

Transient Voltage Suppressors (TVS) Data Sheet

Features

- For surface mounted applications in order to optimize board space
- Low profile package
- Built-in strain relief
- Glass passivated junction
- Low inductance
- Excellent clamping capability
- 600W peak pulse power capability at 10/1000µs waveform, repetition rate (duty cycle): 0.01%
- Fast response time
- High Temperature soldering: 260°C/10 seconds at terminals
- Plastic package has underwriters laboratory flammability 94V-0
- Meets MSL level 1, per J-STD-020
- Safety certification: UL: E244458
- IEC61000-4-2 ESD 30KV Air, 30KV contact compliance



Mechanical Data

- Case: JEDEC DO-214AA. Molded plastic over glass passivated junction
- Terminal: Tin plated, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denotes cathode except bi-directional models
- Standard Packaging: 12mm tape (EIA STD RS-481)
- Weight: 0.10g

Applications

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

Maximum Ratings and Characteristics

Ratings at 25°C ambient temperature unless otherwise specified.

Rating	Symbol	Value	Units
Peak pulse power dissipation at 10/1000µs waveform (Note1, Note2, Fig.1)	P _{PPM}	Minimum 600	Watts
Peak pulse current of at 10/1000µs waveform (Note 1, Fig.3)	I _{PPM}	See Table	Amps
Steady state power dissipation at T _A =50°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) (Note3, Fig.5)	I _{FSM}	100	Amps
Operating junction and Storage Temperature Range.	T _J , T _{STG}	-55 to +150	°C
Typical thermal resistance junction to lead	R _{θJL}	20	°C/W
Typical thermal resistance junction to ambient	R _{θJA}	100	°C/W

Notes: 1. Non-repetitive current pulse, per Fig.3 and derated above T_A=25°C per Fig.2.

2. Mounted on 5.0mmx5.0mm (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.

Dimensions (SMB/DO-214AA)

	Symbol	Millimeters		Inches	
		Min.	Max.	Min.	Max.
	L	4.06	4.57	0.160	0.180
	D	3.30	3.94	0.130	0.155
	D1	1.95	2.20	0.077	0.086
	T	5.21	5.59	0.205	0.220
	T1	0.76	1.52	0.030	0.060
	d	-	0.203	-	0.008
	H	2.15	2.65	0.085	0.104
H1	2.13	2.47	0.084	0.097	

Electrical Characteristics (T_A=25°C)

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}	Capacitance @1MHz, 100mV,0VDC	
		V _{RWM} (V)	V _{BR} (V)	I _T (mA)	V _C (V)	I _{PP} (A)	I _R (μA)	C _J (pF)	
		Typ.		Max.					
P6SMB6.8A	6V8A	5.80	6.45~7.14	10	10.5	58.1	1000	4550	5500

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

Figure 1. Peak Pulse Power Rating Curve

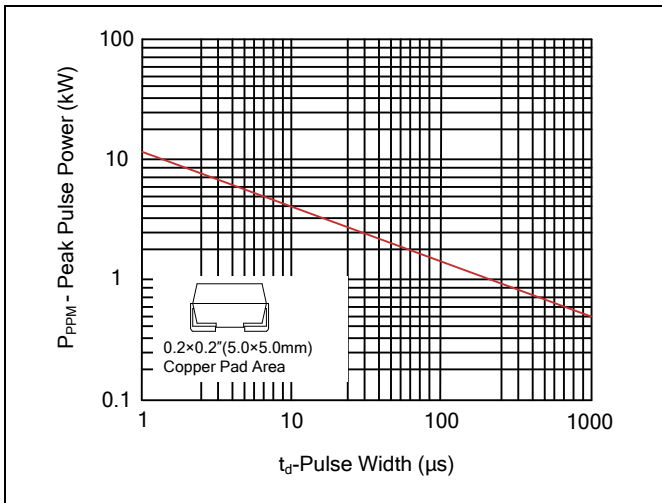


Figure 2. Pulse Derating Curve

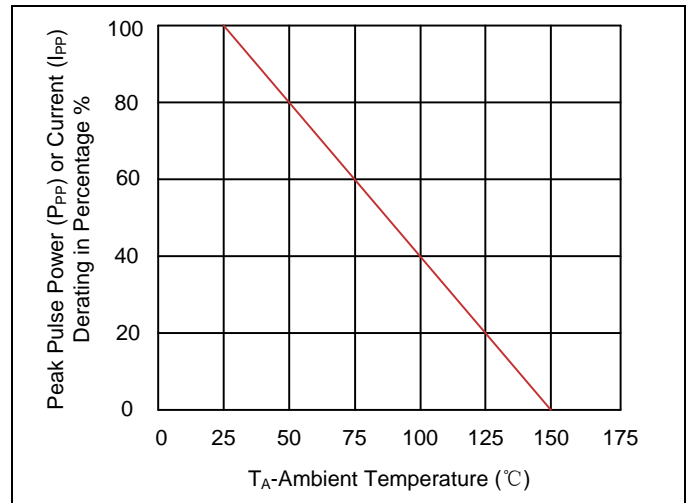


Figure 3. Pulse Waveform

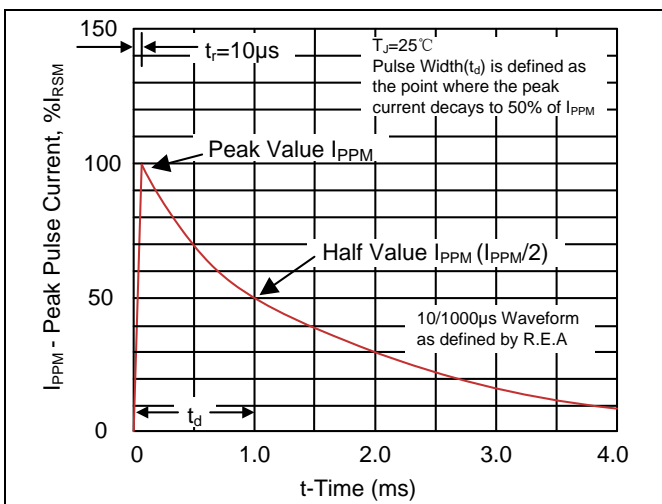


Figure 4. Steady State Power Dissipation Derating Curve

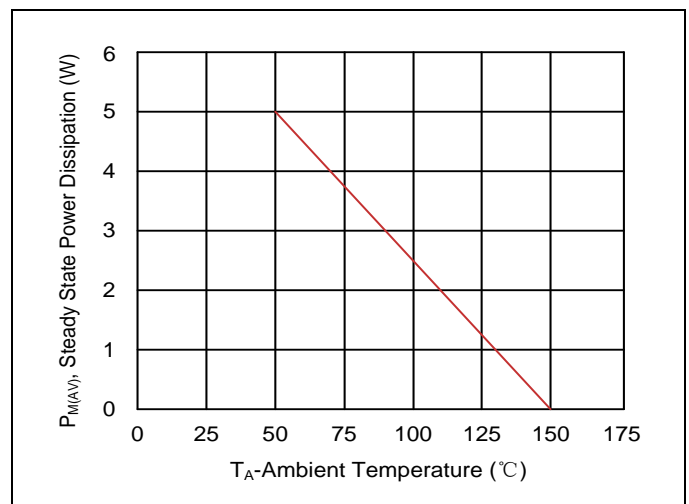
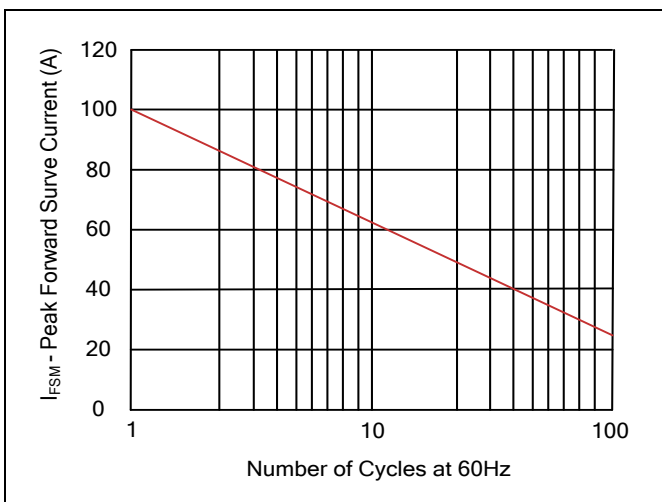
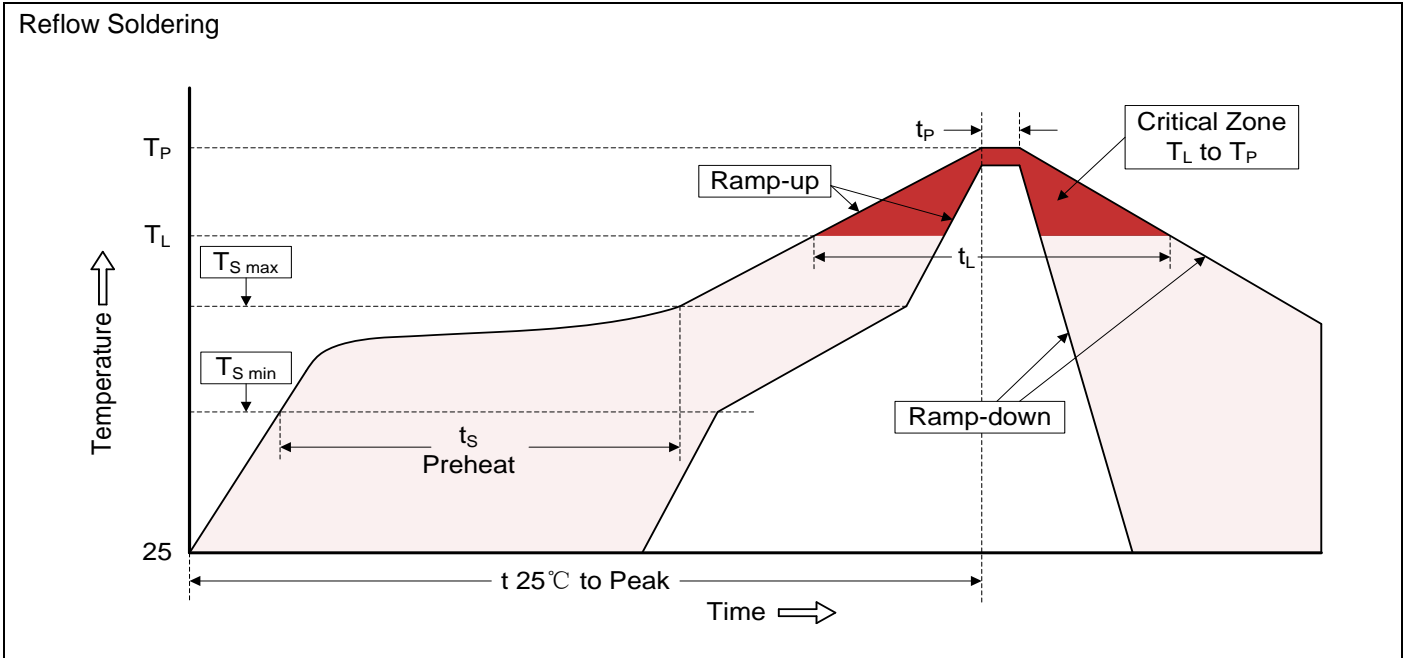


Figure 5. Maximum Non-Repetitive Forward Surge Current Uni-Directional Only



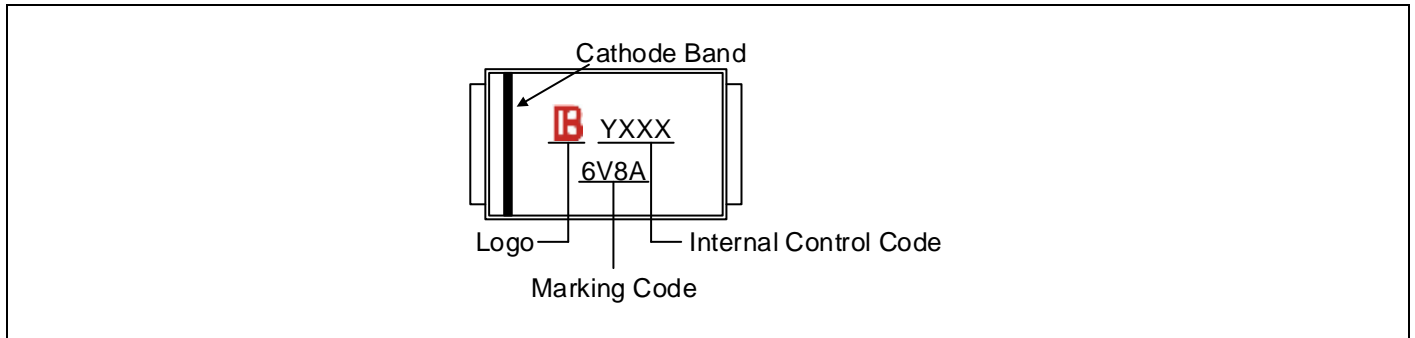
Recommended Soldering Conditions



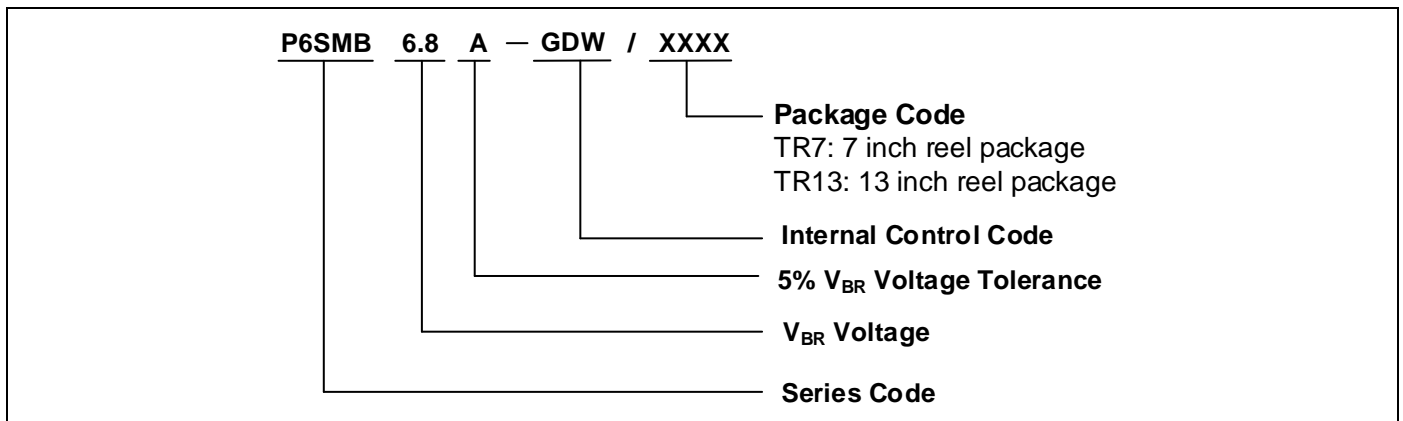
Recommended Conditions

Profile Feature	Pb-Free Assembly
Average ramp-up rate (T_L to T_P)	3°C/second max.
Preheat -Temperature Min ($T_{S\ min}$) -Temperature Max ($T_{S\ max}$) -Time (min to max) (t_s)	150°C 200°C 60-180 seconds
$T_{S\ max}$ to T_L -Ramp-up Rate	3°C/second max.
Time maintained above: -Temperature (T_L) -Time (t_L)	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.

Marking Code



Part Number Code

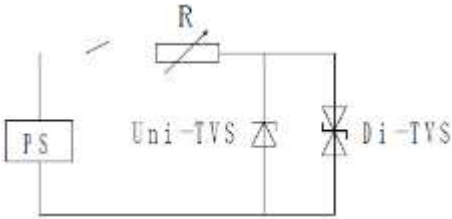


Ordering Code for Different Package

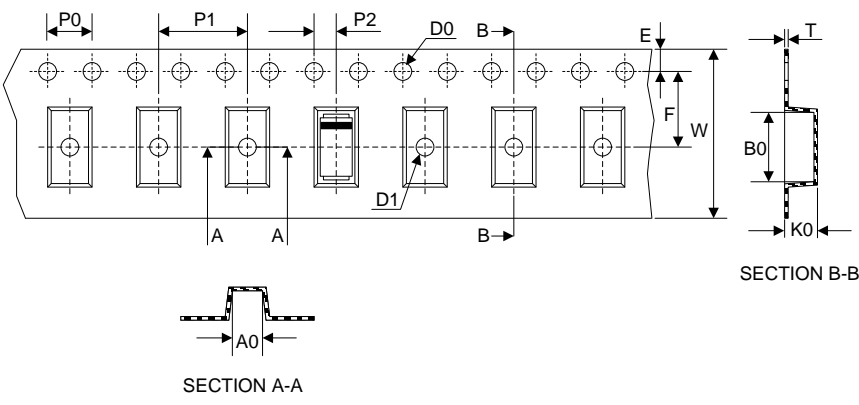
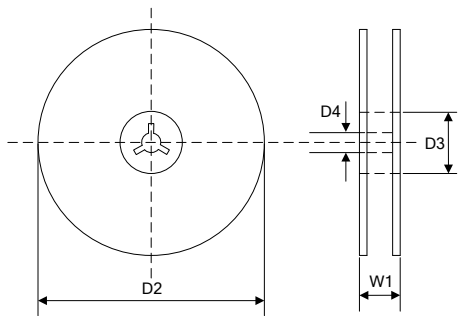
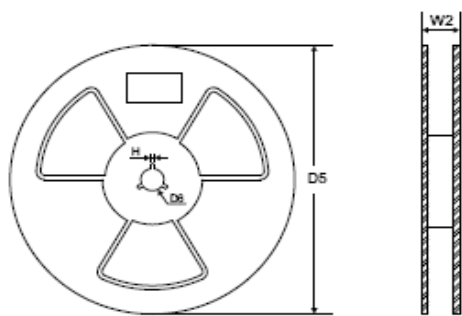
7 inch reel package: Add suffix “ /TR7” at the end of the part number, such as P6SMB6.8A-GDW /TR7

13 inch reel package: Add suffix “ /TR13” at the end of the part number, such as P6SMB6.8A-GDW/TR13

Reliability

Test	Test methods/conditions	Requirement
Temperature Cycling	<ul style="list-style-type: none"> ● Lower test temperature: -40°C, 30min. ● Upper test temperature: 85°C, 30min. ● Soak time at lower or upper temperature: 2~3min. ● Number of cycles:5 ● Measurement at 1h after test conclusion 	<ul style="list-style-type: none"> ● No appearance damage ● No short or open circuit failure ● I_R should comply with specification
High temperature and humidity storage test	<ul style="list-style-type: none"> ● Test temperature: (85±2) °C ● Test humidity: (85±3) % RH ● Duration: 96h ● Measurement at 2h after test conclusion 	<ul style="list-style-type: none"> ● No appearance damage ● No short or open circuit failure ● I_R should comply with specification
High temperature Reverse bias (H.T.R.B)	<ul style="list-style-type: none"> ● Test temperature: 125±3°C ● Bias voltage: V=0.8*V_{BR} ● Duration: 96h for unidirectional device 48h each direction for bidirectional device ● Measurement at 2h after test conclusion 	<ul style="list-style-type: none"> ● No appearance damage ● No short or open circuit failure ● I_R should comply with specification
Alternating Current Test	<p>TVS is connected in series with PPTC(Zero-power resistance value of 40Ω ± 20%, the withstand voltage of 380VAC), which is applied with 380VAC voltage and sustained 1min..</p> <p>The power supply should with a load capacity of not less than 4kW when output 380VAC</p>  <p>PS—Power supply R—PPTC Uni—Unidirectional TVS Di—Bidirectional TVS Note: only Applicable to 6.8V TVS</p>	<ul style="list-style-type: none"> ● No appearance damage ● No short or open circuit failure ● I_R should comply with specification
Solder-ability	<ul style="list-style-type: none"> ● According to GB/T 2423.32-2008 test method ● Leaded solder temperature:235±3 °C ● Sn96.5Ag3.0Cu0.5 solder temperature: (245±3)°C ● Sn99.3Cu0.7 solder temperature: (250±3)°C ● Dipping speed: (5±1) mm/s~(20±1)mm/s ● Dipping time: 5s 	<ul style="list-style-type: none"> ● Measure the wetting force of TVS ● >95% of termination wetted
Resistance to Soldering Heat	<ul style="list-style-type: none"> ● According to GB/T 2423.28-2005,5.4 test method ● Dipping temperature: (260 ± 5)°C ● Dipping time: (5±1) s 	<ul style="list-style-type: none"> ● No appearance damage ● No short or open circuit failure ● I_R should comply with specification
Vibration	<ul style="list-style-type: none"> ● Standard: GB/T 17215.211-2006,5.2.2.3 ● Frequency:10Hz~150Hz ● Crossover frequency:50Hz ● Vibration Amplitude: Constant amplitude 0.075mm (f<60Hz) ● Constant acceleration: f>60Hz,9.8m/s²(1g) ● Single point of control ● Scan cycle:10 Note:10 cycles=10min 	<p>V_{BR} should comply with specification</p>

Packaging

Tape	Symbol Dimension (mm)	
	W	12.00±0.20
	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	3.86±0.15
	B0	5.65±0.10
K0	2.75±0.15	
T	0.25±0.05	
<p>7" Reel</p> 	D2	Φ178.0±2.0
	D3	Φ50.0Min.
	D4	Φ13.0±0.5
	W1	16.0±2.0
	Quantity: 500PCS	
<p>13" Reel</p> 	D5	Φ330.0±2.0
	D6	Φ13.5±0.5
	H	2.5±1.0
	W2	16.0±2.0
	Quantity: 3000PCS	