

SiC-MOSFET Gate Driver Improves Efficiency And Safety

[Power Integrations'](#) SIC1182K SCALE-iDriver, a high-efficiency, single-channel SiC MOSFET gate driver, is said to deliver the highest peak-output gate current available without an external boost stage. The gate driver also features the high-speed FluxLink communications technology, which offers improved isolation versus conventional solutions, and protection circuits that provide fast shutdown.

Devices can be configured to support different gate-drive voltage requirements matching the range of requirements seen in SiC-MOSFETs today. Key applications include UPSs, photovoltaic systems, servo drives, welding inverters and power supplies (Fig. 1).

The SIC1182K offers up to 8 A of output at a junction temperature of 125°C allowing this device to support SiC-MOSFET inverter designs up to several hundred kilowatts without a booster stage. This results in high system efficiency and enables customers to produce only one design to cover their entire portfolio of differently rated power inverters. A switching frequency of up to 150 kHz supports multiple applications.

The IC features Power Integrations' high-speed FluxLink communications technology. FluxLink replaces optocouplers and capacitive or silicon-based isolation solutions, significantly improving reliability, according to the vendor, while delivering reinforced isolation up to 1200 V.

The gate driver also includes system-critical protection features such as desaturation monitoring and current SENSE read out, and primary and secondary undervoltage lockout (UVLO). A new feature combines short-circuit protection (at and during turn-on phase) as well as overvoltage limiting by advanced active clamping (at turn-off phase) through a single sensing pin. In case the driven semiconductor provides a current-sense terminal, adjustable overcurrent detection can be realized.

Also noteworthy, the protection circuits provide safe shutdown within 5 µs, meeting the fast protection needs of SiC devices. In addition, the gate drivers exhibit high external magnetic field immunity, featuring a package that provides ≥9.5 mm of creepage and clearance, using material that has the highest CTI level, CTI600, to IEC60112.

"Silicon carbide MOSFET technology opens the door for decreasing size and weight as well as reduced losses in power inverter systems. The SCALE-iDriver family with FluxLink technology enables safe, cost-effective designs for inverters with very few external components, ensuring functional safety as well as compact packaging and maximized efficiency," says Michael Hornkamp, senior director of marketing for gate-driver products at Power Integrations (see Fig. 2).

The SCALE-iDriver SIC1182K meets IEC60664-1 isolation coordination for low-voltage equipment below 1000 V and IEC61800-5-1 electric motor drive inverter regulations. UL 1577, 5 kVAC for 1 min, is pending and VDE0884-10 is in process. Devices are available now, priced at \$4.65 in 10,000-piece quantities. Technical information is available from the company's [website](#).



Fig. 1. Housed in an eSOP-R16B package, the SIC1182K SCALE-iDriver SiC MOSFET gate driver delivers up to 8 A at a junction temperature of 125°C, allowing it to support SiC-MOSFET inverter designs up to several hundred kilowatts without a booster stage. It also features FluxLink communications technology, which offers high reliability and reinforced galvanic isolation up to 1200 V, and protection circuits that achieve 5-μs shutdown.

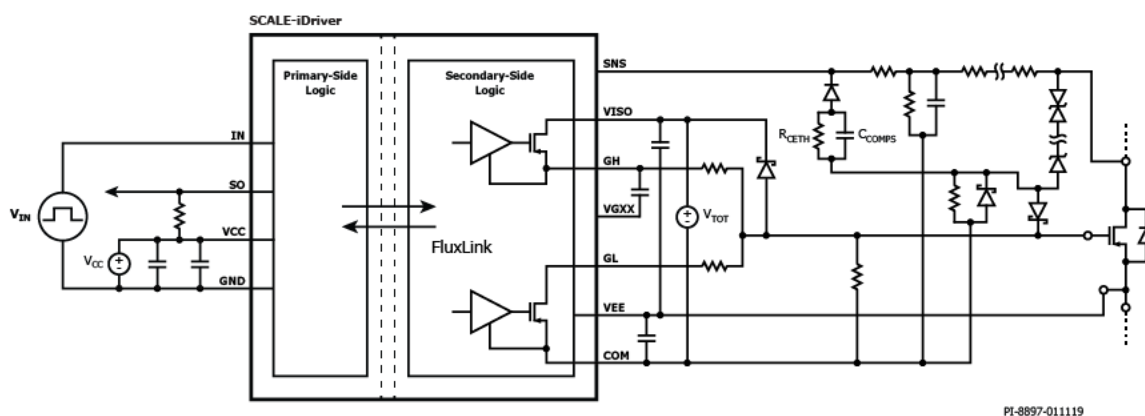


Fig. 2. Typical application circuit. SCALE-iDriver technology minimizes the number of external components that are needed and reduces the BOM; tantalum or electrolytic capacitors are not required, and only one secondary winding is needed. A two-layer PCB can be used, which increases design simplicity, cuts component count and eases supply-chain management.