

TELECOMMUNICATION CIRCUIT PROTECTION SOLUTIONS



Offering overvoltage and overcurrent solutions including Teccor® Protection Thyristors



Circuit protection solutions from the technology leader



The Protection You Need to Keep People Connected.





Littelfuse

develops
innovative solutions

that protect telecom circuits and equipment
from overcurrent and overvoltage.

We help turn networks into
reliable communication systems.

Telecommunication Circuit Protection

Protecting Today's More Vulnerable Networks



Today's telecommunication networks continue to push an increasing amount of solid state equipment outside the central office into vaults, cabinets, pedestals and onto customer premises. These sensitive, outside plant locations increase the network's exposure to lightning-induced transients and power fault hazards.

Littelfuse offers telecom equipment manufacturers and network operators circuit protection solutions for applications ranging from power distribution, POTS (Plain Old Telephone System), ISDN (Integrated Services Digital Network), xDSL (Digital Subscriber Line) and T1/E1/J1 to Ethernet, FTTC (Fiber to the Curb), FTTH (Fiber to the House) and more.

Our products are robust enough for primary and secondary protection within the central office and transmission stations and sensitive enough for chipset protection.

Next Generation Protection Technology

Littelfuse circuit protection technologies for telecom include the latest innovations in PCB mount and power fuses, gas plasma (improved GDT) for very robust environmental and high frequency applications, as well as fast switching, solid-state technology such as our Teccor® brand SIDACTor® and Battrax™ devices for PCB protection. We provide a single source for solutions that protect against both overcurrent and overvoltage threats.

Meeting and Exceeding Regulatory Requirements

To meet regulatory requirements, telecom equipment must survive a wide range of defined events. Littelfuse participates in several standards organizations to ensure up-to-date knowledge of TIA-968-A, GR-1089-CORE, ITU-T K.20, K.21 and K.44 as well as UL 60950 and other applicable standards. This ensures that Littelfuse can remain on the leading edge of technology development to meet the current and future needs of our customers.

Circuit protection solutions from the technology leader



Circuit Protection Solutions for Telecom Applications

APPLICATION:	1 T1/E1/J1 and HDSL 	2 FTTC/FTTP (SLIC interface portion) 	3 non-fiber SLIC applications 	4 LCAS 
CIRCUIT / SUB-APPLICATION:	These trunks offer data rates of 1.544 Mbps (2.058 for E1) on four wire interfaces	Fiber to the curb and Fiber to the premises require an analog conversion which includes the SLIC	Line card in COs, Remote Huts, and CPE require SLICs	This is used in non-ring SLIC applications
REGULATIONS:	Littelfuse offers solutions compliant with: <ul style="list-style-type: none"> • GR 1089-CORE • ITU K.20 & 21 (Basic and Enhanced requirements) • UL 60950/EN60950 • TIA-968-A 	Littelfuse offers solutions compliant with: <ul style="list-style-type: none"> • GR 1089-CORE • ITU K.20 & 21 (Basic and Enhanced requirements) • UL 60950/EN60950 	Littelfuse offers solutions compliant with: <ul style="list-style-type: none"> • GR 1089-CORE • ITU K.20 & 21 (Basic and Enhanced requirements) • UL 60950/EN60950 • TIA-968-A 	Littelfuse offers solutions compliant with: <ul style="list-style-type: none"> • GR 1089-CORE • ITU K.20 & 21 (Basic and Enhanced requirements) • UL 60950/EN60950 • TIA-968-A
THREATS:	Power Fault conditions Lightning induced surges	Power Fault conditions Lightning induced surges	Power Fault conditions Lightning induced surges	Power Fault conditions (for non CPE applications) Lightning induced surges
SUGGESTED SOLUTIONS:	SIDACTor® devices: <ul style="list-style-type: none"> - Pxx00SC (single in D0214) - Pxxx4UC (quad in MS-013) - Pxxx0SA for secondary side of the coupling transformer Fuse: <ul style="list-style-type: none"> - 461 series TeleLink® fuse Gas Plasma (improved GDTs): <ul style="list-style-type: none"> - SL1002 - SL1003 	SIDACTor® uni-directional and programmable devices: <ul style="list-style-type: none"> - Pxxx1SC (D0214) for FTTC - Pxxx1SA (D0214) for FTTP - Pxxx1CA2 (dual in three pin D0214) for FTTP - Pxxx1AA2 (TO-220) for FTTP - Pxxx1AC2 (TO-220) for FTTC - Pxxx1UA (MS-013) for FTTP - Pxxx1UC (MS-013) for FTTC - Pxxx1UC (MS-013) - Bxxx0C (three pin D0214) for FTTC - Bxxx0A (three pin D0214) for FTTP - B1xx1UA (MS-013) for FTTP - B1xx1UC (MS-013) for FTTC - B1xx1UA4 (MS-013) for FTTP - B1xx1UC4 (MS-013) for FTTC Fuse: <ul style="list-style-type: none"> - 461 series TeleLink® fuse 	SIDACTor® uni-directional and programmable devices: <ul style="list-style-type: none"> - Pxxx1SC (D0214) - Pxxx1SA (D0214) - Pxxx1CA2 (dual in three pin D0214) - Pxxx1AA2 (TO-220) - Pxxx1AC2 (TO-220) - Pxxx1UA (MS-013) - Pxxx1UC (MS-013) - Pxxx1UC (MS-013) - B1xx0C (three pin D0214) - B1xxx0A (three pin D0214) - B1xx1UA (MS-013) - B1xx1UC (MS-013) - B1xx1UA4 (MS-013) - B1xx1UC4 (MS-013) - B3xx4UA (MS-013) - B3xx4UC (MS-013) - B2050CA (three pin D0214) - B2050CC (three pin D0214) Fuse: <ul style="list-style-type: none"> - 461 series TeleLink® fuse 	SIDACTor® asymmetrical and symmetrical devices: <ul style="list-style-type: none"> - P1200Sx (used in combination with one of the others) - P2000Sx - P2500Sx These may also be considered: <ul style="list-style-type: none"> - A2106Ux3 - A5030Ux3 - Pxxx2Ax Fuse: <ul style="list-style-type: none"> - 461 series TeleLink® fuse 
Through hole options also available				

5 xDSL

6 VoIP/Ethernet

7 POTS (plain old telephone sets)

8 Telco DC Power



This includes ADSL, ADSL2, ADSL2+, VDSL

Littelfuse offers solutions compliant with:

- GR 1089-CORE
- ITU K.20 & 21 (Basic and Enhanced requirements)
- UL 60950/EN60950
- TIA-968-A

*Power Fault conditions
Lightning induced surges*

**Low capacitance
SIDACTor® devices:**

- Pxxx0SAMC
- Pxxx0SCMC
- Pxxx4Ux
- Pxxx4UCMC

Gas Plasma (improved GDTs):
- SL1002

Fuse:
- 461 series TeleLink® fuse

This will include 10BaseT, 100BaseT

Littelfuse offers solutions compliant with:

- GR 1089-CORE
- ITU K.20 & 21 (Basic and Enhanced requirements)
- UL 60950/EN60950
- TIA-968-A

*Power Fault conditions
Lightning induced surges*

**Low capacitance
SIDACTor® devices:**

- Pxxx2Sx
- P0220Sx
- Pxxx2Cx

Gas Plasma (improved GDTs):
- SL1002

Fuse:
- 461 series TeleLink® fuse

Telephones, modems, fax machines (home security systems are included in this category)

Littelfuse offers solutions compliant with:

- UL 60950/EN60950
- TIA-968-A

SIDACTor® devices:

- PxxxxSx (P3100SB popular)
- PxxxxEx

Gas Plasma (improved GDTs):
- SL1002

Fuse:
- 461 series TeleLink® fuse

Power Distribution Circuits
Protection of cables and battery circuits.

Littelfuse offers solutions compliant with:

- GR 1089-CORE

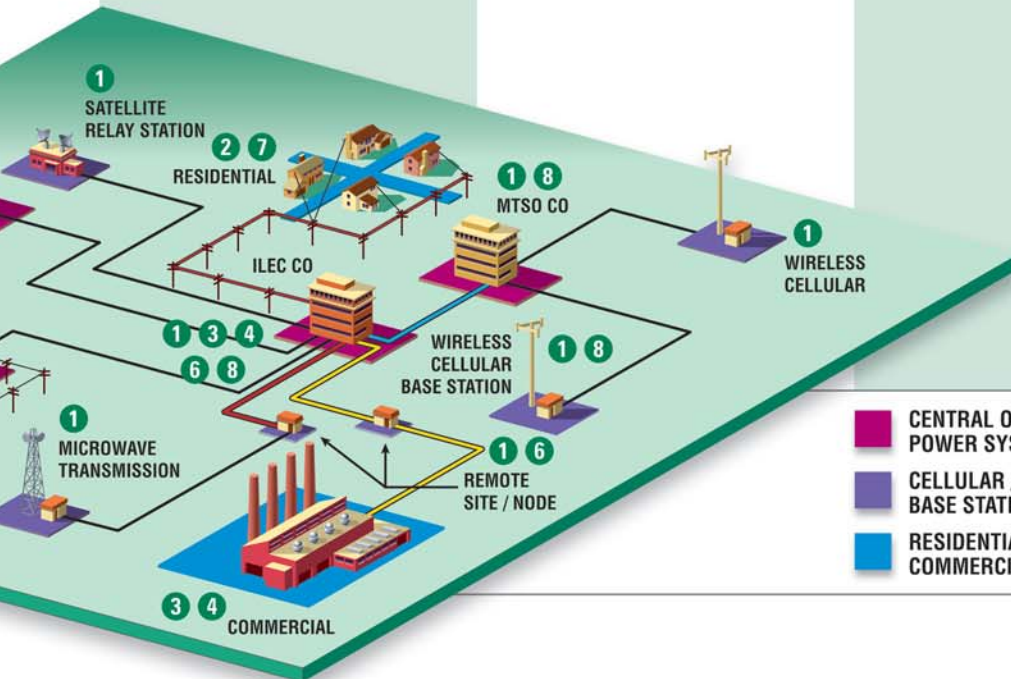
Power Fault conditions

Fuse:

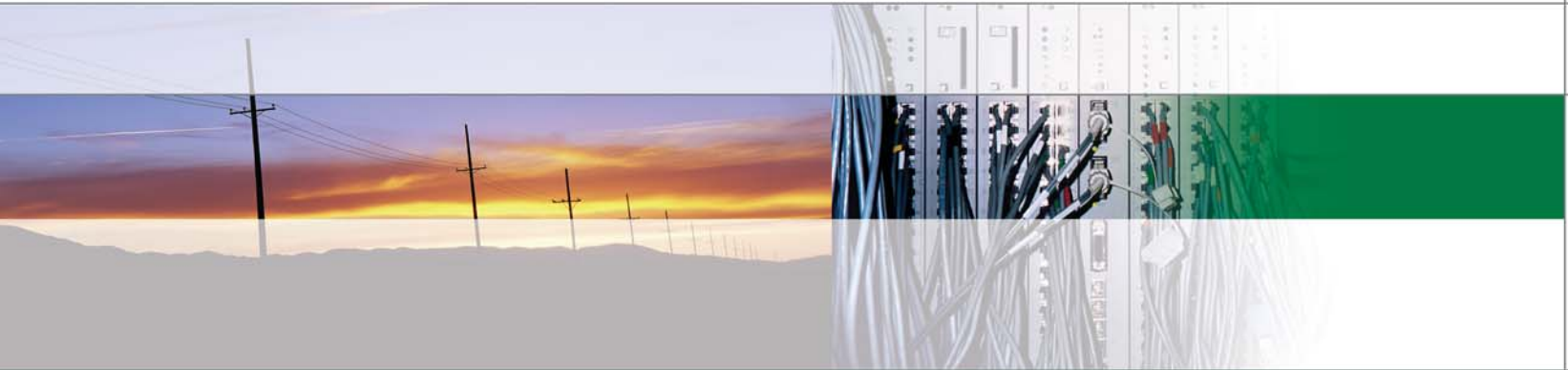
- L17T series Telecom Power Fuse
- TLN series Telecom Power Fuse
- TLS series Telecom Power Fuse
- 481 series

**Fuseholders and
Disconnect Switches:**

- LTFD101
- LTFD6001
- LTFD1200
- 482 series



- CENTRAL OFFICE (CO)
POWER SYSTEM
- CELLULAR / WIRELESS
BASE STATION
- RESIDENTIAL /
COMMERCIAL NETWORK



Helping You Meet Customer Expectations

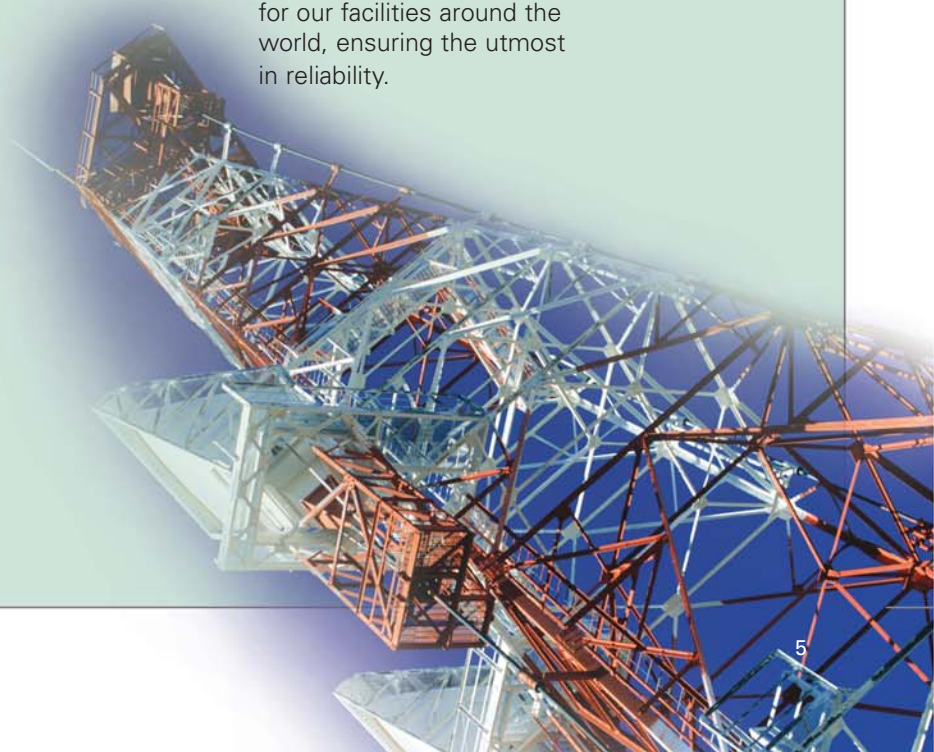
Traditional telephone service has evolved to include broadband transmission of data, Internet access and other converged media. Customer expectations of 24/7 access, consistent quality-of-service and high reliability are now greater than ever before.

In light of these developments, the need for circuit protection to ensure both successful day-to-day operation and public safety is also greater than ever. Today's copper plant is exposed to threats from AC power fault and lightning induced events. Unless telecommunications links are properly protected, this exposure can lead to service interruptions or possible equipment failure.

The Littelfuse Solution

Regardless of your location around the globe, Littelfuse has the circuit protection solution to help your telecommunication equipment comply with applicable industry Regulations, Recommendations, and Standards. Our telecom application experts are dedicated to helping you with your design and testing to ensure you receive a telecommunications protection solution compliant to your precise needs.

Littelfuse was the very first U.S. fuse manufacturer to attain ISO 9001 certification. We have been awarded ISO and other quality certifications for our facilities around the world, ensuring the utmost in reliability.



Littelfuse-The Leader In Telecommunication Protection



Serving Telecommunications Engineers with Teccor® Solutions

Founded in 1964 as Electronic Controls Corporation, Teccor products included lighting controls and motor speed controls. To provide the highest quality product, Teccor began to design and make its own thyristors. Soon after, Teccor chose to concentrate on discrete thyristor components, leaving the manufacture of the assemblies to its customers.

In 2003, Teccor was acquired by Littelfuse, Inc. and today lives on as the most recognized brand in telecom overvoltage circuit protection. Teccor products are renowned for high quality and high reliability. Thanks to patented technology and superior silicon

designs, Teccor thyristors can withstand high surge currents making them the most durable thyristors on the market today.

SIDACTor® Devices: Fast, Stable, Reliable and Cost Effective

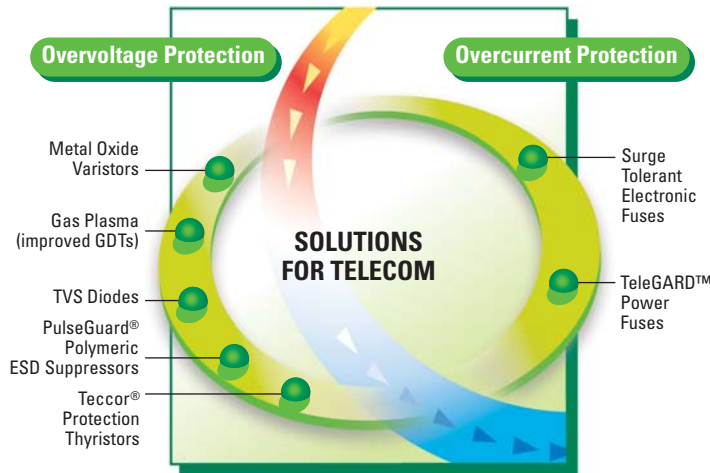
Teccor SIDACTor protection thyristors are the fastest, most stable, reliable and cost effective solution for protecting telecommunication equipment from hazardous transient voltages. In telecommunication products, which must pass regulatory requirements, SIDACTor devices are connected across tip and ring and from tip and ring to ground, typically behind a current-limiting device such as a surge tolerant TeleLink® fuse.

Innovative Solutions Designed to Your Specifications

Littelfuse offers a wide range of protection technologies to meet the circuit protection requirements of telecommunication circuit designers around the world. Our focus on solutions, rather than just products, enables us to tailor our product offering to meet the needs of your specific application.

As part of this process, we make it our job to understand your applications and challenges. Because we can offer the broadest array of technologies—and work with you to design solutions to meet your specific needs—we can give you the best, most objective solution available. We are prepared to be a valuable resource and integrated partner in even your most complex circuit design efforts.

Circuit protection solutions from the technology leader



**Where You Need Us,
When You Need Us.**

Littelfuse has consistently expanded its global customer base by directing our development and manufacturing efforts toward the entire circuit protection market, resulting in the industry's widest range of overvoltage and overcurrent solutions.

With manufacturing, development, sales and distribution centers around the globe, we can serve you where and when you need us.

To get additional technical information or samples, visit us at www.littelfuse.com/telecom or contact your local Littelfuse representative or sales office.

www.littelfuse.com/telecom

World Headquarters

Littelfuse, Inc.
800 E. Northwest Highway
Des Plaines, IL 60016, USA
www.littelfuse.com/telecom

International Sales, Distribution and Engineering Facilities:

North America

- Des Plaines, Illinois USA
and Irving, Texas USA
Technical Assistance
Phone: +1 (800) 999-9445
+1 (847) 824-1188
Fax: +1 (847) 391-0459

Europe

- Utrecht, The Netherlands
Phone: (+31) 30-299-9900
Fax: (+31) 30-299-9800
- Munich, Germany
Phone: (+49) 89-552766-0
Fax: (+49) 89-552766-99
- Swindon, United Kingdom
Phone: (+44) (0) 1793-720400
Fax: (+44) (0) 1793-720401

Asia/Pacific

- Singapore
Phone: (+65) 6746-9666
Fax: (+65) 6742-8178
- Taipei, Taiwan R.O.C.
Phone: (+886) 2-8751-1234
Fax: (+886) 2-8751-1177
- Yokohama, Japan
Phone: (+81) 45-478-1088
Fax: (+81) 45-478-1089
- Seoul, Korea
Phone: (+82) 2-6000-8600
Fax: (+82) 2-6000-8602
- Beijing, China
Phone: (+86-10) 8213-6327
Fax: (+86-10) 8213-6343

- Hong Kong, China
Phone: (+85) 22-810-5099
Fax: (+85) 22-810-5500
- Shanghai, China
Phone: (+86-21) 5383-8016
Fax: (+86-21) 5383-7476
- Shenzhen, China
Phone: (+86-755) 829-95548
Fax: (+86-755) 829-95040

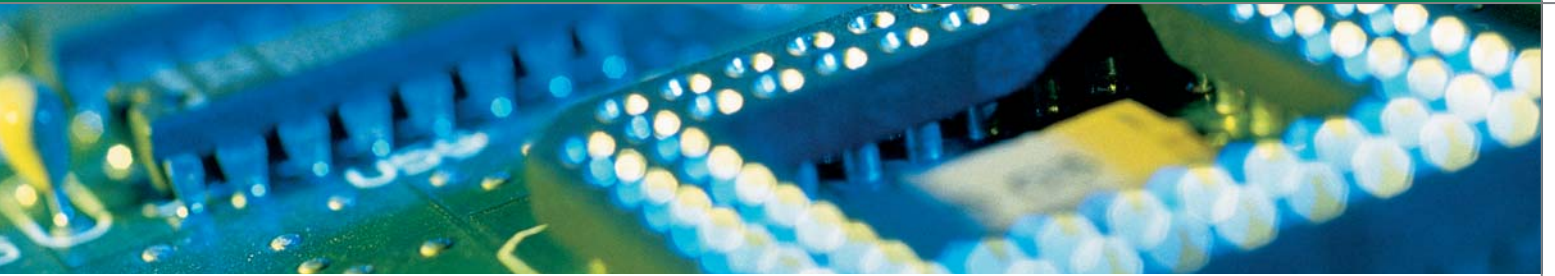
Central and South America

- São Paulo, Brasil
Phone: (+55) 11-3835-3780
Fax: (+55) 11-364-50612

Research and Manufacturing Facilities:

- Arcola, Illinois USA
- Des Plaines, Illinois USA
- Irving, Texas USA
- Dundalk, Ireland
- Grenchen, Switzerland
- Lipa City, Philippines
- Matamoros, Mexico
- Piedras Negras, Mexico
- Suzhou, China
- Swindon, United Kingdom

TELECOMMUNICATION CIRCUIT PROTECTION SOLUTIONS



Offering overvoltage and overcurrent solutions
including Teccor® Protection Thyristors



Littelfuse offers a wide variety of products to protect telecommunication circuits from overvoltage and overcurrent threats.

This quick reference provides specifications for SIDACTor® thyristors, BattraX® devices, PCB mount fuses, TeleGARD™ power fuses and disconnects/fuse holders.

With manufacturing, development, sales and distribution centers around the globe, we can serve you where and when you need us.

Please visit www.littelfuse.com/telecom for a complete catalog, including environmental and physical specifications, product data sheets and application notes.

Overvoltage Selection Guide

Technology	SIDACTor® Protection Thyristor								
Series	PxxxxSA	PxxxxSB	PxxxxSC	PxxxxSC MC	PxxxxEA	PxxxxEB	PxxxxEC	Pxxx2CA	Pxxx2SA & P0220SA
Package Type	SMT DO-214	SMT DO-214	SMT DO-214	SMT DO-214	TO-92	TO-92	TO-92	modified DO-214	DO-214
# of Chips	1	1	1	1	1	1	1	2	1
Holding Current	50 mA - 150 mA	50 mA - 150 mA	50 mA - 150 mA	50 mA - 150 mA	50 mA - 150 mA	50 mA - 150 mA	50 mA - 150 mA	120 mA	50mA - 150 mA
Switching Voltage	25V - 400V	25V - 400V	25V - 400V	25V - 400V	25V - 400V	25V - 400V	25V - 400V	77V - 350V	32V - 600V
Stand-off Voltage	6V- 275V	6V- 275V	6V- 275V	6V- 275V	6V- 275V	6V- 275V	6V- 275V	58V- 275V	15V - 440V
Programmable?	No	No	No	No	No	No	No	No	No
Capacitance	100 pF - 30 pF	100 pF - 30 pF	200 pF- 60 pF	55 pF- 40 pF	100 pF - 30 pF	100 pF - 30 pF	200 pF- 60 pF	15 pF	40 pF - 15 pF
Bi-directional or Uni-directional	Bi-directional	Bi-directional	Bi-directional	Bi-directional	Bi-directional	Bi-directional	Bi-directional	Bi-directional	Bi-directional
Ipp:									
2x10µs	150 A	250 A	500 A	500 A	150 A	250 A	500 A	150 A	150 A
10x560µs	50 A	100 A	150 A	150 A	50 A	100 A	150 A	50 A	50 A
10x1000µs	45A	80A	100A	100A	45A	80A	100A	45A	45A
60 Hz	20 A	30 A	50 A	50 A	20 A	30 A	50 A	20 A	20 A
RoHS Compliant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Overvoltage Selection Guide (Continued)

Technology	SIDACTor® Protection Thyristor									
Series	Pxxx3UA	Pxxx3UC	Pxxx4UA	Pxxx4UC	Pxxx4UC MC	Pxxx6UA	Pxxx6UC	A122xUA4	A122xUC4	Pxxx1SA
Package Type	MS-013	MS-013	MS-013	MS-013	MS-013	MS-013	MS-013	MS-013	MS-013	DO-214
# of Chips	3	3	4	4	4	6	6	4	4	1
Holding Current	120 mA - 150 mA	120 mA - 150 mA	50 mA - 150 mA	50 mA - 150 mA	50 mA - 150 mA	120 mA - 150 mA	120 mA - 150 mA	50 mA - 150 mA	50 mA - 150 mA	120 mA
Switching Voltage	180V - 550V	180V - 550V	50V - 800V	50V - 800V	50V - 800V	180V - 550V	180V - 550V	130/220V & 130/290V	130/220V & 130/290V	77V - 200V
Stand-off Voltage	130V - 400V	130 V - 400V	12V - 640V	12V - 640V	12V - 640V	130V - 400V	130V - 400V	100/180V & 100/230V	100/180V & 100/230V	58V - 160V
Programmable?	No	No	No	No	No	No	No	No	No	No
Capacitance	80 pF - 60 pF	160 pF - 120 pF	100 pF - 30 pF	100 pF - 30 pF	30 pF - 20 pF	80 pF - 60 pF	160 pF - 120 pF	30 pF	30 pF	70 pF
Bi-directional or Uni-directional	Bi-directional	Bi-directional	Bi-directional	Bi-directional	Bi-directional	Bi-directional	Bi-directional	Bi-directional	Bi-directional	Uni-directional
Ipp:										
2x10µs	150 A	500 A	150 A	500 A	500 A	150 A	500 A	150 A	500 A	150 A
10x560µs	50 A	150 A	50 A	150 A	150 A	50 A	150 A	50 A	150 A	50 A
10x1000µs	45A	100A	45 A	100A	100A	45A	100A	45 A	100A	45A
60 Hz	20 A	50 A	20 A	50 A	50 A	20 A	50 A	20 A	50 A	20 A
General Comments									Asymmetrical	SLIC protection
RoHS Compliant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes



Overvoltage Selection Guide (Continued)

Technology	SIDACTor® Protection Thyristor			Battrax® Devices					
Series	Pxxx1CA2	Pxxx1UA	Pxxx1UC	B1XXCA	B1xx1UA	B1xx1UC	B3xxxUA	B3xxxUC	B1xx1UC4
Package Type	modified DO-214	MS-013	MS-013	modified DO-214	MS-013	MS-013	MS-013	MS-013	MS-013
# of Chips	2	4	4	1	2	2	4	4	4
Holding Current	120 mA	120 mA	120 mA	100-200	100 mA	100 mA	100 mA	100 mA	100 mA
Switching Voltage	77V - 200V	77V - 200V	77V - 200V	NA	NA	NA	NA	NA	NA
Stand-off Voltage	58V - 160V	58V - 160V	58V - 160V	NA	NA	NA	NA	NA	NA
Programmable?	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Capacitance	70 pF - 60 pF	70 pF	70 pF	50 pF	50 pF	50 pF	50 pF	50 pF	50 pF
Bi-directional or Uni-directional	Uni-directional	Uni-directional	Uni-directional	Uni-directional	Uni-directional	Uni-directional	Bi-directional	Bi-directional	Uni-directional
Ipp:									
2x10µs	150 A	150 A	500 A	150 A	150 A	500 A	150 A	500 A	500 A
10x560µs	50 A	50 A	150 A	50 A	50 A	150 A	50 A	150 A	150 A
10x1000µs	45A	45A	100A	45 A	45 A	100 A	45 A	100 A	100 A
60 Hz	20 A	20 A	50 A	20 A	20 A	50 A	20 A	50 A	50 A
General Comments	SLIC protection	SLIC protection	SLIC protection	negative Battrax	negative Battrax w/diode	negative Battrax w/diode	negative Battrax w/diode	positive/negative Battrax w/diode	quad negative Battrax w/diode
RoHS Compliant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Overcurrent Selection Guide

Technology	PCB Mount Fuses				TeleGARD™ Power Fuses			
Series Name	TeleLink® Fuse	229	230	481	70	L17T	TLN	TLS
Mounting Method	Surface Mount	Cartridge (requires fuseclip)	Through-Hole	Holder	Holder	Bolt-On	Cartridge, Knifeblade	Cartridge, Bolt-On, Through-Hole
Operating Current	2A, 1.25A, & 0.5 A	0.25 - 1.25A	0.25 - 1.25A	0.100 - 20A	0.100 - 10A	70-1200 A	1-600 A	1-125 A
Maximum Interrupting Rating	600V @ 60A *	600V @ 60A *	600V @ 60A *	300A @ 125 VAC/VDC	1000 @ 300 VDC	170V @ 100,000 A	170V @ 100,000 A	170V @ 100,000 A
Temperature Range	-55 C to + 125 C	-55 C to + 125 C	-55 C to + 125 C	-55 C to + 125 C	NA	NA	NA	NA
DC cold resistance (in ohms)	0.100 - 0.640	0.145-2.41	0.145-2.41	0.00394 - 6.25	NA	NA	NA	NA
Opening time at 250%	1 s	NA	NA	NA	NA	NA	NA	NA
Surge current rating (Ipp) @								
10x1000µs	100A	12.4-100A	12.4-100A	NA	NA	NA	NA	NA
Typical inductance	< 40 nH up to 500 Mhz	NA	NA	NA	NA	NA	NA	NA
RoHS Compliant	Yes	Yes	Yes	No	No	No	No	No

* as specified in GR-1089

Fuseholder/Disconnect Selection Guide

Family Name	Disconnects/Fuse Holders			
Series Name	482	LTFD101	LTFD6001	LTFD1200
Mounting Method	Panel / PCB Mount	Front/Rear Panel Mount	Bolt-Down	Bolt-Down
Operating Current	up to 20A	1-125A	70-800A	70-1200A
Voltage Rating	125 VAC/VDC	80 VDC	60 - 145 VDC	60 - 145 VDC
Indicating	Yes	Yes	Yes	Yes
For Use With:	481 Series	TLS Series	L17T Series	L17T Series

Greentube™ Gas Plasma (improved GDT) Selection Guide

Family name	Omega		Beta							Alpha	
Performance Level	Standard		High							Ultra	
Series Name	SL1024B	SL1024A	SL1011A	SL1011B	SL1021A	SL1021B	SL1002A	SL1003A	SL0902	SL1122A	SL1221
Technology Type	Gas Plasma (GDT)	Gas Plasma (GDT)	Gas Plasma (GDT)	Gas Plasma (GDT)	Gas Plasma (GDT)	Gas Plasma (GDT)	Gas Plasma (GDT)	Gas Plasma (GDT)	Gas Plasma (GDT)	Gas Plasma (GDT)	Gas Plasma (GDT)
Temperature Range	-55 to +150	-55 to +150	-55 to +150	-55 to +150	-55 to +150	-55 to +150	-55 to +150	-55 to +150	-40 to +150	-55 to +150	-55 to +150
Package Type	2 Terminal, Button and axial leads	3 Terminal, Core (no pins) and radial leads	2 Terminal, Button and axial leads	2 Terminal, Button and axial leads	3 Terminal, Core (no pins) and radial leads	3 Terminal, Core (no pins) and radial leads	2 Terminal, Button and surface mount	3 Terminal, Radial and surface mount	2 Terminal SMT and axial leads	3 Terminal, SAD/GP Hybrid radial leads	3 Terminal, radial leads
Mounting Method	through-hole or clip mount	through-hole	through-hole or clip mount	through-hole or clip mount	through-hole	through-hole	SMT	through-hole SMT	through-hole SMT	through-hole	through-hole
DC Breakover Voltage	90-350	90-500	230-600	230-600	200-600	200-500	90-600	90-350	90-350	90-450	200
AC Surge Rating	20A	10A*	5A	10A	10A*	20A*	2A	5A	2.5A	10A*	10A*
Peak Pulse Current (8x20µs)	20,000A	10,000A*	5,000A	10,000A	10,000A*	20,000A*	5,000A	5,000A	2,500A	10,000A*	10,000A*
Max Capacitance	1.5pF	1.5pF	1.5pF	1.5pF	1.5pF	1.5pF	1pF	1pF	1pF	100-200pF	1.5pF
RoHS Compliant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lead-Free (Pb)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes

* total current through center (ground) terminal



World Headquarters

Littelfuse, Inc.
800 E. Northwest Highway
Des Plaines, IL 60016, USA
www.littelfuse.com/telecom

International Sales, Distribution and Engineering Facilities:

North America

- Des Plaines, Illinois USA and Irving, Texas USA
Technical Assistance
Phone: +1 (800) 999-9445
+1 (847) 824-1188
Fax: +1 (847) 391-0459

Europe

- Utrecht, The Netherlands
Phone: (+31) 30-299-9900
Fax: (+31) 30-299-9800
- Munich, Germany
Phone: (+49) 89-552766-0
Fax: (+49) 89-552766-99
- Swindon, United Kingdom
Phone: (+44) (0) 1793-720400
Fax: (+44) (0) 1793-720401

Asia/Pacific

- Singapore
Phone: (+65) 6746-9666
Fax: (+65) 6742-8178
- Taipei, Taiwan R.O.C.
Phone: (+886) 2-8751-1234
Fax: (+886) 2-8751-1177
- Yokohama, Japan
Phone: (+81) 45-478-1088
Fax: (+81) 45-478-1089

- Seoul, Korea
Phone: (+82) 2-6000-8600
Fax: (+82) 2-6000-8602
- Beijing, China
Phone: (+86-10) 8213-6327
Fax: (+86-10) 8213-6343
- Hong Kong, China
Phone: (+85) 22-810-5099
Fax: (+85) 22-810-5500
- Shanghai, China
Phone: (+86-21) 5383-8016
Fax: (+86-21) 5383-7476
- Shenzhen, China
Phone: (+86-755) 829-95548
Fax: (+86-755) 829-95040

Central and South America

- São Paulo, Brasil
Phone: (+55) 11-3835-3780
Fax: (+55) 11-364-50612

Research and Manufacturing Facilities:

- Arcola, Illinois USA
- Des Plaines, Illinois USA
- Irving, Texas USA
- Dundalk, Ireland
- Grenchen, Switzerland
- Lipa City, Philippines
- Matamoros, Mexico
- Piedras Negras, Mexico
- Suzhou, China
- Swindon, United Kingdom