

Standalone 2.0A Li-Ion DC-DC Buck Switch Mode Battery Charger

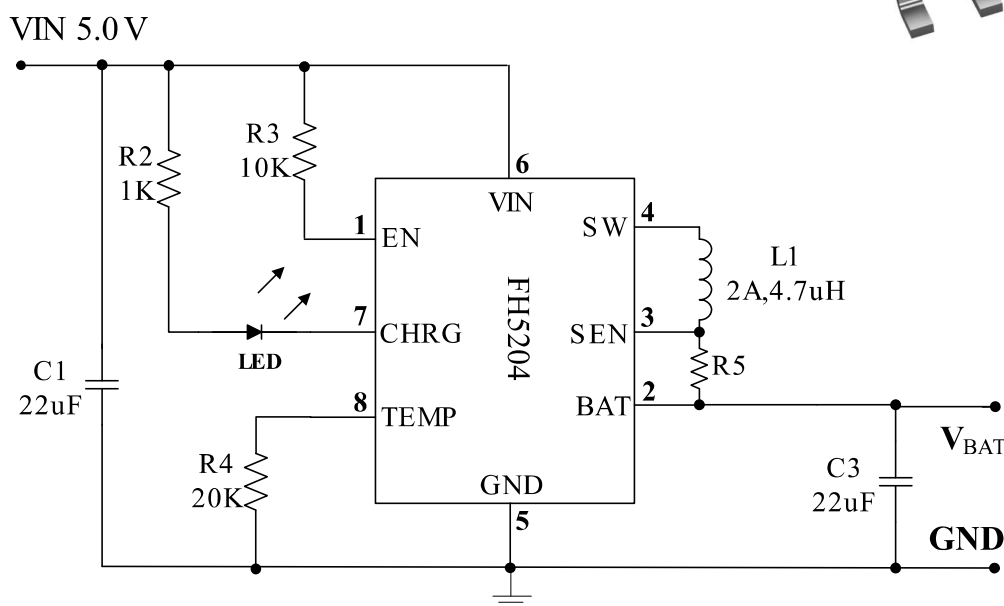
■ General Description

The FH5204 is a complete battery charger controller for one (4.20V/4.34V) cell lithium-ion battery. The FH5204 provides a small, simple and efficient solution to fast charge Li-ion battery. An external sense resistor sets the charge current with high accuracy. An internal resistor divider and precision reference set the final float voltage to 4.20V/4.34V per cell with $\pm 1\%$ accuracy. When the input supply is removed, the FH5204 automatically enters a low current sleep mode, dropping the battery drain current to 1.0 μ A. After the charge cycle ends, If the battery voltage drops below 4.10V/4.15V per cell, a new charge cycle will automatically begin.

■ Typical Applications

- Charging Docks
- Handheld Instrument
- Portable Computers

■ Typical Application Circuit



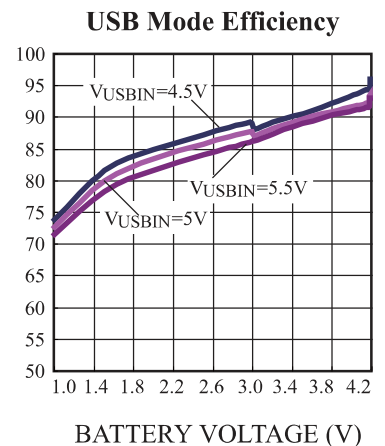
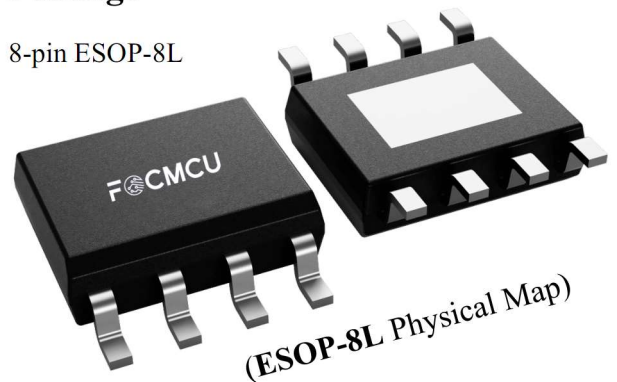
Typical charge cycle (1000mAh battery)

■ Features

- Input Supply Range: 4.7V ~ 5.5V
- High Efficiency Current Mode PWM Controller
- End Charge Current Detection Output
- Constant Switching Frequency for Minimum Noise
- Preset 4.20V/4.34V charge voltage with $\pm 1\%$ accuracy
- Automatic Recharge
- Automatic Shutdown When Input Supply is Removed
- Automatic Trickle Charging of Low Voltage
- Stable with Ceramic Output Capacitor
- Battery Temperature Sensing

■ Package

- 8-pin ESOP-8L



单节 2.0A 开关型锂电池充电管理芯片

■ 器件概述

FH5204 是一款具有恒流恒压充电模式的锂电池充电管理芯片。可以对单节 (4.20V/4.34V) 锂电池进行快速高效地充电。其采用电流模式 PWM 降压型开关控制结构，为锂电池快速充电提供了微型、简单且高效的解决方案。

FH5204 内置防倒灌功能，所以实际应用不需要输入端接二极管防倒灌。大大降低了系统成本。芯片内置过压保护功能，当芯片的 VIN 电压超过6.0V之后，芯片关闭，此时芯片的VIN 端可耐压10.0V。

FH5204 由外部Sense 电阻设定出高精度的充电电流，内部由分压电阻和精准的参考电压将电池的浮充电压设定在 4.20V/4.34V 同时具有高达 $\pm 1\%$ 的精度。当输入电源去掉后，芯片会自动进入低电流休眠模式，电池的漏电流低至 $1.0\mu\text{A}$ 。当充电周期结束后，如果单节电池电压降到4.10V/4.15V 后，芯片将自动重新对电池进行充电。

■ 绝对最大额定值

| 参数 | 范围 | 单位 |
|-----------------------|------------|-----------------------------|
| VIN, CHRG, SW, SEN 电压 | -0.3 ~ 6.0 | V |
| SW脚电流 | 3.8 | A |
| 封装热阻 | 60 | $^{\circ}\text{C}/\text{W}$ |
| 功耗 | 2.0 | W |
| 工作环境温度范围 | -40 ~ 85 | $^{\circ}\text{C}$ |
| 最大结温度 | 150 | $^{\circ}\text{C}$ |
| 储存温度范围 | -55 ~ 150 | $^{\circ}\text{C}$ |
| 引脚温度和时间 | +300 (10S) | $^{\circ}\text{C}$ |

注意：绝对最大额定值是本产品能够承受的最大物理伤害极限值，请在任何情况下勿超出该额定值。

■ 主要特点

- 输入电源电压工作范围：4.7V~5.5V
- 内置防倒灌功能
- 内置过压保护，芯片输入端耐压10.0V
- 内置软启动，防止上电瞬间的大电流过冲
- 高效电流模式PWM降压型开关控制结构
- 充电结束时电流检测输出
- 采用固定开关频率以保证最小的噪声
- $\pm 1\%$ 的充电电压 (4.20V/4.34V) 精度
- 自动再充电
- 输入电源去除自动进入休眠模式
- 电池电压较低时自动进入涓流充电模式
- 采用低ESR的陶瓷电容输出稳定
- 电池温度检测

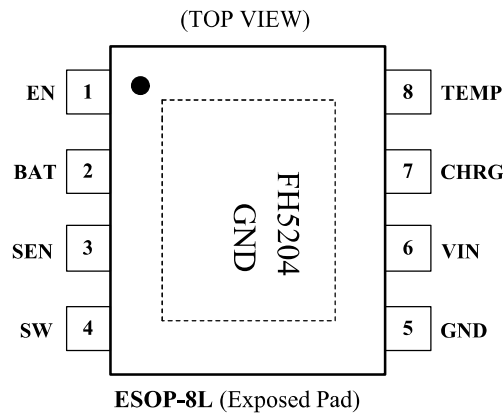
■ 应用领域

- 充电设备
- 便携式笔记本电脑
- 手持设备

■ 封装形式

- 8-pin ESOP-8L

■ Pin Configuration

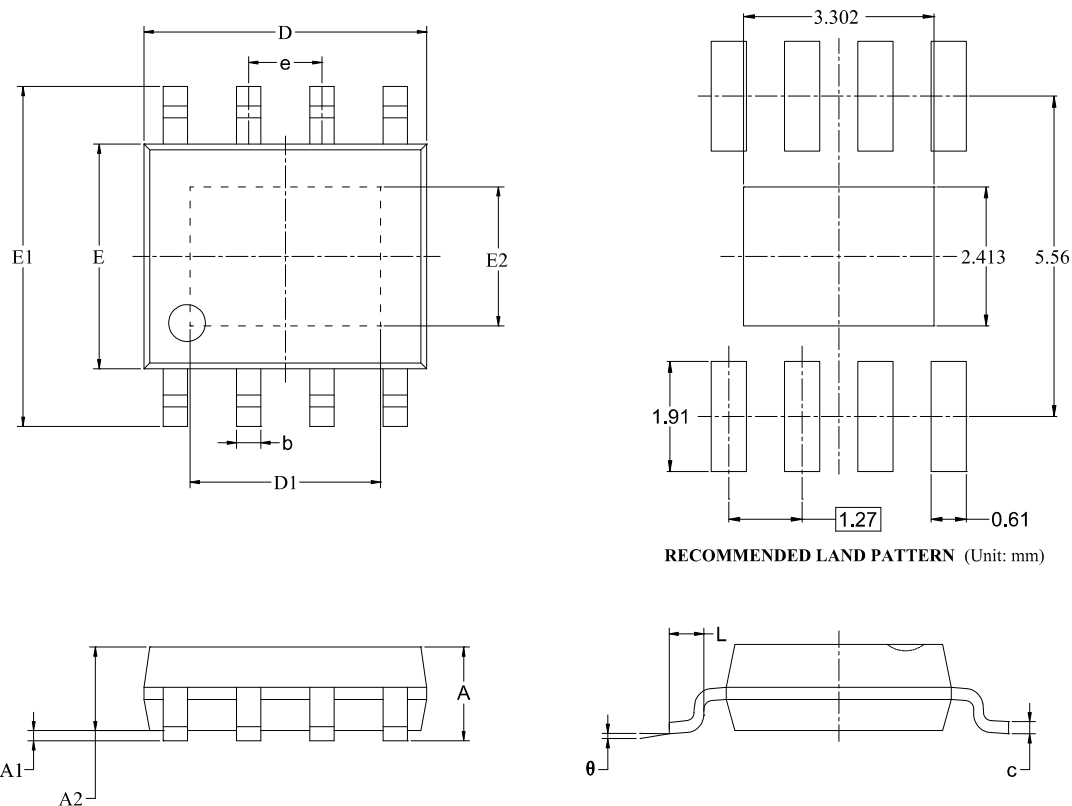


■ Pin Assignment

| Pin Num. | Symbol | Function |
|----------|--------|---|
| 1 | EN | ON/OFF Control |
| 2 | BAT | Feedback Pin. Receives the feedback voltage from an external resistor across the output |
| 3 | SEN | Charge Current program. The output current is set by an external resistor according to the following formula: $I_{OUT} = 125mV/R5$. |
| 4 | SW | Charge Current Output. It provides charge current to the battery and regulates the final float voltage to 4.22V. |
| 5 | GND | Ground |
| 6 | VIN | Positive Supply Voltage Input. VIN can range from 4.7V to 5.5V. A 10 μ F low ESR capacitor is required at the source pins of the power P-channel MOSFET. |
| 7 | CHRG | When the charge current drops below the End-of-Charge threshold for more than 120 μ s, the N-channel MOSFET turns off and a weak current source is connected from the CHRG pin to GND. When the input supply is removed, the weak current source is turned off and the CHRG pin becomes high impedance. |
| 8 | TEMP | Temperature sense. TEMP Thermistor Input. With an external 20K Ω , negative temperature coefficient thermistor to ground, this pin senses the temperature of the battery pack and stops the charger when the temperature is out of range. When the voltage at this pin drops below 540mV at hot temperature or rises above 2.3V at cold temperature, charging is suspended and the internal timer stops. The CHRG pin output is not affected during this hold state. To disable the temperature qualification function, ground the TEMP pin. |

■ Packaging Information

- Packaging Type: **ESOP-8L**



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|------------------------------|-------|-------------------------|-------|
| | MIN | MAX | MIN | MAX |
| A | | 1.700 | | 0.067 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 1.350 | 1.550 | 0.053 | 0.061 |
| b | 0.330 | 0.510 | 0.013 | 0.020 |
| c | 0.170 | 0.250 | 0.007 | 0.010 |
| D | 4.700 | 5.100 | 0.185 | 0.201 |
| D1 | 3.202 | 3.402 | 0.126 | 0.134 |
| E | 3.800 | 4.000 | 0.150 | 0.157 |
| E1 | 5.800 | 6.200 | 0.228 | 0.244 |
| E2 | 2.313 | 2.513 | 0.091 | 0.099 |
| e | 1.27 BSC | | 0.050 BSC | |
| L | 0.400 | 1.270 | 0.016 | 0.050 |
| θ | 0° | 8° | 0° | 8° |

Ordering Information

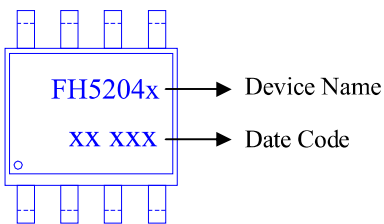
| Part Number | Float Voltage | Operating Ambient Temperature Range | Package | Top Mark | SPQ |
|-------------|---------------|-------------------------------------|---------|------------------|--------------|
| FH5204AS08 | 4.20V | -40 ~ +85°C | ESOP-8L | FH5204A ** ** | 3000PCS/Reel |
| FH5204DS08 | 4.34V | | | FH5204D ** ** | |

Note:

- FH5204 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**



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.



Note:

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➤ Update by Nov.2019