# High-Efficiency, 1.2A Continuous Output, 1.5MHz, PWM Synchronous Step-Down(buck) Regulator

PRELIMINARY DATASHEET

Datasheet Brierf

## Product Overview

The **FH4507L** are 1.5MHz constant frequency, current mode buck(step-down) converters. The devices integrate a main switch and a synchronous rectifier for high efficiency without an external Schottky diode. It is ideal for powering portable equipment that runs from a single cell Lithium-Ion ($Li^+$) battery.

The output voltage can be regulated as low as 0.6V. The FH4507L can also run at 100% duty cycle for low dropout operation, extending battery life in portable system.

The devices offer two operation modes, PWM control and PFM Mode switching control, which allows a high efficiency over the wider range of the load.

Supply current with no load is 40uA and drops to <1.0uA in shutdown.

The FH4507L is available in 6-PIN DFN and 5-PIN SOT package.

## Applications

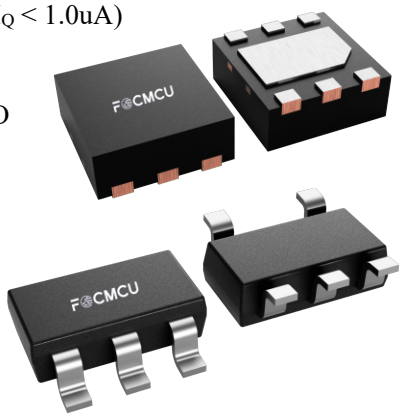
- Cellular and Smart Phones
- Wireless and DSL Modems
- Digital Still and Video Cameras

## Key Features

- 2.5V to 5.5V Input Voltage Range
- Up to 1.2A output current
- Switching frequency: 1.5MHz
- High efficiency: up to 96% (@3.3V)
- Low dropout 100% duty operation
- Internal compensation and soft-start
- Current mode control
- No Schottky Diode Required
- Input over voltage protection (OVP)
- Over Temperature Protected (OTP)
- Reference 0.6V
- Low Quiescent Current: 40μA
- Logic control shutdown ($I_Q$ < 1.0uA)
- Soft Start time for 1.0ms
- Thermal shutdown, UVLO

## Package Type

- 6-pin DFN2.0*2.0
- 5-pin SOT23

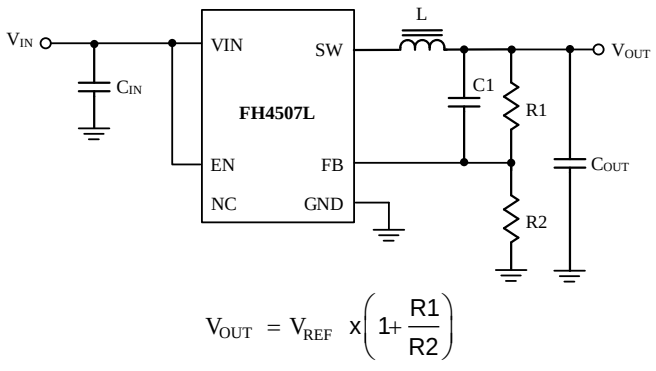



**Device Information** (1)

| PART NUMBER | PACKAGE | BODY SIZE (NOM) |
|---|---|---|
| FH4507LD6 | DFN2*2 (6L) | 1.90mm × 1.90mm |
| FH4507LM5 | SOT-23 (5L) | 2.80mm × 1.50mm |

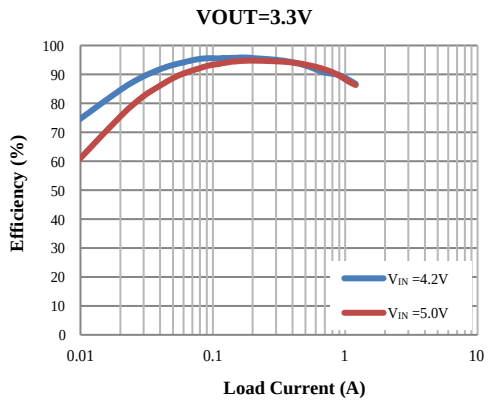
(1) For all available packages, see the orderable addendum at the end of the data sheet.

## Simplified Application Circuit

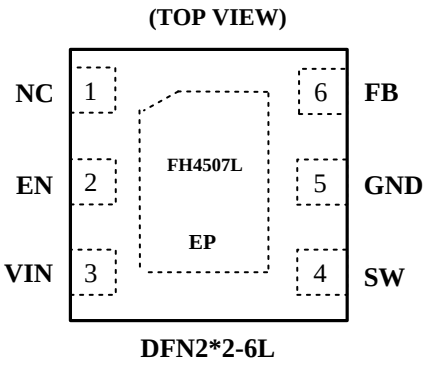


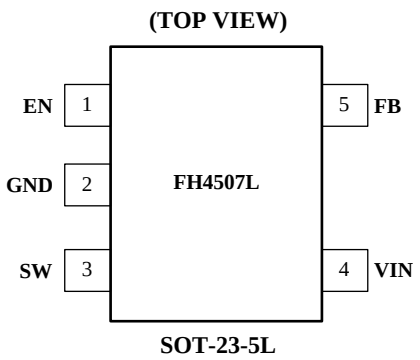

$$V_{OUT} = V_{REF} \times \left(1 + \frac{R1}{R2}\right)$$

**Figure 1. Basic Application Circuits**



## Pin Configuration



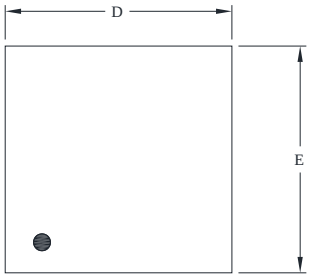

## Pin Description

| Name | Pin Number | | Description |
|---|---|---|---|
| | DFN2.0*2.0-6L | SOT-23-5L | |
| EN | 2 | 1 | Enable pin for the IC.<br>Drive EN above 1.5V to turn on the part. Drive EN below 0.3V to turn it off. Do not leave EN floating. |
| GND | 5 | 2 | Ground. |
| SW | 4 | 3 | Inductor connection.<br>Connect an inductor between SW and the regulator output.<br>This pin connects to the drains of the internal P-ch and N-ch MOSFET switches. |
| VIN | 3 | 4 | Supply voltage.<br>Must be closely decoupled to GND with a 4.7μF or greater ceramic capacitor. |
| FB | 6 | 5 | Feedback input.<br>Connect an external resistor divider from the output to FB and GND to set the output to a voltage between 0.6V and Vin. |
| NC | 1 | / | No connection. |
| Thermal PAD | 7 | / | Ground. |

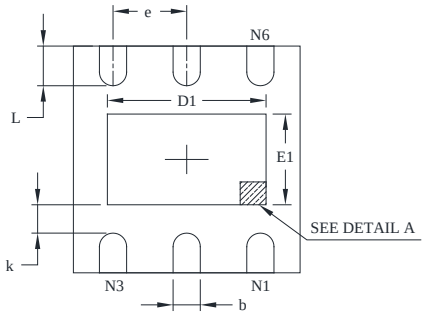
  

# PACKAGE OUTLINE DIMENSIONS

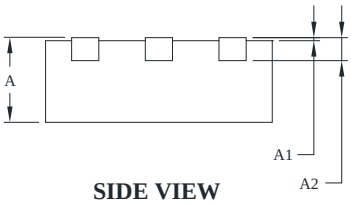
## DFN2*2-6L Unit: inches/mm



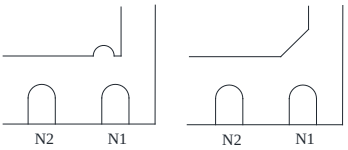

TOP VIEW



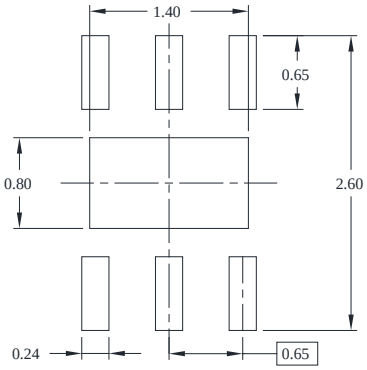

BOTTOM VIEW




SIDE VIEW




DETAIL A




**RECOMMENDED LAND PATTERN**(Unit: mm)

Pin #1 ID and Tie Bar Mark Options

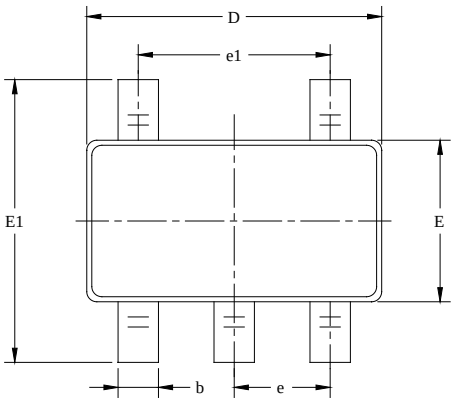
NOTE: The configuration of the Pin #1 identifier is optional, but must be located within the zone indicated.

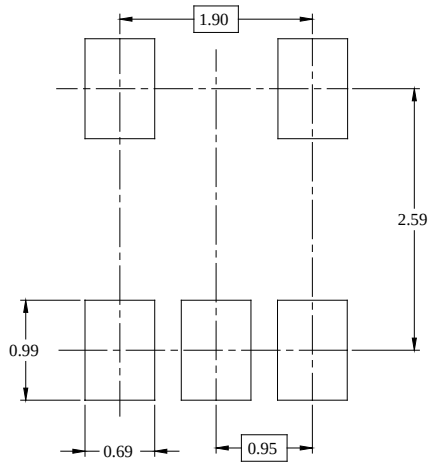
| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| A | 0.700 | 0.800 | 0.028 | 0.031 |
| A1 | 0.000 | 0.050 | 0.000 | 0.002 |
| A2 | 0.203 REF | | 0.008 REF | |
| D | 1.900 | 2.100 | 0.075 | 0.083 |
| D1 | 1.100 | 1.450 | 0.043 | 0.057 |
| E | 1.900 | 2.100 | 0.075 | 0.083 |
| E1 | 0.600 | 0.850 | 0.024 | 0.034 |
| k | 0.200 MIN | | 0.008 MIN | |
| b | 0.180 | 0.300 | 0.007 | 0.012 |
| e | 0.650 TYP | | 0.026 TYP | |
| L | 0.250 | 0.450 | 0.010 | 0.018 |

NOTE: This drawing is subject to change without notice.

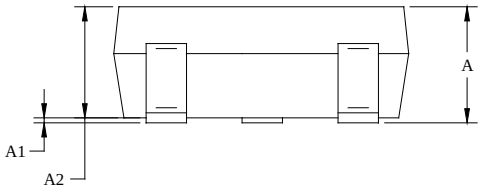
# PACKAGE OUTLINE DIMENSIONS

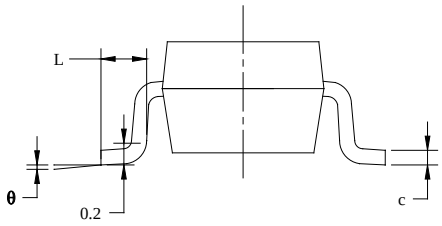
## SOT-23-5L




**RECOMMENDED LAND PATTERN** (Unit: mm)




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| A | 1.050 | 1.250 | 0.041 | 0.049 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 1.050 | 1.150 | 0.041 | 0.045 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.100 | 0.200 | 0.004 | 0.008 |
| D | 2.820 | 3.020 | 0.111 | 0.119 |
| E | 1.500 | 1.700 | 0.059 | 0.067 |
| E1 | 2.650 | 2.950 | 0.104 | 0.116 |
| e | 0.950 BSC | | 0.037 BSC | |
| e1 | 1.900 BSC | | 0.075 BSC | |
| L | 0.300 | 0.600 | 0.012 | 0.024 |
| θ | 0° | 8° | 0° | 8° |

# ORDERING INFORMATION

| Part Number | Input Voltage | Output Function | Operating Temperature | Package Type | Top Mark | SPQ |
|---|---|---|---|---|---|---|
| FH4507LD6 | 2.5V ~ 5.5V | ● DC-DC Buck(Step-down)<br>● Output Current: 1.2A<br>● Switching Frequency: 1.5MHz<br>● $V_{FB}$: 0.6V<br>● Efficiency: Up to 96% (@3.3V)<br>● $I_Q$: 40uA(Typ.) | -40°C to +85°C | DFN2*2-6L | T28 Y M L<br>AN Y M L | 3000EA/Reel |
| FH4507LM5 | 2.5V ~ 5.5V | | -40°C to +85°C | SOT-23-5L | T25 Y M L | 3000EA/Reel |

**Note**:

- **FH4507L** 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)

**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 Jul.2024