

PolyZen Device Helps Protect Automotive Infotainment Peripherals

The explosive growth of portable, battery-powered infotainment peripherals has resulted in a demand for more robust and reliable circuit protection. GPS systems, smart phones, play stations and portable media players that can be charged in the home, the office or the car may be exposed to voltage or current transients every time they are connected or disconnected. Protecting portable electronics from circuit damage has become a critical design issue for manufacturers of consumer electronics as well as automakers.

The evolution of mobile multimedia equipment from audio-centric devices to video-centric storage devices has resulted in higher power requirements, higher data transmission rates and smaller circuitry. Protecting power sensitive silicon from damage caused by incorrect charging systems, environmental hazards or power variations systems is crucial to device reliability and customer satisfaction.

Tyco Electronics' PolyZen micro-assemblies help circuit designers meet safety requirements and protect the portable devices that may be connected to the automotive network. Automotive power buses often exhibit dirty power problems. Although they are nominally 12V, they may range in normal operation from 8V to 16V. Still, battery currents can exceed 100 Amps, and be stopped instantly via a relay or fuse, generating large inductive spikes on the bus and increasing voltage by 5X or more.

The PolyZen device is designed to help clamp and smooth inductive voltage spikes. In response to an inductive spike the Zener diode element helps shunt current to ground until the voltage is reduced to the normal operating range. In the case of an incorrect voltage power supply, the device helps clamp the voltage, shunts excess power to ground, and eventually locks out the wrong supply. The relatively flat voltage vs. current response of the PolyZen device helps clamp the output voltage, even when input voltage and source currents vary.

The PolyZen device is a polymer-enhanced, precision Zener diode micro-assembly. It consists of a low resistance, precision Zener diode that is thermally coupled to a PPTC "thermal switch." In operation, extended overvoltage or reverse bias conditions will cause the PPTC element to "trip" as the diode begins to heat up. A "trip event" causes the PPTC "thermal switch" to transition from a low to high-resistance state, helping protect downstream electronics by generating a series element voltage drop. Also, by limiting the current, it helps to prevent Zener diode failure caused by thermal runaway.



Benefits:

- Helps shield downstream electronics from overvoltage and reverse bias
- Trip events cut off overvoltage and reverse bias sources
- Analog nature of trip events minimizes upstream inductive spikes
- Helps reduce design costs with single component placement and minimal heat-sinking structures

Features:

- Overvoltage transient suppression
- Hold currents up to 2.3A
- Time delayed, overvoltage trip
- Time delayed, reverse bias trip
- Power handling on the order of 30 watts
- Integrated device construction
- RoHS compliant

Applications:

- Portable electronics that can be charged in the car
- Automotive peripheral input power protection
- DC power supply, output power conditioning

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