

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 μ 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
$T_{J\ MAX}$	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 ⁽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 $T_A=25^\circ\text{C}$ 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

THERMAL PERFORMANCE

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

ELECTRICAL SPECIFICATIONS ($T_A = 25^\circ\text{C}$ 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) $I_R@V_{WM}$ (μA)	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 ($T_A = 25^\circ\text{C}$ 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) $I_R@V_{WM}$ (μA)	Maximum peak impulse current (Note 2) I_{PPM} (A)	Maximum clamping voltage (Note 2) $V_C@I_{PPM}$ (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_{BR} measure after I_T applied for 300 μs , I_T =square wave pulse or equivalent
2. Surge current waveform per Figure. 3 and derate per Figure. 2
3. For bipolar types having V_{WM} of 10 V and under, the I_R limit is doubled
4. All terms and symbols are consistent with ANSI/IEEE C62.35

ORDERING INFORMATION		
ORDERING CODE (Note 1, 2, 3)	PACKAGE	PACKING
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:

"xxxx" 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

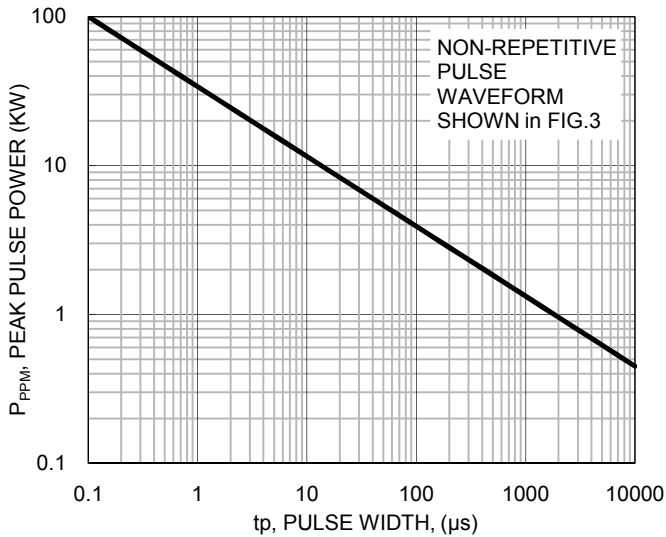


Fig.2 Pulse Derating Curve

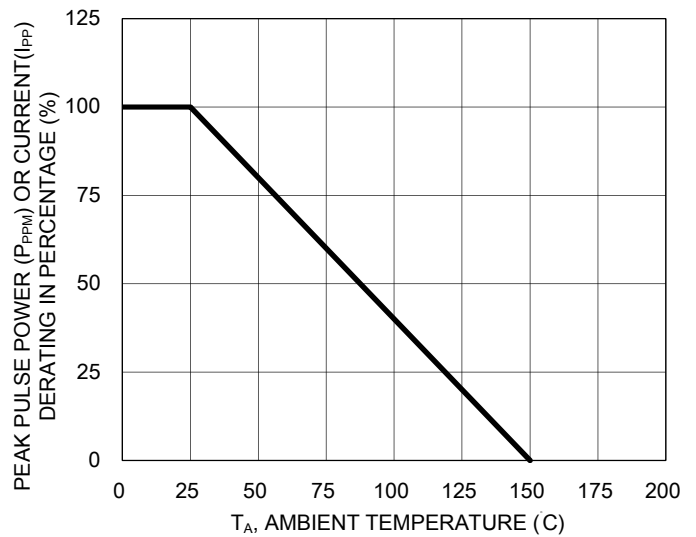


Fig.3 Clamping Power Pulse Waveform

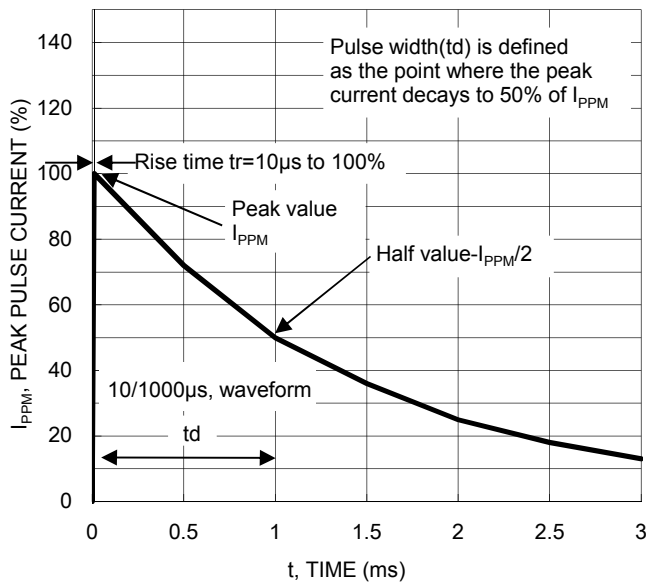
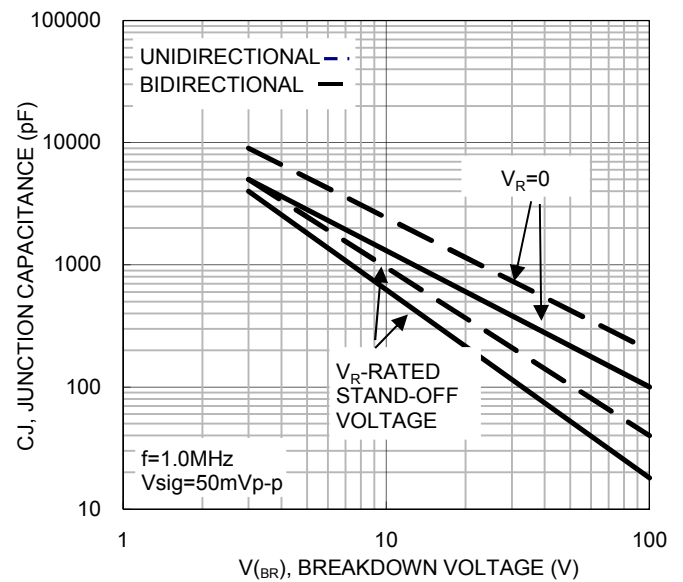


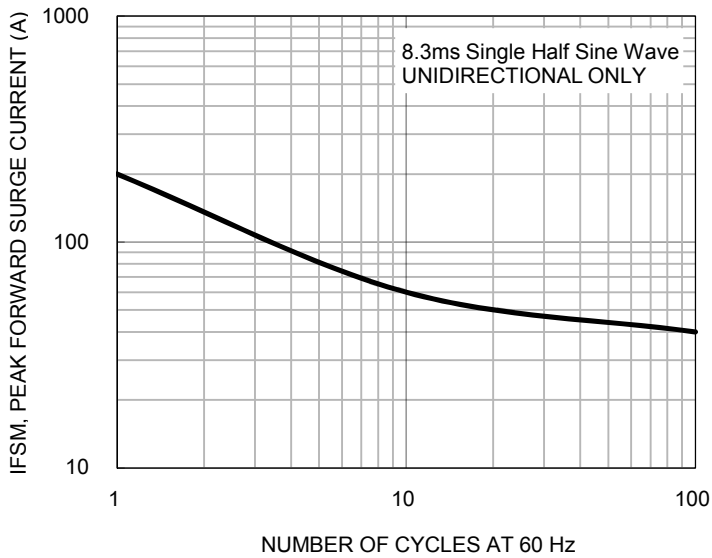
Fig.4 Typical Junction Capacitance



CHARACTERISTICS CURVES

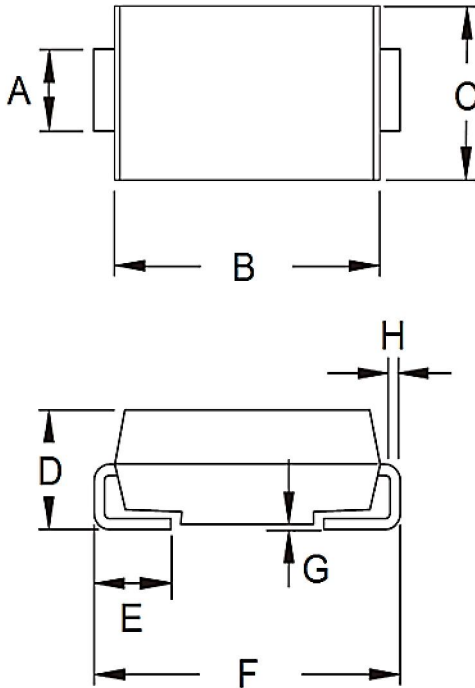
($T_A = 25^\circ\text{C}$ unless otherwise noted)

Fig.5 Maximum Non-repetitive Forward Surge Current



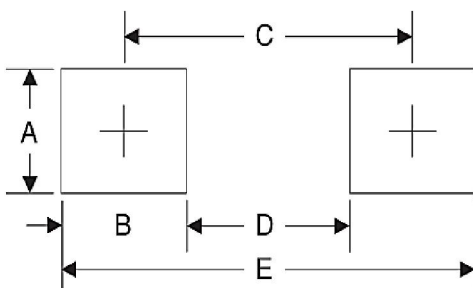
PACKAGE OUTLINE DIMENSIONS

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

SMC

Matrix SMC



Note: Cathode band for unidirectional products only

P/N =Marking Code

G =Green Compound

YW =Date Code

F =Factory Code

Notice

Specifications of the products displayed herein are subject to change without notice. TSC or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, to any intellectual property rights is granted by this document. Except as provided in TSC's terms and conditions of sale for such products, TSC assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of TSC products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify TSC for any damages resulting from such improper use or sale.

