24V Input Voltage, #1~3 Cell, Buck Switch Mode, Li-ion Battery Charger

PRELIMINARY DATASHEET

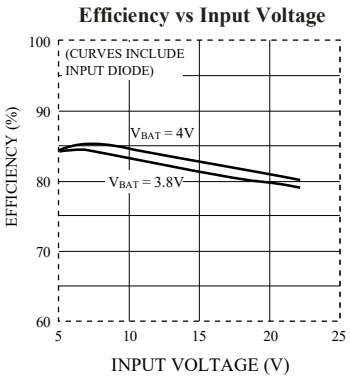
Description

The FH5486A/B/C/E is a complete battery charger controller for one (4.20V/4.35V) or two (8.40V) or three (12.60V) cell lithium-ion battery. The FH5486 provides a small, simple and efficient solution to fast charge Li-ion battery.

The FH5486 built-in anti current backward function, so the application does not need the blocking diode. An external sense resistor sets the charge current with high accuracy.

An internal resistor divider and precision reference set the final float voltage to one (4.20V/4.35V) or two (8.40V) or three (12.60V) cell with ±1% accuracy. When the input supply is removed, the FH5486 automatically enters a low current sleep mode, dropping the battery drain current to 3.0uA. After the charge cycle ends, If the battery voltage drops below one (4.1V/4.23V) or two (8.2V) or three (12.2V) cell, a new charge cycle will automatically begin.

Typical Efficiency Reference Diagram

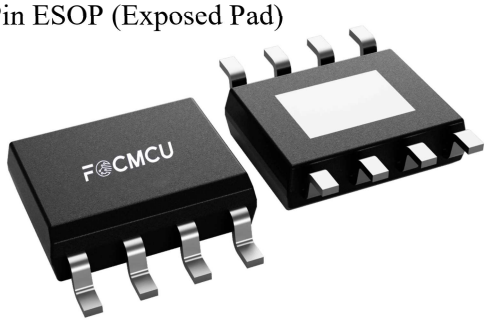


Key Features

- Input Supply Range: #1 Cell: 4.7V ~ 16.0V
  #2 Cell: 10.0V ~ 20.0V #3 Cell: 14.0V ~ 22.0V
- Maximum input voltage: 24.0V
- Built in anti current backward function
- High efficiency current mode PWM controller
- Built-in input adaptive function
- Constant switching frequency for minimum noise
- ±1% charge voltage accuracy
- Automatic recharge
- Automatic shutdown when input supply is removed
- Automatic trickle charging of low voltage
- Stable with ceramic output capacitor
- Battery temperature sensing (NTC function)

Package Type

- 8-Pin ESOP (Exposed Pad)



Typical Applications

- Charging Docks
- Handheld Instrumen TEMP
- Portable Computers

Typical Application Circuit

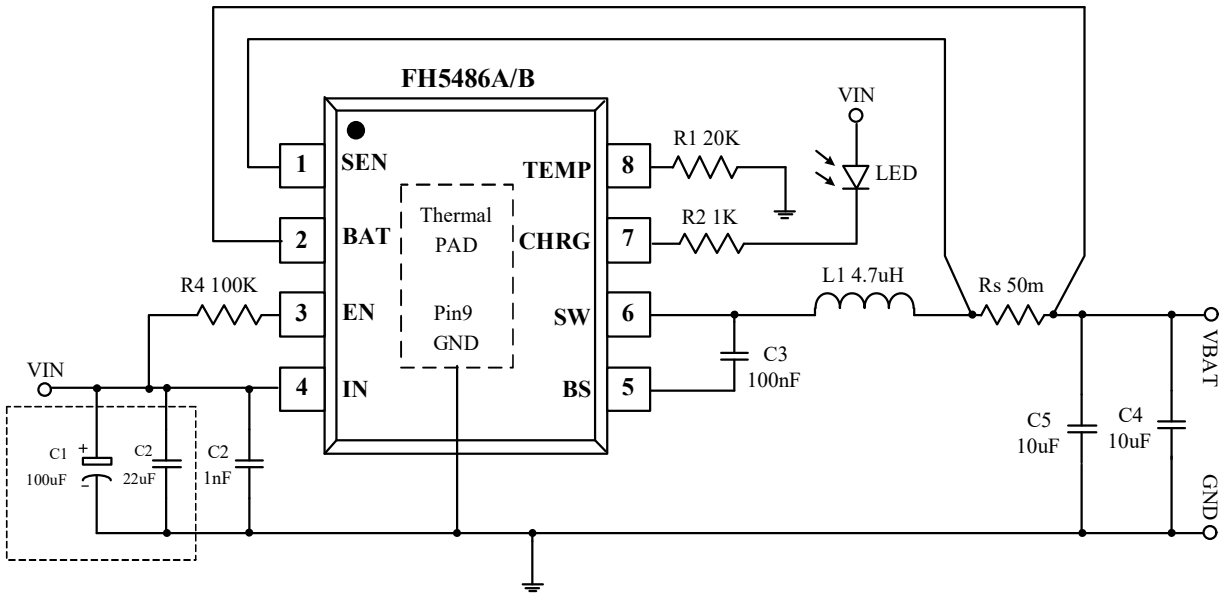


Figure 1. FH5486A/B Typical Application Circuit

Note:

1. The dotted part of the box is the input capacitor. When the input voltage is lower than 9V, ceramic capacitor can be selected. When the input voltage is higher than 9V, an electrolytic capacitor over 100uF should be added into the input. The larger the charging power, the larger the capacity of electrolytic capacitor.
2. For the hot-swappable application at the BAT pin, it is also necessary to add electrolytic capacitors, it is recommended to be 220uF or more.

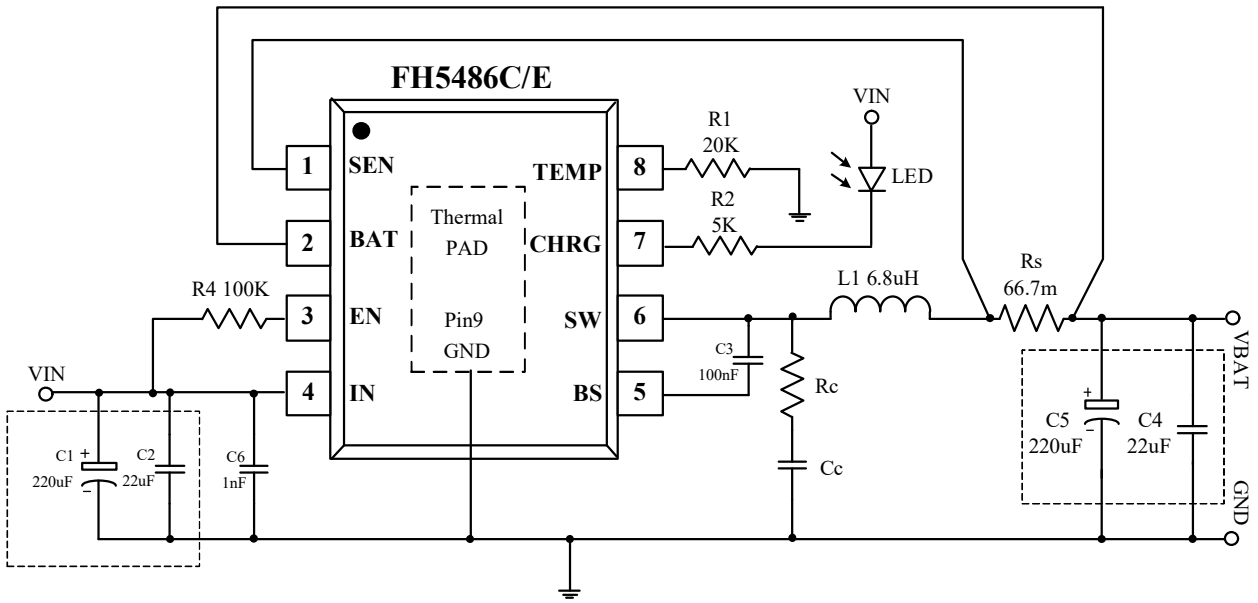
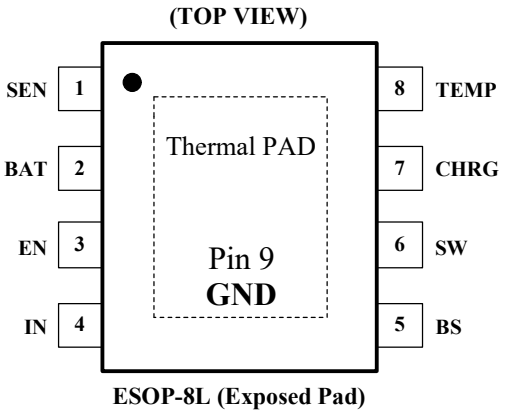


Figure 2. FH5486C/E Typical Application Circuit

Note:

1. The Rc and Cc value range of SW to GND, Rc: 0.5Ω ~ 20Ω, Cc: 1.0nF ~ 100nF.
2. For the hot-swappable application at the BAT pin, it is also necessary to add electrolytic capacitors, it is recommended to be 220uF or more.
3. In the preceding figure, Rc and Cc are optional parameters to improve system EMI characteristics, The value range of Rc and Cc:
   Rc: 0.5Ω ~20Ω, Cc: 100pF~1nF

Pin Configuration

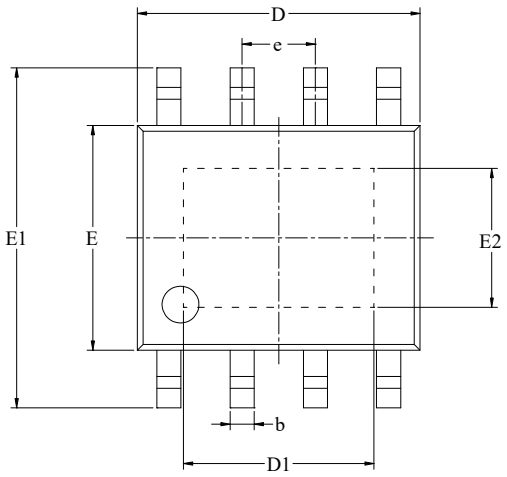


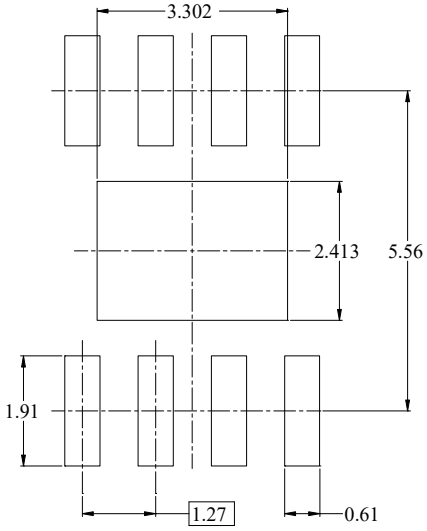
Pin Assignment

Pin No.	Symbol	Function
1	SEN	Charge Current program. The output current is set by an external resistor according to the following formula: I_{OUT} = 100mV/Rs
2	BAT	Battery access end, the capacitor should be as close to the pin as possible
3	EN	ON/OFF Control
4	IN	Power input pin, the input capacitor should be as close to the pin as possible
5	BS	The driver of upper MOSFET
6	SW	Switching
7	CHRG	Open drain,When the charge current drops below the End-of-Charge threshold, the N-channel MOSFET turns off. When the input supply is removed, CHRG pin becomes high impedance.
8	TEMP	Temperature sense. TEMP Thermistor Input.a negative temperature coefficient thermistor to ground, this pin senses the temperature of the battery pack and stops the charger to disable the temperature qualification function, put a 20KΩ resisitor to ground.
9	Themal PAD	The thermal PAD is the Ground of the chip.

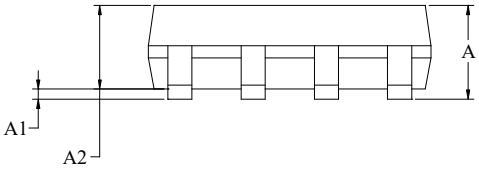
Packaging Information

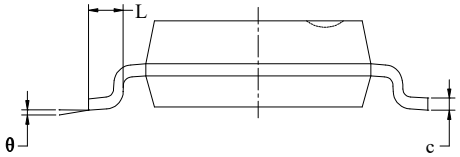
- **Packaging type: ESOP-8L (Exposed Pad)**





RECOMMENDED LAND PATTERN (Unit: mm)





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°

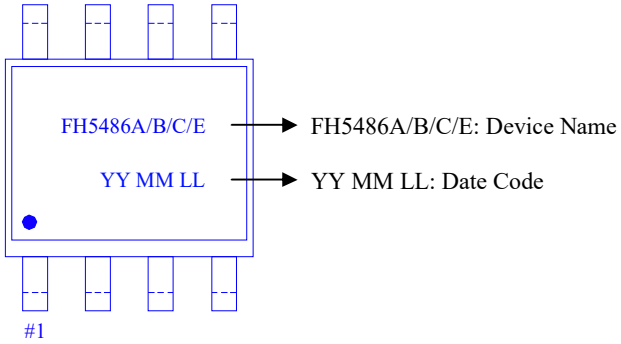
ORDERING INFORMATION

Part Number	Input Voltage	Features	Operating Temperature	Package Type	Top Mark	SPQ
FH5486AS8	4.7V ~ 16.0V	● Switch buck battery charge ● #1 Cell Li-ion ● Frequency: 500KHz ● Vfloat: 4.20V (±1%) ● Automatic recharge	-40℃ to +85℃	ESOP-8L	FH5486A YY WW LL	3000EA/Reel (Small Box)
FH5486BS8	4.7V ~ 16.0V	● Switch buck battery charge ● #1 Cell Li-ion ● Frequency: 500KHz ● Vfloat: 4.35V (±1%) ● Automatic recharge	-40℃ to +85℃	ESOP-8L	FH5486B YY WW LL	3000EA/Reel (Small Box)
FH5486CS8	10.0V ~ 20.0V	● Switch buck battery charge ● #2 Cell Li-ion ● Frequency: 500KHz ● Vfloat: 8.40V (±1%) ● Automatic recharge	-40℃ to +85℃	ESOP-8L	FH5486C YY WW LL	3000EA/Reel (Small Box)
FH5486ES8	14.0V ~ 24.0V	● Switch buck battery charge ● #3 Cell Li-ion ● Frequency: 500KHz ● Vfloat: 12.6V (±1%) ● Automatic recharge	-40℃ to +85℃	ESOP-8L	FH5486E YY WW LL	3000EA/Reel (Small Box)

Note:

- **FH5486A(#1 Cell) / FH5486B(#1 Cell) / FH5486C(#2 Cell) / FH5486E(#3 Cell)** 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)

Device Name: ESOP-8L



Statements and Notes

The name and content of Hazardous substances or Elements in the product

Part name	Hazardous substances or Elements									
	Lead and lead compounds	Mercury and mercury compounds	Cadmium and cadmium compounds	Hexavalent chromium compounds	Polybro minated biphenyls	Polybro minated biphenyl ethers	Dibutyl phthalate	Butylbe nzyl phthalate	Di-2-et hylhexyl phthalate	Diisobutyl phthalate
Lead frame	○	○	○	○	○	○	○	○	○	○
Plastic resin	○	○	○	○	○	○	○	○	○	○
Chip	○	○	○	○	○	○	○	○	○	○
The lead	○	○	○	○	○	○	○	○	○	○
Plastic sheet installed	○	○	○	○	○	○	○	○	○	○
explanation	○: Indicates that the content of hazardous substances or elements in the detection limit of the following the SJ/T11363-2006 standard. ×: Indicates that the content of hazardous substances or elements exceeding the SJ/T11363-2006 Standard limit requirements.									

Notion:

Recommended carefully reading this information before the use of this product; The information in this document are subject to change without notice;

This information is using to the reference only, the company is not responsible for any loss;

The company is not responsible for the any infringement of the third party patents or other rights of the responsibility.

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.

Product Folder

Order Now

Technical Documents

Tools & Software

Support & Community

Note:

CAUTION STATIC SENSITIVE DEVICES NOT TO BE HANDLED BY UNAUTHORISED PERSONNEL

Pb Free

RoHS Compliant

- The information described herein is subject to change without notice.
- FOCMCU Inc. is not responsible for any problems caused by circuits or diagrams described herein whose related industrial properties, patents, or other rights belong to third parties. The application circuit examples explain typical applications of the products, and do not guarantee the success of any specific mass-production design.
- Use of the information described herein for other purposes and/or reproduction or copying without the express permission of FOCMCU Inc. is strictly prohibited.
- The products described herein cannot be used as part of any device or equipment affecting the human body, such as exercise equipment, medical equipment, security systems, gas equipment, or any apparatus installed in airplanes and other vehicles, without prior written permission of FOCMCU Inc.
- Although FOCMCU Inc. exerts the greatest possible effort to ensure high quality and reliability, the failure or malfunction of semiconductor products may occur. The user of these products should therefore give thorough consideration to safety design, including redundancy, fire-prevention measures, and malfunction prevention, to prevent any accidents, fires, or community damage that may ensue.