

Making the Best Contact with the LED Driver

A LED driver is an electrical device that regulates the power of a LED or a series of LEDs. But often, they are the most complicated part of a LED system, especially more, when it comes to making the best contact between the driver and the heat sink.

In high-power LEDs, it is crucial to remove the heat through efficient thermal management. Without a good heat sinking mechanism, the junction (internal) temperature of the LED rises, which affects the LED's characteristics in an adverse way.

Top Factor to Consider

There are several simplistic concepts to achieve the best contact between the heat sink and a LED board, but primarily, the most important thing to consider is air.

Air is an exceptional thermal insulator with an extremely poor thermal conductivity. Air — being 8500 times less conductive than aluminum, and nearly 6800 times lesser than plastic, foam, or plywood — is probably the worst conductivity of heat.

Therefore, it should be kept in mind to do everything that needs to be done in order to make sure there aren't air gaps in the LED system that can act as a thermal insulator.

What Needs to Be Done

The easiest thing that can be done to ensure the best thermal contact is to mount the LED driver on a heatsink which has a smooth top surface. Practically, uneven edges and rough surfaces are more likely to create air bubbles or air gaps that might work as a thermal insulator.

On the contrary, there will be fewer air gaps if the heatsink area is machined smooth, enabling the LED driver to make the best thermal contact.

Additionally, it is also necessary to make sure that the heatsink chamber isn't curved or bowed in any direction because an uneven surface will produce huge air gaps which will dramatically reduce the thermal conductivity.

One of the best ways to maximize the LED driver contact is to apply TIM. TIMs, or thermal interface materials, have inherent capabilities that generate superb thermal conductivity. TIMs are composites consisting of particulate fillers that push thermal conductivity through point contacts and the air between rough, uneven surfaces.

Thermal interface materials can be anything like thermal grease, thermal pad layer, or a tape between the LED driver and heatsinks to eliminate the air gaps.

However, it is necessary to choose TIM products that have the thinnest gap layer and highest conductivity in order to establish the best contact with a LED driver. Also, it must be taken into account that thermal grease or a thermal pad works best when it's uniformly applied at the bottom of a LED driver.

LED system designers should be very particular while applying [thermal interface materials](#) because if the application is thick, clumsy, and uneven it won't allow the LED driver surface to make full contact with the heatsink, creating more air gaps and greatly reducing the thermal conductivity.

So these are some simple yet effective ideas that LED component designers can implement to make maximum contact with the LED driver.