

#### DESCRIPTION

The SA series of transient voltage suppressors are designed to protect components from over voltages caused by electrostatic discharge (ESD), electrical fast transients (EFT), induced lightning, and system generated transients.

TVS diodes are characterized by their high surge capability, low operating and clamping voltages, and fast response time. This makes them ideal for use as board level protection of sensitive semiconductor components. The SA series is suitable protection for sensitive TTL and MOS ICs such as microprocessors, I/O transceivers, ASICs, transducers, and MOS memory.

#### APPLICATIONS:

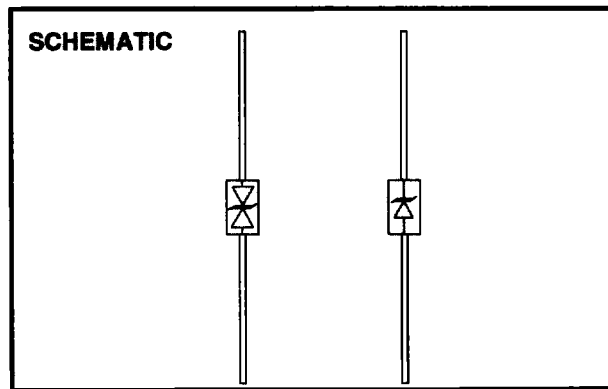
- General Transient Protection
- Board Level Thru-Hole Applications
- Industrial & Commercial Electronics
- Portable electronics
- Networks

#### FEATURES:

- 500 watts Peak Pulse Power ( $t_p = 10 \times 1000 \mu s$ )
- Unidirectional or Bidirectional
- Wide voltage range (5V - 170V)
- Low clamping voltages
- Solid state silicon avalanche technology

#### MECHANICAL CHARACTERISTICS:

- JEDEC DO-15 Outline
- Molded epoxy case
- Marking : P/N, date code, and logo
- Unidirectional devices marked with polarity band



#### MAXIMUM RATINGS

RATING	SYMBOL	VALUE	UNIT
Peak Pulse Power ( $t_p = 10 \times 1000 \mu s$ )	Ppk	500	Watts
Operating Temperature	Tj	-55 to +150	°C
Storage Temperature	Tstg	-55 to +150	°C

#### ELECTRICAL CHARACTERISTICS @ 25°C

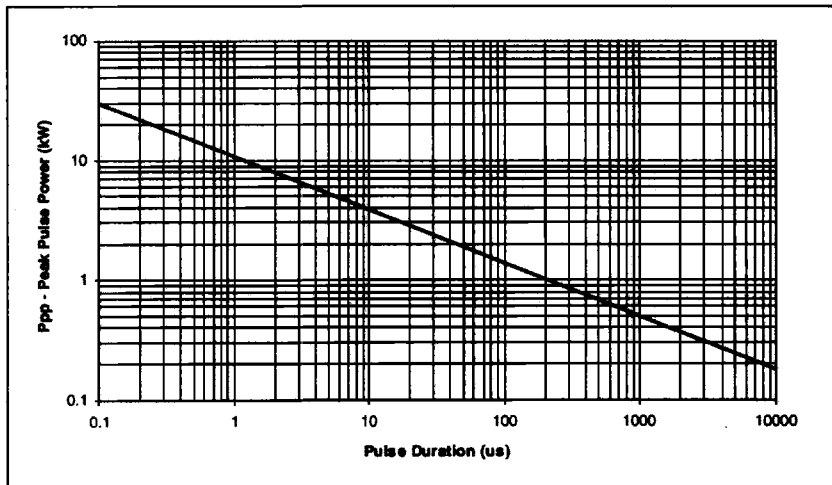
UNI-DIRECTIONAL PART NUMBER <small>See Note 1</small>	BIDIRECTIONAL PART NUMBER <small>See Note 1, 2</small>	REVERSE STAND-OFF VOLTAGE $V_{RWM}$ (V)	REVERSE LEAKAGE CURRENT $I_R$ ( $\mu A$ )	BREAKDOWN VOLTAGE $V_{BR} @ I_T$ (V)		TEST CURRENT $I_T$ (mA)	MAXIMUM CLAMPING VOLTAGE @ $I_{PP}$ $V_C$ (V)	PEAK PULSE CURRENT $I_{PP}$ (A)	MAX. VOLTAGE TEMPERATURE VARIATION OF $V_{BR}$ (mV/°C)
				MIN	MAX				
SA5.0		5.0	600	6.4	7.3	10	8.8	52.0	5.0
SA5.0A		5.0	600	6.4	7	10	9.2	54.3	5.0
SA6.0	SA6.0C	6.0	600	6.67	8.15	10	11.4	43.9	5.0
SA6.0A	SA6.0CA	6.0	600	6.67	7.37	10	10.3	48.5	5.0
SA6.5	SA6.5C	6.5	400	7.22	8.82	10	12.3	40.7	5.0
SA6.5A	SA6.5CA	6.5	400	7.22	7.98	10	11.2	44.7	5.0
SA7.0	SA7.0C	7.0	150	7.78	9.51	10	13.3	37.8	6.0
SA7.0A	SA7.0CA	7.0	150	7.78	8.6	10	12	41.7	6.0
SA7.5	SA7.5C	7.5	50	8.33	10.2	1	14.3	35.0	7.0
SA7.5A	SA7.5CA	7.5	50	8.33	9.21	1	12.9	38.8	7.0
SA8.0	SA8.0C	8.0	25	8.89	10.9	1	15	33.3	7.0
SA8.0A	SA8.0CA	8.0	25	8.89	9.83	1	13.8	36.7	7.0
SA8.5	SA8.5C	8.5	10	9.44	11.5	1	16.2	31.4	8.0
SA8.5A	SA8.5CA	8.5	10	9.44	10.4	1	14.4	34.7	8.0
SA9.0	SA9.0C	9.0	5	10	12.2	1	18.9	29.5	9.0
SA9.0A	SA9.0CA	9.0	5	10	11.1	1	15.4	32.5	9.0

### ELECTRICAL CHARACTERISTICS @ 25°C (CONTINUED)

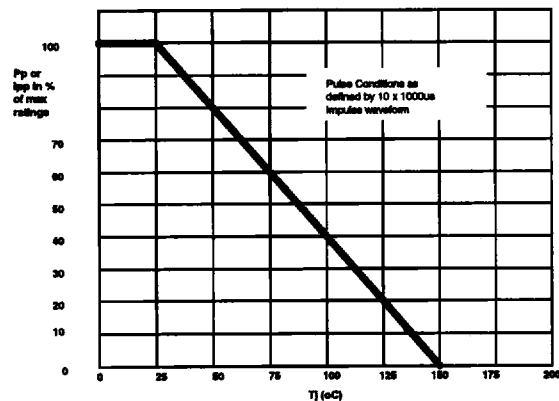
UNI-DIRECTIONAL PART NUMBER  See Note 1	BIDIRECTIONAL PART NUMBER  See Note 1, 2	REVERSE STAND-OFF VOLTAGE $V_{RWM}$ (V)	REVERSE LEAKAGE CURRENT $I_R$ ( $\mu$ A)	BREAKDOWN VOLTAGE $V_{BR} @ I_T$ (V)		TEST CURRENT  $I_T$ (mA)	MAXIMUM CLAMPING VOLTAGE @ $I_{PP}$ $V_C$ (V)	PEAK PULSE CURRENT $I_{PP}$ (A)	MAX. VOLTAGE TEMPERATURE VARIATION OF $V_{BR}$ (mV/°C)
				MIN	MAX				
SA10 ♦	SA10C	10	3	11.1	13.8	1	18.2	26.8	10
SA10A ♦	SA10CA	10	3	11.1	12.3	1	17.0	29.4	10
SA11	SA11C	11	3	12.2	14.9	1	20.1	24.9	11
SA11A	SA11CA	11	3	12.2	13.5	1	18.2	27.4	11
SA12 ♦	SA12C ♦	12	3	13.3	16.3	1	22.8	22.7	12
SA12A ♦	SA12CA ♦	12	3	13.3	14.7	1	19.8	25.1	12
SA13	SA13C	13	3	14.4	17.8	1	23.8	21.0	13
SA13A	SA13CA	13	3	14.4	15.9	1	21.5	23.2	13
SA14	SA14C	14	3	15.6	19.1	1	25.8	19.4	14
SA14A	SA14CA	14	3	15.6	17.2	1	23.2	21.5	14
SA15 ♦	SA15C ♦	15	3	16.7	20.4	1	28.9	18.8	15
SA15A ♦	SA15CA ♦	15	3	16.7	18.5	1	24.4	20.8	15
SA16	SA16C	16	3	17.8	21.8	1	28.8	17.6	16
SA16A	SA16CA	16	3	17.8	19.7	1	26.0	19.2	17
SA17	SA17C	17	3	18.9	23.1	1	30.5	16.4	20
SA17A	SA17CA	17	3	18.9	20.9	1	27.6	18.1	19
SA18	SA18C	18	3	20	24.4	1	32.2	15.5	21
SA18A	SA18CA	18	3	20	22.1	1	28.2	17.2	20
SA20	SA20C	20	3	22.2	27.1	1	36.8	13.9	25
SA20A	SA20CA	20	3	22.2	24.5	1	32.4	15.4	23
SA22	SA22C	22	3	24.4	29.8	1	38.4	12.7	28
SA22A	SA22CA	22	3	24.4	26.9	1	35.5	14.1	25
SA24 ♦	SA24C ♦	24	3	26.7	32.6	1	43.0	11.6	31
SA24A ♦	SA24CA ♦	24	3	26.7	29.5	1	38.9	12.8	28
SA26	SA26C	26	3	28.9	35.3	1	48.8	10.7	31
SA26A	SA26CA	26	3	28.9	31.9	1	42.1	11.9	30
SA28 ♦	SA28C ♦	28	3	31.1	38	1	50.0	9.9	35
SA28A ♦	SA28CA ♦	28	3	31.1	34.4	1	45.4	11.0	31
SA30	SA30C	30	3	33.3	40.7	1	53.5	9.3	39
SA30A	SA30CA	30	3	33.3	36.8	1	48.4	10.3	36
SA33 ♦	SA33C ♦	33	3	36.7	44.9	1	59.0	8.5	42
SA33A ♦	SA33CA ♦	33	3	36.7	40.6	1	53.2	9.4	39
SA36	SA36C	36	3	40	48.9	1	64.3	7.8	48
SA36A	SA36CA	36	3	40	44.2	1	58.1	8.6	41
SA40 ♦	SA40C ♦	40	3	44.4	54.3	1	71.4	7.0	51
SA40A ♦	SA40CA ♦	40	3	44.4	49.1	1	64.5	7.8	46
SA43	SA43C	43	3	47.8	58.4	1	78.7	6.5	55
SA43A	SA43CA	43	3	47.8	52.8	1	69.4	7.2	50
SA45	SA45C	45	3	50	61.1	1	80.3	6.2	58
SA45A	SA45CA	45	3	50	55.3	1	72.7	6.9	52
SA48	SA48C	48	3	53.3	65.1	1	88.5	5.8	63
SA48A	SA48CA	48	3	53.3	58.9	1	77.4	6.5	58
SA51	SA51C	51	3	56.7	69.3	1	91.1	5.5	66
SA51A	SA51CA	51	3	56.7	62.7	1	82.4	6.1	61
SA54	SA54C	54	3	60	73.3	1	98.3	5.2	71
SA54A	SA54CA	54	3	60	66.3	1	87.1	5.7	65
SA58	SA58C	58	3	64.4	78.7	1	103.0	4.9	78
SA58A	SA58CA	58	3	64.4	71.2	1	95.5	5.3	70
SA60	SA60C	60	3	66.7	81.5	1	107.0	4.7	80
SA60A	SA60CA	60	3	66.7	73.7	1	96.8	5.2	71
SA64 ♦	SA64C ♦	64	3	71.1	86.9	1	114.0	4.4	86
SA64A ♦	SA64CA ♦	64	3	71.1	78.8	1	103.0	4.9	78
SA70	SA70C	70	3	77.8	95.1	1	121	4.0	94
SA70A	SA70CA	70	3	77.8	86	1	113	4.4	85
SA75	SA75C	75	3	83.3	102	1	134	3.7	101
SA75A	SA75CA	75	3	83.3	92.1	1	121	4.1	91
SA78	SA78C	78	3	86.7	108	1	137	3.8	105
SA78A	SA78CA	78	3	86.7	95.8	1	126	4.0	95
SA85	SA85C	85	3	94.4	115	1	151	3.3	114
SA85A	SA85CA	85	3	94.4	104	1	137	3.8	103
SA90	SA90C	90	3	100	122	1	169	3.1	121
SA90A	SA90CA	90	3	100	111	1	148	3.4	110
SA100	SA100C	100	3	111	136	1	179	2.8	135
SA100A	SA100CA	100	3	111	123	1	162	3.1	123
SA110	SA110C	110	3	122	149	1	198	2.6	148
SA110A	SA110CA	110	3	122	136	1	177	2.8	133
SA120	SA120C ♦	120	3	133	163	1	214	2.3	162
SA120A	SA120CA ♦	120	3	133	147	1	193	2.0	146
SA130	SA130C	130	3	144	178	1	231	2.2	175
SA130A	SA130CA	130	3	144	159	1	209	2.4	155
SA150	SA150C	150	3	167	204	1	288	1.9	203
SA150A	SA150CA	150	3	167	185	1	243	2.1	184
SA180	SA180C	180	3	178	218	1	287	1.7	217
SA180A	SA180CA	180	3	178	197	1	258	1.9	188
SA170	SA170C ♦	170	3	189	231	1	304	1.6	230
SA170A	SA170CA ♦	170	3	189	209	1	275	1.8	208

NOTE 1: "A" =  $\pm 5\%$  of nominal  $V_{BR}$ , standard tolerance is  $\pm 10\%$ .  
 NOTE 2: Bidirectional devices have symmetrical avalanche characteristics in both directions.  
 NOTE 3: For bidirectional devices with  $V_{RWM} \leq 10$  volts, the  $I_R$  limit is doubled.  
 ♦ : Popular / Recommended part types

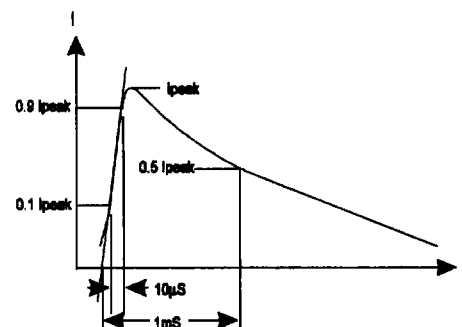
### PEAK PULSE POWER vs. PULSE TIME



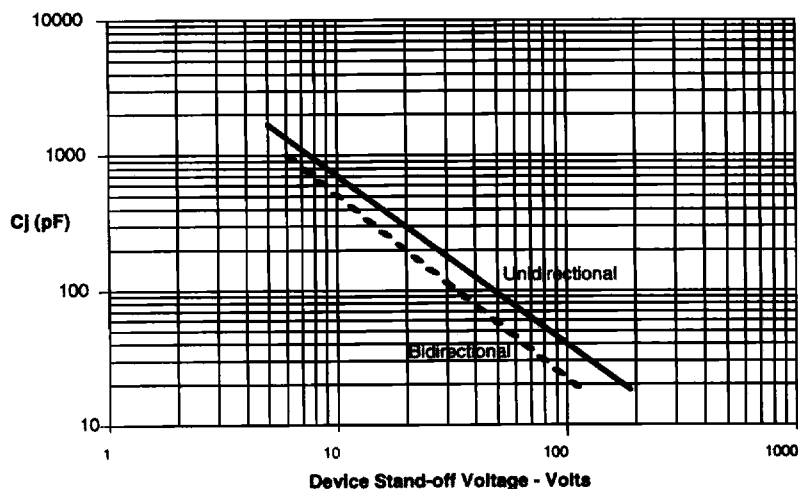
### PULSE DERATING CURVE

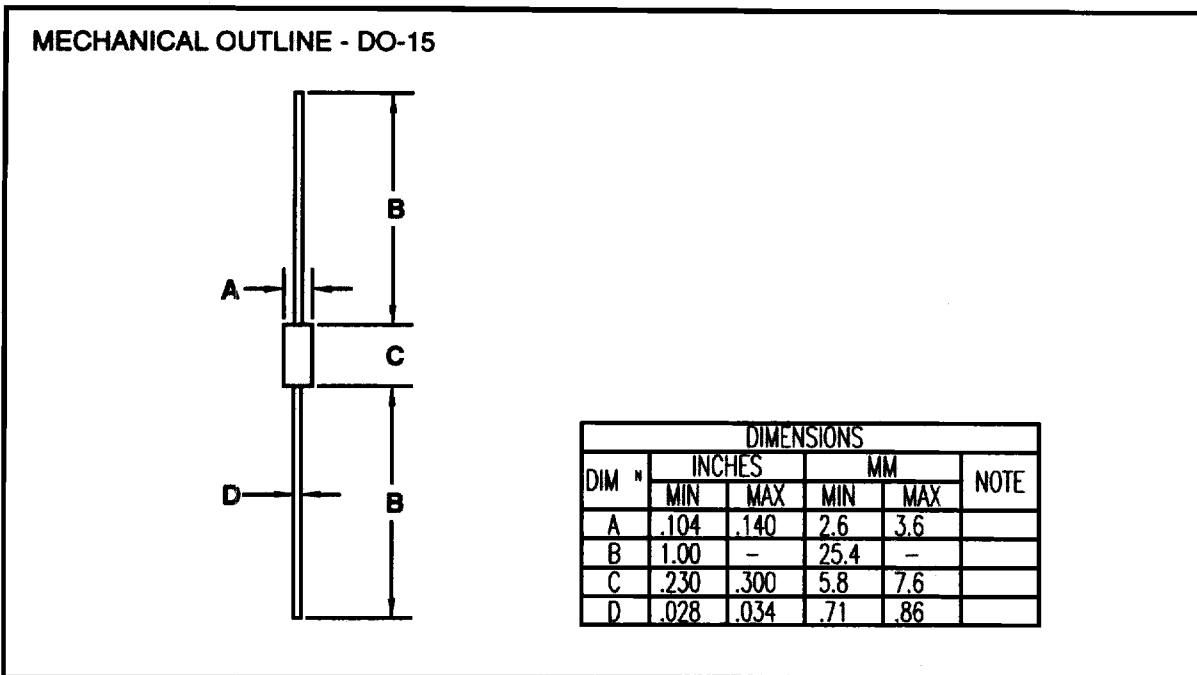


### 10x1000μs IMPULSE WAVEFORM



### CAPACITANCE vs. WORKING VOLTAGE





### TYPICAL APPLICATION

