

Constant Power LED Drivers Offer a Bright Spot for Modern LED Light Fixture Designs

by Michael Petagna and Christopher Rubeo

In the early years of LED lighting technology, fixture designers found it challenging to design LED lighting products to market. The new technology was changing continuously. The evolution of the LED technology brought many improvements, but it also created barriers. For instance, as soon as new technologies were announced by LED chip makers, end users requested the best available fixtures with the best lumen performance. In some cases, a newer LED technology meant a redesign of the layout of discrete LEDs with different voltage and current requirements. Consequently, the LED driver specifications changed. Customers and marketing teams were driving tight schedules. Engineers had to solve thermal, light output, optics and driver changes. The timeline constraints were demanding. Sometimes design changes happened so frequently that the product life cycles of lighting fixtures would last no more than one year before a new revision was needed.

In the case of LED driver changes, lighting engineers perceived the specification changes as “tweaks”. In addition to testing the new driver for functionality and compatibility in the redesigned lighting fixture, complete safety recertification was often needed. Safety recertification typically required additional fees and paperwork.

The lighting business is driven by standard designs as well as individual unique projects. Forecasting business and predicting the product mix for standard design is challenging. It is especially difficult for the project driven business. A majority of LED drivers are manufactured in the Far East. Therefore, lighting fixture manufacturers are subject to LED driver build lead-times plus ocean transit which can total 10 to 16 weeks. Presented with the normal dips and spikes in the business, controlling the LED driver supply chain is challenging.

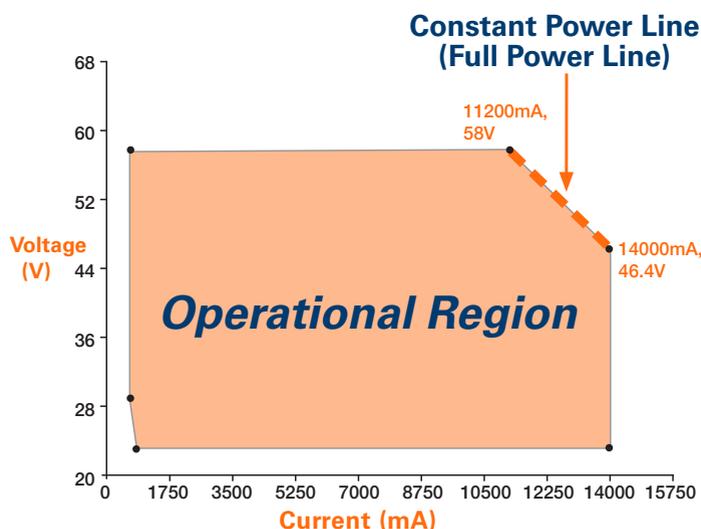
LED Driver Innovations

LED drivers have come a long way since the proliferation of LED lighting began more than 10 years ago. The industry has seen the introduction of programmable LED drivers which permit fixture designers to adjust the LED driver output to match the needs of the specific LED circuit. Since the programmable LED drivers can be adjusted for several lighting fixture designs, a benefit of these LED drivers is minimizing the number of models needed. This benefit does come at a cost. These programmable LED drivers employ microprocessors with additional support circuits to manage the fine details of making the LED driver as flexible as possible. At lower volumes, programmable LED drivers provide their greatest benefit. A small premium can offset the high costs of expediting custom LED drivers. This is particularly important when the key to winning unique lighting projects is availability of parts.

Additional innovations include MEAN WELL’s LED drivers that operate in either constant voltage or constant current mode. This dual mode operation feature coupled with the ability for minor output adjustments via a potentiometer provides a cost effective solution for “tweaking” the LED driver. While these innovations have contributed to more flexible LED driver solutions for lighting fixture designers, the common drawback is the utilization of power. Offering flexible solutions means at times, the LED driver chosen may be specified to have more power than is needed for some lighting fixtures. In some cases, the volume purchase of a common part may offset the cost of managing multiple LED drivers when factoring in lead-time, logistics and expediting costs.

Introducing Constant Power LED Drivers

Initially, the term “constant power” to most lighting fixture designers may not seem exciting. However, imagine taking the benefits of programmable drivers while also being able to maximize the power for multiple fixtures. Even further, add adjustability to the driver’s output current. This yields a solution that delivers the precise voltage and current combination at the maximum power of the driver’s rating. This means operating the LED driver at maximum power across numerous combinations of voltage and current. Lighting manufacturers can use one driver for multiple fixtures, while obtaining the maximum dollars per watt utilization across multiple designs. Constant power delivers the flexibility needed while minimizing risk and cost and maximizing value.



Multiple operating possibilities along the constant power line yields many voltage and current combinations that optimizes the lighting fixture design. Where older designs were limited on the output current due to maximum power constraints, the constant power offerings from MEAN WELL allows for higher current capability.

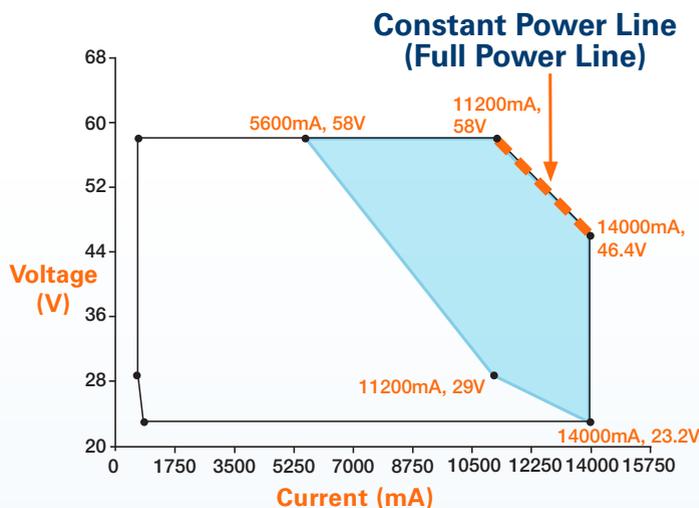
Constant Power Mode MEAN WELL HVGC-650

One Power Supply for Multiple Fixture Requirements



Efficiency and THD Optimization

Low THD and high PFC performance is essential to consider when designing horticulture, stadium lighting or other high lumen applications. The use of constant power LED drivers, like the MEAN WELL HVGC-650, offers the ability to operate in a “high-performance region” which confirms compliance to both PFC and THD parameters. This desired operating region provides additional value specifically when it is essential to be on the Design Lighting Consortium Qualified Parts List (DLC QPL).



High Performance Region

- Higher Power Factor Correction
- Lower Total Harmonic Distortion

In an industry continuously evolving with new requirements and changing technologies, constant power LED drivers offer stability and longevity to new lighting fixture designs. Engineers rely on TRC Electronics as the leading LED driver supplier for the lighting industry. LED fixture designers trust TRC Electronics to provide innovative power supply solutions incorporating the latest technology. More information about constant power drivers may be found by visiting the TRC Electronics constant power web page at:

<https://www.trcelectronics.com/constant-power-led-drivers>