

SMS05C, SMS12C, SMS15C, SMS24C

5-Line Transient Voltage Suppressor Array

This 5-line voltage transient suppressor array is designed for application requiring transient voltage protection capability. It is intended for use in over-transient voltage and ESD sensitive equipment such as computers, printers, automotive electronics, networking communication and other applications. This device features a monolithic common anode design which protects five independent lines in a single SC-74 package.

Features

- Protects up to 5 Lines in a Single SC-74 Package
- Peak Power Dissipation – 350 W (8 × 20 μs Waveform)
- ESD Rating of Class 3B (Exceeding 8.0 kV) per Human Body Model and Class C (Exceeding 400 V) per Machine Model
- Compliance with IEC 61000-4-2 (ESD) 15 kV (Air), 8.0 kV (Contact)
- Flammability Rating of UL 94 V-0

Applications

- Hand-Held Portable Applications
- Networking and Telecom
- Automotive Electronics
- Serial and Parallel Ports
- Notebooks, Desktops, Servers

MAXIMUM RATINGS (T_J = 25°C unless otherwise specified)

Symbol	Rating	Value	Unit
P _{PK} 1	Peak Power Dissipation 8 × 20 μs Double Exponential Waveform (Note 1)	350	W
T _J	Operating Junction Temperature Range	-40 to 125	°C
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _L	Lead Solder Temperature (10 s)	260	°C
ESD	Human Body Model (HBM) Machine Model (MM) IEC 61000-4-2 Air (ESD) IEC 61000-4-2 Contact (ESD)	>8000 >400 >15000 >8000	V

1. Non-repetitive current pulse per Figure 3.

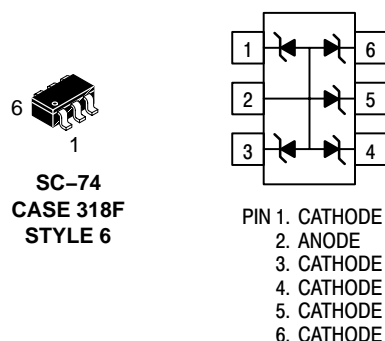


ON Semiconductor®

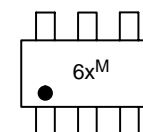
<http://onsemi.com>

SC-74 FIVE TRANSIENT VOLTAGE SUPPRESSOR 350 W PEAK POWER

PIN ASSIGNMENT



MARKING DIAGRAM



x = SMS05C:J
= SMS12C:K
= SMS15C:L
= SMS24C:M
M = Date Code

ORDERING INFORMATION

Device	Package	Shipping†
SMS05CT1	SC-74	3000/Tape & Reel
SMS12CT1	SC-74	3000/Tape & Reel
SMS15CT1	SC-74	3000/Tape & Reel
SMS24CT1	SC-74	3000/Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

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SMS05C ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse Working Voltage	V _{RWM}	(Note 2)			5.0	V
Breakdown Voltage	V _{BR}	I _T = 1.0 mA (Note 3)	6.2		7.2	V
Reverse Leakage Current	I _R	V _{RWM} = 5.0 V			5.0	μA
Clamping Voltage	V _C	I _{PP} = 5.0 A (8 × 20 μs Waveform)			9.8	V
Clamping Voltage	V _C	I _{PP} = 24 A (8 × 20 μs Waveform)			14.5	V
Maximum Peak Pulse Current	I _{PP}	8 × 20 μs Waveform			24	A
Capacitance	C _J	V _R = 0 V, f = 1.0 MHz (Line to GND)		260	400	pF

SMS12C ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse Working Voltage	V _{RWM}	(Note 2)			12	V
Breakdown Voltage	V _{BR}	I _T = 1.0 mA (Note 3)	13.3		15	V
Reverse Leakage Current	I _R	V _{RWM} = 12 V		0.001	1.0	μA
Clamping Voltage	V _C	I _{PP} = 5.0 A (8 × 20 μs Waveform)			19	V
Clamping Voltage	V _C	I _{PP} = 15 A (8 × 20 μs Waveform)			23	V
Maximum Peak Pulse Current	I _{PP}	8 × 20 μs Waveform			15	A
Capacitance	C _J	V _R = 0 V, f = 1.0 MHz (Line to GND)		120	150	pF

SMS15C ELECTRICAL CHARACTERISTICS (T_J = 25°C, unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse Working Voltage	V _{RWM}	(Note 2)			15	V
Breakdown Voltage	V _{BR}	I _T = 1.0 mA (Note 3)	17		19	V
Reverse Leakage Current	I _R	V _{RWM} = 15 V		0.05	1.0	μA
Clamping Voltage	V _C	I _{PP} = 5.0 A (8 × 20 μs Waveform)			24	V
Clamping Voltage	V _C	I _{PP} = 12 A (8 × 20 μs Waveform)			29	V
Maximum Peak Pulse Current	I _{PP}	8 × 20 μs Waveform			12	A
Capacitance	C _J	V _R = 0 V, f = 1.0 MHz (Line to GND)		95	125	pF

SMS24C ELECTRICAL CHARACTERISTICS (T_J = 25°C, unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse Working Voltage	V _{RWM}	(Note 2)			24	V
Breakdown Voltage	V _{BR}	I _T = 1.0 mA (Note 3)	26.7		32	V
Reverse Leakage Current	I _R	V _{RWM} = 24 V		0.001	1.0	μA
Clamping Voltage	V _C	I _{PP} = 5.0 A (8 × 20 μs Waveform)			40	V
Clamping Voltage	V _C	I _{PP} = 8 A (8 × 20 μs Waveform)			44	V
Maximum Peak Pulse Current	I _{PP}	8 × 20 μs Waveform			8.0	A
Capacitance	C _J	V _R = 0 V, f = 1.0 MHz (Line to GND)		60	75	pF

2. TVS devices are normally selected according to the working peak reverse voltage (V_{RWM}), which should be equal or greater than the DC or continuous peak operating voltage level.
3. V_{BR} is measured at pulse test current I_T.

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TYPICAL PERFORMANCE CURVES ($T_J = 25^\circ\text{C}$ unless otherwise specified)

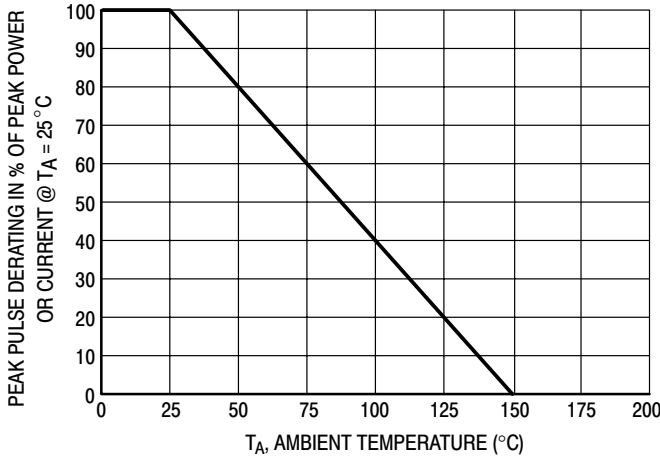


Figure 1. Pulse Derating Curve

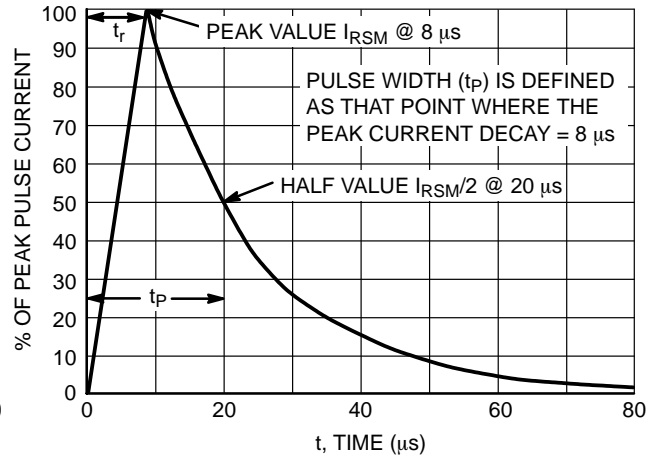


Figure 2. $8 \times 20 \mu\text{s}$ Pulse Waveform

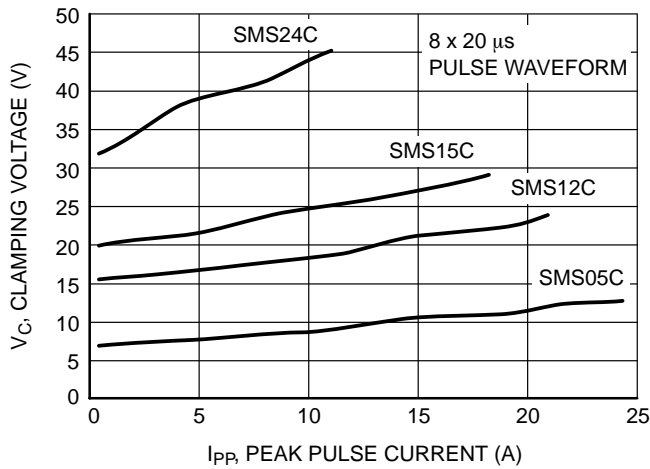


Figure 3. Clamping Voltage vs. Peak Pulse Current

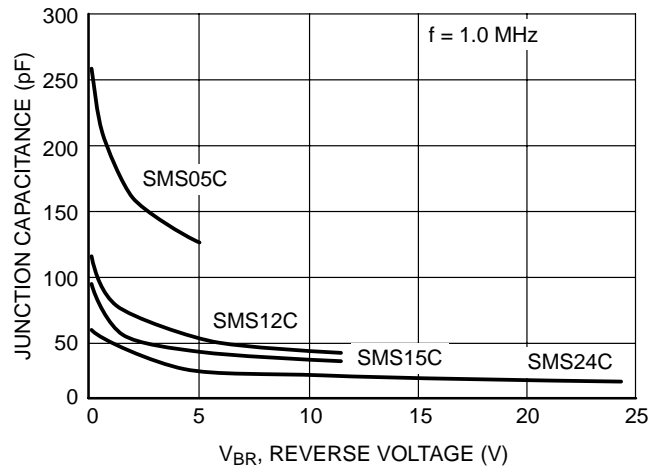


Figure 4. Junction Capacitance vs. Reverse Voltage

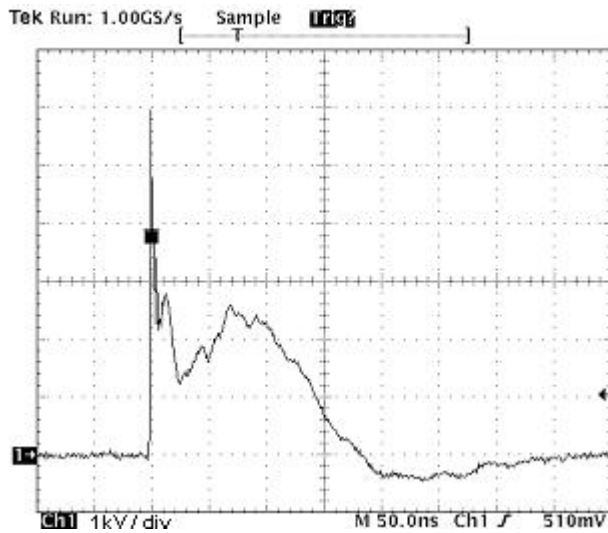


Figure 5. ESD Pulse IEC 61000-4-2 (8.0 kV Contact)

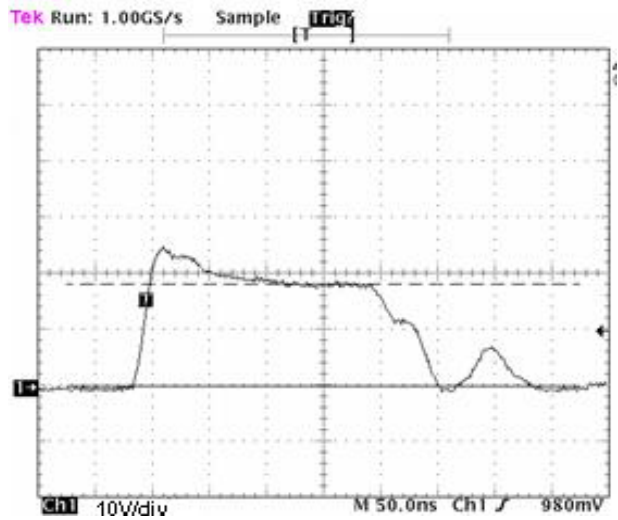


Figure 6. SMS15CT1 ESD Response for IEC 61000-4-2 (+8.0 kV Contact)

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TYPICAL COMMON ANODE APPLICATIONS

A 5 TVS junction common anode design in a SC-74 package protects four separate lines using only one package. This adds flexibility and creativity to PCB design especially

when board space is at a premium. A simplified example of SMS05C Series Device applications is illustrated below.

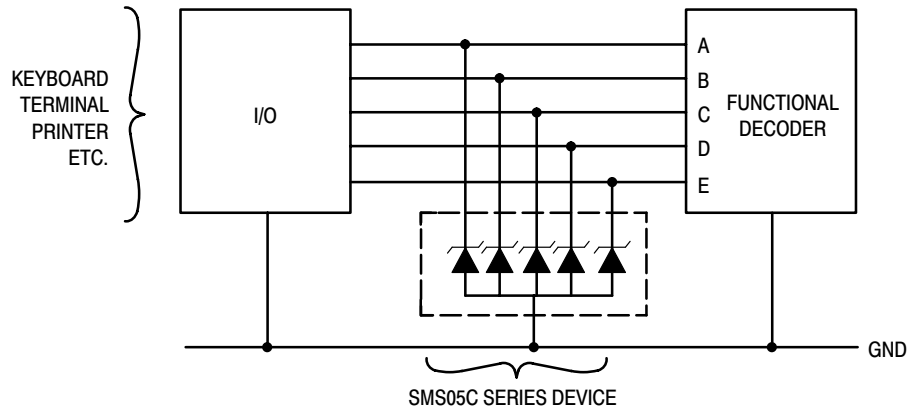


Figure 7. Computer Interface Protection

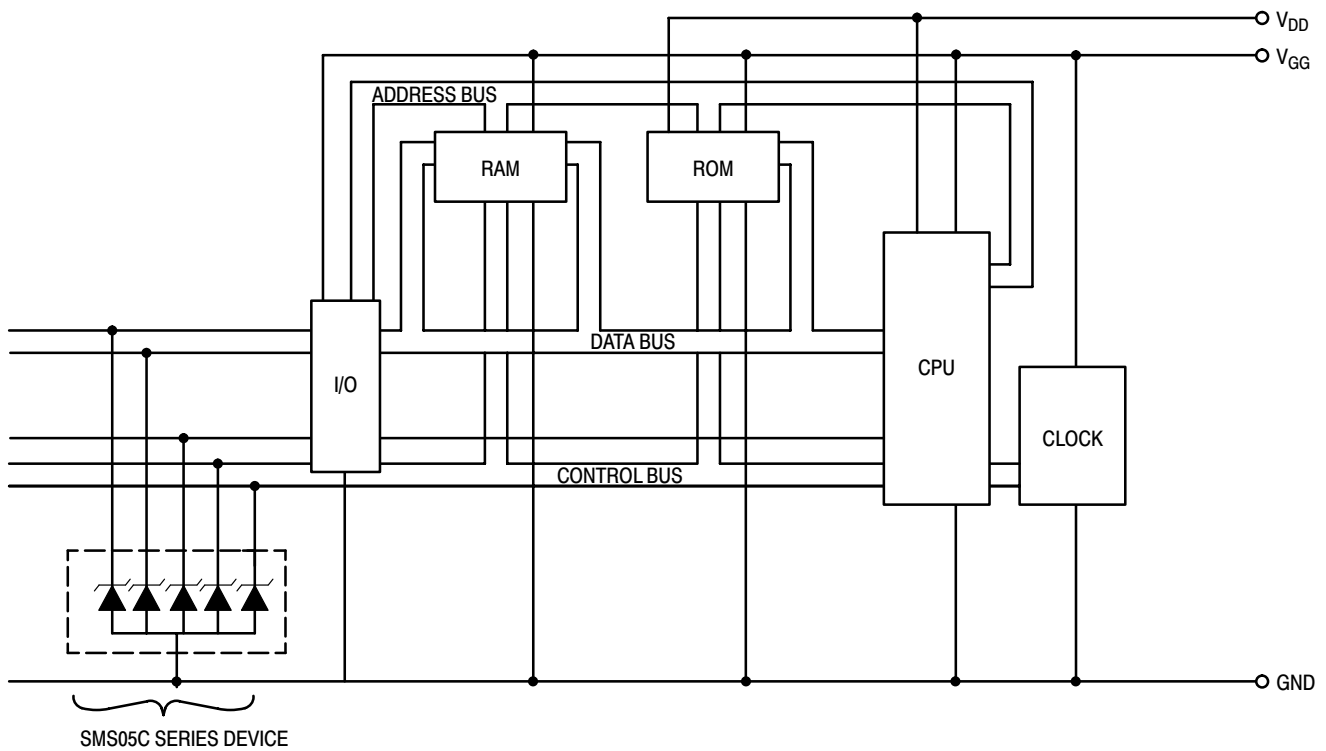
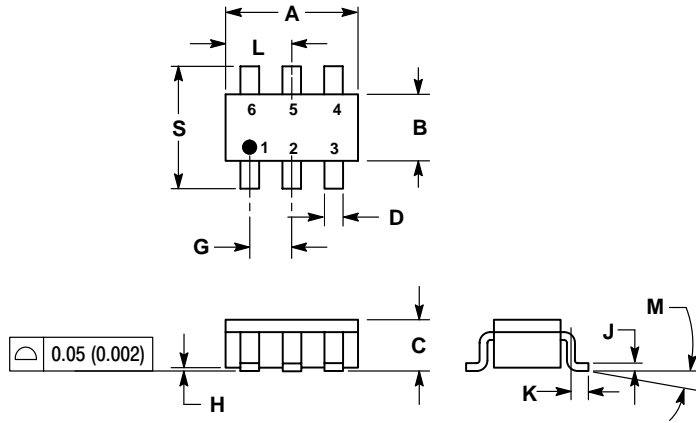


Figure 8. Microprocessor Protection

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PACKAGE DIMENSIONS

SC-74
CASE 318F-05
ISSUE K



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.1142	0.1220	2.90	3.10
B	0.0512	0.0669	1.30	1.70
C	0.0354	0.0433	0.90	1.10
D	0.0098	0.0197	0.25	0.50
G	0.0335	0.0413	0.85	1.05
H	0.0005	0.0040	0.013	0.100
J	0.0040	0.0102	0.10	0.26
K	0.0079	0.0236	0.20	0.60
L	0.0493	0.0649	1.25	1.65
M	0°	10°	0°	10°
S	0.0985	0.1181	2.50	3.00

STYLE 6:

- PIN 1: CATHODE
 2. ANODE
 3. CATHODE
 4. CATHODE
 5. CATHODE
 6. CATHODE

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