

Power Supply and AI Servers



Overview

Infineon explores the latest advancements in AI server power supplies, addressing the challenges driven by increasing power demands and the evolution of AI server rack architectures.

Key Takeaways

AI servers require high-performance power supplies that can handle increased power demands, with options like high-frequency PSUs and advanced architectures to ensure efficiency and reliability.

Key Considerations for AI Server Power Supplies

High Power Output: AI servers, especially those utilizing advanced GPUs, can demand significant power. For instance, power outputs can reach 100 kW or more per cabinet, necessitating robust power supply units (PSUs) that can deliver high wattage efficiently. **Efficiency Ratings:** Modern PSUs for AI applications are designed to meet stringent efficiency standards, such as the 80 PLUS Titanium certification, which requires efficiency levels between 90% and 96% at various load levels.

This is crucial for minimizing energy waste and managing operational costs in data centers. **Advanced Technologies:** The latest PSUs often incorporate wide bandgap devices like silicon carbide (SiC) and gallium nitride (GaN), which allow for higher switching frequencies and improved thermal performance. These technologies contribute to better power density and efficiency, making them ideal for the high demands of AI workloads.



Innovative Architectures: New power architectures, such as 800V high-voltage direct current (HVDC) systems, are being developed to enhance energy-efficient power distribution in AI data centers. These systems enable direct power conversion at the GPU level, improving overall efficiency and performance. **Specific Product Examples:** The 8 kW high-frequency PSU from Infineon is designed for AI data centers, offering a peak efficiency of 97.

5% and a compact form factor, making it suitable for high-density applications. The evolution of PSUs is also reflected in the shift towards solid-state relays and integrated circuits that combine multiple functions, enhancing reliability and reducing the physical footprint of power supplies.

Conclusion

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As technology continues to advance, the demand for efficient and powerful PSUs will only increase. Data centers must adapt by implementing innovative power solutions that not only meet current needs but also anticipate future growth in AI processing capabilities. By focusing on high efficiency, advanced technologies, and robust architectures, organizations can ensure their AI servers operate effectively and sustainably.

Article Content

AI PSU | Infineon Technologies

Infineon explores the latest advancements in AI server power supplies, addressing the challenges driven by increasing power demands and the evolution of AI server rack architectures.

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Both designs are optimized for use with Infineon's broad AI server power delivery portfolio, spanning the full power chain from grid to core. This includes solid-state transformers and circuit breakers, power

POWER ICs FOR AI SERVERS Selector Guide

ited for AI server power architectures. Models such as the SiC461, SiC431, and SiC450 offer wide input voltage ranges, high current capabilities, and peak efficiencies up to 98 %, enabling optimized power

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Understanding the characteristics of AI data center loads and their interactions with the grid is therefore critical for ensuring both reliable power system operation and sustainable AI

Trends in AI Server Power Supply Architectures

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0. Abstract As the demand for AI servers continues to grow, traditional power systems are facing critical limitations. In conventional architecture, rising GPU power consumption leads to higher current

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NVIDIA Corporation

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NVIDIA's 800V Power Rack to Debut as an Optional Configuration for

TrendForce's latest research on power architectures for AI servers highlights that NVIDIA has been developing its proprietary 800V HVDC Power Rack. The platform is expected to be ready

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