Reference Design for 5-W LED Lamps Offers PFC and Flicker-Free TRIAC Dimming

Power Integrations, a leader in high-voltage integrated circuits for energy-efficient solid-state lighting, announced a reference design (RDK-251 [1]) for a 5-watt offline LED driver that includes flicker-free TRIAC dimming and single-stage power factor correction (PFC). The reference design is based on Power Integrations' LNK457DG, a member of the innovative LinkSwitch-PL *[2]* family of LED driver ICs optimized for compact, non-isolated installations.

The new reference design [1] provides a single constant-current output of 350 mA at a nominal LED string voltage of 15 V. The output current can be reduced using a standard AC mains TRIAC dimmer down to 1% (3 mA) without instability or flickering of the LED array. The supply is compatible with both low-cost, leading-edge dimmers and more sophisticated trailing-edge dimmers. It operates over the universal AC input range (85 VAC to 265 VAC, 47 Hz to 63 Hz) and can withstand an input range of 0 VAC to 300 VAC, improving field reliability and lifetime during line sags and swells.

Power factor is high (>0.9) and input current total harmonic distortion (THD) is low (<10% at 115 VAC and <15% at 230 VAC), meeting international requirements and enabling a single universal input design to be used worldwide. The new reference design is suitable for compact form factors due to its low component count of 38 passives and discretes (29 for non-dimming applications), in addition to the *LinkSwitch-PL* [2] device. Manufacturability and longevity are also enhanced by the elimination of passive components required in older LED driver designs, including bulky and unreliable high-voltage electrolytic capacitors. *LinkSwitch-PL* [2], like its isolated counterpart LinkSwitch-PH *[3]*, incorporates the controller and high-voltage power MOSFET into a single silicon die, simplifying PCB layout by further minimizing component count and eliminating parasitics between the controller and high-voltage power MOSFET.

The board fits inside a pear-shaped A19 LED replacement lamp with an E26/27 base. RDK-251 [1] contains full power supply specifications, schematic, bill of materials, transformer documentation, printed circuit board layout, and performance data.

According to Bill Weiss, lighting business development manager at Power Integrations: "This design enables SSL lamps with high-quality dimming, high power factor, low THD, small form factors, and high reliability. All regulatory requirements for energy efficiency are met or exceeded, and solid-state lighting manufacturers can create one platform design that operates in both low-line and high-line installations. For system designers, this compact, high-performance design speeds up their time-to-market."

LinkSwitch-PL *[2]* devices are available now in SO-8, eSOP™ and eDIP™ packages and are priced as low as $0.86 each for 10,000-piece quantities. RDK-251 [1] and RDR-251 [4] are available now on the Power Integrations website at www.powerint.com/rdk [1].

For more information, please visit www.powerint.com *[5]*.

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