

Silicon Labs Digital Isolation Solution Enhances Long-Term Reliability of Motor Controls

CMOS-Based Si826x Isolated Gate Drivers Provide Robust Drop-in Replacements for Opto-Drivers Used in Industrial Power Systems

“The Si826x isolated gate drivers provide a major step forward in isolation technology for industrial motor control by providing a package- and footprint-compatible drop-in replacement for antiquated opto-drivers”

AUSTIN, Texas--([BUSINESS WIRE](#))--[Silicon Labs](#) (NASDAQ: SLAB), a leader in high-performance, analog-intensive, mixed-signal ICs, today introduced the industry's first digital CMOS-based drop-in replacement solution for optocoupler-isolated gate drivers (opto-drivers). Supporting up to 5 kV isolation ratings and up to 10 kV surge protection, the new Si826x isolated gate drivers provide an ideal configuration, package and footprint fit for a wide range of opto-drivers used in high-power motor control, industrial drives, solar power and EV/HEV inverters, and switched mode and uninterruptible power supplies.

Failure-prone opto-drivers are a weak link in motor controls and other industrial power systems that require long-term reliability, extended warranties and fail-safe operation for up to 20 years. Opto-drivers are inherently limited by their inferior LED-based technology, which is subject to large output variations over input current, temperature and age. These variations are eliminated by using Si826x isolated gate drivers. Less variability, especially in input turn-on current, simplifies system design since developers no longer need to anticipate aging effects. Higher reliability and longer device lifetime also allow system manufacturers to support longer warranties and reduce costs associated with product repair or replacement.

Based on Silicon Labs' proven digital isolation technology, the Si826x family is a pin- and footprint-compatible functional upgrade solution for commonly used opto-driver products. Si826x isolated gate drivers emulate the behavior of opto-drivers by modulating a high-frequency carrier instead of light from an LED. This simpler digital architecture provides a robust isolated data path that requires no special considerations or initialization at start-up. While the input circuit mimics the characteristics of an LED, the Si826x devices require less drive current, resulting in higher efficiency. The propagation delay time of Si826x devices is independent of the input drive current, resulting in consistently short propagation times (25 ns), smaller unit-to-unit variation and greater input circuit design flexibility.

The propagation delay and skew of Si826x isolated gate drivers is ten times lower than opto-drivers, which improves response time for feedback loops and enhances system efficiency. The Si826x devices also provide superior noise immunity, enabling robust, glitch-free long-term performance in harsh, noisy environments such as industrial motor control. Unlike opto-drivers, isolated gate drivers offer stable performance over time and temperature with no drift. Because of these advantages, the Si826x family provides longer service life and significantly higher reliability than opto-drivers.

The Si826x gate drivers are ideal for driving power MOSFETs and **insulated gate bipolar transistors** (IGBTs) used in motor control and power inverter applications. Supporting gate drive voltages of up to 30 V and peak output current ranging from 0.6 A to 4.0 A, the Si826x devices provide best-in-class drive strength for MOSFET and IGBT applications, ensuring fast turn-off and turn-on of external switching transistors for maximum efficiency.

“The Si826x isolated gate drivers provide a major step forward in isolation technology for industrial motor control by providing a package- and footprint-compatible drop-in replacement for antiquated opto-drivers,” said Mark Thompson, vice president and general manager of Access, Power and Sensor products at Silicon Labs. “The Si826x family also offers developers a large selection of package and output choices, allowing greater design flexibility.”

Pricing and Availability

Samples and production quantities of the Si826x isolated gate drivers are available now in four package options: SOIC-8 (3.75 kV isolation rating), GW DIP-8 (3.75 kV isolation rating), SO-6 (5 kV isolation rating) and LGA-8 (5 kV isolation rating). Because these package types are pin- and footprint-compatible with popular opto-driver packages, there is no need to change existing designs or printed-circuit board (PCB) layouts to make the easy drop-in switch to isolated gate drivers. The Si826x family also supports a variety of output currents. The Si8261Ax device has an output current drive capability of 0.6 A while the Si8261Bx is capable of driving up to 4 A. The Si8261xAx device has an output under-voltage lockout (UVLO) of 5 V while the Si8261xBx has an 8 V UVLO and the Si8261xCx has a 12 V UVLO option.

Si826x family pricing in 10,000-unit quantities begins at \$0.71 (USD). To help developers evaluate the performance of the Si826x family, Silicon Labs offers the Si826xDIP8-KIT evaluation kit, available now for \$29 (USD MSRP). The evaluation board

is flexible enough to allow both hook-up to lab equipment for detailed specification evaluation as well as connection to the customer's existing board.

For additional information about Silicon Labs' Si826x isolated gate drivers and to purchase samples and development tools, please visit www.silabs.com/isolation.

Silicon Labs

Silicon Labs is an industry leader in the innovation of high-performance, analog-intensive, mixed-signal ICs. Developed by a world-class engineering team with unsurpassed expertise in mixed-signal design, Silicon Labs' diverse portfolio of patented semiconductor solutions offers customers significant advantages in performance, size and power consumption. For more information about Silicon Labs, please visit www.silabs.com.

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