

The Global Market for Power Electronics for Electric Vehicles (EVs) 2024-2035

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Abstracts

As we pivot towards a more sustainable energy landscape, electric vehicles (EVs) have emerged as a cornerstone of modern transportation. The role of power electronics in this revolution is paramount. With its ability to efficiently and swiftly control and convert electricity, power electronics provide the essential technological infrastructure that facilitates the widespread adoption and operation of EVs. As power electronics technology continues to advance, so does the performance and efficiency of EVs. Advancements in semiconductor materials, like Silicon Carbide (SiC) and Gallium Nitride (GaN), have led to the development of power electronics devices with higher efficiencies, smaller sizes, and better thermal properties. This comprehensive market report provides an in-depth analysis of the global market for power electronics in electric vehicles (EVs) from 2024 to 2035.

Report contents include:

Definition of electric vehicles and their key specifications

Evolution of the powertrain in EVs and next-generation developments.

Role of power electronics in managing and controlling the flow of electrical energy within the vehicle, ensuring optimal performance and energy efficiency.

Types of power electronic components used in EVs, including inverters, DC-DC converters, and onboard chargers (OBCs). Each component is examined in detail, covering their functions, working principles, key specifications, and requirements.

Critical components such as battery management systems (BMS), high-voltage distributors, auxiliary power modules (APMs), charging control units (CCUs), and DC charging inlets and connectors.

Primary drivers and trends influencing the power electronics market for EVs.

Power Electronics Value Chain highlighting the various stages and players involved in the production and distribution of power electronic components for EVs.

Global EV market is segmented by region, with detailed analyses of growth trends in China, Europe, and the USA. This section also covers hybrid car sales, emissions reduction through advanced powertrain technologies, the cost dynamics of EVs, and challenges related to chip supply for EV power electronics.

Integration of power electronics in EVs, the properties and applications of Insulated Gate Bipolar Transistors (IGBTs) and Metal-Oxide-Semiconductor Field-Effect Transistors (MOSFETs), and the comparative advantages of Si, SiC, and GaN devices.

Overview of inverter technologies, including Pulse Width Modulation, traditional EV inverters, discretes and modules, and inverter printed circuit boards. The global market for inverters, projecting trends and market sizes from 2022 to 2035.

Onboard Chargers (OBC): components and functions of OBCs, including integrated solutions with DC-DC converters and high-power charging systems. Including market forecasts and analyses of global OBC markets segmented by semiconductor technology (Si, SiC, GaN) and power levels.

Emerging trends in power electronics driving improvements in efficiency and integration.

The transition from traditional 400V systems to higher-voltage 800V platforms along with the implications for SiC and GaN technologies.

Advancements in DC fast charging and the integration of power electronics in various EV systems.

Analysis of the supply chain for power electronics in EVs identifies

Key suppliers of SiC MOSFETs and Si IGBTs, their market shares, and the activities of automotive OEMs.

Production and distribution network supporting the EV power electronics market.

Thermal Management for EV Power Electronics: cooling approaches, thermal interface materials (TIMs), and the transition from single-sided to double-sided liquid cooling technologies.

Emerging Technologies in power electronics, including advanced WBG materials, intelligent power modules with embedded sensing and control, and high-frequency switching technologies.

Detailed profiles of key companies in the EV power electronics market provide insights into their products, innovations, and market strategies. Companies profiled include Advanced Electric Machines Ltd, BMW, BYD Auto, Efficient Power Conversion Corporation (EPC), GaN Systems, General Motors, Infineon, Lucid Motors, and many others (Full list of companies profiled in the table of contents).

This market report is essential for stakeholders in the EV power electronics industry, offering a detailed and strategic analysis of the trends, technologies, and market dynamics shaping the future of power electronics for electric vehicles from 2024 to 2035.

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