100.0V Input, 3.5A Peak Current, High Efficiency Asynchronous Buck(Step-down) DC-DC Converter

PRELIMINARY DATASHEET

Datasheet Brierf

Product Overview

The FH89086 is a high-voltage, step-down, switching regulator that delivers up to 2.0A of continuous current to the load. It integrates a high-side, high-voltage, power MOSFET with a current limit of 3.5A, typically.

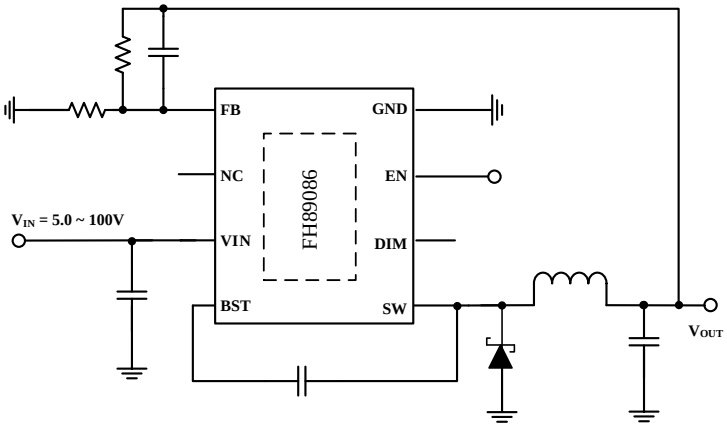
The wide 5V~100V input range accommodates a variety of buck(step-down) applications, at nearly 100% duty cycle if needed, making it ideal for automotive, industry, and lighting applications. Hysteretic voltage-mode control is employed for very fast response.

The switching frequency can be up to 1.0MHz, allowing for small component size. Thermal shutdown and short circuit protection(SCP) provide reliable and fault-tolerant operations.

A 200uA quiescent current allows the FH89086 to be used in battery-powered applications.

The FH89086 is available in ESOP-8L package with an exposed pad.

Typical Application Schematic



$$R1 = \frac{V_{OUT} - V_{FB}}{V_{FB}} \times R2$$

Figure 1. FH89086 Typical Application

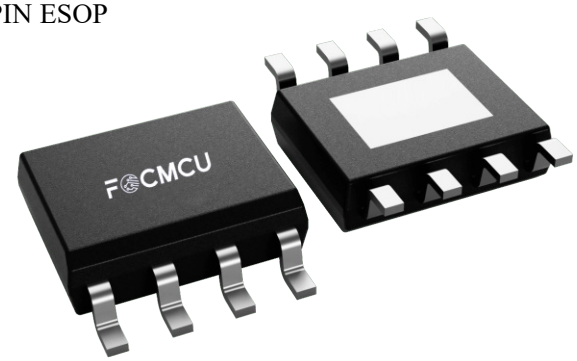
Key Features

- Wide Input Range: 5.0V to 100V
- 3.5A Typical Peak Switching Current Limit
- Hysteretic Control: No Compensation
- Up to 1.0MHz Switching Frequency
- PWM Dimming Control Input for LED Application
- Short-Circuit Protection(SCP) with Integrated High-Side Power MOSFET
- Quiescent Current: 200uA
- Thermal Shutdown
- Ambient Operating Temperature: -40 ~ 125℃
- Packages type: Pb-free Packages, ESOP-8L

Package Type

- 8-PIN ESOP

FH89086S8



(Physical drawings)

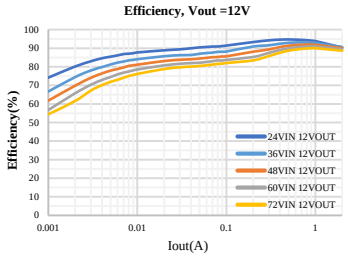
Device Information (1)

PART NUMBER	PACKAGE	BODY SIZE (NOM)
FH89086	ESOP (8L)	4.89 mm x 3.9 mm

(1) For all available packages, see the orderable addendum at the end of the data sheet.

Applications

- Solar Energy Systems
- Automotive System Power
- Industrial Power Supplies
- High-Power LED Drivers
- Scooters, e-Bike Control Power Supplies



耐高压 100V，1.0MHz 开关频率，3.5A 开关限流降压变换器

器件描述

FH89086 是一款高压降压开关稳压器，可向负载提供高达 2.0A 的连续电流。它集成了高压的高端功率 MOSFET，电流限制通常为 3.5A。其极宽的 5V 至 100V 输入电压范围能适应各种降压应用，使其成为汽车、工业和照明应用的理想选择。迟滞电压模式控制的应用，使其具有良好的瞬态响应能力。

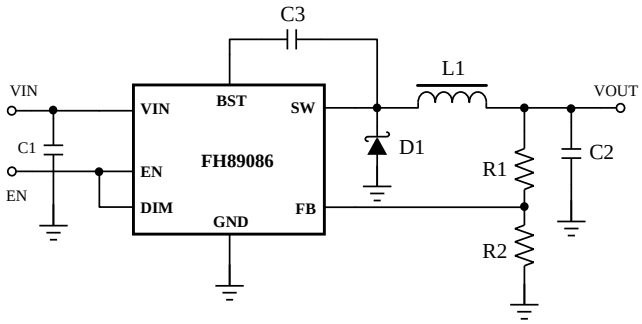
开关频率高达 1.0MHz，从而支持选择小尺寸的外围器件。过热保护和短路保护（SCP）使芯片具有较好的可靠性和容错机制。200μA 的静态电流允许 FH89086 用于电池供电的应用中。

该器件符合环保提供 ESOP-8L 封装。

电气特性

- 宽输入电压: 5.0V ~ 100V
- 峰值开关电流限值典型 3.5A
- 最高 1.0MHz 开关频率
- 滞后电压控制模式，无需补偿
- 支持 PWM 调光控制输入，应用于 LED
- 集成高端 MOSFET 的短路保护
- 200μA 静态电流
- 过热关断保护
- ESOP-8L 封装形式

简化应用示意图



图一、FH89086 简化应用电路图

应用领域

- 太阳能系统
- 汽车系统电源
- 工业电源供电
- 高功率 LED 驱动器
- 电动摩托车、电动自行车控制电源供电

绝对最大额定值 (1)

描述	最小值	最大值	单位
输入电源电压（VIN）	-0.3	+100	V
开关引脚电压（V_{SW}）	-0.5	VIN +0.5	V
BST 到 SW	-0.3	+6.0	V
所有其他引脚	-0.3	+6.0	V
结温		150	°C
焊接温度		260	°C
存储温度	-65	150	°C
推荐工作条件 (3)			
输入电源电压（VIN）	5.0	95	V
EN 和 DIM 电压	0	5.0	V
最大开关频率（f_{SW}）		1.0	MHz
工作结温（T_J）	-40	+125	°C

注:

1) 超过这些限定值可能会损坏芯片。

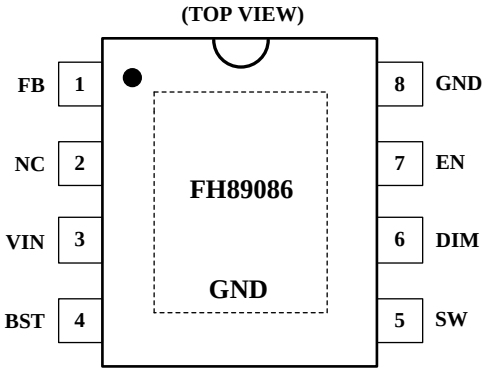
2) 最大允许功耗是最大结温 T_J (MAX)、结温-环境热阻 θ_{JA} 和环境温度 T_A 的函数。任何环境温度下允许的最大连续功耗由 P_D (MAX) = (T_J (MAX) - T_A) / θ_{JA} 计算。超过最大允许功耗会使芯片温度过高，导致稳压器进入热关机状态。内部热关断电路保护芯片免受永久性损坏。

3) 器件不能保证在其工作条件之外运行。

引脚功能概述

ESOP-8L		功能描述
引脚#	名称	FH89086
1	FB	反馈引脚。FB 输入至电压迟滞比较器。通过环路调节，平均反馈电压被保持在 200mV。
2	NC	内部无连接。
2	VIN	输入电源。输入电源给内部所有控制电路供电，包括 BST 调节器和上管开关驱动。为了最大限度地降低开关电压尖峰，接地去耦电容必须放在输入引脚附近。
4	BST	自举。给内部上管 MOSFET 驱动供电。连接一个电容在 BST 和 SW 之间。
5	SW	开关节点。内部上管的源极输出。需要一个低导通压降的肖特基二极管接地。该二极管必须靠近 SW 放置，以降低开关峰值电压。
6	DIM	PWM 调光输入。DIM 在 LED 驱动器中使用。DIM 低于阈值，灯灭；DIM 高于阈值，灯亮。 如果不需要调光功能，例如在普通降压应用中，则将 DIM 和 EN 连接在一起。
7	EN	使能脚。将 EN 拉低至指定阈值以下，关闭 FH89086。将 EN 拉高至指定阈值以上，或让 EN 悬空可启动 FH89086。
8	GND	接地。为避免大的高频电流环路，接地引脚应尽可能靠近输出电容器。将散热焊盘连接至接地面，以优化散热性能。

PIN CONFIGURATION



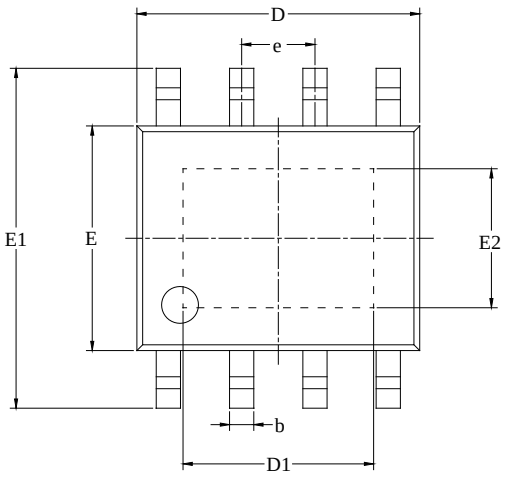
ESOP-8L (Exposed Pad)

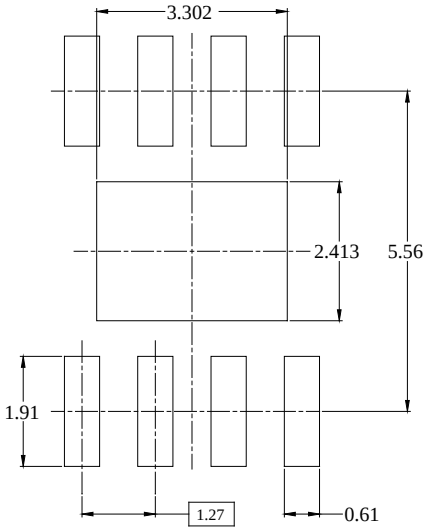
PIN FUNCTIONS

PIN		I/O	DESCRIPTION
NO.	NAME		
1	FB	I	Feedback. FB is the input to the voltage hysteretic comparators. The average FB voltage is maintained at 200mV by loop regulation.
2	NC	/	No connection.
3	VIN	I	Input supply. VIN supplies power to all of the internal control circuitries, both BST regulators, and the high-side switch. A decoupling capacitor to ground must be placed close to VIN to minimize switching spikes.
4	BST	O	Bootstrap. BST is the positive power supply for the internal, floating, high-side MOSFET driver. Connect a bypass capacitor between BST and SW.
5	SW	I	Switch node. SW is the output from the high-side switch. A low forward voltage Schottky rectifier to ground is required. The rectifier must be placed close to SW to reduce switching spikes.
6	DIM	O	PWM dimming input. DIM is useful in LED driver applications. Pull DIM below the specified threshold for dimming off. Pull DIM above the specified threshold for dimming on. If the dimming function is not needed, such as in common buck applications, then connect DIM and EN together.
7	EN	I	Enable input. Pull EN below the specified threshold to shut down the FH89086. Pull EN above the specified threshold or leave EN floating to enable the FH89086.
8	GND	/	Ground. GND should be placed as close to the output capacitor as possible to avoid the high-current switch paths. Connect the exposed pad to GND plane for optimal thermal performance.
EP	Thermal Pad	/	Provides both electrical and thermal connection from the device to the board. A matching ground pad must be provided on the PCB and the device connected to it via solder. For proper electrical operation, this ground pad must be connected to the system ground.

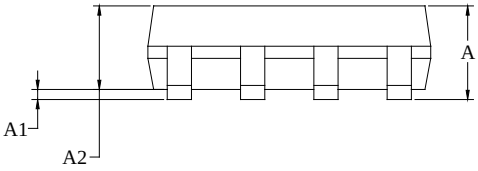
PACKAGE OUTLINE DIMENSIONS

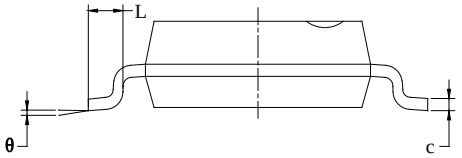
ESOP-8L (Exposed Pad)





RECOMMENDED LAND PATTERN (Unit: mm)





Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A		1.700		0.067
A1	0.000	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	Voltage Range	Output Function	Operating Temperature	(MSL) Moisture Sensitivity Level	Package Type	Top Mark	Standard Pack QTY
FH89086S8	5.0V ~ 100V	● DC-DC Buck(Step-down) ● 3.5A Peak Current ● Switching Frequency: 1.0MHz ● Quiescent Current: 200uA ● V_{FB}: 200mV	-40℃ to +125℃	MSL:3	ESOP-8L	FH89086 YY MM LL	2500 EA (Tape & Reel)

Note:

- **FH89086** 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.
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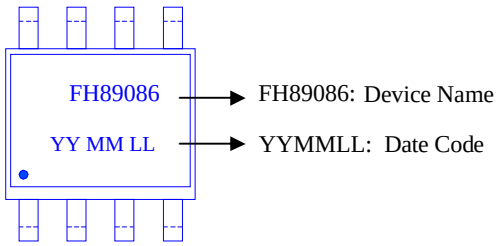
Device Name: ESOP-8L



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 May.2026