



LED Protection - A necessity to make them worth their money

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Lower energy consumption, less generated heat, longer lifetime, smaller size, rapid response and increased robustness - all of which roughly translates into money saved. What I am referring to, are light emitting diodes or simply known as LEDs, the new darling of the lighting industry.



And who can argue against saving money? LEDs have found their way into a huge variety of applications. From simple indoor room lighting, stylish car lights and mesmerizing billboards to critical applications such as traffic lights, railroad crossing and airport runway markers.

However, as stressed multiple times in our newsletters, the increased complexity of advanced technologies makes them far more sensitive to power anomalies than their more simplistic predecessors. Light emitting diodes are no exception. When failure of the device becomes a critical safety concern, the overriding benefit of simply saving money is in question. In addition, because the price per lumen output of LEDs is significantly higher than of incandescent and fluorescent lamps, reaching the end of the full life expectancy is vital to making the investment pay off in the end.

Excessive heat, mechanical shock, electrostatic discharge and lightning induced surges often cause these fragile devices to fail prematurely. As noted in the LED's magazine September 2010 article titled *Circuit-protection devices guard against electrical transients*, "high brightness LEDs built on sapphire substrates [as opposed to the little indicator lamp on your remote control] are especially sensitive to electrical transients." While even household appliances can benefit from surge protective devices, critical applications necessitate a robust protection scheme.

Starting at the AC input side of the circuit to the LED drivers all the way to the individual LED, surge protection can help avoid dark traffic lights or runway markers to become safety hazards and ensure billboard messages are delivered as bright and compelling as intended. The majority of high-brightness LEDs are connected in series, sharing a common constant-current switch mode power supply, which generally requires protection itself. A strong protection system, thus, needs to safeguard the driver and power source to prevent transients from reaching the LEDs and reducing their lifetime, degrading their performance or outright destroying them.

While chances are small, just like any other delicate technology, individual diodes can still fail despite a well designed protection system. Connected in series, such a single failed diode would affect the entire circuit, causing the string to go dark similar to the well-known example of holiday lights. In case of critical applications, adding another layer of reliability may be needed. While not a surge protector, so called Open LED protectors can keep circuits alive by providing an alternative path for the current to bypass the failed LED.

LEDs rightly claim their favorable position within the lighting industry with life expectancies of up to 20 years. Yet, induced surges can significantly shorten the LED life, degrade their performance or outright destroy them. To take full advantage of LEDs vast benefits over traditional incandescent or fluorescent

lights, a proper protection design needs to ensure that the electrically sensitive circuits are protected from electrostatic discharge and other damaging power anomalies. If protected with a robust surge protection system, LEDs do offer an attractive return on your investment.

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Lower energy consumption, longer lifetime, rapid response and increased robustness - LEDs, the new darling of the lighting industry. And who can argue against saving money? However, excessive heat, mechanical shock, electrostatic discharge and lightning induced surges often cause these fragile devices to fail prematurely. Learn how to protect your investment.