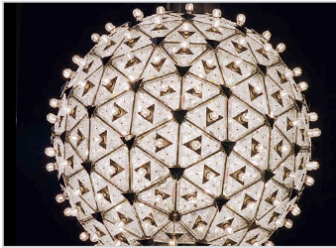


# LuxGuard™ PROTECTION DEVICES



## ESD Silicon Submounts and TVS Diodes for UHB LEDs

▶ LIGHTING



With recent improvements in efficiency and performance, demand for ultra high brightness (UHB) LEDs is increasing at a rapid rate. No longer restricted to traditional applications such as status indicators and alphanumeric displays, UHB LEDs are now being designed into several large, growing applications including handset display backlighting, keypad illumination, automotive lighting, signage and residential and commercial lighting.

More advanced manufacturing processes used to make high

power UHB LEDs have made these products more susceptible to damage from an ESD event. Higher operating current has also created a need for improved thermal management properties in the UHB LED submount. As a result, customers are increasingly looking for cost effective submount and side mount TVS solutions with improved performance in these areas.

California Micro Devices has pioneered the development of ESD protection circuits for high power, high brightness LED

applications. CMD introduced our first LED protection devices in 2001, and since then have shipped more than 300 million units to HB LED customers. CMD offers two types of ESD protection products for HB LEDs - silicon submounts and TVS diodes. CMD also provides customers with the capability to modify the solutions to fit seamlessly into their existing architecture and also utilize the extensive technical, manufacturing and product capabilities of CMD to provide a highly differentiated solution.

Submount Structure for Vertical LEDs

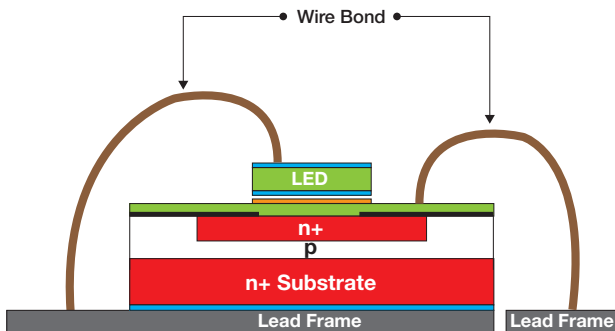


Figure 1.

Submount Structure Requiring Single Wire-Bond for Horizontal LEDs

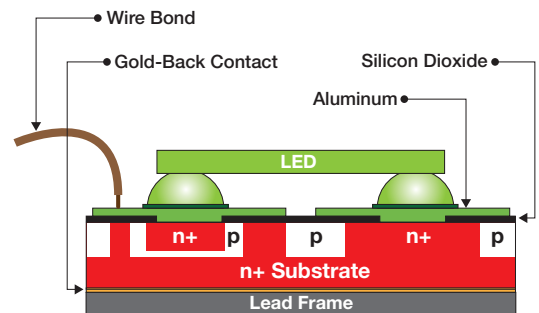


Figure 2.

TYPES OF DEVICES

Silicon Submounts:

As shown in Figure 1, a silicon submount sits between the LED and the leadframe. CMD's submounts provide integrated ESD protection at levels exceeding 15kV HBM (Human Body Model). The silicon submount also helps to cushion the LED from stress due to thermal expansion coefficient differences between the LED and the lead frame, while the option of an aluminum top coat provides improved reflectivity. The diagram in Figure 1 shows a typical single vertical LED on a silicon submount with integrated ESD protection. Submounts for horizontal LEDs

are also available, as shown in Figure 2.

TVS Diodes:

For applications which require a lower cost ESD solution, CMD also offers TVS diodes that are mounted next to the LED die within the LED fixture. ESD ratings vary based on die size, and are typically between 8kV and 15kV HBM.

BROAD PORTFOLIO:

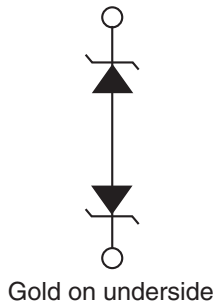
CMD offers a wide variety of product options including:

- Single direction or bidirectional TVS solutions
- Varying breakdown voltage levels to support single or multi-LED products

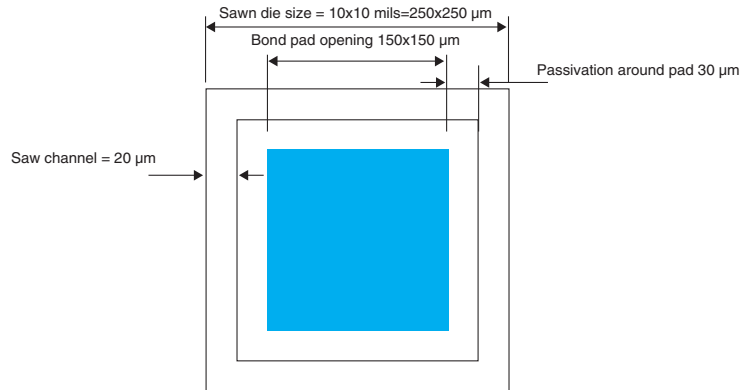
- A variety of submount and TVS die sizes to accommodate different HB LED applications
- Various metallization options to meet most manufacturing requirements.

OUR EXPERTISE:

CMD is a proven supplier to the HB LED industry, and a recognized leader in ESD protection products. We specialize in ESD, EMI protection and thermal management products for the mobile handset, digital consumer and personal computer markets as well as the HB LED market.



CM1791 Electrical Schematics



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