

AUTOMOTIVE CIRCUIT PROTECTION SOLUTIONS



Circuit protection solutions from the technology leader



Overvoltage Selection Guide

	Metal Oxide Varistors (MOV)		Multilayer Varistors (MLV)					
	Radial Leaded	Low Profile Box	Surface Mount					
Series Name	ZA	RA	CH	AUML	ML	MLE	MLN	MHS
Technology Type	Zinc Oxide	Zinc Oxide	Zinc Oxide	Multilayer Zinc Oxide	Multilayer Zinc Oxide	Multilayer Zinc Oxide	Multilayer Zinc Oxide	Multilayer Zinc Oxide
Operating DC Voltage Range	5.5-615V	5.5-369V	18-369V	18V	0-120V	0-18V	0-18V	0-42V
Load Dump Energy	13-160J	13-160J	10J	3-25J	0-6J	–	–	–
Jump Start	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bidirectional (transients of either polarity)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rated Immunity to IEC 61000-4-2 level 4	–	–	–	–	Yes	Yes	Yes	Yes
Typical Device Capacitance	500-1800pF	1000-1800pF	800-1600pF	1000-1800pF	40-6000pF	40-1700pF	45-430pF	3-22pF
Leakage Current	1-25µA	1-25µA	1-25µA	1-25µA	<25µA	<10µA	<5µA	<5µA
Also Rated for EFT or Lighting Wave	–	–	–	–	Yes	Yes	Yes	Yes
Performs Low Pass Filtering	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size	5, 7, 10, 14, 20mm discs	8, 16, 22mm	8x5mm Rectangle	1206-2220	0402-1210	0402-1206	0805-1206	0402-0603
Lines Protected	1	1	1	1	1	1	4	1
Mount/Form Factor	Radial Leaded	Packaged	Surface Mount	Surface Mount	Surface Mount	Surface Mount	Surface Mount	Surface Mount
Temperature Range (°C)	-55° – +85° (Epoxy), -55° – +125° (Phenolic)	-55° – +125°	-55° – +125°	-55° – +125°	-55° – +125°	-55° – +125°	-55° – +125°	-55° – +125°
Threats	Load Dump, Inductive Transients	Load Dump, Inductive Transients	Load Dump, Inductive Transients	Load Dump, Inductive Transients	Load Dump, ESD, Inductive Transients	ESD	ESD	ESD

Overvoltage Selection Guide (Continued)

	TVS Diode Arrays			VVM Polymer	TVS Diodes								
	SP72X	SP05X	PGB1	SA	P6KE	SMBJ	P6SMBJ	1KSMBJ	1.5KE	ICTE/MPTE	5KP	15KP	SLD
Mounting Method	Surface Mount	Surface Mount	Surface Mount	Through-Hole	Through-Hole or SMT (pill)	SMT	SMT	SMT	Through-Hole or SMT (pill)	Through-Hole	Through-Hole or SMT (pill)	Through-Hole or SMT (pill)	Through-Hole or SMT (pill)
Technology Type	Silicon SCR/Diode	TVS Avalanche Diode	PulseGuard® Polymer	Silicon Avalanche Diode	Silicon Avalanche Diode	Silicon Avalanche Diode	Silicon Avalanche Diode	Silicon Avalanche Diode	Silicon Avalanche Diode	Silicon Avalanche Diode	Silicon Avalanche Diode	Silicon Avalanche Diode	Silicon Avalanche Diode
Working Voltage (VDC)	0-30	0-5.5	0-24	–	5.5-376	5.0-188	5.5-185	5.5-160	5.5-376	5.0-45	5.0-180	17.0-240	5.0-30
Operating Temperature (°C)	-40 – +105	-20 – +85	-65 – +125	-55 – +150	-55 – +150	-55 – +150	-55 – +150	-55 – +150	-55 – +150	-55 – +150	-55 – +150	-55 – +150	-55 – +150
Package Type (No. of Lines)	DIP (6,14), SOIC (6, 14), SOT23 (4)	SC70 (2,4,5), SOT23 (2,4,5), SOT143 (3), TSSOP-8 (4), MSOP-8 (6), CSP (4, 8, 16)	SOT23 (2), 0805 (4), 0603 (1)	DO 15 Axial	DO 15 Axial & Pill	DO 214 AA	DO 214 AA	DO 214 AA	Axial & Pill	Axial	Axial & Pill	Axial & Pill	Axial
Peak Pulse Power Range (based on 10/100µs pulse unless stated otherwise)	NA	NA	500 W	500 W	600 W	600 W	600 W	1,000 W	1,500 W	1,500 W	5,000 W	15,000 W based on 100µs/150ms pulse	2,200 W
Typical Device Capacitance	3-5 pF	30pF	0.05 pF	NA	Per Data Sheet	Per Data Sheet	Per Data Sheet	Per Data Sheet	Per Data Sheet	Per Data Sheet	Per Data Sheet	NA	Per Data Sheet
Leakage Current	<20µA	<10µA	<1 nA	<3.0µA	<5.0µA	<5.0µA	<5.0µA	<5.0µA	<5.0µA	<2.0µA	<10µA	<10µA	10µA
Rated Immunity to IEC 61000-4-2 Level 4	Yes	Yes	Yes	Yes	–	–	–	–	–	–	–	–	–
Bidirectional (transients of either polarity)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Threats	ESD	ESD	ESD	ESD	Inductive Transients	Inductive Transients	Inductive Transients	Inductive Transients	Inductive Transients	Inductive Transients	Inductive Transients	Load Dump, Inductive Transients	Load Dump, Inductive Transients

AUTOMOTIVE CIRCUIT PROTECTION

Gas Plasma Voltage Dependent Switch Selection Guide

Family Name	BETA		TRIGGER SWITCH	
Mounting Method	Through-Hole, SMT	Surface Mount and Through-Hole	Through-Hole	Through-Hole
Series Name	SL0902	XT	VS	LT
Technology Type	Gas Plasma (GDT)	Gas Plasma (GDT)	Gas Plasma	Gas Plasma
DC Breakover Voltage (VDC)	230	600-1000	200-750	195-402
Temperature Range (°C)	-55 – +150	-55 – +150	-40 – +150	-40 – +150
Package Type	2 Terminal SMT and Axial Leads	2 Terminal SMT	2 Terminal Axial Leads GDT	2 Terminal Axial Leads GDT
Max Capacitance	1 pF	2.5 pF	2.0 pF	2.0 pF
Leakage Current	1 µA	1 µA	1 µA	1 µA
Repetitive Switching Current	ESD & 2.5 KA	400A	1000A	400A
Rated Immunity to IEC 61000-4-2 Level 4	Yes	NA	NA	NA
Bidirectional (transients of either polarity)	Bidirectional	Bidirectional	Bidirectional	Bidirectional
Typical Application	Antenna Protection	HID Switching	Fuel Ignition Systems	HID Lighting
Switching Operations	TBD	50,000	2,000,000	400,000



World Headquarters

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

International Sales, Distribution and Engineering Facilities:

North America

- Des Plaines, Illinois USA and Irving, Texas USA
Technical Assistance and
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, England
Phone: (+44) 1793-724-000
Fax: (+44) 1793-724-001

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, Philippines
- Matamoros, Mexico
- Piedras Negras, Mexico
- Suzhou, China
- Swindon, England