

Data Center Power Semiconductor Market Forecasts to 2034 – Global Analysis By Semiconductor Type (Power MOSFETs, IGBTs, Insulated Gate Bipolar Transistors, Diodes, Power Integrated Circuits and Other Semiconductor Types), Material, Function, Equipment, Data Center Type and Geography

<https://marketpublishers.com/r/DABC94ACBD14EN.html>

Date: October 2026

Pages: 200

Price: US\$ 4,150.00 (Single User License)

ID: DABC94ACBD14EN

Abstracts

According to Statistics MRC, the Global Data Center Power Semiconductor Market is accounted for \$6.2 billion in 2026 and is expected to reach \$16.8 billion by 2034 growing at a CAGR of 13.3% during the forecast period. Data Center Power Semiconductor comprises semiconductor devices used for power conversion, regulation, switching, protection, and energy management throughout data center infrastructure. These components include power MOSFETs, insulated-gate bipolar transistors, silicon carbide devices, gallium nitride devices, rectifiers, power management ICs, voltage regulators, and other power semiconductor technologies. They are deployed in servers, power supplies, UPS systems, power distribution equipment, voltage regulators, cooling infrastructure, and backup power systems. Growing AI and high-performance computing workloads increase rack power density and create demand for efficient power conversion with reduced energy losses and improved thermal performance. The market is supported by data center expansion, cloud computing, AI infrastructure, and the transition toward higher-efficiency power architectures. Innovation focuses on wide-bandgap semiconductors, higher switching frequencies, improved power density, lower conduction losses, advanced packaging, and integrated power-management solutions designed for high-current AI computing systems.

Market Dynamics

Driver:**Growing data center power requirements and efficiency demands**

Unprecedented growth in data center power consumption, driven by AI workloads and cloud computing expansion, is creating substantial demand for power semiconductors that enable efficient power conversion and management. Rising electricity costs and sustainability commitments are driving demand for power semiconductors with higher efficiency and lower losses. Growing power densities in AI data centers require power semiconductors capable of handling higher currents and voltages. Regulatory requirements for data center energy efficiency support adoption of advanced power semiconductors. Continued data center capacity expansion drives volume growth for power semiconductors.

Restraint:**High costs of wide-bandgap semiconductors**

High costs of silicon carbide and gallium nitride power semiconductors present significant barriers to widespread adoption, particularly in cost-sensitive applications. Limited availability of wide-bandgap semiconductor substrates constrains production capacity and increases costs. Manufacturing complexity for wide-bandgap devices affects yield and production economics. Design and qualification requirements for new semiconductor technologies extend development timelines. Competition from traditional silicon-based solutions limits wide-bandgap adoption in certain applications.

Opportunity:**Wide-bandgap semiconductor adoption for efficiency**

Growing adoption of silicon carbide and gallium nitride power semiconductors for high-efficiency applications presents significant opportunities for market expansion. Wide-bandgap semiconductors offer superior efficiency, higher switching frequencies, and improved thermal performance compared to silicon devices. Development of cost-effective wide-bandgap solutions enables broader adoption across data center power applications. Growing investment in wide-bandgap semiconductor manufacturing expands production capacity and reduces costs. Wide-bandgap semiconductors are increasingly essential for achieving data center efficiency targets.

Threat:

Competition from alternative power architectures

Competition from alternative power architectures and emerging technologies may limit growth in certain power semiconductor applications. Economic pressures may affect data center capital investment decisions and power semiconductor demand.

Technology transitions may render existing power semiconductor designs obsolete. Geopolitical tensions may disrupt supply chains for power semiconductor materials and components. Consolidation among power semiconductor vendors may affect market dynamics.

Covid-19 Impact:

The COVID-19 pandemic accelerated digital transformation and cloud adoption, driving increased demand for data center capacity and power semiconductors. Supply chain disruptions highlighted the importance of power semiconductor availability for maintaining data center operations. The post-pandemic period has witnessed sustained investment in data center infrastructure, supporting power semiconductor demand growth. Growing focus on AI and cloud computing continues driving market expansion. Power semiconductor efficiency has become increasingly critical for data center sustainability.

The power MOSFETs segment is expected to be the largest during the forecast period

The power MOSFETs segment is expected to account for the largest market share during the forecast period as MOSFETs are widely used in power conversion applications across data center power systems. Growing demand for efficient DC-DC conversion in server power supplies drives MOSFET consumption. Advances in MOSFET technology improve efficiency and switching performance. Established application knowledge and supply infrastructure support segment leadership. Power MOSFETs are essential for all data center power conversion applications.

The silicon carbide segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the silicon carbide segment is predicted to witness the highest growth rate driven by increasing adoption of SiC power semiconductors for high-efficiency applications. SiC devices offer superior efficiency and thermal performance compared to silicon, enabling more compact and efficient power conversion. Growing

demand for high-voltage power conversion in AI data centers supports segment growth. Advances in SiC manufacturing reduce costs and expand application possibilities. Silicon carbide is increasingly preferred for demanding data center power applications.

Region with largest share:

During the forecast period, the Asia Pacific region is expected to hold the largest market share owing to the dominant semiconductor manufacturing base and growing data center capacity in China, Japan, South Korea, and Taiwan. The region hosts major power semiconductor manufacturers with extensive production capacity. Growing data center investment across the region drives power semiconductor demand. Government support for semiconductor manufacturing reinforces regional market leadership. Continued digital infrastructure development drives market growth.

Region with highest CAGR:

Over the forecast period, the Asia Pacific region is anticipated to exhibit the highest CAGR driven by continued data center capacity expansion and semiconductor manufacturing growth. China is investing heavily in domestic semiconductor production, creating substantial new demand for power semiconductors. Southeast Asian countries are expanding data center capacity and semiconductor manufacturing. Growing investment in AI infrastructure accelerates power semiconductor demand. Regional supply chain development supports market growth.

Key players in the market

Some of the key players in the Data Center Power Semiconductor Market include Infineon Technologies AG, ON Semiconductor Corporation, STMicroelectronics N.V., Texas Instruments Incorporated, ROHM Co., Ltd., Mitsubishi Electric Corporation, Toshiba Electronic Devices & Storage Corporation, Renesas Electronics Corporation, Nexperia, Wolfspeed, Inc., Navitas Semiconductor Corporation, Power Integrations, Inc., Diodes Incorporated, Littelfuse, Inc., and Alpha & Omega Semiconductor Limited.

Key Developments:

In August 2026, Infineon Technologies AG launched a new generation of silicon carbide power modules optimized for AI data center power supply applications. This development positions Infineon at the forefront of the growing SiC power semiconductor market for data centers.

In May 2026, Wolfspeed, Inc. announced a significant expansion of its silicon carbide production capacity to meet growing demand from data center power applications. This investment responds to accelerating adoption of SiC technology in data center power systems.

In November 2025, STMicroelectronics N.V. expanded its silicon carbide portfolio with new power MOSFETs specifically designed for data center uninterruptible power supplies. This expansion addresses growing demand for high-performance power semiconductors in data center infrastructure.

In March 2025, Infineon Technologies AG introduced a new line of silicon carbide power modules for high-voltage DC power distribution in AI data centers. The modules support voltages up to 1500V and offer industry-leading efficiency for high-power applications.

In October 2024, ROHM Co., Ltd. announced the development of a new silicon carbide power module with integrated gate driver for data center power applications. The integrated solution simplifies design and improves reliability while reducing system footprint. This innovation addresses growing demand for compact, high-performance power solutions in data centers.

Semiconductor Types Covered:

Power MOSFETs

IGBTs

Insulated Gate Bipolar Transistors

Diodes

Power Integrated Circuits

Other Semiconductor Types

Materials Covered:

Silicon

Silicon Carbide

Gallium Nitride

Gallium Arsenide

Diamond

Other Materials

Functions Covered:

Rectification

Voltage Regulation

Power Factor Correction

DC-DC Conversion

DC-AC Inversion

Other Functions

Equipments Covered:

Uninterruptible Power Supplies

Server Power Supply Units

Voltage Regulators

Power Distribution Units

Power Backup Systems

Other Equipments

Data Center Types Covered:

Hyperscale Data Centers

Colocation Data Centers

Enterprise Data Centers

Edge Data Centers

AI Data Centers

Other Data Center Types

Regions Covered:

North America

United States

Canada

Mexico

Europe

United Kingdom

Germany

France

Italy

Spain

Netherlands

Belgium

Sweden

Switzerland

Poland

Rest of Europe

Asia Pacific

China

Japan

India

South Korea

Australia

Indonesia

Thailand

Malaysia

Singapore

Vietnam

Rest of Asia Pacific

South America

Brazil

Argentina

Colombia

Chile

Peru

Rest of South America

Rest of the World (RoW)

Middle East

Saudi Arabia

United Arab Emirates

Qatar

Israel

Rest of Middle East

Africa

South Africa

Egypt

Morocco

Rest of Africa

What our report offers:

Market share assessments for the regional and country-level segments

Strategic recommendations for the new entrants

Covers Market data for the years 2023, 2024, 2025, 2026, 2027, 2028, 2030, 2032 and 2034

Market Trends (Drivers, Constraints, Opportunities, Threats, Challenges, Investment Opportunities, and recommendations)

Strategic recommendations in key business segments based on the market estimations

Competitive landscaping mapping the key common trends

Company profiling with detailed strategies, financials, and recent developments

Supply chain trends mapping the latest technological advancements

Free Customization Offerings:

All the customers of this report will be entitled to receive one of the following free customization options:

Company Profiling

Comprehensive profiling of additional market players (up to 3)

SWOT Analysis of key players (up to 3)

Regional Segmentation

Market estimations, Forecasts and CAGR of any prominent country as per the client's interest (Note: Depends on feasibility check)

Competitive Benchmarking

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