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Silicon Carbide Devices Market Forecasts to 2032 – Global Analysis By Device Type (SiC MOSFETs, SiC Diodes, SiC Power Modules, SiC Inverter Modules and Other Device Types), Manufacturing Process, Packaging Type, Supply Chain Tier, End User, and By Geography.

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Abstracts

According to Stratistics MRC, the Global Silicon Carbide Devices Market is accounted for $4.1 billion in 2025 and is expected to reach $21.3 billion by 2032 growing at a CAGR of 26.5% during the forecast period. Silicon carbide (SiC) devices are advanced semiconductor components engineered for superior thermal conductivity, durability, and high voltage performance. Encompassing MOSFETs, diodes, and power modules, they deliver significant efficiency gains compared to conventional silicon devices. Their unique material properties allow compact, lightweight, and energy efficient designs, making them ideal for demanding applications. Widely adopted in electric vehicles, renewable energy systems, and industrial power electronics, SiC devices enable faster switching, reduced energy losses, and enhanced reliability, driving next generation electrification and sustainable technology solutions.

Market Dynamics:

Driver:

Rising EV adoption boosts demand

Rising adoption of electric vehicles is a major driver of the Silicon Carbide (SiC) Devices market, as SiC semiconductors enable higher efficiency, faster switching, and improved

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thermal performance compared to silicon-based devices. SiC power modules are increasingly used in EV inverters, onboard chargers, and DC-DC converters to extend driving range and reduce energy losses. Fueled by government incentives, emission regulations, and OEM electrification strategies, EV production growth is directly accelerating demand for SiC MOSFETs and diodes.

Restraint:

High manufacturing and material costs

High manufacturing and raw material costs act as a key restraint in the Silicon Carbide Devices market. SiC wafer production is complex, capital-intensive, and characterized by lower yields compared to conventional silicon processing. Spurred by limited availability of high-quality SiC substrates, advanced epitaxy requirements, and costly fabrication equipment, device pricing remains elevated. These cost barriers can slow adoption among cost-sensitive applications and emerging EV manufacturers, despite the long-term efficiency and performance advantages offered by SiC-based power electronics.

Opportunity:

Expansion in renewable energy integration

Expansion in renewable energy integration presents a strong opportunity for the Silicon Carbide Devices market, particularly in solar inverters, wind power systems, and energy storage infrastructure. SiC devices support higher operating voltages, elevated temperatures, and superior power density, making them ideal for next-generation renewable energy converters. Driven by global decarbonization targets and grid modernization initiatives, demand for efficient power management solutions is rising. This creates long-term growth potential for SiC devices across utility-scale and distributed energy systems.

Threat:

Geopolitical and trade restrictions

Geopolitical tensions and trade restrictions pose a notable threat to the Silicon Carbide Devices market, given the concentration of raw material sourcing and manufacturing capabilities in specific regions. Export controls, tariffs, and cross-border regulatory

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constraints can disrupt SiC wafer supply and device distribution. Influenced by strategic competition in semiconductor technologies, such restrictions may increase costs and lead times. Prolonged geopolitical uncertainty could hinder capacity expansion plans and affect global adoption of SiC devices across automotive and energy sectors.

Covid-19 Impact:

The COVID-19 pandemic initially disrupted the Silicon Carbide Devices market through supply chain interruptions, fab slowdowns, and delays in automotive production. Short-term demand declined as EV manufacturing and renewable energy projects were postponed. However, recovery accelerated as governments prioritized clean mobility and energy transition initiatives. Post-pandemic investments in EV infrastructure, power electronics, and grid resilience strengthened demand, positioning SiC devices for sustained growth beyond the recovery phase.

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 its superior efficiency, high-voltage capability, and thermal performance compared to conventional silicon-based devices. Fueled by accelerating adoption in electric vehicles, fast-charging infrastructure, and renewable energy systems, SiC MOSFETs enable higher switching frequencies and reduced energy losses. Additionally, ongoing cost reductions and increased production capacity are reinforcing their large-scale deployment across industrial and power electronics applications.

The bulk SiC growth segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the bulk SiC growth segment is predicted to witness the highest growth rate, supported by increasing demand for high-quality substrates and wafers. Propelled by rising production of SiC-based power devices, this segment benefits from continuous advancements in crystal growth techniques and yield improvement. Furthermore, expanding fabrication capacity and strategic partnerships across the semiconductor value chain are accelerating adoption, positioning bulk SiC growth as a high-growth segment.

Region with largest share:

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During the forecast period, the Asia Pacific region is expected to hold the largest market share, attributed to the strong manufacturing base and high concentration of semiconductor foundries. Driven by rapid EV production growth, renewable energy deployment, and consumer electronics manufacturing in countries such as China, Japan, and South Korea, the region benefits from robust supply chains and favorable government policies supporting advanced power electronics adoption.

Region with highest CAGR:

Over the forecast period, the North America region is anticipated to exhibit the highest CAGR associated with increasing investments in electric mobility, grid modernization, and defense electronics. Fueled by strong R&D activities, technological innovation, and government support for domestic semiconductor manufacturing, the region is witnessing rapid commercialization of SiC devices. Consequently, North America is emerging as a high-growth market for silicon carbide technologies.

Key players in the market

Some of the key players in Silicon Carbide Devices Market include Wolfspeed, STMicroelectronics, Fuji Electric, ROHM Co., Ltd., Infineon Technologies, onsemi, Toshiba, Microchip Technology, Renesas Electronics, General Electric, GeneSiC, Alpha & Omega Semiconductor, Microsemi, Qorvo, Power Integrations, and Littelfuse.

Key Developments:

In September 2025, Wolfspeed announced the commercial launch of its 200mm Silicon Carbide materials portfolio, enabling large-scale manufacturing of SiC devices. This milestone strengthens Wolfspeed’s leadership in SiC substrates and supports next-generation EV and industrial power applications.

In April 2025, STMicroelectronics unveiled its new generation of SiC power technology tailored for next-generation EV traction inverters. The rollout across 750V and 1200V classes will expand SiC adoption from premium EVs to mid-size and compact models.

In April 2025, ROHM developed new high-power density SiC molded modules (4-in-1 and 6-in-1) optimized for onboard chargers (OBCs) in EVs. These modules improve heat dissipation and efficiency in compact designs.

Device Types Covered:

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- SiC MOSFETs
- SiC Diodes
- SiC Power Modules
- SiC Inverter Modules
- Other Device Types

Manufacturing Processes Covered:

- Bulk SiC Growth
- Epitaxial Layer Deposition
- Ion Implantation & Annealing
- Wafer Thinning & Dicing

Packaging Types Covered:

- Discrete Packages
- Power Modules
- Bare Die / Chip-on-Board
- Advanced Packaging

Supply Chain Tiers Covered:

- Wafer Suppliers
- Device Fabricators

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- Module Integrators
- OEM System Integrators

End Users Covered:

- Automotive OEMs
- Power Electronics Manufacturers
- Energy & Grid Operators
- Industrial Enterprises
- Aerospace & Defense

Regions Covered:

- North America
  - US
  - Canada
  - Mexico
- Europe
  - Germany
  - UK
  - Italy
  - France
  - Spain

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- 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

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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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Contents

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10 GLOBAL SILICON CARBIDE DEVICES MARKET, BY GEOGRAPHY

11 KEY DEVELOPMENTS

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12 COMPANY PROFILING

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List Of Tables

LIST OF TABLES

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Note: Tables for North America, Europe, APAC, South America, and Middle East & Africa Regions are also represented in the same manner as above.

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