

## 1500W, 6.8V - 200V Surface Mount Transient Voltage Suppressor

### FEATURES

- Ideal for automated placement
- Glass passivated junction
- Excellent clamping capability
- Fast response time: Typically less than 1.0ps
- 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
$V_{WM}$	5.5 - 171	V
$V_{BR}$	6.8 - 200	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 ( $T_A = 25^\circ C$ unless otherwise noted)

PARAMETER	SYMBOL	VALUE	UNIT
Peak power dissipation at $T_A=25^\circ C$ , $t_p=1ms^{(1)}$	$P_{PK}$	1500	W
Steady state power dissipation at $T_A=25^\circ C$	$P_D$	6.5	W
Peak forward surge current, 8.3 ms single half sine-wave superimposed on rated load	$I_{FSM}$	200	A
Forward Voltage @ $I_F=50A$ for Unidirectional only $^{(2)}$	$V_F$	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  $T_A=25^\circ C$  per Fig. 2
2.  $V_F=3.5V$  on 1.5SMC6.8 - 1.5SMC91 and  $V_F=5.0V$  on 1.5SMC100 - 1.5SMC200

#### Devices for Bipolar Applications

1. For bidirectional use C or CA suffix for types 1.5SMC6.8 - types 1.5SMC200A
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	$R_{\theta JA}$	50	$^{\circ}\text{C/W}$
Junction-to-case thermal resistance	$R_{\theta JC}$	15	$^{\circ}\text{C/W}$

<b>ELECTRICAL SPECIFICATIONS</b> ( $T_A = 25^{\circ}\text{C}$ unless otherwise noted)									
Part number	Marking code	Breakdown voltage (Note 1) $V_{BR@I_T}$ (V)		Test current $I_T$ (mA)	Working stand-off voltage $V_{WM}$ (V)	Maximum blocking leakage current $I_R@V_{WM}$ ( $\mu\text{A}$ )	Maximum peak impulse current (Note 2) $I_{PPM}$ (A)	Maximum clamping voltage $V_C@I_{PPM}$ (V)	Maximum Temperature Coefficient of $V_{BR}$ (%/ $^{\circ}\text{C}$ )
		MIN.	MAX.						
1.5SMC6.8	DDJ	6.12	7.48	10	5.50	1000	145	10.8	0.057
1.5SMC6.8A	DEJ	6.46	7.14	10	5.80	1000	150	10.5	0.057
1.5SMC7.5	DFJ	6.75	8.25	10	6.05	500	134	11.7	0.061
1.5SMC7.5A	DGJ	7.13	7.88	10	6.40	500	139	11.3	0.061
1.5SMC8.2	DHJ	7.38	9.02	10	6.63	200	126	12.5	0.065
1.5SMC8.2A	DKJ	7.79	8.61	10	7.02	200	130	12.1	0.065
1.5SMC9.1	DLJ	8.19	10.00	1.0	7.37	50	114	13.8	0.068
1.5SMC9.1A	DMJ	8.65	9.55	1.0	7.78	50	117	13.4	0.068
1.5SMC10	DNJ	9.00	11.00	1.0	8.10	10	105	15.0	0.073
1.5SMC10A	DPJ	9.50	10.5	1.0	8.55	10	108	14.5	0.073
1.5SMC11	DQJ	9.90	12.1	1.0	8.92	1	97	16.2	0.075
1.5SMC11A	DRJ	10.5	11.6	1.0	9.40	1	100	15.6	0.075
1.5SMC12	DSJ	10.8	13.2	1.0	9.72	1	91	17.3	0.078
1.5SMC12A	DTJ	11.4	12.6	1.0	10.2	1	94	16.7	0.078
1.5SMC13	DUJ	11.7	14.3	1.0	10.5	1	82	19.0	0.081
1.5SMC13A	DVJ	12.4	13.7	1.0	11.1	1	86	18.2	0.081
1.5SMC15	DWJ	13.5	16.5	1.0	12.1	1	71	22.0	0.084
1.5SMC15A	DXJ	14.3	15.8	1.0	12.8	1	74	21.2	0.084
1.5SMC16	DYJ	14.4	17.6	1.0	12.9	1	67	23.5	0.086
1.5SMC16A	DZJ	15.2	16.8	1.0	13.6	1	70	22.5	0.086
1.5SMC18	EDJ	16.2	19.8	1.0	14.5	1	59	26.5	0.088
1.5SMC18A	EEJ	17.1	18.9	1.0	15.3	1	60	25.5	0.088
1.5SMC20	EFJ	18.0	22.0	1.0	16.2	1	54	29.1	0.090
1.5SMC20A	EGJ	19.0	21.0	1.0	17.1	1	56	27.7	0.090
1.5SMC22	EHJ	19.8	24.2	1.0	17.8	1	49	31.9	0.092
1.5SMC22A	EKJ	20.9	23.1	1.0	18.8	1	51	30.6	0.092
1.5SMC24	ELJ	21.6	26.4	1.0	19.4	1	45	34.7	0.094
1.5SMC24A	EMJ	22.8	25.2	1.0	20.5	1	47	33.2	0.094
1.5SMC27	ENJ	24.3	29.7	1.0	21.8	1	40	39.1	0.096
1.5SMC27A	EPJ	25.7	28.4	1.0	23.1	1	42	37.5	0.096
1.5SMC30	EQJ	27.0	33.0	1.0	24.3	1	36	43.5	0.097
1.5SMC30A	ERJ	28.5	31.5	1.0	25.6	1	38	41.4	0.097
1.5SMC33	ESJ	29.7	36.3	1.0	26.8	1	33	47.7	0.098
1.5SMC33A	ETJ	31.4	34.7	1.0	28.2	1	34	45.7	0.098
1.5SMC36	EUJ	32.4	39.6	1.0	29.1	1	30	52.0	0.099
1.5SMC36A	EVJ	34.2	37.8	1.0	30.8	1	31	49.9	0.099
1.5SMC39	EWJ	35.1	42.9	1.0	31.6	1	27	56.4	0.100
1.5SMC39A	EXJ	37.1	41.0	1.0	33.3	1	29	53.9	0.100
1.5SMC43	EYJ	38.7	47.3	1.0	34.8	1	25	61.9	0.101
1.5SMC43A	EZJ	40.9	45.2	1.0	36.8	1	26	59.3	0.101
1.5SMC47	FDJ	42.3	51.7	1.0	38.1	1	23	67.8	0.101
1.5SMC47A	FEJ	44.7	49.4	1.0	40.2	1	24	64.8	0.101
1.5SMC51	FFJ	45.9	56.1	1.0	41.3	1	21	73.5	0.102

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

Part number	Marking code	Breakdown voltage (Note 1) $V_{BR}@I_T$ (V)		Test current $I_T$ (mA)	Working stand-off voltage $V_{WM}$ (V)	Maximum blocking leakage current $I_R@V_{WM}$ ( $\mu\text{A}$ )	Maximum peak impulse current (Note 2) $I_{PPM}$ (A)	Maximum clamping voltage $V_C@I_{PPM}$ (V)	Maximum Temperature Coefficient of $V_{BR}$ (%/°C)
		MIN.	MAX.						
1.5SMC51A	FGJ	48.5	53.6	1.0	43.6	1	22	70.1	0.102
1.5SMC56	FHJ	50.4	61.6	1.0	45.4	1	19	80.5	0.103
1.5SMC56A	FKJ	53.2	58.8	1.0	47.8	1	20	77.0	0.103
1.5SMC62	FLJ	55.8	68.2	1.0	50.2	1	17	89.0	0.104
1.5SMC62A	FMJ	58.9	65.1	1.0	53.0	1	18	85.0	0.104
1.5SMC68	FNJ	61.2	74.8	1.0	55.1	1	16	98.0	0.104
1.5SMC68A	FPJ	64.6	71.4	1.0	58.1	1	17	92.0	0.104
1.5SMC75	FQJ	67.5	82.5	1.0	60.7	1	14	108	0.105
1.5SMC75A	FRJ	71.3	78.8	1.0	64.1	1	15	103	0.105
1.5SMC82	FSJ	73.8	90.2	1.0	66.4	1	13	118	0.105
1.5SMC82A	FTJ	77.9	86.1	1.0	70.1	1	13.9	113	0.105
1.5SMC91	FUJ	81.9	100	1.0	73.7	1	12	131	0.106
1.5SMC91A	FVJ	86.5	95.5	1.0	77.8	1	12.6	125	0.106
1.5SMC100	FWJ	90	110	1.0	81.0	1	10.9	144	0.106
1.5SMC100A	FXJ	95	105	1.0	85.5	1	11.4	137	0.106
1.5SMC110	FYJ	99	121	1.0	89.2	1	9.9	158	0.107
1.5SMC110A	FZJ	105	116	1.0	94.0	1	10.3	152	0.107
1.5SMC120	GDJ	108	132	1.0	97.2	1	9.1	173	0.107
1.5SMC120A	GEJ	114	126	1.0	102.0	1	9.5	165	0.107
1.5SMC130	GFJ	117	143	1.0	105.0	1	8.4	187	0.107
1.5SMC130A	GGJ	124	137	1.0	111.0	1	8.7	179	0.107
1.5SMC150	GHJ	135	165	1.0	121.0	1	7.3	215	0.108
1.5SMC150A	GKJ	143	158	1.0	128.0	1	7.6	207	0.108
1.5SMC160	GLJ	144	176	1.0	130.0	1	6.8	230	0.108
1.5SMC160A	GMJ	152	168	1.0	136.0	1	7.1	219	0.108
1.5SMC170	GNJ	153	187	1.0	138.0	1	6.4	244	0.108
1.5SMC170A	GPJ	162	179	1.0	145.0	1	6.7	234	0.108
1.5SMC180	GQJ	162	198	1.0	146.0	1	6.1	258	0.108
1.5SMC180A	GRJ	171	189	1.0	154.0	1	6.4	246	0.108
1.5SMC200	GSJ	180	220	1.0	162.0	1	5.4	287	0.108
1.5SMC200A	GTJ	190	210	1.0	171.0	1	5.7	274	0.108

**Notes:**

1.  $V_{BR}$  measure after  $I_T$  applied for 30ms,  $I_T$ =square wave pulse or equivalent
2. Surge current waveform per Fig. 3 and derate per Fig. 2
3. For bipolar types having  $V_{WM}$  of 10 V and under, the  $I_R$  limit is doubled
4. For bidirectional use C or CA suffix for types 1.5SMC6.8 - 1.5SMC200A
5. 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>
1.5SMCxxxxHR7G	SMC	850 / 7" Plastic reel
1.5SMCxxxxHR6G	SMC	3,000 / 13" Paper reel
1.5SMCxxxxHM6G	SMC	3,000 / 13" Plastic reel
1.5SMCxxxx R7G	SMC	850 / 7" Plastic reel
1.5SMCxxxx R6G	SMC	3,000 / 13" Paper reel
1.5SMCxxxx M6G	SMC	3,000 / 13" Plastic reel
1.5SMCxxxxHV7G	Matrix SMC	850 / 7" Plastic reel
1.5SMCxxxxHV6G	Matrix SMC	3,000 / 13" Plastic reel
1.5SMCxxxx V7G	Matrix SMC	850 / 7" Plastic reel
1.5SMCxxxx V6G	Matrix SMC	3,000 / 13" Plastic reel
1.5SMCxxxxHR7	SMC	850 / 7" Plastic reel
1.5SMCxxxxHR6	SMC	3,000 / 13" Paper reel
1.5SMCxxxxHM6	SMC	3,000 / 13" Plastic reel
1.5SMCxxxx R7	SMC	850 / 7" Plastic reel
1.5SMCxxxx R6	SMC	3,000 / 13" Paper reel
1.5SMCxxxx M6	SMC	3,000 / 13" Plastic reel

**Note 1:**

"xxxx" defines voltage from 6.8V  
(1.5SMC6.8) to 200V (1SMC200A)

**Note 2:**

"H" means AEC-Q101 qualified

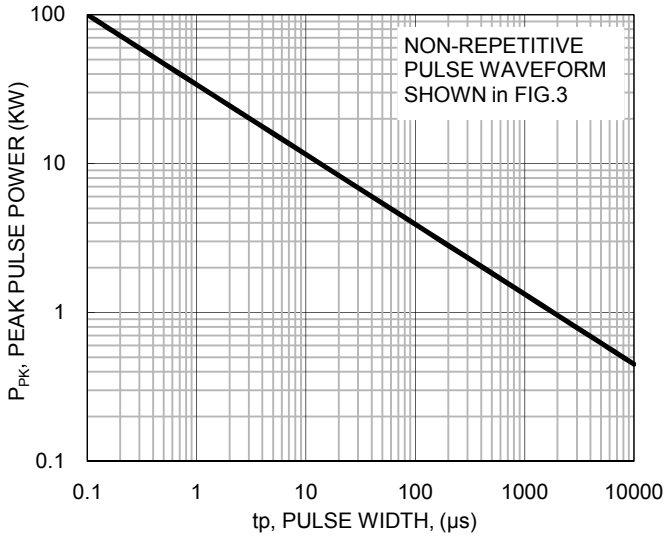
**Note 3:**

"G" means green compound (halogen free)

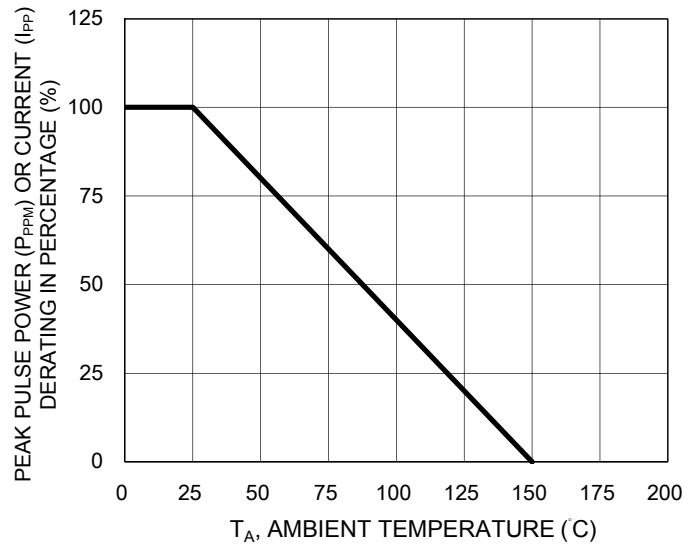
**CHARACTERISTICS CURVES**

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

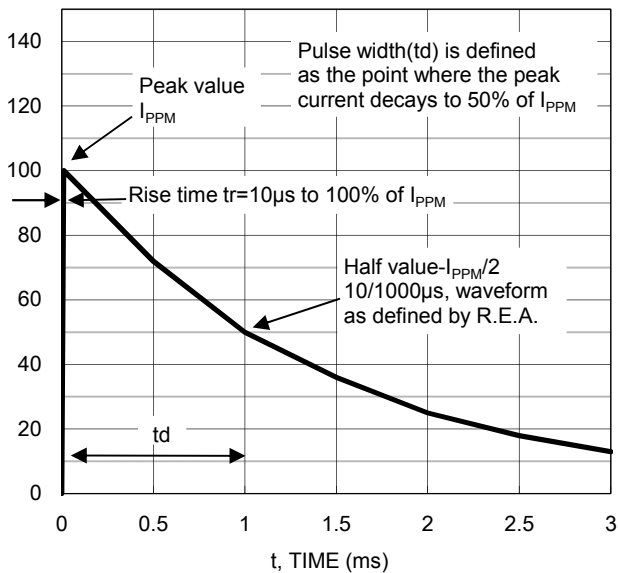
**Fig.1 Peak Pulse Power Rating Curve**



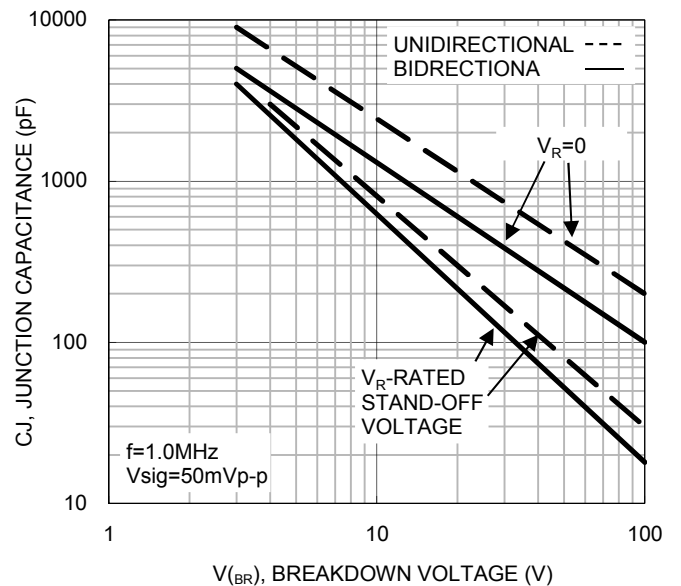
**Fig.2 Pulse Derating Curve**



**Fig.3 Clamping Power Pulse Waveform**



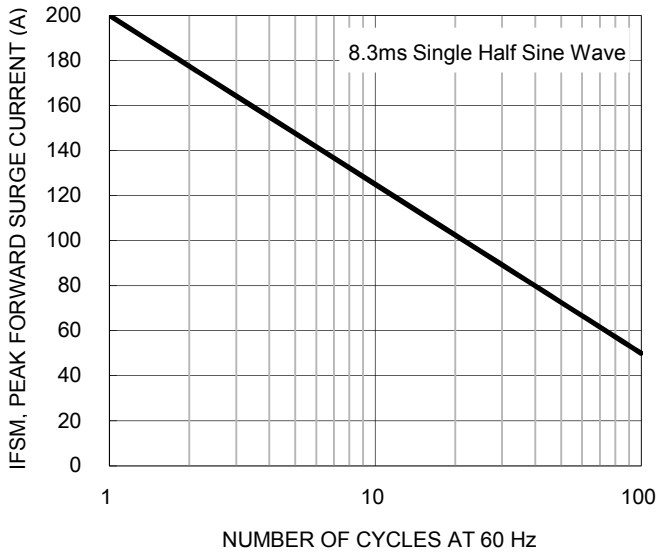
**Fig.4 Typical Junction Capacitance**



**CHARACTERISTICS CURVES**

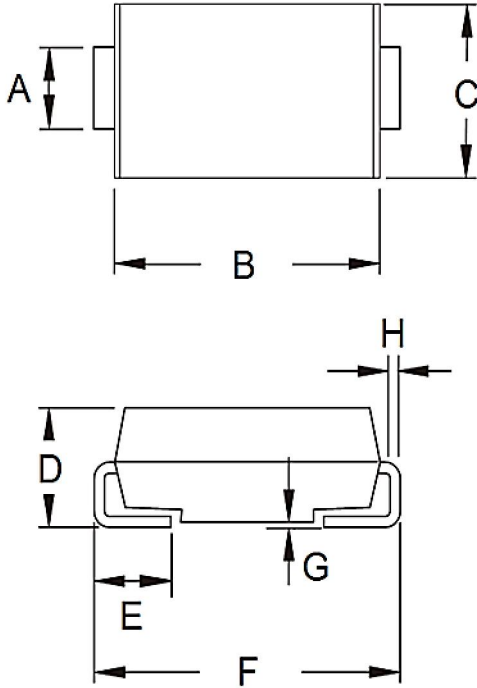
(T<sub>A</sub> = 25°C unless otherwise noted)

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



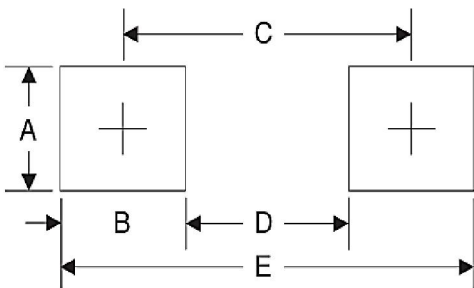
**PACKAGE OUTLINE DIMENSIONS**

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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