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Transphorm Strengthens 900 V GaN Portfolio with Second FET

New Generation III GaN-on-Si FETs Capable of Powering Three-phase Broad Industrial Power Supplies and Automotive Converters

GOLETA, Calif.— June 25, 2017—[Transphorm Inc.](#)—the leader in the design and manufacturing of the highest reliability high-voltage (HV) Gallium Nitride (GaN) semiconductors—today introduced its second 900 V FET, the Gen III [TP90H050WS](#), enhancing the industry’s only 900 V GaN product line. These devices now enable three-phase industrial systems and higher voltage automotive electronics to leverage GaN’s speed, efficiency and power density. Further, the new FET’s platform is based on Transphorm’s 650 V predecessor, the only JEDEC- and AEC-Q101-qualified HV GaN technology. As such, system developers can design with confidence in its quality and reliability.

The TP90H050WS has a typical on-resistance of 50 mOhm with a 1000 V transient rating, offered in a standard TO-247 package. The TP90H050WS can reach power levels of 8 kW in a typical half bridge while maintaining greater than 99 percent efficiencies. Its figures of merit for $R_{on} \cdot Q_{oss}$ (resonant switching topologies) and $R_{on} \cdot Q_{rr}$ (hard switching bridge topologies) are two to five times less than those of common superjunction technologies in production—indicating highly reduced switching losses. While a JEDEC qualified version is slated for Q1 2020, customers can design 900 V GaN power systems today.

Transphorm’s first 900 V device, the [TP90H180PS](#), with a typical on-resistance of 170 mOhm in a TO-220 package is JEDEC qualified and has been available through Digi-Key since 2017. It can reach a peak efficiency of 99 percent, demonstrating its suitability for 3.5 kW single-phase inverters.

Establishing GaN’s Viability in New High Voltage Applications

“Transphorm’s latest 900 V GaN product represents a major milestone for commercial GaN power transistors as it reaches the 1 kilovolt mark, an industry first. This paves the way for GaN to be a viable choice at these higher voltage nodes,” said Primit Parikh, Co-founder and COO, Transphorm. “With partial funding from ARPA-E for early risk reduction and Power America for initial product qualification, this effort represents successful public-private partnership that accelerates GaN’s market adoption.”

Transphorm’s 900 V platform provides higher breakdown levels for systems already targeted by the company’s 650 V FETs, such as renewables, automotive, and various broad industrial applications. It is designed to be deployed in bridgeless totem-pole power factor correction (PFC), half-bridge configurations used in DC to DC converters and inverters. The ability to support these topologies at a higher voltage expands Transphorm’s target applications to now include a broad list of three-phase

industrial applications, such as uninterruptible power supplies and automotive chargers/converters at higher battery voltage nodes.

“900 V GaN power devices eliminate barriers to access applications not presently supported with GaN semiconductors. With innovations like this 900 V platform, Transphorm is advancing the industry, creating new customer opportunities,” said Victor Veliadis, Deputy Executive Director and CTO of PowerAmerica, which partially funded the project.

As do all Transphorm qualified GaN FETs, the TP90H050WS offers the following advantages along with the differentiating features mentioned earlier:

- Easy to drive with off-the-shelf drivers
- Robust safety gate margin
- Higher power density than incumbent Silicon technologies
- Performance exceeding that of IGBTs, superjunction
- Reduced overall system costs
- Reduced system weight

Availability

Now sampling. To order parts, visit the TP90H050WS [product page](#).

Design Resources

- [Datasheet](#)
- [TDINV3500P100-KIT 3.5kW](#) inverter evaluation platform (TP90H180PS)
- [SPICE model](#)
- Application [design support](#)

Welcome to the GaN Revolution!

Transphorm designs and manufactures the highest performance, highest reliability 650 V and 900 V GaN semiconductors for high-voltage power conversion applications. Holding one of the largest IP portfolios (1000+ issued and pending patents worldwide), Transphorm produces the industry’s first JEDEC and AEC-Q101 qualified GaN FETs. This is due to a vertically-integrated business approach, which allows for innovation at every development stage: design, fabrication, device, and application support.

Transphorm: moving power electronics beyond Silicon limits. Website: transphormusa.com Twitter: [@transphormusa](https://twitter.com/transphormusa)

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