

# SA5.0CA Series

## 500 Watt Peak Power MiniMOSORB™ Zener Transient Voltage Suppressors

### Bidirectional\*

The SA5.0CA 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 SA5.0CA series is supplied in ON Semiconductor's exclusive, cost-effective, highly reliable Surmetic™ axial leaded package and is ideally-suited for use in communication systems, numerical controls, process controls, medical equipment, business machines, power supplies and many other industrial/consumer applications.

#### Specification Features:

- Working Peak Reverse Voltage Range – 5.0 to 170 V
- Peak Power – 500 Watts @ 1 ms
- ESD Rating of Class 3 (>16 KV) per Human Body Model
- Maximum Clamp Voltage @ Peak Pulse Current
- Low Leakage < 1  $\mu$ A above 8.5 V
- UL 497B for Isolated Loop Circuit Protection
- Maximum Temperature Coefficient Specified
- Response Time is typically < 1 ns

#### Mechanical Characteristics:

**CASE:** Void-free, Transfer-molded, Thermosetting plastic

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

#### MAXIMUM LEAD TEMPERATURE FOR SOLDERING PURPOSES:

230 °C, 1/16" from the case for 10 seconds

**POLARITY:** Cathode band does not imply polarity

**MOUNTING POSITION:** Any

#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak Power Dissipation (Note 1) @ $T_L \leq 25^\circ\text{C}$	$P_{PK}$	500	Watts
Steady State Power Dissipation @ $T_L \leq 75^\circ\text{C}$ , Lead Length = 3/8" Derated above $T_L = 75^\circ\text{C}$	$P_D$	3.0	Watts
		30	mW/°C
Thermal Resistance, Junction-to-Lead	$R_{\theta JL}$	33.3	°C/W
Operating and Storage Temperature Range	$T_J, T_{stg}$	- 55 to +175	°C

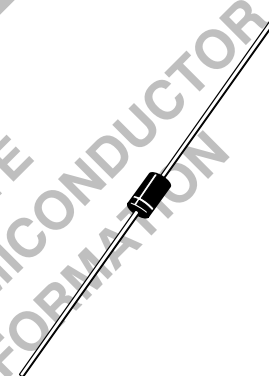
1. Nonrepetitive current pulse per Figure 3 and derated above  $T_A = 25^\circ\text{C}$  per Figure 2.

\*Please see SA5.0A to SA170A for Unidirectional devices.

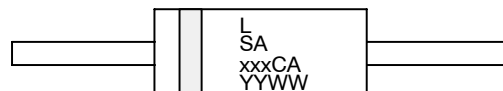


ON Semiconductor®

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AXIAL LEAD  
CASE 59  
PLASTIC



L = Assembly Location  
SAxxxCA = ON Device Code  
YY = Year  
WW = Work Week

#### ORDERING INFORMATION

Device	Package	Shipping
SAxxxCA	Axial Lead	1000 Units/Box
SAxxxCARL*	Axial Lead	5000/Tape & Reel

\*SA6.5CA, SA48CA, SA64CA, and SA78CA Not Available in 5000/Tape & Reel

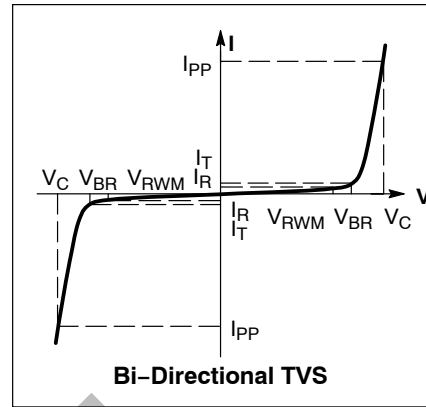
Devices listed in **bold, italic** are ON Semiconductor **Preferred** devices. Preferred devices are recommended choices for future use and best overall value.

## SA5.0CA Series

### 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
$\Theta V_{BR}$	Maximum Temperature Variation of $V_{BR}$



Bi-Directional TVS

**OBSOLETE**  
 THIS DEVICE IS OBSOLETE  
 PLEASE CONTACT YOUR ON SEMICONDUCTOR  
 REPRESENTATIVE FOR INFORMATION

## SA5.0CA Series

### ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted.)

Device	Device Marking	V <sub>RWM</sub> (Note 2) (Volts)	I <sub>R</sub> @ V <sub>RWM</sub> (μA)	Breakdown Voltage			V <sub>C</sub> @ I <sub>PP</sub> (Note 4)		ΘV <sub>BR</sub> (mV/°C)	
				V <sub>BR</sub> (Note 3) (Volts)			@ I <sub>T</sub>	V <sub>C</sub>		I <sub>PP</sub>
				Min	Nom	Max	(mA)	(Volts)		(A)
SA5.0CA	SA5.0CA	5	600	6.4	6.7	7	10	9.2	54.3	5
SA6.0CA	SA6.0CA	6	600	6.67	7.02	7.37	10	10.3	48.5	5
<b>SA6.5CA*</b>	<b>SA6.5CA*</b>	<b>6.5</b>	<b>400</b>	<b>7.22</b>	<b>7.60</b>	<b>7.98</b>	<b>10</b>	<b>11.2</b>	<b>44.7</b>	<b>5</b>
SA7.0CA	SA7.0CA	7	150	7.78	8.19	8.6	10	12	41.7	6
SA7.5CA	SA7.5CA	7.5	50	8.33	8.77	9.21	1	12.9	38.8	7
SA8.0CA	SA8.0CA	8	25	8.89	9.36	9.83	1	13.6	36.7	7
SA8.5CA	SA8.5CA	8.5	5	9.44	9.92	10.4	1	14.4	34.7	8
SA9.0CA	SA9.0CA	9	1	10	10.55	11.1	1	15.4	32.5	9
SA10CA	SA10CA	10	1	11.1	11.7	12.3	1	17	29.4	10
SA11CA	SA11CA	11	1	12.2	12.85	13.5	1	18.2	27.4	11
<b>SA12CA</b>	<b>SA12CA</b>	<b>12</b>	<b>1</b>	<b>13.3</b>	<b>14</b>	<b>14.7</b>	<b>1</b>	<b>19.9</b>	<b>25.1</b>	<b>12</b>
<b>SA13CA</b>	<b>SA13CA</b>	<b>13</b>	<b>1</b>	<b>14.4</b>	<b>15.15</b>	<b>15.9</b>	<b>1</b>	<b>21.5</b>	<b>23.2</b>	<b>13</b>
SA14CA	SA14CA	14	1	15.6	16.4	17.2	1	23.2	21.5	14
<b>SA15CA</b>	<b>SA15CA</b>	<b>15</b>	<b>1</b>	<b>16.7</b>	<b>17.6</b>	<b>18.5</b>	<b>1</b>	<b>24.4</b>	<b>20.6</b>	<b>16</b>
SA16CA	SA16CA	16	1	17.8	18.75	19.7	1	26	19.2	17
SA17CA	SA17CA	17	1	18.9	19.9	20.9	1	27.6	18.1	19
<b>SA18CA</b>	<b>SA18CA</b>	<b>18</b>	<b>1</b>	<b>20</b>	<b>21.05</b>	<b>22.1</b>	<b>1</b>	<b>29.2</b>	<b>17.2</b>	<b>20</b>
SA20CA	SA20CA	20	1	22.2	23.35	24.5	1	32.4	15.4	23
SA22CA	SA22CA	22	1	24.4	25.65	26.9	1	35.5	14.1	25
<b>SA24CA</b>	<b>SA24CA</b>	<b>24</b>	<b>1</b>	<b>26.7</b>	<b>28.1</b>	<b>29.5</b>	<b>1</b>	<b>38.9</b>	<b>12.8</b>	<b>28</b>
SA26CA	SA26CA	26	1	28.9	30.4	31.9	1	42.1	11.9	30
SA28CA	SA28CA	28	1	31.1	32.75	34.4	1	45.4	11	31
SA30CA	SA30CA	30	1	33.3	35.05	36.8	1	48.4	10.3	36
SA33CA	SA33CA	33	1	36.7	38.65	40.6	1	53.3	9.4	39
SA36CA	SA36CA	36	1	40	42.1	44.2	1	58.1	8.6	41
SA40CA	SA40CA	40	1	44.4	46.55	49.1	1	64.5	7.8	46
SA43CA	SA43CA	43	1	47.8	50.3	52.8	1	69.4	7.2	50
SA45CA	SA45CA	45	1	50	52.65	55.3	1	72.7	6.9	52
SA48CA*	SA48CA*	48	1	53.3	56.1	58.9	1	77.4	6.5	56
SA51CA	SA51CA	51	1	56.7	59.7	62.7	1	82.4	6.1	61
SA58CA	SA58CA	58	1	64.4	67.8	71.2	1	93.6	5.3	70
SA60CA	SA60CA	60	1	66.7	70.2	73.7	1	96.8	5.2	71
SA64CA*	SA64CA*	64	1	71.1	74.85	78.6	1	103	4.9	76
SA70CA	SA70CA	70	1	77.8	81.9	86	1	113	4.4	85
SA78CA*	SA78CA*	78	1	86.7	91.25	95.8	1	126	4.0	95
SA85CA	SA85CA	85	1	94.4	99.2	104	1	137	3.6	103
SA90CA	SA90CA	90	1	100	105.5	111	1	146	3.4	110
SA100CA	SA100CA	100	1	111	117	123	1	162	3.1	123
SA110CA	SA110CA	110	1	122	128.5	135	1	177	2.8	133
SA120CA	SA120CA	120	1	133	140	147	1	193	2.5	146
SA130CA	SA130CA	130	1	144	151.5	159	1	209	2.4	158
SA150CA	SA150CA	150	1	167	176	185	1	243	2.1	184

NOTES:

- MiniMOSORB™ transient suppressors are normally selected according to the maximum working peak reverse voltage (V<sub>RWM</sub>), which should be equal to or greater than the dc or continuous peak operating voltage level.
- V<sub>BR</sub> measured at pulse test current I<sub>T</sub> at an ambient temperature of 25°C.
- Surge current waveform per Figure 3 and derate per Figures 1 and 2.

\*Not Available in the 5,000/Tape & Reel.

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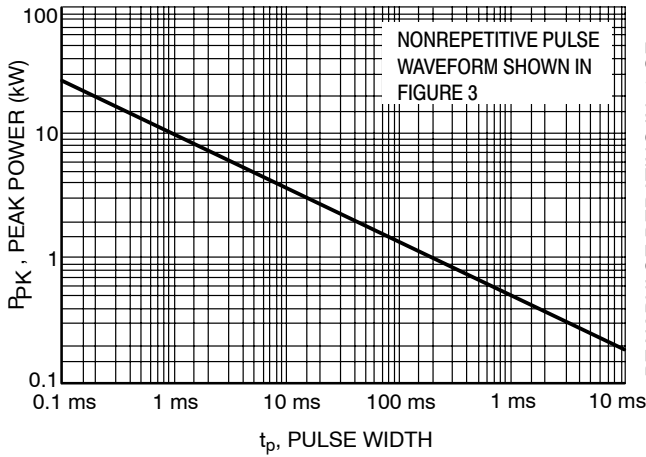


Figure 1. Pulse Rating Curve

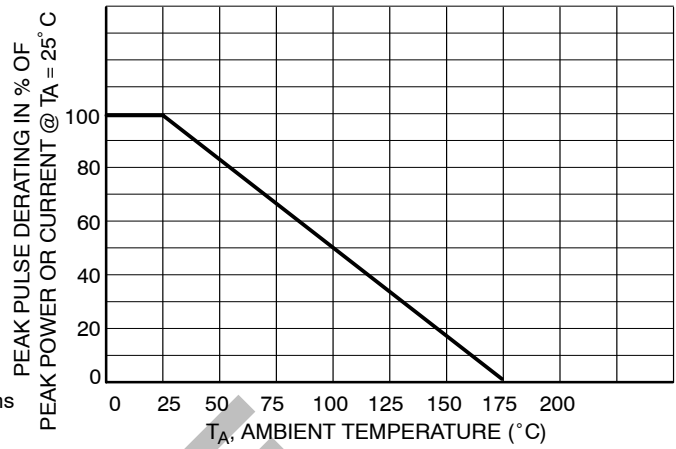


Figure 2. Pulse Derating Curve

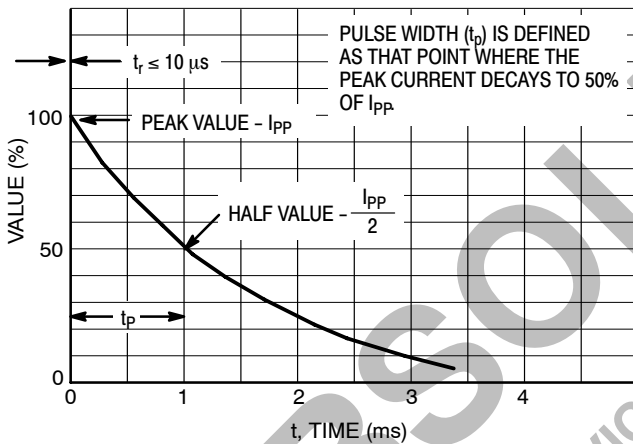


Figure 3. Pulse Waveform

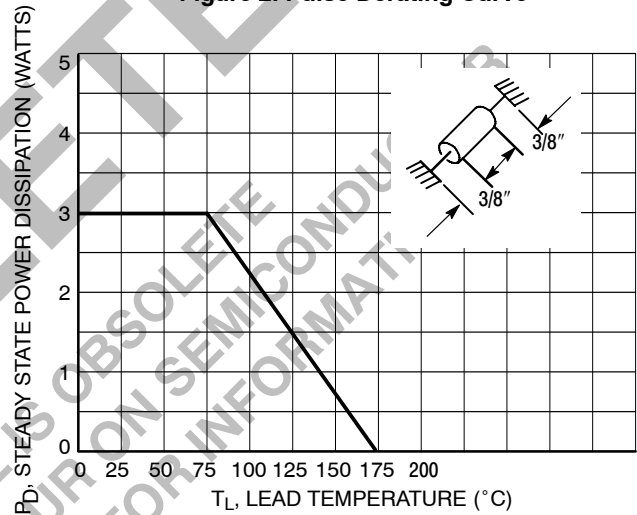


Figure 4. Steady State Power Derating

## UL RECOGNITION\*

The entire series including the bidirectional CA suffix has *Underwriters Laboratory Recognition* for the classification of protectors (QVGV2) under the UL standard for safety 497B and File #E 116110. Many competitors only have one or two devices recognized or have recognition in a non-protective category. Some competitors have no recognition at all. With the UL497B recognition, our parts successfully passed several tests including Strike Voltage

Breakdown test, Endurance Conditioning, Temperature test, Dielectric Voltage-Withstand test, Discharge test and several more.

Whereas, some competitors have only passed a flammability test for the package material, we have been recognized for much more to be included in their protector category.

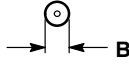
\*Applies to SA5.0A, CA – SA170A, CA.

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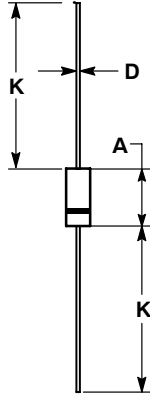
## OUTLINE DIMENSIONS

# Transient Voltage Suppressors – Axial Leaded

## 500 Watt Peak Power MiniMOSORB™



MINI MOSORB  
CASE 59-09  
ISSUE S



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 59-04 OBSOLETE, NEW STANDARD 59-09.
4. 59-03 OBSOLETE, NEW STANDARD 59-10.
5. ALL RULES AND NOTES ASSOCIATED WITH JEDEC DO-41 OUTLINE SHALL APPLY.
6. POLARITY DENOTED BY CATHODE BAND.
7. LEAD DIAMETER NOT CONTROLLED WITHIN F DIMENSION.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.228	0.299	5.80	7.60
B	0.102	0.142	2.60	3.60
D	0.028	0.034	0.71	0.86
K	1.000	---	25.44	---

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