Enphase Energy Publishes Technical White Paper on GaN Technology for Next-Generation Distributed Power Electronics

FREMONT, Calif., May 21, 2026 (GLOBE NEWSWIRE) -- Enphase Energy, Inc. (NASDAQ: ENPH), a global energy technology company, today published a technical white paper titled “Enphase Adoption of GaN Bi-Directional Switch Technology for Distributed Power Electronics.” The paper provides an engineering view of Enphase’s adoption of Gallium Nitride High Electron Mobility Transistor Bi-Directional Switch technology, or GaN HEMT BDS (also referred to as GaN BDS), and explains how the technology is expected to support Enphase’s next generation of distributed power electronics products. The white paper is available here.

Wide bandgap semiconductors are becoming increasingly important across power electronics. Silicon carbide is widely used in high-power electric vehicle (EV) and industrial systems, while GaN has gained traction in compact smartphone and laptop chargers. The Enphase white paper focuses on a specialized form of GaN, the monolithically integrated GaN BDS, and explains why it is well suited to Enphase’s modular, high-frequency, distributed power conversion architecture.

Enphase’s adoption of GaN BDS began with the IQ9™ Series Microinverters for both commercial and residential solar applications. The technology is designed to enable higher switching frequency, improved efficiency, higher power density, and broader AC operating voltage capability for 480 VAC three-phase commercial applications in the United States.

Conventional bi-directional switches typically use two back-to-back unidirectional power transistors. A monolithically integrated GaN BDS uses a single device structure to block voltage in either direction. This approach can reduce semiconductor die area, gate charge, component count, and cost compared with conventional back-to-back switch implementations. The white paper details how these device-level advantages translate into system-level benefits for Enphase products.

“GaN BDS is an important technology step for Enphase,” said Raghu Belur, co-founder and chief product officer at Enphase Energy. “It helps us push more power through smaller, more efficient, and more cost-effective distributed power converters while staying true to our core architecture. This white paper explains why the technology is a strong fit for our roadmap across microinverters, batteries, EV charging, and AI data center power systems.”

The paper highlights four technical advantages of GaN BDS technology:

- **Higher efficiency:** GaN BDS devices reduce switching and gate-drive losses, helping improve power conversion efficiency.
- **Higher switching frequency:** Lower gate charge and high-frequency operation help reduce the size of magnetics and passive filter components.
- **Expanded voltage capability:** GaN BDS technology supports higher AC operating voltages, including commercial three-phase grid applications.
- **Cost advantage:** The monolithic bi-directional switch structure can reduce semiconductor die area and cost compared with conventional back-to-back switch implementations.

In addition to IQ9 Series Microinverters, the paper describes how GaN BDS technology is expected to support Enphase’s Microinverter platform, next-generation battery systems, IQ® Bidirectional EV Charger, and the IQ® Solid-State Transformer (IQ SST) for AI data center power infrastructure. For the IQ SST, the power module is expected to use higher-voltage GaN BDS and GaN uni-directional switch devices as part of Enphase’s distributed architecture for supporting 800 VDC and ±400 VDC power systems.

The white paper also describes Enphase’s work with semiconductor partners to advance GaN BDS technology from early prototypes to commercially available devices. Available here, the paper discusses substrate management circuits, industry-standard packaging, surge robustness, long-term reliability, and the respective roles of GaN and SiC

in power conversion.

About Enphase Energy, Inc.

Enphase Energy, a global energy technology company based in Fremont, CA, is the world's leading supplier of microinverter-based solar and battery systems, EV chargers, home energy management systems, and virtual power plant (VPP) solutions. Enphase products enable people to harness the sun to make, use, save, and sell their own power, all controlled through the Enphase App. The company revolutionized the solar industry with its microinverter-based technology and has shipped approximately 87.8 million microinverters, with more than 5.2 million Enphase-based systems deployed in over 165 countries. For more information, visit https://enphase.com/.

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Forward-Looking Statements

This press release may contain forward-looking statements, including statements related to the expected capabilities, features, performance, efficiency, reliability, voltage capability, cost advantages, architecture, functionality, and benefits of GaN HEMT BDS technology and GaN HEMT Uni-Directional Switch technology in Enphase products; Enphase Energy’s ability to support Enphase’s next generation of distributed power electronics products; the expected capabilities and performance of IQ9 and IQ10 Series Microinverters; the expected use of GaN technology in Enphase battery storage systems, bi-directional EV chargers, and the IQ Solid-State Transformer; the expected ability of GaN technology to support higher switching frequency, higher power density, improved efficiency, expanded operating voltage, reduced semiconductor die area, reduced component size, reduced cost, improved surge robustness, and increased reliability; and Enphase Energy’s expectations regarding the suitability of GaN technology for commercial and industrial solar, battery storage, EV charging, and AI data center power infrastructure. These forward-looking statements are based on Enphase Energy’s current expectations and assumptions and inherently involve significant risks and uncertainties. Actual results and the timing of events could differ materially from those contemplated by these forward-looking statements as a result of such risks and uncertainties. Such risks include, but are not limited to, technological development and validation risks; semiconductor supply availability and qualification timing; the ability to achieve targeted performance, efficiency, reliability, voltage, and cost metrics at scale; customer acceptance and adoption of new power semiconductor architectures; competitive dynamics; supply chain availability and costs; execution risks related to new product development and new market entry; and other factors discussed in Enphase Energy’s filings with the Securities and Exchange Commission, including those risks described in more detail in Enphase Energy’s most recently filed Annual Report on Form 10-K and Quarterly Report on Form 10-Q, and other filings made from time to time with the Securities and Exchange Commission. Enphase Energy undertakes no duty or obligation to update any forward-looking statements contained in this release as a result of new information, future events, or changes in its expectations, except as required by law.

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Source: Enphase Energy, Inc.