

Together We Make It Safe!



Transient Voltage Suppressor (TVS)





Transient Voltage Suppressor (TVS) SMAJ

- Surface Mount
- 400W

Features

- Glass Passivated Chip
- Uni and Bidirectional Unit
- Low Leakage
- Excellent clamping capability
- Fast response time
- AEC-Q101 qualified
- Plastic material U/L 94V-0 recognized
- Reverse Voltage - 5.0 to 440 V
- Power Dissipation - 400 W

Applications

- Automotive Electronics
- Telecom
- Lightning Protection Module
- Security Switching Power Supply
- Industrial Controller
- Inverter
- Renewable Energy Solar/Wind

Maximum Ratings and Thermal Characteristics

Parameter	Symbol	Value	Unit
Peak Power Dissipation At $T_A = 25^\circ\text{C}$ $T_p=10/1000\mu\text{s}$ Waveform ³	P_{PK}	400	W
Power Dissipation on Infinite Heat Sink at $T_A=50^\circ\text{C}$ ⁴	$P_{M(AV)}$	3.3	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave ⁵	I_F	40	A
Maximum Instantaneous forward voltage at 25A for unidirectional devices only ⁶	V_F	3.5/6.5	V
Storage Temperature Range	T_{STG}	-50~150	$^\circ\text{C}$
Operating Junction Temperature Range	T_J	-50~150	$^\circ\text{C}$

Note:

1. Ratings at 25°C ambient temperature unless otherwise specified.
2. Single phase, half wave, 60Hz, resistive or inductive load.
3. Non-repetitive current pulse@10/1000 μs and derated above $T_A=25^\circ\text{C}$
4. Mounted on 5.0x5.0mm copper pad to each terminal.
5. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only.
6. $V_F < 3.5\text{V}$ for $V_{BR} \leq 200\text{V}$ and $V_F < 6.5\text{V}$ for $V_{BR} \geq 201\text{V}$.

Product Identification

SMAJ XXX A or CA
 (1) (2) (3) (4)

(1) Product Code (2) Reverse Standoff Voltage V_{RM} (3) Unidirectional (4) Bidirectional

Transient Voltage Suppressor (TVS) SMAJ

● Surface Mount ● 400W

Electrical Characteristics

Part Number		Part Marking		$V_{BR}^{(1)}$ @ I_T		$I_T^{(2)}$	$V_{RM}^{(3)}$	Max $I_R^{(4)}$ @ V_{RM}	Max $V_C^{(5)}$	Max $I_{PP}^{(6)}$
Uni	Bi	Uni	Bi	MIN(V)	MAX(V)	mA	V	μ A	V	A
SMAJ5.0A	SMAJ5.0CA	HE	TE	6.4	7	10	5	800	9.2	43.5
SMAJ6.0A	SMAJ6.0CA	HG	TG	6.67	7.37	10	6	800	10.3	38.8
SMAJ6.5A	SMAJ6.5CA	HK	TK	7.22	7.98	10	6.5	500	11.2	35.7
SMAJ7.0A	SMAJ7.0CA	HM	TM	7.78	8.6	10	7	200	12	33.3
SMAJ7.5A	SMAJ7.5CA	HP	TP	8.33	9.21	1	7.5	100	12.9	31
SMAJ8.0A	SMAJ8.0CA	HR	TR	8.89	9.83	1	8	50	13.6	29.4
SMAJ8.5A	SMAJ8.5CA	HT	TT	9.44	10.4	1	8.5	20	14.4	27.8
SMAJ9.0A	SMAJ9.0CA	HV	TV	10	11.1	1	9	10	15.4	26
SMAJ10A	SMAJ10CA	HX	TX	11.1	12.3	1	10	5	17	23.5
SMAJ11A	SMAJ11CA	HZ	TZ	12.2	13.5	1	11	1	18.2	22
SMAJ12A	SMAJ12CA	IE	UE	13.3	14.7	1	12	1	19.9	20.1
SMAJ13A	SMAJ13CA	IG	UG	14.4	15.9	1	13	1	21.5	18.6
SMAJ14A	SMAJ14CA	IK	UK	15.6	17.2	1	14	1	23.2	17.2
SMAJ15A	SMAJ15CA	IM	UM	16.7	18.5	1	15	1	24.4	16.4
SMAJ16A	SMAJ16CA	IP	UP	17.8	19.7	1	16	1	26	15.4
SMAJ17A	SMAJ17CA	IR	UR	18.9	20.9	1	17	1	27.6	14.5
SMAJ18A	SMAJ18CA	IT	UT	20	22.1	1	18	1	29.2	13.7
SMAJ20A	SMAJ20CA	IV	UV	22.2	24.5	1	20	1	32.4	12.3
SMAJ22A	SMAJ22CA	IX	UX	24.4	26.9	1	22	1	35.5	11.3
SMAJ24A	SMAJ24CA	IZ	UZ	26.7	29.5	1	24	1	38.9	10.3
SMAJ26A	SMAJ26CA	JE	VE	28.9	31.9	1	26	1	42.1	9.5
SMAJ28A	SMAJ28CA	JG	VG	31.1	34.4	1	28	1	45.4	8.8
SMAJ30A	SMAJ30CA	JK	VK	33.3	36.8	1	30	1	48.4	8.3
SMAJ33A	SMAJ33CA	JM	VM	36.7	40.6	1	33	1	53.3	7.5
SMAJ36A	SMAJ36CA	JP	VP	40	44.2	1	36	1	58.1	6.9
SMAJ40A	SMAJ40CA	JR	VR	44.4	49.1	1	40	1	64.5	6.2
SMAJ43A	SMAJ43CA	JT	VT	47.8	52.8	1	43	1	69.4	5.8
SMAJ45A	SMAJ45CA	JV	VV	50	55.3	1	45	1	72.7	5.5
SMAJ48A	SMAJ48CA	JX	VX	53.3	58.9	1	48	1	77.4	5.2
SMAJ51A	SMAJ51CA	JZ	VZ	56.7	62.7	1	51	1	82.4	4.9
SMAJ54A	SMAJ54CA	RE	WE	60	66.3	1	54	1	87.1	4.6
SMAJ58A	SMAJ58CA	RG	WG	64.4	71.2	1	58	1	93.6	4.3
SMAJ60A	SMAJ60CA	RK	WK	66.7	73.7	1	60	1	96.8	4.1
SMAJ64A	SMAJ64CA	RM	WM	71.1	78.6	1	64	1	103	3.9

Transient Voltage Suppressor (TVS) SMAJ

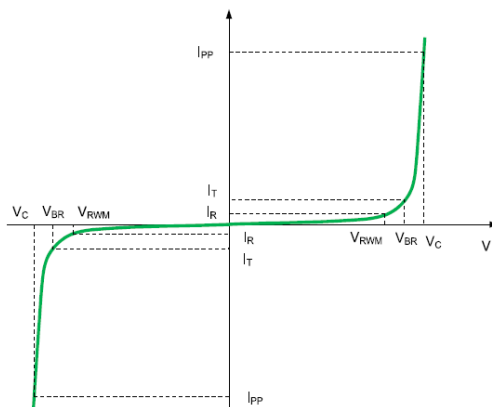
● Surface Mount ● 400W

Part Number		Part Marking		$V_{BR}^{(1)}$ @ I_T		$I_T^{(2)}$	$V_{RWM}^{(3)}$	Max $I_R^{(4)}$ @ V_{RWM}	Max $V_C^{(5)}$	Max $I_{PP}^{(6)}$
Uni	Bi	Uni	Bi	MIN(V)	MAX(V)	mA	V	μ A	V	A
SMAJ70A	SMAJ70CA	RP	WP	77.8	86	1	70	1	113	3.5
SMAJ75A	SMAJ75CA	RR	WR	83.3	92.1	1	75	1	121	3.3
SMAJ78A	SMAJ78CA	RT	WT	86.7	95.8	1	78	1	126	3.2
SMAJ85A	SMAJ85CA	RV	WV	94.4	104	1	85	1	137	2.9
SMAJ90A	SMAJ90CA	RX	WX	100	111	1	90	1	146	2.7
SMAJ100A	SMAJ100CA	RZ	WZ	111	123	1	100	1	162	2.5
SMAJ110A	SMAJ110CA	SE	XE	122	135	1	110	1	177	2.3
SMAJ120A	SMAJ120CA	SG	XG	133	147	1	120	1	193	2.1
SMAJ130A	SMAJ130CA	SK	XK	144	159	1	130	1	209	1.9
SMAJ150A	SMAJ150CA	SM	XM	167	185	1	150	1	243	1.6
SMAJ160A	SMAJ160CA	SP	XP	178	197	1	160	1	259	1.5
SMAJ170A	SMAJ170CA	SR	XR	189	209	1	170	1	275	1.5
SMAJ180A	SMAJ180CA	ST	XT	200	230	1	180	1	290	1.4
SMAJ190A	SMAJ190CA	SV	XV	209	231	1	190	1	306	1.3
SMAJ200A	SMAJ200CA	SX	XX	222	256	1	200	1	322	1.2
SMAJ210A	SMAJ210CA	SZ	XZ	233	268	1	210	1	339	1.2
SMAJ220A	SMAJ220CA	ZE	YE	244	281	1	220	1	355	1.1
SMAJ250A	SMAJ250CA	ZG	YG	278	309	1	250	1	403	1
SMAJ300A	SMAJ300CA	ZK	YK	333	371	1	300	1	484	0.8
SMAJ350A	SMAJ350CA	ZM	YM	389	432	1	350	1	565	0.7
SMAJ400A	SMAJ400CA	ZP	YP	444	494	1	400	1	645	0.6
SMAJ440A	SMAJ440CA	ZR	YR	489	543	1	440	1	710	0.6

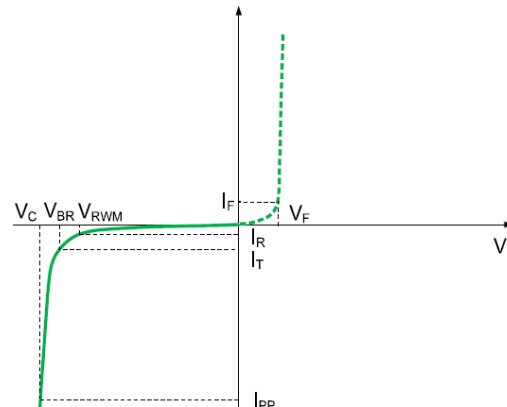
For bidirectional type having V_R of 10 volts and less, the I_R limit is double.

I-V Curve Characteristics

Bidirectional



Unidirectional



Transient Voltage Suppressor (TVS) SMAJ

● Surface Mount ● 400W

Symbol	Parameter	Explanation
(1) V_{BR}	Breakdown voltage	The Voltage that flows through the TVS at a specified test current (I_T)
(2) I_T	Test current	A specified test current that flows through the TVS
(3) V_{RM}	Stand-off voltage	Maximum voltage that can be applied to the TVS without operation
(4) I_R	Leakage current @ V_R	Current measured at V_R
(5) V_C	Clamping voltage	Peak voltage measured across the suppressor at a specified I_{PP} (peak impulse current)
(6) I_{PP}	Peak pulse current	The maximum surge current that flows through the TVS

Fig1. Pulse Waveform

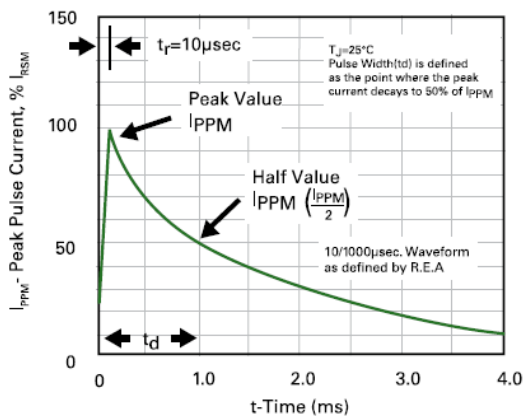


Fig2. Pulse Derating Curve

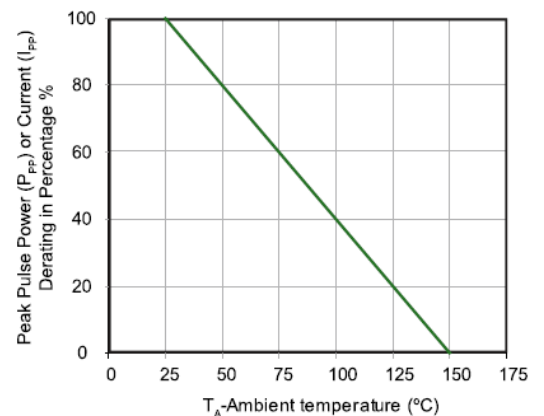


Figure 3. Steady Power Dissipation Derating Curve

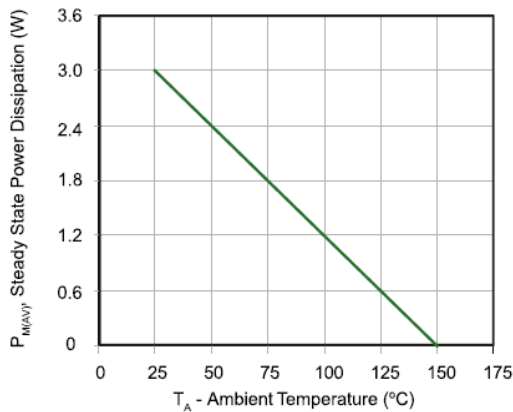
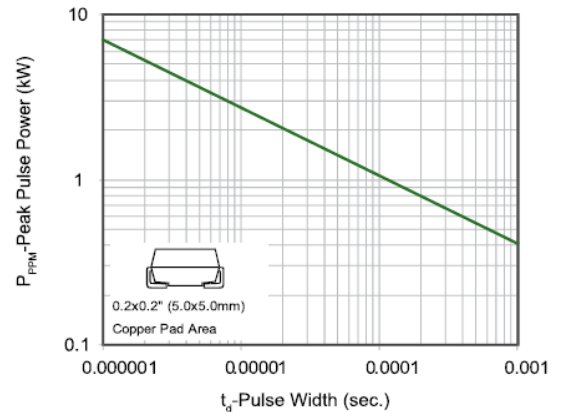


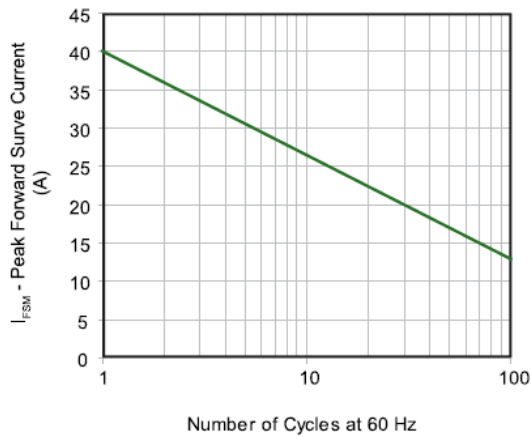
Figure 4. Peak Pulse Power Rating Curve



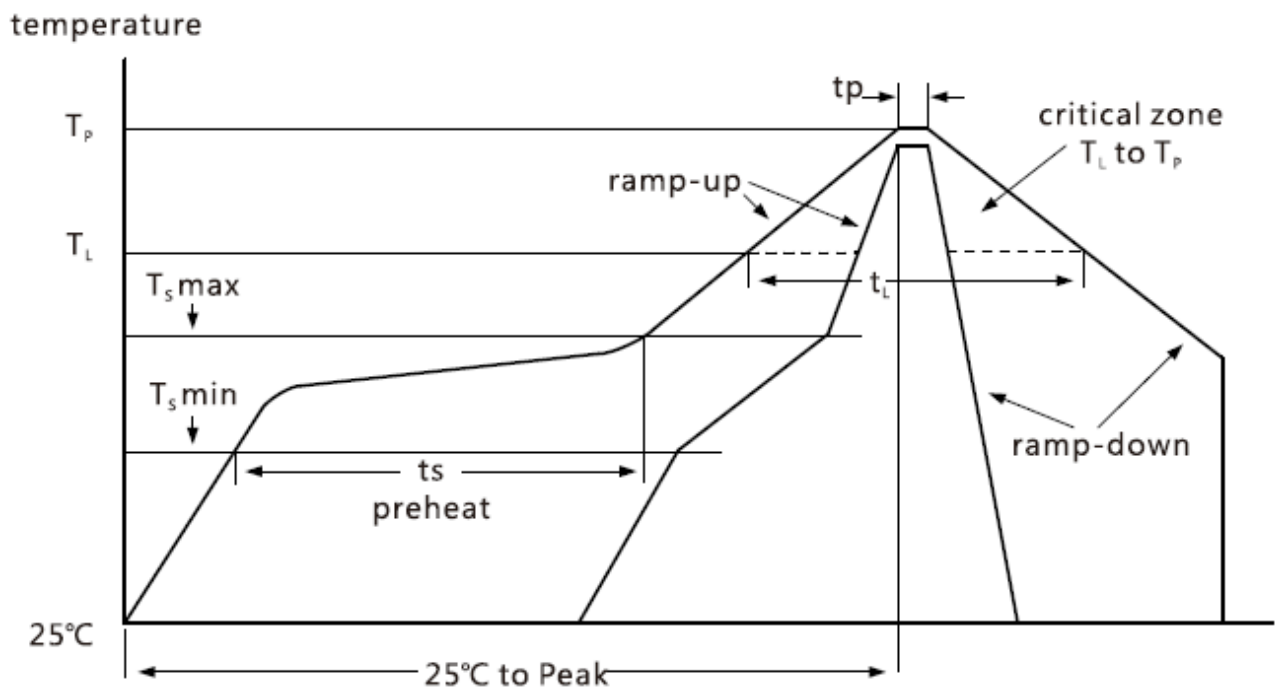
Transient Voltage Suppressor (TVS) SMAJ

● Surface Mount ● 400W

Figure 5. Maximum Non-Repetitive Surge Current



Reflow Soldering Profile

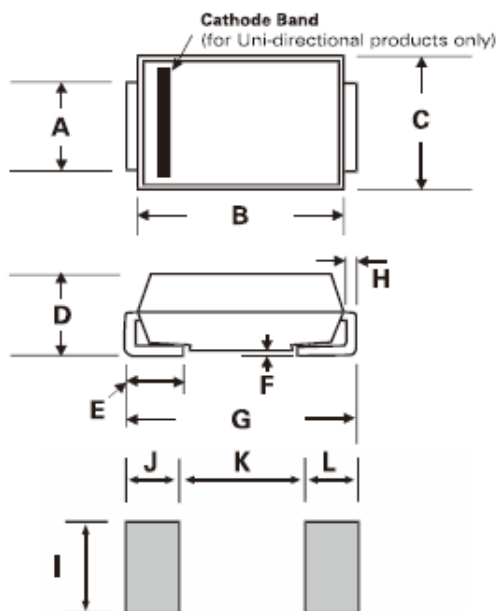


Transient Voltage Suppressor (TVS) SMAJ

● Surface Mount ● 400W

Reflow Profile Feature	SnPb eutectic assembly	Pb-free assembly
Average ramp-up rate (T_s max to T_p)	3°C/s maximum	3°C/s maximum
Preheat		
Temperature minimum (T_s min)	100°C	150°C
Temperature maximum (T_s max)	150°C	200°C
Time (T_s min to T_s max)	60 s to 120 s	60 s to 180 s
Time maintained above		
Temperature (T_L)	183°C	217°C
Time (t_L)	60 s to 150 s	60 s to 150 s
Peak/classification temperature (T_p)	235°C	260°C
Number of allowed reflow cycles	3	3
Time within 5 °C of actual peak temperature (t_p)	10 s to 30 s	10 s to 30 s
Ramp-down rate	6°C/s maximum	6°C/s maximum
Time 25 °C to peak temperature	6 minutes maximum	8 minutes maximum

Package and Layout Dimensions (DO-214AC / SMA)

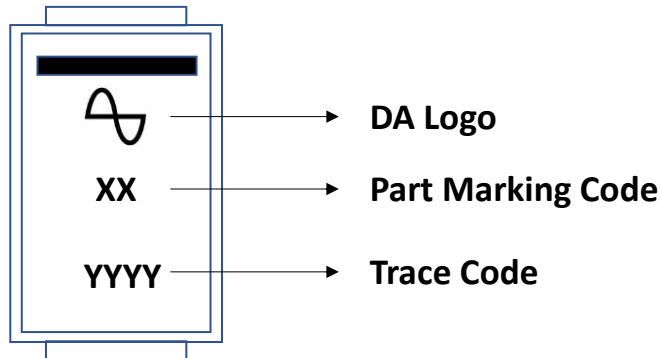


Dimension	Inches		Millimeters	
	Min	Max	Min	Max
A	0.049	0.065	1.25	1.65
B	0.157	0.177	3.99	4.5
C	0.1	0.115	2.54	2.92
D	0.078	0.09	1.98	2.29
E	0.03	0.06	0.78	1.52
F	-	0.008	-	0.203
G	0.194	0.208	4.93	5.28
H	0.006	0.012	0.152	0.305
I	0.07	-	1.8	-
J	0.082	-	2.1	-
K	-	0.09	-	2.3
L	0.082	-	2.1	-

Transient Voltage Suppressor (TVS) SMAJ

● Surface Mount ● 400W

Product Marking



Packaging

Part	Component Package	Quantity	Packaging Option
SMAJ-XXX-A/CA	SMA	2,000pcs	7" REEL
SMAJ-XXX-A/CA	SMA	5,000pcs	13" REEL