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SiC Power Semiconductor Market Research Report – Forecast to 2032

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Description:

Global SiC Power Semiconductor Market Overview:

The SiC power semiconductor market size was valued at USD 0.2 billion in 2022. The SiC power semiconductor industry is projected to grow from USD 0.25 Billion in 2023 to USD 1.64 billion by 2032, exhibiting a compound annual growth rate (CAGR) of 26.30% during the forecast period (2023 - 2032). The expansion in R&D activities that target improved material capabilities and the rising penetration of electronic vehicles are the key market drivers expanding the market growth.

Global SiC Power Semiconductor Market Overview

Source: Secondary Research, Primary Research, MRFR Database, Analyst Review

SiC Power Semiconductor Market Trends

Rising penetration of electronic vehicles is driving the market growth

Market CAGR for SiC power semiconductor is being driven by rising initiatives such as growing acquisition by US DOE for NREL-Led analysis with an intent to decrease SiC power electronics manufacturing costs could further assist such trends and enhance the scope of a more robust market. The world is changing fast, and it is turning towards renewable energy. All sectors, government institutes, and market players are concentrating more on building electric vehicle infrastructure and inducing more demand for EVs.

As per the International Energy Agency (IEA), 16.5 million electric cars were on the street in 2021, a tripling in only three years, which is a big number compared to 2020. Electric car sales enhanced and doubled in China, continued to expand in Europe and peaked in the U.S. in 2021. This data indicates that there is a tremendous rise in the penetration of electric vehicles in the market, which may positively impact the environment and the SiC power semiconductor market. SiC is highly efficient at high voltages, allowing fast battery charging times comparable to filling conventional vehicles' tanks. Silicon carbide power electronics enable an increase in 800-volt drive systems, paving the path for lighter electric vehicles with greater range.

Additionally, several players are entering the market for SiC power semiconductors to tap the potential brought by the demand for cleantech. For instance, in April 2021, NoMIS Power Group declared that it plans to design, create and sell modules, SiC power semiconductor devices, and services for providing assistance to power management product developers driving the SiC power semiconductor market revenue.

The energy lost by SiC during the reverse healing phase is only 1% of the energy lost by silicon which completes a huge discrepancy in the efficiency of the material. The virtual absence of a tail current permits a faster turn-off, and it causes reduction losses. Since there is less energy to dissipate, a SiC device can switch at higher frequencies and enhance efficiency. The more small size, efficiency, and lower weight of SiC as compared to other materials can create a higher-rated solution or a smaller design with reduced cooling requirements. Thus, the beginning of SiC power semiconductors is a significant factor expected to drive the growth of the SiC power semiconductor market.

SiC Power Semiconductor Market Segment Insights:

SiC Power Semiconductor Devices Insights

The SiC power semiconductor market segmentation, based on devices, includes SiC discrete devices (MOSFETs, diode, and module) and SiC bare die devices. The SiC discrete devices segment dominated the market, accounting for the major market revenue over the forecast period. Several companies are launching SiC-based MOSFETs to benefit from a potential increase in demand from several industries.

August 2022: Toshiba Corporation introduced its 3rd generation 650V and 1200V silicon carbide MOSFETs, which reduced switching losses in industrial equipment by 20%.

SiC Power Semiconductor Application Insights

The SiC power semiconductor market segmentation, based on application, includes RF devices & cellular base stations, power supply & inverters, power grids, EV motors, industrial motor drives, railway traction, and others. The EV motor category generated the most income over the forecast period due to the growing adoption of SiC semiconductors in electric vehicles. Silicon Carbide (SiC) semiconductors offer characteristics such as durability for high-frequency switches and low energy losses, making them ideal for application in converters, chargers, and inverters.

Figure 1: SiC Power Semiconductor Market, by Application, 2022 & 2032 (USD billion)

SiC Power Semiconductor Market, by Application, 2022 & 2032

Source: Secondary Research, Primary Research, MRFR Database, and Analyst Review

SiC Power Semiconductor Wafer Size Insights

The SiC power semiconductor market segmentation, based on wafer size, includes 2-inch, 4-inch, and 6-inch & above. The 6-inch & above category generated the most income over the forecast period due to the commercial-scale production of silicon carbide wafers. These wafers also enable the fabrication of Gallium Nitride (GaN) devices, including power devices and Light Emitting Diodes (LED).

SiC Power Semiconductor End User Insights

The SiC power semiconductor market segmentation, based on end users, includes telecommunication, energy & power, automotive, industrial, electronics, and others. The energy & power segment will dominate the market over the forecast period. SiC semiconductor devices offer a wide range of benefits in the energy & power segment. For instance, silicon carbide (SiC) semiconductor devices such as diodes and MOSFETs reduce system costs, minimize component size, and enhance power efficiency in electric vehicle charging.

SiC Power Semiconductor Regional Insights

By Region, the study provides market insights into North America, Europe, Asia-Pacific, and Rest of the World. The Asia Pacific SiC power semiconductor market area will dominate this market. The presence of leading market players is expected to drive the market's growth in the region. The increasing investments in development and manufacturing across the region also contribute to market growth. For instance, in March 2022, Toshiba Electronic Components and Storage Co., Ltd. announced an investment worth JPY 100 billion (USD 839 million) in capacity expansion of power components.

Further, the major countries studied in the market report are The U.S., Canada, German, France, the UK, Italy, Spain, China, Japan, India, Australia, South Korea, and Brazil.

Figure 2: SiC POWER SEMICONDUCTOR MARKET SHARE BY REGION 2022 (%)

SIC POWER SEMICONDUCTOR MARKET SHARE BY REGION 2022

Source: Secondary Research, Primary Research, MRFR Database, and Analyst Review

North America SiC power semiconductor market accounts for the second-largest market share due to the concentration of prominent players in this region encourages power electronics manufacturers to adopt innovative SiC semiconductor devices for better efficiency. Moreover, leading regional players are taking strategic initiatives, driving the region's growth. Further, the US SiC power semiconductor market held the largest market share, and the Canada SiC power semiconductor market was the fastest-growing market in the European region.

The Europe SiC power semiconductor market is anticipated to grow at the fastest CAGR from 2023 to 2032. This is due to the rising adoption of advanced technologies and semiconductors across numerous sectors. Moreover, the German SiC power semiconductor market held the largest market share, and the UK SiC power semiconductor market was the fastest-growing market in the Europe region.

SiC Power Semiconductor Key Market Players & Competitive Insights

Leading market players are investing heavily in research and development to expand their product lines, which will help the SiC power semiconductor market grow even more. Market participants are also undertaking several strategic activities to expand their footprint, with important market developments including new product introduction, contractual agreements, mergers and acquisitions, higher investments, and collaboration with other organizations. To enhance and survive in a more competitive and rising market climate, the SiC power semiconductor industry must provide cost-effective items.

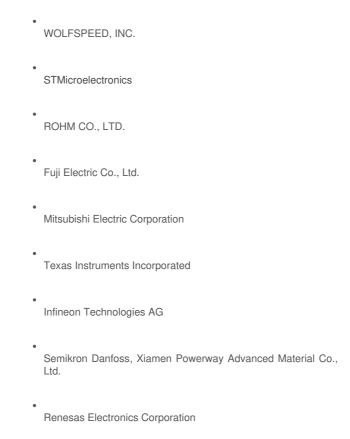
Manufacturing locally to minimize operational costs is one of the key business tactics manufacturers use in the SiC power semiconductor industry to benefit clients and increase the market sector. Major players in the SiC power semiconductor market, including WOLFSPEED, INC., STMicroelectronics, ROHM CO., LTD., Fuji Electric Co., Ltd., Mitsubishi Electric Corporation, Texas Instruments Incorporated, and others, are attempting to increase market demand by investing in research and development operations.

Hitachi Ltd (Hitachi) is an international conglomerate with a presence in information technology, electronics, power systems, social infrastructure, industrial systems, and construction machinery. The company manufactures and sells information and telecom systems, power systems, social and industrial systems, construction machinery, electronic systems, automotive systems, and intelligent life and eco-friendly

systems. In June 2021, Hitachi, a Japanese electronics company, plans to extend its existing existence in Hillsboro by building a huge semiconductor research lab to cooperate with manufacturing clients in the US to develop new technologies.

Infineon Technologies AG (Infineon) is a provider of semiconductor solutions. The company, through its subsidiaries, designs, develops, manufactures, and markets application-specific ICs, automotive system ICs, diodes, evaluation boards, electrostatic discharge protection, and electromagnetic interference protection products. It offers microcontrollers, radio frequency and wireless controls, security ICs, smart card ICs, sensors, interfaces, and transistor products. In April 2021, Infineon Technologies AG introduced a new EasyPACK 2B module to its 1200 V development line. The module shows a three-level Active NPC (ANPC) topology, such as TRENCHSTOP IGBT7 devices, CoolSiC MOSFETs, NTC temperature sensors, and PressFIT contact technology pins.

Key Companies in the SiC Power Semiconductor market include



SiC Power Semiconductor Industry Developments

July 2022: SemiQ introduced its 2nd Generation Silicon Carbide power switch, a 1200V $80m\Omega$ SiCMOSFET, enhancing its portfolio of SiCpower devices. The recent MOSFET complements the firm's existing SiCrectifiers at 650V, 1200V, and 1700V, which obtain high efficiency for high-performance applications such as electric vehicles.

May 2022: STMicroelectronics announced its partnership with Semikron for providing silicon carbide (SiC) technology for the eMPackelectric-vehicle (EV) power modules delivered by the company.

SiC Power Semiconductor Market Segmentation:

SiC Power Semiconductor Devices Outlook

SiC Discrete Devices

MOSFET

Diode

Module

SiC Bare Die Devices

SiC Power Semiconductor Application Outlook

•	RF Devices & Cellular Base Station	
•	Power Supply & Inverter	
•	Power Grids	
•	EV Motor	
•	Industrial Motor Drives	
•	Railway Traction	
•	Others	
SiC Power Semiconductor Wafer Size Outlook		
•	2-Inch	
•	4-Inch	
•	6-Inch And Above	
SiC Powe	er Semiconductor End User Outlook	
•	Telecommunication	
•	Energy & Power	
•	Automotive	
•	Industrial	
•	Electronics	
•	Others	
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North America

· US

Canada

Europe

Germany

France

UK

Italy

Spain

Rest of Europe

Asia-Pacific

China

Japan

• India

Australia

• South Korea

Australia

Rest of Asia-Pacific

Middle East

Africa

Latin America

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