

## Half H-Bridge Module Combines SiC MOSFETs With Integrated Gate Drive

[Apex Microtechnology's](#) SA110 is introduced as the first high-current, high-voltage half H-bridge to combine silicon carbide (SiC) MOSFETs with a gate drive in a single module. Employing hybrid construction, this switching amplifier also features digital gate-driver control, a very high 400-kHz max switching frequency, and 28 A of continuous output current (Fig. 1). A wide range of target applications for the SA110 include sonar, brushless dc motor drives and dc-ac inverters in the industrial, avionics, and military markets.

While the use of SiC technology can potentially impact a hybrid's bill of materials, any increase in cost will most likely be offset by a significant increase in performance, according to the vendor. This includes reduced switching losses, lower conduction losses, and a low temperature dependency of  $R_{DS(ON)}$  over a wide operating temperature range. SiC MOSFETs also provide a reduction in power loss compared to the more commonly used silicon IGBT options. By integrating the gate drive, switching behavior is greatly improved as parasitic impacts are reduced and easier to control.

"The use of SiC MOSFETs in the SA110 represents an exciting first for Apex hybrid designers and our customers," explains Jens Eltze, Apex's strategic marketing director. "We believe any potential uptick in the cost of the device will be more than compensated by the impressive increase in performance and reliability, as well as lower costs for cooling the components. This combination of SiC MOSFETs with integrated gate drive and control logic will shorten design cycle times and save on valuable board real estate for our customers." See Fig. 2.

The SA110 can operate off supply voltages up to 400 V and features a typical switching frequency of 250 kHz, with a maximum frequency of 400 kHz. This hybrid is offered in a 12-pin PSIP package to provide a very compact footprint and is designed with undervoltage lockout protection and active Miller clamping. For more on the key specs, see the table.

The SA110 is sampling now for qualified applications, with production volumes targeted for late Q1 2019. Per unit pricing is available by contacting a local Apex sales representative or distributor. Complete product information is online at the SA110 product [page](#). For technical support, contact Apex applications engineering at 800-546-2739, or [apex.support@apexanalog.com](mailto:apex.support@apexanalog.com).



Fig. 1. The SA110 is introduced as the first high-current, high-voltage half H-bridge to combine SiC MOSFETs with gate drive in a single module. Integrating the gate drive improves switching behavior as parasitics are reduced and easier to control.

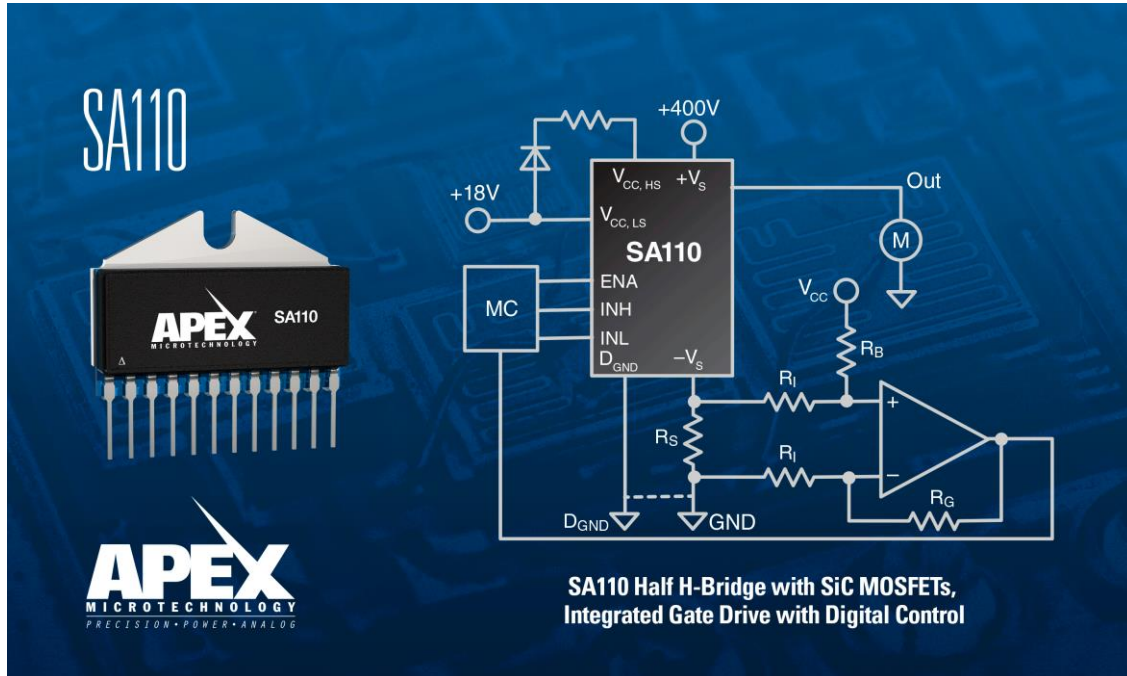


Fig. 2. While the use of SiC MOSFETs can potentially impact a hybrid's bill of materials, any increase in cost will most likely be offset by a significant increase in performance, including reduced switching losses, lower conduction losses, and a low temperature dependency of  $R_{DS(on)}$  over a wide operating temperature range. SiC MOSFETs also provide a reduction in power loss compared to the commonly used silicon IGBTs.

Table. Key specifications for the SA110 half H-bridge module.

Parameter	Value
Supply voltage operation (total)	400 V
Output current	28 A continuous
	40 A peak
Switching frequency	250 kHz typical
	400 kHz max
On-resistance, per MOSFET	30 mΩ typical
Internal power dissipation	75 W per side max
Package style	12-pin power SIP, DP style, heat tab on back