800mA Li-Ion, 9.0V Input Voltage Battery Linear Charger

Description

FH4064 is a complete constant-current/constant voltage linear charger for single cell lithium-ion batteries. Furthermore the FH4064 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 PMOSFET architecture. Thermal feedback regulates the charge current to limit the die temperature during high power operation or high ambient temperature. The charge voltage is fixed at 4.20V, and the charge current can be programmed externally with a single resistor. The FH4064 automatically terminates the charge cycle when the charge current drops to 1/10th the programmed value after the final float voltage is reached.

When the input supply (wall adapter or USB supply) is removed the FH4064 automatically enters a low current state dropping the battery drain current to less than 2.0μA.The FH4064 can be put into shutdown mode reducing the supply current to 55.0μA.

Other features include charge current monitor, undervoltage lockout, automatic recharge and a status.

Package

- 5-pin SOT-23-5L (Pre-order is required)
- 6-pin DFN2*2-6L

Features

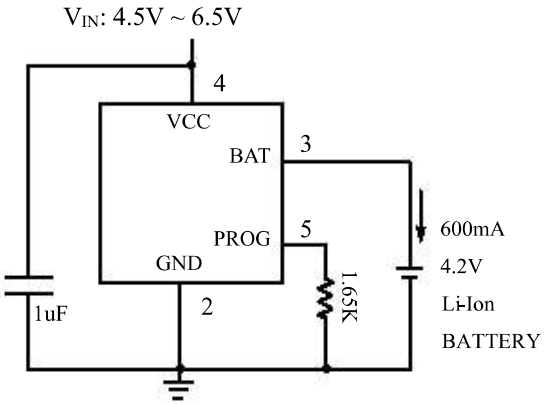
- Maximum operating voltage 9.0V, improve system reliability
- Protection of battery cell reverse connection
- No MOSFET sense resistor or blocking diode required
- Complete Linear Charger in ThinSOT and DFN Package for Single Cell Lithium-Ion Batteries
- Constant-Current/Constant-Voltage operation with thermal regulation to maximize Rate Without risk of overheating.
- Preset 4.2/4.34V charge voltage with ±1% accuracy
- Automatic Recharge
- Charges Single Cell Li-Ion Batteries Directly from USB Port
- C/10 charge termination
- 55μA supply current in shutdown
- 2.9V trickle current charge threshold
- Soft-Start limits inrush current
- Charge Status Output Pin

Typical Application

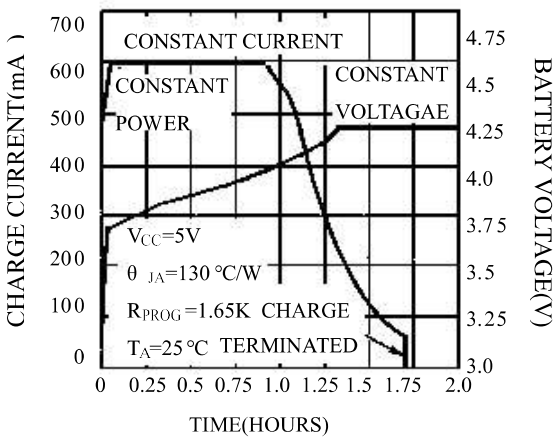
- Cellular Telephones, PDAs, MP3 Players
- Charging Docks and Cradles
- Bluetooth Applications

Typical Application Circuit

Mainly used in Cellular telephones, MP3, MP4 players, digital still cameras, electronic dictionary, GPS, portable devices and vary chargers.

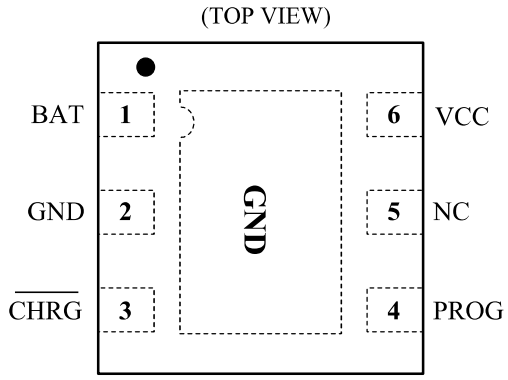


600mA Single Cell Li-Ion Charger

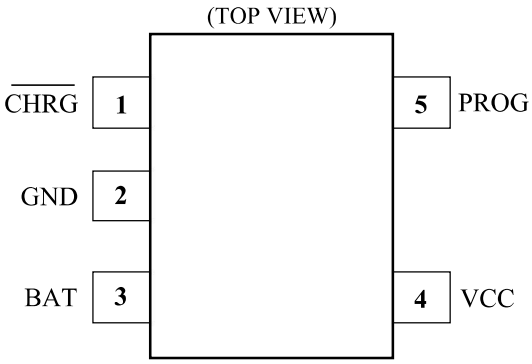


Typical charge cycle (750mAh batter)

■ Pin Configuration



DFN-2×2-6L (Top View)



SOT-23-5L (Top View)

■ Pin Assignment

Pin Number		Symbol	Function
SOT-23-5L	DFN2*2-6L		
1	3	**$\overline{\text{CHRG}}$**	**Open-Drain charge status output** When the battery is being charged, the $\overline{\text{CHRG}}$ pin is pulled low by an internal switch, otherwise, $\overline{\text{CHRG}}$ pin is in high impedance state.
2	2	**GND**	**Ground**
3	1	**BAT**	**Battery connection Pin** Connect the positive terminal of the battery to this pin. Dropping BAT pin's current to less than 2.0μA when IC in disable mode or in sleep mode. BAT pin provides charge current to the battery and provides regulation voltage of 4.2V/4.34V.
4	6	**VCC**	**Positive input supply voltage** Provides power to the internal circuit. When V_{CC} drops to within 80mV of the BAT pin voltage, the FH4064 enters low power sleep mode, dropping I_{BAT} to less than 2.0μA.
5	4	**PROG**	**Constant Charge Current Setting and Charge Current Monitor Pin** The charge current is programmed by connecting a resistor R_{PROG} from this pin to GND. When in precharge mode, the PROG pin's voltage is regulated to 0.1V. When charging in constant-current mode this pin's voltage is regulated to 1.0V. In all modes during charging, the voltage on this pin can be used to measure the charge current using the following formula: $I_{BAT}=\frac{V_{PROG}}{R_{PROG}}*1100$
	5	**NC**	No function pins

最大电流 800mA 耐压 9.0V 的锂电池充电管理芯片

■ 器件概述

FH4064 是一款耐压9.0V的单节锂离子电池恒压恒流充电管理芯片,最大充电电流可达800mA。由于线性充电器在输入和输出大压差情况下会严重发热, 其内部有热反馈电路可以对在充电过程中对芯片温度加以控制,将充电电流调节到较低水平,以适应相应的系统散热要求。采用SOT-23-5L和带有散热PAD的DFN2*2-6L封装形式，外加很少的外部原件，使其成为便携应用的理想选择。

FH4064 不需要电流检测电阻，也不需要外部隔离二极管实现防倒灌应用。充电截止电压固定在4.2/4.34V,充电电流可以外接电阻调节，当充电电流达到恒流电流的1/10时，FH4064 将终止充电。

当输入电压（适配器或USB）被拿掉后，FH4064 进入睡眠模式。芯片内部自动关断充电通路，输入电压变低。此时电池漏电流降低到2.0uA以下。当FH4064 有电源而电池拿掉时，芯片电流为降低至55uA，来降低系统损耗。

FH4064 还具有电池温度检测，输入欠压锁定，自动再充电和两个充电指示引脚。

■ 主要特点

- 最高工作电压到9.0V,提高系统可靠性
- 可编程充电电流可达800mA
- 防电池反接保护功能
- 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
- 采用SOT-23-5、DFN2*2-6封装的单节完整线性充电器
- 恒流恒压切换
- 精度可达±1%的4.2V、4.34V固定充电截止电压
- 自动再充电功能
- 充电状态双输出，无电池和故障状态显示
- C/10 终止充电
- 待机电流55.0μA
- 2.9V 涓流切换阈值
- 软启动限制浪涌电流
- 电池温度监测功能

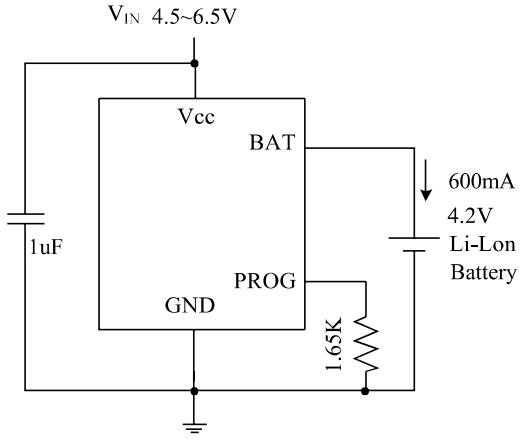
■ 封装结构

- 6 - pin DFN2*2-6L
- 5-pin SOT-23-5L

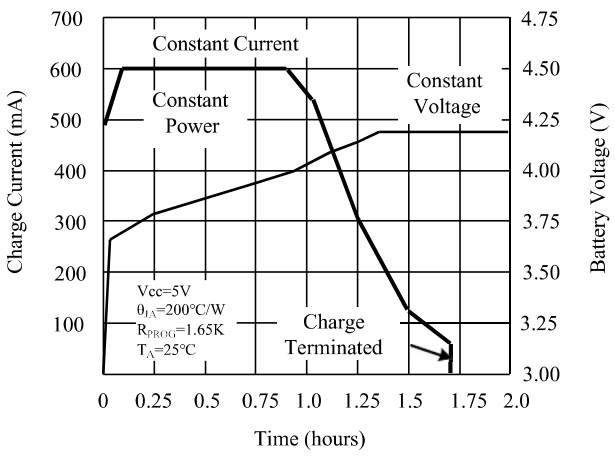
■ 应用领域

- 移动电话
- 数码相机
- MP3，MP4播放器
- 蓝牙应用
- 便携设备
- USB电源，适配器

典型充电周期图



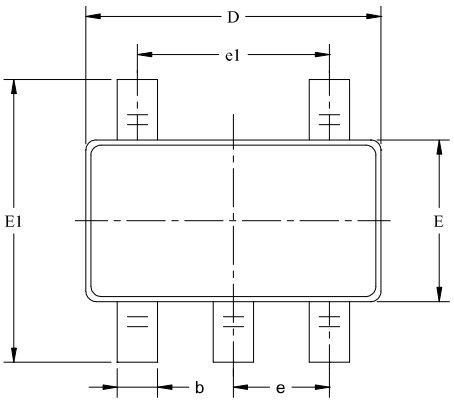
600mA Single Cell Li-Ion Charger

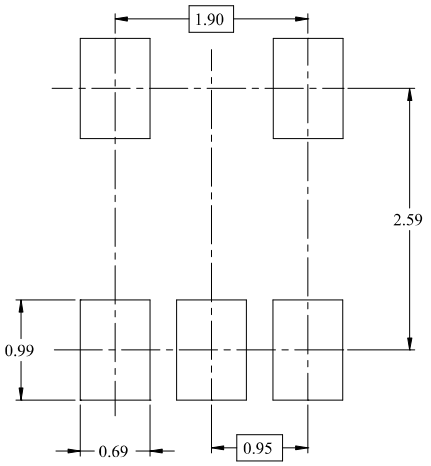


Typical charge cycle (750mAh batter)

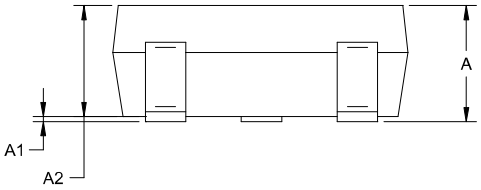
■ Package Information

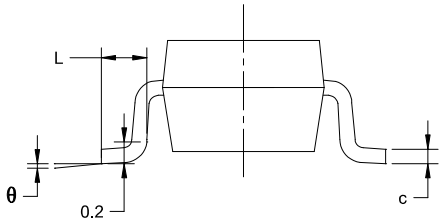
- Package Type: **SOT-23-5L**





RECOMMENDED LAND PATTERN (Unit: mm)

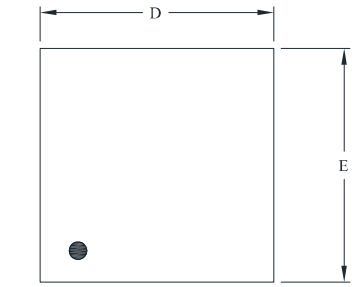




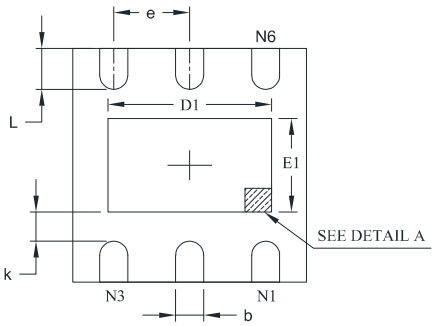
DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	1.05	1.45	0.0413	0.0571
A1	0	0.15	0.0000	0.0059
A2	0.9	1.3	0.0354	0.0512
A3	0.6	0.7	0.0236	0.0276
b	0.25	0.5	0.0098	0.0197
c	0.1	0.23	0.0039	0.0091
D	2.82	3.05	0.1110	0.1201
e1	1.9(TYP)		0.0748(TYP)	
E	2.6	3.05	0.1024	0.1201
E1	1.5	1.75	0.0512	0.0689
e	0.95(TYP)		0.0374(TYP)	
L	0.25	0.6	0.0098	0.0236
L1	0.59(TYP)		0.0232(TYP)	
θ	0	8°	0.0000	8°
c1	0.2(TYP)		0.0079(TYP)	

■ Package Information

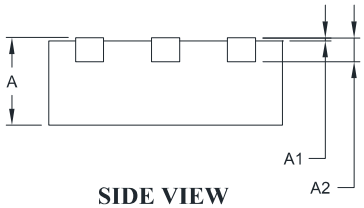
- Package Type: **DFN2*2-6L**



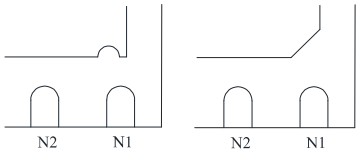
TOP VIEW



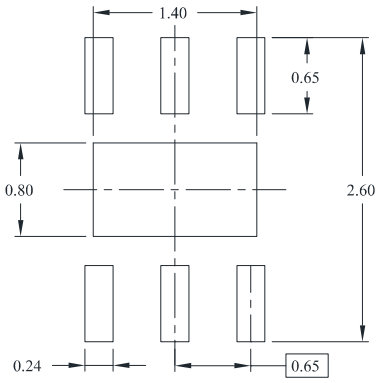
BOTTOM VIEW



SIDE VIEW



DETAIL A



RECOMMENDED LAND PATTERN (Unit: mm)

Pin #1 ID and Tie Bar Mark Options

NOTE: The configuration of the Pin #1 identifier is optional, but must be located within the zone indicated.

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A2	0.203 REF		0.008 REF	
D	1.900	2.100	0.075	0.083
D1	1.100	1.450	0.043	0.057
E	1.900	2.100	0.075	0.083
E1	0.600	0.850	0.024	0.034
k	0.200 MIN		0.008 MIN	
b	0.180	0.300	0.007	0.012
e	0.650 TYP		0.026 TYP	
L	0.250	0.450	0.010	0.018

■ Ordering Information

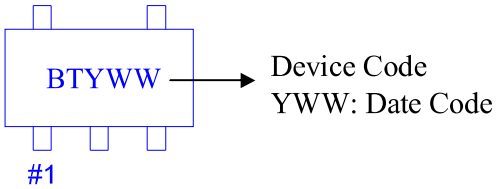
Part Number	Float voltage	Operating ambient temperature	Package Type	Top Mark	SPQ
FH4064AM5	V_{FLOAT} = 4.20V	-40 ~ 85°C	M5: SOT-23-5L	B T * *	3000PCS/Reel
FH4064AN6	V_{FLOAT} = 4.20V		N6: DFN2*2-6L	B 7 * *	3000PCS/Reel
FH4064DN6	V_{FLOAT} = 4.34V		N6: DFN2*2-6L	B 8 * *	3000PCS/Reel

Note:

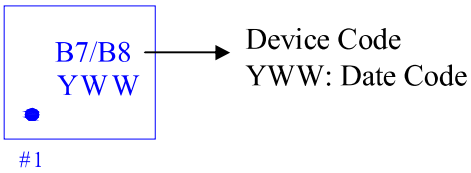
- FH4064 devices are Pb-free and RoHs compliant.
- The surface prints of our semiconductor devices are subject to change during the production process and do not involve changes in electrical parameters, and we will not separately state the notice.
- If you have any other custom purchase needs, please contact our sales department.

■ Marking Information

Device Name: SOT-23-5L



Device Name: DFN2x2-6L



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 Oct.2019