

## Transient Voltage Suppressors (TVS) Data Sheet

### Features

- Glass passivated junction
- Low zener impedance
- Excellent clamping capability
- 600W peak pulse power capability at 10/1000 $\mu$ s waveform, repetition rate (duty cycle):0.01%
- Fast response time
- Typical  $I_R$  less than 1 $\mu$ A above 11V.
- Plastic package has underwriters laboratory flammability 94V-0
- Meets MSL level 1, per J-STD-020.

### Mechanical Data

- Case: JEDEC DO-214AAMoulded plastic
- Terminal:solderplated, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denotes cathode except bi-directional models
- Mounting Position: Any

### Applications

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

### Maximum Ratings and Characteristics

Ratings at 25 $^{\circ}$ C ambient temperature unless otherwise specified.

Rating	Symbol	Value	Units
Peak pulse power dissipation at 10/1000 $\mu$ s waveform (Note1, Fig.1)	$P_{PPM}$	Minimum 600	Watts
Peak pulse current of at 10/1000 $\mu$ s waveform (Note 1, Fig.3)	$I_{PPM}$	See Table	Amps
Steady state power dissipation at $T_L=75^{\circ}$ C (Fig.4)	$P_{M(AV)}$	5.0	Watts
Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load, (JEDEC Method) (Note2)	$I_{FSM}$	100	Amps
Operating junction and Storage Temperature Range.	$T_J, T_{STG}$	-55 to +150	$^{\circ}$ C
Typical thermal resistance junction to lead	$R_{\theta JL}$	20	$^{\circ}$ C/W
Typical thermal resistance junction to ambient	$R_{\theta JA}$	100	$^{\circ}$ C/W

Notes: 1. Non-repetitive current pulse, per Fig.3 and derated above  $T_A=25^{\circ}$ C per Fig.2.

2. 8.3ms single half sine-wave, or equivalent square wave, duty cycle=4 pulses per minutes maximum.

## Dimensions (DO-214AA/SMB)

Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
L	4.06	4.75	0.160	0.187
D	3.30	3.94	0.130	0.155
D1	1.95	2.20	0.077	0.086
T	5.18	5.59	0.204	0.220
T1	0.76	1.52	0.030	0.060
d	-	0.203	-	0.008
H	1.99	2.61	0.078	0.103

## Electrical Characteristics ( $T_A=25^{\circ}\text{C}$ )

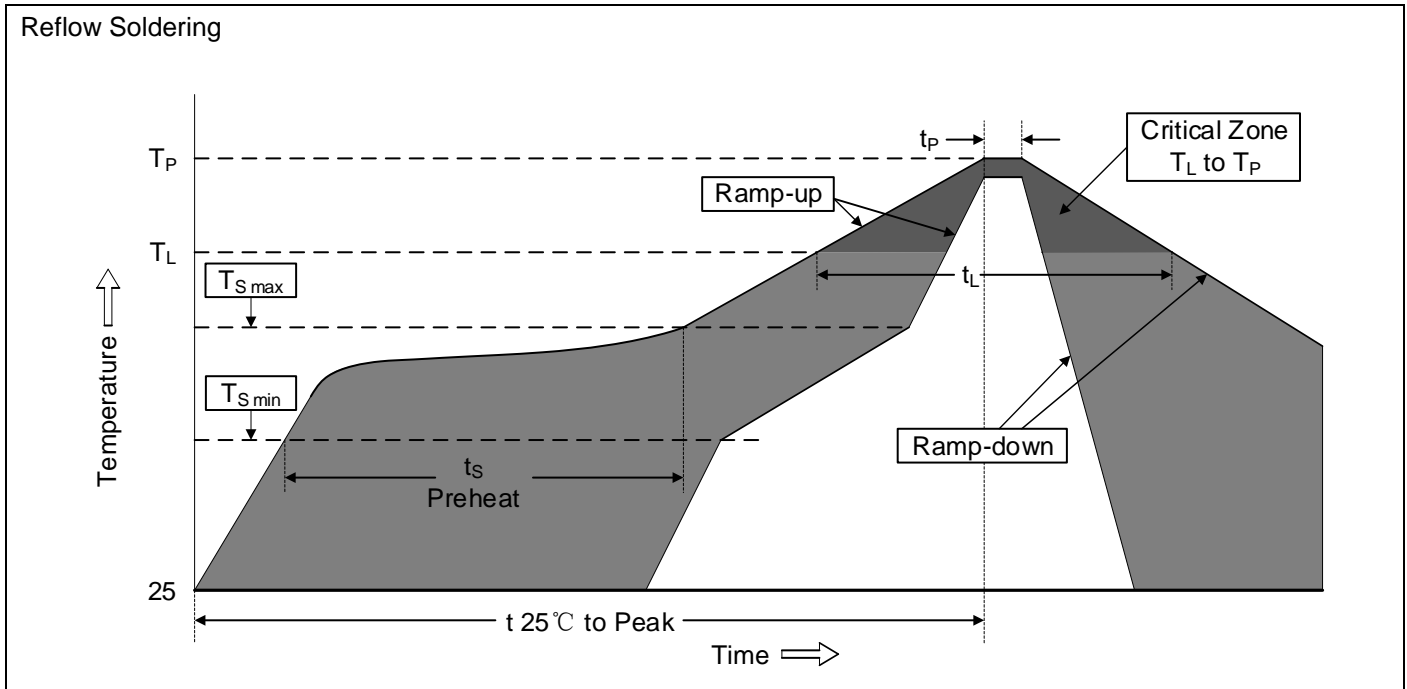
Part Number		Device Marking Code		Reverse Stand-Of f Voltage	Breakdown Voltage @ $I_T$	Test Current	Maximum Clamping Voltage @ $I_{PP}$	Peak Pulse Current	Reverse Leakage @ $V_{RWM}$
Unidirectional	Bidirectional	UNI	BI	$V_{RWM}(V)$	$V_{BR}(V)$	$I_T(mA)$	$V_C(V)$	$I_{PP}(A)$	$I_R(\mu A)$
P6SMB6.8A	P6SMB6.8CA	6V8A	6V8C	5.80	6.45~7.14	10	10.5	57.1	1000
P6SMB7.5A	P6SMB7.5CA	7V5A	7V5C	6.40	7.13~7.88	10	11.3	53.1	500
P6SMB8.2A	P6SMB8.2CA	8V2A	8V2C	7.02	7.79~8.61	10	12.1	49.6	200
P6SMB9.1A	P6SMB9.1CA	9V1A	9V1C	7.78	8.65~9.55	1	13.4	44.8	50
P6SMB10A	P6SMB10CA	10A	10C	8.55	9.5~10.5	1	14.5	41.1	10
P6SMB11A	P6SMB11CA	11A	11C	9.40	10.5~11.6	1	15.6	38.5	5
P6SMB12A	P6SMB12CA	12A	12C	10.2	11.4~12.6	1	16.7	35.9	5
P6SMB13A	P6SMB13CA	13A	13C	11.1	12.4~13.7	1	18.2	33.0	1
P6SMB15A	P6SMB15CA	15A	15C	12.8	14.3~15.8	1	21.2	28.3	1
P6SMB16A	P6SMB16CA	16A	16C	13.6	15.2~16.8	1	22.5	26.7	1
P6SMB18A	P6SMB18CA	18A	18C	15.3	17.1~18.9	1	25.2	23.8	1
P6SMB20A	P6SMB20CA	20A	20C	17.1	19.0~21.0	1	27.7	21.7	1
P6SMB22A	P6SMB22CA	22A	22C	18.8	20.9~23.1	1	30.6	19.6	1
P6SMB24A	P6SMB24CA	24A	24C	20.5	22.8~25.2	1	33.2	18.1	1
P6SMB27A	P6SMB27CA	27A	27C	23.1	25.7~28.4	1	37.5	16.0	1
P6SMB30A	P6SMB30CA	30A	30C	25.6	28.5~31.5	1	41.4	14.5	1
P6SMB33A	P6SMB33CA	33A	33C	28.2	31.4~34.7	1	45.7	13.1	1
P6SMB36A	P6SMB36CA	36A	36C	30.8	34.2~37.8	1	49.9	12	1
P6SMB39A	P6SMB39CA	39A	39C	33.3	37.1~41.0	1	53.9	11.1	1
P6SMB43A	P6SMB43CA	43A	43C	36.8	40.9~45.2	1	59.3	10.1	1
P6SMB47A	P6SMB47CA	47A	47C	40.2	44.7~49.4	1	64.8	9.4	1
P6SMB51A	P6SMB51CA	51A	51C	43.6	48.5~53.6	1	70.1	8.6	1

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Part Number		Device Marking Code		Reverse Stand-Off Voltage	Breakdown Voltage @ $I_T$	Test Current	Maximum Clamping Voltage @ $I_{PP}$	Peak Pulse Current	Reverse Leakage @ $V_{RWM}$
Unidirectional	Bidirectional	UNI	BI	$V_{RWM}(V)$	$V_{BR}(V)$	$I_T(mA)$	$V_C(V)$	$I_{PP}(A)$	$I_R(\mu A)$
P6SMB56A	P6SMB56CA	56A	56C	47.8	53.2~58.8	1	77.0	7.8	1
P6SMB62A	P6SMB62CA	62A	62C	53.0	58.9~65.1	1	85.0	7.1	1
P6SMB68A	P6SMB68CA	68A	68C	58.1	64.6~71.4	1	92.0	6.5	1
P6SMB75A	P6SMB75CA	75A	75C	64.1	71.3~78.8	1	103.0	5.8	1
P6SMB82A	P6SMB82CA	82A	82C	70.1	77.9~86.1	1	113.0	5.3	1
P6SMB91A	P6SMB91CA	91A	91C	77.8	86.5~95.5	1	125.0	4.8	1
P6SMB100A	P6SMB100CA	100A	100C	85.5	95~105	1	137.0	4.4	1
P6SMB110A	P6SMB110CA	110A	110C	94.0	105~116	1	152.0	3.9	1
P6SMB120A	P6SMB120CA	120A	120C	102	114~126	1	165.0	3.6	1
P6SMB130A	P6SMB130CA	130A	130C	111	124~137	1	179.0	3.4	1
P6SMB150A	P6SMB150CA	150A	150C	128	143~158	1	207.0	2.9	1
P6SMB160A	P6SMB160CA	160A	160C	136	152~168	1	219.0	2.7	1
P6SMB170A	P6SMB170CA	170A	170C	145	162~179	1	234.0	2.6	1
P6SMB180A	P6SMB180CA	180A	180C	154	171~189	1	246.0	2.4	1
P6SMB200A	P6SMB200CA	200A	200C	171	190~210	1	274.0	2.2	1
P6SMB220A	P6SMB220CA	220A	220C	185	209~231	1	328.0	1.8	1
P6SMB250A	P6SMB250CA	250A	250C	214	237~263	1	344.0	1.7	1
P6SMB300A	P6SMB300CA	300A	300C	256	285~315	1	414.0	1.4	1
P6SMB350A	P6SMB350CA	350A	350C	300	333~368	1	482.0	1.2	1
P6SMB400A	P6SMB400CA	400A	400C	342	380~420	1	548.0	1.1	1
P6SMB440A	P6SMB440CA	440A	440C	376	418~462	1	602.0	1.0	1
P6SMB480A	P6SMB480CA	480A	480C	408	456~504	1	658	0.9	1
P6SMB510A	P6SMB510CA	510A	510C	434	485~535	1	698	0.9	1
P6SMB530A	P6SMB530CA	530A	530C	477	503~557	1	725	0.8	1
P6SMB550A	P6SMB550CA	550A	550C	495	522~578	1	760	0.8	1

Notes: For bidirectional type having VRWM of 10V and less, the IR limit is double.

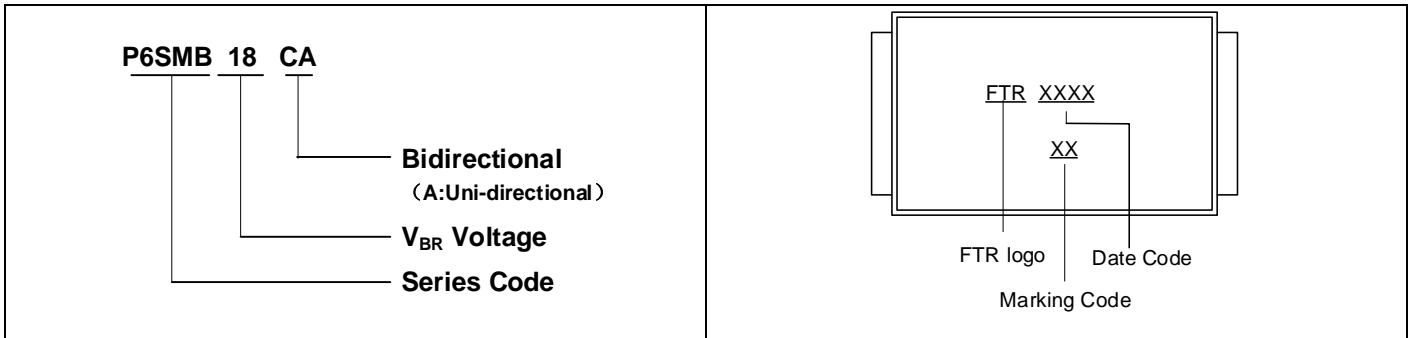
## Recommended Soldering Conditions



### Recommended Conditions

Profile Feature	Pb-Free Assembly
Average ramp-up rate ( $T_L$ to $T_P$ )	3°C/second max.
Preheat <ul style="list-style-type: none"> <li>-Temperature Min (<math>T_{S\min}</math>)</li> <li>-Temperature Max (<math>T_{S\max}</math>)</li> <li>-Time (min to max) (<math>t_s</math>)</li> </ul>	150°C 200°C 60-180 seconds
$T_{S\max}$ to $T_L$ <ul style="list-style-type: none"> <li>-Ramp-up Rate</li> </ul>	3°C/second max.
Time maintained above: <ul style="list-style-type: none"> <li>-Temperature (<math>T_L</math>)</li> <li>-Time (<math>t_L</math>)</li> </ul>	217°C 60-150 seconds
Peak Temperature ( $T_P$ )	260°C
Time within 5°C of actual Peak Temperature ( $t_p$ )	20-40 seconds
Ramp-down Rate	6°C/second max.
Time 25°C to Peak Temperature	8 minutes max.

## Partnumbercode



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

Figure 1. Peak Pulse Power Rating Curve

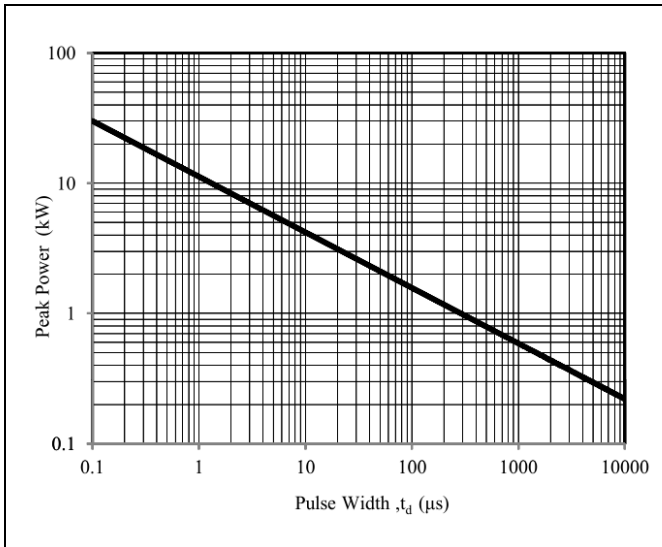


Figure 2. Pulse Derating Curve

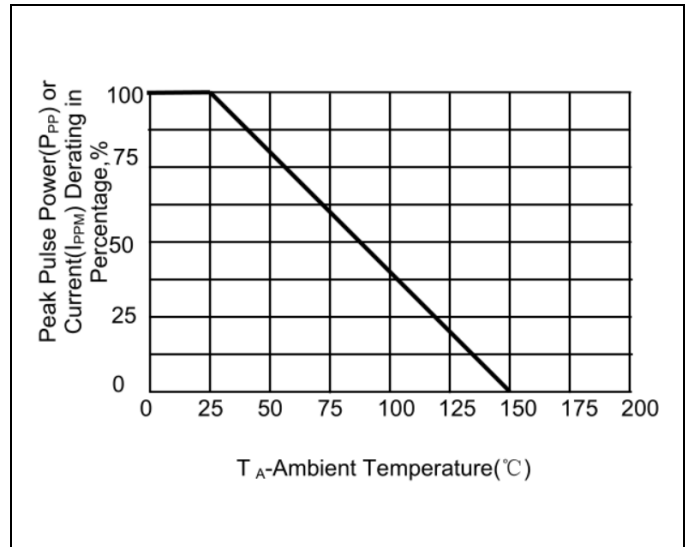


Figure 3. Pulse Waveform

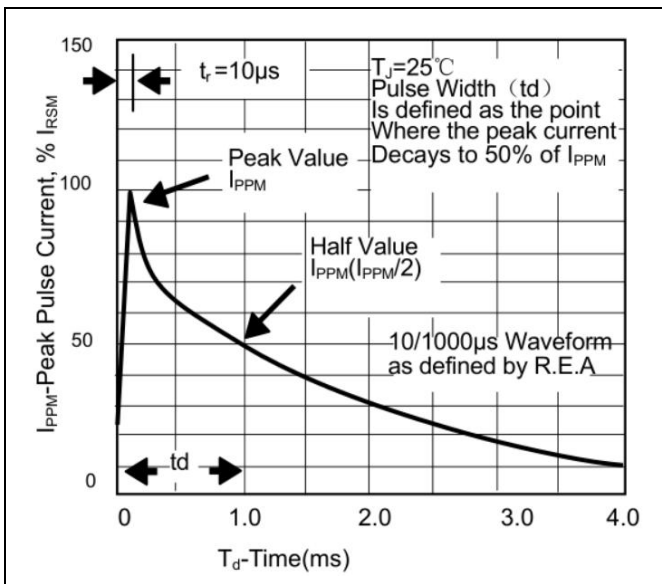
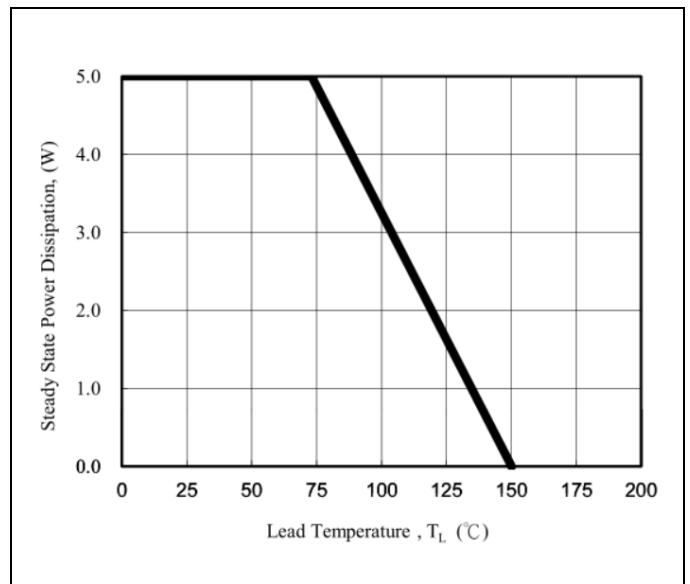


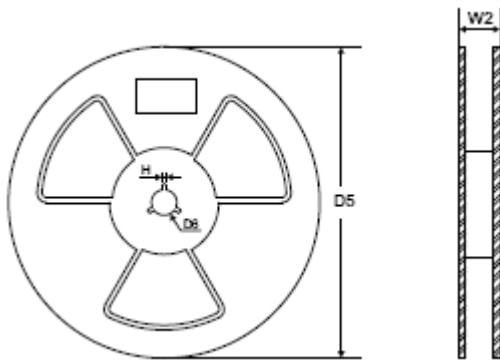
Figure 4. Steady State Power Dissipation Derating Curve



## Packaging

Tape		Symbol	Dimension (mm)
		W	12.00±0.10
		P0	4.00±0.10
		P1	8.00±0.10
		P2	2.00±0.10
		D0	Φ1.55±0.10
		D1	Φ1.5±0.10
		E	1.75±0.10
		F	5.50±0.10
		A0	3.80±0.1
		B0	5.40±0.1
		K0	2.45±0.1
		T	0.25±0.1
		D5	Φ330.0±2.0
		D6	Φ13.5±0.5
		H	2.5±1.0
W2	16.0±2.0		
		Quantity: 3000PCS	

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