ISSUE: November 2025

Vendors Line Up To Support NVIDIA's 800-V Power Architecture For AI Data Centers

by David G. Morrison, Editor, How2Power.com

With power consumption in AI data centers projected to rise to megawatt levels at the rack and gigawatt levels across the data center facility, existing power architectures are becoming inadequate. Feeding 415 or 480 ac to server power supplies within IT racks to generate 48/54 V dc for distribution within those racks will not get there. To handle the increased power levels, a new power architecture spearheaded by NVIDIA has emerged wherein medium voltage (13.8 kV) from the ac grid is stepped down and then feeds dedicated power racks that generate 800 V dc for distribution to the IT racks. Eventually this medium voltage-to-HVDC conversion will be moved to the perimeter of the data center.

As with past migrations to higher bus voltages, this one will reduce power distribution losses for a given cable size while also reducing power conversion losses by cutting the number of power conversion stages. The migration to 800 V will also leverage previous development of components and power supply technology for 400-V and 800-V electric vehicles.

The following diagram from an NVIDIA blog ("NVIDIA 800 VDC Architecture Will Power the Next Generation of AI Factories," May 20, 2025) shows the basic concept, and highlights the coming requirements not just for new server power supplies, but also for new, isolated 800 to 54/48 V (or 12 V) bus converters within the server racks.

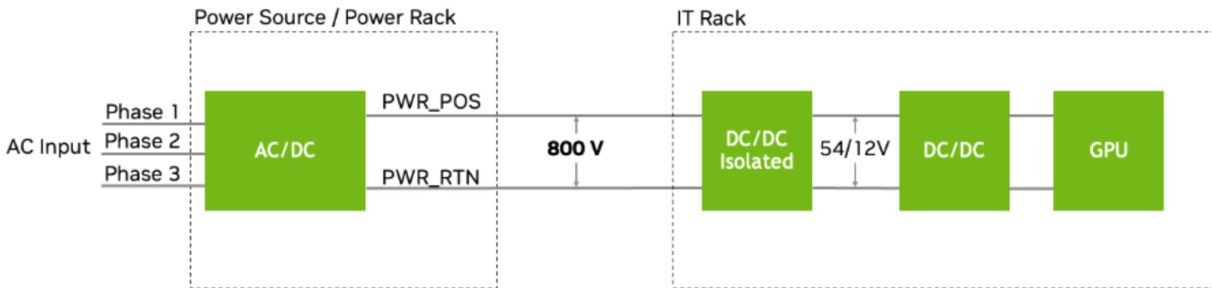

Fig. 1. NVIDIA's 800-V power architecture for AI data centers will accommodate delivery of megawatt-level power to server racks, but demands continued innovation in components and reference designs from power semiconductor manufacturers and similar innovation in the design and manufacture of server power supplies.

To make the new power architecture a reality, NVIDIA has been collaborating with a host of supplier companies to support migration of AI data centers to the 800-V power architecture starting in 2027 (Fig. 2). While some power semiconductor and power supply companies made announcements earlier this year in support of the 800-V dc architecture, the occurrence of the OCP Global Summit this October 13-16 in San Jose spurred an outpouring of such announcements as these suppliers rushed to publicize their collaboration with NVIDIA and highlight their particular technology and product advantages. In many cases, vendors also took this opportunity to introduce white papers on the 800-V dc architecture, discussing its benefits and strategies for implementing it.

This article is a recap of those announcements with some additional details gleaned from attending the OCP Summit. Unless otherwise indicated, all of the product announcements discussed below were issued during the time frame of the OCP Global Summit. (For more on these partnerships and how they relate to NVIDIA's Vera Rubin platform and Kyber rack architecture, see "NVIDIA, Partners Drive Next-Gen Efficient Gigawatt AI Factories in Buildup for Vera Rubin".)

Companies discussed here include:

- Infineon Technologies
- Texas Instruments
- STMicroelectronics
- Power Integrations

- Alpha and Omega Semiconductor
- EPC (Efficient Power Conversion)
- Navitas Semiconductor
- Innoscience
- Renesas Electronics
- Rohm
- Onsemi
- Analog Devices
- Delta
- Advanced Energy Industries
- LITEON Technology
- Megmeet Electrical
- Mitsubishi Electric Power Products (MEPPI)

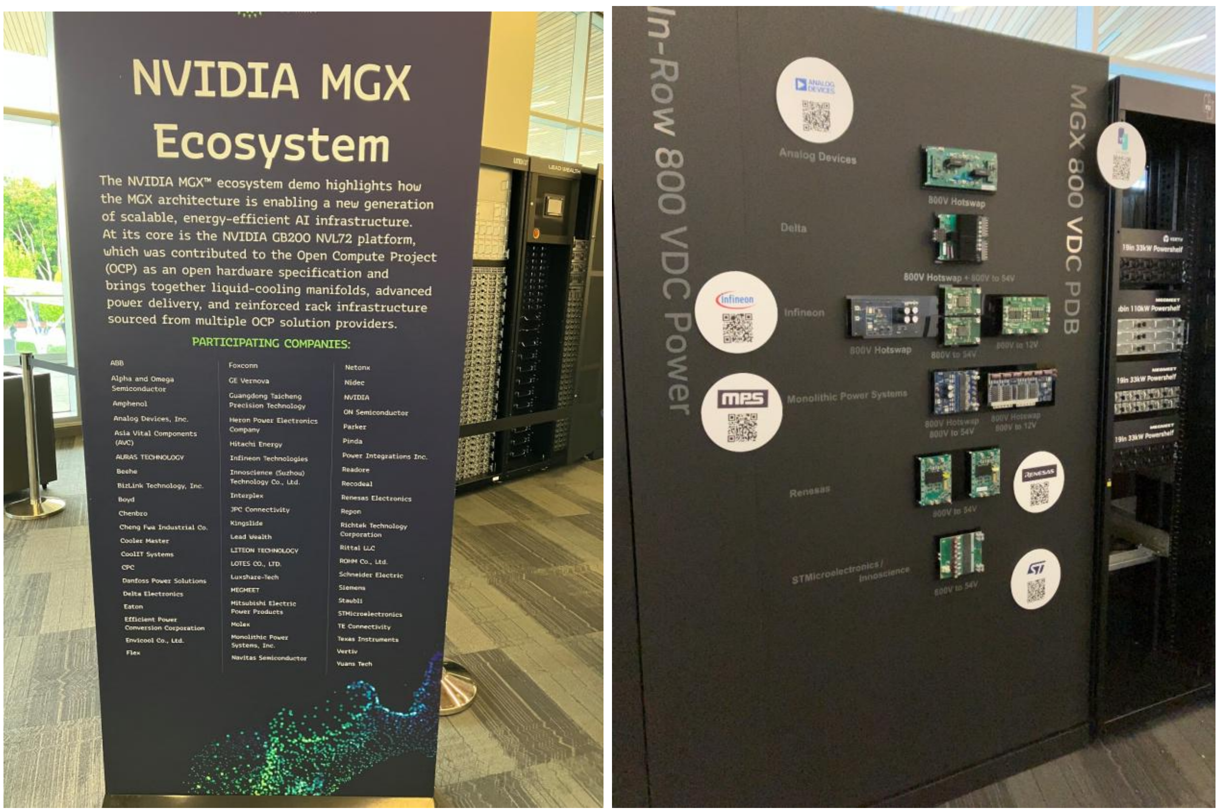

Fig. 2. NVIDIA's MGX Ecosystem. NVIDIA's exhibit at the OCP Summit highlighted the companies that are collaborating with them on the MGX Platform for Modular Server Design (poster on left). Among these are numerous suppliers of power management ICs along with power supply/power module companies and those with dc power distribution technology. Some example power products for the 800-V architecture are shown in the display on the right.

JFET Based Hot-Swap Solutions And GaN-Based Bus Converters

Infineon Technologies announced their support for the 800-V dc power architecture for AI infrastructure, which was announced by NVIDIA at Computex 2025. As Infineon noted in their announcement during the OCP Global Summit, the exponential growth of artificial intelligence is rapidly outstripping the capacity of the current 54-V data center power infrastructure. A shift to a centralized 800-Vdc architecture allows for reduced power losses, higher efficiency and reliability. However, the new architecture requires new power conversion solutions and safety mechanisms to prevent potential hazards and costly server downtimes e.g. due to service and maintenance.

"There is no AI without power. That's why we are working with NVIDIA on intelligent power systems to meet the power demands of future AI data centers while providing a serviceable architecture that reduces system downtimes to a minimum," says Adam White, division president, Power & Sensor Systems at Infineon

Technologies. “By driving the transformation towards high-density, reliable and safe 800-V powered data centers we are revolutionizing the way power is delivered to AI server racks. It’s our vision to maximize the value of every watt, ultimately paving the way for a more efficient and sustainable AI ecosystem.”

AI data center operators are investing heavily in high-performance computing for artificial intelligence, with projects like Stargate requiring massive capital expenditure (CAPEX) of billions of dollars. To guarantee a strong return on invest, it is crucial to maximize the uptime of AI server racks, which mandates a modular and scalable scheme for serviceability. Infineon and NVIDIA are collaborating on safety and service aspects such as the hot-swap controller functionality, which enables future server boards to operate in 800-Vdc power architectures.

Exchanging server boards on an 800-Vdc bus while the entire rack continues operating requires a controlled pre-charging and discharging of the board. Infineon is supporting this with a dedicated solution based on silicon carbide (SiC). Enabled by the CoolSiC JFET technology data center operators can exchange server boards in an 800-Vdc architecture while other servers continue to operate in the same rack. This mitigates the risk of downtimes and enables safe maintenance of server racks.

The switch to an 800-V dc architecture is a major step forward in establishing powerful AI gigafactories of the future. The power consumption of an AI server rack is estimated to increase from around 120 kW to 500 kW and to 1 MW by the end of the decade. As already announced in May (Infineon to revolutionize power delivery architecture for future AI server racks with NVIDIA), Infineon will collaborate with NVIDIA on developing advanced power conversion solutions for accelerated computing platforms powered by 800-Vdc.

Infineon is leveraging its intermediate bus converter (IBC) technology and high-frequency switching solutions based on gallium nitride (GaN) to accelerate the development of three- and two-stage conversion solutions from grid to core. Both approaches aim to provide the most suitable solution for data center operators reaching efficiency levels as high as 98% per conversion stage.

As the cost of an AI server is as much as 30 times higher than a traditional server, reducing power losses and ensuring high service uptime are key levers to reducing total cost of ownership and minimizing the carbon footprint of AI data center. Therefore, Infineon is providing full systems solutions including hot-swap controllers, reliable protection technology and highly efficient power conversion solutions based on all relevant semiconductor materials to enable efficient, safe, and sustainable operation of megawatt-scale AI server racks.

Infineon’s Gerald Deboy, presented at the OCP Global Summit 2025 on October 15 in a session titled, “Power Conversion Solutions for future Server Boards operating directly from HV DC” (Fig. 3). There were also talks and demos on this subject on October 16 at Infineon’s OktoberTech Silicon Valley 2025. More information is available at Infineon’s OktoberTech page.

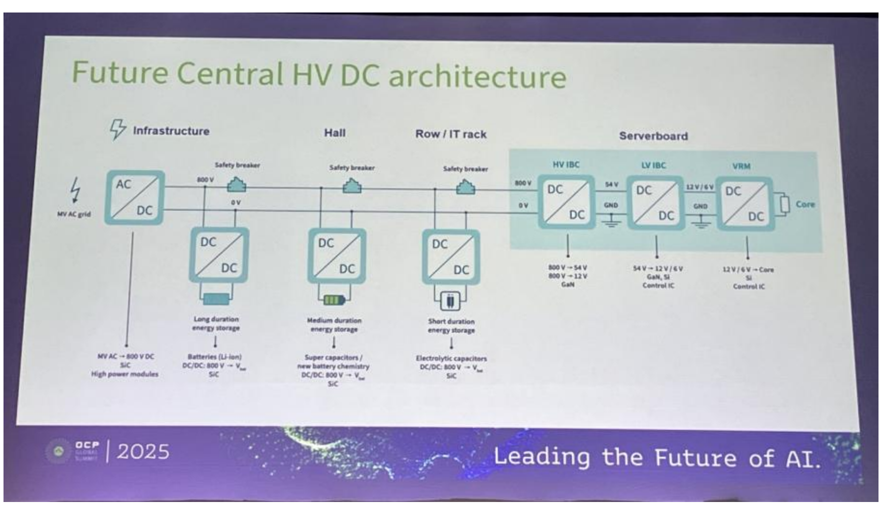

Fig. 3. In his presentation at the OCP Global Summit 2025 on Oct 15, Infineon’s Gerald Deboy presented the above diagram highlighting the power stages and energy storage devices in the 800-V dc architecture. His talk discussed the company’s eFuse and hotswap solution for 800 V, as well as dc-dc solutions for 800 V to 54 and 12 V.

Scaling Of Power Management Architectures From 12 V To 48 V To 800 V

In its summit-related news **Texas Instruments** announced its collaboration with NVIDIA to develop power-management devices to support the 800-Vdc power architecture. It also highlighted the design resources and power-management chips it was debuting at the summit to help companies meet growing AI computing demands and scale power-management architectures from 12-V to 48-V to 800 Vdc.

As the company stated, AI data centers require architectures designed with multiple foundational semiconductors for efficient power management, sensing and data conversion. With new design resources and a broad power-management portfolio, TI is working alongside data center designers to implement a comprehensive approach that drives efficient, safe power management—from power generation at the grid to the fundamental logic gates of graphics processing units.

"With the growth of AI, data centers are evolving from simple server rooms to highly sophisticated power infrastructure hubs," said Chris Suchoski, sector general manager, data centers at TI. "Scalable power infrastructure and increased power efficiency are essential to meet these demands and drive future innovation. With devices from TI, designers can build innovative, next-generation solutions that are enabling the transition to 800 Vdc."

Among the materials presented by TI at the summit was a white paper titled, "Power delivery trade-offs when preparing for the next wave of AI computing growth". This white paper reexamines the power delivery architecture within the IT rack, and addresses design challenges and opportunities for high efficiency and high power-density energy conversion at a system level.

In terms of hardware, one of the highlights of TI's exhibit was a just released 30-kW AI server power-supply unit. This dual-stage power-supply reference design features a three-phase, three-level flying capacitor power factor correction stage paired with dual delta-delta three-phase, two-level LLC converters. The power supply is configurable as a single 800-V output or separate +400-V and -400-V output supplies (Fig. 4).

Speaking at TI's booth at the summit, Suchoski noted that this reference design makes use of separate TMS320F28P650DK controllers for PFC and LLC stages as well as 650-V GaN FETs on the secondary side of the LLCs.

Fig. 4. The PMP23630 reference design is a two-stage, high-efficiency, 30-kW power supply with high-voltage dc output—either separate +400-Vdc and -400-Vdc supplies or a single 800-V dc output.

Suchoski added that the company is developing an 800-V hot swap controller solution using a TSS23521 48-V controller with a floating ground and developing 800-V to 48-V or 12-V intermediate bus converter reference designs, which will leverage GaN devices in the top-side cooled TOLT package as well as new C2000 controllers.

Other demos at the TI booth were for new products addressing power conversion from 48 V to core voltages. For example, TI demonstrated a number of 48-V dc-dc converter solutions, many leveraging their 100-V GaN power stages to enable their customers to maximize peak and light load efficiency.

For generating the core supply voltages required by processors, the company exhibited a dual-phase smart power stage which the company describes as the highest peak power density power stage on the market. The CSD965203B offers 100 A of peak current per phase and combines two power phases in a single 5-mm-by-5-mm x 1-mm QFN package. The device enables designers to increase phase count and power delivery across a small printed circuit board area, improving efficiency and performance. This device appears to be positioned for vertical power delivery.

In contrast, another part shown was the CSDM65295 dual-phase smart power module for lateral power delivery. The module delivers up to 180 A of peak output current in a compact 9-mm-by-10-mm-by-5-mm package, helping engineers increase data center power density without compromising thermal management. The module integrates two power stages and two inductors with trans-inductor voltage regulation (TLVR) options, while maintaining high efficiency and reliable operation.

In addition to TI's exhibit at OCP, the company participated in an OCP Global Summit Breakout Session where TI systems and applications engineer Desheng Guo presented on "Advanced Datacenter AC/DC Distribution and Conversion Power Architecture". Also in the OCP Future Technologies Symposium, TI Compute Power Technologist Pradeep Shenoy presented a poster, titled, "Series-Stacked Power Delivery Architecture for Future Data Centers". For more details, see the TI announcement or ti.com/ocp.

A 12-kW GaN-Based LLC Converter With 98% Efficiency

STMicroelectronics unveiled a complete prototype of its new power delivery system as it develops new chip designs supporting the 800-V dc power architecture announced by NVIDIA for next-generation AI data centers.

STMicroelectronics is actively developing the essential chip technologies for 800-Vdc architectures, leveraging its diverse power chip portfolio that combines SiC, GaN, and silicon technologies and advanced custom design at both chip and package level.

At the OCP Global Summit 2025, ST shared an important milestone with the development of a compact 12-kW power delivery board, approximately the size of a smartphone. The 12-kW GaN-based LLC converter, operating at an 800-V input and a 1-MHz switching frequency, has successfully completed full-power testing, delivering continuous 12-kW output power with over 98% efficiency and a power density exceeding 2,600 W/in^3 at 50 V.

You can download further technical details in the company's whitepaper.

Field-Proven Power Supply ICs With 1250-V And 1700-V GaN Switches

Power Integrations announced it is collaborating with NVIDIA to accelerate the transition to 800-V dc power and megawatt-scale racks. It outlined the benefits of its PowiGaN gallium-nitride technology for next-generation AI data centers, explaining the capabilities of its 1250-V and 1700-V PowiGaN technology for 800-V dc power architectures in a new white paper.

The white paper details the performance advantages of Power Integrations' 1250-V PowiGaN HEMTs, illustrating their field-proven reliability and ability to meet the power-density and efficiency requirements (>98%) of the 800-V dc architecture. Further, the paper demonstrates that a single 1250-V PowiGaN switch delivers greater power density and efficiency compared to stacked 650-V GaN FETs and competing 1200-V SiC devices.

The white paper also highlights Power Integrations' InnoMux2-EP ICs as a unique solution for auxiliary power supplies in 800-V dc data centers. The InnoMux-2 device's integrated 1700-V PowiGaN switch supports 1000-Vdc input voltage, while its SR ZVS operation provides greater than 90.3% of 12-V system efficiency in a liquid-cooled, fan-less 800-V dc architecture.

Speaking at the summit, Chris Lee, director of product marketing at Power Integrations discussed the company's approach in deploying its 1250-V GaN in a half-bridge, synchronously rectified LLC that steps down 800 V to 12.5 V. According to Lee, Power Integrations is in discussions with NVIDIA to refine its 1250-V PowiGaN d-mode switch IC and how it will address the next-generation AI data center power supply architecture. But as Fig. 5 shows, the concept is to use two PowiGaN transistors in a half-bridge configuration, running them at high frequency (perhaps 1 MHz) to achieve high density.

In addition to offering a better figure of merit than SiC MOSFETs, which leads to use of fewer power switches, simpler topology, and better efficiency, the PowiGaN switches are more suitable than the SiC transistors, says Lee. While voltage transients may cause SiC MOSFETs to avalanche, with a single event possibly producing a device failure, GaN transistors do not avalanche. Instead, the GaN devices experience an $R_{DS(ON)}$ increase when operating beyond their rated V_{DS}, but then recover when V_{DS} returns to normal levels. Their potential failure method is dielectric breakdown, which for the 1250-V PowiGaN occurs around 2000 V. That represents significant headroom over that of a 1200-V SiC MOSFET, which can avalanche and fail at 1500 V (see Fig. 6).

This work is still in the design feasibility stage, says Lee. Nevertheless, the company is still looking ahead to opportunities to apply its 1700-V PowiGaN in the future data center architectures that may adopt even higher voltage buses beyond 800 V.

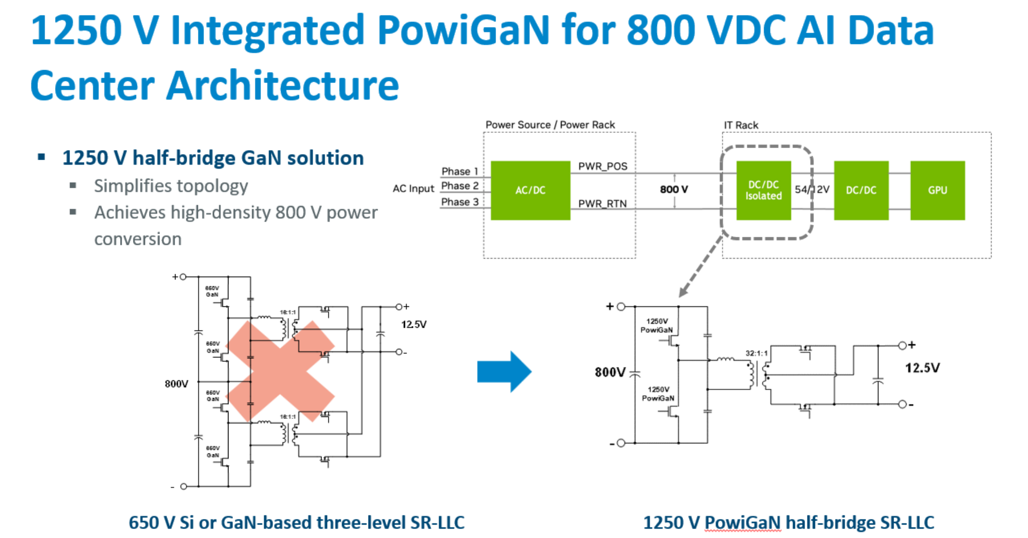

Fig. 5. Power Integrations' concept for using PowiGaN switches in an LLC converter that steps down the 800-V dc bus to an intermediate 12.5-V bus.

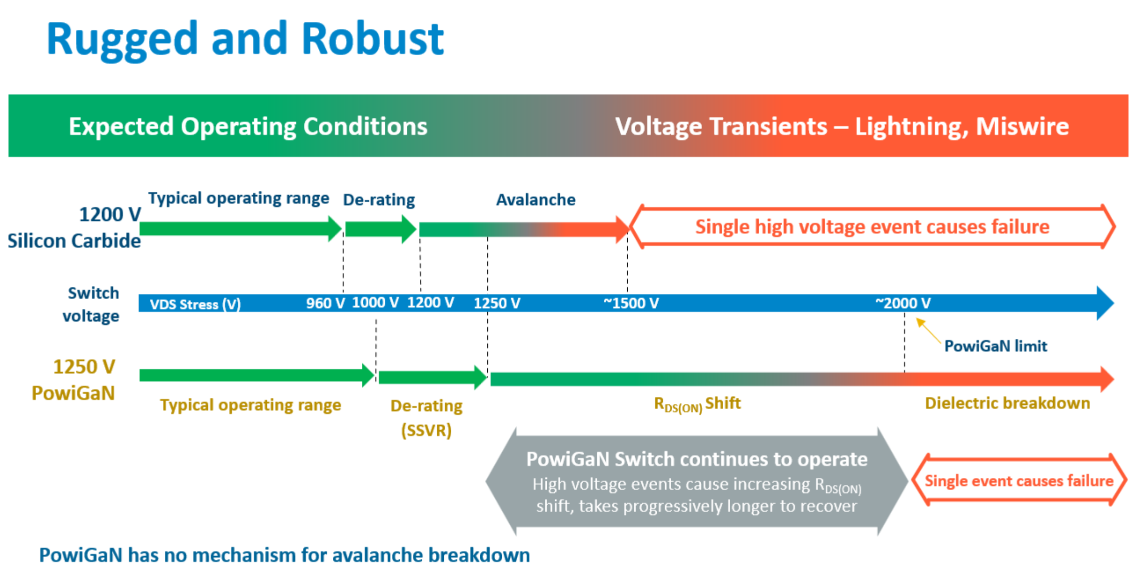

Fig. 6. The lack of avalanche breakdown in the 1250-V PowiGaN device gives it more headroom against failure from a high-voltage transient when compared with a 1200-V SiC MOSFET.

For more information on Power Integrations' PowiGaN technology for AI data centers and to access the white paper, titled "1250 V/1700 V PowiGaN for 800 VDC AI Data Center Architecture," visit the PowiGaN for Next-Generation AI Data Centers page.

A Range Of Power Switches And Power ICs

In the announcement by **Alpha and Omega Semiconductor (AOS)** in support of power requirements for NVIDIA's 800-Vdc architecture, Ralph Monteiro, Sr. VP, Power IC and Discrete Product lines at AOS, highlighted his company's wide-bandgap (WBG) offerings:

"As a key supplier to the high-performance data center market, our portfolio of SiC and GaN products is strategically aligned with the core technical demands of next generation AI factories with 800-Vdc power architecture. We are collaborating with NVIDIA to design 800-Vdc power semiconductors to provide the high efficiency and power density necessary for the new power distribution modules, from the initial ac-to-dc conversion to the final dc-to-dc stages within the racks."

Discussing its WBG products, AOS called out its SiC devices, including the Gen3 AOM020V120X3 or topside cooled AOGT020V120X2Q, which are said to offer superior voltage handling and low losses, making them well suited for either the power sidecar configuration or the single-step conversion of 13.8-kV ac grid power directly to 800 Vdc at the data center perimeter. This simplifies the power chain and enhances overall system efficiency.

Meanwhile within the racks, AOS' 650-V GaN FETs, such as its upcoming AOGT035V65GA1, and 100-V GaN FETs like the AOFG018V10GA1 are said to provide the required density essential for converting the 800-Vdc bus to the lower voltages needed by GPUs. Their high-frequency switching capabilities allow for smaller, lighter converters, freeing up valuable space for more compute resources and improving cooling efficiency.

The company also pointed out that its 80-V and 100-V stacked-die MOSFETs like the AOPL68801, and 100-V GaN FETs share a common package footprint, allowing designers to trade off cost and efficiency in the secondary side of LLC topologies and also in 54-V to 12-V bus converters. AOS' innovative stacked die packages are said to enable next-level power density for the secondary-side LLC socket. Additionally, AOS noted its multiphase controllers including high-performance, multi-rail 16-phase controllers for 54-V to 12-V conversion and further downstream conversion stages to the AI SoC.

By providing these foundational power technologies, AOS says it is helping to advance the benefits of the 800-Vdc architecture, including up to a 5% improvement in end-to-end efficiency, a 45% reduction in copper requirements, and a significant cut in maintenance and cooling costs. For more details, see the announcement.

GaN-Based, 6-kW 800 V-To-12.5 V Converter

Meanwhile, **EPC** announced it's developing an innovative power converter to accelerate the adoption of 800-V dc distribution systems for the next generation of AI data centers. To address the challenge of creating megawatt-scale rack power delivery systems, EPC has developed a low-cost, low-profile GaN-based, 6-kW 800 V-to-12.5 V converter based on an Input Series Output Parallel (ISOP) topology.

This module offers high power density and high efficiency. It occupies under 5,000 mm^2 of board space and only 8 mm in height, making it well suited for space-constrained AI boards. It efficiently converts 800 Vdc to 12.5 Vdc close to the load, reducing bussing losses and improving system-level efficiency (Fig. 7).

Fig. 7. By moving from ac directly to 800 Vdc at the rack level, and then stepping down to 12.5 V at the board, EPC's GaN-based solution eliminates unnecessary conversion stages and enables the scalability, simplicity, and energy optimization demanded by tomorrow's AI data centers.

"GaN is an essential technology for the 800-Vdc ecosystem," said Alex Lidow, CEO of EPC. "Our collaboration with NVIDIA is to develop compact, efficient, cost-effective board-level conversion to power future AI factories at gigawatt scale."

In addition to this 800-V news, EPC announced a 5-kW GaN-Based ac-dc reference design for AI server and data center power supplies. The reference design supports a modular power architecture scalable to 33-kW, 48-kW, and as high as 108-kW rack systems.

The complete system—comprising the EPC91107KIT four-level Totem-Pole PFC and the EPC91110KIT Input-Series Output-Parallel (ISOP) LLC Converter—achieves up to 96.5% system efficiency and a combined power density of 116 W/in³. Designed to meet Open Rack V3 (OCP ORv3) size requirements, this modular solution delivers superior performance with dramatically smaller size and lower cost compared to equivalent silicon implementations.

The EPC91107KIT front-end stage converts 240 Vac to 400 Vdc using a four-level flying capacitor totem-pole PFC topology featuring the EPC2304 (200-V, 5-mΩ) GaN FETs. It features a 9× smaller PFC inductor and 40% smaller EMI filter than conventional two-level designs; up to 98.5% efficiency at 5 kW; and 25-A input current, 240-Vac nominal, switching frequency of 140 kHz.

The EPC91110KIT isolation stage steps down the 400 V bus to 50 Vdc in a fixed ratio using four modular 1.375-kW LLC converters in an ISOP configuration. Each module employs the EPC2305 (150 V, 3 mΩ) GaN FET and achieves 98.2% peak efficiency and 5.5 kW output in total.

Design files and quick start guides for the EPC91107KIT and EPC91110KIT are available for download at EPC’s Low-Voltage GaN for AC/DC Application page.

100-V GaN FETs, Alongside 650-V GaN And High-Voltage SiC Devices

Another WBG specialist, **Navitas Semiconductor,** announced progress in its development of GaN and SiC power devices to enable the 800-Vdc power architecture announced by NVIDIA.

As the company observed in its announcement, the 800-Vdc architecture enables direct conversion from 13.8 kVAC utility power to 800 Vdc within the data center power room or perimeter. By leveraging solid-state transformers (SSTs) and industrial-grade rectifiers, this approach eliminates multiple traditional ac-dc and dc-dc conversion stages, maximizing energy efficiency, reducing losses, and improving overall system reliability.

The 800-Vdc distribution directly powers IT racks, eliminating the need for additional ac-dc conversion stages, and is stepped down through two high-efficiency dc-dc stages (800 Vdc to 54 V or 12 Vdc, and then to point-of-load GPU voltages), to drive advanced infrastructure such as the NVIDIA Rubin Ultra platform (Fig. 8).

These state-of-the-art AI factories demand unprecedented levels of power density, efficiency, and scalability, which can be enabled by Navitas’ high-performance GaNFast and GeneSiC technologies, said the vendor.

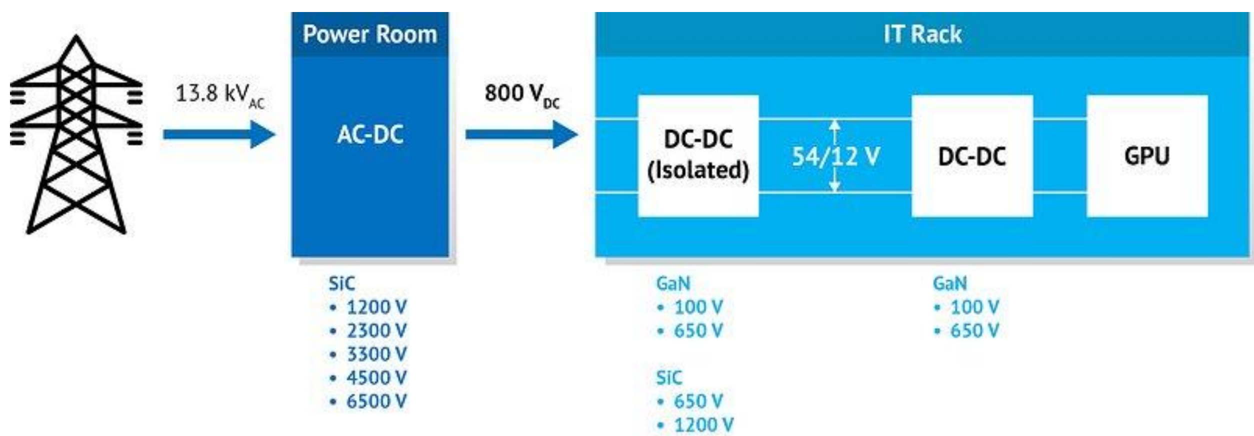

Fig. 8. From the grid to the GPU. Navitas’ graphic suggests its vision for application of GaN and SiC technologies across the 800-V power architecture.

As a pure-play wide bandgap power semiconductor company, Navitas says it delivers breakthrough GaN and SiC technologies that enable high-efficiency and high-power density power conversion across every stage of the AI data center, from the utility grid to the GPU.

Navitas' new 100-V GaN FET portfolio is said to deliver superior efficiency, power density, and thermal performance in advanced dual-sided cooled packages. These FETs are specifically optimized for the lower-voltage dc-dc stages on GPU power boards, where ultra-high density and thermal management are critical to meet the demands of next-generation AI compute platforms. Samples, datasheets, and evaluation boards are available for qualified customers.

Additionally, these 100-V GaN FETs are fabricated on a 200 mm GaN-on-Si process through a new strategic partnership with Power Chip, enabling scalable, high-volume manufacturing.

Navitas notes that its 650-V GaN portfolio includes a new line of high-power GaN FETs, alongside advanced GaNSafe power ICs, which integrate control, drive, sensing, and built-in protection features for robustness and reliability.

The company also highlighted its GeneSiC proprietary "trench-assisted planar" which provides exceptional performance over temperature, according to the vendor, delivering high-speed, cool-running operation for high-power, high-reliability applications. GeneSiC technology offers the industry's broadest voltage range, stretching from 650 V to 6,500 V says Navitas and has been implemented in multiple megawatt-scale energy storage and grid-tied inverter projects, including collaborations with the U.S. Department of Energy (DoE).

For more information, samples, datasheets, and evaluation boards for Navitas' latest 100-V and 650-V GaN FETs, as well as its high-voltage SiC MOSFET portfolio, contact info@navitassemi.com. Also see Navitas' whitepaper, "Redefining Data Center Power: GaN and SiC Technologies for Next-Gen 800 VDC Infrastructure".

An All-GaN Solution For The 800-Vdc Architecture

Innoscience announced its support for the 800-Vdc power architecture with an all-GaN power solution and commented on the necessity of GaN power devices: Beyond moving to 800-V rack power, the architecture requires both ultra-high power density and ultra-high efficiency from 800 V to 1 V. Only GaN power devices (GaN) are capable of simultaneously achieving these demanding requirements, said the company, while calling out the need for power supply switching frequencies approaching 1 MHz, to shrink magnetics and capacitors size.

According to Innoscience, it is the industry's only full-stack GaN supplier and the leading GaN IDM. It adds that it's the only company mass-producing GaN from 1200 V to 15 V, enabling a full conversion chain from 800 V to 1 V. This makes Innoscience the sole supplier capable of delivering an all-GaN power solution across all conversion stages, even as the architecture morphs in the future for higher power, says the vendor (Fig. 9).

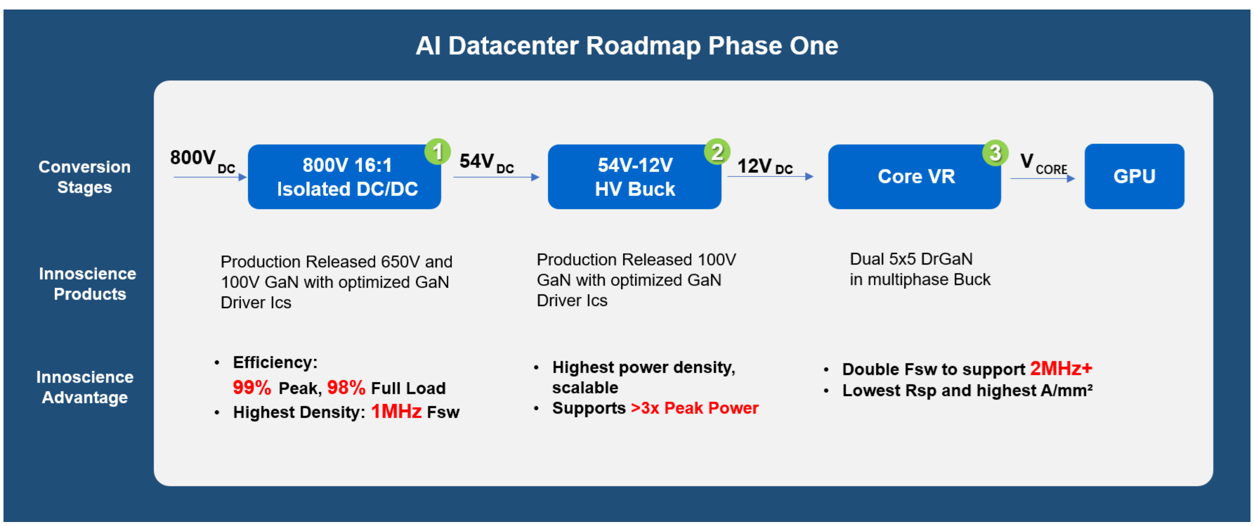

Fig. 9. Innoscience's diagram highlights the potential benefits of GaN devices across the 800-Vdc power architecture. Note that there are also solutions for 800-V to 12-V power conversion as highlighted by other vendors.

In their announcement, the company went on to describe the benefits of Innoscience's third-generation GaN components over SiC on the input side of the 800- V to 54-V dc-dc power stage and over silicon MOSFETs in the 54-V to 12-V dc-dc converter. For the low-voltage power stage, in the Core VR multiphase buck power stage, GaN also enables reduced losses and higher power output versus silicon MOSFETs they said as well as better transient response. For more information, see the Innoscience announcement.

GaN Devices For LLC And Bidirectional GaN For AC-DC Front Ends

Renesas Electronics announced that it is supporting efficient power conversion and distribution for the 800-Vdc power architecture introduced by NVIDIA. The company noted that GaN power devices will enable the development of 800-V dc buses within racks to significantly reduce distribution losses and the need for large bus bars, while still supporting reuse of 48-V components via stepdown converters.

As the company observes, Renesas' GaN-based power solutions are especially suited for the task, supporting efficient and dense dc-dc power conversion with operating voltages of 48 V to as high as 400 V, with the option to stack up to 800 V. Based on the LLC direct current transformer (LLC DCX) topology, these converters achieve up to 98% efficiency.

For the ac-dc front-end, Renesas uses bidirectional GaN switches to simplify rectifier designs and increase power density. Renesas REXFET MOSFETs, drivers and controllers complement the BOM of the new dc-dc converters. For more information, see Renesas' Power Management page.

"Renesas is helping power the future of AI with high-density energy solutions built for scale, supported by our full portfolio of GaN FETs, MOSFETs, controllers and drivers. These innovations will deliver performance and efficiency, with the scalability required for future growth," said Zaher Baidas, senior vice president and general manager of power at Renesas.

Renesas has published a white paper that explores the topology of its devices supporting 800-V power distribution in AI infrastructure.

Supporting Power Devices With Analog ICs

ROHM released a white paper detailing advanced power solutions for AI data centers based on the novel 800-Vdc architecture. As part of the collaboration announced in June 2025, the white paper outlines optimal power strategies that support large-scale 800-Vdc power distribution across AI infrastructure.

ROHM offers a broad portfolio of power devices, including silicon, SiC, and GaN, and says that it is among the few companies globally with the technological expertise to develop analog ICs (control and power ICs) capable of maximizing device performance. Included in the white paper are ROHM's comprehensive power solutions spanning a wide range of power devices and analog IC technologies, supported by thermal design simulations, board-level design strategies, and real-world implementation examples.

The company noted that it is working closely with NVIDIA, data center operators, and power system designers to deliver essential wide bandgap semiconductor technologies for next-generation AI infrastructure. Through strategic collaborations, including a 2022 partnership with Delta Electronics, ROHM says it continues to drive innovation in SiC and GaN power devices, enabling powerful, sustainable, and energy-efficient data center solutions.

For more information, see the white paper.

Silicon- And SiC-Based Solutions, Hot Swap And DC-DC Power Solutions

In late July, **onsemi** announced it was working with NVIDIA to support the transition to 800 Vdc power architectures. In doing so, onsemi stated that its intelligent power portfolio plays a critical role in enabling the next generation of AI data centers by delivering high-efficiency, high-density power conversion across every stage of the power journey—from high-voltage ac-dc conversion at the substation to precise voltage regulation at the processor level.

Leveraging its silicon and SiC technologies, onsemi provides what it describes as industry-leading solutions for solid state transformers, power supply units, 800-Vdc distribution, and core power delivery, all integrated with intelligent monitoring and control.

Hot-Swap And 800-V Bus Converter Power Solutions

Similar to onsemi, **Analog Devices** issued a pre-OCP press release in late August announcing the company's support for 800-Vdc data center architectures. In doing so, it called out its robust hot swap and first-stage (800

V to 48 V or lower) power solutions to enable safe, efficient, and intelligent power distribution in the AI data centers using these architectures.

A number of power supply companies participating in the OCP Global Summit also issued announcements regarding their support of the 800-V power architecture or their support of the transition to this architecture**.**

Power Solutions for 800-V and ±400-V DC Power

In its summit-related news, **Delta Electronics** said it would present its next-generation of highly integrated high-voltage dc power distribution, advanced precision cooling, and networking solutions for AI data centers. As part of this exhibit, which was quite crowded when I visited it, Delta presented state-of-the-art high voltage (HV) power solutions for a wide range of high-density, megawatt-scale AI data centers, either based on the next-generation 800-Vdc architecture, or those based on ±400 Vdc power.

For 800-Vdc environments, Delta's new solid-state transformer (SST) converts medium-voltage ac to 800 Vdc with up to 98.5% energy conversion efficiency. Speaking at the summit, Franzikus Gehle, vice president Americas Region for Delta Electronics (Americas), commented that this solution was co-developed with NVIDIA.

Moreover, the 1-MW-scale In-Row Power is a hyperscale-ready power system offering multiple 106-kW HVDC Power Shelves to solve the challenge of limited space and higher power rack needs (Fig. 10).

The new Energy Variance Appliance (EVA) Rack is conceived to maintain a limited peak-to-average ac input current ratio while enabling energy storage to smoothen GPU peak loads, with efficiency up to 97% at full load. The solution also includes Delta's Power Capacitance System to stabilize GPU-based servers with up to 10 seconds of power backup.

For ±400-Vdc power environments, Delta offers an integrated solution scalable up to 2.4 MW and featuring an In-Row Power System with active current sharing and droop control. According to Gehle, this ±400-Vdc solution was co-developed with Meta.

The solution also boasts 72-kW Power Shelves to convert 480-Vac input to 50-or 48-Vdc outputs for seamless integration with existing 21-inch ORV3 racks, as well as 72-kW battery backup units (BBU) in a compact 2U form with 97.5% efficiency. For more information, see the Delta press release.

Fig. 10. Delta's booth at OCP, which was busy with visitors, showcased power products for the 800-V bus (left) as well as power supply and cooling products for existing data centers. Delta's 1MW-scale In-Row Power is a hyperscale-ready power solution designed for high-end AI data centers to deal with limited space to install more power inside computing racks. It includes multiple 106-kW HVDC Power Shelves to deliver up to 1.1 MW of in-row power delivery and support 400 to 480-Vac input, 800-Vdc output within a standard 19-inch footprint.

Transitioning To The HVDC Power Architecture

Another power supply manufacturer exhibiting at the OCP Global Summit, **Advanced Energy Industries**, issued an announcement regarding the products it was showing here. In that news, the power supply products on display in its booth were described as enabling the upcoming transition to HVDC power architecture. So, while these are not power supplies for the 800-V architecture, they are moving power density and power delivery towards the levels required for 1 MW per rack and with a separate power rack as specified by OCP's Mt. Diablo power architecture.

For example, among the products Advanced Energy showed at its booth was a new 100-kW, 48-V ORv3 HPR-compliant power shelf, featuring six 18-kW power supply units and an integrated power management module in a 1OU form factor. This solution achieves over 97.5% efficiency, reducing wasted energy in GPU-intensive environments. Additional generations of ORv3 shelves, ranging from 18 kW to 72 kW, were also on display (Fig. 11).

Speaking at his company's booth at the summit, Harry Soin, AE's senior director of technical marketing, hyperscale observed that ten of the 100-kW power shelves can be combined to deliver 1 MW in a power rack in accord with OCP's Mt Diablo power architecture. However, closer to commercial deployment are the 72-kW power shelves, which can be combined to obtain 720 kW or even 800 kW per power rack, and which could be deployed by Q2 of next year. According to Soin, the 72-kW power shelf is where liquid cooling will start to be applied.

Fig. 11. Advanced Energy's power rack display at OCP Global Summit (left) highlighted the progression in power density that this company (and others) are achieving in developing server power supplies in standard formats with 12-V or 48-V/54-V output. Acbel (right) had a similar display of power shelves in their booth at the summit.

In addition to highlighting where the leading edge is for server power supplies, Advanced Energy's exhibit traced the evolution of server power supplies in the older M-CRPS package format (1.8 kW to 3.6 kW) and in the newer ORv3 format from 3 kW to 5.5 kW to 12 kW and now 18 kW.

Soin observed that the pace of server power supply development has gotten so much faster. Going from 300 W to 1.8 kW in the M-CRPS format took years, while the transition from 3-kW to the higher power levels in the ORV3 power supplies has occurred in much less time. The migration from silicon to SiC MOSFETs has been an enabler of increased power density. The migration to GaN will push density even higher. According to Soin the 72-kW and 100-kW power shelves are currently employing SiC MOSFETs switching at 250 to 300 kHz, but this frequency will double with the adoption of GaN.

Advanced Energy's display also featured M-CRPS compliant, Titanium efficiency power supplies, including a new 3.6-kW CSU3600AT and 1.8-kW CST1800AT. For stepdown from 48 V the company exhibited board-mounted dc-dc converters, such as the recently launched NDQ1600 and NDQ1300, with up to 98% efficiency for 48-V to 12-V applications.

For more details, see the announcement. In addition to his presence in the exhibit, Soin gave a presentation in the "Rack & Power Update and Product Overview" session on October 15. For more details, visit OCP 2025 | Advanced Energy.

Another power supply company making an announcement on its participation in the summit, was **LITEON Technology**. Together with Quanta Cloud Technology (QCT), a provider of global data center and AI solutions, LITEON showcased an AI server solution based on the NVIDIA GB300 NVL72 platform.

The server rack was integrated with LITEON's 33-kW power shelf, delivering an optimized power solution to support stable operation under high-density computing workloads. Through advanced power management design, the power shelf effectively reduces energy consumption and improves energy efficiency, says the vendor.

Also exhibiting at the OCP Global Summit was **Megmeet Electrical**, which indicated its support of the 800-V power architecture earlier in the year when announcing its participation in NVIDIA's GTC AI conference in March in San Jose. In that announcement, the company described itself as a turnkey provider of advanced 800-Vdc side-car power solutions for data centers. It also noted that its ORv3-HPR3 Open Compute Rack Power & Power Shelf & Capacitor shelf solutions support EDPP network communication protocols, delivering over 180% peak power.

DC Power Distribution For 800 V

Mitsubishi Electric Power Products (MEPPI) announced its support for the deployment of 800-Vdc infrastructure in AI factories by leveraging its expertise in dc power distribution technology. MEPPI will leverage the proven expertise of its parent corporation, Mitsubishi Electric (MELCO) in dc power distribution technology, having previously tested and installed dc data center infrastructure in the United States.

MEPPI's Critical Power Solutions Division (CPSD) is dedicated to minimizing downtime and delivering unparalleled reliability in power, cooling, and customer experience. Consistent with this mission, and through collaboration with NVIDIA, MEPPI CPSD is developing systems to enable safe, efficient, and high performance 800 Vdc power delivery for the world's most demanding and specialized computing infrastructure.

"Our deep experience in critical power, power electronics, and energy storage systems positions us to help our customers achieve the highest levels of uptime and efficiency in their AI factories," said John Campion, general manager, at MEPPI CPSD. "To meet these needs, we are excited to develop technologies that support industry moves toward an 800-Vdc power standard for AI infrastructure."

For more information, see the MEPPI announcement.