Power Modules Simplify SiC Inverter Designs

STMicroelectronics has released two STPOWER modules that contain 1200-V SiC MOSFETs in popular configurations. Each uses ST's ACEPACK 2 package technology to ensure high power density and simplified assembly. The first of these modules, the A2F12M12W2-F1, is a four-pack module that provides a convenient and compact full-bridge solution for circuits such as dc-dc converters. Another module, the A2U12M12W2-F2, employs a three-level T-type topology to combine high conduction and switching efficiency with consistent output-voltage quality (see the figure).

The MOSFETs in these modules leverage ST's second-generation SiC technology, which has an outstanding $R_{DS(ON)}$ x die-area figure-of-merit, according to the vendor, to ensure high current-handling capability with minimal losses. With a 13-mΩ typical $R_{DS(ON)}$ per die, both full-bridge and T-type topologies tackle high-power applications and ensure excellent energy efficiency with simplified thermal management due to low dissipation.

The ACEPACK 2 package has compact dimensions and ensures high power density, with an efficient alumina substrate and direct bonded copper (DBC) die attachment. The external connections are press fit pins that simplify assembly in potentially harsh-environment equipment such as electric vehicles (EVs) and power conversion for charging stations, energy storage, and solar energy. The package provides 2.5-kVrms insulation and contains an integrated NTC temperature sensor that can be used for system protection and diagnostics.

The modules are in production now and the unit price is $235.20 for both the A2F12M12W2-F1 four-pack configuration and the A2U12M12W2-F2 three-level T-type inverter. For further information, see the A2F12M12W2-F1 page and the A2U12M12W2-F2 page.

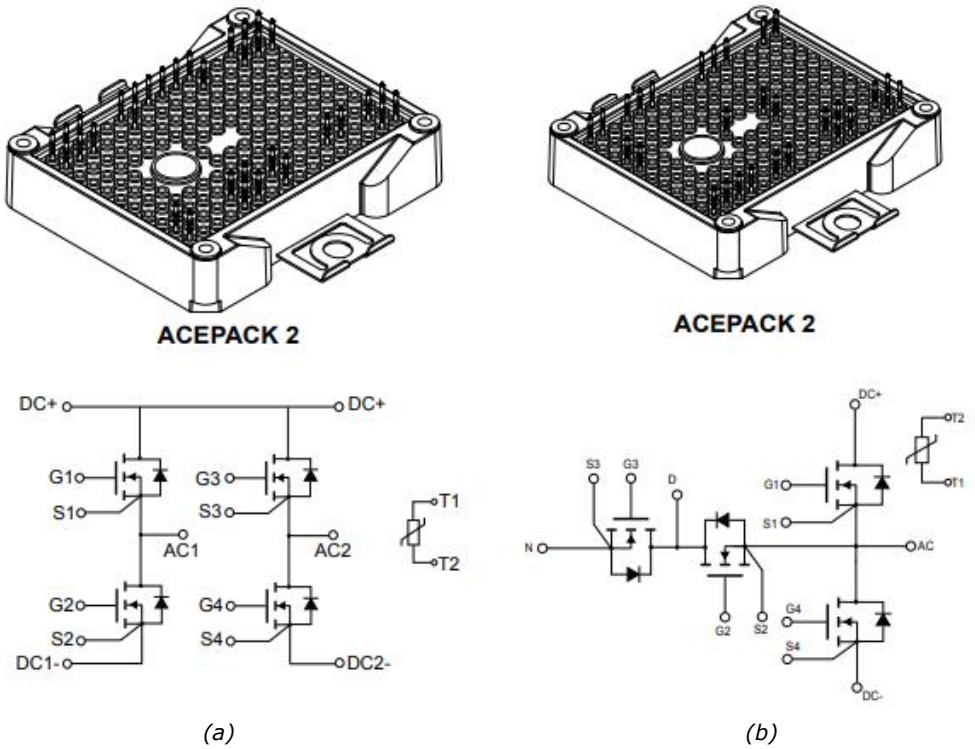

Figure. The A2F12M12W2-F1 ACEPACK 2 power module (a) in fourpack topology integrates advanced SiC power MOSFET technology from STMicroelectronics. The module leverages the innovative properties of the wide-bandgap SiC material and a high-thermal performance substrate to achieve low on-resistance per unit area and excellent switching performance that is virtually independent of temperature. An NTC sensor completes the design. Offering similar benefits, the A2U12M12W2-F2 ACEPACK 2 power module represents a leg of a T-type three-level inverter topology that integrates ST's advanced SiC power MOSFET technology.