

# MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

**SMAJXXXA(CA)-MS**

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**Product specification**

## Description

Transient voltage suppression diodes, also known as TVS diodes, are protective electronic parts that protect electrical equipment from voltage spikes introduced by wires.

## Applications

- computer system
- domestic appliance
- video input


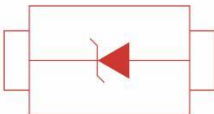


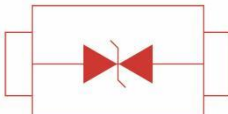

## Features

- For surface mounted applications
- Excellent clamping capability
- 400 W peak pulse power capability with a 10/1000 $\mu$ s Waveform.
- $V_{RWM}$  3.3-550V
- Low profile package and low inductance
- Typical IR less than 1 $\mu$ A above 10V
- Fast response time: typically less than 1.0ps from 0V to  $V_{BRmin}$ .

## Mechanical Characteristics

- Package: SMA/DO-214AC
- Case Material: Molded Plastic. UL Flammability
- Classification Rating 94V-0
- Moisture Sensitivity: Meet MSL 1
- Terminal: Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denotes cathode except bi-directional models
- Weight: 0.07g(Approximate)

## Reference News

PACKAGE OUTLINE	PIN CONFIGURATION	Marking Information
		
<b>Unipolar</b>		
		
<b>Bipolar</b>		

**Electrical Characteristics (T=25°C)**

Part Number		Marking		V <sub>R</sub>	I <sub>R@V<sub>R</sub></sub>	V <sub>BR@I<sub>T</sub></sub>		I <sub>T</sub>	V <sub>C@I<sub>PP</sub></sub>	I <sub>PP@</sub>
Uni-Polar	Bi-Polar	Uni	Bi	V	μA	min(V)	max(V)	mA	max(V)	A
SMAJ3.3A-MS	/	SMAJ3.3A	/	3.3	200	5.2	6	10	8.0	50.00
SMAJ5.0A-MS	SMAJ5.0CA-MS	SMAJ5.0A	SMAJ5.0CA	5.0	800	6.40	7.00	10	9.2	43.48
SMAJ6.0A-MS	SMAJ6.0CA-MS	SMAJ6.0A	SMAJ6.0CA	6.0	800	6.67	7.37	10	10.3	38.84
SMAJ6.5A-MS	SMAJ6.5CA-MS	SMAJ6.5A	SMAJ6.5CA	6.5	500	7.22	7.98	10	11.2	35.72
SMAJ7.0A-MS	SMAJ7.0CA-MS	SMAJ7.0A	SMAJ7.0CA	7.0	200	7.78	8.60	10	12.0	33.34
SMAJ7.5A-MS	SMAJ7.5CA-MS	SMAJ7.5A	SMAJ7.5CA	7.5	100	8.33	9.21	1	12.9	31.01
SMAJ8.0A-MS	SMAJ8.0CA-MS	SMAJ8.0A	SMAJ8.0CA	8.0	50	8.89	9.83	1	13.6	29.42
SMAJ8.5A-MS	SMAJ8.5CA-MS	SMAJ8.5A	SMAJ8.5CA	8.5	20	9.44	10.40	1	14.4	27.78
SMAJ9.0A-MS	SMAJ9.0CA-MS	SMAJ9.0A	SMAJ9.0CA	9.0	10	10.00	11.10	1	15.4	25.98
SMAJ10A-MS	SMAJ10CA-MS	SMAJ10A	SMAJ10CA	10.0	5	11.10	12.30	1	17.0	23.53
SMAJ11A-MS	SMAJ11CA-MS	SMAJ11A	SMAJ11CA	11.0	1	12.20	13.50	1	18.2	21.98
SMAJ12A-MS	SMAJ12CA-MS	SMAJ12A	SMAJ12CA	12.0	1	13.30	14.70	1	19.9	20.11
SMAJ13A-MS	SMAJ13CA-MS	SMAJ13A	SMAJ13CA	13.0	1	14.40	15.90	1	21.5	18.61
SMAJ14A-MS	SMAJ14CA-MS	SMAJ14A	SMAJ14CA	14.0	1	15.60	17.20	1	23.2	17.25
SMAJ15A-MS	SMAJ15CA-MS	SMAJ15A	SMAJ15CA	15.0	1	16.70	18.50	1	24.4	16.40
SMAJ16A-MS	SMAJ16CA-MS	SMAJ16A	SMAJ16CA	16.0	1	17.80	19.70	1	26.0	15.39
SMAJ17A-MS	SMAJ17CA-MS	SMAJ17A	SMAJ17CA	17.0	1	18.90	20.90	1	27.6	14.50
SMAJ18A-MS	SMAJ18CA-MS	SMAJ18A	SMAJ18CA	18.0	1	20.00	22.10	1	29.2	13.70
SMAJ20A-MS	SMAJ20CA-MS	SMAJ20A	SMAJ20CA	20.0	1	22.20	24.50	1	32.4	12.35
SMAJ22A-MS	SMAJ22CA-MS	SMAJ22A	SMAJ22CA	22.0	1	24.40	26.90	1	35.5	11.27
SMAJ24A-MS	SMAJ24CA-MS	SMAJ24A	SMAJ24CA	24.0	1	26.70	29.50	1	38.9	10.29
SMAJ26A-MS	SMAJ26CA-MS	SMAJ26A	SMAJ26CA	26.0	1	28.90	31.90	1	42.1	9.51
SMAJ28A-MS	SMAJ28CA-MS	SMAJ28A	SMAJ28CA	28.0	1	31.10	34.40	1	45.4	8.82
SMAJ30A-MS	SMAJ30CA-MS	SMAJ30A	SMAJ30CA	30.0	1	33.30	36.80	1	48.4	8.27
SMAJ33A-MS	SMAJ33CA-MS	SMAJ33A	SMAJ33CA	33.0	1	36.70	40.60	1	53.3	7.51
SMAJ36A-MS	SMAJ36CA-MS	SMAJ36A	SMAJ36CA	36.0	1	40.00	44.20	1	58.1	6.89
SMAJ40A-MS	SMAJ40CA-MS	SMAJ40A	SMAJ40CA	40.0	1	44.40	49.10	1	64.5	6.21
SMAJ43A-MS	SMAJ43CA-MS	SMAJ43A	SMAJ43CA	43.0	1	47.80	52.80	1	69.4	5.77
SMAJ45A-MS	SMAJ45CA-MS	SMAJ45A	SMAJ45CA	45.0	1	50.00	55.30	1	72.7	5.51
SMAJ48A-MS	SMAJ48CA-MS	SMAJ48A	SMAJ48CA	48.0	1	53.30	58.90	1	77.4	5.17
SMAJ51A-MS	SMAJ51CA-MS	SMAJ51A	SMAJ51CA	51.0	1	56.70	62.70	1	82.4	4.86
SMAJ54A-MS	SMAJ54CA-MS	SMAJ54A	SMAJ54CA	54.0	1	60.00	66.30	1	87.1	4.60
SMAJ58A-MS	SMAJ58CA-MS	SMAJ58A	SMAJ58CA	58.0	1	64.40	71.20	1	93.6	4.28
SMAJ60A-MS	SMAJ60CA-MS	SMAJ60A	SMAJ60CA	60.0	1	66.70	73.70	1	96.8	4.14
SMAJ64A-MS	SMAJ64CA-MS	SMAJ64A	SMAJ64CA	64.0	1	71.10	78.60	1	103.0	3.89
SMAJ70A-MS	SMAJ70CA-MS	SMAJ70A	SMAJ70CA	70.0	1	77.80	86.00	1	113.0	3.54
SMAJ75A-MS	SMAJ75CA-MS	SMAJ75A	SMAJ75CA	75.0	1	83.30	92.10	1	121.0	3.31
SMAJ78A-MS	SMAJ78CA-MS	SMAJ78A	SMAJ78CA	78.0	1	86.70	95.80	1	126.0	3.18
SMAJ85A-MS	SMAJ85CA-MS	SMAJ85A	SMAJ85CA	85.0	1	94.40	104.0	1	137.0	2.92

**Electrical Characteristics (T=25°C)**

Part Number		Marking		V <sub>R</sub>	I <sub>R@V<sub>R</sub></sub>	V <sub>BR@I<sub>T</sub></sub>		I <sub>T</sub>	V <sub>C@I<sub>PP</sub></sub>	I <sub>PP</sub> <sup>①</sup>
Uni- Polar	Bi- Polar	Uni	Bi	V	μA	min(V)	max(V)	mA	max(V)	A
SMAJ90A-MS	SMAJ90CA-MS	SMAJ90A	SMAJ90CA	90.0	1	100.0	111.0	1	146.0	2.74
SMAJ100A-MS	SMAJ100CA-MS	SMAJ100A	SMAJ100CA	100.0	1	111.0	123.0	1	162.0	2.47
SMAJ110A-MS	SMAJ110CA-MS	SMAJ110A	SMAJ110CA	110.0	1	122.0	135.0	1	177.0	2.26
SMAJ120A-MS	SMAJ120CA-MS	SMAJ120A	SMAJ120CA	120.0	1	133.0	147.0	1	193.0	2.08
SMAJ130A-MS	SMAJ130CA-MS	SMAJ130A	SMAJ130CA	130.0	1	144.0	159.0	1	209.0	1.92
SMAJ150A-MS	SMAJ150CA-MS	SMAJ150A	SMAJ150CA	150.0	1	167.0	185.0	1	243.0	1.65
SMAJ160A-MS	SMAJ160CA-MS	SMAJ160A	SMAJ160CA	160.0	1	178.0	197.0	1	259.0	1.55
SMAJ170A-MS	SMAJ170CA-MS	SMAJ170A	SMAJ170CA	170.0	1	189.0	209.0	1	275.0	1.46
SMAJ180A-MS	SMAJ180CA-MS	SMAJ180A	SMAJ180CA	180.0	1	201.0	222.0	1	292.0	1.37
SMAJ190A-MS	SMAJ190CA-MS	SMAJ190A	SMAJ190CA	190.0	1	209.0	233.0	1	308.0	1.30
SMAJ200A-MS	SMAJ200CA-MS	SMAJ200A	SMAJ200CA	200.0	1	224.0	247.0	1	324.0	1.24
SMAJ210A-MS	SMAJ210CA-MS	SMAJ210A	SMAJ210CA	210.0	1	237.0	263.0	1	340.0	1.18
SMAJ220A-MS	SMAJ220CA-MS	SMAJ220A	SMAJ220CA	220.0	1	246.0	272.0	1	356.0	1.13
SMAJ250A-MS	SMAJ250CA-MS	SMAJ250A	SMAJ250CA	250.0	1	279.0	309.0	1	405.0	0.99
SMAJ300A-MS	SMAJ300CA-MS	SMAJ300A	SMAJ300CA	300.0	1	335.0	371.0	1	486.0	0.83
SMAJ350A-MS	SMAJ350CA-MS	SMAJ350A	SMAJ350CA	350.0	1	391.0	432.0	1	567.0	0.71
SMAJ400A-MS	SMAJ400CA-MS	SMAJ400A	SMAJ400CA	400.0	1	447.0	494.0	1	648.0	0.62
SMAJ440A-MS	SMAJ440CA-MS	SMAJ440A	SMAJ440CA	440.0	1	492.0	543.0	1	713.0	0.57
SMAJ550A-MS	SMAJ550CA-MS	SMAJ550A	SMAJ550CA	550.0	1	614.7	679.4	1	972.0	0.42

**Notes:**

① Surge waveform: 10/1000μs

 V<sub>R</sub> : Stand-off Voltage -- Maximum voltage that can be applied

 V<sub>BR</sub>: Breakdown Voltage

 V<sub>C</sub>: Clamping Voltage -- Peak voltage measured across the suppressor at a specified I<sub>pp</sub>

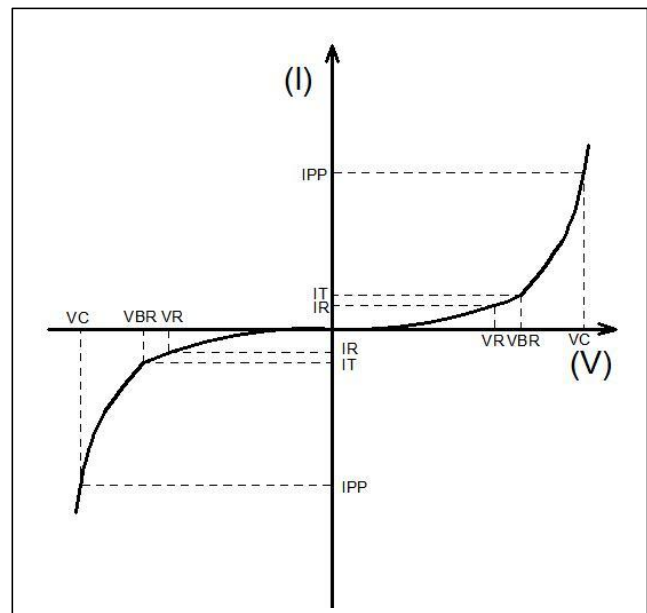
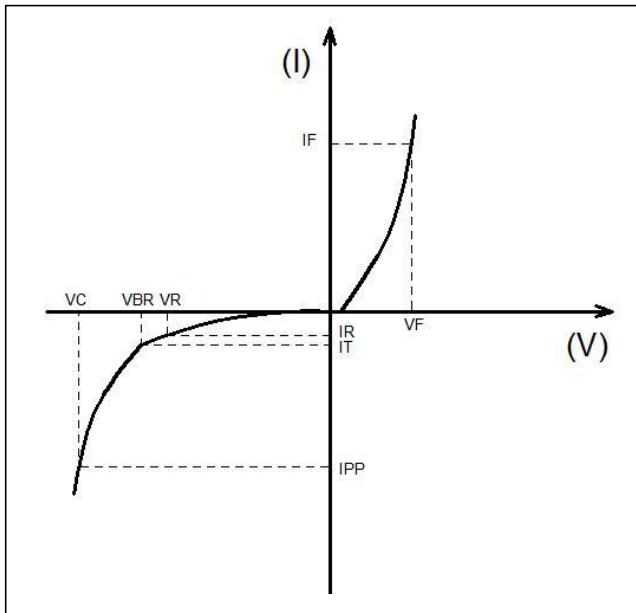
 I<sub>R</sub>: Reverse Leakage Current

**Absolute Maximum Ratings(T=25°C, RH=45%-75%, unless otherwise noted)**

Parameter	Symbol	Value	Unit
Peak pulse power dissipation on 10/ 1000µs waveform	P <sub>PP</sub>	400	W
Steady state power dissipation at T <sub>L</sub> =75°C	P <sub>M(AV)</sub>	1.0	W
Operating junction temperature range	T <sub>j</sub>	-55 to +125	°C
Storage temperature range	T <sub>stg</sub>	-55 to +150	°C

**Ratings And V-I Characteristics Curves (T=25°C, unless otherwise noted)**

FIG1: V-I cure characteristics



Symbol	Parameter
I <sub>F</sub>	Mean Forward Current
V <sub>F</sub>	Maximum Forward Voltage @ I <sub>F</sub>
V <sub>R</sub>	Peak Reverse Working Voltage
I <sub>R</sub>	Reverse Leakage Current @ V <sub>R</sub>
V <sub>BR</sub>	Breakdown Voltage @ I <sub>T</sub>
I <sub>T</sub>	Test Current
I <sub>PP</sub>	Maximum Reverse Peak Pulse Current
V <sub>C</sub>	Clamping Voltage @ I <sub>PP</sub>

Typical Characteristics

FIG2: Pulse Derating Curve

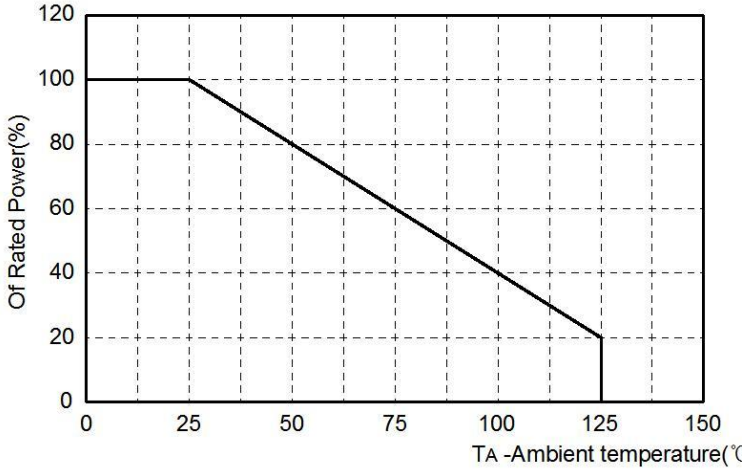


FIG3: Pulse Wavefor

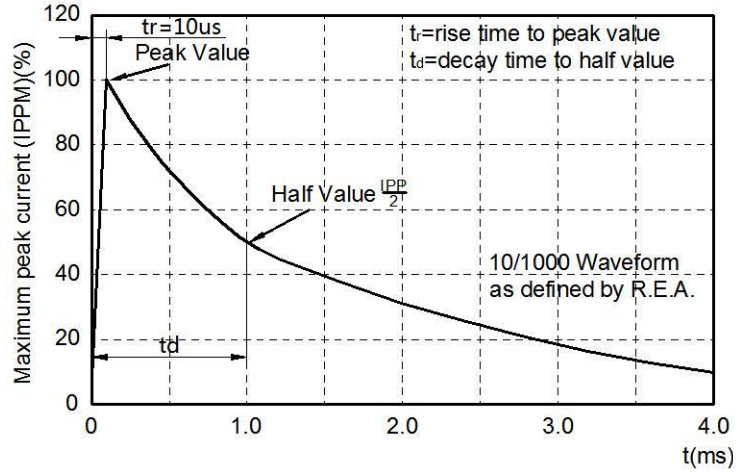


FIG4: Peak Pulse Power Rating Curve

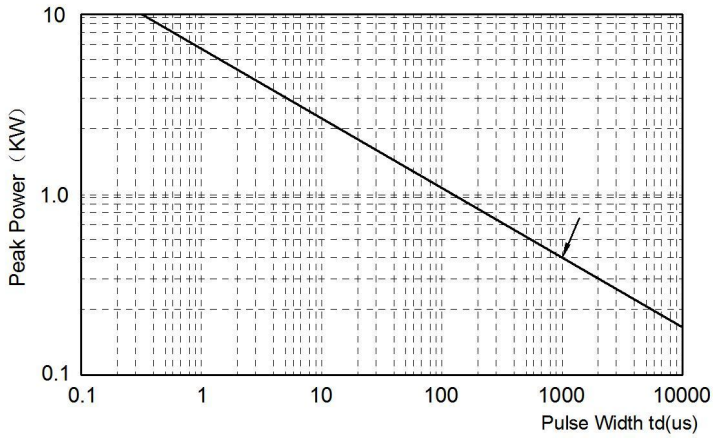
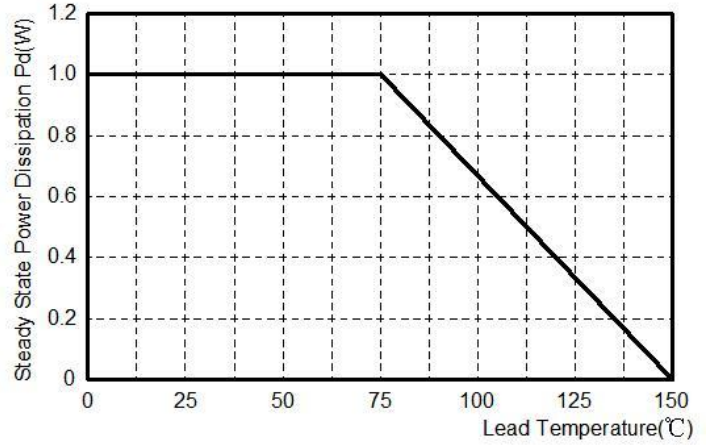
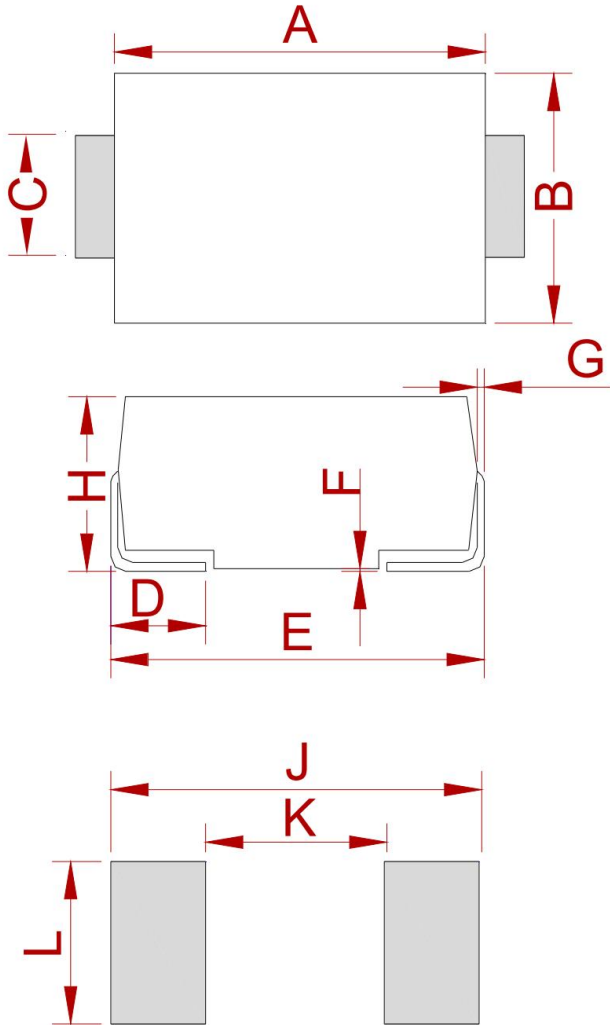


FIG5: Steady State Power Dissipation



**PACKAGE MECHANICAL DATA**



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.25	4.65	0.167	0.183
B	2.50	2.90	0.098	0.114
C	1.35	1.65	0.053	0.065
D	0.76	1.52	0.030	0.060
E	4.93	5.28	0.194	0.208
F	0.051	0.203	0.002	0.008
G	0.15	0.31	0.006	0.012
H	1.98	2.41	0.078	0.095
J	6.50		0.256	
K		2.30		0.090
L	1.70		0.067	

**REEL SPECIFICATION**

P/N	PKG	QTY
SMAJXXXA(CA)-MS	SMA	2000

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