

## SPECIFICATION FOR APPROVAL

<p><b>CUSTOMER'S APPROVAL CHOP</b></p>  <p>Approval's Condition: _____</p> <p>Approved Date: _____</p>
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KINDLY RETURN A SET WITH YOUR COMPANY'S OFFICIAL STAMP ON APPROVAL OF THIS ITEM

**CUSTOMER'S NAME:** \_\_\_\_\_

**CUSTOMER'S MODEL NO. :** \_\_\_\_\_

**CUSTOMER'S PART NO. :** \_\_\_\_\_

**DESCRIPTION:** **SMAJ**

**Semitel'S MODEL NO. :** **SMAJ Series**

**VERSION:** **A**

**DATE:** **2019/11/12**

**Attachments:**

- Product Specification
- Sample Qty. :
- Test Data

Prepared By	Checked By	Approved By
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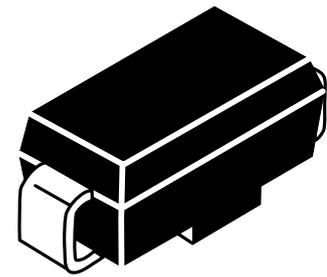


## Transient Voltage Suppression Diodes Surface Mount – 400W > SMAJ series

### Descriptions

Transient Voltage Suppressors (TVS) are semiconductor devices designed to provide protection against over voltage transients. When over voltage events occur, the silicon TVS activates from an very high impedance status to a very low impedance status by operating in the avalanche mode and uses a large junction area to absorb large transient currents in a fast response time, protecting voltage sensitive electronics equipment from damaging.

Semitelint supplies unipolar and bipolar TVS devices with axial and SMD packages, with maximum working voltage 5V to 550V, maximum power dissipation from 200W-5000W.



**SMA  
(JEDEC DO-214AC)**

### Features

- Glass passivated chip junction in SMA Package
- 400W peak pulse power @10/1000 $\mu$ s
- Typical  $I_R$  less than 1 $\mu$ A above 13V
- Low incremental surge resistance
- Excellent clamping capability
- Typical failure mode is short from over-specified voltage/current
- Fast response time: typically less than 1.0ps from 0V to BV min
- IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- EFT protection of data lines in accordance with IEC 61000-4-4
- UL94V-0 Flammability Rating
- Halogen free and RoHS compliant

### Order Information

Device	Qty per Box	Tape
SMAJ series	2000	7" Reel
	5000	13" Reel

### Applications

- Telecom and Network
- Industrial Products
- Business Machines
- Vehicles Electronics
- Power Adapter
- Consumer Products
- Security Protection

### Maximum Ratings and Thermal Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation by 10/1000 $\mu$ s Test Waveform	P <sub>PPM</sub>	400	W
Steady State Power Dissipation on Infinite Heat Sink at T <sub>L</sub> =75°C	P <sub>D</sub>	3.3	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave Unidirectional Only <sup>(1)</sup>	I <sub>FSM</sub>	40	A
Maximum Instantaneous Forward Voltage at 100A for Unidirectional Only <sup>(2)</sup>	V <sub>F</sub>	3.5/6.5	V
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to 150	°C
Typical Thermal Resistance Junction to Lead	R <sub>wJL</sub>	30	°C/W
Typical Thermal Resistance Junction to Ambient	R <sub>wJA</sub>	120	°C/W

#### Notes:

1) Measured on 8.3ms single half sine wave or equivalent square wave, duty cycle=4 per minute maximum.

2) V<sub>F</sub><3.5V for devices of V<sub>BR</sub>≤200V and V<sub>F</sub><5.0V for devices of V<sub>BR</sub> ≥201V.

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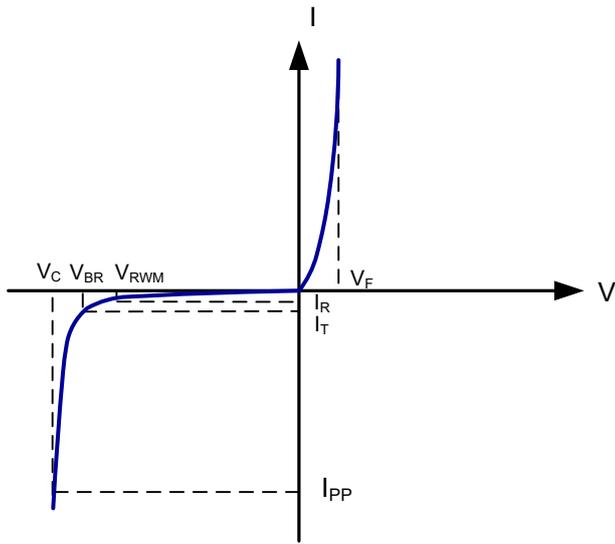
**Electrical Characteristics (TA=25°C unless otherwise noted)**

Type Number		Marking		V <sub>RMW</sub>	I <sub>R</sub> @V <sub>RMW</sub>	V <sub>BR</sub> @I <sub>T</sub> (V)			I <sub>T</sub>	V <sub>C</sub> @I <sub>PP</sub>	I <sub>PP</sub> MAX
Uni	B	Uni	Bi	(V)	(μA)	Min	Nom	Max	(mA)	(V)	(A)
SMAJ5.0A	SMAJ5.0CA	AE	WE	5	800	6.4	6.7	7	10	9.2	43.5
SMAJ6.0A	SMAJ6.0CA	AG	WG	6	800	6.67	7.02	7.37	10	10.3	38.8
SMAJ6.5A	SMAJ6.5CA	AK	WK	6.5	500	7.22	7.6	7.98	10	11.2	35.7
SMAJ7.0A	SMAJ7.0CA	AM	WM	7	200	7.78	8.19	8.6	10	12	33.3
SMAJ7.5A	SMAJ7.5CA	AP	WP	7.5	100	8.33	8.77	9.21	1	12.9	31
SMAJ8.0A	SMAJ8.0CA	AR	WR	8	50	8.89	9.36	9.83	1	13.6	29.4
SMAJ8.5A	SMAJ8.5CA	AT	WT	8.5	20	9.44	9.92	10.4	1	14.4	27.8
SMAJ9.0A	SMAJ9.0CA	AV	WV	9	10	10	10.6	11.1	1	15.4	26
SMAJ10A	SMAJ10CA	AX	WX	10	5	11.1	11.7	12.3	1	17	23.5
SMAJ11A	SMAJ11CA	AZ	WZ	11	1	12.2	12.9	13.5	1	18.2	22
SMAJ12A	SMAJ12CA	BE	XE	12	1	13.3	14	14.7	1	19.9	20.1
SMAJ13A	SMAJ13CA	BG	XG	13	1	14.4	15.2	15.9	1	21.5	18.6
SMAJ14A	SMAJ14CA	BK	XK	14	1	15.6	16.4	17.2	1	23.2	17.2
SMAJ15A	SMAJ15CA	BM	XM	15	1	16.7	17.6	18.5	1	24.4	16.4
SMAJ16A	SMAJ16CA	BP	XP	16	1	17.8	18.8	19.7	1	26	15.4
SMAJ17A	SMAJ17CA	BR	XR	17	1	18.9	19.9	20.9	1	27.6	14.5
SMAJ18A	SMAJ18CA	BT	XT	18	1	20	21.1	22.1	1	29.2	13.7
SMAJ20A	SMAJ20CA	BR	XV	20	1	22.2	23.4	24.5	1	32.4	12.3
SMAJ22A	SMAJ22CA	BX	XX	22	1	24.4	25.7	26.9	1	35.5	11.3
SMAJ24A	SMAJ24CA	BZ	XZ	24	1	26.7	28.1	29.5	1	38.9	10.3
SMAJ26A	SMAJ26CA	CE	YE	26	1	28.9	30.4	31.9	1	42.1	9.5
SMAJ28A	SMAJ28CA	CG	VG	28	1	31.1	32.8	34.4	1	45.4	8.8
SMAJ30A	SMAJ30CA	CK	YK	30	1	33.3	35.1	36.8	1	48.4	8.3
SMAJ33A	SMAJ33CA	CM	YM	33	1	36.7	38.7	40.6	1	53.3	7.5
SMAJ36A	SMAJ36CA	CP	YP	36	1	40	42.1	44.2	1	58.1	6.9
SMAJ40A	SMAJ40CA	CR	YR	40	1	44.4	46.8	49.1	1	64.5	6.2
SMAJ43A	SMAJ43CA	CT	YT	43	1	47.8	50.3	52.8	1	69.4	5.8
SMAJ45A	SMAJ45CA	CV	YV	45	1	50	52.7	55.3	1	72.7	5.5
SMAJ48A	SMAJ48CA	CX	YX	48	1	53.3	56.1	58.9	1	77.4	5.2
SMAJ51A	SMAJ51CA	CZ	YZ	51	1	56.7	59.7	62.7	1	82.4	4.9
SMAJ54A	SMAJ54CA	RE	ZE	54	1	60	63.2	66.3	1	87.1	4.6
SMAJ58A	SMAJ58CA	RG	ZG	58	1	64.4	67.8	71.2	1	93.6	4.3
SMAJ60A	SMAJ60CA	RK	ZK	60	1	66.7	70.2	73.7	1	96.8	4.1
SMAJ64A	SMAJ64CA	RM	ZM	64	1	71.1	74.9	78.6	1	103	3.9
SMAJ70A	SMAJ70CA	RP	ZP	70	1	77.8	81.9	86	1	113	3.5
SMAJ75A	SMAJ75CA	RR	ZR	75	1	83.3	87.7	92.1	1	121	3.3
SMAJ78A	SMAJ78CA	RT	ZT	78	1	86.7	91.3	95.8	1	126	3.2
SMAJ85A	SMAJ85CA	RV	ZV	85	1	94.4	99.2	104	1	137	2.9
SMAJ90A	SMAJ90CA	RX	ZX	90	1	100	105.5	111	1	146	2.7
SMAJ100A	SMAJ100CA	RZ	ZZ	100	1	111	117	123	1	162	2.5
SMAJ110A	SMAJ110CA	SE	VE	110	1	122	128.5	135	1	177	2.3
SMAJ120A	SMAJ120CA	SG	VG	120	1	133	140	147	1	193	2.1
SMAJ130A	SMAJ130CA	SK	VK	130	1	144	151.5	159	1	209	1.9
SMAJ150A	SMAJ150CA	SM	VM	150	1	167	176	185	1	243	1.6
SMAJ160A	SMAJ160CA	SP	VP	160	1	178	187.5	197	1	259	1.5
SMAJ170A	SMAJ170CA	SR	VR	170	1	189	199	209	1	275	1.5
SMAJ180A	SMAJ180CA	ST	VT	180	1	201	211.5	222	1	292	1.4
SMAJ200A	SMAJ200CA	SV	VV	200	1	224	235.5	247	1	324	1.2
SMAJ220A	SMAJ220CA	GE	VX	220	1	246	259	272	1	356	1.1
SMAJ250A	SMAJ250CA	SZ	VZ	250	1	279	294	309	1	405	1
SMAJ300A	SMAJ300CA	TE	UE	300	1	335	353	371	1	486	0.8
SMAJ350A	SMAJ350CA	TG	UG	350	1	391	411.5	432	1	567	0.7
SMAJ400A	SMAJ400CA	TK	UK	400	1	447	470.5	494	1	648	0.6
SMAJ440A	SMAJ440CA	TM	UM	440	1	492	517.5	543	1	713	0.6

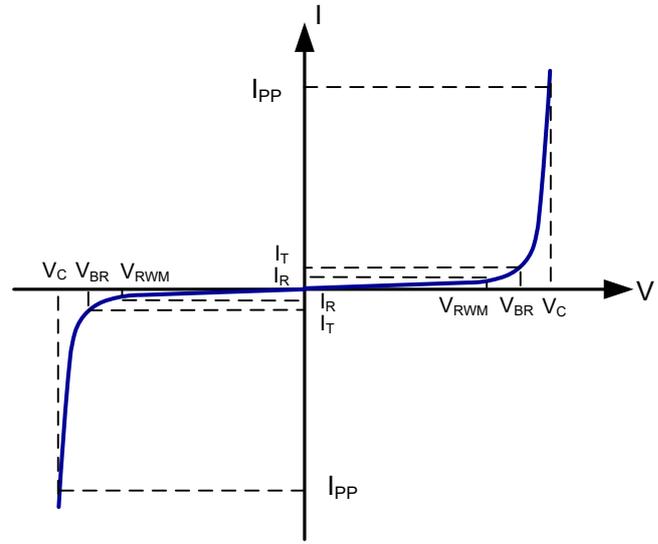
For bidirectional type having V<sub>RMW</sub> of 10 volts and less, the I<sub>R</sub> limit is double.

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## I-V Curve Characteristics



Uni-Directional TVS



Bi-Directional TVS

**V<sub>RWM</sub> - Reverse Stand-Off Voltage** - Working Peak Reverse Voltage

**V<sub>BR</sub> - Breakdown Voltage** - Maximum current that flows through the TVS at a specified test current ( $I_T$ )

**I<sub>T</sub> - Test Current** - Test Current

**V<sub>C</sub> - Clamping Voltage** - Peak voltage measured across the suppressor at a specified  $I_{ppm}$  (peak impulse current)

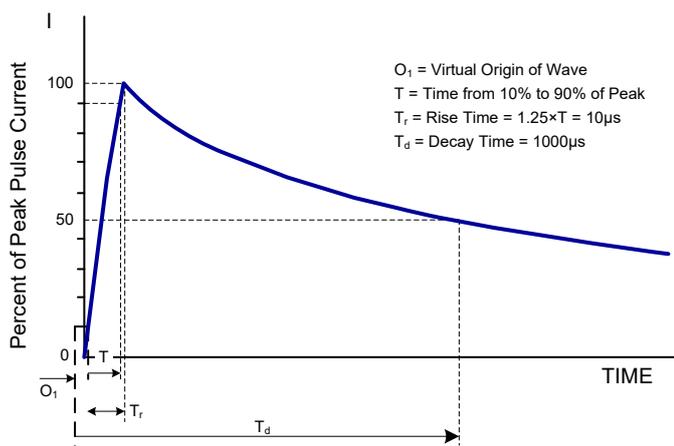
**I<sub>PP</sub> - Peak Pulse Current** - Maximum Reverse Peak Pulse Current

**P<sub>PPM</sub> - Peak Pulse Power Dissipation** - Max power dissipation

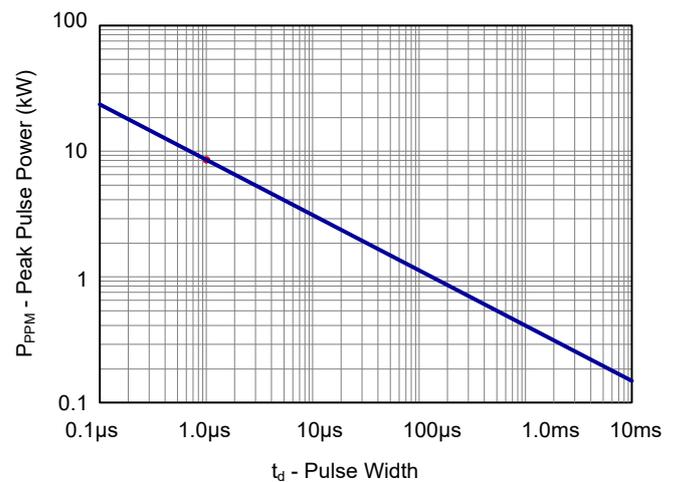
**I<sub>R</sub> - Reverse Leakage Current** - Current measured at  $V_{RWM}$

**V<sub>F</sub> - Forward Voltage** - Drop for Uni-directional

## Ratings and Characteristic Curves (TA=25°C unless otherwise noted)

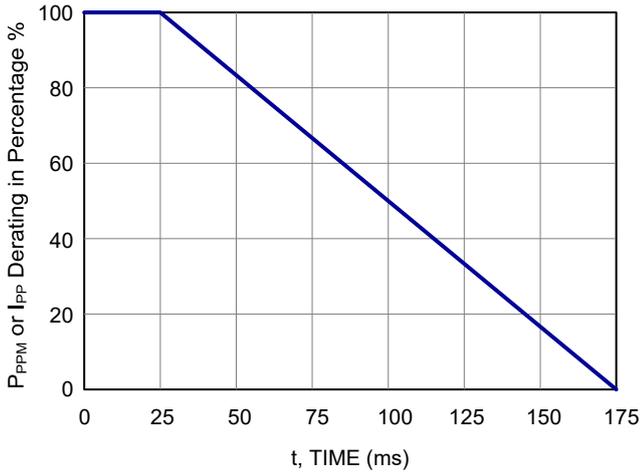


Pulse Waveform- 10/1000μs

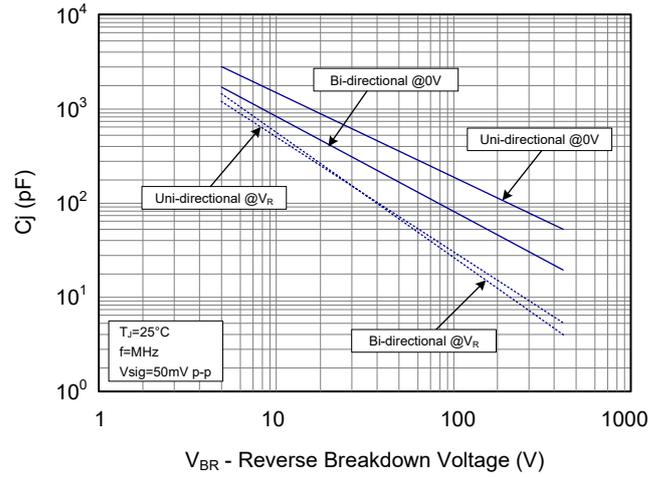


Peak Pulse Power Rating Curve

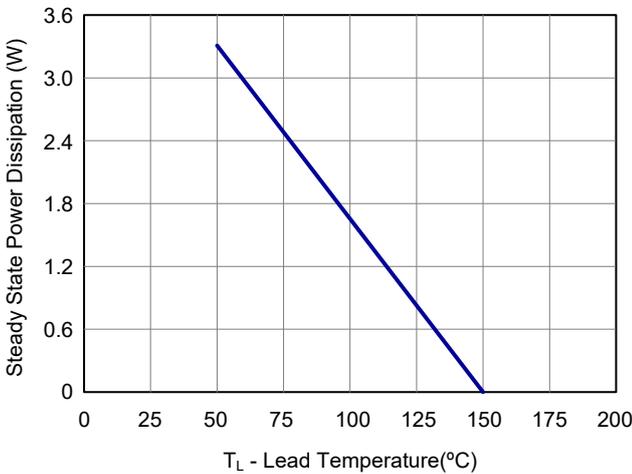
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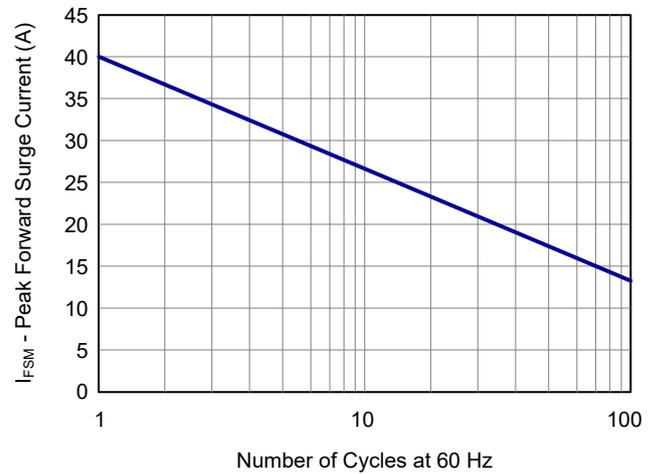
**Pulse Derating Curve**



**Typical Junction Capacitance**



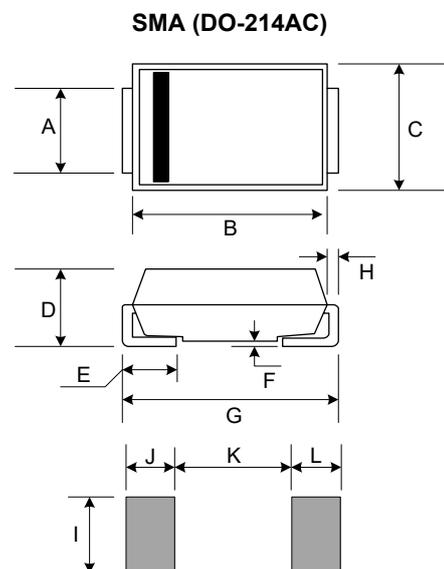
**Steady State Power Derating Curve**



**Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only**

**Product Dimensions**

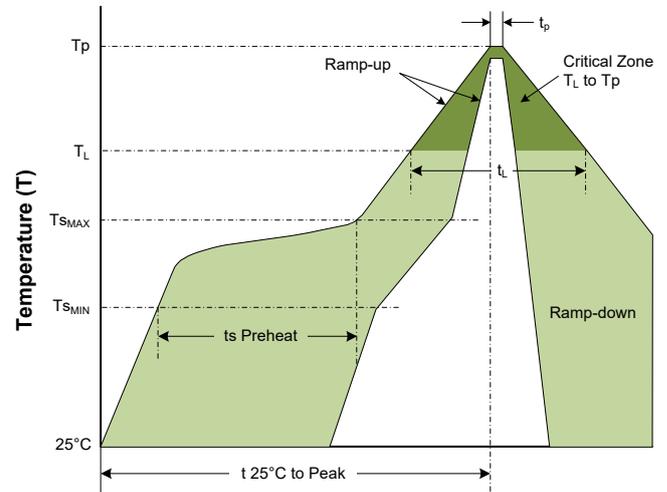
Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.049	0.065	1.250	1.650
B	0.157	0.177	3.990	4.500
C	0.100	0.110	2.540	2.790
D	0.078	0.090	1.980	2.290
E	0.030	0.060	0.780	1.520
F	-	0.008	-	0.203
G	0.194	0.208	4.930	5.280
H	0.006	0.012	0.152	0.305
I	0.070	-	1.800	-
J	0.082	-	2.100	-
K	-	0.090	-	2.300
L	0.082	-	2.100	-



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## Soldering Parameters

Profile Feature	Lead-Free Assembly
Average Ramp-up Rate ( $T_{S_{MAX}}$ to $T_p$ ) Average Ramp-down Rate ( $T_p$ to $T_L$ )	3°C/second max. 6°C/second max.
<b>Preheat</b> • Temperature Min ( $T_{S_{MIN}}$ ) • Temperature Max ( $T_{S_{MAX}}$ ) • Time ( $t_s$ Preheat)	150°C 200°C 60-180 seconds
<b>Time maintained above:</b> • Temperature ( $T_L$ ) • Time ( $t_L$ )	217°C 60-150 seconds
<b>Peak/Classification Temperature</b> • Temperature ( $T_p$ )	260 <sup>+0/-5</sup> °C
<b>Time within 5°C of actual Peak</b> Time ( $t_p$ )	20-40 seconds
<b>Time 25°C to peak Temperature</b>	8 minutes max
<b>Do not exceed</b>	280 °C



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