Single Li-ion Battery Charger With Thermal Regulation

Description

The FH4066 is a complete constant-current / constant-voltage linear charger for single cell Li-ion battery.Its Thin SOP package and low external component count make the FH4066 ideally suited for portable applications.

No external sense resistor is needed , and no blocking diode is required due to the internal MOSFET 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 FH4066 automatically terminates the charge cycle when the charge current drops to $1/10^{th}$ the programmed value after the final float voltage is reached.

When the input supply is removed, the FH4066 automatically enters a low current state, dropping the battery drain current to less than 0.1μA.

Other features include charge current monitor, under-voltage lockout, automatic recharge and a status pin to indicate charge termination and the presence of an input voltage.

Applications

- Charger
- Digital products
- Cellular phone

Features

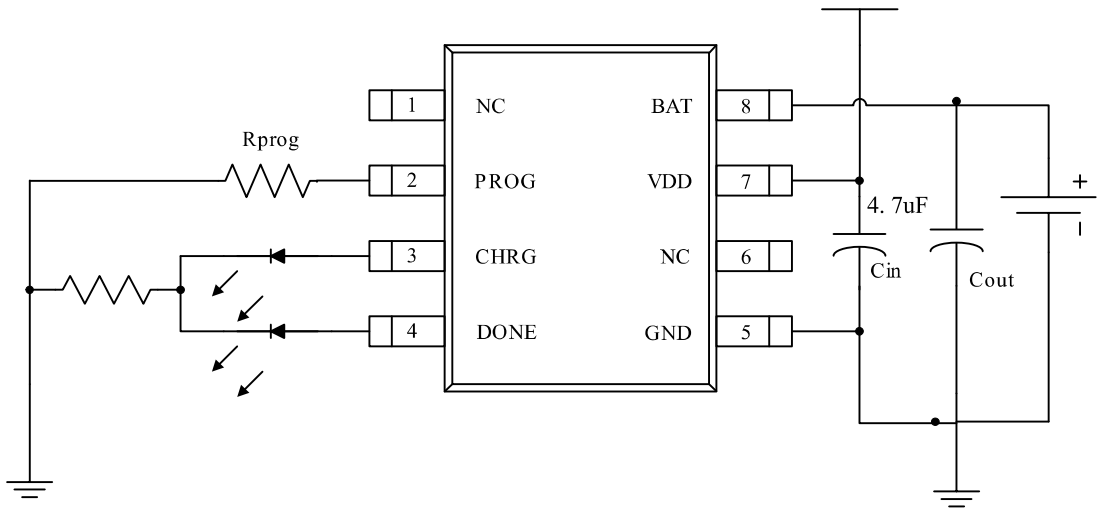
- Programmable charge current up to 800mA
- No MOSFET, sense resistor or blocking diode required
- Complete linear charger in thin SOP package for single cell Li-ion battery
- Constant-current/constant-voltage operation with thermal regulation to maximize charge rate without risk of overheating
- Preset 4.20V charge voltage
- Voltage accuracy of ±1%
- Charge current monitor output for gas gauging
- Automatic recharge
- Charge status output pin
- 6.80V input over-voltage protection
- C/10 charge termination
- 25μA supply current in shutdown
- 2.9V trickle charge threshold
- Soft-start limits inrush current

Package

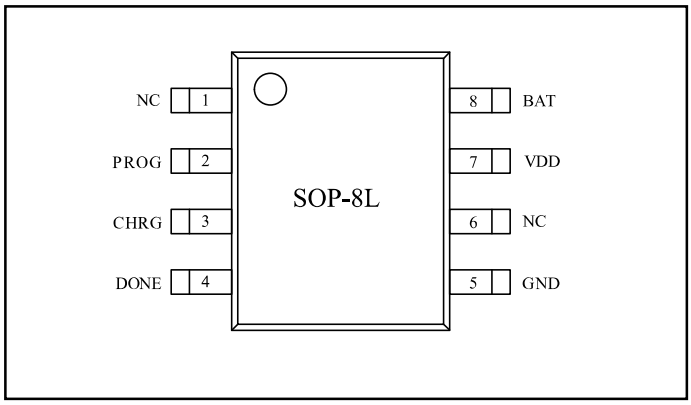
- SOP-8L

Typical Application Circuit

- **Basic circuit**



■ Pin Assignment



Pin Number	Pin Name
1	NC
2	PROG
3	CHRG
4	DONE
5	GND
6	NC
7	VDD
8	BAT

■ Pin Function

Pin Number	Pin Name	Description
1	NC	Not connect.
2	PROG	Charge current program, charge current monitor and shutdown pin. The charge current is programmed by connecting a 1% resistor, RPROG to ground. When charging in constant-current mode, this pin servos to 1V. In all modes, the voltage on this pin can be used to measure the charge current using the following formula: IBAT = (VPROG / RPROG) × 1000 The PROG pin can also be used to shutdown the charger. Disconnecting the program resistor from ground allows a 3μA current to pull the PROG pin high.
3	CHRG	CMOS charge status output. When the battery is charging, the CHRG pin is high. When the charge cycle is completed or other abnormal situation occurs, the CHRG is set in high impedance state.
4	DONE	Full indication output. When fully charged, DONE port is placed in high position. In the charging process or other abnormal situation occurs, the DONE is set in high impedance state.
5	GND	Ground.
6	NC	Not connect.
7	VDD	Positive input supply voltage. Provides power to the charger. VCC can range from 3.8V~6.8V and should be bypassed with at least a 1μF capacitor.
8	BAT	Charge current output. Provides charge current to the battery and regulates the final float voltage to 4.20V.

Application Information

- **Charge current design**

  FH4066 charge current is set by an external resistor. $I_{CHRG} = 1000/R_{PROG}$, If R_{PROG}=2K, the charging current is 500mA.

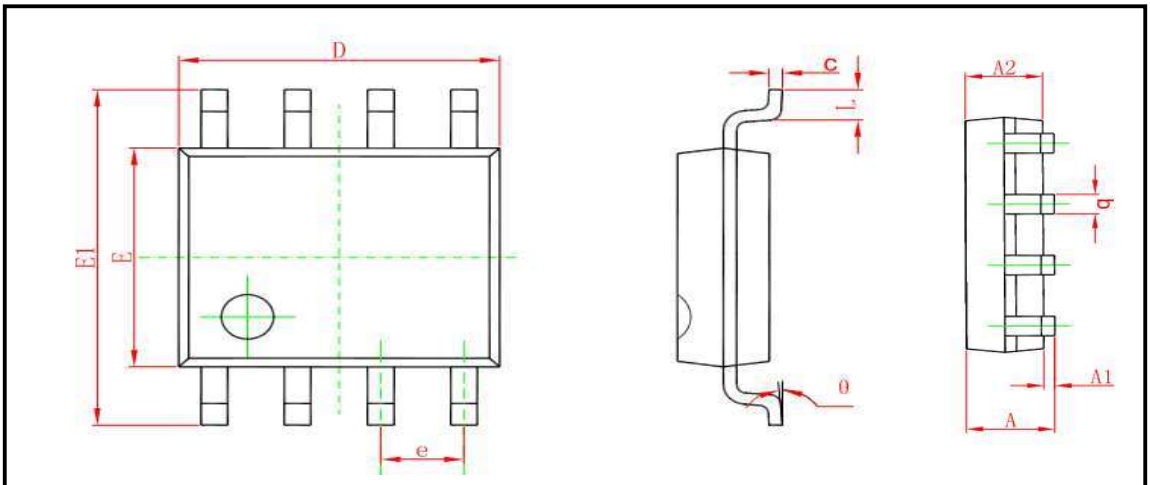
- **Status Indication**

  FH4066 has 2LEDs for status indication. The following table indicates the corresponding relationship for the state:

Pin Name	Charge Mode	Charge Full, Not Connect	Protection
CHRG	Light	Off	Off
DONE	Off	Light	Off

Package Information

- **SOP-8L**



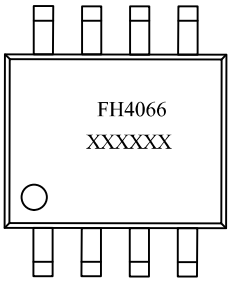
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050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

■ Ordering Information

Part Number	Description	Packaged	SPQ	Device Orientation	
FH4066S08	Preset 4.20V charge voltage C/10 charge termination Voltage accuracy of ±1%	SOP-8L	2500pcs	R	Embossed tape: Standard feed
				L	Embossed tape: Reverse feed

■ Marking Rule

- **SOP-8**



Note:

The first row of the product name,

the second and third rows of the internal regulations of the lot number,

wafer number and the internal product characteristics, and other information.

Update by Dec-2015