



Which is more energy-efficient AC DC integrated server rack





Overview

As DC systems are more efficient, they free up space for high-powered racks and do away with the need for AC UPS and transformers. Kleyman pointed out that with fewer and smaller power-conversion units needed in DC systems, there will be fewer points of failure. To meet increasing demands, 400V DC rack distribution is emerging as a more efficient and scalable solution. Silicon Carbide (SiC) semiconductors provide a powerful solution to make. As facilities grow larger and more power-hungry, the century-old question resurfaces with new urgency: Is alternating current (AC) or direct current (DC) the optimal choice for tomorrow's data centers?

The answer, according to some experts, is that while AC has dominated commercial and data center. NVIDIA is leading the transition to 800 VDC data center power infrastructure to support 1 MW IT racks and beyond, starting in 2027, in collaboration with key industry partners. The 800 VDC architecture addresses the limitations of traditional 54 VDC power distribution, including space constraints. The PSU is the power backbone of the data center, converting high-voltage AC power from the grid into the lower-voltage DC used by all of the components within the server rack. To deliver higher output and improved efficiency while minimizing losses and managing heat, many engineers are leveraging. EL SEGUNDO, Calif. — October 2025 — Efficient Power Conversion Corporation (EPC), the world leader in enhancement-mode gallium nitride (eGaN[®]) power devices announced the availability of a high-efficiency, high-power-density 5 kW AC-to-48 V DC reference design that demonstrates the full potential. Given rapid growth in the server and artificial intelligence (AI) markets, the amount of energy required per rack is increasing from 100kW to >1MW.



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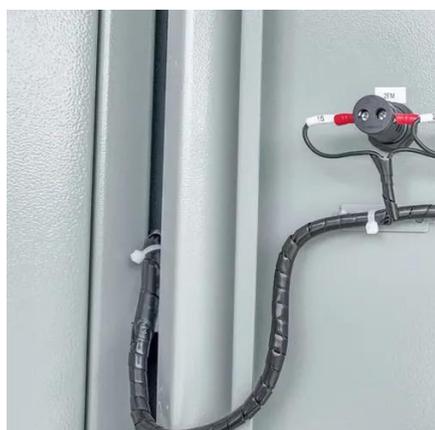
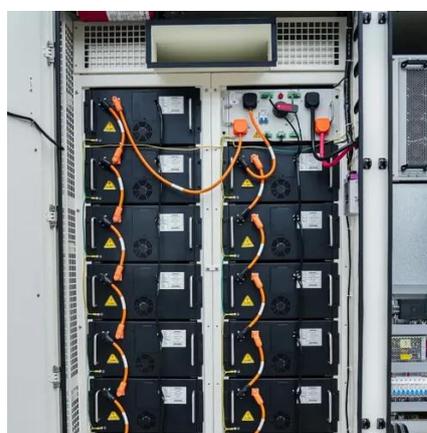


NVIDIA 800 VDC Architecture Will Power the Next Generation of AI

By adopting direct 800 V input, compute racks can efficiently handle power delivery without relying on integrated AC/DC conversion stages. These racks accept two conductor 800 V ...

Power Architecture Evolution in Data Centers

These technologies involved in the circuit implementation of the new architecture and components can also be leveraged in the sidecar AC/DC rack, where GaN BDS and UDS devices can increase ...



Scaling AI Data Center Power Delivery with Si, SiC, and GaN

Solutions scale from 3 to 12 kW, and output voltages reach up to 50 V DC to support busbar distribution in AI server racks (Figure 1). These designs deliver efficiencies of up to 98%, meet

News Center

In close collaboration with NVIDIA, Delta has developed next-generation 800 VDC power solutions capable of enabling 1.1 MW-scale racks for hyperscale AI factories, setting a new standard ...



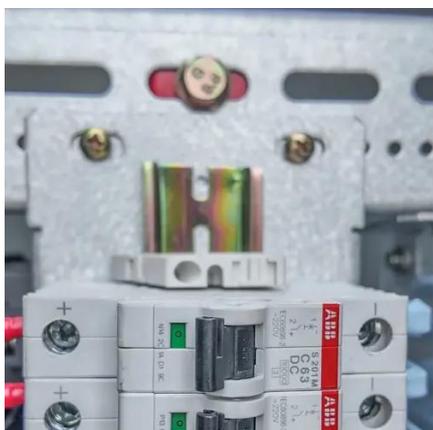
How Next-Gen AI Data Centers Are Optimizing Power Efficiency with ...

To address this, data centers are exploring the integration of both high-efficiency AC and 400V DC rack power distribution by leveraging mSiC(TM) technology to optimize power conversion, ...



5 kW GaN-Based AC/DC Reference Design for AI Server and Data ...

The EPC 5 kW reference design supports a modular power architecture scalable to 33 kW, 48 kW, and as high as 108 kW rack systems for less cost, delivering industry-leading efficiency ...



Current Debate: Will the Data Center of the Future Be AC or DC?

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[Scaling AI Data Center Power Delivery](#)



with Si, SiC, and GaN

Rather than absorbing the steep cost of new construction or shifting the AC-DC power supplies into separate racks, many operators are opting to increase power density while staying with existing rack ...



Addressing challenges in data-center power delivery with 800V ...

Given rapid growth in the server and artificial intelligence (AI) markets, the amount of energy required per rack is increasing from 100kW to >1MW. This increase requires designers to fundamentally ...



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