

## 28V, 5A, 150KHz/ADJ Synchronous Step-Down DC/DC Converter

PRELIMINARY DATASHEET

### DESCRIPTION

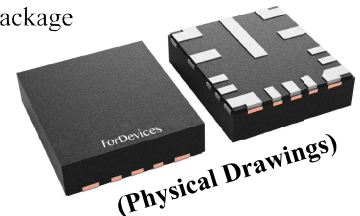
The FH56000 is a synchronous rectified step-down converter that provides wide 5.0V to 28.0V input voltage range and 5.0A continuous load current capability. The FH56000 can operate at PFM mode to achieve high efficiency which can be programmed by are sistor tied between RT to ground and reduce power loss at light load. The COMP pin allows the loop compensation of the switching regulator to be optimized based on the programmed switching frequency, allowing for a fast transient response.

The FH56000 protection function includes cycle-by-cycle current limit, hiccup short circuit protection, UVLO and thermal shutdown. Besides, internal soft-start prevents inrush current at fast power-on.

The FH56000 requires a minimum number of readily available standard external components and is available in QFN4\*4-14L package and provides good thermal conductance.

### FEATURES

- Low  $R_{DS(ON)}$  integrated power MOSFET (25mΩ Typ.)
- Wide input voltage range: 5.0V to 28.0V
- Adjustable output voltage down to 0.8V
- Output current: 5.0A
- Output Soft-Start and Power Good
- High efficiency at light load
- Cycle-by-cycle current limit
- Over-temperature protection with auto recovery
- Under voltage lockout
- Hiccup short circuit protection
- ADJ switch frequency from 150KHz
- Available in QFN4\*4-14L package
- RoHs compliant



### APPLICATIONS

- Distributed power system
- Flat panel television and monitors
- Wireless chargers
- Networking, XDSL modem

### Simplified Application Circuit

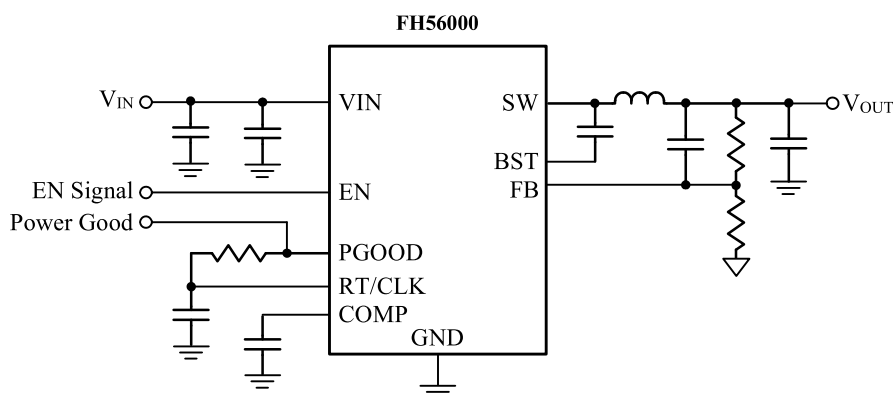
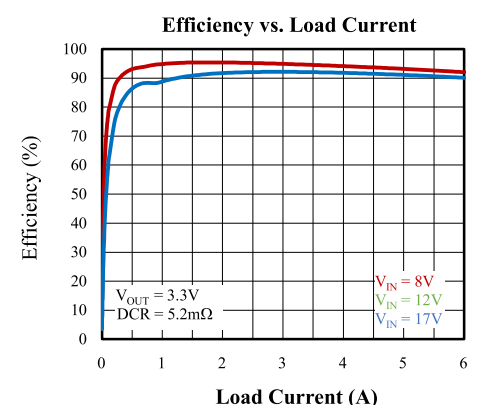
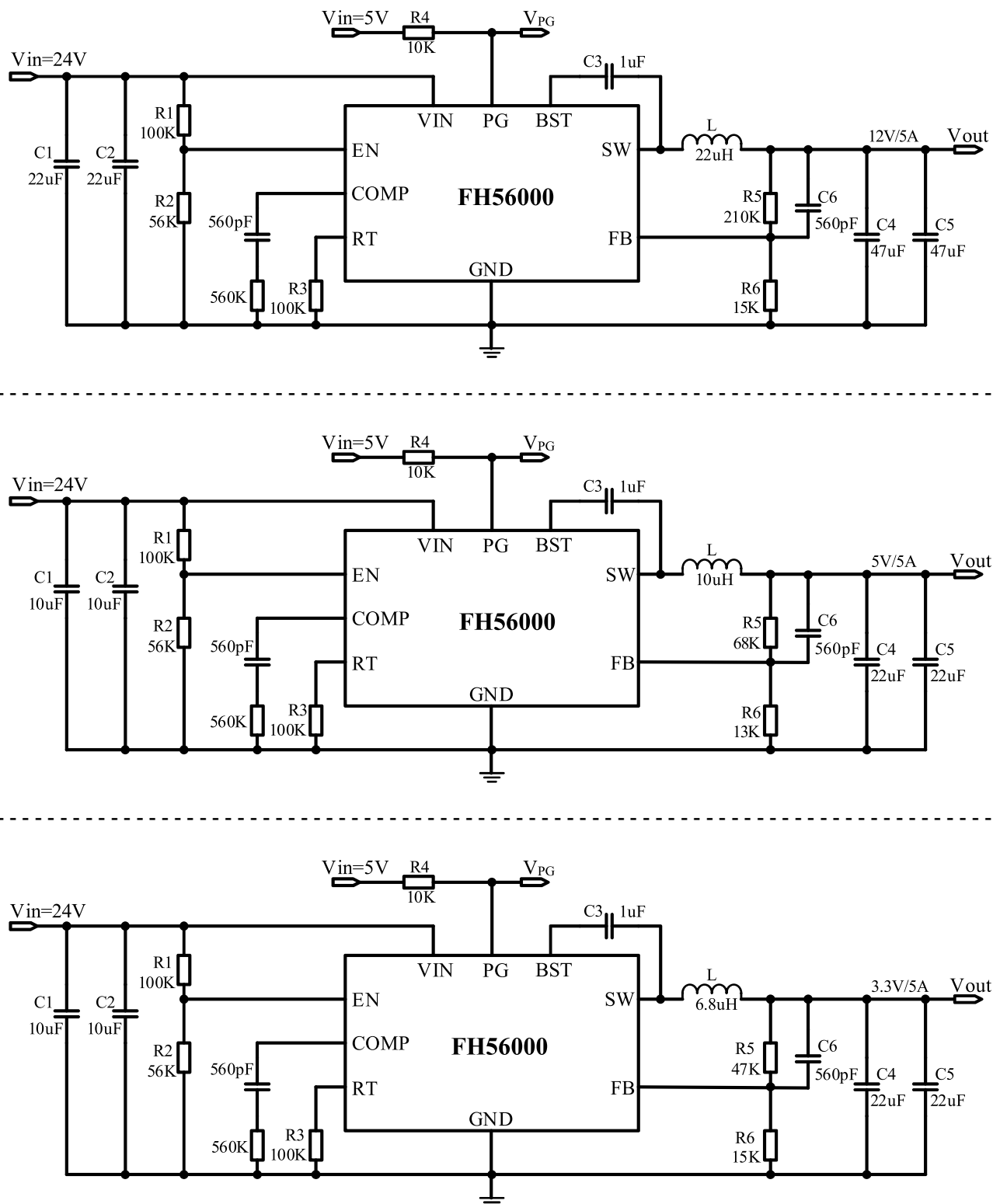


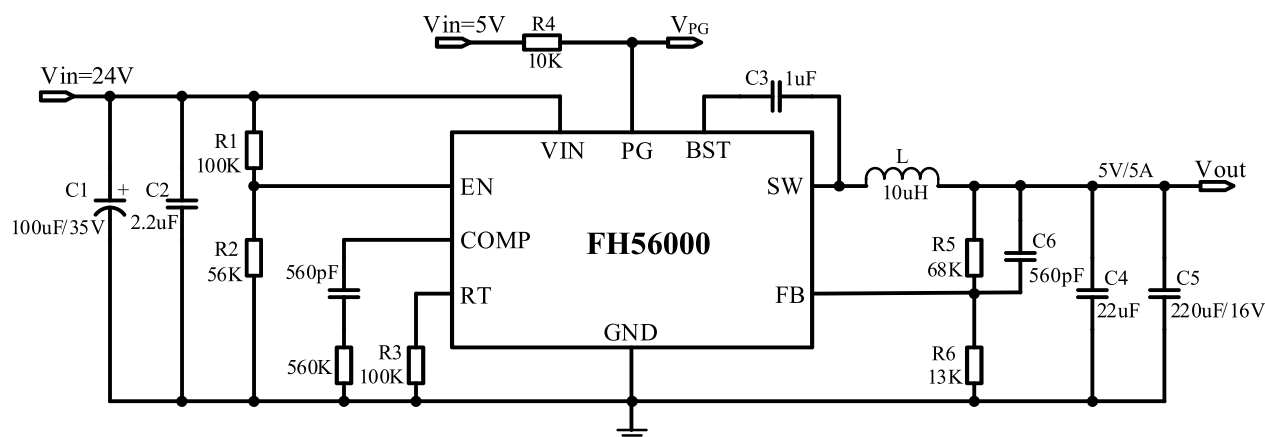
Figure 1. Simplified Application Circuit



## TYPICAL APPLICATION

Figure 2. C<sub>IN</sub> & C<sub>OUT</sub> use Ceramic Capacitors Application Circuit

## TYPICAL APPLICATION

Figure 3.  $C_{IN}$  &  $C_{OUT}$  use Electrolytic Capacitors Application Circuit

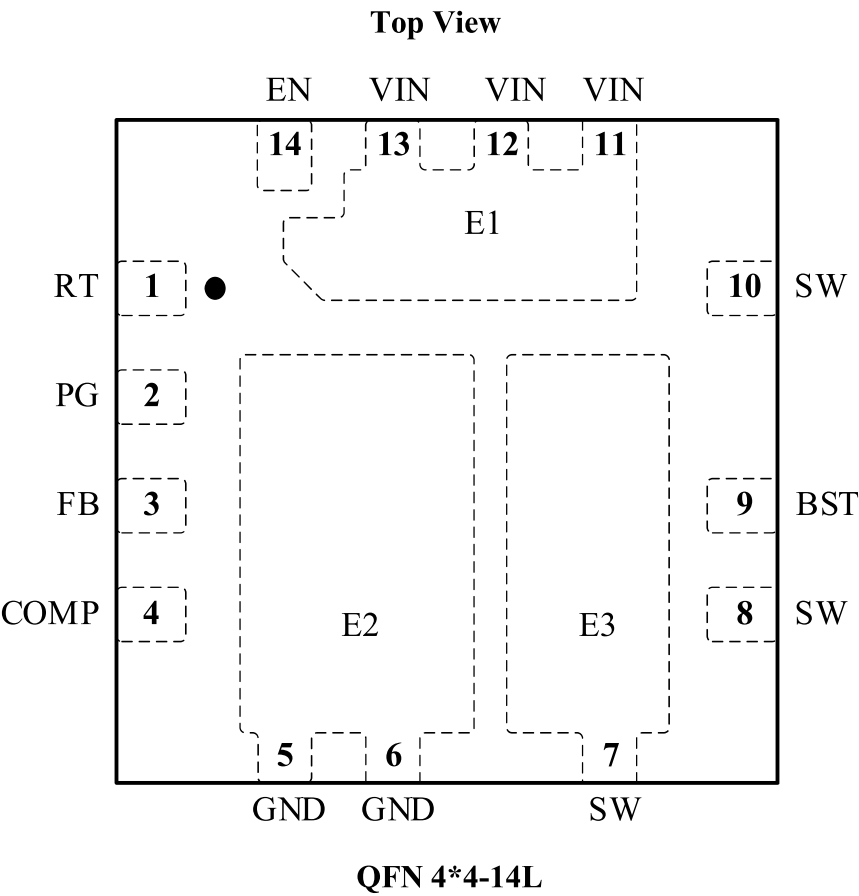
- Note:** 1) If the input voltage is below 12V, R1 can be set to 0K and R2 can be removed.  
 2) R3 can be used to set the switch frequency of FH56000. The detail information can be found at page 10.

Table 1. Recommended Component Values

$V_{IN}=12\sim 24V$ ,  $R3=100K$ , the recommended BOM list is shows as below.

V <sub>OUT</sub>	C1	C2	C3	C6	L	R5	R6	C4	C5
12V	22uF/MLCC	22uF/MLCC	0.1~1uF	560pF~1nF	10uH-22uH	210K	15K	47uF/MLCC	47uF/MLCC
5.0V	10uF/MLCC	10uF/MLCC			4.7uH-10uH	68K	13K	22uF/MLCC	22uF/MLCC
3.3V					3.3uH-6.8uH	47K	15K		
2.5V					3.3uH-6.8uH	39K	18K		
1.8V					2.2uH-4.7uH	15K	12K		
1.2V					2.2uH-4.7uH	7.5K	15K		
12V	100uF/35V/ECL	2.2uF/MLCC			10uH-22uH	210K	15K	2.2uF/MLCC	220uF/16V/ECL
5.0V					4.7uH-10uH	68K	13K		
3.3V					3.3uH-6.8uH	47K	15K		
2.5V					3.3uH-6.8uH	39K	18K		
1.8V					2.2uH-4.7uH	15K	12K		
1.2V					2.2uH-4.7uH	7.5K	15K		

PIN CONFIGURATION

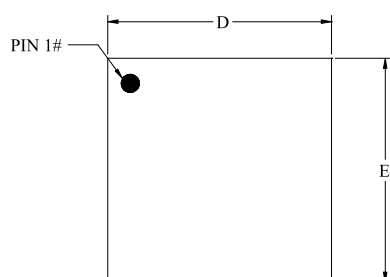


PIN DESCRIPTION

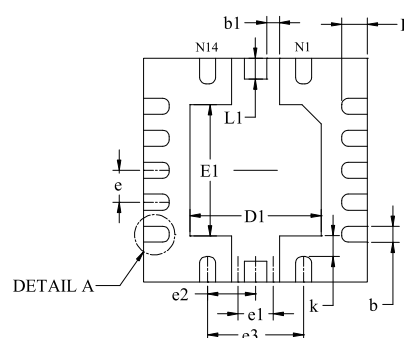
PIN #	NAME	DESCRIPTION
1	RT	Pin used to program Switch Frequency by a resister to GND.
2	PG	Open drain Power Good Indicator Output .Pulled up to 5V by a 10Kohm resistance.
3	FB	Feedback input with reference voltage set to 0.8V.
4	COMP	This pin is the error-amplifier output and the input to the PWM comparator. Connect frequency compensation components to this pin.
5, 6	GND	Ground.
7, 8, 10	SW	Power switching node to connect inductor.
9	BST	High side power transistor gate drive boost input.
11, 12, 13	VIN	Power input. Bypass with a 22uF ceramic capacitor to GND.
14	EN	Enable input. Set this pin to high level to enable the part, low level to disable.

## PACKAGE OUTLINE DIMENSIONS

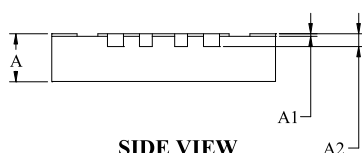
- Type: QFN4.0\*4.0-14L



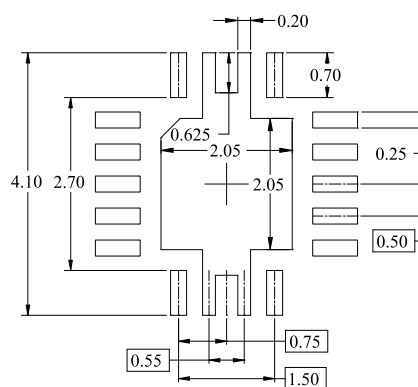
TOP VIEW



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	-	0.050
A2	0.200 REF		
D	3.900	4.000	4.100
E	3.900	4.000	4.100
D1	1.950	2.050	2.150
E1	1.950	2.050	2.150
b	0.200	0.250	0.300
b1	0.150	0.200	0.250
e	1.300 BSC		
e1	0.650 BSC		
e2	1.300 BSC		
e3	0.650 BSC		
k	0.220	0.320	0.420
L	0.300	0.400	0.500
L1	0.225	0.325	0.425

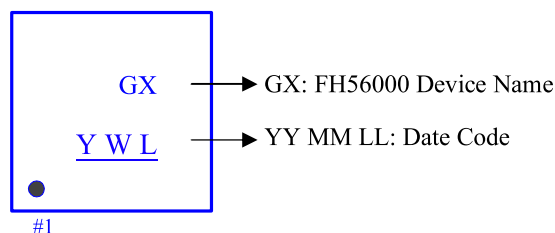
NOTE: This drawing is subject to change without notice.

## ORDERING INFORMATION

Part Number	Input Voltage	Features	Operating Temperature	Package Type	Top Mark	SPQ
FH56000N14	5.0V ~ 28.0V	<ul style="list-style-type: none"> <li>• DC-DC buck (step-down)</li> <li>• VFB: 0.8V</li> <li>• Frequency: 150kHz ADJ</li> <li>• Output Current: 5.0A</li> <li>• Duty cycle: 80%</li> </ul>	-40°C to +85°C	QFN4*4-14L	GX <u>YWL</u>	3000EA/Reel

**Note:**

- **FH56000** 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: DFN4.0\*4.0-14L****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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