LED driver optimized for commercial and wireless lighting

iWatt Inc. [1] debuted an innovative digital AC/DC LED driver platform designed to address cost, performance and operating life in commercial and wireless solid state lighting (SSL) systems. The first device in this new platform, the iW3630 [2] is a two-stage, Flickerless LED driver with output power up to 45W and is believed to be the first SSL LED driver with a built-in 0V to 10V dimming interface for commercial lighting ballasts. It also supports a PWM digital dimming interface for wireless SSL applications.

The highly integrated design of the iW3630 enables a 30% to 40%(1) savings in bill of materials (BOM) cost compared to competitive solutions in 0V to 10V applications and, unlike alternative solutions, it maintains an extremely high power factor (PF) even at loads down to 20% of full load. It also offers a low total harmonic distortion (THD) of < 15%, to meet stringent global energy regulations, along with a built-in over-temperature protection (OTP) and derating function to improve the predictability and reliability of system operating life.

The iW3630 achieves a 30% to 40% savings in BOM cost by integrating a number of design features. A built-in isolation transformer driver works directly with 0V to 10V dimming systems, eliminating the need for additional driver circuitry components and costly microcontrollers, while the PWM digital interface simplifies integration into wireless lighting systems.

In both commercial and wireless applications, the built-in over-temperature

protection and derating function means there is no need for additional components to control heat. Plus, iWatt's patented PrimAccurate primary-side control technology eliminates the need for a secondary-side regulator and optical feedback isolator, while EZ-EMI technology simplifies EMI filtering to further minimize the external component count. This combination of on-board functions results in a typical BOM of less than 70 components using the iW3630 compared to often more than 100 components needed using conventional SSL LED drivers. It also reduces the overall solution size and improves reliability.

The digital control architecture of the iW3630 simplifies ballast driver designs by allowing it to adapt to wide input and output conditions. This enables one configuration to support a wide range of LED string lengths to cover the full output power range. iWatt's analysis of one example lighting ballast portfolio using the iW3630 resulted in the ability to replace nine existing ballasts with just three, thus reducing the number of production models needed.

The iW3630 uses iWatt's Flickerless technology to eliminate flicker across the entire 1% to 100% dimming range, while providing tight, ±5% LED current regulation. Flickerless technology incorporates a power factor correction (PFC) circuit comprised of a chopping circuit. This circuit ensures high power factor and also virtually eliminates the input line-voltage frequency component.

The on-chip over-temperature protection and derating feature of the iW3630 monitors the temperature inside the ballast. When thermal conditions reach a point set by the system designer, the iW3630 LED driver automatically reduces the current drive to the LEDs, lowering the power dissipation and resulting in cooler overall operation. This avoids the risk of thermal runaway, ensures the temperature rating of the electrolytic capacitors in the lighting system is not exceeded, and allows a predictable operating life. Additional built-in protection features include LED open/short, input over-voltage, over-current, and current-sense resistor short protections.

iW3630 Key Features

- Output power: 3W to 45W
- Built-in 0-10V dimming interface, no need for driver circuit and MCU
- PWM digital interface eliminates auxiliary power supplies in wireless lighting systems
- Wide dimming range: 1% – 100%
- Flickerless technology eliminates LED flicker in entire dimming range
- Power factor > 0.95
- Total harmonic distortion (THD) < 15%
- High efficiency > 85% (typical)
- Integrated LED over-temperature protection and derating

Pricing, availability

The iW3630 is available now in production quantities. It comes in a standard, 14-lead SOIC package. Samples are available at $1.16 in 1000-piece quantities.

Product brief is available: iW3630 Product Brief [3].

http://www.iwatt.com [1]

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