

SMDA05C-7 THRU SMDA24C-7 Bidirectional TVS Array for Protection of Seven Lines

PROTECTION PRODUCTS

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 ESD (electrostatic discharge), EFT (electrical fast transients), 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.

Features

- ◆ Transient protection for data lines to
 IEC 61000-4-2 (ESD) 15kV (air), 8kV (contact)
 IEC 61000-4-4 (EFT) 40A (5/50ns)
 IEC 61000-4-5 (Lightning) 12A (8/20µs)
- Small S0-8 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

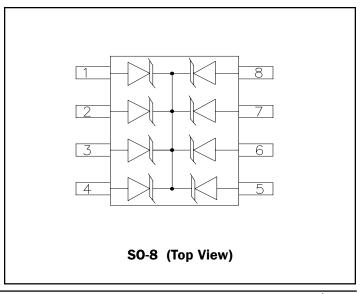
Mechanical Characteristics

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

Applications

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

Schematic & PIN Configuration





SMDA05C-7 THRU SMDA24C-7

PROTECTION PRODUCTS

Absolute Maximum Rating

Rating	Symbol	Value	Units
Peak Pulse Power (tp = 8/20µs)	P _{pk}	300	Watts
Lead Soldering Temperature	T _L	260 (10 sec.)	°C
Operating Temperature	T _J	-55 to +125	°C
Storage Temperature	T _{STG}	-55 to +150	°C

Electrical Characteristics

SMDA05C-7						
Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	V _{RWM}				5	V
Reverse Breakdown Voltage	V _{BR}	I _t = 1mA	6			V
Reverse Leakage Current	I _R	V _{RWM} = 5V, T=25°C			20	μΑ
Clamping Voltage	V _c	I _{PP} = 1A, tp = 8/20μs			9.8	V
Maximum Peak Pulse Current	I _{PP}	tp = 8/20µs			17	Α
Junction Capacitance	C _j	Between I/O Pins and Gnd V _R = OV, f = 1MHz			350	pF

SMDA12C-7						
Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	V _{RWM}				12	V
Reverse Breakdown Voltage	V _{BR}	I _t = 1mA	13.3			V
Reverse Leakage Current	I _R	V _{RWM} = 12V, T=25°C			1	μΑ
Clamping Voltage	V _c	I _{PP} = 1A, tp = 8/20μs			19	V
Maximum Peak Pulse Current	I _{PP}	tp = 8/20µs			12	Α
Junction Capacitance	C _j	Between I/O Pins and Gnd V _R = OV, f = 1MHz			120	pF



SMDA05C-7 THRU SMDA24C-7

PROTECTION PRODUCTS

Electrical Characteristics (Continued)

SMDA15C-7						
Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	V _{RWM}				15	V
Reverse Breakdown Voltage	V _{BR}	I _t = 1mA	16.7			V
Reverse Leakage Current	I _R	V _{RWM} = 15V, T=25°C			1	μA
Clamping Voltage	V _c	I _{PP} = 1A, tp = 8/20μs			24	V
Maximum Peak Pulse Current	I _{PP}	tp = 8/20µs			10	А
Junction Capacitance	C _j	Between I/O Pins and Gnd V _R = OV, f = 1MHz			75	pF

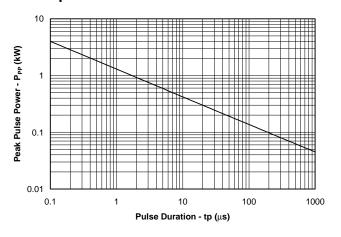
SMDA24C-7						
Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	V _{RWM}				24	V
Reverse Breakdown Voltage	V _{BR}	I _t = 1mA	26.7			V
Reverse Leakage Current	I _R	V _{RWM} = 24V, T=25°C			1	μA
Clamping Voltage	V _c	$I_{pp} = 1A$, tp = 8/20 μ s			43	V
Maximum Peak Pulse Current	I _{PP}	tp = 8/20µs			5	А
Junction Capacitance	C _j	Between I/O Pins and Gnd V _R = OV, f = 1MHz			50	pF



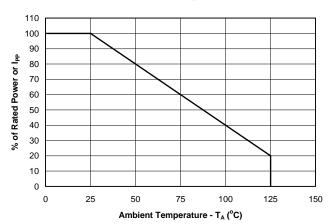


Typical Characteristics

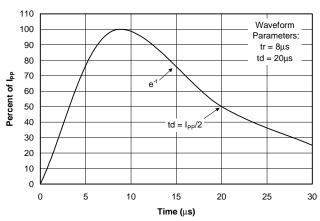
Non-Repetitive Peak Pulse Power vs. Pulse Time



Power Derating Curve

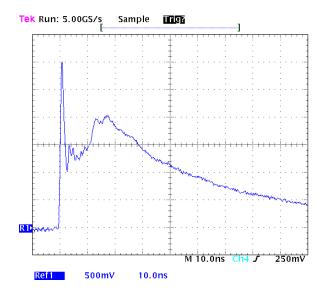


Pulse Waveform



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ESD Pulse Waveform (IEC 61000-4-2)



IEC 61000-4-2 Discharge Parameters

Level	First Peak Current	Peak Current at 30 ns	Peak Current at 60 ns	Test Voltage (Contact	Test Voltage (Air
	(A)	(A)	(A)	Discharge) (kV)	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 employ a monolithic structure. Therefore, the working voltage (V_{RWM}) and breakdown voltage (V_{BR}) 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 +/-12V between any two data lines.

The device is connected as follows:

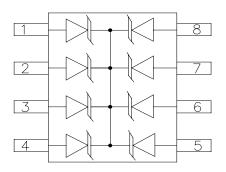
 Pins 1, 2, 3, 4, 5, 6 and 7 are connected to the lines that are to be protected. Pin 8 is connected to ground. The ground connections should be made directly to the ground plane for best results. The path length is kept as short as possible to reduce the effects of parasitic inductance in the board traces.

Circuit Board Layout Recommendations for Suppression of ESD.

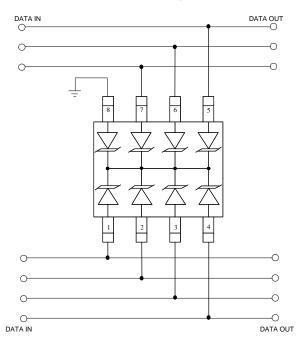
Good circuit board layout is critical for the suppression of ESD induced transients. The following guidelines are recommended:

- 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

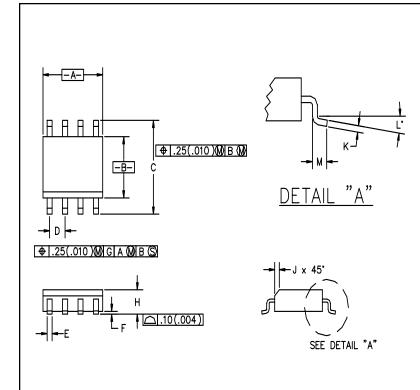


Connection Diagram



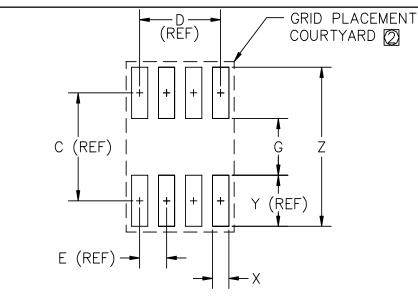


Outline Drawing - SO-8



	DIMENSIONS							
DIN	ΛN	INC	HES	М	NIOTE			
יווטן	/ ``	MIN	MAX	MIN	MAX	NOTE		
A	١	.188	.197	4.80	5.00			
E	}	.149	.158	3.80	4.00			
	` `	.228	.244	5.80	6.20			
)	.050	BSC	1.27	BSC			
E	_	.013	.020	0.33	0.51			
F	•	.004	.010	0.10	0.25			
	1	.053	.069	1.35	1.75			
J		.011	.019	0.28	0.48			
K	,	.007	.010	.19	.25			
		0.	8°	0°	8			
N	1	.016	.050	0.40	1.27			

Land Pattern - SO-8



	DIMENSIONS 🛈						
DIM	INCHES		М	NOTE			
ווועו	MIN	MAX	MIN	MAX	NOIL		
С	_	.19	ı	5.00	_		
D	_	.15	_	3.81	_		
E	_	.05	_	1.27	_		
G	.10	.11	2.60	2.80	_		
Χ	.02	.03	.60	.80	_		
Y	_	.09	_	2.40	_		
Ζ	_	.29	7.20	7.40	_		

- GRID PLACEMENT COURTYARD IS 12x16 ELEMENTS
 (6 mm X 8mm) IN ACCORDANCE WITH THE
 INTERNATIONAL GRID DETAILED IN IEC PUBLICATION 97.
- (1) CONTROLLING DIMENSION: MILLIMETERS





Ordering Information

Part Number	Working Voltage	Qty per Reel	Reel Size
SMDA05C-7.TB	5V	500	7 Inch
SMDA05C-7.TE	5V	2,500	13 Inch
SMDA12C-7.TB	12V	500	7 Inch
SMDA12C-7.TE	12V	2,500	13 Inch
SMDA15C-7.TB	15V	500	7 Inch
SMDA15C-7.TE	15V	2,500	13 Inch
SMDA24C-7.TB	24V	500	7 Inch
SMDA24C-7.TE	24V	2,500	13 Inch

Note:

(1) No suffix indicates tube pack.

Contact Information

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