

Automotive Power Electronics Market Forecasts to 2032 – Global Analysis By Component (Power Modules, Power Discrete, Microcontrollers & DSPs, Sensors, Gate Driver ICs, and Other Components), Material, Vehicle Type, Distribution Channel, Application, and By Geography

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Abstracts

According to Statistics MRC, the Global Automotive Power Electronics Market is accounted for \$5.1 billion in 2025 and is expected to reach \$7.8 billion by 2032 growing at a CAGR of 6.2% during the forecast period. Automotive power electronics involves devices and systems managing energy conversion, distribution, and control in electric, hybrid, and conventional vehicles. Key components include inverters, converters, sensors, and battery management systems. Growth is fueled by increasing adoption of electric vehicles, stricter emission regulations, and rising demand for energy-efficient and reliable automotive systems. Advancements in wide-bandgap semiconductors, high-efficiency converters, and thermal management solutions are accelerating market expansion.

According to the International Energy Agency (IEA), the global electric car stock surpassed 30 million vehicles, with sales exceeding 10 million in a single year.

Market Dynamics:

Driver:

Electrification of Vehicles

Electrification of vehicles has become the primary growth engine for automotive power electronics. As OEMs transition from internal-combustion platforms to battery-electric and hybrid architectures, demand for efficient inverters, onboard chargers, DC–DC converters, and traction modules is rising markedly. Additionally, regulatory pressure to reduce CO₂ emissions and consumer preference for cleaner mobility are accelerating vehicle electrification programs worldwide. Suppliers are therefore prioritizing higher-efficiency topologies, advanced packaging, and integration of wide-bandgap semiconductors to meet performance, size, and cost targets required by next-generation electric powertrains. This structural shift underpins capital investment and supplier-OEM partnerships across the value chain.

Restraint:

Thermal Management Challenges

High switching frequencies, greater power densities, and integration of wide-bandgap devices intensify heat fluxes within compact modules. Moreover, uneven temperature gradients and inadequate heat sinking can accelerate material degradation, elevate failure rates, and force conservatively derated operation. Cooling systems add weight, complexity, and cost, while packaging limits complicate thermal paths. Manufacturers must pursue advanced heat-spreading materials, liquid cooling, and co-design of thermal and electrical architectures to achieve required lifetime and efficiency targets.

Opportunity:

Development of Wireless Charging Technologies

Inductive and resonant systems reduce driver friction by enabling seamless, hands-free energy transfer for passenger cars and commercial fleets. Furthermore, integration of compact power electronics and alignment aides can improve efficiency and broaden use cases from private garages to urban curbside and shared mobility hubs. Standards work and pilot deployments are attracting investment, while modular power converters and control electronics create supplier playbooks for scalable rollouts. Adoption timelines hinge on infrastructure investment and regulatory support, but commercial pilots indicate accelerating momentum globally.

Threat:

Cybersecurity Risks

Power electronics interfaces including charging systems, inverters, and vehicle-to-grid modules can expose new attack surfaces if software and communications are not hardened. Successful intrusions could disrupt charging operations, degrade vehicle safety, or enable theft of sensitive data, undermining consumer trust. Moreover, the convergence of OT and IT within EV ecosystems complicates responsibility across OEMs, suppliers, and infrastructure operators. Addressing these risks requires secure-by-design electronics, robust authentication, and coordinated incident response capabilities.

Covid-19 Impact:

The COVID-19 pandemic disrupted automotive power electronics through supply-chain shocks, most notably semiconductor shortages and production delays that constrained module availability and slowed vehicle launches. Lockdowns and logistics bottlenecks amplified lead times for key substrates and packaging materials, raising costs and forcing design reprioritization. However, demand for electrification remained resilient, prompting manufacturers to diversify suppliers and accelerate local sourcing strategies to improve future resilience. These adjustments strengthened long-term procurement and inventory planning across the industry.

The power modules segment is expected to be the largest during the forecast period

The power modules segment is expected to account for the largest market share during the forecast period because modules aggregate discrete semiconductors, passive components, and packaging into compact functional units ready for traction and auxiliary applications. Power modules offer system-level advantages reduced assembly time, higher reliability, and simplified thermal and electrical integration which appeal to OEMs seeking scalable solutions. Additionally, rising adoption of inverterized drivetrains and the need for high-current handling in onboard chargers and DC-DC converters sustain module demand. Suppliers are therefore investing in module miniaturization, improved thermal paths, and integrated sensing to capture this sizable market opportunity.

The silicon carbide (SiC) segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the silicon carbide (SiC) segment is predicted to witness the highest growth rate due to SiC's intrinsic material advantages for high-voltage, high-

efficiency power conversion. SiC devices reduce switching losses, enable higher switching frequencies, and tolerate greater operating temperatures than legacy silicon, allowing smaller filters and lighter thermal systems. Automakers seeking extended range and faster charging are increasingly specifying SiC in traction inverters and onboard chargers. Furthermore, falling wafer costs, manufacturing scale-up, and supplier ecosystems are accelerating SiC adoption in vehicle platforms. These trends position SiC as the preferred choice across EV segments.

Region with largest share:

During the forecast period, the Asia Pacific region is expected to hold the largest market share driven by a combination of manufacturing scale, strong domestic EV demand, and supportive policy frameworks. China's large battery and semiconductor ecosystems, India's emerging EV programs, and established supply chains in Japan and South Korea create dense regional capabilities for power electronics production. Additionally, aggressive electrification targets and incentives for EV adoption underpin sustained component demand. Consequently, Asia Pacific remains the primary manufacturing and consumption hub for power electronics, attracting supplier investments and localization efforts globally.

Region with highest CAGR:

Over the forecast period, the North America region is anticipated to exhibit the highest CAGR due to rapid technology adoption, strong R&D ecosystems, and sizeable electrification incentives. Growing deployments of fast chargers, rising fleet electrification in commercial transport, and policy support for domestic semiconductor capacity bolster regional growth. Furthermore, close collaboration between OEMs, Tier-1 suppliers, and startups accelerates commercialization of wide-bandgap devices and advanced modules. These factors, combined with improving supply-chain localization and capital investment, position North America for accelerated compound annual growth.

Key players in the market

Some of the key players in Automotive Power Electronics Market include Robert Bosch GmbH, Continental AG, Infineon Technologies AG, STMicroelectronics International N.V., ON Semiconductor Corporation, NXP Semiconductors N.V., Denso Corporation, Mitsubishi Electric Corporation, Renesas Electronics Corporation, Danfoss A/S, BorgWarner Inc., Vishay Intertechnology, Inc., Analog Devices, Inc., Toshiba

Corporation, Texas Instruments Incorporated, ABB Ltd., Magna International Inc., Hyundai Mobis, Panasonic Corporation, and LG Electronics Inc.

Key Developments:

In September 2025, Mitsubishi Electric Corporation announced that it has developed a new compact version of its DIIPM power semiconductor modules specifically for use in consumer and industrial equipment such as packaged air conditioners and heat pump heating and hot water systems. The new Compact DIIPM series of products comprises the PSS30SF1F6 (rated current 30A / rated voltage 600V) and the PSS50SF1F6 (rated current 50A / rated voltage 600V), and samples will begin shipping on September 22.

In August 2025, Dream Incubator Inc. and DENSO CORPORATION are pleased to announce that their joint initiative, “Digital Platform Development for Mobility Circular Economy and Integrated Manufacturing for India by Collaboration with Open API Network in India and Japan”, has been selected under United Nations Industrial Development Organization’s “Industrial cooperation programme in the Global South through technology transfer from Japan”.

In December 2024, The U.S. Commerce Department reached a preliminary agreement to provide US \$225 million in subsidies to Bosch for a planned transformation of its California facility into a silicon carbide (SiC) power semiconductor manufacturing plant. Bosch aims to start producing SiC chips on 200 mm wafers by 2026.

Components Covered:

Power Modules

Power Discrete

Microcontrollers & DSPs

Sensors

Gate Driver Ics

Other Components

Materials Covered:

Silicon (Si)

Silicon Carbide (SiC)

Gallium Nitride (GaN)

Other Materials

Vehicle Types Covered:

Passenger Cars

Light Commercial Vehicles (LCVs)

Heavy Commercial Vehicles (HCVs)

Distribution Channels Covered:

Original Equipment Manufacturer (OEM)

Aftermarket

Applications Covered:

Powertrain & Chassis

Body Electronics

Safety & Security Systems

Infotainment & Telematics

Regions Covered:

North America

US

Canada

Mexico

Europe

Germany

UK

Italy

France

Spain

Rest of Europe

Asia Pacific

Japan

China

India

Australia

New Zealand

South Korea

Rest of Asia Pacific

South America

Argentina

Brazil

Chile

Rest of South America

Middle East & Africa

Saudi Arabia

UAE

Qatar

South Africa

Rest of Middle East & Africa

What our report offers:

- Market share assessments for the regional and country-level segments
- Strategic recommendations for the new entrants
- Covers Market data for the years 2024, 2025, 2026, 2028, and 2032
- Market Trends (Drivers, Constraints, Opportunities, Threats, Challenges, Investment Opportunities, and recommendations)
- Strategic recommendations in key business segments based on the market estimations
- Competitive landscaping mapping the key common trends
- Company profiling with detailed strategies, financials, and recent developments
- Supply chain trends mapping the latest technological advancements

Free Customization Offerings:

All the customers of this report will be entitled to receive one of the following free customization options:

Company Profiling

Comprehensive profiling of additional market players (up to 3)

SWOT Analysis of key players (up to 3)

Regional Segmentation

Market estimations, Forecasts and CAGR of any prominent country as per the client's interest (Note: Depends on feasibility check)

Competitive Benchmarking

Benchmarking of key players based on product portfolio, geographical presence, and strategic alliances

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