



# SMAJ5.0 THRU SMAJ188A

## TRANSIENT VOLTAGE SUPPRESSORS

### Features

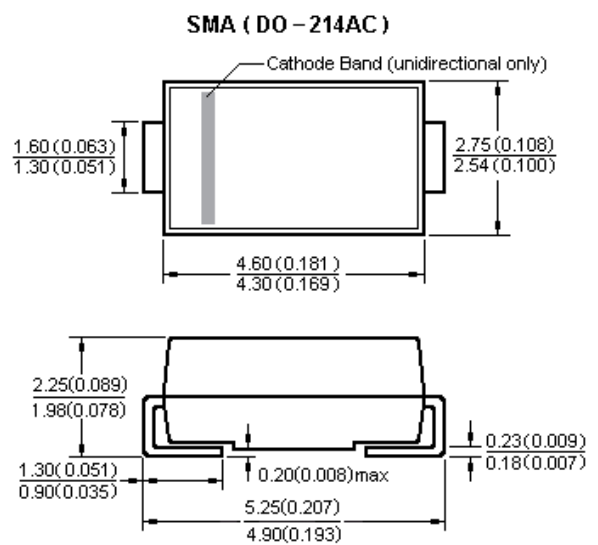
- For surface mounted applications in order to optimize board space
- Low profile space
- Glass passivated chip
- Low inductance
- Excellent clamping capability
- Very fast response time
- Typical  $I_D$  less than  $1\mu A$  at  $V_{WM}$
- 400 W peak pulse power capability with a 10/1000  $\mu s$  waveform
- Component in accordance to RoHS 2002/95/1 and WEEE 2002/96/EC



SMA (DO-214AC)

### Mechanical Date

- Case: JEDEC DO-214AC molded plastic over passivated chip
- Terminals: Solder plated, solderable per MIL-STD-750 Method 2026
- Polarity: For uni-directional types the band by laser denotes the cathode, which is positive with respect to the anode under normal TVS operation



Dimensions in millimeters and (inches)

### Devices for Bidirectional Applications

- For bi-directional devices, use suffix C or CA (e.g. SMAJ10C, SMAJ10CA).  
Electrical characteristics apply in both directions.

### Maximum Ratings & Thermal Characteristics

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

	Symbol	VALUE	UNIT
Peak pulse power dissipation with a 10/1000 $\mu s$ waveform (see fig. 1)	$P_{PPM}$	400	W
Peak pulse current with a waveform (see fig. 3, single pulse)	$I_{PPM}$	See Next Table	A
Peak forward surge current 8.3ms single half sine-wave uni-directional only	$I_{FSM}$	40	A
Typical thermal resistance, junction to ambient	$R_{\theta JA}$	120	$^\circ C / W$
Typical thermal resistance, junction to lead	$R_{\theta JL}$	30	$^\circ C / W$
Operating junction and storage temperature range	$T_J T_{STG}$	-55 to +150	$^\circ C$



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## TRANSIENT VOLTAGE SUPPRESSORS

TRR Industry No.	TRR House No.	Marking Code		Breakdown Voltage at $I_T^{(1)}$ $V_{(BR)}$ (V)		Test Current $I_T$ (mA)	Stand-off Voltage $V_{WM}$ (V)	Maximum Reverse Leakage at $V_{WM}$ $I_D$ ( $\mu$ A)	Maximum Peak Pulse Surge Current $(^{2})$ $I_{PPM}$ (A)	Maximum Clamping Voltage at $I_{PPM}$ $V_C$ (V)
		UNI	BI	Min	Max					
SMAJ5.0	4AT5	AD	WD	6.40	7.82	10.0	5.0	800	41.7	9.6
SMAJ5.0A	4AT5A	AE	WE	6.40	7.07	10.0	5.0	800	43.5	9.2
SMAJ6.0	4AT6	AF	WF	6.67	8.15	10.0	6.0	800	35.1	11.4
SMAJ6.0A	4AT6A	AG	WG	6.70	7.37	10.0	6.0	800	38.8	10.3
SMAJ6.5	4AT6.5	AH	WH	7.22	8.82	10.0	6.5	500	32.5	12.3
SMAJ6.5A	4AT6.5A	AK	WK	7.22	7.98	10.0	6.5	500	35.7	11.2
SMAJ7.0	4AT7	AL	WL	7.78	9.51	10.0	7.0	200	30.1	13.3
SMAJ7.0A	4AT7A	AM	WM	7.78	8.60	10.0	7.0	200	33.3	12.0
SMAJ7.5	4AT7.5	AN	WN	8.33	10.2	1.0	7.5	100	28.0	14.3
SMAJ7.5A	4AT7.5A	AP	WP	8.33	9.21	1.0	7.5	100	31.0	12.9
SMAJ8.0	4AT8	AQ	WQ	8.89	10.9	1.0	8.0	50	26.7	15.0
SMAJ8.0A	4AT8A	AR	WR	8.89	9.83	1.0	8.0	50	29.4	13.6
SMAJ8.5A	4AT8.5	AS	WS	9.44	11.5	1.0	8.0	10	25.2	15.9
SMAJ8.5A	4AT8.5A	AT	WT	9.44	10.4	1.0	8.5	10	27.8	14.4
SMAJ9.0	4AT9	AU	WU	10.0	12.2	1.0	8.5	5.0	23.7	16.9
SMAJ9.0A	4AT9A	AV	WV	10.0	11.1	1.0	9.0	5.0	26.0	15.4
SMAJ10	4AT10	AW	WW	11.1	13.6	1.0	10	1.0	21.3	18.8
SMAJ10A	4AT10A	AX	WX	11.1	12.3	1.0	10	1.0	23.5	17.0
SMAJ11	4AT11	AY	WY	12.2	14.9	1.0	11	1.0	19.9	20.1
SMAJ11A	4AT11A	AZ	WZ	12.2	13.5	1.0	11	1.0	22.0	18.2
SMAJ12	4AT12	BD	XD	13.3	16.3	1.0	12	1.0	18.2	22.0
SMAJ12A	4AT12A	BE	XE	13.3	14.7	1.0	12	1.0	20.1	19.9
SMAJ13	4AT13	BF	XF	14.4	17.6	1.0	13	1.0	16.8	23.8
SMAJ13A	4AT13A	BG	XG	14.4	15.9	1.0	13	1.0	18.6	21.5
SMAJ14	4AT14	BH	XH	15.6	19.1	1.0	14	1.0	15.5	25.8
SMAJ14A	4AT14A	BK	XK	15.6	17.2	1.0	14	1.0	17.2	23.2
SMAJ15	4AT15	BL	XL	16.7	20.4	1.0	15	1.0	14.9	26.9
SMAJ15A	4AT15A	BM	XM	16.7	18.5	1.0	15	1.0	16.4	24.4
SMAJ16	4AT16	BN	XN	17.8	21.8	1.0	16	1.0	13.9	28.8
SMAJ16A	4AT16A	BP	XP	17.8	19.7	1.0	16	1.0	15.4	26.0
SMAJ17	4AT17	BQ	XQ	18.9	23.1	1.0	17	1.0	13.1	30.5
SMAJ17A	4AT17A	BR	XR	18.9	20.9	1.0	17	1.0	14.5	27.6
SMAJ18	4AT18	BS	XS	20.0	24.4	1.0	18	1.0	12.4	32.2
SMAJ18A	4AT18A	BT	XT	20.0	22.1	1.0	18	1.0	13.7	29.2
SMAJ20	4AT20	BU	XU	22.2	27.1	1.0	20	1.0	11.2	35.8
SMAJ20A	4AT20A	BV	XV	22.2	24.5	1.0	20	1.0	12.3	32.4
SMAJ22	4AT22	BW	XW	24.4	29.8	1.0	22	1.0	10.2	39.4
SMAJ22A	4AT22A	BX	XX	24.4	26.9	1.0	22	1.0	11.3	35.5
SMAJ24	4AT24	BY	XY	26.7	32.6	1.0	24	1.0	9.3	43.0
SMAJ24A	4AT24A	BZ	XZ	26.7	29.5	1.0	24	1.0	10.3	38.9
SMAJ26	4AT26	CD	YD	28.9	35.3	1.0	26	1.0	8.6	46.6
SMAJ26A	4AT26A	CE	YE	28.9	31.9	1.0	26	1.0	9.5	42.1
SMAJ28	4AT28	CF	YF	31.1	38.0	1.0	28	1.0	8.0	50.0
SMAJ28A	4AT28A	CG	YG	31.1	34.4	1.0	28	1.0	8.8	45.4
SMAJ30	4AT30	CH	YH	33.3	40.7	1.0	30	1.0	7.5	53.5
SMAJ30A	4AT30A	CK	YK	33.3	36.8	1.0	30	1.0	8.3	48.4
SMAJ33	4AT33	CL	YL	36.7	44.9	1.0	33	1.0	6.8	59.0

Notes: (1) Pulse test :  $T_p \cong 50ms$

(2) Surge current waveform Per Fig. 3 and derate Per Fig. 2

(3) Ratings at 25°C ambient temperature unless otherwise specified.





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TRR Industry No.	TRR House No.	Marking Code		Breakdown Voltage at $I_T^{(1)}$ $V_{(BR)}$ (V)		Test Current $I_T$ (mA)	Stand-off Voltage $V_{WM}$ (V)	Maximum Reverse Leakage at $V_{WM}$ $I_D$ ( $\mu$ A)	Maximum Peak Pulse Surge Current <sup>(2)</sup> $I_{PPM}$ (A)	Maximum Clamping Voltage at $I_{PPM}$ $V_C$ (V)
		UNI	BI	Min	Max					
SMAJ33A	4AT33A	CM	YM	36.70	40.60	1.0	33.0	1	7.5	53.3
SMAJ36	4AT36	CN	YN	40.00	48.90	1.0	36.0	1	6.2	64.3
SMAJ36A	4AT36A	CP	YP	40.00	44.20	1.0	36.0	1	6.9	58.1
SMAJ40	4AT40	CQ	YQ	44.40	54.30	1.0	40.0	1	5.6	71.4
SMAJ40A	4AT40A	CR	YR	44.40	49.10	1.0	40.0	1	6.2	64.5
SMAJ43	4AT43	CS	YS	47.80	58.40	1.0	43.0	1	5.2	76.7
SMAJ43A	4AT43A	CT	YT	47.80	52.80	1.0	43.0	1	5.8	69.4
SMAJ45	4AT45	CU	YU	50.00	61.10	1.0	45.0	1	5.0	80.3
SMAJ45A	4AT45A	CV	YV	50.00	55.3	1.0	45.0	1	5.5	72.7
SMAJ48	4AT48	CW	YW	53.30	65.10	1.0	48.0	1	4.7	85.5
SMAJ48A	4AT48A	CX	YX	53.30	58.9	1.0	48.0	1	5.2	77.4
SMAJ51	4AT51	CY	YY	56.70	69.30	1.0	51.0	1	4.4	91.1
SMAJ51A	4AT51A	CZ	YZ	56.70	62.7	1.0	51.0	1	4.9	82.4
SMAJ54	4AT54	RD	ZD	60.00	73.3	1.0	54.0	1	4.2	96.3
SMAJ54A	4AT54A	RE	ZE	60.0	66.3	1.0	54.0	1.0	4.6	87.1
SMAJ58	4AT58	RF	ZF	64.4	78.7	1.0	58.0	1.0	3.9	103.0
SMAJ58A	4AT58A	RG	ZG	64.4	71.2	1.0	58	1.0	4.3	93.6
SMAJ60	4AT60	RH	ZH	66.7	81.5	1.0	60	1.0	3.7	107.0
SMAJ60A	4AT60A	RK	ZK	66.7	73.7	1.0	60	1.0	4.1	96.8
SMAJ64	4AT64	RL	ZL	71.1	86.9	1.0	64	1.0	3.5	114.0
SMAJ64A	4AT64A	RM	ZM	71.1	78.6	1.0	64	1.0	3.9	103.0
SMAJ70	4AT70	RN	ZN	77.8	95.1	1.0	70	1.0	3.2	125.0
SMAJ70A	4AT70A	RP	ZP	77.8	86.0	1.0	70	1.0	3.5	113.0
SMAJ75	4AT75	RQ	ZQ	83.3	102.0	1.0	75	1.0	3.0	134.0
SMAJ75A	4AT75A	RR	ZR	83.3	92.1	1.0	75	1.0	3.3	121.0
SMAJ78	4AT78	RS	ZS	86.7	106.0	1.0	78	1.0	2.9	139.0
SMAJ78A	4AT78A	RT	ZT	86.7	95.8	1.0	78	1.0	3.2	126.0
SMAJ85	4AT85	RU	ZU	94.4	115.0	1.0	85	1.0	2.6	151.0
SMAJ85A	4AT85A	RV	ZV	94.4	104.0	1.0	85	1.0	2.9	137.0
SMAJ90	4AT90	RW	ZW	100.0	122.0	1.0	90	1.0	2.5	160.0
SMAJ90A	4AT90A	RX	ZX	100.0	111.0	1.0	90	1.0	2.7	146.0
SMAJ100	4AT100	RY	ZY	111.0	136.0	1.0	100	1.0	2.2	179.0
SMAJ100A	4AT100A	RZ	ZZ	111.0	123.0	1.0	100	1.0	2.5	162.0
SMAJ110	4AT110	SD	VD	122.0	149.0	1.0	110	1.0	2.0	196.0
SMAJ110A	4AT110A	SE	VE	122.0	135.0	1.0	110	1.0	2.3	177.0
SMAJ120	4AT120	SF	VF	133.0	163.0	1.0	120	1.0	1.9	214.0
SMAJ120A	4AT120A	SG	VG	133.0	147.0	1.0	120	1.0	2.0	193.0
SMAJ130	4AT130	SH	VH	144.0	176.0	1.0	130	1.0	1.7	231.0
SMAJ130A	4AT130A	SK	VK	144.0	159.0	1.0	130	1.0	1.9	209.0
SMAJ150	4AT150	SL	VL	167.0	204.0	1.0	150	1.0	1.5	268.0
SMAJ150A	4AT150A	SM	VM	167.0	185.0	1.0	150	1.0	1.6	243.0
SMAJ160	4AT160	SN	VN	178.0	218.0	1.0	160	1.0	1.4	287.0
SMAJ160A	4AT160A	SP	VP	178.0	197.0	1.0	160	1.0	1.5	259.0
SMAJ170	4AT170	SQ	VQ	189.0	231.0	1.0	170	1.0	1.3	304.0
SMAJ170A	4AT170A	SR	VR	189.0	209.0	1.0	170	1.0	1.4	275.0
SMAJ188	4AT188	ST	VT	209.0	255.0	1.0	188	1.0	1.1	344.0
SMAJ188A	4AT188A	SS	VS	209.0	231.0	1.0	188	1.0	1.2	328.0

Notes: (1) Pulse test :  $T_p \cong 50\text{ms}$

(2) Surge current waveform Per Fig. 3 and derate Per Fig. 2

(3) Ratings at 25°C ambient temperature unless otherwise specified.





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

Fig. 1 -- Peak Pulse Power Rating Curve

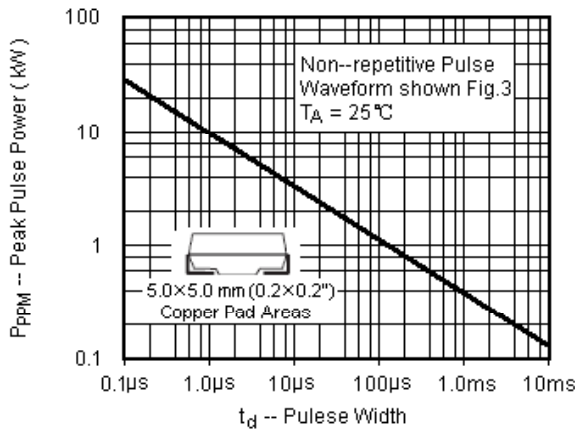


Fig.2--Pulse Derating Curve

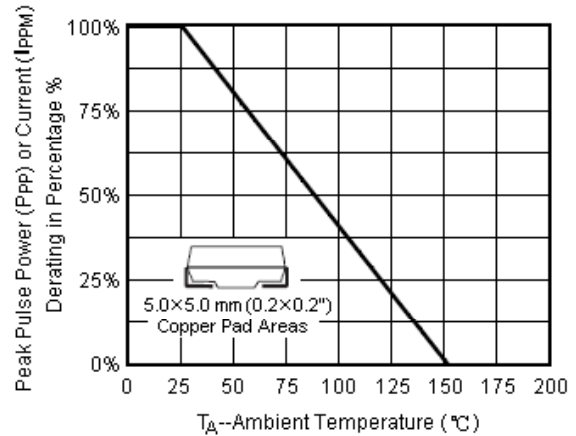


Fig. 3 --Pulse Waveform

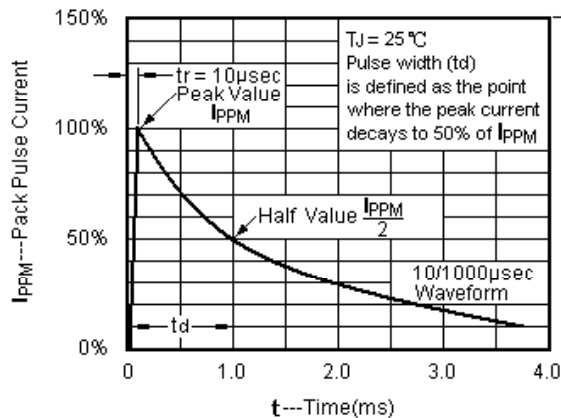


Fig. 4 -- Typical Junction Capacitance

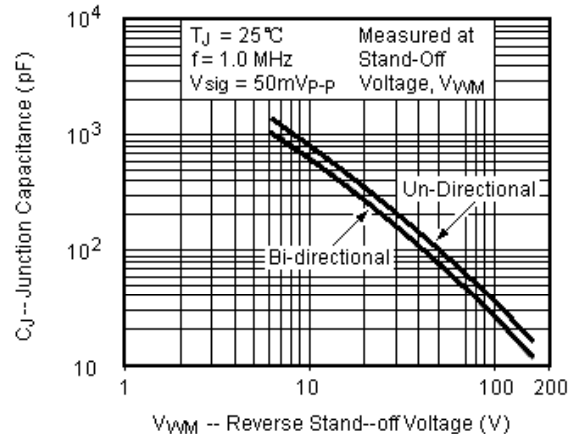


Fig. 5 -- Typical Tansient Thermal Impedance

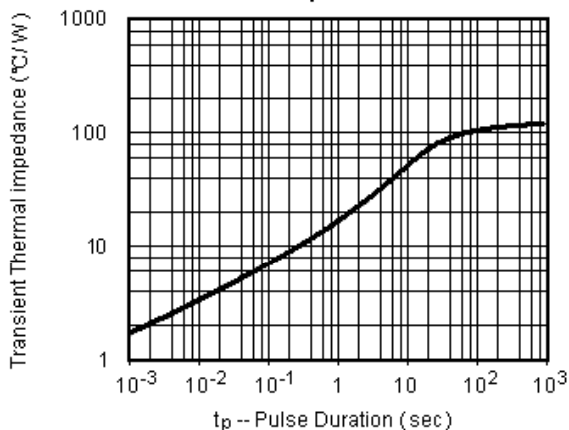


Fig. 6 -- Maximum Non-Repetitive Forward Surge Current (Uni-Dirertional Only)

