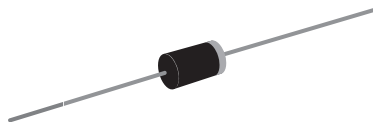


TRANSZORB® Transient Voltage Suppressors



DO-204AC (DO-15)

MAJOR RATINGS AND CHARACTERISTICS

V_{WM}	5.0 V to 170 V
P_{PPM}	500 W
P_D	3.0 W
I_{FSM} (Unidirectional only)	70 A
T_j max.	175 °C

DEVICES FOR BIDIRECTION APPLICATIONS

For bidirectional types, use C or CA suffix (e.g. SA5.0C, SA170CA).

Electrical characteristics apply in both directions.

FEATURES

- Glass passivated chip junction
- Available in Unidirectional and Bidirectional
- 500 W peak pulse power capability with a 10/1000 μ s waveform, repetitive rate (duty cycle): 0.01 %
- Excellent clamping capability
- Very fast response time
- Low incremental surge resistance
- Solder Dip 260 °C, 40 seconds
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



TYPICAL APPLICATIONS

Use in sensitive electronics protection against voltage transients induced by inductive load switching and lighting on ICs, MOSFET, signal lines of sensor units for consumer, computer, industrial and telecommunication.

MECHANICAL DATA

Case: DO-204AC, molded epoxy over passivated chip
Epoxy meets UL 94V-0 flammability rating

Terminals: Matte tin plated leads, solderable per J-STD-002B and JESD22-B102D

E3 suffix for commercial grade, HE3 suffix for high reliability grade (AEC Q101 qualified)

Polarity: For unidirectional types the color band denotes cathode end, no marking on bidirectional types

MAXIMUM RATINGS ($T_A = 25$ °C unless otherwise noted)

PARAMETER	SYMBOL	VALUE	UNIT
Peak pulse power dissipation with a 10/1000 μ s waveform ⁽¹⁾ (Fig. 1)	P_{PPM}	500 (min.)	W
Peak pulse current with a 10/1000 μ s waveform ⁽¹⁾	I_{PPM}	See Next Table	A
Power dissipation on infinite heatsink at $T_A = 75$ °C (Fig. 5)	P_D	3.0	W
Peak forward surge current, 10ms single half sine-wave unidirectional only	I_{FSM}	70	A
Maximum instantaneous forward voltage at 35 A for unidirectional only ⁽²⁾	V_F	3.5	V
Operating junction and storage temperature range	T_J, T_{STG}	- 55 to + 175	°C

Note:

(1) Non-repetitive current pulse, per Fig. 3 and derated above $T_A = 25$ °C per Fig. 2

(2) 8.3 ms single half sine-wave or equivalent square wave, duty cycle = 4 per minute maximum

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

DEVICE TYPE	BREAKDOWN VOLTAGE $V_{(BR)}$ AT I_T ⁽¹⁾ (V)		TEST CURRENT I_T (mA)	STAND-OFF VOLTAGE V_{WM} (V)	MAXIMUM REVERSE LEAKAGE AT V_{WM} I_D ⁽³⁾ (μA)	MAXIMUM PEAK PULSE CURRENT I_{PPM} ⁽²⁾ (A)	MAXIMUM CLAMPING VOLTAGE AT I_{PPM} V_C (V)	MAXIMUM TEMPERATURE COEFFICIENT OF $V_{(BR)}$ (mV/ $^{\circ}\text{C}$)
	MIN	MAX						
SA5.0	6.40	7.30	10	5.0	600	52.1	9.6	5.0
SA5.0A ⁽⁴⁾	6.4	7.07	10	5.0	600	54.3	9.2	5.0
SA6.0	6.67	8.15	10	6.0	600	43.9	11.4	5.0
SA6.0A	6.67	7.37	10	6.0	600	48.5	10.3	5.0
SA6.5	7.22	8.82	10	6.5	400	40.7	12.3	5.0
SA6.5A	7.22	7.98	10	6.5	400	44.7	11.2	5.0
SA7.0	7.78	9.51	10	7.0	150	37.6	13.3	6.0
SA7.0A	7.78	8.60	10	7.0	150	41.7	12.0	6.0
SA7.5	8.33	10.2	1.0	7.5	50	35.0	14.3	7.0
SA7.5A	8.33	9.21	1.0	7.5	50	38.8	12.9	7.0
SA8.0	8.89	10.9	1.0	8.0	25	33.3	15.0	7.0
SA8.0A	8.89	9.83	1.0	8.0	25	36.8	13.6	7.0
SA8.5	9.44	11.5	1.0	8.5	10	31.4	15.9	8.0
SA8.5A	9.44	10.4	1.0	8.5	10	34.7	14.4	8.0
SA9.0	10.0	12.2	1.0	9.0	5.0	29.6	16.9	9.0
SA9.0A	10.0	11.1	1.0	9.0	5.0	32.5	15.4	9.0
SA10	11.1	13.6	1.0	10	1.0	26.6	18.8	10
SA10A	11.1	12.3	1.0	10	1.0	29.4	17.0	10
SA11	12.2	14.9	1.0	11	1.0	24.9	20.1	11
SA11A	12.2	13.5	1.0	11	1.0	27.5	18.2	11
SA12	13.3	16.3	1.0	12	1.0	22.7	22.0	12
SA12A	13.3	14.7	1.0	12	1.0	25.1	19.9	12
SA13	14.4	17.6	1.0	13	1.0	21.0	23.8	13
SA13A	14.4	15.9	1.0	13	1.0	23.3	21.5	13
SA14	15.6	19.1	1.0	14	1.0	19.4	25.8	14
SA14A	15.6	17.2	1.0	14	1.0	21.6	23.2	14
SA15	16.7	20.4	1.0	15	1.0	18.6	26.9	16
SA15A	16.7	18.5	1.0	15	1.0	20.5	24.4	16
SA16	17.8	21.8	1.0	16	1.0	17.4	28.8	19
SA16A	17.8	19.7	1.0	16	1.0	19.2	26.0	17
SA17	18.9	23.1	1.0	17	1.0	16.4	30.5	20
SA17A	18.9	20.9	1.0	17	1.0	18.1	27.6	19
SA18	20.0	24.4	1.0	18	1.0	15.5	32.2	21
SA18A	20.0	22.1	1.0	18	1.0	17.1	29.2	20
SA20	22.2	27.1	1.0	20	1.0	14.0	35.8	25
SA20A	22.2	24.5	1.0	20	1.0	15.4	32.4	23
SA22	24.4	29.8	1.0	22	1.0	22.7	39.4	28
SA22A	24.4	26.9	1.0	22	1.0	14.1	35.5	25
SA24	26.7	32.6	1.0	24	1.0	11.6	43.0	31
SA24A	26.7	29.5	1.0	24	1.0	12.9	38.9	28
SA26	28.9	35.3	1.0	26	1.0	10.7	46.6	31
SA26A	28.9	31.9	1.0	26	1.0	11.9	42.1	30
SA28	31.1	38.0	1.0	28	1.0	10.0	50.1	35
SA28A	31.1	34.4	1.0	28	1.0	11.0	45.4	31
SA30	33.3	40.7	1.0	30	1.0	9.3	53.5	39
SA30A	33.3	36.8	1.0	30	1.0	10.0	48.4	36
SA33	36.7	44.9	1.0	33	1.0	8.5	59.0	42
SA33A	36.7	40.6	1.0	33	1.0	9.4	53.3	39
SA36	40.0	48.9	1.0	36	1.0	7.8	64.3	46
SA36A	40.0	44.2	1.0	36	1.0	8.6	58.1	41

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

DEVICE TYPE	BREAKDOWN VOLTAGE $V_{(BR)}$ AT I_T ⁽¹⁾ (V)		TEST CURRENT I_T (mA)	STAND-OFF VOLTAGE V_{WM} (V)	MAXIMUM REVERSE LEAKAGE AT V_{WM} I_D ⁽³⁾ (μA)	MAXIMUM PEAK PULSE CURRENT AT I_{PPM} ⁽²⁾ (A)	MAXIMUM CLAMPING VOLTAGE AT I_{PPM} V_C (V)	MAXIMUM TEMPERATURE COEFFICIENT OF $V_{(BR)}$ (mV/ $^{\circ}\text{C}$)
	MIN	MAX						
SA40	44.4	54.3	1.0	40	1.0	7.0	71.4	51
SA40A	44.4	49.1	1.0	40	1.0	7.8	64.5	46
SA43	47.8	58.4	1.0	43	1.0	6.5	76.7	55
SA43A	47.8	52.8	1.0	43	1.0	7.2	69.4	50
SA45	50.0	61.1	1.0	45	1.0	6.2	80.3	58
SA45A	50.0	55.3	1.0	45	1.0	6.9	72.7	52
SA48	53.3	65.2	1.0	48	1.0	5.8	85.5	63
SA48A	53.3	58.9	1.0	48	1.0	6.5	77.4	56
SA51	56.7	69.3	1.0	51	1.0	5.5	91.1	66
SA51A	56.7	62.7	1.0	51	1.0	6.1	82.4	61
SA54	60.0	73.3	1.0	54	1.0	5.2	96.3	71
SA54A	60.0	66.3	1.0	54	1.0	5.7	87.1	65
SA58	64.4	78.7	1.0	58	1.0	4.9	103	78
SA58A	64.4	71.2	1.0	58	1.0	5.3	93.6	70
SA60	66.7	81.5	1.0	60	1.0	4.7	107	80
SA60A	66.7	73.7	1.0	60	1.0	5.2	96.8	71
SA64	71.1	86.9	1.0	64	1.0	4.4	114	86
SA64A	71.1	78.6	1.0	64	1.0	4.9	103	76
SA70	77.8	95.1	1.0	70	1.0	4.0	125	94
SA70A	77.8	86.0	1.0	70	1.0	4.4	113	85
SA75	83.3	102	1.0	75	1.0	3.7	134	101
SA75A	83.3	92.1	1.0	75	1.0	4.1	121	91
SA78	86.7	106	1.0	78	1.0	3.6	139	105
SA78A	86.7	95.8	1.0	78	1.0	4.0	126	95
SA85	94.4	115	1.0	85	1.0	3.3	151	114
SA85A	94.4	104	1.0	85	1.0	3.6	137	103
SA90	100	122	1.0	90	1.0	3.1	160	121
SA90A	100	111	1.0	90	1.0	3.4	146	110
SA100	111	136	1.0	100	1.0	2.8	179	135
SA100A	111	123	1.0	100	1.0	3.1	162	123
SA110	122	149	1.0	110	1.0	2.6	196	148
SA110A	122	135	1.0	110	1.0	2.8	177	133
SA120	133	163	1.0	120	1.0	2.3	214	162
SA120A	133	147	1.0	120	1.0	2.6	193	146
SA130	144	176	1.0	130	1.0	2.2	230	175
SA130A	144	159	1.0	130	1.0	2.4	209	158
SA150	167	204	1.0	150	1.0	1.9	268	203
SA150A	167	185	1.0	150	1.0	2.1	243	184
SA160	178	218	1.0	160	1.0	1.7	257	217
SA160A	178	197	1.0	160	1.0	1.9	259	196
SA170	189	231	1.0	170	1.0	1.6	304	230
SA170A	189	209	1.0	170	1.0	1.8	275	208

Note:

- (1) Pulse test: $t_p \leq 50\text{ ms}$
- (2) Surge current waveform per Fig. 3 and derate per Fig. 2
- (3) For bidirectional types with V_{WM} of 10 volts and less, the I_D limit is doubled
- (4) For the bidirectional SA5.0CA, the maximum V_{BR} is 7.25 V
- (5) All terms and symbols are consistent with ANSI/IEEE C62.35

ORDERING INFORMATION

PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
SA5.0A-E3/54	0.432	54	4000	13" Diameter Paper Tape & Reel

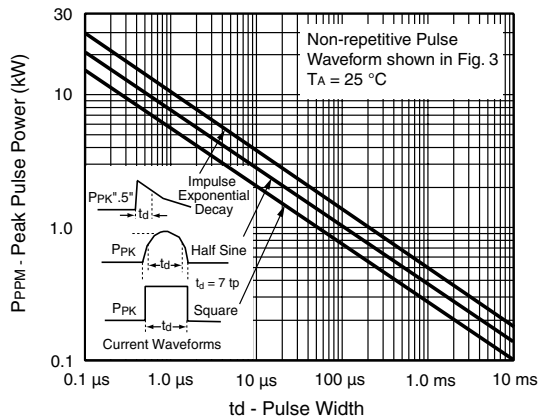
RATINGS AND CHARACTERISTICS CURVES(T_A = 25 °C unless otherwise noted)

Figure 1. Peak Pulse Power Rating Curve

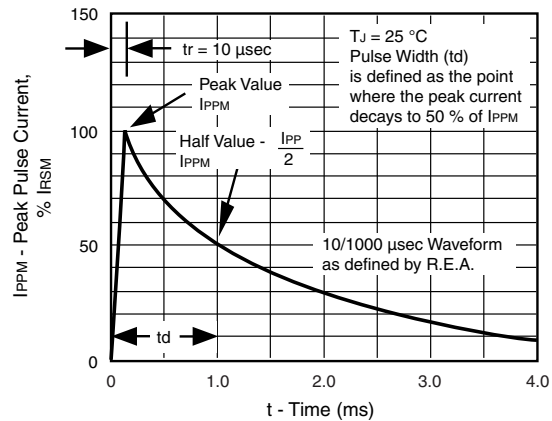


Figure 3. Pulse Waveform

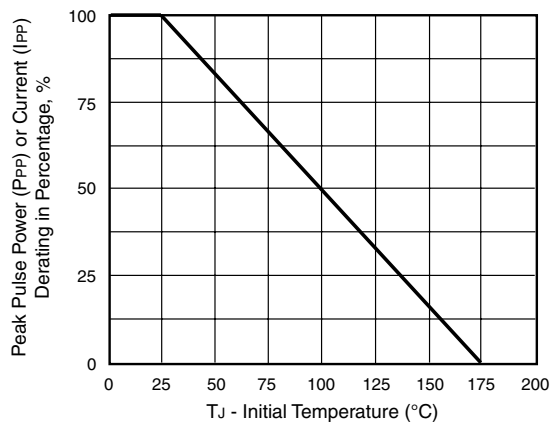
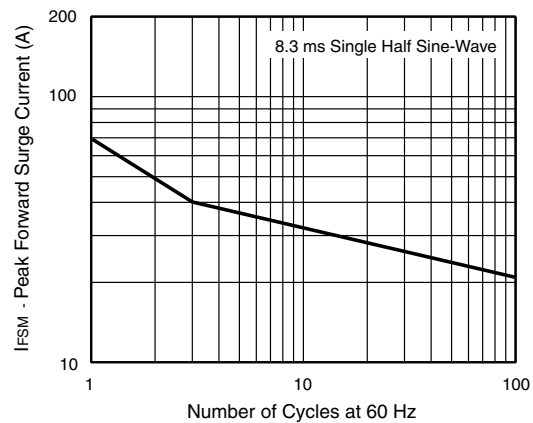


Figure 2. Pulse Derating Curve

Figure 4. Maximum Non-Repetitive Forward Surge Current
Uni-Directional Only

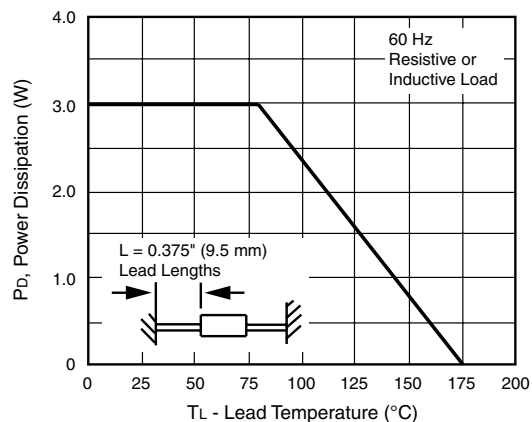


Figure 5. Steady State Power Derating Curve

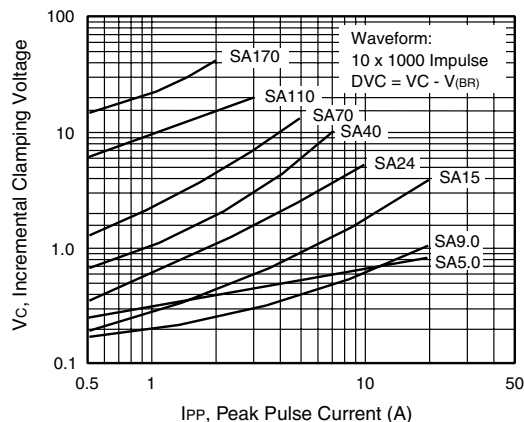


Figure 8. Incremental Clamping Voltage Curve Unidirectional

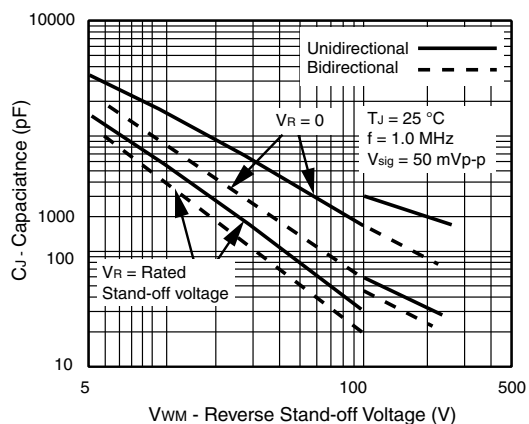


Figure 6. Capacitance

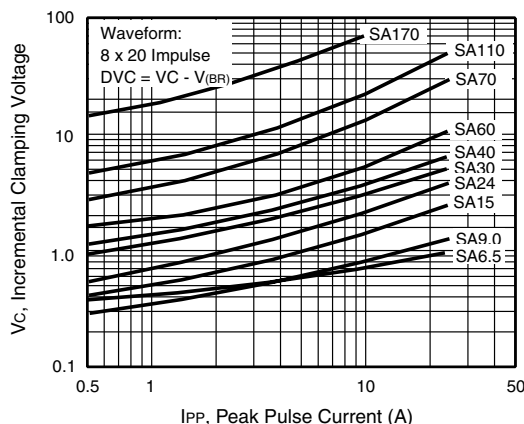


Figure 9. Incremental Clamping Voltage Curve Bidirectional

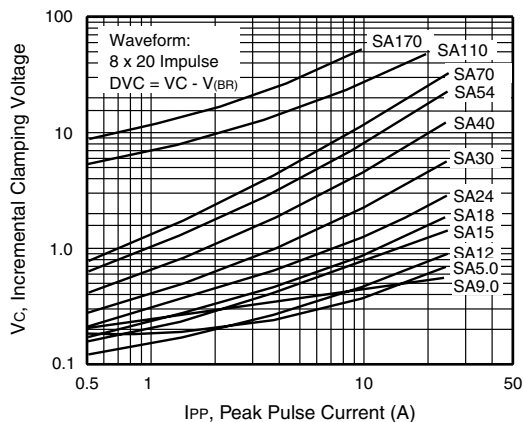


Figure 7. Incremental Clamping Voltage Curve Unidirectional

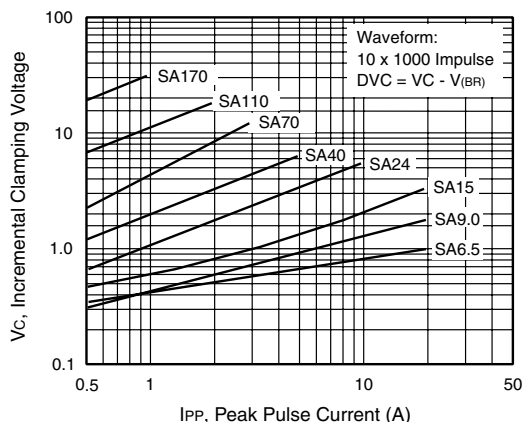


Figure 10. Incremental Clamping Voltage Curve Bidirectional

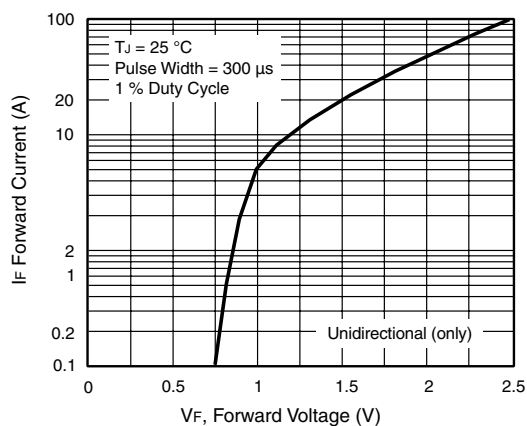


Figure 11. Typical Instantaneous Forward Voltage

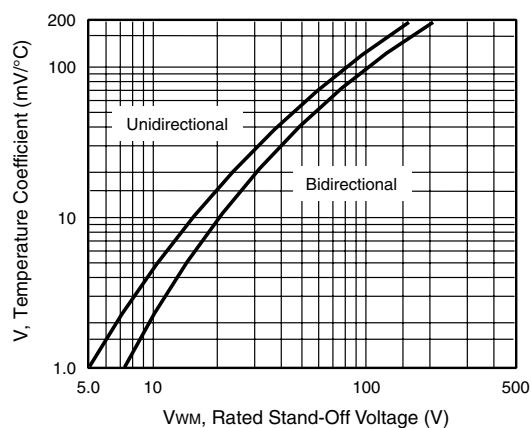
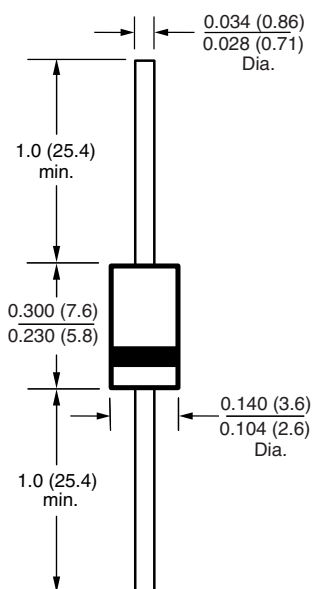


Figure 12. Breakdown Voltage Temperature Coefficient Curve

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

DO-204AC (DO-15)





Notice

Specifications of the products displayed herein are subject to change without notice. Vishay Intertechnology, Inc., or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Vishay's terms and conditions of sale for such products, Vishay assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of Vishay products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Vishay for any damages resulting from such improper use or sale.