Littelfuse NPI Summary

2019: January – December

Littelfuse®

Expertise Applied | Answers Delivered

Index (NPI level 1 & level 2)*

Primary markets	NPI launch date (YYMM)	Technology	Product name (link to slide detail)	Design registrable	Keywords
Data Center & Cloud Infrastructure	1910	PolySwitch ® Resettable PPTC	TSM250-130	Y	Resettable, dual channel, telecom equipment
Appliances Building Automation	1910	Switching Thyristor	High Temperature Alternistor TRIAC	Y	Line AC voltage up to 250$V_{RMS,}$ IOT applications
Data Center & Cloud Infrastructure	1909	TVS Diode	SP3384NUTG	Y	10GbE high-speed, ESD protection
Industrial Renewable Energy	1909	Specialty Power Fuses	PSR Series High Speed Semiconductor Fuse	Y	High speed, semiconductor fuses
Data Center & Cloud Industrial	1909	TVS Diode	8.0SMDJ	Y	High power density, compact design
Industrial	1906	Surge Protection Device	SPD2 Series	Y	UL/IEC compliant, high-energy transients protection
General Electronics Mobile & Wearable	1906	Digital Temperature Indicator	PolySwitch setP™	Y	USB-C, temperature, protection, thermal, sensing
Consumer Electronics Mobile & Wearable	1904	TVS Diode Array	SP3208. SP3213	Y	High speed interfaces, Ultra low capacitance, AEC-Q101
Industrial EV Infrastructure	1904	SiC Diode	650V SiC Schottky Diodes	Y	AEC-Q101, Silicon Carbide
Consumer Electronics Data Center & Cloud	1903	SIDACtor® Protection Thyristor	PxxxxS4xLRP Series	Y	CVBS and RS-485 Ports, surge protection 4kV
Industrial Renewable Energy	1902	SiC Diode	650V SiC Schottky Diodes	Y	AEC-Q101, Silicon Carbide, High surge capability

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NPI Level 1: New to the world product; high degree differentiation
NPI Level 2: Few competitors; some differentiation
NPI Level 3: Many competitors; weak differentiation; could be an existing product extension

Index (NPI level 3)*

NPI launch date (YYMM)	Product name (link to slide detail)
1912	Fuse: 308
1911	SIDACtor: Pxxx0ME
1911	TVS diode array: SP3420
1910	TVS diode: 1.5SMB series
1909	SIDACtor: Pxxx0SxL-A
1909	SIDACtor: Pxxx0SxLHL
1909	TVS diode: AK10-Y
1909	TVS diode: AK6-Y
1909	TVS diode array: SP3401
1909	Fuse: 400M
1908	LED protector: PLEDxUSxA

NPI launch date (YYMM)	Product name (link to slide detail)
1908	TVS diode arrays: AQ3400-02UTG
1908	Varistor: AUML(V16AUMLA2220NS)
1907	TVS diode: AK3-Y
1907	TVS diode: AK1-Y
1907	LED protector: PLEDXUX-A
1907	LED protector: PLEDxS-A
1907	SCR: S6002xS
1907	TRIAC: Q6016xH1LED
1907	TVS diode: TLPA
1906	TVS diode: TLP
1906	Fuse: 881F

NPI launch date (YYMM)	Product name (link to slide detail)
1906	Resettable PPTC: picoSMDCH010F
1905	TVS diode array: SRV05-4HTG-D
1905	TVS diode array: SP1305
1905	Power inductor: LPWI
1904	SCR: S8X5ECSRP
1904	Resettable PPTC: LoRho
1904	Fuse: 456SD
1902	TVS diode array: AQ24CANA
1902	SCR: SxX8BBS
1901	TVS diode: AK15-Y

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NPI Level 1: New to the world product; high degree differentiation
NPI Level 2: Few competitors; some differentiation
NP Level 3: Many competitors; weak differentiation; could be an existing product extension

NPI Level 1 & Level 2 products

PolySwitch® TSM250-130 series resettable PPTC

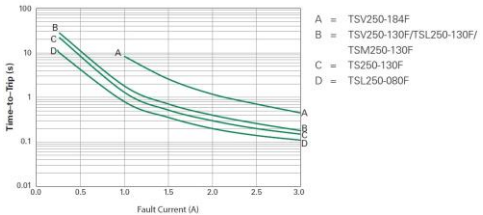
Problem/Solution:

Telecom and network equipment designers seek to conserve board space and comply with standards for reliability. TSM250-130 Series combines two resistance-matched 250 V PPTCs in a single surface-mount housing, it reduces board space 50%, simplifies assembly, and offers Tip and Ring resistance balance.

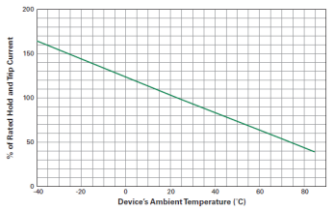
Technical resources:

Series Page | Datasheet | Tech Info

Typical Time-to-Trip Curves at 25ºC



TSM250 Temperature Rerating Curve



Benefits

- Reduce PCB area by 50%
- Improve assembly efficiency
- Tip and Ring resistance balance
- Aids compliance with industry certification

Features

- Two PPTCs in single housing
- Resistance matched PPTCs
- Very high voltage surge capabilities
- Surface mount

Markets/Applications

- Telecom and network equipment
- Customer Premise Equipment (CPE)
- Central Office (CO) Equipment
- Subscriber Line Interface Cards (SLIC)

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High temperature alternistor TRIAC switching thyristors

Problem/Solution

Newly expanded line of high-temperature TRIAC switching thyristors suitable for line AC voltage up to 250 V_{RMS} utilizes a combination of five space-saving packaging types and additional current ratings (12 A, 16 A, 25 A, 30 A and 40 A). This makes them well-suited for Internet of Things (IoT) applications that require compact design but don't involve continuous high currents.

Technical resources:

Series Page | Datasheet | Tech Info

Benefits

- Allows for a larger thermal margin in design
- Enables designers to use smaller board sizes in low power applications
- Ensures higher surge capability to withstand short-duration overload conditions

Features

- Maximum junction temperature of 150 ºC
- Up to 25 Arms AC control in a compact surface-mount packages, up to 40 A in through-hole packages
- Clip-attach assembly of field-tested robustness combined with high maximum junction temperature of 150 ºC

Markets/Applications

- Home Appliances
- Tankless Water Heaters
- Electric Tools
- Lighting Dimmers

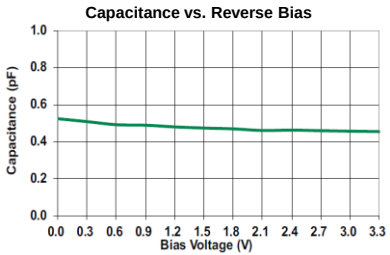
SP3384NUTG 3.3 V 15 A series TVS diode arrays

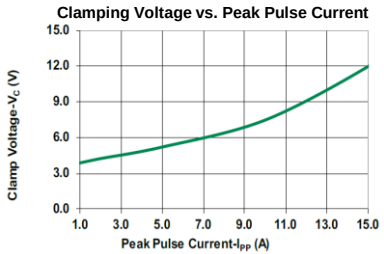
Problem/Solution

The latest 10 GbE high-speed technologies are susceptible to damage caused by electrostatic discharge (ESD), cable discharge events (CDE), electrical fast transients (EFT), and lightning-induced surges. The series of low capacitance are optimized to protect high-speed differential data lines in servers, switches and consumer electronics.

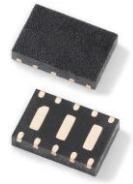
Technical resources:

Series Page | Datasheet | Tech Info





Benefits



- More robust device against electrical threats preserves signal integrity and minimizes data loss
- Optimized for protection of high-speed differential data lines
- Exceeds the maximum IEC standards requirement for ESD protection, ensuring product reliability

Features

- Low capacitance (0.5 pF per I/O) and low clamping voltage (4 V @Ipp=1 A)
- Compact µDFN packaging (3.0 x 2.0 mm)
- Provides protection for two differential data pairs (4 channels) against up to 15 A

Markets/Applications

- Datacenter and Telecom – 2.5 G/5 G/10 G Ethernet, WAN/LAN Equipment, 5G Wireless Backhaul
- Industrial – LVDS Interfaces, Integrated Magnetics
- Consumer Electronics – Desktops, Servers and Notebooks

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R1909

High-speed square body semiconductor fuses

Problem/Solution

The PSR series is part of the POWR-SPEED® line of high-speed (semiconductor) fuses and are designed for modern day sensitive power electronics devices that require superior protection against overcurrent. They offer extreme current limiting protection, balanced performance for longevity, and are available in direct bus-bar mount flush-end and blade designs to meet the needs of a global market.

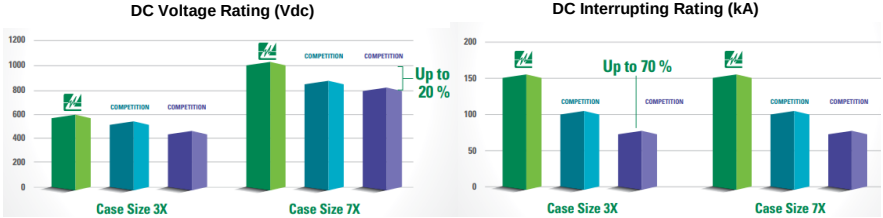
Technical resources:

Series Page

DIN Blade Datasheet

Bolted Blade Datasheet

Tech Info



Benefits

- Reduces peak let-through current and let-through energy (I^2t)
- Less energy wasted during operation
- Laser etched resistance values eliminate labels that erode over time
- Better energy efficiency and improved protection levels

Features

- Extremely current limiting
- Low watt loss
- Universal blade mounting
- Optimized design
- RoHS and REACH Compliant
- Optimized performance

Markets/Applications

- Industrial Electronics
- Renewable Energy
- EV Infrastructure
- Power conversion devices

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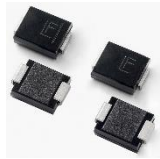
R1909

8.0SMDJ series 8000 W high voltage TVS diodes

Problem/Solution

Today's electronics designers need to conserve precious board space for design optimization opportunities including increased power density and higher efficiency. The 8.0SMDJ high voltage TVS diode solution provides 8000 W of peak pulse power dissipation in a compact DO-214AB SMC package.

Benefits



- Provides high power protection for sensitive electronics from voltage transients, increases reliability
- Compact surface mounted package (SMT) helps optimize board space
- Wide range of selections available for circuit designers

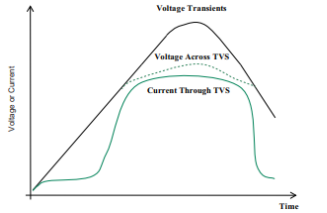
Features

- 8 kW peak pulse power capability at 10/1000 µs waveform, excellent clamping performance
- High power density in compact, low profile DO-214AB package
- Provides reverse stand-off voltage range from 12 V to 110 V

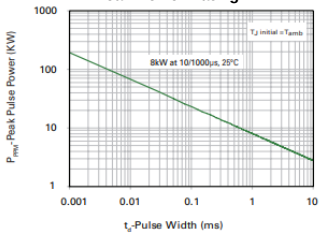
Technical resources:

Series Page | Datasheet | Tech Info

TVS Transient Clamping Waveform



Peak Power Rating



Markets/Applications

- Data center
- Industrial
- Home Appliances
- Consumer Electronics
- DC/AC Protection
- PoE Protection

SPD2 series surge protection devices

Problem/Solution

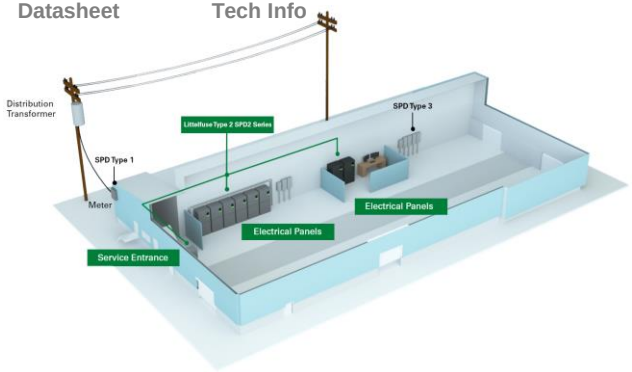
According to the Electrical Safety Foundation International, sixty to eighty percent of transient overvoltage or surges are caused by equipment being turned on or off within a facility. Littelfuse SPD2 series surge protection devices safeguard components from transient overvoltage or surges by limiting the fault current to a load or the unit being protected to mitigate damage to equipment or downtime.

Technical resources:

Series Page

Datasheet

Tech Info



Benefits

- Ensures low-residual voltage during high-energy surge events
- Higher nominal discharge current to prevent disruption, downtime, and degradation or damage to equipment
- One component can be utilized globally, reducing inventory needs and simplifying allocation of parts
- Provides panel design flexibility
- Eliminates catastrophic failure

Features

- Capability to clamp and withstand high-energy transients
- UL and IEC compliant in a single part number
- Compact footprint
- Thermal protection

Markets/Applications

- Power distribution
- Electrical Loads
- Industrial Controls
- Computers and Communications
- HVAC or Medical Equipment

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R1906

NEW TECH

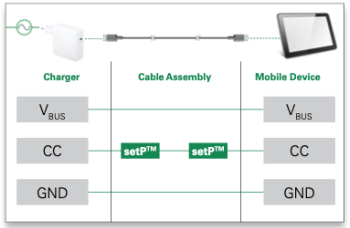
PolySwitch® setP™ digital temperature indicators

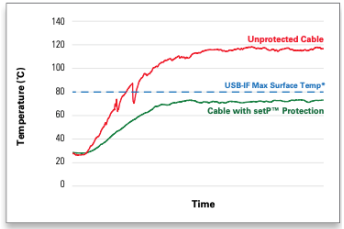
Problem/Solution

In USB Type-C connectors contamination or deformed pins to cause resistive faults leading to overheating damage. The setP™ series of Digital Temperature Indicators can help overheating of, preventing damage to connectors, cables and PCBs. Application of setP™ devices placed on digital control line of USB Type C links (CC line) can help mitigate risk. Additional applications include setP devices placed near PCB-mounted semiconductor or capacitors to trigger a digital signal when a critical temperature is exceeded.

Technical resources:

Series Page | Datasheet | Tech Info





* Reference temperature set by USB-IF within Table 6-14 of the USB Type-C Cable and Connector Specification.

Benefits

- Drop-in over-temperature protection for many existing designs
- Power independent protection in USB Type C systems
  up 100+ W and no power loss due to thermal protection
  No impact on communication channel performance
- Can help implement over temperature safety features for power electronics + multiple setP devices can be used in series

Features

- Designed to the help comply with USB-IF overheating recommendations (check wording + official name)
- Single part helps to protect systems using digital power control lines (USB Type C, HDMI, DP)
- Compact size and rigid structure for PCB installations
- For use with industry-standard assembly and molding operations

Markets/Applications

- Consumer, mobile and portable electronics
- USB Type-C cables and chargers
- Industrial, medical, first-responders, POS, or high-reliability applications with contamination risk

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R1906

SP3208 and SP3213 series TVS diode arrays

Problem/Solution

Rising data rate speeds present significant challenges to design engineers who need to maintain high signal integrity. The SP3208 and SP3213 series TVS diode arrays provide 50 percent lower nominal capacitance than other ESD protection solutions, which helps preserve signal integrity and minimize data loss.

Benefits

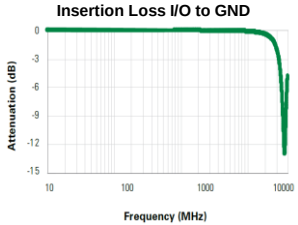
- Allows for passbands as high as 30 GHz, enabling high signal integrity for high speed data interfaces
- Makes these devices easier to model into a protection scheme
- Improves dynamic resistance performance, protecting the circuit faster and better

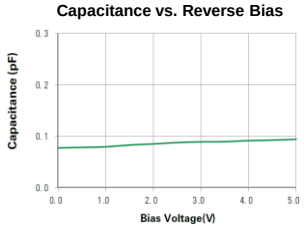
Features

- Sub-0.1 pF silicon-based ESD protection
- 0201DFN packaging with internal construction enhancements that reduce parasitic capacitance, inductance, and resistance
- Lower parasitic capacitance and inductance

Technical resources:

SP3208 Series Page | 3208 Datasheet | SP3213 Series Page | 3213 Datasheet | Tech Info





Markets/Applications

- Consumer, mobile and portable electronics
- Ultra high speed data lines and interfaces
- Low power antenna ports
- Tablet PCs and external storage

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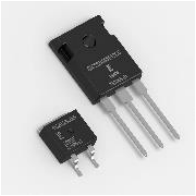
650 V SiC Schottky diodes in TO-263-2L and TO-247-3L packages

Problem/Solution

These additions to the expanding line of 650 V series SiC Schottky diodes offer power electronics designers a variety of advantages over traditional silicon-based devices, including negligible reverse recovery current, high surge capability, and a maximum operating junction temperature of 175 ºC.



Benefits

- Greater design and performance flexibility
- Suitable for high-frequency power switching
- Negligible switching losses
- Reduced stress on the opposing switch
- Enhanced surge capability and extremely low leakage
- Exceptional performance in demanding applications

Features

- Available in TO-263-2L and TO-247-3L package sizes
- Far lower switching losses than Si bipolar diodes
- Extremely fast, temperature-independent switching behavior
- PTC for safe operation and ease of paralleling
- Excellent surge capability
- AEC-Q101 qualified

Markets/Applications

- Power electronics systems
- EV infrastructure
- Boost diodes in PFC or DC/DC stage
- Power supplies

Technical resources:

Series Page | Datasheet | Tech Info

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PxxxxS4xLRP series SIDACtor® protection thyristor

Problem/Solution

Overvoltage transients can damage sensitive telecommunications equipment, including Composite Video Blanking Sync (CVBS) signal lines and ports. The new component combines 6 V operating voltage with 100 A 5/310 µs surge peak current capability and a low junction capacitance rating to offer robust protection from these transients.

Benefits

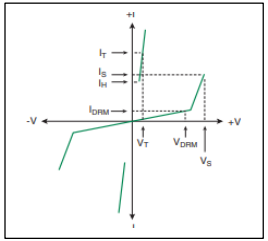
- Preferable for compact product designs
- Well-suited for low voltage signal line protection applications
- Simplifies designing into PCB layouts

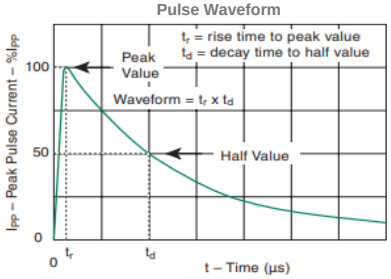
Features

- Develops higher power density in a smaller footprint than current market solutions
- Operating voltage of 6 V with 100 A 10/700 µS, 4 kV surge peak current capability, and junction capacitance <30 pF
- SMT solution in a compact SOD-123FL package

Technical resources:

Series Page | Datasheet | Tech Info





Markets/Applications

- Consumer electronics
- TV/camera CVBS cables
- Data communications
- Set Top Boxes (STBs)

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R1903

650 V series SiC Schottky diodes

Problem/Solution

Standard silicon bipolar power diodes and PN-junction diodes can exhibit less-than-ideal switching behavior. The LSIC2SD065CxxA and LSIC2SD065AxxA series SiC Schottky Diodes support dramatic reductions in switching losses and substantial increases in the efficiency and robustness of a power electronics system.

Technical resources:

LSIC2SD065 CxxA

LSIC2SD065 AxxA

Tech Info

Benefits

- Exceptional performance in demanding applications
- Suitable for high-frequency power switching
- Negligible switching losses
- Reduced stress on the opposing switch
- Larger design margin and relaxed thermal management requirements
- Enhanced surge capability and extremely low leakage

Features

- AEC-Q101 qualified
- Dramatically reduced switching losses compared to Si bipolar diodes
- Extremely fast, temperature-independent switching behavior
- Positive temperature coefficient for safe operation and ease of paralleling
- 175 ºC maximum operating junction temperature
- Excellent surge capability

Markets/Applications

- Boost diodes in PFC or DC/DC stages
- Power supplies (UPS, SMPS)
- EV charging stations
- Solar inverters
- Motor drives

NPI Level 3 products

PICO® 308 series – 30 V intrinsically safe fuse

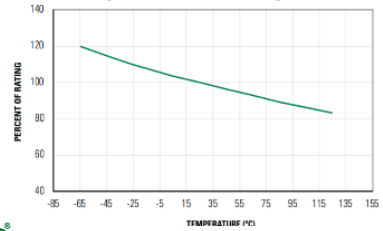
Problem/Solution

The 308 series offers a range of surface mountable encapsulated fuses certified as intrinsically safe components that can be used in hazardous locations. Ideal for use in oil, gas, mine, chemical, pharmaceutical, and process industries, the 308 series surface mountable fuse was designed to limit the energy and temperature generated during its operation. The fuse design and its encapsulant are suitable for use in intrinsically safe apparatus and associated apparatus for peak voltage not exceeding 30 V.

Technical resources:

Series Page | Datasheet | Tech Info

Temperature Rerating Curve



Features

- Surface mountable
- Encapsulated and sealed (0.7 mm minimum)
- Designed for operation in a range of hazardous area applications requiring 30 V peak.
- RoHS compliant and Pb-Free
- Fully compatible with lead-free solder alloys and higher temperature profiles associated with lead-free assembly.
- Global hazardous location certifications.

Markets/Applications

- Testing, measuring, or processing electronic and electrical equipment
- Motor controllers
- Communication handsets/two-way radios
- Process control and automation
- Sensors
- Lighting
- Flow/gas meters

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R1912

SIDACtor® Pxxx0ME extension 260-350

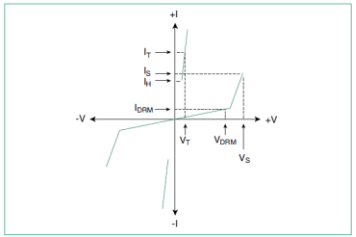
Problem/Solution

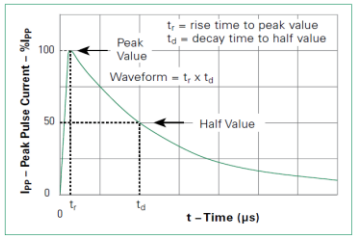
Pxxx0ME 5 kA SIDACtor® series components are designed to protect equipment located in high exposure environments from severe overvoltage transients.

Setup in a robust TO-218 package, Pxxx0ME components are ideal for use in data interface and AC power line for CATV amplifiers, telecom base station equipment, and cell towers.

Technical resources:

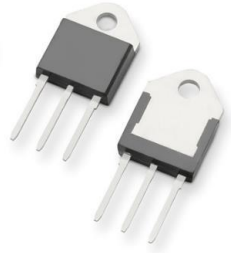
Series Page | Datasheet | Tech Info





Features

- Low voltage overshoot
- Low on-state voltage
- Surge capability does not degrade after multiple surge events within its limits
- Fails to short circuit mode when it is surged beyond its ratings
- Rugged TO-218 package
- 5000 A 8/20 µs surge rating
- 2nd level interconnect is Pb-free per IPC/JEDEC J-STD-609A
- RoHS compliant, lead-free, and halogen-free



Markets/Applications

- Data/power interface for cable CATV amplifiers
- Telecom base station equipment
- Cell towers
- UPS/AC high-power distribution grid
- Automotive battery charging systems
- Solar system DC/AC invertors

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R1911

SP3420-04UTG 0.32 pF, 6 A series TVS diode array

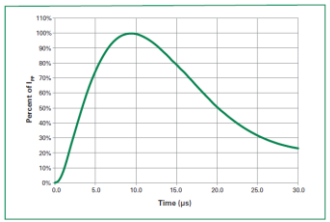
Problem/Solution

The SP3420 includes four channel ultra low capacitance and high-level ESD protection diodes to protect high-speed data rate such as USB 3.1, DisplayPort, Thunderbolt, and e-SATA. The typical capacitance of 0.32 pF helps ensure signal integrity. This robust device can safely absorb repetitive ESD strikes at the maximum level specified in the IEC 61000-4-2 international standard (Level 4, ±8 kV contact discharge) without performance degradation. It will safely dissipate 6 A of 8/20 µs surge current (IEC 61000-4-5 second edition).

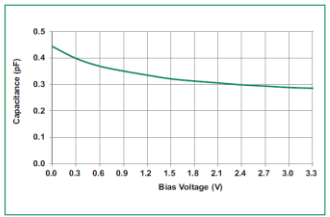
Technical resources:

Series Page | Datasheet | Tech Info

8/20µs Pulse Waveform



Capacitance vs. Reverse Bias



Features

- ESD, IEC 61000-4-2, ±12 kV contact, ±15 kV air
- EFT, IEC 61000-4-4, 40 A (5/50 ns)
- Lightning, IEC 61000- 4-5 2nd edition, 6 A (tP=8/20 µs)
- Low capacitance of 0.32 pF@1.5 V (TYP)
- Low leakage current of 0.02 µA (TYP) at 3.3 V
- Low operating and clamping voltage
- AEC-Q101 qualified
- Halogen-free, lead-free, and RoHS compliant
- Moisture Sensitivity Level (MSL -1)

Markets/Applications

- Ultra-high speed data lines
- USB 3.1, 3.0, 2.0
- DisplayPort
- Thunderbolt (Light Peak)
- V-by-One®
- LVDS interfaces
- Consumer, mobile, and portable electronics
- Tablet, PC, and external storage with high-speed interfaces

Littelfuse
Expertise Applied | Answers Delivered

R1911

1.5SMB series 1500 W surface mount TVS diode

Problem/Solution

The 1.5SMB series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events. 1.5 kW in DO-214AA package, high current density in small footprint.

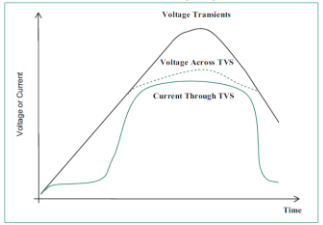
Features

- For surface mounted applications to optimize board space
- Low profile package
- Typical failure mode is short from over-specified voltage or current
- Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ESD protection of data lines in accordance with IEC 61000-4-2, 30 kV (air), 30 kV (contact)
- EFT protection of data lines in accordance with IEC 61000-4-4

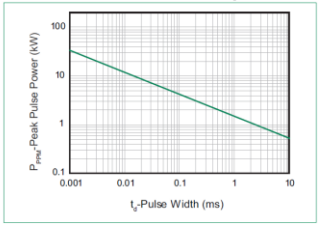
Technical resources:

Series Page | Datasheet | Tech Info

TVS Transients Clamping Waveform



Peak Pulse Power Rating Curve



Markets/Applications

- I/O interfaces
- VCC bus
- Telecom
- Computer
- Industrial
- Consumer electronics

Littelfuse
Expertise Applied | Answers Delivered

R1910

SIDACtor® protection thyristors Pxxx0SxL-A series baseband protection (voice-DS1)

Problem/Solution

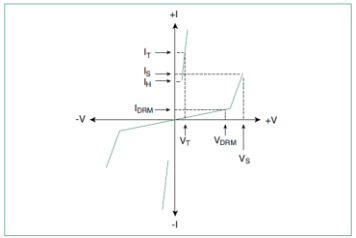
Pxxx0SxL-A series is designed to protect automotive grade equipment such as vehicle infotainment system, device communication line, and automotive camera data lines from damaging overvoltage transients.

The series provides a surface mount solution that enables equipment to comply with global regulatory standards.

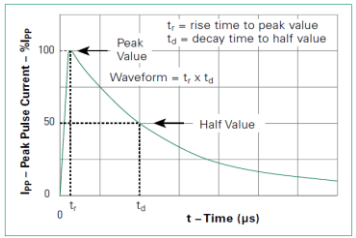
Technical resources:

Series Page | Datasheet | Tech Info

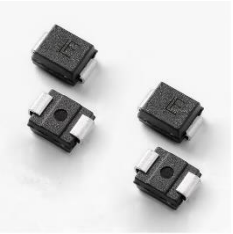
V-I Characteristics



Pulse Waveform



Features



- Automotive grade AEC-Q101 qualified
- Low voltage overshoot
- Low on-state voltage
- Does not degrade surge capability after multiple surge events within limit
- Fails short circuit when surged in excess of currents
- Low capacitance
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin (Sn) (IPC/JEDEC J-STD- 609A.01)
- UL recognized to UL 497B as an Isolated Loop Circuit Protector

Markets/Application

- Infotainment system
- Communication equipment
- Automotive camera

Littelfuse
Expertise Applied | Answers Delivered

R1909

SIDACtor® protection thyristors Pxxx0SxLHL series baseband protection (Voice-DS1)

Problem/Solution

The low IH Pxxx0SxLHL series is designed to protect baseband equipment such as modems, line cards, CPE, and DSL from damaging overvoltage transients.

The series provides a surface mount solution that enables equipment to comply with global regulatory standards.

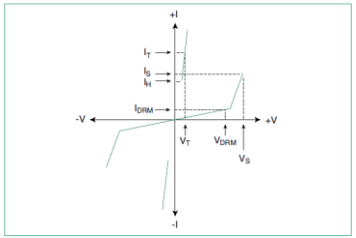
Features

- Low voltage overshoot
- Low on-state voltage
- Does not degrade in surge capability after multiple surge events within limit.
- Fails short circuit when surged in excess of ratings
- Low capacitance
- UL recognized to UL 497B as an Isolated Loop Circuit Protector

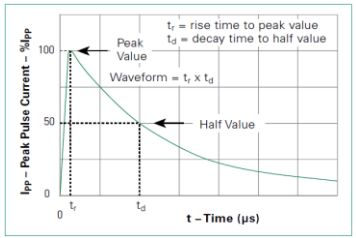
Technical resources:

Series Page | Datasheet | Tech Info

V-I Characteristics



Pulse Waveform



Markets/Applications

- Baseband equipment such as modems, line cards, CPE, and DSL

Littelfuse
Expertise Applied | Answers Delivered

AK10-Y TVS diode series – 10 kA (8/20 µS) with reflow and wave flow capability

Problem/Solution

The AK10-Y series of high power TVS diode with reflow and wave-flow capability, is specially designed for meeting severe surge test environment of both AC and DC line protection applications. It features a very fast response and ultra-low clamping characteristics as compared to MOVs (Metal Oxide Varistors). These AK components can be connected in series and/or parallel to create a very high surge current protection solution.

Features

- Recognized to UL 497B as an Isolated Loop Circuit Protector
- Both reflow and wave soldering capable
- Very low clamping voltage
- Ultra compact: less than one-tenth the size of traditional discrete solutions
- Sharp breakdown voltage
- Low slope resistance
- Bi-directional
- Symmetric in leads width for easier soldering during assembly.

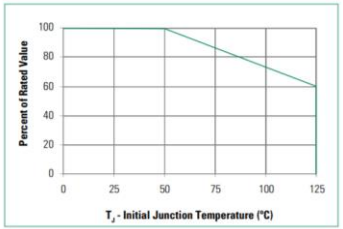
Markets/Applications

- AC line or DC line protection

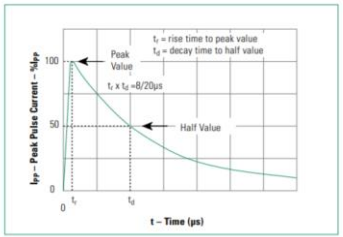
Technical resources:

Series Page | Datasheet | Tech Info

Peak power derating



Pulse Waveform



Littelfuse
Expertise Applied | Answers Delivered

AK6-Y TVS diode series – 6 kA (8/20 µS) with reflow and wave flow capability

Problem/Solution

The AK6-Y series of high power TVS diode with reflow and wave-flow capability, is specially designed for meeting severe surge test environment of both AC and DC line protection applications. It features a very fast response and ultra-low clamping characteristics as compared to MOVs (Metal Oxide Varistors). These AK components can be connected in series and/or parallel to create a very high surge current protection solution.

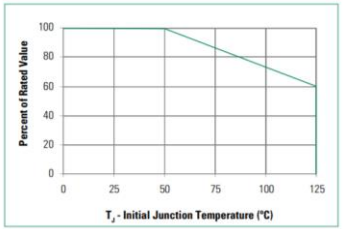
Features

- Recognized to UL 497B as an Isolated Loop Circuit Protector
- Both reflow and wave soldering capable
- Very low clamping voltage
- Ultra compact: less than one-tenth the size of traditional discrete solutions
- Sharp breakdown voltage
- Low slope resistance
- Bi-directional
- Symmetric in leads width for easier soldering during assembly.

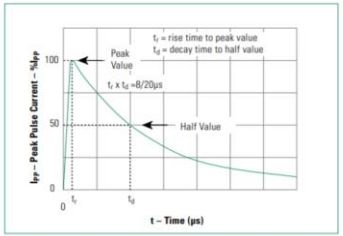
Technical resources:

Series Page | Datasheet | Tech Info

Peak power derating



Pulse Waveform



Markets/Applications

- AC line or DC line protection

Littelfuse
Expertise Applied | Answers Delivered

R1909

SP3401-02UTG 0.35 pF, 18 kV series TVS diode array low capacitance ESD protection

Problem/Solution

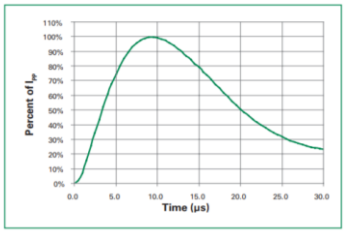
SP3401 is specifically designed to protect high-speed interfaces against Electrostatic Discharge (ESD), such as DisplayPort interfaces and USB 3.1 Gen 1. The signal line is protected by a TVS diode offering low line capacitance of 0.35 pF typical. SP3401 can safely absorb repetitive ESD strikes up to ±18 kV contact exceeding IEC 61000-4-2, level 4 (±8 kV contact discharge).

Excellent low capacitance, clamping capability, low leakage, and fast response time make this parts an ideal solution for protecting high speed data lines.

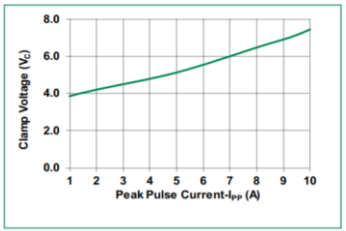
Technical resources:

Series Page | Datasheet | Tech Info

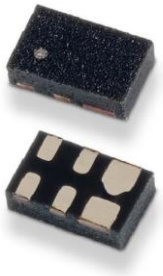
Pulse waveform



Clamping voltage vs. IPP for 8/20µs waveshape



Features



- ESD, IEC 61000-4-2, ±18 kV contact, ±30 kV air
- EFT, IEC 61000-4-4, 80 A (tP=5/50 ns)
- Lightning, IEC 61000- 4-5 2nd edition, 10 A (tP=8/20 µs)
- Low capacitance of 0.35 pF (TYP) per I/O
- Low leakage current of 1 nA (TYP) at 3.3 V
- Small form factor µDFN (JEDEC MO-229) package provides flow through routing to simplify PCB layout
- AEC-Q101 qualified
- Moisture Sensitivity Level (MSL -1)
- Halogen-free, lead-free and RoHS compliant

Markets/Applications

- USB 3.1 Gen1
- HDMI
- DisplayPort
- S-ATA
- NFC

Littelfuse
Expertise Applied | Answers Delivered

400M series low resistance fast acting fuse (0.5 A, 1.5 A)

Problem/Solution

The 400M Series is an 0603 fast-acting fuse that is best suited for applications that require relatively low resistance. The part is 100% lead-free, RoHS compliant, and halogen-free fuse. It is designed to provide overcurrent protection to circuits that operate under high operating temperatures of up to 150 ºC.

Features

- Low resistance
- Fast response to faulty current to ensure over-current protection to sensitive electronic component.
- Operating temperature from -55 ºC to +150 ºC
- 100% lead-free, halogen-free, and RoHS compliant

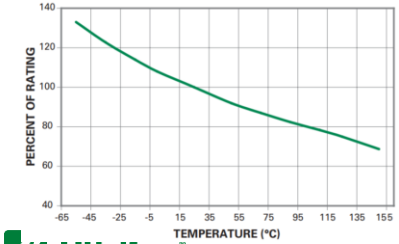
Markets/Applications

- Burn in test

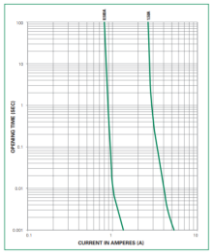
Technical resources:

Series Page Datasheet Tech Info

Temperature Rerating Curve



Average time current curves



Littelfuse
Expertise Applied | Answers Delivered

PLEDxUSxA series unidirectional open LED protector

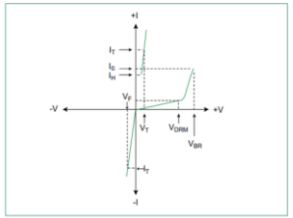
Problem/Solution

PLEDxUSxA open LED protectors provide an electronic switching shunt path when an LED in an LED string fails as an open circuit. This ensures that the remaining string of LEDs will continue to function if a single LED does not. The protector is designed to enable higher reliability in indoor LED lighting applications such as advertisement lighting and other applications. This series is compatible with one, two, and three watt LEDs that have a nominal 3 V forward characteristic and is available in an SMB surface mount package. The low profile package is ideal for dense board applications.

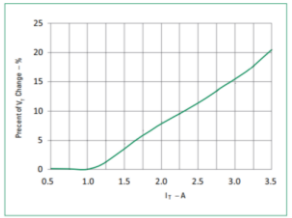
Technical resources:

Series Page | Datasheet | Tech Info

V-I Characteristics



V_T vs. I_T



Features

- Ideal for protecting high brightness LED with high operating current at specified condition
- Fast switching
- Reverse battery/power protection
- Low profile, small foot print standard DO-214AA package
- Compatible with industrial lighting environments
- IEC-61000-4-2 ESD 30 kV air, 30 kV contact
- ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)

Markets/Applications

- Indoor and outdoor LED lighting applications

Littelfuse
Expertise Applied | Answers Delivered

AQ3400-02UTG TVS diode arrays 1 pF, ±30 kV automotive qualified

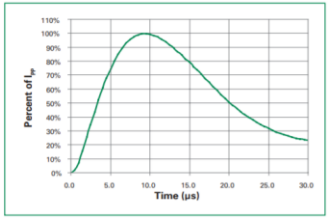
Problem/Solution

The AQ3400 integrates two channels of low capacitance steering diodes and an additional Zener diode to provide protection for electronic equipment that may experience destructive electrostatic discharges (ESD). The AQ3400 can safely absorb repetitive ESD strikes above the maximum contact level specified in IEC 61000-4-2 international standard (Level 4, ±8 kV contact discharge) without performance degradation. The low off-state capacitance makes it ideal for protecting high-speed signal lines such as USB2.0 or USB 3.0 and 1 Gb Ethernet.

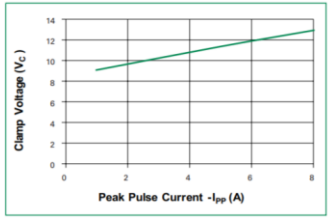
Technical resources:

Series Page | Datasheet | Tech Info

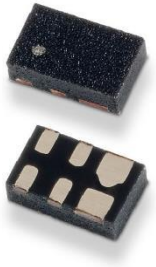
8/20µs Pulse Waveform



Clamping voltage vs. IPP for 8/20µs waveshape



Features



- ESD, IEC 61000-4-2, ±30 kV contact, ±30 kV air
- ESD, ISO 10605, 330 pF 330 Ω, ±30 kV contact, ±30 kV air
- EFT, IEC 61000-4-4, 80 A (tP=5/50 ns)
- Lightning, 8 A (8/20 µs as defined in IEC 61000-4-5 second edition)
- Low capacitance of 1 pF (TYP) per I/O
- Low leakage current of 0.01 µA (TYP) at 5 V
- Small form factor µDFN (JEDEC MO-229) package provides flow through routing to simplify PCB layout
- AEC-Q101 qualified

Markets/Applications

- Automotive electronics
- LCD/PDP TVs
- External storage
- DVD/Blu-ray players and set top boxes
- Smartphones
- Ultrabooks/notebooks

Littelfuse
Expertise Applied | Answers Delivered

R1908

AUML series - V16AUMLA2220NS-2220 inch, 16 Vdc, 50 J load dump energy

Problem/Solution

The AUML Series of Multilayer Transient Surge Suppressors was specifically designed to suppress the destructive transient voltages found in an automobile. The most common transient condition results from large inductive energy discharges. The electronic systems in the automobile are susceptible to damage from these voltage transients and thus require protection. The AUML transient suppressors have temperature independent suppression characteristics affording protection from -55 ºC to 125 ºC

Technical resources:

Series Page

Datasheet

Tech Info

Current, energy, and power derating curve

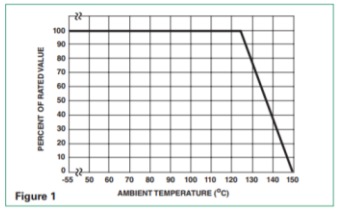


Figure 1

Peak pulse current test waveform for clamping voltage

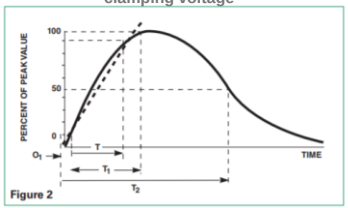


Figure 2

Features

- AEC-Q200 compliant
- RoHS compliant
- Leadless, surface mount chip form
- “Zero” lead inductance
- Variety of energy ratings available
- Load Dump energy rated per SAE specification J1113
- No temperature derating up to 125 ºC ambient
- High peak surge current capability
- Low profile, compact industry standard chip size (1206, 1210, 1812, and 2220 sizes)
- Inherent bidirectional clamping
- No plastic or epoxy packaging assures better than 94 V-0 flammability rating

Markets/Applications

- Automotive lighting system

AK3-Y TVS diode series – 3 kA (8/20 µS) with reflow and wave flow capability

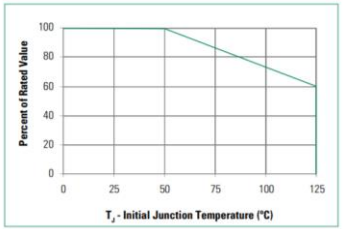
Problem/Solution

The AK3-Y series of high power TVS diode with reflow and wave-flow capability, is specially designed for meeting severe surge test environment of both AC and DC line protection applications. It features a very fast response and ultra-low clamping characteristics as compared to MOVs (Metal Oxide Varistors). These AK components can be connected in series and / or parallel to create a very high surge current protection solution.

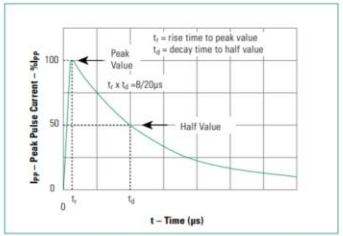
Technical resources:

Series Page | Datasheet | Tech Info

Peak power derating



Pulse Waveform



Features

- Recognized to UL 497B as an Isolated Loop Circuit Protector
- Both reflow and wave soldering capable
- Very low clamping voltage
- Ultra compact: less than one-tenth the size of traditional discrete solutions
- Sharp breakdown voltage
- Low slope resistance
- Bi-directional
- Symmetric in leads width for easier soldering during assembly.

Markets/Applications

- AC line or DC line protection

AK1-Y TVS diode series – 1 kA (8/20 µS) with reflow and wave flow capability

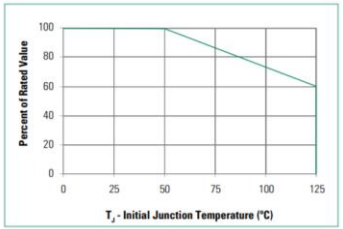
Problem/Solution

The AK1-Y series of high power TVS diode with reflow and wave-flow capability, is specially designed for meeting severe surge test environment of both AC and DC line protection applications. It features a very fast response and ultra-low clamping characteristics as compared to MOVs (Metal Oxide Varistors). These AK components can be connected in series and / or parallel to create a very high surge current protection solution.

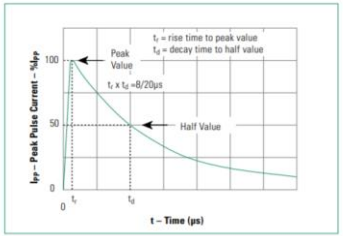
Technical resources:

Series Page | Datasheet | Tech Info

Peak power derating



Pulse Waveform



Features

- Recognized to UL 497B as an Isolated Loop Circuit Protector
- Both reflow and wave soldering capable
- Very low clamping voltage
- Ultra compact: less than one-tenth the size of traditional discrete solutions
- Sharp breakdown voltage
- Low slope resistance
- Bi-directional
- Symmetric in leads width for easier soldering during assembly.

Markets/Applications

- AC line or DC line protection

Littelfuse
Expertise Applied | Answers Delivered

R1907

PLEDXUX-A series automotive grade unidirectional open LED protector

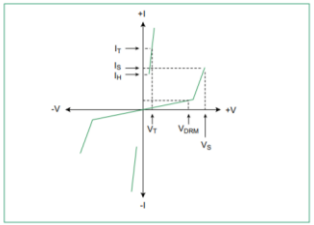
Problem/Solution

Automotive PLED Unidirectional Series (PLEDxUx-A) open LED protectors provide a switching electronic shunt path around a single LED that fails as an open circuit. This ensures the remaining string of LEDs will continue to function even though a single LED in the string has failed open. It also provides reverse battery or reverse power polarity protection. This series is designed for automotive applications such as automotive car head lamp, tail lamp, LED indicator protection, aircraft runway lighting, and other applications.

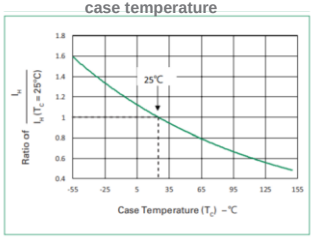
Technical resources:

Series Page Datasheet Tech Info

V-I Characteristics



Normalized DC holding current vs. case temperature



Features

- AEC−Q101 qualified and PPAP capable
- Fast switching
- Reverse battery/power protection
- Automatically resets after power cycle
- Available in standard DO- 214AA package
- Compatible with industrial lighting environments
- IEC-61000-4-2 ESD 30 kV air, 30 kV contact
- ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- Compatible with PWM frequencies up to 10 kHz

Markets/Applications

- Automotive

Littelfuse
Expertise Applied | Answers Delivered

PLEDxS-A series automotive grade open LED protector

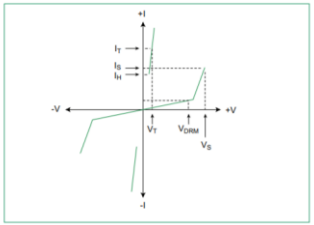
Problem/Solution

Automotive PLED Series (PLEDxS-A) open LED protectors provide a switching electronic shunt path when an LED in an LED string fails as an open circuit. This ensures that the remaining string of LEDs will continue to function if a single LED does not. This series is designed for automotive applications such as automotive car head lamp, tail lamp, LED indicator protection, aircraft runway lighting, and other applications need high reliability requirements. Compatible with one, two, and three watt LEDs that have a nominal 3 V forward characteristic.

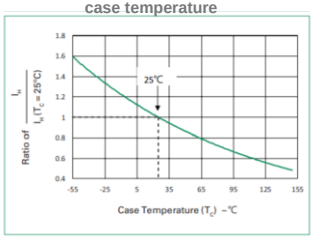
Technical resources:

Series Page Datasheet Tech Info

V-I Characteristics



Normalized DC holding current vs. case temperature



Features

- Recognized to UL 497B as an Isolated Loop Circuit Protector
- AEC−Q101 qualified and PPAP capable
- Fast switching
- Automatically resets after power cycle
- Available in standard DO- 214AA package
- Compatible with industrial lighting environments
- IEC-61000-4-2 ESD 30kV air, 30 kV contact
- ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- Compatible with PWM frequencies up to 30 kHz

Markets/Applications

- Automotive

Littelfuse
Expertise Applied | Answers Delivered

R1907

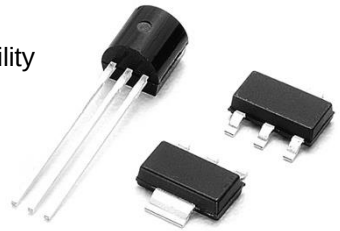
S6002xS thyristor EV series 2.0 amp sensitive SCRs

Problem/Solution

The S6002xS offers high di/dt capability through small die construction design. It is glass-passivated to ensure long term reliability and parametric stability.

Features

- Surge capability > 25 Amps
- Blocking voltage (VDRM / VRRM) capability — up to 600V
- High di/dt capability of 500 A/µs
- Improved turn-off time (tq) < 55 µsec
- Sensitive gate for direct microprocessor interface
- Thru hole and surface mount packages
- RoHS compliant and halogen-free



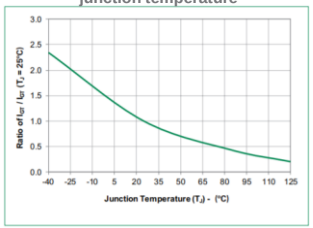
Markets/Applications

- Capacitor discharge application such as high-power gas flame ignition

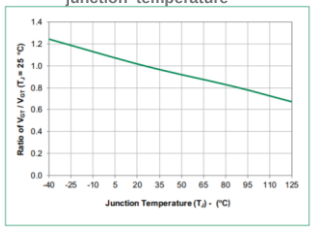
Technical resources:

Series Page | Datasheet | Tech Info

Normalized DC gate trigger current vs. junction temperature



Normalized DC holding current vs. junction temperature



Littelfuse
Expertise Applied | Answers Delivered

Q6016xH1LED 16 amp alternistor thyristor TRIAC

Problem/Solution

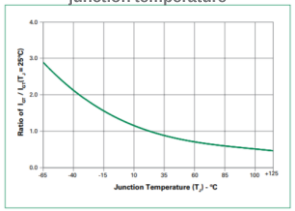
Q6016LH1LED series is designed to meet low load current characteristics typical in LED lighting applications.

By keeping holding current at 5 mA maximum, this triac series is characterized and specified to perform best with LED loads. The Q6016LH1LED series is best suited for LED dimming controls to obtain the lowest levels of light output with a minimum probability of flickering. Q6016LH1LED series is offered in the industry standard TO-220AB package with an isolated mounting tab that makes it best suited for adding an external heat sink.

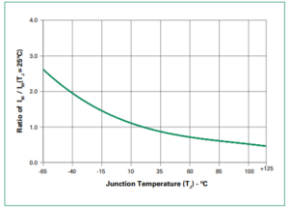
Technical resources:

Series Page | Datasheet | Tech Info

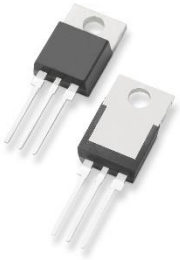
Normalized DC gate trigger current vs. junction temperature



Normalized DC holding current vs. junction temperature



Features



- As low as 5 mA max holding current
- L-Package is UL recognized for 2500 Vrms
- UL recognized to UL 1557
- Provides full control of light out put at the extreme low end of load conditions.
- 2500V AC min isolation between mounting tab and active terminals
- Improves margin of safe operation with less heat sinking required
- Enable survivability of typically LED load operating characteristics
- Simplicity of circuit design and layout

Markets/Applications

- AC solid-state switches
- Lighting controls with LED lamp loads
- Small low current motor in power tools
- Lower current motor in home/brown goods appliances

Littelfuse
Expertise Applied | Answers Delivered

1907

TLPA series high reliability TVS diodes

Problem/Solution

The TLPA Series is packaged in a highly reliable industry standard P600 axial leaded package and is designed to provide precision overvoltage protection for sensitive electronics.

Features

- High reliability application
- Glass passivated chip junction in P600 package
- Fast response time: typically, less than 1.0 ps from 0 volts to VBR min
- Excellent clamping capability
- Typical failure mode is short from over-specified voltage or current
- Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ESD protection of data lines in accordance with IEC 61000-4-2, 30 kV air, 30 kV contact
- EFT protection of data lines in accordance with IEC 61000-4-4

Markets/Applications

- Designed to protect sensitive electronics from 50 ms Square Test Waveform

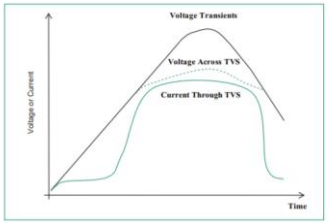
Technical resources:

Series Page

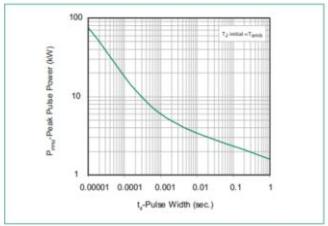
Datasheet

Tech Info

TVS transients clamping waveform



Peak pulse power rating curve



Littelfuse

Expertise Applied | Answers Delivered

TLP series high reliability TVS diodes

Problem/Solution

The TLP series is packaged in a highly reliable industry standard P600 axial leaded package and is designed to provide precision overvoltage protection for sensitive electronics.

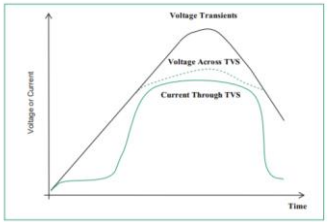
Features

- High reliability application
- Glass passivated chip junction in P600 package
- Fast response time: typically, less than 1.0 ps from 0 volts to VBR min
- Excellent clamping capability
- Typical failure mode is short from over-specified voltage or current
- Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ESD protection of data lines in accordance with IEC 61000-4-2, 30 kV air, 30 kV contact
- EFT protection of data lines in accordance with IEC 61000-4-4

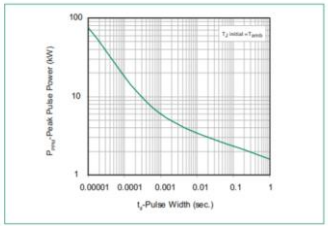
Technical resources:

Series Page | Datasheet | Tech Info

TVS transients clamping waveform



Peak pulse power rating curve



Markets/Applications

- Designed to protect sensitive electronics from 50 ms Square Test Waveform

Littelfuse
Expertise Applied | Answers Delivered

881F series - NANO2® fast opening high current subminiature surface mount fuse

Problem/Solution

The 881F series NANO²® fuse is a relatively small sized, high-current, surface-mount fuse which provides overcurrent protection for applications of high operating current in a limited space. This is the faster opening version of the original 881 series which offers faster opening response during current overload conditions, protecting downstream components from getting damaged.

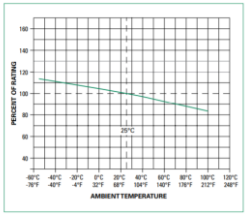
Technical resources:

Series Page

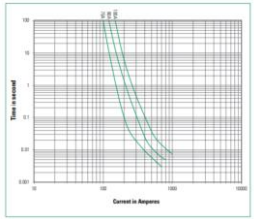
Datasheet

Tech Info

Temperature Re-rating curve



Average time current curves



Benefits

- Single fuse solution for high current application
- Suitable for a wide variety of voltage requirement and application
- Ensures downstream component protection during current overload conditions
- Enhanced product reliability and performance
- Compatible with high volume assembly requirements

Features

- Available in ratings of 70 A, 80 A, and 100 A
- High interrupting rating – 1500 A @ 75 VDC
- Faster opening time response for 200% OL current
- Robust and solderless fuse design
- Surface mountable high-current fuse

Markets/Applications

- Blade servers
- Routers
- High power battery systems
- Power Factor Correction (PFC) in high-wattage power supplies

Littelfuse
Expertise Applied | Answers Delivered

PolySwitch® picoSMDCH010F series automotive high temperature lead-free SMD resettable PPTC

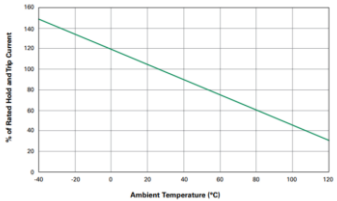
Problem/Solution

The automotive high temperature SMD is the first miniature-sized high temperature PPTC series from Littelfuse with AEC-Q200 qualification for automotive applications. It provides surface mount overcurrent protection for applications where space is a prime concern and resettable protection is desired.

Technical resources:

Series Page | Datasheet | Tech Info

Temperature Re-rating curve



Benefits:

- Expertise from the world's leading resettable overcurrent protection manufacturer
- Provides wider range of form factors to enhance design flexibility
- Meets ever-increasing demand for compact and space-saving designs due to more electronics content in vehicle
- Restores system operation after reset when fault condition is removed, thus provides safety and protection

Features

- Products meet applicable automotive industry standards
- Compatible with high-volume electronics assembly
- Smaller footprint, surface-mount form factor
- High operating temperature - -40 ℃ ~ 125 ℃
- AEC-Q200 qualified, RoHS compliant, and ISO/TS16949 certificated

Markets/Applications

- Automotive and industrial transportation
- Infotainment/telematics
- Climate control systems
- Body electronics and sensor protection
- ADAS (Advanced Driver Assistance)

Littelfuse
Expertise Applied | Answers Delivered

R1906

SRV05-4HTG-D 5 V 10 A series TVS diode array

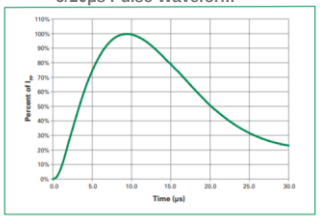
Problem/Solution

The SRV05-4HTG-D integrates low capacitance rail-to-rail diodes with an additional zener diode to protect each I/O pin against ESD and high surge events. This robust device can safely absorb 10 A surge current per IEC 61000-4- 5 (tP=8/20 µs) without performance degradation and a minimum ±30 kV ESD per IEC 61000-4-2. Their very low loading capacitance also makes them ideal for protecting high speed signal pins.

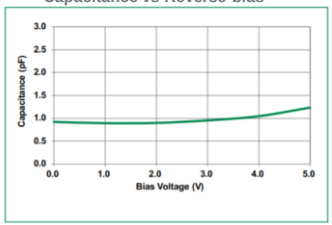
Technical resources:

Series Page | Datasheet | Tech Info

8/20µs Pulse Waveform



Capacitance vs Reverse bias



Features

- ESD, IEC 61000-4-2, ±30 kV contact, ±30 kV air
- EFT, IEC61000-4-4, 40 A (5/50 ns)
- Lightning, 10 A (8/20 µs as defined in IEC 61000-4-5 second edition)
- Low capacitance of 1 pF (TYP) per I/O
- Low leakage current of 0.5 µA (MAX) at 5 V
- Small SOT23-6 (JEDEC MO-178) packaging
- Halogen-free, lead-free and RoHS compliant
- Moisture Sensitivity Level (MSL -1)

Markets/Applications

- LCD/PDP TVs
- Monitors
- Notebooks
- 10/100/1000 ethernet
- Firewire
- Set top boxes
- Flat panel displays
- Portable medical

Littelfuse
Expertise Applied | Answers Delivered

R1905

SP1305-02HTG 30 pF 30 kV series TVS diode array

Problem/Solution

The SP1305 TVS diode array is designed to protect sensitive equipment from damage due to electrostatic discharge (ESD), electrical fast transients (EFT), and lightning induced surges. The SP1305 can absorb repetitive ESD strikes above the maximum level specified in the IEC 61000-4-2 international standard without performance degradation and safely dissipate up to 5 A of 8/20 µs induced surge current (IEC- 61000-4-5, 2nd edition) with very low clamping voltages.

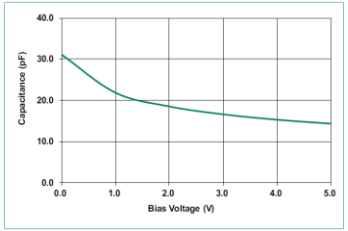
Features

- ESD, IEC 61000-4-2, ±30 kV contact, ±30 kV air
- EFT, IEC 61000-4-4, 50 A (5/50ns)
- Lightning, 5 A (8/20 µs as defined in IEC 61000-4-5 second edition)
- Low clamping voltage
- Low leakage current
- AEC-Q101 qualified
- Moisture Sensitivity Level (MSL-1)

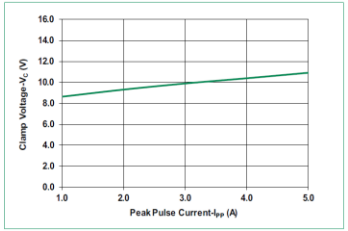
Technical resources:

Series Page | Datasheet | Tech Info

Capacitance vs. Reverse Bias



Clamping Voltage vs. Peak Pulse Current



Markets/Applications

- Industrial equipment
- Test and medical equipment
- Point-of-Sale terminals
- Motor controls
- Legacy ports (RS-232, RS-4
- Security and alarm system

LPWI series power inductors 1608 mm/2012 mm/ 2016 mm/2520 mm

Problem/Solution

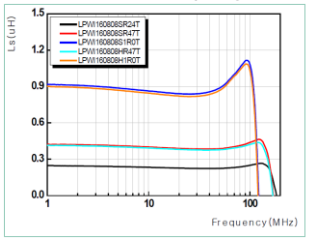
The LPWI series offers compact and low profile dimensions, low losses, and high efficiency inductor for power supply circuits based thin film photolithography technology.

The metal alloy composite thin film power inductor enables high durability, reliability, quality, excellent temperature saturated characteristics, highly crafted miniaturization, and low-height profiles.

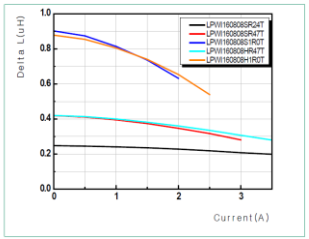
Technical resources:

Series Page Datasheet Tech Info

Inductive vs. Frequency



Inductive vs. DC Current



Features

- Thin film photolithography technology for compact and low profile
- The metal alloy composite for high reliability
- Large current type
- High efficiency and Isat ratings: ΔTemp value up to 95%
- DC resistance as low as 17 mOhm typ.
- Magnetically shielded

Markets/Applications

- Mobile phone and tablet
- Portable/wearable devices
- DC-DC converters and power modules in general use electronic equipment
- Game console, POS, VR, dongle, and IoT module
- Consumer products like PDP, LCD TV, DVD player, PC, audio player, DSC, STB, laptop, SSD, and home automation
- Power banks and printers

Littelfuse
Expertise Applied | Answers Delivered

R1905

S8X5ECSRP SCR series discrete thyristor 1200 V VDRM, 0.5 A IT (RMS) capability in TO-92 GAK package

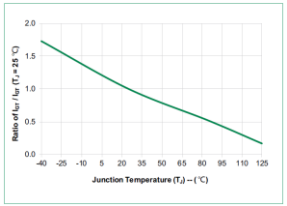
Problem/Solution

The S8X5ECS offers a high static dv/dt with a low turn off (tq) time. It is specifically designed for GFCI (Ground Fault Circuit Interrupter) and AFCI (Arc Fault Circuit Interrupter), RCD (Residual Current Device), and RCBO (Residual Current Circuit Breaker with Overload Protection) applications. All SCRs junctions are glass-passivated to ensure long term reliability and parametric stability.

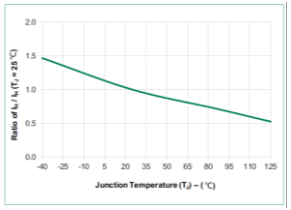
Technical resources:

Series Page | Datasheet | Tech Info

Normalized DC Gate Trigger Current For All Quadrants vs. Junction Temperature



Normalized DC Holding Current vs. Junction Temperature



Features

- Thru-hole packages
- Surge current capability < 20 amps
- Blocking voltage (VDRM/VRRM) capability - up to 800 V
- Non-repetitive direct surge peak off-state voltage (VDSM) up to 1200 V
- Non-repetitive reverse surge peak off-state voltage (VRSM) up to 1000 V
- High dv/dt noise immunity
- Improved turn-off time (t_q)
- Sensitive gate for direct microprocessor interface
- Halogen free and RoHS compliant

Markets/Applications

- GFCI/AFCI receptacle

Littelfuse
Expertise Applied | Answers Delivered

PolySwitch® LoRho SMD series packaged PPTC for charging cable protection

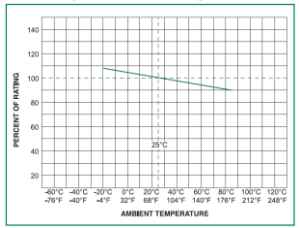
Problem/Solution

The LoRho SMD PTC for charging cables provides protection from heat generated due to faults within the connector such as USB-C, microUSB, and many others. As connectors get smaller, their pin-to-pin spacings are shrinking which increases the opportunity for debris such as dust, dirt, or water to collect causing a fault. These faults can generate a tremendous amount of heat which will damage charging cables, the devices they charge, or people using them.

Technical resources:

Series Page | Datasheet | Tech Info

Temperature Derating Curve



Benefits

- Surface mount design reduces assembly time and cost compared to leaded/strapped models
- Saves PCB space in the USB-C connector and ensures that the USB-C plug meets USB-IF dimension specifications
- Well-suited for fast-charging applications up to 21 Vdc and 4.5 A I_{hold}

Features

- SMD compatible with reflow soldering process
- Available in small 1206 and 1210 sizes
- Up to 21 Vdc and 4.5 A I_{hold}
- Ultra-low internal resistance
- Reset automatically

Markets/Applications

- Overtemperature (OT) protection for USB connectors and cables including USB Type-C, USB Micro-B and USB-A
- Fast charging standards and protocols

Littelfuse
Expertise Applied | Answers Delivered

456SD 40A/50A series - NANO²® high current subminiature surface mount fuse

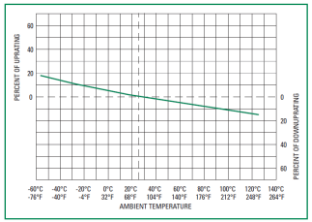
Problem/Solution

The 456SD series NANO²® fuse is a small sized, surface-mountable high current fuse which provides over-current and excessive surge current protection for applications operating at high current in a limited space. This is a supplementary offering to the existing 456 and 881 series where the 50 A fuse rating is not available. Such applications are mostly served today through a single large-sized high-current industrial type fuse or in some cases, parallel configuration of lower amperage SMD fuses.

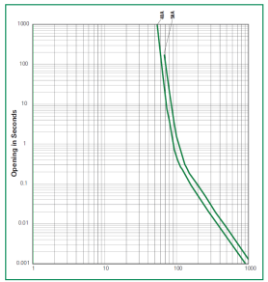
Technical resources:

Series Page | Datasheet | Tech Info

Temperature Re-rating Curve



Average Time Current Curves

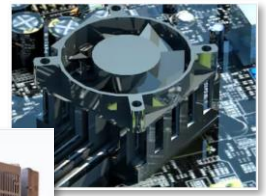


Benefits

- Single fuse solution for high current application
- Suitable for a wide variety of voltage requirement and application
- Enhances power efficiency
- Avoids nuisance opening due to high inrush and surge current inherent in the system
- Compatible with high volume assembly requirements

Features

- Available in ratings of 40 to 50 A
- High interrupting rating – 600 A @ 75 VDC
- Very low cold resistance, temperature rise, and voltage drop
- High inrush/surge current withstand capability
- Surface mountable high current fuse



Markets/Applications

- Voltage regulator module for PC server
- Cooling fan system for PC server
- Storage system power
- Base station power supply
- Power tools

Littelfuse
Expertise Applied | Answers Delivered

AQ24CANA-02HTG series 250 W TVS diode array

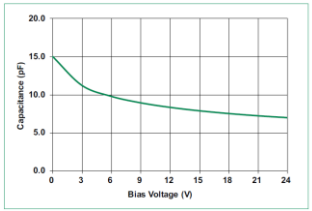
Problem/Solution

The AQ24CANA TVS diode array is designed to protect automotive Controller Area Network (CAN) lines from damage due to electrostatic discharge (ESD), electrical fast transient (EFT), and other overvoltage transients. The AQ24CANA can absorb repetitive ESD strikes above the maximum level specified in IEC 61000-4-2 international standard without performance degradation and safely dissipate 5 A of 8/20 µs surge current (IEC 61000-4-5 2nd edition) with very low clamping voltages.

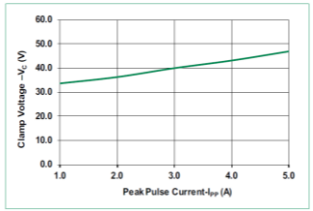
Technical resources:

Series Page | Datasheet | Tech Info

Capacitance vs. Reverse Bias



Clamping Voltage vs. Peak Pulse Current



Features

- ESD, IEC 61000-4-2, ±27 kV contact, ±30 kV air
- EFT, IEC 61000-4-4, 50 A (5/50 ns)
- Lightning, 5 A (8/20 µs as defined in IEC 61000-4-5 second edition)
- PPAP capable
- Low clamping voltage
- Low leakage current
- ESD, ISO 10605, 330 pF 330 Ω, ±27 kV contact, ±30 kV air
- AEC-Q101 qualified
- Halogen-free, lead-free and RoHS compliant
- Moisture Sensitivity Level (MSL -1)

Markets/Applications

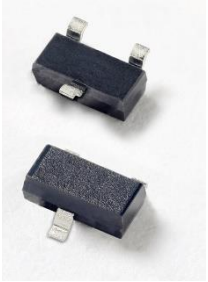
- Automotive applications
- CAN bus
- Electronic control units
- Body control units
- ADAS control units
- Power train control units

SxX8BBS series 600 V VDRM and 0.8 A IT (RMS) capability in SOT23 package

Problem/Solution

This new sensitive SCR component series offers 600 V VDRM and 0.8 A IT (RMS) capability in SOT23 package, smallest in industry. It is specifically designed for GFCI (Ground Fault Circuit Interrupter) applications. All SCRs junctions are glass-passivated to ensure long term reliability and parametric stability.

Features



- Very compact SOT23 SMT package
- Surge current capability up to 12 A @ 60 Hz
- Blocking voltage (VDRM / VRRM) capability - up to 600 V
- High dv/dt noise immunity
- Improved turn-off time (tq) <25 µsec
- Sensitive gate for direct microprocessor interface
- RoHS compliant and Halogen-free

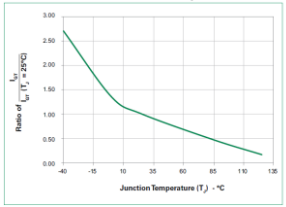
Technical resources:

Series Page

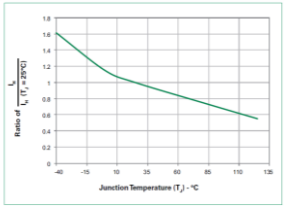
Datasheet

Tech Info

Normalized DC Gate Trigger Current vs. Junction Temperature



Normalized DC Holding Current vs. Junction Temperature



Markets/Applications

- GFCI (Ground Fault Circuit Interrupter) applications

AK15-Y TVS diode series – 1 kA (8/20 µS) with reflow and wave flow capability

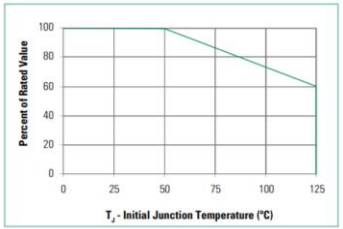
Problem/Solution

The AK15-Y series of high power TVS diode is specially designed for meeting severe surge test environment of both AC and DC line protection applications. It features a very fast response and ultra low clamping characteristics as compared to MOVs (Metal Oxide Varistors). It accomplishes this by virtue of the Littelfuse Foldback™ technology, which provides a clamping voltage lower than the avalanche voltage (but above the rated working voltage); therefore, any voltage rise due to increased current conduction is maintained at a minimum magnitude, providing the best possible protection level.

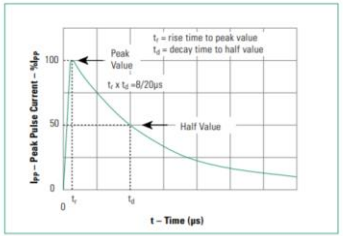
Technical resources:

Series Page | Datasheet | Tech Info

Peak power derating



Pulse waveform



Features

- Recognized to UL 497B as an Isolated Loop Circuit Protector
- Both reflow and wave soldering capable
- Very low clamping voltage
- Ultra compact: less than one-tenth the size of traditional discrete solutions
- Sharp breakdown voltage
- Low slope resistance
- Bi-directional
- Symmetric in leads width for easier soldering during assembly.

Markets/Applications

- AC line or DC line protection

Littelfuse
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