

1.5MHz 2.0A Synchronous Switch Buck(Step-down) Li-ion Battery Charger

Description

The FH5202 is a 2.0A single cell Li-ion battery charger applied for 5.0V wall adapters. It utilize 1.50MHz synchronous buck (step-down) converter topology to reduce power dissipation and therefore reaches a high efficiency up to 90%.

The FH5202 includes complete charge termination circuitry, automatic recharge, and a 4.2V (±1%) float float voltage. It also has other features include output short-circuit protection, battery temperature monitor, overheating protection, and no blocking diode is required.

The FH5202 is available in SOP-8L / MSOP-8L package with heat sink. Its few external component count makes the FH5202 a high-efficient battery charger ideally suited for portable applications.

Applications

- Cellular Telephones
- MP3 , MP4 Players
- Electronic Dictionaries
- Portable Devices, Chargers
- GPS, Digital Cameras

Typical Application Circuit

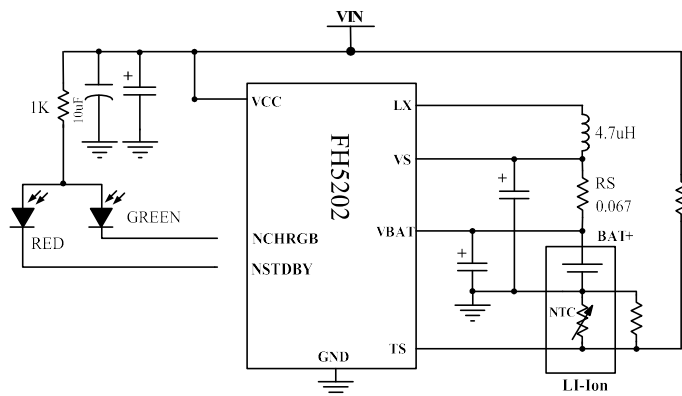
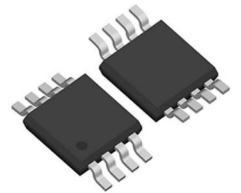


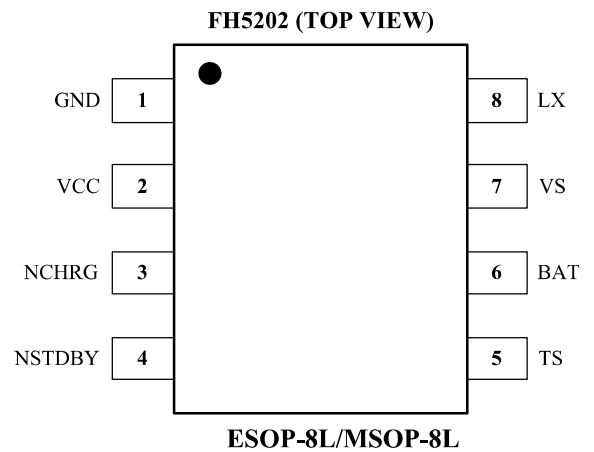
Figure 1. Typical basic application circuit

Features

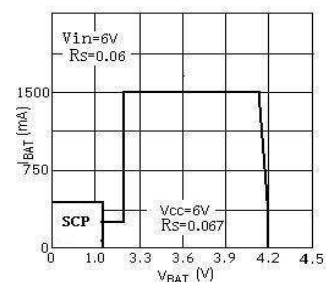
- Fixed Switching Frequency: 1.5MHz
- High Efficiency up to 90%
- Maximum Charge Current: 2.5A
- No External MOSFET or Blocking Diode Required
- Preset 4.20V Charge Voltage with ±1% Accuracy
- Automatic Recharge
- Charge State Pairs of Output, No Battery and Fault Status Display
- C/10 Charge Termination
- 140uA Supply Current in Shutdown
- 2.9V Trickle Charge
- Soft-Start Limits Inrush Current
- Battery Temperature Monitoring
- Short-Circuit Protection
- Available in 8-Pin ESOP/MSOP Package



Pin Configuration



Complete Charge Cycle



Pin Description

Pin	Symbol	Function
1	GND	Ground
2	Vcc	Positive input supply voltage
3	NCHRG	Open-Drain charge status output
4	NSTDBY	Charge terminated status output
5	TS(TEMP)	Chip enable and battery temperature sense
6	BAT	Battery connection Pin
7	VS	Charge current sense
8	LX	Switching

Pin Assignment

GND(Pin 1): Ground.

Vcc (Pin 2): Positive input supply voltage. It provides power to the internal circuit. When VCC drops to within 30mV of the BAT pin voltage, the FH5202 enters low power mode, dropping I_{BAT} to less than $2\mu A$.

NCHRG (Pin 3): Open-Drain charge status output. When the battery is being charged, the NCHRG pin is pulled low by an internal switch to indicate the charge. Otherwise, NCHRG pin is in high impedance state.

NSTDBY(Pin 4): Charge terminated status output. NSTDBY is pulled low by an internal switch to indicate the termination of battery charge. Otherwise NSTDBY pin is in high impedance state.

TS(Pin 5): Chip enable and battery temperature sense input. Connecting TS pin to NTC sensor's output in Lithium ion battery pack. If TEMP pin's voltage is below 45% or above 80% of supply voltage VCC, this means that battery's temperature is too low or too high, charging is suspended. The temperature sense function can be disabled by connecting it to Vcc pin. Grounding TS pin will make the chip disable and terminate the charge.

BAT(Pin 6): Battery connection Pin. Connect the positive terminal of the battery to this pin. Dropping BAT pin's current to less than $2\mu A$ when IC in disable mode or in sleep mode. BAT pin provides charge current to the battery and provides regulation voltage of 4.2V.

VS(Pin 7): Charge current sense pin.

LX(Pin 8): External inductor connecting pin.

2.0A 同步降压型锂电池充电电路

器件概述

FH5202 是一款面向5V 交流适配器的2A 锂离子充电电路。它是采用1.5M Hz固定频率的同步降压型转换器，因此具有高达 90% 以上的充电效率，自身发热量极小。

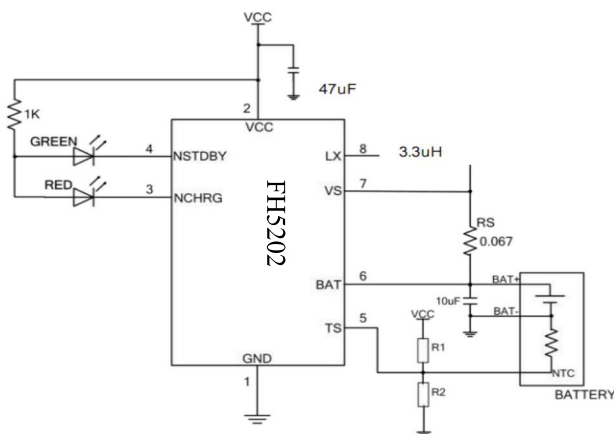
FH 5202 包括完整的充电终止电路、自动再充电和一个精确度达±1% 的4.2V 预设充电电压，内部集成了防反灌保护、输出短路保护、芯片及电池温度保护等多种功能。

FH 5202 采用带散热片的SO P-8L或M SO P-8L封装，并且只需极少的外围元器件，因此能够被嵌入在手持式产品中，作为大容量电池的高效充电器。

最大极限值

- 输入电源电压(Vcc): -0.3V~6.5V
- BAT: -0.3V~7.0V
- LX: -0.3V~7.0V
- VS: -0.3V~7.0V
- NCHRG: -0.3V~8.0V
- NSTDBY: -0.3V~8.0V
- TS: -0.3V~8.0V
- BAT短路持续时间: 连续
- 最大结温: 145°C
- 工作环境温度范围: -40°C~85°C
- 贮存温度范围: -65°C~125°C
- 引脚温度（焊接时间10秒）: 260°C

典型应用



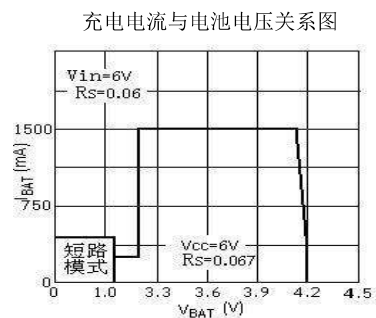
图一、基础应用电路

电气特性

- 1.5M Hz固定开关频率
- 高达90% 以上的输出效率
- 最大2.5A输出电流
- 无需防反灌电流二极管
- 无需外置功率MOS管或续流二极管
- 精度达到±1% 的4.2V 充电电压
- 充电状态双输出、无电池和故障状态显示
- C/10充电终止
- 待机模式下的供电电流为140uA
- 2.9V涓流充电
- 软启动限制了浪涌电流
- 电池温度监测功能
- 输出短路保护功能
- 采用8引脚SO P/M SO P封装

应用领域

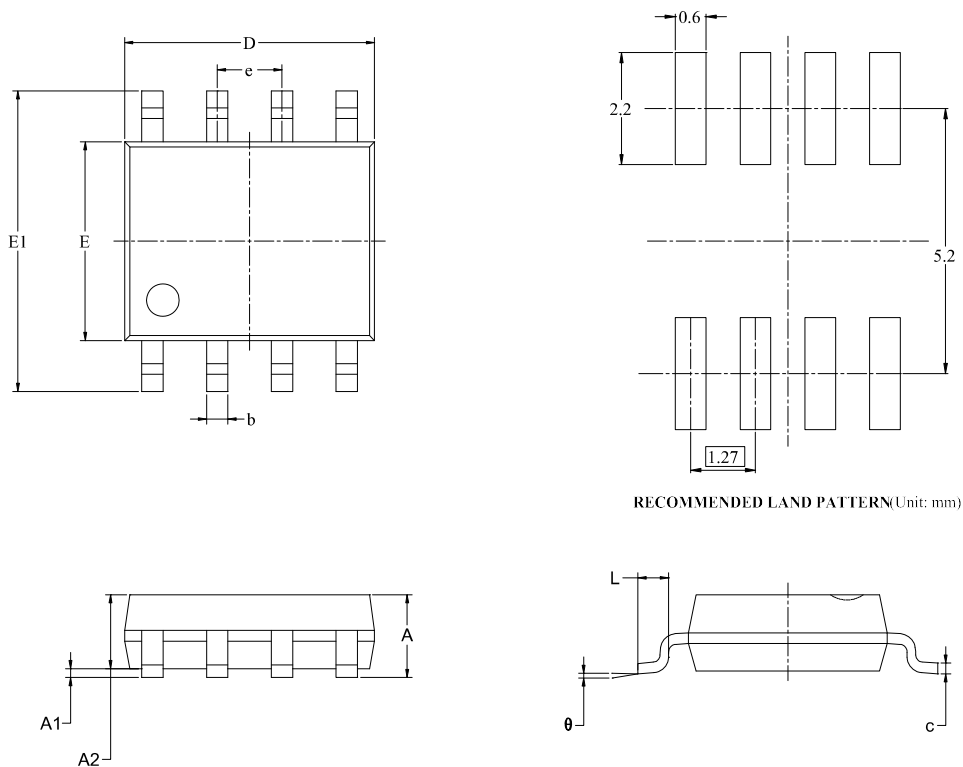
- 移动电话
- 平板电脑
- MP3、MP4播放器
- 数码相机
- 电子词典
- GPS
- 便携式设备、各种充电器



图二

Packaging Information

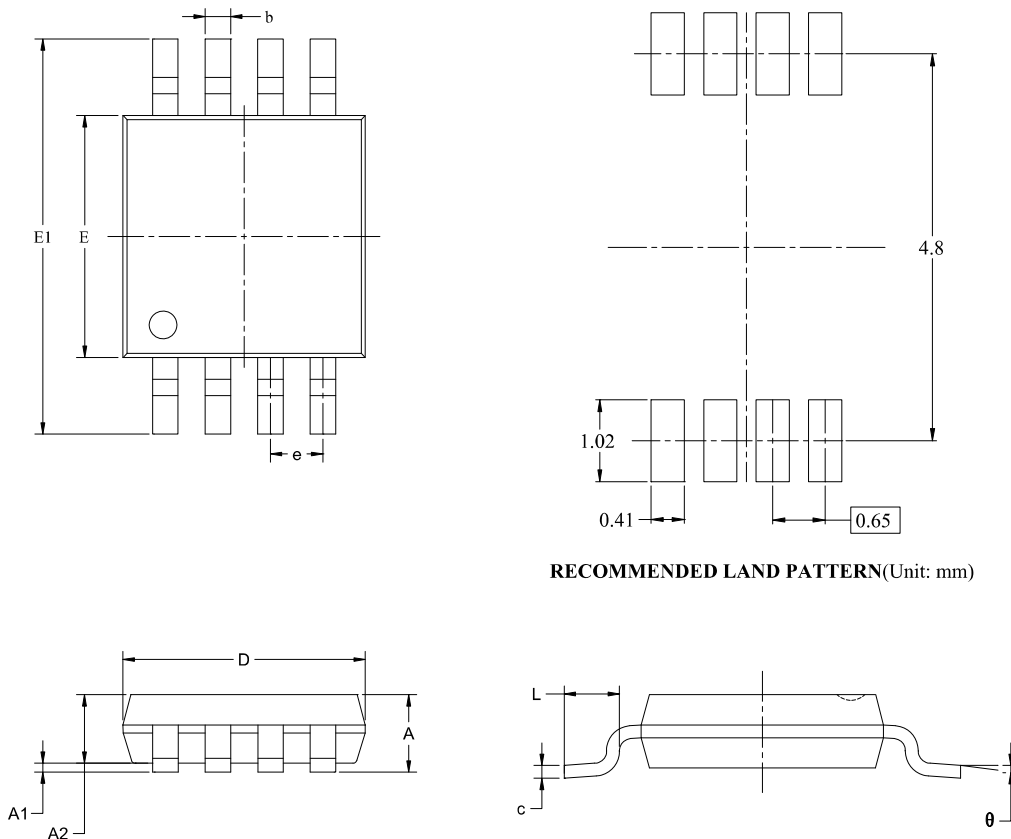
8-Pin SOP Package



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.27 BSC		0.050 BSC	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Packaging Information

MSOP-8L



RECOMMENDED LAND PATTERN(Unit: mm)

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
e	0.650 BSC		0.026 BSC	
L	0.400	0.800	0.016	0.031
θ	0°	6°	0°	6°

ORDERING INFORMATION

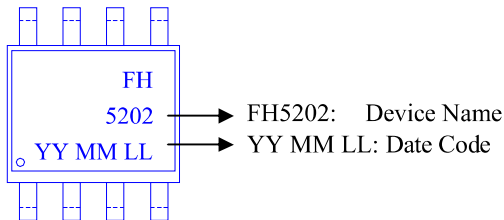
Part Number	Voltage Range	Features	Operating Temperature	Package Type	Top Mark	SPQ
FH5202S8	4.0V ~ 8.0V	<ul style="list-style-type: none"> • Synchronous Buck(Step-down) • 90% Efficiency 	-40°C to 85°C	ESOP-8L	FH5202 <u>YY MM LL</u>	2500PCS/Reel
FH5202MS8	4.0V ~ 8.0V	<ul style="list-style-type: none"> • Charge Current: 2.5A(Max.) • Charge Voltage:4.20V(±1%) • Switch frequency: 1.5MHz 	-40°C to 85°C	MSOP-8L	FH5202S <u>YY MM LL</u>	3000PCS/Reel

Note:

- **FH5202** 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.



Device Name: ESOP-8L/MSOP-8L



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 ForDevices 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 Aug.2019