

## 500 WATT MULTI-LINE LOW CAPACITANCE TVS ARRAY



**SO-8 PACKAGE**

### DESCRIPTION

The SMDAxxLC and SMDAxxLCC Series are low capacitance multi-line transient voltage suppressor arrays that provides board level protection for standard TTL and MOS bus line applications against the damaging effects of ESD, tertiary lightning and switching transients.

The SMDAxxLC/LCC Series has a peak pulse power rating of 500 Watts for an 8/20 $\mu$ s waveshape. This device series meets the IEC 61000-4-2, IEC 61000-4-4 and IEC 61000-4-5 requirements.

### FEATURES

- Compatible with IEC 61000-4-2 (ESD): Air - 15kV, Contact - 8kV
- Compatible with IEC 61000-4-4 (EFT): 40A - 5/50ns
- Compatible with IEC 61000-4-5 (Surge): 12A, 8/20 $\mu$ s - Level 1(Line-Gnd) & Level 2(Line-Line)
- 500 Watts Peak Pulse Power per Line (tp = 8/20 $\mu$ s)
- Unidirectional and Bidirectional Configurations
- Available in Multiple Voltages Ranging from 3V to 24V
- Protects up to Four Lines
- Low Capacitance: 8pF
- RoHS Compliant
- REACH Compliant

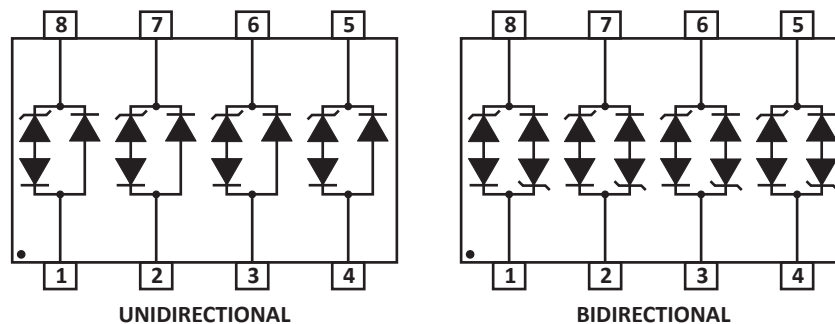
### APPLICATIONS

- Computer Interface Protection
- Ethernet - 10/100/1000 Base T
- Test and Measurement Equipment
- Industrial Control - Low Voltage Sensors

### MECHANICAL CHARACTERISTICS

- Molded JEDEC SO-8 Package
- Approximate Weight: 70 milligrams
- Lead-Free Pure-Tin Plating (Annealed)
- Solder Reflow Temperature:  
Pure-Tin - Sn, 100: 260-270°C
- 12mm Tape and Reel Per EIA Standard 481
- Flammability Rating UL 94V-0

### PIN CONFIGURATIONS



## TYPICAL DEVICE CHARACTERISTICS

## MAXIMUM RATINGS @ 25°C Unless Otherwise Specified

PARAMETER	SYMBOL	VALUE	UNITS
Operating Temperature	$T_L$	-55 to 150	°C
Storage Temperature	$T_{STG}$	-55 to 150	°C
Peak Pulse Power (tp = 8/20μs) - See Figure 1	$P_{PP}$	500	Watts
Forward Voltage @ 50mA, 300μs - Square Wave (See Note 1)	$V_F$	1.5	Volts

## NOTE

1. Only applies to unidirectional devices.

## ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified

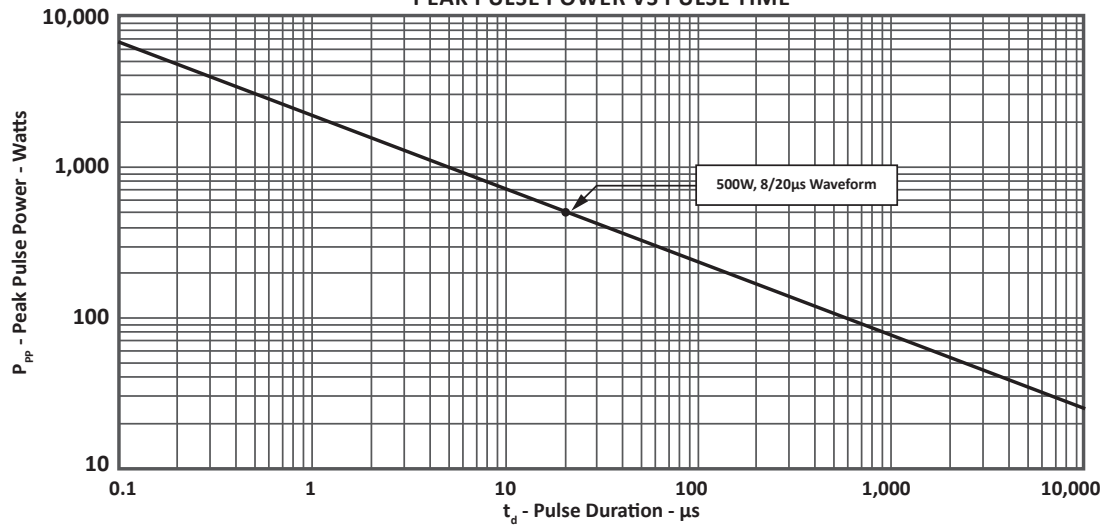
PART NUMBER (Note 1)	DEVICE MARKING	RATED STAND-OFF VOLTAGE  $V_{WM}$ VOLTS	MINIMUM BREAKDOWN VOLTAGE  @1mA $V_{(BR)}$ VOLTS	MAXIMUM CLAMPING VOLTAGE (Fig. 2)  @ $I_p = 1A$ $V_C$ VOLTS	MAXIMUM CLAMPING VOLTAGE (Fig. 2)  @ 8/20μs $V_C @ I_{PP}$ VOLTS	MAXIMUM LEAKAGE CURRENT  @ $V_{WM}$ $I_D$ μA	MAXIMUM CAPACITANCE  @0V, 1MHz C pF
SMDA03LC	SLA	3.3	4.5	7.0	10.9V @ 43.0A	125	8
SMDA03LCC	SLB	3.3	4.5	7.0	10.9V @ 43.0A	125	8
SMDA05LC	SLC	5.0	6.0	9.8	13.5V @ 42.0A	20	8
SMDA05LCC	SLD	5.0	6.0	9.8	13.5V @ 42.0A	20	8
SMDA08LC	SLE	8.0	8.5	13.4	16.9V @ 34.0A	10	8
SMDA08LCC	SLF	8.0	8.5	13.4	16.9V @ 34.0A	10	8
SMDA12LC	SLG	12.0	13.3	19.0	25.9V @ 27.0A	1	8
SMDA12LCC	SLH	12.0	13.3	19.0	25.9V @ 27.0A	1	8
SMDA15LC	SLJ	15.0	16.7	24.0	30.0V @ 17.0A	1	8
SMDA15LCC	SLK	15.0	16.7	24.0	30.0V @ 17.0A	1	8
SMDA24LC	SLL	24.0	26.7	43.0	49.0V @ 12.0A	1	8
SMDA24LCC	SLM	24.0	26.7	43.0	49.0V @ 12.0A	1	8

## NOTES

1. Part numbers with a "C" suffix are bidirectional devices, i.e., SMDA03LCC.

**TYPICAL DEVICE CHARACTERISTICS**

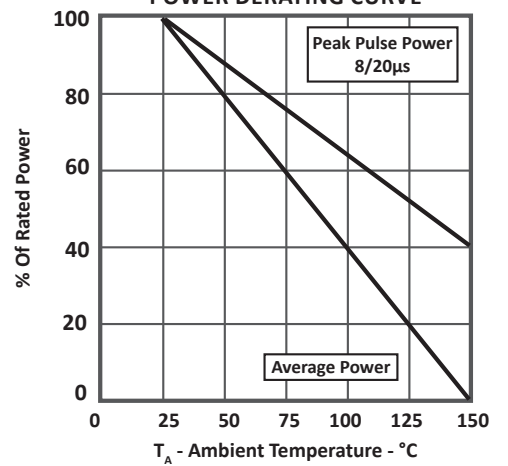
**FIGURE 1**  
**PEAK PULSE POWER VS PULSE TIME**

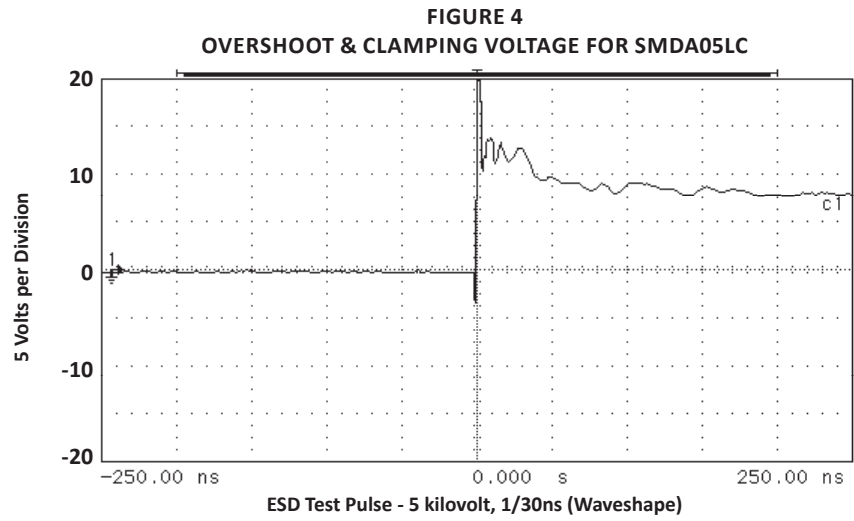


**FIGURE 2**  
**PULSE WAVE FORM**

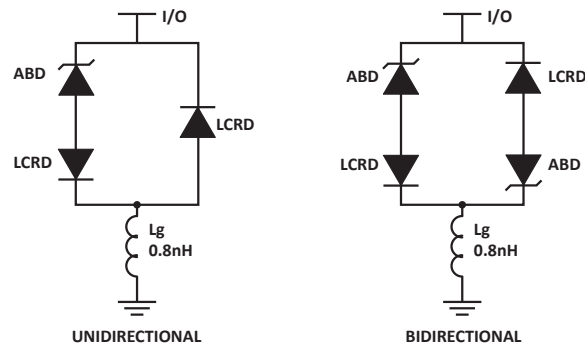


**FIGURE 3**  
**POWER DERATING CURVE**



**TYPICAL DEVICE CHARACTERISTICS**

## SPICE MODEL

**FIGURE 1**  
**SPICE MODEL**


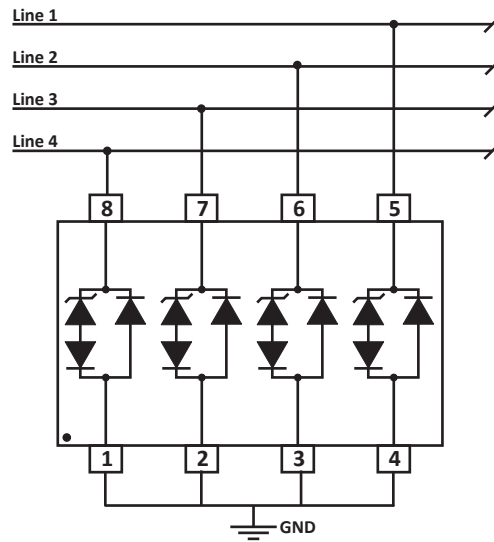
ABD - Avalanche Breakdown Diode (TVS)  
 LCRD: Low Capacitance Rectifier Diode  
 Lg - Lead Inductance

**TABLE 1 - SPICE PARAMETERS**

PARAMETER	UNIT	ABD(TVS)	LCRD
BV	V	See Table 2	200
IBV	μA	1	0.01
$C_{jo}$	pF	See Table 2	5
$I_s$	A	See Table 2	1E-13
Vj	V	0.6	0.6
M	-	0.33	0.33
N	-	1	1
$R_s$	Ohms	See Table 2	0.31
TT	s	1E-8	1E-9
EG	eV	1.11	1.11

**TABLE 2 - ABD SPECIFIC SPICE PARAMETERS**

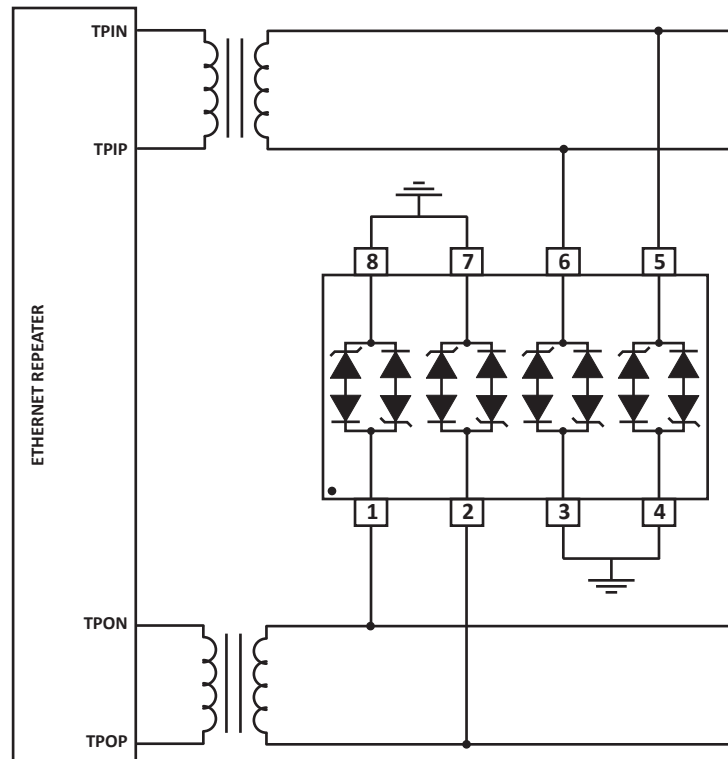
PART NUMBER	$B_v$ (VOLTS)	$C_{jo}$ (pF)	$I_s$ (AMPS)	$R_s$ (OHMS)
SMDA03LC	4.5	438	1E-11	0.21
SMDA05LC	6.0	284	1E-11	0.14
SMDA08LC	8.5	146	1E-11	0.28
SMDA12LC	13.3	123	1E-13	0.40
SMDA15LC	16.7	102	1E-13	0.52
SMDA24LC	26.7	61	1E-13	1.54
SMDA03LCC	4.5	438	1E-11	0.21
SMDA05LCC	6.0	284	1E-11	0.14
SMDA08LCC	8.5	146	1E-11	0.28
SMDA12LCC	13.3	123	1E-13	0.40
SMDA15LCC	16.7	102	1E-13	0.52
SMDA24LCC	26.7	61	1E-13	1.54

**APPLICATION INFORMATION****FIGURE 1 - UNIDIRECTIONAL COMMON-MODE PROTECTION**

Circuit connectivity is as follows:

- Line 1 connected to Pin 5.
- Line 2 connected to Pin 6.
- Line 3 connected to Pin 7.
- Line 4 connected to Pin 8.
- Pins 1 - 4 connected to ground.

## APPLICATION INFORMATION



**FIGURE 2 - BIDIRECTIONAL COMMON-MODE ETHERNET PROTECTION**

Circuit connectivity is as follow:

- TPIN connected to Pin 5.
- TPIP connected to Pin 6.
- TPON connected to Pin 1.
- TPOP connected to Pin 2.
- Pins 3, 4, 7 and 8 connected to ground.

## CIRCUIT BOARD RECOMMENDATIONS

Circuit board layout is critical for electromagnetic compatibility protection. The following guidelines are recommended:

- The protection device should be placed near the input terminals or connectors, the device will divert the transient current immediately before it can be coupled into the nearby traces.
- The path length between the TVS device and the protected line should be minimized.
- All conductive loops including power and ground loops should be minimized.
- The transient current return path to ground should be kept as short as possible to reduce parasitic inductance.
- Ground planes should be used whenever possible. For multilayer PCBs, use ground vias.

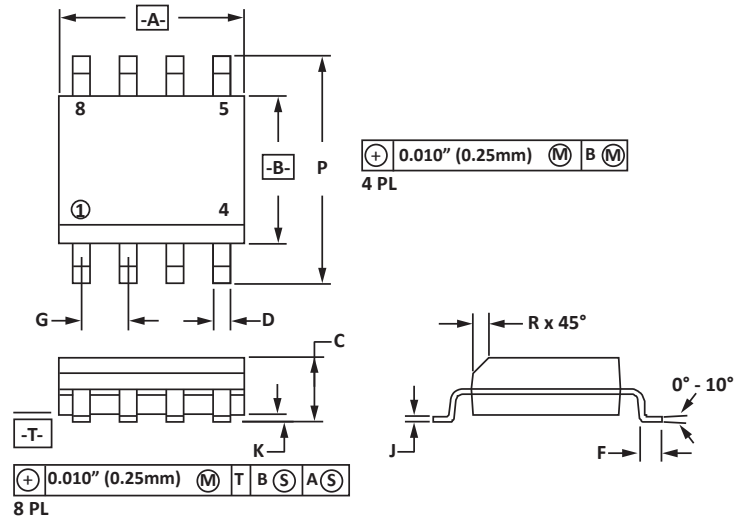
## SO-8 PACKAGE INFORMATION

## OUTLINE DIMENSIONS

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.80	5.00	0.189	0.196
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27 BSC		0.05 BSC	
J	0.18	0.25	0.007	0.009
K	0.10	0.25	0.004	0.008
P	5.80	6.20	0.229	0.244
R	0.25	0.50	0.010	0.019

## NOTES

- T = Seating plane and datum surface.
- Dimensions "A" and "B" are datum.
- Dimensions "A" and "B" do not include mold protrusion.
- Maximum mold protrusion is 0.015" (0.380mm) per side.
- Dimensioning and tolerances per ANSI Y14.5M, 1982.
- Dimensions are exclusive of mold flash and metal burrs.

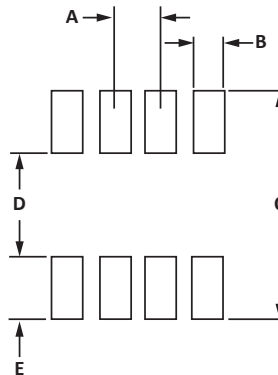


## PAD LAYOUT DIMENSIONS

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.14	1.40	0.045	0.055
B	0.64	0.89	0.025	0.035
C	6.22	-	0.245	-
D	3.94	4.17	0.155	0.165
E	1.02	1.27	0.040	0.050

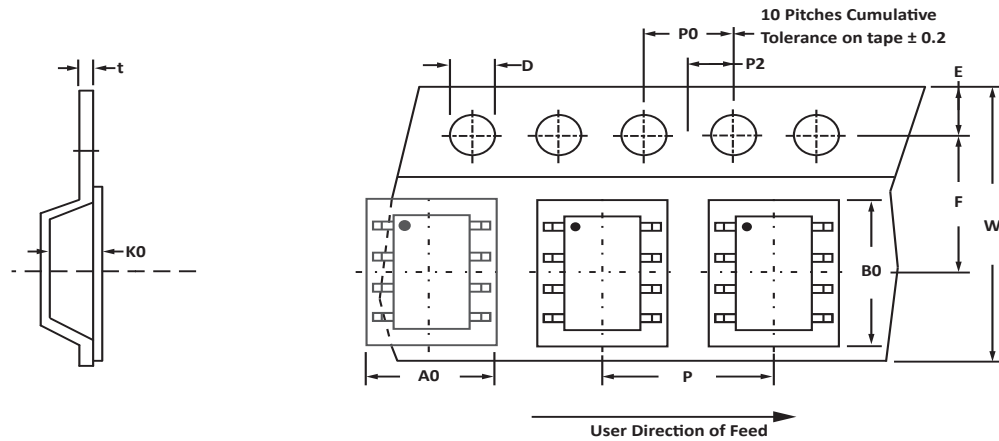
## NOTES

- Controlling dimension: inches.





## TAPE AND REEL



## SPECIFICATIONS

REEL DIA.	TAPE WIDTH	A0	B0	K0	D	E	F	W	P0	P2	P	tmax
178mm (7")	12mm	6.50 ± 0.10	5.40 ± 0.10	2.00 ± 0.10	1.50 ± 0.10	1.75 ± 0.10	5.50 ± 0.05	12.00 ± 0.30	4.00 ± 0.12	2.00 ± 0.10	8.00 ± 0.10	0.25

## NOTES

- Dimensions are in millimeters.
- Surface mount product is taped and reeled in accordance with EIA-481.
- Suffix - T7 = 7" Reel - 1,000 pieces per 12mm tape.
- Suffix - T13 = 13" Reel - 2,500 pieces per 12mm tape.
- Bulk product shipped in tubes of 98 pieces per tube.
- Marking on Part - marking code (see page 2), date code, logo and pin one defined by dot on top of package.

## ORDERING INFORMATION

BASE PART NUMBER (xx = Voltage)	LEADFREE SUFFIX	TAPE SUFFIX	QTY/REEL	REEL SIZE	TUBE QTY
SMDAxx/SMDAxxC	-LF	-T7	1,000	7"	98
SMDAxx/SMDAxxC	-LF	-T13	2,500	13"	98

This device is only available in a Lead-Free configuration.

## COMPANY INFORMATION

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### COMPANY PROFILE

In business more than 25 years, ProTek Devices™ is a privately held semiconductor company. The company offers a product line of overvoltage protection and overcurrent protection components. These include transient voltage suppressor array (TVS arrays) avalanche breakdown diode, steering diode TVS array and electronics SMD chip fuses. These components deliver circuit protection in electronic systems from numerous overvoltage and overcurrent events. They include lightning; electrostatic discharge (ESD); nuclear electromagnetic pulses (NEMP); inductive switching; and electromagnetic interference (EMI) / radio frequency interference (RFI). ProTek Devices also offers LED wafer die for ESD protection and related high frequency products. ProTek Devices is ISO 9001:2015 certified.

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