700mA Li-Ion, 4.35V Charge Voltage, Linear Charger Management Controllers

Datasheet Brierf

PRELIMINARY DATASHEET

Product Overview

The FH5101 devices is a complete constant-current/ constant-voltage linear charger for single cell lithium-ion batteries. Its package and low external component count make the FH5101 ideally suited for portable applications. Furthermore, the FH5101 is specifically designed to work within USB power specifications.

No external sense resistor is needed, and no blocking diode is required due to the internal MOSFET architecture. The charge voltage is fixed at 4.35V, and the charge current can be programmed externally with a single resistor.

The FH5101 automatically terminates the charge cycle when the charge current drops to 1/10th(C/10) the programmed value after the final float voltage is reached.

The FH5101 converters are available in the industry standard SOT-23-5L power packages (or upon request).

Key Features

- Maximum operating voltage 7.0V
- Programmable Charge Current up to 700mA
- No MOSFET, Sense Resistor or Blocking Diode Required
- Constant-Current/Constant-Voltage operation with Thermal Regulation to Maximize Charge Rate
- Charges #1-Cell Li-Ion Batteries Directly from USB Port
- Preset 4.35V Charge Voltage with 1% Accuracy
- Automatic Recharge
- C/10 charge termination
- 2.9V Trickle Charge Threshold
- Soft-Start limits inrush current
- Available in 5-Lead SOT-23 Package

Application

- Charger for Li-Ion Coin Cell Batteries
- Multifunction Wristwatches
- Charging Docks and Cradles
- Bluetooth Applications

Simplified Application Circuit

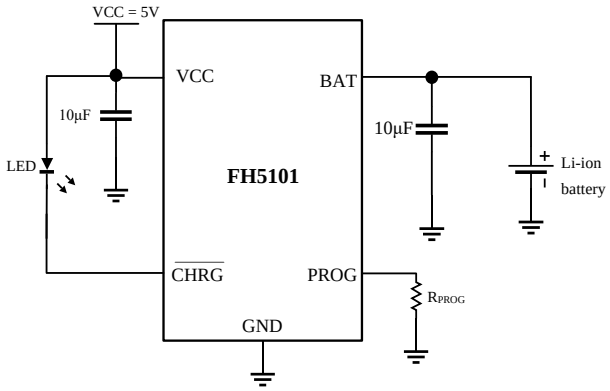
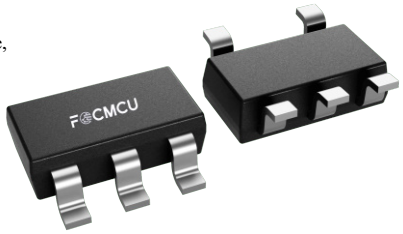


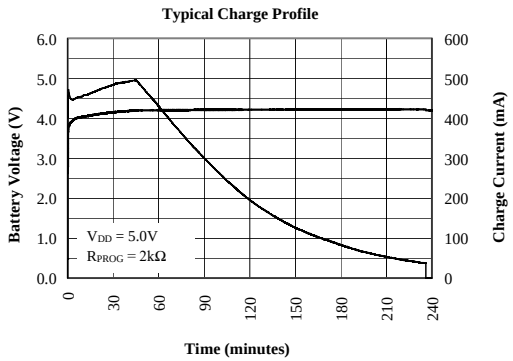
Figure 1. Basic Application Circuits

Note

※ $I_{BAT} = (V_{PROG} / R_{SET}) \cdot 900$.

※ When charging in constant-current mode, the V_{PROG} is usually 1.0V.



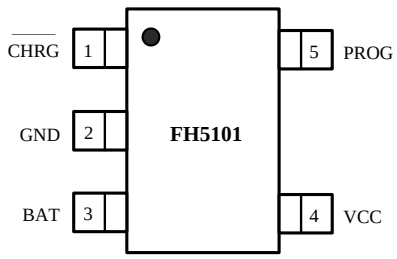


Device Information (1)

PART NUMBER	PACKAGE	BODY SIZE (NOM)
FH5101PM5	SOT-23 (5L)	2.80mm × 1.50mm

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

Pin Configuration



PIN	NAME	DESCRIPTION
1	CHRG	Open-Drain Charge Status Output
2	GND	Ground
3	BAT	Charge Current Output
4	VCC	Positive Input Supply Voltage
5	PROG	Charge Current Program

Pin Functions

$\overline{\text{CHRG}}$ (Pin 1)	Open-Drain Charge Status Output. When the battery is being charged, the CHRG pin is pulled low by an internal N-channel MOSFET. When the charge cycle is completed or reverse battery lockout / No AC is detected, CHRG is forced high impedance.
GND (Pin 2)	Ground.
BAT (Pin 3)	Charge Current Output. It should be bypassed with at least a 1.0μF capacitor. It Provides charge current to the battery and regulates the final float voltage to 4.35V. An internal precision resistor divider from this pin sets the float voltage which is disconnected in shutdown mode.
VCC (Pin 4)	Positive Input Supply Voltage. It provides power to the charger. VCC can range from 4.5V to 6.5V and should be bypassed with at least a 1.0μF capacitor.
PROG (Pin 5)	Charge Current Program, Charge Current Monitor and Shutdown Pin. The charge current is programmed by connecting a 1% resistor, R_{PROG}, to ground. When charging in constant-current mode, this pin servos to 1.0V. In all modes, the voltage on this pin can be used to measure the charge current using the following formula: $I_{BAT} = (V_{PROG} / R_{SET}) \bullet 900$ The PROG pin can also be used to shut down the charger. Disconnecting the program resistor from ground, the charger enters shutdown mode. Reconnecting R_{PROG} to ground will return the charger to normal operation.

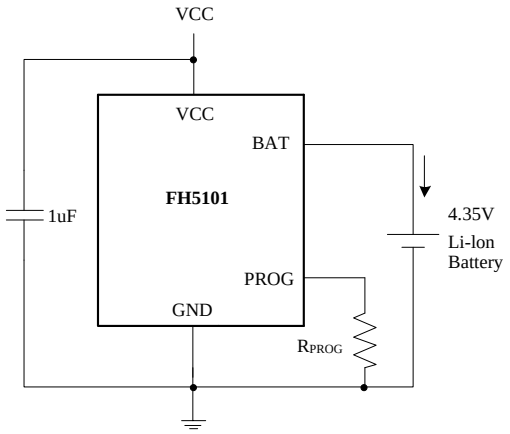
器件概述

FH5101 是一款耐压 7V 的单节锂电池充电 IC，兼容 10mA~700mA 的充电电流。采用低压超小电流，涓流，恒流，恒压充电方式，可以使用 USB 电源和适配器电源工作。

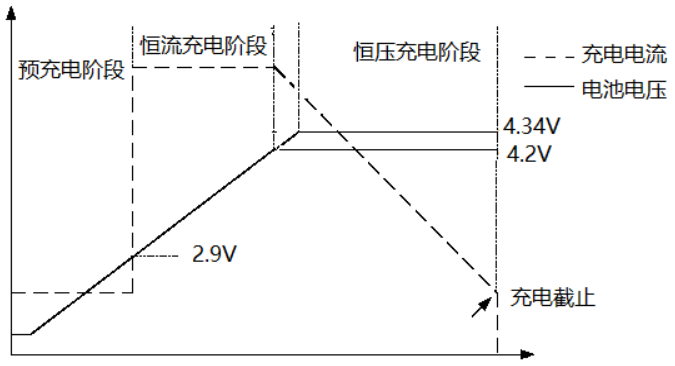
FH5101 连接电源之后，通过软起动进入工作状态，充电电流可以通过外接电阻进行设置。当电池电压达到预设电压之后，充电电流降至设定值的 1/10，达到选择的充满电压后，将自动停止充电。

FH5101 内置的高温反馈电路可在高温时对充电电流进行自动调节，以便在大功率工作或高环境温度条件下对芯片工作电流加以限制，防止过温。当输入断开时 (输入电压为 0 或低压)，FH5101 会自动进入低功耗模式，本身功耗会小于 1uA。CHRG 引脚会提示是否处于充电状态。

典型应用电路图



充电过程示意图



电气特性

- 工作电压 7.0V
- 超低功耗：输入断开或低压 TYP 0.2uA
- 充电终止电压：4.35V
- 充电终止电压精度：±1%精度
- 10mA~700mA 可调充电电流
- 恒流恒压切换
- 涓流充电阈值：2.9V
- C/10 终止充电
- 软启动功能限制浪涌电流
- 自动再充电功能
- 内部热反馈保护功能,控制系统在合理充电范围
- 无需 MOSFET，检测电阻或隔离二极管
- 充电状态 LED 输出，无电池和故障状态显示
- 采用 SOT-23-5L 封装形式

应用领域

- TWS 无线耳机和蓝牙耳机
- 智能手表，智能手环
- 其他穿戴和手持便携产品
- 单节锂电池产品

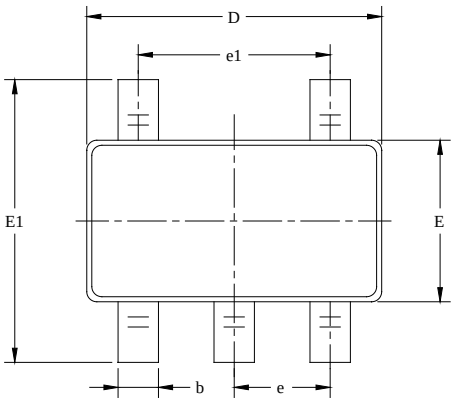
工作原理

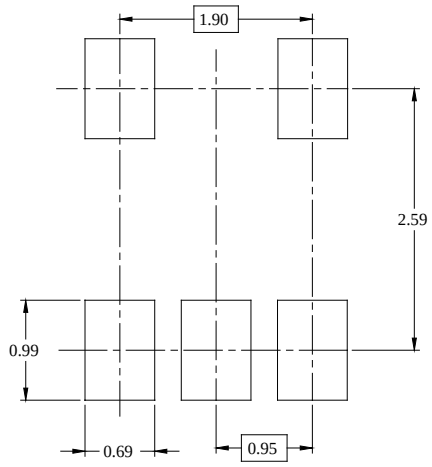
FH5101 是一款可以为单节锂离子电池进行恒定电流/恒定电压充电的线性充电芯片。它能够提供高达 700mA 的充电电流和±1%精度的浮充电压。FH5101 集成了一个内部功率 MOSFET 及热调节电路，无需隔离二极管或外部电流检测电阻。FH5101 可以由输入端连接 USB 电源对锂电池进行充电，充电时最少仅需一个外部元器件。

注：本页内容依据英文内容翻译引述，可以存在有表述不准确之处，如有疑问请以英文为准。

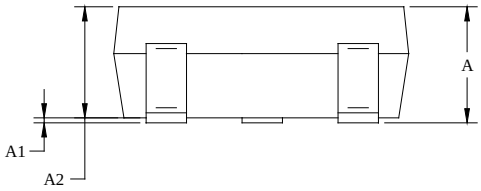
PACKAGE OUTLINE DIMENSIONS

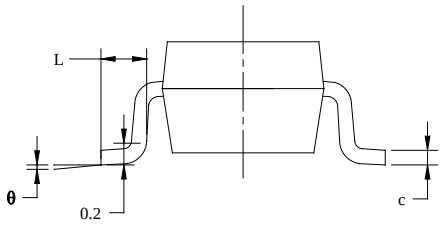
SOT-23-5L





RECOMMENDED LAND PATTERN (Unit: mm)





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°

ORDERING INFORMATION

Part Number	Input Voltage	Output Function	Operating Temperature	Package Type	Top Mark	SPQ
FH5101PM5	4.5V ~ 6.0V	● Linear charger for Li-ion batteries ● Charge Current: 700mA ● Preset 4.35V Charge Voltage with ±1% Accuracy ● 2.9V Trickle Charge Threshold ● C/10 charge termination	-40°C to +85°C	SOT-23-5L	He5 Y M L T1B Y M L	3000EA/Reel

Note:

- **FH5101** 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.
- FOCMCU Inc. reserves the right to amend and legally interpret the electrical parameters of this chip device. (http://www.fordevices.com)

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 Sep.2025