12 V Sensorless Code-Free FOC BLDC Motor Controller

FEATURES AND BENEFITS

- Fully integrated single-shunt sensorless FOC controller (code-free)
- Power-loss brake functionality
- Universal speed curve
- Fault mode brake
- Analog/PWM/Clock mode speed control

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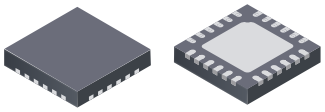
APPLICATIONS

- 12 V server fans
- Home appliance fans

PACKAGE

24-lead QFN with exposed thermal pad (suffix ES)



Not to scale

DESCRIPTION

The A89337 is a three-phase, sensorless brushless DC (BLDC) motor controller.

A field-oriented control (FOC) control algorithm is fully integrated to achieve the best efficiency and acoustic noise performance. The device also optimizes the motor startup performance in the stationary, forward, and reverse-windmill conditions.

Programmable profiles and closed-loop controls are included for constant power and constant speed operations. This eliminates the requirement for a microprocessor-based system and minimizes programming requirements. The sleep state can be entered to conserve power if enabled.

A simple I²C interface is provided for setting motor-related parameters, control-related parameters, and startup profiles, which are stored in nonvolatile memory (NVM). The I²C interface can also be used to control the motor directly and to provide speed and status feedback. Password protection is available for stored NVM data.

The A89337 is available in a 4 mm × 4 mm 24-terminal quad-flat no-lead) (QFN) package with exposed thermal pad (suffix ES).

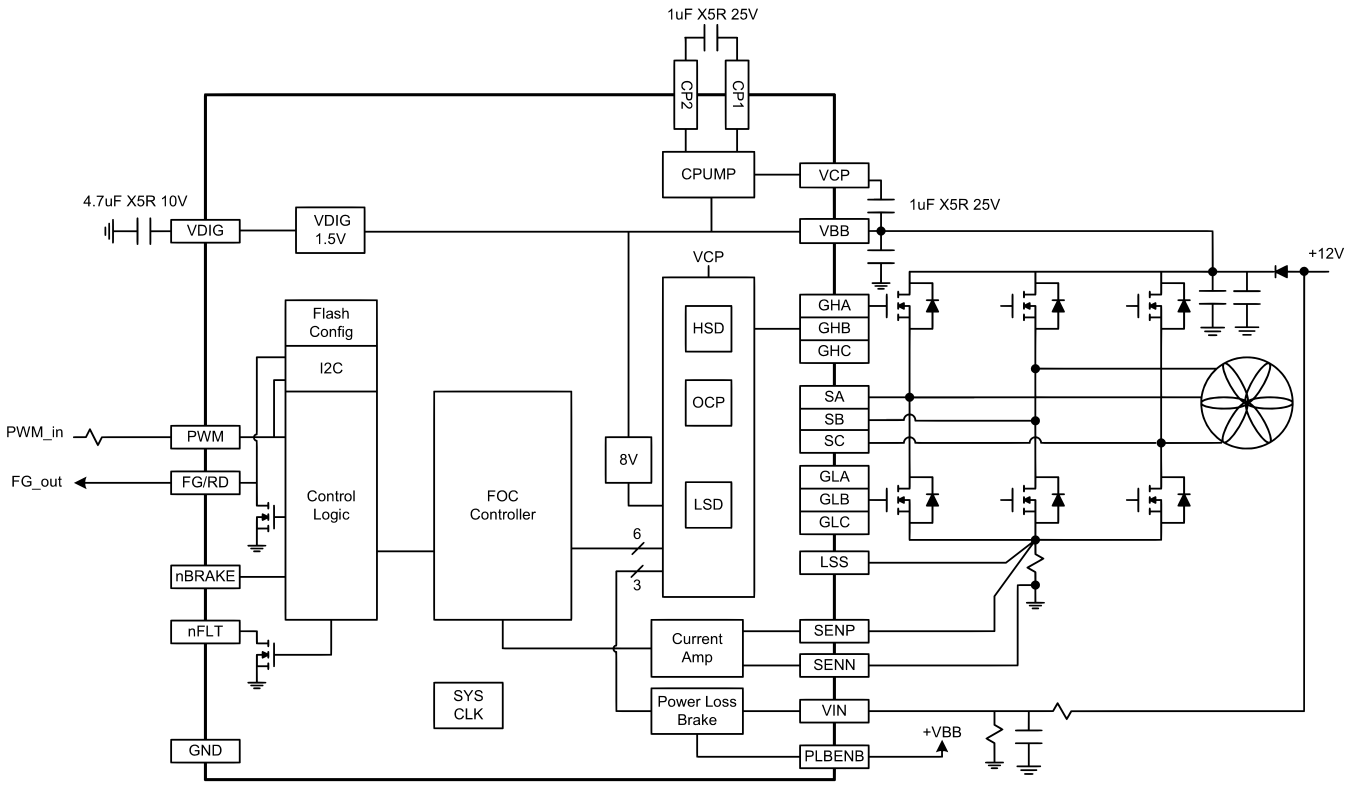


Figure 1: A89337 Block Diagram

FEATURES AND BENEFITS (cont.)

- Precision closed-loop speed control
- Configurable RD or FG output
- Slew-rate control for electromagnetic interference (EMI) mitigation
- Proprietary nonreverse fast startup
- Ultraquiet low-speed operation
- Current-control soft start
- Windmill startup operation
- I^2C serial port
- Power limit protection
- Configurable current and power limit
- Lock detection
- Overcurrent limit (OCL)
- Overvoltage protection (OVP)
- Short-circuit protection (OCP)
- Logic input compatible with 3.3 V and 5 V

SELECTION GUIDE

Part Number	Package	Packing
A89337GESSR	24-terminal, 4 mm × 4 mm, QFN with exposed thermal pad	6,000 pieces per 13-inch reel

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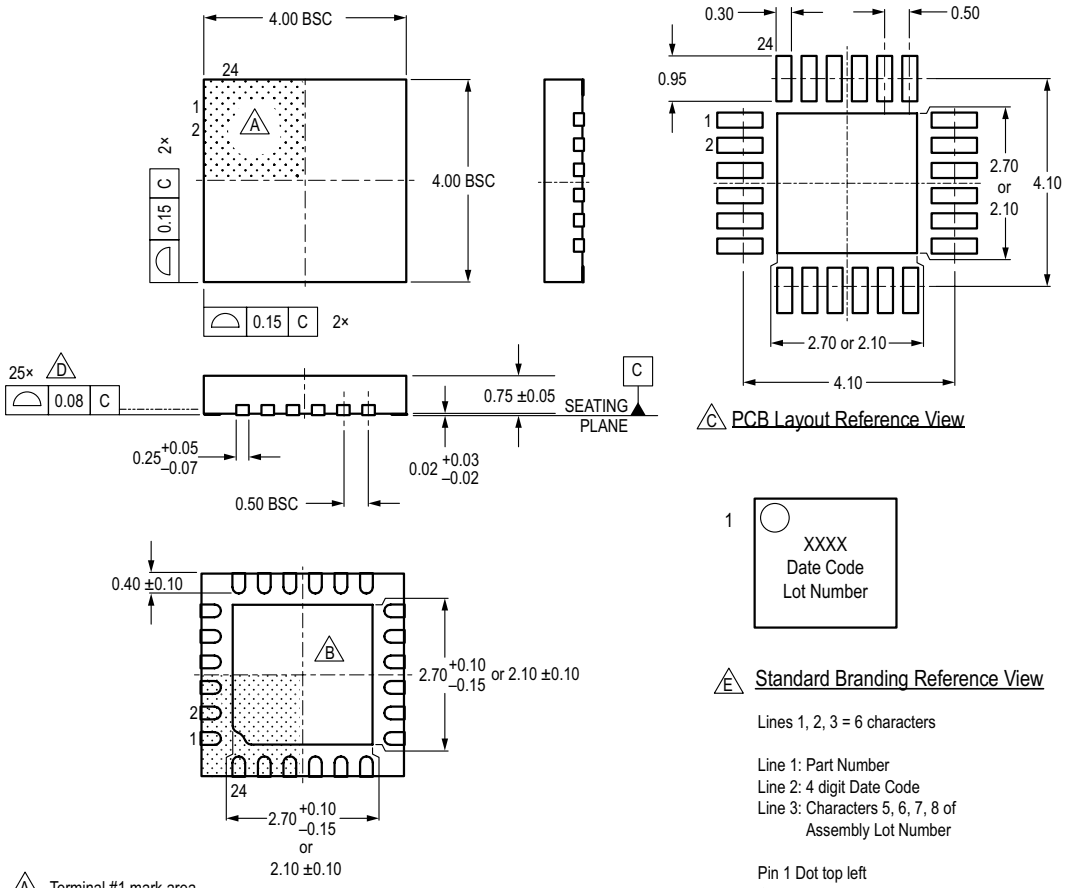
PACKAGE OUTLINE DRAWING

For Reference Only – Not for Tooling Use

(Reference Allegro DWG-0000222 Rev. 4 or JEDEC MO-220WGGD.)
Dimensions in millimeters – NOT TO SCALE.
Exact case and lead configuration at supplier discretion within limits shown.



A Terminal #1 mark area

B Exposed thermal pad (reference only, terminal #1 identifier appearance at supplier discretion). Two variations shown: 2.70 mm × 2.70 mm and 2.10 mm × 2.10 mm

C Reference land pattern layout (reference IPC7351 QFN50P400X400X80-25W6M); all pads a minimum of 0.20 mm from all adjacent pads; adjust as necessary to meet application process requirements and PCB layout tolerances; when mounting on a multilayer PCB, thermal vias at the exposed thermal pad land can improve thermal dissipation (reference EIA/JEDEC Standard JESD51-5)

D Coplanarity includes exposed thermal pad and terminals

E Branding scale and appearance at supplier discretion.

Figure 2: 24-Contact QFN, 4 mm x 4 mm, 0.75 mm Thickness, with Exposed Thermal Pad (Suffix ES)

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REVISION HISTORY

Number	Date	Description
–	March 25, 2026	Initial release to the web site of short-form datasheet and initial release of limited distribution long-form datasheet.

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