

Automotive Film Capacitor Market Analysis and Industry Development Trends

HONGKONG, HONGKONG, CHINA, March 19, 2024 /EINPresswire.com/ -- In today's ever-changing technology, the automotive [film capacitor](#) market is gradually becoming a shining star in the field of electronic components with its unique advantages and growing demand. In this article, we will analyze the various aspects of the automotive film capacitor market, in order to provide valuable reference for related enterprises and investors.

Market Overview

The automotive film capacitor market mainly serves the automotive electronics field, used to realize the function of filtering, decoupling, energy storage, and so on. The market originated in the 1990s, when the trend of automotive electronics first appeared, prompting the continuous development of on-board film capacitor technology. In recent years, with the rise of smart cars and new energy vehicles, the automotive film capacitor market has shown explosive growth.

Market Size and Growth Trend

The global automotive film capacitor market is expanding, mainly due to the following driving factors: 1) the increasing degree of automotive electronics; 2) the rapid growth of the new energy vehicle market; and 3) the wide application of smart grid car technology. At the same time, some of the constraints should not be ignored, such as supply chain tension and rising raw material prices. In the domestic market, the demand for on-board film capacitors continues to be strong, especially in the field of new energy vehicles and intelligent connected cars, domestic enterprises are gradually expanding their market share by virtue of their technological advantages and cost advantages.

Main Product Types and Functions

Automotive film capacitors are widely used in automotive engine control, body control, safety systems, and in-vehicle infotainment systems. Automotive film capacitors are characterized by high stability, low ESR (Equivalent Series Resistance), and good temperature stability, which can effectively improve circuit performance and extend component life.

The development trend of the film capacitor industry mainly has the following aspects:

High-performance: With the new energy vehicles, wind power, photovoltaic, and other fields of film capacitors performance requirements continue to improve, and film capacitors of high performance have become an important development direction of the industry. High

performance is mainly reflected in the high withstand voltage, low ESR, good temperature characteristics, long life, and so on. In order to improve the performance of film capacitors, it is necessary to continuously optimize the design structure, improve the manufacturing process, and develop new materials.

Miniaturization: With the new energy vehicles, wind power, photovoltaic, and other fields of film capacitors volume requirements continue to increase, the miniaturization of film capacitors has become an important development direction of the industry. Miniaturization is mainly reflected in the small size, lightweight, large capacity, and so on. In order to realize the miniaturization of film capacitors, it is necessary to continuously improve the dielectric constant of the dielectric material, reduce the thickness of the metallization layer, and reduce the lead spacing.

High voltage resistance: New energy vehicles, wind power, photovoltaic, and other fields have high requirements for power density and efficiency of the power system, which requires the use of high-voltage circuits. This requires film capacitors to have high voltage resistance to be able to work stably in high-voltage environments. At present, the mainstream film capacitor's withstand voltage is generally between 1.5kV ~ 3kV, the future is expected to reach more than 5kV.

Low ESR: New energy vehicles, wind power, photovoltaic, and other areas of the power system loss and heating have high control requirements, the need to use low ESR (equivalent series resistance) circuit. This requires film capacitors to have a low ESR ability to reduce losses and heat generation in a high-frequency environment. At present, the mainstream film capacitors' ESR is generally between 10mΩ ~ 20mΩ, the future is expected to be reduced to below 5mΩ.

Development Trends and Challenges

In the next few years, the automotive film capacitor market will show the following development trends: 1) technology iteration and upgrading: with the continuous emergence of new materials and new processes, the performance of automotive film capacitors will be further improved; 2) intelligent trend: the demand for automotive electronic components in smart cars will continue to grow, and automotive film capacitors will be more intelligent; 3) customized services: in order to meet the needs of different models and systems, automotive film capacitor enterprises will provide more customized services.

However, the challenges should not be ignored. For example, fluctuations in the new energy vehicle market may have an impact on the demand for onboard film capacitors; the safety of smart grid-connected vehicles has also put forward higher requirements for onboard film capacitors. In addition, with the changes in the international trade environment, the stability of the global supply chain is also facing a test.

Film capacitors in new energy vehicle electric drive systems belong to the auxiliary system components, skills to protect teammates. The [inverter](#) is responsible for converting the high-voltage direct current output from the battery into three-phase alternating current with variable current and frequency for driving the motor. This part of the work mainly consists of two major

processes: the DC power from the battery pack is used as the input power source, which needs to be connected to the inverter through the DC bus; the inverter carries out the DC-AC conversion and outputs it to the drive motor. Among them, film capacitors are used as DC-LINK capacitors, which act as a meat shield, absorbing high pulse currents and smoothing bus voltages at the electric control bus, so that the IGBT switches are not subjected to high pulse currents and transient voltage shocks. At the same time, film capacitors can also be used as X/Y capacitors to play a role in filtering and suppressing strong electromagnetic interference. For DC-LINK capacitors, the performance advantages of film capacitors instead of electrolytic capacitors are higher withstand voltage, lower ESR (Equivalent Series Resistance), no polarity, more stable performance, and longer lifespan, which leads to simplified application system design, outstanding ripple resistance, and more reliable use in harsh environments.

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