



Littelfuse Q1–Q3 2020 NPI Summary*

November 2020

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Expertise Applied | Answers Delivered

Users must independently evaluate the suitability of and test each product selected for their own specific applications. It is the User's sole responsibility to determine fitness for a particular system or use based on their own performance criteria, conditions, specific application, compatibility with other components, and environmental conditions. Users must independently provide appropriate design and operating safeguards to minimize any risks associated with their applications and products. Littelfuse products are not designed for, and may not be used in, all applications.

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Index

Primary markets	NPI launch date (MM/YY)	Technology	Product name (link to information)	Design registrable	Keywords
Mobile & wearables Consumer electronics	09/20	TVS Diode	SP1250-01ETG	Y	Small footprint 0402; AEC-Q101 qualified
Consumer electronics Data Center	09/20	1206 Time Lag Fuse	407 Series	Y	Time-lag fuse; high I ² t values
Industrial	09/20	Discrete IGBTs	Trench Series	Y	XPT™ thin-wafer technology; 1200 V, 140 A
Automotive Consumer electronics	09/20	TVS Diode	AQ3522-01FTG AQ3530-01FTG	Y	High speed interfaces - USB3.0, HDMI, USB2.0, and eSATA
EV infrastructure Data Center	08/20	Discrete MOSFET	X2 Series	Y	600 V, 14 A MOSFETs; Package options: TO-252, TO-220
Mobile & wearables Consumer electronics	07/20	PolySwitch® Resettable PPTC	zeptoSMDC Series	Y	Small 0201 size; Li-ion battery protection
Consumer electronics Automotive	07/20	Diode Array	SP3205	Y	High speed interfaces - USB3.0, HDMI, USB2.0, and eSATA
Industrial	07/20	Discrete Thyristor	SCR SV60xx Series	Y	High temperature SCRs; low gate current trigger level of 6 mA, 10 mA maximum at approximately 1.5 V
Industrial EV infrastructure	07/20	Rectifier Diodes	DMA Series	Y	1200 V and 1600 V Diodes designed for single and three-phase input rectifier circuit
Industrial	07/20	Discrete Thyristor	SCR SV6016Dx	Y	High temperature SCRs; low gate current trigger level of 6 mA maximum at approximately 1.5 V

Index

Primary markets	NPI launch date (MM/YY)	Technology	Product name (link to information)	Design registrable	Keywords
Industrial; Medical	06/20	Solid State Relay	PLA172P	Y	High voltage 800 V rating; 5000 VRMS input-to-output isolation
Industrial; Transportation	06/20	Rectifier Diode	W2865HA680-720	N	High current and blocking voltage 2862 A, 7200 V
Consumer Electronics; Datacenter & Cloud	06/20	Diode Array	SP4322	Y	speed interfaces - USB3.0, HDMI, USB2.0, and eSATA
Industrial; Building Automation	05/20	Temperature Sensor	PPGxxxJx	Y	RTD; wide temperature range of -70° C to +500° C; excellent stability and high accuracy
Automotive; Consumer Electronics	05/20	Diode Array	AQ3102	Y	AEC-Q101 qualified; low capacitance of 1 pF; low leakage current of 0.01 μ A
Industrial	05/20	Gate Driver	IX4310T	Y	2 A high-speed; low-side IGBT & MOSFET Gate Driver; replacement to IRS44273L
Industrial	05/20	IGBT	Trench Series XPT™	Y	1200 V; current ratings: 40 A, 55 A, and 85 A; Low V_{sat} , low E_{on}/E_{off} , high surge current capability
Appliances; Electrical Vehicles	04/20	Battery Protectors	ITV Series	Y	Li-ion battery protector; current ratings 12 A, 15 A, 30 A and 45 A; operation voltages 3 V to 62 V
Automotive; Industrial	04/20	Gate Driver	IX4351NE Evaluation Board	Y	Evaluation Board (IX4351NE & LSIC1M0120E0080)
Building Automation; Data Center & Cloud	04/20	Diode Array	SP712	Y	640 W peak pulse power; RS-485 application
Mobile & Wearables; Consumer Electronics	04/20	Diode Array	SP4010	Y	High speed interfaces - USB3.0, HDMI, USB2.0, and eSATA

Index

Primary markets	NPI launch date (MM/YY)	Technology	Product name (link to information)	Design registrable	Keywords
Mobile & Wearables; Consumer Electronics	03/20	TVS Diode	SMF 200W	Y	Surface mount; 200 W peak pulse power capability; IEC/UL certified
Data Center; Consumer Electronics	03/20	Diode Array	SP2525NUTG	Y	High-speed interfaces-10/100/1000 Ethernet; µDFN-10 package
Data Center; Consumer Electronics	03/20	Diode Array	SP3025-04HTG	Y	High-speed interfaces; 10/100/1000 Ethernet; SOT23-6L package
Industrial; Electric Vehicle	03/20	Discrete IGBTs	Trench Series IGBTs	Y	XPT™ (Thin-wafer technology); 650 – 1200 V
Industrial	02/20	Fast Recovery Diode	M2325HA400-450	Y	Reverse voltage:4500 V; Capsule type
Automotive	02/20	PolySwitch® Resettable PPTC	High Temp nanoASMDCH	Y	AEC-Q200; Surface mount; operating temperature of -40° C ~ 125° C
Automotive; Industrial	01/20	Gate Driver	IX4351NE	Y	SiC MOSFET driver; IGBT driver; Internal negative charge pump
Mobile & Wearables; Consumer Electronics	01/20	TVS Diode	SMF4L 400W	Y	Surface mount; 400 W peak pulse power capability; IEC/UL certified
Building Automation; Industrial	01/20	Magnetic Sensor	TMR Switch	Y	Tunneling Magnetoresistance (TMR); Ultra low power consumption

TVS Diode Arrays SP1250-01ETG

50 A unidirectional in SOD-882, low clamping 8.7 V & low leakage current 0.02 μ A

Problem/Solution

The SP1250 unidirectional TVS is fabricated in a proprietary silicon avalanche technology. These diodes provide a high ESD (electrostatic discharge) protection level for electronic equipment. The SP1250 TVS can safely absorb repetitive ESD strikes of ± 30 kV (contact and air discharge as defined in IEC 61000-4-2) without any performance degradation. Each device can dissipate up to 50 A 8/20 μ s surge event.

Technical resources *(Click on below icons to learn more)*



Series Page

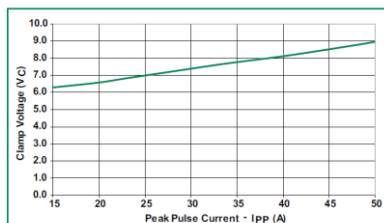


Datasheet



Tech Info

Clamping voltage vs. I_{pp} for 8/20 μ s waveshape



Expertise Applied | Answers Delivered

Feature and Benefits

- High surge capability, 50 A (8/20 μ s) and Low clamping performance, 8.7 V (TYP, $I_{pp}=50$ A) together offers more robust protection against electrical threats.
- Low leakage current, 0.02 μ A (TYP) at 5 V extends longer operating life.
- An AEC-Q101 qualified solution in a SOD-882 DFN package (0402 footprint) enables easy and compact mounting with excellent performance.



Markets/Applications

- V_{BUS} protection
- Portable battery
- Switches/buttons
- Test equipment/instrumentation
- Medical equipment
- Notebooks/desktops/servers
- Computer peripherals
- Point-of-sale terminals



R2009

407 Series 1206 Time Lag Fuse

Problem/Solution

Power-on and other system operations, such as processor speed changes in notebook or desktop may cause voltage or current spikes, resulting in nuisance blows. Over time, repeated surges may result in fuse fatigue. Extreme temperatures can cause degradation of the circuit protection device's performance. Selecting a fuse with slow-blow characteristics, high current carrying capability, and high pulse withstand is critical in such designs. The 407 Series time-lag high I^2t fuse can help protect in the DC input system of computers from hazard of over-heating or fire.

Technical resources *(Click on below icons to learn more)*



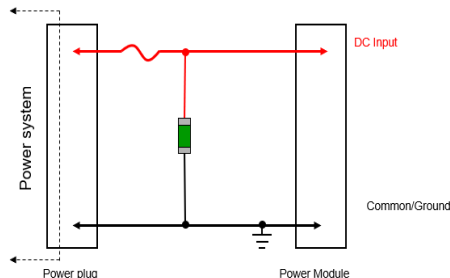
Series Page



Datasheet



Tech Info



Benefits

- Minimizes the possibility of nuisance openings due to high inrush and surge current
- Wider offerings

Features

- High I^2t values
- Operating Temperature from -55 to 150°C
- 100% Lead-Free, RoHS compliant, and Halogen Free
- Suitable for both leaded and lead-free reflow/wave soldering



Markets/Applications

- Displays
- Servers
- Computers
- Printers
- Scanners
- Data Modems
- Gaming Consoles



Extension of Trench Series XPT™ Discrete IGBTs

Problem/Solution

Utilizing XPT™ thin-wafer technology and fourth generation (GenX4™) Trench IGBT process, this 1200 V, 140 A device features reduced thermal resistance, low energy losses, fast switching and high current densities. Other qualities help reduce gate drive requirements and switching losses, including a positive collector-to-emitter voltage temperature coefficient that enables designers to use multiple devices in parallel, and low gate charges.

Technical resources (Click on below icons to learn more)



Series Page



IXYK140N120A4
Datasheet



IXYK140N120A4
Datasheet



IXYN140N120A4
Datasheet

Benefits

- Ideal for high power density, low losses applications
- Hard-switching capable
- Easy paralleling of devices
- Reduced gate driver requirements
- Ease of replacement and availability of isolation package



Features

- I_C 140 A, I_{CM} 1200 A (Check datasheet), Low $V_{CE(sat)}$, low E_{ON}/E_{OFF}
- Square Reverse Bias Safe Operating Areas (RBSOA) at 960V
- Positive thermal coefficient of $V_{CE(sat)}$
- Low gate charge Q_G
- Packages: TO-264, PLUS247 and SOT-227B (miniBLOC)

Markets/Applications

- Switch mode power supplies
- Lamp ballasts
- Motor drives
- Power inverters
- Welding machines
- Power factor correction (PFC) circuits



R2009

AQ3522-01FTG, 0.15pF 22kV Bidirectional TVS Diode

AQ3530-01FTG, 0.3pF 22kV Unidirectional TVS Diode

New

Problem/Solution

The AQ3522-01FTG and AQ3530-01FTG integrate ultra low capacitance diodes to provide robust protection for electronics that may experience destructive electrostatic discharges (ESD). These TVS diodes safely absorb repetitive ESD strikes above the maximum Level 4, $\pm 8\text{kV}$. Ideal for protecting applications requiring high ESD performance in small packages. Extremely low loading capacitance also makes it perfect for safeguarding ultra high-speed data lines.

Technical resources *(Click on below icons to learn more)*



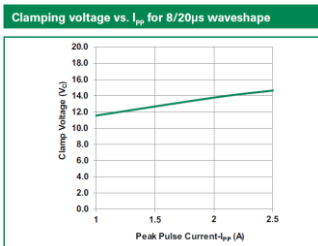
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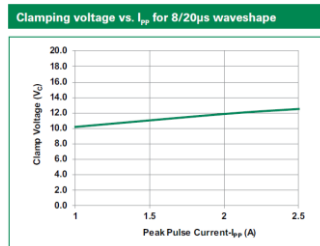
Datasheet



Tech Info



AQ3522-01FTG



AQ3530-01FTG

Features and Benefits

- Provides excellent signal integrity due to ultra low capacitance
- Quality assurance through AEC-Q101 qualification and PPAP compliance
- Environmentally friendly component is halogen free, lead free and RoHS compliant
- ESD, ISO 10605, 330 pF 330 Ω , ± 20 kV contact, ± 20 kV air
- ESD, IEC 61000-4-2, ± 22 kV contact, ± 30 kV air
- Lightning, 2.5 A (8/20 μs as defined in IEC 61000-4-5 2nd edition)



Markets/Applications

- Automotive application
- LVDS interfaces
- Display port
- V-by-One®
- HDMI
- USB2.0 and USB3.0



Ultra Junction X2 Series Discrete MOSFETs

600 V, 14 A – IXTY14N60X2 (TO-252) / IXTP14N60X2 (TO-220)

New

Problem/Solution

Developed using the charge compensation principle and proprietary process technology, these new devices exhibit the lowest on-state resistances, along with low gate charges and superior dv/dt performance. Their avalanche capability also enhances the device ruggedness.

In addition, thanks to superior power dissipation performance, this product exhibits excellent long-term stability and reliability in extended lifetime applications.

Technical resources *(Click on below icons to learn more)*



Series Page



IXTY14N60X2
Datasheet



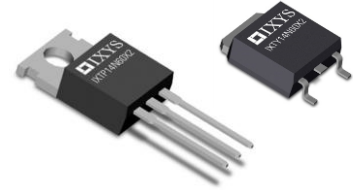
IXTP14N60X2
Datasheet



Tech Info

Benefits

- Low switching losses
- High power density
- Reduced turn-on and turn-off delay times
- High reliability



Features

- Low $R_{ds(on)}$ and Q_g
- High-current capability with small package
- High dv/dt capability
- Superior Avalanche capability
- Low package inductance
- Low C_{oss}

Markets/Applications

- Server power
- Telecom power
- Medical power
- EV Charger



PolySwitch® Resettable zeptoSMDC Series PPTC

Problem/Solution

The PolySwitch® zeptoSMDC PPTC Series was developed to protect the lithium-ion battery packs used in most mobile devices from overcurrent and overtemperature conditions. It works to protect both the battery management ICs and battery fuel gauges. Available in the smallest form factor currently available, it is ideal for portable, mobile, and wearable consumer electronics applications.

Benefits

- Saves PCB space due to smallest available footprint.
- Helps protect battery monitor IC from electrical over-stress.
- Resets to normal operation after fault is cleared.



Features

- Surface mount, small 0201 size
- Maximum electrical rating: 13 VDC
- Short circuit current: 82~200 mA
- RoHS compliant and ISO/TS 16949 certified

Technical resources (Click on below icons to learn more)



Series Page



Datasheet



Tech Info



Markets/Applications

- Smartphones and Tablets
- Wearables
- Notebook PC
- Smartwatches
- e-Readers
- Wireless speakers
- Portable medical equipment
- Portable game players
- Mobile point of sale

SP3205, 0.3 pF 4 A Unidirectional Diode Array in SOD882 for High-speed signal lines protection

New

Problem/Solution

The SP3205 provides low capacitance, unidirectional and a high level of protection for electronic equipment that may experience destructive electrostatic discharges(ESD). It can safely absorb repetitive ESD strikes at $\pm 30\text{kV}$ without performance degradation and safely dissipate 4A of 8/20 μs surge current.

The typical capacitance of 0.3pF helps ensure excellent signal integrity on the most challenging consumer electronics interfaces, such as USB 3.1, HDMI, DisplayPort, Thunderbolt and V-by-One®.

Technical resources (Click on below icons to learn more)



Series Page

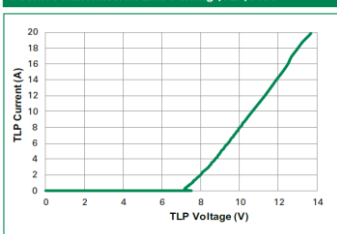


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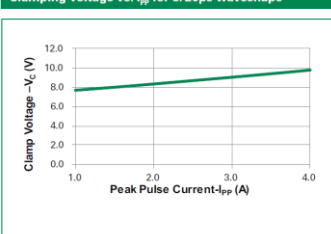


Tech Info

Positive Transmission Line Pulsing (TLP) Plot



Clamping voltage vs. I_{PP} for 8/20 μs waveshape



Features

- ESD, IEC 61000-4-2, $\pm 30\text{ kV}$ contact, $\pm 30\text{ kV}$ air
- EFT, IEC 61000-4-4, 40 A ($t_P=5/50\text{ ns}$)
- Low capacitance of 0.3 pF (TYP @ $V_R=0\text{ V}$)
- Low leakage current of 1 nA (TYP) at 3.3 V
- Lightning, IEC 61000- 4-5 2nd edition, 4 A ($t_P=8/20\text{ }\mu\text{s}$)
- AEC-Q101 qualified
- Halogen free, Lead free and RoHS compliant
- Moisture Sensitivity Level (MSL -1)



Markets/Applications

- USB 3.1
- HDMI
- Display port
- S-ATA
- NFC

USB3.1	HDMI
S-ATA	NFC

High-Temperature Discrete Thyristor SCR Series

SV6012xx, SV6016xx, SV6020xx, SV6025xx

New

Problem/Solution

The SV60xx high-temperature SCR series is ideal for unidirectional switching applications including phase control, motorcycle voltage regulators, converters/rectifiers, inrush current control and capacitive discharge ignitions. These SCRs have a low gate current trigger level of 6 mA, 10 mA maximum at approximately 1.5 V.

Technical resources: *(Click on below icons to learn more)*



Series Page



Datasheet



Tech Info



Benefits

- Capable of handling higher load current
- Better heat dissipation and higher isolation voltage
- Capable of handling occasional overload conditions within limited cooling applications
- Enables higher frequency voltage input in various AC to DC applications



Features

- 150 °C maximum junction temperature
- High surge capability by clip-attach package design
- High dv/dt performance
- Halogen free and RoHS compliant

Markets/Applications

- AC Generator (ACG) rectifiers
- Voltage regulators
- Inrush current controller in various AC to DC applications
- Motorcycle and small engine CDI
- Control of power tools

Rectifier Diodes DMA Series for single and three-phase bridge

New

Problem/Solution

Finding suitable medium voltage standard rectifier diodes has been a challenge, especially for single and three-phase input rectifier circuit designs. Three standard rectifier options—with features such as small footprint, isolated package options, and high current ratings in slight discrete packages—have been added to the Littelfuse power diode product portfolio. This series provides more options for designers to help meet today's unique design requirements.

Technical resources: (Click on below icons to learn more)



Series Page



DMA10P1200UZ
Datasheet

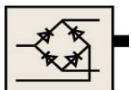


DMA10P1600HR
Datasheet

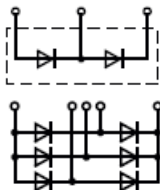
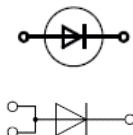


DMA80IM1600HB
Datasheet

AC
Rectification

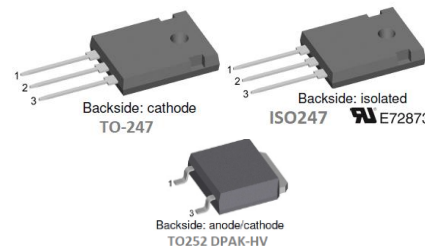


Switching
Frequency
50~60Hz



Benefits

- Planar passivated chips
- Very low leakage current
- Improved thermal behavior
- High commutation robustness
- High surge capability



Features

- DMA10P1200UZ: 2x1200 V, 10 A in slight DPAK HV package
- DMA10P1600HR: 2x1600 V, 10 A in ISO247 DCB base isolated package
- DMA80IM1600HB: 1600 V, 80 A in standard TO-247 package
Direct cross to competitor part number

Markets/Applications

- Industrial drivers
- EV offboard chargers
- Power supplies/UPS
- Soft starters
- Wind power
- Central HVAC
- SVC



High-Temperature Discrete Thyristor SCR SV6016Dx in TO-252 (DPAK) package

New

Problem/Solution

The SV6016Dx high-temperature SCR series is designed to provide exceptional performance in environmentally demanding applications. It is suitable for general switching as well as unidirectional switching for phase control. The SV6016Dx series is well suited for motorcycle voltage regulators, converters/rectifiers, and capacitive discharge ignition applications. The SV6016Dx series has a low gate current trigger level of 6 mA maximum, at approximately 1.5 V.

Technical resources (Click on below icons to learn more)



Series Page



Datasheet



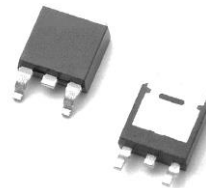
Tech Info



Expertise Applied | Answers Delivered

Benefits

- Allows for a wider operating margin in existing design, enables smaller heat sink for new design
- Enhanced surge capability
- Enables smaller board design by replacing larger TO-220AB/TO-263
- Environmentally friendly



Features

- 150 °C maximum junction temperature
- Surge capability up to 200 A at 60 Hz half-cycle
- $I_{T(rms)}$ up to 16 A
- Compact TO-252 package with clip bond technology
- Halogen-free and RoHS compliant

Markets/Applications

- AC Generator (ACG) rectifiers
- Voltage regulators
- Inrush current controllers for AC/DC applications
- Motorcycles and other small engine Capacitor Discharge Ignition (CDI)
- Power tools
- Brown and white goods

R2007

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PLA172P – 800 V normally-open Solid-State Relay with 105° C specs and 5000 V_{RMS} input-to-output isolation

Problem/Solution

Isolation current monitor circuits for higher voltage systems >400 V require high blocking voltage, low off-state leakage current relays with high input-to-output isolation rating to prevent potential lethal current conduction to the system chassis. The PLA172P relay's 800 V load voltage rating with 100 mA load current capability provides additional design margin compared to the more common 600 V rated solid-state relays, particularly on noisy AC power line applications and high voltage battery applications. The 105° C specifications including the low 5 μ A maximum off-state leakage current rating in conjunction with the low on-resistance, making it the ideal choice for high precision isolation current monitor applications.

Technical resources *(Click on below icons to learn more)*



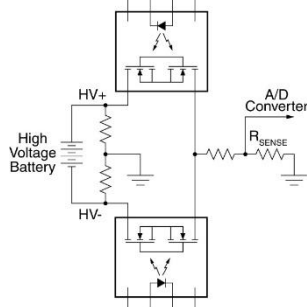
Series Page



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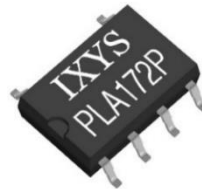


Product Intro



Benefits

- Replaces electro-mechanical relays (EMRs) that are bulky and prone to failing drop tests
- Unique device pinout provides more than 6.8 mm of pad-to-pad separation between the high voltage output pins preventing arcing
- 5000 V_{RMS} input-to-output isolation
- 5 mA Low input control current over operating temperature range



Features

- High voltage 800 V rating and 100 mA load current (AC) operational specifications (Note 85 mA for DC applications)
- 105° C specification ratings for off-state leakage current, on- resistance, switch speeds and input control current
- Guaranteed off-state leakage current $\leq 5 \mu$ A at 105° C
- Unique surface mount package with 6.8 mm output pin spacing applications with demanding creepage distance requirements

Markets/Applications

- Industrial
- Instrumentation
- Medical
- Isolation test equipment
- Battery isolation monitors
- Industrial solar field isolation monitor



R2006

Rectifier Diode 2865 A, 6800 V – 7200 V (W2865HA680-720)

Problem/Solution

Utilizing the latest production and assembly techniques, this new rectifier diode expands our portfolio into higher voltage technology. This rectifier diode is used in medium and high voltage applications to convert AC to DC. Typically used in high power, multilevel platforms where robustness and ease of series connection are critical considerations. Front end rectification in medium voltage motor control is a typical application for this new diode.

Technical resources (Click on below icons to learn more)



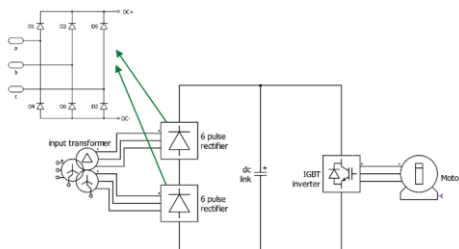
Series Page



Datasheet



Tech Info



An illustration of 12 pulse diode front end for electric drives

Benefits

- Designed for optimum cooling solutions
- Withstand high temperatures in challenging environments
- Optimized device for low conduction losses
- High reliability and robustness
- For use in series operation as well as stand alone
- Suitable for n+1 redundancy designs



Features

- Hermetic package and double side cooling capability
- - 40 to + 150° C operating temperature
- High current and blocking voltage 2862 A, 7200 V
- Pressure contact with short circuit failure mode

Markets/Applications

- Industrial
- Transportation Vehicles
- Motor Control
- Medium and high voltage applications



R2006

SP4322, 0.4 pF, 11 A Bidirectional Diode Array in SOD882 for high-speed data interfaces protection

Problem/Solution

SP4322 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 low capacitance of 0.4 pF typical.

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

Technical resources *(Click on below icons to learn more)*



Series Page

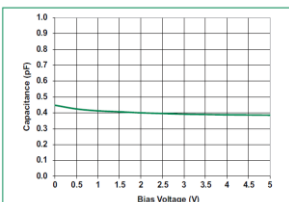


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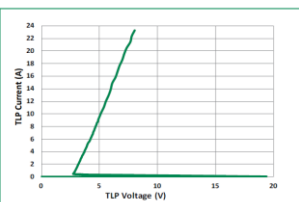


Tech Info

Capacitance vs. Reverse Bias

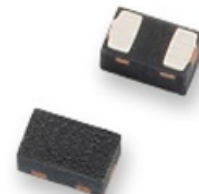


Positive Transmission Line Pulsing (TLP) Plot



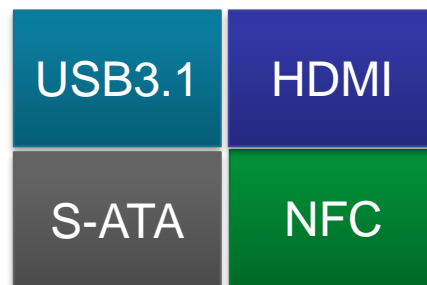
Features

- ESD, IEC 61000-4-2, ± 18 kV contact, ± 30 kV air
- EFT, IEC 61000-4-4, 40 A ($t_p=5/50$ ns)
- Low capacitance of 0.4 pF (TYP @ $V_R=0$ V)
- Low leakage current of 1 nA (TYP) at 5V
- Lightning, IEC 61000- 4-5 2nd Edition, 11 A ($t_p=8/20$ μ s)
- AEC-Q101 qualified
- Halogen free, Lead free and RoHS compliant
- Moisture Sensitivity Level (MSL -1)



Markets/Applications

- USB 3.1
- DisplayPort
- S-ATA
- NFC
- 1G/2.5G/10G Ethernet



PPGxxxJx Series Thin Film Platinum RTDs

Problem/Solution

Thin film platinum resistance temperature detectors (RTDs) are best suited for temperature measurement where accuracy, repeatability and stability of measurements are required. The PPGxxxJx series of RTDs offer a nearly linear relationship between temperature and resistance. The RTDs are rated for use in a wide temperature range of -70° C to +500° C and offer excellent stability, even at high and low temperature extremes.

Technical resources *(Click on below icons to learn more)*



Series Page



Datasheet



Tech Info

Benefits

- Excellent stability even at high temperatures
- High accuracy: resistance and temperature deviation can be controlled to within $\pm 0.06\%$ and $\pm 0.15^\circ\text{C}$, a tolerance that corresponds to Class "A" or Class "F 0.15" of DIN EN 60751 (Class A products only)
- High reliability: capable of withstanding extreme environmental conditions

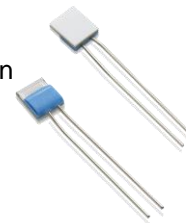
Features

- Glass-coated platinum element
- Platinum-clad nickel lead wires
- Virtually linear relationship between temperature and resistance
- Capable of withstanding temperatures ranging from -70 to +500° C

Markets/Applications

- Industrial water meters and heat meters
- Cold chain and cold storage

RoHS



AQ3102, 1 pF, ± 30 kV Diode Array in SOT23-3L and SC70-3L for protecting high speed signal line

Problem/Solution

Integrates two channels of low capacitance steering diodes and Zener Diode to provide protection for automotive electronics equipment that may experience destructive electrostatic discharges (ESD) 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 with an extremely low dynamic resistance

Technical resources (Click on below icons to learn more)



Series Page

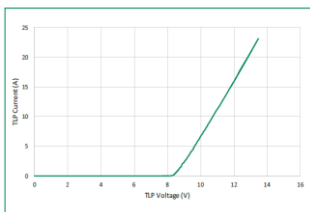


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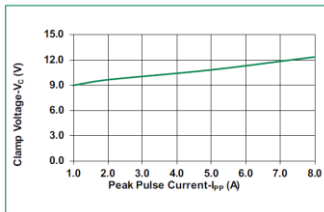


Tech Info

Positive Transmission Line Pulsing (TLP) Plot



Clamping voltage vs. I_{PP} for 8/20 μ s waveshape



Expertise Applied | Answers Delivered

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 ($t_P=5/50$ ns)
- Low capacitance of 1 pF (TYP) per I/O
- Low leakage current of 0.01 μ A (TYP) at 5 V
- Lightning, IEC 61000- 4-5 2nd edition, 8 A ($t_P=8/20$ μ s)
- AEC-Q101 qualified, PPAP capable (Automotive Grade)
- Halogen free, Lead free and RoHS compliant
- Moisture Sensitivity Level (MSL -1)



Markets/Applications

- Automotive Electronics
- Wearable Technology
- Portable Medical
- LCD/PDP TVs
- External Storages
- DVD/Blu-ray Players
- Set Top Boxes
- Smartphones
- Ultrabooks/Notebooks
- Digital Cameras



R2005

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IX4310T 2 A high-speed, low-side IGBT & MOSFET Gate Driver

Problem/Solution

The IX4310T converts a logic level input to the high current and high voltage needed to quickly turn-on and turn-off a power discrete MOSFET or IGBT.

Technical resources *(Click on below icons to learn more)*



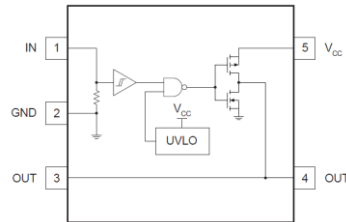
Series Page



Datasheet



Product catalog



Benefits

- Cost competitive replacement to IRS44273L
- Smallest and least expensive low-side gate driver offered by Littelfuse



Features

- Output capable of sourcing and sinking 2 A of peak current
- 5 V to 24 V supply voltage range
- Fast rise and fall times (7 ns typical)
- Fast propagation delay times (13 ns typical)
- Small 5-pin SOT23 package

Markets/Applications

- Consumer and industrial
- DC-DC converters
- Motor controllers
- Power inverters



Trench Series XPT™ Discrete IGBTs product extension

Problem/Solution

Utilizing XPT™ thin-wafer technology and 4th generation (GenX4™) Trench IGBT process, these 1200V devices feature reduced thermal resistance, low energy losses, fast switching, low tail current, and high current densities. Other qualities include a positive collector-to-emitter voltage temperature coefficient that enables designers to use multiple devices in parallel and low gate charges, thus helping reduce gate drive requirements and switching losses.

Technical resources *(Click on below icons to learn more)*



Series Page



IXYH55N120A4
Datasheet



IXYH85N120A4
Datasheet



IXYT55N120A4HV
Datasheet



IXYT85N120A4HV
Datasheet



Benefits

- Ideal for high power density and low losses applications
- Hard-switching capabilities
- Easy paralleling of devices



Features

- Packages: TO-268HV (IXYT*HV) and TO-247 (IXYH*)
- Current ratings: 40 A, 55 A, and 85 A
- Low V_{sat} , low E_{on}/E_{off} , high surge current capability
- Square Reverse Bias Safe Operating Areas (RBSOA) at 960 V
- Positive thermal coefficient of $V_{CE(sat)}$

Markets/Applications

- Hard Switching Applications without snubber
- Battery chargers
- Lamp ballasts
- Motor drives
- Power inverters
- Power Factor Correction (PFC) circuits
- Switch-mode power supplies
- Uninterruptible Power Supplies (UPS)
- Welding machines

ITV Series surface mount battery protectors

Problem/Solution

The ITV Series is a three-terminal, surface mountable Li-ion battery protector designed to guard against the damage caused by both overcurrent and overcharging. The devices are available in current ratings of 12 A, 15 A, 30 A, and 45 A. Innovative design provides fast response and reliable performance to interrupt the charging or discharging circuit before the battery pack becomes overcharged or overheated.

Technical resources *(Click on below icons to learn more)*



ITV4030 12A
Series Page



ITV4030 15A
Series Page



ITV5432 30A
Series Page



ITV9550 30A
Series Page



ITV9550 45A
Series Page



ITV4030 12A
Datasheet



ITV4030 15A
Datasheet



ITV5432 30A
Datasheet



ITV9550 30A
Datasheet



ITV9550 45A
Datasheet



Tech Info

Benefits

- Prevents battery pack damage caused by over-charging
- Over-current and overvoltage protection
- Aids compliance with industry certification
- Automation assembling available
- Environment friendly



Features

- Current ratings of 12 A, 15 A, 30 A and 45 A
- Operation voltages ranging from 3 V to 62 V
- Innovative design uses embedded fuse and heater elements
- Low internal resistance
- UL and TUV certification; RoHS compliant and Halogen free
- Surface mountable footprint

Markets/Applications

- Power tools
- Robotic appliances
- E-bikes, e-scooters
- UPS
- Emergency radio, eCall



R2004

IX4351NE Evaluation Board

Problem/Solution

The IX4351-EVAL Board contains all the necessary circuitry to demonstrate how the IX4351NE SiC MOSFET gate driver IC solves many of issues with driving SiC MOSFETs. The EVAL Board shows the correct discrete components to implement IX4351NE key features:

- Programable negative charge pump
- Desaturation detection with soft turn-off

Technical resources *(Click on below icons to learn more)*



Series Page



User's Guide



Tech Info



Expertise Applied | Answers Delivered

Benefits

- Demonstrates the IX4351 SiC MOSFET driving features and promotes Littelfuse SiC MOSFETs
- Allow engineers to quickly evaluate the IX4351NE and the LSIC1MO120E0080
- Shows how galvanic isolation can be simply and cost effectively implemented for use with the IX4351NE
- Engineers can quickly layout a PCB for IX4351NE implementation in their application



Features

- Fully functional evaluation board with the IX4351NE driving the LSICMO120E0080
- Discrete components set for the IX4351NE negative charge pump regulator to provide the -5 V turn-off voltage recommended for Littelfuse SiC MOSFETs
- Galvanic isolation between logic side and load side
- Bill of Material and Gerber files available

Markets/Applications

- Automotive/On-board EV Charger and DC Charging Stations
- Light Industrial/Motors, Inverters or Rectifiers
- Data Center and Cloud/Power Supplies and UPS
- PFC, AC/DC, and DC/DC Converters

R2004

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SP712, 640 W Diode Array in SOT23-3L for RS-485 applications protection with very low clamping

Problem/Solution

The SP712 Diode Array is designed to protect RS-485 applications with asymmetrical working voltages (-7 V to 12 V).

Can absorb repetitive ESD strikes above the maximum level without performance degradation and safely dissipate up to 20 A of 8/20 μ s induced surge current with very low clamping voltages.

Technical resources (Click on below icons to learn more)



Series Page

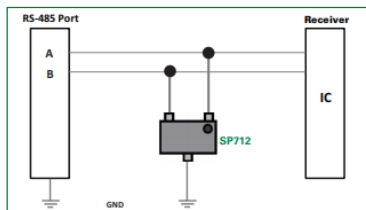


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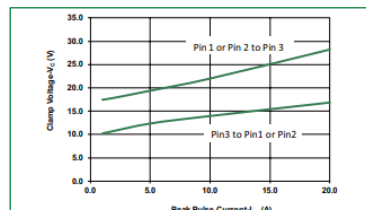


Tech Info

RS-485 Application Example



Clamping Voltage Vs. I_{PP}



Features & Benefits

- Working Voltages: -7 V to 12 V
- Low clamping voltage
- Low leakage current
- ESD, IEC 61000-4-2, ± 30 kV contact, ± 30 kV air
- EFT, IEC 61000-4-4, 50 A (5/50 ns)
- Lightning, IEC 61000- 4-5 2nd edition, 20 A ($t_P=8/20$ μ s)
- AEC-Q101 qualified
- Halogen free, Lead free and RoHS compliant
- Moisture Sensitivity Level (MSL -1)



Markets/Applications

- RS-485
- Fieldbus
- Modbus
- Profibus
- DMX512
- Security Systems
- Automated Teller Machines
- Lighting Control - DALI
- Communication Equipment

RS-485	Fieldbus
Modbus	Profibus



R2004



Expertise Applied | Answers Delivered

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SP4010, 0.48 pF Diode Arrays in SOT23-6L for high speed signal lines protection

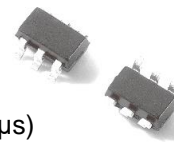
Problem/Solution

Integrates two channels of ultra low capacitance asymmetrical protection for electronic equipment that may experience destructive electrostatic discharges (ESD) without performance degradation.

The extremely low off-state capacitance also makes it ideal for protecting high speed signal lines such as USB3.0, HDMI, USB2.0, and eSATA.

Features & Benefits

- ESD, IEC 61000-4-2, ± 30 kV contact, ± 30 kV air
- EFT, IEC 61000-4-4, 40 A (5/50 ns)
- Lightning, IEC 61000- 4-5 2nd edition, 23 A ($t_P=8/20$ μ s)
- Low capacitance of 0.48 pF @ 0 V, 1 MHz (TYP) per I/O
- Low leakage current of 0.2 μ A (MAX) at 10 V
- Halogen free, Lead free and RoHS compliant
- Moisture Sensitivity Level (MSL -1)



Technical resources (Click on below icons to learn more)



Series Page

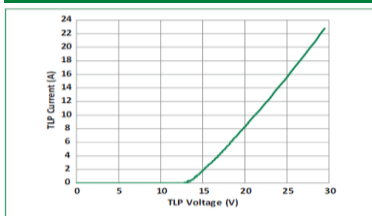


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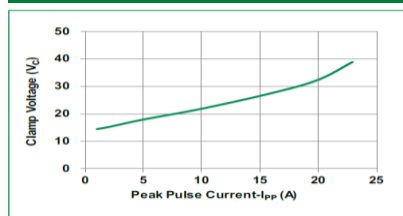


Tech Info

Positive Transmission Line Pulsing Plot



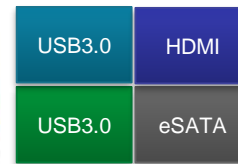
Clamping Voltage Vs. I_{PP} for 8/20 μ s Waveshape



Expertise Applied | Answers Delivered

Markets/Applications

- LCD/PDP TVs
- External Storages
- DVD/Blu-ray Players
- Desktops
- MP3/PMP
- Set Top Boxes
- Smartphones
- Ultrabooks and Notebooks
- Digital Cameras



R2004

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SMF TVS Diode series surface mount SOD123FL 200 W

Problem/Solution

The SMF series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events. SMF package is 50% smaller in footprint when compare to SMA package and delivering one of the low height profiles (1.1mm) in the industry.

Technical resources *(Click on below icons to learn more)*



Series Page

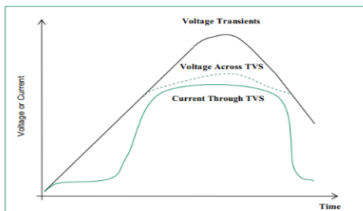


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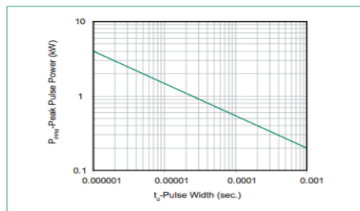


Tech Info

TVS Transients Clamping Waveform



Peak Pulse Power Rating Curve



Features & Benefits

- 200 W peak pulse power capability at 10/1000 μ s waveform, repetition rate (duty cycle): 0.01%
- Low profile: maximum height of 1.1 mm and surface mount
- Low inductance, excellent clamping capability
- Fast response time: typically less than 1.0 ns from 0 Volts to VBR min
- ESD protection as per IEC-61000-4-2
- EFT protection as per IEC-61000-4-4
- UL Recognized to UL 497B



Markets/Applications

- Cellular Phones
- Portable Devices
- Business Machines
- Power Supplies
- Other Consumer Electronics



Expertise Applied | Answers Delivered

SP2525NUTG, 2.5 V, 30 A Diode Arrays in μ DFN-10 for high-speed data interface protection

Problem/Solution

This is designed to provide protection against ESD, CDE, and lightning induced surges for highspeed, differential data lines.

The SP2525NUTG with its low capacitance and low clamping voltage makes it ideal for high-speed data interfaces such as 1 GbE applications found in notebooks, switches, etc.

Technical resources *(Click on below icons to learn more)*



Series Page

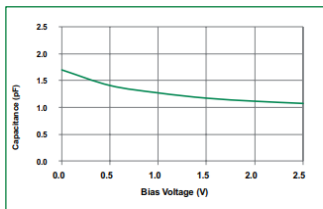


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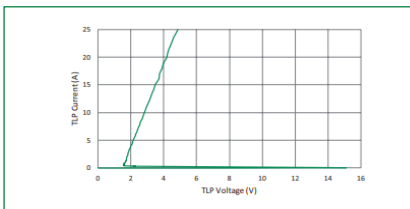


Tech Info

Capacitance Vs. Reverse Bias



Positive Transmission Line Pulsing Plot



Features & Benefits

- ESD, IEC 61000-4-2, ± 30 kV contact, ± 30 kV air
- EFT, IEC 61000-4-4, 40 A (5/50ns)
- Lightning, IEC 61000- 4-5 2nd edition, 30 A ($t_P=8/20 \mu s$)
- Low capacitance of 1.7 pF@ 0 V (TYP)
- Low leakage current of 1 nA (TYP) at 2.5 V
- Low operating and clamping voltage
- μ DFN-10 package is optimized for high-speed data line routing
- Provides protection for two differential data pairs (4 channels) up to 30 A
- Moisture Sensitivity Level (MSL -1)



Markets/Applications

- 10/100/1000 Ethernet
- WAN/LAN Equipment
- Desktops, Servers, and Notebooks
- LVDS Interfaces
- Integrated Magnetics
- Smart TV
- 2.5G/5G/10G Ethernet



Expertise Applied | Answers Delivered

R2003

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SP3025, 2.5 V, 30 A Diode Arrays in SOT23-6L for high-speed data interface protection

Problem/Solution

This is designed to provide protection against ESD, CDE, and lightning induced surges for highspeed, differential data lines

The SP3025 Series with its low capacitance and low clamping voltage makes it ideal for high-speed data interfaces such as 1GbE applications found in notebooks, switches, etc.

Technical resources (Click on below icons to learn more)



Series Page

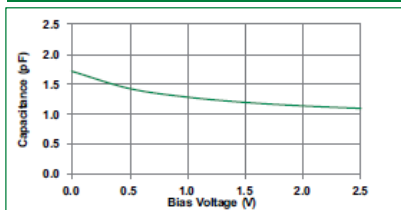


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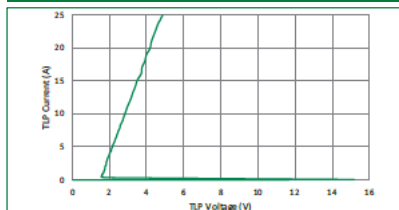


Tech Info

Capacitance Vs. Reverse Bias

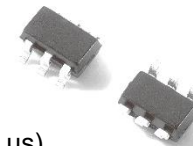


Positive Transmission Line Pulsing Plot



Features & Benefits

- ESD, IEC 61000-4-2, ± 30 kV contact, ± 30 kV air
- EFT, IEC 61000-4-4, 40 A (5/50 ns)
- Lightning, IEC 61000- 4-5 2nd edition, 30 A ($t_P=8/20 \mu s$)
- Low capacitance of 1.7pF@0V (TYP)
- Low leakage current of 1 nA (TYP) at 2.5 V
- Low operating and clamping voltage
- It's packaged in a SOT23- 6L and each device can protect up four channels up to 30 A
- Halogen-free, Lead-free, and RoHS compliant
- Moisture Sensitivity Level (MSL -1)



Markets/Applications

- 10/100/1000 Ethernet
- WAN/LAN Equipment
- Desktops, Servers, and Notebooks
- LVDS Interfaces
- Integrated Magnetics
- Smart TV
- 2.5G/5G/10G Ethernet



Expertise Applied | Answers Delivered

R2003

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Trench Series 650 V – 1200 V XPT™ (eXtreme-light punch through) IGBTs

Problem/Solution

Developed using our proprietary XPT™ thin-wafer technology and state-of-the-art 4th generation (GenX4™) Trench IGBT process, these devices feature reduced thermal resistance, low energy losses, fast switching, low tail current, and high current densities. In addition, they display exceptional ruggedness under short-circuit conditions – a 10 μ s Short Circuit Safe Operating Area (SCSOA).

Technical resources (Click on below icons to learn more)



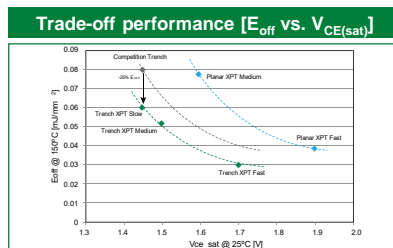
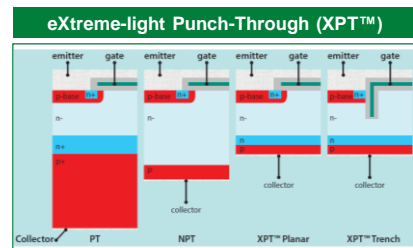
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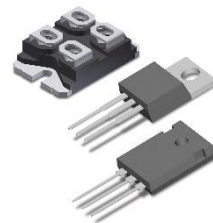


Tech Info



Benefits

- Hard-switching capabilities
- High power densities
- Temperature stability of diode forward voltage V_F
- Low gate drive requirements



Features

- Low on-state voltages $V_{CE(sat)}$
- Optimized for high-speed switching (up to 60 kHz)
- Short circuit capability (10 μ s)
- Square RBSOA
- Positive thermal coefficient of $V_{CE(sat)}$
- Ultra-fast anti-parallel diodes (Sonic-FRD™)

Markets/Applications

- Battery Chargers
- Lamp Ballasts
- Motor Drives
- Power Inverters
- SMPS, UPS
- Welding Machines



Fast recovery diode M2325HA400 and M2325HA450

Problem/Solution

Our soft recovery diodes available with a range of reverse recovery characteristics tailored to meet the requirements where soft recovery is required, such as RCD snubbers, voltage clamping and snubber less applications. These parts are suitable in applications using Fast Thyristor or GTO technology and require snubber diodes or for voltage clamping.

Technical resources (Click on below icons to learn more)



M2325HA400
Series Page



M2325HA450
Series Page



Datasheet



Tech Info



Features

- Reverse voltage (V_{RRM}): 4000 - 4500 V
- Non-repetitive peak reverse voltage (V_{RSM}): 4100 - 4600 V
- Forward current (I_F): 2325 A
- Maximum forward voltage (V_{FM}): 2.6 V
- Reverse recovery time (t_{rr}): 5.4 μ s
- Reverse leakage current (I_{rm}): 540 A
- Operating temperature range: -40 to +150° C



Markets/Applications

- Gate turn-off and fast thyristor inverters
- Traction

nanoASMDCH PolySwitch® automotive high temperature 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 and it provides surface mount overcurrent protection for applications where space is a prime concern and resettable protection is desired.

Technical resources (Click on below icons to learn more)



Series Page

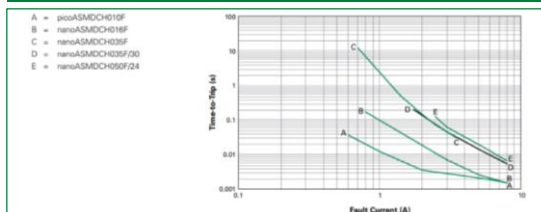


Datasheet



Tech Info

Typical Time-to-Trip Curves at 25°C



Expertise Applied | Answers Delivered

Benefits

- Wide range of form factors for design flexibility
- Meets ever-increasing demand for compact and space-saving designs in vehicle
- Able to meet most stringent requirements for the extreme harsh automotive environment
- Enable automated mass PCB assembly and production



Features

- AEC-Q200 qualified
- High Operating Temperature -40° C ~ 125° C
- Surface mount form factor
- Smaller footprint
- Compatible with high-volume electronics assembly

Markets/Applications

- Automotive and Industrial Transportation
- Body Electronics & Sensor Protection
- ADAS (Advanced Driver Assistance)
- Infotainment/Telematics
- Climate Control Systems



R2002

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SMF4L TVS Diode – surface mount, 400 W

Problem/Solution

The SMF4L series of SOD-123FL small and flat lead low profile plastic package is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

Technical resources (Click on below icons to learn more)



Series Page

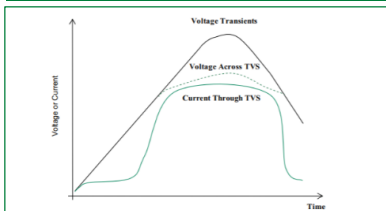


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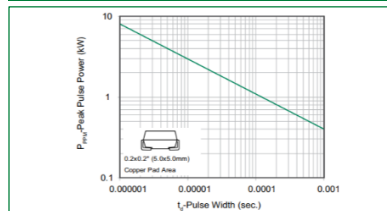


Tech Info

TVS Transients Clamping Waveform



Peak Pulse Power Rating Curve



Benefits

- Optimize board space
- Excellent clamping capability
- Fast response time
- Reduces customer qualification time by complying with third party safety standards like UL/IEC



Features

- 400 W peak pulse power capability at 10/1000 μ s waveform
- Reverse standoff voltage range from 5.0 V-250 V
- Uni-directional parts and Bi-directional (9-51 V) parts are both available
- Low profile SMT package SOD-123FL, maximum height of 1mm
- Low inductance

Markets/Applications

- Cellular Phones
- Portable Devices
- Business Machines
- Power Supplies
- Other Consumer Electronics



High sensitivity ultra-low power TMR switch series

Problem/Solution

By integrating Tunneling Magnetoresistance (TMR) and CMOS technologies, the TMR Switch Series provides a magnetically triggered digital switch with high sensitivity and ultra-low power consumption. It also incorporates an on-chip TMR voltage generator for precise magnetic sensing, a TMR voltage amplifier and comparator plus a Schmitt trigger to provide switching hysteresis for noise rejection. An internal band gap regulator provides temperature compensated supply voltage for internal circuits, permitting a wide range of supply voltages.

Technical resources *(Click on below icons to learn more)*



Series Page

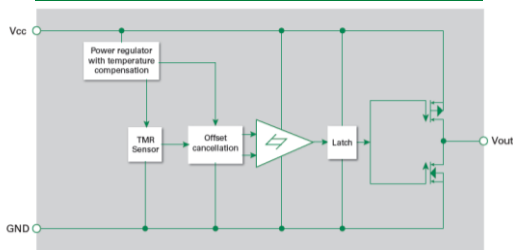


Datasheet



Tech Info

Functional Block Diagram of a TMR Switch



Features & Benefits

- TMR Technology supports Bop of 5 or 7 or 10 or 14 or 17 Gauss available
- Ultra-Low Power Consumption: 200nA at 50 Hz response or 1.5 uA at 1 kHz response
- X-axis or Z-axis sensing directions available
- Unipolar, Omnipolar, or Bipolar (latching) operating modes available
- Excellent Thermal Stability
- Open Drain or Push Pull output available
- SOT23-3 package



Markets/Applications

- Utility Meters including Gas, Water, and Heat Meters
- Motor and Fan Control
- Proximity Switches
- Position and Speed Sensing
- Solid State Switches



IX4351NE 9 A low side SiC MOSFET & IGBT Driver

Problem/Solution

The IX4351NE is designed specifically to drive SiC MOSFETs and high power IGBTs. Separate 9 A source and sink outputs allow for tailored turn-on and turn-off timing while minimizing switching losses. An internal negative charge regulator provides a selectable negative gate drive bias for improved dV/dt immunity and faster turn-off.

Technical resources *(Click on below icons to learn more)*



Series Page



Datasheet



Product Intro



Sell Sheet



Benefits

- Negative gate drive pull down for improved dV/dt immunity
- Eliminates the need for separate negative supply
- Quick turn-on and turn-off of power SiC MOSFET and IGBT



Features

- Separate 9A peak source and sink outputs
- -10 V to +25 V operating voltage range
- Internal negative charge pump regulator for selectable negative gate drive bias

Markets/Applications

- Automotive: On-board EV Charger & DC Charging Stations
- Light Industrial: Motors, Inverters or Rectifiers
- Data Center & Cloud: Power Supplies & UPS
- PFC, AC/DC & DC/DC Converters

Additional information can be found on littelfuse.com

Circuit Protection Selection Guide



Sensor Selection Guide



Industrial Fuses Catalog

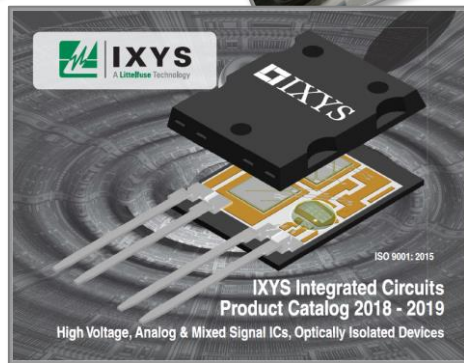


Power Semiconductor Selection Guide

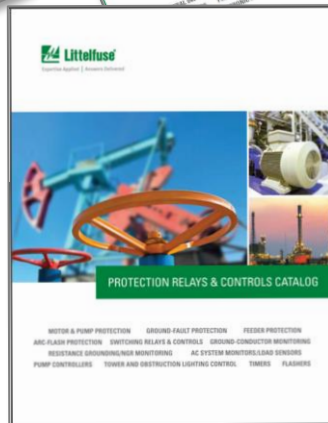


Click on images
to open the
catalog

Integrated Circuits Catalog



Power Relay & Control Catalog

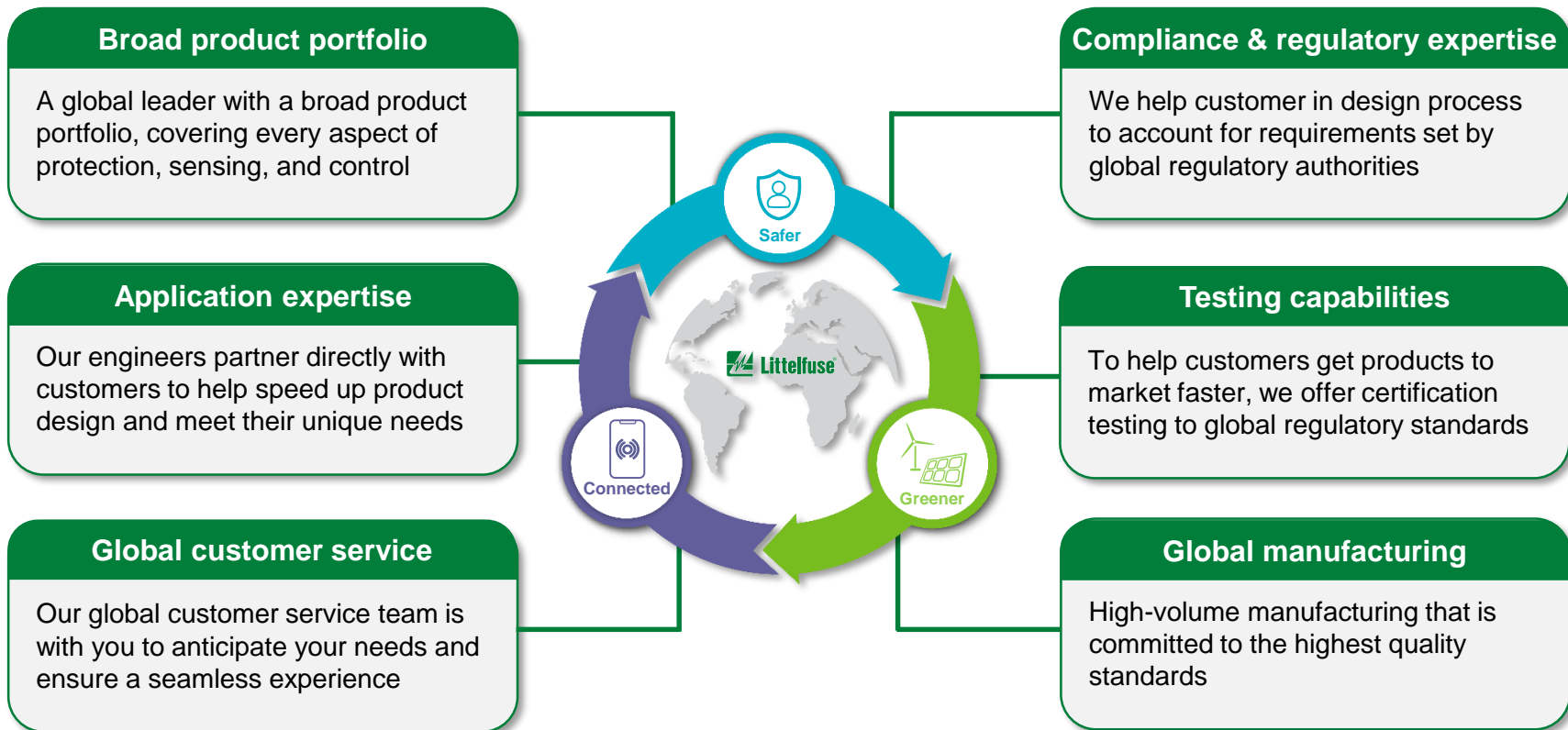


Littelfuse Capability Brochure

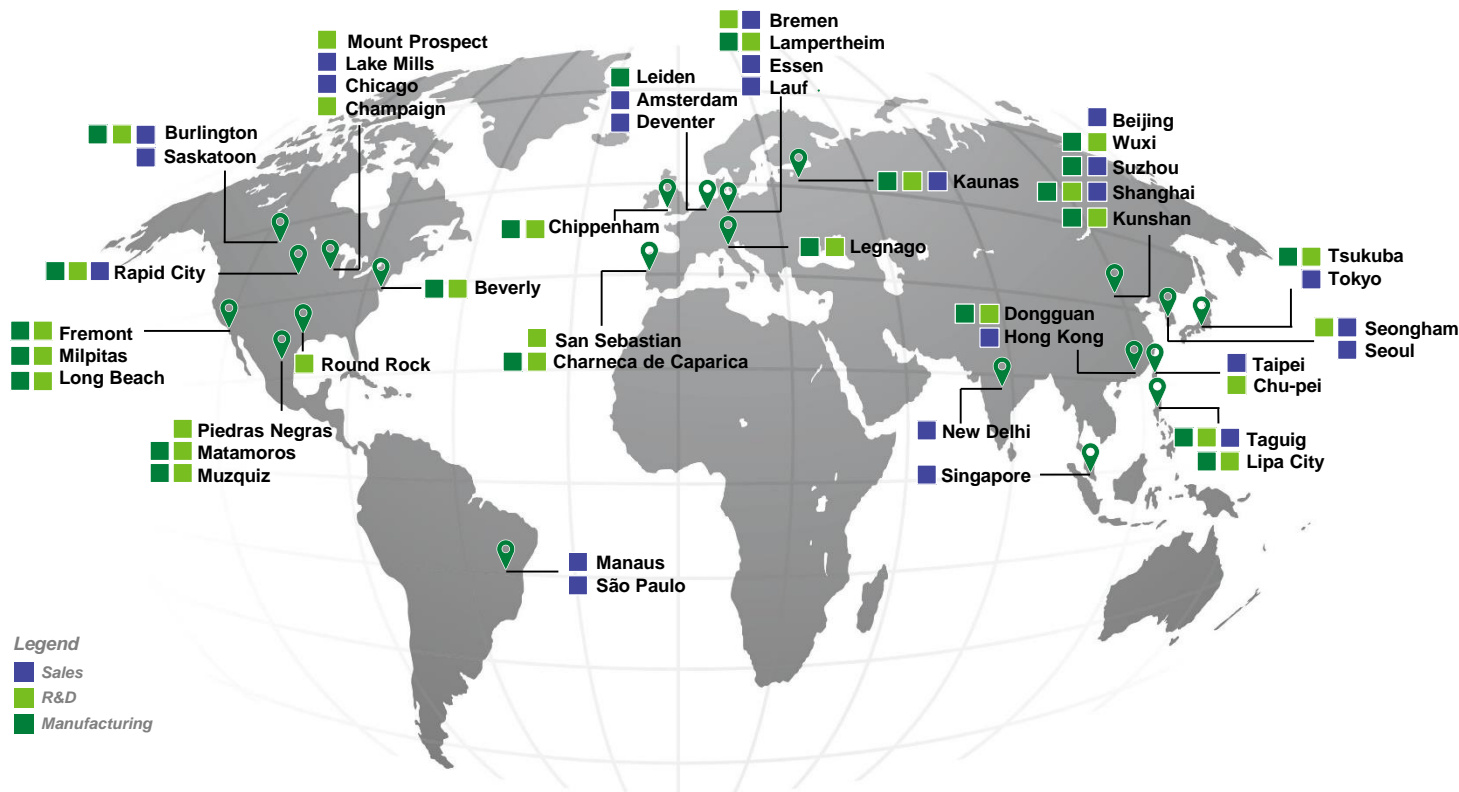


Expertise Applied | Answers Delivered

Partner for tomorrow's electronic systems



Local resources supporting our global customers





Expertise Applied | Answers Delivered



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