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## **900-V GaN-on-Si FETs Empower Three-Phase Industrial Power Supplies And Automotive Converters**

[Transphorm](#) has introduced its second 900-V FET, the Gen III TP90H050WS, enhancing what the company describes as the industry's only 900-V GaN product line. These devices enable three-phase industrial systems and higher voltage automotive electronics to leverage GaN's speed, efficiency and power density. Furthermore, the new FET's platform is based on Transphorm's 650-V predecessor, the only JEDEC- and AEC-Q101-qualified HV GaN technology, according to the vendor.

The TP90H050WS has a typical on-resistance of 50 mΩ 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% efficiencies. According to Transphorm, its figures of merit for  $R_{on} \cdot Q_{oss}$  (relevant for resonant switching topologies) and  $R_{on} \cdot Q_{rr}$  (relevant for 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 mΩ 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%, demonstrating its suitability for 3.5-kW single-phase inverters.

"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-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, executive director of PowerAmerica, which partially funded the project.

As with all Transphorm-qualified GaN FETs, the TP90H050WS offers numerous advantages including easy driving with off-the-shelf gate drivers, robust safety gate margin, performance exceeding that of IGBTs and superjunction MOSFETs, reduced overall system costs and reduced system weight. The TP90H050WS is now sampling. To order parts, visit the TP90H050WS [product page](#).