

# 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.

# **Table of Contents:**

1 INTRODUCTION 28 1.1 STUDY OBJECTIVES 28 1.2 MARKET DEFINITION 28 1.2.1 INCLUSIONS AND EXCLUSIONS 29 1.3 STUDY SCOPE 30 1.3.1 MARKETS COVERED 30 1.3.2 GEOGRAPHIC SCOPE 30 1.3.3 YEARS CONSIDERED 31 1.4 CURRENCY CONSIDERED 1.5 STAKEHOLDERS 31 1.6 SUMMARY OF CHANGES 32 2 RESEARCH METHODOLOGY 33 2.1 RESEARCH DATA 2.1.1 SECONDARY AND PRIMARY RESEARCH 35 2.1.2 SECONDARY DATA 36 2.1.2.1 Key secondary sources 36 2.1.2.2 Key data from secondary sources 36 2.1.3 PRIMARY DATA 37 2.1.3.1 Major primary interview participants 37 2.1.3.2 Breakdown of primaries 37 2.1.3.3 Key data from primary sources 38 2.1.3.4 Key industry insights 38 2.2 FACTOR ANALYSIS 39 2.2.1 SUPPLY-SIDE ANALYSIS 39 2.3 MARKET SIZE ESTIMATION 40 2.3.1 BOTTOM-UP APPROACH 41 2.3.1.1 Approach to obtain market share using bottom-up analysis (demand side) 41 2.3.2 TOP-DOWN APPROACH 42 2.3.2.1∏Approach to obtain market share using top-down analysis (supply side)∏42 2.3.3 GROWTH PROJECTION AND FORECAST-RELATED ASSUMPTIONS 43 TABLE 1 MARKET GROWTH ASSUMPTIONS 43 2.4 MARKET BREAKDOWN AND DATA TRIANGULATION 43 2.5 RESEARCH ASSUMPTIONS 44

TABLE 2 KEY ASSUMPTIONS: MACRO- AND MICRO-ECONOMIC ENVIRONMENT 44 2.5.1 RECESSION IMPACT ANALYSIS 45 TABLE 3[]PARAMETERS CONSIDERED TO ANALYZE IMPACT OF RECESSION ON SILICON CARBIDE MARKET[]45 2.6 STUDY LIMITATIONS 45 2.7 RISK ASSESSMENT 45 TABLE 4 RISK ASSESSMENT: SILICON CARBIDE MARKET 45 3 EXECUTIVE SUMMARY 46 3.1 IMPACT OF RECESSION ON SILICON CARBIDE MARKET 48 4 PREMIUM INSIGHTS 50 4.1∏ATTRACTIVE GROWTH OPPORTUNITIES FOR PLAYERS IN SILICON CARBIDE MARKET∏50 4.2 SILICON CARBIDE MARKET, BY DEVICE 4.3 SILICON CARBIDE MARKET FOR AUTOMOTIVE APPLICATIONS, BY REGION 51 4.4 SILICON CARBIDE MARKET, BY REGION 51 4.5 SILICON CARBIDE MARKET, BY COUNTRY 52 5 MARKET OVERVIEW 53 5.1 INTRODUCTION 53 5.2 MARKET DYNAMICS 54 5.2.1 DRIVERS 54 5.2.1.1 Benefits of silicon carbide over silicon 54 5.2.1.2 || Increasing use of SiC devices in power electronics || 55 5.2.1.3 Better mechanical, electrical, and thermal properties of SiC than regular silicon 56 TABLE 5[]SILICON CARBIDE (SIC) VS. SILICON (SI), BY CHARACTERISTIC AND MEASUREMENT[]56 5.2.1.4 Growing investments by governments, private organizations, research institutes, and manufacturers to increase SiC production[]57 5.2.2 RESTRAINTS 58 5.2.2.1 Availability of substitute materials such as gallium nitride 58 TABLE 6[]MATERIAL PROPERTY COMPARISON: SILICON CARBIDE (SIC) VS. SILICON (SI) VS. GALLIUM NITRIDE (GAN)[]59 5.2.2.2 High cost of raw materials and fabrication 59 5.2.3 OPPORTUNITIES 60 5.2.3.1 Evolving renewable energy applications of SiC 60 5.2.3.2∏Increasing use of SiC in electric vehicles∏60 5.2.3.3 Growing implementation of SiC devices in automotive and power device applications 60 5.2.4 CHALLENGES 61 5.2.4.1 Material defects and designing and packaging issues in SiC power devices 61 5.3 VALUE CHAIN ANALYSIS 62 TABLE 7 SILICON CARBIDE MARKET: ECOSYSTEM 63 5.4 REVENUE SHIFT AND NEW REVENUE POCKETS FOR PLAYERS IN SILICON CARBIDE MARKET 64 5.5 SILICON CARBIDE MARKET ECOSYSTEM 5.6 AVERAGE SELLING PRICE ANALYSIS 66 5.6.1 AVERAGE SELLING PRICE OF SILICON CARBIDE WAFERS 66 TABLE 8∏AVERAGE SELLING PRICE OF SIC WAFERS, BY SIZE (USD)∏66 5.6.2 AVERAGE SELLING PRICE TREND 66 TABLE 9⊓AVERAGE PRICE: SILICON CARBIDE, BY DEVICE (USD)⊓66 5.7 KEY STAKEHOLDERS AND BUYING CRITERIA 67 5.7.1 KEY STAKEHOLDERS IN BUYING PROCESS 67 TABLE 10 INFLUENCE OF STAKEHOLDERS ON BUYING PROCESS FOR TOP 3 END-USE APPLICATIONS (%) 68 5.7.2 BUYING CRITERIA 68

TABLE 11 KEY BUYING CRITERIA FOR TOP 3 END-USE APPLICATIONS 68 5.8 PORTER'S FIVE FORCES ANALYSIS 69 TABLE 12 SILICON CARBIDE MARKET: PORTER'S FIVE FORCES ANALYSIS 69 5.8.1 THREAT OF NEW ENTRANTS 70 5.8.2 THREAT OF SUBSTITUTES 71 5.8.3 BARGAINING POWER OF SUPPLIERS 71 5.8.4 BARGAINING POWER OF BUYERS 71 5.8.5 INTENSITY OF COMPETITIVE RIVALRY 71 5.9□CASE STUDIES□72 5.9.1 SEMIPOWEREX INCREASES SWITCHING FREQUENCY AND REDUCES COST BY USING QORVO'S SIC DEVICES 72 5.9.2∏SIGNET EV ACHIEVES HIGHER EFFICIENCY AND IMPROVES NOISE IMMUNITY AND DURABILITY BY DEPLOYING QORVO'S EASY-TO-USE SIC DIODES IN ITS FAST-CHARGING STATION∏72 5.10 TRADE ANALYSIS 73 5.10.1 IMPORT SCENARIO 73 TABLE 13 IMPORT DATA, BY COUNTRY, 2017-2021 (USD MILLION) 73 5.10.2 EXPORT SCENARIO 74 TABLE 14[EXPORT DATA, BY COUNTRY, 2017-2021 (USD MILLION)]74 5.11 PATENT ANALYSIS, 2012-2022 75 TABLE 15 KEY PATENTS PERTAINING TO SILICON CARBIDE MARKET, 2021-2023 76 5.12 KEY CONFERENCES AND EVENTS, 2023-2024 79 TABLE 16 SILICON CARBIDE MARKET: MAJOR CONFERENCES AND EVENTS 79 5.13 STANDARDS AND REGULATORY LANDSCAPE 80 5.13.1 ⊓REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER ORGANIZATIONS 180 TABLE 17 NORTH AMERICA: LIST OF REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER ORGANIZATIONS 80 TABLE 18 EUROPE: LIST OF REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER ORGANIZATIONS 81 TABLE 19∏ASIA PACIFIC: LIST OF REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER ORGANIZATIONS[]81 5.13.2 STANDARDS 81 5.14 TARIFF ANALYSIS 82 TABLE 20[]TARIFF FOR CARBIDES OF SILICON COVERED UNDER HS CODE 284920 EXPORTED BY CHINA (2021)[]82 TABLE 21∏TARIFF FOR CARBIDES OF SILICON COVERED UNDER HS CODE 284920 EXPORTED BY US (2021)∏82 6 APPLICATIONS OF SILICON CARBIDE 83 6.1 || INTRODUCTION || 83 6.2⊓RF DEVICES AND CELLULAR BASE STATIONS∏83 6.2.1 GROWING CONNECTIVITY AND CELLULAR TECHNOLOGY TO PROPEL MARKET 83 6.3 POWER GRID DEVICES 84 6.3.1 DEPLOYMENT OF SIC DEVICES IN POWER GRIDS FOR EFFICIENT POWER DISTRIBUTION TO FUEL GROWTH 84 6.4 FLEXIBLE AC TRANSMISSION SYSTEMS 6.4.1∏IMPLEMENTATION OF SIC IN FLEXIBLE AC TRANSMISSION SYSTEMS TO REDUCE POWER LOSS TO FUEL MARKET∏84 6.5□HIGH-VOLTAGE DIRECT CURRENT (HVDC) SYSTEMS□84 6.5.1 RISING USE OF HVDC SYSTEMS TO ACHIEVE LOW LOSSES TO INCREASE DEMAND FOR SIC DEVICES 84 6.6 POWER SUPPLIES AND INVERTERS 85 6.6.1 INTEGRATION OF SIC DEVICES INTO POWER SUPPLIES FOR IMPROVED POWER EFFICIENCY TO STIMULATE MARKET GROWTH∏85 6.7⊓LIGHTING CONTROLS⊓85 6.7.1 IMPLEMENTATION OF SIC TECHNOLOGY TO FABRICATE DURABLE LEDS TO ACCELERATE MARKET GROWTH 85 6.8 INDUSTRIAL MOTOR DRIVE 86 6.8.1 INCREASING USE OF SIC MODULES IN INDUSTRIAL MOTORS TO FUEL MARKET GROWTH 86

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6.9 FLAME DETECTORS 86 6.9.1 SURGING DEMAND FOR FLAME DETECTORS FOR HUMAN SAFETY TO FUEL MARKET GROWTH 86 6.10 EV MOTOR DRIVES 86 6.10.1 □ DEPLOYMENT OF SIC-BASED DEVICES IN EV MOTOR DRIVES TO BOOST MARKET □ 86 6.11 EV CHARGING SYSTEMS 87 6.11.1 GROWING PRODUCTION OF ELECTRIC VEHICLES TO FUEL SIC MARKET GROWTH 87 6.12 ELECTRONIC COMBAT SYSTEMS 6.12.1 CAPABILITY TO OPERATE AT HIGH TEMPERATURES WITH HIGH SWITCHING FREQUENCY PROPELS DEMAND FOR SILICON CARBIDE∏87 6.13 WIND TURBINES 87 6.13.1∏UTILIZATION OF SIC DEVICES IN WIND TURBINES TO REDUCE ENERGY LOSS AND COST TO FUEL MARKET∏87 6.14 SOLAR POWER SYSTEMS 88 6.14.1 TRISING DEMAND FOR SIC DEVICES IN SOLAR POWER SYSTEMS TO FUEL MARKET GROWTH 188 6.15 OTHERS 88 7 SILICON CARBIDE MARKET, BY WAFER SIZE 89 7.1 INTRODUCTION 90 TABLE 22 SILICON CARBIDE MARKET, BY WAFER SIZE, 2019-2022 (USD MILLION) 90 TABLE 23 SILICON CARBIDE MARKET, BY WAFER SIZE, 2023-2028 (USD MILLION) 191 TABLE 24 SILICON CARBIDE MARKET, BY WAFER SIZE, 2019-2022 (THOUSAND UNITS) 191 TABLE 25⊓SILICON CARBIDE MARKET, BY WAFER SIZE, 2023-2028 (THOUSAND UNITS)∏91 7.2 UP TO 150 MM 92 7.2.1 HIGH RESISTANCE TO THERMAL SHOCKS TO BOOST NEED FOR 150 MM SIC WAFERS 92 TABLE 26□CHARACTERISTICS OF SIC WAFERS, BY DIAMETER□92 7.3□>150 MM□92 7.3.1 GROWING NEED FOR COMPACT AND MORE EFFICIENT SIC DEVICES TO ACCELERATE USE OF >150 MM WAFERS 92 8 SILICON CARBIDE MARKET, BY DEVICE 93 8.1 INTRODUCTION 94 TABLE 27 SILICON CARBIDE MARKET, BY DEVICE, 2019-2022 (USD MILLION) 94 TABLE 28[SILICON CARBIDE MARKET, BY DEVICE, 2023-2028 (USD MILLION)[]94 8.2 SIC DISCRETE DEVICE 95 8.2.1 SIC DIODE 95 8.2.1.1 [Increasing adoption of SiC diodes in commercial products to fuel segmental growth [95 8.2.2 SIC MOSFET 96 8.2.2.1 Rising need for SiC MOSFETs in automotive sector to boost segmental growth 96 TABLE 29∏SILICON CARBIDE MARKET, BY SIC DISCRETE DEVICE TYPE, 2019-2022 (USD MILLION)∏97 TABLE 30 SILICON CARBIDE MARKET, BY SIC DISCRETE DEVICE TYPE, 2023-2028 (USD MILLION) 97 TABLE 31∏SIC DISCRETE DEVICE: SILICON CARBIDE MARKET, BY REGION, 2019-2022 (USD MILLION)∏98 TABLE 32∏SIC DISCRETE DEVICE: SILICON CARBIDE MARKET, BY REGION, 2023-2028 (USD MILLION)∏98 TABLE 33[]ASIA PACIFIC: SILICON CARBIDE MARKET FOR SIC DISCRETE DEVICES, BY COUNTRY, 2019-2022 (USD MILLION)[]99 TABLE 34∏ASIA PACIFIC: SILICON CARBIDE MARKET FOR SIC DISCRETE DEVICES, BY COUNTRY, 2023-2028 (USD MILLION)∏99 TABLE 35[]EUROPE: SILICON CARBIDE MARKET FOR SIC DISCRETE DEVICES, BY COUNTRY, 2019-2022 (USD MILLION)[]99 TABLE 36[]EUROPE: SILICON CARBIDE MARKET FOR SIC DISCRETE DEVICES, BY COUNTRY, 2023-2028 (USD MILLION)[]100 TABLE 37 NORTH AMERICA: SILICON CARBIDE MARKET FOR SIC DISCRETE DEVICES, BY COUNTRY, 2019-2022 (USD MILLION) 100 TABLE 38[NORTH AMERICA: SILICON CARBIDE MARKET FOR SIC DISCRETE DEVICES, BY COUNTRY, 2023-2028 (USD MILLION)[100 TABLE 39[REST OF THE WORLD: SILICON CARBIDE MARKET FOR SIC DISCRETE DEVICES, BY REGION, 2019-2022 (USD MILLION)[]100 TABLE 40 REST OF THE WORLD: SILICON CARBIDE MARKET FOR SIC DISCRETE DEVICES, BY REGION, 2023-2028 (USD MILLION) 101 8.3 SIC MODULE 101

8.3.1 INTEGRATION OF SIC POWER DEVICES INTO INDUSTRIAL POWER EQUIPMENT TO DRIVE MARKET [101 TABLE 41 ASIA PACIFIC: SILICON CARBIDE MARKET FOR SIC MODULES, BY COUNTRY, 2019-2022 (USD MILLION) 102 TABLE 42 ASIA PACIFIC: SILICON CARBIDE MARKET FOR SIC MODULES, BY COUNTRY, 2023-2028 (USD MILLION) 102 TABLE 43 EUROPE: SILICON CARBIDE MARKET FOR SIC MODULES, BY COUNTRY, 2019-2022 (USD MILLION) 102 TABLE 44 EUROPE: SILICON CARBIDE MARKET FOR SIC MODULES, BY COUNTRY, 2023-2028 (USD MILLION) 103 TABLE 45 NORTH AMERICA: SILICON CARBIDE MARKET FOR SIC MODULES, BY COUNTRY, 2019-2022 (USD MILLION) 103 TABLE 46 NORTH AMERICA: SILICON CARBIDE MARKET FOR SIC MODULES, BY COUNTRY, 2019-2022 (USD MILLION) 103 TABLE 46 NORTH AMERICA: SILICON CARBIDE MARKET FOR SIC MODULES, BY COUNTRY, 2019-2022 (USD MILLION) 103 TABLE 47 REST OF THE WORLD: SILICON CARBIDE MARKET FOR SIC MODULES, BY COUNTRY, 2023-2028 (USD MILLION) 103 TABLE 48 REST OF THE WORLD: SILICON CARBIDE MARKET FOR SIC MODULES, BY REGION, 2019-2022 (USD MILLION) 103 TABLE 48 REST OF THE WORLD: SILICON CARBIDE MARKET FOR SIC MODULES, BY REGION, 2023-2028 (USD MILLION) 103

9.1 INTRODUCTION 106

TABLE 49[SILICON CARBIDE MARKET, BY END-USE APPLICATION, 2019-2022 (USD MILLION)[]106 TABLE 50[SILICON CARBIDE MARKET, BY END-USE APPLICATION, 2023-2028 (USD MILLION)[]107 9.2[]AUTOMOTIVE[]107

9.2.1 RAPID ADOPTION OF ELECTRIC VEHICLES TO PROPEL MARKET 107

TABLE 51[]AUTOMOTIVE: SILICON CARBIDE MARKET, BY REGION, 2019-2022 (USD MILLION)[]108 TABLE 52[]AUTOMOTIVE: SILICON CARBIDE MARKET, BY REGION, 2023-2028 (USD MILLION)[]109 9.3[]ENERGY & POWER[]109

9.3.1 RENEWABLE POWER GENERATION 109

9.3.1.1 Increasing use of SiC in wind turbines, solar inverters, and EV chargers to boost market 109 TABLE 53 ENERGY & POWER: SILICON CARBIDE MARKET, BY REGION, 2019-2022 (USD MILLION) 110 TABLE 54 ENERGY & POWER: SILICON CARBIDE MARKET, BY REGION, 2023-2028 (USD MILLION) 110 9.4 INDUSTRIAL 111

9.4.1 HIGH STRENGTH, WEAR RESISTANCE, AND THERMAL CONDUCTIVITY FEATURES TO INCREASE SIC DEMAND IN INDUSTRIAL APPLICATIONS 111

TABLE 55[INDUSTRIAL: SILICON CARBIDE MARKET, BY REGION, 2019-2022 (USD MILLION)[]111 TABLE 56[INDUSTRIAL: SILICON CARBIDE MARKET, BY REGION, 2023-2028 (USD MILLION)[]112 9.5[]TRANSPORTATION[]112

9.5.1 CHARGING STATIONS 112

9.5.1.1 Rising adoption of SiC devices in charging stations due to their resistance to thermal and electrical stress 112 9.5.2 RAIL 113

9.5.2.1 Growing implementation of SiC for increased safety and efficiency and reduced maintenance requirements 113 TABLE 57 TRANSPORTATION: SILICON CARBIDE MARKET, BY REGION, 2019-2022 (USD MILLION) 113 TABLE 58 TRANSPORTATION: SILICON CARBIDE MARKET, BY REGION, 2023-2028 (USD MILLION) 114

9.6 TELECOMMUNICATIONS 114

9.6.1 RADAR SYSTEMS, RF ELECTRONICS, AND WIRELESS DATA TECHNOLOGY TO BE POTENTIAL APPLICATIONS OF SIC IN TELECOMMUNICATIONS 114

TABLE 59[]TELECOMMUNICATIONS: SILICON CARBIDE MARKET, BY REGION, 2019-2022 (USD MILLION)[]115 TABLE 60[]TELECOMMUNICATIONS: SILICON CARBIDE MARKET, BY REGION, 2023-2028 (USD MILLION)[]116 9.7[]OTHERS[]116

TABLE 61\_OTHERS: SILICON CARBIDE MARKET, BY REGION, 2019-2022 (USD MILLION)\_116 TABLE 62\_OTHERS: SILICON CARBIDE MARKET, BY REGION, 2023-2028 (USD MILLION)\_117

10 SILICON CARBIDE MARKET, BY REGION 118

10.1 INTRODUCTION 119

TABLE 63[]SILICON CARBIDE MARKET, BY REGION, 2019-2022 (USD MILLION)[]120

TABLE 64[]SILICON CARBIDE MARKET, BY REGION, 2023-2028 (USD MILLION)[]120 10.2[]NORTH AMERICA[]121

TABLE 65[]NORTH AMERICA: SILICON CARBIDE MARKET, BY COUNTRY, 2019-2022 (USD MILLION)]122 TABLE 66[]NORTH AMERICA: SILICON CARBIDE MARKET, BY COUNTRY, 2023-2028 (USD MILLION)[]122 TABLE 67∏NORTH AMERICA: SILICON CARBIDE MARKET, BY END-USE APPLICATION, 2019-2022 (USD MILLION)∏122 TABLE 68[NORTH AMERICA: SILICON CARBIDE MARKET, BY END-USE APPLICATION, 2023-2028 (USD MILLION)[123] TABLE 69[NORTH AMERICA: SILICON CARBIDE MARKET, BY DEVICE, 2019-2022 (USD MILLION)[123 TABLE 70 NORTH AMERICA: SILICON CARBIDE MARKET, BY DEVICE, 2023-2028 (USD MILLION) 124 10.2.1 US 124 10.2.1.1 Prominent presence of various silicon carbide manufacturers to foster growth 124 TABLE 71[US: SILICON CARBIDE MARKET, BY DEVICE, 2019-2022 (USD MILLION)[]125 TABLE 72 US: SILICON CARBIDE MARKET, BY DEVICE, 2023-2028 (USD MILLION) 125 10.2.2 CANADA 125 10.2.2.1 Government initiatives promoting use of EVs to increase demand for SiC devices TABLE 73 CANADA: SILICON CARBIDE MARKET, BY DEVICE, 2019-2022 (USD MILLION) TABLE 74 CANADA: SILICON CARBIDE MARKET, BY DEVICE, 2023-2028 (USD MILLION) 10.2.3 MEXICO 126 10.2.3.1 Growing distribution network of SiC device manufacturers to expedite market growth 126 TABLE 75[]MEXICO: SILICON CARBIDE MARKET, BY DEVICE, 2019-2022 (USD MILLION)[]126

TABLE 75[]MEXICO: SILICON CARBIDE MARKET, BY DEVICE, 2019-2022 (USD MILLION)[]126 TABLE 76[]MEXICO: SILICON CARBIDE MARKET, BY DEVICE, 2023-2028 (USD MILLION)[]126 10.2.4[]IMPACT OF RECESSION ON SILICON CARBIDE MARKET IN NORTH AMERICA[]127 10.3[]EUROPE[]127

TABLE 77 EUROPE: SILICON CARBIDE MARKET, BY COUNTRY, 2019-2022 (USD MILLION) 128 TABLE 78 EUROPE: SILICON CARBIDE MARKET, BY COUNTRY, 2023-2028 (USD MILLION) 129 TABLE 79 EUROPE: SILICON CARBIDE MARKET, BY END-USE APPLICATION, 2019-2022 (USD MILLION) 129 TABLE 80 EUROPE: SILICON CARBIDE MARKET, BY END-USE APPLICATION, 2023-2028 (USD MILLION) 129 TABLE 81 EUROPE: SILICON CARBIDE MARKET, BY DEVICE, 2019-2022 (USD MILLION) 130 TABLE 82 EUROPE: SILICON CARBIDE MARKET, BY DEVICE, 2023-2028 (USD MILLION) 130 TABLE 82 EUROPE: SILICON CARBIDE MARKET, BY DEVICE, 2023-2028 (USD MILLION) 130 10.3.1 UK 131

10.3.1.1 Presence of top automotive companies to provide opportunities for SiC device manufacturers 131 TABLE 83 UK: SILICON CARBIDE MARKET, BY DEVICE, 2019-2022 (USD MILLION) 131 TABLE 84 UK: SILICON CARBIDE MARKET, BY DEVICE, 2023-2028 (USD MILLION) 131

10.3.2[]GERMANY[]132

10.3.2.1 Germany to dominate European silicon carbide market during forecast period 132 TABLE 85 GERMANY: SILICON CARBIDE MARKET, BY DEVICE, 2019-2022 (USD MILLION) 132 TABLE 86 GERMANY: SILICON CARBIDE MARKET, BY DEVICE, 2023-2028 (USD MILLION) 132 10.3.3 FRANCE 133

10.3.3.1[Adoption of renewable energy to drive market]]133

TABLE 87[]FRANCE: SILICON CARBIDE MARKET, BY DEVICE, 2019-2022 (USD MILLION)[]133 TABLE 88[]FRANCE: SILICON CARBIDE MARKET, BY DEVICE, 2023-2028 (USD MILLION)[]133 10.3.4[]REST OF EUROPE[]133

TABLE 89 REST OF EUROPE: SILICON CARBIDE MARKET, BY DEVICE, 2019-2022 (USD MILLION) 134 TABLE 90 REST OF EUROPE: SILICON CARBIDE MARKET, BY DEVICE, 2023-2028 (USD MILLION) 134 10.3.5 IMPACT OF RECESSION ON SILICON CARBIDE MARKET IN EUROPE 134 10.4 ASIA PACIFIC 135

TABLE 91[ASIA PACIFIC: SILICON CARBIDE MARKET, BY COUNTRY, 2019-2022 (USD MILLION)[]136 TABLE 92[]ASIA PACIFIC: SILICON CARBIDE MARKET, BY COUNTRY, 2023-2028 (USD MILLION)[]137 TABLE 93[]ASIA PACIFIC: SILICON CARBIDE MARKET, BY END-USE APPLICATION, 2019-2022 (USD MILLION)[]137 TABLE 94[]ASIA PACIFIC: SILICON CARBIDE MARKET, BY END-USE APPLICATION, 2023-2028 (USD MILLION)[]137

TABLE 95[]ASIA PACIFIC: SILICON CARBIDE MARKET, BY DEVICE, 2019-2022 (USD MILLION)[]138 TABLE 96[]ASIA PACIFIC: SILICON CARBIDE MARKET, BY DEVICE, 2023-2028 (USD MILLION)[]138 10.4.1 CHINA 139 10.4.1.1 Mass production of electric vehicles to foster demand for SiC devices 139 TABLE 97□CHINA: SILICON CARBIDE MARKET, BY DEVICE, 2019-2022 (USD MILLION)□140 TABLE 98⊓CHINA: SILICON CARBIDE MARKET, BY DEVICE, 2023-2028 (USD MILLION)∏140 10.4.2 JAPAN 140 10.4.2.1 Increasing R&D on SiC devices to propel market 140 TABLE 99[]APAN: SILICON CARBIDE MARKET, BY DEVICE, 2019-2022 (USD MILLION)[]141 TABLE 100 APAN: SILICON CARBIDE MARKET, BY DEVICE, 2023-2028 (USD MILLION) 141 10.4.3 SOUTH KOREA 142 10.4.3.1 Large-scale consumer electronics and automobile manufacturing to spur demand for SiC devices TABLE 101⊓SOUTH KOREA: SILICON CARBIDE MARKET, BY DEVICE, 2019-2022 (USD MILLION)∏142 TABLE 102 SOUTH KOREA: SILICON CARBIDE MARKET, BY DEVICE, 2023-2028 (USD MILLION) 142 10.4.4 REST OF ASIA PACIFIC 143 TABLE 103 REST OF ASIA PACIFIC: SILICON CARBIDE MARKET, BY DEVICE, 2019-2022 (USD MILLION) 143 TABLE 104 REST OF ASIA PACIFIC: SILICON CARBIDE MARKET, BY DEVICE, 2023-2028 (USD MILLION) 144 10.4.5□IMPACT OF RECESSION ON SILICON CARBIDE MARKET IN ASIA PACIFIC□144 10.5 REST OF THE WORLD 145 TABLE 105∏REST OF THE WORLD: SILICON CARBIDE MARKET, BY DEVICE, 2019-2022 (USD MILLION)∏145 TABLE 106 REST OF THE WORLD: SILICON CARBIDE MARKET, BY DEVICE, 2023-2028 (USD MILLION) 145 TABLE 107 REST OF THE WORLD: SILICON CARBIDE MARKET, BY END-USE APPLICATION, 2019-2022 (USD MILLION) 145 TABLE 108∏REST OF THE WORLD: SILICON CARBIDE MARKET, BY END-USE APPLICATION, 2023-2028 (USD MILLION)∏146 10.5.1 MIDDLE EAST & AFRICA 146 10.5.1.1 Increasing renewable energy production to induce market growth 146 TABLE 109∏MIDDLE EAST & AFRICA: SILICON CARBIDE MARKET, BY DEVICE, 2019-2022 (USD MILLION)∏147 TABLE 110 MIDDLE EAST & AFRICA: SILICON CARBIDE MARKET, BY DEVICE, 2023-2028 (USD MILLION) 147 10.5.2 SOUTH AMERICA 147 10.5.2.1 Growing telecom industry to lead to increased demand for SiC devices 147 TABLE 111∏SOUTH AMERICA: SILICON CARBIDE MARKET, BY DEVICE, 2019-2022 (USD MILLION)∏147 TABLE 112∏SOUTH AMERICA: SILICON CARBIDE MARKET, BY DEVICE, 2023-2028 (USD MILLION)∏148 10.5.3 IMPACT OF RECESSION ON SILICON CARBIDE MARKET IN REST OF THE WORLD 148 11 COMPETITIVE LANDSCAPE 149 11.1 OVERVIEW 149 11.2 MARKET EVALUATION FRAMEWORK 149 TABLE 113 OVERVIEW OF STRATEGIES DEPLOYED BY KEY SILICON CARBIDE DEVICE PROVIDERS 149 11.2.1 PRODUCT PORTFOLIO 150 11.2.2 REGIONAL FOCUS 150 11.2.3 MANUFACTURING FOOTPRINT 150 11.2.4 ORGANIC/INORGANIC STRATEGIES 150 11.3 MARKET SHARE ANALYSIS, 2022 150 TABLE 114 SILICON CARBIDE MARKET: MARKET SHARE ANALYSIS (2022) 150 11.4 FIVE-YEAR COMPANY REVENUE ANALYSIS 11.5 COMPANY EVALUATION QUADRANT 152 11.5.1 STARS 152 11.5.2 EMERGING LEADERS 152 11.5.3 PERVASIVE PLAYERS 152

11.5.4 PARTICIPANTS 153 11.6[]STARTUPS/SMALL AND MEDIUM-SIZED ENTERPRISES (SMES) EVALUATION QUADRANT[]154 TABLE 115 SILICON CARBIDE MARKET: DETAILED LIST OF KEY STARTUPS/SMES 154 TABLE 116 STARTUPS/SMALL AND MEDIUM-SIZED ENTERPRISES (SMES) IN SILICON CARBIDE MARKET 154 TABLE 117 SILICON CARBIDE MARKET: COMPETITIVE BENCHMARKING OF KEY STARTUPS/SMES (END-USE APPLICATION FOOTPRINT)⊓156 TABLE 118 SILICON CARBIDE MARKET: COMPETITIVE BENCHMARKING OF KEY STARTUPS/ SMES (DEVICE FOOTPRINT) TABLE 119[]SILICON CARBIDE MARKET: COMPETITIVE BENCHMARKING OF KEY STARTUPS/ SMES (REGION FOOTPRINT)[]157 11.6.1 PROGRESSIVE COMPANIES 157 11.6.2 RESPONSIVE COMPANIES 157 11.6.3 DYNAMIC COMPANIES 157 11.6.4 STARTING BLOCKS 157 11.7 COMPANY FOOTPRINT 159 TABLE 120 COMPANY FOOTPRINT 159 TABLE 121 COMPANY-WISE END-USE APPLICATION FOOTPRINT 160 TABLE 122 COMPANY-WISE VERTICAL FOOTPRINT 161 TABLE 123 COMPANY-WISE REGION FOOTPRINT 162 11.8 COMPETITIVE SCENARIOS AND TRENDS 163 11.8.1 PRODUCT LAUNCHES 163 TABLE 124 PRODUCT LAUNCHES, JANUARY 2020-MARCH 2023 163 11.8.2 DEALS 168 TABLE 125 DEALS, JANUARY 2020-MARCH 2023 168 11.8.3 OTHERS 174 TABLE 126 OTHERS, JANUARY 2020-MARCH 2023 174 12 COMPANY PROFILES 176 12.1 KEY PLAYERS 176 (Business Overview, Products/Services/Solutions Offered, MnM View, Key Strengths and Right to Win, Strategic Choices Made, Weaknesses and Competitive Threats, Recent Developments)\* 12.1.1 WOLFSPEED, INC. 176 TABLE 127 WOLFSPEED, INC.: COMPANY SNAPSHOT 176 TABLE 128 WOLFSPEED, INC.: PRODUCTS OFFERED 177 TABLE 129 WOLFSPEED, INC.: PRODUCT LAUNCHES AND DEVELOPMENTS 178 TABLE 130 WOLFSPEED, INC.: DEALS 178 12.1.2 STMICROELECTRONICS N.V. 181 TABLE 131 STMICROELECTRONICS N.V.: COMPANY SNAPSHOT 181 TABLE 132 STMICROELECTRONICS N.V.: PRODUCTS OFFERED 182 TABLE 133 STMICROELECTRONICS N.V.: PRODUCT LAUNCHES AND DEVELOPMENTS 183 TABLE 134 STMICROELECTRONICS N.V.: DEALS 184 12.1.3 ON SEMICONDUCTOR CORPORATION 187 TABLE 135 ON SEMICONDUCTOR CORPORATION: COMPANY SNAPSHOT 187 TABLE 136 ON SEMICONDUCTOR CORPORATION: PRODUCTS OFFERED 188 TABLE 137[ON SEMICONDUCTOR CORPORATION: PRODUCT LAUNCHES AND DEVELOPMENTS]189 TABLE 138 ON SEMICONDUCTOR CORPORATION: DEALS 189 12.1.4 INFINEON TECHNOLOGIES AG 191 TABLE 139 INFINEON TECHNOLOGIES AG: COMPANY SNAPSHOT 191 TABLE 140□INFINEON TECHNOLOGIES AG: PRODUCTS OFFERED□192 TABLE 141 INFINEON TECHNOLOGIES AG: PRODUCT LAUNCHES AND DEVELOPMENTS 193

TABLE 142 INFINEON TECHNOLOGIES AG: DEALS 194 12.1.5 ROHM CO., LTD 196 TABLE 143 ROHM CO., LTD.: COMPANY SNAPSHOT 196 TABLE 144 ROHM CO., LTD.: PRODUCTS OFFERED 197 TABLE 145 ROHM CO., LTD.: PRODUCT LAUNCHES AND DEVELOPMENTS 198 TABLE 146⊓ROHM CO., LTD.: DEALS⊓198 12.1.6 FUJI ELECTRIC CO., LTD. 201 TABLE 147 FUJI ELECTRIC CO., LTD.: COMPANY SNAPSHOT 201 TABLE 148 FUJI ELECTRIC CO., LTD.: PRODUCTS OFFERED 202 TABLE 149 FUI ELECTRIC CO., LTD.: PRODUCT LAUNCHES AND DEVELOPMENTS 203 TABLE 150 FUI ELECTRIC CO., LTD.: DEALS 204 12.1.7 TOSHIBA CORPORATION 205 TABLE 151 TOSHIBA CORPORATION: COMPANY SNAPSHOT 205 TABLE 152 TOSHIBA CORPORATION: PRODUCTS OFFERED 206 TABLE 153 TOSHIBA CORPORATION: PRODUCT LAUNCHES AND DEVELOPMENTS 207 12.1.8 MICROCHIP TECHNOLOGY INC. 209 TABLE 154 MICROCHIP TECHNOLOGY INC.: COMPANY SNAPSHOT 209 TABLE 155□MICROCHIP TECHNOLOGY INC.: PRODUCTS OFFERED□210 TABLE 156 MICROCHIP TECHNOLOGY INC.: PRODUCT LAUNCHES AND DEVELOPMENTS 211 TABLE 157 MICROCHIP TECHNOLOGY INC.: DEALS 212 12.1.9 MITSUBISHI ELECTRIC CORPORATION 213 TABLE 158[MITSUBISHI ELECTRIC CORPORATION: COMPANY SNAPSHOT]213 TABLE 159 MITSUBISHI ELECTRIC CORPORATION: PRODUCTS OFFERED 214 TABLE 160[]MITSUBISHI ELECTRIC CORPORATION: PRODUCT LAUNCHES AND DEVELOPMENTS[]215 \*Business Overview, Products/Services/Solutions Offered, MnM View, Key Strengths and Right to Win, Strategic Choices Made, Weaknesses and Competitive Threats, Recent Developments might not be captured in case of unlisted companies. 12.2 OTHER PLAYERS 217 12.2.1 HITACHI LTD. 217 TABLE 161 HITACHI LTD 217 12.2.2 COHERENT CORP. (II-VI INCORPORATED) 218 TABLE 162□COHERENT CORP.□218 12.2.3 SEMIKRON DANFOSS 219 TABLE 163 SEMIKRON DANFOSS 219 12.2.4 QORVO, INC. 219 TABLE 164 QORVO, INC.: COMPANY SNAPSHOT 219 12.2.5 GENESIC SEMICONDUCTOR INC. 220 TABLE 165 GENESIC SEMICONDUCTOR INC. 220 12.2.6 TT ELECTRONICS 221 TABLE 166 TT ELECTRONICS 221 12.2.7 VISHAY INTERTECHNOLOGY, INC. 222 TABLE 167 VISHAY INTERTECHNOLOGY, INC. 222 12.2.8 WEEN SEMICONDUCTORS 223 TABLE 168 WEEN SEMICONDUCTORS 223 12.2.9 SOLITRON DEVICES, INC. 224 TABLE 169 SOLITRON DEVICES, INC. 224 12.3 CHINA-SPECIFIC KEY PLAYERS 225 12.3.1 SANAN INTEGRATED CIRCUIT CO., LTD. 225

TABLE 170 SANAN INTEGRATED CIRCUIT CO., LTD. 225 12.3.2 SHANGHAI HANXIN TECHNOLOGY 225 TABLE 171 SHANGHAI HANXIN TECHNOLOGY 225 12.3.3 CENTURY JINGUANG 226 TABLE 172 CENTURY JINGUANG 226 12.3.4∏GLOBAL POWER TECHNOLOGY CO., LTD. (TYCO TIANRUN SEMICONDUCTOR TECHNOLOGY CO., LTD.)∏227 TABLE 173 GLOBAL POWER TECHNOLOGY CO., LTD. 227 12.3.5 BYD SEMICONDUCTOR CO., LTD 227 TABLE 174 BYD SEMICONDUCTOR CO., LTD 227 12.3.6 INVENTCHIP TECHNOLOGY CO., LTD 228 TABLE 175 INVENTCHIP TECHNOLOGY CO., LTD 228 12.3.7 CRRC CORPORATION LIMITED 229 TABLE 176 CRRC CORPORATION LIMITED 229 13 APPENDIX 230 13.1 DISCUSSION GUIDE 230 13.2 KNOWLEDGESTORE: MARKETSANDMARKETS' SUBSCRIPTION PORTAL 233 13.3 CUSTOMIZATION OPTIONS 235 13.4 RELATED REPORTS 235 13.5 AUTHOR DETAILS 236



# 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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