

## ***Devices Copackage Silicon Half-Bridge Driver And 650-V GaN Transistors***

[STMicroelectronics](#)' MasterGaN is being introduced as the world-first platform embedding a half-bridge driver based on silicon technology along with a pair of GaN power transistors. According to the company, the combination will accelerate the creation of next-generation compact and efficient chargers and power adapters for consumer and industrial applications up to 400 W.

GaN technology enables these devices to handle more power even as they become smaller, more lightweight, and more energy efficient. These improvements will make a difference for smartphone ultra-fast chargers and wireless chargers, USB-PD compact adapters for PCs and gaming, as well as in industrial applications like solar-energy storage systems, uninterruptible power supplies, and high-end OLED TVs and server cloud.

Today's GaN market is typically served by discrete power transistors and driver ICs that require designers to learn how to make them work together for best performance. ST's MasterGaN approach bypasses that challenge, resulting in faster time to market and assured performance, together with a smaller footprint, simplified assembly, and increased reliability with fewer components. With GaN technology and the advantages of ST's integrated products, chargers and adapters can cut 80% of the size and 70% of the weight of ordinary silicon-based solutions, according to the vendor.

"ST's market-unique MasterGaN platform builds on our proven expertise and power-design skills to combine high-voltage smart-power BCD process with GaN technology, to accelerate the creation of space-saving and power-efficient products that are kinder to the environment," said Matteo Lo Presti, executive VP and general manager Analog Sub-Group, STMicroelectronics.

ST is launching the new platform with MasterGaN1, which contains two GaN power transistors connected as a half bridge with integrated high-side and low-side drivers in a 9-mm x 9-mm x 1-mm GQFN package. The two normally-off transistors feature closely matched timing parameters, a 10-A maximum current rating, and a 150-mΩ on-resistance. The logic inputs are compatible with signals from 3.3 V to 15 V. Protection features are also built in, including low-side and high-side UVLO protection, interlocking, a dedicated shutdown pin, and overtemperature protection (see the figure).

The MasterGaN platform leverages STDRIVE 600-V gate drivers and GaN HEMT. The low-profile GQFN package ensures high power density and is designed for high-voltage applications with over 2-mm creepage distance between high-voltage and low-voltage pads. The family of devices will span different GaN-transistor sizes ( $R_{DS(ON)}$ ) and will be offered as pin-compatible half-bridge products that let engineers scale successful designs with minimal hardware changes.

Leveraging the low turn-on losses and absence of body-diode recovery that characterize GaN transistors, the products offer superior efficiency and overall performance enhancement in high-end, high-efficiency topologies such as flyback or forward with active clamp, resonant, bridgeless totem pole PFC and other soft- and hard-switching topologies used in ac-dc and dc-dc converters and dc-ac inverters.

MasterGaN1 is in production now. Priced at \$7 each for orders of 1,000 units, it is available from distributors. An evaluation board is also available. For more information see [www.st.com/mastergan1-pr](http://www.st.com/mastergan1-pr)

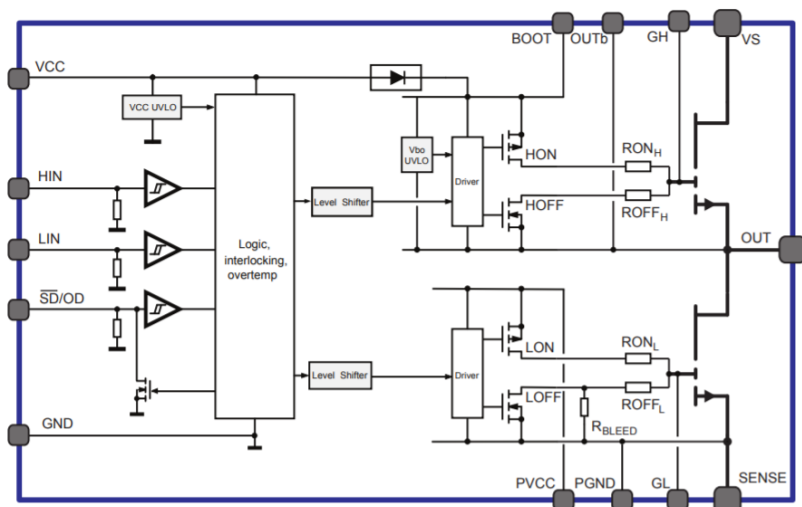


Figure. The MASTERGAN1 is a power system-in-package co-packaging a gate driver and two 650-V 150-mΩ enhancement-mode GaN HEMT transistors in half-bridge configuration with integrated bootstrap diode and UVLO protection on both the lower and upper driving sections. The device is housed in a compact 9-mm x 9-mm QFN package as shown on the right.