

## 1500W, 5V - 170V Surface Mount Transient Voltage Suppressor

### FEATURES

- Ideal for automated placement
- Glass passivated junction
- Excellent clamping capability
- Fast response time: Typically less than 1.0ps from 0 V to BV min
- Typical  $I_R$  less than 1 $\mu$ A above 10V
- Moisture sensitivity level: level 1, per J-STD-020
- AEC-Q101 qualified available: ordering code with suffix "H"
- Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC

KEY PARAMETERS		
PARAMETER	VALUE	UNIT
$V_{WM}$	5 - 170	V
$V_{BR}$	6.4 - 231	V
$P_{PK}$	1500	W
$T_{JMAX}$	150	°C
Package	DO-214AB (SMC)	
Configuration	Single die	

### APPLICATIONS

- Immunization of sensitive devices in automotive, telecommunications, consumer electronics, and industrial equipment from electrostatic discharge (ESD) and transient voltages induced by load switching and lightning.



DO-214AB (SMC)

### MECHANICAL DATA

- Case : DO-214AB (SMC)
- Molding compound meets UL 94V-0 flammability rating
- Terminal : Matte tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 2 whisker test
- Polarity : As marked
- Weight : 0.21 g (approximately)

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Peak power dissipation at $T_A=25^\circ\text{C}$ , $t_p=1\text{ms}^{(1)}$	$P_{PK}$	1500	W
Steady state power dissipation at $T_A=25^\circ\text{C}$	$P_D$	5	W
Peak forward surge current, 8.3 ms single half sine-wave superimposed on rated load	$I_{FSM}$	200	A
Forward Voltage @ $I_F=100\text{A}$ for Unidirectional only <sup>(2)</sup>	$V_F$	3.5 /5.0	V
Junction temperature	$T_J$	-55 to +150	°C
Storage temperature	$T_{STG}$	-55 to +150	°C

#### Notes:

1. Non-repetitive current pulse per Fig. 3 and derated above  $T_A=25^\circ\text{C}$  per Fig. 2
2.  $V_F=3.5\text{V}$  on SMCJ5.0 - SMCJ90 devices and  $V_F=5.0\text{V}$  on SMCJ100 - SMCJ170 devices

Devices for bipolar applications

1. For bidirectional use C or CA suffix for types SMCJ5.0 - types SMCJ170
2. Electrical characteristics apply in both directions

<b>THERMAL PERFORMANCE</b>			
<b>PARAMETER</b>	<b>SYMBOL</b>	<b>TYP</b>	<b>UNIT</b>
Junction-to-ambient thermal resistance	$R_{\theta JA}$	55	°C/W
Junction-to-case thermal resistance	$R_{\theta JC}$	10	°C/W

<b>ELECTRICAL SPECIFICATIONS</b> ( $T_A = 25^\circ\text{C}$ unless otherwise noted)								
Part number	Marking code	Breakdown voltage $V_{BR@I_T}$ (V)		Test current $I_T$ (mA)	Working stand-off voltage $V_{WM}$ (V)	Maximum Reverse Leakage (Note 3) $I_R@V_{WM}$ ( $\mu\text{A}$ )	Maximum peak impulse current (Note 2) $I_{PPM}$ (A)	Maximum clamping voltage (Note 2) $V_C@I_{PPM}$ (V)
		MIN.	MAX.					
SMCJ5.0	GDD	6.4	7.3	10	5	1000	164	9.6
SMCJ5.0A	GDE	6.4	7	10	5	1000	171	9.2
SMCJ6.0	GDF	6.67	8.15	10	6	1000	138	11.4
SMCJ6.0A	GDG	6.67	7.37	10	6	1000	152	10.3
SMCJ6.5	GDH	7.22	8.82	10	6.5	500	128	12.3
SMCJ6.5A	GDK	7.22	7.98	10	6.5	500	140	11.2
SMCJ7.0	GDL	7.78	9.51	10	7	200	118	13.3
SMCJ7.0A	GDM	7.78	8.6	10	7	200	131	12.0
SMCJ7.5	GDN	8.33	10.30	1	7.5	100	110	14.3
SMCJ7.5A	GDP	8.33	9.21	1	7.5	100	122	12.9
SMCJ8.0	GDQ	8.89	10.9	1	8	50	105	15.0
SMCJ8.0A	GDR	8.89	9.83	1	8	50	115	13.6
SMCJ8.5	GDS	9.44	11.5	1	8.5	20	99	15.9
SMCJ8.5A	GDT	9.44	10.4	1	8.5	20	109	14.4
SMCJ9.0	GDU	10	12.2	1	9	10	93	16.9
SMCJ9.0A	GDV	10	11.1	1	9	10	102	15.4
SMCJ10	GDW	11.1	13.6	1	10	5	83	18.8
SMCJ10A	GDX	11.1	12.3	1	10	5	92	17.0
SMCJ11	GDY	12.2	14.9	1	11	1	78	20.1
SMCJ11A	GDZ	12.2	13.5	1	11	1	86	18.2
SMCJ12	GED	13.3	16.3	1	12	1	71	22.0
SMCJ12A	GEE	13.3	14.7	1	12	1	79	19.9
SMCJ13	GEF	14.4	17.6	1	13	1	66	23.8
SMCJ13A	GEG	14.4	15.9	1	13	1	73	21.5
SMCJ14	GEH	15.6	19.1	1	14	1	61	25.8
SMCJ14A	GEK	15.6	17.2	1	14	1	67	23.2
SMCJ15	GEL	16.7	20.4	1	15	1	58	26.9
SMCJ15A	GEM	16.7	18.5	1	15	1	64	24.4
SMCJ16	GEN	17.8	21.8	1	16	1	54	28.8
SMCJ16A	GEP	17.8	19.7	1	16	1	60	26.0
SMCJ17	GEQ	18.9	23.1	1	17	1	51	30.5
SMCJ17A	GER	18.9	20.9	1	17	1	57	27.6
SMCJ18	GES	20	24.4	1	18	1	48	32.2
SMCJ18A	GET	20	22.1	1	18	1	53	29.2
SMCJ20	GEU	22.2	27.1	1	20	1	43	35.8
SMCJ20A	GEV	22.2	24.5	1	20	1	48	32.4
SMCJ22	GEW	24.4	29.8	1	22	1	39	39.4
SMCJ22A	GEX	24.4	26.9	1	22	1	44	35.5
SMCJ24	GEY	26.7	32.6	1	24	1	36	43.0
SMCJ24A	GEZ	26.7	29.5	1	24	1	40	38.9
SMCJ26	GFD	28.9	35.3	1	26	1	33	46.6
SMCJ26A	GFE	28.9	31.9	1	26	1	37	42.1
SMCJ28	GFF	31.1	38	1	28	1	31	50.0

ELECTRICAL SPECIFICATIONS (T <sub>A</sub> = 25°C unless otherwise noted)								
Part number	Marking code	Breakdown voltage V <sub>BR@IT</sub> (V)		Test current I <sub>T</sub> (mA)	Working stand-off voltage V <sub>WM</sub> (V)	Maximum Reverse Leakage (Note 3) I <sub>R@VWM</sub> (μA)	Maximum peak impulse current (Note 2) I <sub>PPM</sub> (A)	Maximum clamping voltage (Note 2) V <sub>C@IPPM</sub> (V)
		MIN.	MAX.					
SMCJ28A	GFG	31.1	34.4	1	28	1	34	45.4
SMCJ30	GFH	33.3	40.7	1	30	1	29	53.5
SMCJ30A	GFK	33.3	36.8	1	30	1	32	48.4
SMCJ33	GFL	36.7	44.9	1	33	1	26	59.0
SMCJ33A	GFM	36.7	40.6	1	33	1	29	53.3
SMCJ36	GFN	40	48.9	1	36	1	24	64.3
SMCJ36A	GFP	40	44.2	1	36	1	27	58.1
SMCJ40	GFQ	44.4	54.3	1	40	1	22	71.4
SMCJ40A	GFR	44.4	49.1	1	40	1	24	64.5
SMCJ43	GFS	47.8	58.4	1	43	1	20	76.7
SMCJ43A	GFT	47.8	52.8	1	43	1	22	69.4
SMCJ45	GFU	50	61.1	1	45	1	19	80.3
SMCJ45A	GFV	50	55.3	1	45	1	21	72.7
SMCJ48	GFW	53.3	65.1	1	48	1	18	85.5
SMCJ48A	GFX	53.3	58.9	1	48	1	20	77.4
SMCJ51	GFY	56.7	69.3	1	51	1	17	91.1
SMCJ51A	GFZ	56.7	62.7	1	51	1	19	82.4
SMCJ54	GGD	60	73.3	1	54	1	16	96.3
SMCJ54A	GGE	60	66.3	1	54	1	18	87.1
SMCJ58	GGF	64.4	78.7	1	58	1	15	103
SMCJ58A	GGG	64.4	71.2	1	58	1	16	93.6
SMCJ60	GGH	66.7	81.5	1	60	1	14	107
SMCJ60A	GGK	66.7	73.7	1	60	1	16	96.8
SMCJ64	GGL	71.1	86.9	1	64	1	13.8	114
SMCJ64A	GGM	71.1	78.6	1	64	1	15	103
SMCJ70	GGN	77.8	95.1	1	70	1	12.6	125
SMCJ70A	GGP	77.8	86	1	70	1	13.9	113
SMCJ75	GGQ	83.3	102	1	75	1	11.7	134
SMCJ75A	GGR	83.3	92.1	1	75	1	13	121
SMCJ78	GGS	86.7	106	1	78	1	11.3	139
SMCJ78A	GGT	86.7	95.8	1	78	1	12.5	126
SMCJ85	GGU	94.4	115	1	85	1	10.4	151
SMCJ85A	GGV	94.4	104	1	85	1	11.5	137
SMCJ90	GGW	100	122	1	90	1	9.8	160
SMCJ90A	GGX	100	111	1	90	1	10.7	146
SMCJ100	GGY	111	136	1	100	1	8.8	179
SMCJ100A	GGZ	111	123	1	100	1	9.7	162
SMCJ110	GHD	122	149	1	110	1	8	196
SMCJ110A	GHE	122	135	1	110	1	8.9	177
SMCJ120	GHF	133	163	1	120	1	7.3	214
SMCJ120A	GHG	133	147	1	120	1	8.1	193
SMCJ130	GHH	144	176	1	130	1	6.8	231
SMCJ130A	GHK	144	159	1	130	1	7.5	209
SMCJ150	GHL	167	204	1	150	1	5.8	266
SMCJ150A	GHM	167	185	1	150	1	6.4	243
SMCJ160	GHN	178	218	1	160	1	5.4	287
SMCJ160A	GHP	178	197	1	160	1	6	259
SMCJ170	GHQ	189	231	1	170	1	5.1	304
SMCJ170A	GHR	189	209	1	170	1	5.7	275

**Notes:**

1. V<sub>BR</sub> measure after I<sub>T</sub> applied for 300μs, I<sub>T</sub>=square wave pulse or equivalent
2. Surge current waveform per Figure. 3 and derate per Figure. 2
3. For bipolar types having V<sub>WM</sub> of 10 V and under, the I<sub>R</sub> limit is doubled
4. All terms and symbols are consistent with ANSI/IEEE C62.35

<b>ORDERING INFORMATION</b>		
<b>ORDERING CODE</b> (Note 1, 2, 3)	<b>PACKAGE</b>	<b>PACKING</b>
SMCJxxxxHR7G	SMC	850 / 7" Plastic reel
SMCJxxxxHR6G	SMC	3,000 / 13" Paper reel
SMCJxxxxHM6G	SMC	3,000 / 13" Plastic reel
SMCJxxxx R7G	SMC	850 / 7" Plastic reel
SMCJxxxx R6G	SMC	3,000 / 13" Paper reel
SMCJxxxx M6G	SMC	3,000 / 13" Plastic reel
SMCJxxxxHV7G	Matrix SMC	850 / 7" Plastic reel
SMCJxxxxHV6G	Matrix SMC	3,000 / 13" Plastic reel
SMCJxxxx V7G	Matrix SMC	850 / 7" Plastic reel
SMCJxxxx V6G	Matrix SMC	3,000 / 13" Plastic reel
SMCJxxxxHR7	SMC	850 / 7" Plastic reel
SMCJxxxxHR6	SMC	3,000 / 13" Paper reel
SMCJxxxxHM6	SMC	3,000 / 13" Plastic reel
SMCJxxxx R7	SMC	850 / 7" Plastic reel
SMCJxxxx R6	SMC	3,000 / 13" Paper reel
SMCJxxxx M6	SMC	3,000 / 13" Plastic reel
SMCJxxxxHV7	Matrix SMC	850 / 7" Plastic reel
SMCJxxxxHV6	Matrix SMC	3,000 / 13" Plastic reel
SMCJxxxx V7	Matrix SMC	850 / 7" Plastic reel
SMCJxxxx V6	Matrix SMC	3,000 / 13" Plastic reel

**Note 1:**

"xxx" defines voltage from 5.0V (SMCJ5.0) to 170V (SMCJ170A)

**Note 2:**

"H" means AEC-Q101 qualified

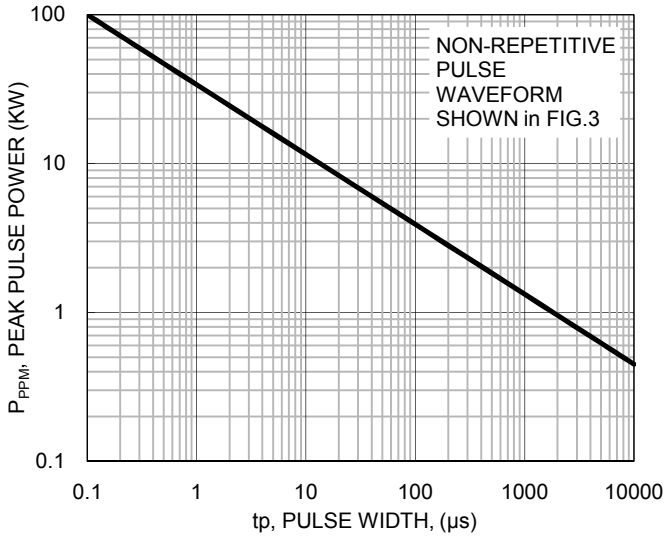
**Note 3:**

"G" means green compound (halogen free)

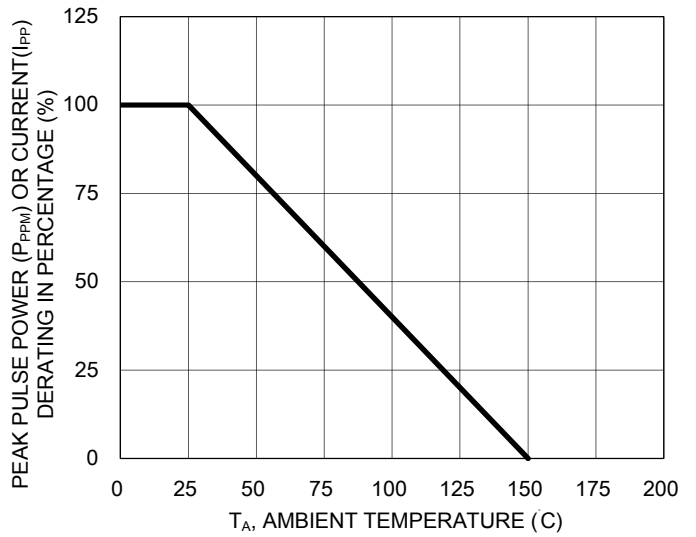
**CHARACTERISTICS CURVES**

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

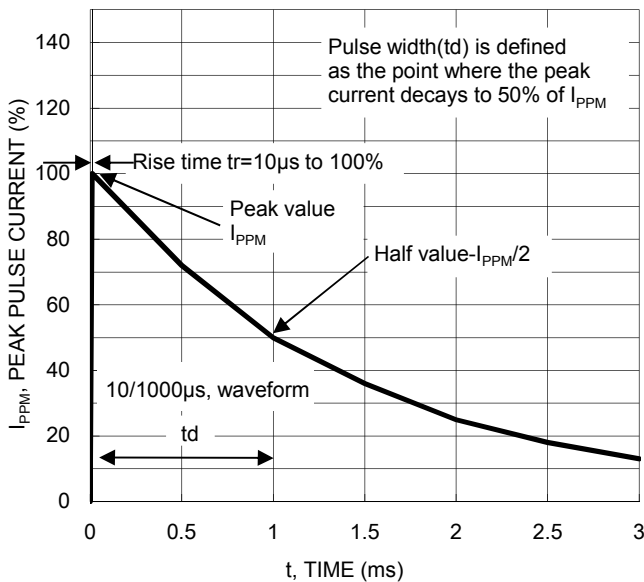
**Fig.1 Peak Pulse Power Rating Curve**



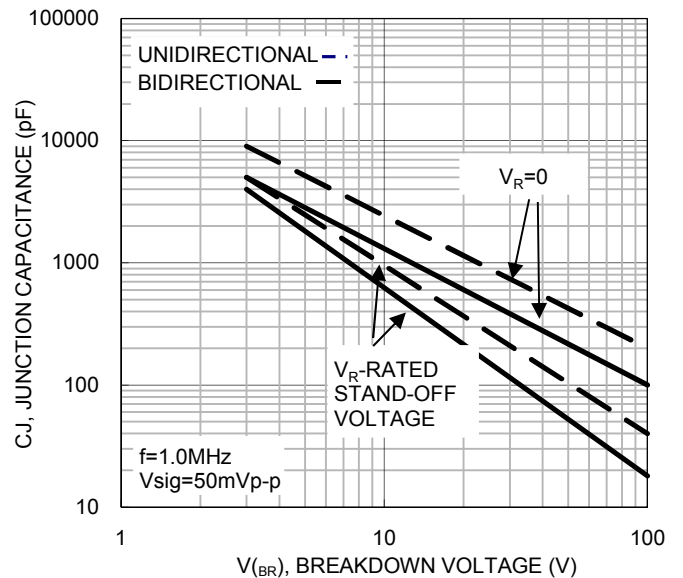
**Fig.2 Pulse Derating Curve**



**Fig.3 Clamping Power Pulse Waveform**



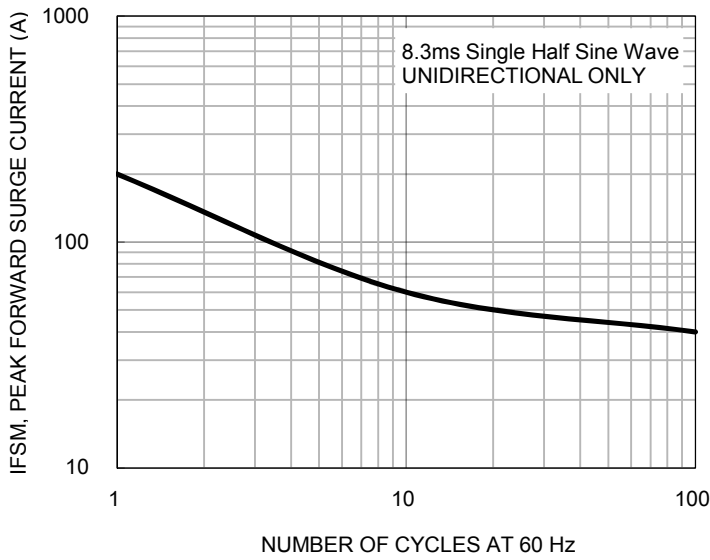
**Fig.4 Typical Junction Capacitance**



**CHARACTERISTICS CURVES**

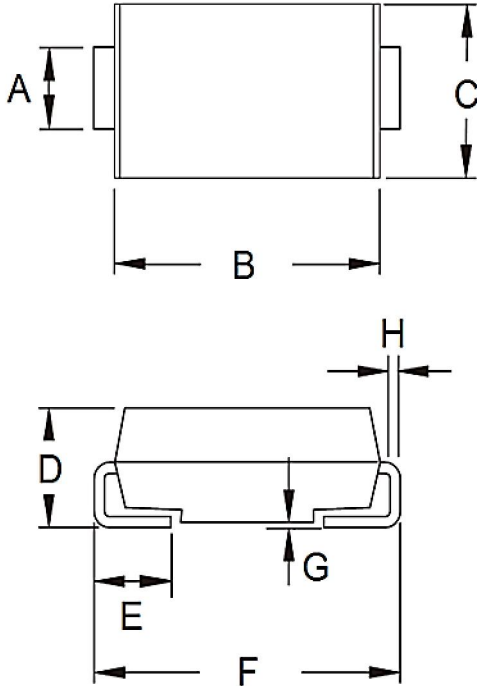
(T<sub>A</sub> = 25°C unless otherwise noted)

**Fig.5 Maximum Non-repetitive Forward Surge Current**



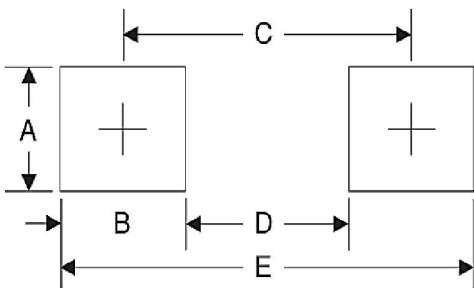
**PACKAGE OUTLINE DIMENSIONS**

DO-214AB (SMC)



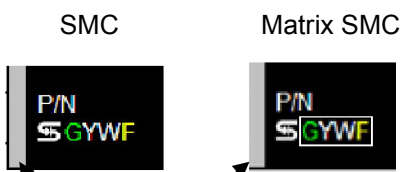
DIM.	Unit (mm)		Unit (inch)	
	Min.	Max.	Min.	Max.
A	2.90	3.20	0.114	0.126
B	6.60	7.11	0.260	0.280
C	5.59	6.22	0.220	0.245
D	2.00	2.62	0.079	0.103
E	1.00	1.60	0.039	0.063
F	7.75	8.13	0.305	0.320
G	0.10	0.20	0.004	0.008
H	0.15	0.31	0.006	0.012

**SUGGESTED PAD LAYOUT**



Symbol	Unit (mm)	Unit (inch)
A	3.30	0.130
B	2.50	0.098
C	6.80	0.268
D	4.40	0.173
E	9.40	0.370

**MARKING DIAGRAM**



- P/N =Marking Code
- G =Green Compound
- YW =Date Code
- F =Factory Code

Note: Cathode band for unidirectional products only

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