

Silicon Carbide Modules Market Forecasts to 2034 – Global Analysis By Module Type (Half-Bridge Modules, Full-Bridge Modules, Multi-Level Modules, and Discrete Integrated Power Modules), Device Type, Voltage Range, Power Rating, Application, End User, Distribution Channel, and By Geography

<https://marketpublishers.com/r/SB02DC69AC54EN.html>

Date: April 2026

Pages: 200

Price: US\$ 4,150.00 (Single User License)

ID: SB02DC69AC54EN

Abstracts

According to Statistics MRC, the Global Silicon Carbide Modules Market is accounted for \$5.6 billion in 2026 and is expected to reach \$27.0 billion by 2034 growing at a CAGR of 21.7% during the forecast period. Silicon carbide (SiC) modules are advanced power semiconductor devices that enable superior efficiency, higher switching frequencies, and enhanced thermal management compared to traditional silicon-based solutions. These modules are critical components in electric vehicles, renewable energy systems, industrial motor drives, and power supplies. The market is expanding rapidly as industries transition toward energy-efficient technologies that reduce system size, weight, and overall operational costs while meeting stringent environmental regulations.

Market Dynamics:

Driver:

Rapid electrification of transportation

The accelerating shift toward electric vehicles (EVs) creates enormous demand for SiC modules, which deliver higher efficiency and extended driving range compared to silicon alternatives. EV manufacturers increasingly adopt SiC inverters and onboard chargers to achieve faster charging times and reduce battery pack weight. This technology

directly addresses consumer range anxiety while enabling automakers to meet tightening emissions standards. With major automotive OEMs committing to electrification roadmaps, the adoption curve for SiC modules steepens, supported by government incentives and expanding charging infrastructure worldwide.

Restraint:

High manufacturing costs and substrate limitations

SiC module production remains substantially more expensive than silicon equivalents due to complex crystal growth processes and limited substrate availability. Manufacturing requires specialized equipment and yields lower wafer output, constraining supply while demand accelerates. The high entry cost deters adoption in price-sensitive applications, particularly in emerging markets and consumer electronics segments. Although economies of scale are gradually reducing prices, the cost differential remains a significant barrier for manufacturers seeking to balance performance gains against bill-of-materials constraints.

Opportunity:

Expanding renewable energy infrastructure

Global investments in solar, wind, and energy storage systems create substantial opportunities for SiC modules, which significantly improve power conversion efficiency in inverters and grid-tied equipment. As renewable energy capacity expands, operators seek components that minimize conversion losses, reduce cooling requirements, and enhance system reliability under harsh operating conditions. SiC devices enable smaller, lighter inverters that lower installation costs and extend system lifetimes. This alignment with clean energy transitions positions SiC technology as a cornerstone of modern power infrastructure development.

Threat:

Intensifying competition from gallium nitride (GaN)

Wide-bandgap competitor GaN continues to advance in low-to-medium voltage applications, threatening SiC's market share in certain segments. GaN devices offer superior switching speeds and potentially lower manufacturing costs, particularly in consumer electronics and data center power supplies. As GaN supply chains mature

and device reliability improves, some applications that previously favored SiC may migrate. This competitive pressure could fragment the wide-bandgap market and intensify price competition, potentially slowing SiC's return on investment for manufacturers.

Covid-19 Impact:

The pandemic initially disrupted SiC module production through supply chain bottlenecks and temporary facility closures, delaying automotive and industrial projects. However, the recovery period accelerated electrification investments as governments prioritized green stimulus programs and semiconductor self-sufficiency initiatives. Consumer demand for EVs rebounded strongly, while renewable energy projects gained momentum. The crisis also exposed vulnerabilities in silicon-based supply chains, prompting manufacturers to diversify technologies and accelerate SiC capacity expansions that continue driving market growth.

The Half-Bridge Modules segment is expected to be the largest during the forecast period

Half-bridge modules are anticipated to hold the largest market share due to their versatile configuration, serving as fundamental building blocks in inverters, converters, and motor drives across automotive, industrial, and renewable energy applications. Their two-switch topology offers design flexibility while minimizing component count, reducing system complexity and reliability risks. High-volume production has optimized manufacturing processes, making half-bridge modules more cost-effective than specialized topologies. As electric vehicle powertrains and solar inverters continue scaling globally, this segment benefits from broad adoption across diverse end-use industries.

The SiC MOSFET Modules segment is expected to have the highest CAGR during the forecast period

SiC MOSFET modules are projected to witness the highest growth rate, driven by their superior performance in high-power, high-frequency applications where efficiency directly impacts system economics. These modules enable unipolar operation with extremely low switching losses, allowing designers to increase switching frequencies while reducing passive component sizes. Electric vehicle traction inverters represent the primary growth engine, with automakers transitioning to SiC MOSFET-based architectures. Additionally, industrial motor drives and high-power charging stations

increasingly adopt these modules, expanding their addressable market beyond early adopter segments.

Region with largest share:

North America is projected to hold the largest market share during the forecast period, supported by strong automotive electrification initiatives, advanced semiconductor manufacturing capabilities, and significant renewable energy investments. The region hosts leading SiC module manufacturers and electric vehicle producers, creating a vertically integrated ecosystem. Government policies promoting domestic semiconductor production and clean energy infrastructure further strengthen market positioning. Collaborative research between industry and national laboratories accelerates technology maturation, while robust venture capital funding fuels innovation across the SiC supply chain.

Region with highest CAGR:

Asia Pacific is expected to exhibit the highest CAGR, driven by concentrated electronics manufacturing, aggressive electric vehicle adoption, and substantial government support for semiconductor self-sufficiency. China, Japan, and South Korea lead in silicon carbide capacity expansion and EV production volumes, with domestic automakers rapidly integrating SiC modules into next-generation vehicles. The region's vast renewable energy deployment and industrial automation modernization create sustained demand. Cross-border supply chain integration and collaborative innovation initiatives position Asia Pacific as the fastest-growing regional market throughout the forecast period.

Key players in the market

Some of the key players in Quantum Communication Market include Infineon Technologies, Wolfspeed, STMicroelectronics, ON Semiconductor, ROHM Semiconductor, Mitsubishi Electric, Fuji Electric, Toshiba Electronic Devices, Semikron Danfoss, Hitachi Energy, General Electric, ABB Ltd, Bosch, Denso Corporation, and Microchip Technology.

Key Developments:

In February 2026, ON Semiconductor (onsemi) received a €450 million boost from the EU for its SiC power chip plant; while primarily for power, the expansion supports the

high-reliability infrastructure required for the 'quantum-grade' components and sensors used in satellite-based quantum communication.

In December 2025, ROHM Semiconductor signed a major GaN technology licensing agreement with TSMC, aimed at securing supply for AI and high-frequency communication infrastructure, which is foundational for the deployment of edge-based quantum encryption devices.

In September 2025, Microchip Technology launched PQC-ready controllers featuring immutable hardware support for algorithms like ML-DSA and ML-KEM, enabling secure boot and firmware verification that blends classical ECC with quantum-resistant standards.

Module Types Covered:

Half-Bridge Modules

Full-Bridge Modules

Multi-Level Modules

Discrete Integrated Power Modules

Device Types Covered:

SiC MOSFET Modules

SiC Diode Modules

Hybrid Modules

Voltage Ranges Covered:

Up to 1200 V

1200 V – 1700 V

1700 V – 3300 V

Above 3300 V

Power Ratings Covered:

Low Power

Medium Power

High Power

Applications Covered:

Automotive

Energy & Utilities

Industrial

Consumer Electronics

Aerospace & Defense

Rail Traction

End Users Covered:

Automotive Manufacturers

Energy & Power Companies

Industrial Manufacturing

Electronics & Semiconductor Industry

Other End Users

Distribution Channels Covered:

Direct Sales (OEMs)

Distributors & Channel Partners

Regions Covered:

North America

United States

Canada

Mexico

Europe

United Kingdom

Germany

France

Italy

Spain

Netherlands

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

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

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

Contents

1 EXECUTIVE SUMMARY

- 1.1 Market Snapshot and Key Highlights
- 1.2 Growth Drivers, Challenges, and Opportunities
- 1.3 Competitive Landscape Overview
- 1.4 Strategic Insights and Recommendations

2 RESEARCH FRAMEWORK

- 2.1 Study Objectives and Scope
- 2.2 Stakeholder Analysis
- 2.3 Research Assumptions and Limitations
- 2.4 Research Methodology
 - 2.4.1 Data Collection (Primary and Secondary)
 - 2.4.2 Data Modeling and Estimation Techniques
 - 2.4.3 Data Validation and Triangulation
 - 2.4.4 Analytical and Forecasting Approach

3 MARKET DYNAMICS AND TREND ANALYSIS

- 3.1 Market Definition and Structure
- 3.2 Key Market Drivers
- 3.3 Market Restraints and Challenges
- 3.4 Growth Opportunities and Investment Hotspots
- 3.5 Industry Threats and Risk Assessment
- 3.6 Technology and Innovation Landscape
- 3.7 Emerging and High-Growth Markets
- 3.8 Regulatory and Policy Environment
- 3.9 Impact of COVID-19 and Recovery Outlook

4 COMPETITIVE AND STRATEGIC ASSESSMENT

- 4.1 Porter's Five Forces Analysis
 - 4.1.1 Supplier Bargaining Power
 - 4.1.2 Buyer Bargaining Power
 - 4.1.3 Threat of Substitutes
 - 4.1.4 Threat of New Entrants

- 4.1.5 Competitive Rivalry
- 4.2 Market Share Analysis of Key Players
- 4.3 Product Benchmarking and Performance Comparison

5 GLOBAL SILICON CARBIDE MODULES MARKET, BY MODULE TYPE

- 5.1 Half-Bridge Modules
- 5.2 Full-Bridge Modules
- 5.3 Multi-Level Modules
- 5.4 Discrete Integrated Power Modules

6 GLOBAL SILICON CARBIDE MODULES MARKET, BY DEVICE TYPE

- 6.1 SiC MOSFET Modules
- 6.2 SiC Diode Modules
- 6.3 Hybrid Modules

7 GLOBAL SILICON CARBIDE MODULES MARKET, BY VOLTAGE RANGE

- 7.1 Up to 1200 V
- 7.2 1200 V – 1700 V
- 7.3 1700 V – 3300 V
- 7.4 Above 3300 V

8 GLOBAL SILICON CARBIDE MODULES MARKET, BY POWER RATING

- 8.1 Low Power
- 8.2 Medium Power
- 8.3 High Power

9 GLOBAL SILICON CARBIDE MODULES MARKET, BY APPLICATION

- 9.1 Automotive
 - 9.1.1 Electric Vehicles (EVs)
 - 9.1.2 Hybrid Electric Vehicles (HEVs)
 - 9.1.3 Charging Infrastructure
- 9.2 Energy & Utilities
 - 9.2.1 Solar Inverters
 - 9.2.2 Wind Power Systems

- 9.2.3 Energy Storage Systems
- 9.3 Industrial
 - 9.3.1 Motor Drives
 - 9.3.2 UPS Systems
 - 9.3.3 Industrial Automation
- 9.4 Consumer Electronics
- 9.5 Aerospace & Defense
- 9.6 Rail Traction

10 GLOBAL SILICON CARBIDE MODULES MARKET, BY END USER

- 10.1 Automotive Manufacturers
- 10.2 Energy & Power Companies
- 10.3 Industrial Manufacturing
- 10.4 Electronics & Semiconductor Industry
- 10.5 Other End Users

11 GLOBAL SILICON CARBIDE MODULES MARKET, BY DISTRIBUTION CHANNEL

- 11.1 Direct Sales (OEMs)
- 11.2 Distributors & Channel Partners

12 GLOBAL SILICON CARBIDE MODULES MARKET, BY GEOGRAPHY

- 12.1 North America
 - 12.1.1 United States
 - 12.1.2 Canada
 - 12.1.3 Mexico
- 12.2 Europe
 - 12.2.1 United Kingdom
 - 12.2.2 Germany
 - 12.2.3 France
 - 12.2.4 Italy
 - 12.2.5 Spain
 - 12.2.6 Netherlands
 - 12.2.7 Belgium
 - 12.2.8 Sweden
 - 12.2.9 Switzerland

- 12.2.10 Poland
- 12.2.11 Rest of Europe
- 12.3 Asia Pacific
 - 12.3.1 China
 - 12.3.2 Japan
 - 12.3.3 India
 - 12.3.4 South Korea
 - 12.3.5 Australia
 - 12.3.6 Indonesia
 - 12.3.7 Thailand
 - 12.3.8 Malaysia
 - 12.3.9 Singapore
 - 12.3.10 Vietnam
 - 12.3.11 Rest of Asia Pacific
- 12.4 South America
 - 12.4.1 Brazil
 - 12.4.2 Argentina
 - 12.4.3 Colombia
 - 12.4.4 Chile
 - 12.4.5 Peru
 - 12.4.6 Rest of South America
- 12.5 Rest of the World (RoW)
 - 12.5.1 Middle East
 - 12.5.1.1 Saudi Arabia
 - 12.5.1.2 United Arab Emirates
 - 12.5.1.3 Qatar
 - 12.5.1.4 Israel
 - 12.5.1.5 Rest of Middle East
 - 12.5.2 Africa
 - 12.5.2.1 South Africa
 - 12.5.2.2 Egypt
 - 12.5.2.3 Morocco
 - 12.5.2.4 Rest of Africa

13 STRATEGIC MARKET INTELLIGENCE

- 13.1 Industry Value Network and Supply Chain Assessment
- 13.2 White-Space and Opportunity Mapping
- 13.3 Product Evolution and Market Life Cycle Analysis

13.4 Channel, Distributor, and Go-to-Market Assessment

14 INDUSTRY DEVELOPMENTS AND STRATEGIC INITIATIVES

- 14.1 Mergers and Acquisitions
- 14.2 Partnerships, Alliances, and Joint Ventures
- 14.3 New Product Launches and Certifications
- 14.4 Capacity Expansion and Investments
- 14.5 Other Strategic Initiatives

15 COMPANY PROFILES

- 15.1 Infineon Technologies
- 15.2 Wolfspeed
- 15.3 STMicroelectronics
- 15.4 ON Semiconductor
- 15.5 ROHM Semiconductor
- 15.6 Mitsubishi Electric
- 15.7 Fuji Electric
- 15.8 Toshiba Electronic Devices
- 15.9 Semikron Danfoss
- 15.10 Hitachi Energy
- 15.11 General Electric
- 15.12 ABB Ltd
- 15.13 Bosch
- 15.14 Denso Corporation
- 15.15 Microchip Technology

List Of Tables

LIST OF TABLES

Table 1 Global Silicon Carbide Modules Market Outlook, By Region (2023–2034) (\$MN)

Table 2 Global Silicon Carbide Modules Market Outlook, By Module Type (2023–2034) (\$MN)

Table 3 Global Silicon Carbide Modules Market Outlook, By Half-Bridge Modules (2023–2034) (\$MN)

Table 4 Global Silicon Carbide Modules Market Outlook, By Full-Bridge Modules (2023–2034) (\$MN)

Table 5 Global Silicon Carbide Modules Market Outlook, By Multi-Level Modules (2023–2034) (\$MN)

Table 6 Global Silicon Carbide Modules Market Outlook, By Discrete Integrated Power Modules (2023–2034) (\$MN)

Table 7 Global Silicon Carbide Modules Market Outlook, By Device Type (2023–2034) (\$MN)

Table 8 Global Silicon Carbide Modules Market Outlook, By SiC MOSFET Modules (2023–2034) (\$MN)

Table 9 Global Silicon Carbide Modules Market Outlook, By SiC Diode Modules (2023–2034) (\$MN)

Table 10 Global Silicon Carbide Modules Market Outlook, By Hybrid Modules (2023–2034) (\$MN)

Table 11 Global Silicon Carbide Modules Market Outlook, By Voltage Range (2023–2034) (\$MN)

Table 12 Global Silicon Carbide Modules Market Outlook, By Up to 1200 V (2023–2034) (\$MN)

Table 13 Global Silicon Carbide Modules Market Outlook, By 1200 V – 1700 V (2023–2034) (\$MN)

Table 14 Global Silicon Carbide Modules Market Outlook, By 1700 V – 3300 V (2023–2034) (\$MN)

Table 15 Global Silicon Carbide Modules Market Outlook, By Above 3300 V (2023–2034) (\$MN)

Table 16 Global Silicon Carbide Modules Market Outlook, By Power Rating (2023–2034) (\$MN)

Table 17 Global Silicon Carbide Modules Market Outlook, By Low Power (2023–2034) (\$MN)

Table 18 Global Silicon Carbide Modules Market Outlook, By Medium Power (2023–2034) (\$MN)

Table 19 Global Silicon Carbide Modules Market Outlook, By High Power (2023–2034) (\$MN)

Table 20 Global Silicon Carbide Modules Market Outlook, By Application (2023–2034) (\$MN)

Table 21 Global Silicon Carbide Modules Market Outlook, By Automotive (2023–2034) (\$MN)

Table 22 Global Silicon Carbide Modules Market Outlook, By Electric Vehicles (EVs) (2023–2034) (\$MN)

Table 23 Global Silicon Carbide Modules Market Outlook, By Hybrid Electric Vehicles (HEVs) (2023–2034) (\$MN)

Table 24 Global Silicon Carbide Modules Market Outlook, By Charging Infrastructure (2023–2034) (\$MN)

Table 25 Global Silicon Carbide Modules Market Outlook, By Energy & Utilities (2023–2034) (\$MN)

Table 26 Global Silicon Carbide Modules Market Outlook, By Solar Inverters (2023–2034) (\$MN)

Table 27 Global Silicon Carbide Modules Market Outlook, By Wind Power Systems (2023–2034) (\$MN)

Table 28 Global Silicon Carbide Modules Market Outlook, By Energy Storage Systems (2023–2034) (\$MN)

Table 29 Global Silicon Carbide Modules Market Outlook, By Industrial (2023–2034) (\$MN)

Table 30 Global Silicon Carbide Modules Market Outlook, By Motor Drives (2023–2034) (\$MN)

Table 31 Global Silicon Carbide Modules Market Outlook, By UPS Systems (2023–2034) (\$MN)

Table 32 Global Silicon Carbide Modules Market Outlook, By Industrial Automation (2023–2034) (\$MN)

Table 33 Global Silicon Carbide Modules Market Outlook, By Consumer Electronics (2023–2034) (\$MN)

Table 34 Global Silicon Carbide Modules Market Outlook, By Aerospace & Defense (2023–2034) (\$MN)

Table 35 Global Silicon Carbide Modules Market Outlook, By Rail Traction (2023–2034) (\$MN)

Table 36 Global Silicon Carbide Modules Market Outlook, By End User (2023–2034) (\$MN)

Table 37 Global Silicon Carbide Modules Market Outlook, By Automotive Manufacturers (2023–2034) (\$MN)

Table 38 Global Silicon Carbide Modules Market Outlook, By Energy & Power

Companies (2023–2034) (\$MN)

Table 39 Global Silicon Carbide Modules Market Outlook, By Industrial Manufacturing (2023–2034) (\$MN)

Table 40 Global Silicon Carbide Modules Market Outlook, By Electronics & Semiconductor Industry (2023–2034) (\$MN)

Table 41 Global Silicon Carbide Modules Market Outlook, By Other End Users (2023–2034) (\$MN)

Table 42 Global Silicon Carbide Modules Market Outlook, By Distribution Channel (2023–2034) (\$MN)

Table 43 Global Silicon Carbide Modules Market Outlook, By Direct Sales (OEMs) (2023–2034) (\$MN)

Table 44 Global Silicon Carbide Modules Market Outlook, By Distributors & Channel Partners (2023–2034) (\$MN)

Note: Tables for North America, Europe, APAC, South America, and Rest of the World (RoW) Regions are also represented in the same manner as above.

I would like to order

Product name: Silicon Carbide Modules Market Forecasts to 2034 – Global Analysis By Module Type (Half-Bridge Modules, Full-Bridge Modules, Multi-Level Modules, and Discrete Integrated Power Modules), Device Type, Voltage Range, Power Rating, Application, End User, Distribution Channel, and By Geography

Product link: <https://marketpublishers.com/r/SB02DC69AC54EN.html>

Price: US\$ 4,150.00 (Single User License / Electronic Delivery)

If you want to order Corporate License or Hard Copy, please, contact our Customer Service:

info@marketpublishers.com

Payment

To pay by Credit Card (Visa, MasterCard, American Express, PayPal), please, click button on product page <https://marketpublishers.com/r/SB02DC69AC54EN.html>