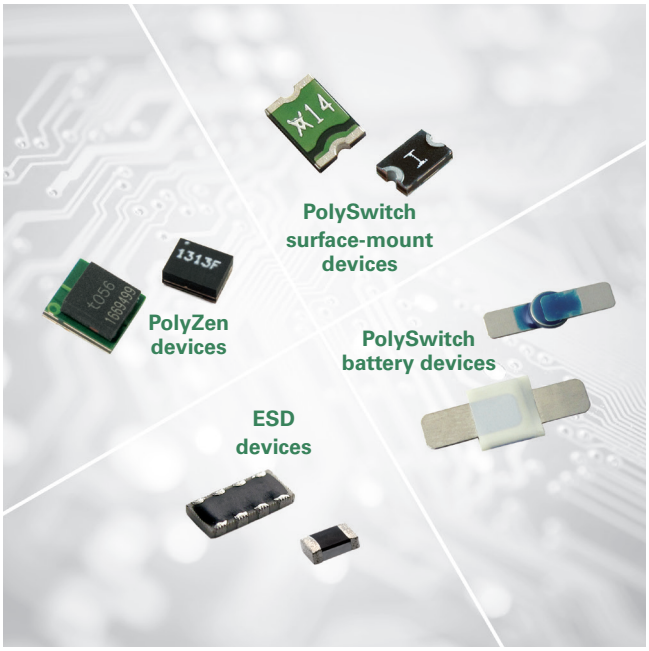
PORTABLE MEDICAL DEVICES PROTECTION

QUICK REFERENCE GUIDE

Littelfuse overvoltage, overcurrent and overtemperature circuit protection devices help designers provide effective protection for portable medical products.



About Littelfuse Circuit Protection

Littelfuse provides a wide range of circuit protection devices including overvoltage, overcurrent, and over-temperature protection, as well as hybrid circuit protection and ESD protection.

Developed with innovative proprietary technology, these circuit protection devices can help customers design products with effective protection solutions.

Littelfuse Protective Devices Help Make Portable Medical Products Safer and More Durable

With the rise of family medical care and increasing health concerns, the demand continues to grow for portable household products, such as portable electronic manometers, portable blood glucose meters, and digital thermometers. Portable medical products are generally equipped with batteries and adapters. The parameter setting, data display and storage are carried out via buttons and displays using USB or Bluetooth protocols, or WiFi.

Coupled with the aging of the population and the medical needs in far reaching regions around the world, portable medical products have become a strong growth area in the medical electronics industry. Since many of the users of these portable medical devices are elderly, cases of misuse (such as misconnection of adapters due to poor eyesight) may occur. In remote regions with unreliable electrical service, the fluctuation of the power may cause malfunction due to voltage transients or surges. In addition, discharge of static electricity from the human body can make portable medical devices susceptible to damage or failure due to overvoltage or overcurrent, or even cause bodily injury and property damage.

Littelfuse circuit protection devices help improve the reliability of portable medical products. By reducing the incidence of failures due to misapplication or power quality, the need for rework or replacement is reduced. Littelfuse PolySwitch PPTC devices and PolyZen hybrid devices can help protect the product's batteries and adapters, while PESD devices can help prevent static electricity from human bodies from damaging the portable medical products' buttons, interfaces, screens, etc.

Circuit Protection Solutions for Portable Medical Devices

Wearable Devices


PPTC/PolyZen Devices

1 Charging short circuit and reversed polarity protection


ESD Devices

2 Screen electrostatic protection

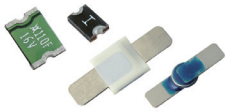
3 Antenna electrostatic protection

4 USB interface electrostatic protection

Electronic Cigarette


ESD Devices

5 Semiconductor control chip electrostatic protection


PPTC Devices

6 Battery overcurrent, short circuit and overcharge protection

1 PPTC / PolyZen Devices

A PolySwitch PPTC device is a resettable overcurrent and over-temperature protection device which helps protect from damage caused by potential safety hazards arising from the overcurrent, short circuit, and over- temperature of the lithium ion batteries.

The PolyZen miniature integrated protection module may help protect the wearable device's recharging input port against damage from overvoltage and overcurrent The latest PolyZen YM series is suitable for the compact space available in wearable devices.

2 ESD Protection Devices

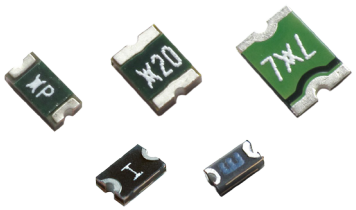
3 4 The touch screens, antennas, and USB interfaces of wearable device are vulnerable to electrostatic discharge (ESD). The PESD electrostatic protection device may help protect the various input and output interfaces, and its low capacitance characteristics are also suitable for the ESD protection of the wearable device's high-speed data transmission signal.

5 ESD Protection Devices

The semiconductor IC control chip in an electronic cigarette is vulnerable to ESD. The PESD electrostatic protection device helps protect the semiconductor IC control chip in the electronic cigarette.

6 PPTC Devices

The PolySwitch PPTC device is a resettable temperature protection device, which helps protect from damage caused by the potential safety hazards arising from overcurrent, short circuit, and over-temperature of the lithium ion batteries.



PolySwitch Surface-mount Devices

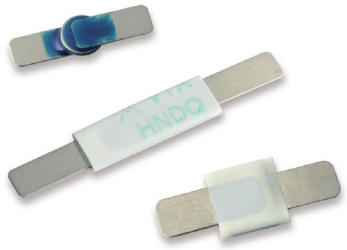
PolySwitch surface-mount devices are an effective circuit protection method for computer, consumer, multimedia, portable and automotive electronics applications. In an affort to reduce the size and cost of surface-mount devices, Littelfuse PolySwitch introduced the miniSMD product series in 1995. Subsequently, we developed the microSMD, nanoSMD, picoSMD and femtoSMD family of products. The femtoSMD series reduced the device size to a 1608mm (0603 mils) footprint, which is one-twelfth the size of the popular miniSMD series.

Features

- Smaller size helps save board space and cost
- Many product choices optimizes design flexibility
- Compatible with high-volume electronics assembly
- Assists in meeting regulatory requirements
- Higher voltage ratings allow use in new applications

Benefits

- RoHS compliant
- Halogen free (refers to: Br≤900ppm, Cl≤900ppm, Br+Cl≤1500ppm)
- Broadest range of resettable devices available in the industry
- Current ratings from 0.05 to 3A
- Voltage ratings from 6V computer and electronic applications to 60V telecom applications
- Agency recognition: UL, CSA, TÜV
- Small footprint
- Fast time-to-trip
- Low resistance



PolySwitch Strap Battery Devices

Littelfuse PolySwitch, a pioneer of polymeric positive temperature coefficient (PPTC) resettable devices, offers several material platforms to help protect battery applications. Each of these material platforms offers different performance characteristics that allow the engineer greater design flexibility. PolySwitch devices for battery protection include SRP, LR4, VTP, VLP, VLR, MXP, MGP and RSD series, disc and special application strap devices.

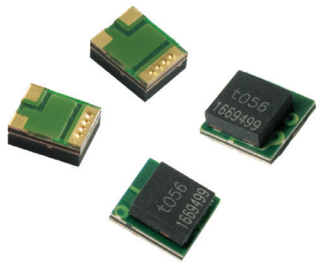
Features

- Many material platforms and device form factors help provide engineers more design flexibility
- Compatible with high-volume electronics assembly
- Assists in meeting regulatory requirements
- Low-resistance devices increase battery operating time

Benefits

- RoHS compliant
- Lead-free versions of all devices are available
- Broad range of resettable devices available
- Current ratings from 1.1A to 13A
- Voltage ratings from 6V to 30V
- Agency recognition: UL, CSA, TÜV
- Fast time-to-trip
- Low resistance

Portable Medical Devices Protection



PolyZen Devices

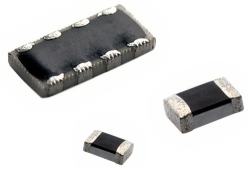
PolyZen devices are polymer enhanced precision Zener diode that help protect sensitive electronics from damage caused by inductive voltage spikes, voltage transients, use of incorrect power supplies and reverse bias. Well suited for cigarette lighter adaptor chargers, DC power port protection, cell phone charger port and infotainment power.

Features

- Overvoltage transient suppression
- Hold currents up to 2.6A
- Time delayed, overvoltage trip
- Time delayed, reverse bias trip
- Power handling on the order of 30 Watts
- Integrated device construction
- RoHS compliant and halogen free

Benefits

- Helps shield downstream electronics from overvoltage and reverse bias
- Trip events shut out 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 requirements



ESD Protection Devices

Littelfuse PESD line of devices helps protect I/O ports on HDMI 1.3, portable video players, digital visual interface (DVI) and antenna switches. PESD devices shut electrostatic discharge away from sensitive circuitry in portable devices.

Features

- Low capacitance: 0.25pF (typ)
- Low leakage current
- Low clamping voltage
- Fast response time (<1ns)
- Capable of withstanding numerous ESD strikes
- Bi-directional protection
- Thick film technology

Benefits

- ESD protection for high-frequency applications (HDMI 1.3)
- Smaller form factor for board space savings
- Helps protect sensitive electronic circuits against damage caused by electrostatic discharge (ESD) events