

HL7501

I²C Programmable 6A DVS Buck Converter

Overview

The HL7501 is a synchronous buck converter optimized to supply different sub systems of portable applications. Its input voltage range is 2.5-5.5V. Its output voltage range is 0.6-1.42V 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.

The HL7501 can deliver up to 6A while maintaining over 80% efficiency at load currents as low as 10mA. The maximum load current up to 7.5A can be supported for 50ms. 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 VOUT stability during load transients. Inductors from 0.33-1.0μH 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 60μA. Even with such a low quiescent current, the HL7501 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 VOUT ripple and optimal load transient response. In shutdown mode, the supply current drops below 1μA and reduces power consumption. The PFM Mode can be disabled if needed through I²C registers.

The HL7501 is available in a 20-bump, 0.4mm pitch, 2.0mmx1.6mm wafer-Level chip-scale package (CSP).

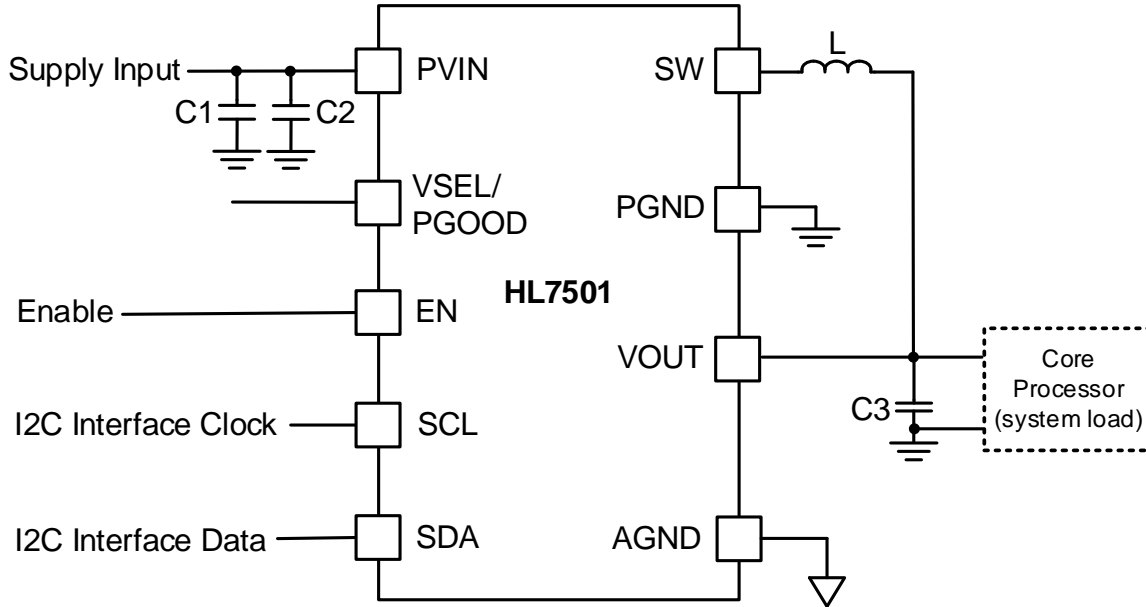
Features

- Input voltage ranges: 2.5-5.5V
- Programmable output voltage:
 - 0.600-1.420V in 10mV, 12.5mV, 12.826mV, or 12.967mV steps
- Maximum output current:
 - 6A continuous, 7.5A peak
- 2.4MHz 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: 60μA
- I²C interface with SM, FM, FM+, and HS modes
- Comprehensive protections
 - Input under-voltage lockout (UVLO)
 - Input over-voltage protection (OVP)
 - Over-current and short-circuit protections
 - Thermal shutdown
- 2.0mm x 1.6mm 20-bump chip-scale package

Applications

- Application Processors
- Graphic Processors
- Memory, Hard Disk Drive, and SSD
- Smartphones
- Tablets
- Handheld Devices

Simplified Application Diagram



Ordering Information

Part Number	Default V _{OUT} after POR		Max Output Current (RMS)	Max Pulse Current (50ms)	A1 Pin Func.	I ² C Address	V _{OUT} Range	V _{OUT} Step	Package	Packing Method
	VSEL=0	VSEL=1								
HL7501WE ¹	1.150V	1.150V	5A	7.0A	VSEL	1100000	0.600V ~ 1.3875V	12.5mV	WLCSP	Tape & Reel
HL7501WF	0.800V	0.800V	6A	N/A	VSEL	1100000	0.600V ~ 1.3875V	12.5mV		
HL7501W9	1.000V	1.000V	5A	N/A	VSEL	1000000	0.603V ~ 1.411V	12.826mV		
HL7501WA	1.000V	1.000V	5A	N/A	VSEL	1000001	0.603V ~ 1.411V	12.826mV		
HL7501WT ¹	1.10V	1.20V	5A	N/A	VSEL	1100000	0.603V ~ 1.411V	12.826mV		
HL7501W8	0.900V	off	5A	7.0A	VSEL	1100000	0.6V ~ 1.230V	10mV		

Note:

- (1) For HL7501WE and HL7501WT, EN pin=0 also resets the chip.
- (2) For other default output voltage, mode and I²C address options, contact Halo Micro Sales Representative.

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