

# LED drivers turn smart as LED lighting becomes more flexible

With LEDs moving into various application areas, their drivers need to be more efficient and cost effective. Read about the technological advances in this segment before you make a purchase decision

By Gunjan Piplani

LED lighting is gaining prominence in India because of its increasing energy efficiency, growing consumer awareness and the focus on green energy. According to a report by IESA-Frost & Sullivan on the Indian electronic system design and manufacturing (ESDM) industry, the Indian LED lighting market generated a revenue of US\$ 168.6 million in 2012 and is expected to reach a turnover of US\$ 440.7 million by 2015, growing at a CAGR of 38 per cent.

With this pace of growth, the efficiency of the product becomes paramount, which in turn is defined by the components used in its production.

One of the components, the LED ballast or driver, plays a key role in defining the life of the product. It accounts for nearly 20 per cent of the total cost of the components used in an LED light.

The IESA-Frost & Sullivan report further shows that currently, the LED driver market comprises both imports and locally manufactured products. Domestic companies, however, are setting up plants to manufacture drivers. But the missing link in the Indian ecosystem is local IP capabilities, though design registrations are encouraged.

## What's new in the market

LED drivers are used to convert voltage into a constant current, ensuring

### MEAN WELL'S LDB-L/LW SERIES

- Buck-boost design, constant current (CC mode) output
- 9-36V DC input/2-40V DC output
- High efficiency of up to 91 per cent
- Built-in PWM dimming function and remote ON/OFF controls
- Protections: Short circuit /over temperature
- UL 94V-0 flame-retardant plastic case
- -40~+71°C working temperature
- Dimension (L×W×H): 31.8×20.3×12.2 mm



### ON SEMICONDUCTORS' NCL30085

- Constant current control with primary side feedback
- Precise current regulation accuracy
- PF correction with low harmonic distortion
- Three dimmable steps of 70 per cent, 25 per cent and 5 per cent of full current
- Line feed-forward for enhanced regulation accuracy
- Wide VCC operating range
- User programmable thermal foldback
- Secondary diode short protection
- VCC under voltage and over voltage protection



the stable colour and brightness of the light. The drivers maintain a power supply to the LED while the input voltage changes.

Currently, the LED market has ballasts with a capacity ranging from 3W to 120W and above, informs Puneet Dhawan, senior VP and business head for the lighting business, Orient Electric.

The capacity shift depends on the wattage of the LED in which

the ballast is being used. Moreover, with LED lighting being used in areas that demand higher flexibility, the driver's design and efficiency is what will impact the LED's functioning. At present, there is a constant need to reduce chip sizes and increase the lumens per watt; so manufacturers are continuously working on the drivers to meet these challenges, thus helping to reduce the cost of

the final product.

Keeping in mind the reducing size of LEDs and allied products, ON Semiconductors has launched the NCL30085. This constant current LED driver has AC-DC power factor correction, and a flyback controller that targets isolated and non-isolated buck-boost/SEPIC. The controller operates in a quasi-resonant mode to provide optimal efficiency. The device has a control method that enables it to regulate a constant LED current from the primary side, thus removing the need for secondary side feedback circuitry, biasing and an optocoupler. This controller has integrated three-step log-dimming, which allows an LED bulb or luminaire to be dimmed from a standard wall switch.

Mean Well, a company focused on manufacturing LED drivers for a wide variety of LEDs, has launched a series of buck-boost, DC-DC potted module type of constant current LED drivers called the

### FAIRCHILD'S FL7733A

- $\pm 3$  per cent total constant current tolerance
- $\pm 1$  per cent with  $\pm 20$  per cent magnetising inductance variation
- Application input voltage range: 80V AC - 308V AC
- High PF of 0.9, and low THD of 10 per cent over universal line input range
- Fast 200ms start-up (at 85V AC)



Fairchild, a company focused on the efficiency of LEDs, has introduced the FL7733A LED driver, which is a highly integrated PWM controller with advanced primary-side regulation (PSR) to minimise the components used in low-to-mid-power LED lighting converters. Using its innovative Truecurrent technology to provide tight tolerance constant-



Suraj Moothedath, director, Unirans Technosystems Pvt Ltd

### Opportunities in the LED lighting market

Year	Total market (US\$ billion)	Total domestic manufacturing (US\$ billion)
2012	0.17	0.04
2015 (projected)	0.44	0.20

Source: IESA-Frost Sullivan Report

technology has come up yet. The future of LED drivers should logically lie in the development of innovative driving techniques for AC LEDs."

### KEY FEATURES OF LED DRIVERS TO LOOK AT



Puneet Dhawan, senior VP and business head, lighting business, Orient Electric

- PF (power factor)
- THD (total harmonic distortion)
- Input wattage
- Input voltage range
- Surge capability
- Efficiency
- Isolated or non-isolated
- Maximum output voltage-- related to SELV information
- EMI-EMC -- whether or not it meets CISPR 15 or any other international standards
- Output current
- If suitable for multiple wattage or not
- Ambient temperature range

less than 5 per cent and PF of more than 0.99."

Though these numbers are achievable in technical terms, they also increase the bill of materials (BOM) cost and pose a serious constraint on cost reduction. The industry has to move towards a more standardised approach to tackle this situation.

The other factor that is important while picking up a ballast or driver is its design, the complexity of which

needs to be in sync with the product it is being used in. Moreover, one must have a complete understanding of the prevailing electricity conditions - the driver should be able to take in sudden variations in electricity input.

### Certification

With LED systems gaining prominence, the need for standards becomes necessary. Presently, the standards that are important in-

clude Energy Star, IEC standards, UL and RoHS.

"Though IS standards have been released, they have not been made mandatory. However, they will soon be applicable. This will bring quality to the consumers, which will help shape the industry and curb imports, which has been a worry for the industry," shares Puneet Dhawan.

### Infrastructure development

To meet the changing needs of a growing market, the government has planned three more testing facilities to be located in three regions in the country. Setting up of design houses, both for products and components, will create a pool of trained labour and also enhance design capabilities, locally. Product awareness across the value chain is an immediate necessity to promote the adoption and penetration of LEDs, thus overcoming the issue of volume manufacturing. **LE3**