4.0A / Standalone 3#Cell Li-ion Battery Charger

Descriptions

The FH5406 is a PWM switch mode lithium-ion battery charger controller for 3 cell li-ion battery in a small package using few external components.

The FH5406 is specially designed for charging lithium-ion batteries with constant current and constant voltage mode. In constant voltage mode, the regulation voltage can be at 12.6V with ±1% accuracy, also can be adjusted upwards with an external resistor. The constant charging current is programmable with a single current sense resistor.

Deeply discharged batteries are automatically trickle charged at 17.5% of the programmed constant charging current until the cell voltage exceeds 66.5% of constant voltage. The charge cycle is terminated once the charging current drops to 16% of full-scale current,and a new charge cycle automatically restarts if the battery voltage falls below 95.5% of regulation voltage. FH5406 will automatically enter sleep mode when input voltage is lower than battery voltage.

Other features include under voltage lockout, battery over voltage protection, status indication, etc.

FH5406 is available in a space-saving SSOP-10 package.

Features

- Wide Input Voltage: 6.6V to 30.0V
- Complete Charge Controller for single cell Li-ion Battery
- Charge Current Up to 4.0A
- High PWM Switching Frequency: 300KHz
- Regulation Voltage can be adjusted upward
- Constant Voltage Accuracy: ±1%
- Charging Current is programmed with a current sense resistor
- Automatic Conditioning of Deeply Discharged Batteries
- Automatic Recharge
- Charging Status Indication
- Soft Start
- Battery Overvoltage Protection
- Operating Ambient Temperature −40℃ to +85℃
- Available in 10-Pin SSOP Package
- Pb-free, Rohs-Compliant, Halogen Free

Applications

- Hand-held Equipment
- Battery-Backup Systems
- Portable Industrial and Medical Equipment
- Standalone Battery Chargers

Absolute Maximum Ratings

Voltage from VCC, VG, DRV, CHRG, DONE to GND	−0.3V to 33V
Voltage from VG to VCC	−8V to VCC+0.3V
Voltage from CSP, BAT, FB to GND	−0.3V to 25V
Voltage from COM to GND	−0.3V to 6.5V
Storage Temperature	−65℃ to 150℃
Operating Ambient Temperature	−40℃ to 85℃
Lead Temperature(Soldering, 10 seconds)	260℃

Stresses beyond those listed under 'Absolute Maximum Ratings' may cause permanent damage to the device.

These are stress ratings only and functional operation of the device at these or any other conditions above those indicated in the operational sections of the specifications is not implied.

Exposure to Absolute Maximum Rating Conditions for extended periods may affect device reliability.

Typical Application Circuit

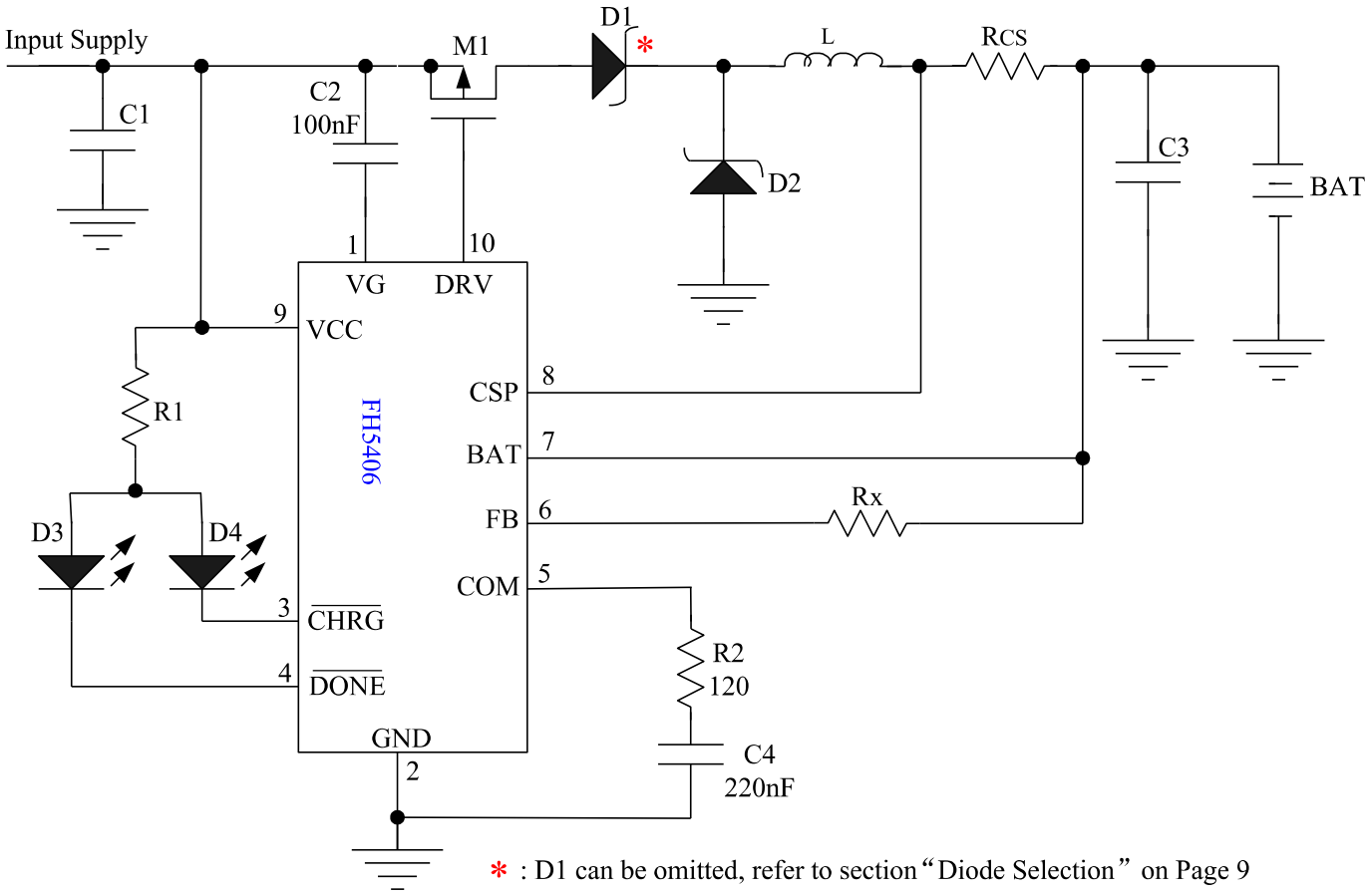
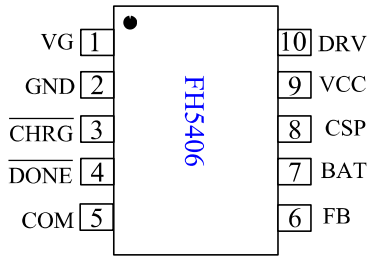


Figure.1 Typical Application Circuit

Pin Assignment



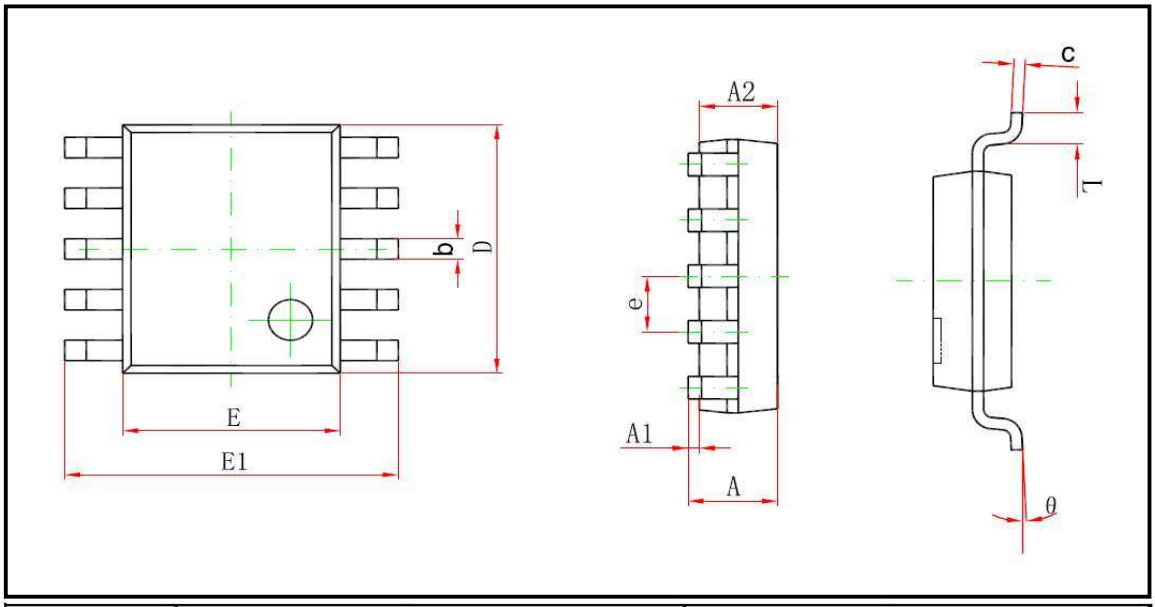
SSOP-10L

Pin Description

Pin No.	Name	Descriptions
1	VG	**Internal Voltage Regulator.** VG internally supplies power to gate driver, connect a 100nF capacitor between VG pin and VCC pin.
2	GND	**Ground.** Negative terminal of input supply.
3	$\overline{\text{CHRG}}$	**Open-Drain Charge Status Output.** When the battery is being charged, this pin is pulled low by an internal switch. Otherwise this pin is in high impedance state.
4	$\overline{\text{DONE}}$	**Open-Drain Charge Termination Output.** When the charging is terminated, this pin is pulled low by an internal switch. Otherwise this pin is in high impedance state.
5	COM	**Loop Compensation Input.** Connect a 220nF capacitor in series with an 120Ω resistor from this pin to GND.
6	FB	**Battery Voltage Kevin Sense Input.** This Pin can Kelvin sense the battery voltage; Also the regulation voltage in constant voltage mode can be adjusted upward by connecting a resistor between FB pin and BAT pin.
7	BAT	**Negative Input for Charge Current Sensing.** This pin and the CSP pin measure the voltage drop across the sense resistor R_{CS} to provide the current signals required.
8	CSP	**Positive Input for Charge Current Sensing.** This pin and the BAT pin measure the voltage drop across the sense resistor R_{CS} to provide the current signals required.
9	VCC	**External DC Power Supply Input.** VCC is also the power supply for internal circuit. Bypass this pin with capacitors.
10	DRV	**Gate Drive Pin.** Drive the gate of external P-channel MOSFET.

Package Information

SSOP-10L



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	0.300	0.450	0.012	0.018
c	0.170	0.250	0.007	0.010
D	4.700	5.100	0.185	0.201
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.000 (BSC)		0.039 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	1°	8°

Ordering Information

Part No.	Part No.	Shipment	Operating Ambient Temperature
FH5406S10	SSOP-10L	Tape and Reel, 3000/Reel	−40℃ to +85℃

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