

Transient Voltage Suppression Diodes Surface Mount – 400W

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.

Boarden 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 @10/1000µs
- Typical I_R less than 1µA 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
- EFT protection of data lines in accordance with IEC 61000-4-4
- UL94V-0 Flammability Rating
- Halogen free and RoHS compliant

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 10/1000µs Test Waveform	P_{PPM}	400	W
Steady State Power Dissipation on Infinite Heat Sink at $T_L=75^\circ\text{C}$	P_D	3.3	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave Unidirectional Only ⁽¹⁾	I_{FSM}	40	A
Maximum Instantaneous Forward Voltage at 100A for Unidirectional Only ⁽²⁾	V_F	3.5/6.5	V
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175	°C
Typical Thermal Resistance Junction to Lead	R_{uJL}	30	°C/W
Typical Thermal Resistance Junction to Ambient	R_{uJA}	120	°C/W

Notes:

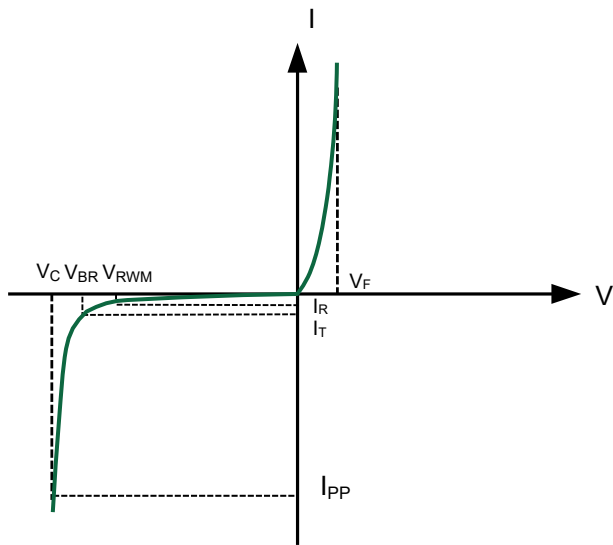
- 1) Measured on 8.3ms single half sine wave or equivalent square wave, duty cycle=4 per minute maximum.
 2) $V_F < 3.5\text{V}$ for devices of $V_{BR} \leq 200\text{V}$ and $V_F < 5.0\text{V}$ for devices of $V_{BR} \geq 201\text{V}$.

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

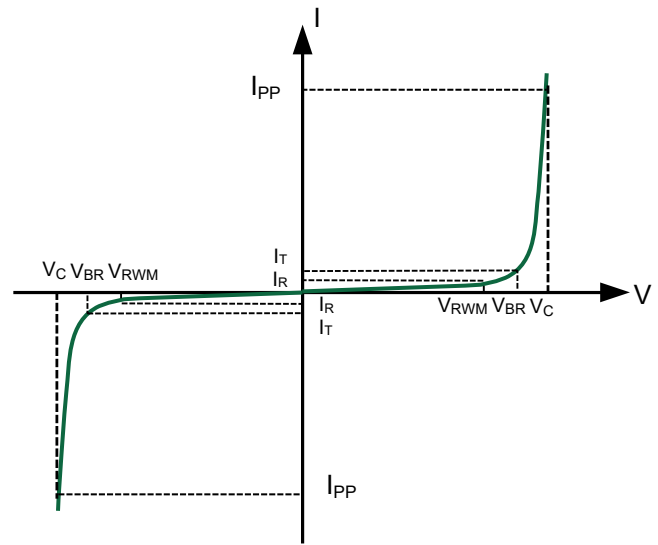
Type Number		V _{RMW}	I _R @V _{RMW}	V _{BR} @I _T (V)			I _T	V _C @I _{PP}	I _{PP} MAX
Uni	Bi	(V)	(μA)	Min	Nom	Max	(mA)	(V)	(A)
SMAJ5.0A	SMAJ5.0CA	5.0	800	6.40	6.70	7.00	10	9.20	43.5
SMAJ6.0A	SMAJ6.0CA	6.0	800	6.67	7.02	7.37	10	10.3	38.8
SMAJ6.5A	SMAJ6.5CA	6.5	500	7.22	7.60	7.98	10	11.2	35.7
SMAJ7.0A	SMAJ7.0CA	7.0	200	7.78	8.19	8.60	10	12.0	33.3
SMAJ7.5A	SMAJ7.5CA	7.5	80	8.33	8.77	9.21	1	12.9	31.0
SMAJ8.0A	SMAJ8.0CA	8.0	40	8.89	9.36	9.83	1	13.6	29.4
SMAJ8.5A	SMAJ8.5CA	8.5	20	9.44	9.92	10.4	1	14.4	27.8
SMAJ9.0A	SMAJ9.0CA	9.0	10	10.0	10.6	11.1	1	15.4	26.0
SMAJ10A	SMAJ10CA	10	5	11.1	11.7	12.3	1	17.0	23.5
SMAJ11A	SMAJ11CA	11	1	12.2	12.9	13.5	1	18.2	22.0
SMAJ12A	SMAJ12CA	12	1	13.3	14	14.7	1	19.9	20.1
SMAJ13A	SMAJ13CA	13	1	14.4	15.2	15.9	1	21.5	18.6
SMAJ14A	SMAJ14CA	14	1	15.6	16.4	17.2	1	23.2	17.2
SMAJ15A	SMAJ15CA	15	1	16.7	17.6	18.5	1	24.4	16.4
SMAJ16A	SMAJ16CA	16	1	17.8	18.8	19.7	1	26.0	15.4
SMAJ17A	SMAJ17CA	17	1	18.9	19.9	20.9	1	27.6	14.5
SMAJ18A	SMAJ18CA	18	1	20.0	21.1	22.1	1	29.2	13.7
SMAJ20A	SMAJ20CA	20	1	22.2	23.4	24.5	1	32.4	12.3
SMAJ22A	SMAJ22CA	22	1	24.4	25.7	26.9	1	35.5	11.3
SMAJ24A	SMAJ24CA	24	1	26.7	28.1	29.5	1	38.9	10.3
SMAJ26A	SMAJ26CA	26	1	28.9	30.4	31.9	1	42.1	9.5
SMAJ28A	SMAJ28CA	28	1	31.1	32.8	34.4	1	45.4	8.8
SMAJ30A	SMAJ30CA	30	1	33.3	35.1	36.8	1	48.4	8.3
SMAJ33A	SMAJ33CA	33	1	36.7	38.7	40.6	1	53.3	7.5
SMAJ36A	SMAJ36CA	36	1	40.0	42.1	44.2	1	58.1	6.9
SMAJ40A	SMAJ40CA	40	1	44.4	46.8	49.1	1	64.5	6.2
SMAJ43A	SMAJ43CA	43	1	47.8	50.3	52.8	1	69.4	5.8
SMAJ45A	SMAJ45CA	45	1	50.0	52.7	55.3	1	72.7	5.5
SMAJ48A	SMAJ48CA	48	1	53.3	56.1	58.9	1	77.4	5.2
SMAJ51A	SMAJ51CA	51	1	56.7	59.7	62.7	1	82.4	4.9
SMAJ54A	SMAJ54CA	54	1	60.0	63.2	66.3	1	87.1	4.6
SMAJ58A	SMAJ58CA	58	1	64.4	67.8	71.2	1	93.6	4.3
SMAJ60A	SMAJ60CA	60	1	66.7	70.2	73.7	1	96.8	4.1
SMAJ64A	SMAJ64CA	64	1	71.1	74.9	78.6	1	103	3.9
SMAJ70A	SMAJ70CA	70	1	77.8	81.9	86.0	1	113	3.5
SMAJ75A	SMAJ75CA	75	1	83.3	87.7	92.1	1	121	3.3
SMAJ78A	SMAJ78CA	78	1	86.7	91.3	95.8	1	126	3.2
SMAJ85A	SMAJ85CA	85	1	94.4	99.2	104	1	137	2.9
SMAJ90A	SMAJ90CA	90	1	100	105.5	111	1	146	2.7
SMAJ100A	SMAJ100CA	100	1	111	117.0	123	1	162	2.5
SMAJ110A	SMAJ110CA	110	1	122	128.5	135	1	177	2.3
SMAJ120A	SMAJ120CA	120	1	133	140.0	147	1	193	2.1
SMAJ130A	SMAJ130CA	130	1	144	151.5	159	1	209	1.9
SMAJ150A	SMAJ150CA	150	1	167	176.0	185	1	243	1.6
SMAJ160A	SMAJ160CA	160	1	178	187.5	197	1	259	1.5
SMAJ170A	SMAJ170CA	170	1	189	199.0	209	1	275	1.5
SMAJ180A	SMAJ180CA	180	1	201	211.5	222	1	292	1.4
SMAJ200A	SMAJ200CA	200	1	224	235.5	247	1	324	1.2
SMAJ220A	SMAJ220CA	220	1	246	259.0	272	1	356	1.1
SMAJ250A	SMAJ250CA	250	1	279	294.0	309	1	405	1.0
SMAJ300A	SMAJ300CA	300	1	335	353.0	371	1	486	0.8
SMAJ350A	SMAJ350CA	350	1	391	411.5	432	1	567	0.7
SMAJ400A	SMAJ400CA	400	1	447	470.5	494	1	648	0.6
SMAJ440A	SMAJ440CA	440	1	492	517.5	543	1	713	0.6

For bidirectional type having V_{RMW} of 10 volts and less, the I_R limit is double.

I-V Curve Characteristics



Uni-Directional TVS



Bi-Directional TVS

VRWM - Reverse Stand-Off Voltage - Working Peak Reverse Voltage

VBR - Breakdown Voltage - Maximum current that flows through the TVS at a specified test current (I_T)

IT - Test Current - Test Current

Vc - Clamping Voltage - Peak voltage measured across the suppressor at a specified I_{ppm} (peak impulse current)

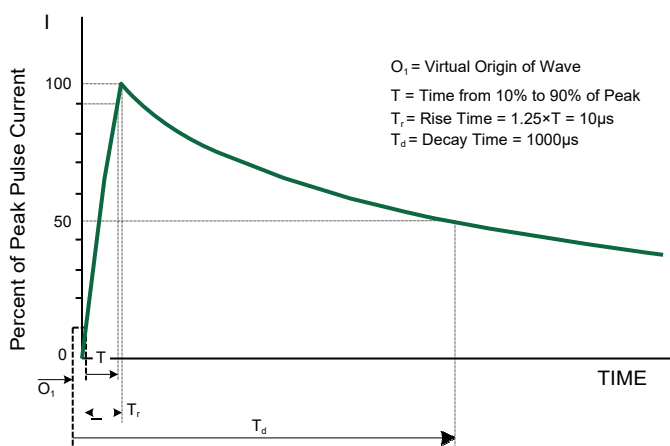
IPP - Peak Pulse Current - Maximum Reverse Peak Pulse Current

PPP - Peak Pulse Power Dissipation - Max power dissipation

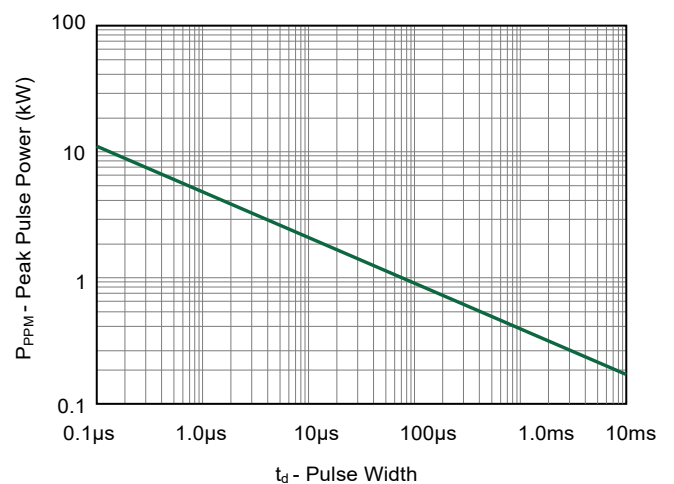
IR - Reverse Leakage Current - Current measured at V_{RWM}

VF - Forward Voltage - Drop for Uni-directional

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

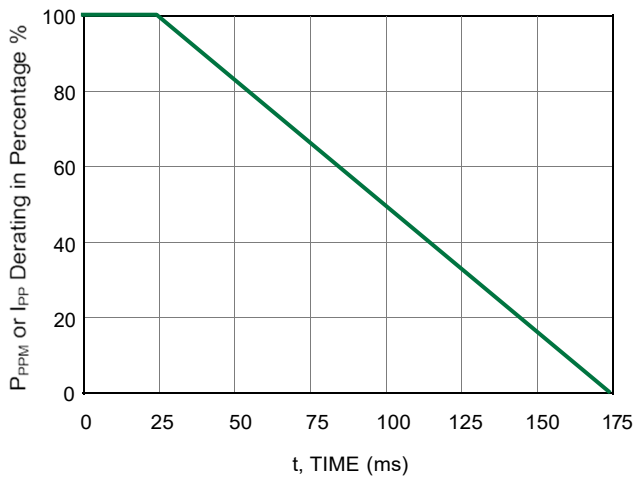


Pulse Waveform- 10/1000µs

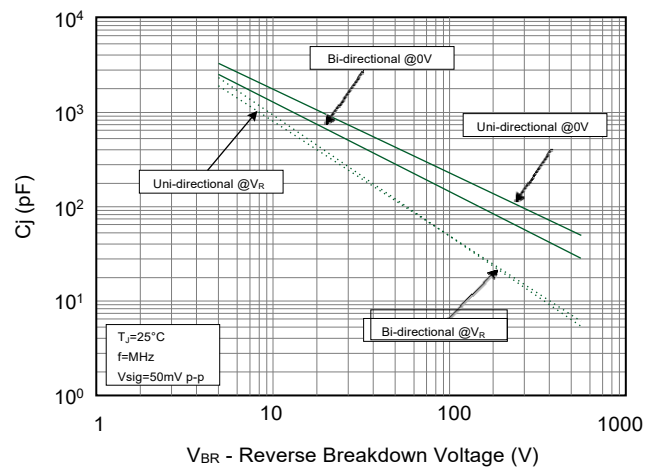


Peak Pulse Power Rating Curve

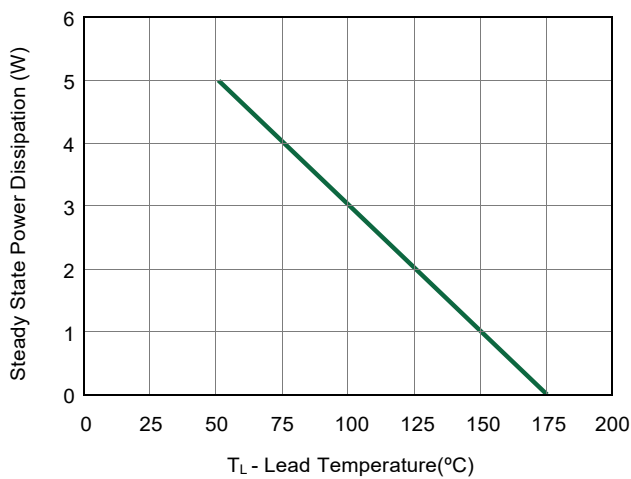
Ratings and Characteristic Curves (TA=25°C unless otherwise noted)



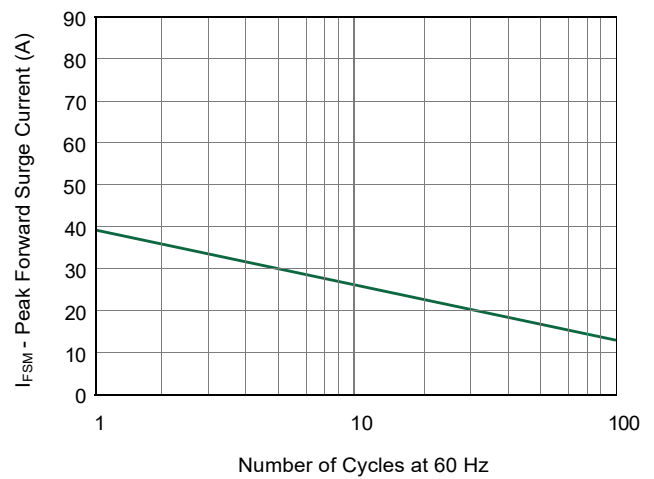
Pulse Derating Curve



Typical Junction Capacitance



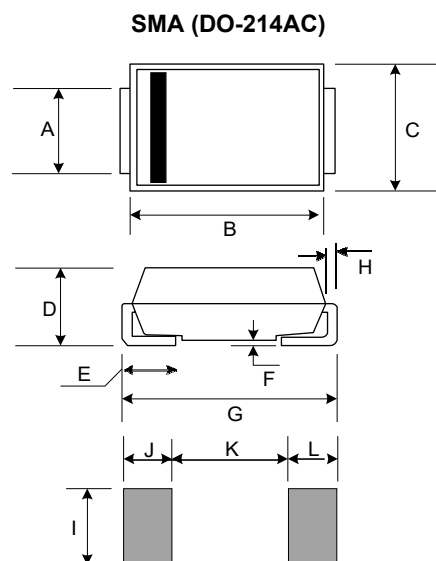
Steady State Power Derating Curve



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

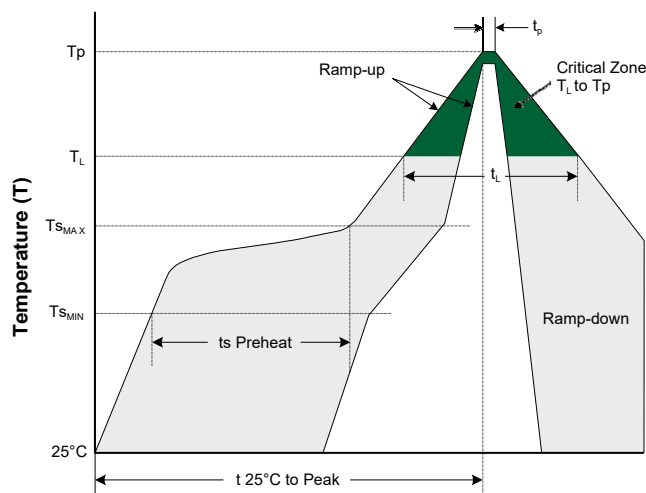
Product Dimensions

Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.047	0.065	1.200	1.650
B	0.157	0.181	3.990	4.600
C	0.095	0.114	2.400	2.900
D	0.075	0.096	1.900	2.440
E	0.030	0.060	0.780	1.520
F	-	0.008	-	0.203
G	0.189	0.208	4.800	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	-

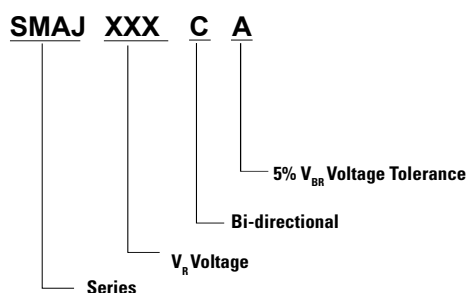


Soldering Parameters

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.
Preheat • Temperature Min ($T_{S_{MIN}}$) • Temperature Max ($T_{S_{MAX}}$) • Time (t_s Preheat)	150°C 200°C 60-180 seconds
Time maintained above: • Temperature (T_L) • Time (t_L)	217°C 60-150 seconds
Peak/Classification Temperature • Temperature (T_p)	260 ^{+0/-5} °C
Time within 5°C of actual Peak Time (t_p)	20-40 seconds
Time 25°C to peak Temperature	8 minutes max
Do not exceed	260 °C



Part Numbering System



Order Information

Device	Package	Quantity	Tape
SMAJ series	SMA/DO-214AC	2000	7" Reel
SMAJ series	SMA/DO-214AC	5000	13" Reel