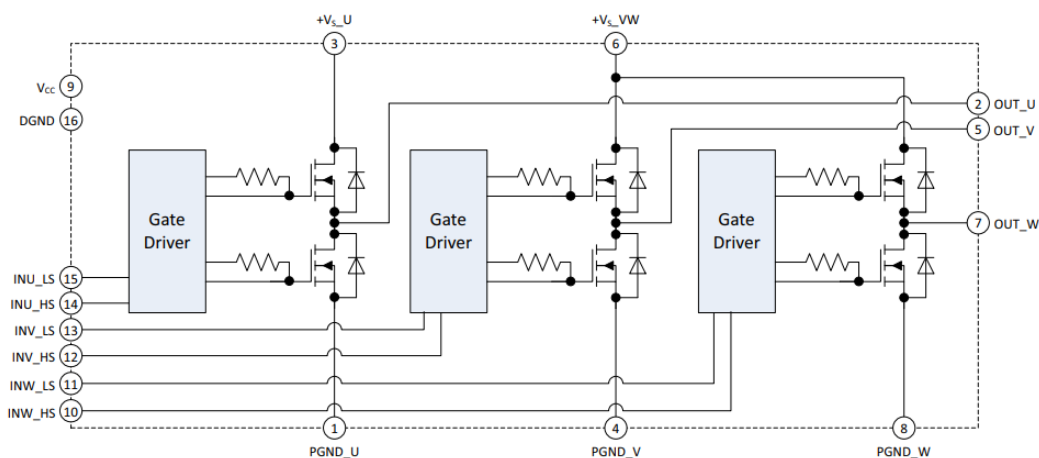


SiC-Based Three-Phase Driver Module Delivers 80 A Peak, Is Fully Integrated

[Apex Microtechnology's](#) SA310 is a fully integrated three-phase driver designed primarily to drive brushless dc (BLDC) and permanent magnet synchronous motors (PMSMs) or dc-ac inverters. The module uses silicon carbide (SiC) MOSFETs to improve efficiency over other devices in its class. Three independent half-bridges provide up to 80 A peak output current under direct microcontroller or digital signal controller (DSC) control. The SA310 is built on a thermally conductive, but electrically isolated substrate to provide the most versatility and ease in heatsinking (see the figure).

Protection features include undervoltage lockout (UVLO) and active Miller clamping to reduce switching noise and improve reliability. Also included in the module are SiC Schottky Barrier free-wheeling diodes to improve performance under hard-switching conditions. No external output protection diodes are required. The SA310's integrated gate drivers provide transformer isolation between the inputs and high-voltage outputs.

By combining the gate drive and the SiC MOSFETs within the same package, Apex was able to reduce parasitics, improving the module's switching behavior. As a result, the SA310 shows superior switching characteristics even under fast rise and fall times, increasing efficiency while reducing dead times. According to the company, the SA310 has been tested at frequencies of 500 kHz and rise and fall times of 50 ns and 30 ns, respectively with excellent switching characteristics. For more details, see the SA310 product [page](#).



(a)



(b)

Figure. A fully integrated three-phase driver with built-in protection features, the SA310 combines three independent half-bridges (a) in a 16-pin Power DIP (b), providing up to 30 A continuous or 80 A peak output per phase, while operating under direct microcontroller or DSC control. According to the company, its use of SiC MOSFETs improves the efficiency of this module over that of other comparable devices in its class.