400W, 5V - 188V 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 1μA above 10V
- Moisture sensitivity level: level 1, per J-STD-020
- AEC-Q101 qualified available: ordering code with suffix “H”
- 400 W peak pulse power capability with a 10 / 1000 μs waveform(300W above 78V)
- Compliant to RoHS directive 2011/65/EU and in accordance to WEEE 2002/96/EC

KEY PARAMETERS		
PARAMETER	**VALUE**	**UNIT**
V_{WM}	5 - 188	V
V_{BR}	6.4 - 255	V
P_{PPM} t_p = 10/1000 μs waveform	400	W
$T_{J\,MAX}$	150	°C
Package	DO-214AC (SMA)	
Configuration	Single die	

Pb-Free RoHS COMPLIANT

APPLICATIONS

- Switching mode power supply (SMPS)
- Adapters
- Lighting application
- On-board DC/DC converter

MECHANICAL DATA

- Case: DO-214AC (SMA)
- Molding compound meets UL 94V-0 flammability rating
- Matte tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 2 whisker test
- Weight: 0.06g (approximately)

DO-214AC (SMA)

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)			
PARAMETER	**SYMBOL**	**VALUE**	**UNIT**
Peak power dissipation at T_A=25°C, tp=1ms (Note 1)	P_{PK}	400	W
Steady state power dissipation	P_D	1	W
Peak forward surge current, 8.3 ms single half sine-wave superimposed on rated load	I_{FSM}	40	A
Maximum instantaneous forward voltage at 25 A for unidirectional only	V_F	3.5	V
Operating junction temperature range	T_J	-55 to +150	°C
Storage temperature range	T_{STG}	-55 to +150	°C

Note:
1. Non-repetitive current pulse per Fig. 3 and derated above TA=25°C per Fig. 2

Devices for Bipolar Applications
1. For bidirectional use C or CA suffix for types SMAJ5.0 - Types SMAJ188
2. Electrical characteristics apply in both directions

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

Part number	Marking code	Breakdown voltage V_{BR}@I_T (1) (V)		Test current I_T (mA)	Working stand-off voltage V_{WM} (V)	Maximum reverse leakage current I_R@V_{WM} (1) (μA)	Maximum peak impulse current I_{PPM} (A) (2)	Maximum clamping voltage V_C@I_{PPM} (V) (2)
		Min.	Max.					
SMAJ5.0	AD	6.4	7.30	10	5	800	41.7	9.6
SMAJ5.0A	AE	6.4	7.00	10	5	800	43.5	9.2
SMAJ6.0	AF	6.67	8.15	10	6	800	35.1	11.4
SMAJ6.0A	AG	6.67	7.37	10	6	800	38.8	10.3
SMAJ6.5	AH	7.22	8.82	10	6.5	500	32.5	12.3
SMAJ6.5A	AK	7.22	7.98	10	6.5	500	35.7	11.2
SMAJ7.0	AL	7.78	9.51	10	7	200	30.1	13.3
SMAJ7.0A	AM	7.78	8.60	10	7	200	33.3	12.0
SMAJ7.5	AN	8.33	10.30	1	7.5	100	28.0	14.3
SMAJ7.5A	AP	8.33	9.21	1	7.5	100	31.0	12.9
SMAJ8.0	AQ	8.89	10.90	1	8	50	26.7	15.0
SMAJ8.0A	AR	8.89	9.83	1	8	50	29.4	13.6
SMAJ8.5	AS	9.44	11.50	1	8.5	10	25.2	15.9
SMAJ8.5A	AT	9.44	10.40	1	8.5	10	27.8	14.4
SMAJ9.0	AU	10.0	12.20	1	9	5	23.7	16.9
SMAJ9.0A	AV	10.0	11.10	1	9	5	26.0	15.4
SMAJ10	AW	11.1	13.60	1	10	5	21.3	18.8
SMAJ10A	AX	11.1	12.30	1	10	5	23.5	17.0
SMAJ11	AY	12.2	14.90	1	11	1	19.9	20.1
SMAJ11A	AZ	12.2	13.50	1	11	1	22.0	18.2
SMAJ12	BD	13.3	16.30	1	12	1	18.2	22.0
SMAJ12A	BE	13.3	14.70	1	12	1	20.1	19.9
SMAJ13	BF	14.4	17.60	1	13	1	16.8	23.8
SMAJ13A	BG	14.4	15.90	1	13	1	18.6	21.5
SMAJ14	BH	15.6	19.10	1	14	1	15.5	25.8
SMAJ14A	BK	15.6	17.20	1	14	1	17.2	23.2
SMAJ15	BL	16.7	20.40	1	15	1	14.9	26.9
SMAJ15A	BM	16.7	18.50	1	15	1	16.4	24.4
SMAJ16	BN	17.8	21.80	1	16	1	13.9	28.8
SMAJ16A	BP	17.8	19.70	1	16	1	15.4	26.0
SMAJ17	BQ	18.9	23.10	1	17	1	13.1	30.5
SMAJ17A	BR	18.9	20.90	1	17	1	14.5	27.6
SMAJ18	BS	20.0	24.40	1	18	1	12.4	32.2
SMAJ18A	BT	20.0	22.10	1	18	1	13.7	29.2
SMAJ20	BU	22.2	27.10	1	20	1	11.2	35.8
SMAJ20A	BV	22.2	24.50	1	20	1	12.3	32.4
SMAJ22	BW	24.4	29.80	1	22	1	10.2	39.4
SMAJ22A	BX	24.4	26.90	1	22	1	11.3	35.5
SMAJ24	BY	26.7	32.60	1	24	1	9.3	43.0
SMAJ24A	BZ	26.7	29.50	1	24	1	10.3	38.9
SMAJ26	CD	28.9	35.30	1	26	1	8.6	46.6
SMAJ26A	CE	28.9	31.90	1	26	1	9.5	42.1
SMAJ28	CF	31.1	38.00	1	28	1	8.0	50.0
SMAJ28A	CG	31.1	34.40	1	28	1	8.8	45.4
SMAJ30	CH	33.3	40.7	1	30	1	7.5	53.5
SMAJ30A	CK	33.3	36.8	1	30	1	8.3	48.4
SMAJ33	CL	36.7	44.9	1	33	1	6.8	59.0
SMAJ33A	CM	36.7	40.6	1	33	1	7.5	53.3

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

Part number	Marking code	Breakdown voltage V_{BR}@I_T (1) (V)		Test current I_T (mA)	Working stand-off voltage V_{WM} (V)	Maximum reverse leakage current I_R@V_{WM} (1) (μA)	Maximum peak impulse current I_{PPM} (A) (2)	Maximum clamping voltage V_C@I_{PPM} (V) (2)
		Min.	Max.					
SMAJ36	CN	40.0	48.9	1	36	1	6.2	64.3
SMAJ36A	CP	40.0	44.2	1	36	1	6.9	58.1
SMAJ40	CQ	44.4	54.3	1	40	1	5.6	71.4
SMAJ40A	CR	44.4	49.1	1	40	1	6.2	64.5
SMAJ43	CS	47.8	58.4	1	43	1	5.2	76.7
SMAJ43A	CT	47.8	52.8	1	43	1	5.8	69.4
SMAJ45	CU	50.0	61.1	1	45	1	5.0	80.3
SMAJ45A	CV	50.0	55.3	1	45	1	5.5	72.7
SMAJ48	CW	53.3	65.1	1	48	1	4.7	85.5
SMAJ48A	CX	53.3	58.9	1	48	1	5.2	77.4
SMAJ51	CY	56.7	69.3	1	51	1	4.4	91.1
SMAJ51A	CZ	56.7	62.7	1	51	1	4.9	82.4
SMAJ54	RD	60.0	73.3	1	54	1	4.2	96.3
SMAJ54A	RE	60.0	66.3	1	54	1	4.6	87.1
SMAJ58	RF	64.4	78.7	1	58	1	3.9	103
SMAJ58A	RG	64.4	71.2	1	58	1	4.3	93.6
SMAJ60	RH	66.7	81.5	1	60	1	3.7	107
SMAJ60A	RK	66.7	73.7	1	60	1	4.1	96.8
SMAJ64	RL	71.1	86.9	1	64	1	3.5	114
SMAJ64A	RM	71.1	78.6	1	64	1	3.9	103
SMAJ70	RN	77.8	95.1	1	70	1	3.2	125
SMAJ70A	RP	77.8	86	1	70	1	3.5	113
SMAJ75	RQ	83.3	102	1	75	1	3.0	134
SMAJ75A	RR	83.3	92.1	1	75	1	3.3	121
SMAJ78	RS	86.7	106	1	78	1	2.9	139
SMAJ78A	RT	86.7	95.8	1	78	1	3.2	126
SMAJ85	RU	94.4	115	1	85	1	2.0	151
SMAJ85A	RV	94.4	104	1	85	1	2.2	137
SMAJ90	RW	100	122	1	90	1	1.9	160
SMAJ90A	RX	100	111	1	90	1	2.1	146
SMAJ100	RY	111	136	1	100	1	1.7	179
SMAJ100A	RZ	111	123	1	100	1	1.9	162
SMAJ110	SD	122	149	1	110	1	1.6	196
SMAJ110A	SE	122	135	1	110	1	1.7	177
SMAJ120	SF	133	163	1	120	1	1.4	214
SMAJ120A	SG	133	147	1	120	1	1.6	193
SMAJ130	SH	144	176	1	130	1	1.3	231
SMAJ130A	SK	144	159	1	130	1	1.5	209
SMAJ150	SL	167	204	1	150	1	1.1	266
SMAJ150A	SM	167	185	1	150	1	1.3	243
SMAJ160	SN	178	218	1	160	1	1.0	287
SMAJ160A	SP	178	197	1	160	1	1.2	259
SMAJ170	SQ	189	231	1	170	1	1.0	304
SMAJ170A	SR	189	209	1	170	1	1.1	275
SMAJ188	ST	209	255	1	188	1	0.9	344
SMAJ188A	SS	209	231	1	188	1	0.9	328

Notes:

1. Pulse test with PW=30 ms
2. Non-repetitive current pulse, per Fig. 3 and derated above T_A=25°C per Fig. 2
3. Peak pulse power waveform is 10/1000μs
4. For bi-directional devices having V_R of 10 V and under, the I_R limit is double.

ORDERING INFORMATION		
ORDERING CODE (Note 1,2,3)	**PACKAGE**	**PACKING**
SMAJxxxAHR3G	SMA	1,800 / 7” Plastic reel
SMAJxxxAHR2G	SMA	7,500 / 13” Paper reel
SMAJxxxAHM2G	SMA	7,500 / 13” Plastic reel
SMAJxxxAHF3G	Folded SMA	1,800 / 7” Plastic reel
SMAJxxxAHF2G	Folded SMA	7,500 / 13” Paper reel
SMAJxxxAHF4G	Folded SMA	7,500 / 13” Plastic reel
SMAJxxxAHE3G	Clip SMA	1,800 / 7” Plastic reel
SMAJxxxAHE2G	Clip SMA	7,500 / 13” Plastic reel
SMAJxxxA R3G	SMA	1,800 / 7” Plastic reel
SMAJxxxA R2G	SMA	7,500 / 13” Paper reel
SMAJxxxA M2G	SMA	7,500 / 13” Plastic reel
SMAJxxxA F3G	Folded SMA	1,800 / 7” Plastic reel
SMAJxxxA F2G	Folded SMA	7,500 / 13” Paper reel
SMAJxxxA F4G	Folded SMA	7,500 / 13” Plastic reel
SMAJxxxA E3G	Clip SMA	1,800 / 7” Plastic reel
SMAJxxxA E2G	Clip SMA	7,500 / 13” Plastic reel
SMAJxxxAHR3	SMA	1,800 / 7” Plastic reel
SMAJxxxAHR2	SMA	7,500 / 13” Paper reel
SMAJxxxAHM2	SMA	7,500 / 13” Plastic reel
SMAJxxxAHF3	Folded SMA	1,800 / 7” Plastic reel
SMAJxxxAHF2	Folded SMA	7,500 / 13” Paper reel
SMAJxxxAHF4	Folded SMA	7,500 / 13” Plastic reel
SMAJxxxAHE3	Clip SMA	1,800 / 7” Plastic reel
SMAJxxxAHE2	Clip SMA	7,500 / 13” Plastic reel
SMAJxxxA R3	SMA	1,800 / 7” Plastic reel
SMAJxxxA R2	SMA	7,500 / 13” Paper reel
SMAJxxxA M2	SMA	7,500 / 13” Plastic reel
SMAJxxxA F3	Folded SMA	1,800 / 7” Plastic reel
SMAJxxxA F2	Folded SMA	7,500 / 13” Paper reel
SMAJxxxA F4	Folded SMA	7,500 / 13” Plastic reel
SMAJxxxA E3	Clip SMA	1,800 / 7” Plastic reel
SMAJxxxA E2	Clip SMA	7,500 / 13” Plastic reel

Note 1:
"xxx" defines voltage from 5V (SMAJ5.0) to 188V (SMAJ188)

Note 2:
"H" means AEC-Q101 qualified

Note 3:
"G" means green compound (halogen free)

CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

Fig.1 Peak Pulse Power Rating Curve

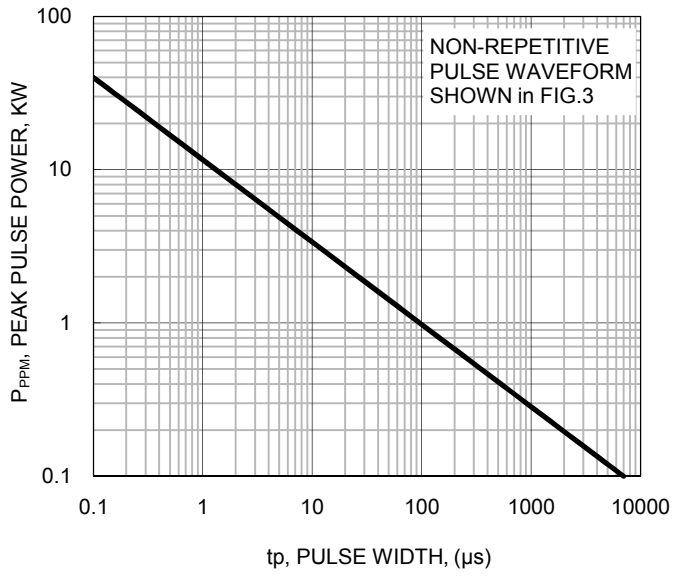


Fig.2 Pulse Derating Curve

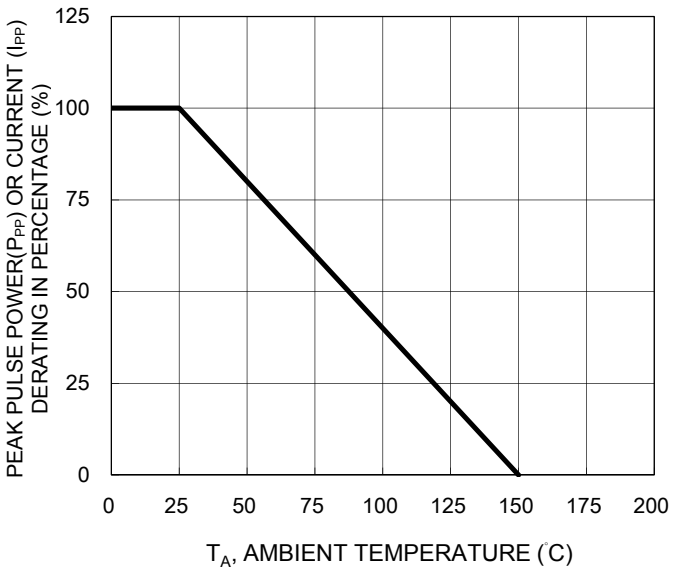


Fig.3 Clamping Power Pulse Waveform

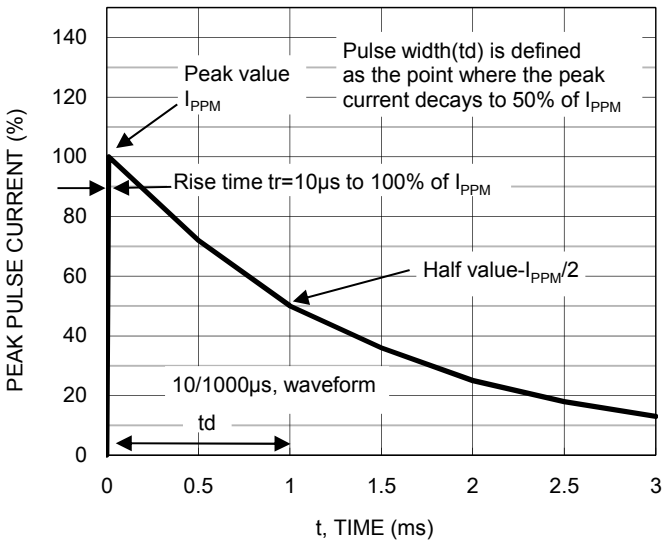
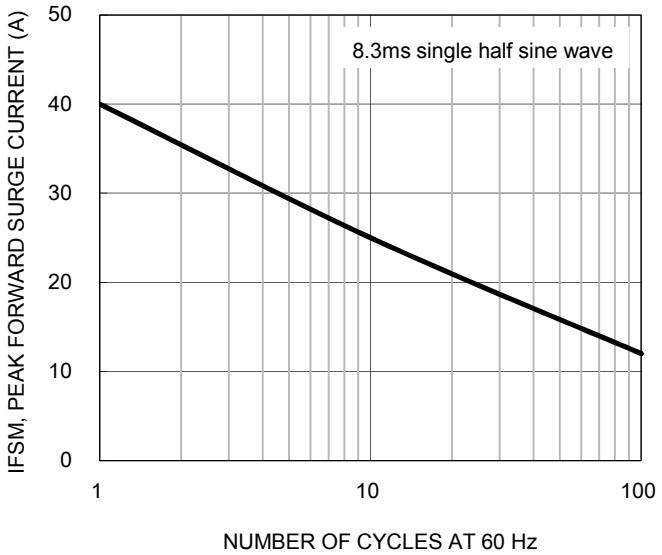


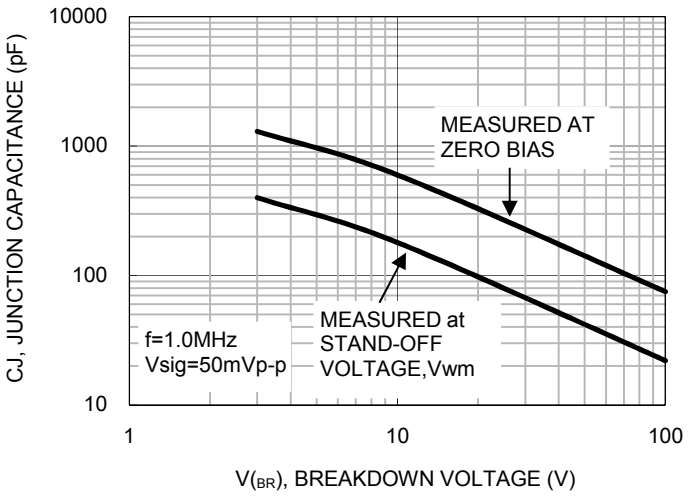
Fig.4 Maximum Non-repetitive Forward Surge Current



CHARACTERISTICS CURVES

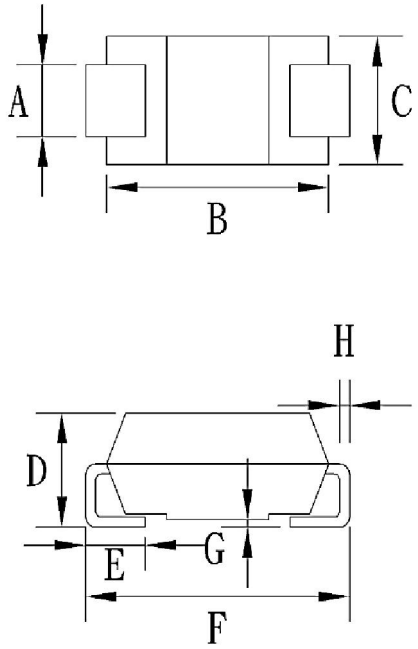
(T_A = 25°C unless otherwise noted)

Fig.5 Typical Junction Capacitance



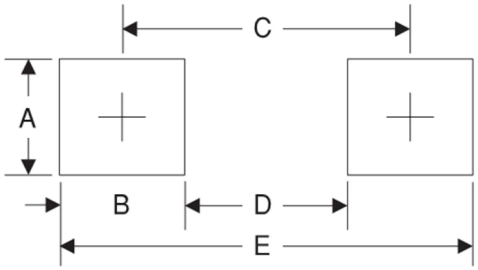
PACKAGE OUTLINE DIMENSIONS

DO-214AC (SMA)



DIM	Unit (mm)		Unit (inch)	
	Min	Max	Min	Max
A	1.27	1.58	0.050	0.062
B	4.06	4.60	0.160	0.181
C	2.29	2.83	0.090	0.111
D	1.99	2.50	0.078	0.098
E	0.90	1.41	0.035	0.056
F	4.95	5.33	0.195	0.210
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	1.68	0.066
B	1.52	0.060
C	3.93	0.155
D	2.41	0.095
E	5.45	0.215

MARKING DIAGRAM

Note: Cathode band for uni-directional products only

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

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