Product Overview

When to use SSR or Isolated Gate Driver

Isolated gate drivers and isolated switch drivers (from TI's solid-state relay portfolio) both use a low voltage control signal to drive one or more FETs or IGBTs. The difference is isolated gate drivers use an external isolated bias supply to drive a FET while the isolated switch drivers use an internal bias supply to drive a FET.

Isolated Switch Driver Portfolio

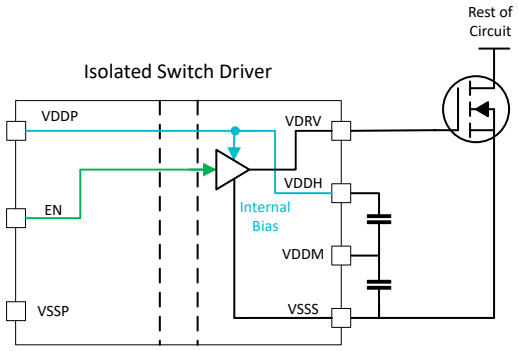

Figure 1-1. Isolated Switch Driver Simplified Diagram

Isolated Gate Driver Portfolio

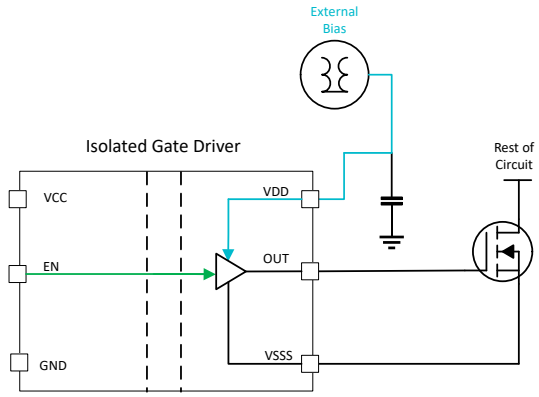

Figure 1-2. Isolated Gate Driver Simplified Diagram

An isolated gate driver is a very flexible solution due to the use of an external isolated bias supply. This device transfers signal across the isolation barrier which enables the external bias to drive a FET or IGBT. This external bias allows for high power applications as well as a wide range of frequencies to limit switching losses (for example, in power conversion systems). TI's isolated gate driver portfolio also offers devices with many monitoring features including short circuit detection, miller clamping, as well as ADC inputs that can be transmitted back to the MCU controlling the device.

TI's solid-state relay portfolio includes isolated switch drivers that are an optimized solution for applications that require less power transfer (for example, switching below 100kHz). These devices transfer power and signal across the isolation barrier to be used on the high voltage side, acting as an internal bias supply that is then used to drive a FET. This internal bias supply makes TI's solid-state relays a compact and cost-efficient solution when replacing photorelays and electromechanical relays (EMRs) or contactors. TI's SSR do not integrate diagnostic communication (yet); excess power not being used for switching is available to power auxiliary monitoring circuits.

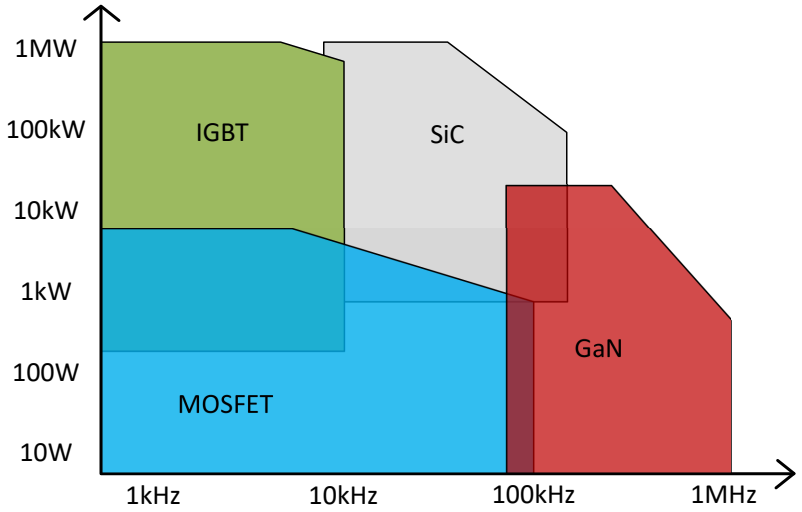

Figure 1-3. High Voltage Power Device Mapping

Figure 1-3 shows the typical frequencies and power needed to operate different FETs and IGBTs. Isolated gate drivers are able to operate SiC, GaN, MOSFET, and IGBT. Isolated switch drivers are able to operate IGBTs, SiC and MOSFETs; they are not suitable for operating GaN (intended for high frequency switching).

Table 1-1. Comparison of Isolated Gate Driver and Isolated Switch Driver

	Isolated Gate Driver	Isolated Switch Driver/SSR
Isolated Bias Supply	External	Internal (up to 65mW)
Monitoring Features	Integrated	External
Propagation Delay	As low as 19ns	As low as 3us
Switching Frequency	0Hz to ~20Mhz	0Hz to ~100kHz

Both isolated gate drivers and isolated switch drivers use low voltage control signals to drive FETs and IGBTs. Isolated gate drivers use an external bias supply which can be sized accordingly, to drive a FET or IGBT. Integrated monitoring features are available to provide protection or diagnostic information back to a low voltage MCU. In contrast, isolated switch drivers use an internal bias supply to make a compact and cost-optimized solution for low frequency switching applications (such as mechanical relay or photo relay replacement).

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