Silicon Carbide Market by Device (SiC Discrete Device, SiC Module), Wafer Size (Up to 150 MM, >150 MM), End-Use Application (Automotive, Energy & Power, Transportation, Industrial, Telecommunications) and Region - Global Forecast to 2028

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Report description:

The global silicon carbide market was valued at USD 1.8 billion in 2022 and is projected to reach USD 11.1 billion by 2028; it is expected to register a CAGR of 36.4% during the forecast period. Higher mechanical, electrical, and thermal properties of SiC than regular silicon is driving the growth of the silicon carbide market, whereas availability of substitute materials such as gallium nitride are restraining the growth of silicon carbide market.

>150 mm segment is expected to grow at higher CAGR during forecast period
The market for >150 mm wafers is expected to grow at a higher CAGR of 123.5% during the forecast period. Most SiC power electronics, such as Schottky barrier diodes and MOSFETs, are built using 150 mm wafers. These fabrications take place in fully depreciated 150 mm fabs. The market for >150 mm and above wafer size is still in the process of gaining traction, and there are very few players that offer and manufacture them. These wafers can be used in a variety of SiC devices as SiC MOFETS and SiC modules as they are 50% thinner than the standard silicon wafers.

SiC module segment by wattage to register growth at higher CAGR
SiC module segment is expected to experience the higher CAGR of 38.1% % during the forecast period. SiC modules provide power supply efficiency with simpler cooling measures, small peripheral components for higher frequency operation, and supreme endurance. These modules are used in DC-DC solar inverters. SiC modules improve the efficiency of the device, facilitating high-frequency operations above 100 kHz. Furthermore, its features such as reduced size and cost, increased switching

frequency, and high switching speed are widely used in power supplies for photovoltaic (PV) power conditioners, industrial equipment, traction drives, and others.

Automotive segment is likely to grow at higher CAGR
Automotive segment is expected to experience the highest CAGR of 38.2% during the forecast period. The rising adoption of EVs/HEVs and electrified powertrains will boost the demand for silicon carbide devices. The rising use of high-efficiency SiC devices in automotive applications increases the operating time of battery-powered vehicles and reduces electricity consumption at wireless base stations and similar applications. SiC is gaining traction in automotive applications as the industry is shifting toward more efficient and sustainable transportation. Its unique properties make it suitable for these applications, and SiC-based components are expected to play an important role in the future of EVs and other electric vehicles. Electric vehicle (EV) sales increased in every region as production increased, oil prices hiked and targeted policies to reduce vehicle emissions have become stringent. According to the World Economic Forum, 10.6 million electric vehicles were sold. This adoption rate of EV is expected to have a growth in the coming years, with sales of ~21 million EVs by 2025.

North America to register growth at second highest CAGR
North America is expected to witness the second highest CAGR of 36.1% during the forecast period. North America is a home to major silicon carbide manufacturers and technology providers such as GeneSiC Semiconductor Inc., General Electric (US), and Microchip Technology Inc. The majority of silicon carbide startups operating in North America cater mainly to the domestic market. High adoption of silicon carbide in electric vehicles is anticipated to provide potential growth opportunities for silicon carbide vendors in the region. The presence of a broad consumer base and high industrial virility in the region act as catalysts for the growth of the silicon carbide market.

Breakdown of primaries
The study contains insights from various industry experts, ranging from component suppliers to Tier 1 companies and OEMs. The break-up of the primaries is as follows:

-□By Company Type - Tier 1 - 35%, Tier 2 - 45%, Tier 3 - 20%
-□By Designation- C-level Executives - 40%, Managers - 30%, Others - 30%
-□By Region-North America - 30%, Europe - 20%, Asia Pacific - 40%, RoW - 10%

The silicon carbide market is dominated by a few globally established players such as STMicroelectronics N.V. (Switzerland); Infineon Technologies AG (Germany); WOLFSPEED, INC. (North Carolina); □ON Semiconductor Corporation (Arizona); ROHM Co., Ltd. (Kyoto). The study includes an in-depth competitive analysis of these key players in the silicon carbide market, with their company profiles, recent developments, and key market strategies.

Research Coverage:
The report segments the silicon carbide market and forecasts its size, by device, wafer size, end-use application, and region. The report also discusses the drivers, restraints, opportunities, and challenges pertaining to the market. It gives a detailed view of the market across four main regions-North America, Europe, Asia Pacific, and RoW. Supply chain analysis has been included in the report, along with the key players and their competitive analysis in the silicon carbide ecosystem

Key Benefits to Buy the Report:
-□Analysis Of key drivers (Benefits of silicon carbide over silicon, Increasing use of SiC devices in power electronics, Higher mechanical, electrical, and thermal properties of SiC than regular silicon, Growing investments by governments, private organizations, research institutes, and manufacturers to increase SiC production). Restraint (Availability of substitute materials such as gallium nitride, High cost of raw materials and fabrication). Opportunity (Evolving renewable energy applications of SiC,

Increasing use of SiC in electric vehicles, Growing implementation of SiC devices in automotive and power device applications). Challenges (Material defects and designing and packaging issues in SiC power devices)
-Product Development/Innovation: Detailed insights on upcoming technologies, research & development activities, and new product launches in the silicon carbide market
-Market Development: Comprehensive information about lucrative markets - the report analyses the silicon carbide market across varied regions
-Market Diversification: Exhaustive information about new products & services, untapped geographies, recent developments, and investments in the silicon carbide market
-Competitive Assessment: In-depth assessment of market shares, growth strategies and service offerings of leading players like STMicroelectronics N.V. (Switzerland); Infineon Technologies AG (Germany); WOLFSPEED, INC. (North Carolina); ON Semiconductor Corporation (Arizona); ROHM Co., Ltd. (Kyoto); Fuji Electric Co., Ltd. (Tokyo);Toshiba Corporation (Tokyo); Hitachi Ltd. (Japan); and Microchip Technology Inc. (Arizona) among others in the silicon carbide market.

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