

# SMS05T1 Series

## SC-74 Quad Transient Voltage Suppressor

### for ESD Protection

This quad monolithic silicon voltage suppressor is designed for applications requiring transient overvoltage protection capability. It is intended for use in voltage and ESD sensitive equipment such as computers, printers, business machines, communication systems and other applications. This quad device provides superior surge protection over current quad Zener MMQA series by providing up to 350 watts peak power.

#### Features

- SC-74 Package Allows Four Separate Unidirectional Configurations
- Peak Power – 350 W, 8 x 20  $\mu$ S
- ESD Rating of Class N (Exceeding 25 kV) per the Human Body Model
- ESD Rating:
  - IEC 61000-4-2 (ESD) 15 kV (air) 8 kV (contact)
  - IEC 61000-4-4 (EFT) 40 A (5/50 ns)
  - IEC 61000-4-5 (lightning) 23 A (8/20  $\mu$ s)
- UL Flammability Rating of 94 V-0
- Pb-Free Packages are Available

#### Typical Applications

- Hand Held Portable Applications such as Cell Phones, Pagers, Notebooks and Notebook Computers

#### MAXIMUM RATINGS

| Rating                                                                                                          | Symbol          | Value       | Unit                       |
|-----------------------------------------------------------------------------------------------------------------|-----------------|-------------|----------------------------|
| Peak Power Dissipation<br>8 x 20 $\mu$ S @ $T_A = 25^\circ\text{C}$ (Note 1)                                    | $P_{pk}$        | 350         | W                          |
| Total Power Dissipation on FR-5 Board<br>@ $T_A = 25^\circ\text{C}$ (Note 2)<br>Derate Above $25^\circ\text{C}$ | $P_D$           | 225<br>1.8  | mW<br>mW/ $^\circ\text{C}$ |
| Thermal Resistance,<br>Junction-to-Ambient                                                                      | $R_{\theta JA}$ | 556         | $^\circ\text{C}/\text{W}$  |
| Junction and Storage<br>Temperature Range                                                                       | $T_J, T_{stg}$  | -55 to +150 | $^\circ\text{C}$           |
| Lead Solder Temperature<br>Maximum 10 Seconds Duration                                                          | $T_L$           | 260         | $^\circ\text{C}$           |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. Non-repetitive current pulse 8 x 20  $\mu$ S exponential decay waveform
2. FR-5 = 1.0 x 0.75 x 0.62 in.



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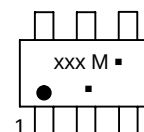
<http://onsemi.com>

## SC-74 QUAD TRANSIENT VOLTAGE SUPPRESSOR 350 WATTS PEAK POWER 5 VOLTS



SC-74  
CASE 318F  
STYLE 1

#### MARKING DIAGRAM



xxx = Specific Device Code

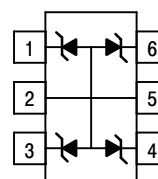
M = Date Code\*

■ = Pb-Free Package

(Note: Microdot may be in either location)

\*Date Code orientation and/or position may vary depending upon manufacturing location.

#### PIN ASSIGNMENT



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

#### DEVICE MARKING INFORMATION

See specific marking information in the device marking column of the Electrical Characteristics table on page 2 of this data sheet.

#### ORDERING INFORMATION

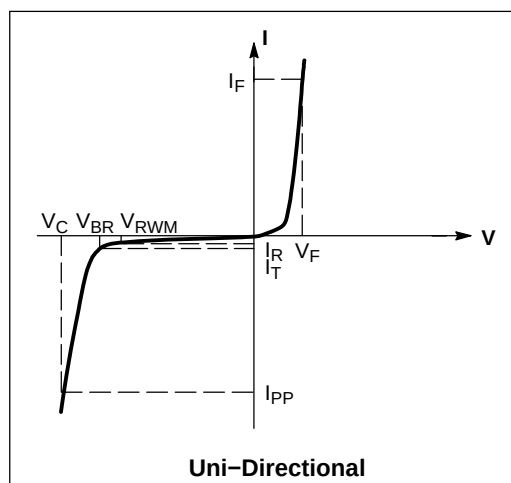
See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

## SMS05T1 Series

### ELECTRICAL CHARACTERISTICS

(T<sub>A</sub> = 25°C unless otherwise noted)

| Symbol           | Parameter                                          |
|------------------|----------------------------------------------------|
| I <sub>PP</sub>  | Maximum Reverse Peak Pulse Current                 |
| V <sub>C</sub>   | Clamping Voltage @ I <sub>PP</sub>                 |
| V <sub>RWM</sub> | Working Peak Reverse Voltage                       |
| I <sub>R</sub>   | Maximum Reverse Leakage Current @ V <sub>RWM</sub> |
| V <sub>BR</sub>  | Breakdown Voltage @ I <sub>T</sub>                 |
| I <sub>T</sub>   | Test Current                                       |
| ΘV <sub>BR</sub> | Maximum Temperature Coefficient of V <sub>BR</sub> |
| I <sub>F</sub>   | Forward Current                                    |
| V <sub>F</sub>   | Forward Voltage @ I <sub>F</sub>                   |
| Z <sub>ZT</sub>  | Maximum Zener Impedance @ I <sub>ZT</sub>          |
| I <sub>ZK</sub>  | Reverse Current                                    |
| Z <sub>ZK</sub>  | Maximum Zener Impedance @ I <sub>ZK</sub>          |



### ELECTRICAL CHARACTERISTICS – UNIDIRECTIONAL

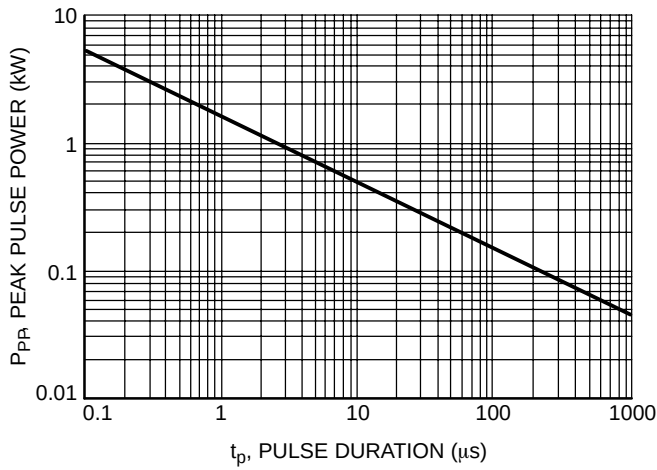
| Device  | Device Marking | Breakdown Voltage   |     |      |                | Max Reverse Leakage Current |                | Max Reverse Voltage (Clamping Voltage) At Specified Reverse Surge Current (I <sub>RSM</sub> ) |                            | Max Reverse Voltage (Clamping Voltage) At Specified Reverse Surge Current (I <sub>RSM</sub> ) |                            | Capacitance @ 0 Volt Bias, 1 MHz |     |
|---------|----------------|---------------------|-----|------|----------------|-----------------------------|----------------|-----------------------------------------------------------------------------------------------|----------------------------|-----------------------------------------------------------------------------------------------|----------------------------|----------------------------------|-----|
|         |                | V <sub>BR</sub> (V) |     |      | I <sub>T</sub> | I <sub>R</sub>              | V <sub>R</sub> | I <sub>RSM</sub> (8x20 μs)                                                                    | V <sub>RSM</sub> (8x20 μs) | I <sub>RSM</sub> (8x20 μs)                                                                    | V <sub>RSM</sub> (8x20 μs) |                                  |     |
|         |                | Min                 | Nom | Max  | (mA)           | (μA)                        | (V)            | (A)                                                                                           | (V)                        | (A)                                                                                           | (V)                        | Min                              | Max |
| SMS05T1 | 5V0            | 6.0                 | –   | 7.2  | 1.0            | 20                          | 5.0            | 5.0                                                                                           | 9.8                        | 23                                                                                            | 15.5                       | 250                              | 400 |
| SMS12T1 | 12V            | 13.3                | –   | 15   | 1.0            | 1.0                         | 12             | 5.0                                                                                           | 19.0                       | 15                                                                                            | 23.0                       | 80                               | 150 |
| SMS15T1 | 15V            | 16.7                | –   | 18.5 | 1.0            | 1.0                         | 15             | 5.0                                                                                           | 24.0                       | 12                                                                                            | 29.0                       | 60                               | 125 |
| SMS24T1 | 24V            | 26.7                | –   | 32   | 1.0            | 1.0                         | 24             | 5.0                                                                                           | 40.0                       | 8                                                                                             | 44.0                       | 40                               | 75  |

### ORDERING INFORMATION

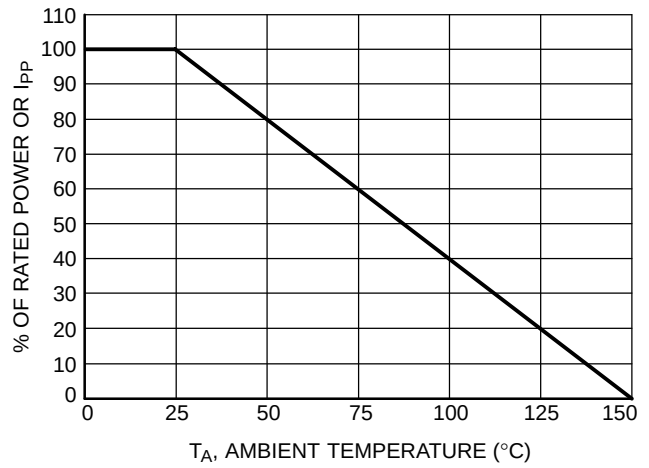
| Device   | Package            | Shipping <sup>†</sup> |
|----------|--------------------|-----------------------|
| SMS05T1  | SC-74              | 3000 / Tape & Reel    |
| SMS05T1G | SC-74<br>(Pb-Free) |                       |
| SMS12T1  | SC-74              | 3000 / Tape & Reel    |
| SMS12T1G | SC-74<br>(Pb-Free) |                       |
| SMS15T1  | SC-74              | 3000 / Tape & Reel    |
| SMS15T1G | SC-74<br>(Pb-Free) |                       |
| SMS24T1  | SC-74              | 3000 / Tape & Reel    |
| SMS24T1G | SC-74<br>(Pb-Free) |                       |

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

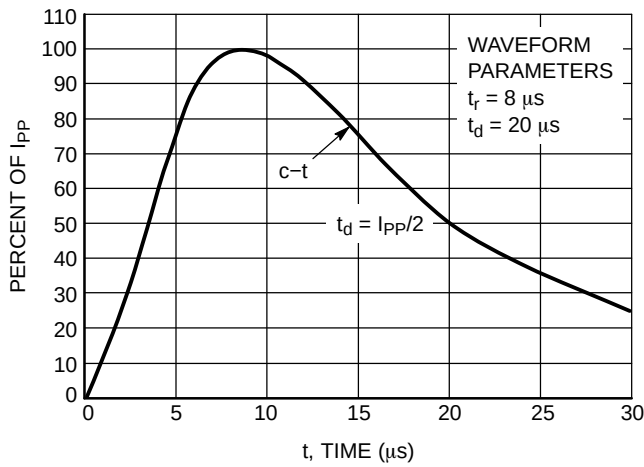
# SMS05T1 Series



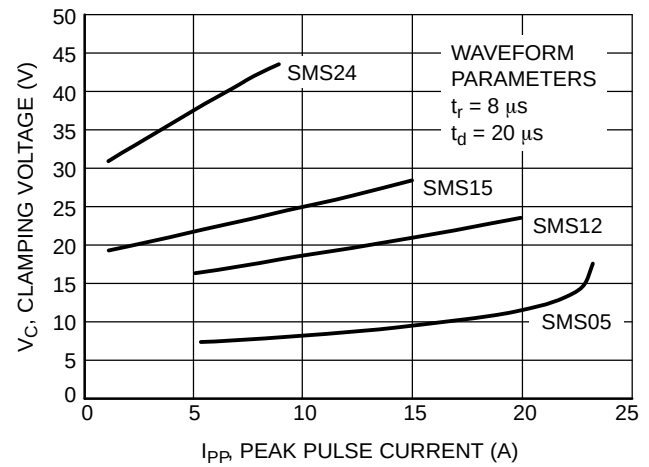
**Figure 1. Non-Repetitive Peak Pulse Power versus Pulse Time**



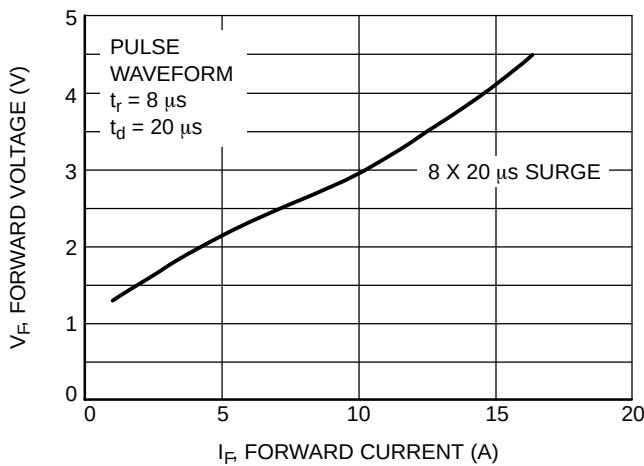
**Figure 2. Power Derating Curve**



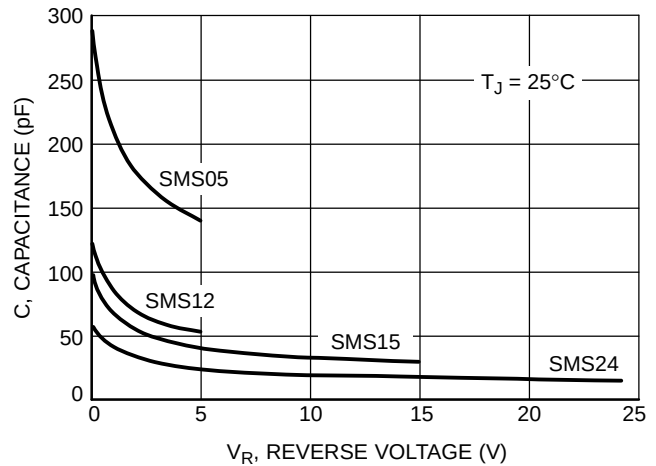
**Figure 3. Pulse Waveform**



**Figure 4. Clamping Voltage versus Peak Pulse Current**



**Figure 5. 8 x 20  $\mu s$   $V_F$**

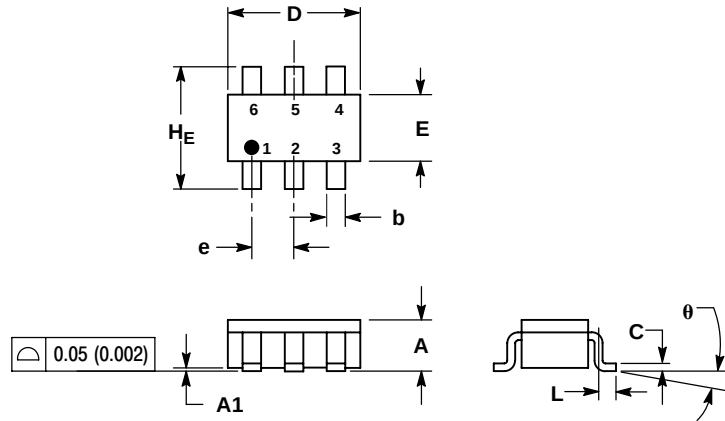


**Figure 6. Typical Capacitance (SMS05 Series)**

# SMS05T1 Series

## PACKAGE DIMENSIONS

### SC-74 (SC-59ML) CASE 318F-05 ISSUE M



#### NOTES:

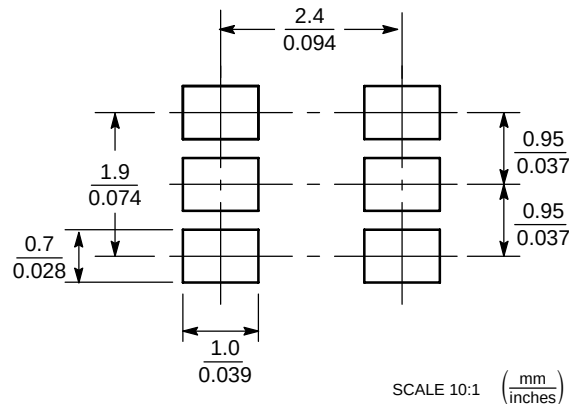
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318F-01, -02, -03, -04 OBSOLETE. NEW STANDARD 318F-05.

| DIM | MILLIMETERS |      |      | INCHES |       |       |
|-----|-------------|------|------|--------|-------|-------|
|     | MIN         | NOM  | MAX  | MIN    | NOM   | MAX   |
| A   | 0.90        | 1.00 | 1.10 | 0.035  | 0.039 | 0.043 |
| A1  | 0.01        | 0.06 | 0.10 | 0.001  | 0.002 | 0.004 |
| b   | 0.25        | 0.37 | 0.50 | 0.010  | 0.015 | 0.020 |
| c   | 0.10        | 0.18 | 0.26 | 0.004  | 0.007 | 0.010 |
| D   | 2.90        | 3.00 | 3.10 | 0.114  | 0.118 | 0.122 |
| E   | 1.30        | 1.50 | 1.70 | 0.051  | 0.059 | 0.067 |
| e   | 0.85        | 0.95 | 1.05 | 0.034  | 0.037 | 0.041 |
| L   | 0.20        | 0.40 | 0.60 | 0.008  | 0.016 | 0.024 |
| HE  | 2.50        | 2.75 | 3.00 | 0.099  | 0.108 | 0.118 |
| θ   | 0°          | —    | 10°  | 0°     | —     | 10°   |

#### STYLE 1:

- PIN 1. CATHODE
- ANODE
- CATHODE
- CATHODE
- ANODE
- CATHODE

#### SOLDERING FOOTPRINT\*



\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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