600-V GaN FET Power Stages Boost Performance For Applications Up To 10 kW

Texas Instruments' LMG34x family of 600-V, 50-mΩ and 70-mΩ gallium nitride (GaN) power stages support power converter applications up to 10 kW, enabling smaller, more efficient designs in ac-dc power supplies, robotics, renewable energy, grid infrastructure, telecom and personal electronics applications. According to TI, its integrated GaN power stage doubles power density and reduces losses by 80% compared to silicon MOSFETs. Each device is capable of 1-MHz switching frequencies and slew rates of up to 100 V/ns.

Unlike traditional cascade and standalone GaN FETs, these power stages integrate unique functional and protection features to simplify design, enable greater system reliability and optimize the performance of high-voltage power supplies. With integrated <100-ns current limiting and overtemperature detection, the devices protect against unintended shoot-through events and prevent thermal runaway, while system interface signals enable a self-monitoring capability (see the figure).

The family includes three models. One is a power stage with a 50-mΩ GaN FET, the LMG3410R050. The other two power stages have a 70-mΩ GaN FET, the LMG3410R070 and LMG3411R070, which offer latched overcurrent protection and cycle-by-cycle overcurrent protection, respectively. The portfolio is backed by 20 million hours of device reliability testing, including accelerated and in-application hard switch testing.

At Electronica, TI is showcasing a 10-kW cloud-enabled grid link demo jointly developed with Siemens. This demos uses TI's LMG3410R050 600-V GaN FET with integrated driver and protection, enabling engineers to achieve 99% efficiency and up to 30% reduction in power component size compared to a traditional silicon design.

These devices are available now in 8-mm-by-8-mm split-pad, QFN packages. The LMG3410R050, LMG3410R070 and LMG3411R070 are priced at $14.95, $16.45 and $16.45, respectively, in 1,000-unit quantities. For more information, see http://www.ti.com/lmg3410r050-pr, http://www.ti.com/lmg3410r070-pr and http://www.ti.com/lmg3411r070-pr.

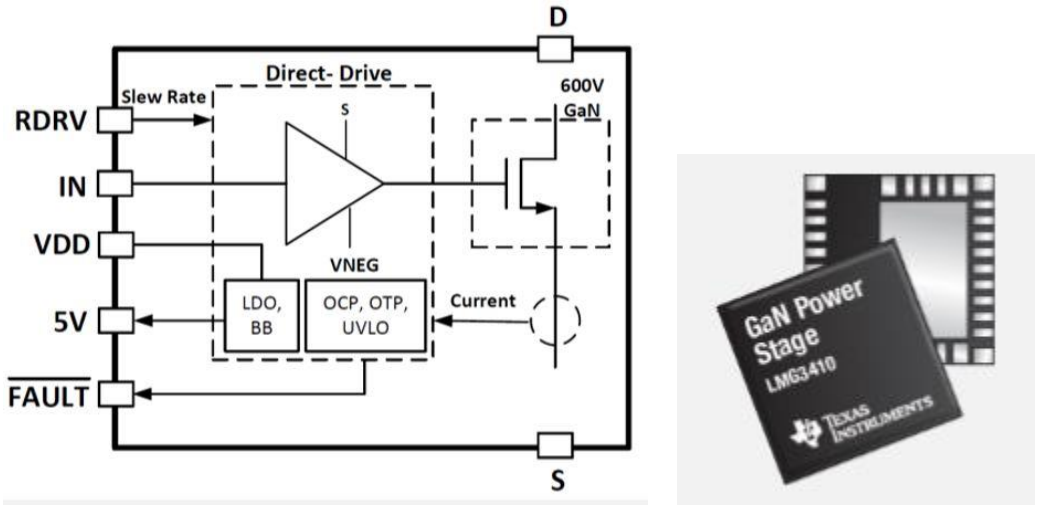

Figure. Offered in 8-mm x 8-mm split-pad QFNs, the LMG34x integrated 600-V GaN FET power stages feature an integrated gate driver with zero common-source inductance, a 5-V LDO to power an external digital isolator, an integrated bias supply (allowing operation from a +12-V unregulated supply), and high-speed overcurrent protection. They offer a choice of a 50-mΩ or 70-mΩ GaN FET, and either latched or cycle-by-cycle overcurrent protection.