

DATACENTER

Circuit Protection Selection Guide

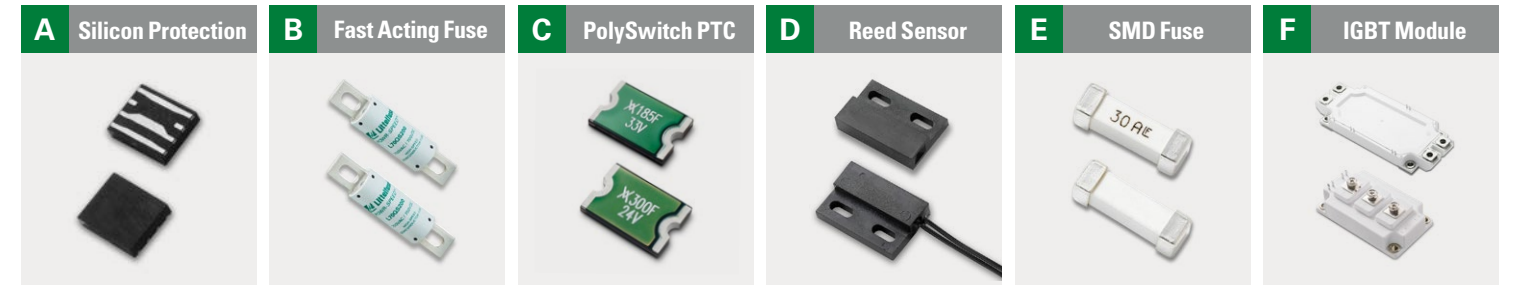
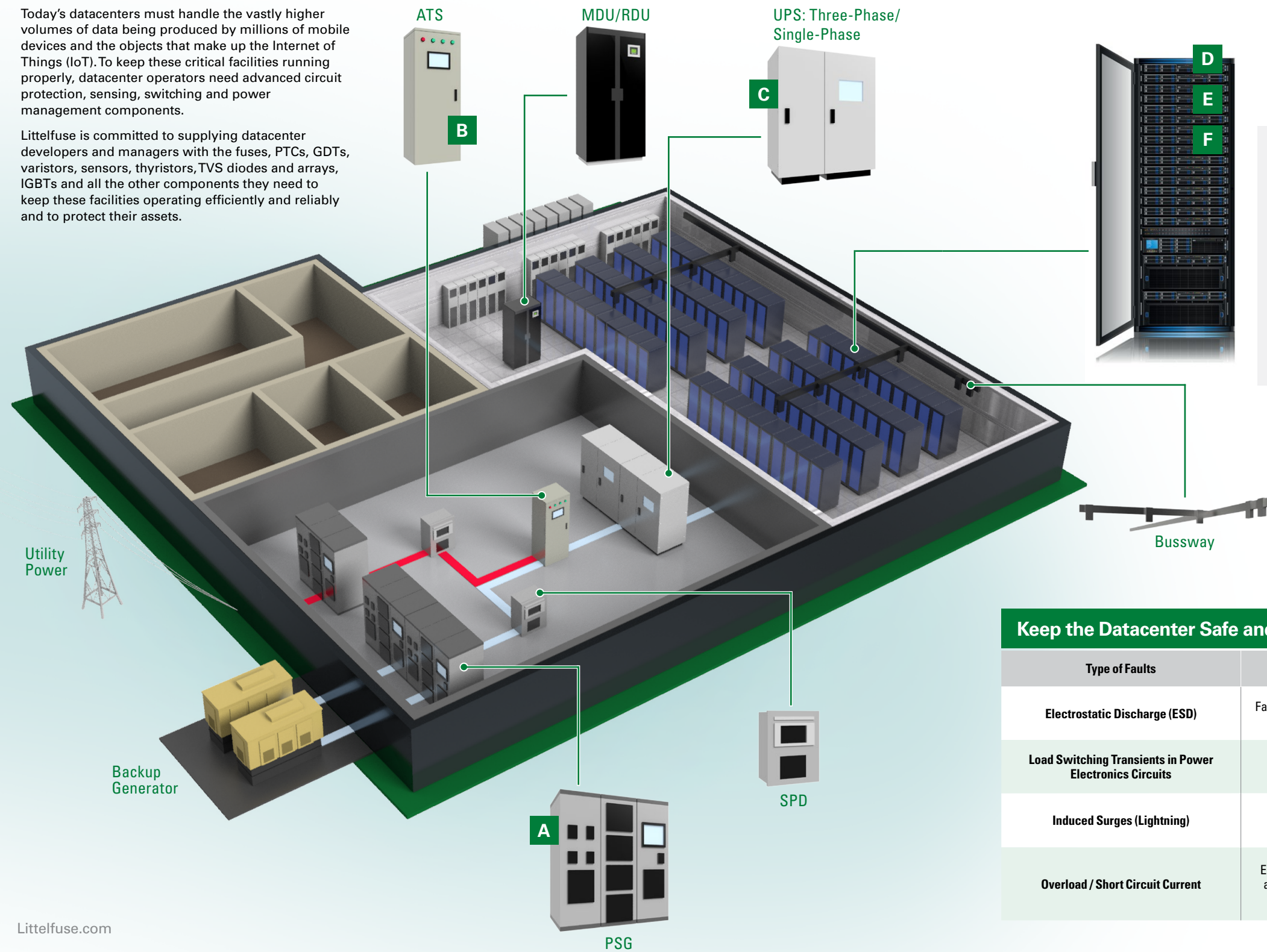


Expertise Applied | Answers Delivered

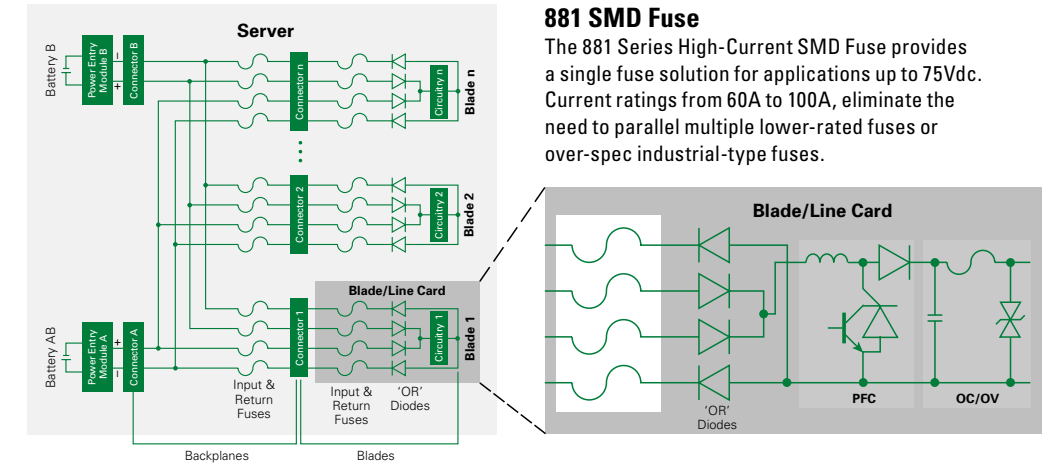
Protecting the Highway to the Cloud

Today's datacenters must handle the vastly higher volumes of data being produced by millions of mobile devices and the objects that make up the Internet of Things (IoT). To keep these critical facilities running properly, datacenter operators need advanced circuit protection, sensing, switching and power management components.

Littelfuse is committed to supplying datacenter developers and managers with the fuses, PTCs, GDTs, varistors, sensors, thyristors, TVS diodes and arrays, IGBTs and all the other components they need to keep these facilities operating efficiently and reliably and to protect their assets.



*The devices illustrated here address only a few of the datacenter areas for which Littelfuse can deliver industry-leading solutions. For a more complete view of Littelfuse solutions by application, consult the selection matrix included in this document.



881 SMD Fuse
The 881 Series High-Current SMD Fuse provides a single fuse solution for applications up to 75Vdc. Current ratings from 60A to 100A, eliminate the need to parallel multiple lower-rated fuses or over-spec industrial-type fuses.

Keep the Datacenter Safe and More Reliable		
Type of Faults	Possible Effect of Unprotected Faults	Protection Solutions
Electrostatic Discharge (ESD)	Faulty circuit operation, latent defects, and even catastrophic failure of sensitive datacenter equipment	Polymer ESD, Multilayer Varistors, TVS Diode Arrays
Load Switching Transients in Power Electronics Circuits	Equipment failure or faulty operation, leading to downtime or corrupt data	Metal Oxide Varistors, Gas Discharge Tubes, TVS Diodes
Induced Surges (Lightning)	Equipment failure leading to downtime	Metal Oxide Varistors, Gas Discharge Tubes, Protection Thyristors, TVS Diodes
Overload / Short Circuit Current	Excessive current can result in complete circuit destruction and possible fire, electrocution or explosion. Short circuits can cause arcs, shock and fire hazards	Fuses, Resettable PTCs

	Littelfuse Product Series	Product Function Level		Server			Network Switch			UPS			Modems	ADSL splitters, CSU/DSU	Repeaters, Mux, WAN	VoIP, LAN	Switchgear Panel	ATS	PDU/RPP	Busway	Panelboard	Backup Generator
				USB 2.0/3.0	Ethernet	VGA / RS-232	eSATA / SATA	Power Module	Power Supply	Fans	Network ports	AC mains										
Over Current Protection	Resettable PTCs	Max I_{HOLD}	Max Voltage																			
	LoRho	5A	12Vdc																			
	SMD (xxxxL, xxxxSMD)	5A	60Vdc	●	●																	
	Radial Leaded (xxR, xxEF, xxRF)	9A	72Vdc																			
	Strap	9A	24Vdc																			
	T-line (xxxR, Txxx)	2.5A	600Vint/60Vop																			
	Fuses	Max Current Rating	Max Voltage																			
	Cartridge	100A	600Vac																			
	NANO ²	40A	250Vac																			
	Thin Film Chip	20A	32Vdc																			
	High Current SMD (881 Series)	100A	250Vac																			
	Medium Voltage (E-Rated, R-Rated)	400A	38000 Vac																			
	Semiconductor	1500A	1300Vac																			
	Industrial Power & UL Class	3000A	600Vac																			
	HBC	Max Current Rating	Max Voltage																			
Holders	30A	300Vac																				
Blocks	600A	1000Vac																				
Clips	60A	600Vac																				
OV/OC	PolyZen	Max I_{HOLD}	Max V_Z																			
	Miniature (ZENxxxYM, ZENxxxYC)	2.6A	13.8Vdc	●																		
	Standard (ZENxxxLS)	2.3A	13.4Vdc	●																		
Over Voltage Protection	Polymer ESD Suppressors	Max Surge Rating	V_{MAX}																			
	PESD discrete and array	ESD Contact 8kV	24Vdc	●	●																	
	XTREME-GUARD™	ESD Contact 30kV	32Vdc	●	●																	
	TVS Diodes	Max Power	Max V_R																			
	SMD (SMxx, xxSMx)	5000W	400Vdc	●	●	●																
	Leaded (xxKP, xxKE)	30000W	400Vdc																			
	High Power (AKxx, LTKAKxx)	Ipp (8/20µs) at 15kA	430Vdc																			
	TVS Diode Arrays (SPA® Diodes)	Max Surge Rating	Max V_R																			
	SESD Series	Contact Discharge at 20kV	7Vdc	●	●																	
	General Purpose (SP10x)	ESD Contact 30kV	6Vdc	●	●	●																
	Low Capacitance (SP30x)	ESD Contact 20kV	6Vdc	●	●	●																
	Lightning Surge (SRxx, SLVUxx, SP40xx)	Ipp (8/20µs) 40A	70Vdc	●	●																	
	Lightning Surge (SP03xx, LC03xx)	Ipp (8/20µs) 150A	6Vdc	●																		
	Varistors (MOV/MLV)	Max Surge Rating	V_{MAX}																			
	Radial Leaded (LA, C-III, UltraMOV®)	1 Pulse (8/20µs) 10,000A	1000Vac																			
SMD MOV (CH, SMxx)	1 Pulse (8/20µs) 250A	275Vac																				
Thermal Protected (TMOV)	1 Pulse (8/20µs) 10,000A	750Vac																				
High Energy (HA, HB34, HF34, HG34)	1 Pulse (8/20µs) 40,000A	750Vac																				
Multilayer General (MLA, MLE, MHS)	1 Pulse (8/20µs) 125A, ESD Contact at 8kV	120Vdc	●	●	●																	
Gas Discharge Tube (GDT)	Max Surge Rating	Max V_{NORM}																				
High Voltage (CG2, CG3)	10 shots at 5000A	3000Vdc																				
Squared (SG, SE)	10 shots at 2000A	600Vdc																				
Medium Surge (CG5, CG6, CG7, SLxxx)	10 shots at 5000A	600Vdc																				
Protection Thyristor	Max Surge Rating	Max V_{DRM}																				
SIDActor® (Pxxxx, SDPxxx, SEPxxx)	Ipp (8/20µs) 400A	530Vdc	●																			
Switching Thyristor	Max I_{T(RMS)}	Max V_{DRM}																				
Triac (HQ6025xH5, Lxx04xx, Qxx04xx)	25A	Vdrm at 600Vdc																				
SCR (S4040xQx)	40A	Vdrm at 1000Vdc																				
IGBT Module	Max Current Rating	Max Voltage																				
MG06xxx Series	600A	600Vdc																				
MG12xxx Series	600A	1200Vdc																				
Sense	Magnetic Sensors & Reed Switches	Max Switching Current	Max Voltage																			
	Reed Sensors (59xxx)	Current 0.5A	300Vdc																			
	Reed Switches (DRxxx, Mxxx)	Current 0.5A	1000Vdc																			

Server Protection Example

Problem	Solution
G Over Current Protection	NANO ² Fuse – 881 Series High Current SMD Fuse
H Surge Protection	UltraMOV® Series
I ESD Protection	TVS Diode
J Enclosure Open/Close Status	Reed Sensor

Network Equipment Port Protection

Problem	Solution
K Over Current and Over Temperature Protection	Surface Mount PTC: 1206L150SLYR
L ESD Protection on Vbus	TVS Diode Array: SP1003
M ESD Protection on Data Lines	TVS Diode Array: SP3012
N Over Current Protection	461 Series TeleLink Surge Tolerant Surface Mount Fuse
O ESD and Surge Protection	TVS Diode Array: SLVU2.8-4
P ESD and Surge Protection	TVS Diode Array: SP0524P

Typical Solution for Uninterruptible Power Supply

Problem	Solution
Q Surge Protection	High Energy Industrial Varistors – BA or BB Series
R Over Current Protection	Semiconductor Fuse – L70QS Series (500-700, AC & DC) Cartridge Fuse – 505 Series
S Convert Rectify: AC → DC	Rectifier Diode Modules or Active Front-End IGBT
T Inverter: DC → AC	IGBT Modules or SiC MOSFETs/Diodes
U Over Current Protection	Full-range, Branch Circuit Fuses – JTD Series (600Vac) Cartridge Fuse – 505 Series

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