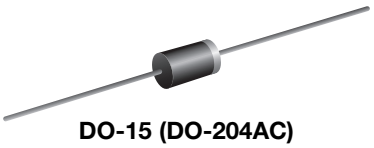
TRANSZORB® Transient Voltage Suppressors



DO-15 (DO-204AC)

FEATURES

- Glass passivated chip junction
- Available in unidirectional and bidirectional
- 500 W peak pulse power capability with a 10/1000 µs waveform, repetitive rate (duty cycle): 0.01 %
- Excellent clamping capability
- Very fast response time
- Low incremental surge resistance
- Solder dip 275 °C max. 10 s, per JESD 22-B106
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT

PRIMARY CHARACTERISTICS	
V_{WM}	5.0 V to 170 V
V_{BR} (unidirectional)	6.4 V to 209 V
V_{BR} (bidirectional)	6.4 V to 209 V
P_{PPM}	500 W
P_D	3.0 W
I_{FSM} (unidirectional only)	70 A
T_J max.	175 °C
Polarity	Unidirectional, bidirectional
Package	DO-15 (DO-204AC)

DEVICES FOR BIDIRECTION APPLICATIONS

For bidirectional types, use CA suffix (e.g. SA5.0CA, SA170CA).
Electrical characteristics apply in both directions.

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-15 (DO-204AC)
Molded epoxy over passivated chip
Molding compound meets UL 94 V-0 flammability rating
Base P/N-E3 - RoHS compliant, commercial grade
Base P/NHE3 - RoHS compliant, AEC-Q101 qualified

Terminals: matte tin plated leads, solderable per J-STD-002 and JESD 22-B102
E3 suffix meets JESD 201 class 1A whisker test, HE3 suffix meets JESD 201 class 2 whisker test

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 µs waveform (1) (fig. 1)	P_{PPM}	500	W
Peak pulse current with a 10/1000 µs waveform (1)	I_{PPM}	See next table	A
Power dissipation on infinite heatsink at T_L = 75 °C (fig. 5)	P_D	3.0	W
Peak forward surge current 10 ms single half sine-wave unidirectional only	I_{FSM}	70	A
Maximum instantaneous forward voltage at 100 A for unidirectional only (3)	V_F	3.5	V
Operating junction and storage temperature range	T_J, T_{STG}	-55 to +175	°C

Notes

(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 pulses per minute maximum

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ELECTRICAL CHARACTERISTICS (T_A = 25 °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} (3) I_D (µA)	MAXIMUM PEAK PULSE CURRENT I_{PPM} (2) (A)	MAXIMUM CLAMPING VOLTAGE AT I_{PPM} V_C (V)	MAXIMUM TEMPERATURE COEFFICIENT AT V_{BR} (mV/°C)
	MIN.	MAX.						
SA5.0A (4)	6.40	7.07	10	5.0	600	54.3	9.2	5
SA6.0A	6.67	7.37	10	6.0	600	48.5	10.3	5
SA6.5A	7.22	7.98	10	6.5	400	44.7	11.2	5
SA7.0A	7.78	8.60	10	7.0	150	41.7	12.0	6
SA7.5A	8.33	9.21	1.0	7.5	50	38.8	12.9	7
SA8.0A	8.89	9.83	1.0	8.0	25	36.8	13.6	7
SA8.5A	9.44	10.4	1.0	8.5	10	34.7	14.4	8
SA9.0A	10.0	11.1	1.0	9.0	5.0	32.5	15.4	9
SA10A	11.1	12.3	1.0	10	1.0	29.4	17.0	10
SA11A	12.2	13.5	1.0	11	1.0	27.5	18.2	11
SA12A	13.3	14.7	1.0	12	1.0	25.1	19.9	12
SA13A	14.4	15.9	1.0	13	1.0	23.3	21.5	13
SA14A	15.6	17.2	1.0	14	1.0	21.6	23.2	14
SA15A	16.7	18.5	1.0	15	1.0	20.5	24.4	16
SA16A	17.8	19.7	1.0	16	1.0	19.2	26.0	17
SA17A	18.9	20.9	1.0	17	1.0	18.1	27.6	19
SA18A	20.0	22.1	1.0	18	1.0	17.1	29.2	20
SA20A	22.2	24.5	1.0	20	1.0	15.4	32.4	23
SA22A	24.4	26.9	1.0	22	1.0	14.1	35.5	25
SA24A	26.7	29.5	1.0	24	1.0	12.9	38.9	28
SA26A	28.9	31.9	1.0	26	1.0	11.9	42.1	30
SA28A	31.1	34.4	1.0	28	1.0	11	45.4	31
SA30A	33.3	36.8	1.0	30	1.0	10	48.4	36
SA33A	36.7	40.6	1.0	33	1.0	9.4	53.3	39
SA36A	40.0	44.2	1.0	36	1.0	8.6	58.1	41
SA40A	44.4	49.1	1.0	40	1.0	7.8	64.5	46
SA43A	47.8	52.8	1.0	43	1.0	7.2	69.4	50
SA45A	50.0	55.3	1.0	45	1.0	6.9	72.7	52
SA48A	53.3	58.9	1.0	48	1.0	6.5	77.4	56
SA51A	56.7	62.7	1.0	51	1.0	6.1	82.4	61
SA54A	60.0	66.3	1.0	54	1.0	5.7	87.1	65
SA58A	64.4	71.2	1.0	58	1.0	5.3	93.6	70
SA60A	66.7	73.7	1.0	60	1.0	5.2	96.8	71
SA64A	71.1	78.6	1.0	64	1.0	4.9	103	76
SA70A	77.8	86.0	1.0	70	1.0	4.4	113	85
SA75A	83.3	92.1	1.0	75	1.0	4.1	121	91
SA78A	86.7	95.8	1.0	78	1.0	4	126	95
SA85A	94.4	104	1.0	85	1.0	3.6	137	103
SA90A	100	111	1.0	90	1.0	3.4	146	110
SA100A	111	123	1.0	100	1.0	3.1	162	123
SA110A	122	135	1.0	110	1.0	2.8	177	133
SA120A	133	147	1.0	120	1.0	2.6	193	146
SA130A	144	159	1.0	130	1.0	2.4	209	158
SA150A	167	185	1.0	150	1.0	2.1	243	184
SA160A	178	197	1.0	160	1.0	1.9	259	196
SA170A	189	209	1.0	170	1.0	1.8	275	208

Notes

(1) Pulse test: $t_p \leq 50$ ms

(2) Surge current waveform per fig. 3 and derate per fig. 2

(3) For bidirectional types with V_{WM} of 10 V 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/EEE CA62.35

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ORDERING INFORMATION (Example)				
PREFERRED PIN	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
SA5.0A-E3/54	0.432	54	4000	13" diameter paper tape and reel
SA5.0AHE3/54 (1)	0.432	54	4000	13" diameter paper tape and reel

Note

(1) AEC-Q101 qualified

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

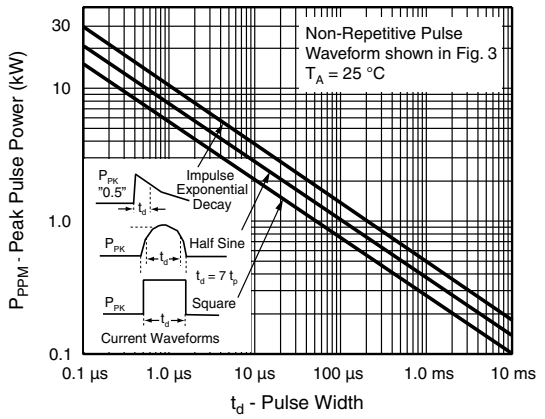

Fig. 1 - Peak Pulse Power Rating Curve

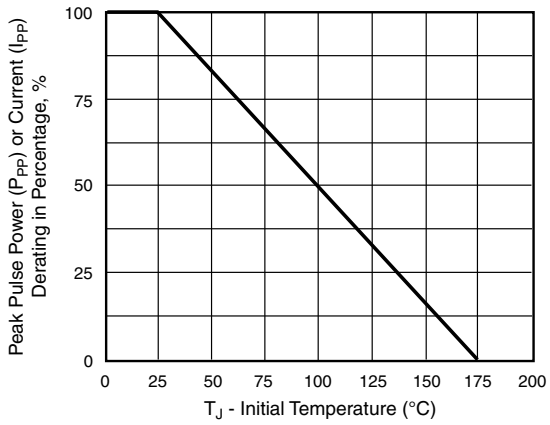

Fig. 2 - Pulse Derating Curve

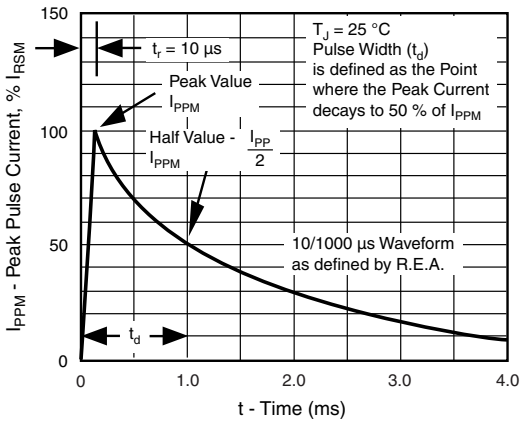

Fig. 3 - Pulse Waveform

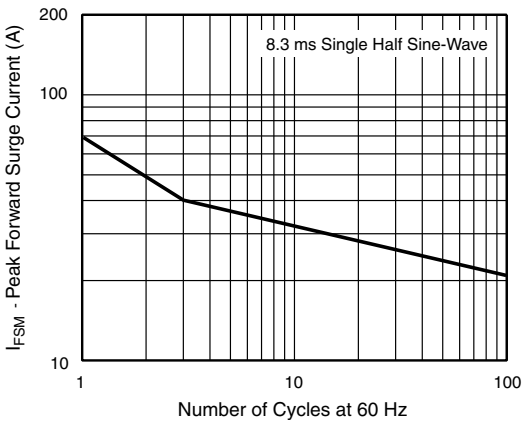

Fig. 4 - Maximum Non-Repetitive Forward Surge Current
Unidirectional Only

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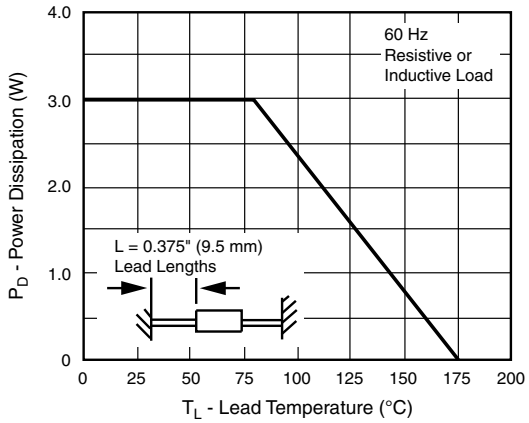

Fig. 5 - Steady State Power Derating Curve

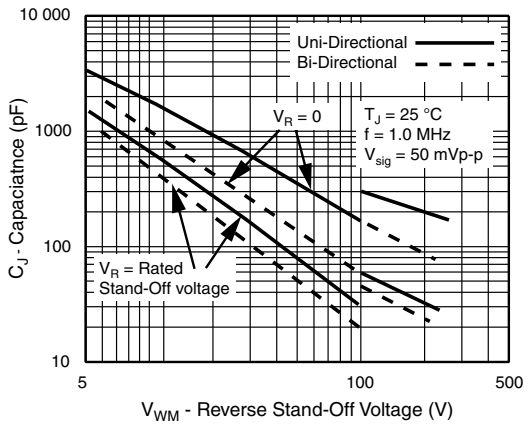

Fig. 6 - Capacitance

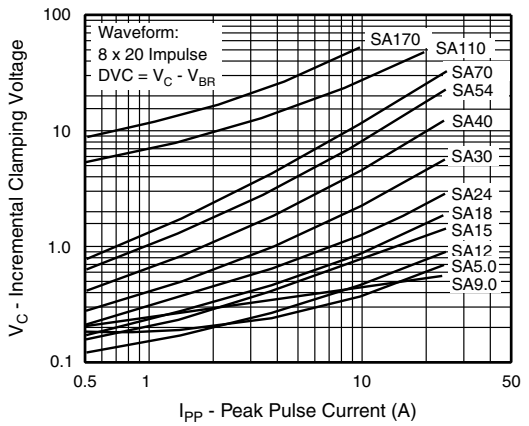

Fig. 7 - Incremental Clamping Voltage Curve Unidirectional

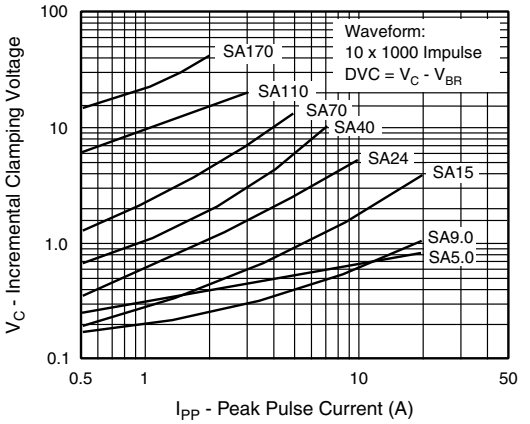

Fig. 8 - Incremental Clamping Voltage Curve Uni-Directional

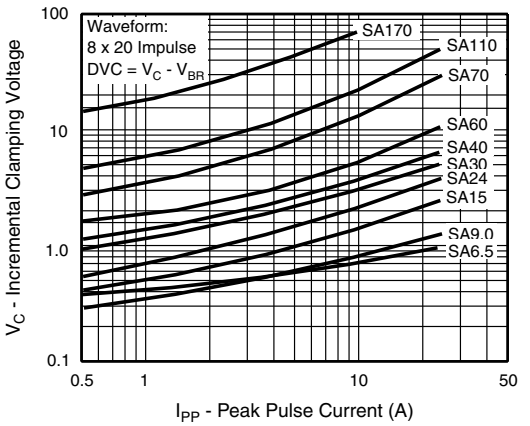

Fig. 9 - Incremental Clamping Voltage Curve Bidirectional

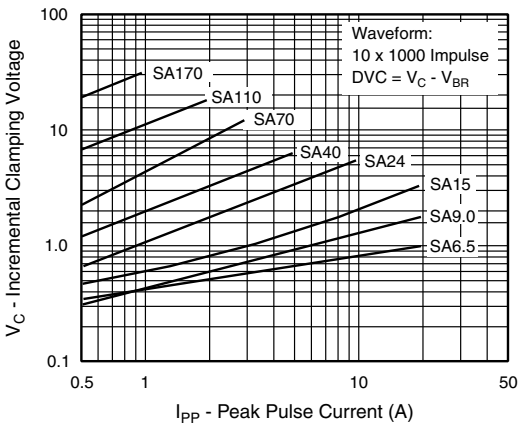

Fig. 10 - Incremental Clamping Voltage Curve Bidirectional

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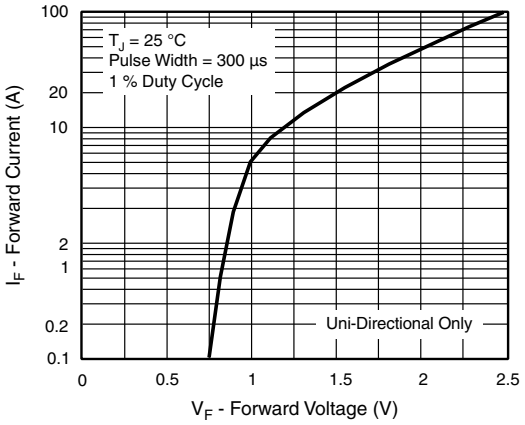


Fig. 11 - Typical Instantaneous Forward Voltage

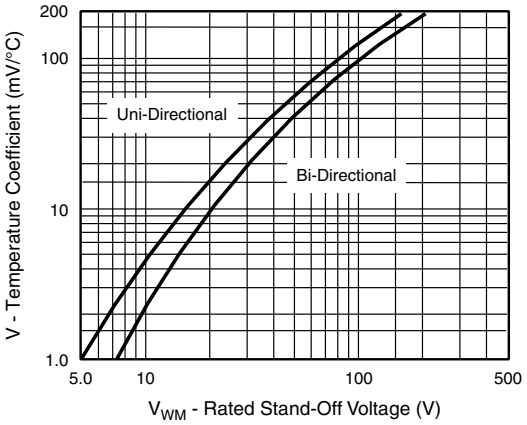
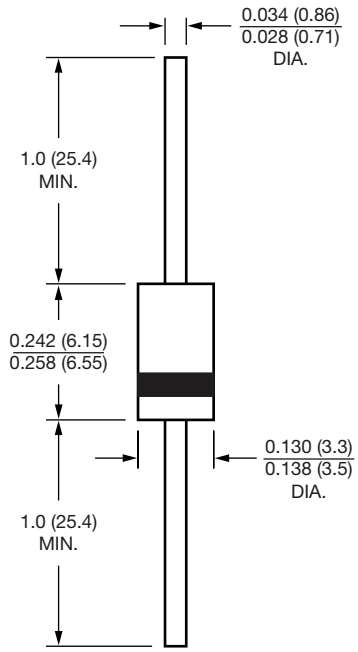


Fig. 12 - Breakdown Voltage Temperature Coefficient Curve

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

DO-15 (DO-204AC)



Note

- Dimensions of mold length and diameter do not include mold flash and gate burr, mold flash shall not exceed 0.015 inch per side. These dimensions are measured at the outermost extreme of the plastic body

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