

Marvell 88EM8183

Deep Dimming Single-Stage AC/DC LED Driver IC for Replacement Offline LED Lamps and Luminaires



PRODUCT OVERVIEW

The Marvell® 88EM8183 is a deep dimming single-stage AC/DC constant current controller designed for offline dimmable LED lighting applications. Through Marvell’s innovative mixed-signal architecture and signal processing technology, 88EM8183 delivers down to 1% deep dimming and the highest compatibility with a wide range of wall box (TRIAC) dimmers. 88EM8183 implements a unique primary side current control mechanism achieving very tight output current regulation over wide range AC input. It deploys the Quasi Resonant Control (QRC) and valley switching method with Power Factor Correction (PFC) offering high efficiency, high power factor, low harmonic distortion, and low Electromagnetic Interference (EMI).

The 88EM8183 significantly reduces external components required for a dimmable LED driver. The primary side control topology eliminates the need to use opto-couplers and any other associated secondary feedback circuit, thus improving system reliability. The embedded digital core and analog circuit manages dimmer load requirements and also eliminates the need to use external bleeder circuits. In addition, 88EM8183 integrates a high voltage start up power supply circuit, hence eliminates the usage of external start up circuits. The dramatic reduction in component count enables LED lighting adoption in cost and space challenged applications such as retrofit lamps.

TARGET APPLICATIONS

The Marvell 88EM8183 is ideally suited for the following LED lighting applications:

- Retrofit A19, GU-10, PAR, and BR lamps
- Downlight, recess, troffer, and panel lighting
- LED modules

88EM8183 TYPICAL APPLICATIONS SCHEMATIC DIAGRAM

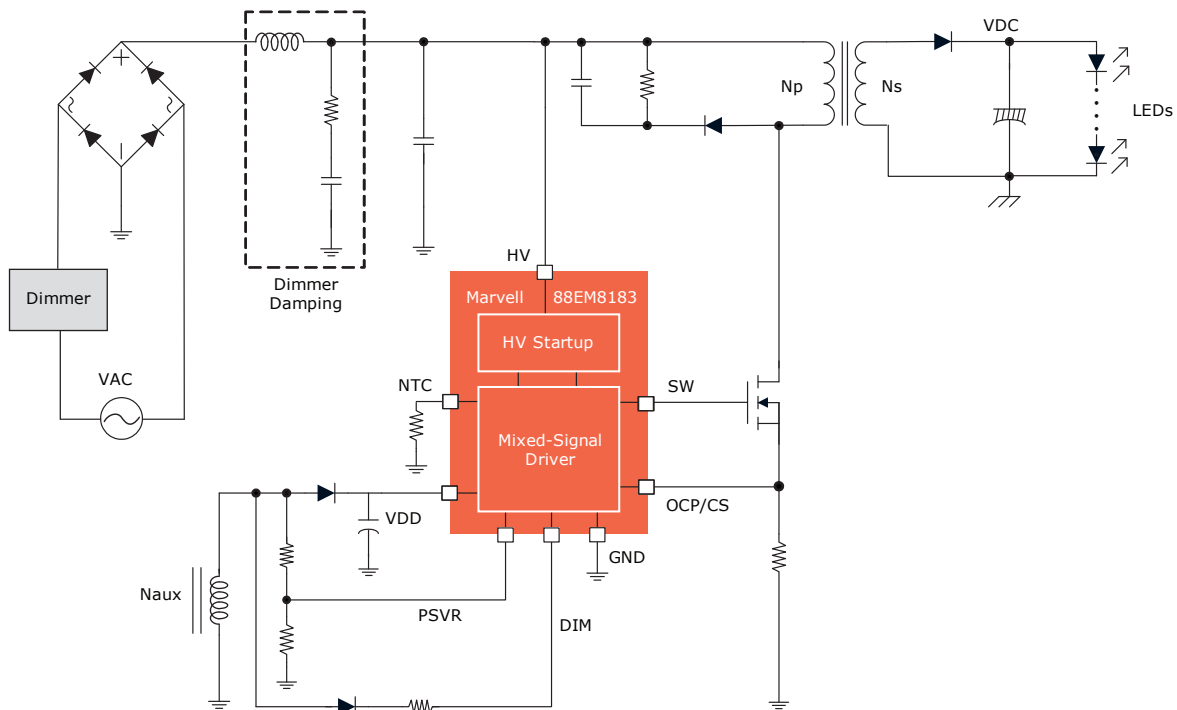


Fig 1. 88EM8183 Typical Application Block Diagram – Phase-Cut Dimmable Single-Stage Flyback (isolated)

▶ FEATURES

- Advanced dimming control to support all types of dimmers including leading-edge (TRIAC), trailing-edge and special (smart) dimmers
- Programmable deep dimming control to comply with NEMA SSL-6 dimming curve
- Accurate primary side current regulation
 - +/- 2% output current accuracy over wide range AC input
- On-chip high voltage start-up circuit
- Quasi Resonant Control (QRC) with Power Factor Correction (PFC)
- Valley switching
- Soft startup for reduced voltage stress
- Built-in protection for open circuit, short circuit, and over-temperature
- Pulse-skipping for low standby power consumption
- SOIC-8-EP package
- Junction temperature: -40 to 150°C

▶ BENEFITS

- Highest dimmer compatibility in industry
 - Compatible with vast majority of wall box dimmers
 - Fully comply with NEMA SSL 6 dimming standard
- Best dimming performance
 - Incandescent-like dimming experience: down to 1% deep dimming, no flicker, no shimmer
- High efficiency - up to 90%
- High power factor - > 0.95
- Low THD - <20%
- Lowest component count in its class
 - Eliminates opto-coupler and secondary feedback circuit
 - Eliminates startup power supply circuit
 - Eliminates dimmer bleeder circuit
- Smallest driver PCB space in its class
 - Fits in majority of replacement bulb form factors

▶ 88EM8183 DRIVER IC

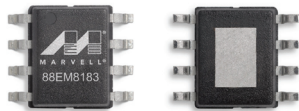


Fig 2. IC - Front / Back (enlarged)

▶ EVALUATION BOARD

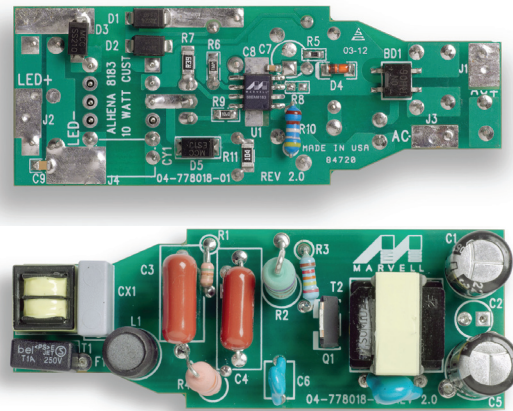


Fig 3. Evaluation Board - Front / Back (actual size)

THE MARVELL ADVANTAGE: Marvell chipsets come with complete reference designs which include board layout designs, software, manufacturing diagnostic tools, documentation, and other items to assist customers with product evaluation and production. Marvell's worldwide field application engineers collaborate closely with end customers to develop and deliver new leading-edge products for quick time-to-market. Marvell utilizes world-leading semiconductor foundry and packaging services to reliably deliver high-volume and low-cost total solutions.

ABOUT MARVELL: Marvell is a leader in storage, communications, and consumer silicon solutions. Marvell's diverse product portfolio includes switching, transceiver, communications controller, processor, wireless, power management, and storage solutions that power the entire communications infrastructure, including enterprise, metro, home, storage, and digital entertainment solutions. For more information, visit our Web site at www.marvell.com.



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