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Isolated Gate Drivers Integrate Sensing For IGBTs And SiC MOSFETs

Texas Instruments' UCC21710-Q1, UCC21732-Q1 and UCC21750 isolated gate drivers are said to provide unparalleled levels of monitoring and protection for high-voltage systems. These ICs enable designers to create smaller, more efficient and higher-performing designs in traction inverters, onboard chargers, solar inverters and motor drives. The devices are described as the industry's first to offer integrated sensing features for IGBTs and SiC MOSFETs to simplify designs and enable greater system reliability in applications operating up to 1.5 kVrms (see the figure). With integrated components, the devices provide fast detection time to protect against overcurrent events while ensuring safe system shutdown.

Using capacitive isolation technology, the UCC21710-Q1, UCC21732-Q1 and UCC21750 maximize insulation barrier lifetimes while providing high reinforced isolation ratings, fast data speeds and high-density packaging.

"System robustness is becoming an increasing challenge in high-voltage motor drive and power delivery applications," said Steve Lambouses, vice president, TI High-Voltage Power. "These new gate drivers using TI's isolation technology, combined with the other integrated features and support, can enable engineers to more quickly ramp to production reliable systems, while minimizing space and cost."

The isolated gate drivers' high peak drive strength of ±10 A maximizes switching behavior and reduces losses, while 200 ns of overcurrent detection enables fast system protection. The UCC217xx family extends insulation barrier lifetimes with capacitive isolation technology and reinforced isolation ratings with surge immunity up to 12.8 kV. Additionally, the devices ensure accurate data communication with common-mode transient immunity (CMTI) of more than 150 V/ns.

The gate drivers eliminate external components with integrated buffers and sensors while providing accurate temperature, current or voltage sensing, with an isolated analog-to-pulse-width modulation sensor to simplify system-level diagnostics and prevent switch failures.

For designers of industrial applications needing increased noise immunity and wider operating temperatures, TI has also announced the UCC23513, an opto-compatible gate driver with 3-A drive strength and 5-kVrms reinforced safety isolation. Developed to maximize system performance and reliability in motor drives, solar inverters and power supplies, this gate driver offers a wide junction temperature range from -40ºC to +150ºC and high CMTI greater than 100 V/ns—enabling designers to achieve levels of performance not available with traditional optocouplers, according to TI.

Designers can accelerate time to market with the UCC23513's pin-to-pin compatibility with opto-isolated gate drivers and ready-to-use design resources, including the three-phase inverter reference design for 200-480 Vac drives with opto-emulated input gate drivers.

Pre-production samples of the UCC21710-Q1, UCC21732-Q1, UCC21750 and UCC23513 gate drivers are available now. The table lists pricing and package type. For more information, see www.ti.com/UCC21710-Q1-pr, www.ti.com/UCC21732-Q1-pr and www.ti.com/UCC21750-pr.

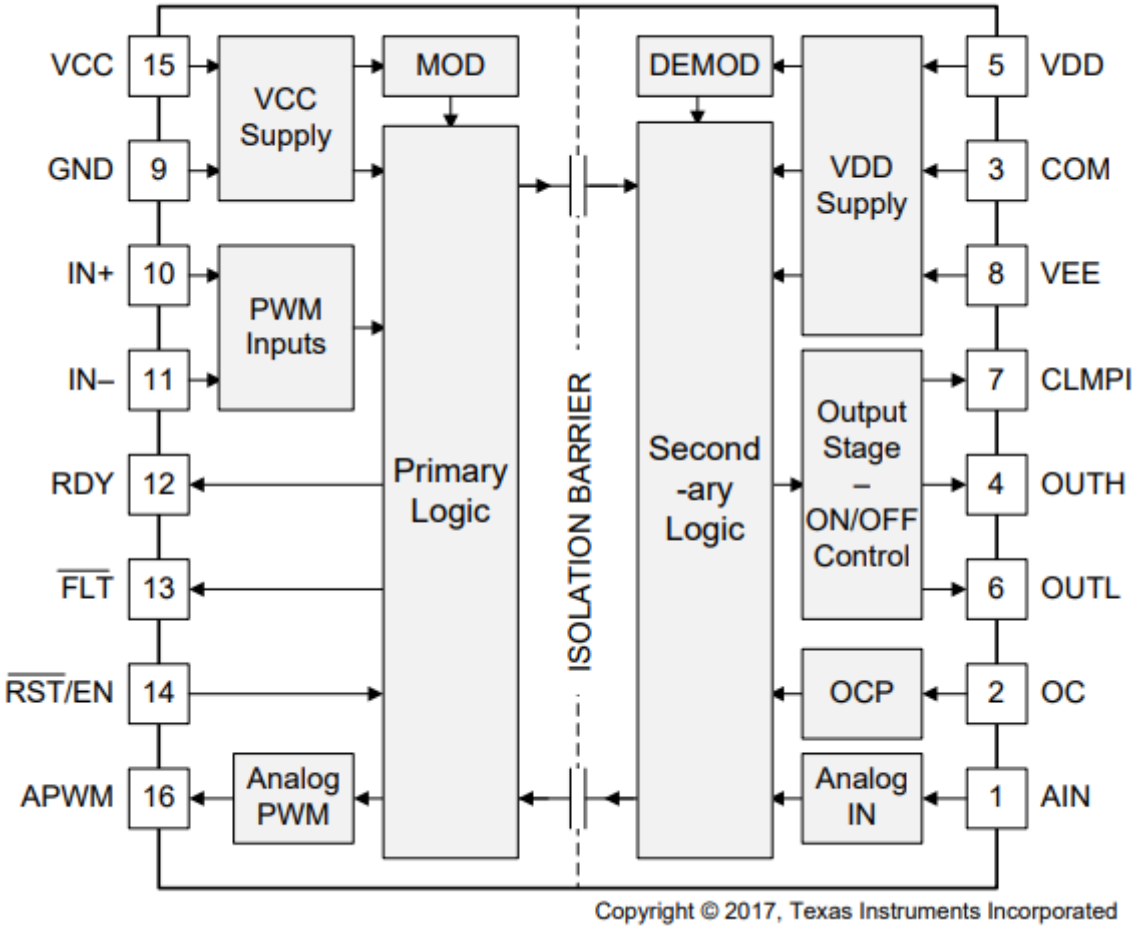

Figure. The UCC21710-Q1, UCC21732-Q1 and UCC21750 are single-channel isolated gate drivers for SiC/IGBT devices with advanced protection and high-CMTI. These gate drivers also improve total system efficiency in automotive and industrial applications.

Table. Pricing and packaging for the UCC217xx-Q1 gate driver ICs.

Product	Package type	Price (1,000-unit quantities)	Evaluation module
UCC21710-Q1	16-pin SOIC	$4.00	UCC21710QDWEVM-025
UCC21732-Q1	16-pin SOIC	$4.00	UCC21732QDWEVM-025
UCC21750	16-pin SOIC	$3.48	UCC21750QDWEVM-025
UCC23513	6-pin SOIC	$2.08	UCC23513EVM-014