

Description

The SMDAxxC-7 series of transient voltage suppressors are designed to protect components which are connected to data and transmission lines from voltage surges caused by electrostatic discharge (ESD), electrical fast transients(EFT), and lightning.

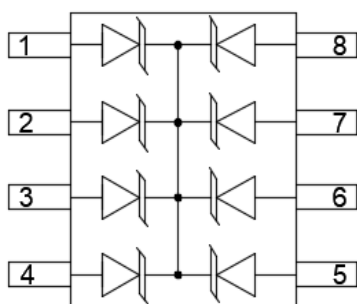
TVS diodes are characterized by their high surge capability, low operating and clamping voltages, and fast response time. This makes them ideal for use as board level protection of sensitive semiconductor components, The SMDAxxC-7 is designed to provide transient suppression on multiple data lines and I/O ports. The low profile SO-8 design allows the user to protect up to seven data and I/O lines with one package.

The SMDAxxC-7 TVS diode array will meet the surge requirements of IEC 61000-4-2(Formerly IEC 801-2), Level 4, "Human Body Model" for air and contact discharge.

Mechanical Characteristics

- ◆ JEDEC SO-8 package
- ◆ Molding compound flammability rating: UL 94V-0
- ◆ Marking: Part number
- ◆ Packaging: Tube or Tape and Reel per EIA 481

Dimensions and Pin Configuration



SO-8 (Top View)

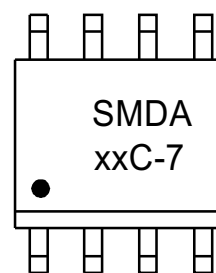
Features

- ◆ Transient protection for data lines to IEC 61000-4-2(ESD) $\pm 15KV$ (air), $\pm 8KV$ (contact)
- ◆ IEC 61000-4-4(EFT) 40A(5/50ns)
- ◆ IEC 61000-4-5(Lightning)12A(8/20 μ s)
- ◆ Small SO-8 surface mount package
- ◆ Protects seven I/O lines
- ◆ Working voltages: 5V, 12V, 15V and 24V
- ◆ Low leakage current
- ◆ Low operating and clamping voltages
- ◆ Solid-state silicon avalanche technology

Applications

- ◆ RS-232 and RS-422 Data Lines
- ◆ Microprocessor Based Equipment
- ◆ LAN/WAN Equipment
- ◆ Notebooks, Desktops, and Servers
- ◆ Instrumentation
- ◆ Peripherals
- ◆ Set Top Box
- ◆ Serial and Parallel Ports

Marking Information



xx represents the voltage
Dot denotes Pin1

Ordering Information

Part Number	Marking	Packaging	Reel Size
SMDAxxC-7	SMDAxxC-7	2500/Tape & Reel	13 inch

Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Peak Pulse Power(8/20 μs)	Ppk	300	W
Lead Soldering Temperature	T _L	260(10 sec.)	$^{\circ}\text{C}$
Operating Temperature Range	T _J	-55 to +125	$^{\circ}\text{C}$
Storage Temperature Range	T _{stg}	-55 to +150	$^{\circ}\text{C}$

Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

SMDA05C-7 (Marking Code:SMDA05C-7)						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V _{RWM}			5	V	
Reverse Breakdown Voltage	V _{BR}	6			V	I _T = 1mA
Reverse Leakage Current	I _R			20	μA	V _{RWM} = 5V, T=25 $^{\circ}\text{C}$
Clamping Voltage	V _C			9.8	V	I _{PP} = 1A (8 x 20 μs pulse)
Maximum Peak Pulse Current	I _{PP}			17	A	t _p =8/20 μs
Junction Capacitance	C _J			350	pF	V _R = 0V, f = 1MHz

SMDA12C-7 (Marking Code:SMDA12C-7)						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V _{RWM}			12	V	
Reverse Breakdown Voltage	V _{BR}	13.3			V	I _T = 1mA
Reverse Leakage Current	I _R			1	μA	V _{RWM} = 12V, T=25°C
Clamping Voltage	V _C			19	V	I _{PP} = 1A (8 x 20μs pulse)
Maximum Peak Pulse Current	I _{PP}			12	A	t _p =8/20μs
Junction Capacitance	C _J			120	pF	V _R = 0V, f = 1MHz

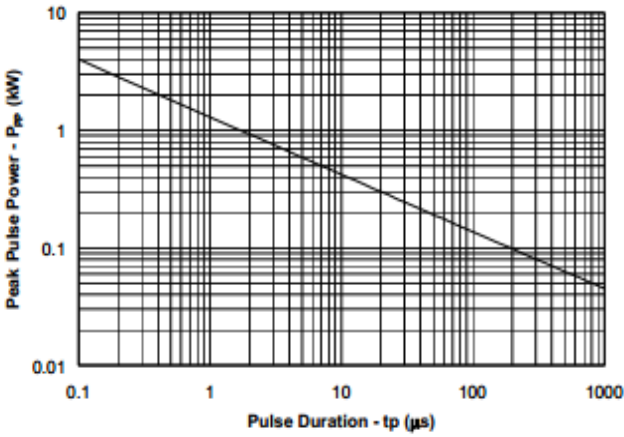
SMDA15C-7 (Marking Code:SMDA15C-7)						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V _{RWM}			15	V	
Reverse Breakdown Voltage	V _{BR}	16.7			V	I _T = 1mA
Reverse Leakage Current	I _R			1	μA	V _{RWM} = 15V, T=25°C
Clamping Voltage	V _C			24	V	I _{PP} = 1A (8 x 20μs pulse)
Maximum Peak Pulse Current	I _{PP}			10	A	t _p =8/20μs
Junction Capacitance	C _J			75	pF	V _R = 0V, f = 1MHz

SMDA24C-7 (Marking Code:SMDA24C-7)

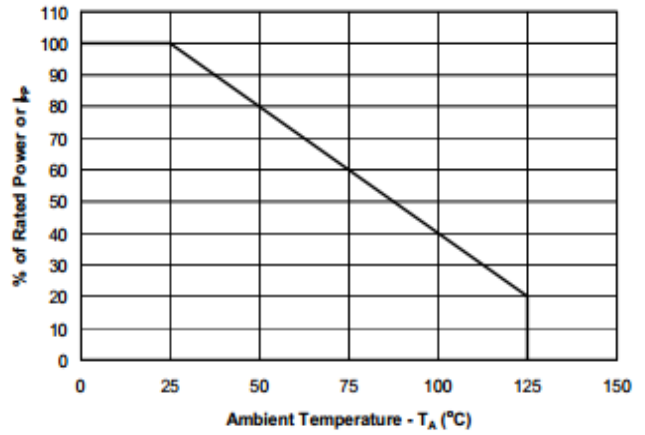
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V_{RWM}			24	V	
Reverse Breakdown Voltage	V_{BR}	26.7			V	$I_T = 1\text{mA}$
Reverse Leakage Current	I_R			1	μA	$V_{RWM} = 24\text{V}, T = 25^\circ\text{C}$
Clamping Voltage	V_C			43	V	$I_{PP} = 1\text{A}$ (8 x 20 μs pulse)
Maximum Peak Pulse Current	I_{PP}			5	A	$t_p = 8/20\mu\text{s}$
Junction Capacitance	C_J			50	pF	$V_R = 0\text{V}, f = 1\text{MHz}$

Typical Characteristics

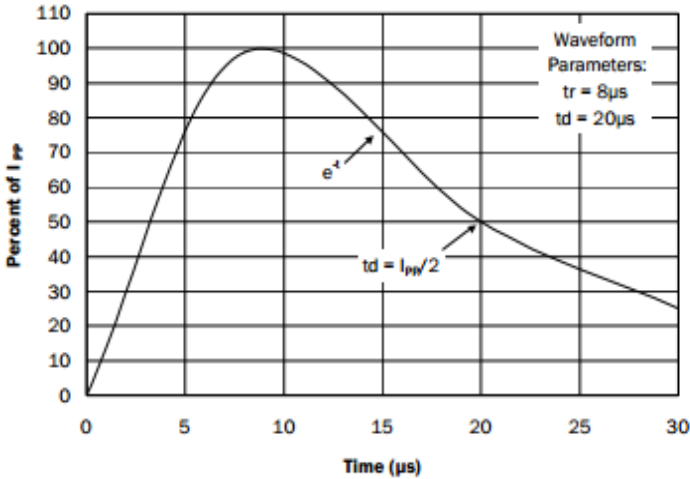
Non-Repetitive Peak Pulse Power vs. Pulse Time



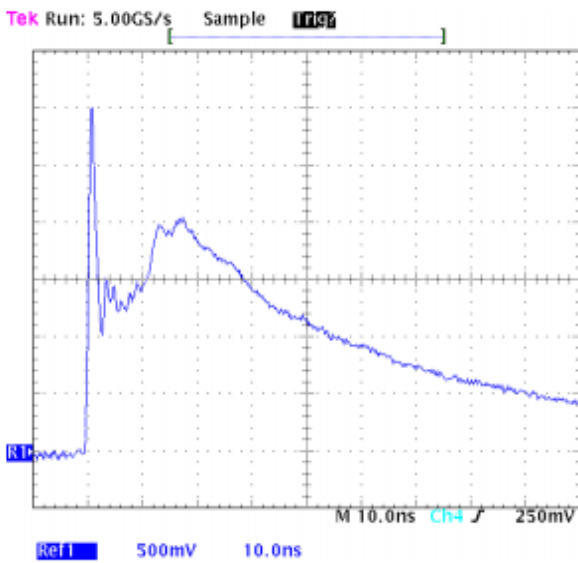
Power Derating Curve



Pulse Waveform



ESD Pulse Waveform (IEC 61000-4-2)



IEC 61000-4-2 Discharge Parameters

Level	First Peak Current (A)	Peak Current at 30 ns (A)	Peak Current at 60 ns (A)	Test Voltage (Contact Discharge) (kV)	Test Voltage (Air Discharge) (kV)
1	7.5	4	8	2	2
2	15	8	4	4	4
3	22.5	12	6	6	8
4	30	16	8	8	15

Applications Information

Device Connection for Protection of Seven Data Lines

The SMDAxxC-7 is designed to protect up to 7 data or I/O lines. They are bidirectional devices and may be used on lines where the signal polarities are above and below ground.

The SMDAxxC-7 TVS arrays employs a monolithic structure. Therefore, the working voltage (VRWM) and breakdown voltage (VBR) specifications apply to the differential voltage between any two data line pins. For example, the SMDA24C-7 is designed for a maximum voltage excursion of $\pm 12V$ between any two data lines.

The device is connected as follows:

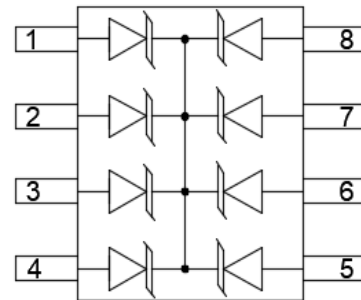
- ◆ Pins 1, 2, 3, 4, 5, 6 and 7 are connected to the lines that are to be protected. Pin 8 is connected to ground. The ground connections should be made directly to the ground plane for best results. The path length is kept as short as possible to reduce the effects of parasitic inductance in the board traces.

Circuit Board Layout Recommendations for Suppression of ESD.

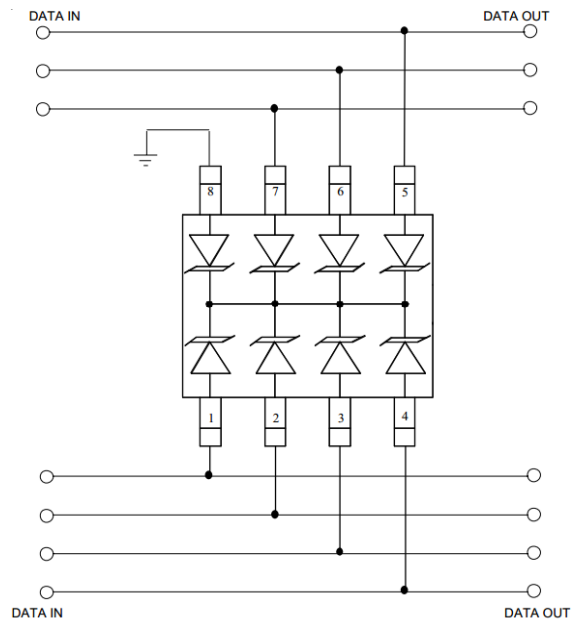
Good circuit board layout is critical for the suppression of ESD induces transients. The following guidelines are recommended:

- ◆ Place the TVS near the input terminals or connectors to restrict transient coupling.
- ◆ Minimize the path length between the TVS and the protected line.
- ◆ Minimize all conductive loops including power and ground loops.
- ◆ The ESD transient return path to ground should be kept as short as possible.
- ◆ Never run critical signals near board edges.
- ◆ Use ground planes whenever possible.

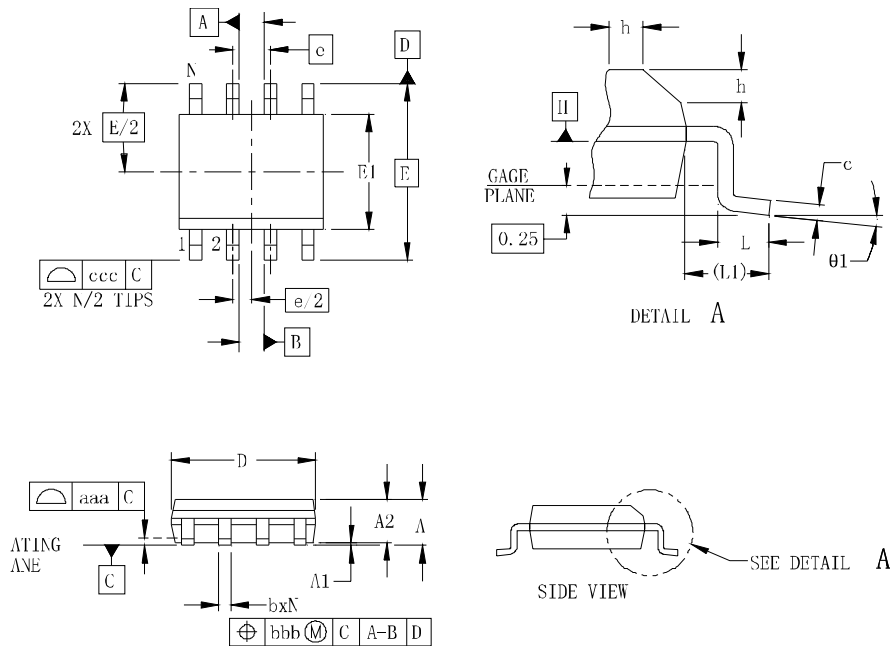
Circuit Diagram



Connection Diagram

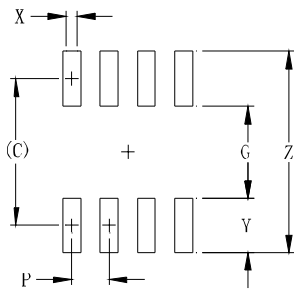


SO-8 Package Outline Drawing



SYM	DIMENSIONS					
	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.35		1.75	0.053		0.069
A1	0.10		0.25	0.004		0.010
A2	1.25		1.65	0.049		0.065
b	0.31		0.51	0.012		0.020
c	0.17		0.25	0.007		0.010
D	4.80	4.90	5.00	0.189	0.193	0.197
E	3.80	3.90	4.00	0.150	0.154	0.157
E1	6.00 BSC			0.236 BSC		
e	1.27 BSC			0.050 BSC		
h	0.25		0.50	0.010		0.020
L	0.40	0.72	1.04	0.016	0.028	0.041
L1	(1.04)			(0.041)		
N	8			8		
theta1	0°		8°	0°		8°
aaa	0.10			0.004		
bbb	0.25			0.010		
ccc	0.20			0.008		

Suggested Land Pattern



SYM	DIMENSIONS	
	MILLIMETERS	INCHES
C	(5.20)	0.205
G	3.00	0.118
P	1.27	0.050
X	0.60	0.024
Y	2.20	0.087
Z	7.40	0.291

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