

Small Smart Motor Module Addresses Space-Constrained Designs

[Alpha and Omega Semiconductor's](#) highly integrated AOZ9530QV Smart Motor Module (SMM) half-bridge power stage packs many features and protections that simplify motor drive designs into a thermally enhanced 3-mm x 3-mm QFN-18L package. An addition to its compact SMM family, the AOZ9530QV SMM is suitable for use in a large number of BLDC fan applications including PC and server fans, seat cooling and home appliances.

"We designed the AOZ9530QV in a compact 3-mm x 3-mm QFN package to satisfy higher density, space-constrained design trends in BLDC motor drives. In several cooling fan applications, the PCB for drive circuitry is enclosed within the fan assembly. The AOZ9530QV enables shrinking of the PCB enabling a system designer to increase the size of the fan blades, thus pushing more air within a given form factor," said Armin Hsu, Power IC senior marketing manager at AOS.

The AOZ9530QV features multiple advanced protection functions that include short circuit protection, overtemperature protection, Vcc UVLO and bootstrap UVLO. With an input voltage up to 28 V and supporting high current up to 7 A, the AOZ9530QV has a wide operating ambient temperature range of -40°C to +125°C and offers 100% pulse-width modulation (PWM) duty operation support.

The device also provides adjustable gate-drive sink and source current control that gives designers the ability to minimize EMI while maximizing power efficiency (see the figure). These features and others make the AOZ9530QV well suited as a power stage solution for brushless dc (BLDC) motor drives.

A single AOZ9530QV would be used for single-phase applications, two AOZ9530QV SMMs would be used for an H-Bridge motor drive, and three AOZ9530QV SMMs would be needed for three-phase designs (see the figure). Other features include an integrated bootstrap diode, self-powered Vcc and 11-mΩ R_{DS(ON)} internal NFETs in half-bridge configuration

The AOZ9530QV is available in production quantities with a lead-time of 24 weeks. The unit price in 1,000-piece quantities is \$1.00. For more information, see the [datasheet](#).

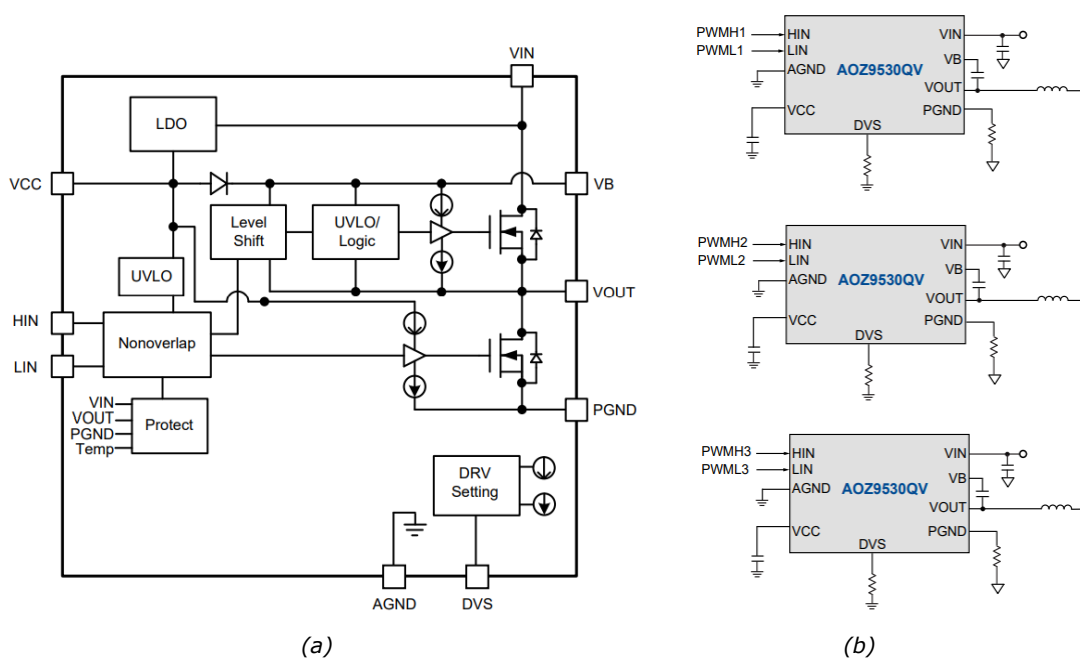


Figure. The AOZ9530QV Smart Motor Module features adjustable gate-drive current control that provides a low EMI, higher efficiency solution for one-phase and three-phase BLDC motor drive designs. An internal block diagram (a) and typical three-phase application diagram (b) are shown here.