

CeraPad™

Ultra-thin substrate with integrated ESD protection

- ESD strength more than three times higher than that of standard Zener diodes
- Thermal conductivity more than three times better than that of conventional carriers
- Enables customized chip-scale packages for standard LED elements

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TDK Corporation presents CeraPad™, a new ultra-thin ceramic substrate that features integrated ESD protection within its multilayer structure and eliminates the need for discrete ESD components. The innovative substrate meets the demands for maximum miniaturization coupled with the best ESD protection and thus enables highest degree of ESD integration in sensitive applications.

CeraPad's ESD strength of up to 25 kV is more than three times higher than the standard 8 kV of state-of-the-art Zener diodes. Moreover, the ceramic substrate features a high thermal conductivity of 22 W/mK that is more than three times better than that of conventional carriers, even though it is significantly slimmer with a thickness of just 300 µm to 400 µm. Depending on customer requirements, the CeraPad contact pads can be designed for both standard SAC (Sn/Ag/Cu, 260 °C) reflow processes and eutectic bonding (AuSn, 320 °C).

The new technology is especially well-suited for LED applications where the number and density of LEDs per unit continues to grow. CeraPad enables customized chip-scale packages (CSP) for standard LED elements from CSP1515 down to CSP0707. A further advantage is CeraPad's low coefficient of thermal expansion (6 ppm/mK), which is almost identical to that of LEDs. As a result, there is nearly no mechanical stress between substrate and LED when temperature changes.

Similar to printed circuit boards, CeraPad's multilayer technology can be leveraged to design a kind of integrated circuit by interconnecting the internal redistribution layers with vias. As a rule, today's matrix LEDs consist of several dual LEDs connected in series. By contrast, the new CeraPad module now enables for the first time a new kind of LED matrix array with up to hundreds of LED light points that can be individually controlled. Application designers will be able to use this technology to create innovative high resolution and safety-relevant light effects in the smallest of spaces, for example in multiple LED flashes in smartphones or in adaptive headlights in cars.

With CeraPad TDK offers attractive customer-specific packaging solutions that address the future challenges of rising IC sensitivity, giving customers a promising new way to focus on light design and increasing the light efficiency of LEDs.

Main applications

- LED systems in automobile headlights and smartphone flashes
- Automotive ECUs, smartphones and tablets

Main features and benefits

- ESD protection integrated in multilayer substrate
- ESD strength of up to 25 kV
- High thermal conductivity of 22 W/mK
- Ultra-thin thickness of 300 µm to 400 µm

About TDK Corporation

TDK Corporation is a leading electronics company based in Tokyo, Japan. It was established in 1935 to commercialize ferrite, a key material in electronic and magnetic products. TDK's portfolio includes electronic components, modules and systems* marketed under the product brands TDK and EPCOS, power supplies, magnetic application products as well as energy devices, flash memory application devices, and others. TDK focuses on demanding markets in the areas of information and communication technology and consumer, automotive and industrial electronics. The company has a network of design and manufacturing locations and sales offices in Asia, Europe, and in North and South America. In fiscal 2016, TDK posted total sales of USD 10.2 billion and employed about 92,000 people worldwide.

* The product portfolio includes ceramic, aluminum electrolytic and film capacitors, ferrites, inductors, high-frequency components such as surface acoustic wave (SAW) filter products and modules, piezo and protection components, and sensors.

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