

Digital Power Solutions

Fairchild's Offering

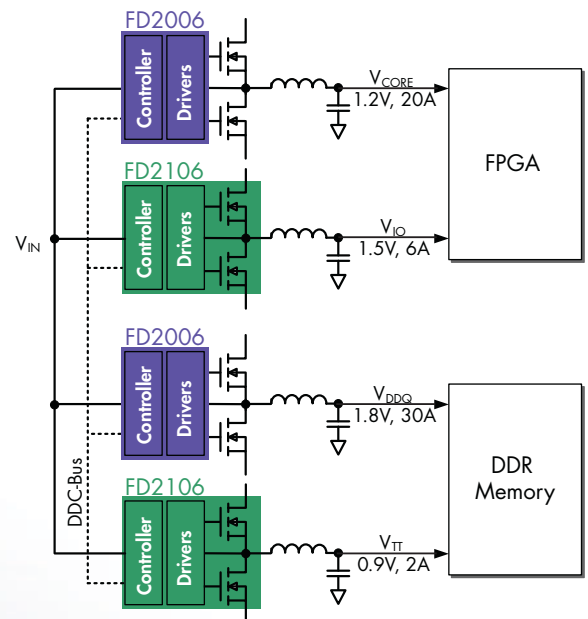
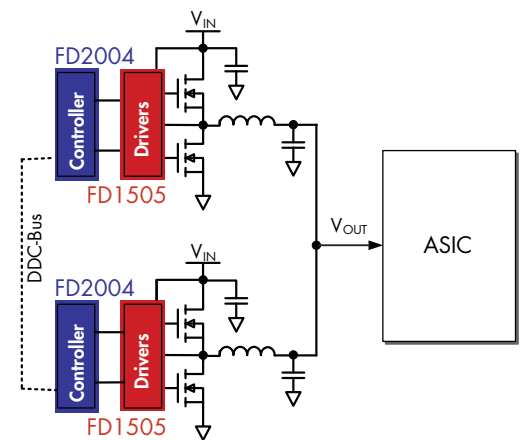
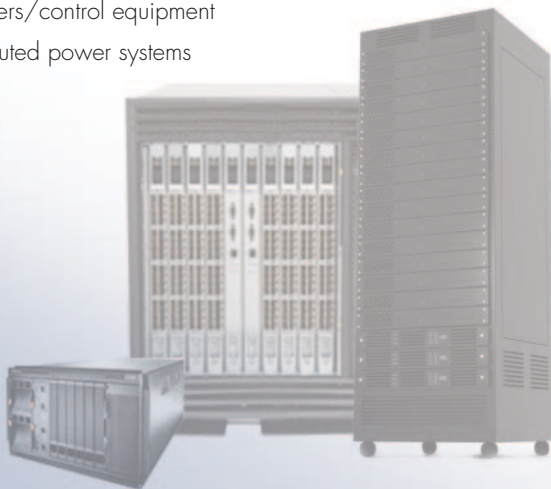
Our highly-integrated, high performance digital power solutions are universal building blocks that easily combine and adapt to address a variety of complex power system requirements. These products incorporate the innovative Digital-DC™ power conversion architecture that provides flexible power-stage options that dynamically optimize efficiency as system conditions change. Extensive integrated power management capabilities reduce external component and board space requirements and simplify the design process. The Digital-DC devices incorporate integrated intelligence that require no software coding and provide efficient, flexible and easy-to-design power delivery solutions.

Features & Benefits

- High performance digital power solution
- Flexible solution can be used in a wide variety of applications
- Seamlessly combines devices to address a full range of system requirements
- Easily configurable without programming
- Sequencing order can be changed through simple PMBus™ commands
- High integration minimizes component count and board space requirements

Applications

- Datacom/telecom equipment
- Servers/storage equipment
- FPGA/DSP/ASIC power supplies
- DDR memory power supplies
- Industrial computers/control equipment
- 5V & 12V distributed power systems



Solutions for complex power systems using an inter-device communication bus (DDC-Bus)

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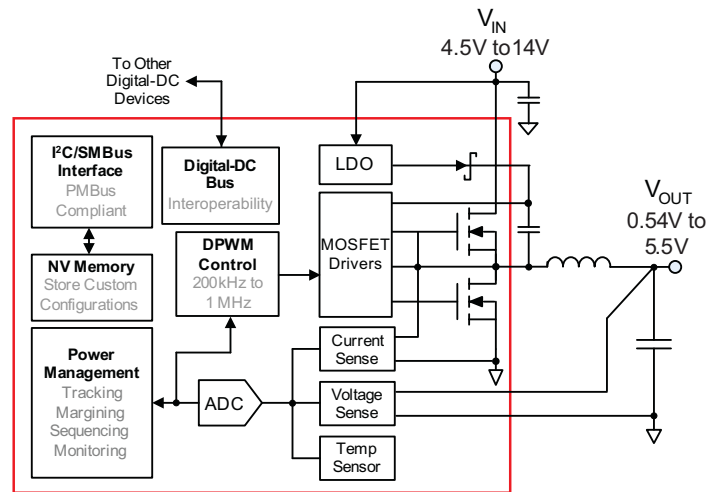
DIGITAL POWER CONVERTERS

Power Conversion Features

- Synchronous Buck converter with integrated MOSFET switches
- Up to 6A continuous output current
- Single supply operation from 4.5V to 14V
- Output voltage from 0.54V to 5.5V
- $\pm 1\%$ output voltage currenacy
- 200kHz to 1.0MHz operation
- External clock synchronization and phase spreading
- Simple device configuration using pin-straps, resistor connections, and I²C/SMBus
- Small size and fewer components

Power Management Features

- Coincidental/ratiometric tracking
- Power-up/power-down sequencing
- Voltage margining
- Voltage/current monitoring
- Internal temperature monitoring
- Extensive fault management
 - Fault handling for all parameters
 - Configurable fault response
 - Fault spreading between devices
 - Snapshot™ parametric capture
- I²C/SMBus serial interface
- PMBus™ compliant command set
- DDC-Bus for interoperability between Digital-DC components
- On-chip non-volatile memory (NVM) for storing custom configurations



The FD2106 combines an efficient and fully integrated digital power conversion architecture with comprehensive power management features.



Digital Power Converters

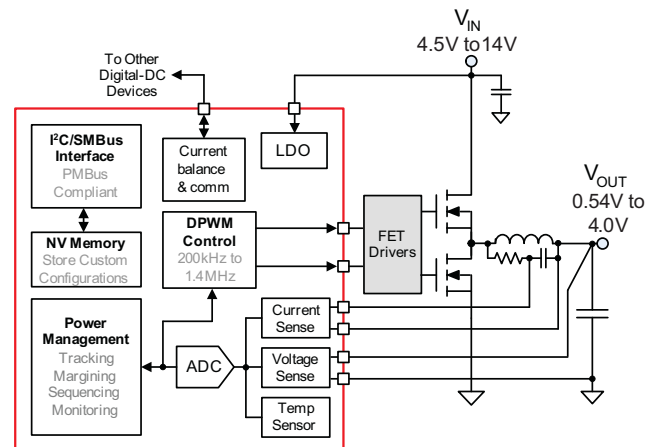
Part Number	Description	Output Current (A)	V _{IN} Range (V)	V _{OUT} Range (V)	Current Sharing	F _{sw} Max. (MHz)	Package
FD2106	6A digital power synchronous step-down DC-DC converter	6	4.5 to 14	0.54 to 5.5	No	1.0	QFN-36 (6mm x 6mm)

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DIGITAL DC-DC CONTROLLERS

Power Conversion Features

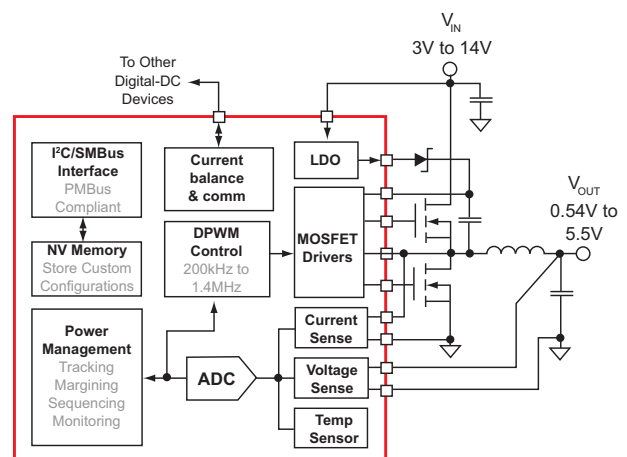
- Synchronous Buck controller with adaptive MOSFET drivers
- Simple device configuration using pin-strap or resistor connections
- Supports masterless current sharing for up to 8 phases
- Adaptive performance optimization
 - Dynamic deadtime control
 - Adaptive diode emulation
 - Phase adding/shedding
 - Adaptive loop compensation
- Single supply operation
- $\pm 1\%$ or better output voltage accuracy
- 200kHz to 1.4MHz operation
- Supports clock synchronization and phase interleaving
- Soft-start into pre-biased load



The FD2004's innovative Digital-DC architecture works together with external FET drivers such as the FD1505 for maximum power stage flexibility.

Power Management Features

- Integrated power management
- Coincidental/ratiometric tracking
- Power-up/power-down sequencing
- Voltage margining
- Internal/external temperature monitoring
- Extensive fault management
 - Individual fault handling for all circuit parameters
 - User configurable fault response parameters
 - Fault spreading between multiple devices
- DDC-Bus for interoperability between Digital-DC™ components
- I2C/SMBus serial interface
- Supports PMBus™ command set
- On-chip non-volatile memory (NVM) for storing custom configurations



The FD2006 combines an efficient, synchronous Buck control, adaptive MOSFET drivers and key power and thermal management functions in a compact 6mm x 6mm package.



Digital Step-Down PWM Controllers

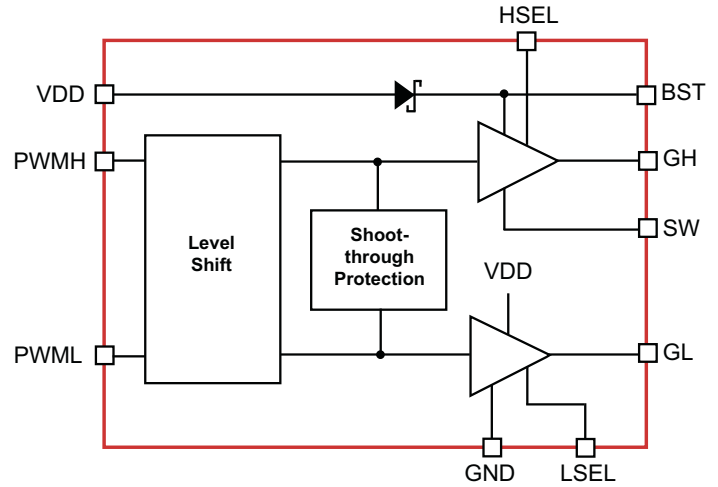
Part Number	Description	Configuration	V _{IN} Range (V)	V _{OUT} Range (V)	F _{sw} Max. (MHz)	Current Sharing	Package
FD2004	Adaptive step-down DC-DC controller	Controller	4.5 to 14	0.54 to 4.0	1.4	Yes	QFN-32 (5mm x 5mm)
FD2004-01	Adaptive step-down DC-DC controller $\pm 0.2\% V_{OUT}$ set point accuracy	Controller	8.0 to 10.0	0.9 to 1.1	1.4	Yes	QFN-32 (5mm x 5mm)
FD2006	Adaptive step-down DC-DC controller with drivers	Controller + Driver	3.0 to 14	0.54 to 5.5	1.4	Yes	QFN-36 (6mm x 6mm)

Digital Power Solutions

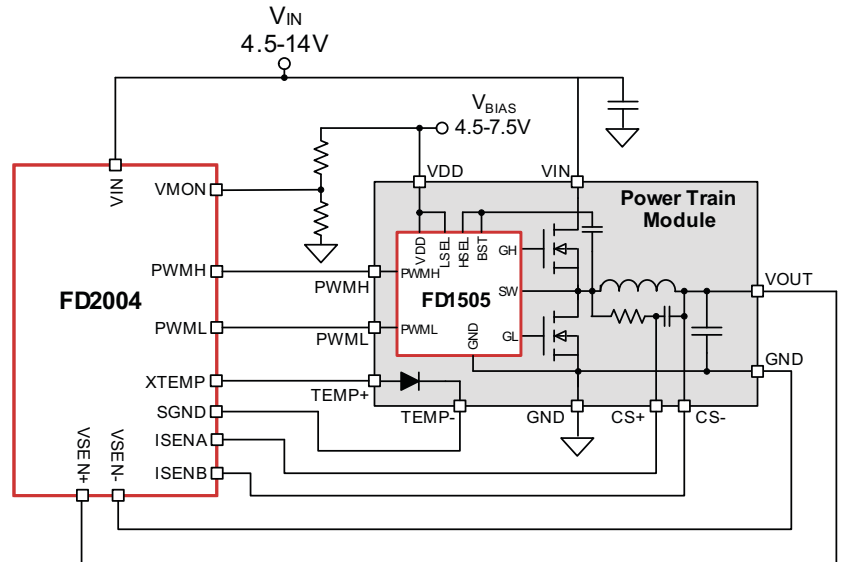
DIGITAL POWER DRIVERS

Digital Power Driver Features

- High-speed, high-current drivers for synchronous N-channel MOSFETs
 - 4A source, 5A sink low-side driver
 - 3A source, 3A sink high-side driver
 - Supports $\geq 40\text{A}$ power stages
 - Supports switching frequencies up to 1.4MHz
 - $< 10\text{ns}$ rise/fall times
- Dual PWM inputs enable adaptive dead-time control when used with Digital-DC™ PWM controllers
- Adjustable gate drive current of both high-side and low-side outputs to either 50% or 100% of their full ratings to optimize for different $V_{IN}/V_{OUT}/I_{OUT}/F_{SW}$ and MOSFET combinations
- Adjustable gate drive voltage from 4.5V to 7.5V
- Internal non-overlap watchdog prevents shoot-through current
- Integrated 30V bootstrap Schottky diode
- Wide junction temperature range (-40°C to 125°C)
- Exposed pad DFN-10 package (3mm x 3mm)



The FD1505 is an integrated high speed, high current dual-input MOSFET driver for synchronous step-down DC-DC conversion applications.



The FD1505 enables high current, high efficiency DC-DC converter designs when used with Fairchild's FD2004 Digital Power PWM controllers.



Digital Power Drivers

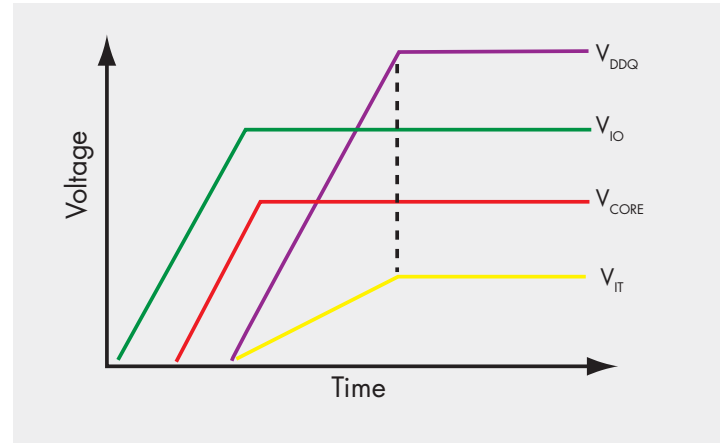
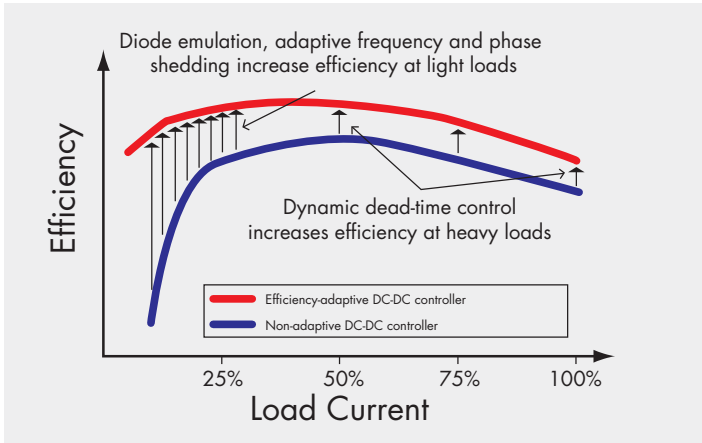
Part Number	Description	Low-Side Drive (Sink/Source) (A)	High-Side Drive (Sink/Source) (A)	System V_{IN} Range (V)	Gate Drive Voltage Range (V)	Package
FD1505	Synchronous MOSFET driver with adjustable gate drive current	+5/-4	+3/-3	3 to $(30V-V_{DD})$	4.5 to 7.5	DFN-10 (3mm x 3mm)

Digital Power Solutions

EFFICIENT, FLEXIBLE, EASY-TO-USE

Digital-DC step-down controllers with drivers and current sharing provide high efficiency over the entire load spectrum in a highly compact power solution.

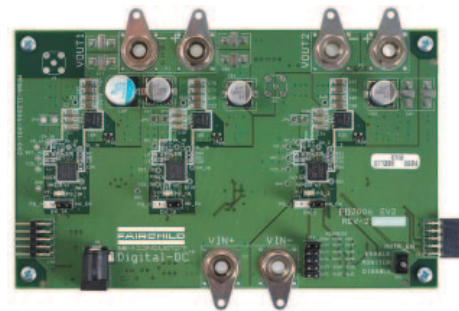
Creating a complex power system is easy using Fairchild's digital power ICs. Features such as sequencing, margining and fault management do not require a host controller. All devices can be monitored and controlled individually or as a system.



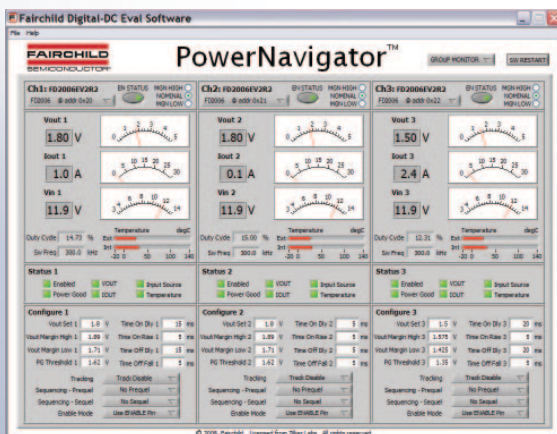
- High V_{OUT} accuracy across line, load and temperature
- High current up to 40A per phase
- Current sharing
- Adaptive efficiency optimization
- Startup pre-bias protection
- External clock synchronization with phase interleaving
- Voltage tracking (50%, 100%)
- Autonomous output sequencing
- Adjustable voltage margining (5%/10%)
- Voltage, current, temperature monitoring
- Configurable fault management
- Snapshot™ parametric data capture
- Interoperability with DDC-Bus
- I²C/SMBus with PMBus support

Fairchild Evaluation Board (FEB) Kits Include:

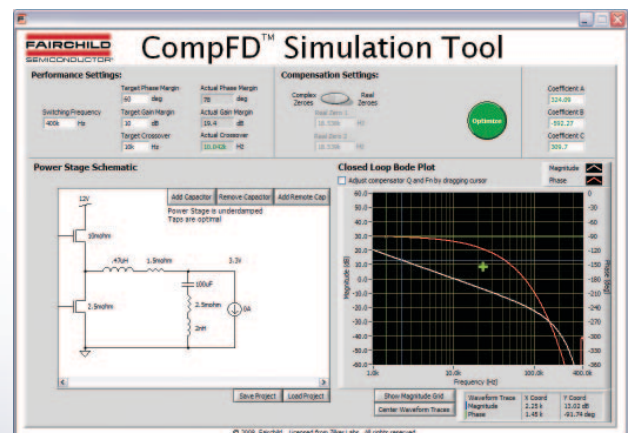
- Evaluation board
- Evaluation software
- Evaluation board data sheet
- Product data sheet(s)
- Quick start guide
- USB-to-SMBus interface board
- USB cable



Contact your local sales representative to request your evaluation board today.



PowerNavigator™ allows simple configuration and monitoring of multiple Digital-DC devices using a PC with a USB interface.



CompFD™ allows dynamic simulation and display of loop compensation settings and configuration coefficients.

For datasheets, application notes, samples and more, please visit: www.fairchildsemi.com

**PRODUCTS &
SAMPLES**

APPLICATIONS

DESIGN SUPPORT

COMPANY

POWER MANAGEMENT ICs

AC-DC: Power Factor Correction

- Continuous Conduction Mode (CCM) PFC Controllers
- Critical (CrCM) / Boundary Conduction Mode (BCM) PFC Controllers
- PFC + PWM Combination (Combo) Controllers

Digital Power Solutions

- Digital Power Controllers
- Digital Power Converters
- Digital Power Support Drivers

Isolated DC-DC

- Green-Mode PWM Controllers
- Integrated Green-Mode PWM Regulators (Green FPS™)
- Integrated PWM Regulators (FPS™)
- Primary-side only CV/CC Controllers
- Standard SMPS PWM Controllers

Non-Isolated DC-DC

- Charge-Pump Converters
- Multi-phase Controllers
- Step-down Controllers (External Switch)
- Step-down Regulators (Integrated Switch)
- Step-up Regulators (Integrated Switch)

Power Drivers

- High Voltage Gate Drivers (HVIC)
- Low-Side Gate Drivers
- Synchronous Rectifier Controllers/Drivers
- Synchronous-Buck/Multi-phase Drivers

Supervisory/Monitor ICs

- Ground Fault Interrupt (GFI) Controllers
- Supervisors + PWM
- Temperature Sensors
- Voltage Supervisors/Detectors/Stabilizers

Voltage Regulators

- LDOs
- Positive Voltage Linear Regulators
- Negative Voltage Linear Regulators
- Shunt Regulators

POWER SEMICONDUCTORS

Diodes & Rectifiers

- Bridge Rectifiers
- Rectifiers
- Schottky Diodes and Rectifiers
- Small Signal Diodes
- Transient Voltage Suppressors
- Zener Diodes

IGBTs

- Discrete IGBTs
- IGBT Modules

Integrated Power Solutions

- DrMOS FET Plus Driver Multi-Chip Module
- IGBT Module
- Full Function Load Switches (IntelliMAX™)
- MOSFET/Schottky Combos
- Smart Power Modules (SPM®)
- Smart Switches

Transistors

- BJTs
- IGBT Discrete
- JFETs
- Load Switches
- MOSFETs
- MOSFET/Schottky Combos
- Small Signal Transistors

TRIACs

- TRIACs

LIGHTING AND DISPLAY

- CCFL Ballast IC
- CFL/Lighting Ballast Control IC
- Critical (CrCM)/Boundary Conduction Mode (BCM) PFC Controllers for Lighting
- High Voltage Gate Drivers (HVIC)
- LED Drivers
- PDP Smart Power Module (PDP-SPM™)

SIGNAL PATH ICs

Amplifiers & Comparators

- Audio Amplifiers
- Comparators
- Current Sense Amplifier
- High Performance Amplifiers (>15MHz)
- Operational Amplifiers

Signal Conversion

- Triple Video DACs
- Video Filter Drivers
- Video Switch Matrix/Multiplexers

Interface

- LVDS
- Serializer/Deserializer (µSerDes™)
- USB Transceiver

Switches

- Analog/Audio Switches
- Bus Switches
- USB Switches
- Video Switches

LOGIC | TINYLOGIC®

- Buffers, Drivers, Transceivers
- Flip flops, Latches, Registers
- Gates
- MSI Functions
- Multiplexer/Demultiplexer Encoders/Decoders
- Specialty Logic
- TinyLogic®
- Voltage Level Translators

OPTOELECTRONICS

- Infrared Products
- Optocouplers