Featured White Papers on Opto-Isolation

March 2020
Building Safe and Reliable Electrical Systems with Optocouplers

Reducing EMI from an Internally Clocked Sigma-Delta Modulator Through Spread Spectrum

Ensure Safe System Operation with Certified Isolator Devices

Achieve Fast and Accurate Over-Current Detection Using Optically Coupled Sigma-Delta Modulators

Gate Drive Optocoupler Provides Robust Insulation in IGBT Destructive Tests

Calculate Reliable LED Lifetime Performance in Optocouplers

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SiC MOSFET Gate Drive Optocouplers

Safety Considerations When Using Optocouplers and Alternative Isolators for Providing Protection Against Electrical Hazards

Gate Drive Optocouplers for GaN Power Devices

15-mm Wide ACNT Optocouplers for High Voltage Applications
Building Safe and Reliable Electrical Systems with Optocouplers

Abstract: Optocouplers generate the least EMI and are most resistant to EMI of all the isolation technologies. Similarly, they are the most resistant to damage or disruption by high-voltage transients. Optocouplers also have the only well-defined safety specification that allows them to receive a reinforced rating for safety critical applications.

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Reducing EMI from an Internally Clocked Sigma-Delta Modulator Through Spread Spectrum

Abstract: Broadcom’s internally clocked sigma-delta modulators, like the ACPL-C797, employ a single clock for sigma-delta modulation and demodulation. To reduce EMI radiations, a spread-spectrum technique is applied.

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Abstract: Alternative isolators based on monolithic IC fabrication processes, e.g., magnetic and capacitive isolators, typically are built using thin layers of insulation. Such isolators experience considerably higher electric field stress for the same working voltage when compared to that of optocouplers.

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Achieve Fast and Accurate Over-Current Detection Using Optically Coupled Sigma-Delta Modulators

Abstract: The Broadcom optocouplers’ sigma-delta modulators not only provide high-resolution current measurement with proven and reliable fail-safe isolation protection, but additional fast-response over-current fault detection functionality can be easily implemented by feeding the single-bit stream output data directly to a simple bit-stream detection circuitry.

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Gate Drive Optocoupler Provides Robust Insulation in IGBT Destructive Tests

Abstract: The polyimide film and insulation barrier of Broadcom’s gate drive optocoupler is proven robust even during catastrophic failures like the IGBT destructive tests presented in the paper. Although the gate driver boards were damaged, the gate drive optocouplers were able to pass partial discharge and high voltage tests, providing reinforced insulation, protecting the systems and users.

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Abstract: Broadcom optocouplers have been operating in harsh and hazardous applications, handling high voltages and transients with continued success, for many years. The LED in Broadcom optocouplers, unlike inferior phototransistors, has excellent reliability performance (< 10% drop) over 30 years of field operation.

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Improve Lithium-Ion Battery-Stack Safety in Electric Vehicles by Leveraging Optocouplers to Isolate High Voltages

Abstract: This paper examines the requirements for Li-ion cell monitoring, and review the architecture and components used in the cell-monitoring subsystem, digital-communications subsystem, and isolation interface.

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SiC MOSFET Gate Drive Optocouplers

Abstract: Broadcom evaluated gate drive optocouplers ACPL-W346 and ACPL-339J with CREE C2M SiC MOSFET using an 8A SEPIC DC-DC converter at 100 kHz. The gate driving capability of these 2 optocouplers met CREE's efficiency requirement of 98%.

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Safety Considerations When Using Optocouplers and Alternative Isolators for Providing Protection Against Electrical Hazards

Abstract: In many cases, equipment standard definitions effectively prohibit the use of alternative isolator technologies for reinforced insulation on a construction basis. This is not always the case; the specific risks relating to some legacy equipment standards of alternative isolators either offer ambiguous guidelines or none at all. This situation is often further compounded by the technically invalid usage of optocoupler component standards for assessing the safety of alternative isolators.

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Gate Drive Optocouplers for GaN Power Devices

Abstract: Using the half bridge evaluation board from Panasonic and GaN Systems, the slew rate, switching power loss, and efficiency tests were performed on the GaN using gate drive optocoupler ACPL-P346. The ACPL-P346 can achieve a high of $\text{dv/dt} > 100\text{kV/}\mu\text{s}$ and conversion efficiency of approximately 99%. 

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Abstract: The Broadcom optocouplers’ excellent performance withstands high-voltage surges. As per the component safety standard IEC 60747-5-5, the Broadcom ACNT optocouplers pass a requirement of more than 25 kV.