

High Efficiency, Low Voltage, 1.0MHz, Synchronous Boost(Step-up) Converter with 2.0A Peak Current Switch

PRELIMINARY DATASHEET

DESCRIPTION

The FH4101 is a constant frequency, current mode, synchronous Boost switching regulator. The input voltage can accept the voltage at a range from 1.8V to 5.0V. And the output voltage is adjustable with a peak of 5.5V.

This device also has the 3.3V&5V fixed output versions.

High switching frequency minimizes the sizes of inductor and capacitor. Integrated power MOSFETs and internal compensation make the FH4101 simple to use and fit the total solution in to a compact space.

The FH4104 enters the power-save mode at light loads to maintain high efficiency. Anti-ringing control circuitry reduces EMI concerns by damping the inductor in discontinuous mode. The FH4101 provides true output disconnection, allowing V_{OUT} to go to 0V during shutdown without drawing any current from the input source.

The output voltage of FH4104-ADJ can be programmed by an external resistor divider, and those of FH4104-3.3V /5.0V are fixed internally on the chip. The device is available in a Green SOT-23-6L package. It operates over an ambient temperature range of -40°C to +85°C.

Key Features

- Up to 95% Efficiency
- True Output Disconnect from Input
- Inrush Current Limiting and Internal Soft-Start
- 0.8V Low Voltage Start-Up
- Internal Synchronous Rectifier
- Current Mode Control with Internal Compensation
- Short-Circuit Protection
- 1.0MHz Fixed Frequency Switching
- 1.8V to 5.5V Input Range
- 2.5V to 5.0V Output Range
- Tiny External Components
- Small 6-lead SOT Package

APPLICATIONS

- Cellular and Smart Phones
- Microprocessors and DSP Core Supplies
- Wireless and DSL Modems
- MP3 Player
- Digital Still and Video Cameras
- Portable Instruments

TYPICAL APPLICATION

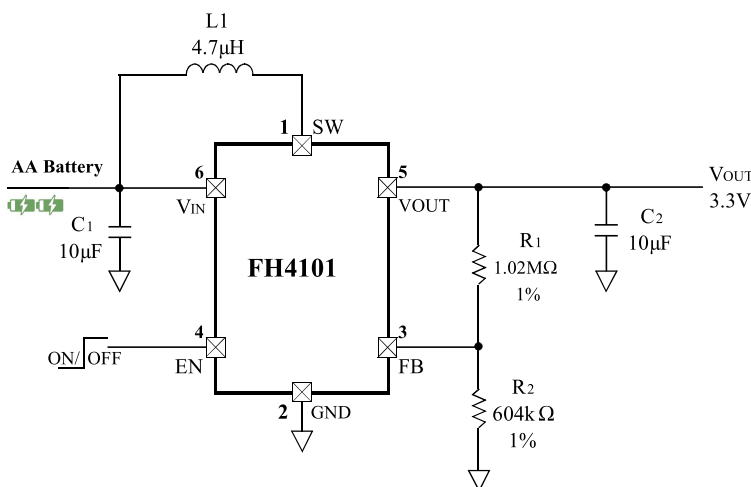
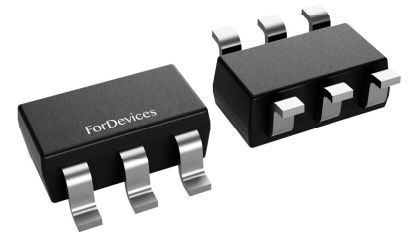
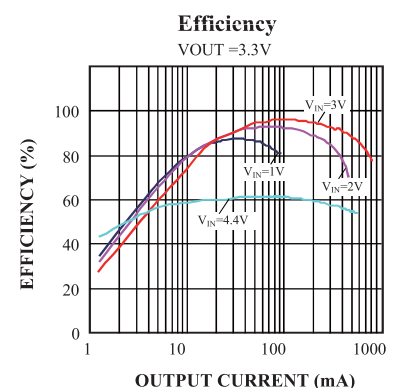
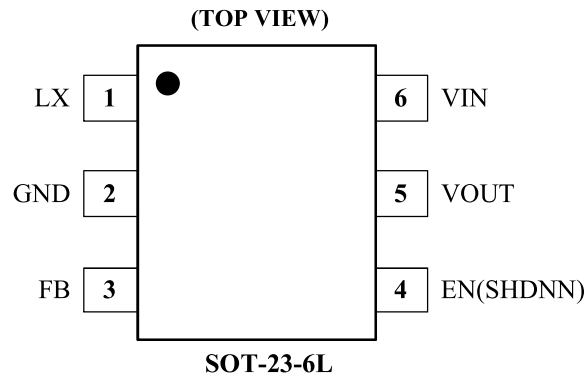


Figure 1. FH4101 Typical Application Diagram

--Single Cell to 3.3V Synchronous Boost Converter



PIN CONFIGURATION



PIN DESCRIPTION

Table 2. Pin Descriptions

Pin Name	Pin Number	Description
SW(LX)	1	Switch Pin. Connect an inductor between this pin and VIN. Keep the PCB trace lengths as short and wide as is practical to reduce EMI and voltage overshoot. If the inductor current falls to zero, or pin SHDNN is low, an internal 100Ω anti-ringing switch is connected from this pin to VIN to minimize EMI. Note: An optional Schottky diode can be connected between this pin and VOUT.
GND	2	Signal and Power Ground. Provide a short, direct PCB path between this pin and the negative side of the output capacitor(s).
FB	3	Feedback Pin. Feedback input to the FH4101 error amplifier. Connect a resistor divider tap to this pin. The output voltage can be adjusted from 2.5 to 5V by: $V_{OUT} = 0.60V[1 + (R_1/R_2)]$
SHDNN (EN)	4	Shutdown Pin. Logic controlled shutdown input. 1 = Normal operation, 1.0MHz typical operating frequency. 0 = Shutdown; quiescent current <1μA. If SHDNN is undefined, pin SW may ring. Note: In a typical application, SHDNN should be connected to VIN through a 1MΩ pull-up resistor.
VOUT	5	Output Voltage Sense Input and Drain of the Internal PMOS Synchronous Rectifier. Bias is derived from VOUT when VOUT exceeds VIN. PCB trace length from VOUT to the output filter capacitor(s) should be as short and wide as is practical. Due to the ESD protection diode of the internal PMOS synchronous rectifier, VOUT is held at VIN -0.6V during shutdown.
VIN	6	Input Voltage. The FH4101 gets its start-up bias from VIN unless VOUT exceeds VIN, in which case the bias is derived from VOUT. Thus, once started, operation is completely independent from VIN. Operation is only limited by the output power level and the internal series resistance of the supply.

1.0MHz 超小型同步升压 DC/DC 电压调整器

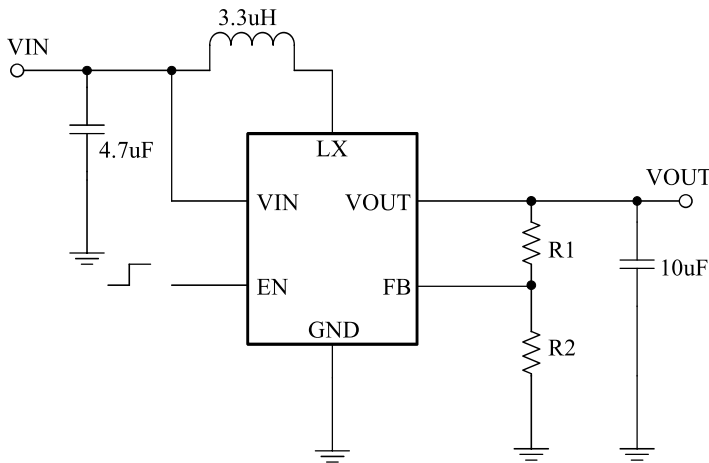
■ 产品概述

FH4101是一款微型、高效率、同步升压型 DC/DC 调整器。电路由电流模 PWM 控制环路，误差放大器，斜波补偿电路，比较器和功率开关等模块组成。该芯片可在较宽负载范围内高效稳定的工作，内置一个 2A 的功率开关和软启动保护电路。高达 95% 的转换效率能够高效的延长电池寿命。

■ 封装形式

- SOT-23-6L

■ 典型应用电路



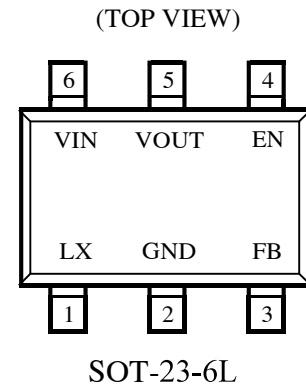
■ 产品特点

- 效率高达 95%
- 1MHz 的固定开关频率
- 2.5V 至 4.5V 的输出电压范围
- PFM/PWM 自动切换模式
- 抗振铃控制使 EMI 最小化
- 静态电流 60uA

■ 应用领域

- 数码相机
- 手持设备
- 手机

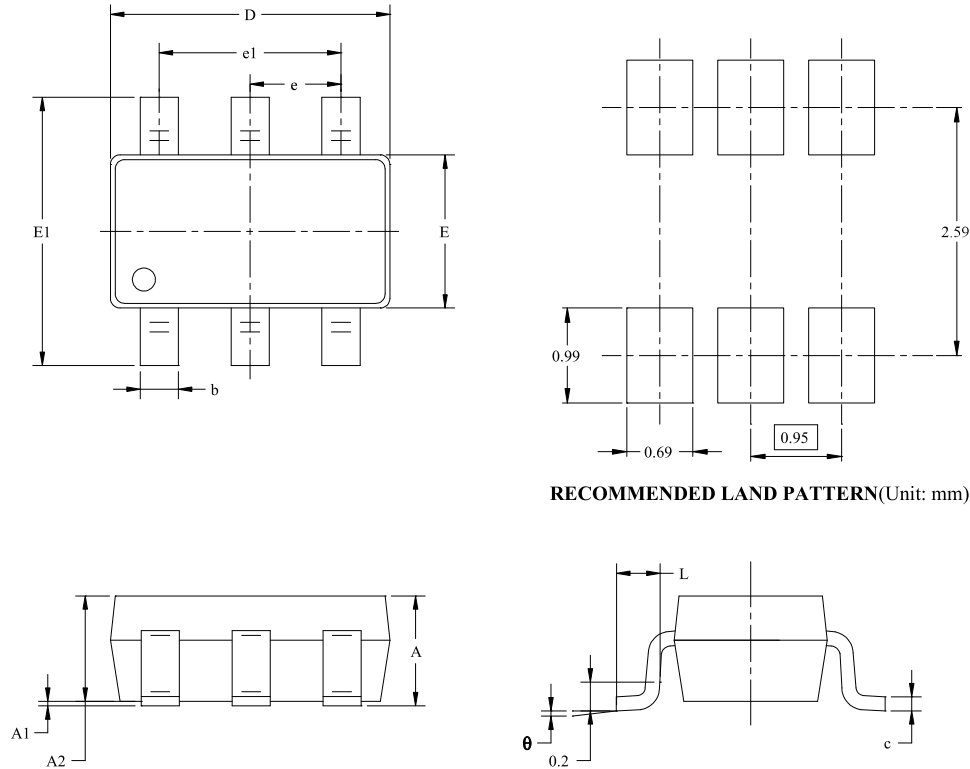
■ 引脚配置



引脚号	引脚名称	功能描述
1	LX	开关引脚
2	GND	接地端
3	FB	反馈端
4	EN	使能端，高有效，内置下拉电阻1M
5	VOUT	输出端
6	VIN	输入端

PACKAGE OUTLINE DIMENSIONS

Type: SOT-23-6L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 BSC		0.037 BSC	
e1	1.900 BSC		0.075 BSC	
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

NOTES:

1. Body dimensions do not include mode flash or protrusion.
2. This drawing is subject to change without notice .

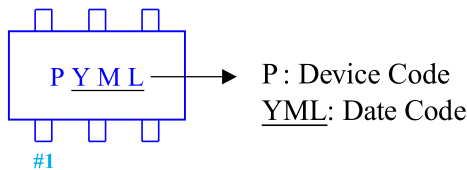
ORDERING INFORMATION

Part Number	Voltage Output	Features	Operating Temperature	Package Type	Top Mark	SPQ
FH4101M6	ADJ	<ul style="list-style-type: none"> • Synchronous Boost(Step-up) • Input Voltage: 1.8V ~ 5.5V • Ilimit: 2.0A • VFB: 0.6V • Efficiency: 95% 	-40°C to +85°C	SOT-23-6L	P <u>Y</u> M <u>L</u>	3000PCS/Reel
FH4101C33M6	3.3V		-40°C to +85°C	SOT-23-6L	P <u>Y</u> M <u>L</u>	3000PCS/Reel
FH4101C50M6	5.0V		-40°C to +85°C	SOT-23-6L	P <u>Y</u> M <u>L</u>	3000PCS/Reel

Note:

- **FH4101** 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: SOT-23-6L



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.



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▲ Update by Aug.2020