

# 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:

<b>SDG 7</b> Affordable & Clean Energy	<b>SDG 9</b> Industry, Innovation & Infrastructure	<b>SDG 12</b> Responsible Consumption	<b>SDG 13</b> 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

<b>53</b> Chapters	<b>9</b> Report Parts	<b>7</b> Regions Covered	<b>40+</b> Country Markets
<b>2025–32</b> Forecast Horizon	<b>4</b> Forward Scenarios	<b>25+</b> Companies Profiled	<b>4</b> 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
<ul style="list-style-type: none"> <li>• 800 V EV architectures &amp; fast charging</li> <li>• Renewable inverter efficiency demand</li> <li>• Energy-loss reduction &amp; net-zero pull</li> <li>• 200 mm wafer transition &amp; cost decline</li> <li>• Grid &amp; industrial power upgrades</li> </ul>	<ul style="list-style-type: none"> <li>• SiC substrate cost &amp; supply tightness</li> <li>• Wafer-quality &amp; defect-density limits</li> <li>• Long automotive qualification cycles</li> <li>• Silicon-vs-SiC cost crossover timing</li> <li>• Capital intensity of vertical integration</li> </ul>

## SEGMENTATION SNAPSHOT

<b>By Device Type</b>	SiC MOSFETs · SiC diodes · SiC power modules
<b>By Voltage Class</b>	650 V · 1200 V · 1700 V+ high-voltage
<b>By Application</b>	EV powertrain · fast charging · solar inverters · industrial · grid
<b>By End User</b>	Automotive OEMs · charging-infra · utilities · industrial OEMs
<b>By Wafer Size</b>	150 mm · 200 mm transition
<b>By Business Model</b>	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 I — Report Foundation, Discovery and Strategic Intelligence

- › Chapter 1. Scope, Methodology and Report Architecture
- › Chapter 2. Industry Discovery Summary — Silicon Carbide (SiC) Power Devices
- › Chapter 3. Executive Intelligence and Decision Dashboard
- › Chapter 4. Strategic Findings, Materiality and Investment Verdict Preview

### Part II — Market Intelligence, Sizing, Forecasting and Segmentation

- › Chapter 5. Industry Overview and Market Evolution
- › Chapter 6. Market Dynamics
- › Chapter 7. Global Market Size and Forecast, 2020–2032
- › Chapter 8. Market Segmentation Analysis
- › Chapter 9. End-User and Demand-Side Intelligence
- › Chapter 10. Pricing, Cost and Commercial Model Intelligence

### Part III — Regional and Country Intelligence

- › Chapter 11. Global Regional Intelligence Framework
- › Chapter 12. North America Market Intelligence
- › Chapter 13. Europe Market Intelligence
- › Chapter 14. Asia Pacific Market Intelligence
- › Chapter 15. Latin America Market Intelligence
- › Chapter 16. Africa Market Intelligence
- › Chapter 17. Middle East Market Intelligence
- › Chapter 18. Rest of World Market Intelligence

### Part IV — Technology, Innovation and Category-Specific Intelligence

- › Chapter 19. Technology Landscape and Architecture
- › Chapter 20. Emerging and Next-Generation Technology Intelligence
- › Chapter 21. Category-Specific Intelligence Module
- › Chapter 22. Research, Innovation and Funding Landscape

## Part V — Company, Competition, Patent and Project Intelligence

- › Chapter 23. Competitive Landscape
- › Chapter 24. Company Profiles
- › Chapter 25. Mergers, Acquisitions, Partnerships and Ecosystem Intelligence
- › Chapter 26. Patent Landscape and Intellectual Property Intelligence
- › Chapter 27. Project, Deployment and Case-Study Intelligence

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

- › Chapter 28. Sustainability Intelligence Suite
- › Chapter 29. ESG Intelligence and Double Materiality
- › Chapter 30. ESG and Sustainability Framework Alignment
- › Chapter 31. SDG Intelligence
- › Chapter 32. Carbon, Net-Zero and Climate-Mitigation Intelligence
- › Chapter 33. Water, Biodiversity and Natural-Capital Intelligence
- › Chapter 34. Circular Economy and Resource-Security Intelligence
- › Chapter 35. Social Impact, Human Capital and Community Intelligence
- › Chapter 36. Climate Risk, Adaptation and Resilience Intelligence

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

- › Chapter 37. Value Chain, Supply Chain and Geopolitical Intelligence
- › Chapter 38. Policy, Regulation and Incentive Intelligence
- › Chapter 39. Legal, Contracting and Risk-Allocation Intelligence
- › Chapter 40. Unit Economics, CAPEX, OPEX and Return Analysis
- › Chapter 41. Investment, Sustainable Finance and Bankability Intelligence

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

- › Chapter 42. Scenario Analysis and Future Intelligence
- › Chapter 43. Sustainability Due Diligence Framework and Data-Room Index
- › Chapter 44. Risk Register, RAG Rating and Anti-Greenwashing Screen
- › Chapter 45. Bottom-Line Verdict and Strategic Recommendations
- › Chapter 46. Implementation Roadmap and Stakeholder Playbooks

## Part IX — Annexes, Directories and Reference Material

- › Chapter 47. Methodology Annex
- › Chapter 48. Corporate Directory and Company Intelligence Annex
- › Chapter 49. Patent Directory and Patent Intelligence Annex
- › Chapter 50. Project Intelligence Annex
- › Chapter 51. Forecast Annex
- › Chapter 52. Sustainability KPI Annex
- › Chapter 53. Reference Annexes

## 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](http://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](http://www.anewmarketdynamics.com). The full detailed table of contents will be sent directly to your registered company email address.