28V Input Voltage, OVP Function, 1.0A Linear Battery Charger

PRELIMINARY DATASHEET

DESCRIPTION

The FH4056H is a cost-effective, fully integrated high input voltage single-cell battery charger. The charger uses a CC/CV charge profile required by Li-Ion battery. The charger accepts an input voltage up to 28.0V but is disabled when the input voltage exceeds the OVP threshold, typically 6.5V, to prevent excessive power dissipation. The 28.0V rating eliminates the over-voltage protection circuit required in a low input voltage charger.

The charge current and the end-of-charge (EOC) current are programmable with external resistors. When the battery voltage is lower than typically 2.9V, the charger precondition the battery with typically 18% of the programmed charge current. When the charge current reduces to the programmable EOC current level during the CV charge phase, an EOC indication is provided by the $\overline{\text{CHRG}}$ pin, which is an open-drain output. An internal thermal foldback function protects the charger from any thermal failure.

Two indication pins ($\overline{\text{PROG}}$ & $\overline{\text{CHRG}}$) allow simple interface to a microprocessor or LEDs. When no adapter is attached or when disabled, the charger draws less than 1.0uA leakage current from the battery.

The FH4056H is available in Green 8-Pin DFN2*2/ESOP, packages and is rated over the -40°C to +85°C temperature range.

FEATURES

- 28.0V Maximum Voltage for the Power Input
- Programmable Charge Current Up to 1000mA
- Preset 4.2V/4.35V Charge Voltage with ±1% Accuracy
- 2.9V Trickle Charge Threshold
- 6.5V Input Over-Voltage Protection
- C/10 Charge Termination
- Supports 0V battery charging
- Complete Charger for Single-Cell Batteries
- Integrated Pass Element and Current Sensor
- No External Blocking Diode Required
- Low Component Count and Cost
- Programmable Charge Current
- Programmable End-of-Charge Current
- Charge Current Thermal Foldback for Thermal Protection
- Power Presence and Charge Indications
- Less than 1uA Leakage Current off the Battery When No Input Power Attached or Charger Disabled
- Available in Green DFN2*2-8L, ESOP-8L(Expose Pad) Packages

APPLICATIONS

- Mobile Phones
- Blue-Tooth Devices
- PDAs
- MP3 Players
- Stand-Alone Chargers
- Other Handheld Devices

Typical Application Topology

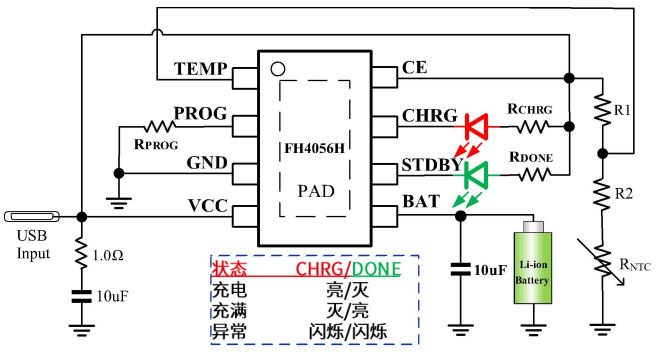
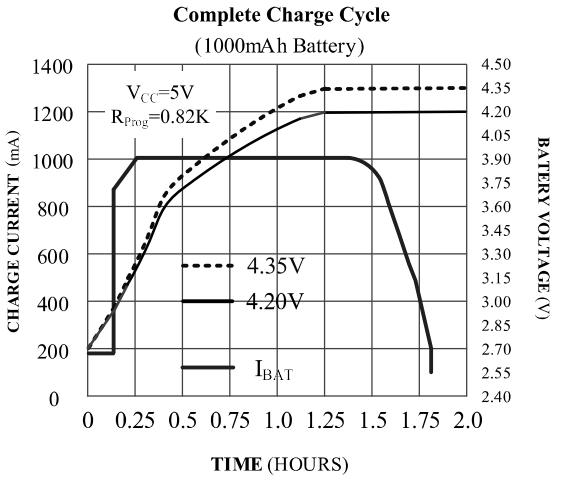
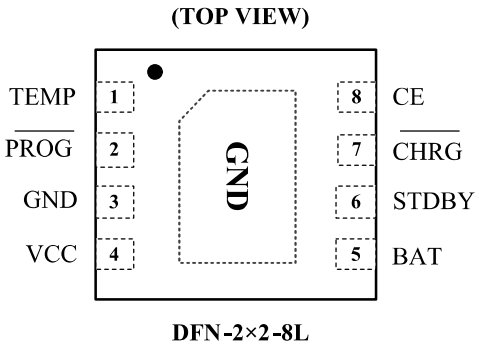


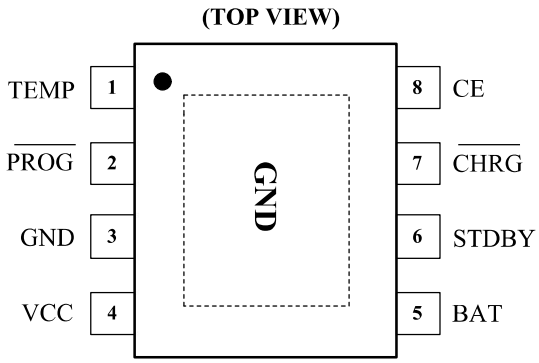
Figure 1. FH4056H Typical Application Circuit with USB Input



PIN CONFIGURATIONS



DFN-2×2-8L

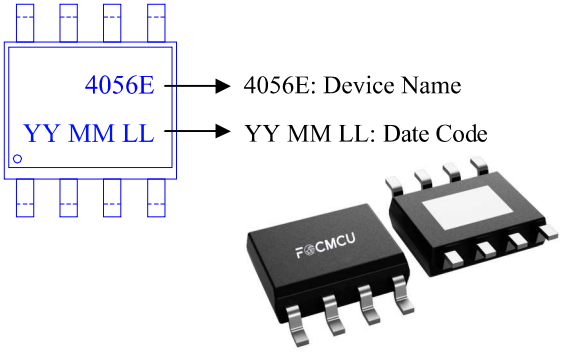


ESOP-8L (Exposed Pad)

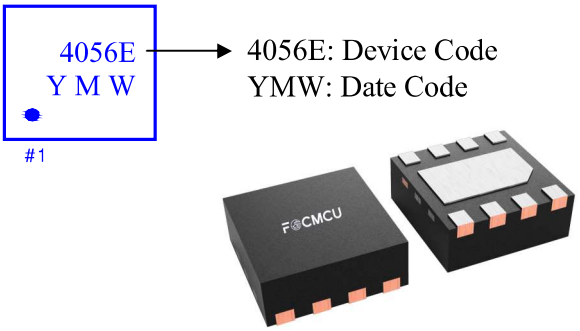
PIN DESCRIPTION

引脚编号	引脚名称	说明
1	TEMP	电池温度检测引脚。将 TEMP 管脚接到电池的 NTC 传感器的输出端。如果 TEMP 管脚的电压小于输入电压的 45%或者大于输入电压的 80%，意味着电池温度过低或过高，则充电被暂停。如果 TEMP 引脚接地或浮空，电池温度检测功能取消，其他充电功能正常。
2	PROG	恒流充电电流设置和充电电流监测引脚。外部连接 1%精度电阻器到地来设置充电电流。300mA 以上设置公式：$I_{BAT} = 1000/R_{PROG}$，300m A 以下设置为$I_{BAT} = 900/R_{PROG}$。举例：1K 对应 1A 充电；2K 对应 0.5A 充电；3K 对应 0.3A 充电。
3	GND	芯片地。
4	VCC	电源输入引脚。连接至电源正极，使用至少 10uF 有效值的陶瓷电容尽量近旁路 VCC 和 GND。
5	BAT	电池充电输出引脚。连接至电池正极，放置至少 10uF 有效值的陶瓷电容器到地。
6	STDBY	充满指示引脚。连接至 LED 灯负极，电池充满时，引脚输出低电平，指示灯亮。
7	CHRG	充电指示引脚。连接至 LED 灯负极，电池充电时，引脚输出低电平，指示灯亮。
8	CE	使能输入引脚。连接至 VCC 或 MCU 控制，高电平使能充电，低电平关闭充电。
EP	PAD	封装底部散热焊盘，可与芯片 GND 连接到一起，连接到大的覆铜平面，达到较好的散热。

Device Name: ESOP-8L

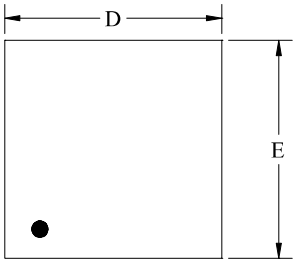


Device Name: DFN2x2-8L

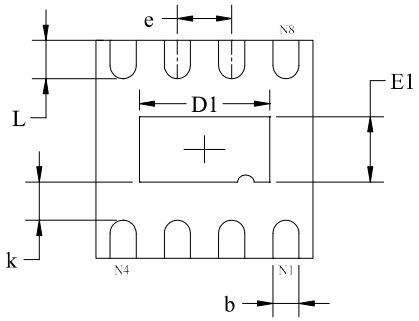


PACKAGE OUTLINE DIMENSIONS

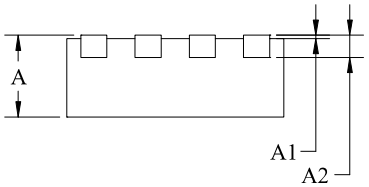
DFN2*2-8L



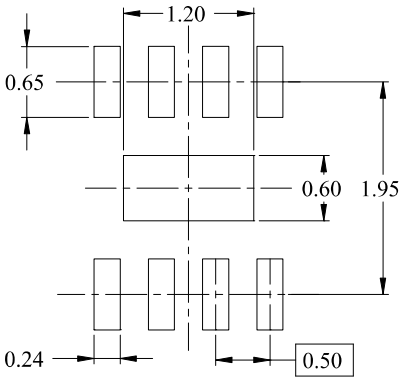
TOP VIEW



BOTTOM VIEW



SIDE VIEW

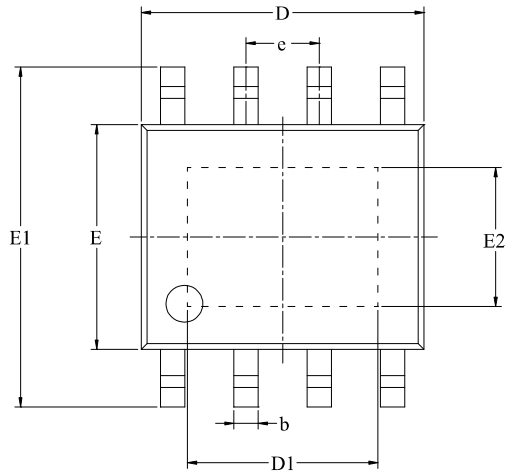


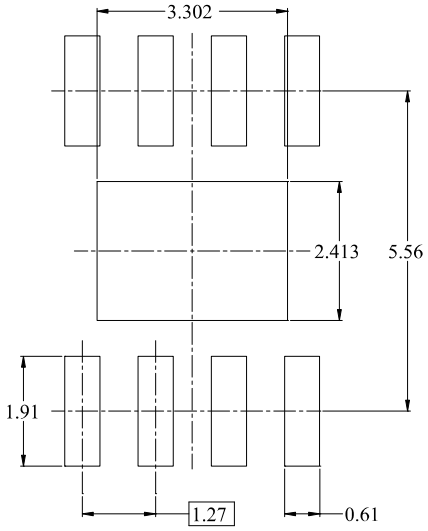
RECOMMENDED LAND PATTERN(Unit: mm)

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.500	0.600	0.020	0.024
A1	0.000	0.050	0.000	0.002
A2	0.152 REF		0.006 REF	
D	1.924	2.076	0.076	0.082
D1	1.400	1.600	0.055	0.063
E	1.924	2.076	0.076	0.082
E1	0.700	0.900	0.028	0.035
k	0.250 MIN		0.010 MIN	
b	0.180	0.280	0.007	0.011
e	0.500 TYP		0.020 TYP	
L	0.224	0.376	0.009	0.015

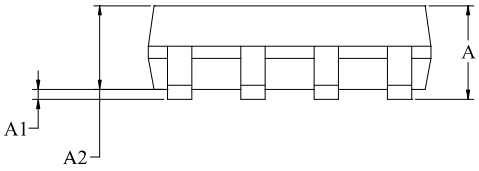
PACKAGE OUTLINE DIMENSIONS

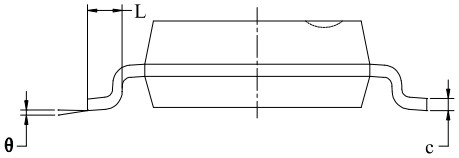
ESOP-8L (Exposed Pad)





RECOMMENDED LAND PATTERN(Unit: mm)





Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A		1.700		0.067
A1	0.0 00	0.1 00	0.00 0	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 Standoff Voltage	Features	Operating Temperature	Package Type	Top Mark	SPQ
FH4056HAS8	~30.0V	● Linear Battery Charger ● Charger Current: 1.0A(typ.) ● V_{OVP}: 6.5V ● V_{BATT_REG}: 4.2V ● VBAT Rising:2.9V	-40°C to +85°C	ESOP-8L	NL Y Y MM LL	3000EA/Reel
FH4056HAD8	~30.0V		-40°C to +85°C	DFN2*2-8L	NN Y Y MM LL	3000EA/Reel
FH4056HHS8	~30.0V	● Linear Battery Charger ● Charger Current: 1.0A(typ.) ● V_{OVP}: 6.5V ● V_{BATT_REG}: 4.35V ● VBAT Rising:2.9V	-40°C to +85°C	ESOP-8L	4056E Y Y MM LL	3000EA/Reel
FH4056HHD8	~30.0V		-40°C to +85°C	DFN2*2-8L	4056E Y Y MM LL	3000EA/Reel

Note:

- **FH4056HA(4.2V)/FH4056HH(4.35V)** 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.
- ForDevices 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.

Product Folder | Order Now | Technical Documents | Tools & Software | Support & Community

Note:

- The information described herein is subject to change without notice.
- ForDevices 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 FocDevice 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 ForDevices Inc.
- Although ForDevices 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.

▲ Update by Oct.2022