



CMA 0204, CMB 0207

HIGH PULSE LOAD CARBON FILM MELF RESISTORS PRODUCT OVERVIEW

DRALORIC BEYSCHLAG RESISTORS

A **WORLD OF**
SOLUTIONS





INTRODUCTION

Purpose

- Introduction of the Vishay High Pulse Load Carbon Film MELF Resistor Series CMA 0204, CMB 0207

Objectives

- Present an overview of this product's special performance properties
- Explain product design and features
- Discuss product advantages
- Present typical applications



Welcome to the Vishay High Pulse Load Carbon Film MELF Resistors product overview. This tutorial will provide an overview of the CMA 0204, CMB 0207 Carbon Film MELF resistors. The key functional performance parameters of this MELF resistor series will be discussed as well as design, features, and benefits. A selection of potential applications from typical market segments will be presented.



FUNCTIONAL PERFORMANCE OF THE CMA 0204, CMB 0207

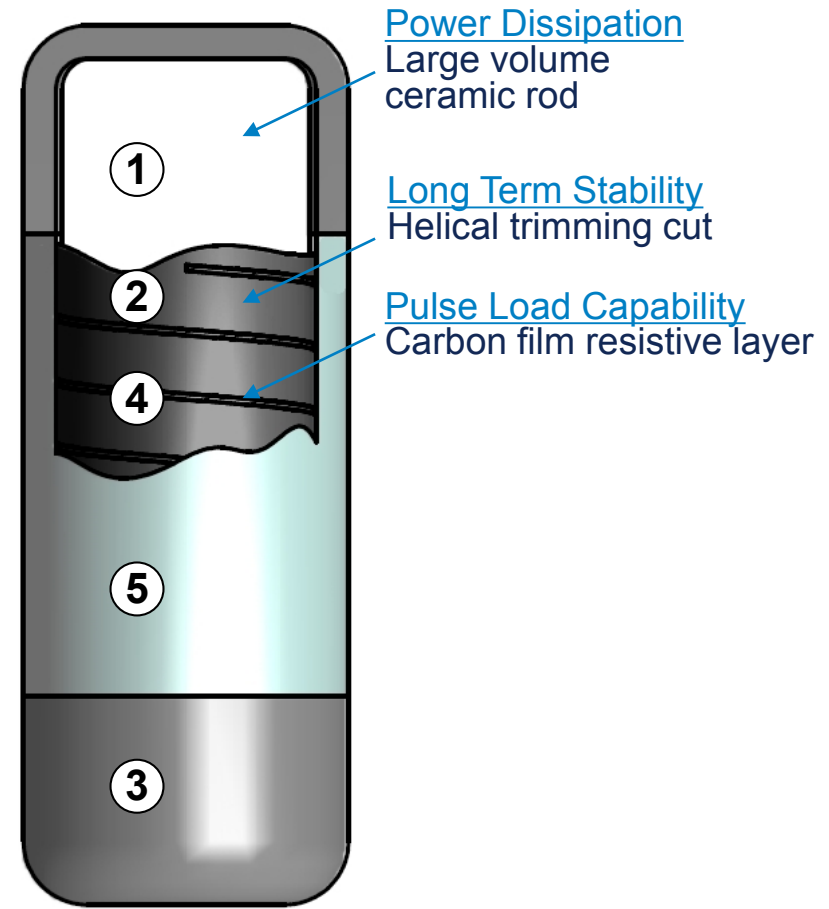
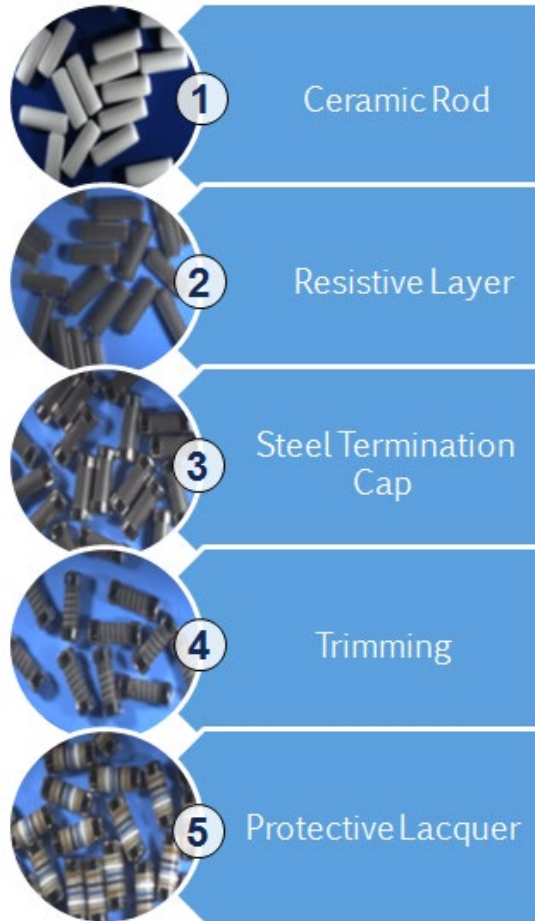
Key Properties

- One of the highest pulse load capability of any SMD film resistor: up to 3 kW for single pulses
- Up to 10 kV surge handling capability 1.2/50 μ s pulse
- ESD capability of up to 16 kV, human body model
- High Rated Dissipation of up to 1 W
- Resistance range from 2.2 Ω to 1.5 M Ω
- Tolerance down to 1%
- Operating temperature up to 155 °C
- AEC-Q200 qualified
- Intrinsic sulfur resistance

The CMA 0204, CMB 0207 Carbon Film MELF resistor series from Vishay is an excellent choice for electronics applications at high pulse load conditions. The series offers a pulse load capability up to more than 10 times higher as compared to equivalent case size metal film MELF resistors. High-reliability applications will benefit from AEC-Q200 qualification. The CMA 0204, CMB 0207 carbon film MELF resistors offer excellent sulfur resistivity and are RoHS compliant and halogen free.

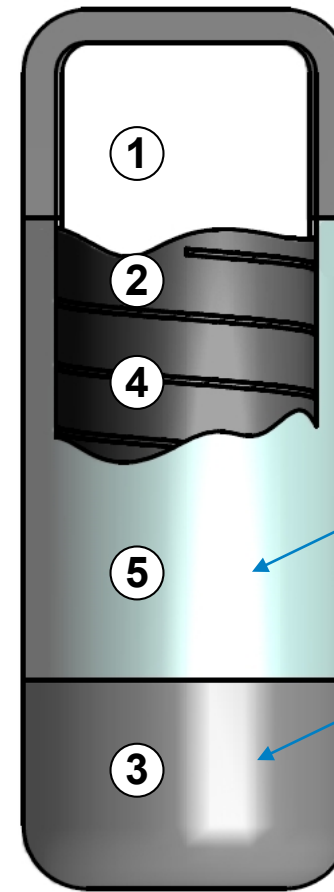
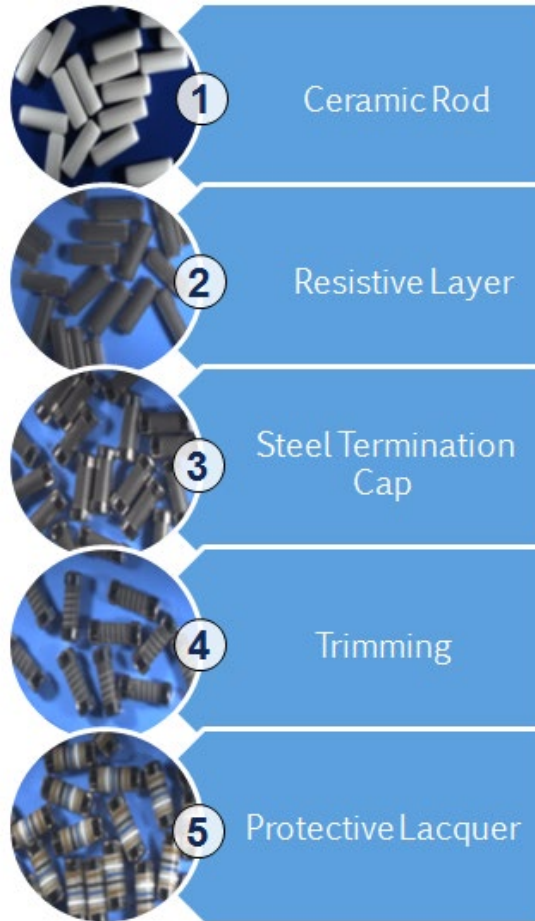


DESIGN OF CARBON FILM MELF RESISTORS



The CMA 0204, CMB 0207 carbon film MELF resistor series offers a significant pulse load capability advantage compared to metal film MELF resistors. The cylindrical ceramic substrate is covered by a high-quality homogeneous carbon film resistive layer. Due to the high sublimation point of the carbon material, the pulse load capability is significantly increased. The cylindrical shape results in a larger substrate volume and resistive element area as compared to chip resistors, allowing for a higher power dissipation. The helical laser trimming cut applied to the resistive film allows the resistor to evenly distribute thermal energy across the entire resistive element.

DESIGN OF CARBON FILM MELF RESISTORS



Moisture Resistivity
Protective lacquer

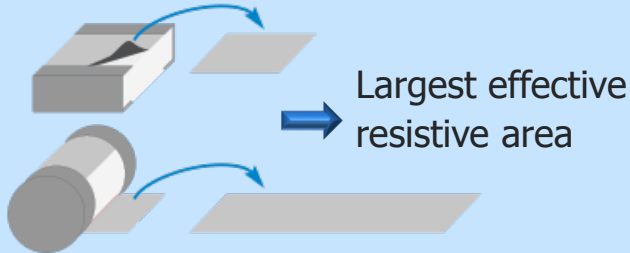
Excellent Solderability
Steel termination cap
plated pure tin on nickel

The carbon film MELF resistor's contacts are built from steel termination caps, plated with pure matte tin on nickel, and support excellent solderability. The protective lacquer ensures the component's moisture resistivity, verified according to the 85°C/85 % biased humidity test for 42 days. The carbon film MELF resistors reliability has been proven in various automotive and industrial applications, in which the resistor is exposed to harsh operating environments, including high humidity and high temperature.

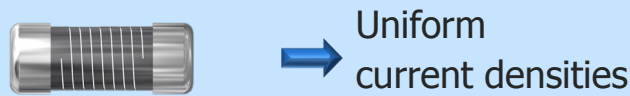
HIGHEST PULSE LOAD CAPABILITY OF SMD FILM RESISTORS

Device Characteristics

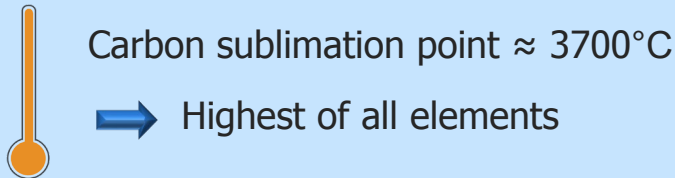
- Cylindrical Shape



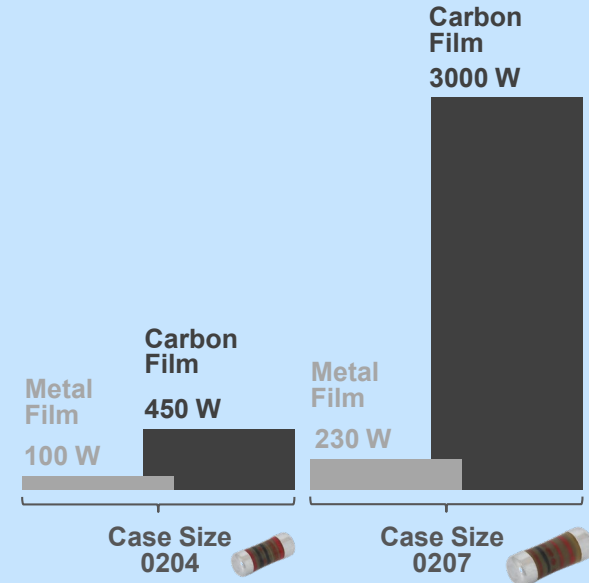
- Helical trimming cut



- Thermal stability of carbon film material



Pulse Load Capability



Maximum specified single pulse load capability for Vishay metal and carbon film MELF resistors (at 1 μs pulse duration). Application of specified pulse load may result in a maximum resistance change of 0.5% .

For high pulse load applications the resistor's pulse load capability is essential. Carbon film MELF resistors are the pulse load champions of SMD film resistors as they combine the most important characteristics that support high pulse load capability: the pulse resistant cylindrical design, offering the largest effective film area; the helical trimming cut, avoiding locally enhanced current densities; the carbon film material, with its unrivaled thermal stability. The diagram here illustrates the maximum single pulse load capability of carbon film MELF resistors compared to metal film MELF resistors with typical specification.



COMMERCIAL BENEFITS

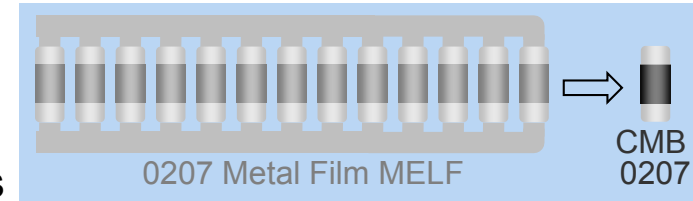
The High Pulse Load Carbon Film MELF Resistor Series allows the user to...

- greatly reduce the number of components in pulse load applications:

One! CMB 0207 can replace up to

→ 13 same case size metal film MELF resistors or

→ 30 equivalent case size standard thick film chip resistors

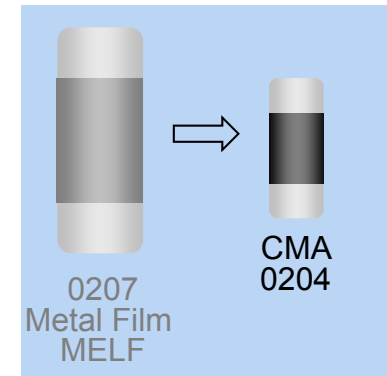


- save board space or increase PCB integration density

One! CMA 0204 can replace

→ the next case size 0207 metal film MELF resistor or

→ 10 standard thick film chip resistors of next larger case size



- greatly reduce pick and place costs

- increase application reliability by reducing the number of solder joints

The High Pulse Load Carbon Film MELF resistor series offers significantly higher pulse load capability as compared to standard metal film MELF resistors of same case size. This allows for a significant reduction in component counts by replacing multiple devices of same case size or larger case size resistors, consequently saving board space and lowering costs. The CMA 0204 and CMB 0207 series thus enable engineers to design cost-saving and reliable high pulse load applications.



APPLICATIONS

Pulse Load Circuit Protection



Alternative Energy

- Auxiliary Power Supplies for Solar Inverters and Metering Equipment



Automotive

- DC_Link Pre-charging Resistors in Electric Vehicles



Industrial

- Drives
- Programmable Logic Controllers
- DC Link Pre-charging Resistors



Medical

- Patient Monitoring (ECG, EEG)

Today, in various applications high pulse loads occur, whether they are intended or incidental. For those applications, High Pulse Load Carbon Film MELF Resistors from Vishay are the perfect choice, as they allow the user to combine the advantages of compact case size and exceptional pulse load capability. Pulse protection circuits especially benefit from the Carbon Film MELF resistors high surge pulse and ESD capability. From automotive electronics to industrial applications, the high pulse load carbon film MELF resistors are the perfect solution for a wide variety of applications that must be secured from high pulse loads.



SUMMARY

- One of the highest pulse load capability of any SMD film resistor
- High surge voltage and ESD capability
- High rated dissipation of up to 1 W
- Significantly reduces component counts and saves board space

In summary, the Vishay High Pulse Load Carbon Film MELF resistor series offers one of the highest pulse load capability for SMD film resistors, with single pulse capability up to 3 kW. Its exceptional ESD capability up to 16 kV and high surge voltage of up to 10 kV makes them a perfect choice in circuit protection applications. Here, the CMA 0204 and CMB 0207 will allow for a reduction in component count and to save board space and lower costs. Besides exceptional pulse load capability, the cylindrical design also allows for a high rated dissipation up to 1 W. High-reliability applications will benefit from AEC-Q200 qualification.