

Overvoltage protection

TDK offers extremely small TVS diodes with extremely low capacitances and clamping voltages

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TDK Corporation (TSE:6762) has extended its range of TVS (transient voltage suppression) diodes characterized by their extremely low capacitance values for bidirectional overvoltage protection to include the ULC series (Ultra Low Clamping & Capacitance). The SD01005SL-ULC101 (B74111U0033M060) type has a minimum capacitance of ~0.5 pF and the SD0201SL-ULC101 (B74121U0033M060) type of ~0.6 pF, both at 1 MHz.

The new TVS diodes are designed for a maximum operating voltage of 3.3 V. The ULC products offer an extremely low clamping voltage of ~3.8 V at a peak pulse current of 8 A or 16 A at ~5 V and a breakdown voltage of 6.3 V. Further features include very short response times and the extremely low leakage current of ~1 nA at 3.3 V. They are designed in accordance with IEC 61000-4-2 for an ESD contact discharge of up to 15 kV.

Despite high-level performance of robust protective components, the diodes meet the highest requirements in terms of miniaturization. Their dimensions in the Wafer-Level Chip Scale Package (WL-CSP) are just 400 x 200 µm (WL-CSP01005) or 600 x 300 µm (WL-CSP0201) with a height of 100 µm in the 01005 size or 150 µm in the 0201 size. Despite their extremely small size, the components are designed for a high surge current load of up to 7 A according to IEC 61000-4-5 (8/20 µs).

The diodes are well suited for the reliable ESD protection of high-speed interface ICs and data lines such as USB 3.1, USB 3.2, HDMI, FireWire and Thunderbolt due to their parasitic capacitances and clamping voltage. Typical target applications include smartphones, notebooks, tablets, wearables and ESD sensitive network components.

Main fields of application

- High-speed interface ICs and data lines such as USB 3.1, USB 3.2, HDMI, FireWire, Thunderbolt
- Smartphones, laptops, tablets and wearables as well as ESD sensitive network components

Main features and benefits

- Extremely low values at:
 - Capacitance: just ~0.5 pF or ~0.6 pF at 1 MHz
 - Clamping voltage: ~3.8 V at a peak pulse current of 8 A
 - Size: 400 x 200 µm (WL-CSP01005) or 600 x 300 µm
- ESD protection to IEC 61000-4-2 up to 15 kV contact discharge
- High surge current loads of up to 7 A according to IEC 61000-4-5 (8/20 µs)

About TDK Corporation

TDK Corporation is a world leader in electronic solutions for the smart society based in Tokyo, Japan. Built on a foundation of material sciences mastery, TDK welcomes societal transformation by resolutely remaining at the forefront of technological evolution and deliberately “Attracting Tomorrow.” It was established in 1935 to commercialize ferrite, a key material in electronic and magnetic products. TDK’s comprehensive, innovation-driven portfolio features passive components such as ceramic, aluminum electrolytic and film capacitors, as well as magnetics, high-frequency, and piezo and protection devices. The product spectrum also includes sensors and sensor systems such as temperature and pressure, magnetic, and MEMS sensors. In addition, TDK provides power supplies and energy devices, magnetic heads and more. These products are marketed under the product brands TDK, EPCOS, InvenSense, Micronas, Tronics and TDK-Lambda. TDK focuses on demanding markets in automotive, industrial and consumer electronics, and information and communication technology. The company has a network of design and manufacturing locations and sales offices in Asia, Europe, and in North and South America. In fiscal 2021, TDK posted total sales of USD 13.3 billion and employed about 129,000 people worldwide.

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