

Applications for Isolated Gate Drivers

Multiple Choice Quiz

TI Precision Labs – Isolation

Quiz: Applications for Isolated Gate Drivers

1. _____ must be used for the interface between high voltage and user-accessible circuitry (like connectors or communications ports) to meet many equipment safety standards.
 - a. Reinforced isolation
 - b. Line drivers
 - c. Fiber optics
 - d. Low-voltage microcontrollers

2. _____ converts stable, monofrequency AC power to stable, clean DC power; _____ converts stable, clean DC power to stable, monofrequency AC power
 - a. Solar string inverters / Motor drives
 - b. Power factor correction circuits / Traction inverters
 - c. Power factor correction circuits / Solar string inverters
 - d. Motor drives perform both functions

3. Thanks to their high voltage ratings and high current capability, _____ have been historically used in switching power systems up to hundreds of kilowatts
 - a. Silicon carbide transistors
 - b. Insulated-gate bipolar transistors (IGBTs)
 - c. Silicon MOSFETs
 - d. Gallium nitride transistors

Quiz: Applications for Isolated Gate Drivers

4. **The high-voltage bus in solar string inverter designs has been _____ over time because _____**
- Increasing; it reduces I^2R losses and component size
 - Increasing; it increases switching frequency
 - Decreasing; it becomes easier to use inexpensive non-isolated gate drivers
 - Decreasing; it permits the use of faster, lower-voltage MOSFETs
5. **Silicon carbide MOSFETs are one potential way to improve size, cost, and performance of motor drives and traction inverters. It requires gate drivers that can:**
- Operate at automotive temperature ranges of -40°C to 125°C to enable high-temperature applications
 - Switch with low propagation delay and low pulse width distortion to enable fast switching
 - Integrate protection features to minimize external component count and cost
 - Both b and c
6. **Traction inverters help to define the next generation of isolated gate drivers because:**
- Automotive ASIL ratings place strict requirements on critical systems, including gate drivers
 - Size, cost, and heatsinking material constraints emphasize gate drivers with highly-integrated features
 - Silicon carbide MOSFETs have unique drive requirements compared to IGBTs or MOSFETs
 - All of the above

Applications for Isolated Gate Drivers

Multiple Choice Quiz – Solutions

TI Precision Labs – Isolation

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1. _____ must be used for the interface between high voltage and user-accessible circuitry (like connectors or communications ports) to meet many equipment safety standards.
 - a. **Reinforced Isolation**
 - b. Line drivers
 - c. Fiber optics
 - d. Low-voltage microcontrollers
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 - b. Power factor correction circuits / Traction inverters
 - c. **Power factor correction circuits / Solar string inverters**
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