

GaN Server Power Supply Unit (PSU) Market Expected to Grow at 24.76% CAGR by 2032

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NEW JERSEY, NJ, UNITED STATES, February 10, 2025 /EINPresswire.com/ -- The [GaN Server Power Supply Unit Market](#) was estimated at 1.28 billion USD in 2023. It is anticipated to grow from 1.6 billion USD in 2024 to 9.4 billion USD by 2032, with a CAGR of approximately 24.76% from 2025 to 2032.



The Gallium Nitride (GaN) Server Power Supply Unit (PSU) market is rapidly evolving as data centers, cloud computing services, and high-performance computing systems demand more efficient and compact power solutions. GaN technology is revolutionizing the power supply industry by offering higher efficiency, reduced size, and better thermal performance compared to traditional silicon-based power supplies.

With the global digital transformation accelerating, the need for high-power-density solutions is more critical than ever. Traditional silicon-based PSUs have long been the backbone of server power management, but their limitations in efficiency, heat dissipation, and power handling have led to the rise of GaN-based alternatives. These new-generation PSUs provide superior power conversion efficiency, reducing overall energy consumption and operational costs for data centers and IT infrastructure providers.

The increasing adoption of artificial intelligence (AI), machine learning (ML), cloud computing, and edge computing has further fueled the demand for high-efficiency power supplies. Companies are now focusing on improving energy efficiency, reducing carbon footprints, and meeting stringent power regulations, making GaN PSUs a preferred choice in the modern server market.

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Market Drivers

Several factors are driving the growth of the GaN server PSU market, making it one of the most promising segments in the power supply industry:

Increased Demand for Energy-Efficient Solutions

Data centers and cloud service providers require power supplies that can minimize energy losses and reduce electricity bills. GaN PSUs offer high efficiency (up to 98%), reducing overall power consumption and waste heat production.

Rising Adoption of AI and High-Performance Computing

The increasing use of AI, ML, big data, and IoT applications demands powerful computing resources. These technologies require robust and efficient power solutions, which GaN PSUs can provide.

Compact and Lightweight Design

GaN-based PSUs are significantly smaller and lighter than silicon-based alternatives. This compact form factor allows for better space utilization in server racks, making them ideal for hyperscale data centers and enterprise servers.

Reduced Cooling Requirements

Due to their higher efficiency, GaN PSUs generate less heat, reducing the need for additional cooling solutions. This not only lowers operational costs but also improves system reliability and longevity.

Government Regulations and Sustainability Initiatives

Many governments worldwide are imposing strict energy efficiency standards for electronic devices and server infrastructure. The adoption of GaN PSUs helps companies comply with these regulations while reducing carbon emissions.

Technological Advancements and Investments

The continuous advancement in GaN technology, along with investments from key players, is improving the reliability, affordability, and scalability of GaN PSUs, making them a viable option for large-scale deployment.

Key Companies in the GaN Server PSU Market

Several major companies are driving innovation and competition in the GaN server PSU market. These companies are focusing on R&D, partnerships, and strategic collaborations to enhance product performance and expand market reach. Some of the key players include:

Navitas Semiconductor

Navitas is a pioneer in GaN-based power solutions, offering high-efficiency GaN power ICs designed for server PSUs, data centers, and fast-charging applications.

Infineon Technologies

Infineon is a major player in power electronics, producing high-performance GaN transistors and semiconductors for efficient power conversion in server applications.

GaN Systems

GaN Systems is known for its innovative GaN power transistors, which improve power density and efficiency in data center and cloud computing applications.

Texas Instruments

Texas Instruments offers GaN-based power solutions that enhance efficiency and thermal management in server and industrial power supplies.

Efficient Power Conversion (EPC)

EPC specializes in enhancing GaN technology, providing power-efficient solutions for server PSUs, electric vehicles, and industrial applications.

Market Restraints

Despite its numerous advantages, the GaN server PSU market faces certain challenges that could slow its widespread adoption:

High Initial Costs

GaN PSUs are still more expensive than traditional silicon-based power supplies due to higher manufacturing costs and limited large-scale production capabilities.

Reliability Concerns

While GaN technology offers improved efficiency and compactness, its long-term reliability is still under evaluation. Many businesses hesitate to switch due to concerns over component durability.

Limited Awareness and Adoption

Many data centers and enterprises are unfamiliar with GaN technology and prefer to stick with well-established silicon-based PSUs, slowing adoption rates.

Manufacturing Challenges

The production of GaN power devices requires advanced fabrication processes, which can be more complex and costly than traditional silicon-based semiconductors.

Compatibility Issues

Integrating GaN-based power supplies into existing server infrastructure can be challenging, requiring modifications to power distribution systems and cooling mechanisms.

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GaN Server PSU Market Segmentation Insights

The GaN server PSU market is segmented based on various factors, including power capacity, application, end-user, and region.

By Power Capacity

Below 500W – Suitable for small-scale enterprise servers and networking equipment.

500W to 1,500W – Used in mid-range servers and cloud computing applications.

Above 1,500W – Ideal for high-performance computing (HPC) systems and data centers.

By Application

Data Centers – Major consumers of high-efficiency power solutions.

Cloud Computing – Increasing adoption of AI and machine learning workloads.

Enterprise Servers – Need compact, reliable, and cost-efficient power solutions.

By End-User

IT & Telecom – High demand for cloud infrastructure and network servers.

BFSI (Banking, Financial Services, and Insurance) – Data-intensive applications require efficient power solutions.

Healthcare & Research – Use of HPC for medical simulations and research.

By Region

North America – Leading market due to rapid data center expansion.

Europe – Increasing focus on energy-efficient solutions.

Asia-Pacific – Growing demand for cloud computing and AI applications.

Future Scope of GaN Server PSU Market

The future of GaN server PSUs looks highly promising as technology continues to advance and the demand for efficient power solutions rises. Several trends are expected to shape the market in the coming years:

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Mass Adoption in Hyperscale Data Centers

Tech giants like Amazon, Google, Microsoft, and Facebook are expected to adopt GaN-based PSUs to improve energy efficiency and reduce carbon footprints.

Cost Reduction through Innovation

With increased R&D investments and large-scale production, the cost of GaN power devices is expected to decrease, making them more accessible to enterprises.

Integration with Renewable Energy Sources

GaN PSUs will likely play a critical role in data centers powered by solar and wind energy, improving overall efficiency and sustainability.

Enhanced Reliability and Durability

As GaN technology matures, improvements in material science and design will enhance its reliability, making it a long-term replacement for silicon-based PSUs.

Regulatory Push for Energy Efficiency

Stronger government regulations on power consumption and sustainability will drive the adoption of GaN-based power solutions.

The GaN server PSU market is set to disrupt the traditional power supply landscape with its high efficiency, compact design, and superior performance. While challenges like high costs and adoption barriers exist, the long-term benefits make GaN PSUs a game-changer for data centers, AI applications, and cloud computing. As technology evolves and production scales up, GaN power solutions will become the new standard in server infrastructure.

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