



Analog Solutions – Robust Reliable Performance

MC34GD3000

Three-Phase Field-Effect Transistor Pre-driver

Overview

The GD3000 is a field-effect transistor (FET) pre-driver designed to enable three-phase motor control configurations with stable digital accuracy. It is easily configured for systems driving brushless DC (BLDC), permanent magnet synchronous motor (PMSM) or switched reluctance (SR) motors with or without sensors. Typical applications include portable power tools and electric bicycles, as well as industrial and consumer robots.

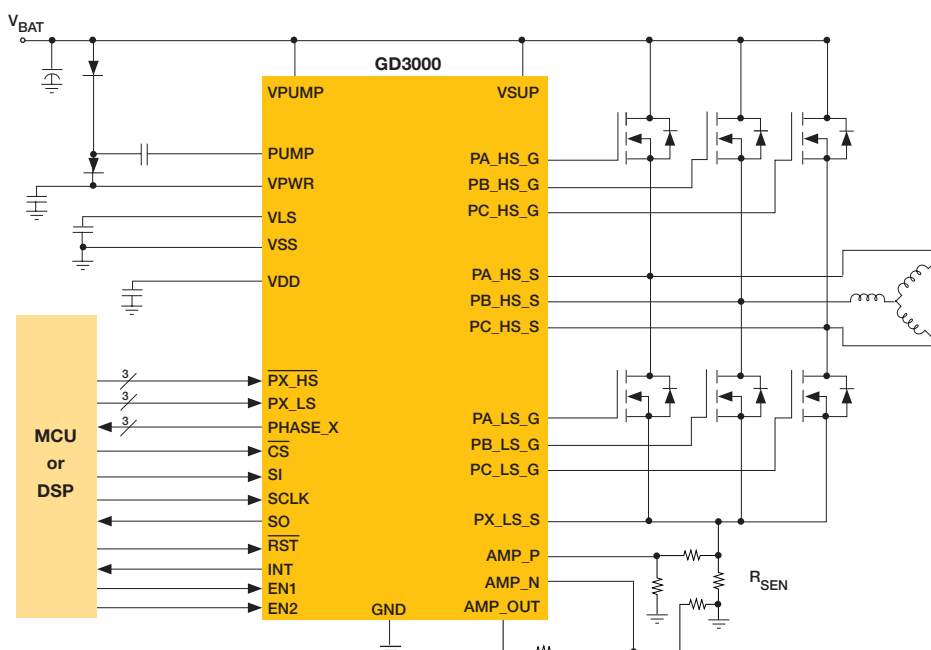
The GD3000's extensive and flexible features allow a user to realize precise and complete control of speed, torque and power, thereby increasing safety in the end application. It integrates the logic as well as the sensing, monitoring, and control functions required to control and protect a DC motor with up to three phases. The versatile SPI programming interface gives the user easy access to control of FET phase timing, programmable protection and detailed diagnostics. No other device is as well-suited for fractional on integral horsepower motor control and places as much control in the hands of the user.

The GD3000 interfaces directly to 5.0 V or 3.0 V MCUs via six direct input control signals, a SPI port for device setup, and asynchronous reset, enable, and interrupt signals. The device is compatible with a wide range of MOSFETs which makes it easy to implement in scalable solutions. Additionally, the GD3000 is designed to reduce PCB size by including an internal charge pump, consequently eliminating external charge pump specific components.

Target Applications

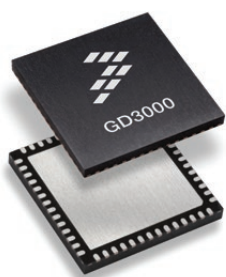
- 12 V–48 V three-phase brushless DC (BLDC) motors and permanent magnet synchronous motors (PMSM)
- CPAPs, inflation pumps, industrial fans
- Portable power tools
- Electric bicycles, scooters and UAVs
- Electric wheelchairs and hospital beds
- Robotic lawn mowers and vacuum cleaners
- Small kitchen appliances

MC34GD3000 Simplified Application Drawing



Freescale: A Leader in Analog Solutions

Expanding on more than 30 years of innovation, Freescale is a leading provider of high-performance products that use SMARTMOS technology combining digital, power and standard analog functions. Freescale supplies analog and power management ICs that are advancing the automotive, consumer, industrial and networking markets. Analog solutions interface with real world signals to control and drive complete embedded systems.



56-pin QFN
98ASA00654D
EP SUFFIX (Pb-Free)

MC34GD3000 Product Differentiation

	Features	Benefits
Scalability	Wide (6.0 V–58 V) supply voltage operating range	One motor drive solution that can cover 12 V, 24 V, and 48 V applications
	Powerful gate drive, > 1.0 A at 620nC	Drive powerful motors which require large FET drivers capable of sourcing sufficient current to achieve desired speed and torque
	On-chip charge pump	Guarantees proper operation of external FETs, even when the supply voltage dips below 5.0 V
Safety	75 V Transient spike tolerant	Protects motor and MOSFETs, while maintaining device functionality
	Rich diagnostic features and fault reporting for all outputs	User can easily monitor against faults in real-time, allowing protection of external FETS and motor
Size	8x8 QFN package (64 mm square board space)	Enables the use of smaller printed circuit boards

Parametric Table

Specification	Typical Values
Extended Operating Voltage	6.0 V to 58 V
PWM Input Control	DC to ≥ 50 kHz
Gate Drive Capability	> 1.0 A
Dead Time Programming Range	10 ns to 12 μ s
Control/Communication	SPI and parallel
FET Drivers	Voltage transients of 7.0 V up to +75 V without permanent damage

Development Tools

Kit Number	Description
FRDM-GD3000-EVB	Evaluation board to demonstrate the key features of MC34GD3000
TWR-MC-LV3PH	Tower System board
TPP-GD3000-RC2	Processor Expert Software

Documentation

Freescale Document Number	Type	Description
MC34GD3000	Data Sheet	Presents the specifications for the product
SG1002	Selector Guide	Analog and power management device comparison
SG200	Selector Guide	Analog and Power Management Industrial Selector Guide
AN1902	Application note	Small outline integrated circuit fine pitch package

For more information, please visit freescale.com/analog

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