

HL9001

High-Power PFC Controller

Overview

The HL9001 is a hybrid operation controller for Boost topology that operates in critical conduction mode and discontinuous conduction mode. In order to reduce the current harmonic components of conductive electromagnetic interference, the maximum switching frequency of the converter is limited to 125kHz. Through the valley synchronized frequency fold-back (VSFF) method, the switching frequency is linearly reduced at light loads. The lowest switching frequency is accurately limited to 30kHz, so the converter does not have audio noise and achieves better efficiency performance. In addition, an internal on-time compensation mechanism ensures near-unity power factor even when the switching frequency is reduced.

For improvement of no-load efficiency, the 8-kind valley switching delay time ensures that the HL9001 can reach the valley switching under different system designs with reduced switching loss. In addition, this device incorporates burst mode operation to improve light load performance to enable systems to meet challenging energy standards while eliminating energy consumption of the PFC switching.

The circuit is housed in a SOT23 package and incorporates the necessary features for robust and compact PFC stages with few external components. In addition, the HL9001 further provides the follower boost capability for a drastic size reduction of the PFC stage and an ultra-low consumption mode externally controlled by the disabled function.

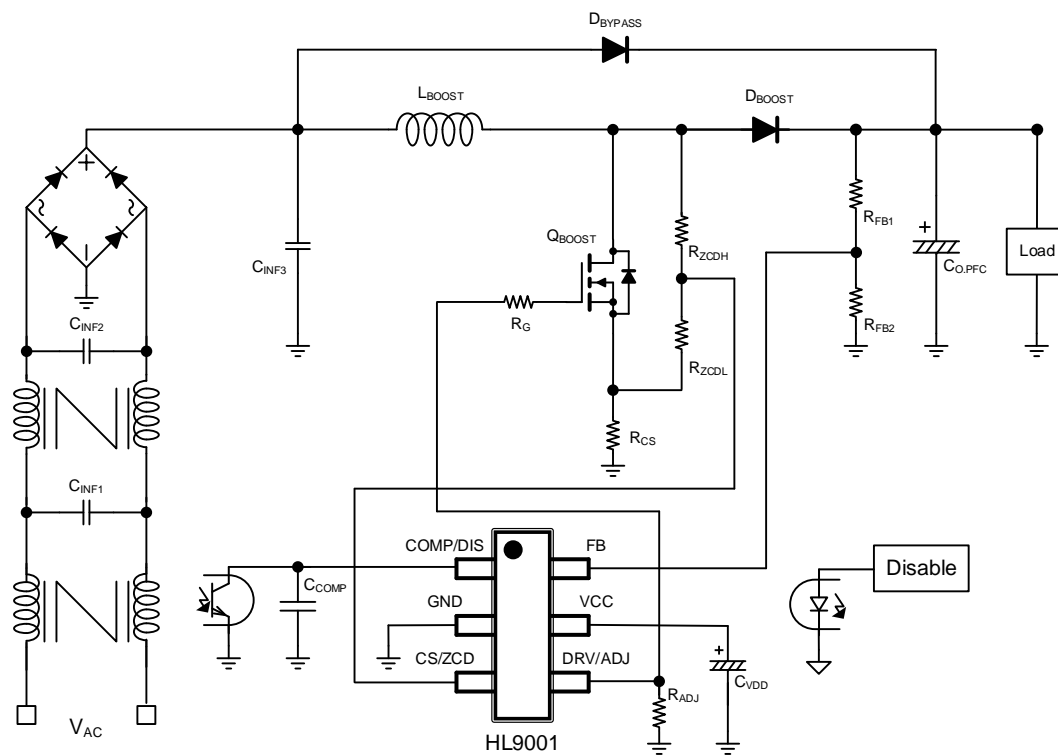
Features

- Excellent light load efficiency and high efficiency over wide load range due to multi-mode CrM and DCM control
- Valley synchronized frequency fold-back (VSFF): low frequency operation is forced at low current levels
- On-time modulation to maintain a proper current shaping in VSFF mode
- Enables low system cost through FET drain valley synchronized turn-on which eliminates need for second winding on the boost inductor
- Burst mode with soft-entry and soft-exit periods enables ultra-low audible noise output
- Enhanced error amplifier responds rapidly to load steps without degrading input current distortion
- User adjustable valley delay ensures valley switching
- 2-Level follower boost further reduces the inductor size
- The disabled function of the multi-function pin can use an external signal to control the controller to enter sleep mode for loss reduction.
- Wide VCC range: 8.5V to 40V
- Brown-in/out detection
- Output over-voltage protection
- Second independent output over-voltage protection
- Cycle-by-cycle current limit
- Low duty-cycle operation if the bypass diode is short
- Soft start for smooth start-up operation
- Integrated over-temperature protection
- Pin open/short detection features to help pass safety tests

Applications

- Desktop Computing and Digital TV
- Gaming, Set-top Box, AC Adapter Front End
- LED Drivers and Luminaries
- Industrial and Medical Power Supplies, e-Bike Chargers, Power Tools Chargers
- USB-PD
- All Off-line Appliances Requiring Power Factor Correction

Simplified Application Diagram



Ordering Information

Part Number	Operating Temperature Range	Package	Packing Method
HL9001	-40°C to +125°C	SOT-23	Tape & Reel

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