

Super-Small Package PWM Control Step-up Switching Regulator

Description

The FH4001 is a compact, high efficiency, and low voltage step-up DC-DC converter with an Adaptive Current Mode PWM control loop, includes an error amplifier, ramp generator, comparator, switch pass element and driver in which providing a stable and high efficient operation over a wide range of load currents. It operates in stable waveforms without external compensation.

The low start-up input voltage below 1.00V makes FH4001 suitable for 1 to 4 battery cells applications of providing up to 600mA output current. Besides, the 14.0uA low quiescent current together with high efficiency maintains long battery lifetime. The output voltage is set with two external resistors. Both internal 2.0A switch and driver for driving external power devices (NMOS or NPN) are provided.

Features

- 0.8V ($I_{out}=1mA$) Low Start-up Input Voltage
- 500kHz Fixed Switching Frequency
- 90% Efficiency
- High Supply Capability to Deliver 3.3V 300mA with 1 Alkaline Cell or Deliver 5V 800mA with 1 Li-ion Cell
- 14 μ A Quiescent (Switch-off) Supply Current
- 0.01 μ A Shutdown Mode Supply Current
- Providing Flexibility for Using Internal and External Power Switches
- Output voltage: Settable to between 2.0V to 6.0V, accuracy of 2%

Package

- SOT-23-6L / SOT-89-5L (Note: New design selection is not recommended)

Applications

- MP3
- PDA
- DSC
- LCD Panel
- RF-Tags
- Portable Instrument
- Wireless Equipment

Absolute Maximum Ratings

Parameter	Symbol	Maximum Rating	Unit	
Input voltage	V_{DD}	$V_{SS}-0.3 \sim V_{SS}+7.0$	V	
Output voltage	V_{OUT}	$V_{SS}-0.3 \sim V_{SS}+7.0$		
	V_{LX}	$V_{SS}-0.3 \sim V_{SS}+7.0$		
EXT pin Driver Current	I_{EXT}	200	mA	
LX pin Switch Current	I_{LX}	2.5	A	
Power dissipation	PD	SOT-23-6	150	mW
Operating ambient temperature	T_{opr}	-40 ~ +80	°C	
Storage ambient temperature	T_{stg}	-40 ~ +125		

Caution : The absolute maximum ratings are rated values exceeding which the product could suffer physical damage. These values must therefore not be exceeded under any conditions.

超小型低电压启动 PWM 控制升压 DC-DC 电压调整器

产品概述

FH4001 是一款微型、高效率、升压 DC/DC 调整器。电路由电流模 PWM 控制环路，误差放大器，斜坡产生电路，比较器和一个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。低于 1V 的启动电压，可以使用 1-4 节电池供电，提供 600mA 的输出电流。14uA 的静态电流以及高达 90% 的转换效率能够高效的延长电池寿命。可以通过调整两个外加电阻来设定输出电压。除内置一个 2A 的功率开关外，芯片还提供了外置扩流器件（NMOS 或 NPN）的驱动端口。

产品特点

- 低电压工作 可保证以 0.8V ($I_{out}=1mA$) 启动
- 开关频率 500KHz
- 转换效率 90%
- 输出电流 一节碱性电池提供 3.3V 300mA
一节锂电池提供 5V 800mA
- 输出电压精度 输出电压从 2V 到 6V, 精度可达 $\pm 2.0\%$
- 静态功耗 典型值 14 μ A
- 关断电流 典型值 0.01 μ A
- 扩流器件驱动端口

封装

- SOT-23-6L / SOT-89-5L

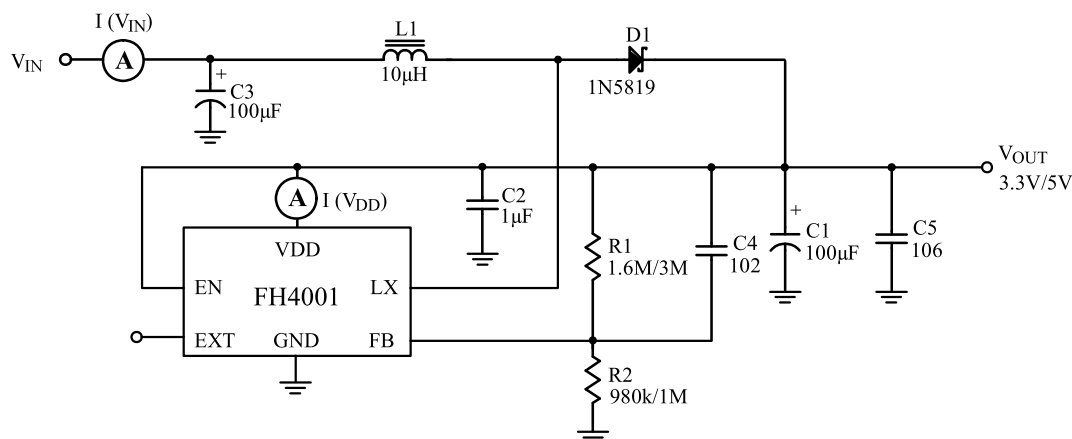
用途

- MP3
- 电子词典
- 射频标签
- PDA
- 电子学习机
- 便携式移动设备
- 无线通信设备
- DSC、LCD 显示屏

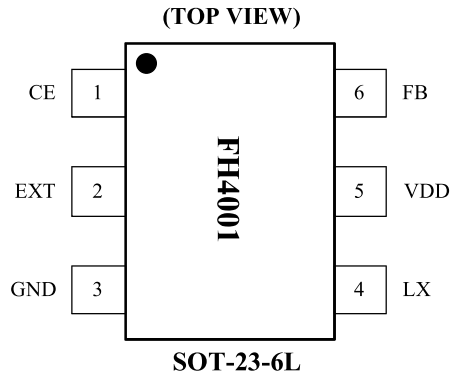
绝对最大额定值

项目	符号	绝对最大额定值	单位	
输入电压	VDD	$V_{ss}-0.3 \sim V_{ss}+7$	V	
输出电压	VOUT	$V_{ss}-0.3 \sim V_{ss}+7$		
	VLX	$V_{ss}-0.3 \sim V_{ss}+7$		
EXT 端驱动电流	IEXT	200	mA	
LX 端开关电流	ILX	2.5	A	
容许功耗	PD	SOT-23-6L	150	mW
		SOT-89-5L	500	
工作环境温度	Topr	-40 ~ +80	°C	
保存温度	Tstg	-40 ~ +125		

测试电路



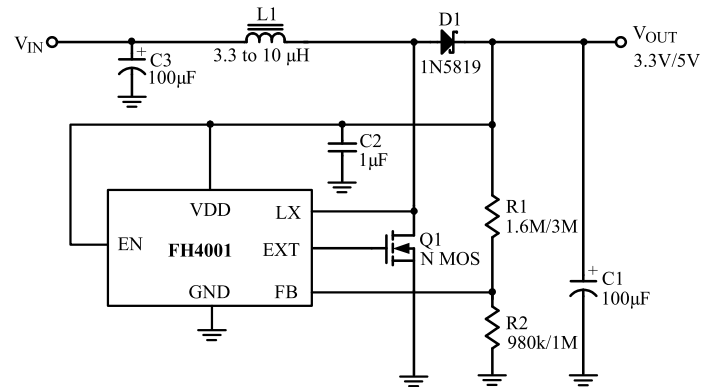
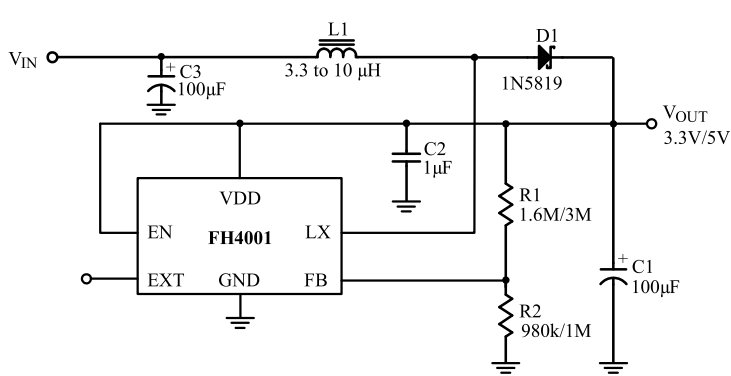
Pin Configuration



Pin Assignment

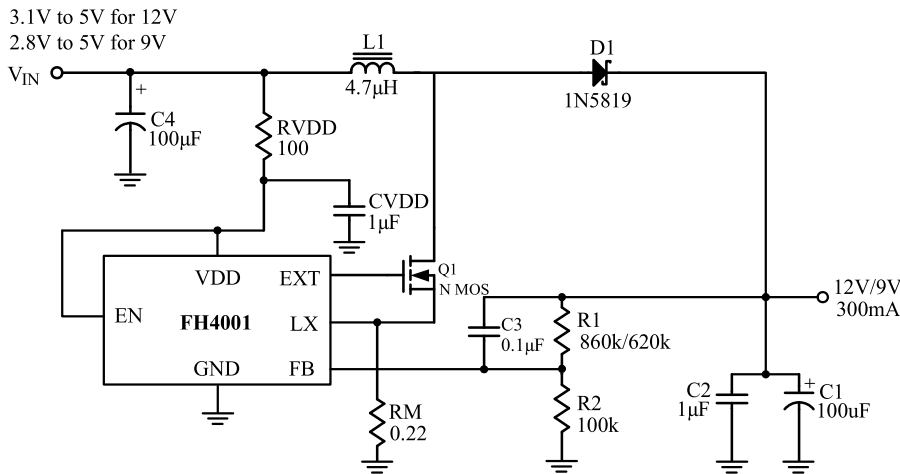
Pin Number		Pin Name	Function
SOT-23-6L	SOT-89-5L		
1	1	CE	Chip enable
2	-	EXT	Output pin for driving external NMOS
3	5	GND	Ground
4	4	LX	Pin for switching
5	2	VDD	Input positive power pin of FH4001
6	3	FB	Feedback input pin

Typical Application Circuit

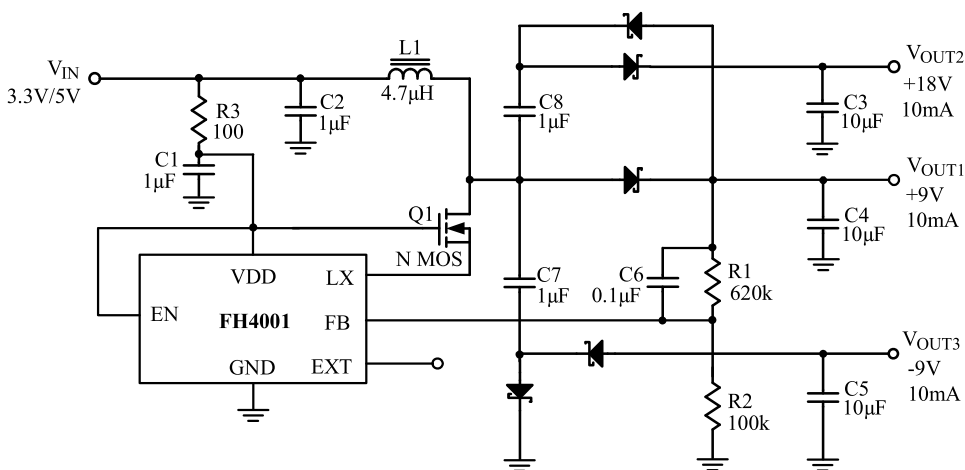


Circuit 1. FH4001 Typical Application for Portable Instruments

Circuit 3. FH4001 for Higher Current Application



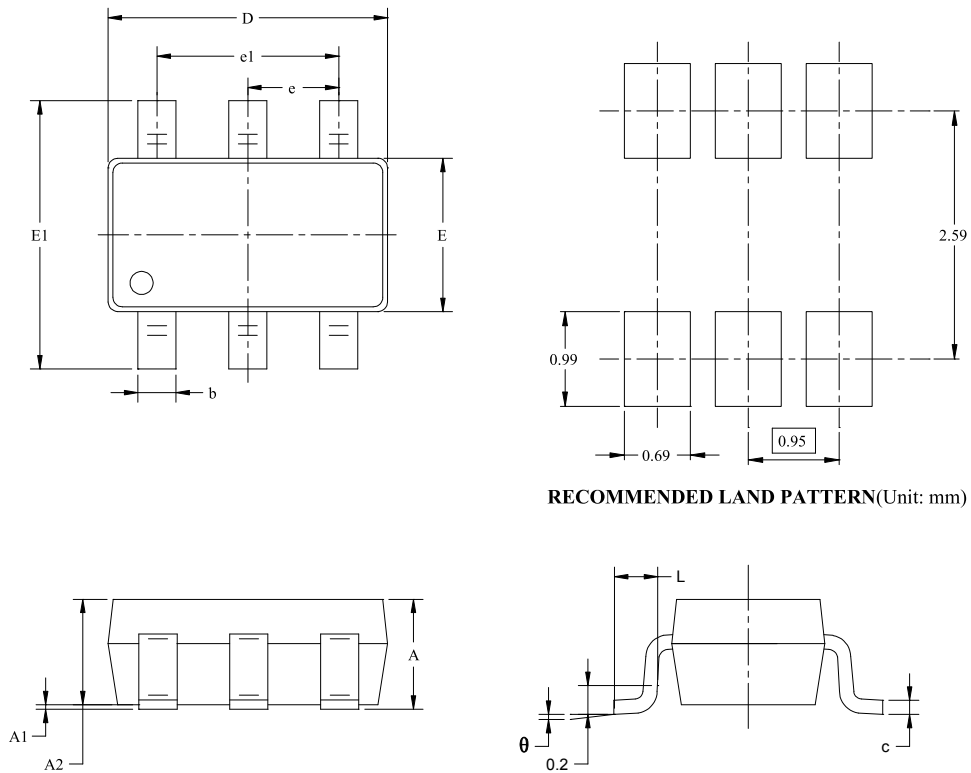
Circuit 2. FH4001 High Voltage Application



Circuit 4. FH4001 for multi-output Application

Package Information

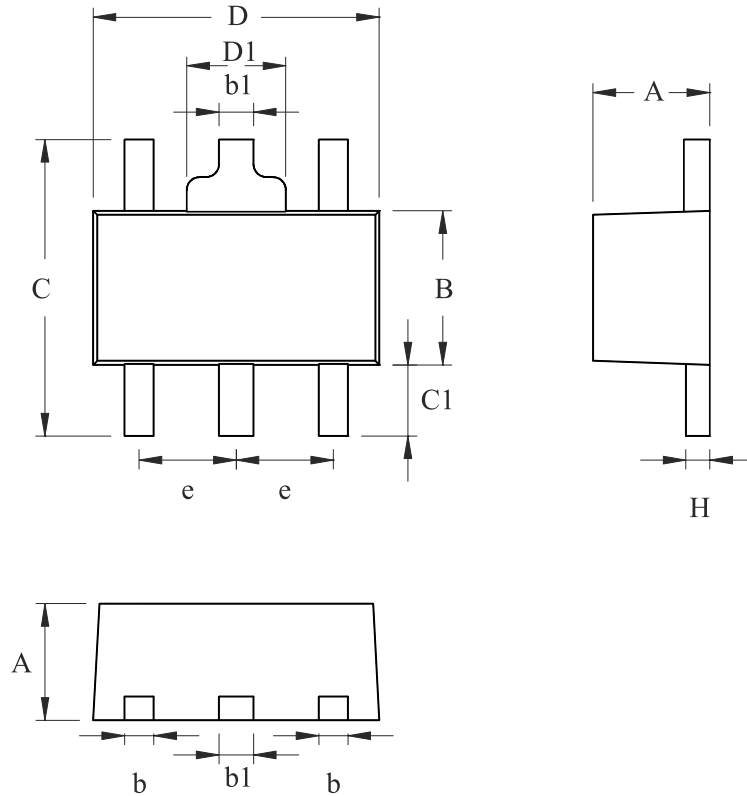
- Type: SOT-23-6L



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	1.90 0 BSC		0.075 BSC	
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

Package Information

- Type: SOT-89-5L (Note: New design selection is not recommended)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.397	1.600	0.055	0.063
b	0.356	0.508	0.014	0.020
B	2.388	2.591	0.094	0.102
b1	0.406	0.533	0.016	0.021
C	3.937	4.242	0.155	0.167
C1	0.787	1.194	0.031	0.047
D	4.394	4.597	0.173	0.181
D1	1.397	1.702	0.055	0.067
e	1.397	1.600	0.055	0.063
H	0.356	0.432	0.014	0.017

Ordering Information

Part Number	Voltage Range	Features	Operating Temperature	Package Type	Top Mark	SPQ
FH4001M6	2.0V ~ 6.0V	<ul style="list-style-type: none"> • Boost(Step-up) • 90% Efficiency • VFB Voltage: 1.25V 	-40°C to 80°C	SOT-23-6L	AA 2 *	3000PCS/Reel
FH4001P5 (Ordering)	2.0V ~ 6.0V	<ul style="list-style-type: none"> • Vout: 2.0V~6.0V(ADJ) • Switching Frequency: 500kHz • Reference accuracy: ±2% 	-40°C to 80°C	SOT-89-5L	AA 2 *	1000PCS/Reel

Note:

- **FH4001** 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.



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 Oct.2021