

## Littelfuse is recognized around the world as the #1 brand in circuit protection.

With the industry's broadest and deepest portfolio of circuit protection technologies backed by unparalleled design support, Littelfuse is the company that engineers trust to answer their most critical circuit protection questions.

### Overcurrent Protection Devices



#### Fuses

Littelfuse is the world leader in the design and manufacturing of fuses for the automotive, industrial, handheld, computer and telecom markets. Whether you're looking for surface mount or axial; glass or ceramic; thinfilm or Nano2® style; fast-acting or Slo-Blo® fuses; Littelfuse has the part to meet your need. Operating characteristics of our electronics application fuses include current ranges from .010A–40A, maximum voltage ranges from 24V–600V, and interrupting ratings from 24A–50,000A. Our comprehensive line of lead-free and RoHS devices, are perfect for your environmentally friendly design. Enable easy fuse installation and replacement with our comprehensive line of fuse blocks, fuse holders, and fuse accessories for automotive, electronic, and industrial applications.



#### Resettable PTCs

Littelfuse offers a full range of surface mount, radial leaded and axial leaded (battery strap) PTC resettable overcurrent suppression devices. Surface mount PTCs are available with broad range of hold current from 0.05A to 7.0A while footprint varies from 0402 to 2920. Radial PTCs are rated from 6VDC to 600VDC respectively, and are designed for use in higher voltage applications that require minimal maintenance and are subject to repetitive overcurrent conditions. Axial PTCs are rated from 6VDC to 30VDC, and are designed for use in battery pack applications that require thermal protection against overcurrent fault conditions. All Littelfuse PTC devices are recognized under the Components Program of Underwriters Laboratory for both the US and Canada as well as being certified by TUV. All devices are lead-free and RoHS compliant.

### Overvoltage Suppression Devices



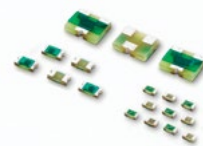
#### TVS Diodes

TVS Diodes are used to protect semiconductor components from high-voltage transients. Their p-n junctions have a larger cross-sectional area than those of a normal diode, allowing them to conduct large currents to ground without sustaining damage. Littelfuse supplies TVS Diodes with peak power ratings from 200W to 30kW, and reverse standoff voltages from 5V to 512V.



#### TVS Diode Arrays (SPA® Devices)

TVS Diode Arrays are designed to protect analog and digital signal lines from electrostatic discharge (ESD), Electrical Fast Transients (EFT), and lightning-induced surge currents. Offering low dynamic resistance for improved clamping performance, TVS Diode Arrays are offered in a wide range of industry standard discrete and multi-channel SMD packages. Features of this portfolio include capacitance as low as 0.4 pF and enhanced ESD capability up to ±30kV (contact discharge).



#### PulseGuard® ESD Suppressors

With a capacitance value as low as 0.04 pF, PulseGuard suppressors can protect high-speed digital I/O lines (HDMI, USB, eSata, Ethernet) without causing signal distortion. Since today's fastest data buses are operating at speeds in excess of 5 Gbps, it is necessary that protection devices do not present a capacitive load to the bus in order to ensure signal integrity. With respect to ESD testing, PulseGuard suppressors are specified to protect against ESD transients per the IEC 61000-4-2 (Level 4) test method. Available in small surface mount form factors, they are lead-free and RoHS compliant.



#### Varistors

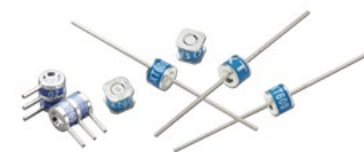
MOVs – Littelfuse Metal Oxide Varistors (MOVs) are designed to suppress transient voltages such as lightning and other high level transients found in industrial, AC line application or lower level transients found in automotive DC line applications. With peak current ratings ranging from 40A to 70,000A and peak energy from 0.1J to 10,000J, Littelfuse varistors are available in radial leaded, axial leaded, surface mount and bare-disk options.

MLVs – Littelfuse Multilayer Varistors (MLVs) are designed for applications requiring protection from low to medium energy transients in the computer, handheld device, industrial and automotive markets. Available in miniature surface mount options as small as 0201 size, Littelfuse MLVs offer a low voltage range (5.5–135VDC) and enhanced performance and filtering characteristics in a small package. Peak current ratings range from 4A to 500A and peak energy 0.02J–2.5J.



#### SIDACtor® Devices

SIDACtor® devices are designed to suppress overvoltage transients in telecom and datacom equipment, and are able to divert currents as high as 5000A to ground within nanoseconds of reaching their breakover voltage. Littelfuse offers a wide range of configurations including DO-214AA, DO214AC, COMPAK (3-Pin DO-214), SOT23-5, QFN, MS-012 and modified MS-013 surface mount, TO-92, TO-218, DO-15, modified TO-220, and TO-220 through-hole package options designed to handle medium to high energy transients.



#### Gas Discharge Tubes (GDTs)

Available in small foot print leaded, surface mount and cartridge configurations, Littelfuse GDTs offer fast response time to transient overvoltage events. This fast response time translates into a reduced risk of equipment damage. Littelfuse GDTs have the ability to handle very high current surges – up to 40,000A – while effectively suppressing overvoltage transients. Their low capacitance (typically 1–2pF), high insulation resistance (greater than 1GΩ) and low leakage ensure virtually no effect on the protected system during normal (non-surge) operating conditions. Their electrical characteristics make them ideal for use in broadband cable, MDF (Main Distribution Frame), and central office applications.



#### Switching Thyristors

Switching Thyristors are solid state switches that are normally open circuits (very high impedance), capable of withstanding rated blocking/off-state voltage until triggered to on state. Used for circuit control applications, Littelfuse offers TRIAC, QUADRAC, SCRs, Rectifiers plus Alternistor Triacs for best commutating and noise immunity. Offered in various and other configurations for a wide range of currents blocking/off-state voltages, packages, and triggering.



#### PLED Light-Emitting Diode (LED) Protectors

PLED Light-Emitting Diode (LED) Protectors Littelfuse PLED devices provide added reliability to LED lighting strings. Designed to minimize the impact of losing an entire LED string due to a single LED failure, PLED devices provide a switching function that will bypass LEDs that go open circuit, and allow current to flow to the remaining LEDs in the string. PLED devices also offer LED protection against electrostatic discharge (ESD) and accidental reverse power connection (PLED5 devices only). Designed to serve the needs of high brightness outdoor LED lighting applications (advertising and traffic signs, roadway/pathway/runway lighting, aircraft and emergency lighting, etc), PLED devices help assure reliability and lower maintenance costs.

|   | Market Segment               | Fuses | Resettable PTCs | Varistors | GDTs | TVS Diode | TVS Diode Arrays (SPA@ Devices) | PulseGuard® ESD Suppressors | SIDACTor® Devices | Thyristors | PLED LED Protectors |
|---|------------------------------|-------|-----------------|-----------|------|-----------|---------------------------------|-----------------------------|-------------------|------------|---------------------|
| <b>CONSUMER ELECTRONICS</b>             | LCD TV                       | •     | •               | •         |      | •         | •                               | •                           |                   |            |                     |
|   | Refrigerator                 | •     |                 | •         |      | •         |                                 |                             |                   | •          |                     |
|   | Room AC                      | •     |                 | •         |      | •         |                                 |                             |                   | •          |                     |
|   | Washing Machine              | •     |                 | •         |      | •         |                                 |                             |                   | •          |                     |
|   | Instant Water Heater         | •     |                 | •         |      |           |                                 |                             |                   | •          |                     |
|   | Gas Igniter                  |       |                 |           |      |           |                                 |                             |                   | •          |                     |
|   | Bluetooth Headset            | •     | •               | •         |      |           | •                               | •                           |                   |            |                     |
|   | Cell Phone                   | •     | •               | •         |      |           | •                               | •                           |                   |            |                     |
|   | E-Book                       | •     | •               | •         |      |           | •                               | •                           |                   |            |                     |
|   | PMP (Portable Media Player)  | •     | •               | •         |      |           | •                               | •                           |                   |            |                     |
|   | Small Appliance              | •     | •               | •         |      |           | •                               |                             |                   | •          |                     |
| DVD                                     | •                            | •     | •               |           |      | •         | •                               |                             |                   |            |                     |
| <b>POWER SUPPLY</b>                     | Telecom Power                | •     | •               | •         | •    | •         |                                 |                             |                   |            |                     |
|   | Adapter / Charger            | •     | •               | •         |      |           |                                 |                             |                   |            |                     |
|   | Industrial Power             | •     | •               | •         |      | •         |                                 |                             |                   | •          |                     |
|   | UPS                          | •     | •               | •         | •    | •         |                                 |                             |                   | •          |                     |
|   | SMPS                         | •     | •               | •         |      | •         |                                 |                             |                   | •          |                     |
|   | Li-Ion Battery PackA         | •     | •               |           |      |           | •                               |                             |                   |            |                     |
| <b>COMMERCIAL SYSTEMS</b>               | DVR (Digital Video Recorder) | •     | •               | •         | •    | •         | •                               | •                           | •                 |            |                     |
|   | IP Camera                    |       | •               |           | •    | •         | •                               |                             |                   |            |                     |
|   | Detector                     |       | •               | •         |      | •         |                                 |                             |                   |            |                     |
|   | POS                          | •     | •               | •         |      | •         | •                               | •                           | •                 |            |                     |
|   | Solar Power System           | •     | •               | •         |      |           | •                               |                             |                   | •          |                     |
| <b>LIGHTING</b>                         | Electronic Ballast           | •     |                 | •         |      | •         |                                 |                             |                   |            |                     |
|   | Dimmer                       |       |                 | •         |      |           |                                 |                             |                   | •          |                     |
|   | LED Lighting                 | •     |                 | •         | •    | •         |                                 |                             |                   | •          | •                   |
|   | HID Lighting                 | •     |                 | •         | •    | •         |                                 |                             |                   | •          |                     |
| <b>INDUSTRIAL &amp; INSTRUMENTATION</b> | GFCI/AFCI                    |       |                 | •         |      |           |                                 |                             |                   | •          |                     |
|   | Smart Power Meter            | •     | •               | •         |      | •         | •                               |                             | •                 |            |                     |
|   | Power Tools                  | •     | •               | •         |      | •         |                                 |                             |                   | •          |                     |
|   | Elevator                     | •     | •               | •         | •    | •         | •                               | •                           |                   | •          |                     |
|   | Sewing Machine               | •     | •               | •         |      | •         | •                               |                             |                   |            |                     |
| <b>MEDICAL</b>                          | Portable Medical Device      | •     | •               | •         | •    | •         | •                               | •                           |                   |            |                     |
|   | Medical Diag./Anal. Devices  | •     | •               | •         | •    | •         | •                               |                             |                   |            |                     |
| <b>COMMUNICATIONS</b>                   | SLIC Line Card               | •     | •               |           | •    | •         | •                               |                             | •                 |            |                     |
|   | Ethernet Router              |       |                 |           | •    | •         | •                               | •                           | •                 |            |                     |
|   | DSL Modem Router             | •     |                 |           | •    | •         | •                               |                             | •                 |            |                     |
|   | Phone / FAX / 56K Modem      | •     | •               | •         | •    | •         | •                               | •                           | •                 |            |                     |
|   | Set Top Box                  | •     | •               | •         | •    | •         | •                               | •                           | •                 |            |                     |
|   | T1/T3 Line Driver            | •     | •               |           | •    | •         | •                               |                             | •                 |            |                     |
|   | Central Office/CPE Splitter  | •     | •               |           | •    | •         | •                               | •                           | •                 |            |                     |
| <b>COMPUTER</b>                         | Desktop / Notebook           | •     | •               | •         |      | •         | •                               | •                           |                   |            |                     |
|   | Server                       | •     | •               | •         |      |           | •                               | •                           |                   |            |                     |
| <b>AUTOMOTIVE ELECTRONICS</b>           |                              |       |                 |           |      | •         |                                 |                             |                   |            |                     |