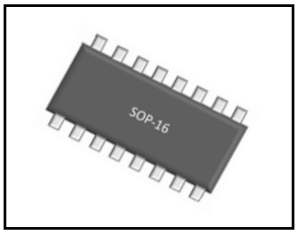
UR3311

SmartPower Enabled Combo Controller for High PF LED Lighting

Overview:



UR3311 is a high performance AC/DC off-line power supply controller for LED luminaries. The UR3311 combines power factor correction and LED current regulation into one controller. It achieves PF>0.95 and TH<10% for 100-277Vac input voltage range.

UR3311 can be designed into an isolated two stage switching power lighting system which includes Boost and Flyback converters. It also can be designed into a non-isolated two stage switching power lighting system which includes Boost and Buck converters. This greatly simplifies customer's design for different types of lighting applications.

A patented SmartPower supply method enabled UR3311 to have fast startup and low IC supply consumption. The UR3311 operates in boundary-current and quasi-resonant modes for both switching converter stages to provide highest efficiency in the industry. With Bps's patented circuits integrated inside, the UR3311 allows customer to use single winding inductor for BOOST stage, two windings transformer for Flyback stage and single winding inductor for buck stage which greatly simplify application circuit and reduce the system cost.

The device uses Bps's advanced primary-side sensing technology to achieve excellent line and load regulation (<+/-1.5%) without secondary-feedback circuit. UR3311 is the lowest external cost and highest performance solution compared with current two-stage off-line solutions in the market.

Features:

1. isolated or non-isolated AC/DC LED driver
2. With unique patented ZCD and Smart High voltage IC power supply methods UR3311 saves great external components
3. PF>95%, THD<10%
4. <5% 100Hz/120Hz output current ripple
5. Boundary current mode and Quasi-Resonant control to achieve Ultra high conversion efficiency
6. Tight mass production current tolerance at ±3% in mass production
7. Under 0.5 second startup time
8. Excellent line/load regulation
9. CS open circuit protection
10. Cycle-cycle peak current limitation
11. LED Open/Short circuit protection
12. BOOST output over voltage protection
13. Input voltage brown out detection
14. BOOST's output voltage is using an advanced dynamic adjusting method according to AC input voltage which achieves the highest efficiency for wide input application.
15. Natural X-cap discharge function by Bps's smart power supply method which improves both the efficiency and safety.

Typical Application:

1. Typical isolated (Boost+Flyback) lighting application diagram

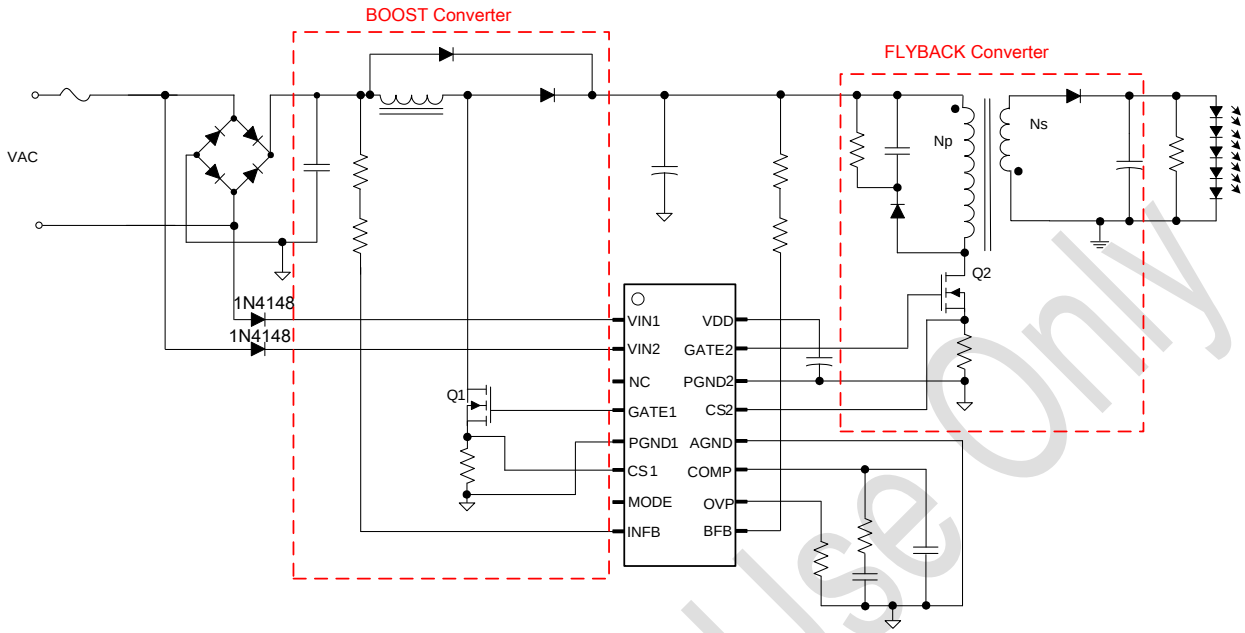


Fig.1 A typical isolated lighting application circuit

2. Typical non-isolated (Boost+Buck) lighting application diagram

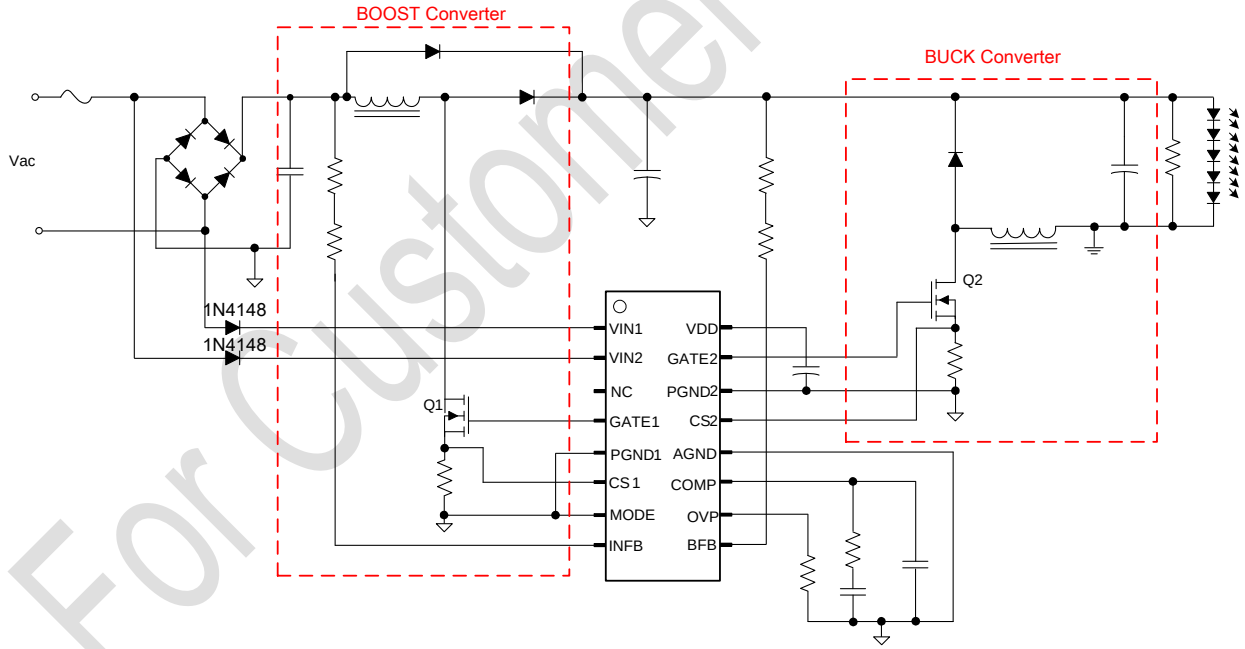
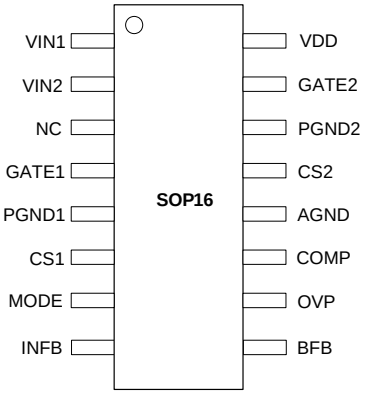


Fig.2 A typical non-isolated lighting application circuit

Pin Description:



Device	Pin Count	Package	Junction Temperature
UR3311	16	SOP-16	-40°C - +150°C

Pin	Symbol	Description
1	VIN1	High voltage input via a diode connected to L or N AC line. High voltage SmartPower inside to control the VIN's charge current.
2	VIN2	High voltage input via a diode connected to L or N AC line. High voltage SmartPower inside to control the VIN's charge current.
3	NC	Non-connection
4	GATE1	Gate switch for boost transistor, connected to a MOSFET's gate.
5	PGND1	Power ground for boost stage.
6	CS1	Current sense for boost transistor, used for cycle-by-cycle peak current limit.
7	MODE	Isolated or non-isolated mode selection. Mode=Float, UR3311 is used for Flyback isolated application. Mode=GND, UR3311 is used for Buck non-isolated application.
8	INFB	Input voltage sense.
9	BFB	Boost stage output voltage feedback, used to set boost output voltage.
10	OVP	Output over voltage protection pin, programmed by a resistor
11	COMP	Compensation network for Boost converter, Output of the error amplifier. Connect capacitors and resistor from this pin to ground to set the frequency response of the LED current regulation loop.
12	AGND	Analog ground.
13	CS2	Flyback primary side or Buck power switching current sense, used to set output LED current.
14	PGND2	Power ground for Flyback or Buck stage.
15	GATE2	Gate switch for Flyback or Buck transistor, connected to a MOSFET's gate.
16	VDD	Power supply, this pin provides bias power for the IC during startup and steady state operation.