Automotive Power Electronics Market Report and Forecast 2025-2034

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Report description:

The global automotive power electronics market size reached USD 3.86 Billion in 2024. The market is expected to grow at a CAGR of 4.30% between 2025 and 2034, reaching almost USD 5.88 Billion by 2034.

Automotive power electronics encompass the use of electronic systems and devices within vehicles to supervise and control electrical energy. These systems are pivotal for the efficient operation of modern vehicles, ranging from electric vehicles (EVs) and hybrid electric vehicles (HEVs) to conventional internal combustion engine vehicles.

Included in automotive power electronics are DC-DC converters for adjusting voltage, AC-DC converters for EV charging, inverters for motor power, battery management systems (BMS) for battery maintenance, and motor control systems. These components are essential for EV propulsion, battery replenishment, the management of auxiliary systems, regenerative braking, and the implementation of Vehicle-to-Grid (V2G) systems.

As per the global automotive power electronics market report, Since 2010, the proportion of electronic components within the total cost of a vehicle has been projected to increase significantly, reaching nearly half of the vehicle cost by 2030, compared to approximately one-third in 2010.

Key Trends and Developments

Factors like the expanding middle class, technological advancements, and rising electric vehicle demand propel the growth of the global automotive power electronics market.

November 2023

VisIC Technologies Ltd, a prominent figure in GaN power electronics, unveiled the groundbreaking V22TG D3GAN power package, housed in an innovative gull-wing led top-side cooled isolated package, marking a new era in automotive industry standards.

October 2023

Hyundai and Kia have entered a lasting partnership with Infineon for automotive power modules and chips, ensuring the supply of SiC and Si power components until 2030. Hyundai/Kia will financially support capacity expansion.

September 2023

MacDermid Alpha Electronics Solutions, a leading provider of integrated materials for electronics, showcased their latest solutions at The Electric & Hybrid Vehicle Technology Expo 2023, emphasizing improved inverter power and battery efficiency.

September 2023

Vitesco Technologies, a German powertrain supplier, has created a power module using transfer moulding. Set for delivery to a global automaker by mid-2025, this module will serve as a central component in electric vehicle power electronics.

Growing middle class

The global automotive power electronics market is experiencing growth due to the expanding middle class and rising disposable incomes. Shifting lifestyle choices, a heightened focus on safety and comfort, and the aim to reduce road accidents are driving the demand worldwide.

Technological advancements

The global automotive power electronics market development is buoyed by technological progress, notably AI and ML integration for safety enhancements like ADAS. Major companies are investing heavily in autonomous vehicles, aiming to revolutionize transportation and reduce reliance on human drivers.

Electronic vehicle demand

Numerous individuals opt for electric vehicles for urban commuting, driven by cost efficiency and growing environmental consciousness. This surge in global electric vehicle demand is fuelling the expansion of the market.

Power Modules and Semiconductors

There is an increasing need for power modules and semiconductors like insulated gate bipolar transistors (IGBTs) and silicon carbide (SiC) devices in the automotive sector. These elements provide enhanced efficiency, superior thermal characteristics, and increased power density, aligning with modern vehicle demands.

Global Automotive Power Electronics Market Trends

The automotive power electronics sector is progressing to meet the industry's focus on compact, lightweight designs. Manufacturers are producing smaller, more efficient components to fit into vehicles' limited spaces while maintaining performance.

As per the global automotive power electronics market analysis, the advancement of battery technologies, particularly in energy density and charging capabilities, is influencing the automotive power electronics market. Power electronics are essential for

optimizing and managing the performance of these advanced batteries in electric vehicles (EVs).

Market Segmentation

Global Automotive Power Electronics Market Report and Forecast 2025-2034 offers a detailed analysis of the market based on the following segments:

Market Breakup by Device Type

- Power IC
- Power Module
- Power Discrete

Market Breakup by Application Type

- ADAS and Safety
- Body Control and Comfort
- Infotainment
- Telematics
- Engine Management and Powertrain
- Battery Management

Market Breakup by Drive Type

- IC Engine Vehicle
- Electric Vehicle

Market Breakup by Component Type

- Sensor
- Microcontroller Unit
- Power Integrated Circuit

Market Breakup by Vehicle Type

- Passenger Cars
- Commercial Vehicles

Market Breakup by Electric Vehicle Type

- Battery Electric Vehicles
- Hybrid Electric Vehicles
- Plug-in Hybrid Electric Vehicles

Market Breakup by Region

- North America

- Europe
- Asia Pacific
- Latin America
- Middle East and Africa

Electric vehicles are driving growth in the global automotive power electronics market

Electric vehicles offer benefits such as cheaper recharging, instant acceleration, and eco-friendliness.

In contrast, internal combustion engines have advantages such as a high power-to-weight ratio, readily available fuel, affordability, and user-friendliness.

In terms of device type, the global automotive power electronics market share is led by power modules which offers a compact and efficient solution for managing high-power applications within vehicles

Power module is employed in electric motors to convert DC from the vehicle battery into AC, which powers the vehicle propulsion system.

Power integrated circuits (ICs) in automotive power electronics integrate multiple components into a single chip, improving efficiency, regulating voltages, controlling motors, managing batteries, optimizing LED lighting, ensuring safety, and handling thermal conditions.

ADAS is driving the global automotive power electronics market growth through features such as collision avoidance, lane departure warning/assist, and blind spot detection

ADAS functionalities such as adaptive cruise control (ACC) regulate vehicle speed to uphold safe following distances, minimizing the need for manual speed adjustments by the driver. Traffic jam assist manages acceleration, braking, and steering during congested traffic conditions. Parking assistance assists in parallel or perpendicular parking by assuming control of steering.

Vehicle telematics combines GPS systems, onboard vehicle diagnostics, wireless telematics devices, and black box technologies to gather and transmit vehicle data such as speed, location, maintenance alerts, and service needs. This data is then cross-referenced with the vehicle's internal operations.

Competitive Landscape

The market key players are boosting the competition in the global automotive power electronics market by improving their product portfolio while also engaging in strategic collaborations.

Robert Bosch GmbH

Robert Bosch GmbH, founded in Germany in 1886, is a prominent global technology and services provider. The company excels in automotive components, industrial technology, consumer goods, and energy and building solutions. Known for its focus on innovation, Bosch is a pioneer in mobility solutions and Internet of Things (IoT) technologies.

Continental AG

Continental AG, also headquartered in Germany and founded in 1871, is a multinational corporation specializing in automotive

manufacturing. Its focus includes tyres, brake systems, automotive safety, and powertrain components, making it a key player in the automotive industry with renowned technologies and solutions worldwide.

Infineon Technologies AG

Infineon Technologies AG, founded in Germany in 1999, is a significant semiconductor manufacturer. It offers solutions for automotive, industrial, and security applications, recognized for its pioneering work in power electronics, sensors, and microcontrollers. Infineon is instrumental in the advancement of automotive electronics and electrification.

STMicroelectronics International N.V.

STMicroelectronics International N.V., based in Switzerland and established in 1987, is a global semiconductor giant. Renowned for its cutting-edge technologies in automotive electronics, IoT, and power management, STMicroelectronics focuses on innovation and sustainability, delivering state-of-the-art solutions across diverse industries and applications.

Other key players in the global automotive power electronics market are Mitsubishi Electric Corporation, Fuji Electric Co., Ltd., BorgWarner Inc., Danfoss A/S., Valeo, and Vishay Intertechnology, Inc. among others.

Global Automotive Power Electronics Market Analysis by Region

Asia Pacific holds a dominant position in the global automotive power electronics market. The region's development is driven by the growing production of vehicles and the growing number of automotive power electronics manufacturers. Furthermore, a significant population base, rising incomes in the middle class, and rapid urbanization contribute to considerable demand for vehicles, especially in countries like China, India, and Japan.

According to the International Trade Administration, China remains the largest vehicle market globally, leading in both annual sales and manufacturing output. Domestic production is expected to reach 35 million vehicles by 2025. Data from the Ministry of Industry and Information Technology reveals that in 2021, China sold over 26 million vehicles, comprising 21.48 million passenger vehicles and 4.79 million commercial units.

North America and Europe are also significant contributors to market growth due to the increasing adoption of electric vehicles and ongoing technological advancements.

Table of Contents:

1 Executive Summary
1.1 Market Size 2024-2025
1.2 Market Growth 2025(F)-2034(F)
1.3 Key Demand Drivers
1.4 Key Players and Competitive Structure
1.5 Industry Best Practices
1.6 Recent Trends and Developments
1.7 Industry Outlook
2 Market Overview and Stakeholder Insights
2.1 Market Trends
2.2 Key Verticals

2.3 Key Regions
2.4 Supplier Power
2.5 Buyer Power
2.6 Key Market Opportunities and Risks
2.7 Key Initiatives by Stakeholders
3 Economic Summary
3.1 GDP Outlook
3.2 GDP Per Capita Growth
3.3 Inflation Trends
3.4 Democracy Index
3.5 Gross Public Debt Ratios
3.6 Balance of Payment (BoP) Position
3.7 Population Outlook
3.8 Urbanisation Trends
4 Country Risk Profiles
4.1 Country Risk
4.2 Business Climate
5 Global Automotive Power Electronics Market Analysis
5.1 Key Industry Highlights
5.2 Global Automotive Power Electronics Historical Market (2018-2024)
5.3 Global Automotive Power Electronics Market Forecast (2025-2034)
5.4 Global Automotive Power Electronics Market by Device Type
5.4.1 Power IC
5.4.1.1 Historical Trend (2018-2024)
5.4.1.2 Forecast Trend (2025-2034)
5.4.2 Power Module
5.4.2.1 Historical Trend (2018-2024)
5.4.2.2 Forecast Trend (2025-2034)
5.4.2.3 Breakup by Type
5.4.2.3.1 Intelligent Power Module (IPM)
5.4.2.3.2 Power Integrated Module (PIM)
5.4.3 Power Discrete
5.4.3.1 Historical Trend (2018-2024)
5.4.3.2 Forecast Trend (2025-2034)
5.4.3.3 Breakup by Type
5.4.3.3.1 Diode
5.4.3.3.2 Transistor
5.4.3.3.3 Thyristor
5.5 Global Automotive Power Electronics Market by Application Type
5.5.1 ADAS and Safety
5.5.1.1 Historical Trend (2018-2024)
5.5.1.2 Forecast Trend (2025-2034)
5.5.1.3 Breakup by Type
5.5.1.3.1 ADAS
5.5.1.3.2 Electric Power Steering (EPS)
5.5.1.3.3 Anti-lock Braking System (ABS)
5.5.2 Body Control and Comfort

5.5.2.1 Historical Trend (2018-2024)
5.5.2.2 Forecast Trend (2025-2034)
5.5.2.3 Breakup by Type
5.5.2.3.1 TPMS
5.5.2.3.2 Lighting
5.5.2.3.2.1 Exterior Lighting
5.5.2.3.2.2 Interior Lighting
5.5.2.3.3 Seat Control
5.5.2.3.3.1 Heated Seats
5.5.2.3.3.2 Seat Adjustment
5.5.2.3.4 HVAC
5.5.2.3.5 Start-Stop Module
5.5.3 Infotainment
5.5.3.1 Historical Trend (2018-2024)
5.5.3.2 Forecast Trend (2025-2034)
5.5.3.3 Breakup by Type
5.5.3.3.1 Instrument Cluster
5.5.3.3.2 Audio System
5.5.4 Telematics
5.5.4.1 Historical Trend (2018-2024)
5.5.4.2 Forecast Trend (2025-2034)
5.5.4.3 Breakup by Type
5.5.4.3.1 Vehicle Management
5.5.4.3.2 V2X
5.5.5 Engine Management and Powertrain
5.5.5.1 Historical Trend (2018-2024)
5.5.5.2 Forecast Trend (2025-2034)
5.5.5.3 Breakup by Type
5.5.5.3.1 Engine Control
5.5.5.3.2 Transmission Control
5.5.6 Battery Management
5.5.6.1 Historical Trend (2018-2024)
5.5.6.2 Forecast Trend (2025-2034)
5.6 Global Automotive Power Electronics Market by Drive Type
5.6.1 IC Engine Vehicle
5.6.1.1 Historical Trend (2018-2024)
5.6.1.2 Forecast Trend (2025-2034)
5.6.2 Electric Vehicle
5.6.2.1 Historical Trend (2018-2024)
5.6.2.2 Forecast Trend (2025-2034)
5.7 Global Automotive Power Electronics Market by Vehicle Type
5.7.1 Passenger Cars
5.7.1.1 Historical Trend (2018-2024)
5.7.1.2 Forecast Trend (2025-2034)
5.7.2 Commercial Vehicles
5.7.2.1 Historical Trend (2018-2024)
5.7.2.2 Forecast Trend (2025-2034)

5.8 Global Automotive Power Electronics Market by Electric Vehicle Type
5.8.1 Battery Electric Vehicles
5.8.1.1 Historical Trend (2018-2024)
5.8.1.2 Forecast Trend (2025-2034)
5.8.2 Hybrid Electric Vehicles
5.8.2.1 Historical Trend (2018-2024)
5.8.2.2 Forecast Trend (2025-2034)
5.8.3 Plug-in Hybrid Electric Vehicles
5.8.3.1 Historical Trend (2018-2024)
5.8.3.2 Forecast Trend (2025-2034)
5.9 Global Automotive Power Electronics Market by Region
5.9.1 North America
5.9.1.1 Historical Trend (2018-2024)
5.9.1.2 Forecast Trend (2025-2034)
5.9.2 Europe
5.9.2.1 Historical Trend (2018-2024)
5.9.2.2 Forecast Trend (2025-2034)
5.9.3 Asia Pacific
5.9.3.1 Historical Trend (2018-2024)
5.9.3.2 Forecast Trend (2025-2034)
5.9.4 Latin America
5.9.4.1 Historical Trend (2018-2024)
5.9.4.2 Forecast Trend (2025-2034)
5.9.5 Middle East and Africa
5.9.5.1 Historical Trend (2018-2024)
5.9.5.2 Forecast Trend (2025-2034)
6 North America Automotive Power Electronics Market Analysis
6.1 United States of America
6.1.1 Historical Trend (2018-2024)
6.1.2 Forecast Trend (2025-2034)
6.2 Canada
6.2.1 Historical Trend (2018-2024)
6.2.2 Forecast Trend (2025-2034)
7 Europe Automotive Power Electronics Market Analysis
7.1 United Kingdom
7.1.1 Historical Trend (2018-2024)
7.1.2 Forecast Trend (2025-2034)
7.2 Germany
7.2.1 Historical Trend (2018-2024)
7.2.2 Forecast Trend (2025-2034)
7.3 France
7.3.1 Historical Trend (2018-2024)
7.3.2 Forecast Trend (2025-2034)
7.4 Italy
7.4.1 Historical Trend (2018-2024)
7.4.2 Forecast Trend (2025-2034)
7.5 Others

8 Asia Pacific Automotive Power Electronics Market Analysis
8.1 China
8.1.1 Historical Trend (2018-2024)
8.1.2 Forecast Trend (2025-2034)
8.2 Japan
8.2.1 Historical Trend (2018-2024)
8.2.2 Forecast Trend (2025-2034)
8.3 India
8.3.1 Historical Trend (2018-2024)
8.3.2 Forecast Trend (2025-2034)
8.4 ASEAN
8.4.1 Historical Trend (2018-2024)
8.4.2 Forecast Trend (2025-2034)
8.5 Australia
8.5.1 Historical Trend (2018-2024)
8.5.2 Forecast Trend (2025-2034)
8.6 Others
9 Latin America Automotive Power Electronics Market Analysis
9.1 Brazil
9.1.1 Historical Trend (2018-2024)
9.1.2 Forecast Trend (2025-2034)
9.2 Argentina
9.2.1 Historical Trend (2018-2024)
9.2.2 Forecast Trend (2025-2034)
9.3 Mexico
9.3.1 Historical Trend (2018-2024)
9.3.2 Forecast Trend (2025-2034)
9.4 Others
10 Middle East and Africa Automotive Power Electronics Market Analysis
10.1 Saudi Arabia
10.1.1 Historical Trend (2018-2024)
10.1.2 Forecast Trend (2025-2034)
10.2 United Arab Emirates
10.2.1 Historical Trend (2018-2024)
10.2.2 Forecast Trend (2025-2034)
10.3 Nigeria
10.3.1 Historical Trend (2018-2024)
10.3.2 Forecast Trend (2025-2034)
10.4 South Africa
10.4.1 Historical Trend (2018-2024)
10.4.2 Forecast Trend (2025-2034)
10.5 Others
11 Market Dynamics
11.1 SWOT Analysis
11.1.1 Strengths
11.1.2 Weaknesses
11.1.3 Opportunities

11.1.4 Threats
11.2 Porter's Five Forces Analysis
11.2.1 Supplier's Power
11.2.2 Buyer's Power
11.2.3 Threat of New Entrants
11.2.4 Degree of Rivalry
11.2.5 Threat of Substitutes
11.3 Key Indicators for Demand
11.4 Key Indicators for Price
12 Value Chain Analysis
13 Competitive Landscape
13.1 Supplier Selection
13.2 Key Global Players
13.3 Key Regional Players
13.4 Key Player Strategies
13.5 Company Profiles
13.5.1 Robert Bosch GmbH
13.5.1.1 Company Overview
13.5.1.2 Product Portfolio
13.5.1.3 Demographic Reach and Achievements
13.5.1.4 Certifications
13.5.2 Continental AG
13.5.2.1 Company Overview
13.5.2.2 Product Portfolio
13.5.2.3 Demographic Reach and Achievements
13.5.2.4 Certifications
13.5.3 Infineon Technologies AG
13.5.3.1 Company Overview
13.5.3.2 Product Portfolio
13.5.3.3 Demographic Reach and Achievements
13.5.3.4 Certifications
13.5.4 STMicroelectronics International N.V.
13.5.4.1 Company Overview
13.5.4.2 Product Portfolio
13.5.4.3 Demographic Reach and Achievements
13.5.4.4 Certifications
13.5.5 Mitsubishi Electric Corporation
13.5.5.1 Company Overview
13.5.5.2 Product Portfolio
13.5.5.3 Demographic Reach and Achievements
13.5.5.4 Certifications
13.5.6 Fuji Electric Co., Ltd.
13.5.6.1 Company Overview
13.5.6.2 Product Portfolio
13.5.6.3 Demographic Reach and Achievements
13.5.6.4 Certifications
13.5.7 BorgWarner Inc.

13.5.7.1 Company Overview
13.5.7.2 Product Portfolio
13.5.7.3 Demographic Reach and Achievements
13.5.7.4 Certifications
13.5.8 Danfoss A/S.
13.5.8.1 Company Overview
13.5.8.2 Product Portfolio
13.5.8.3 Demographic Reach and Achievements
13.5.8.4 Certifications
13.5.9 Valeo
13.5.9.1 Company Overview
13.5.9.2 Product Portfolio
13.5.9.3 Demographic Reach and Achievements
13.5.9.4 Certifications
13.5.10 Vishay Intertechnology, Inc.
13.5.10.1 Company Overview
13.5.10.2 Product Portfolio
13.5.10.3 Demographic Reach and Achievements
13.5.10.4 Certifications
13.5.11 Others

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