

Transient Voltage Suppressors (TVS) Data Sheet

Description

The SMAJ series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events

Features

- For surface mounted applications in order to optimize board space
- Low leakage
- Glass passivated junction
- Low inductance
- Excellent clamping capability
- 400W peak pulse power capability at 10/1000μs waveform
- Fast response time
- Typical IR less than 5μA above 12V
- High Temperature soldering: 260°C /40 seconds at terminals
- Typical maximum temperature coefficient $\Delta V_{BR} = 0.1\% \times V_{BR}@25^{\circ}\text{C} \times \Delta T$
- Plastic package has Underwriters Laboratory Flammability 94V-0
- Matte tin lead-free Plated
- Halogen free and RoHS compliant
- Typical failure mode is short from over-specified voltage or current
- Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- IEC 61000-4-2 ESD 30KV(Air),30KV(contact)
- "AT "meet AEC-Q101 qualifiedavailab

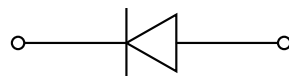
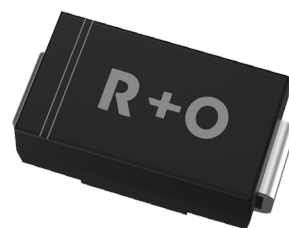
Breakdown Voltage

3.3 to 440 V

Peak Pulse Power

400 W

DO-214AC(SMA)



Applications

TVS devices are ideal for the protection of I/O interfaces, VCC bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications

Maximum Ratings (Ta=25°C Unless otherwise specified)

PARAMETER	SYMBOL	VALUE	SYMBOL
Peak Pulse Power Dissipation with a 10/1000μs waveform (Fig.1)(Note 1), (Note 2)	P_{PPM}	400	W
Peak Pulse Current with a 10/1000μs waveform.(Note1, Fig.3)	I_{PP}	See Next Table	A
Power Dissipation on Infinite Heat Sink at TL=75° C	$P_{M(AV)}$	1.0	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)	I_{FSM}	40	A
Maximum Instantaneous Forward Voltage at 25A for Unidirectional Only(Note 4)	V_F	3.5/5.0	V
Operating junction and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C
Typical thermal resistance junction to lead	$R_{\theta J-L}$	30	°C /W
Typical thermal resistance junction to ambient	$R_{\theta J-A}$	120	°C /W

Note :

(1) Non-repetitive current pulse, per Fig. 3 and derated above Ta = 25°C per Fig. 2.

(2) Mounted on 5.0mm x 5.0mm (0.03mm thick) Copper Pads to each terminal.

(3) 8.3ms single half sine-wave, or equivalent square wave, Duty cycle = 4 pulses per minutes maximum.

(4) $V_F < 3.5V$ for $V_{BR} < 200V$ and $V_F < 5.0V$ for $V_{BR} > 201V$.

SMAJxx-AT SERIES

400W SURFACE MOUNT TRANSIENT VOLTAGE SUPPRESSORS

● Package Outline Dimensions (SMA/DO-214AC)

Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.25	1.65	0.049	0.065
B	3.95	4.65	0.156	0.183
C	2.35	2.85	0.093	0.112
D	1.98	2.41	0.078	0.095
E	0.76	1.52	0.030	0.060
F	-	0.203	-	0.008
G	4.70	5.30	0.185	0.209
H	0.15	0.31	0.006	0.012
M	2.26	-	0.089	-
J	2.10	-	0.085	-
K	-	2.74	-	0.107

● Electrical Characteristics (Ta=25°C Unless otherwise specified)

Part Number		Marking		Reverse Stand-Off Voltage	Breakdown Voltage V_{BR} (V) @ I_T		Test Current	Maximum Clamping Voltage @ I_{PP}	Peak Pulse Current	Reverse Leakage @ V_{RWM}
Uni	Bi	Uni	Bi	V_{RWM} (V)	Min.	Max.	I_T (mA)	V_C (V)	I_{PP} (A)	I_R (μA)
SMAJ3.3A-AT	SMAJ3.3CA-AT	AD	WD	3.3	5.2	6	10	8	43.8	800
SMAJ5.0A-AT	SMAJ5.0CA-AT	AE	WE	5	6.4	7	10	9.2	43.5	800
SMAJ6.0A-AT	SMAJ6.0CA-AT	AG	WG	6	6.67	7.37	10	10.3	38.8	800
SMAJ6.5A-AT	SMAJ6.5CA-AT	AK	WK	6.5	7.22	7.98	10	11.2	35.7	500
SMAJ7.0A-AT	SMAJ7.0CA-AT	AM	WM	7	7.78	8.6	10	12.0	33.3	200
SMAJ7.5A-AT	SMAJ7.5CA-AT	AP	WP	7.5	8.33	9.21	1	12.9	31.0	100
SMAJ8.0A-AT	SMAJ8.0CA-AT	AR	WR	8	8.89	9.83	1	13.6	29.4	50
SMAJ8.5A-AT	SMAJ8.5CA-AT	AT	WT	8.5	9.44	10.4	1	14.4	27.8	20
SMAJ9.0A-AT	SMAJ9.0CA-AT	AV	WV	9	10	11.1	1	15.4	26.0	10
SMAJ10A-AT	SMAJ10CA-AT	AX	WX	10	11.1	12.3	1	17.0	23.5	5
SMAJ11A-AT	SMAJ11CA-AT	AZ	WZ	11	12.2	13.5	1	18.2	22.0	1
SMAJ12A-AT	SMAJ12CA-AT	BE	XE	12	13.3	14.7	1	19.9	20.1	1
SMAJ13A-AT	SMAJ13CA-AT	BG	XG	13	14.4	15.9	1	21.5	18.6	1
SMAJ14A-AT	SMAJ14CA-AT	BK	XK	14	15.6	17.2	1	23.2	17.2	1
SMAJ15A-AT	SMAJ15CA-AT	BM	XM	15	16.7	18.5	1	24.4	16.4	1
SMAJ16A-AT	SMAJ16CA-AT	BP	XP	16	17.8	19.7	1	26.0	15.4	1
SMAJ17A-AT	SMAJ17CA-AT	BR	XR	17	18.9	20.9	1	27.6	14.5	1
SMAJ18A-AT	SMAJ18CA-AT	BT	XT	18	20	22.1	1	29.2	13.7	1
SMAJ20A-AT	SMAJ20CA-AT	BV	XV	20	22.2	24.5	1	32.4	12.3	1
SMAJ22A-AT	SMAJ22CA-AT	BX	XX	22	24.4	26.9	1	35.5	11.3	1
SMAJ24A-AT	SMAJ24CA-AT	BZ	XZ	24	26.7	29.5	1	38.9	10.3	1
SMAJ26A-AT	SMAJ26CA-AT	CE	YE	26	28.9	31.9	1	42.1	9.5	1
SMAJ28A-AT	SMAJ28CA-AT	CG	YG	28	31.1	34.4	1	45.4	8.8	1

SMAJxx-AT SERIES

400W SURFACE MOUNT TRANSIENT VOLTAGE SUPPRESSORS

● Electrical Characteristics (Ta=25°C Unless otherwise specified)

Part Number		Marking		Reverse Stand-Off Voltage	Breakdown Voltage V_{BR} (V) @ I_T		Test Current	Maximum Clamping Voltage@ I_{PP}	Peak Pulse Current	Reverse Leakage @ V_{RWM}
Uni	Bi	Uni	Bi	V_{RWM} (V)	Min.	Max.	I_T (mA)	V_C (V)	I_{PP} (A)	I_R (μA)
SMAJ30A-AT	SMAJ30CA-AT	CK	YK	30	33.3	36.8	1	48.4	8.3	1
SMAJ33A-AT	SMAJ33CA-AT	CM	YM	33	36.7	40.6	1	53.3	7.5	1
SMAJ36A-AT	SMAJ36CA-AT	CP	YP	36	40	44.2	1	58.1	6.9	1
SMAJ40A-AT	SMAJ40CA-AT	CR	YR	40	44.4	49.1	1	64.5	6.2	1
SMAJ43A-AT	SMAJ43CA-AT	CT	YT	43	47.8	52.8	1	69.4	5.8	1
SMAJ45A-AT	SMAJ45CA-AT	CV	YV	45	50	55.3	1	72.7	5.5	1
SMAJ48A-AT	SMAJ48CA-AT	CX	YX	48	53.3	58.9	1	77.4	5.2	1
SMAJ51A-AT	SMAJ51CA-AT	CZ	YZ	51	56.7	62.7	1	82.4	4.9	1
SMAJ54A-AT	SMAJ54CA-AT	RE	ZE	54	60	66.3	1	87.1	4.6	1
SMAJ58A-AT	SMAJ58CA-AT	RG	ZG	58	64.4	71.2	1	93.6	4.3	1
SMAJ60A-AT	SMAJ60CA-AT	RK	ZK	60	66.7	73.7	1	96.8	4.1	1
SMAJ64A-AT	SMAJ64CA-AT	RM	ZM	64	71.1	78.6	1	103	3.9	1
SMAJ70A-AT	SMAJ70CA-AT	RP	ZP	70	77.8	86	1	113	3.5	1
SMAJ75A-AT	SMAJ75CA-AT	RR	ZR	75	83.3	92.1	1	121	3.3	1
SMAJ78A-AT	SMAJ78CA-AT	RT	ZT	78	86.7	95.8	1	126	3.2	1
SMAJ80A-AT	SMAJ80CA-AT	RB	ZB	80	88.8	97.6	1	129.6	3.09	1
SMAJ85A-AT	SMAJ85CA-AT	RV	ZV	85	94.4	104	1	137	2.9	1
SMAJ90A-AT	SMAJ90CA-AT	RX	ZX	90	100	111	1	146	2.7	1
SMAJ100A-AT	SMAJ100CA-AT	RZ	ZZ	100	111	123	1	162	2.5	1
SMAJ110A-AT	SMAJ110CA-AT	SE	VE	110	122	135	1	177	2.3	1
SMAJ120A-AT	SMAJ120CA-AT	SG	VG	120	133	147	1	193	2.1	1
SMAJ130A-AT	SMAJ130CA-AT	SK	VK	130	144	159	1	209	1.9	1
SMAJ150A-AT	SMAJ150CA-AT	SM	VM	150	167	185	1	243	1.6	1
SMAJ160A-AT	SMAJ160CA-AT	SP	VP	160	178	197	1	259	1.5	1
SMAJ170A-AT	SMAJ170CA-AT	SR	VR	170	189	209	1	275	1.5	1
SMAJ180A-AT	SMAJ180CA-AT	ST	VT	180	201	222	1	292	1.4	1
SMAJ200A-AT	SMAJ200CA-AT	SV	VV	200	224	247	1	324	1.2	1
SMAJ220A-AT	SMAJ220CA-AT	SX	VX	220	246	272	1	356	1.1	1
SMAJ250A-AT	SMAJ250CA-AT	SZ	VZ	250	279	309	1	405	1.0	1
SMAJ300A-AT	SMAJ300CA-AT	TE	UE	300	335	371	1	486	0.8	1
SMAJ350A-AT	SMAJ350CA-AT	TG	UG	350	391	432	1	567	0.7	1
SMAJ400A-AT	SMAJ400CA-AT	TK	UK	400	447	494	1	648	0.6	1
SMAJ440A-AT	SMAJ440CA-AT	TM	UM	440	492	543	1	713	0.6	1

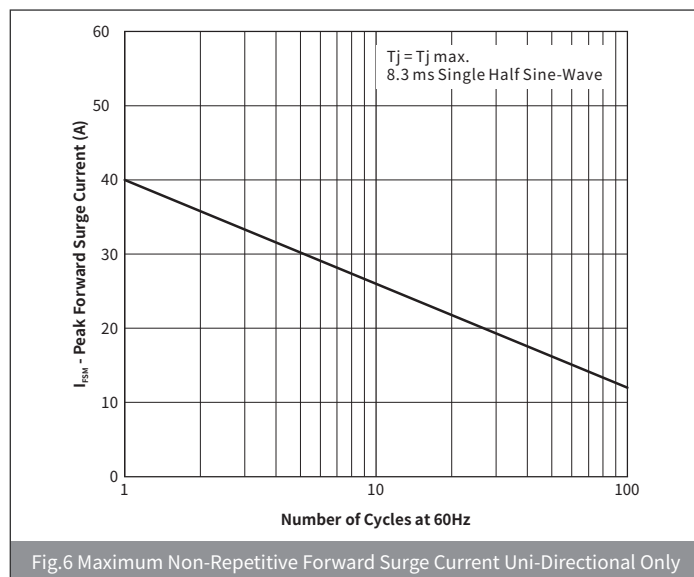
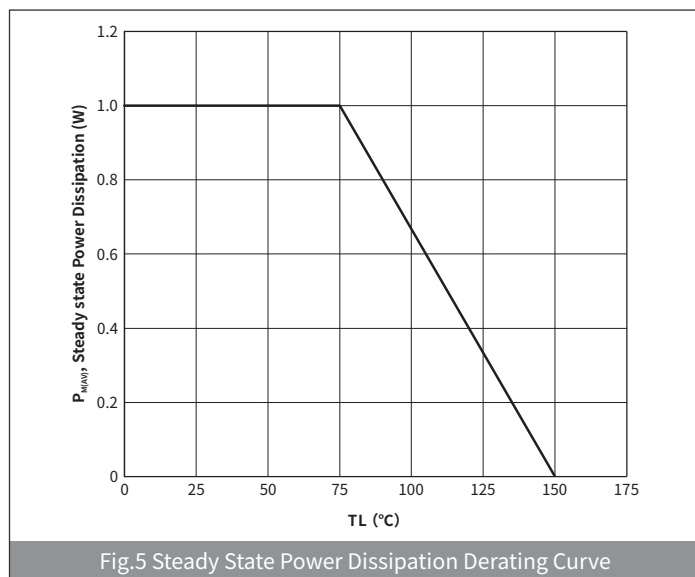
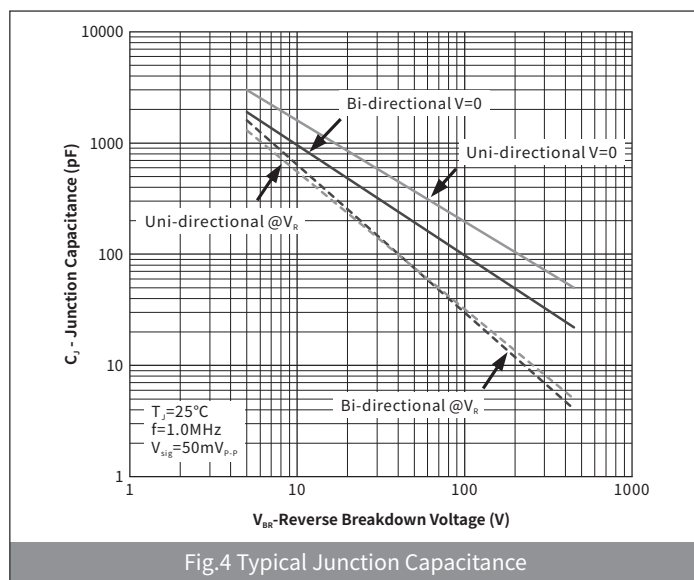
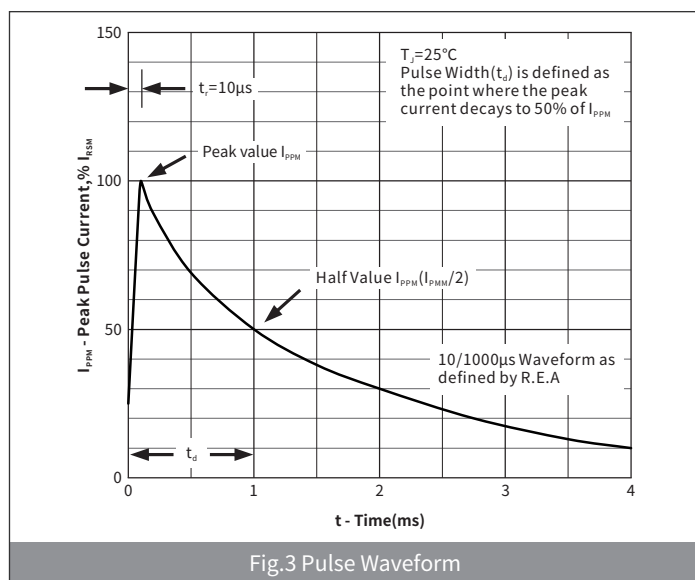
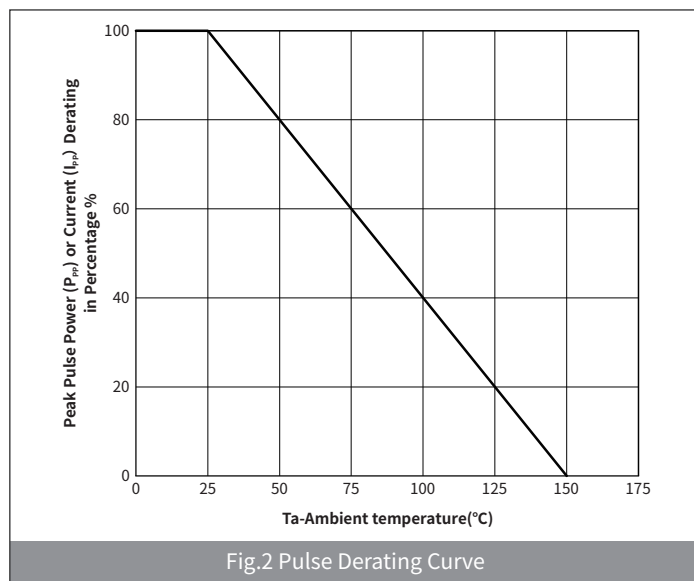
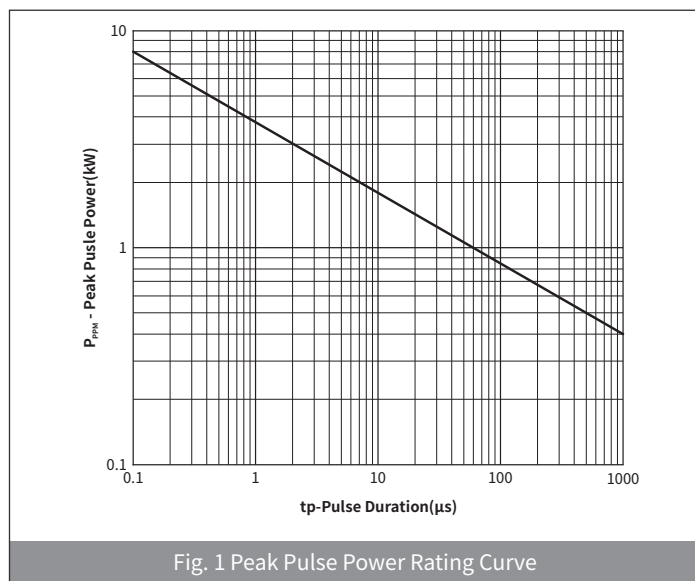
Note :

(1) Suffix 'A ' denotes 5% tolerance device.

(2) Add suffix ' CA ' after part number to specify Bi-directional devices.

(3) For Bi-Directional devices having VR of 10 volts and under, the IR limit is double.

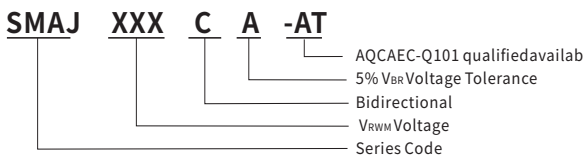
● Ratings And Characteristics Curves ($T_a=25^\circ\text{C}$ Unless otherwise specified)



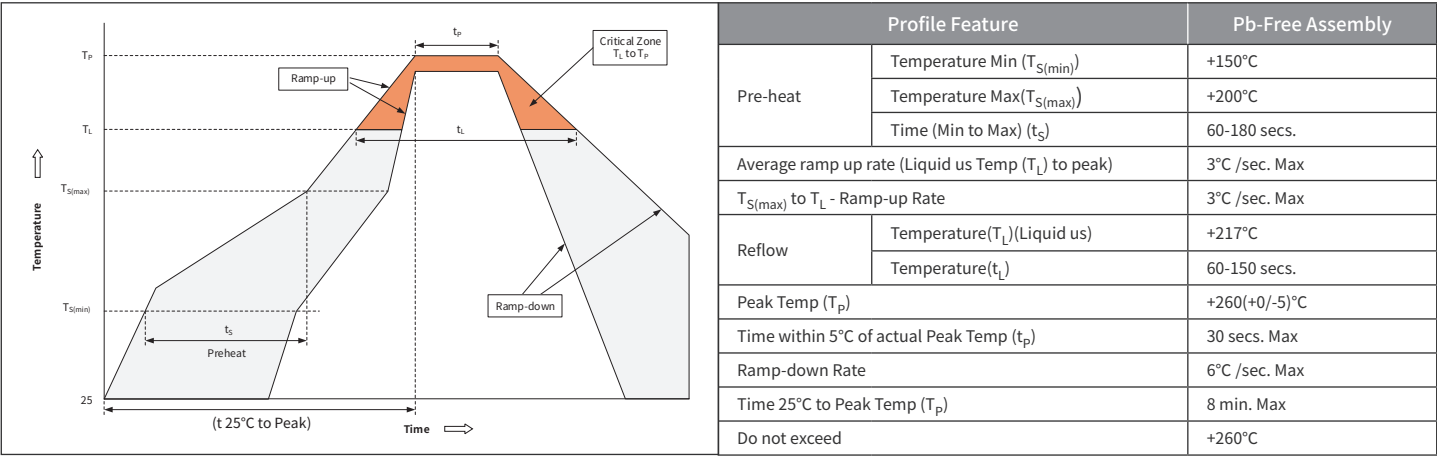
● Ordering Information

PACKAGE	PACKAGE CODE	UNIT WEIGHT(g)	REEL(pcs)	BOX(pcs)	CARTON(pcs)	DELIVERY MODE
SMA	R2	0.07	5000	10000	80000	11"
SMA	R3	0.07	7500	15000	120000	13"

● Part Numbering



● Soldering Parameters



● Packaging (SMA/DO-214AC)

