

High Efficiency, 10.0A DC-DC Synchronous Boost Converter

General Description

FH47115 is a high power density synchronous boost converter which integrates two low $R_{DS(ON)}$ MOSFETs to reduce conduction loss. It provides tiny and high efficiency solution for portable electronics. FH47115 has wide input voltage range from 2.7 to 12.0V and can provide output voltage up to 12.6V. It has 10.0A switch current capability and is capable of delivering more than 30.0W power.

FH47115 uses current mode COT control to regulate output voltage. It works with PWM mode in moderate to heavy load. In light load, it can work with PFM mode and FPWM mode selected by the MODE pin to avoid problems caused by low switch frequency.

The switch frequency is adjustable ranging from 200kHz to 2.2MHz by an external resistor. FH47115 is also capable of programming peak current limit and soft-start time. In addition, FH47115 provides UVLO, OVP and thermal shutdown protection.

Typical Application Circuit

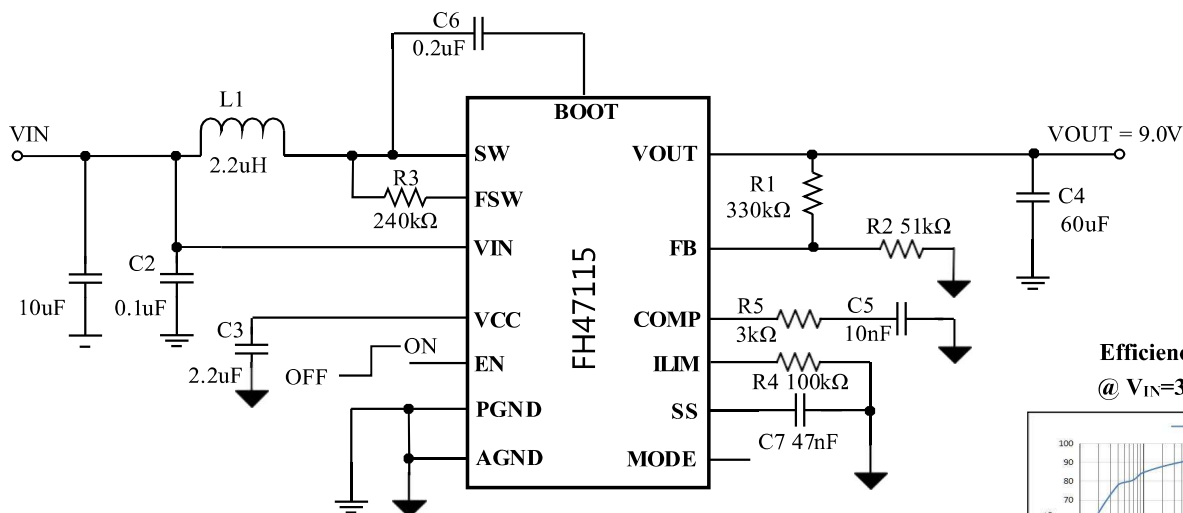


Figure 1. FH47115 typical application schematic

Features

- Input voltage range: 2.7 ~ 12.0V
- Output voltage range: 4.5 ~ 12.6V
- Low shutdown current: 1.0 ~ 3.0uA
- Low $R_{DS(ON)}$ MOSFETs (LSD/HSD): 13m Ω / 16m Ω
- Up to 90% efficiency
(@ $V_{IN} = 3.3V, V_{OUT} = 9.0V,$ and $I_{OUT} = 3.0A$)
- Adjustable switch frequency: 200kHz ~ 2.2MHz
- Selectable mode between PFM and FPWM
- Programmable peak switch current limit
- Programmable soft -start time
- Output over-voltage protection @ 13.4V
- Thermal shutdown @ 150°C

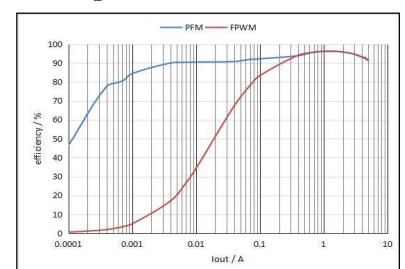
Typical Application

- Quick Charge Power Bank
- Bluetooth Speaker
- E-Cigarette
- Portable POS terminal

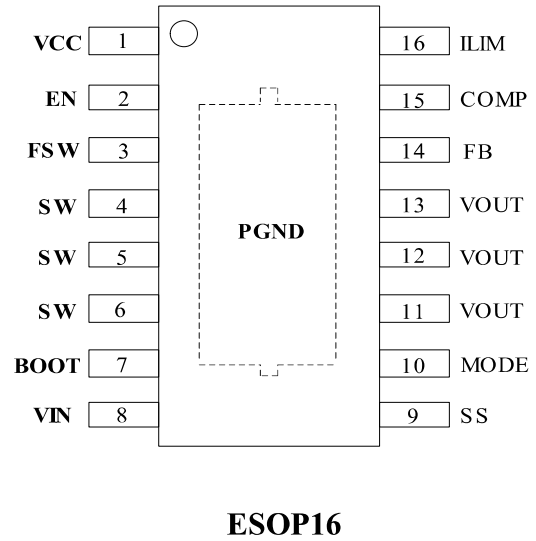
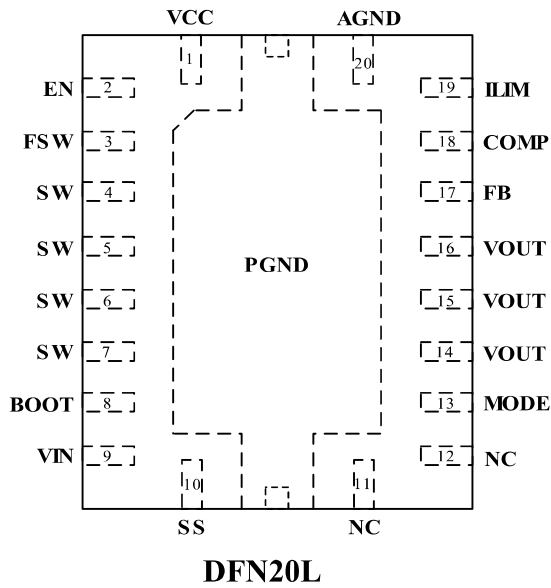
Package Type

- 16-pin ESOP16
- 20-pin DFN20L(4.5×3.5×0.9-0.5)
- DFN20L(4.5×3.5×0.75-0.5)

Efficiency vs I_{OUT}
@ $V_{IN} = 3.6V, V_{OUT} = 5.0V$



■ Pin Configuration

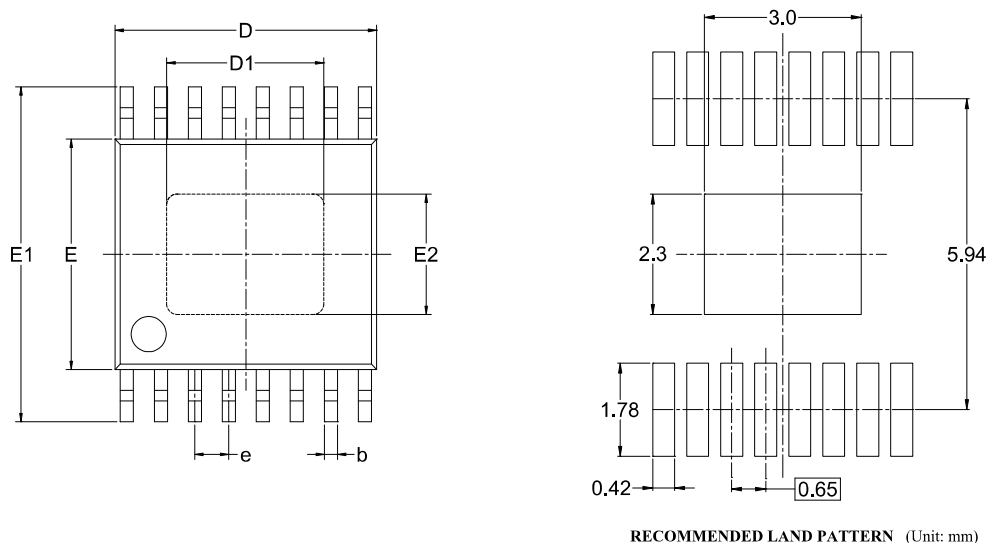


■ Pin Assignment

| Pin | | | Description |
|------|---------------|---------------|--|
| Name | Number DFN20L | Number ESOP16 | |
| VCC | 1 | 1 | Output of internal LDO. A ceramic capacitor of more than 1.0uF is required between VCC pin and ground. |
| EN | 2 | 2 | Enable logic input. Logic high enable s IC and logic low disable s IC. |
| FSW | 3 | 3 | Use external resistor between FSW pin and SW pin to set switch frequency |
| SW | 4, 5, 6, 7 | 4, 5, 6 | Switching node of boost converter. It is connected to the drain of LSD and the source of HSD. |
| BOOT | 8 | 7 | Power supply for HSD gate driver. A ceramic capacitor of more than 0.2uF is required between BOOT pin and ground. |
| VIN | 9 | 8 | Power supply for IC. |
| SS | 10 | 9 | Use external capacitor between SS pin and ground to set soft-start time. |
| NC | 11, 12 | | No connection inside the IC. It's recommended to connect these two pins to ground to improve thermal performance. |
| MODE | 13 | 10 | Mode select pin. In light load, logic high or floating selects PFM mode and logic low selects FPWM mode. |
| VOUT | 14, 15, 16 | 11,12,13 | Output of boost converter. |
| FB | 17 | 14 | Voltage feedback. This pin is connected to the center tape of a resistor divider. |
| COMP | 18 | 15 | Output of internal error amplifier. Loop compensate network is required between COMP pin and ground. |
| ILIM | 19 | 16 | Use external resistor between ILIM pin and ground to set peak current limit. |
| AGND | 20 | | Analog ground. |
| PGND | Thermal PAD | Thermal PAD | Power ground. It is connected to the source of LSD. |

■ Packaging Information

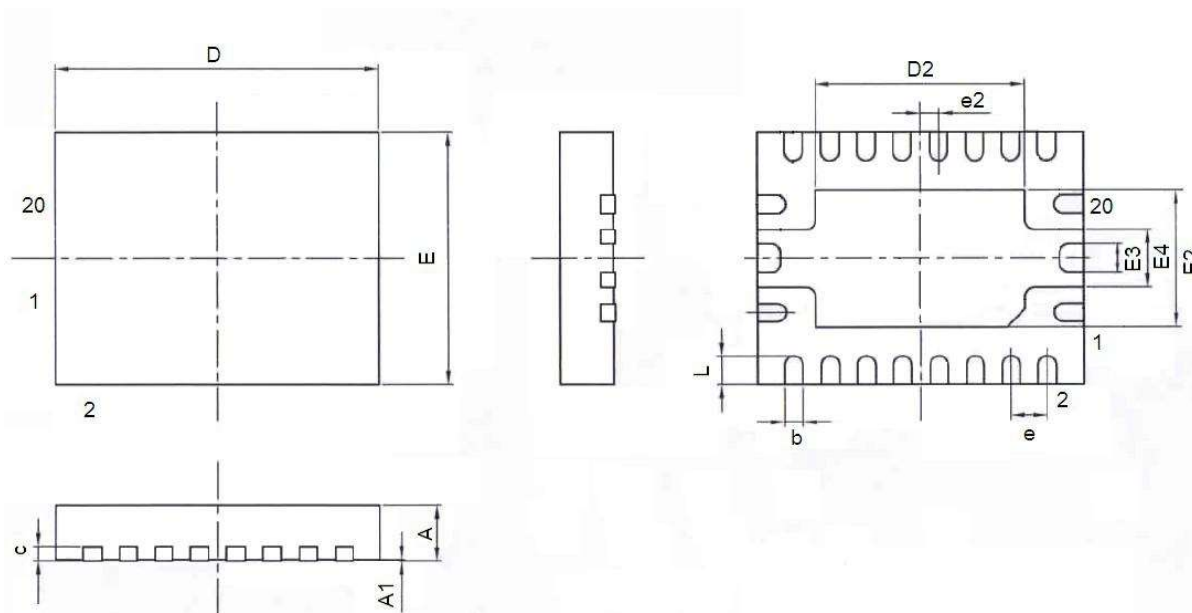
- Package Type: **ESOP-16L**



| DIM | Millimeters | | Inches | |
|------------|-------------|------|-----------|--------|
| | Min | Max | Min | Max |
| A | 1.35 | 1.75 | 0.0531 | 0.0689 |
| A1 | 0.05 | 0.2 | 0.0020 | 0.0079 |
| A2 | 1.3 | 1.6 | 0.0512 | 0.0630 |
| A3 | 0.6 | 0.71 | 0.0236 | 0.0280 |
| b | 0.356 | 0.47 | 0.0140 | 0.0185 |
| c | 0.2 | 0.24 | 0.0079 | 0.0094 |
| D | 9.8 | 10.2 | 0.3858 | 0.4016 |
| E | 5.8 | 6.24 | 0.2283 | 0.2457 |
| E1 | 3.8 | 4 | 0.1496 | 0.1575 |
| e | 1.27BSC | | 0.0500 | |
| h | 0.25 | 0.5 | 0.0098 | 0.0197 |
| L | 0.4 | 0.8 | 0.0157 | 0.0315 |
| L1 | 1.05BSC | | 0.0413 | |
| θ | 0 | 8° | 0 | 8° |
| c1 | 0.25 | | 0.0098 | |
| D1(95*180) | 4.57REF | | 0.1799REF | |
| E2(95*180) | 2.41REF | | 0.0949REF | |
| g | 0.51REF | | 0.02REF | |
| j | 0.4REF | | 0.0157REF | |

■ Packaging Information

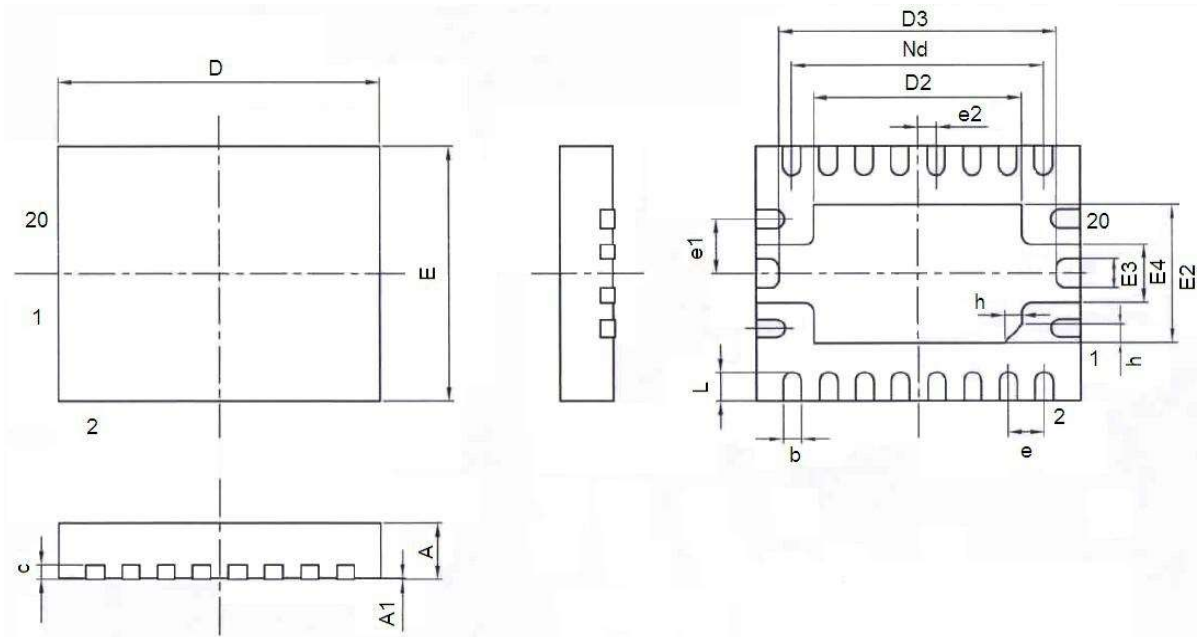
- Package Type: **DFN20L** (4.5×3.5×0.75-0.5)



| DIM | Millimeters | | Inches | |
|-----|-------------|------|-------------|--------|
| | Min | Max | Min | Max |
| A | 0.7 | 0.8 | 0.0275 | 0.0315 |
| A1 | | 0.05 | | 0.0020 |
| b | 0.2 | 0.3 | 0.0079 | 0.0118 |
| c | 0.203 | | 0.0080 | |
| D | 4.5 | | 0.1772 | |
| D2 | 2.95 | 3.15 | 0.1161 | 0.1240 |
| e | 0.5(BSC) | | 0.0197(TYP) | |
| e2 | 0.25(BSC) | | 0.0098(BSC) | |
| E | 3.5 | | 0.1378 | |
| E2 | 1.95 | 2.15 | 0.0768 | 0.0846 |
| E3 | 0.25 | 0.45 | 0.0098 | 0.0177 |
| E4 | 0.65 | 0.85 | 0.0256 | 0.0335 |
| L | 0.3 | 0.5 | 0.0118 | 0.0197 |

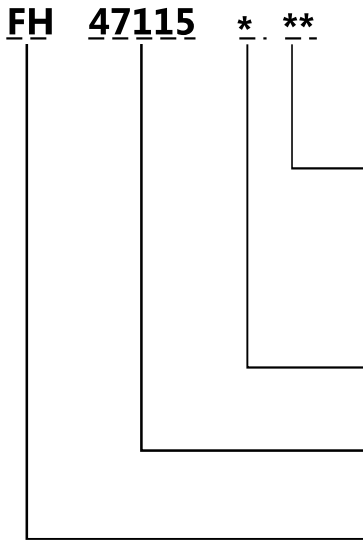
■ Packaging Information

- Package Type: **DFN20 L** (4.5×3.5×0.9-0.5)



| DIM | Millimeters | | Inches | |
|-----|-------------|------|-------------|--------|
| | Min | Max | Min | Max |
| A | 0.85 | 0.95 | 0.0335 | 0.0374 |
| A1 | | 0.05 | | 0.0020 |
| b | 0.18 | 0.3 | 0.0071 | 0.0118 |
| c | 0.18 | 0.25 | 0.0071 | 0.0098 |
| D | 4.4 | 4.6 | 0.1732 | 0.1811 |
| D2 | 3.1 | 3.3 | 0.1220 | 0.1299 |
| D3 | 3.85(REF) | | 0.1516REF | |
| e | 0.5(BSC) | | 0.0197(TYP) | |
| e1 | 0.75(BSC) | | 0.0295(BSC) | |
| e2 | 0.25(BSC) | | 0.0098(BSC) | |
| Nd | 3.5(BSC) | | 0.1378(BSC) | |
| E | 3.4 | 3.6 | 0.1339 | 0.1417 |
| E2 | 2.1 | 2.3 | 0.0827 | 0.0906 |
| E3 | 0.35(BSC) | | 0.0138(BSC) | |
| E4 | 0.75(BSC) | | 0.0295(BSC) | |
| L | 0.35 | 0.45 | 0.0138 | 0.0177 |
| h | 0.2 | 0.3 | 0.0079 | 0.0118 |

Ordering Information



Package Type:

N20A: DFN20L(0.75)

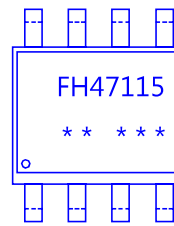
N20B: DFN20L(0.9)

S16P: ESOP-16L

Product Version

Product Mode

ForDevices



FH47115 Device Name

*** **: Date Code

| Part Number | Description | Operating ambient temperature | Package | Top Mark | SPQ |
|-------------|---|-------------------------------|--------------------------|-----------------------|--------------|
| FH47115AS16 | V_{IN} : ~12.6V V_{OVP} : 13.4V I_{LIM} : 12.6A | -40 ~ 85°C | ESOP-16L | FH47115S * * * * * | 3000PCS/Reel |
| FH47115AN20 | | | DFN20L(4.5x3.5x0.75-0.5) | FH47115A * * * * * | |
| FH47115BN20 | | | DFN20L(4.5x3.5x0.90-0.5) | FH47115B * * * * * | |



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