SA5.0A Series

500 Watt Peak Power MiniMOSORB™ Zener Transient Voltage Suppressors

Unidirectional

The SA5.0A 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 SA5.0A 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.

Features

- Working Peak Reverse Voltage Range – 5.0 to 170 V
- Peak Power – 500 Watts @ 1.0 ms
- ESD Rating of Class 3 (>16 kV) per Human Body Model
- Maximum Clamp Voltage @ Peak Pulse Current
- Low Leakage < 1 μA above 8.5 V
- UL 497B for Isolated Loop Circuit Protection
- Maximum Temperature Coefficient Specified
- Response Time is typically < 1.0 ns
- Pb−Free Packages are Available*

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:
260°C, 1/16 in. from the case for 10 seconds

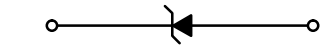
POLARITY: Cathode indicated by polarity band

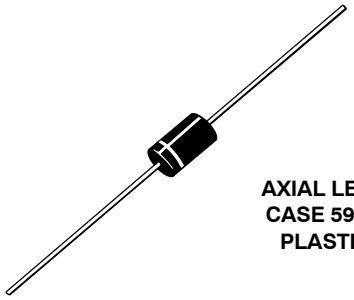
MOUNTING POSITION: Any

*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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http://onsemi.com





AXIAL LEAD
CASE 59AA
PLASTIC

MARKING DIAGRAM



A = Assembly Location
SAxxxA = Device Number (Refer to Table on Page 3)
YY = Year
WW = Work Week
▪ = Pb−Free Package
(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping†
SAxxxAG	Axial Lead (Pb−Free)	1000 Units / Box
SAxxxARLG	Axial Lead (Pb−Free)	5000 / Tape & Reel
SAxxxALFG**	Axial Lead (Pb−Free)	2000 Units / Box

†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.

**Lead formed device.

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MAXIMUM RATINGS

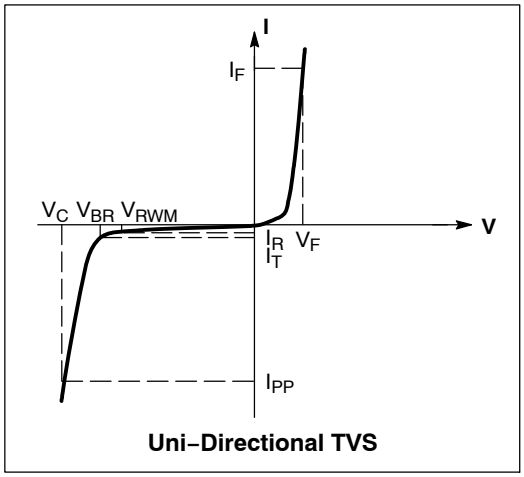
Rating	Symbol	Value	Unit
Peak Power Dissipation (Note 1) @ $T_L \le 25°C$	P_{PK}	500	W
Steady State Power Dissipation @ $T_L \le 25°C$, Lead Length = 3/8 in Derated above $T_L = 50°C$	P_D	3.0 30	W mW/°C
Thermal Resistance, Junction−to−Lead	$R_{\theta JL}$	33.3	°C/W
Forward Surge Current (Note 2) @ $T_A = 25°C$	I_{FSM}	70	A
Operating and Storage Temperature Range	T_J, T_{stg}	− 55 to +150	°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. Nonrepetitive current pulse per Figure 4 and derated above $T_A = 25°C$ per Figure 5.
2. 1/2 sine wave (or equivalent square wave), PW = 8.3 ms, duty cycle = 4 pulses per minute.

ELECTRICAL CHARACTERISTICS ($T_A = 25°C$ unless otherwise noted, $V_F = 3.5$ V Max. @ I_F (Note 6) = 35 A)

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
ΘV_{BR}	Maximum Temperature Variation of V_{BR}
I_F	Forward Current
V_F	Forward Voltage @ I_F



Uni−Directional TVS

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted, V_F = 3.5 V Max. @ I_F (Note 6) = 35 A)

Device*	Device Marking	V_{RWM} (Note 3)	I_R @ V_{RWM}	Breakdown Voltage				V_C @ I_{PP} (Note 5)		ΘV_{BR}
				V_{BR} (Note 4) (Volts)			@ I_T	V_C	I_{PP}	
		Volts	μA	Min	Nom	Max	mA	Volts	A	mV/°C
SA5.0A, G	SA5.0A	5	600	6.4	6.7	7	10	9.2	54.3	5
SA6.0AG	SA6.0A	6	600	6.67	7.02	7.37	10	10.3	48.5	5
SA7.0ARLG	SA7.0A	7	150	7.78	8.19	8.6	10	12	41.7	6
SA10AG	SA10A	10	1	11.1	11.7	12.3	1	17	29.4	10
SA12AG	SA12A	12	1	13.3	14	14.7	1	19.9	25.1	12
SA13AG	SA13A	13	1	14.4	15.15	15.9	1	21.5	23.2	13
SA15AG	SA15A	15	1	16.7	17.6	18.5	1	24.4	20.6	16
SA16AG	SA16A	16	1	17.8	18.75	19.7	1	26	19.2	17
SA17ARLG	SA17A	17	1	18.9	19.9	20.9	1	27.6	18.1	19
SA18ARLG	SA18A	18	1	20	21.05	22.1	1	29.2	17.2	20
SA20ARLG	SA20A	20	1	22.2	23.35	24.5	1	32.4	15.4	23
SA24AG	SA24A	24	1	26.7	28.1	29.5	1	38.9	12.8	28
SA26ARLG	SA26A	26	1	28.9	30.4	31.9	1	42.1	11.9	30
SA28ARLG	SA28A	28	1	31.1	32.75	34.4	1	45.4	11	31
SA30ARLG	SA30A	30	1	33.3	35.05	36.8	1	48.4	10.3	36
SA33ARLG	SA33A	33	1	36.7	38.65	40.6	1	53.3	9.4	39
SA36AG	SA36A	36	1	40	42.1	44.2	1	58.1	8.6	41
SA51AG	SA51A	51	1	56.7	59.7	62.7	1	82.4	6.1	61
SA64ALFG	SA64A	64	1	71.1	74.85	78.6	1	103	4.9	76
SA100AG	SA100A	100	1	111	117	123	1	162	3.1	123
SA170ARLG	SA170A	170	1	189	199	209	1	275	1.8	208

3. MiniMOSORB™ transients suppressor is normally selected according to the maximum working peak reverse voltage (V_{RWM}), which should be equal to or greater than the dc or continuous peak operating voltage level.
4. V_{BR} measured at pulse test current I_T at an ambient temperature of 25°C.
5. Surge current waveform per Figure 4 and derate per Figures 1 and 2.
6. 1/2 sine wave (or equivalent square wave), PW = 8.3 ms, duty cycle = 4 pulses per minute

*The "G" suffix indicates Pb−Free package or Pb−Free Packages available.

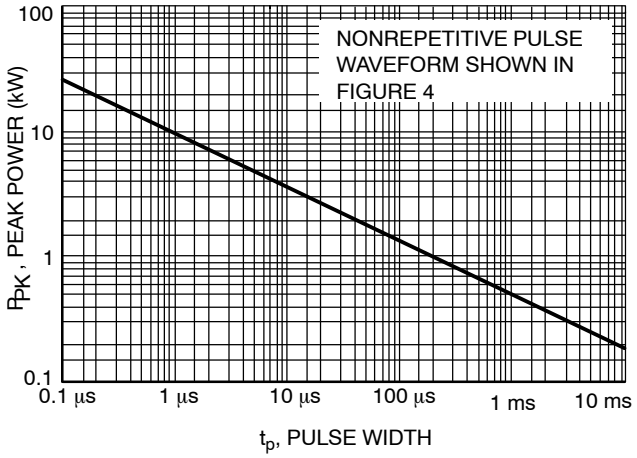


Figure 1. Pulse Rating Curve

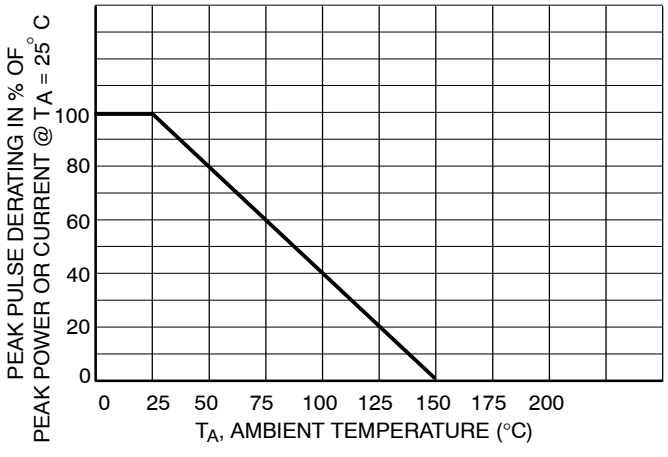


Figure 2. Pulse Derating Curve

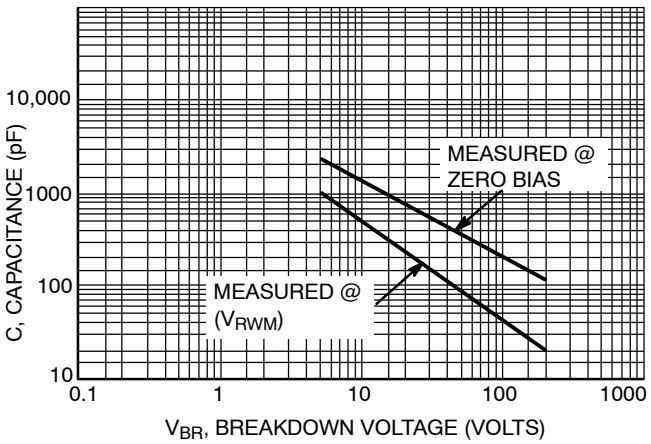


Figure 3. Capacitance versus Breakdown Voltage

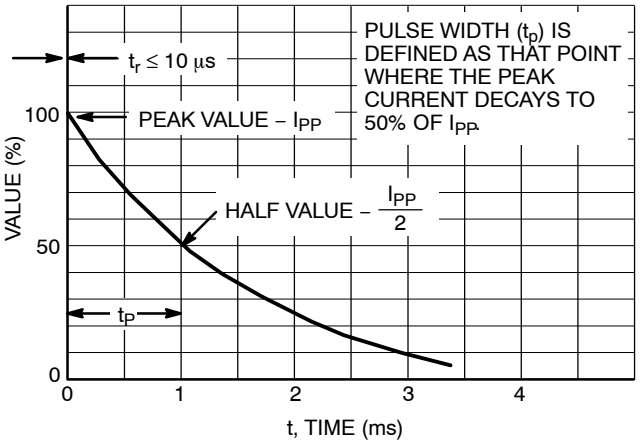


Figure 4. Pulse Waveform

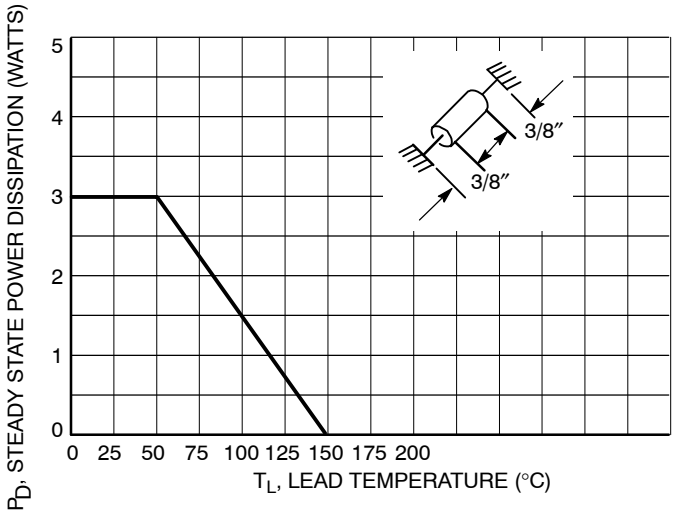


Figure 5. Steady State Power Derating

UL RECOGNITION*

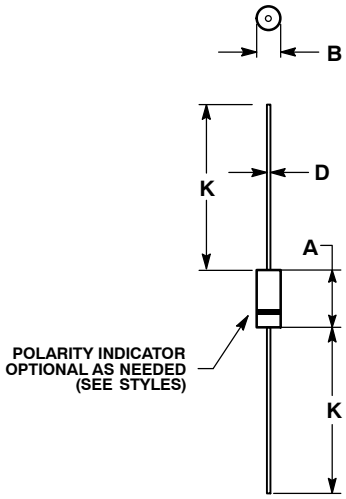
The entire series including the bidirectional CA suffix has *Underwriters Laboratory Recognition* for the classification of protectors (QVGQ2) under the UL standard for safety 497B and File #E210057. Many competitors only have one or two devices recognized or have recognition in a non-protective category. 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 – SA170A.

PACKAGE DIMENSIONS

AXIAL LEAD
CASE 59AA−01
ISSUE A



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

	INCHES		MILLIMETERS	
DIM	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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