

HVLED815PF

One-chip LED driving solution with high power factor



High power factor off-line LED driver with constant output current and primary-sensing regulation (PSR).

ST's HVLED815 is a high-voltage primary switcher designed to operate directly from the rectified mains with minimum external parts and with a high power factor to provide an efficient, compact and cost-effective solution to drive LEDs. This IC combines a high-performance PWM controller chip and an 800 V, avalanche-rugged power MOSFET, in the same package. The PWM is a peak current-mode controller IC specifically designed for quasi resonant (QR) flyback LED drivers, with constant output current (CC) regulation using primary sensing feedback.

KEY FEATURES

- High power factor (>0.94)
- 3 % accuracy on constant LED output current with primary control
- Optocoupler not needed
- 800 V avalanche-rugged internal power MOSFET
- Internal high-voltage start-up
- Quasi-resonant operation mode
- Safe against open or shorted LED string
- Automatic self supply
- Input voltage feed-forward for mains independent constant-current regulation
- SO16N package

KEY BENEFITS

- Highly efficient solution thanks to the high power factor
- Reduced external part count to allow very small form factors and simplified design
- Robustness and compactness is guaranteed thanks to the internal power MOSFET and HV start up
- Accurate primary-current control avoids the use of secondary sensing, reducing costs and complexity

TARGETED APPLICATIONS

- AC-DC LED driver applications
- LED retrofit lamps

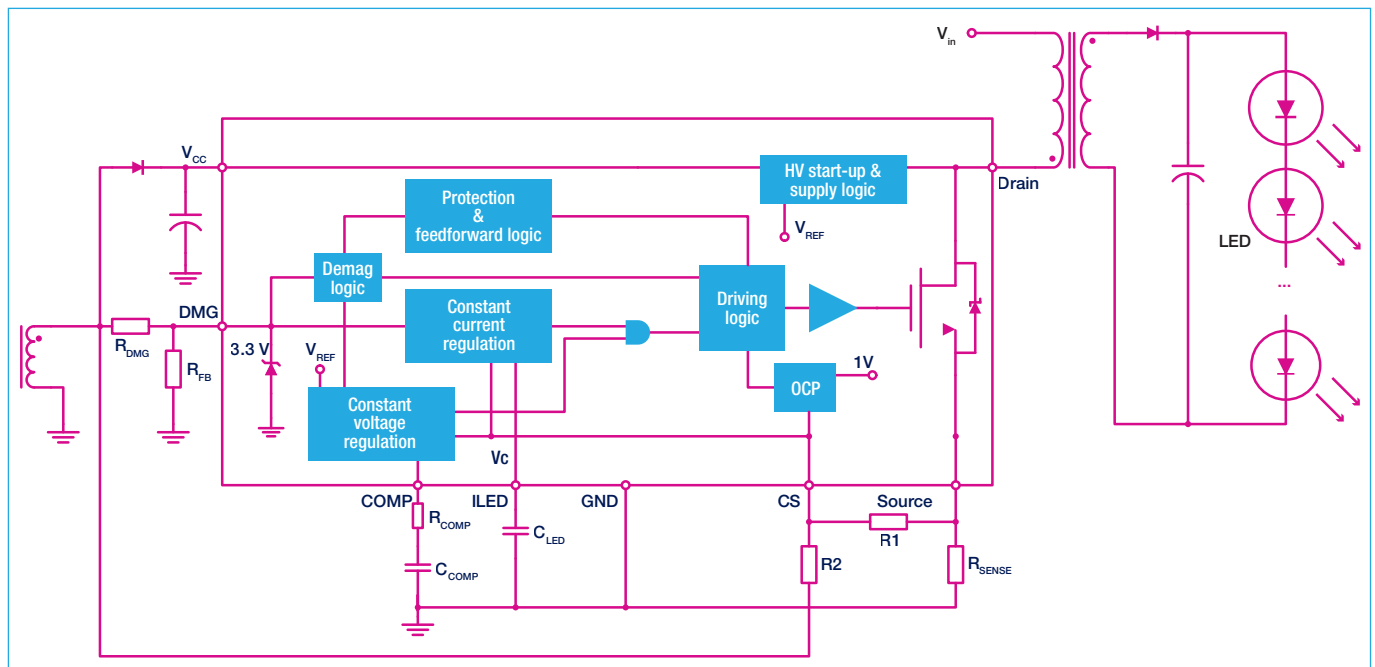


EFFICIENT COMPACT ROBUST SOLUTION IN ONE-CHIP

By combining a state-of-the-art low-voltage technology for the controller and an extremely robust 800 V technology for the power MOSFET in the same package, ST offers an efficient, compact and cost-effective solution to drive LEDs directly from the rectified mains. Its compactness makes the HVLED815PF the perfect solution to fit into very space-limited applications, such as lamp LED retrofits and compact AC-DC LED driver applications.

The very high power factor guarantees compliance with new standards and regulations such as Energy Star. The PWM is a current-mode controller IC specifically designed for quasi resonant (QR) flyback LED drivers, with constant output current (CC) regulation using primary-sensing feedback. This eliminates the need for an optocoupler, a secondary voltage reference and current sense on the secondary side, still maintaining high LED current accuracy. Moreover, it guarantees safe operation when a short circuit of one or more LEDs occurs. In addition, the device can also provide a constant output voltage regulation (CV) so the application can work safely when the LED string opens due to a failure. Quasi-resonant operation is achieved by means of a transformer demagnetization sensing input that triggers turn-on of the MOSFET. This input also serves as both an output voltage monitor to perform CV regulation, and input voltage monitor to achieve mains-independent CC regulation (line voltage feed forward). Although an auxiliary winding is required in the transformer to correctly perform CV/CC regulation, the chip is able to power itself directly from the rectified mains. This is useful especially during CC regulation, where the flyback voltage generated by the winding drops. The device also offers protection features that considerably increase the end product's safety and reliability: shorted secondary rectifier or transformer saturation detection. All offer auto restart mode.

APPLICATION BLOCK DIAGRAM



HIGH-VOLTAGE OFF-LINE LED DRIVER FAMILY

Part number	Main application power range	Internal power MOS	Output Current accuracy	Power Factor	Package	Evaluation board
HVLED815PF	Up to 15 W in 230 V mains	6 Ω (typ. T_{AMB}) 800 V	$\pm 3\%$	$>0,94$	S016N	On demand
HVLED807PF	Up to 10 W in 230 V mains	11 Ω (typ. T_{AMB}) 800 V	$\pm 3\%$	$>0,94$	S016N	On demand
HVLED805	Up to 8 W in 230 V mains	11 Ω (typ. T_{AMB}) 800 V	$\pm 5\%$	N.A.	S016N	EVALHVLED805 STEVAL-ILL037V1

