600W, 5V - 170V Surface Mount Transient Voltage Suppressor

FEATURES

- AEC-Q101 qualified
- Ideal for automated placement
- Glass passivated junction
- Excellent clamping capability
- Fast response time: Typically less than 1.0ps
- Typical I_R less than 1μA above 10V
- Meets ISO 7637-2 (Pulse 1/2a/2b/3a/3b)
- Moisture sensitivity level: level 1, per J-STD-020
- RoHS Compliant
- Halogen-free according to IEC 61249-2-21

KEY PARAMETERS		
PARAMETER	**VALUE**	**UNIT**
V_{WM}	5 - 170	V
V_{BR} (uni - directional)	6.4 - 231	V
V_{BR} (bi - directional)	6.4 - 231	V
P_{PK}	600	W
$T_{J\ MAX}$	150	
Package	DO-214AA (SMB)	
Configuration	Single die	

APPLICATIONS

- Protect sensitive circuit from damage by high voltage transients
- Lighting, ESD transient voltage protection of IC, system
- Inductive switching load protection of IC, system
- Electrical Fast Transient Immunity protection of IC, system

MECHANICAL DATA

- Case: DO-214AA (SMB)
- 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: 0.090g (approximately)

DO-214AA (SMB)

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)			
PARAMETER	**SYMBOL**	**VALUE**	**UNIT**
Non-repetitive peak impulse power dissipation with 10/1000μs waveform(1)	P_{PK}	600	W
Steady state power dissipation at T_A = 25°C	P_D	3	W
Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load for Uni-directional only	I_{FSM}	100	A
Forward Voltage @ I_F = 50A for Uni-directional 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°C per Fig. 2
2. V_F = 3.5V on SMBJ5.0H - SMBJ90H devices and V_F = 5.0V on SMBJ100H - SMBJ170H devices

Devices for Bipolar Applications

1. For bidirectional use CH or CAH suffix for types SMBJ5.0H - types SMBJ170H
2. Electrical characteristics apply in both directions

THERMAL PERFORMANCE

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

ELECTRICAL SPECIFICATIONS (T_A = 25°C unless otherwise noted)

Part number	Marking code	Breakdown voltage $V_{BR}@I_T$ (V) (Note 1)		Test current I_T (mA)	Working stand-off voltage V_{WM} (V)	Maximum blocking leakage current $I_D@V_{WM}$ (μA)	Maximum peak impulse current I_{PP} (A) (Note 2)	Maximum clamping voltage $V_C@I_{PP}$ (V)
		Min	Max					
SMBJ5.0H	KD	6.40	7.30	10	5.0	800	65.0	9.6
SMBJ5.0AH	KE	6.40	7.00	10	5.0	800	68.0	9.2
SMBJ6.0H	KF	6.67	8.15	10	6.0	800	55.0	11.4
SMBJ6.0AH	KG	6.67	7.37	10	6.0	800	61.0	10.3
SMBJ6.5H	KH	7.22	8.82	10	6.5	500	51.0	12.3
SMBJ6.5AH	KK	7.22	7.98	10	6.5	500	56.0	11.2
SMBJ7.0H	KL	7.78	9.51	10	7.0	200	47.0	13.3
SMBJ7.0AH	KM	7.78	8.60	10	7.0	200	52.0	12.0
SMBJ7.5H	KN	8.33	10.3	1	7.5	100	44.0	14.3
SMBJ7.5AH	KP	8.33	9.21	1	7.5	100	48.0	12.9
SMBJ8.0H	KQ	8.89	10.9	1	8.0	50	42.0	15.0
SMBJ8.0AH	KR	8.89	9.83	1	8.0	50	46.0	13.6
SMBJ8.5H	KS	9.44	11.5	1	8.5	10	39.0	15.9
SMBJ8.5AH	KT	9.44	10.4	1	8.5	10	43.0	14.4
SMBJ9.0H	KU	10.0	12.2	1	9.0	5	37.0	16.9
SMBJ9.0AH	KV	10.0	11.1	1	9.0	5	40.0	15.4
SMBJ10H	KW	11.1	13.6	1	10	5	33.0	18.8
SMBJ10AH	KX	11.1	12.3	1	10	5	37.0	17.0
SMBJ11H	KY	12.2	14.9	1	11	1	31.0	20.1
SMBJ11AH	KZ	12.2	13.5	1	11	1	34.0	18.2
SMBJ12H	LD	13.3	16.3	1	12	1	28.0	22.0
SMBJ12AH	LE	13.3	14.7	1	12	1	31.0	19.9
SMBJ13H	LF	14.4	17.6	1	13	1	26.0	23.8
SMBJ13AH	LG	14.4	15.9	1	13	1	29.0	21.5
SMBJ14H	LH	15.6	19.1	1	14	1	24.4	25.8
SMBJ14AH	LK	15.6	17.2	1	14	1	27.0	23.2
SMBJ15H	LL	16.7	20.4	1	15	1	23.1	26.9
SMBJ15AH	LM	16.7	18.5	1	15	1	25.1	24.4
SMBJ16H	LN	17.8	21.8	1	16	1	21.8	28.8
SMBJ16AH	LP	17.8	19.7	1	16	1	24.2	26.0
SMBJ17H	LQ	18.9	23.1	1	17	1	20.0	30.5
SMBJ17AH	LR	18.9	20.9	1	17	1	22.8	27.6
SMBJ18H	LS	20.0	24.4	1	18	1	19.5	32.2
SMBJ18AH	LT	20.0	22.1	1	18	1	21.5	29.2
SMBJ20H	LU	22.2	27.1	1	20	1	17.6	35.8
SMBJ20AH	LV	22.2	24.5	1	20	1	19.4	32.4
SMBJ22H	LW	24.4	29.8	1	22	1	15.0	39.4
SMBJ22AH	LX	24.4	26.9	1	22	1	17.7	35.5
SMBJ24H	LY	26.7	32.6	1	24	1	14.6	43.0
SMBJ24AH	LZ	26.7	29.5	1	24	1	16.0	38.9
SMBJ26H	MD	28.9	35.3	1	26	1	13.5	46.6
SMBJ26AH	ME	28.9	31.9	1	26	1	14.9	42.1

ELECTRICAL SPECIFICATIONS (T_A = 25°C unless otherwise noted)

Part number	Marking code	Breakdown voltage $V_{BR}@I_T$ (V) (Note 1)		Test current I_T (mA)	Working stand-off voltage V_{WM} (V)	Maximum blocking leakage current $I_D@V_{WM}$ (μA)	Maximum peak impulse current I_{PP} (A) (Note 2)	Maximum clamping voltage $V_C@I_{PP}$ (V)
		Min	Max					
SMBJ28H	MF	31.1	38.0	1	28	1	12.6	50.0
SMBJ28AH	MG	31.1	34.4	1	28	1	13.8	45.4
SMBJ30H	MH	33.3	40.7	1	30	1	11.7	53.5
SMBJ30AH	MK	33.3	36.8	1	30	1	13.0	48.4
SMBJ33H	ML	36.7	44.9	1	33	1	10.6	59.0
SMBJ33AH	MM	36.7	40.6	1	33	1	11.8	53.3
SMBJ36H	MN	40.0	48.9	1	36	1	9.8	64.3
SMBJ36AH	MP	40.0	44.2	1	36	1	10.8	58.1
SMBJ40H	MQ	44.4	54.3	1	40	1	8.8	71.4
SMBJ40AH	MR	44.4	49.1	1	40	1	9.7	64.5
SMBJ43H	MS	47.8	58.4	1	43	1	8.2	76.7
SMBJ43AH	MT	47.8	52.8	1	43	1	9.0	69.4
SMBJ45H	MU	50.0	61.1	1	45	1	7.8	80.3
SMBJ45AH	MV	50.0	55.3	1	45	1	8.6	72.7
SMBJ48H	MW	53.3	65.1	1	48	1	7.3	85.5
SMBJ48AH	MX	53.3	58.9	1	48	1	8.1	77.4
SMBJ51H	MY	56.7	69.3	1	51	1	6.9	91.1
SMBJ51AH	MZ	56.7	62.7	1	51	1	7.6	82.4
SMBJ54H	ND	60.0	73.3	1	54	1	6.5	96.3
SMBJ54AH	NE	60.0	66.3	1	54	1	7.2	87.1
SMBJ58H	NF	64.4	78.7	1	58	1	6.1	103
SMBJ58AH	NG	64.4	71.2	1	58	1	6.7	93.6
SMBJ60H	NH	66.7	81.5	1	60	1	5.8	107
SMBJ60AH	NK	66.7	73.7	1	60	1	6.5	96.8
SMBJ64H	NL	71.1	86.9	1	64	1	5.5	114
SMBJ64AH	NM	71.1	78.6	1	64	1	6.1	103
SMBJ70H	NN	77.8	95.1	1	70	1	5.0	125
SMBJ70AH	NP	77.8	86	1	70	1	5.5	113
SMBJ75H	NQ	83.3	102	1	75	1	4.7	134
SMBJ75AH	NR	83.3	92.1	1	75	1	5.2	121
SMBJ78H	NS	86.7	106	1	78	1	4.5	139
SMBJ78AH	NT	86.7	95.8	1	78	1	5.0	126
SMBJ85H	NU	94.4	115	1	85	1	4.1	151
SMBJ85AH	NV	94.4	104	1	85	1	4.6	137
SMBJ90H	NW	100	122	1	90	1	3.9	160
SMBJ90AH	NX	100	111	1	90	1	4.3	146
SMBJ100H	NY	111	136	1	100	1	3.5	179
SMBJ100AH	NZ	111	123	1	100	1	3.8	162
SMBJ110H	PD	122	149	1	110	1	3.2	196
SMBJ110AH	PE	122	135	1	110	1	3.5	177
SMBJ120H	PF	133	163	1	120	1	2.9	214
SMBJ120AH	PG	133	147	1	120	1	3.2	193
SMBJ130H	PH	144	176	1	130	1	2.7	231
SMBJ130AH	PK	144	159	1	130	1	3.0	209
SMBJ150H	PL	167	204	1	150	1	2.3	266
SMBJ150AH	PM	167	185	1	150	1	2.5	243
SMBJ160H	PN	178	218	1	160	1	2.2	287
SMBJ160AH	PP	178	197	1	160	1	2.4	259
SMBJ170H	PQ	189	231	1	170	1	2.0	304

ELECTRICAL SPECIFICATIONS (T_A = 25°C unless otherwise noted)

Part number	Marking code	Breakdown voltage $V_{BR}@I_T$ (V) (Note 1)		Test current I_T (mA)	Working stand-off voltage V_{WM} (V)	Maximum blocking leakage current $I_D@V_{WM}$ (μA)	Maximum peak impulse current I_{PP} (A) (Note 2)	Maximum clamping voltage $V_C@I_{PP}$ (V)
		Min	Max					
SMBJ170AH	PR	189	209	1	170	1	2.2	275

Notes:

1. V_{BR} measure after I_T applied for 30ms, I_T=square wave pulse or equivalent.
2. Surge current waveform per Figure. 3 and derate per Figure. 2.
3. All terms and symbols are consistent with ANSI/IEEE C62.35.
4. For bidirectional use CH or CAH suffix for types SMBJ5.0H - SMBJ170H
5. For bipolar types having V_{WM} of 10V (SMBJ10CH) and under, the I_D limit is doubled.

ORDERING INFORMATION

ORDERING CODE(1)	PACKAGE	PACKING
SMBJxH	DO-214AA (SMB)	3,000 / Tape & Reel

Notes:

1. "x" defines voltage from 5V(SMBJ5.0H) to 170V(SMBJ170AH)

CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

Fig.1 Peak Pulse Power Rating Curve

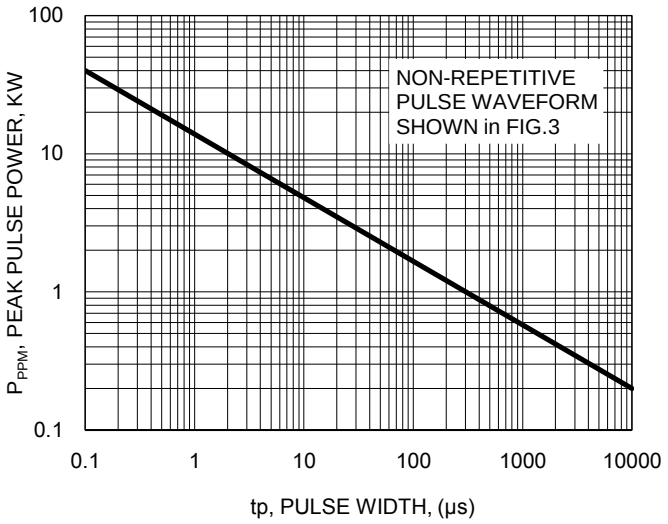


Fig.2 Pulse Derating Curve

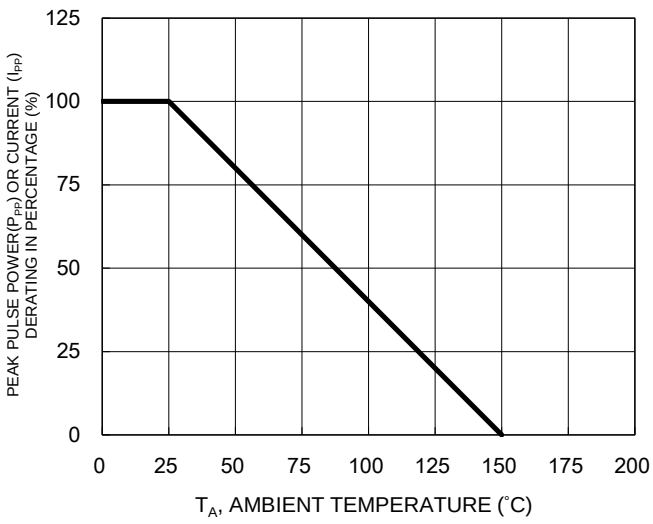


Fig.3 Clamping Power Pulse Waveform

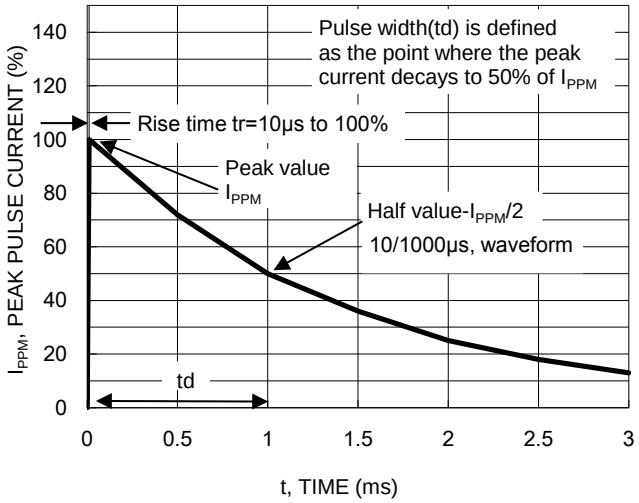
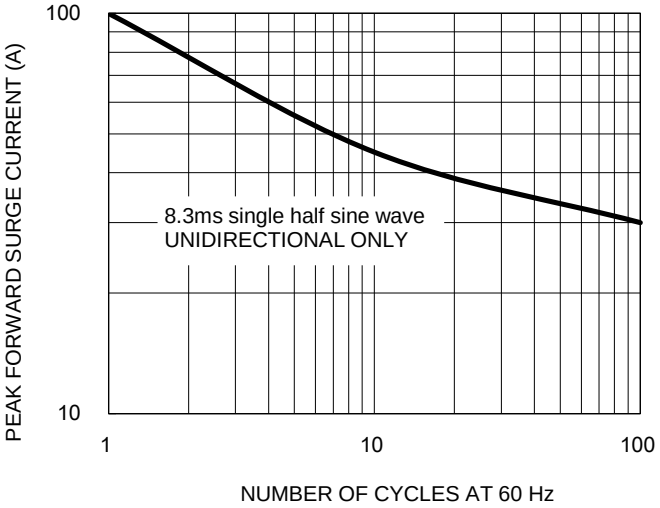


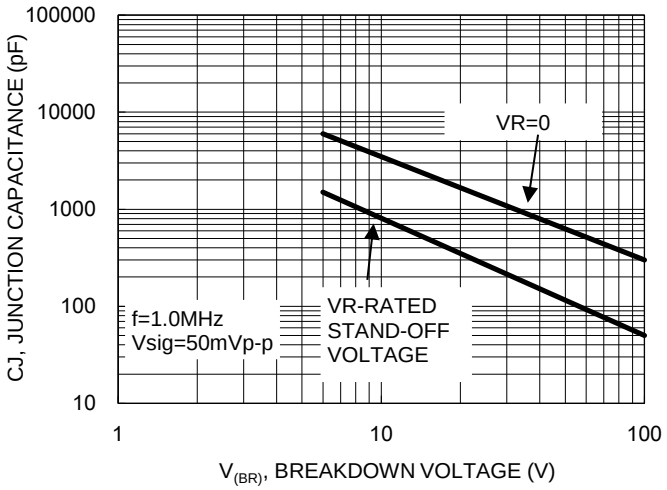
Fig.4 Maximum Non-Repetitive Forward Surge Current



CHARACTERISTICS CURVES

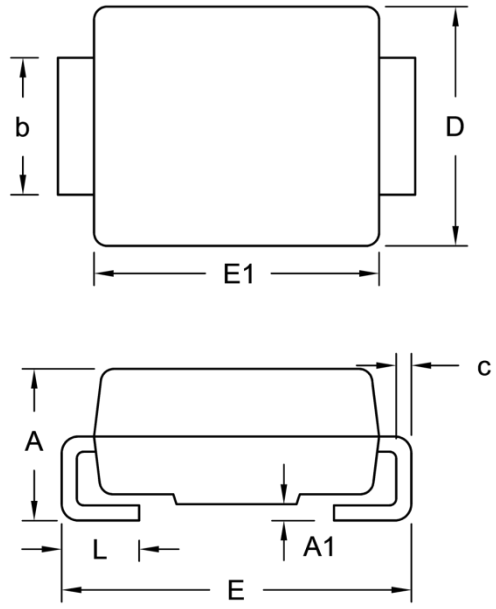
(T_A = 25°C unless otherwise noted)

Fig.5 Typical Junction Capacitance



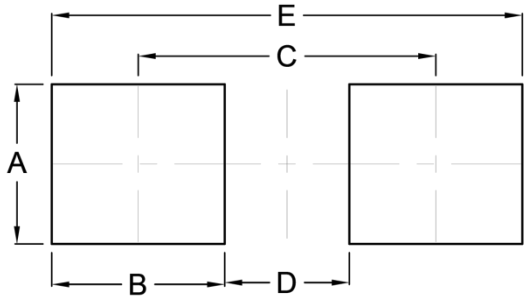
PACKAGE OUTLINE DIMENSIONS

DO-214AA (SMB)



DIM.	Unit (mm)		Unit (inch)	
	Min.	Max.	Min.	Max.
A	1.95	2.65	0.077	0.104
A1	0.05	0.20	0.002	0.008
b	1.95	2.20	0.077	0.087
c	0.15	0.31	0.006	0.012
D	3.30	3.95	0.130	0.156
E	5.10	5.60	0.201	0.220
E1	4.05	4.60	0.159	0.181
L	0.75	1.60	0.030	0.063

SUGGESTED PAD LAYOUT



Symbol	Unit (mm)	Unit (inch)
A	2.30	0.091
B	2.50	0.098
C	4.30	0.169
D	1.80	0.071
E	6.80	0.268

MARKING DIAGRAM

Cathode band for uni-directional products only

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

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