

High Current Stepper Motor Driver Solution With Minimal External Components

Allegro announces the release of the A3986, a dual full-bridge gate driver with integrated microstepping translator suitable for driving a wide range of medium to high-power bipolar two-phase stepper motors. Allegro's A3986 addresses the market need for a low-cost stepper motor driver that exceeds the output current range of existing fully integrated IC solutions limited to 2.0 to 3.0 A. Full step to sixteenth step microstepping control reduces system vibration and improves the overall positioning accuracy. Targeted at the industrial and office automation markets, Allegro's A3986 provides an efficient and easy to implement solution.

Motor power is provided by external N-channel power MOSFETs at supply voltages from 12 V to 50 V. The A3986 provides all the necessary circuitry to ensure that the gate-source voltage of both high-side and low-side external MOSFETs are above 10 V, and the gate capacitance is quickly charged and discharged in order to reduce power dissipation during switching.

Separate fixed-off-time PWM current controllers. These provide current regulation for external power MOSFET full-bridges.

The PWM regulators automatically switch between slow and fast or mixed decay mode. This patented current decay scheme results in reduced audible noise, increased step accuracy and lower power dissipation.

The two-wire step and direction translator interface is the key to the implementation of the A3986. Simply inputting one pulse on the STEP input drives the motor one step (full, half, quarter, or sixteenth depending on the microstep select input). There are no phase-sequence tables, high frequency control lines, or complex interfaces to program. This reduces the need for a complex microcontroller.

Using synchronous rectification enhances efficiency and the external power MOSFETs are protected from shoot-through by integrated crossover control and programmable dead time. In addition to crossover current control, internal circuit protection provides thermal shutdown with hysteresis and undervoltage lockout. Special power-up sequencing is not required.

Allegro's A3986 device is supplied in a (Pb) free 38-pin TSSOP package with 100% matte tin leadframe plating.
