



I²C Programmable 3A DVS Buck Converter

Features

- Input Voltage Range: 2.5V~5.5V
- Programmable Output Voltage:
 - 0.600V to 1.394V in 6.25 mV Steps
 - 0.550V to 1.277V in 5.73 mV Steps
- Maximum Output Current: 3A
- 2.4 MHz PWM with Seamless PWM/PFM Switching for Light-load Efficiency
- Dynamic Voltage Scaling (DVS) with Programmable Voltage Slew Rate
- Excellent Load and Line Transient
- Quiescent Current in PFM Tristate: 48μA
- I²C Interface with SM, FM, FM⁺ and HS Modes

- Comprehensive Protection
 - Input Under-Voltage Lockout (UVLO)
 - Input Over-Voltage Protection (OVP)
 - Over Current and Short-Circuit Protection
 - Thermal Shut-down
- 4mm x 3 mm 14-Pin DFN

Applications

- Application Processors
- Memory, Hard Disk Drive and SSD
- Smart Phones
- Tablets
- Handheld Devices



Order Information

Part Number	Default V _{OUT} after POR		Default mode after POR		Package	I ² C Address
	VSEL=0	VSEL=1	VSEL=0	VSEL=1		
HL7503FN01	1.15625V	1.15625V	Auto PFM	Forced PWM	DFN	1100 000
HL7503FN02	1.2625V	1.2625V	Auto PFM	Forced PWM	DFN	
HL7503FN04	1.300V	1.300V	Auto PFM	Forced PWM	DFN	

Note:

1. Packing Method: Tape & Reel;
2. Logic pin pull-down EN/VSEL/MODE: 250k Ω ;
3. For other default output voltage, mode, logic pin pull-down and I²C address options, contact a Halo Microelectronics sales representative.



Typical Application Diagram

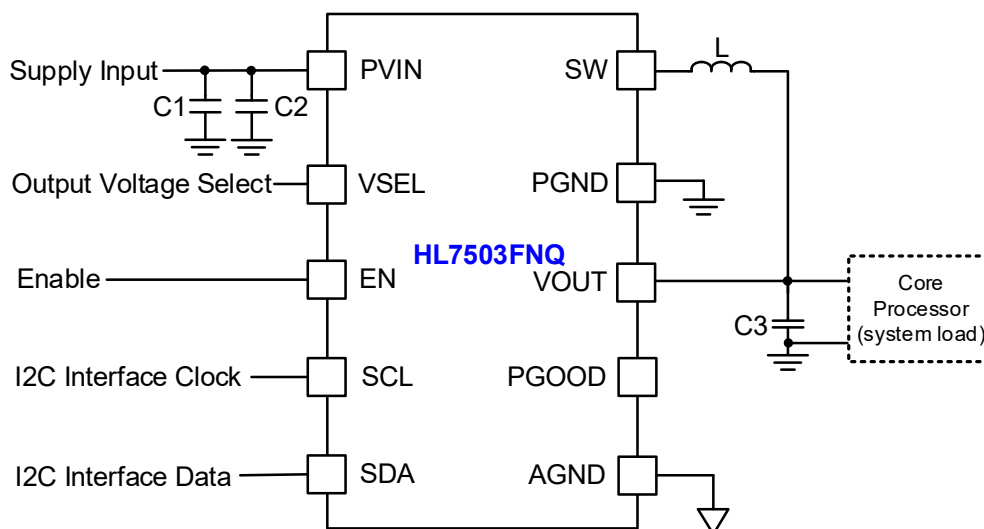


Figure 1 HL7503FNQ Typical Application Diagram

Component	Part Number	Value	Size	Vendor
L1	See Table2	470 or 330 nH	2016	See Table2
C1,C2	C1608X5R1A475K	4.7 μ F/10V	0603	TDK
C3	C1608X5R0J226M	4*22 μ F/6.3V	0603	TDK

Table 1 Recommended External Components

Manufacturer	Part Number	L (nH)	DCR(m Ω)	$I_{MAXDC}^{(1)}$	Component Dimensions		
					L	W	H
Toko	DFR201612C-R33N	330	23	4.2	2	1.6	1.2
Cyntek	PIFE20161B-R33MS	330	27	3.5	2	1.6	1.2
Toko	DFE201612C-R47N	470	40	3.2	2	1.6	1.2
Cyntek	PIFE20161B-R47MS-39	470	30	3.1	2	1.6	1.2
SEMCO	CIGT201610UMR47MNE	470	30	4	2	1.6	0.9

Table 2 Recommended Inductors

Notes:

- I_{MAXDC} is the smaller current to produce 40°C temperature rise or 30% effective inductance reduction.



Description

HL7503FNQ is a synchronous buck converter optimized to supply different sub systems of portable applications. Its input voltage range is 2.5V to 5.5V. Its output voltage range is 0.600V to 1.394V in 6.25mV steps or 0.550V to 1.277V in 5.73mV steps, programmed through an I²C interface. Its output voltage can be adjusted on the fly to provide Dynamic Voltage Scaling (DVS) function with a programmable slew rate.

HL7503FNQ can deliver up to 3A with 80% efficiency, while maintaining over 80% efficiency at load currents as low as 10mA. It operates at fixed frequency of 2.4MHz, which reduces the value of the external components. A wide range of output capacitors can be used to optimize V_{OUT} stability during load transients. Inductors from 0.33uH to 1.0uH may be used without affecting loop stability.

At moderate to light loads, Pulse Frequency Modulation (PFM) is used to maintain conversion efficiency with a

typical non-switching quiescent current of 48μA. Even with such a low quiescent current, HL7503FNQ maintains excellent load and line transient responses. At higher loads, the system automatically switches to fixed-frequency Pulse Width Modulation (PWM) operation at 2.4MHz for minimum V_{OUT} ripple and optimal load transient response. In Shutdown Mode, the supply current drops below 1μA, reducing power consumption. PFM Mode can be disabled if needed through MODE pin or I²C registers.

HL7503FNQ supports V_{OUT} remote sensing. Its feedback signal V_{OUT} can be connected close to the power supply pin of the load for a true point-of-load operation without affecting control loop stability.

The HL7503FNQ is available in a 4mm x 3 mm 14-pin DFN.



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