

What is an LED Driver?

An LED driver is a self-contained power supply with input supply from AC mains and outputs that are matched to the electrical characteristics of the LED string or strings. An LED driver responds to the changing needs of the LED circuit by providing a constant quantity of power to the LED as its electrical properties change with temperature. LED drivers may offer dimming by means of pulse width modulation (PWM) circuits and may have more than one channel for separate control of different LEDs or LED arrays. Without the proper driver, the LED may become overheated and unstable, therefore causing poor performance or failure.

Types of LED Drivers

There are several different kinds of LED drivers categorized by supply voltage, output current per channel, output voltage, maximum switching frequency and packaging type.

Why does an LED need a Driver?

Most LED (Light Emitting Diode) luminaires are designed to use high power LEDs in both series and parallel. Placing LEDs in series compounds their voltage but not their current. Placing sets of series LEDs in parallel compounds their current but not their voltage. The results are reasonable voltage and current totals.

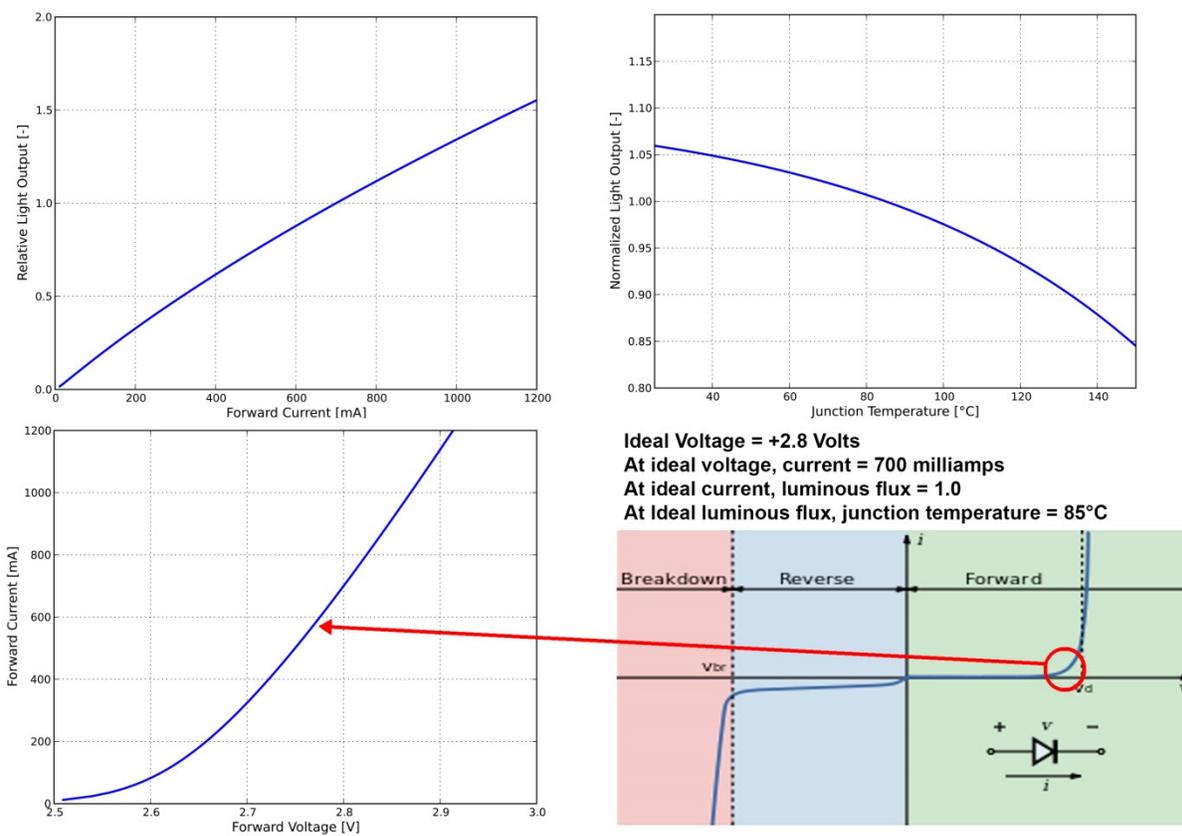
Diodes are called semi-conductors because their reaction to voltage and current is not linear. In other words they conduct at certain voltages and do not conduct at other voltages.

Most high power LEDs have an effective operating forward voltage range between 2.6 volts to 2.92 volts. Within that narrow 0.32 volt range the LED will consume between 1 milliamp current at 2.6 volts and 1200 milliamps current at 2.92 Volts. (That is an increase of 3.75 milliamps for every 1 millivolt increase.) Within that range of current the LED will produce between 0 luminous flux at 0 milliamps to 1.6 luminous flux at 1200 milliamps. Within that range of current the LED will produce between no junction temperature at 0 milliamps to 135°C (275°F) junction temperature at 1200 milliamps. (Now here's the kicker.) The more current used by the LED the greater the amount of luminous flux and the higher the LED junction temperature, however the higher the LED junction temperature the less amount of luminous flux the LED can produce. This is why it is so very critical each LED luminaire be fitted with not only a LED driver but an exceptionally good heat sink as well.

Why Titan LED Employs High Quality LED Drivers

To be an effective and cost effective lighting system the LED must be driven at a current and voltage capable of producing the required luminous flux level but the junction temperature must be kept as cool as possible to ensure the greatest efficacy. ("efficacy" refers to the amount of light (luminous flux) produced by a lamp or other light source, usually measured in lumens, as a ratio of the amount of power

consumed to produce it, usually measured in watts. (A watt is voltage times amps or milliamps. 2.8 volts times 700 milliamps equals 1.96 watts)).



A good quality LED driver will adjust power output to optimize light efficacy. In other words it will reduce the current when it senses the junction temperature has increased beyond optimum light production and will increase current when it senses junction temperature has dipped below optimum light production. These current level adjustments are in very small increments so no noticeable increase or decrease in light levels or color temperature are discernable to the human eye but this optimization of efficacy not only decreases the cost of operating the LED luminaire but greatly extends the life of the LED luminaire as well.

LED Drivers for Multi-Lamp devices

LED luminaires that employ more than one lamp such as LED tube lighting fixtures create another problem where LED drivers are concerned. LED drivers are designed and configured for the number of individual LED chips deployed in both serial and parallel. Fluorescent lamp replacements present a challenge because the individual lamps can be removed to either reduce light or cost. If the LED driver uses a single line to drive all 2, 3 or 4 tubes and one of the tubes are removed, the total voltage and



TITAN LED, Inc.
4590 Ish Drive, Unit #100
Simi Valley, CA 93063
Phone: 805.523.7500
Fax: 805.523.7502
Website: www.titanled.net

current being sent to the LED lamps does not decrease when one is removed. On the contrary the remaining tubes are now being driven with more than their design ratings, no energy savings has been realized and the lifespan of the remaining LED tubes may be shortened.

At Titan LED we provide LED drivers with our LED tube lighting specifically designed to prevent these problems. Our LED tube drivers have multiple duplicate output channels to ensure each LED tube receives the optimum current and voltage for greatest efficacy and longevity and if one LED tube is removed it does not adversely affect the remaining LED tubes and allows you to receive the reduced energy cost as well.

The above mentioned reasons drivers are needed constitutes just a few aspects of LED driver design. At Titan LED we do not provide a confusing matrix of LED drivers you can choose from nor are we paid by LED driver manufacturers to include them on a compatibility list of our luminaire products. We provide the absolute best LED driver for each and every product we make to ensure the greatest efficacy and longevity at the best price.