Silicon Carbide (SiC) Power Devices

ANMD-MRS7-066 · Advanced Semiconductor Applications

A Global Sustainability Due Diligence & Market Research Study

History 2020–2024 · Base Year 2025 · Forecast 2025–2032 · Outlooks 2035 / 2040 / 2050 · Currency US$

WHY THIS REPORT

Silicon carbide power devices are the wide-bandgap workhorses of high-efficiency power electronics — the SiC MOSFETs, diodes and modules that switch faster, run hotter and lose less energy than legacy silicon in EV traction, fast charging, solar inverters and grid systems. This decision-grade study sizes the global market three ways — value, unit volume and GW switched — across device type, voltage class and wafer size, across seven regions and four scenarios to 2032, with outlooks to 2050.

SUSTAINABILITY & SDG IMPACT — THE ANMD LENS

Sustainability is this report's backbone, not an afterthought. SiC's core contribution is measurable energy-loss reduction and system-level efficiency across every powertrain, charger and inverter it enters, translating into avoided emissions over device lifetimes.

Mapped Sustainable Development Goals:

SDG 7	SDG 9	SDG 12	SDG 13
Affordable & Clean Energy	Industry, Innovation & Infrastructure	Responsible Consumption	Climate Action

Measurable sustainability outcomes assessed:

- Energy-loss reduction and system-level efficiency
- Avoided emissions over device lifetimes
- Range and density gains from efficiency
- Crystal-growth energy, sourcing and end-of-life as material risks

Framework alignment: Double materiality mapped to GRI, SASB, ISSB, TCFD, TNFD, CSRD and the EU Taxonomy, with greenwashing and SDG-washing screens applied throughout.

WHAT'S INSIDE AT A GLANCE

53 Chapters	**9** Report Parts	**7** Regions Covered	**40+** Country Markets
2025–32 Forecast Horizon	**4** Forward Scenarios	**25+** Companies Profiled	**4** SDGs Mapped

REPORT COVERAGE

Geographic scope: North America, Europe, Asia Pacific, Latin America, Africa, Middle East and Rest of World — with named country intelligence. North America leads substrate and capacity; Europe drives automotive adoption; Asia Pacific is the volume and China-capacity engine; other regions assessed on their own merits.

MARKET OVERVIEW

From premium niche to mainstream power — where wide-bandgap efficiency becomes structural decarbonisation.

SiC is moving from premium niche to mainstream power. Demand is driven by 800 V EV architectures, fast charging and renewable inverters, with substrate supply and the 200 mm wafer transition central to cost and availability. The market is read three ways — value, unit volume and GW switched — and forecast under four scenarios, each region reported separately.

- **North America leads substrate and capacity** — United States, on vertically integrated SiC and CHIPS-Act-backed fab expansion
- **Europe drives automotive adoption** — Germany, France and Italy, on SiC embedded in 800 V traction inverters
- **Asia Pacific is the volume and China-capacity engine** — Japan, China and South Korea, on rapid SiC build-out for EV scale
- **Substrate supply is the differentiator** — SiC wafer cost, quality and the 150-to-200 mm transition gate device economics

REGIONAL OUTLOOK

Across seven reporting regions, the report separates leading markets from high-growth and emerging ones — each profiled in full rather than aggregated into Rest of World.

Region	Stage	Lead Markets & Drivers
North America	Substrate leader	United States — vertical SiC, CHIPS fabs
Europe	Automotive driver	Germany, France, Italy — 800 V traction
Asia Pacific	Volume & China capacity	Japan, China, South Korea — EV scale
Latin America	Emerging	Brazil, Mexico — EV assembly, industrial drives
Africa	Frontier	South Africa — solar inverters, grid stability
Middle East	Frontier	Saudi Arabia, UAE — solar inverters, sovereign investment

KEY MARKET DRIVERS & RESTRAINTS

Drivers	Restraints
• 800 V EV architectures & fast charging	• SiC substrate cost & supply tightness
• Renewable inverter efficiency demand	• Wafer-quality & defect-density limits
• Energy-loss reduction & net-zero pull	• Long automotive qualification cycles
• 200 mm wafer transition & cost decline	• Silicon-vs-SiC cost crossover timing
• Grid & industrial power upgrades	• Capital intensity of vertical integration

SEGMENTATION SNAPSHOT

By Device Type	SiC MOSFETs · SiC diodes · SiC power modules
By Voltage Class	650 V · 1200 V · 1700 V+ high-voltage
By Application	EV powertrain · fast charging · solar inverters · industrial · grid
By End User	Automotive OEMs · charging-infra · utilities · industrial OEMs
By Wafer Size	150 mm · 200 mm transition
By Business Model	Device sale · IP licensing · foundry · vertical integration

TABLE OF CONTENTS — PARTS & CHAPTERS

The full report is organised into nine parts across 53 chapters, listed below. Detailed sub-headings, country tables and directories are provided in the full report.

Part V — Company, Competition, Patent and Project Intelligence

Part VI — Sustainability, ESG, SDG, Climate and Natural-Capital Intelligence

Part VII — Supply Chain, Policy, Legal, Economics and Finance

Part VIII — Scenario, Future Intelligence and Final Due Diligence Verdict

Part IX — Annexes, Directories and Reference Material

COMPETITIVE & INVESTMENT SNAPSHOT

The competitive field spans vertically integrated substrate makers and wide-bandgap device houses. Deal activity — long-term substrate supply deals, capacity expansions and OEM co-development — signals a market consolidating around secured wafer supply and automotive-qualified SiC platforms.

Representative players profiled in the full report:

Wolfspeed, Inc. · Infineon Technologies AG · STMicroelectronics N.V. · ON Semiconductor Corporation · ROHM Co., Ltd. · Mitsubishi Electric Corporation · Robert Bosch GmbH · and 18+ further profiled players.

Investment intelligence: venture, infrastructure, development, climate and blended finance, green bonds and sustainability-linked loans — culminating in a bankability assessment and a conditional investment view.

KEY QUESTIONS THIS REPORT ANSWERS

- How large is the global SiC power devices market, and how fast will it grow to 2032?
- Which regions, countries and segments offer the strongest risk-adjusted opportunity?
- How does wide-bandgap efficiency change value versus legacy silicon?
- Who leads, and where is the competitive and patent white space?
- Is the investment case bankable — and under what conditions?
- How does the category align with the SDGs, energy transition and disclosure regulation?

WHY ANMD — THE DIFFERENCE

Most market studies stop at units and revenue. This report is built as a sustainability due diligence instrument — fusing market sizing with ESG, SDG, climate, water and natural-capital intelligence and a decision-ready bankability view in a single architecture.

- **Triangulated sizing** — every market read three ways so value, volume and the physical-unit views reconcile rather than conflict.
- **Region-honest forecasting** — Latin America, Africa and the Middle East reported in full, never hidden inside Rest of World, every forecast resolved to the 2025 base year.
- **Integrated evidence base** — company, patent and project databases linked to the analysis, with published-filing patents and FTO treated as an indicator, not a legal conclusion.
- **No-fabrication discipline** — every estimate carries a data-confidence rating and disclosed sources; gaps are flagged for further diligence, never filled with invented numbers.
- **Anti-greenwashing rigour** — SDG-washing and greenwashing screens plus claim-substantiation checks built into the ESG and project analysis.
- **Decision-first structure** — 9 Parts and 53 Chapters culminating in stakeholder playbooks and a clear, conditional investment view.

WHO SHOULD BUY THIS REPORT

Investors, OEMs, charging-infrastructure developers, utilities, foundries, lenders and policymakers, and strategic corporate planners and decision-makers.

Access the Full Report

The complete report delivers all 53 chapters in full, with every sub-heading, country table, company and patent directory, forecast model and due diligence checklist.

Purchase at **www.anewmarketdynamics.com** · Standard & Premium licences · Single-Site (SSL) and Global-Site (GSL) options at checkout.

Want the Complete Detailed Table of Contents?

This prospectus lists the nine parts and 53 chapters. The complete detailed table of contents — every sub-heading, country table, exhibit, company and patent directory and annex — is available on request to registered users. To receive it, register with your official company email at **www.anewmarketdynamics.com**. The full detailed table of contents will be sent directly to your registered company email address.