

1SMA10CAT3 Series

400 Watt Peak Power Zener Transient Voltage Suppressors Bidirectional*

The SMA series is designed to protect voltage sensitive components from high voltage, high energy transients. They have excellent clamping capability, high surge capability, low zener impedance and fast response time. The SMA series is supplied in ON Semiconductor's exclusive, cost-effective, highly reliable Surmetic™ package and is ideally suited for use in communication systems, automotive, numerical controls, process controls, medical equipment, business machines, power supplies and many other industrial/consumer applications.

Specification Features

- Working Peak Reverse Voltage Range – 10 V to 78 V
- Standard Zener Breakdown Voltage Range – 11.7 V to 91.3 V
- Peak Power – 400 Watts @ 1 ms
- ESD Rating of Class 3 (> 16 kV) per Human Body Model
- Response Time is Typically < 1 ns
- Flat Handling Surface for Accurate Placement
- Package Design for Top Slide or Bottom Circuit Board Mounting
- Low Profile Package
- Pb-Free Packages are Available

Mechanical Characteristics:

CASE: Void-free, transfer-molded plastic

FINISH: All external surfaces are corrosion resistant and leads are readily solderable

MAXIMUM CASE TEMPERATURE FOR SOLDERING PURPOSES:
260°C for 10 Seconds

POLARITY: Cathode polarity notch does not indicate polarity

MOUNTING POSITION: Any



ON Semiconductor®

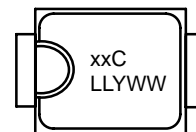
<http://onsemi.com>

**PLASTIC SURFACE MOUNT
ZENER OVERVOLTAGE
TRANSIENT SUPPRESSORS
10–78 V V_R
400 W PEAK POWER**



**SMA
CASE 403B
PLASTIC**

MARKING DIAGRAM



xxC = Specific Device Code
(See Table Next Page)

LL = Assembly Location

Y = Year

WW = Work Week

ORDERING INFORMATION

| Device [†] | Package | Shipping [†] |
|---------------------|------------------|-----------------------|
| 1SMAxxCAT3 | SMA | 5000/Tape & Reel |
| 1SMAxxCAT3G | SMA (Pb-Free) | 5000/Tape & Reel |

[†]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.

Individual devices are listed on page 3 of this data sheet.

*The "T3" suffix refers to a 13 inch reel.

1SMA10CAT3 Series

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|--|-----------------|-------------|----------------------------|
| Peak Power Dissipation (Note 1) @ $T_L = 25^\circ\text{C}$, Pulse Width = 1 ms | P_{PK} | 400 | W |
| DC Power Dissipation @ $T_L = 75^\circ\text{C}$ Measured Zero Lead Length (Note 2) Derate Above 75°C | P_D | 1.5 | W |
| Thermal Resistance from Junction-to-Lead | $R_{\theta JL}$ | 20 | $\text{mW}/^\circ\text{C}$ |
| | | 50 | $^\circ\text{C}/\text{W}$ |
| DC Power Dissipation (Note 3) @ $T_A = 25^\circ\text{C}$ Derate Above 25°C | P_D | 0.5 | W |
| Thermal Resistance from Junction-to-Ambient | $R_{\theta JA}$ | 4.0 | $\text{mW}/^\circ\text{C}$ |
| | | 250 | $^\circ\text{C}/\text{W}$ |
| Operating and Storage Temperature Range | T_J, T_{stg} | -65 to +150 | $^\circ\text{C}$ |

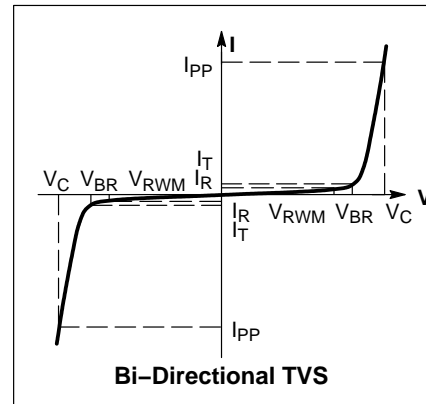
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

- 10 X 1000 μs , non-repetitive
 - 1" square copper pad, FR-4 board
 - FR-4 board, using ON Semiconductor minimum recommended footprint, as shown in 403B case outline dimensions spec.
- *Please see 1SMA5.0AT3 to 1SMA78AT3 for Unidirectional devices.

ELECTRICAL CHARACTERISTICS

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

| Symbol | Parameter |
|-----------|---|
| I_{PP} | Maximum Reverse Peak Pulse Current |
| V_C | Clamping Voltage @ I_{PP} |
| V_{RWM} | Working Peak Reverse Voltage |
| I_R | Maximum Reverse Leakage Current @ V_{RWM} |
| V_{BR} | Breakdown Voltage @ I_T |
| I_T | Test Current |



1SMA10CAT3 Series

ELECTRICAL CHARACTERISTICS

| Device | Device Marking | V _{RWM} (Note 4) Volts | I _R @ V _{RWM} μA | Breakdown Voltage | | | | V _C @ I _{PP} (Note 6) | |
|----------------|----------------|---------------------------------------|---|----------------------------------|-------|-------|------------------|---|-----------------|
| | | | | V _{BR} (Volts) (Note 5) | | | @ I _T | V _C | I _{PP} |
| | | | | Min | Nom | Max | mA | Volts | Amps |
| 1SMA10CAT3 | QXC | 10 | 2.5 | 11.1 | 11.69 | 12.27 | 1.0 | 17.0 | 23.5 |
| 1SMA11CAT3 | QZC | 11 | 2.5 | 12.2 | 12.84 | 13.48 | 1.0 | 18.2 | 22.0 |
| 1SMA12CAT3 | REC | 12 | 2.5 | 13.3 | 14.00 | 14.70 | 1.0 | 19.9 | 20.1 |
| 1SMA13CAT3, G* | RGC | 13 | 2.5 | 14.4 | 15.16 | 15.92 | 1.0 | 21.5 | 18.6 |
| 1SMA14CAT3 | RKC | 14 | 2.5 | 15.6 | 16.42 | 17.24 | 1.0 | 23.2 | 17.2 |
| 1SMA15CAT3, G* | RMC | 15 | 2.5 | 16.7 | 17.58 | 18.46 | 1.0 | 24.4 | 16.4 |
| 1SMA16CAT3, G* | RPC | 16 | 2.5 | 17.8 | 18.74 | 19.67 | 1.0 | 26.0 | 15.4 |
| 1SMA18CAT3 | RTC | 18 | 2.5 | 20 | 21.06 | 22.11 | 1.0 | 29.2 | 13.7 |
| 1SMA20CAT3, G* | RVC | 20 | 2.5 | 22.2 | 23.37 | 24.54 | 1.0 | 32.4 | 12.3 |
| 1SMA22CAT3 | RXC | 22 | 2.5 | 24.4 | 25.69 | 26.97 | 1.0 | 35.5 | 11.3 |
| 1SMA24CAT3, G* | RZC | 24 | 2.5 | 26.7 | 28.11 | 29.51 | 1.0 | 38.9 | 10.3 |
| 1SMA26CAT3, G* | SEC | 26 | 2.5 | 28.9 | 30.42 | 31.94 | 1.0 | 42.1 | 9.5 |
| 1SMA28CAT3 | SGC | 28 | 2.5 | 31.1 | 32.74 | 34.37 | 1.0 | 45.4 | 8.8 |
| 1SMA30CAT3 | SKC | 30 | 2.5 | 33.3 | 35.06 | 36.81 | 1.0 | 48.4 | 8.3 |
| 1SMA33CAT3, G* | SMC | 33 | 2.5 | 36.7 | 38.63 | 40.56 | 1.0 | 53.3 | 7.5 |
| 1SMA36CAT3, G* | SPC | 36 | 2.5 | 40 | 42.11 | 44.21 | 1.0 | 58.1 | 6.9 |
| 1SMA40CAT3 | SRC | 40 | 2.5 | 44.4 | 46.74 | 49.07 | 1.0 | 64.5 | 6.2 |
| 1SMA43CAT3 | STC | 43 | 2.5 | 47.8 | 50.32 | 52.83 | 1.0 | 69.4 | 5.8 |
| 1SMA48CAT3 | SXC | 48 | 2.5 | 53.3 | 56.11 | 58.91 | 1.0 | 77.4 | 5.2 |
| 1SMA51CAT3 | SZC | 51 | 2.5 | 56.7 | 59.69 | 62.67 | 1.0 | 82.4 | 4.9 |
| 1SMA54CAT3 | TEC | 54 | 2.5 | 60 | 63.16 | 66.32 | 1.0 | 87.1 | 4.6 |
| 1SMA58CAT3, G* | TGC | 58 | 2.5 | 64.4 | 67.79 | 71.18 | 1.0 | 93.6 | 4.3 |
| 1SMA60CAT3, G* | TKC | 60 | 2.5 | 66.7 | 70.21 | 73.72 | 1.0 | 96.8 | 4.1 |
| 1SMA64CAT3 | TMC | 64 | 2.5 | 71.1 | 74.84 | 78.58 | 1.0 | 103 | 3.9 |
| 1SMA70CAT3 | TPC | 70 | 2.5 | 77.8 | 81.90 | 85.99 | 1.0 | 113 | 3.5 |
| 1SMA78CAT3 | TTC | 78 | 2.5 | 86.7 | 91.27 | 95.83 | 1.0 | 126 | 3.2 |

4. A transient suppressor is normally selected according to the working peak reverse voltage (V_{RWM}), which should be equal to or greater than the DC or continuous peak operating voltage level

5. V_{BR} measured at pulse test current I_T at an ambient temperature of 25°C

6. Surge current waveform per Figure 2 and derate per Figure 3

* The "G" suffix indicates Pb-Free package available.

1SMA10CAT3 Series

RATING AND TYPICAL CHARACTERISTIC CURVES

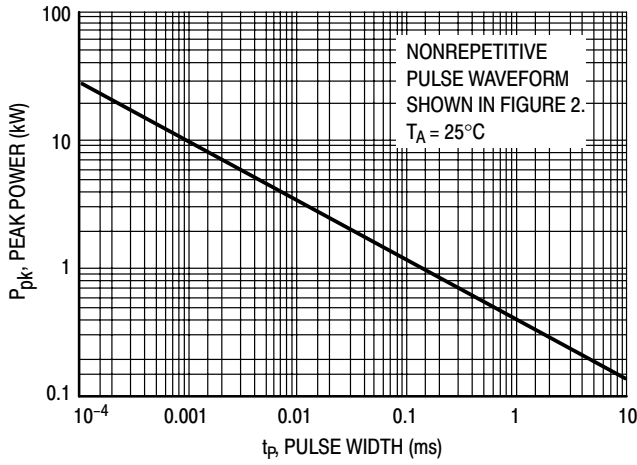


Figure 1. Pulse Rating Curve

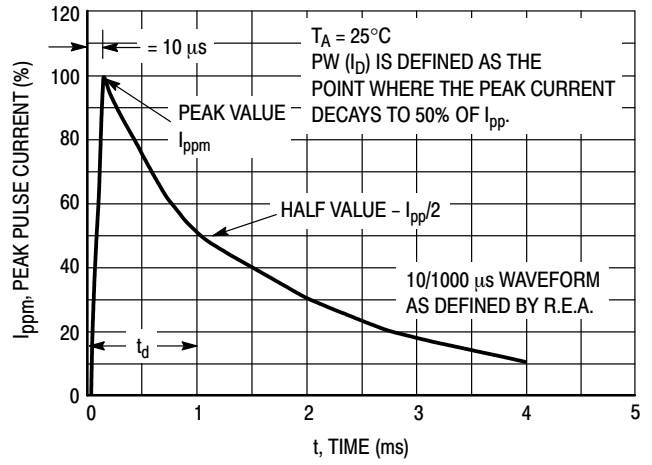


Figure 2. Pulse Waveform

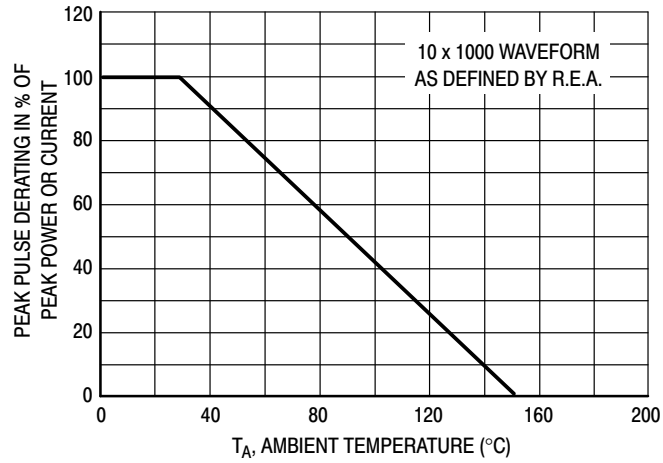
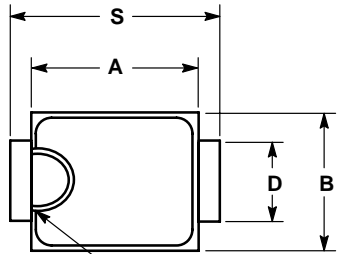


Figure 3. Pulse Derating Curve

1SMA10CAT3 Series

OUTLINE DIMENSIONS

SMA
CASE 403B-02
ISSUE C

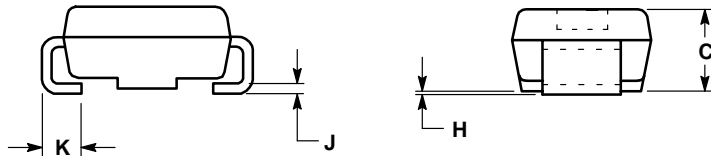


**POLARITY INDICATOR OPTIONAL
AS NEEDED**

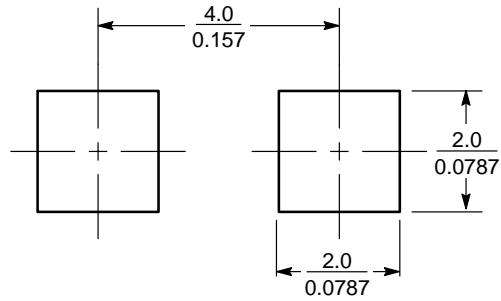
NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 403B-01 OBSOLETE, NEW STANDARD 403B-02.

| DIM | INCHES | | MILLIMETERS | |
|-----|--------|-------|-------------|------|
| | MIN | MAX | MIN | MAX |
| A | 0.160 | 0.180 | 4.06 | 4.57 |
| B | 0.090 | 0.115 | 2.29 | 2.92 |
| C | 0.075 | 0.095 | 1.91 | 2.41 |
| D | 0.050 | 0.064 | 1.27 | 1.63 |
| H | 0.002 | 0.006 | 0.05 | 0.15 |
| J | 0.006 | 0.016 | 0.15 | 0.41 |
| K | 0.030 | 0.060 | 0.76 | 1.52 |
| S | 0.190 | 0.220 | 4.83 | 5.59 |



SOLDERING FOOTPRINT*




SCALE 8:1 $\left(\frac{\text{mm}}{\text{inches}}\right)$

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

1SMA10CAT3 Series

SURMETIC is a trademark of Semiconductor Components Industries, LLC.

ON Semiconductor and  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA

Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada

Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada

Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada

Japan: ON Semiconductor, Japan Customer Focus Center

2-9-1 Kamimeguro, Meguro-ku, Tokyo, Japan 153-0051

Phone: 81-3-5773-3850

ON Semiconductor Website: <http://onsemi.com>

Order Literature: <http://www.onsemi.com/litorder>

For additional information, please contact your
local Sales Representative.