



## DGD05xx Gate Drivers

# 50V MOSFET Gate Drivers for Driving Battery-Powered BLDC Motors

The DGD0506A and DGD0507A high-frequency gate-driver ICs are designed for driving two external N-channel MOSFETs in a half-bridge configuration.

Featuring both high-side and low-side output drive capability, with simple logic level input, enabling an easy interface between the MCU and the power MOSFET switches. Supporting up to 50V via a floating high-side suits a wide range of motor driving in battery-operated applications.

Encompassing self-protection features: such as dead-time and matched delays to evade shoot-through issues, Schmitt triggered inputs to avoid false triggering, gate drive tolerance to negative transients caused during high dV/dt switching, and undervoltage lockout (UVLO) protection on the Vcc supply to avoid malfunction under low supply voltage.



### The Diodes Advantage

The DGD0506A and DGD0507A are 50V high-speed gate drivers capable of driving N-channel MOSFETs in half bridge configuration.

- **1.5A / 2.0A source & sink currents**  
Increasing system efficiencies by minimizing switching time of power MOSFETs
- **Logic Level Input > 2.5V**  
PWM control directly from 3.3V MCU while the output steps up to the Vcc supply (8 to 14V) to ensure the MOSFET is fully enhanced to reduce losses
- **Shoot-through Prevention Logic**  
To protect the MOSFET from shoot-through, these gate drivers have matched delays and DGD0506A has a programmable deadtime from 70 to 430ns
- **3 x 3mm footprint**  
DFN3030 small form-factor that integrates a bootstrap diode to reduce component count for space- and weight-constrained applications

### Applications

#### Motor Drive

Brushless DC (BLDC) motor driving up to 50V, especially in battery operated applications:

- Cordless power tools incl. drills, hand vacuum cleaners and blenders
- Drones, RC cars and planes
- Fans, e-cigarettes

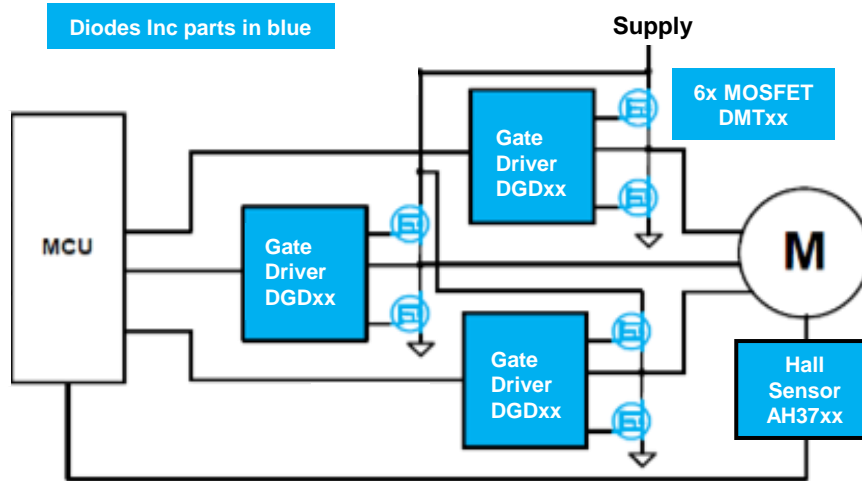


### Half-Bridge Gate Drivers in DFN3030

Part Number	Offset Voltage Max(V)	Bootstrap Diode	Inputs	Output Current lo+ typ (mA)	Output Current lo- typ (mA)	Internal Deadtime typ (ns)	t <sub>on</sub> / t <sub>off</sub> typ (ns)	t <sub>r</sub> / t <sub>f</sub> typ (ns)	Package
DGD0506A	50	Yes <sup>a</sup>	IN, EN	1500	2,000	70 to 430 <sup>b</sup>	96 to 463 <sup>b</sup> / 22	17 / 12	DFN3030
DGD0507A	50	Yes <sup>a</sup>	HIN, LIN, EN	1500	2,000	None <sup>c</sup>	20 / 23	16 / 18	DFN3030
DGD0503	100	No	IN, LIN*	290	600	430	680 / 150	70 / 35	DFN3030
DGD0504	100	No	IN, SD <sup>^</sup>	290	600	430	680 / 150	70 / 35	DFN3030

\* = Out of phase  
<sup>^</sup> = Enable low  
<sup>a</sup> = Integrated bootstrap diode for supply to the HS driver  
<sup>b</sup> = Adjustable deadtime using external resistor  
<sup>c</sup> = HS/LS Gate Driver with no internal deadtime

### 3-Phase BLDC Motor Application Example



3-phase BLDC motor driving using 3x half-bridge gate drivers (DGDxx), 6x N-channel MOSFETs (DMTxx) and Hall Sensors (AH37xx).

#### Gate Drivers

**12V or 24V Supply**  
DGD0506A 50V Half-Bridge  
DGD0507A 50V Half-Bridge  
**48V Supply**  
DGD0503 100V Half-Bridge  
DGD0504 100V Half-Bridge

#### MOSFETs

**12V Supply**  
DMT31M6LPS 30V 1.35mOhm  
DMT3002LPS 30V 1.6mOhm  
**24V Supply**  
DMT4002LPS 40V 1.8mOhm  
DMT4004LPS 40V 2.5mOhm  
**48V Supply**  
DMT6002LPS 60V 2mOhm  
DMT6004LPS 60V 3.1mOhm

#### Hall Sensors

AH3772 3-28V Bipolar Latch  
AH3774 3-28V Bipolar Latch