

Designing with *iCoupler* Digital Isolators in Solar PV Inverters

IDEA IN BRIEF

If you were to open the inverter controller enclosure of a typical central inverter solar PV system, you would find a number of areas where digital isolation products are employed. These include isolation of the gate drive signals, isolation of digital feedback in the voltage control loop, and isolation of communications channels. ADI offers products well matched to these design needs.

First and foremost, all inverters have power transistors, either MOSFETs or IGBTs, that do the heavy lifting to turn the dc power into ac. These power switches are driven from the dc/ac controller, and since most controllers are low voltage devices, while the power transistors are relatively much higher voltage devices, digital isolated gate drivers are required for this function. ADI's *iCoupler*® technology forms the basis of a number of isolated gate drivers, such as the [ADuM3220](#), which contains two isolated drivers integrated into the one package with 4 A peak current drive capability. Two ADuM3220's can control the four switches of a H-bridge output circuit. See Figure 1.

Normally, you will find at least two controllers, if not three, in a typical inverter. Where there are both a dc/dc and a dc/ac controller employed, there must be communication between the two controllers to ensure that the overall system runs efficiently. However, the dc/dc controller is very often electrically isolated from the dc/ac controller, or at least there is a high probability that large CM voltages can exist between the two ground systems. Hence, the communication between the two processors needs to be electrically isolated, and here is where you will find a number of standard bidirectional isolators. The [ADuM140x](#) family, which are quad channel isolators, are very popular in this application.

Finally, a communication channel will be needed both to report on the performance of the system to a central controller and to receive instructions from that source. When communicating at high data rates or over long distances, differential data transmission offers superior performance to single-ended transmission. Popular protocols for this communication task are RS-485 and CAN. The RS-485 specification meets the requirements for a truly multipoint communications network, and the standard specifies up to 32 drivers and 32 receivers on a single (2-wire) bus, although it's unlikely that this capability will be needed in the typical solar installation. Analog Devices offers a wide range of *iCoupler*-based isolated RS-485/RS-422 transceivers to suit this application with our [ADM248x](#) family. More recently, we have announced the first of a family of isolated CAN transceivers, the [ADM3052/ADM3053](#). These products are sampling now, with full production and availability summer of 2011.

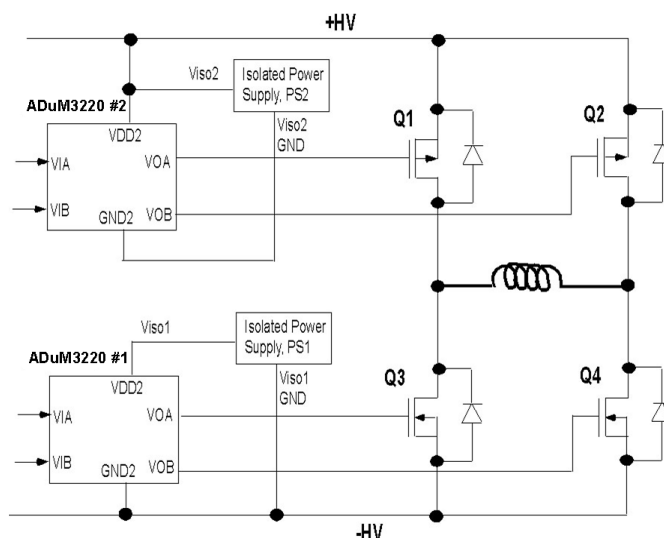


Figure 1. ADuM3220 and H-Bridge Driving

RESOURCES

To learn more about iCoupler technology and digital isolators, visit www.analog.com/icoupler.

To learn more about energy solutions, visit www.analog.com/energy.

Products Mentioned in This Article

Product	Description
ADuM3220	4 A Dual Channel Gate Driver
ADuM140x	Quad Channel Digital Isolator
ADM248x	Isolated RS-485 Transceiver
ADM3052/ADM3053	Signal and Power Isolated CAN Transceiver with Integrated Isolated DC-to-DC Converter