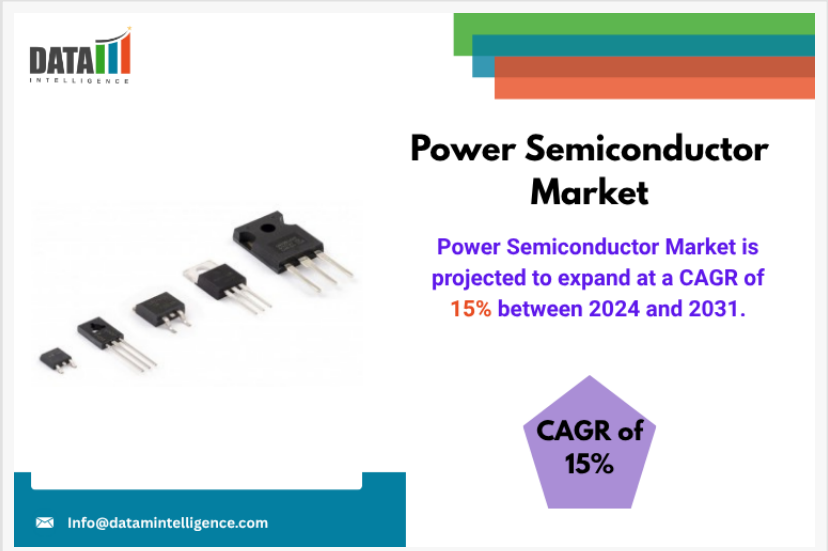
Power Semiconductor Market Surges with SiC, GaN & Modules Driving EV, Renewable & Industrial Growth | DataM Inteligence

Discover how SiC, GaN, and integrated power modules are fueling the Power Semiconductor Market's growth in EVs, renewables, and industrial automation.



Power Semiconductor Market

NEW YORK, NY, UNITED STATES, June 27, 2025 /EINPresswire.com/ -- Market Overview :

Power Semiconductors are the backbone of modern electrification, governing the efficient conversion and control of electrical energy across a wide range of applications from electric vehicles (EVs) and renewable energy inverters to industrial motor drives and consumer electronics adapters. By minimizing losses and enhancing thermal performance, these devices enable systems to be more compact, reliable, and energy-efficient. The global power semiconductor market was valued at US$ 56.16 billion in 2022.

> Power semiconductors are the silent engines of electrification fueling EV inverters, green energy systems, and smart factories with efficiency gains that redefine modern power electronics."
>
> *DataM Intelligence*

. With surging demand for electrified mobility, green energy, and smart grids, the market is poised to reach US$ 171,709 million by 2031, expanding at a CAGR of 15.0% during 2024–2031.

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Market Drivers are :

Electrification of Transportation: Growing adoption of EVs and hybrid vehicles is driving demand for high-performance IGBTs, MOSFETs, and SiC devices in

inverters and on-board chargers.

Renewable Energy Integration: Solar and wind installations rely on efficient power conversion modules to maximize yield and grid compatibility.

Industrial Automation & Robotics: Smart factories require precise motor control and energy-saving drives, boosting power MOSFET and IGBT usage.

Data Center & Telecom Growth: High-efficiency power supplies and DC-DC converters in servers and 5G base stations depend on advanced semiconductors.

Energy Efficiency Regulations: Stricter global standards for energy consumption compel appliance and HVAC manufacturers to incorporate lower-loss power chips.

Miniaturization & Integration Trends: Demand for compact, high-density power modules spurs innovation in packaging and heterogeneous integration.

Emergence of SiC and GaN Technologies: Wide-bandgap materials offer superior switching speeds, higher temperature operation, and reduced cooling needs.

Market Key Players are :

Leading companies shaping the power semiconductor landscape include:

Infineon Technologies AG

STMicroelectronics

NXP Semiconductors

Renesas Electronics Corporation

Robert Bosch GmbH

Mitsubishi Electric Corporation

Semiconductor Components Industries (ON Semiconductor)

Littelfuse

Texas Instruments

Analog Devices

Qualcomm

Semikron Elektronik GmbH & Co. KG

Toshiba Corporation

Fuji Electric Co., Ltd.

These players continuously invest in fabs, R&D, and strategic partnerships to advance device performance and capacity.

Market Segmentation:

By Device Type

Insulated Gate Bipolar Transistors (IGBTs)
Metal-Oxide-Semiconductor Field-Effect Transistors (MOSFETs)
Power Diodes & Rectifiers
Thyristors & Silicon-Controlled Rectifiers (SCRs)
Integrated Power Modules
Silicon Carbide (SiC) & Gallium Nitride (GaN) Devices

By Voltage Rating

Low-Voltage (< 200 V)
Medium-Voltage (200–1,200 V)
High-Voltage (> 1,200 V)

By Application

Automotive (EV/HEV powertrains, charging stations)
Renewable Energy (solar inverters, wind converters)
Industrial (motor drives, welding systems)
Consumer Electronics (adaptors, UPS)
Telecommunications (base station power)
Aerospace & Defense (power systems)

By Region

Asia Pacific
North America
Europe

Latin America
Middle East & Africa
Asia Pacific dominates due to its vast electronics manufacturing base, while North America and Europe invest heavily in green energy and automotive electrification.

Latest News – USA

In mid-2024, Infineon Technologies broke ground on its new SiC wafer fab in Texas, aiming to double its U.S. production capacity by 2026 and support domestic EV supply chains. Texas Instruments unveiled its latest GaN power stage reference design, enabling manufacturers to cut power-supply losses by over 20% in server racks. Meanwhile, ON Semiconductor (formerly SC Industries) announced a strategic collaboration with a leading electric-truck OEM to co-develop 900 V SiC MOSFET modules optimized for heavy-duty applications.

Latest News – Japan

In Japan, Toshiba Corporation launched a 1,700 V SiC MOSFET product line in Q2 2024, targeting industrial inverter and traction drive markets. Fuji Electric has commenced mass production of high-density IGBT modules for railway traction systems at its newly established Ehime facility.

Renesas Electronics expanded its power-management IC portfolio with integrated GaN drivers, addressing the fast-charge smartphone and laptop adapter segments favored by Japanese consumers.

Key Developments in 2024
Infineon released its “EiceDRIVER™” family of isolated gate drivers tailored for 1,200 V SiC MOSFETs, simplifying power-module design and reducing component count.

STMicroelectronics unveiled an all-in-one SiC inverter module for passenger EVs, claiming a 30% reduction in system size and weight.

NXP Semiconductors launched its SmartMOS™ 80 V FETs, featuring built-in drivers and protection mechanisms, tailored for industrial motor control applications.

Semikron Elektronik and Bosch established a joint venture to manufacture wide-bandgap power modules for automotive traction inverters, with pilot production expected to begin by late 2024.
Mitsubishi Electric announced a breakthrough in GaN-on-SiC devices, achieving < 20 ns switching times at 650 V, propelling high-frequency power supplies.

These innovations reflect a broader shift toward more integrated, efficient, and compact power solutions across industries.

Conclusion
The power semiconductor market is at the heart of the global transition toward electrification, digitalization, and decarbonization. Fueled by robust demand in EVs, renewable energy, industrial automation, and data centers, the market's projected CAGR of 15.0% through 2031 underscores its critical role in enabling efficient power conversion. Key players are racing to scale SiC and GaN production, integrate advanced packaging, and collaborate with system-level partners to deliver turnkey solutions. As governments and industries worldwide commit to net-zero targets, power semiconductors will remain a pivotal technology driving energy savings, performance gains, and the next wave of smart, sustainable applications.

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