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Silicon Carbide (SiC) Devices Market Forecasts to 2032 – Global Analysis By Product Type (SiC MOSFETs, SiC Modules, SiC Discrete Devices, SiC Diodes / Schottky Barrier Diodes and Other Product Types), Voltage Rating (Up to 650V, 650V-1200V, 1200V-1700V and Above 1700V), Material, Production Method, Power Range, Application and By Geography

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Abstracts

According to Stratistics MRC, the Global Silicon Carbide (SiC) Devices Market is accounted for $4.02 billion in 2025 and is expected to reach $18.88 billion by 2032 growing at a CAGR of 24.7% during the forecast period. Advanced semiconductor components known for their remarkable performance in high-power, high-temperature, and high-frequency applications are silicon carbide (SiC) devices. SiC has a better characteristic than conventional silicon-based devices, including a wider band gap, increased thermal conductivity, and a stronger electric field breakdown. SiC devices are perfect for use in electric vehicles, power electronics, renewable energy systems, and aerospace applications because of these benefits, which allow them to function more effectively and dependably under challenging conditions. Moreover, SiC technology is becoming more and more popular in next-generation electronic systems due to its capacity to lower energy losses and boost power density.

According to a fact sheet by the U.S. Department of Energy, SiC power electronic devices can withstand junction temperatures up to 600 °C and can operate at higher voltage, higher switching frequency, and with greater current density. These capabilities lead to significant energy efficiency gains in power systems.

Market Dynamics:

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Driver:

Growing uptake of electric cars (EVs)

One of the major factors propelling the market for SiC devices is the electric vehicle (EV) industry. Because SiC-based MOSFETs and diodes can withstand higher voltages and temperatures than conventional silicon devices, improve efficiency, and minimize energy losses, they are being utilized more and more in EV powertrains, on-board chargers (OBCs), and DC-DC converters. Longer driving ranges, smaller cooling systems, and quicker charging are all benefits of these characteristics that are important selling points in the EV market. Additionally, the demand for SiC devices is anticipated to rise sharply as EV production continues to increase globally and government regulations favor electrification more and more.

Restraint:

Exorbitant production and material expenses

The high cost of manufacturing SiC devices in comparison to conventional silicon-based components is one of the biggest obstacles preventing their widespread use. Because SiC crystals are difficult to grow, processing takes longer, and yields are lower, the cost of producing high-quality SiC wafers is significantly higher. For example, SiC wafers need high-temperature chemical vapor deposition (CVD) and have difficulties in obtaining defect-free crystal structures, whereas silicon wafers are mass-produced on well-established and economically optimized infrastructure. Furthermore, SiC substrates and epitaxial layers continue to be several times more expensive than silicon.

Opportunity:

Integration with smart grid and renewable energy systems

SiC devices are positioned to improve power conversion efficiency and system reliability in solar inverters, wind turbines, battery storage systems, and smart grid applications as the world's energy mix moves toward renewable sources. Particularly in utility-scale installations, SiC-based components can function at higher voltages and frequencies, enabling more compact and effective inverters. Moreover, the modernization of the smart grid necessitates high-performance power electronics that can facilitate fast switching, precise control, and bi-directional power flow—all of which are advantages of

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SiC. Clean energy and grid resiliency are receiving significant investments from governments and energy companies, which is fostering a strong growth environment for SiC technologies in these fields.

Threat:

Supply chain weaknesses and material scarcity

High-purity SiC substrates and wafers are still produced by a small number of suppliers, making the SiC supply chain still rather constrained and concentrated. The availability and cost of devices can be greatly impacted by disruptions in this supply, which can be brought on by trade restrictions, natural disasters, labor shortages, or geopolitical instability. Events like the COVID-19 pandemic, for instance, revealed weaknesses in international semiconductor supply chains, and the already competitive SiC wafer market may be impacted by similar disruptions. Furthermore, SiC wafer manufacturing's energy-intensive and time-consuming nature prevents quick scale-up, leaving the sector susceptible to unforeseen demand spikes or logistical problems.

Covid-19 Impact:

In the market for silicon carbide (SiC) devices, the COVID-19 pandemic had a mixed but noticeable effect. Factory closures, labor shortages, and supply chain disruptions caused short-term market disruptions that primarily affected the manufacturing and delivery of SiC wafers and devices. These limitations resulted in bottlenecks in industries like industrial manufacturing and the automotive sector as well as delays in ongoing projects. But long-term trends like the move toward electrification, renewable energy, and digital infrastructure—all of which depend on SiC devices to enable high-efficiency power conversion—were also accelerated by the pandemic. The increased emphasis on sustainable technologies and robust supply chains as economies started to recover spurred both public and private investment in SiC manufacturing, paving the way for strong post-pandemic growth.

The SiC MOSFETs segment is expected to be the largest during the forecast period

The SiC MOSFETs segment is expected to account for the largest market share during the forecast period, mainly due to their extensive use in high-voltage, high-efficiency applications like motor drives, industrial power supplies, renewable energy systems, and electric vehicles (EVs). By enabling faster switching speeds, lower conduction losses, and operation at higher temperatures and voltages, these transistors outperform

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conventional silicon MOSFETs. Moreover, the demand for SiC MOSFETs is rising quickly as automakers and power system designers move more and more toward electrification and energy efficiency, making them the leading product category in the larger SiC device ecosystem.

The chemical vapor deposition (CVD) segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the chemical vapor deposition (CVD) segment is predicted to witness the highest growth rate. In order to produce sophisticated SiC power devices like MOSFETs and Schottky diodes, high-quality epitaxial layers must be deposited on SiC substrates, and CVD is vital to this process. In order to create high-voltage, low-defect devices that are needed in industrial power electronics, renewable energy systems, and electric vehicles, this process enables exact control over layer thickness, doping levels, and uniformity. Additionally, the ability of CVD to meet stringent quality and efficiency requirements is driving its adoption as the need for higher-performance SiC devices increases, particularly in the automotive and energy sectors.

Region with largest share:

During the forecast period, the Asia-Pacific region is expected to hold the largest market share, propelled by its robust presence in power electronics, industrial automation, and the production of electric vehicles. Due to strong government support, quick industrialization, and the presence of significant players like ROHM, Mitsubishi Electric, and STMicroelectronics, nations like China, Japan, and South Korea are at the forefront of SiC device consumption and production. Furthermore, Asia-Pacific is now a major center for SiC innovation, fabrication, and end-user applications due to rising investments in domestic semiconductor manufacturing and technology infrastructure, guaranteeing the region's sustained dominance in the global market share.

Region with highest CAGR:

Over the forecast period, the North America region is anticipated to exhibit the highest CAGR, propelled by quick developments in defense, aerospace, renewable energy, and electric car technologies. Strong government programs, like the U.S. CHIPS Act and Department of Energy funding programs that give priority to wide-bandgap technologies like SiC, help the region localize semiconductor manufacturing. In an effort to lessen dependency on foreign supply chains, major companies like Wolfspeed, ON Semiconductor, and General Electric are increasing their SiC manufacturing capabilities

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and R&D activities in the United States. Moreover, the demand for SiC devices is also being driven by North America's increasing emphasis on strategic defense technologies and high-efficiency energy infrastructure, which will make it the region with the fastest rate of growth during the forecast period.

Key players in the market

Some of the key players in Silicon Carbide (SiC) Devices Market include Infineon Technologies AG, NXP Semiconductors, Microchip Technology Inc., BASiC Semiconductor Co., Ltd., Renesas Electronics Corporation, Fuji Electric Co., Ltd., ON Semiconductor, Mitsubishi Electric Corporation, Coherent Corp., Wolfspeed, Inc., STMicroelectronics N.V., ROHM Co., Ltd., Toshiba Corporation, GeneSiC Semiconductor Inc. and Littelfuse, Inc.

Key Developments:

In June 2025, NXP Semiconductors has announced the conclusion of the acquisition of Vienna-based TTTech Auto, a pioneer in the development of distinctive safety-critical technologies and middleware for software-defined vehicles (SDVs). The open and modular NXP CoreRide platform and TTTech Auto’s MotionWise safety middleware help automakers get past obstacles to software and hardware integration while lowering complexity and development efforts and boosting the scalability and cost-effectiveness needed for next-generation vehicles.

In May 2025, Fuji Electric Co. Ltd (Fuji Electric) has been awarded the contract to supply the complete set of power generation equipment for the Muara Laboh Stage 2 geothermal power project of PT Supreme Energy Muara Laboh (SEML) in West Sumatra, Indonesia. The project has a planned installed capacity of 80 MW and is targeting commercial operations by 2027.

In February 2025, Teradyne and Infineon Technologies AG have announced that they have entered into a strategic agreement to advance power semiconductor test. As part of the agreement, Teradyne will acquire part of Infineon’s automated test equipment team in Regensburg, Germany. For its part, Infineon will enter into a service agreement to secure continued manufacturing support as well as enhanced flexibility to respond to internal demand for this specialized test equipment as well as benefit from Teradyne’s economy of scale.

Product Types Covered:

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SiC MOSFETs

SiC Modules

SiC Discrete Devices

SiC Diodes / Schottky Barrier Diodes

Other Product Types

Voltage Ratings Covered:

Up to 650V

650V-1200V

1200V-1700V

Above 1700V

Materials Covered:

Black Silicon Carbide

Green Silicon Carbide

Other Materials

Production Methods Covered:

Acheson Process

Physical Vapor Transport (PVT)

Chemical Vapor Deposition (CVD)

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- Other Production Methods

Power Ranges Covered:

- Low Power (50 kW)

Applications Covered:

- Automotive
- Industrial
- Energy & Utilities
- Aerospace & Defense
- Consumer Electronics
- Other Applications

Regions Covered:

- North America
  - US
  - Canada
  - Mexico
- Europe
  - Germany
  - UK

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- 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

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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

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presence, and strategic alliances

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Africa Regions are also represented in the same manner as above.

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