FAIRCHILD SEMICONDUCTOR®

November 2013

FAN7930B
Critical Conduction Mode PFC Controller

Features

- Additional OVP Detection Pin
- V_{IN}-Absent Detection
- Maximum Switching Frequency Limitation
- Internal Soft-Start and Startup without Overshoot
- Internal Total Harmonic Distortion (THD) Optimizer
- Precise Adjustable Output Over-Voltage Protection
- Open-Feedback Protection and Disable Function
- Zero Current Detector (ZCD)
- 150 µs Internal Startup Timer
- MOSFET Over-Current Protection (OCP)
- Under-Voltage Lockout with 3.5 V Hysteresis
- Low Startup and Operating Current
- Totem-Pole Output with High State Clamp
- +500/-800 mA Peak Gate Drive Current
- 8-Pin, Small-Outline Package (SOP)

Applications

- Adapter
- Ballast
- LCD TV, CRT TV
- SMPS

Description

The FAN7930B is an active power factor correction (PFC) controller for boost PFC applications that operate in critical conduction mode (CRM). It uses a voltage-mode PWM that compares an internal ramp signal with the error amplifier output to generate a MOSFET turn-off signal. Because the voltage-mode CRM PFC controller does not need rectified AC line voltage information, it saves the power loss of an input voltage sensing network necessary for a current-mode CRM PFC controller.

FAN7930B provides over-voltage protection (OVP), open-feedback protection, over-current protection (OCP), input-voltage-absent detection, and under-voltage lockout protection (UVLO). The additional OVP pin can be used to shut down the boost power stage when output voltage exceeds OVP level due to the resistors that are connected at INV pin are damaged. The FAN7930B can be disabled if the INV pin voltage is lower than 0.45 V and the operating current decreases to a very low level. Using a new variable on-time control method, total harmonic distortion (THD) is lower than in conventional CRM boost PFC ICs.

Related Resources

AN-8035 — Design Consideration for Boundary Conduction Mode PFC Using FAN7930

Ordering Information

Part Number	Operating Temperature Range	Top Mark	Package	Packing Method
FAN7930BMX_G	-40 to +125°C	FAN7930BG	8-Lead, Small-Outline Package (SOP)	Tape & Reel

Application Diagram

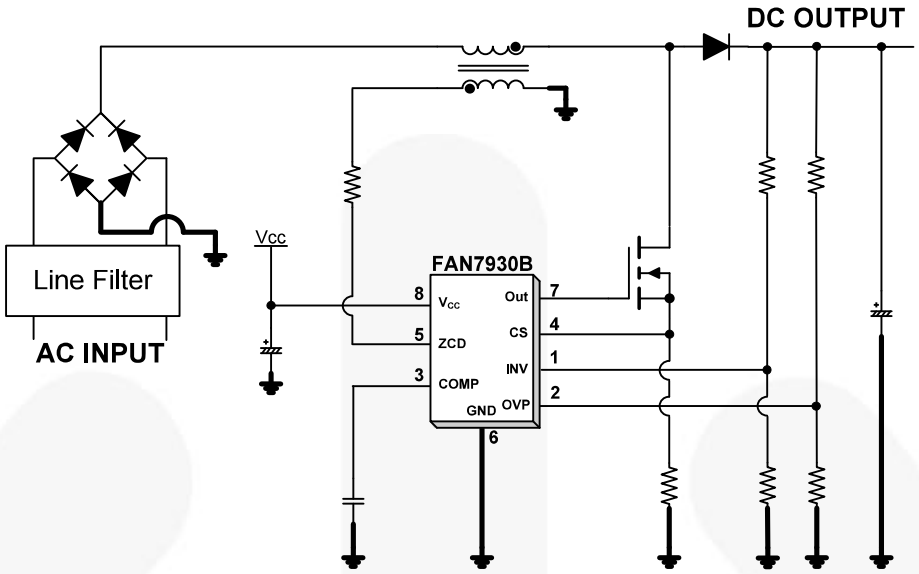

Figure 1. Typical Boost PFC Application

Internal Block Diagram

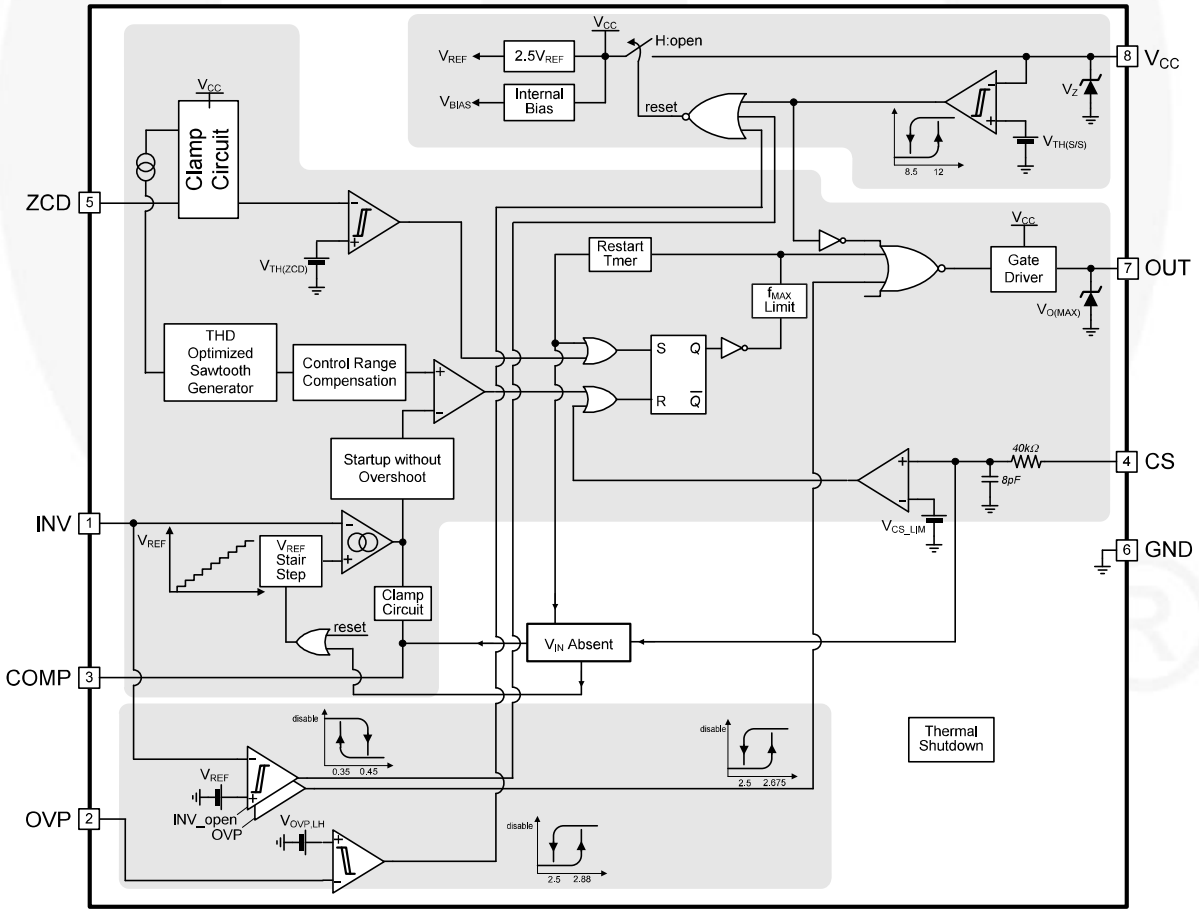

Figure 2. Functional Block Diagram

Pin Configuration

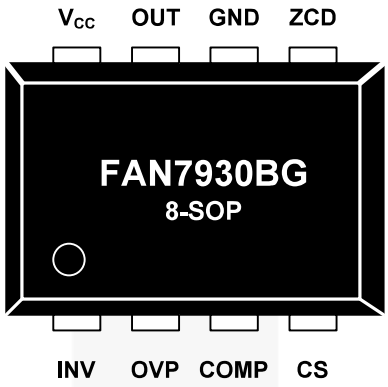

Figure 3. Pin Configuration (Top View)

Pin Definitions

Pin #	Name	Description
1	INV	This pin is the inverting input of the error amplifier. The output voltage of the boost PFC converter should be resistively divided to 2.5 V.
2	OVP	This pin is used to detect PFC output over voltage when INV pin information is not correct.
3	COMP	This pin is the output of the transconductance error amplifier. Components for the output voltage compensation should be connected between this pin and GND.
4	CS	This pin is the input of the over-current protection comparator. The MOSFET current is sensed using a sensing resistor and the resulting voltage is applied to this pin. An internal RC filter is included to filter switching noise.
5	ZCD	This pin is the input of the zero-current detection (ZCD) block. If the voltage of this pin goes higher than 1.5 V, then goes lower than 1.4 V, the MOSFET is turned on.
6	GND	This pin is used for the ground potential of all the pins. For proper operation, the signal ground and the power ground should be separated.
7	OUT	This pin is the gate drive output. The peak sourcing and sinking current levels are +500 mA and -800 mA, respectively. For proper operation, the stray inductance in the gate driving path must be minimized.
8	V_{CC}	This is the IC supply pin. IC current and MOSFET drive current are supplied using this pin.