



40V Automobile uPMU with 5A Buck Converter and Dual 100mA LDOs

Features

- ◆ Input Voltage Range: 4~40V
- ◆ Excellent Line Transient, Compliant to ISO76375 Test Pulses
- ◆ One Buck Converter
 - Max I_{load} : 5A
 - HL8001FNQ01 V_{OUT} : 4.8-5.5V Programmable via I²C
 - HL8001FNQ01 V_{OUT} : 3.876-4.443V Programmable via I²C
 - Synchronous Operation with Integrated 50/40mΩ Switches
 - Excellent Line and Load Transient Response
 - Factory Programmed Switching Frequency by I²C: 1.4MHz to 1.7MHz
 - No External Schottky Diode or Compensating Circuit
 - PFM for Light Load Operation
 - Small Output Inductor: 1~2.2uH

- ◆ Two LDOs
 - Output Voltages: 5V and 3.3V
 - Max I_{load} : 100mA Each
 - Drop-out voltage: 25mV@ I_{out} =1mA
 - Internal Soft-start to Avoid In-rush Current
- ◆ 4-channel Analog voltage level Detectors
- ◆ Comprehensive Protection
 - Input over Voltage Protection
 - Input Under-voltage Lock-out
 - Buck and LDO Output over Current Protection
 - Over Temperature Protection
- ◆ 5mmx5mm QFN-24 Package

Applications

- Car Navigator
- Distributive Power Systems
- Automotive Infotainment and Entertainment Systems

Order Information

Part Number	Max Output Current (RMS)	LDO Maximum Output Current	I ² C Address	V _{OUT} Range	V _{OUT} Step	Default V _{OUT}	Package	Packing Method
HL8001FNQ01	5A	100mA	1101101	4.8V~5.5V	100mV	5.2V	QFN	Tape & Reel
HL8001FNQ02	5A	100mA	1101101	3.876V~4.443V	81mV	4.200V		



Typical Application Diagram

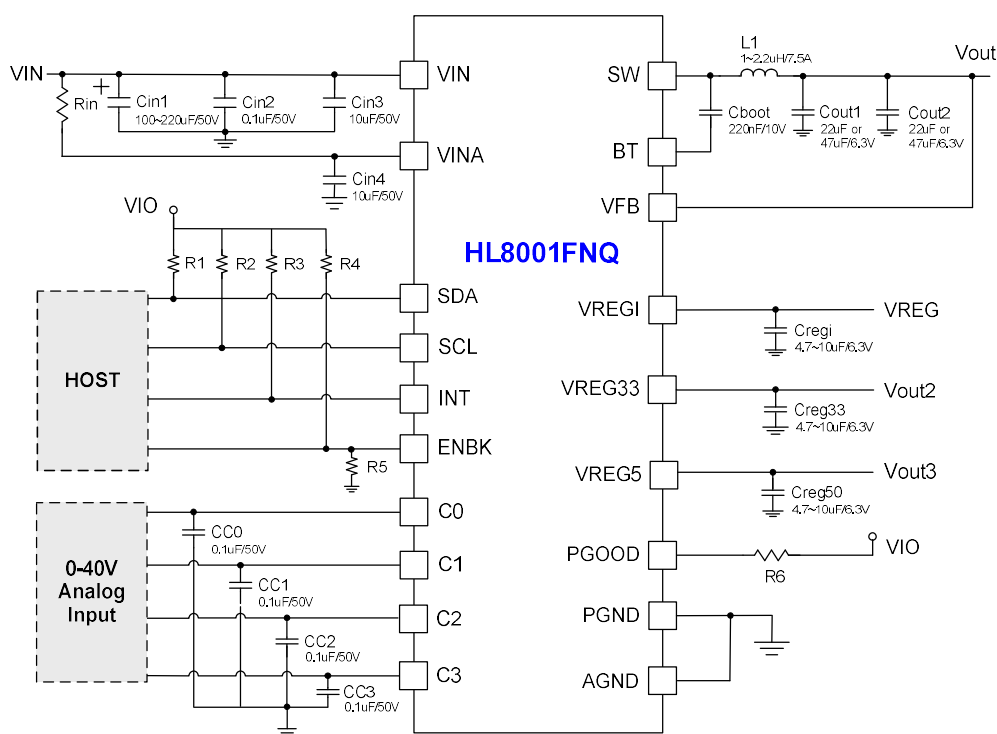


Figure 1 HL8001FNQ Typical Application Circuit

Name	Purpose	Value	Size
Cin1	Input Voltage capacitor	electrolytic 100~220µF 50V	-
Cin2	Input Voltage capacitor	0.1µF/50V	0805
Cin3	Input Voltage capacitor	10µF/50V	0805
Cin4	3.3V LDO, 5V LDO input capacitor	10µF/50V	0805
Rin	3.3V LDO, 5V LDO input Resistor(optional)	20Ω/1W	-
CC0~CC3	Analog Input capacitor	0.1µF/50V	0805
Creg33	3.3V LDO output capacitor	4.7~10µF/6.3V	0805
Creg50	5.0V LDO output capacitor	4.7~10µF/6.3V	0805
Cregi	VREGI LDO output capacitor	4.7~10µF/6.3V	0805
L1	DCDC output inductor	1~2.2µH/7.5A (Saturation Current)	-
Cout1, Cout2	DCDC output capacitor	22µF or 47µF/6.3V	0805
Cboot	Boot-strap cap for HS FET drive	220nF/10V	0805
R1, R2, R3, R4, R5, R6	Pull up resistance or pull Low resistance	10KΩ	0805

Table 1 Recommended External Components List



Description

HL8001FNQ is a 40V-maximum-input micro power management IC (uPMU) for automobile applications such as infotainment and entertainment system. It integrates one DCDC convertor and two LDOs to provide a compact solution to convert the automobile battery voltage to appropriate low supply rails for on-board electronic sub-systems. It also integrates four channels of analog level shifters to facilitate various detection needs.

The DCDC converter provides a 5.2V output supply with maximum 5A continuous load capacity, or 6.5A peak current for 100ms. The output voltage is adjustable in 100mV steps via I²C interface. Synchronous PWM operation with integrated low R_{dson} switches eliminates the need for external free-wheeling Schottky diode, and provides higher efficiency at the same time. A proprietary control scheme provides instant duty cycle change that exhibits superior load transient response compared to conventional current or voltage mode control loops. 1.6MHz PWM frequency allows the usage of small 1-2.2uH inductor, reducing PCB area. The PWM frequency is adjustable via I²C for EMI compliance.

Two LDOs provide 5.0V and 3.3V outputs, each with 100mA maximum load. Load transient performance is also optimized for these linear regulators.

Both the DCDC converter and LDOs are optimized for line transient cases in automobile environments, compliant to ISO7637 test pulses.

Four channel analog voltage level shifters are also integrated to convert various high-voltage (up to 40V) signals to logic levels suitable for system micro-processors.

HL8001FNQ has comprehensive protection schemes built in for reliable operation, including input over-voltage and under-voltage lock-out, buck and LDO output over-current protection, and over-temperature protection.

HL8001FNQ is AEC Q100 Grade 3 certified to operate in automotive environment with ambient temperature range from -40°C to +85°C. It is available in a 5x5x0.85mm QFN-24 Package.



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