



MCW 0612 AT

WIDE TERMINAL THIN FILM CHIP RESISTORS PRODUCT OVERVIEW

DRALORIC/BEYSCHLAG RESISTORS





INTRODUCTION

Purpose

- Introduction of the Vishay MCW 0612 AT Thin Film Chip Resistor

Objectives

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



Welcome to the Vishay Beyschlag MCW 0612 AT Thin Film Chip Resistor product overview. This tutorial will provide an overview of the MCW 0612 AT high power resistor series. The key functional performance parameters will be discussed as well as design, unique features, and benefits when compared to other chip resistors with similar case sizes. A selection of potential applications from typical market segments will be presented.



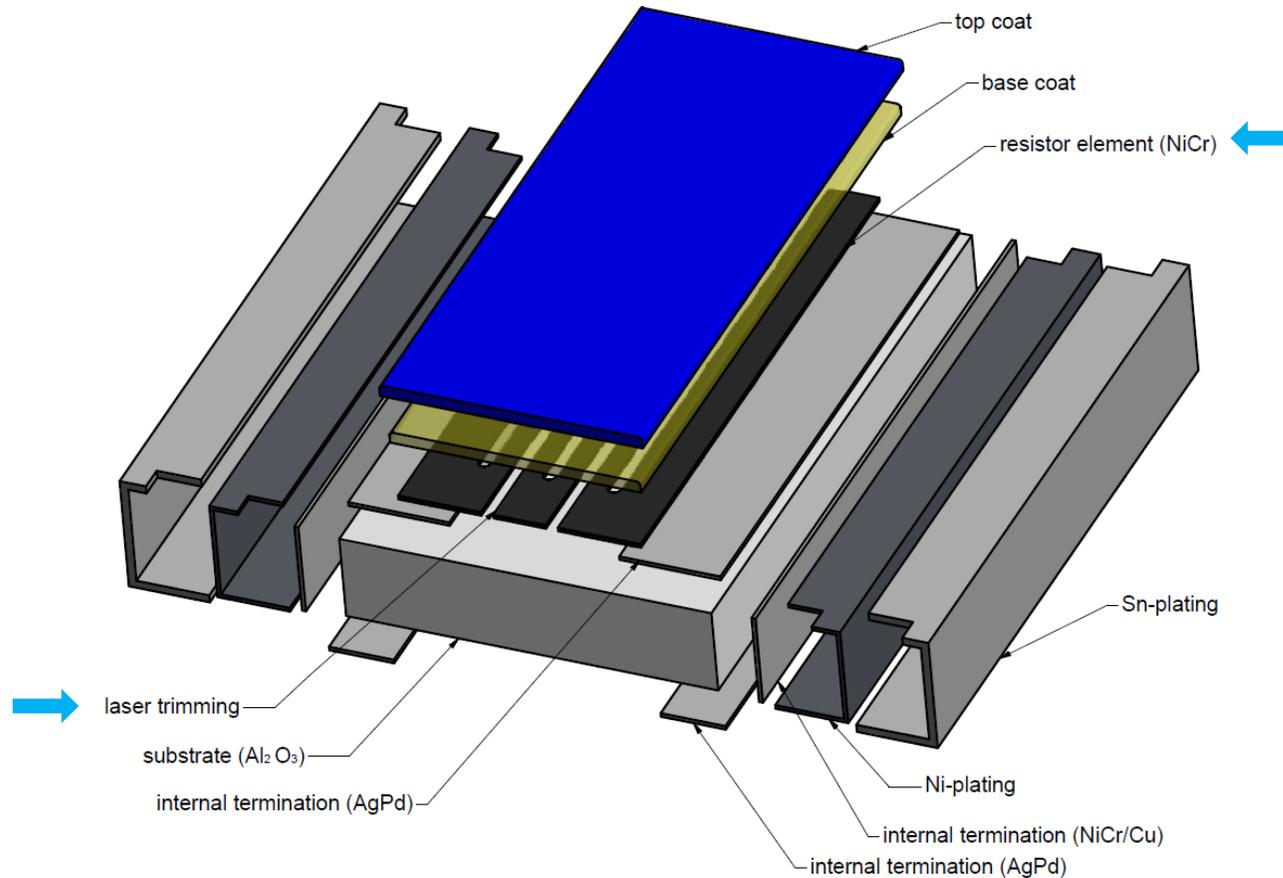
FUNCTIONAL PERFORMANCE OF THE MCW 0612 AT

Key Properties

- High power dissipation P_{85} up to 1 W
- Size of a standard 1206 chip resistor replaces large case sizes including 2512
- Operating temperature up to 175 °C
- Tolerance down to $\pm 0.5\%$ and TCR down to ± 25 ppm/K
- Extraordinary thermal cycling robustness
- AEC-Q200 qualification available in Q3/2016

The MCW 0612 AT series is an excellent choice for today's modern electronics where power dissipation, reliability, stability, and robust design is of major concern. The 0612 case size is equivalent to the footprint of 1206 chip resistors, while the power rating of 1 W is significantly higher than standard 1206 resistors and even overcomes ratings of 2512 chip resistors. High-reliability applications will benefit from AEC-Q200 qualification, increased operating temperature and advanced thermal cycling robustness. This thin film series furthermore offers excellent moisture resistance, sulfur resistivity and is RoHS compliant. The MCW 0612 AT is available from 10 Ohm to 100 kOhm with tolerances down to $\pm 0.5\%$, and TCR down to ± 25 ppm/K.

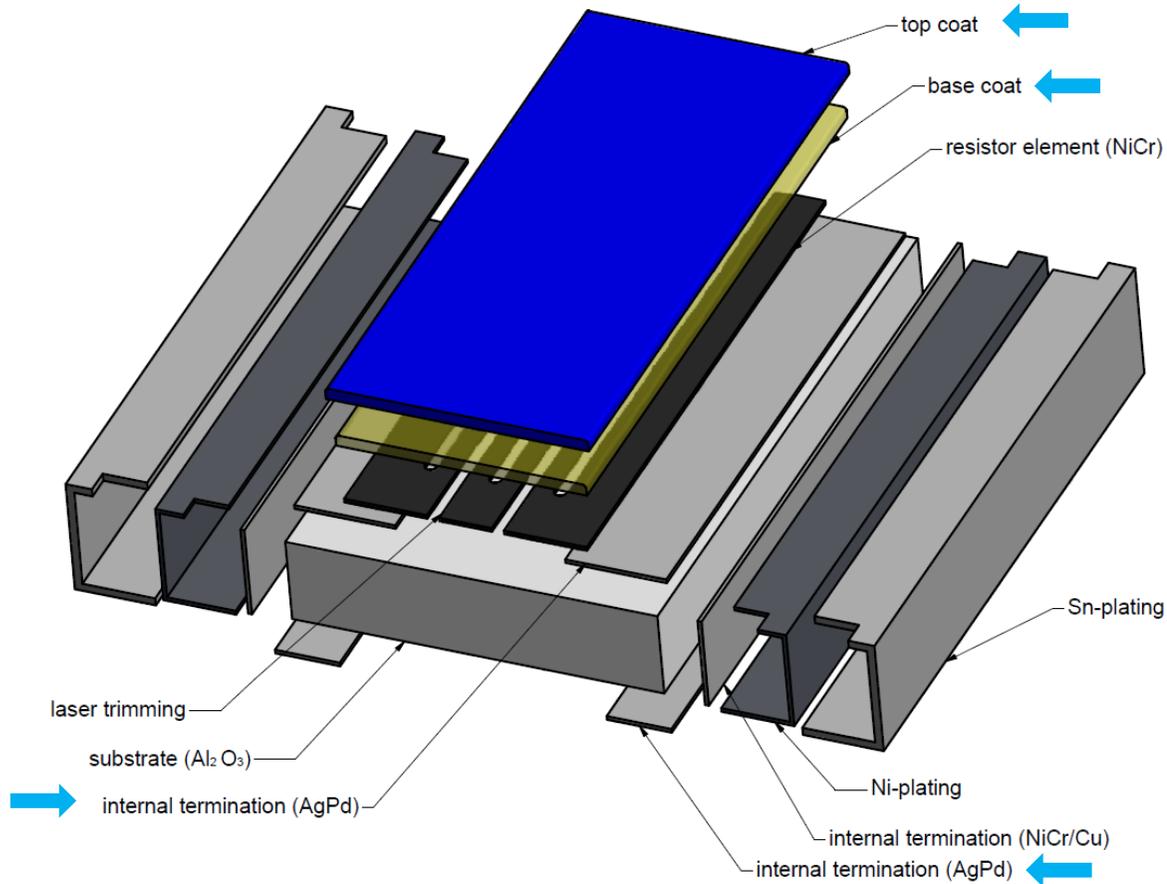
DESIGN OF MCW 0612 AT COMPONENTS



The MCW AT design offers significant advantages compared to other resistor types. The resistive element is a high-quality homogeneous material with meander laser trimming. This trimming geometry allows the resistor to homogeneously dissipate power and distribute thermal energy across the entire resistive element when the resistor is in use. This enhances the stability of MCW AT components to low resistive drifts $\leq 0.1\%$ after 1,000 hours life test by reducing the intensity of any single hot spot on the resistive film.

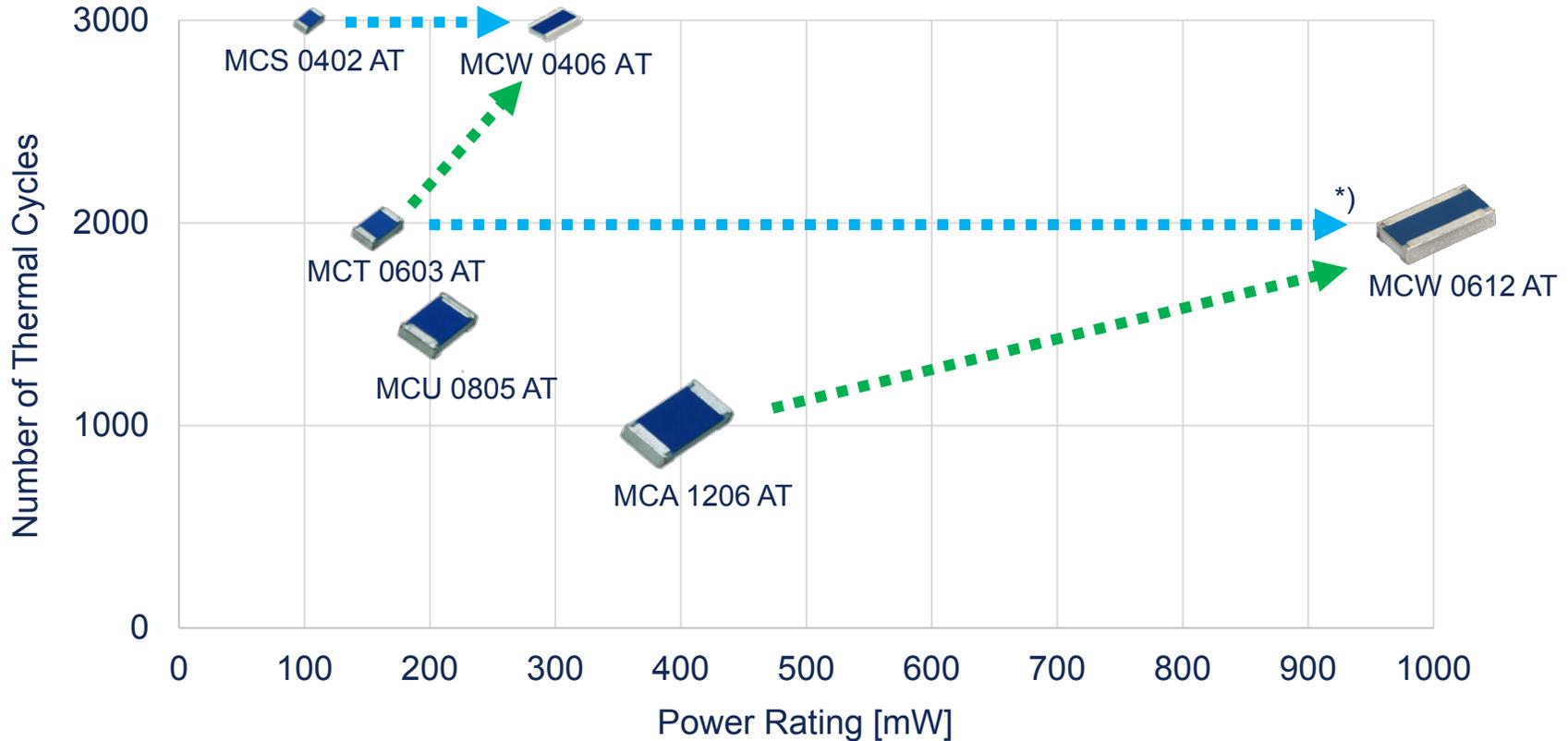


DESIGN OF MCW 0612 AT COMPONENTS



With respect to moisture resistivity, a special two-layer passivation provides excellent protection of the resistive element from humid atmospheres as verified according to the 85 °C/85 % biased humidity test for 42 days. Furthermore, with silver palladium inner terminations, the MCW AT series is impervious to sulfur exposure as verified in accordance with the ASTM B 809 standard. As an increase in incidents of corrosion failures related to high sulfur-containing environments has been observed in the electronics industry, the MCW AT series is best suited for applications which require sulfur resistant resistors.

TECHNICAL ADVANTAGE OF WIDE TERMINATIONS



Another important design feature is the wide termination style of the MCW 0612 AT Series (and that of the smaller case size MCW 0406 AT which is also available) which results in several unique product properties. In general, heat dissipation from the component to the ambient is dominated (about 80 %) by conduction into the PCB. Wide terminations decrease the thermal resistance of the assembly and thus allow for significantly increased power ratings. Besides extraordinary high power rating, the thermal cycling robustness of wide terminated parts can be enhanced. As the 0406 case size uses the same distance between its electrodes as the smaller case size 0402, the MCW 0406 AT also handles up to 3000 cycles of “Rapid Change of Temperature” from -40 °C to +125 °C. Accordingly, for the MCW 0612 AT a thermal cycling capability equivalent to case size 0603 is expected, namely 2000 cycles (* evaluation currently under progress).

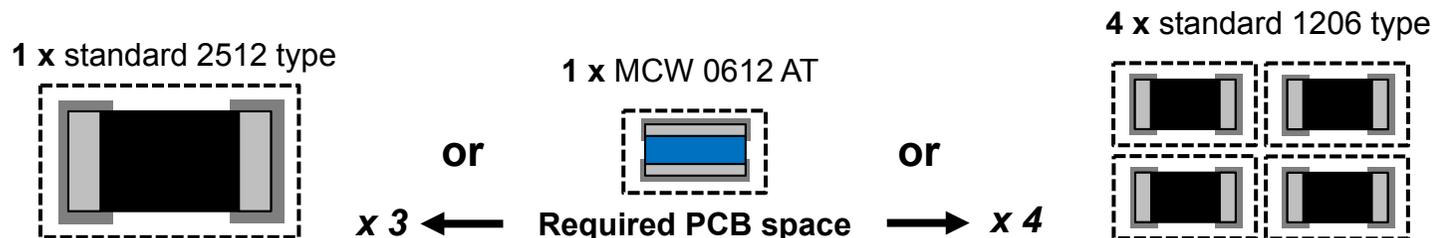


COMMERCIAL BENEFITS

MCW 0612 AT Thin Film Series allows the user to...

- greatly reduce the number of components in power electronics applications:
One! MCW 0612 AT can replace up to four standard resistors of equivalent foot print
- replace larger case sizes rated up to 1 W
- greatly reduce pick and place costs, save board space or increase PCB integration density
- increase application reliability by reducing the number of solder joints

Component Count & Board Space for 1 W Rated Power



The MCW 0612 AT Thin Film Series from Vishay offers significantly higher power ratings as compared to standard thin film resistors with comparable footprint. This allows for a reduction of component counts by replacing multiple devices of the same case size or larger case size resistors, consequently saving board space and lowering costs. The MCW 0612 AT series thus enables developers to design cost-sensitive, accurate and reliable applications.



APPLICATIONS

Reliable Power Electronics

Automotive

- Inverter for Electric and Hybrid-Electric Vehicles
- Lighting
- Control units
- Braking systems

Industrial

- Energy management
- Power supplies
- Test and Measurement Equipment

Consumer

- Inverter for home appliances

Computer

- High-end computer

Nowadays, various applications require components with advanced power rating or have to meet miniaturization requirements which steadily gain more importance in today's modern electronics. The MCW AT series from Vishay allows the user to combine the advantages of compact case size with enhanced power rating, making the devices suited for a variety of power electronics applications. From automotive electronics to industrial appliances, the MCW AT Professional Wide Terminal Resistors are the perfect choice for a wide variety of power circuitry types where reliability, stability, power dissipation and robust design is of major concern.



SUMMARY

- MCW 0612 AT features 1 W power rating in compact 0612 case size
- Superior robustness against thermal cycling due to wide terminals
- Significantly reduces component counts and saves board space
- Impervious to sulfur exposure and superior moisture resistivity
- Excellent choice for most fields of modern power electronics where stability and reliability at increased power dissipation are required

In summary, the Vishay MCW 0612 AT wide terminal thin film chip resistor series offers power rating up to 1 W which allows for a reduction in component counts and replacement of larger case sizes to save board space and lower costs in power electronics circuits. With its special wide terminal design, the MCW AT is extremely robust with respect to thermal cycling. Important high-reliability applications will benefit from AEC-Q200 qualification as well as from the excellent moisture and sulfur resistivity. Combining the technical advantages of both small and large case sizes in this all-in-one device, the MCW AT is the perfect choice for most fields of today's and tomorrow's emerging high power electronics.