Silicon Carbide (SiC) Market by SiC Discrete Device (SiC Diode and SiC MOSFET), SiC Module, Voltage Range (Up to 1,200 V, Low (1,200 V to 1,700 V), Medium (1,700 V to 3,300 V), High (More than 3,300 V)), Automotive SiC Device - Global Forecast to 2030

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Report description:

The global silicon carbide (SiC) market is estimated to be valued at USD 12.03 billion by 2030, up from USD 3.83 billion in 2025, at a CAGR of 25.7%.

https://mnmimg.marketsandmarkets.com/Images/silicon-carbide-electronics-market-img-overview.svg

The silicon carbide (SiC) market is experiencing robust growth, driven by the increasing deployment of SiC devices in electric vehicles and the rising demand for efficient power electronics across industrial and energy applications. Automakers are adopting SiC MOSFETs and modules for traction inverters, onboard chargers, and fast-charging systems, while renewable energy and grid infrastructure projects are leveraging SiC to achieve higher efficiency and reliability. Advancements in wide-bandgap technologies, wafer scaling, and substrate quality are enhancing performance and lowering system costs, enabling broader adoption. These drivers are collectively accelerating the transition from silicon to SiC in next-generation power systems. At the same time, the market presents strong opportunities in telecommunications, transportation, and industrial automation, where the need for compact, energy-efficient, and high-temperature-resistant devices is growing. Ongoing innovations in materials and packaging, along with the expansion of global production capacity, are fostering greater scalability and enabling SiC to redefine power electronics for a more sustainable future.
"SiC modules to record fastest growth in silicon carbide (sic) market based on device"
SiC modules are expected to register the fastest growth in the silicon carbide (SiC) market as industries increasingly demand compact, integrated, and high-efficiency solutions for power management. Unlike discrete devices, modules integrate multiple SiC components within a single package, providing higher power density, simplified system design, and enhanced thermal

performance. This makes them particularly valuable for applications requiring robust and scalable solutions, such as electric vehicle powertrains, fast-charging infrastructure, industrial motor drives, and renewable energy systems. The shift toward e-mobility is a major driver, with automakers adopting SiC modules to deliver efficient traction inverters and onboard charging systems that improve range and reduce energy losses. In renewable energy, SiC modules enhance the performance of solar and wind power conversion by handling higher voltages with minimal losses. Additionally, data centers and telecom infrastructure are increasingly adopting these modules to improve power usage effectiveness and reduce operational costs. As packaging technology improves and economies of scale expand manufacturing, SiC modules are becoming more cost-competitive, further fueling their rapid adoption. Their combination of performance, reliability, and scalability positions them as the fastest-growing segment in the global silicon carbide (SiC) market.

"Medium (1,700 V to 3,300 V) voltage range to account for largest share of silicon carbide (SiC) market based on voltage range"

The medium voltage range, spanning 1,700 V to 3,300 V, is projected to account for the largest share of the silicon carbide (SiC) market during the forecast period. This segment has become the backbone of high-performance applications where traditional silicon solutions face limitations in terms of efficiency, thermal management, and power density. Key growth areas include electric rail traction, wind turbines, industrial drives, and high-power EV inverters, all of which demand reliable operation under high voltage and temperature conditions. Medium-voltage SiC devices offer lower switching losses and improved thermal stability, making them highly suitable for demanding environments that prioritize energy efficiency and reduced system footprint. In transportation, particularly electric trains and heavy-duty electric vehicles, these devices are driving efficiency gains and range improvements. In renewable energy, they enable higher output and reliability in solar inverters and wind energy conversion systems. With industries increasingly targeting energy savings, compact designs, and sustainability, the medium voltage SiC range is positioned as the largest contributor to overall market adoption, ensuring long-term dominance across industrial and power-intensive sectors.

"Europe to account for second-largest market share in 2025."

Europe is expected to hold the second-largest share of the global silicon carbide (SiC) market, driven by strong government support for electrification, renewable energy adoption, and industrial modernization. The region is at the forefront of the electric vehicle revolution, with leading automakers and suppliers integrating SiC MOSFETs and modules into powertrains, onboard chargers, and charging infrastructure to meet strict emission reduction targets. Europe's ambitious green deal and carbon neutrality goals are fueling investments in renewable energy projects, such as solar farms, wind power, and smart grids, where SiC technology enhances efficiency, reliability, and grid stability. The industrial automation and transportation sectors are also embracing SiC devices to improve power density and lower operational costs in rail traction, robotics, and aerospace applications. In addition, European semiconductor players and research institutions are investing heavily in advancing wafer production and packaging technologies, thereby ensuring a secure supply chain and fostering regional innovation ecosystems. With its strong regulatory push toward sustainability and leadership in automotive and energy technologies, Europe is positioned to remain a critical growth region for the SiC market, consolidating its role as the second-largest contributor globally.

The breakdown of the primary participants' profiles in the silicon carbide (SiC) market is as follows.

- By Company Type: Tier 1 - 45%, Tier 2 - 35%, and Tier 3 - 20%
- By Designation Type: C-level Executives - 40%, Directors - 30%, and Others - 30%
- By Region: Europe - 20%, North America - 40%, Asia Pacific - 30%, Rest of the World (RoW) - 10%

Note: Other designations include sales, marketing, and product managers.

The three tiers of the companies are based on their total revenues as of 2024: Tier 1: >USD 1 billion, Tier 2: USD 500 million-1 billion, and Tier 3: USD 500 million.

The major players in the silicon carbide (SiC) market with a significant global presence include STMicroelectronics (Switzerland), Semiconductor Components Industries, LLC (US), Infineon Technologies AG (Germany), Wolfspeed, Inc. (US), ROHM Co., Ltd. (Japan), and others.

Research Coverage

The report segments the silicon carbide (SiC) market and forecasts its size by device type, voltage range, vertical, and region. It

also provides a comprehensive review of the drivers, restraints, opportunities, and challenges that influence market growth. The report encompasses both qualitative and quantitative aspects of the market.

Reasons to buy the report:
The report will assist market leaders/new entrants in this market by providing information on the approximate revenues for the overall silicon carbide (SiC) market and its related segments. This report will help stakeholders understand the competitive landscape and gain valuable insights to strengthen their market position and develop effective go-to-market strategies. The report also helps stakeholders understand the pulse of the market, providing them with information on key market drivers, restraints, opportunities, and challenges.
The report provides insights into the following pointers:
-Analysis of key drivers (growing deployment of SiC devices in EVs, increasing demand for power electronics, and growing demand for renewable energy systems), restraints (high efficacy of alternative technologies for power electronics and high cost of SiC devices), opportunities (growing adoption of SiC devices in telecommunications industry and ongoing quality enhancements of SiC substrates and epitaxy processes), and challenges (material defects and designing and packaging issues in SiC devices, and supply chain and capacity constraints)
-Product Development/Innovation: Detailed insights on upcoming technologies, research and development activities, and new product launches in the silicon carbide (SiC) market.
-Market Development: Comprehensive information about lucrative markets by analyzing the silicon carbide (SiC) market across varied regions
-Market Diversification: Exhaustive information about new products, untapped geographies, recent developments, and investments in the silicon carbide (SiC) market
-Competitive Assessment: In-depth assessment of market shares, growth strategies, and product offerings of leading players, including STMicroelectronics (Switzerland), Semiconductor Components Industries, LLC (US), Infineon Technologies AG (Germany), Wolfspeed, Inc. (US), and ROHM Co., Ltd. (Japan)

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