



Transphorm Demonstrates a Bidirectional SuperGaN Power Supply with New Reference Design for E-Mobility and Energy/Industrial Markets

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300 W DC-to-DC Battery Charger Board Showcases Key Capability of GaN Technology Necessary to Advance E-Mobility Applications

GOLETA, Calif.--(BUSINESS WIRE)--Jun. 11, 2024-- [Transphorm, Inc.](#) (Nasdaq: TGAN), the global leader in robust GaN power semiconductors, today announced the release of a new 300 W DC-to-DC GaN reference design for 2- and 3-wheeled electric vehicle battery chargers. The [TDDCDC-TPH-IN-BI-LLC-300W-RD](#) design uses [TP65H150G4PS](#) 150 mOhm SuperGaN® FETs in a robust TO-220 package to power a high performing, high efficiency energy harvesting and distribution battery charging system. The new board notably demonstrates one of the most anticipated value propositions of a GaN power supply: **bidirectionality**. This capability indicates that a single power system can deliver power in two directions from input (AC) to output (DC) and output (DC) to input (AC) depending on system needs, with GaN enabling energy efficiency in both conversions.

“The first value proposition of GaN in high power applications was realized by the highly efficient operation of the bridgeless totem-pole power factor correction circuit. This subsequently led to the next level of benefits across a variety of topologies, including overall smaller and lower-cost power systems across the full power conversion spectrum, from 30 watts to over 10 kilowatts,” said Primit Parikh, President and CEO, Transphorm. “Continuing the leadership of Transphorm GaN in higher power applications, we have now demonstrated bidirectional power conversion that can be used by vehicle on-board chargers for e-mobility, renewable energy and backup power systems, and other power supply applications requiring highly integrated, interchangeable input and output terminals.”

Bidirectionality is a core capability required to advance V2X (vehicle-to-everything) infrastructure for e-mobility applications that comprise V2L (vehicle-to-load), V2H (vehicle-to-house), and V2G (vehicle-to-grid) scenarios, which represent a projected overall V2X system market size ranging from a conservative 9 billion USD to an aggressive 70 billion USD by 2030.

In EV systems, renewable energy systems, and other applications within the V2X model, design and performance flexibility will be critical to innovation and wider deployment. The high power density and bidirectionality is a key enabler for this area. The V2X applications are prime use cases that can truly leverage all the SuperGaN technology’s superior value proposition. This new reference design is an exciting example of what’s possible in a future enabled by SuperGaN technology.

TDDCDC-TPH-IN-BI-LLC-300W-RD Reference Design Specifications

The TDDCDC-TPH-IN-BI-LLC-300W-RD board is a fully analog implementation without complex firmware development for the power stage. This design configuration enables simpler and faster power system development.

Specification highlights follow:

Topology	Full-Bridge LLC
Convection Cooling	Natural convection without forced air
Output Power	300 W
Output Voltage	48 V/6 A, 380 V/0.9 A
Peak Efficiency	97.3%
Power Density	36.5 W/in ³

Target Applications and Availability

The TDDCDC-TPH-IN-BI-LLC-300W-RD board is ideal for high power density applications such as the DC-to-DC power stage of bidirectional DC-to-AC inverter power supplies used in energy harvesting applications with solar-, battery- and/or grid-tied solutions as well as AC-to-DC power supplies used in 2-, 3-, and 4-wheeler battery chargers.

The design guide and BOM can be downloaded here: <https://www.transphormusa.com/en/reference-design/tddcdc-tph-in-bi-llc-300w-rd/>.

About Transphorm

Transphorm, Inc., a global leader in the GaN revolution, designs and manufactures high performance and high reliability GaN semiconductors for high voltage power conversion applications. Having one of the largest Power GaN IP portfolios of more than 1,000 owned or licensed patents, Transphorm produces the industry’s first JEDEC and AEC-Q101 qualified high voltage GaN semiconductor devices. The Company’s vertically integrated device business model allows for innovation at every development stage: design, fabrication, device, and application support. Transphorm’s innovations move power electronics beyond the limitations of silicon to achieve over 99% efficiency, 50% more power density and 20% lower system cost. Transphorm is headquartered in Goleta, California and has manufacturing operations in Goleta and Aizu, Japan. For more information, please visit www.transphormusa.com. Follow us on Twitter @transphormusa and WeChat at Transphorm_GaN.

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