# 20V, 10A, Synchronous Boost Converter with Load Disconnect Control

## Description

The FH43052 is a 20.0V synchronous boost converter with the gate driver built-in for load disconnect. The FH43052 integrates two low on resistance power FETs: A 7mohm switching FET and a 7mohm rectifier FET.

The FH43052 uses the adaptive constant off time peak current mode control. FH43052 has an internal feature to help improving light load efficiency. When output current is low, FH43052 will go into DCM mode.

The FH43052 includes configurable features include programmable cycle-by-cycle current limit and progr-ammable switching frequency functions.The FH43052 could isolate the output from input side when shutdown.

Once the output is shorted, it enters into the hiccup mode to lower the thermal stress and can recover automatically after the short condition releases. Additionally, the FH43052 also has OVP and thermal protection to avoid the fault operation. The FH43052 is in a 3.0mm x 3.5mm 13-pin VQFN package with enhanced thermal dissipation.

## Features

- Input Voltage Range: 2.7V to 20.0V
- Output Voltage Range: 4.5V to 20.0V
- Efficiency up to 96%:
  $V_{IN}$ = 7.2V, $V_{BUS}$ = 16V, $I_{OUT}$ = 2A
- Two 7mohm MOSFETs Integrated
- Adjustable switching frequency up to 2.2MHz
- Programmable Cycle-by-Cycle Current Limit up to 15.0A
- Hiccup Short Protection with Load Disconnect Drive
- DCM Operation under light load
- Input Under-Voltage Lockout
- Output Over-Voltage Protection at fixed 21.0V
- Over-Temperature Protection
- Package: VQFN3.0*3.5-13L

## Applications

- E-Cigarette
- Portable POS terminal
- Bluetooth Speaker
- Thunderbolt Interface
- USB Type-C Power Delivery

## Typical Application Schematic

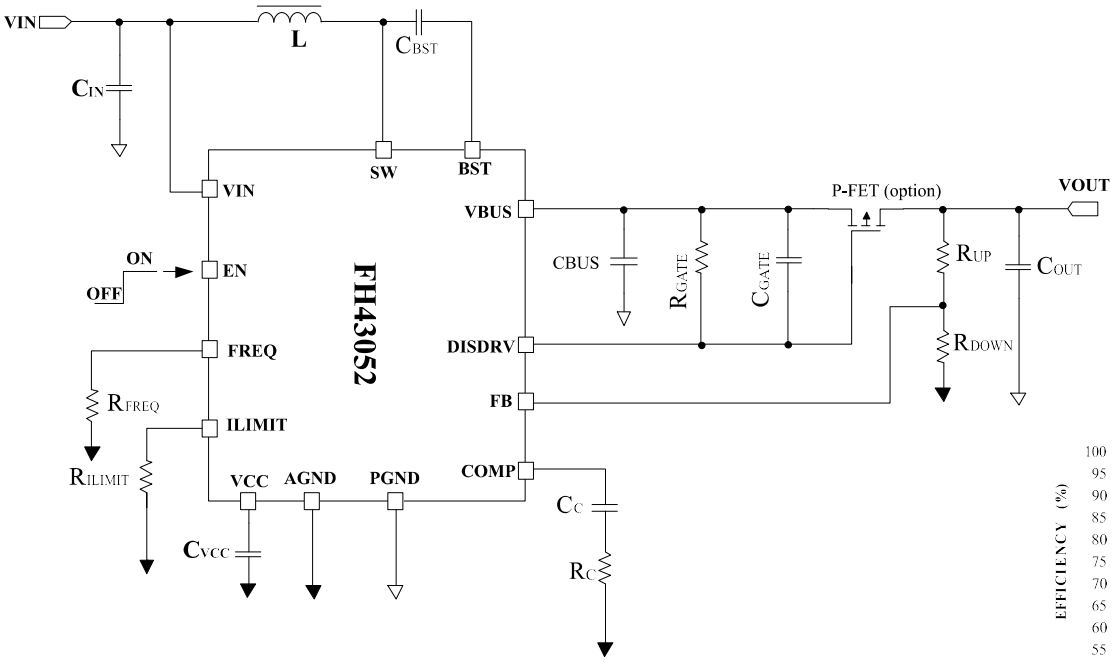
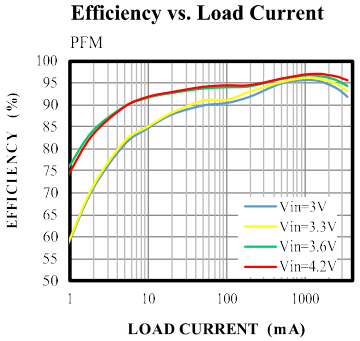



**Figure. 1 Application Schematic**



## Pin Configuration

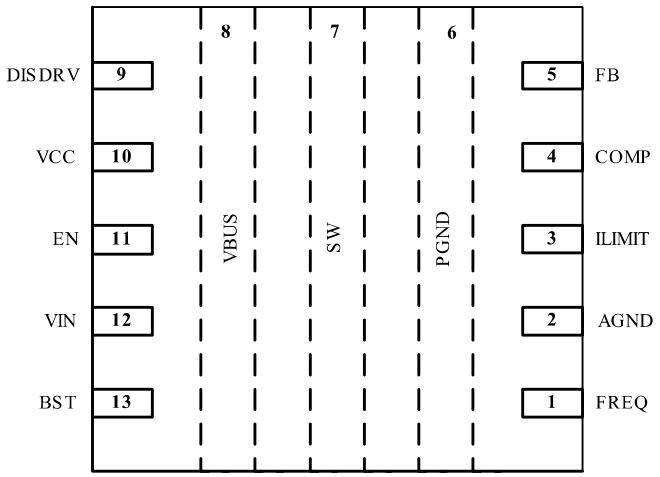


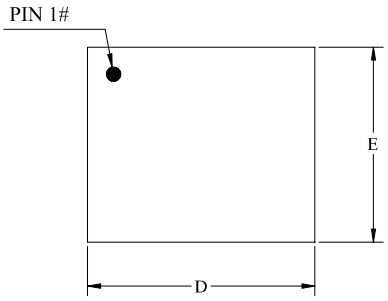

**Figure 2. Pin Function (VQFN-13L)**

## Pin Functions

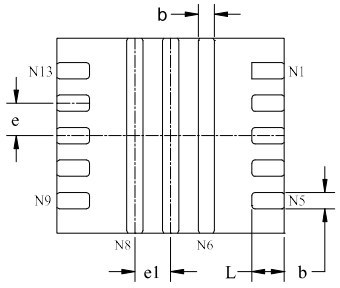
| Pin | | Description |
|---|---|---|
| Number | Name | |
| 1 | **FREQ** | The switching frequency is programmed by a resistor between this pin and the AGND. This pin can 't be float in application. |
| 2 | **AGND** | Analog ground. |
| 3 | **ILIMIT** | A Adjustable LSFET peak current limit. Connect a resistor to AGND. |
| 4 | **COMP** | Output of internal error amplifier, loop compensation network connect to COMP and AGND. COMP is a sensitive node, keep COMP away from SW and BST pin. |
| 5 | **FB** | Feedback Input. FB senses the output voltage, connect FB with a resistor divider connected between the output and ground. FB is a sensitive node, keep FB away from SW and BST pin. |
| 6 | **PGND** | Power ground. The source of LSFET connect to PGND internally. |
| 7 | **SW** | Power switching pin of boost converter, common node of LSFET drain and HSFET source. Connect the coil to this pin and power input. |
| 8 | **VBUS** | Output pin of boost converter, connect to the drain of HSFET internally. |
| 9 | **DISDRV** | A gate drive output for the external disconnect FET. Connect the DISDRV pin to the gate of the external FET. Leave it floating if not using the load disconnect function. |
| 10 | **VCC** | Output of internal regulator, A ceramic capacitor of more than 4.7uF is required between this pin and ground. |
| 11 | **EN** | Enable pin. Pull high to turn on the IC, don't float. |
| 12 | **VIN** | Input supply pin. Bypass Vin to GND with a large capacitor and at least another 0.1uF ceramic capacitor to eliminate noise on the input to the IC. Put the capacitors close to Vin and GND pins. |
| 13 | **BST** | Boot strap pin connect a 0.1uF or greater capacitor between SW and BST to power the high side gate driver. |

## Packaging Information

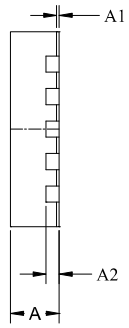
### Type: VQFN3.0*3.5-13L



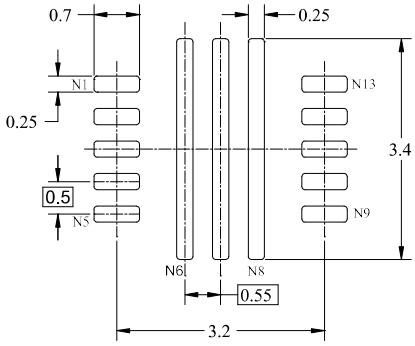

TOP VIEW




BOTTOM VIEW




SIDE VIEW




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

| Symbol | Dimensions In Millimeters | | |
|---|---|---|---|
| | MIN | MOD | MAX |
| A | 0.700 | 0.750 | 0.800 |
| A1 | 0.000 | 0.020 | 0.050 |
| A2 | 0.203 REF | | |
| b | 0.200 | 0.250 | 0.300 |
| D | 3.450 | 3.500 | 3.550 |
| E | 2.950 | 3.000 | 3.050 |
| L | 0.450 | 0.500 | 0.550 |
| e | 0.500 BSC | | |
| e1 | 0.550 BSC | | |

NOTE: This drawing is subject to change without notice.

# ORDERING INFORMATION

| Part Number | Voltage Range | Features | Operating Temperature | Package Type | Top Mark | SPQ |
|---|---|---|---|---|---|---|
| FH43052N13 | 2.7V ~ 20.0V | ● Synchronous Boost(Step-up)<br>● 96% Efficiency<br>● VFB Voltage: 1.2V<br>● Vout: 4.5V~20.0V(ADJ)<br>● Switching Frequency: 2.2MHz<br>● Current Limit: 15.0A | -40°C to 85°C | VQFN3.0*3.5-13L | FH43052<br>YY MM LL | 3000PCS/Reel |

**Note**:

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▲ Update by Aug.2020