3W, 0.85V Startup Voltage, Synchronous Step-Up Converter with Real-Shutdown and Short-Circuit Protection

PRELIMINARY DATASHEET

DESCRIPTION

The FH4135 is a high efficiency synchronous boost (step-up) converter that can provide up to 3.0W of power to a boosted output from a low voltage source.

Unlike most step-up converter, not only it starts up at a very low input voltage as low as 0.85V, it also incorporates circuits that disconnect the input from output, during shutdown, short-circuit, output current overloading, or other events when output is higher than the input. This eliminates the need for an external MOSFET and its control circuitry to disconnect the input from output, and provides robust output overload protection.

The FH4135 starts up from a voltage as low as 0.85V making it ideal for applications with single-cell or two-cell alkaline, NiCd, and NiMh batteries.

A switching frequency of 2.0MHz minimizes solution footprint by allowing the use of tiny and low profile inductors and ceramic capacitors.

An internal synchronous MOSFET provides highest efficiency and with a current mode control that is internally compensated, external parts count is reduced to minimal.

FEATURES

- Output Disconnect
- Short-circuit Protection
- Output Power: 3.0W
- Output to Input Reversed Current Protection
- Low Start-up Voltage: 0.85V
- VIN range from 0.6V to 4.5V
- Efficiency Up to 96%
- 40uA No load I_Q and light load PFM Mode
- Internal Synchronous Rectifier
- Current Mode control
- Logic Control Shutdown and Thermal shutdown
- Package Type: DFN2*2-6L

APPLICATIONS

- USB OTG for MIDs, Smartphones
- Mobile back-up Battery Chargers
- USB powered devices
- Alkaline, NiCd, and NiMh batteries applications

Device Information

PART NUMBER	PACKAGE (1)	BODY SIZE (NOM)
FH4135D	6 Pin DFN	2.00mm × 2.00mm

(1) For all available packages, see the orderable addendum at the end of this document.

TYPICAL APPLICATION

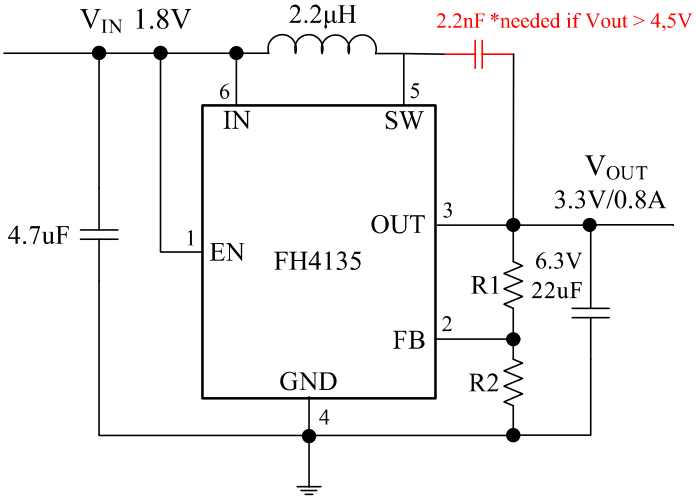
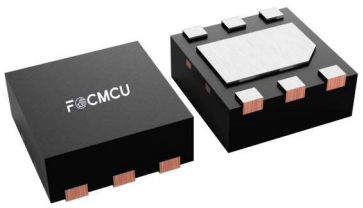
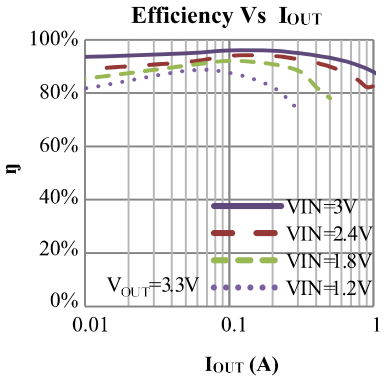
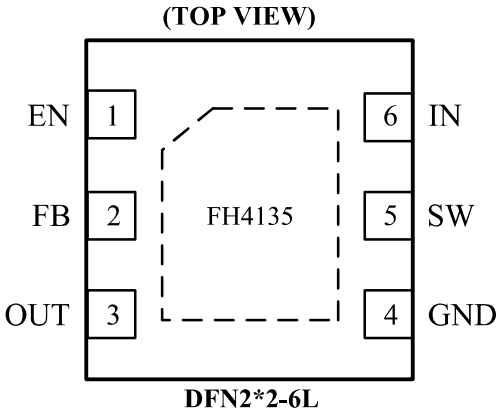


Figure 1. Typical Simplified Schematic





PIN CONFIGURATION



PIN DESCRIPTION

PIN#	NAME	DESCRIPTION
1	EN	Enable pin for the IC. Drive this pin to a voltage no higher than Vin to enable the part, low to disable.
2	FB	Feedback Input. Connect an external resistor divider from the output to FB and GND to set V_{OUT}.
3	OUT	Output pin. Bypass with a 22uF or larger ceramic capacitor closely between this pin and GND.
4	GND	Ground Pin
5	SW	Inductor Connection. Connect an inductor Between SW and the regulator output.
6	IN	Input Supply Voltage. Bypass with a 4.7uF ceramic capacitor to GND

BLOCK DIAGRAM

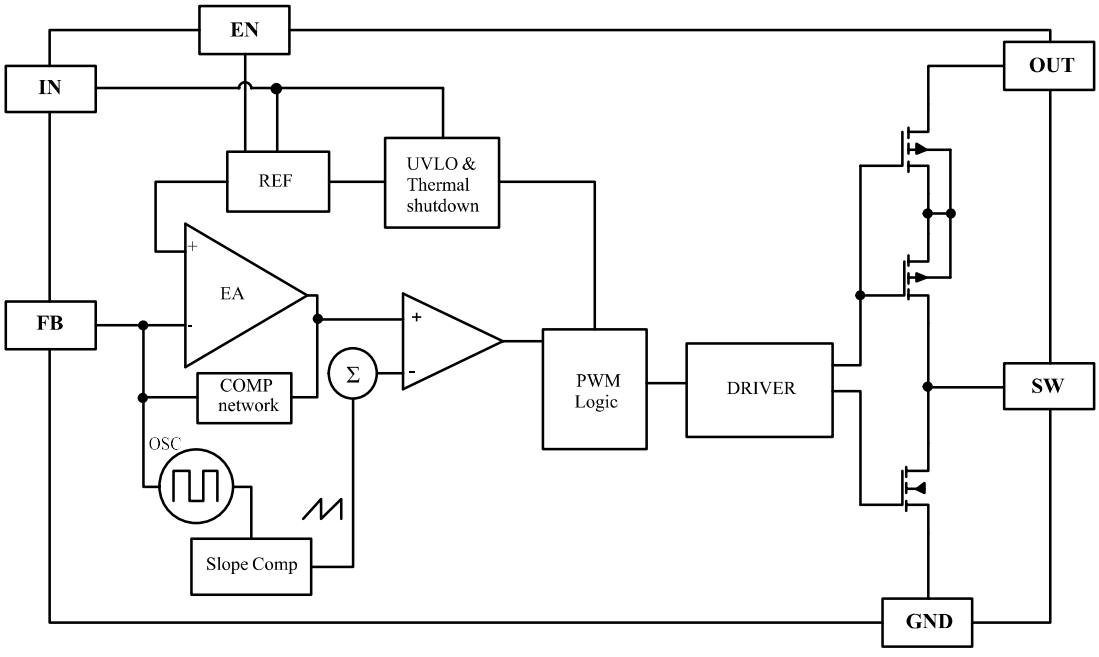
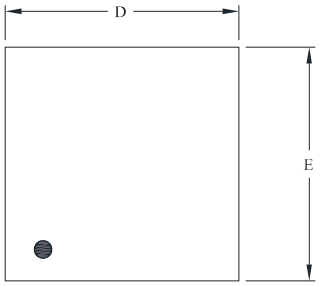


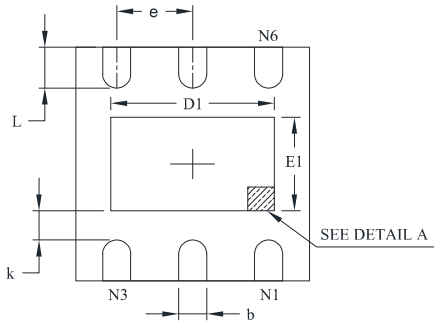
Figure 2. FH4135 Functional Block Diagram

PACKAGE OUTLINE DIMENSIONS

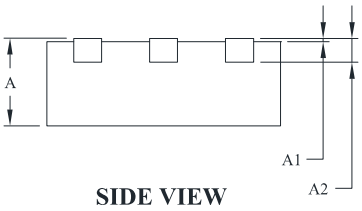
- **Type: DFN-2*2-6L**



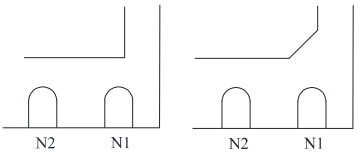
TOP VIEW



BOTTOM VIEW



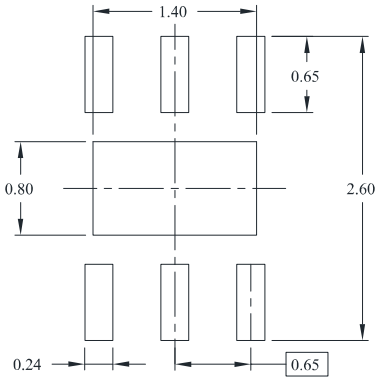
SIDE VIEW



DETAIL A

Pin #1 ID and Tie Bar Mark Options

NOTE: The configuration of the Pin #1 identifier is optional, but must be located within the zone indicated.



RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A2	0.203 REF		0.008 REF	
D	1.900	2.100	0.075	0.083
D1	1.100	1.450	0.043	0.057
E	1.900	2.100	0.075	0.083
E1	0.600	0.850	0.024	0.034
k	0.200 MIN		0.008 MIN	
b	0.180	0.300	0.007	0.012
e	0.650 TYP		0.026 TYP	
L	0.250	0.450	0.010	0.018

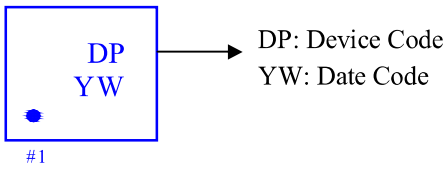
ORDERING INFORMATION

Part Number	Input Voltage	Features	Operating Temperature	Package Type	Top Mark	SPQ
FH4135D6	0.6V ~ 4.5V	● DC-DC boost (step-up) ● Output Voltage: ADJ ● VFB: 0.6V ● Frequency: 2.0MHz ● Output Current: 600mA ● Duty cycle: 90%(Min.)	-40°C to +85°C	DFN2*2-6L	DP Y W	3000EA/Reel

Note:

- **FH4135C50D6** devices are Pb-free and RoHs compliant.
- The surface prints of our semiconductor devices are subject to change during the production process and do not involve changes in electrical parameters, and we will not separately state the notice.
- If you have any other custom purchase needs, please contact our sales department.
- ForDevices reserves the right to amend and legally interpret the electrical parameters of this chip device. (http://www.fordevices.com)

Device Name: DFN2x2-6L



ESD SENSITIVITY CAUTION

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

Product Folder
Order Now
Technical Documents
Tools & Software
Support & Community

Note:

- The information described herein is subject to change without notice.
- ForDevices Inc. is not responsible for any problems caused by circuits or diagrams described herein whose related industrial properties, patents, or other rights belong to third parties. The application circuit examples explain typical applications of the products, and do not guarantee the success of any specific mass-production design.
- Use of the information described herein for other purposes and / or reproduction or copying without the express permission of FocDevice Inc. is strictly prohibited.
- The products described herein cannot be used as part of any device or equipment affecting the human body, such as exercise equipment, medical equipment, security systems, gas equipment, or any apparatus installed in airplanes and other vehicles, without prior written permission of ForDevices Inc.
- Although ForDevices Inc. exerts the greatest possible effort to ensure high quality and reliability, the failure or malfunction of semiconductor products may occur. The user of these products should therefore give thorough consideration to safety design, including redundancy, fire-prevention measures, and malfunction prevention, to prevent any accidents, fires, or community damage that may ensue.

▲ Update by Sep.2020