RoHS Available

5.0 to 170 Volts, 500 Watts Transient Voltage Suppressors

DESCRIPTION

This Transient Voltage Suppressor is a high value commercial product that offers protection to voltage sensitive components. The response time of their clamping action is virtually instantaneous (less than 100 ps for unidirectional and less than 5 ns for bidirectional). They have a peak pulse power rating of 500 watts at 10/1000µs as depicted in figures 1 and 2. They are also virtually identical to power ratings and electrical features of the P5KE5.0 through P5KE170CA series that had also been earlier defined for this same package.

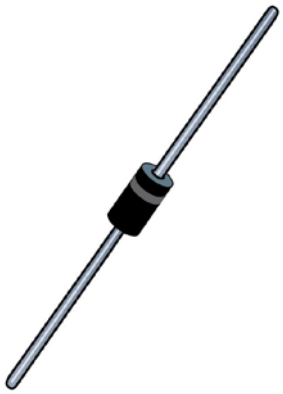
Important: For the latest information, visit our website http://www.microsemi.com.

FEATURES

- Available in both unidirectional and bi-directional construction.
- 5.0 to 170 volts stand-off voltage availability.
- 500 watts Peak Pulse Power dissipation.
- RoHS compliant versions available.

APPLICATIONS / BENEFITS

- Economical series.
- Flexible axial-lead mounting terminals.
- Quick response.



DO-41 Package

Also available in:

J-bend Package
(surface mount)
MSMBJ5.0A – MSMBJ170A

Gull-wing Package
(surface mount)
MSMBG5.0A – MSMBG170A

MAXIMUM RATINGS @ 25 ºC unless otherwise stated

Parameters/Test Conditions		Symbol	Value	Unit
Junction and Storage Temperature		T_J and T_{STG}	-55 to +150	^oC
Average Power Dissipation @ T_L = 25 ^oC (1)		$P_{M(AV)}$	2.5	W
Peak Pulse Power Dissipation @ 1000 µs		P_{PP}	500	W
tclamping (0 volts to BV Min)	Unidirectional		$<1x10^{-12}$	S
	Bi-directional		$<5x10^{-9}$	
Solder Temperature @ 10 s		T_{SP}	260	^oC

Notes: 1. At 3/8 (10 mm) lead length from body.

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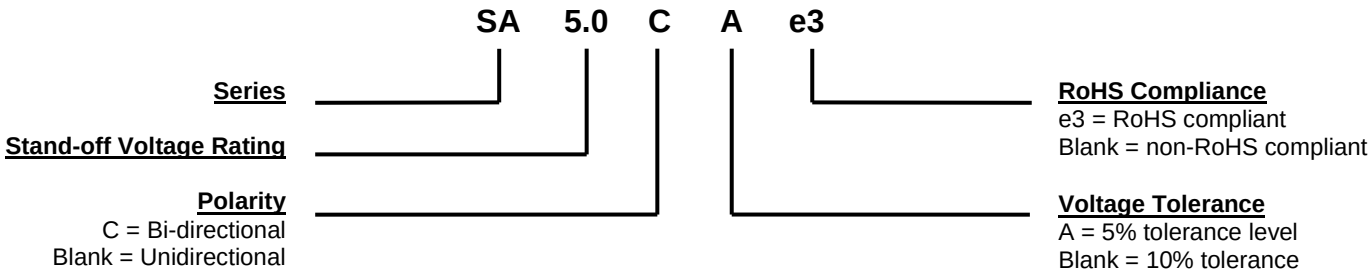
MECHANICAL and PACKAGING

- CASE: Void-free transfer molded thermosetting epoxy body meeting UL94V-0.
- TERMINALS: Tin-lead or RoHS compliant annealed matte-tin plating. Solderable per MIL-STD-750, method 2026.
- MARKING: Part number, MSC.
- POLARITY: Cathode indicated by band. Bi-directional not marked.
- TAPE & REEL option: Standard per EIA-296 (add "TR" suffix to part number). Consult factory for quantities.
- WEIGHT: Approximately 0.7 grams.
- See package dimensions on last page.

PART NOMENCLATURE



SYMBOLS & DEFINITIONS

Symbol	Definition
I_R	Reverse Current: The maximum reverse (leakage) current that will flow at the specified voltage and temperature.
I_Z, I_{ZT}, I_{ZK}	Regulator Current: The dc regulator current (I_Z), at a specified test point (I_{ZT}), near breakdown knee (I_{ZK}).
I_{ZM}	Maximum Regulator (Zener) Current: The maximum rated dc current for the specified power rating.
I_{ZSM}	Maximum Zener Surge Current: The non-repetitive peak value of Zener surge current at a specified wave form.
V_R	Reverse Voltage: The reverse voltage dc value, no alternating component.
V_Z	Zener Voltage: The Zener voltage the device will exhibit at a specified current (I_Z) in its breakdown region.
Z_{ZT} or Z_{ZK}	Dynamic Impedance: The small signal impedance of the diode when biased to operate in its breakdown region at a specified rms current modulation (typically 10% of I_{ZT} or I_{ZK}) and superimposed on I_{ZT} or I_{ZK} respectively.

ELECTRICAL CHARACTERISTICS @ 25 °C

PART NUMBER	BREAKDOWN VOLTAGE $V_{(BR)}$		TEST CURRENT I_T	RATED STAND-OFF VOLTAGE V_{WM}	MAXIMUM REVERSE STANDBY CURRENT I_D @ V_{WM}	MAXIMUM PEAK REVERSE VOLTAGE V_C MAX. @ I_{PP}	MAXIMUM PEAK PULSE CURRENT I_{PP} (Figure 2)	MAXIMUM TEMPERATURE COEFFICIENT OF $V_{(BR)}$ -55°C TO +175°C $\alpha_{V(BR)}$
	Volts		mA	Volts	µA	Volts	Amp	% / °C
SA5.0	6.40	7.30	10	5.0	600	9.6	52.0	0.057
SA5.0A	6.40	7.00	10	5.0	600	9.2	54.3	0.057
SA6.0	6.67	8.15	10	6.0	600	11.4	43.9	0.059
SA6.0A	6.67	7.37	10	6.0	600	10.3	48.5	0.059
SA6.5	7.22	8.82	10	6.5	400	12.3	40.7	0.061
SA6.5A	7.22	7.98	10	6.5	400	11.2	44.7	0.061
SA7.0	7.78	9.51	10	7.0	150	13.3	37.8	0.065
SA7.0A	7.78	8.60	10	7.0	150	12.0	41.7	0.065
SA7.5	8.33	10.2	1	7.5	50	14.3	35.0	0.067
SA7.5A	8.33	9.21	1	7.5	50	12.9	38.8	0.067
SA8.0	8.89	10.9	1	8.0	25	15.0	33.3	0.070
SA8.0A	8.89	9.83	1	8.0	25	13.6	36.7	0.070
SA8.5	9.44	11.5	1	8.5	5	15.9	31.4	0.073
SA8.5A	9.44	10.4	1	8.5	5	14.4	34.7	0.073
SA9.0	10.0	12.2	1	9.0	1	16.9	29.5	0.076
SA9.0A	10.0	11.1	1	9.0	1	15.4	32.5	0.076
SA10	11.1	13.6	1	10	1	18.8	26.6	0.078
SA10A	11.1	12.3	1	10	1	17.0	29.4	0.078
SA11	12.2	14.9	1	11	1	20.1	24.9	0.081
SA11A	12.2	13.5	1	11	1	18.2	27.4	0.081
SA12	13.3	16.3	1	12	1	22.0	22.7	0.082
SA12A	13.3	14.7	1	12	1	19.9	25.1	0.082
SA13	14.4	17.6	1	13	1	23.8	21.0	0.084
SA13A	14.4	15.9	1	13	1	21.5	23.2	0.084
SA14	15.6	19.1	1	14	1	25.8	19.4	0.086
SA14A	15.6	17.2	1	14	1	23.2	21.5	0.086
SA15	16.7	20.4	1	15	1	26.9	18.8	0.087
SA15A	16.7	18.5	1	15	1	24.4	20.6	0.087
SA16	17.8	21.8	1	16	1	28.8	17.6	0.088
SA16A	17.8	19.7	1	16	1	26.0	19.2	0.088
SA17	18.9	23.1	1	17	1	30.5	16.4	0.090
SA17A	18.9	20.9	1	17	1	27.6	18.1	0.090
SA18	20.0	24.4	1	18	1	32.2	15.5	0.092
SA18A	20.0	22.1	1	18	1	29.2	17.2	0.092
SA20	22.2	27.1	1	20	1	35.8	13.9	0.093
SA20A	22.2	24.5	1	20	1	32.4	15.4	0.093
SA22	24.4	29.8	1	22	1	39.4	12.7	0.094
SA22A	24.4	26.9	1	22	1	35.5	14.4	0.094
SA24	26.7	32.6	1	24	1	43.0	11.6	0.096
SA24A	26.7	29.5	1	24	1	38.9	12.8	0.096
SA26	28.9	35.3	1	26	1	46.6	10.7	0.097
SA26A	28.9	31.9	1	26	1	42.1	11.9	0.097
SA28	31.1	38.0	1	28	1	50.0	9.9	0.098
SA28A	31.1	34.4	1	28	1	45.4	11.0	0.098
SA30	33.3	40.7	1	30	1	53.5	9.3	0.099
SA30A	33.3	36.8	1	30	1	48.4	10.3	0.099
SA33	36.7	44.9	1	33	1	59.0	8.5	0.100
SA33A	36.7	40.6	1	33	1	53.3	9.4	0.100
SA36	40.0	48.9	1	36	1	64.3	7.8	0.101
SA36A	40.0	44.2	1	36	1	58.1	8.6	0.101
SA40	44.4	54.3	1	40	1	71.4	7.0	0.101
SA40A	44.4	49.1	1	40	1	64.5	7.8	0.101
SA43	47.8	58.4	1	43	1	76.7	6.5	0.102
SA43A	47.8	52.8	1	43	1	69.4	7.2	0.102
SA45	50.0	61.1	1	45	1	80.3	6.2	0.102
SA45A	50.0	55.3	1	45	1	72.7	6.9	0.102

ELECTRICAL CHARACTERISTICS @ 25 °C

PART NUMBER	BREAKDOWN VOLTAGE $V_{(BR)}$		TEST CURRENT I_T	RATED STAND-OFF VOLTAGE V_{WM}	MAXIMUM REVERSE STANDBY CURRENT I_D @ V_{WM}	MAXIMUM PEAK REVERSE VOLTAGE V_C MAX. @ I_{PP}	MAXIMUM PEAK PULSE CURRENT I_{PP} (Figure 2)	MAXIMUM TEMPERATURE COEFFICIENT OF $V_{(BR)}$ -55°C TO +175°C $\alpha_{V(BR)}$
	Volts		mA	Volts	µA	Volts	Amp	% / °C
SA48	53.3	65.1	1	48	1	85.5	5.8	0.103
SA48A	53.3	58.9	1	48	1	77.4	6.5	0.103
SA51	56.7	69.3	1	51	1	91.1	5.5	0.103
SA51A	56.7	62.7	1	51	1	82.4	6.1	0.103
SA54	60.0	73.3	1	54	1	96.3	5.2	0.104
SA54A	60.0	66.3	1	54	1	87.1	5.7	0.104
SA58	64.4	78.7	1	58	1	103.0	4.9	0.104
SA58A	64.4	71.2	1	58	1	93.6	5.3	0.104
SA60	66.7	81.5	1	60	1	107.0	4.7	0.104
SA60A	66.7	73.7	1	60	1	96.8	5.2	0.104
SA64	71.1	86.9	1	64	1	114.0	4.4	0.105
SA64A	71.1	78.6	1	64	1	103.0	4.9	0.105
SA70	77.8	95.1	1	70	1	125.0	4.0	0.105
SA70A	77.8	86.0	1	70	1	113.0	4.4	0.105
SA75	83.3	102.0	1	75	1	134.0	3.7	0.105
SA75A	83.3	92.1	1	75	1	121.0	4.1	0.105
SA78	86.7	106.0	1	78	1	139.0	3.6	0.106
SA78A	86.7	95.8	1	78	1	126.0	4.0	0.106
SA85	94.4	115.0	1	85	1	151.0	3.3	0.106
SA85A	94.4	104.0	1	85	1	137.0	3.6	0.106
SA90	100.0	122.0	1	90	1	160.0	3.1	0.107
SA90A	100.0	111.0	1	90	1	146.0	3.4	0.107
SA100	111.0	136.0	1	100	1	179.0	2.8	0.107
SA100A	111.0	123.0	1	100	1	162.0	3.1	0.107
SA110	122.0	149.0	1	110	1	196.0	2.6	0.107
SA110A	122.0	135.0	1	110	1	177.0	2.8	0.107
SA120	133.0	163.0	1	120	1	214.0	2.3	0.107
SA120A	133.0	147.0	1	120	1	193.0	2.0	0.107
SA130	144.0	176.0	1	130	1	231.0	2.2	0.108
SA130A	144.0	159.0	1	130	1	209.0	2.4	0.108
SA150	167.0	204.0	1	150	1	268.0	1.9	0.108
SA150A	167.0	185.0	1	150	1	243.0	2.1	0.108
SA160	178.0	218.0	1	160	1	287.0	1.7	0.108
SA160A	178.0	197.0	1	160	1	259.0	1.9	0.108
SA170	189.0	231.0	1	170	1	304.0	1.6	0.108
SA170A	189.0	209.0	1	170	1	275.0	1.8	0.108

GRAPHS

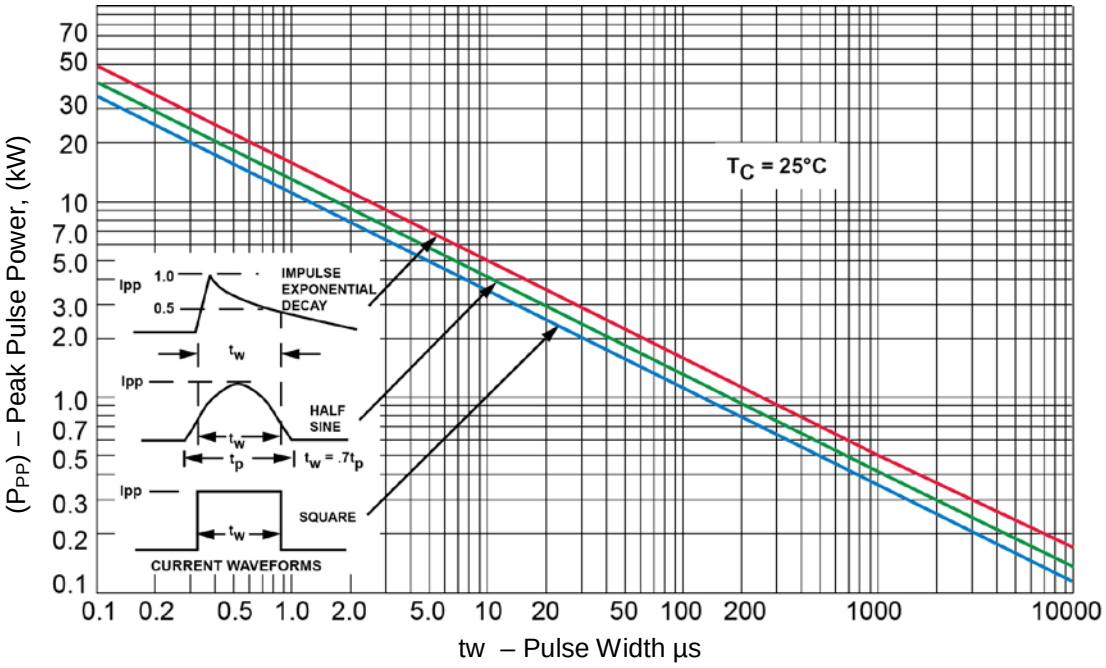


FIGURE 1
Peak Pulse Power vs Pulse Time

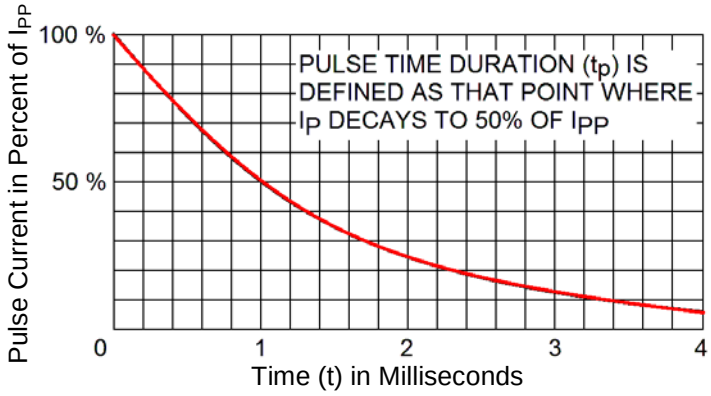


FIGURE 2
Pulse Waveform for Exponential Surge

GRAPHS

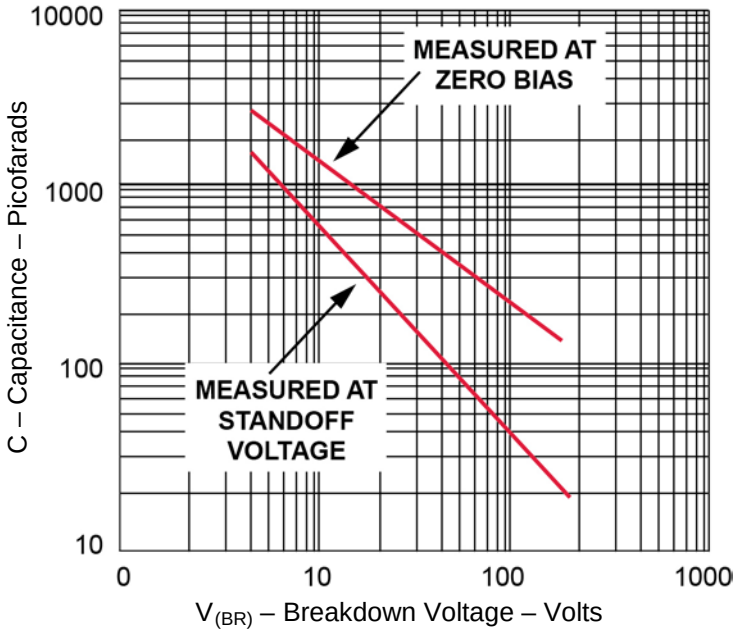


FIGURE 3
Typical Capacitance vs Breakdown Voltage

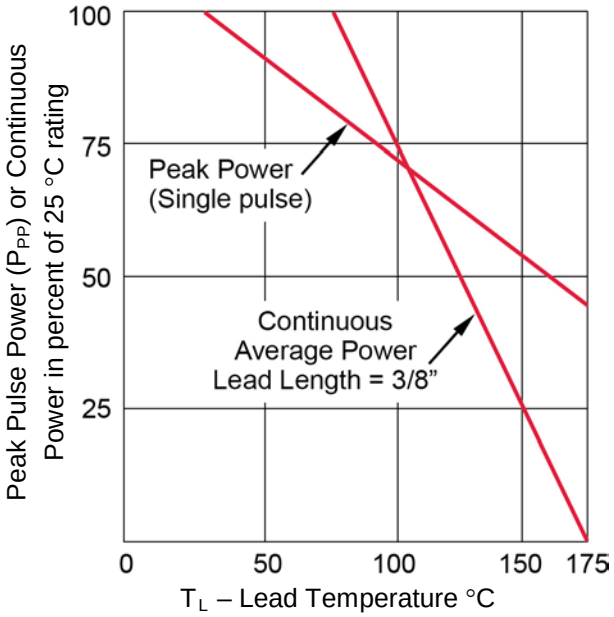
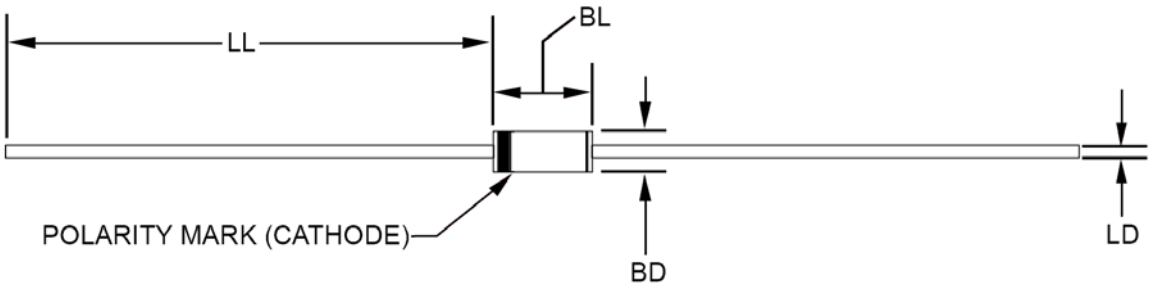


FIGURE 4
Derating Curve

PACKAGE DIMENSIONS



NOTES: Cathode indicated by band.

Dim	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
LL	1.10	-	27.94	-
BL	-	0.205	-	5.21
BD	-	0.107	-	2.72
LD	0.030	0.034	0.76	0.86