

36.0V/10A, 1.2MHz, Buck(Step-Down) Switching Regulator

Description

FH 56001 is a PWM controller, designed for high performance synchronous buck DC-DC applications with input voltages 4.5V to 32.0V(36.0V maximum).

FH56001 employs Constant ON time control. The switching frequency could be set to 150kHz, 300kHz, 600kHz or 1200kHz based on different resistor value between FREQ pin and GND pin. The device also features a programmable soft-start function and offers all kinds of protection features including cycle-by-cycle current limiting, input under voltage lockout (UVLO), output over voltage protection (OVP), input Over Voltage Protection, thermal shutdown and output short protection etc.

FH56001 provides voltage control loop, constant current loop, and thermal regulation loop.

Typical Application Schematic

Features

- 4.5V to 36.0V wide operating input range
- 10.0A continuous output current capability
- Dynamical programming of output current and Output voltage using PWM signal or analog signal
- Adjustable Switching Frequency using resistor
- Frequency dithering for good EMI performance
- Integrated 2.0A MOSFET Gate Drivers
- Comprehensive protection features including Output Short Protection(OSP), Cycle-by-Cycle input and output Peak Current Limit, thermal regulation, thermal shutdown, input UVLO, input OVP, output OVP etc.
- Output Average Current Limiting with stable CC loop
- 5.0V/55mA low Iq LDO to power system MCU
- Package type: QFN4x4-20L

Applications

- Automotive Start-Stop Systems
- Industrial PC Power Supplies
- USB Power Delivery

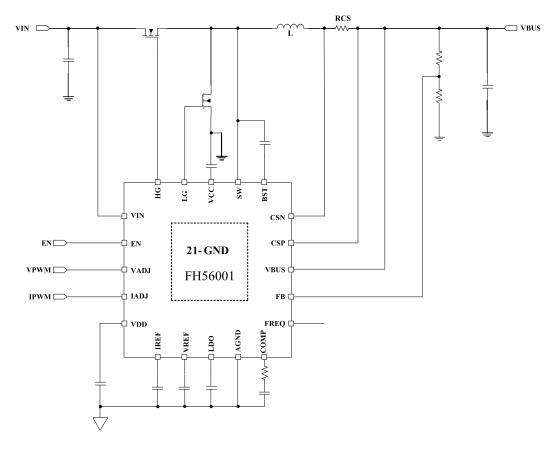


Figure 1. Basic Application Schematic



Pin Configuration

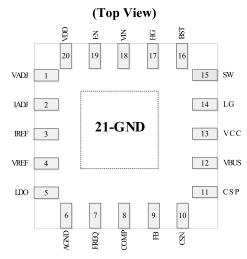


Figure 2. Pin Function (QFN4x4-20L)

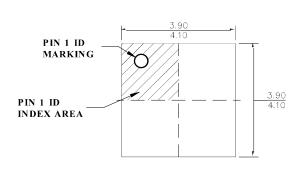
Pin Functions

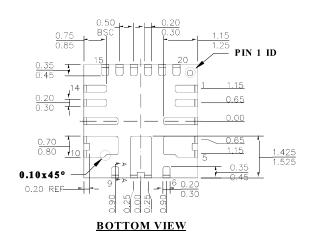
Pin		D 1.4				
Number	Name	- Description				
1	VADJ	Connect a 0-2V analog voltage or a PWM signal to program voltage reference on VREF pin. Connect this pin to VDD will force VREF to constant 2.0V.				
2	IADJ	Connect a 0-2V analog voltage or a PWM signal to program voltage reference on IREF pin. Connect this pin to VDD will force IREF to 2.0V.				
3	IREF	Reference voltage for input and output current limiting loop.				
4	VREF	Voltage reference for voltage control loop.				
5	LDO	Low quiescent current 5.0V/55mA LDO. Directly powered from VIN pin. LDO can be used as power supply for application processor such as MCU. When EN is low, only this LDO will be active to power MCU and keep low quiescent current for the whole system.				
6	AGND	Analog ground				
7	FREQ	Connect to GND to set the switching frequency at 150kHz. Connect this pin to VDD to set switching frequency at 300kHz. Connect to a resistor divider between VDD and GND to set frequency to 600kHz and 1.0MHz.				
8	COMP	Error Amplifier output.				
9	FB	VBUS voltage feedback. Connect a resistor divider between VBUS and GND to FB to program VBUS voltage in battery discharging mode.				
10	CSN	He minus input of output current sense.				
11	CSP	The positive input of output current sense.				
12	VBUS	VBUS voltage				
13	VCC	6.6V power supply for high side and low side driver				
14	LG	Low side MOSFET driver output.				
15	SW	Connect this pin to the Switching point of the power stage.				
16	BST	Boost pin for high side MOSFET driver.				
17	HG	High side MOSFET driver.				
18	VIN	Input voltage.				
19	EN	Logic high will enable the converter. Logic low will disable the whole FH56001 except LDO. Only LDO is working to power system MCU when EN is low. EN is pulled high internally by a high value resistor.				
20	VDD	5.4V power supply for FH56001 control core.				



Packaging Information

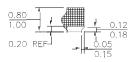
Type: DFN4*4-20L





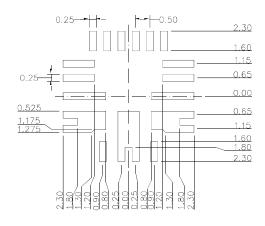
TOP VIEW





SIDE VIEW





RECOMMENDED LAND PATTERN

NOTE:

- 1) THE LEAD SIDE IS WETTABLE.
- 2) ALL DIMENSIONS ARE IN MILLIMETERS.
- 3) LEAD COPLANARITY SHALL BE 0.08 MILLIMETERS MAX.
- 4) JEDEC REFERENCE IS MO-220.
- 5) DRAWING IS NOT TO SCALE.



ORDERING INFORMATION

Part Number	Voltage Range	Features	Operating Temperature	Package Type	Top Mark	SPQ
FH56001D20	4.5V ~ 36.0V	 Synchronous Buck(Step-down) 96% Efficiency VFB Voltage: 2.0V Vout: ADJ Switching Frequency: 150kHz/300kHz/600kHz/1.2MHz Output Current: 10.0A 	-40°C to 125°C	QFN4.0*4.0 -2 0L	FH56001 YY MM LL	4000PCS/Reel

Note:

- > FH56001 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.
- > ForDevices reserves the right to amend and legally interpret the electrical parameters of this chip device.



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.















Note:

- > The information described herein is subject to change without notice.
- > ForDevices Inc. is not responsible for any problems caused by circuits or diagrams described herein whose related industrial properties, patents, or other rights belong to third parties. The application circuit examples explain typical applications of the products, and do not quarantee the success of any specific mass-production design.
- > Use of the information described herein for other purposes and/or reproduction or copying without the express permission of ForDevices Inc. is strictly prohibited.
- > The products described herein cannot be used as part of any device or equipment affecting the human body, such as exercise equipment, medical equipment, security systems, gas equipment, or any apparatus installed in airplanes and other vehicles, without prior written permission of ForDevices Inc.
- Although ForDevices Inc. exerts the greatest possible effort to ensure high quality and reliability, the failure or malfunction of semiconductor products may occur. The user of these products should therefore give thorough consideration to safety design, including redundancy, fire-prevention measures, and malfunction prevention, to prevent any accidents, fires, or community damage that may ensue.

▲ Update by Aug.2020