

## 400W, 5V - 188V Surface Mount Transient Voltage Suppressor

### FEATURES

- Low profile package
- 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
- 400 watts peak pulse power capability with a 10 / 1000  $\mu s$  waveform (300W above 78V)
- Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21



**DO-214AC (SMA)**



### MECHANICAL DATA

**Case:** DO-214AC (SMA)

Molding compound: UL flammability classification rating 94V-0

Moisture sensitivity level (MSL): level 1, per J-STD-020

Part No. with suffix "H" means AEC-Q101 qualified

Packing code with suffix "G" means green compound (halogen-free)

**Terminal:** Matte tin plated leads, solderable per JESD22-B102

Meet JESD 201 class 2 whisker test

**Polarity:** Indicated by cathode band

**Weight:** 0.06 g (approximately)

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS ( $T_A=25^\circ C$ unless otherwise noted)			
PARAMETER	SYMBOL	Value	UNIT
Peak power dissipation at $T_A=25^\circ C$ , $T_p=1ms$ (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	$^\circ C$
Storage temperature range	$T_{STG}$	- 55 to +150	$^\circ C$

Note 1: Non-repetitive current pulse per fig. 3 and derated above  $T_A=25^\circ C$  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

ORDERING INFORMATION					
PART NO.	PART NO. SUFFIX	PACKING CODE	PACKING CODE SUFFIX (*)	PACKAGE	PACKING
SMAJxxxx (Note 1)	H	R3	G	SMA	1,800 / 7" Plastic reel
		R2		SMA	7,500 / 13" Paper reel
		M2		SMA	7,500 / 13" Plastic reel
		F3		Folded SMA	1,800 / 7" Plastic reel
		F2		Folded SMA	7,500 / 13" Paper reel
		F4		Folded SMA	7,500 / 13" Plastic reel
		E3		Clip SMA	1,800 / 7" Plastic reel
		E2		Clip SMA	7,500 / 13" Plastic reel

Note 1: "xxxx" defines voltage from 5.0V (SMAJ5.0) to 188V (SMAJ188)

\*: Optional available. For packing code E3 and E2 with green compound only

EXAMPLE					
EXAMPLE P/N	PART NO.	PART NO. SUFFIX	PACKING CODE	PACKING CODE SUFFIX	DESCRIPTION
SMAJ26AHR3G	SMAJ26A	H	R3	G	AEC-Q101 qualified Green compound

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

FIG. 1 PEAK PULSE POWER RATING CURVE

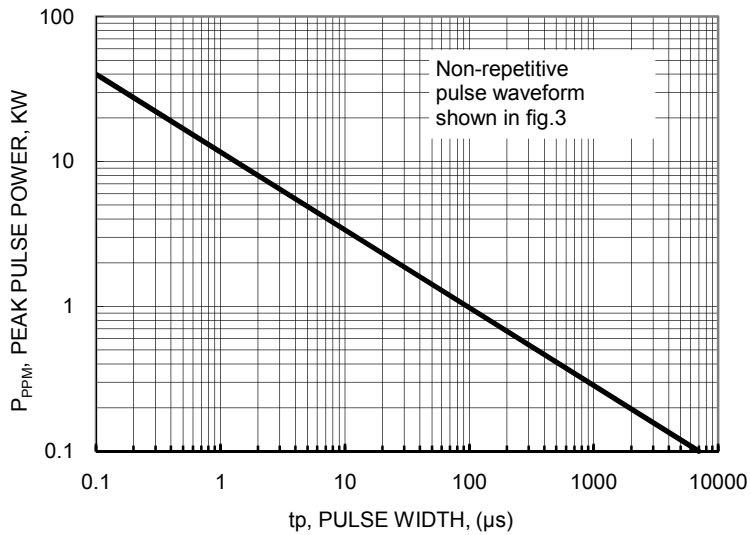


FIG. 2 PULSE DERATING CURVE

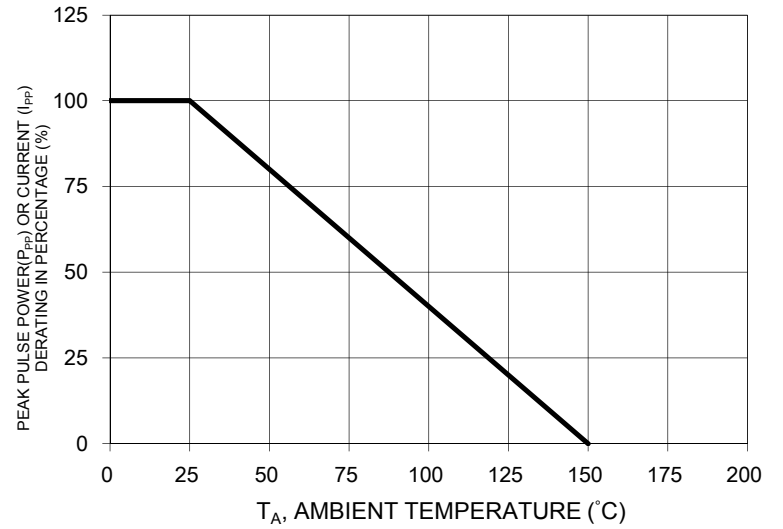


FIG. 3 CLAMPING POWER PULSE WAVEFORM

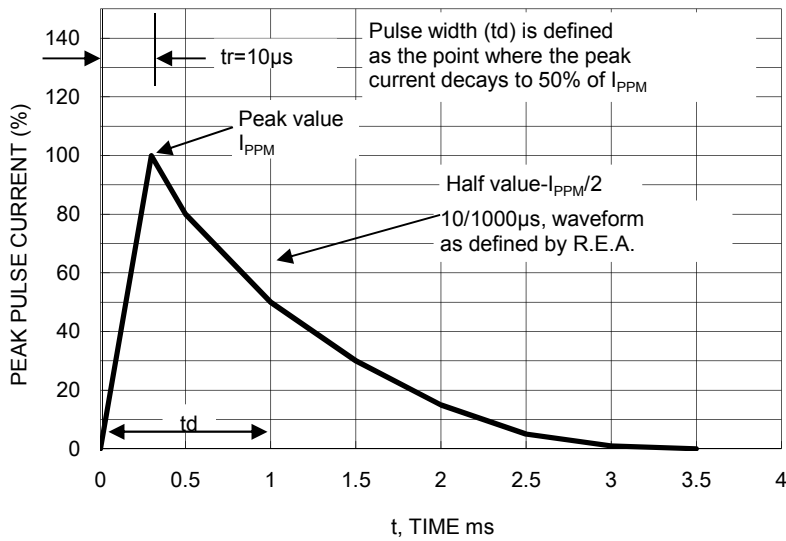


FIG. 4 MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT UNIDIRECTIONAL ONLY

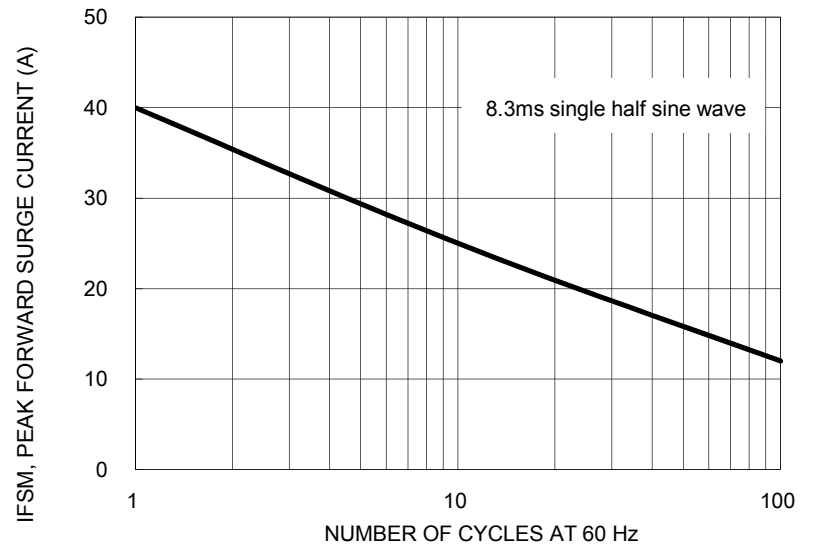
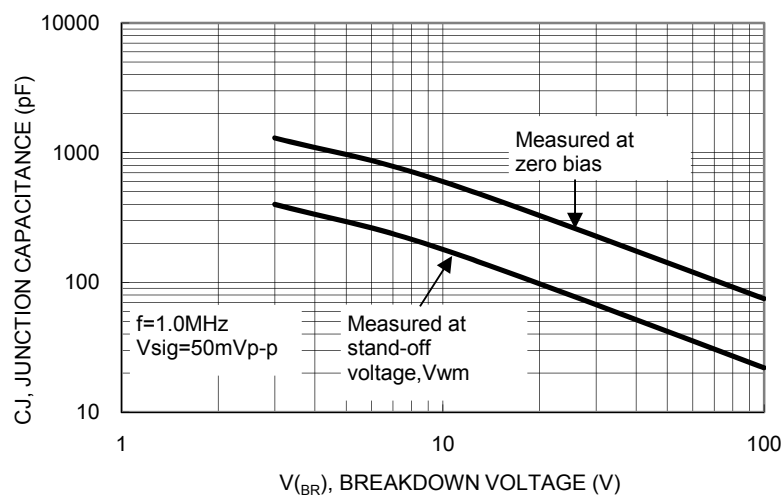


FIG. 5 TYPICAL JUNCTION CAPACITANCE



Device	Device Marking Code	Working Peak Reverse Voltage $V_{WM}$ (V)	Breakdown Voltage $V_{BR}$ (V)		Test Current $I_T$ (mA)	Maximum Clamping Voltage at $I_{PPM}$ $V_c$ (V) (Note5)	Maximum Peak Pulse Surge Current $I_{PPM}$ (A)(Note5)	Maximum Reverse Leakage @ $V_{WM}$ $I_R$ ( $\mu$ A)
			at $I_T$					
			Min	Max				
SMAJ5.0	AD	5	6.4	7.30	10	9.6	41.7	800
SMAJ5.0A	AE	5	6.4	7.00	10	9.2	43.5	800
SMAJ6.0	AF	6	6.67	8.15	10	11.4	35.1	800
SMAJ6.0A	AG	6	6.67	7.37	10	10.3	38.8	800
SMAJ6.5	AH	6.5	7.22	8.82	10	12.3	32.5	500
SMAJ6.5A	AK	6.5	7.22	7.98	10	11.2	35.7	500
SMAJ7.0	AL	7	7.78	9.51	10	13.3	30.1	200
SMAJ7.0A	AM	7	7.78	8.60	10	12.0	33.3	200
SMAJ7.5	AN	7.5	8.33	10.30	1	14.3	28.0	100
SMAJ7.5A	AP	7.5	8.33	9.21	1	12.9	31.0	100
SMAJ8.0	AQ	8	8.89	10.90	1	15.0	26.7	50
SMAJ8.0A	AR	8	8.89	9.83	1	13.6	29.4	50
SMAJ8.5	AS	8.5	9.44	11.50	1	15.9	25.2	10
SMAJ8.5A	AT	8.5	9.44	10.40	1	14.4	27.8	10
SMAJ9.0	AU	9	10.0	12.20	1	16.9	23.7	5
SMAJ9.0A	AV	9	10.0	11.10	1	15.4	26.0	5
SMAJ10	AW	10	11.1	13.60	1	18.8	21.3	5
SMAJ10A	AX	10	11.1	12.30	1	17.0	23.5	5
SMAJ11	AY	11	12.2	14.90	1	20.1	19.9	1
SMAJ11A	AZ	11	12.2	13.50	1	18.2	22.0	1
SMAJ12	BD	12	13.3	16.30	1	22.0	18.2	1
SMAJ12A	BE	12	13.3	14.70	1	19.9	20.1	1
SMAJ13	BF	13	14.4	17.60	1	23.8	16.8	1
SMAJ13A	BG	13	14.4	15.90	1	21.5	18.6	1
SMAJ14	BH	14	15.6	19.10	1	25.8	15.5	1
SMAJ14A	BK	14	15.6	17.20	1	23.2	17.2	1
SMAJ15	BL	15	16.7	20.40	1	26.9	14.9	1
SMAJ15A	BM	15	16.7	18.50	1	24.4	16.4	1
SMAJ16	BN	16	17.8	21.80	1	28.8	13.9	1
SMAJ16A	BP	16	17.8	19.70	1	26.0	15.4	1
SMAJ17	BQ	17	18.9	23.10	1	30.5	13.1	1
SMAJ17A	BR	17	18.9	20.90	1	27.6	14.5	1
SMAJ18	BS	18	20.0	24.40	1	32.2	12.4	1
SMAJ18A	BT	18	20.0	22.10	1	29.2	13.7	1
SMAJ20	BU	20	22.2	27.10	1	35.8	11.2	1
SMAJ20A	BV	20	22.2	24.50	1	32.4	12.3	1
SMAJ22	BW	22	24.4	29.80	1	39.4	10.2	1
SMAJ22A	BX	22	24.4	26.90	1	35.5	11.3	1
SMAJ24	BY	24	26.7	32.60	1	43.0	9.3	1
SMAJ24A	BZ	24	26.7	29.50	1	38.9	10.3	1
SMAJ26	CD	26	28.9	35.30	1	46.6	8.6	1
SMAJ26A	CE	26	28.9	31.90	1	42.1	9.5	1
SMAJ28	CF	28	31.1	38.00	1	50.0	8.0	1
SMAJ28A	CG	28	31.1	34.40	1	45.4	8.8	1

Device	Device Marking Code	Working Peak Reverse Voltage $V_{WM}$ (V)	Breakdown Voltage $V_{BR}$ (V) at $I_T$		Test Current $I_T$ (mA)	Maximum Clamping Voltage at $I_{PPM}$ $V_C$ (V) (Note5)	Maximum Peak Pulse Surge Current $I_{PPM}$ (A) (Note5)	Maximum Reverse Leakage @ $V_{WM}$ $I_R$ ( $\mu$ A)
			Min	Max				
SMAJ30	CH	30	33.3	40.7	1	53.5	7.5	1
SMAJ30A	CK	30	33.3	36.8	1	48.4	8.3	1
SMAJ33	CL	33	36.7	44.9	1	59.0	6.8	1
SMAJ33A	CM	33	36.7	40.6	1	53.3	7.5	1
SMAJ36	CN	36	40.0	48.9	1	64.3	6.2	1
SMAJ36A	CP	36	40.0	44.2	1	58.1	6.9	1
SMAJ40	CQ	40	44.4	54.3	1	71.4	5.6	1
SMAJ40A	CR	40	44.4	49.1	1	64.5	6.2	1
SMAJ43	CS	43	47.8	58.4	1	76.7	5.2	1
SMAJ43A	CT	43	47.8	52.8	1	69.4	5.8	1
SMAJ45	CU	45	50.0	61.1	1	80.3	5.0	1
SMAJ45A	CV	45	50.0	55.3	1	72.7	5.5	1
SMAJ48	CW	48	53.3	65.1	1	85.5	4.7	1
SMAJ48A	CX	48	53.3	58.9	1	77.4	5.2	1
SMAJ51	CY	51	56.7	69.3	1	91.1	4.4	1
SMAJ51A	CZ	51	56.7	62.7	1	82.4	4.9	1
SMAJ54	RD	54	60.0	73.3	1	96.3	4.2	1
SMAJ54A	RE	54	60.0	66.3	1	87.1	4.6	1
SMAJ58	RF	58	64.4	78.7	1	103	3.9	1
SMAJ58A	RG	58	64.4	71.2	1	93.6	4.3	1
SMAJ60	RH	60	66.7	81.5	1	107	3.7	1
SMAJ60A	RK	60	66.7	73.7	1	96.8	4.1	1
SMAJ64	RL	64	71.1	86.9	1	114	3.5	1
SMAJ64A	RM	64	71.1	78.6	1	103	3.9	1
SMAJ70	RN	70	77.8	95.1	1	125	3.2	1
SMAJ70A	RP	70	77.8	86	1	113	3.5	1
SMAJ75	RQ	75	83.3	102	1	134	3.0	1
SMAJ75A	RR	75	83.3	92.1	1	121	3.3	1
SMAJ78	RS	78	86.7	106	1	139	2.9	1
SMAJ78A	RT	78	86.7	95.8	1	126	3.2	1
SMAJ85	RU	85	94.4	115	1	151	2.0	1
SMAJ85A	RV	85	94.4	104	1	137	2.2	1
SMAJ90	RW	90	100	122	1	160	1.9	1
SMAJ90A	RX	90	100	111	1	146	2.1	1
SMAJ100	RY	100	111	136	1	179	1.7	1
SMAJ100A	RZ	100	111	123	1	162	1.9	1
SMAJ110	SD	110	122	149	1	196	1.6	1
SMAJ110A	SE	110	122	135	1	177	1.7	1
SMAJ120	SF	120	133	163	1	214	1.4	1
SMAJ120A	SG	120	133	147	1	193	1.6	1
SMAJ130	SH	130	144	176	1	231	1.3	1
SMAJ130A	SK	130	144	159	1	209	1.5	1
SMAJ150	SL	150	167	204	1	266	1.1	1
SMAJ150A	SM	150	167	185	1	243	1.3	1

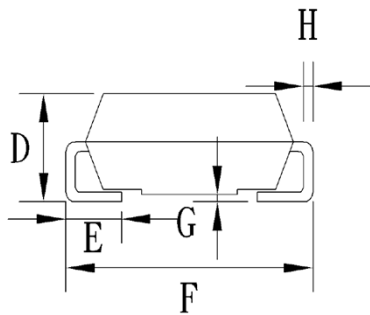
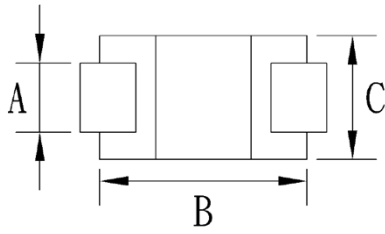
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			Min	Max				
SMAJ160	SN	160	178	218	1	287	1.0	1
SMAJ160A	SP	160	178	197	1	259	1.2	1
SMAJ170	SQ	170	189	231	1	304	1.0	1
SMAJ170A	SR	170	189	209	1	275	1.1	1
SMAJ188	ST	188	209	255	1	344	0.9	1
SMAJ188A	SS	188	209	231	1	328	0.9	1

Notes:

1. Non-repetitive current pulse, per fig. 3 and derated above  $T_A=25^\circ\text{C}$  per fig. 2
2. Mounted on 5 x 5mm copper pads to each terminal
3. Lead temperature at  $T_L=75^\circ\text{C}$
4. Measure on 8.3ms single half sine-wave duty cycle=4 pulses per minutes maximum
5. Peak pulse power waveform is 10/1000  $\mu$ s
6. For bi-directional devices having  $V_R$  of 10 volts and under, the  $I_R$  limit is double.

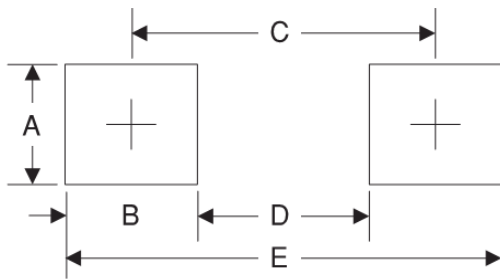
PACKAGE OUTLINE DIMENSIONS

**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



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

Note: Cathode band for uni-directional products only

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