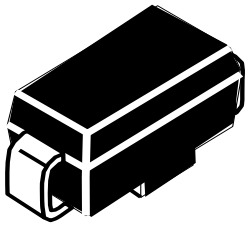
Transient Voltage Suppression Diodes
Surface Mount – 600W

Descriptions

Transient Voltage Suppressors (TVS) are semiconductor devices designed to provide protection against over voltage transients. When over voltage events occur, the silicon TVS actives 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.



SMB
(JEDEC DO-214AA)

Features

- Glass passivated chip junction in SMB Package
- 600W 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}	600	W
Steady State Power Dissipation on Infinite Heat Sink at T_L=75°C	P_D	5.0	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave Unidirectional Only (1)	I_{FSM}	100	A
Maximum Instantaneous Forward Voltage at 100A for Unidirectional Only (2)	V_F	3.5/5.0	V
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175	°C
Typical Thermal Resistance Junction to Lead	R_{uJL}	20	°C/W
Typical Thermal Resistance Junction to Ambient	R_{uJA}	100	°C/W

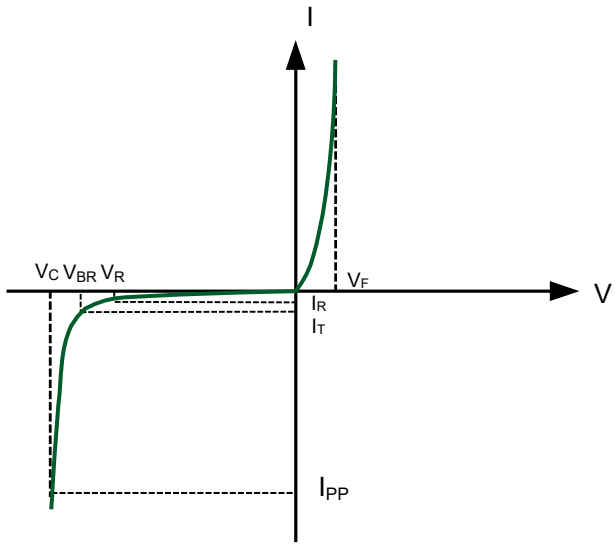
Notes:
1) Measured on 8.3ms single half sine wave or equivalent square wave, duty cycle=4 per minute maximum.
2) V_F<3.5V for devices of $V_{BR} \leqslant$200V and V_F<5.0V for devices of $V_{BR} \geqslant$201V.

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

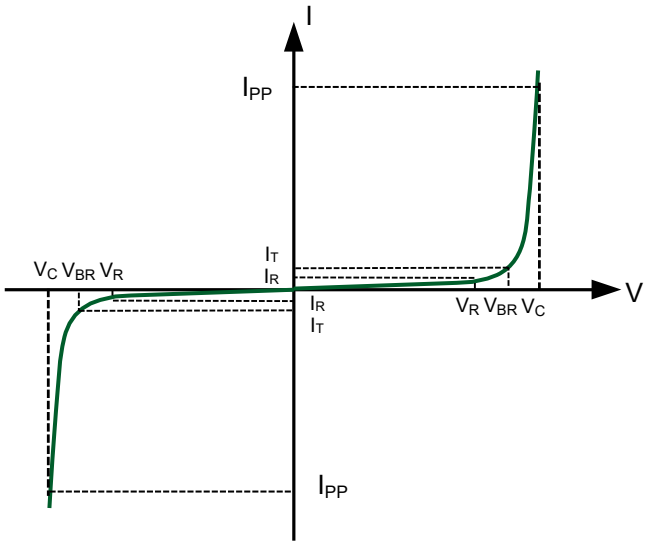
Type Number		V_R	I_R @V_R	V_{BR} @I_T (V)			I_T	V_C @I_{PP}	I_{PP} MAX
Uni	Bi	(V)	(μA)	Min	Nom	Max	(mA)	(V)	(A)
P6SMB6.8A	P6SMB6.8CA	5.80	1000	6.48	6.8	7.13	10	10.5	58.1
P6SMB7.5A	P6SMB7.5CA	6.40	500	7.16	7.5	7.87	10	11.3	54.0
P6SMB8.2A	P6SMB8.2CA	7.02	200	7.82	8.2	8.60	10	12.1	50.4
P6SMB9.1A	P6SMB9.1CA	7.78	50	8.68	9.1	9.54	1	13.4	45.5
P6SMB10A	P6SMB10CA	8.55	10	9.54	10	10.49	1	14.5	42.1
P6SMB11A	P6SMB11CA	9.40	5	10.54	11	11.59	1	15.6	39.1
P6SMB12A	P6SMB12CA	10.20	5	11.45	12	12.59	1	16.7	36.5
P6SMB13A	P6SMB13CA	11.10	1	12.45	13	13.69	1	18.2	33.5
P6SMB15A	P6SMB15CA	13.00	1	14.36	15	15.79	1	21.2	28.8
P6SMB16A	P6SMB16CA	14.40	1	15.26	16	16.79	1	22.5	27.1
P6SMB18A	P6SMB18CA	16.20	1	17.17	18	18.89	1	25.2	24.2
P6SMB20A	P6SMB20CA	18.00	1	19.08	20	20.99	1	27.7	22.0
P6SMB22A	P6SMB22CA	19.80	1	20.98	22	23.08	1	30.6	19.9
P6SMB24A	P6SMB24CA	21.60	1	22.89	24	25.18	1	33.2	18.4
P6SMB27A	P6SMB27CA	24.35	1	25.8	27	28.38	1	37.5	16.3
P6SMB30A	P6SMB30CA	27.00	1	28.61	30	31.48	1	41.4	14.7
P6SMB33A	P6SMB33CA	29.75	1	31.53	33	34.68	1	45.7	13.3
P6SMB36A	P6SMB36CA	32.40	1	34.34	36	37.77	1	49.9	12.2
P6SMB39A	P6SMB39CA	35.15	1	37.25	39	40.97	1	53.9	11.3
P6SMB43A	P6SMB43CA	38.75	1	41.06	43	45.17	1	59.3	10.3
P6SMB47A	P6SMB47CA	42.35	1	44.88	47	49.37	1	64.8	9.4
P6SMB51A	P6SMB51CA	45.95	1	48.69	51	53.56	1	70.1	8.7
P6SMB56A	P6SMB56CA	50.40	1	53.41	56	58.76	1	77.0	7.9
P6SMB62A	P6SMB62CA	55.80	1	59.14	62	65.05	1	85.0	7.2
P6SMB68A	P6SMB68CA	61.20	1	64.86	68	71.35	1	92.0	6.6
P6SMB75A	P6SMB75CA	67.95	1	71.59	75	78.74	1	103.0	5.9
P6SMB82A	P6SMB82CA	74.31	1	78.21	82	86.04	1	113.0	5.4
P6SMB91A	P6SMB91CA	82.47	1	86.85	91	95.43	1	125.0	4.9
P6SMB100A	P6SMB100CA	90.63	1	95.38	100	104.93	1	137.0	4.5
P6SMB110A	P6SMB110CA	99.64	1	105.42	110	115.92	1	152.0	4.0
P6SMB120A	P6SMB120CA	108.10	1	114.46	120	125.91	1	165.0	3.7
P6SMB130A	P6SMB130CA	117.70	1	124.50	130	136.90	1	179.0	3.4
P6SMB150A	P6SMB150CA	135.70	1	143.57	150	157.89	1	207.0	2.9
P6SMB160A	P6SMB160CA	144.20	1	152.61	160	167.88	1	219.0	2.8
P6SMB170A	P6SMB170CA	153.70	1	162.65	170	178.87	1	234.0	2.6
P6SMB180A	P6SMB180CA	163.20	1	171.69	180	188.87	1	246.0	2.5
P6SMB200A	P6SMB200CA	179.40	1	190.76	200	209.85	1	274.0	2.2
P6SMB220A	P6SMB220CA	195.30	1	209.84	220	230.84	1	328.0	1.9
P6SMB250A	P6SMB250CA	214.00	1	237.00	250	263.00	1	344.0	1.8
P6SMB300A	P6SMB300CA	256.00	1	285.00	300	315.00	1	414.0	1.5
P6SMB350A	P6SMB350CA	300.00	1	332.00	350	368.00	1	482.0	1.3
P6SMB400A	P6SMB400CA	342.00	1	380.00	400	420.00	1	548.0	1.1
P6SMB440A	P6SMB440CA	376.00	1	418.00	440	462.00	1	602.0	1.0
P6SMB480A	P6SMB480CA	408.00	1	456.00	480	504.00	1	658.0	0.9
P6SMB510A	P6SMB510CA	434.00	1	485.00	510	535.00	1	698.0	0.9
P6SMB530A	P6SMB530CA	451.00	1	503.50	530	556.50	1	725.0	0.8
P6SMB540A	P6SMB540CA	459.00	1	513.00	540	567.00	1	740.0	0.8
P6SMB550A	P6SMB550CA	495.00	1	522.50	550	577.50	1	760.0	0.8

Notes: For bidirectional type having V_{RWM} of 10V and less, the I_R limit is double.

I-V Curve Characteristics



Uni-Directional TVS



Bi-Directional TVS

V_R - Stand-Off Voltage - Maximum voltage that can be applied to the TVS without operation

V_{BR} - Breakdown Voltage - Maximum current that flows though the TVS at a specified test current (I_T)

I_T - Test Current - Test Current

V_C - Clamping Voltage - Peak voltage measured across the suppressor at a specified Ippm (peak impulse current)

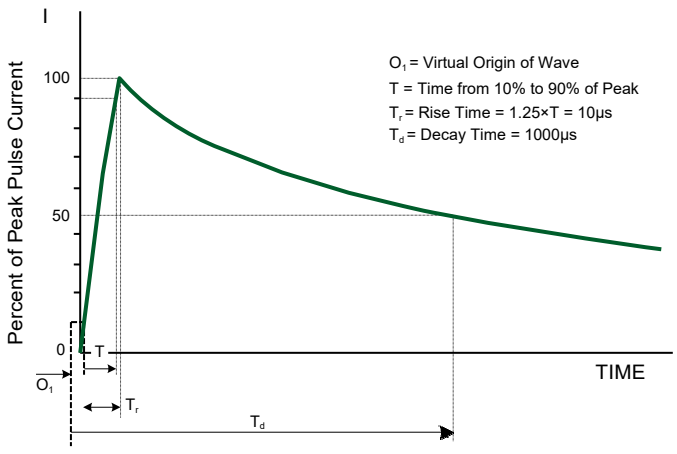
I_{PP} - Peak Pulse Current - Maximum Reverse Peak Pulse Current

P_{PP} - Peak Pulse Power Dissipation - Max power dissipation

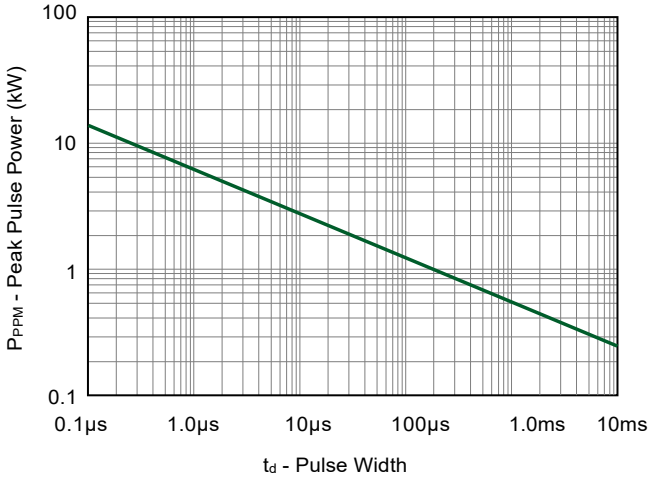
I_R - Reverse Leakage Current - Current measured at V_R

V_F - Forward Voltage - Drop for Uni-directional

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

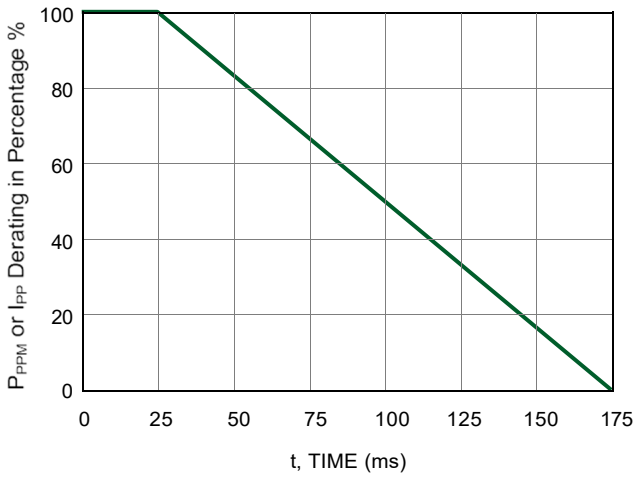


Pulse Waveform- 10/1000μs

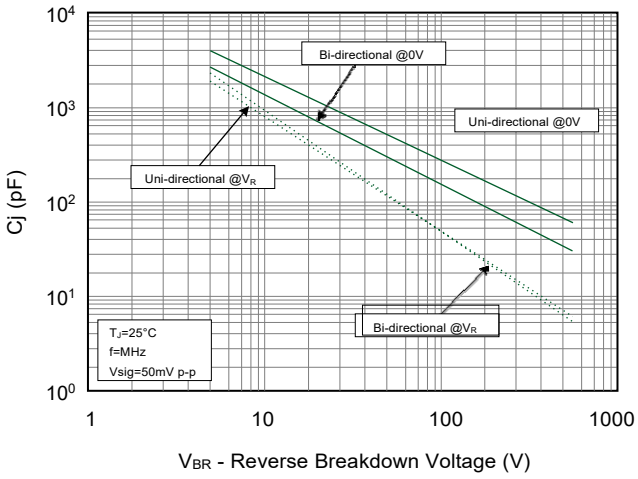


Peak Pulse Power Rating Curve

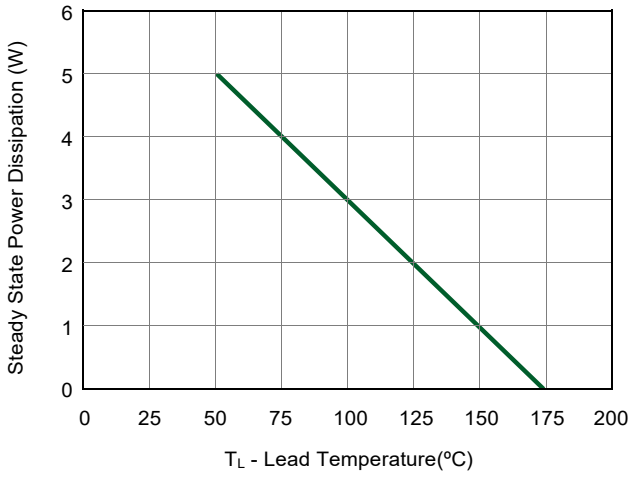
Ratings and Characteristic Curves (TA=25°C unless otherwise noted)



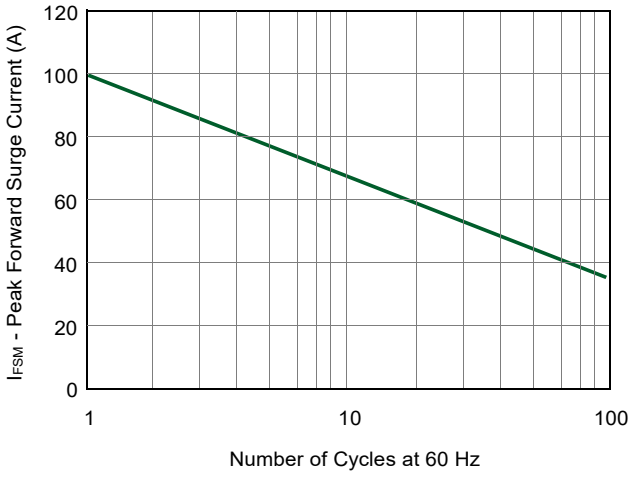
Pulse Derating Curve



Typical Junction Capacitance



Steady State Power Derating Curve

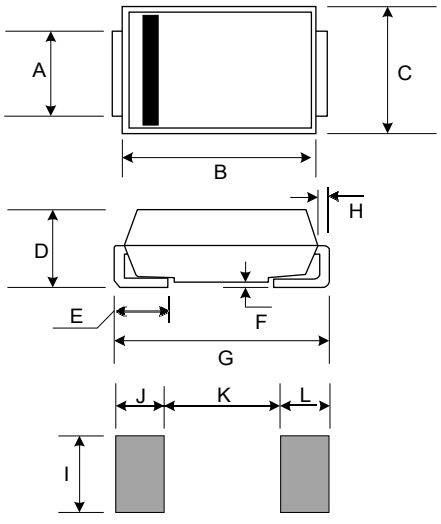


Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only

Product Dimensions

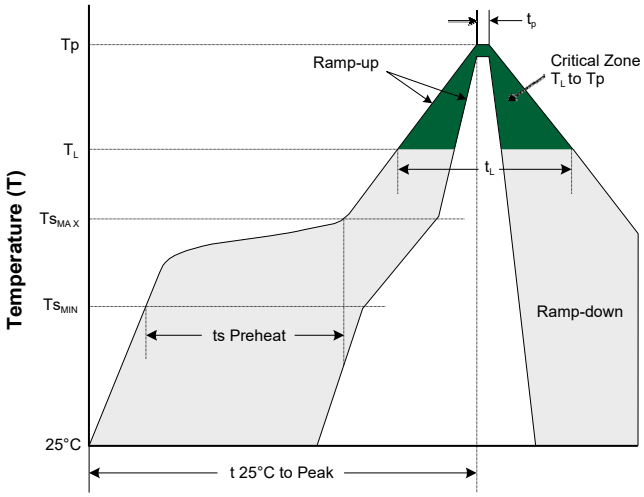
Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.077	0.086	1.950	2.200
B	0.160	0.180	4.060	4.570
C	0.130	0.155	3.300	3.940
D	0.084	0.096	2.130	2.440
E	0.030	0.060	0.760	1.520
F	-	0.008	-	0.203
G	0.205	0.220	5.210	5.590
H	0.006	0.012	0.152	0.305
I	0.089	-	2.260	-
J	0.085	-	2.160	-
K	-	0.107	-	2.740
L	0.085	-	2.160	-

SMB (DO-214AA)

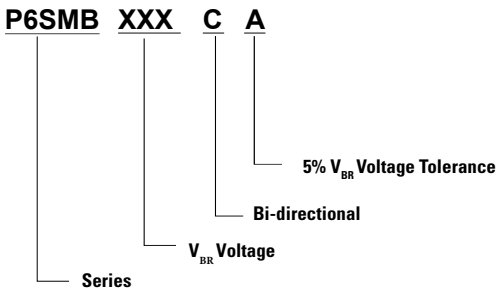


Soldering Parameters

Profile Feature	Lead-Free Assembly
Average Ramp-up Rate (Ts_{MAX} to Tp) Average Ramp-down Rate (Tp to T_L)	3°C/second max. 6°C/second max.
Preheat • Temperature Min (Ts_{MIN}) • Temperature Max (Ts_{MAX}) • Time (ts 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 (Tp)	 $260^{+0/-5}$°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
P6SMB series	SMB/DO-214AA	500	7" Reel
P6SMB series	SMB/DO-214AA	3000	13" Reel