



VisIC Technologies partners with TSMC to offer industry's most advanced 1200V GaN-based Power Device solutions

04 February, 2018

Tel Aviv, Israel

VisIC Technologies, developing and marketing efficient GaN-based Power Device components for energy conversion systems, is now sampling the industry's first 1200V GaN modules, and is announcing a major manufacturing partnership with TSMC on their GaN on silicon technologies that were announced last year. Engineering samples are now in design with lead customers, and trade demonstrations will take place during PCIM China 2018 Shanghai.

This extremely fast power switch module performs with the highest efficiency in the industry, enabling small yet efficient xEV chargers and uninterruptible power supply (UPS) systems.

The new VisIC module, based on TSMC's 650D GaN-on-Silicon process, leverages the wide band gap technology that is revolutionizing the world of xEV power electronics and data center power supplies. TSMC's GaN on Silicon process further provides high yield and fast ramp-up capabilities, while VisIC's GaN transistor design brings unprecedented levels of performance. Switching time below 10 nanoseconds is ensured by a high electron mobility transistor (HEMT) design, where electrons flow in a 2-dimensional quantum well, which fundamentally differs from electron flow in SiC MOSFETs.

With 1200 V ratings, the GaN module offers typical on resistance of just 40 mΩ. Target applications are power converters for motor drives, three-phase power supplies and other applications requiring current switching up to 50 A.

VisIC's 1200V GaN device is a half-bridge module that integrates GaN high-electron mobility transistors (HEMTs) with push-pull and over-current and over-temperature protections in a single package. The design takes advantage of VisIC's innovative Advanced Low Loss Switch (ALL-Switch©) technology, which uses a patented, high-density lateral layout that results in fast switching performance and low RDS(on).

The high-voltage GaN module offers reduced gate charge and capacitances with low RDS(on), so the switching energy for the GaN device is as low as 140 μJ. Consequently, the switching losses are three to five times lower as compared to comparable silicon carbide MOSFETs.

The GaN power device market is predicted to be over US\$ 332,5 million in 2022 according to Yole Développement (Yole), the market research & strategy consulting company (Source: GaN Power Epitaxy, Devices, Applications and Technology Trends report, Yole Développement, November 2017), based on products rated for 650V of blocking voltage and below. VisIC's new product opens access to a wider market of devices with 1200V blocking voltage, currently serviced by Silicon IGBT and Silicon Carbide (SiC) MOSFET devices.



FIGURE 1 VISIC'S 1200V MODULE WITH PROPOSED COOLING SOLUTION

“We are very pleased to partner with VisIC, an exciting new entrant to the fast-growing GaN power market,” said Maria Marced, President of TSMC EMEA . “TSMC has made significant capital and engineering investment in our GaN manufacturing capability, which makes this platform well suited to support VisIC and its customers’ demands. We look forward to working with VisIC as they drive adoption of this new platform”

In addition to UPS and xEV chargers, 1200V GaN technology enables a wide range of inverter applications, which require high current, in the range of hundreds of Amperes. These high-current applications require a high volume GaN manufacturing capability, which TSMC provides.

“GaN has better fundamental physical properties, such as maximal breakdown field and current density, than those of silicon or SiC. There are no fundamental limitations for GaN products to address the high voltage high current space” said VisIC CTO Gregory Bunin. “This manufacturing partnership allows VisIC to ramp capacity very quickly. I am proud to partner with TSMC. They are outstanding, world-class supply-chain partners and I am confident in their ability to support the dramatic growth expectations we have for our GaN power devices.”

**About TSMC:**

TSMC is a dedicated semiconductor foundry, providing the industry's leading process technology and a large portfolio of process-proven libraries, IPs, design tools and reference flows. The Company's owned capacity in 2018 is expected to exceed 12 million (12-inch equivalent) wafers, including capacity from three advanced 12-inch GIGAFAB® facilities, four eight-inch fabs, and one six-inch fab, in Taiwan, as well as TSMC's wholly owned subsidiaries WaferTech, TSMC China, and TSMC Nanjing. TSMC is the first foundry to provide 7-nanometer production capabilities. Its corporate headquarters are in Hsinchu, Taiwan. For more information about TSMC please visit <http://www.tsmc.com>.

About VisIC Technologies:

Based in Nes Ziona, Israel, VisIC Technologies, Ltd. was established in 2010 by experts in Gallium Nitride (GaN) technology to develop and sell advanced GaN-based power conversion products. VisIC has successfully developed, and is bringing to market, high power GaN-based transistors and modules. (GaN is expected to replace most of the Silicon-based (Si) products currently used in power conversion systems.) VisIC has been granted keystone patents for GaN technology and has additional patents pending.

For more information about VisIC Technologies please visit <http://www.visic-tech.com>.