



The new Traction Inverter with Gallium Nitride Chip Technology runs successfully

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hofer powertrain opts for the most future-proof chip technologies and develops new multilevel power electronics with VisIC Technologies' Gallium Nitride Chip Technology, D³GaN (Direct Drive D-Mode), capable of meeting the needs of modern drivetrains and breaking efficiency barriers. The new solution's efficiency and power density exceed silicon-based technology's capabilities – the tests prove successful. The new 3Level GaN (Gallium Nitrite) Inverter proves its strong capabilities on the test bench, confirming significantly better switching speed and smaller and lighter package size, reducing total system cost.

Gallium nitride semiconductors are key to efficiency improvements, increasing the driving range of electrified vehicles. hofer powertrain and VisIC Technologies Ltd. aim to develop gallium nitride-based power inverters for electric vehicles, achieving the breakthrough of gallium nitride technology for 800V battery systems in the automotive industry.

"We are proud to achieve the next step in developing efficient GaN-based, high-frequency inverters for 800V automotive applications", says Lukasz Roslaniec, electronics expert at hofer powertrain.

Based on the guiding principle "develop fast and learn fast," hofer powertrain achieves quick results: the team develops a Minimal Viable Product (MVP) to investigate and prove the capability of using 650 V gallium nitride semiconductors in an 800 V 3L NPC inverter application. Precisely, their behavior in terms of switching speed, EMC, and the limits. The main goal is to prove the capability to feed a sinusoidal current of 100 Arms through an inductive load and to perform a double pulse test. Measurements have shown the possibilities of an excellent performance increase.

"hofer powertrain's development paves the way for a breakthrough in GaN inverter performance, which is superior to silicon and silicon-carbide-based designs for high efficiency," says Ilia Bunin, Senior Product Manager & Technical Expert at VisIC Technologies

This system provides valuable insights and in-depth understanding of the short circuit protection, switching properties of the implemented GaN transistors, the impact on dv/dt, oscillations during switching, voltage overshoots, and much more. In addition, the company identifies the most important electrical and thermal properties for rapid further development.

In-depth understanding derives from a successful customer project that acts as a benchmark, comparing the individual benefits with an existing 2L inverter, both at the sub-assembly level and the system level.

The upcoming sample stage (A1) has already started and is expected to perform well in real test conditions with a permanent synchronous motor. The team aims to validate and benchmark existing systems using test cycles like the Worldwide Harmonized Light Vehicles Test Procedure (WLTP) and prove its outstanding potential for the entire automotive powertrain.

[About hofer powertrain](#)

As an established and independent partner of the mobility industry, hofer powertrain has been providing pioneering technologies and products to companies worldwide for over 40 years. Accomplished by our experienced teams of experts specialized in the development, industrialization, and production of powertrain systems.

[About VisIC Technologies](#)

VisIC Technologies is a world leader in GaN electronics for EV applications, focused on high-power automotive solutions. Its efficient and scalable products are based on deep technological knowledge of gallium-nitride and decades of experience. VisIC is committed to providing a step function improvement in size and cost of energy conversion systems and is dedicated to high-quality customer support at all development phases. VisIC offers high-power transistor products based upon compound semiconductor Gallium Nitride (GaN) material aiming to provide products for cost-effective and high-performance automotive inverter systems.