

FD1505 — Synchronous Step-Down MOSFET Driver

1. Overview

1.1. Features

- High-speed, High-current Drivers for Synchronous N-Channel MOSFETs
- Adaptive Dead-time Control Optimizes Efficiency When Used with Digital-DC™ Controllers
- Adjustable Gate Drive Voltage: 4.5V to 7.5V
- Integrated 30V Bootstrap Schottky Diode
- Capable of Driving $\geq 40A$ per Phase
- Supports Switching Frequency up to 1.4MHz
 - >5A Sink Low-side Driver
 - High-side Driver
 - <10ns Rise/Fall Times, Low Propagation Delay
- Adjustable Gate Drive Strength Optimizes Efficiency for Different V_{IN} , V_{OUT} , I_{OUT} , f_{SW} , and MOSFET Combinations
- Internal Non-overlap Watchdog Prevents Shoot-through Currents
- RoHS Compliant, Pb-free
- Exposed Pad 3 x 3mm DFN-10 Package

1.2. Applications

- High-Efficiency, High-Current DC-DC Buck Converters with Digital Control and PMBus™
- Multi-Phase Digital DC-DC converters with Phase Adding/Dropping
- Power Train Modules
- Synchronous Rectification for Secondary Side Isolated Power Converters

1.3. Description

The FD1505 is an integrated high-speed, high-current N-channel MOSFET driver for synchronous step-down DC-DC conversion applications. When used with Digital-DC™ PWM controllers, the FD1505 enables dynamically adaptive dead-time control that optimizes efficiency under all operating conditions. A dual input PWM configuration enables this efficiency optimization while minimizing complexity within the driver.

Operating from a 4.5V to 7.5V input, the FD1505 combines a 5A, 0.5Ω low-side driver and a 3A, 0.8Ω high-side driver to support high step-down buck applications. A unique adjustable gate drive current scheme allows the user to adjust the drive current on both drivers to optimize performance for a wide range of input/output voltages, load currents, power MOSFETs, and switching frequencies up to 1.4MHz. An integrated 30V bootstrap Schottky diode is used to charge the external bootstrap capacitor. An internal watchdog circuit prevents excessive shoot-through currents and protects the external MOSFET switches.

The FD1505 is specified over a wide -40°C to 125°C junction temperature range and is available in an exposed-pad, DFN-10 package.

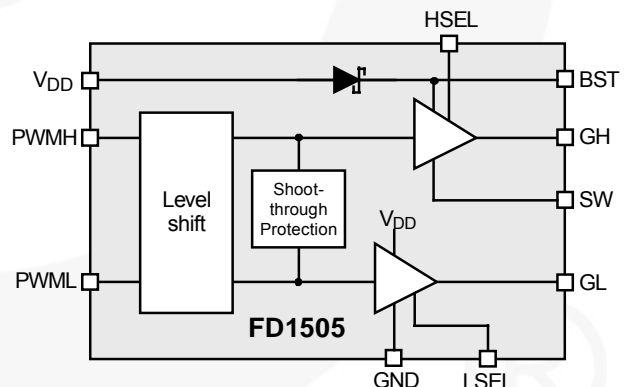






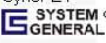


Figure 1. Block Diagram



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Rev. 136

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