Motor Driver IC Requires Only Four External Components

Allegro MicroSystems Europe's A3916 low-voltage bipolar stepper or dual dc motor driver IC is designed for pulse-width-modulated (PWM) control of low-voltage stepper motors or dual dc motors using just four external components (Fig. 1) and is capable of delivering up to 1 A per channel while operating from a 2.7-V to 15-V supply. The A3916 integrates all motor control circuitry including a fixed off-time PWM regulator that sets a peak current in the motor winding based on the selection of a low-value current-sense resistor.

A single supply eliminates the need for an external low-dropout regulator, and the integrated charge pump requires only one external capacitor. Output diagnostics are provided by an active-low fault output that notifies the user of a thermal shutdown or overcurrent protection event (Fig. 2.)

According to Dan Jacques, Allegro's strategic marketing manager, there are a few features and characteristics that make this new motor driver IC stand out from previously introduced devices. "The '3916 is the next generation version of Allegro's '3906 and brings many advancements to the driver. Some of those would be overcurrent protection and sleep function," says Jacques, who also points out the newness of the charge pump.

"The architecture uses an internal charge pump which is used to generate the supply voltage needed to enhance the all n-channel MOSFET bridge. The predecessor to the '3916 required two external capacitors. Also the extended voltage range allows this device to run on a single cell Li-ion or up to four-cell batteries."

In addition, Jacques notes the small size of the A3916—it's offered in a 3-mm x 3-mm (16-pin) QFN package. For comparison, the A3906 is offered in a 4-mm x 4-mm (20-pin) QFN. However, Allegro also offers a version of the A3916 in a 4-mm x 4-mm (20-pin) QFN and this version is a drop-in replacement for the A3906. Both package options have an exposed power tab for enhanced thermal dissipation.

The new device is targeted at applications that run off single, Li-ion cell or three AA batteries, including office and industrial automation systems, point-of-sale equipment, 3D printers, medical, CCTV and the toy market.

For more information, see the A3916 dual DMOS full-bridge motor driver datasheet.

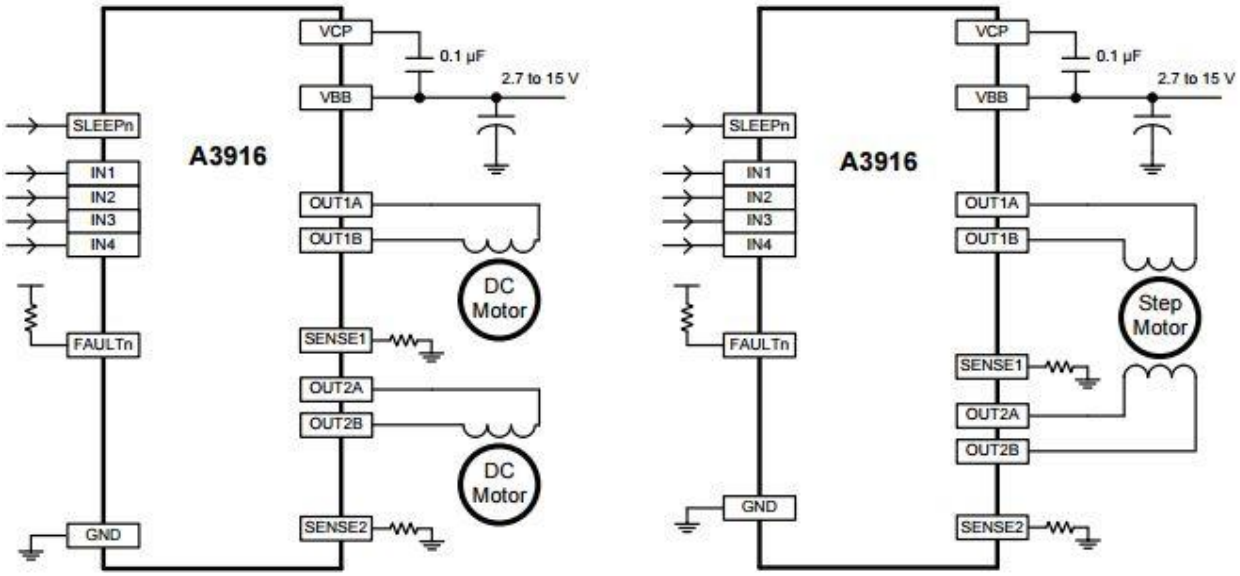

Fig. 1. Requiring just four external components, the A3916 dual DMOS full-bridge motor driver IC is designed for PWM control of low-voltage stepper motors or dual dc motors, delivering up to 1 A per channel. The chip operates from a 2.7-V to 15-V supply.

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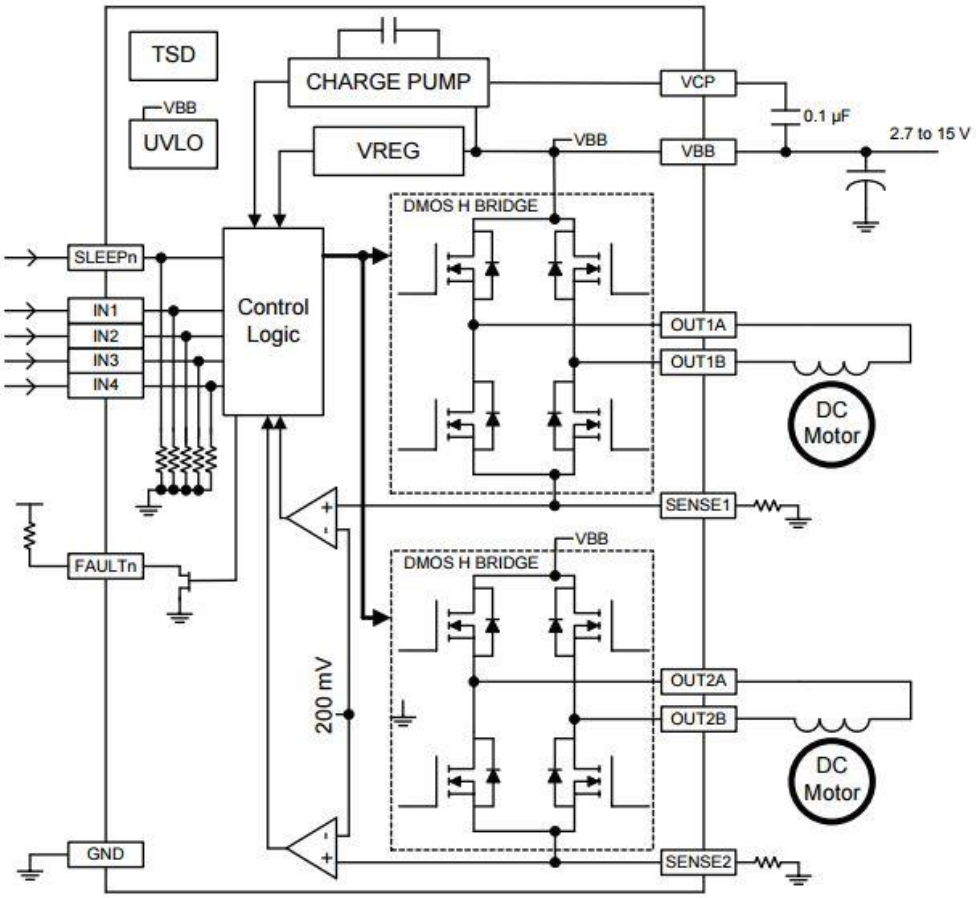

Fig. 2. The A3916 features integrated PWM current control, two DMOS full-bridges with low $R_{DS(ON)}$ outputs; synchronous rectification for reduced power dissipation, an integrated charge pump and on-chip protection such as overcurrent protection, undervoltage lockout and thermal shutdown.

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