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Silicon Carbide (SiC) Power Semiconductor Market Forecasts to 2034 – Global Analysis By Device Type (SiC MOSFETs, SiC Schottky Barrier Diodes (SBDs), SiC Junction Barrier Schottky (JBS) Diodes, SiC Power Modules, and SiC Power Integrated Circuits (ICs)), Wafer Size, Wafer Type, Voltage Range, Application, End User and By Geography

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Abstracts

According to Stratistics MRC, the Global Silicon Carbide (SiC) Power Semiconductor Market is accounted for $4.3 billion in 2026 and is expected to reach $17.9 billion by 2034, growing at a CAGR of 19.5% during the forecast period. Silicon Carbide Power Semiconductors are wide-bandgap semiconductor devices that offer superior performance compared to traditional silicon-based power electronics, enabling higher efficiency, faster switching, and operation at higher temperatures and voltages. SiC devices include MOSFETs, Schottky barrier diodes, power modules, and integrated circuits, manufactured on various wafer sizes with conductive or semi-insulating substrates. This technology helps industries improve energy efficiency, reduce system size and weight, and enable new applications in electric vehicles, renewable energy, and industrial automation.

Market Dynamics:

Driver:

Rapid growth of electric vehicles and charging infrastructure

The rapid expansion of electric vehicle adoption and charging infrastructure serves as a

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primary driver for the Silicon Carbide Power Semiconductor market. SiC devices enable higher efficiency in EV traction inverters, onboard chargers, and DC-DC converters, extending vehicle range and reducing battery costs. The superior thermal performance of SiC allows for smaller, lighter cooling systems, improving overall vehicle efficiency. The growing network of fast-charging stations requires high-power, high-efficiency components that SiC uniquely provides. As automotive manufacturers transition to 800V architectures for faster charging, SiC becomes essential for optimal performance. Government incentives and regulations supporting EV adoption further accelerate SiC demand.

Restraint:

High manufacturing costs and limited substrate availability

The significant manufacturing costs and limited substrate availability pose restraints to the Silicon Carbide Power Semiconductor market. Producing SiC wafers is more complex and expensive than silicon, requiring high-temperature processing and specialized equipment. Defect density in SiC crystals remains higher than silicon, reducing yields and increasing costs. The supply of high-quality SiC substrates is constrained by limited production capacity and the technical challenges of crystal growth. Scaling up manufacturing capacity requires substantial capital investment. These cost and supply constraints can limit the market competitiveness of SiC devices compared to silicon alternatives, potentially slowing adoption.

Opportunity:

Expansion into renewable energy and industrial applications

The expansion of SiC power semiconductors into renewable energy and industrial applications presents significant opportunities for market growth. Solar inverters and wind turbine converters benefit from SiC's higher efficiency and reliability, reducing energy losses and improving system performance. Industrial motor drives and power supplies can achieve substantial energy savings with SiC devices. Energy storage systems and grid infrastructure applications require the high voltage and temperature capabilities of SiC. As industries increasingly prioritize energy efficiency and sustainability, the demand for SiC in diverse power electronics applications continues to grow. This expansion creates substantial opportunities for SiC device manufacturers.

Threat:

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Competition from other wide-bandgap semiconductors

Competition from other wide-bandgap semiconductor technologies poses a significant threat to the SiC Power Semiconductor market. Gallium nitride (GaN) devices are gaining traction in applications below 650V, offering advantages in high-frequency switching and cost for certain applications. The market may segment between SiC and GaN based on voltage and application requirements. Other emerging wide-bandgap materials could potentially compete in specific applications. Investment in competing technologies may divert resources from SiC development and manufacturing capacity expansion. The technology landscape remains dynamic, requiring continuous innovation to maintain competitive position.

Covid-19 Impact:

The COVID-19 pandemic initially disrupted the Silicon Carbide Power Semiconductor market through supply chain interruptions, reduced automotive production, and project delays. However, the crisis also reinforced the importance of clean energy and sustainable technologies, with recovery packages including support for EV adoption and renewable energy. The pandemic highlighted the need for resilient, efficient energy systems. As economies recover, renewed focus on electrification and decarbonization has created favorable conditions for SiC technology adoption. The crisis has ultimately reinforced the long-term growth trajectory of the market.

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, driven by the essential role of these devices in high-power, high-efficiency applications including EV traction inverters and industrial power supplies. MOSFETs offer superior switching performance and efficiency gains compared to traditional IGBTs. The automotive industry's transition to SiC MOSFETs for 800V EV platforms creates substantial demand. The wide adoption across various voltage ranges and applications positions MOSFETs as the dominant device type. Ongoing technology improvements and cost reductions further support market leadership.

The 6-inch (150 mm) wafer segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the 6-inch wafer segment is predicted to witness the highest

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growth rate, due to the industry transition from 4-inch to 6-inch wafers for improved manufacturing efficiency and cost reduction. The larger wafer size enables higher device production per wafer, reducing unit costs. Major manufacturers are investing in 6-inch production capacity to meet growing demand. The transition to 6-inch wafers is essential for achieving competitive economics in high-volume applications. As production yields improve and costs decline, the 6-inch wafer segment continues to accelerate, positioning it for rapid market expansion.

Region with largest share:

During the forecast period, the North America region is expected to hold the largest market share, driven by the presence of leading SiC device manufacturers, strong EV adoption, and substantial investment in semiconductor manufacturing capacity. The region's leadership in EV production and charging infrastructure deployment creates significant SiC demand. Government support for semiconductor manufacturing and clean energy technologies contributes to market dominance. Additionally, the strong focus on energy efficiency and technological innovation further fuels SiC power semiconductor adoption in North America.

Region with highest CAGR:

Over the forecast period, the Asia Pacific region is anticipated to exhibit the highest CAGR, fueled by rapid EV adoption, growing renewable energy installations, and significant investment in semiconductor manufacturing across major economies. Countries such as China, Japan, and South Korea are heavily investing in SiC production capacity and electric vehicle manufacturing. The region's large automotive and electronics industries create substantial demand for SiC devices. Government initiatives supporting clean energy and semiconductor self-sufficiency further contribute to regional market growth.

Key players in the market

Some of the key players in the Silicon Carbide (SiC) Power Semiconductor Market include Wolfspeed Inc., onsemi, STMicroelectronics N.V., Infineon Technologies AG, ROHM Co. Ltd., Mitsubishi Electric Corporation, Fuji Electric Co. Ltd., Toshiba Electronic Devices & Storage Corporation, Microchip Technology Inc., Semikron Danfoss, GeneSiC Semiconductor Inc., Littelfuse Inc., Bosch Semiconductor, Coherent Corp., and SK Powertech Co. Ltd.

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Key Developments:

In February 2025, Wolfspeed announced a major expansion of its SiC wafer manufacturing capacity in North America, with a new 200mm production facility. The expansion aims to meet growing demand from automotive and industrial customers and reduce reliance on imported substrates.

In October 2024, STMicroelectronics announced the launch of a new generation of SiC MOSFETs featuring improved efficiency and reduced on-resistance for EV applications. The devices target 800V traction inverters and onboard chargers for next-generation electric vehicles.

Device Types Covered:

- SiC MOSFETs
- SiC Schottky Barrier Diodes (SBDs)
- SiC Junction Barrier Schottky (JBS) Diodes
- SiC Power Modules
- SiC Power Integrated Circuits (ICs)

Wafer Sizes Covered:

- 4-inch (100 mm)
- 6-inch (150 mm)
- 8-inch (200 mm)
- Above 8-inch

Wafer Types Covered:

- Conductive SiC Wafers

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Semi-Insulating SiC Wafers

Voltage Ranges Covered:

Below 650 V

650–1200 V

1201–1700 V

Above 1700 V

Applications Covered:

Electric Vehicles (EVs)

EV Charging Infrastructure

Renewable Energy Systems

Industrial Motor Drives

Power Supplies

Energy Storage Systems (ESS)

Rail Traction

Aerospace & Defense

Telecommunications

End Users Covered:

Automotive

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- Industrial
- Energy & Utilities
- Consumer Electronics
- Aerospace & Defense
- Telecommunications
- Healthcare
- Other End Users

Regions Covered:

- North America
  - United States
  - Canada
  - Mexico
- Europe
  - United Kingdom
  - Germany
  - France
  - Italy
  - Spain
  - Netherlands

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- Belgium
- Sweden
- Switzerland
- Poland
- Rest of Europe

Asia Pacific

- China
- Japan
- India
- South Korea
- Australia
- Indonesia
- Thailand
- Malaysia
- Singapore
- Vietnam
- Rest of Asia Pacific

South America

- Brazil

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- Argentina
- Colombia
- Chile
- Peru
- Rest of South America

Rest of the World (RoW)

- Middle East
  - Saudi Arabia
  - United Arab Emirates
  - Qatar
  - Israel
  - Rest of Middle East
- Africa
  - South Africa
  - Egypt
  - Morocco
  - Rest of Africa

What our report offers:

- Market share assessments for the regional and country-level segments

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- Strategic recommendations for the new entrants
- Covers Market data for the years 2023, 2024, 2025, 2026, 2027, 2028, 2030, 2032 and 2034
- 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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Note: Tables for North America, Europe, APAC, South America, and Rest of the World (RoW) are also represented in the same manner as above.

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