Automotive Grade Programmable Bipolar Stepper Motor Driver ICs

Allegro MicroSystems, Inc. introduces two flexible microstepping motor drivers each with a built-in translator for easy operation. They both encompass a single-chip solution, designed to operate bipolar stepper motors in full-, half-, quarter- and sixteenth-step modes, at up to 28 V and ±750 mA. The A3981 and A4980 devices are targeted at the automotive, consumer and industrial markets.

The A3981 can be controlled by simple Step and Direction inputs, or through the SPI-compatible interface that also can be used to program many of the integrated features and to read diagnostic information. The A4980 is identical to the A3981 except for a low-voltage operation feature which will allow the IC to run down to a load supply voltage of 3.3 V (7 V on the A3981.) This low voltage operation can be a necessary feature in some automotive applications where the battery voltage during cold cranking can drop critically low.

The current regulator can be programmed to operate in fixed off-time or fixed frequency PWM, with several decay modes to reduce audible motor noise and increase step accuracy. In addition the phase current tables can be programmed via SPI to create unique microstep current profiles to further improve motor performance for specific applications.

The current in each phase of the motor is controlled through a DMOS full bridge, using synchronous rectification to improve power dissipation. Internal circuits and timers prevent cross-conduction and shoot-through, when switching between high-side and low-side drives. The outputs are protected from short circuits, and features for low load current and stalled rotor detection are included. Chip-level protection includes: hot and cold thermal warnings, overtemperature shutdown, and overvoltage and undervoltage lockout.

The A3981 and A4980 are supplied in a 28-pin TSSOP power package with an exposed thermal pad (package type LP). This package is lead (Pb) free with 100% matte-tin leadframe plating. The A3981KLPTR-T is priced at $2.17 and the A4980KLPTR-T is priced at $2.26 - both in quantities of 1,000.

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