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# RCV High Voltage Thick Film Chip Resistors

## Product Overview

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# Introduction

- Purpose
  - Overview of the RCV High Voltage Thick Film Chip Resistors
- Objectives
  - Present an overview of this product's special electrical parameters
  - Discuss product design and features
  - Discuss product construction
  - Present potential applications



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Welcome to the Vishay RCV High Voltage Thick Film Chip Resistors product overview. This material will present an overview of the RCV products. The key functional performance parameters of the RCV series will be discussed as well as construction and features. A selection of potential applications from typical market segments will be presented.

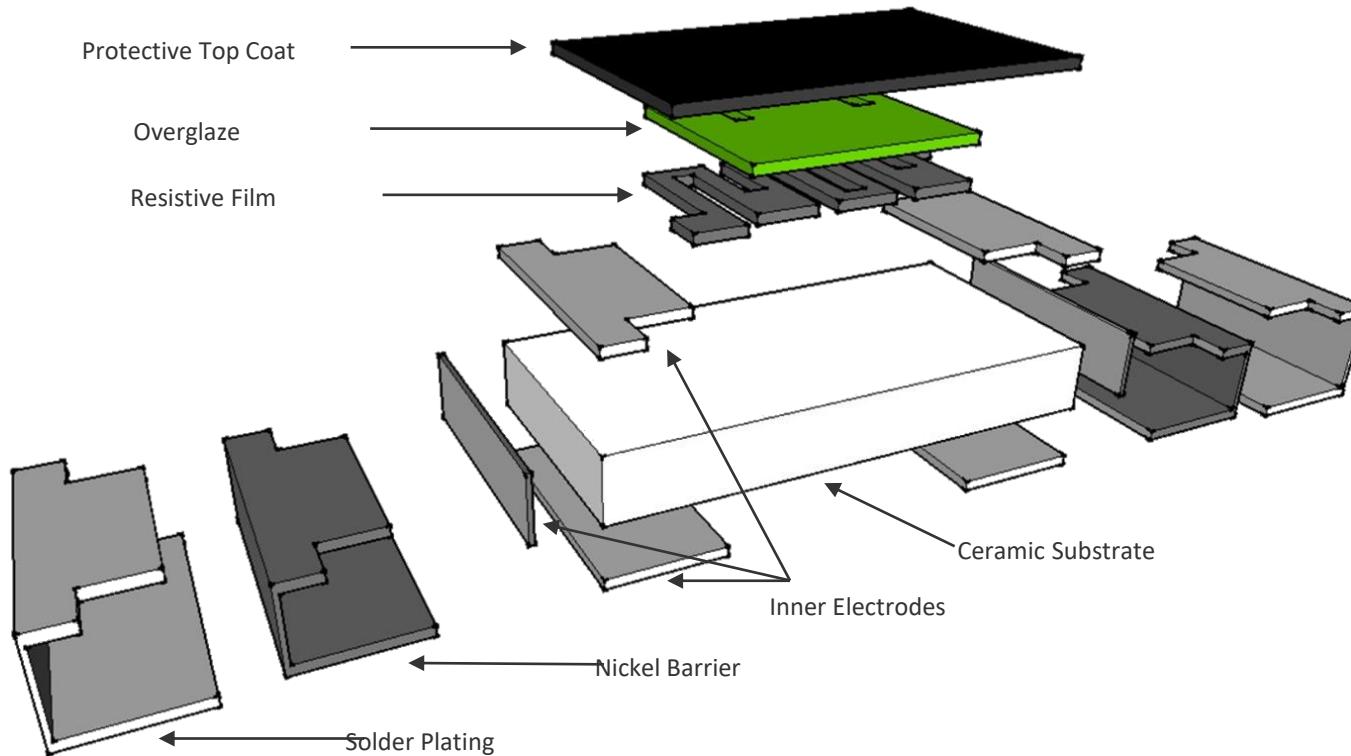
# Main Features of the RCV series

- Three sizes: 0805, 1206, and 2010
- Rated power,  $P_{70}$ : 0.125W, 0.25W, and 0.75W
- High voltage ratings: 400V, 500V, and 2000V
- Resistance range and tolerance: 100KΩ to 10MΩ, with 1% and 5%
- AEC-Q200 qualified version available in some package sizes (RCV-AT)
- Low voltage coefficient of resistance (VCR): 25 ppm/V
- Meets flammability requirements according to IEC-60115-1, 4.35
- RoHS compliant

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The RCV High Voltage Thick Film Chip Resistor series from Vishay is an excellent choice for applications requiring high resistance and high reliability at high voltage. This high voltage thick film offers maximum continuous working voltage up to 2000V. This product series is RoHS compliant and meets flammability requirements as per IEC standard, needle flame test procedure based on IEC 60695-11-5 for 10 seconds.

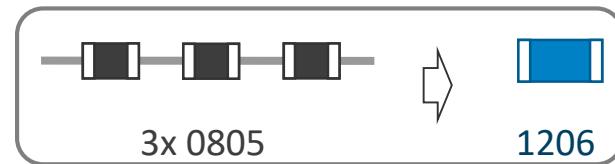
# Construction of RCV series



The construction of the RCV series begins with a metal glazed ruthenium oxide resistive film (Thick Film technology) deposited on a high grade ceramic substrate ( $\text{Al}_2\text{O}_3$  – also known as alumina). The resistive element is longer as compared to standard Thick Film by taking on a snake shape for an increased resistive path allowing for more working voltage across the resistor at the same package size when the resistor is in use. Laser trimming cut is used to achieve the final resistance value down to  $\pm 1\%$  tolerance. The resistor elements are covered by a protective coating designed for electrical, mechanical, and climatic protection. The terminations receive a final pure tin on nickel plating.

# Commercial Benefits: Component Count and Board Space Reduction

- High voltage resistors replace either a chain of standard resistors improving application accuracy and saving placement cost ...
- ... or saving board space
- ... or both
- Or replace the last leaded resistor on the board



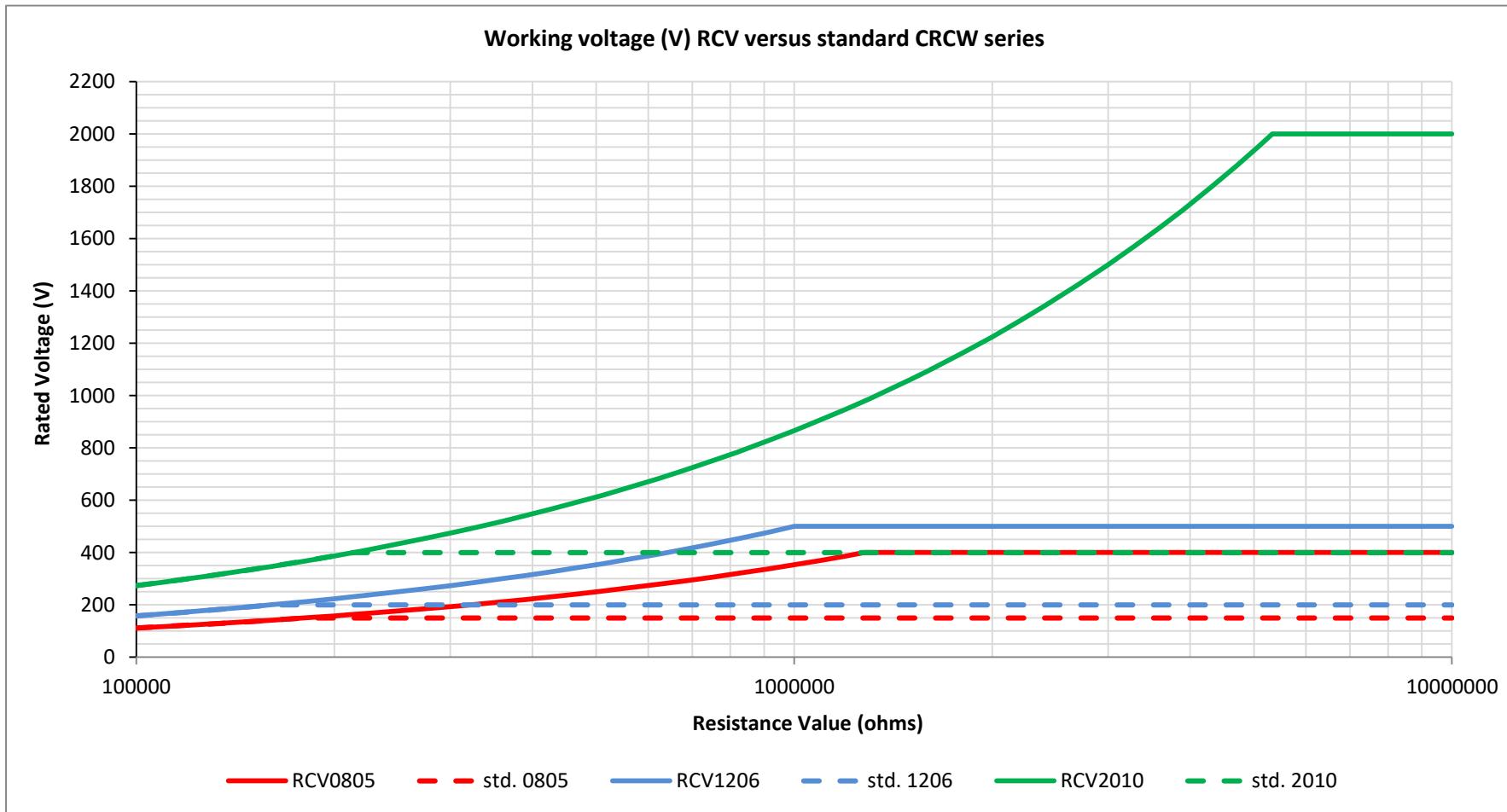
### *Example for 500 V*

Voltage rating	Standard size	Replacement Thick Film	x times smaller <sup>(1)</sup>
150 V	0805		
200 V	1206		
400 V	2010	2x 1206	RCV0805
500 V	2512	3x 0805	RCV1206
2000 V	4x 2512	5x 2010	RCV2010
			6.4x / 5x

(1) Reduction of area occupied by component(s), does not include additional area savings due to lower number of solder pads.

One benefit of high working voltage resistors is using a fewer number of components to achieve the same or better performance. The cost reduction is achieved by less needed board space of expensive multilayer PCBs and by reduction of assembly cost in which the assembly of a resistor is approx. 10x the product cost. For example, one RCV0805 can replace one 2010 chip resistor or 2x 1206 case sizes, reducing the area on the PCB by 5 times or 4.1 times, respectively.

# High Voltage Features



Above graph shows the working voltage as a function of resistance value of the RCV series versus standard Thick Film chip resistors, sizes 0805, 1206 and 2010. While the standard Thick Film can handle maximum continuous working voltage of 150V, 200V and 400V, the RCV series can handle 2.5 to 5 times more, rated at 400V, 500V and 2,000V, respectively.

# Applications



## Alternative Energy

- Solar Inverters
- Wind Power



## Industrial

- Electric Meter
- Power Supply
- Traffic Light Module



## Consumer

- Lighting Ballast
- Home Appliances
- Monitors

The RCV series is suitable for different applications in which high working voltage is required. RCV can be found in Alternative Energy, Industrial and Consumer market segments, in applications such as inverters, electric meters, power supplies, lighting ballasts as well as home appliances.

# Summary RCV series

- Resistance value from 100K to 10M
- High working voltage ratings up to 2000V
- Available in three sizes: 0805, 1206 and 2010
- Excellent choice to reduce component count and space savings on PCB
- Lead-free termination RoHS compliant
- AEC-Q200 qualified version available with RCV-AT series

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In summary, the RCV series is the most suitable product for applications with high working voltage requirement, up to 2000 Volts continuous, and offered with case sizes 0805, 1206 and 2010. The RCV series is an excellent choice to reduce component count and save space on PCB rather than using multiple standard thick film resistors or large package sizes. The RCV is RoHS compliant and also available with AEC-Q200 qualified version with the RCV-AT series.