

# 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®**

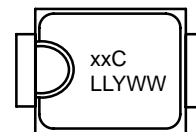
<http://onsemi.com>

**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 <sup>†</sup>	Package	Shipping <sup>†</sup>
1SMAxxCAT3	SMA	5000/Tape & Reel
1SMAxxCAT3G	SMA (Pb-Free)	5000/Tape & Reel

<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.

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 $75^\circ\text{C}$	$P_D$	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 $25^\circ\text{C}$	$P_D$	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	$^\circ\text{C}$

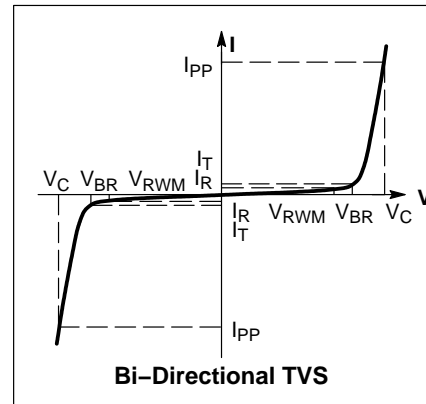
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur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

- 10 X 1000  $\mu\text{s}$ , 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 <sub>RWM</sub> (Note 4) Volts	I <sub>R</sub> @ V <sub>RWM</sub> μA	Breakdown Voltage				V <sub>C</sub> @ I <sub>PP</sub> (Note 6)	
				V <sub>BR</sub> (Volts) (Note 5)			@ I <sub>T</sub>	V <sub>C</sub>	I <sub>PP</sub>
				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<sub>RWM</sub>), which should be equal to or greater than the DC or continuous peak operating voltage level

5. V<sub>BR</sub> measured at pulse test current I<sub>T</sub> 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

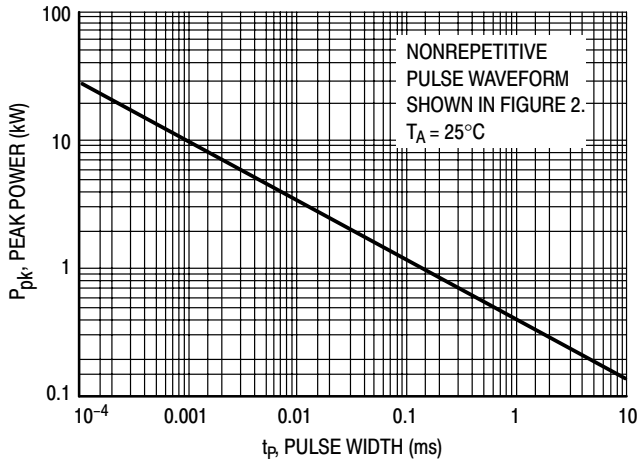


Figure 1. Pulse Rating Curve

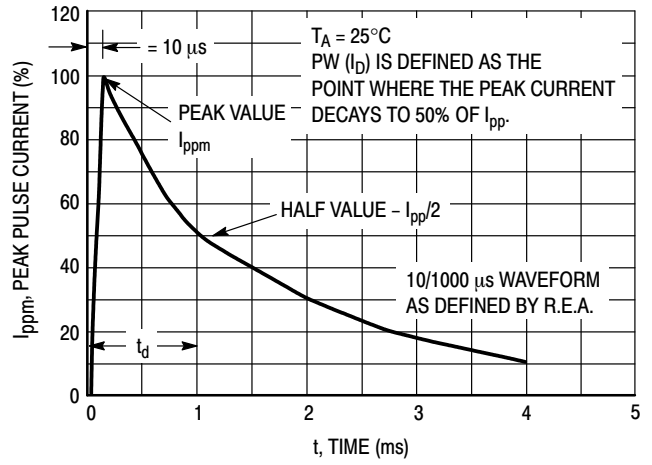


Figure 2. Pulse Waveform

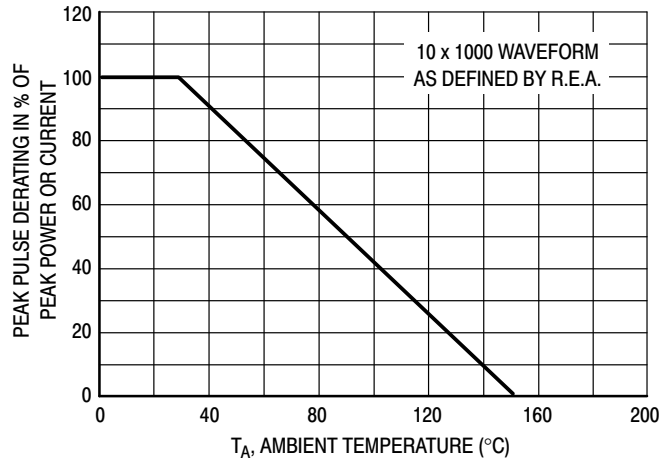
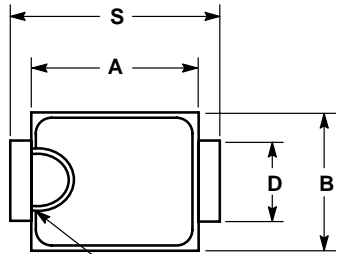


Figure 3. Pulse Derating Curve

# 1SMA10CAT3 Series

## OUTLINE DIMENSIONS

**SMA**  
CASE 403B-02  
ISSUE C

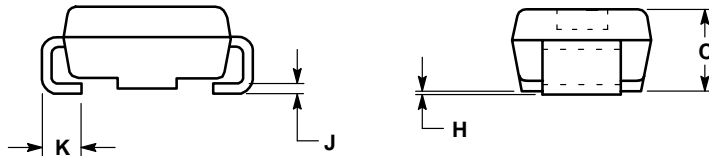


**POLARITY INDICATOR OPTIONAL  
AS NEEDED**

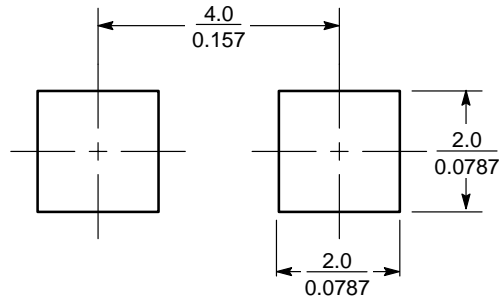
**NOTES:**

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](mailto: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.