A89331

Three-Phase Sensorless Fan Driver

FEATURES AND BENEFITS

- Closed-loop speed control
- Overvoltage protection
- Power loss brake
- Fault mode brake
- Configurable RD or FG output
- Speed curve configuration via EEPROM
- I^2C serial port
- Sinusoidal modulation for reduced audible noise and low vibration
- Sensorless (no Hall sensors required)
- Trapezoidal drive option for high speed
- Low $R_{ds(on)}$ power MOSFETs – 3 A capability
- PWM duty cycle speed input
- FG speed output
- Lock detection
- Soft start
- Shorted load protection

APPLICATIONS

- High-speed 12 V server cooling fans
- Industrial and consumer blowers and fans

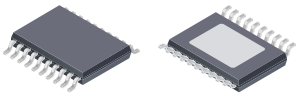
DESCRIPTION

The A89331 three-phase motor driver incorporates sensorless sinusoidal drive to minimize vibration for high-speed server fans. Sensorless control eliminates the requirement for Hall sensors for server fan applications.

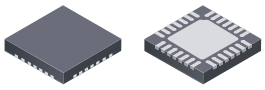
A flexible closed-loop speed control system is integrated into the IC. EEPROM is used to tailor the common functions of the fan speed curve to a specific application. This eliminates the requirement for a microprocessor-based system and minimizes programming requirements.

The A89331 is available in a 28-lead 5 mm × 5 mm QFN with exposed power pad (suffix ET), and a 20-lead TSSOP with exposed power pad (suffix LP).

PACKAGES:



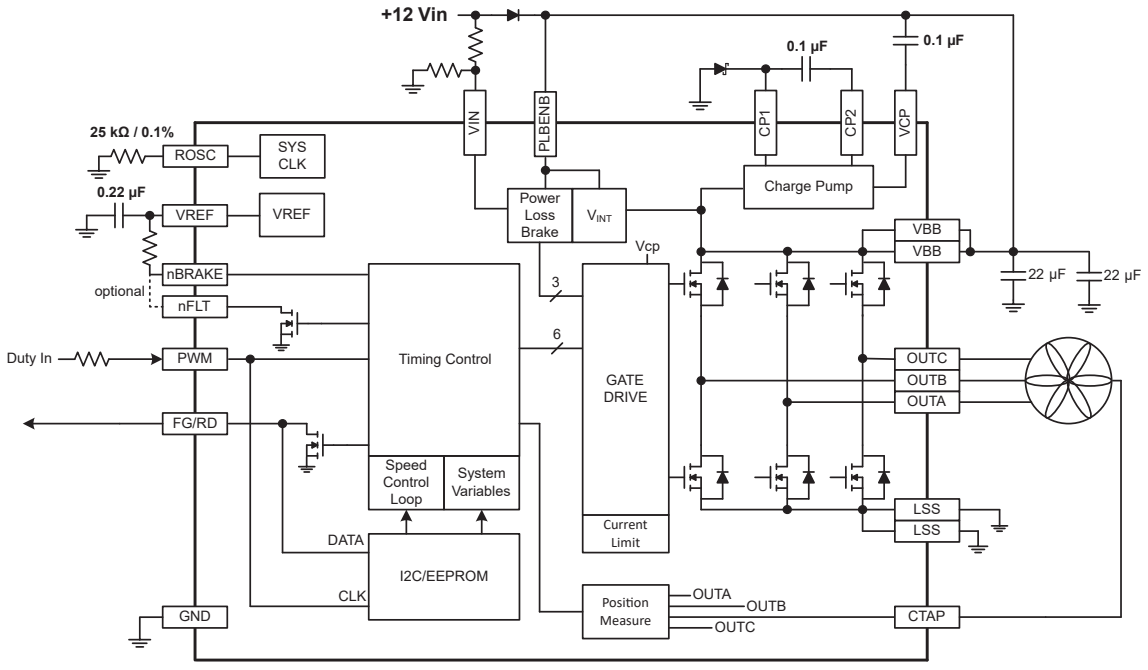
20-lead TSSOP with exposed thermal pad (LP package)



28-contact QFN with exposed thermal pad 5 mm × 5 mm × 0.90 mm (ET package)

Not to scale

TYPICAL APPLICATION



SELECTION GUIDE

Part Number	Package	Packing
A89331GETSR	28-pin QFN with exposed thermal pad	1500 pieces per 7-inch reel
A89331GLPTR-T	20-pin TSSOP with exposed power pad	4000 pieces per 13-inch reel

ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Notes	Rating	Unit
Supply Voltage	V_{BB}	DC	–0.3 to 18	V
		t_w < 10 ms	–0.3 to 20	V
Control Input	V_{IN}, V_{PLBENB}	VIN, PLBENB	–0.3 to 18	V
Analog Input	V_{ROSC}	ROSC	4	V
Logic Input Voltage Range	V_{PWM}, V_{nBRAKE}	PWM, nBRAKE	–0.3 to 6	V
Logic Output	$V_{FG/RD}$, V_{nFLT}	FG/RD, nFLT	V_{BB}	V
Output Current	I_{OUT} [1]	DC	Internally Limited	A
		Peak Brake Mode Current; t < 500 ms	6.5	A
Output Voltage	V_{OUT}		V_{BB} + 1	V
Junction Temperature	T_J		150	°C
Storage Temperature Range	T_{stg}		–55 to 150	°C
Operating Temperature Range	T_A		–40 to 105	°C

[1] Power dissipation and thermal limits must be observed.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Test Conditions*	Value	Unit
Package Thermal Resistance	$R_{\theta JA}$	ET package, 2-sided PCB with 1 in.^{2} copper	42	°C/W
		LP package, 2-sided PCB with 1 in.^{2} copper	35	°C/W

*Additional thermal information available on the Allegro website.

RECOMMENDED OPERATIONAL RANGE

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Supply Voltage	V_{BB}	DC	8	12	15	V
Logic Input Voltage Range	V_{PWM}, V_{nBRAKE}	PWM, nBRAKE	–0.3	–	5.5	V
Motor Current	I_{OUT}	Peak Motor Phase Current - Sinusoidal Running Mode	–	–	3	A

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