Marvell 88EM8801

Dual-string Intelligent PWM Dimming DC/DC Buck LED Driver for Professional and Consumer LED Lights

PRODUCT OVERVIEW

The Marvell® 88EM8801 is the first device from the new 8800 family, it is an intelligent dual-string PWM Dimming LED Driver based on DC/DC Buck topology. Using high levels of integration and advanced mixed-signal technology, Marvell is able to pack high-end lighting features into a single chip that would otherwise require multiple driver chips, a micro-controller and many discrete components to implement. The on-chip intelligent digital controls and ultra-small form factor enables customers to introduce superior lighting features and controls into mainstream professional and consumer lighting products.

The 88EM8801 device works at high switching frequency, continuously selectable from 200kHz to 800kHz, and offers an elevated level of integration having four internal power MOSFETs. These features lead to smaller system form factor and lower Bill of Materials (BOM) costs.

The 88EM8801 device controls two LED strings using PWM current control. Intelligent digital control allows for 10bit PWM dimming resolution and up to 0.1% deep dimming capability. The incorporated OTP memory block further allows the calibration of each string to its respective target LED current, during the final light fixture manufacturing. As a result, the 88EM8801 device enables the mass production of consistent light output, without using tight, hence expensive, binning LEDs. Moreover, the 88EM8801 device enables high quality light output in terms of warm CCT (correlated color temperature) and high CRI (color rendering index) by mixing red LEDs with cool white LEDs or bluish green LEDs.

The 88EM8801 device integrates I2C compatible Two Wire Serial Interface (TWSI) which can connect with different communication units, such as ZigBee®, PLC, Wi-Fi or others, for dimming and on/off control, enabling further energy efficiency through networked lighting control.

APPLICATIONS

Marvell 88EM8801 supports various LED lighting applications ranging from professional luminares to consumer light bulbs:

- Down lights and recessed lights
- PAR lamps
- A bulbs
- MR, AR and GU lamps
- LED modules

88EM8801 APPLICATIONS SCHEMATIC DIAGRAM

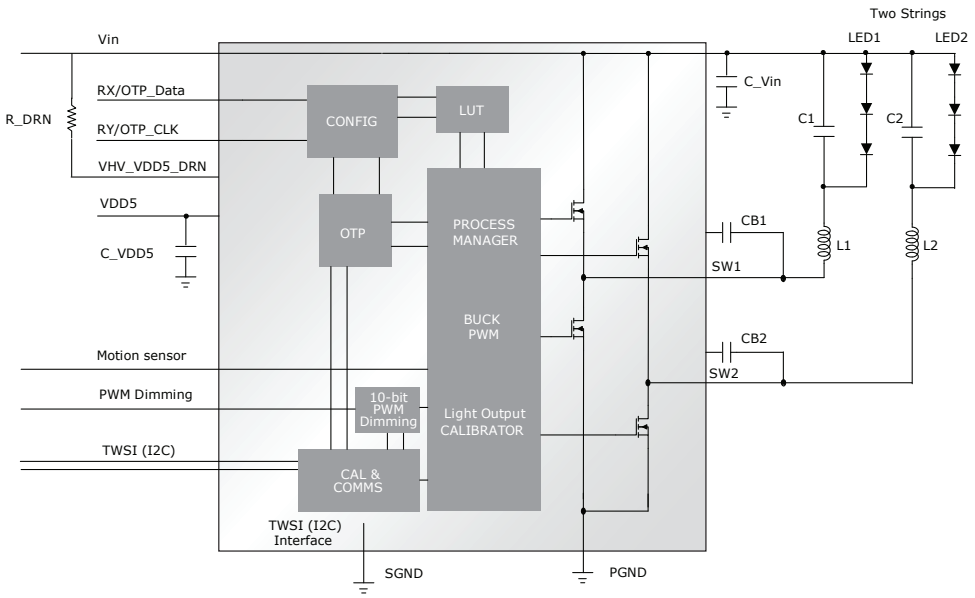

Fig 1. 88EM8801 Block Diagram

Marvell 88EM8801

FEATURES	BENEFITS
• Dual-string high efficiency LED driver with synchronous buck topology	• Independent LED string current calibration allows using loosely binned LEDs for reduced system cost
• Up to 1000 mA LED output current for first string and 500 mA for second string	• Independent control of two LED strings enables mixing of red LEDs with cool white or bluish green LEDs to achieve warmer color and higher CRI with higher efficacy
• Up to 40V input voltage	• High efficiency up to 95%
• Selectable buck switching frequency, within 200kHz and 800kHz range	• Digital interface for Networked lighting control
• Flexible OTP memory configuration capability for compensating the die-to-die light output variation	• High integration requires only inductors and few other discrete components for reduced BOM cost and PCB space
• 10-bit PWM dimming resolution.	• Minimize design effort by built-in intelligence
• Up to 0.1% deep dimming capability	
• PWM dimming input control	
• TWSI (I2C compatible) interface with ZigBee, PLC, WiFi	
• Input ripple cancellation	
• Soft startup	
• Over current protection	
• Over temperature protection	
• Under voltage lock-out	

88EM8801 DRIVER IC

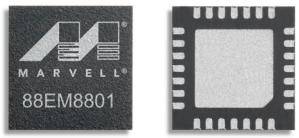

Fig 2. IC - Front / Back (enlarged)

EVALUATION BOARD

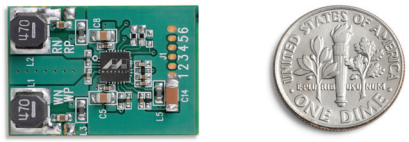

Fig 3. Evaluation Board - Front (actual size)

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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