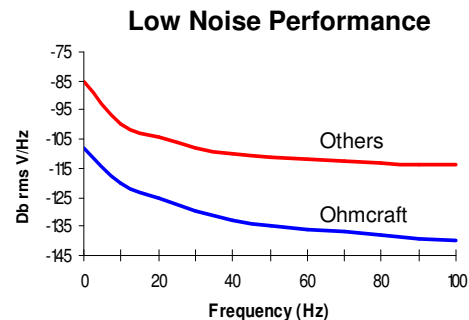
The usual hybrid technologies for manufacturing resistors depend upon composite materials that have limitations. Traditional thick-film methods severely limit performance characteristics and thin-film methods are limited in attainable ohmic values. The **Ohmcraft** method of manufacturing offers the best characteristics of both methods, plus adds many unique features. **Ohmcraft** resistors feature a longer, high-aspect ratio trace of lower resistivity film. The combination of long line, high-aspect

ratio, and higher conductivity film, give **Ohmcraft** resistors unmatched design efficiency, versatility, linearity, stability and low noise. The **Ohmcraft** method allows control of process parameters to very tight tolerances. The result is chip resistors with outstanding stability and performance.

Using the same method, a complete line of **Ohmcraft** leaded resistors, dividers and networks are manufactured. For information on those products, please refer to the appropriate data sheets.

Low Noise

Ohmcraft resistors exhibit exceptional noise characteristics. The graph on the right demonstrates the comparison of a resistor written by **Ohmcraft**, and an equivalent resistor printed using a standard thick-film process. The longer serpentine path which uses lower resistivity inks, and the smoother edges created by "writing" rather than "screening" combine to make one of the lowest noise generating resistors in the market.

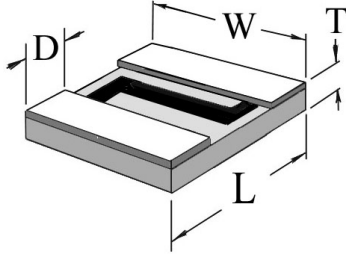


Ratings	Case Size ¹					
	0202	0303	0403	0404	0502	0505
Max. Power (W)	0.040	0.050	.055	0.060	.050	0.100
Max. Voltage ² (V)	50	50	100	100	100	100
Resistance Range (ohms)	1K-500M	1K-10G	1K-200G	1K-300G	1K-10G	1K-500G

Note 1: Other custom case sizes are available.

Note 2: The continuous maximum voltage applied cannot exceed the maximum power rating.

Dimensions



L = Length
W = Width
T = Thickness
D = Pad dimension

Ohmcraft features Lead Free construction



Ohmcraft's HC series chip resistors are RoHS compliant

Case Size ▼	Length (L) (mils)	Width (W) (mils)	Thickness (T) Max. (mils)	Pad (D) (mils)
0202	20 ± 5	20 ± 3	15	5 (+2,-1)
0303	30 ± 5	30 ± 5	15	5 (+2,-1)
0403	45 ± 5	30 ± 5	20	10 (± 5)
0404	40 (+10,-5)	40 ± 5	20	10 (± 5)
0502	50 (+10,-5)	25 ± 5	20	10 (± 5)
0505	50 (+10,-5)	50 ± 5	20	10 (± 5)

Custom configurations available:

- ◆ Non EIA ohmic values to 500GΩ
- ◆ Group A, B, C MIL STD testing suites
- ◆ Non standard case sizes

How to build a part number....

Type	Case size	TCR ¹	Value ²	Tolerance ³	Termination
HC					
Wire Bondable Chip	See dimension table above	E = ±25ppm/°C H = ±50ppm/°C K = ±100ppm/°C L = ±200ppm/°C	Resistance value expressed as a four digit number where the first three numbers are the significant value, and the fourth number is the number of zeros.	B = ±0.1% C = ±0.25% D = ±0.5% F = ±1% G = ±2% J = ±5% K = ±10% L = ±20%	G = Wire Bondable (gold)

Note 1: TCR measured from 25°C to 75°C.
Note 2: Value range is dependent on case size.
Note 3: Tolerance is measured at 100VDC.

Example: For a 125 Megohm chip resistor with case size of 0202, a TCR of ±50 ppm/°C, a ±1% tolerance - the part number would be:
HC0202H1256FG

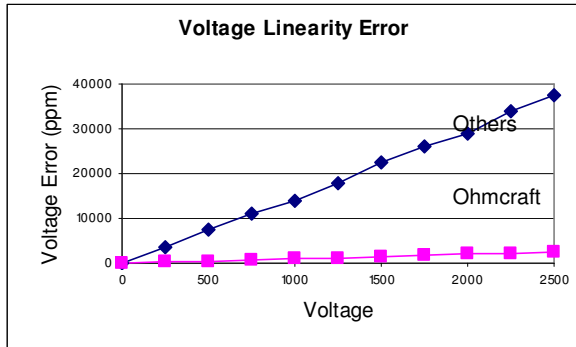
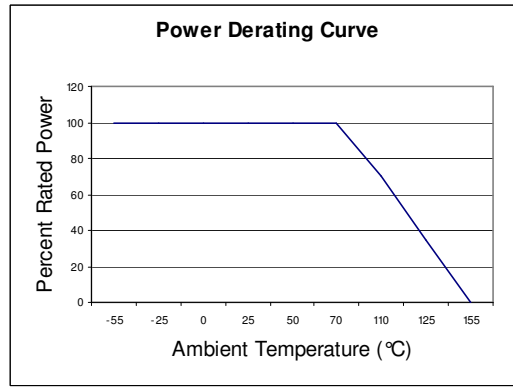


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HC Performance Data

Characteristic	Specification
Moisture Resistance	$\Delta R/R < \pm 0.5\%$, $< 0.1\%$ typ.
Insulation Resistance	over 10G Ω , dry
Dielectric Strength	>1000 Volts
Load Life	$\Delta R/R < \pm 0.5\%$, $< 0.1\%$ typ.
Shock (pulse)	$\Delta R/R < \pm 0.25\%$, $< 0.1\%$ typ.
Shock (thermal)	$\Delta R/R < \pm 0.5\%$, $< 0.1\%$ typ.
Overload	$\Delta R/R < \pm 0.5\%$, $< 0.1\%$ typ.
Solderability	$\geq 95\%$ coverage

Appropriate MIL STD specifications are utilized as test methods



Low VCR

Low Voltage Coefficient of Resistance (VCR) minimizes the voltage error associated with standard chip resistors

Rated Power

Rated power is the maximum value of power (watts), which can be continuously applied to a resistor at a rated ambient temperature. The basic mathematical relationships are:

$$\text{Power} = I^2 * R = V^2 \div R = I * V$$

If the circuit designs permits, the choice of a higher ohmic value resistor will minimize the power level and improve the resistor's performance because it is operating at a lower power and temperature level.

High Stability

Ohmcraft's resistors feature low noise, and high stability at high ohmic values due to their high square count and associated design characteristics.

Comparison of Ohmcraft's Fine Line patterning & conventional thick film resistors

If given an equal area on a resistor substrate, and using the patterns specified in the layout on the left, the following parameter comparisons are made:



Ohmcraft

Line Width: 4 mils
Space: 2 mils



Conventional Thick film

Line width: 22 mils
Space: 22 mils

	Ohmcraft	Conventional	Ohmcraft Advantage
Resistance (ohms) :	R	R	Equal
Aspect ratio (unit squares):	80	2	40x Higher
Sheet resistivity (ohms/sq):	p/40	p	40x Lower
Resistor length (mils):	188 mils	33 mils	5.7x Longer
Electric field (volts/mil ²):	V/188	V/33	5.7x Less
Current density(amps/mil ²):	V/4	V/22	5.7x More