

SMF05

ESD Protection Diode Array

Quad, Low Clamping Voltage

This quad monolithic silicon overvoltage suppressor is designed for applications requiring transient voltage protection capability. It is intended for use in ESD sensitive equipment such as computers, printers, cell phones, medical equipment, and other applications. Its quad junction common anode design protects four separate lines using only one package. These devices are ideal for situations where board space is at a premium.

Specification Features

- SC-88A Package Allows Four Separate Unidirectional Configurations
- Low Leakage < 5 μ A @ 5 V
- Breakdown Voltage: 6.1 V – 7.2 V @ 1 mA
- Low Capacitance (90 pF TYP)
- Provides Protection for IEC61000-4-2
- Pb-Free Packages are Available*

Mechanical Characteristics

- Void Free, Transfer-Molded, Thermosetting Plastic Case
- Corrosion Resistant Finish, Easily Solderable
- Package Designed for Optimal Automated Board Assembly
- Small Package Size for High Density Applications

Applications

- Computers
- Printers
- Cell Phones
- Medical Equipment



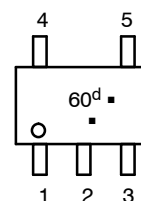
ON Semiconductor®

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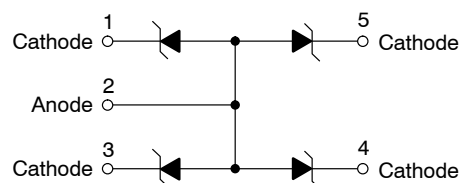


SC-88A/SOT-353
CASE 419A-02
STYLE 5
SCALE 2:1

MARKING DIAGRAM



60 = Specific Device Code
^d = Date Code
▪ = Pb-Free Package
(Note: Microdot may be in either location)



ORDERING INFORMATION

| Device | Package | Shipping† |
|-----------|------------------|------------------|
| SMF05T1 | SC-88A | 3000 Tape & Reel |
| SMF05T1G | SC-88A (Pb-Free) | 3000 Tape & Reel |
| SMF05T2G | SC-88A (Pb-Free) | 3000 Tape & Reel |
| SMF05CT1 | SC-88A | 3000 Tape & Reel |
| SMF05CT1G | SC-88A (Pb-Free) | 3000 Tape & Reel |
| SMF05CT2 | SC-88A | 3000 Tape & Reel |
| SMF05CT2G | SC-88A (Pb-Free) | 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.

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

SMF05

MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| Characteristic | Symbol | Value | Unit |
|---|----------------|-------------|------------------|
| Peak Power Dissipation @ $8 \times 20 \mu\text{s}$ @ $T_A \leq 25^\circ\text{C}$ (Note 1) | P_{pk} | 200 | W |
| Maximum Junction Temperature | T_{Jmax} | 150 | $^\circ\text{C}$ |
| Operating Junction and Storage Temperature Range | T_J, T_{stg} | -55 to +150 | $^\circ\text{C}$ |
| ESD Discharge IEC61000-4-2, Air Discharge IEC61000-4-2, Contact Discharge | V_{pp} | 16 9 | kV |
| Lead Solder Temperature (10 seconds duration) | T_L | 260 | $^\circ\text{C}$ |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Non-repetitive current per Figure 2. Derate per Figure 3.

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| Device | Breakdown Voltage V_{BR} @ 1 mA (Volts) | | Leakage Current I_R @ $V_{RWM} = 5 \text{ V}$ (μA) | Capacitance @ 0 V Bias (pF) | Max V_F @ $I_F = 200 \text{ mA}$ (V) | Max Clamping Voltage (V_C) @ I_{PP} | | Max Clamping Voltage (V_C) @ I_{PP} | |
|--------|---|-----|---|--|--|---|-----------|---|-----------|
| | Min | Max | | | | I_{PP} (A) | V_C (V) | I_{PP} (A) | V_C (V) |
| SMF05 | 6.0 | 7.2 | 5.0 | 90 | 1.25 | 1.0 | 9.5 | 12 | 12.5 |

TYPICAL PERFORMANCE CURVES

($T_A = 25^\circ\text{C}$ unless otherwise noted)

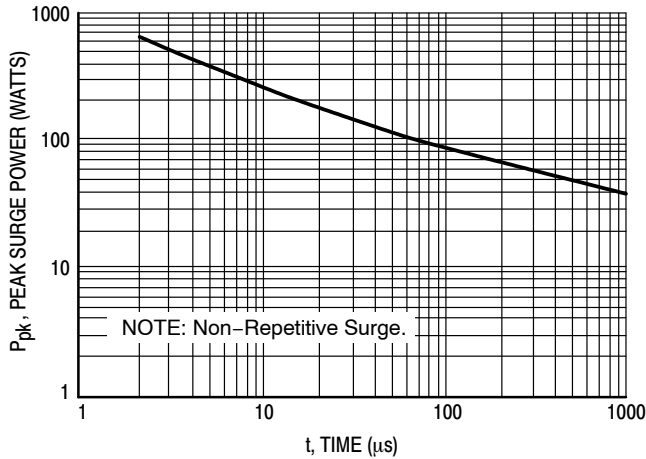


Figure 1. Peak Power Dissipation versus Pulse Width

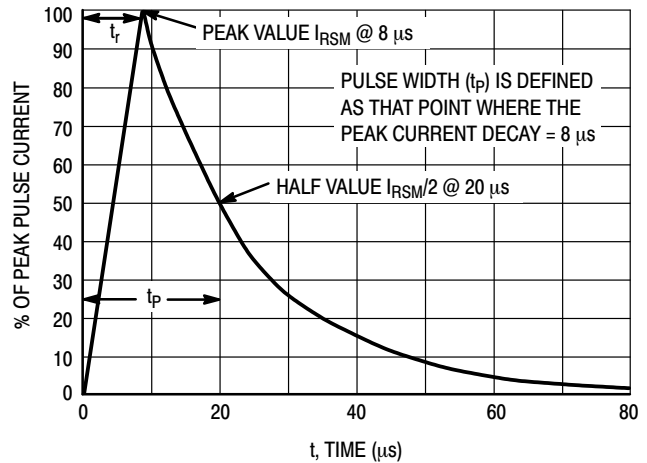


Figure 2. Pulse Waveform $8 \times 20 \mu\text{s}$

SMF05

TYPICAL PERFORMANCE CURVES

($T_A = 25^\circ\text{C}$ unless otherwise noted)

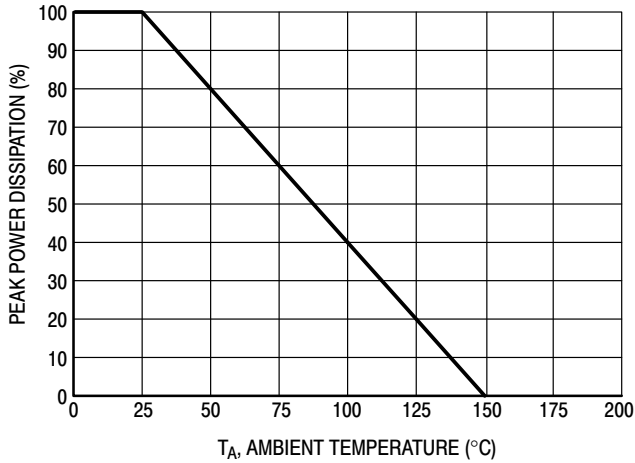


Figure 3. Power Derating Curve

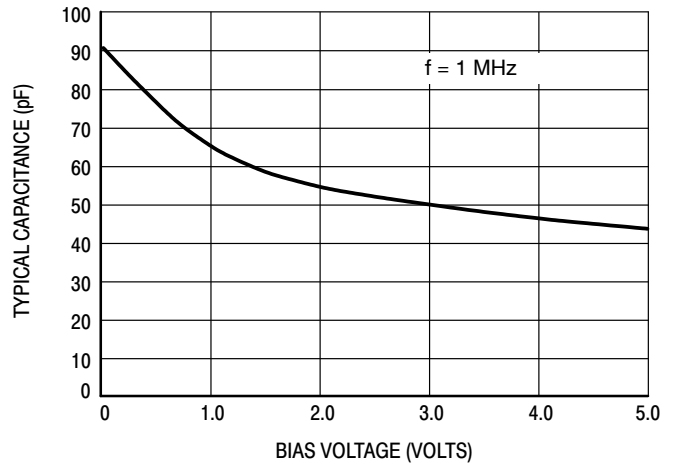


Figure 4. Junction Capacitance versus Reverse Voltage

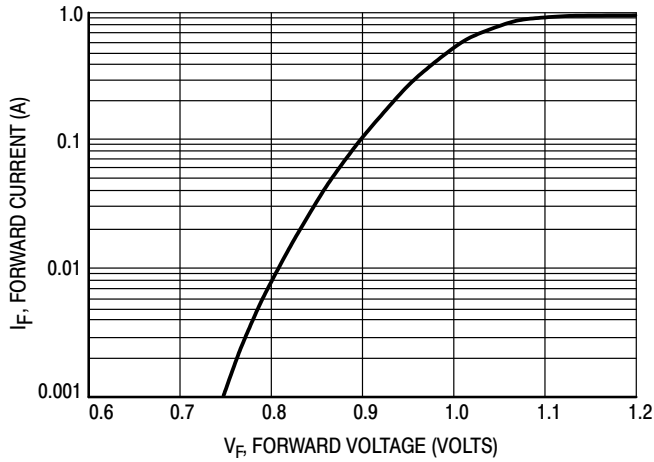


Figure 5. Forward Voltage Curve

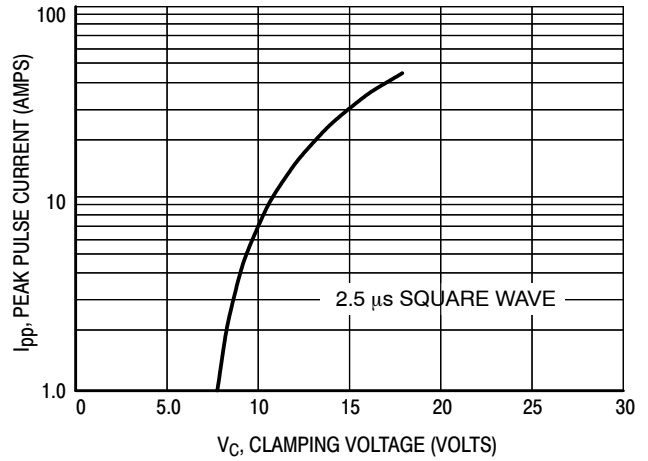


Figure 6. Clamping Voltage versus Peak Pulse Current (Reverse Direction)

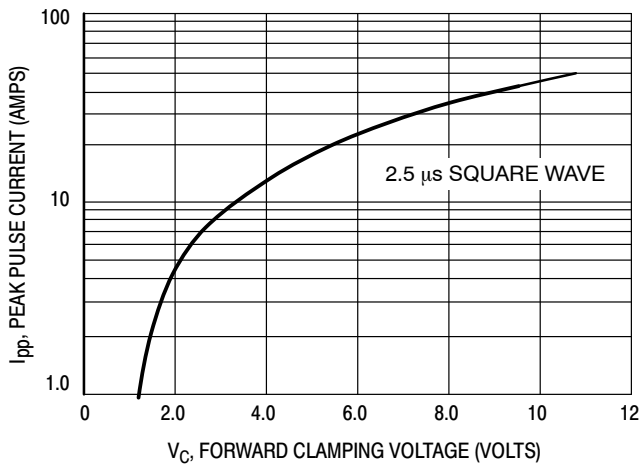


Figure 7. Clamping Voltage versus Peak Pulse Current (Forward Direction)

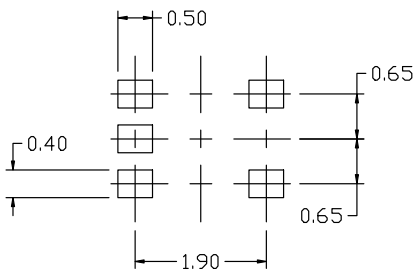
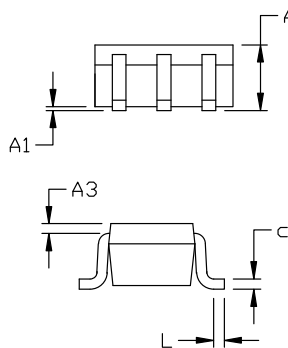
MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



SCALE 2:1

SC-88A (SC-70-5/SOT-353) CASE 419A-02 ISSUE M

DATE 11 APR 2023



RECOMMENDED MOUNTING FOOTPRINT

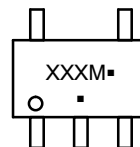
* For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERM/D.

NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS
3. 419A-01 OBSOLETE. NEW STANDARD 419A-02
4. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.1016MM PER SIDE.

| DIM | MILLIMETERS | | |
|-----|-------------|------|------|
| | MIN. | NOM. | MAX. |
| A | 0.80 | 0.95 | 1.10 |
| A1 | --- | --- | 0.10 |
| A3 | 0.20 REF | | |
| b | 0.10 | 0.20 | 0.30 |
| c | 0.10 | --- | 0.25 |
| D | 1.80 | 2.00 | 2.20 |
| E | 2.00 | 2.10 | 2.20 |
| E1 | 1.15 | 1.25 | 1.35 |
| e | 0.65 BSC | | |
| L | 0.10 | 0.15 | 0.30 |

GENERIC MARKING DIAGRAM*



*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

XXX = Specific Device Code

M = Date Code

▪ = Pb-Free Package

(Note: Microdot may be in either location)

STYLE 1:

- PIN 1. BASE
- EMITTER
- BASE
- COLLECTOR
- COLLECTOR

STYLE 2:

- PIN 1. ANODE
- EMITTER
- BASE
- COLLECTOR
- CATHODE

STYLE 3:

- PIN 1. ANODE 1
- N/C
- ANODE 2
- CATHODE 2
- CATHODE 1

STYLE 4:

- PIN 1. SOURCE 1
- DRAIN 1/2
- SOURCE 1
- GATE 1
- GATE 2

STYLE 5:

- PIN 1. CATHODE
- COMMON ANODE
- CATHODE 2
- CATHODE 3
- CATHODE 4

STYLE 6:

- PIN 1. EMITTER 2
- BASE 2
- EMITTER 1
- COLLECTOR
- COLLECTOR 2/BASE 1

STYLE 7:

- PIN 1. BASE
- EMITTER
- BASE
- COLLECTOR
- COLLECTOR

STYLE 8:

- PIN 1. CATHODE
- COLLECTOR
- N/C
- BASE
- EMITTER

STYLE 9:

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

Note: Please refer to datasheet for style callout. If style type is not called out in the datasheet refer to the device datasheet pinout or pin assignment.

| | | |
|-------------------------|---------------------------------|---|
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| DESCRIPTION: | SC-88A (SC-70-5/SOT-353) | PAGE 1 OF 1 |

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