

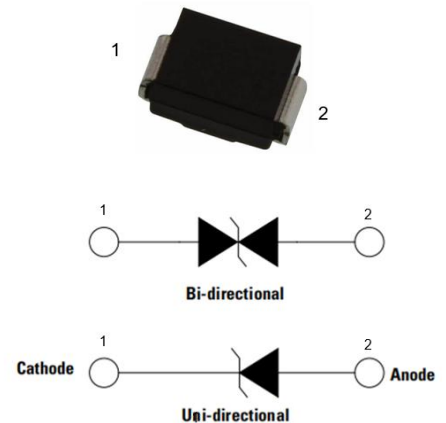


TVS Diodes P6SMB series

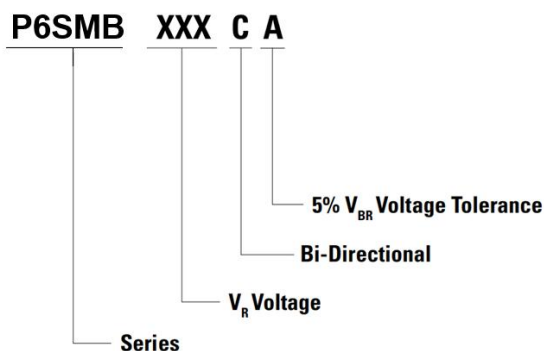
Transient Voltage Suppressors

Features

- ◆ 600W peak pulse power capability at 10/1000 μ s waveform, repetition rate (duty cycle): 0.01%
- ◆ For surface mounted applications to optimize board space
- ◆ Low incremental surge impedance
- ◆ Excellent clamping capability
- ◆ Typical IR less than 1 μ A when VBR min>12V
- ◆ High temperature soldering guaranteed: 260 $^{\circ}$ C/30 seconds at terminals
- ◆ Plastic package has underwriters laboratory flammability 94V-0
- ◆ Meets MSL level 1, per J-STD-020
- ◆ Meet Halogen free and RoHS compliant
- ◆ IEC-61000-4-2 ESD 30kV(Air), 30kV (Contact)
- ◆ ESD protection of data lines in accordance with IEC 61000-4-2
- ◆ EFT protection of data lines in accordance with IEC 61000-4-4



Part Number Coding System



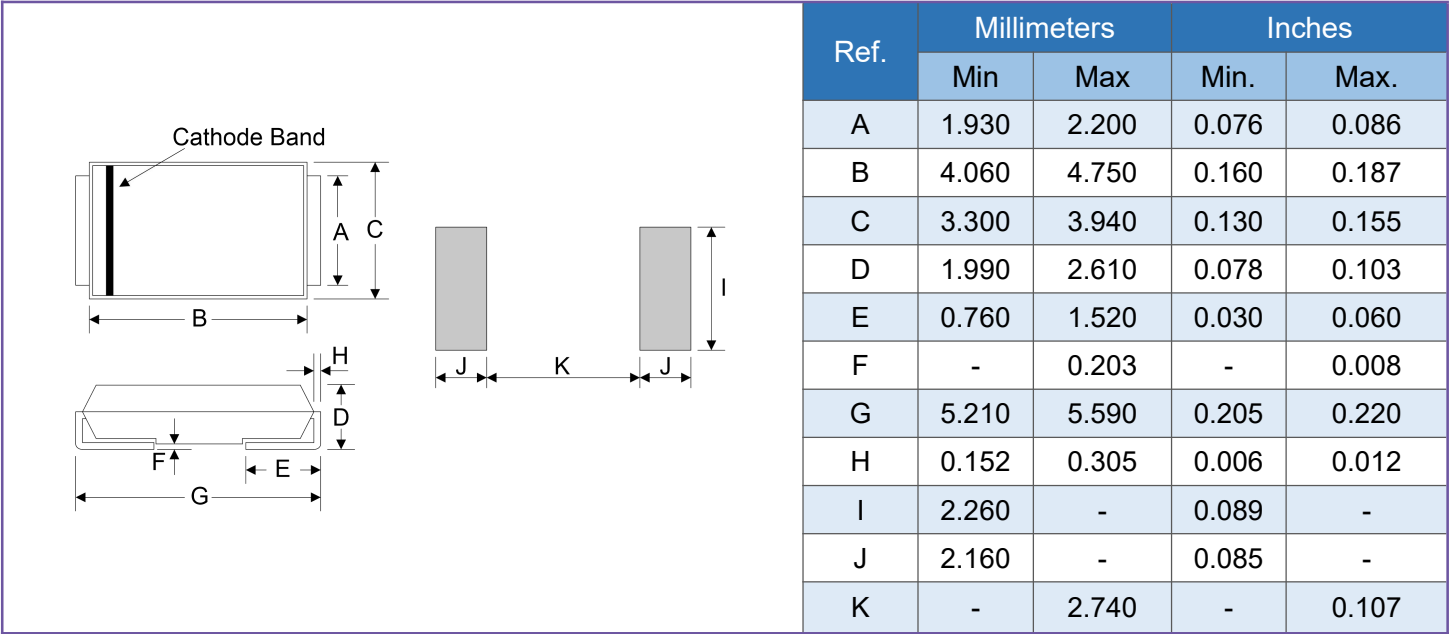
Applications

- ◆ I/O interface
- ◆ AC/DC power supply
- ◆ Low frequency signal transmission line(RS232,RS485,etc.)

Mechanical Data

- ◆ Case: JEDEC DO-214AA
- ◆ Polarity: Color band denotes positive end (cathode) except bi-directional models
- ◆ Weight: About 0.093g

Dimensions (SMB)



Maximum Rating and Characteristics

Parameters at 25°C ambient temperature unless otherwise Noted.

Rating	Symbol	Value	Unit
Peak Pulse power Dissipation at 10/1000μs Waveform (Note1, Note2)	P_{PPM}	Minimum 600	Watts
Peak pulse current of at 10/1000μs waveform (Note 1, Fig.2)	I_{PPM}	See Table	Amps
Steady state power dissipation at $T_A=50^{\circ}\text{C}$	$P_{M(AV)}$	5.0	Watts
Maximum Instantaneous Forward Voltage at 50A for Unidirectional Only (Note 4)	V_F	3.5/5.0	V
Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load, (JEDEC Method) (Note3, Fig.5)	I_{FSM}	100	Amps
Operating Temperature Range	T_J	-65 to +150	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-65 to +175	$^{\circ}\text{C}$
Typical Thermal Resistance Junction to Lead	$R_{\theta JL}$	20	$^{\circ}\text{C/W}$
Typical Thermal Resistance Junction to Ambient	$R_{\theta JA}$	100	$^{\circ}\text{C/W}$

Notes:

1. Non-repetitive current pulse, per Fig.2 and derated above $T_A=25^{\circ}\text{C}$ per Fig.1.
2. Mounted on 5.0mm×5.0mm (0.03mm thick) copper pads to each terminal.
3. 8.3ms single half sine-wave, or equivalent square wave, duty cycle=4 pulses per minutes maximum.
4. $V_F<3.5\text{V}$ for $V_{BR}\leq 200\text{V}$ and $V_F<5.0\text{V}$ for $V_{BR}\geq 201\text{V}$.

Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Part Number		Reverse Stand-Off Voltage	Breakdown Voltage @ I_T	Test Current	Maximum Clamping Voltage @ I_{PP}	Peak Pulse Current	Reverse Leakage @ V_{RWM}
Unidirectional	Bidirectional	$V_{RWM}(V)$	$V_{BR}(V)$	$I_T(mA)$	$V_C(V)$	$I_{PP}(A)$	$I_R(\mu A)$
P6SMB6.8A	P6SMB6.8CA	5.80	6.45~7.14	10	10.5	58.1	1000
P6SMB7.5A	P6SMB7.5CA	6.40	7.13~7.88	10	11.3	54.0	500
P6SMB8.2A	P6SMB8.2CA	7.02	7.79~8.61	10	12.1	50.4	200
P6SMB9.1A	P6SMB9.1CA	7.78	8.65~9.55	1	13.4	45.5	50
P6SMB10A	P6SMB10CA	8.55	9.50~10.50	1	14.5	42.1	10
P6SMB11A	P6SMB11CA	9.40	10.50~11.60	1	15.6	39.1	5
P6SMB12A	P6SMB12CA	10.20	11.40~12.60	1	16.7	36.5	5
P6SMB13A	P6SMB13CA	11.10	12.40~13.70	1	18.2	33.5	1
P6SMB15A	P6SMB15CA	12.80	14.30~15.80	1	21.2	28.8	1
P6SMB16A	P6SMB16CA	13.60	15.20~16.80	1	22.5	27.1	1
P6SMB18A	P6SMB18CA	15.30	17.10~18.90	1	25.5	24.2	1
P6SMB20A	P6SMB20CA	17.10	19.00~21.00	1	27.7	22.0	1
P6SMB22A	P6SMB22CA	18.80	20.90~23.10	1	30.6	19.9	1
P6SMB24A	P6SMB24CA	20.50	22.8~25.20	1	33.2	18.4	1
P6SMB27A	P6SMB27CA	23.10	25.70~28.40	1	37.5	16.3	1
P6SMB30A	P6SMB30CA	25.60	28.50~31.50	1	41.4	14.7	1
P6SMB33A	P6SMB33CA	28.20	31.40~34.70	1	45.7	13.3	1
P6SMB36A	P6SMB36CA	30.80	34.20~37.80	1	49.9	12.2	1
P6SMB39A	P6SMB39CA	33.30	37.10~41.00	1	53.9	11.3	1
P6SMB43A	P6SMB43CA	36.80	40.90~45.20	1	59.3	10.3	1
P6SMB47A	P6SMB47CA	40.20	44.70~49.40	1	64.8	9.4	1
P6SMB51A	P6SMB51CA	43.60	48.50~53.60	1	70.1	8.7	1
P6SMB56A	P6SMB56CA	47.80	53.20~58.80	1	77.0	7.9	1
P6SMB58A	P6SMB58CA	52.78	55.10~60.90	1	79.8	7.7	1
P6SMB62A	P6SMB62CA	53.00	58.90~65.10	1	85.0	7.2	1
P6SMB68A	P6SMB68CA	58.10	64.60~71.40	1	92.0	6.6	1
P6SMB75A	P6SMB75CA	64.10	71.30~78.80	1	103.0	5.9	1
P6SMB82A	P6SMB82CA	70.10	77.90~86.10	1	113.0	5.4	1
P6SMB91A	P6SMB91CA	77.80	86.50~95.50	1	125.0	4.9	1
P6SMB100A	P6SMB100CA	85.50	95.0~105.00	1	137.0	4.5	1
P6SMB110A	P6SMB110CA	94.00	105.0~116.00	1	152.0	4.0	1
P6SMB120A	P6SMB120CA	102.00	114.0~126.00	1	165.0	3.7	1
P6SMB130A	P6SMB130CA	111.00	124.0~137.00	1	179.0	3.4	1
P6SMB150A	P6SMB150CA	128.00	143.0~158.00	1	207.0	2.9	1
P6SMB160A	P6SMB160CA	136.00	152.0~168.00	1	219.0	2.8	1
P6SMB170A	P6SMB170CA	145.00	162.0~179.00	1	234.0	2.6	1
P6SMB180A	P6SMB180CA	154.00	171.0~189.00	1	246.0	2.5	1

Part Number		Reverse Stand-Off Voltage	Breakdown Voltage @ I_T	Test Current	Maximum Clamping Voltage @ I_{PP}	Peak Pulse Current	Reverse Leakage @ V_{RWM}
Unidirectional	Bidirectional	$V_{RWM}(V)$	$V_{BR}(V)$	$I_T(mA)$	$V_C(V)$	$I_{PP}(A)$	$I_R(\mu A)$
P6SMB200A	P6SMB200CA	171.00	190.0~210.00	1	274.0	2.2	1
P6SMB220A	P6SMB220CA	185.00	209.0~231.00	1	328.0	1.9	1
P6SMB250A	P6SMB250CA	214.00	237.0~263.00	1	344.0	1.8	1
P6SMB300A	P6SMB300CA	256.00	285.0~315.00	1	414.0	1.5	1
P6SMB350A*	P6SMB350CA*	300.00	332.0~368.00	1	482.0	1.7	1
P6SMB400A*	P6SMB400CA*	342.00	380.0~420.00	1	548.0	1.5	1
P6SMB440A*	P6SMB440CA*	376.00	418.0~462.00	1	602.0	1.4	1
P6SMB480A*	P6SMB480CA*	408.00	456.0~504.00	1	658.0	1.3	1
P6SMB510A*	P6SMB510CA*	434.00	485.0~535.00	1	698.0	1.2	1
P6SMB530A*	P6SMB530CA*	451.00	503.50~556.50	1	725.0	1.2	1
P6SMB540A*	P6SMB540CA*	460.00	513.00~567.00	1	740.0	1.1	1
P6SMB550A*	P6SMB550CA*	468.00	522.50~577.50	1	760.0	1.1	1
P6SMB600A*	P6SMB600CA*	512.00	570.00~630.00	1	828.0	1.0	1

Notes: 1.For bidirectional type having V_{RWM} of 10V and less, the IR limit is double.
2.For stack-die parts, use * to label the part number.

Ratings and Characteristic Curves ($T_A=25^\circ\text{C}$ unless otherwise noted)

Figure 1. Peak Pulse Power Rating Curve

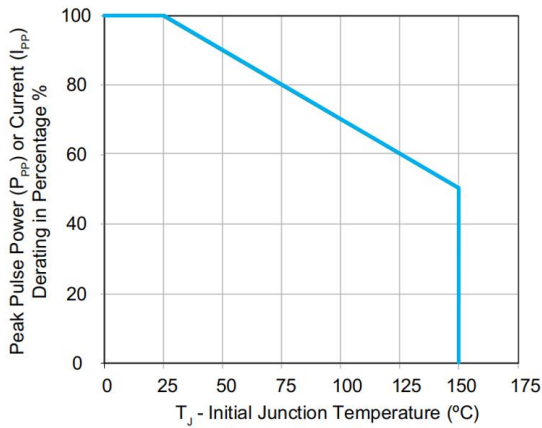


Figure 2. Pulse Waveform

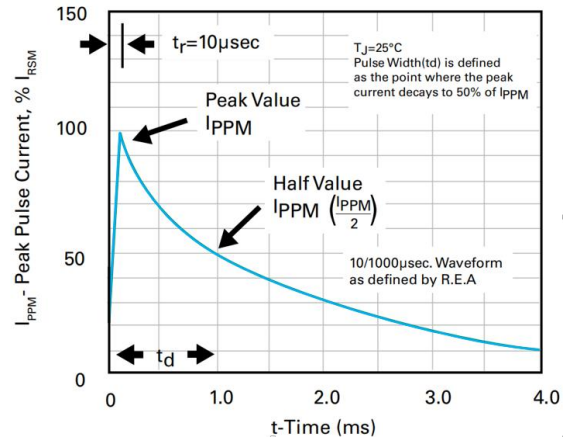


Figure 3. Typical Junction Capacitance

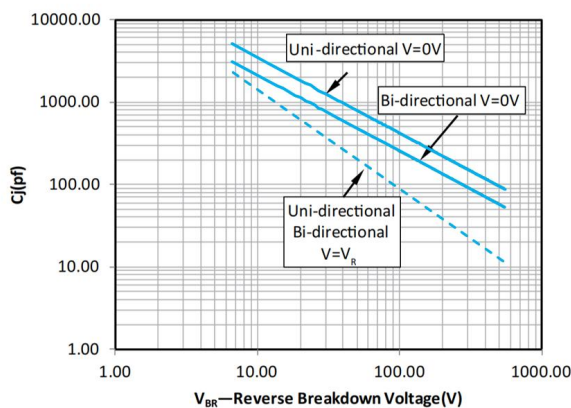


Figure 4. Typical Thermal Impedance

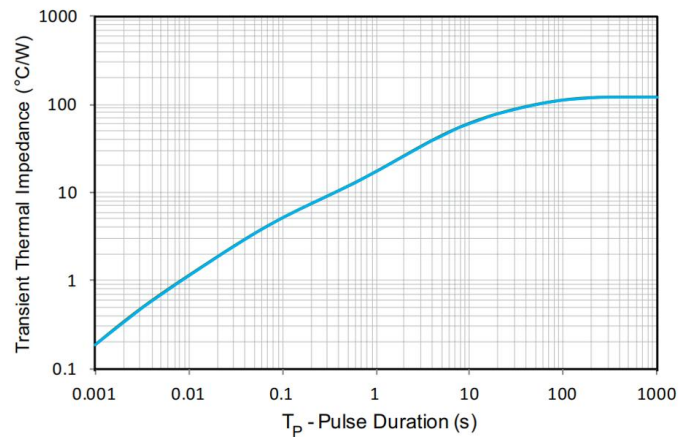


Figure 5. Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional

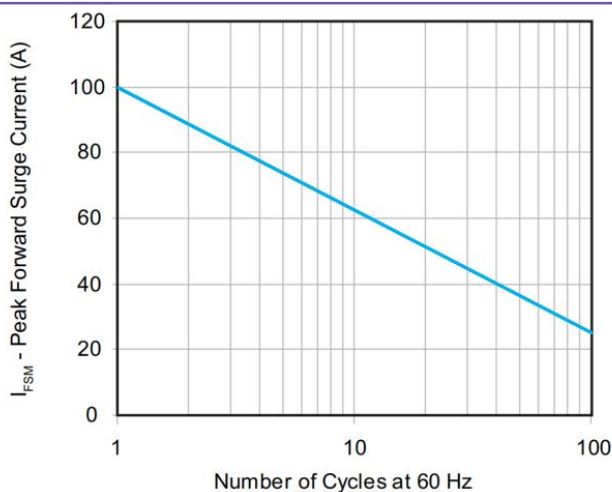
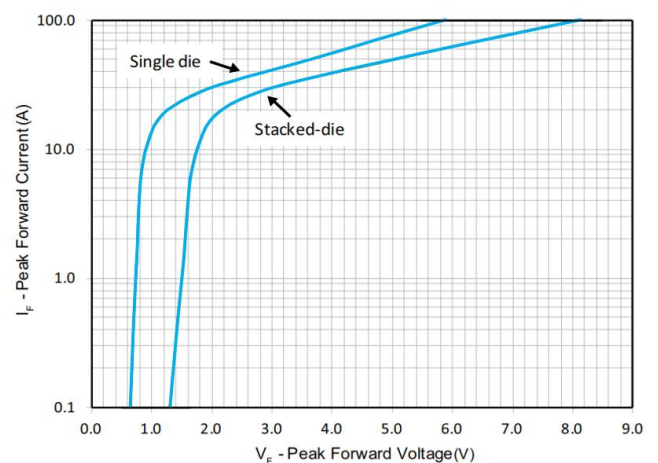
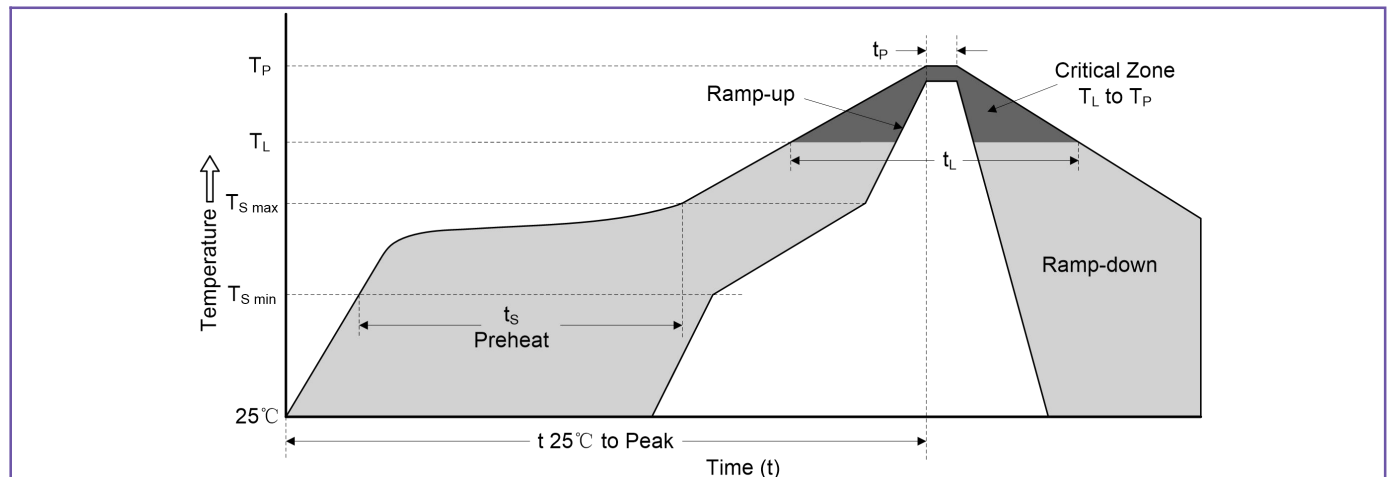


Figure 6. Peak Forward Voltage VS Peak Forward Current



Reflow Soldering Parameters



Reflow Condition		Lead-free Assembly
Pre heat	-Temperature Min ($T_{S\ min}$)	150°C
	-Temperature Max ($T_{S\ max}$)	200°C
	-Time (min to max) (t_s)	60-120 seconds
Average ramp-up rate (T_L to T_P)		3°C/second max.
$T_{S\ max}$ to T_L -Ramp-up Rate		3°C/second max.
Reflow	-Temperature (T_L) (Liquidus)	217°C
	-Time (min to max) (t_s)	60-150 seconds
Peak Temperature (T_P)		260(+0/-5)°C
Time within 5°C of actual Peak Temperature (t_P)		30 seconds
Ramp-down Rate		6°C/second max.
Time 25°C to Peak Temperature(T_P)		8 minutes max.
Do not exceed		260°C

Reliability

Items	Standards
Terminal strength	MIL-STD-750 Method 2036
Mechanical shock	JESD22-B104
Vibration	JESD22-B103
High Temp. Storage	JESD22-A103
High Temp Reverse Bias	JESD22-A108
Temperature Cycling	JESD22-A104
High Temp High Humidity Reverse Bias	JESD22-A101
Resistance to solder heat	JESD22-A111(SMD)