NVIDIA Selects Navitas to Collaborate on Next Generation 800 V HVDC Architecture

May 21, 2025

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TORRANCE, Calif., May 21, 2025 (GLOBE NEWSWIRE) -- Navitas Semiconductor (Nasdaq: NVTS), the industry leader in next-generation GaNFast™ gallium nitride (GaN) and GeneSiC™ silicon carbide (SiC) power semiconductors, today announced a collaboration with NVIDIA (Nasdaq: NVDA) on their next-generation 800 V HVDC architecture to support 'Kyber' rack-scale systems powering their GPUs, such as Rubin Ultra, enabled by GaNFast™ and GeneSiC™ power technologies.

NVIDIA's next generation of 800V DC architecture aims to establish high-efficiency, scalable power delivery for next-generation AI workloads, to ensure greater reliability, efficiency, and reduced infrastructure complexity.

Today's existing data center architecture uses traditional 54 V in-rack power distribution and is limited to a few hundred kilowatts (kW). Bulky copper busbars are required to transfer this low-voltage electricity from the rack-mounted power shelves to the compute trays. As power increases above 200 kW, this architecture runs into physical limits due to power density, copper requirements, and reduced system efficiency.

Modern AI data centers require gigawatts (GW) of power for the increasing demand for AI computation. Nvidia's approach is to directly convert the 13.8 kV AC grid power to 800 V HVDC at the data center perimeter using solid state transformers (SST) and industrial-grade rectifiers, eliminating several AC/DC and DC/DC conversion steps, maximizing efficiency and reliability.

Due to the higher voltage level of 800 V HVDC, the thickness of copper wires can be reduced by up to 45%, due to I^2R losses, where the same amount of power can be delivered with increased voltage and lower current. Using a traditional 54V DC system, over 200 kg of copper would be needed to power a 1MW rack, which is not sustainable for next-generation AI data centers with GW power demand.

The 800V HVDC directly powers the IT racks (eliminating the need for additional AC-DC converters) and is converted by DC-DC converters to lower voltages, which will drive GPUs, such as the Rubin Ultra.

Navitas is an established leader in AI data center solutions enabled by GaN and SiC technology. The high-power GaNSafe™ power ICs integrate control, drive, sensing, and critical protection features, enabling unprecedented reliability and robustness. GaNSafe is the world's safest GaN with short-circuit protection (350ns max latency), 2kV ESD protection on all pins, elimination of negative gate drive, and programmable slew rate control. All these features are controlled with 4-pins, allowing the package to be treated like a discrete GaN FET, requiring no V_{CC} pin.

Additionally, Navitas offers a family of medium voltage (80-120V) GaN devices, which have been optimized for secondary side DC-DC conversion, delivering high-speed, high efficiency, and small footprint, for AI data centers PSUs with outputs of 48V-54V.

Enabled by 20 years of SiC innovation leadership, GeneSiC proprietary 'trench-assisted planar' technology provides world-leading performance over temperature, delivering high-speed, cool-running operation for high-power, high-reliability applications. G3F SiC MOSFETs deliver high-efficiency with high-speed performance, enabling up to 25°C lower case temperature, and up to 3x longer life than SiC products from other vendors.

Offering the industry's broadest voltage range – stretching from 650 V to ultra-high voltages of 2.3 kV to 6.5 kV, the SiC technology has been implemented in multiple projects for MW energy storage and grid-tied inverters with the Department of Energy (DoE).

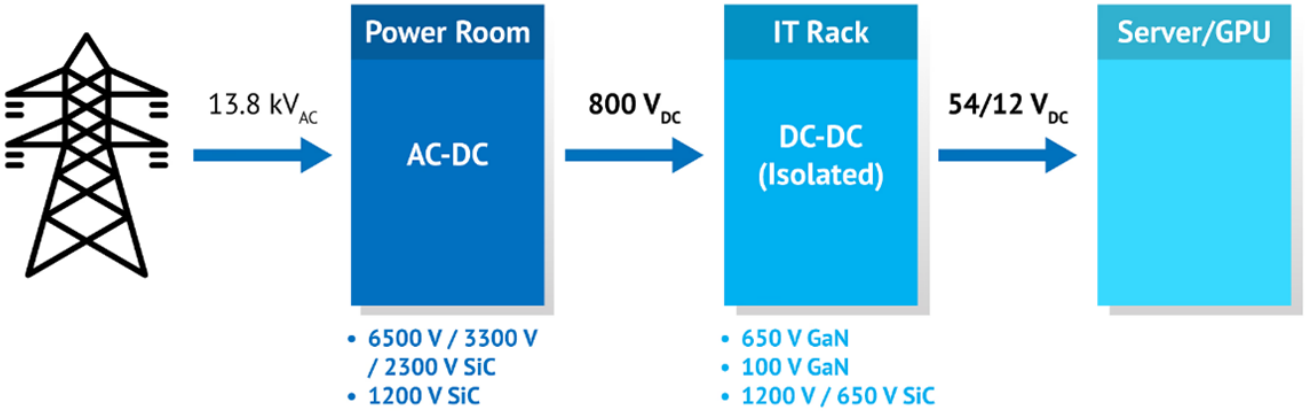

Fig. 1. Navitas GaN and SiC technologies cover the complete power delivery from grid to the GPU.

In August 2023, Navitas introduced a high-speed, high-efficiency 3.2 kW CRPS, achieving a 40% smaller size than best-in-class, legacy silicon solutions for

power-hungry AI and Edge computing. This was followed by the world's highest power density 4.5 kW CRPS, achieving a ground-breaking 137 W/in^3, and an efficiency of over 97%. In November 2024, Navitas released the world's first 8.5 kW AI data center power supply, powered by GaN and SiC that could meet 98% efficiency, complying with the Open Compute Project (OCP) and Open Rack v3 (ORv3) specifications. Additionally, Navitas created IntelliWeave, an innovative patented new digital control technique, that when combined with high-power GaNSafe and Gen 3-Fast SiC MOSFETs, enables PFC peak efficiencies to 99.3% and reduces power losses by 30% compared to existing solutions. Alongside the Computex exhibition in Taiwan, the latest release of their 12 kW PSU was presented at the Navitas 'AI Tech Night' on 21st May.

"We are proud to be selected by NVIDIA to collaborate on their 800 HVDC architecture initiative. Our latest innovations in high-power GaN and SiC technologies have seen world firsts and have created new inflections into markets such as AI datacenters and electric vehicles", said Gene Sheridan, CEO and co-founder of Navitas. "With our wide portfolio range, we can support NVIDIA's 800V HVDC infrastructure, from grid to the GPU. We appreciate that NVIDIA recognizes our technology and commitment to driving the next generation of data center power delivery."

NVIDIA's 800V HVDC architecture will improve end-to-end power efficiency up to 5%, reduce maintenance costs by 70% (due to fewer PSU failures), and lower cooling costs by directly connecting HVDC to the IT and compute racks.

To read NVIDIA's technical blog, please click here. For more information on Navitas' AI roadmap, please visit here or contact us at info@navitassemi.com.

About Navitas

Navitas Semiconductor (Nasdaq: NVTS) is the only pure-play, next-generation power-semiconductor company, celebrating 10 years of power innovation, founded in 2014. GaNFast™ power ICs integrate gallium nitride (GaN) power and drive, with control, sensing, and protection to enable faster charging, higher power density, and greater energy savings. Complementary GeneSiC™ power devices are optimized high-power, high-voltage, and high-reliability silicon carbide (SiC) solutions. Focus markets include AI data centers, EV, solar, energy storage, home appliance / industrial, mobile, and consumer. Over 300 Navitas patents are issued or pending, with the industry's first and only 20-year GaNFast warranty. Navitas was the world's first semiconductor company to be CarbonNeutral®-certified.

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Photos accompanying this announcement are available at:

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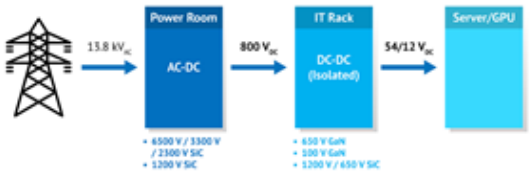
Figure 1



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Source: Navitas Semiconductor Corporation