



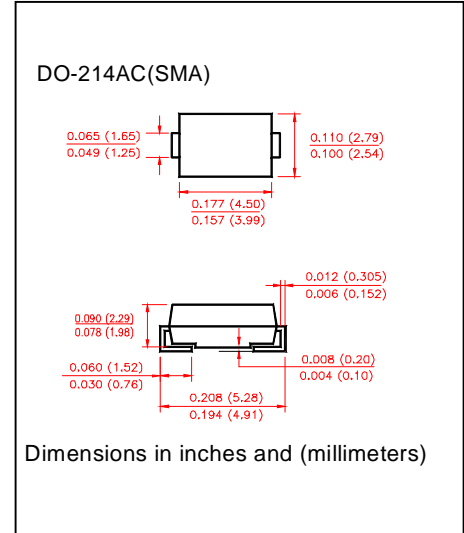
# SURFACE MOUNT TRANSIENT VOLTAGE SUPPRESSOR

SMA5.0 THRU SMA170CA

Stand-off Voltage 5.0 to 170 Volts  
Peak Pulse Power 300 Watts

## FEATURES

- For surface mounted applications in order to optimize board space
- Low profile package
- Built-in strain relief
- Glass passivated junction
- Low inductance
- Excellent clamping capability
- Repetition Rate (duty cycle): 0.01%
- Fast response time: typical less than 1.0ps from 0 volts to BV for unidirectional types
- Typical  $I_b$  less than  $1 \mu A$  above 10V
- High temperature soldering:  
250°C/W seconds at terminals
- Plastic package has Underwriters Laboratory Flammability Classification 94V-0



## MECHANICAL DATA

- Cass: JEDEC DO-214 AC, low profile molded plastic
- Terminals: Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity: Indicated by cathode band except bi-directional types
- Weight: 0.002 ounces, 0.064 gram
- Standard Packaging: 12mm tape per (EIA-481)

## MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

- Ratings at 25°C ambient temperature unless otherwise specified

	Symbols	Value	Unit
Peak Pulse Power Dissipation at $T_A=25^\circ C$ (NOTE 1,2,5) Fig.1	PPM	Minimum 400	Watts
Peak Forward Surge Current per Figure 5 (NOTE 3)	$I_{FSM}$	40.0	Amps
Peak Pulse Current on 10/10000 $\mu s$ wave from (NOTE 1, FIG. 2)	$I_{PPM}$	See Table 1	Amps
Steady Stage Power Dissipation (Note 4)	$P_{M(AV)}$	1.0	Watts
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	50 to + 150	°C

### Notes:

1. Non-repetitive current pulse, per Fig.3 and derated above  $T_A=25^\circ C$  per Fig.2
2. mounted on  $5.0mm^2$  copper pads to each terminal.
3. 8.3ms single half sine-wave duty cycle = 4 pulses per minutes maximum.
4. Lead temperature at  $75^\circ C = T_L$ .
5. Peak pulse power waveform is 10/1000  $\mu s$ .



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### Electrical Characteristic (T<sub>A</sub> = 25°C unless otherwise noted)

Device Type	Device Marking Code (Note 4)		Breakdown Voltage V <sub>(BR)</sub> (Volts) at Test Current I <sub>T</sub> (Note 1&2)			Working Peak Reverse Voltage V <sub>WM</sub> (Volts)	Maximum Reverse Leakage at V <sub>WM</sub> I <sub>D</sub> (μ A) (Note 3)	Maximum Peak Pulse Surge Current I <sub>PPM</sub> * (Amps)	Maximum Clamping Voltage at I <sub>PPM</sub> * V <sub>C</sub> (Volts)
	UNI	BI	MIN	MAX	I <sub>T</sub> (mA)				
SMA5.0	5V0	5V0C	6.4	7.81	10	5.0	800	31.3	9.6
SMA5.0A	5V0A	5V0CA	6.4	7.08	10	5.0	800	32.6	9.2
SMA6.0	6V0	6V0C	6.67	8.15	10	6.0	800	26.3	11.4
SMA6.0A	6V0A	6V0CA	6.67	7.37	10	6.0	800	29.1	10.3
SMA6.5	6V5	6V0C	7.22	8.82	10	6.5	500	24.4	12.3
SMA6.5A	6V5A	6V0CA	7.22	7.98	10	6.5	500	26.8	11.2
SMA7.0	7V0	7V0C	7.78	9.51	10	7.0	200	22.6	3.3
SMA7.0A	7V0A	7V0CA	7.78	8.6	10	7.0	200	25	12
SMA7.5	7V5	7V0C	8.33	10.3	1	7.5	100	21	14.3
SMA7.5A	7V5A	7V0CA	8.33	9.21	1	7.5	100	23.3	12.9
SMA8.0	8V0	8V0C	8.89	10.9	1	8.0	50	20	15
SMA8.0A	8V0A	8V0CA	8.89	9.83	1	8.0	50	22.1	13.6
SMA8.5	8V5	8V0C	9.44	11.5	1	8.5	10	18.9	15.9
SMA8.5A	8V5A	8V0CA	9.44	10.4	1	8.5	10	20.8	14.4
SMA9.0	9V0	9V0C	10	12.2	1	9.0	5	17.8	16.9
SMA9.0A	9V0A	9V0CA	10	11.1	1	9.0	5	19.5	15.4
SMA10	10V	10VC	11.1	13.6	1	10.0	5	16	18.8
SMA10A	10VA	10VCA	11.1	12.3	1	10.0	5	17.6	17
SMA11	11V	11VC	12.2	14.9	1	11.0	5	14.9	20.0
SMA11A	11VA	11VCA	12.2	13.5	1	11.0	5	16.5	18.2
SMA12	12V	12VC	13.3	16.3	1	12.0	5	13.6	22
SMA12A	12VA	12VCA	13.3	14.7	1	12.0	5	15.1	19.9
SMA13	13V	13VC	14.4	17.6	1	13.0	5	12.5	23.8
SMA13A	13VA	13VCA	14.4	15.9	1	13.0	5	14	21.5
SMA14	14V	14VC	15.6	19.1	1	14.0	5	11.6	25.8
SMA14A	14VA	14VCA	15.6	17.2	1	14.0	5	12.9	23.2
SMA15	15V	15VC	16.7	20.4	1	15.0	5	11.2	26.9
SMA15A	15VA	15VCA	16.7	18.5	1	15.0	5	12.3	24.4
SMA16	16V	16VC	17.8	21.8	1	16.0	5	10.4	28.8
SMA16A	16VA	16VCA	17.8	19.7	1	16.0	5	11.5	26
SMA17	17V	17VC	18.9	22.1	1	17.0	5	9.8	30.5
SMA17A	17VA	17VCA	18.9	20.9	1	17.0	5	10.9	27.6
SMA18	18V	18VC	20	24.4	1	18.0	5	9.3	32.2
SMA18A	18VA	18VCA	20	22.1	1	18.0	5	10.3	29.2
SMA20	20V	20VC	22.2	27.1	1	20.0	5	8.4	35.8
SMA20A	20VA	20VCA	22.2	24.5	1	20.0	5	9.3	32.4
SMA22	22V	22VC	24.4	29.8	1	22.2	5	7.6	39.4
SMA22A	22VA	22VCA	24.4	26.9	1	22.2	5	8.5	35.5
SMA24	24V	24VC	26.7	32.6	1	24.0	5	7	43
SMA24A	24VA	24VCA	26.7	29.5	1	24.0	5	7.7	38.9
SMA 26	26V	26VC	28.9	35.3	1	26.0	5	6.4	46.6
SMA26A	26VA	26VCA	28.9	31.9	1	26.0	5	7.1	42.1
SMA28	28V	28VC	31.1	38	1	28.0	5	6	50
SMA28A	28VA	28VCA	31.1	34.4	1	28.0	5	6.6	45.4
SMA30	30V	30VC	33.3	40.7	1	30.0	5	5.6	53.5
SMA30A	30VA	30VCA	33.3	36.8	1	30.0	5	6.2	48.4
SMA33	33V	33VC	36.7	44.9	1	33.0	5	5.1	59
SMA33A	33VA	33VCA	36.7	40.6	1	33.0	5	5.6	53.3

Notes:

\*Peak Pulse power waveform in 10/1000 us



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**Electrical Characteristic (T<sub>A</sub> = 25°C unless otherwise noted)**

Device Type	Device Marking Code (Note 4)		Breakdown Voltage V <sub>(BR)</sub> (Volts) at Test Current I <sub>T</sub> (Note 1&2)			Working Peak Reverse Voltage V <sub>WM</sub> (Volts)	Maximum Reverse Leakage at V <sub>WM</sub> I <sub>D</sub> (μA) (Note 3)	Maximum Peak Pulse Surge Current I <sub>PPM</sub> * (Amps)	Maximum Clamping Voltage at I <sub>PPM</sub> * V <sub>C</sub> (Volts)
	UNI VA	BI	MIN	MAX	I <sub>T</sub> (mA)				
SMA36	36V	36VC	40	48.6	1	36.0	5	4.7	64.3
SMA36A	36 VA	36 VCA	40	44.2	1	36.0	5	5.2	58.1
SMA40	40V	40 VC	44.4	54.3	1	40.0	5	4.2	71.4
SMA40A	40 VA	40 VCA	44.4	49.1	1	40.0	5	4.7	64.5
SMA43	43V	43 VC	47.8	58.4	1	43.0	5	3.9	76.7
SMA43A	43 VA	43 VCA	47.8	52.8	1	43.0	5	4.3	69.4
SMA45	45V	45 VC	50	61.1	1	43.0	5	3.7	80.3
SMA45A	45 VA	45 VCA	50	55.3	1	45.0	5	4.1	72.7
SMA48	48V	48 VC	53.3	65.1	1	48.0	5	3.5	85.5
SMA48A	48 VA	48 VCA	53.3	58.9	1	48.0	5	3.6	77.4
SMA51	51V	51 VC	56.7	69.3	1	51.0	5	3.3	91.1
SMA51A	51 VA	51 VCA	56.7	62.7	1	51.0	5	3.6	82.4
SMA54	54V	54 VC	60	73.3	1	54.0	5	3.1	96.3
SMA54A	54 VA	54 VCA	60	66.3	1	54.0	5	3.4	87.1
SMA58	58V	58 VC	64.4	78.7	1	58.0	5	2.9	103
SMA58A	58 VA	58 VCA	64.4	71.2	1	58.0	5	3.2	93.6
SMA60	60V	60 VC	66.7	81.5	1	60.0	5	2.8	107
SMA60A	60 VA	60 VCA	66.7	73.7	1	60.0	5	3.1	96.8
SMA64	64V	64 VC	71.1	86.4	1	64.0	5	2.6	114
SMA64A	64 VA	64 VCA	71.1	78.6	1	64.0	5	2.9	103
SMA70	70V	70 VC	77.8	95.1	1	70.0	5	2.4	125
SMA70A	70 VA	70 VCA	77.8	86	1	70.0	5	2.7	113
SMA75	75V	75 VC	83.3	102	1	75.0	5	2.2	134
SMA75A	75 VA	75 VCA	83.3	92.1	1	75.0	5	2.5	121
SMA78	78V	78 VC	86.7	106	1	78.0	5	2.2	139
SMA78A	78 VA	78 VCA	86.7	95.8	1	78.0	5	2.4	126
SMA85	85V	85 VC	94.4	115	1	85.0	5	2	151
SMA85A	85 VA	85 VCA	94.4	104	1	85.0	5	2.2	137
SMA90	90V	90 VC	100	122	1	90.0	5	1.9	160
SMA90A	90 VA	90 VCA	100	111	1	90.0	5	2.1	146
SMA100	100V	100 VC	111	136	1	100.0	5	1.7	179
SMA100A	100 VA	100 VCA	111	123	1	100.0	5	1.9	162
SMA110	110V	110 VC	122	149	1	110.0	5	1.5	196
SMA110A	110 VA	110 VCA	122	135	1	110.0	5	1.7	177
SMA120	120V	120 VC	133	163	1	120.0	5	1.4	214
SMA120A	120 VA	120 VCA	133	157	1	120.0	5	1.6	193
SMA130	130V	130 VC	144	176	1	130.0	5	1.3	231
SMA130A	130 VA	130 VCA	144	159	1	130.0	5	1.4	209
SMA150	150V	150 VC	167	204	1	150.0	5	1.1	268
SMA150A	150 VA	150 VCA	167	185	1	150.0	5	1.2	243
SMA160	160V	160 VC	178	218	1	160.0	5	1	287
SMA160A	160 VA	160 VCA	178	197	1	160.0	5	1.2	259
SMA170	170V	170 VC	189	231	1	170.0	5	0.99	304
SMA170A	170VA	170VCA	189	209	1	170.0	5	1.09	275

**Notes:**

- (1) Suffix A denotes 5% tolerance device, no suffix A denotes 10% tolerance device
- (2) V<sub>(BR)</sub> measured after I<sub>T</sub> applied for 300 μs I<sub>T</sub>=square wave pulse or equivalent
- (3) For bidirectional type having V<sub>WM</sub> of 10 volts and less, the I<sub>D</sub> limit is doubled
- (4) For bidirectional use C or CA suffixes for all types, electrical characteris apply in both directions



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## RATING AND CHARACTERISTIC CURVES SMA5.0 THRU SMA170CA

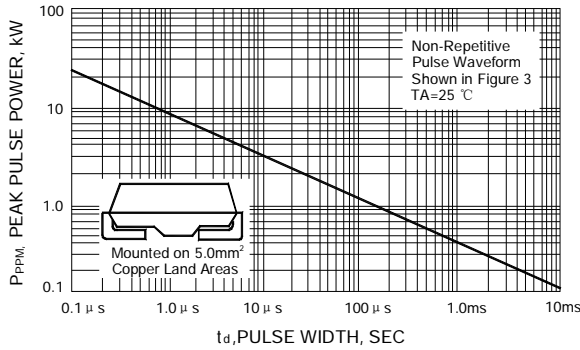


FIG. 1- PEAK PULSE POWER RATING CURVE

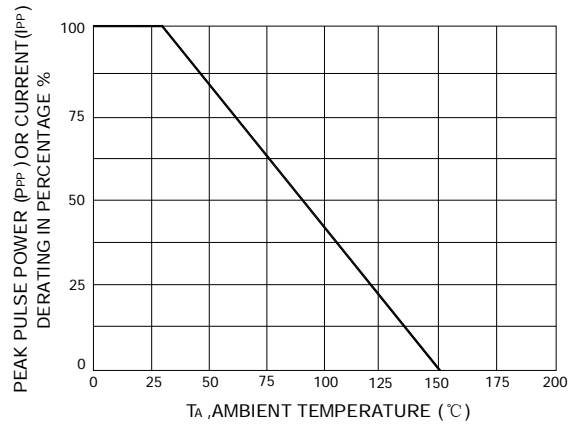


FIG. 2- PULSE RATING CURVE

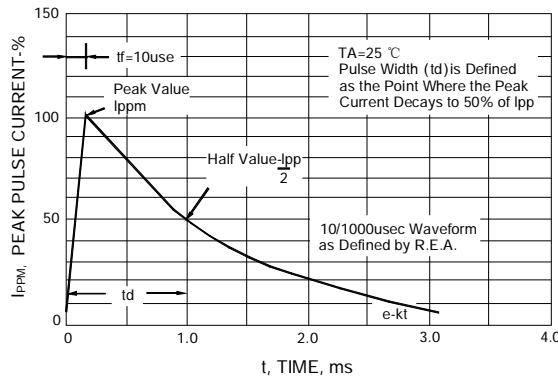


FIG. 3- PULSE WAVEFORM

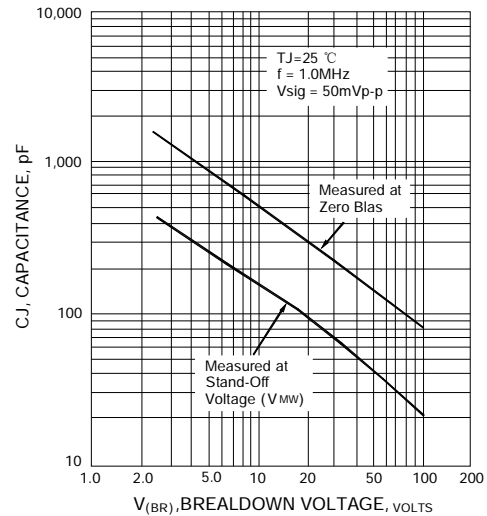


FIG. 4- TYPICAL JUNCTION CAPACITANCE

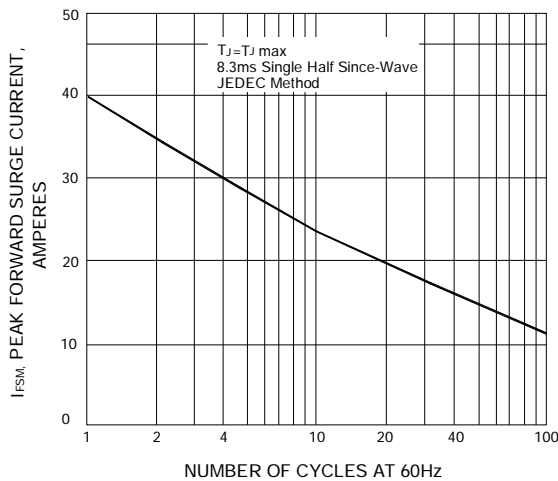


FIG. 5- MAXIMUM NON-REPETITIVE PEAK FORWARD SURGE CURRENT