

## 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
- 5000W peak pulse power capability at 10/1000 $\mu$ s waveform, repetition rate (duty cycle): 0.01%
- Fast response time
- Typical  $I_R$  less than 2 $\mu$ A above 22V
- High Temperature soldering: 260 $^{\circ}$ 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
- AEC-Q101 qualified



### Mechanical Data

- Case: JEDEC DO-214AB. Molded plastic over glass passivated junction
- Terminal: Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denotes cathode except bi-directional models
- Standard Packaging: 16mm tape (EIA STD RS-481)
- Weight: 0.28g

### 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, Note2, Fig.1)	$P_{PPM}$	Minimum 5000	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 $T_A=50^{\circ}$ C (Fig.5)	$P_{M(AV)}$	6.5	Watts
Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load, (JEDEC Method) (Note3, Fig.6)	$I_{FSM}$	300	Amps
Operating junction and Storage Temperature Range.	$T_J, T_{STG}$	-65 to +150	$^{\circ}$ C
Typical thermal resistance junction to lead	$R_{\theta JL}$	15	$^{\circ}$ C/W
Typical thermal resistance junction to ambient	$R_{\theta JA}$	75	$^{\circ}$ C/W

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

2. Mounted on 8.0mm $\times$ 8.0mm copper pads to each terminal.

3. 8.3ms single half sine-wave, or equivalent square wave, duty cycle=4 pulses per minutes maximum.

**Dimensions (SMC/DO-214AB)**

Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
L	6.60	7.11	0.260	0.280
D	5.59	6.22	0.220	0.245
D1	2.90	3.20	0.114	0.126
T	7.75	8.13	0.305	0.320
T1	0.76	1.52	0.030	0.060
d	-	0.203	-	0.008
H	2.20	2.80	0.087	0.110
H1	2.06	2.62	0.079	0.103

**Electrical Characteristics (T<sub>A</sub>=25°C)**

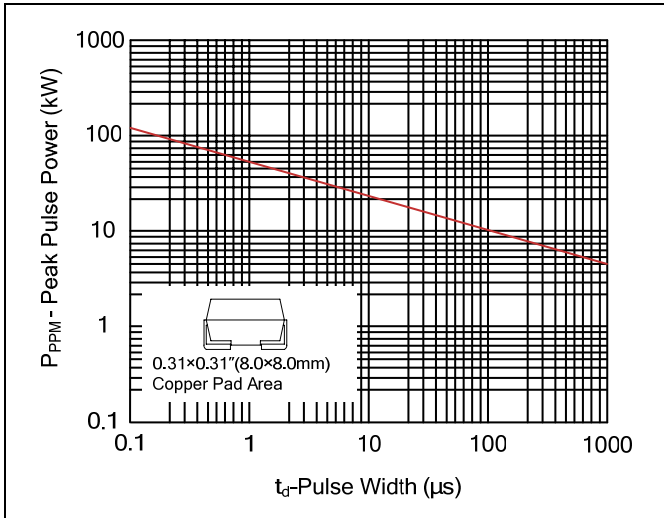
Part Number		Device Marking Code		Reverse Stand-Off Voltage	Breakdown Voltage @I <sub>T</sub>	Test Current	Maximum Clamping Voltage @I <sub>PP</sub>	Peak Pulse Current	Reverse Leakage @V <sub>RWM</sub>
Unidirectional	Bidirectional	UNI	BI	V <sub>RWM</sub> (V)	V <sub>BR</sub> (V)	I <sub>T</sub> (mA)	V <sub>C</sub> (V)	I <sub>PP</sub> (A)	I <sub>R</sub> (μA)
5.0SMDJ22A-AT	5.0SMDJ22CA-AT	5PEX	5BEX	22.0	24.40~26.90	1	35.5	141.00	5
5.0SMDJ24A-AT	5.0SMDJ24CA-AT	5PEZ	5BEZ	24.0	26.70~29.50	1	38.9	129.00	2
5.0SMDJ26A-AT	5.0SMDJ26CA-AT	5PFE	5BFE	26.0	28.90~31.90	1	42.1	119.00	2
5.0SMDJ28A-AT	5.0SMDJ28CA-AT	5PFG	5BFG	28.0	31.10~34.40	1	45.4	110.00	2
5.0SMDJ30A-AT	5.0SMDJ30CA-AT	5PFK	5BFK	30.0	33.30~36.80	1	48.4	103.00	2
5.0SMDJ33A-AT	5.0SMDJ33CA-AT	5PFM	5BFM	33.0	36.70~40.60	1	53.3	93.90	2
5.0SMDJ36A-AT	5.0SMDJ36CA-AT	5PFP	5BFP	36.0	40.00~44.20	1	58.1	86.10	2
5.0SMDJ40A-AT	5.0SMDJ40CA-AT	5PFR	5BFR	40.0	44.40~49.10	1	64.5	77.60	2
5.0SMDJ43A-AT	5.0SMDJ43CA-AT	5PFT	5BFT	43.0	47.80~52.80	1	69.4	72.10	2
5.0SMDJ45A-AT	5.0SMDJ45CA-AT	5PFV	5BFV	45.0	50.00~55.30	1	72.7	68.80	2
5.0SMDJ48A-AT	5.0SMDJ48CA-AT	5PFX	5BFX	48.0	53.30~58.90	1	77.4	64.70	2
5.0SMDJ51A-AT	5.0SMDJ51CA-AT	5PFZ	5BFZ	51.0	56.70~62.70	1	82.4	60.70	2
5.0SMDJ54A-AT	5.0SMDJ54CA-AT	5PGE	5BGE	54.0	60.00~66.30	1	87.1	57.50	2
5.0SMDJ58A-AT	5.0SMDJ58CA-AT	5PGG	5BGG	58.0	64.40~71.20	1	93.6	53.50	2

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

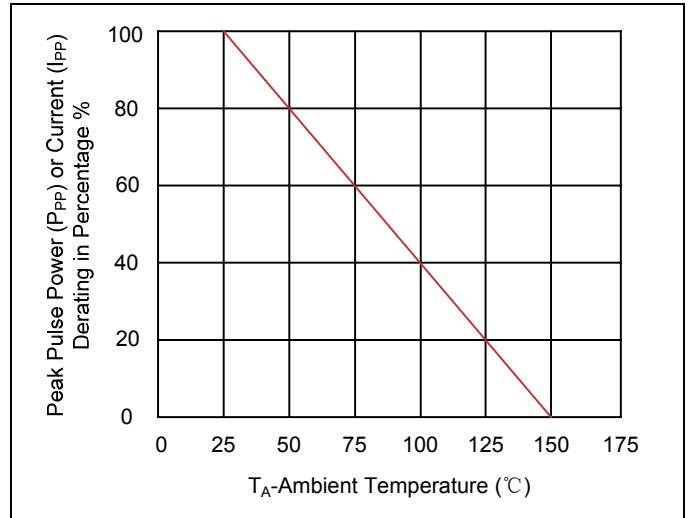
Part Number		Device Marking Code		Reverse Stand-Off Voltage	Breakdown Voltage @ $I_T$	Test Current	Maximum Clamping Voltage @ $I_{PP}$	Peak Pulse Current	Reverse Leakage @ $V_{RWM}$
Unidirectional	Bidirectional	UNI	BI	$V_{RWM}(V)$	$V_{BR}(V)$	$I_T(mA)$	$V_C(V)$	$I_{PP}(A)$	$I_R(\mu A)$
5.0SMDJ60A-AT	5.0SMDJ60CA-AT	5PGK	5BGK	60.0	66.70~73.70	1	96.8	51.70	2
5.0SMDJ64A-AT	5.0SMDJ64CA-AT	5PGM	5BGM	64.0	71.10~78.60	1	103.0	48.60	2
5.0SMDJ70A-AT	5.0SMDJ70CA-AT	5PGP	5BGP	70.0	77.80~86.00	1	113.0	44.30	2
5.0SMDJ75A-AT	5.0SMDJ75CA-AT	5PGR	5BGR	75.0	83.30~92.10	1	121.0	41.40	2
5.0SMDJ78A-AT	5.0SMDJ78CA-AT	5PGT	5BGT	78.0	86.70~95.80	1	126.0	39.70	2
5.0SMDJ85A-AT	5.0SMDJ85CA-AT	5PGV	5BGV	85.0	94.40~104.00	1	137.0	36.50	2
5.0SMDJ90A-AT	5.0SMDJ90CA-AT	5PGX	5BGX	90.0	100.00~111.00	1	146.0	34.30	2
5.0SMDJ100A-AT	5.0SMDJ100CA-AT	5PGZ	5BGZ	100.0	111.00~123.00	1	162.0	30.90	2
5.0SMDJ110A-AT	5.0SMDJ110CA-AT	5PHE	5BHE	110.0	122.00~135.00	1	177.0	28.30	2
5.0SMDJ120A-AT	5.0SMDJ120CA-AT	5PHG	5BHG	120.0	133.00~147.00	1	193.0	26.00	2
5.0SMDJ130A-AT	5.0SMDJ130CA-AT	5PHK	5BHK	130.0	144.00~159.00	1	209.0	24.00	2
5.0SMDJ150A-AT	5.0SMDJ150CA-AT	5PHM	5BHM	150.0	167.00~185.00	1	243.0	20.60	2
5.0SMDJ160A-AT	5.0SMDJ160CA-AT	5PHP	5BHP	160.0	178.00~197.00	1	259.0	19.30	2
5.0SMDJ170A-AT	5.0SMDJ170CA-AT	5PHR	5BHR	170.0	189.00~209.00	1	275.0	18.20	2

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

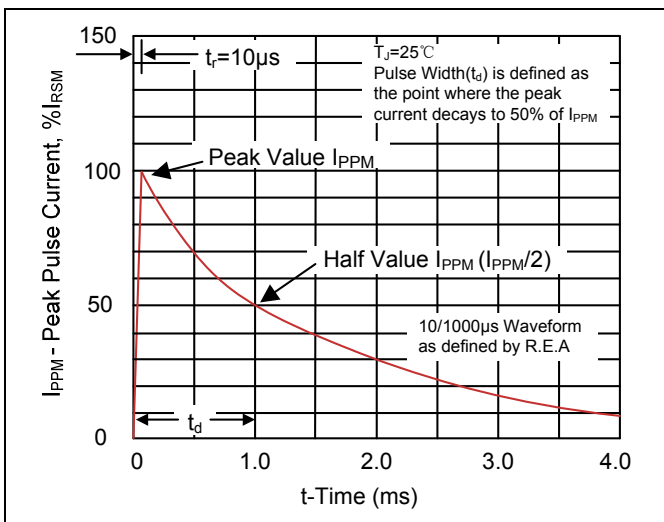
**Figure 1. Peak Pulse Power Rating Curve**



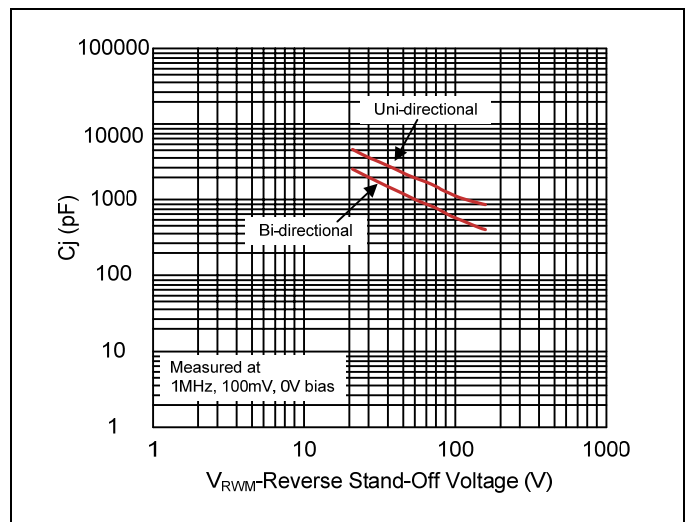
**Figure 2. Pulse Derating Curve**



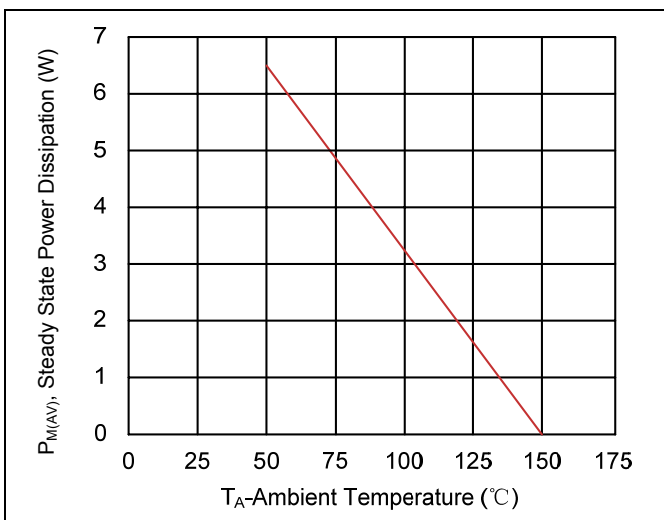
**Figure 3. Pulse Waveform**



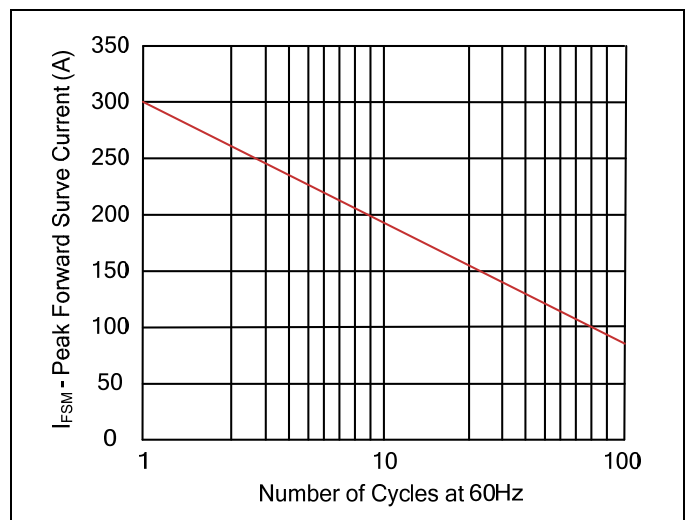
**Figure 4. Typical Junction Capacitance**



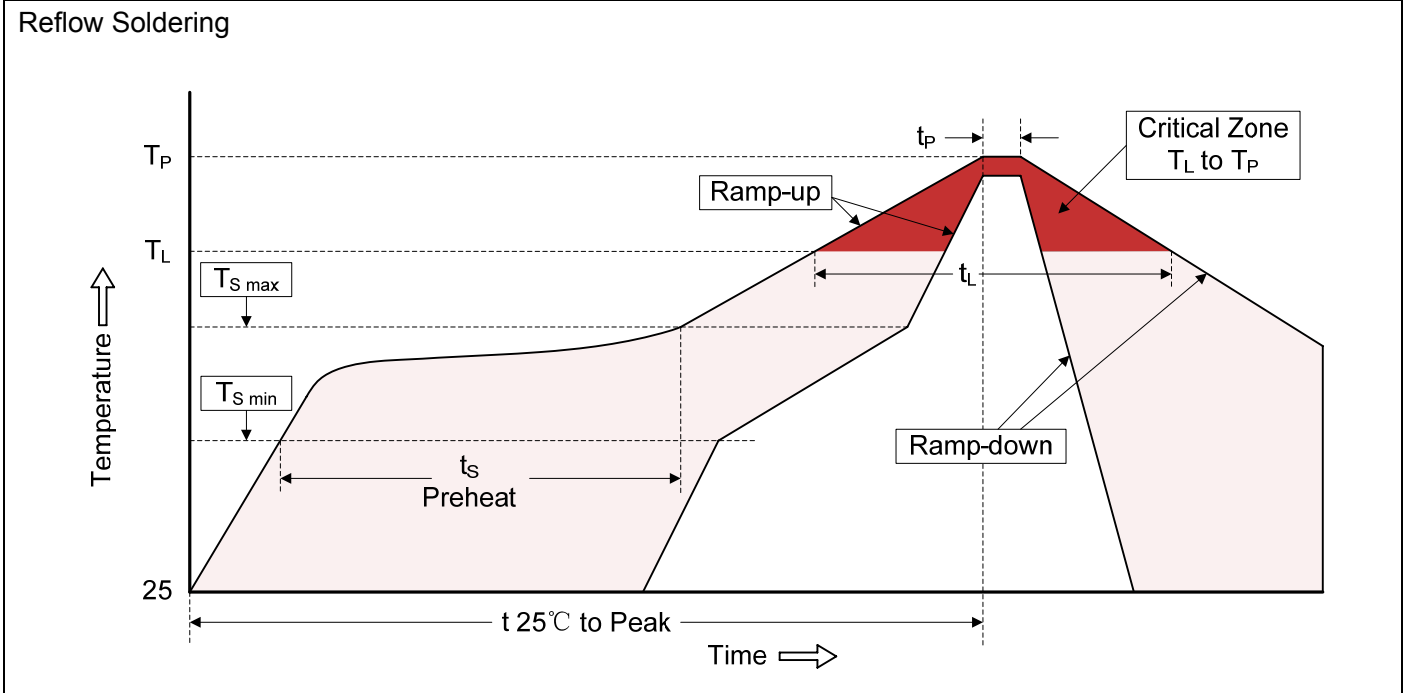
**Figure 5. Steady State Power Dissipation Derating Curve**



**Figure 6. Maximum Non-Repetitive Forward Surge Current Uni-Directional Only**



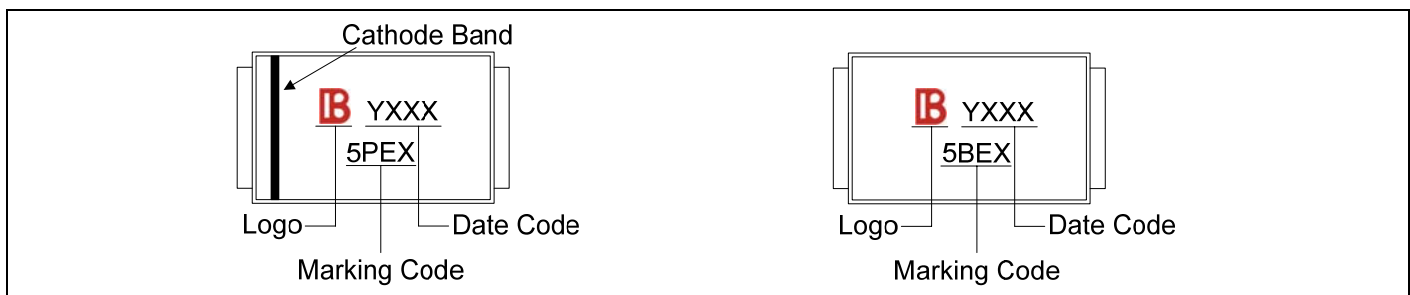
**Recommended Soldering Conditions**



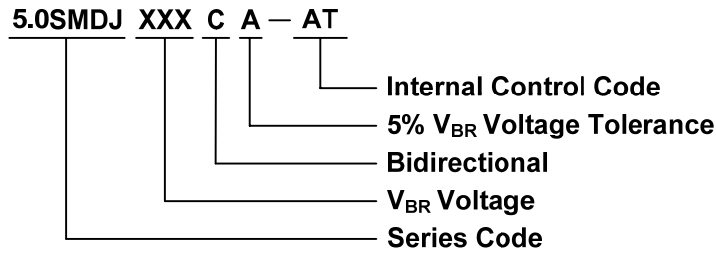
**Recommended Conditions**

Profile Feature	Pb-Free Assembly
Average ramp-up rate (T <sub>L</sub> to T <sub>P</sub> )	3°C/second max.
Preheat -Temperature Min (T <sub>S min</sub> ) -Temperature Max (T <sub>S max</sub> ) -Time (min to max) (t <sub>s</sub> )	150°C 200°C 60-180 seconds
T <sub>S max</sub> to T <sub>L</sub> -Ramp-up Rate	3°C/second max.
Time maintained above: -Temperature (T <sub>L</sub> ) -Time (t <sub>L</sub> )	217°C 60-150 seconds
Peak Temperature (T <sub>P</sub> )	260°C
Time within 5°C of actual Peak Temperature (t <sub>p</sub> )	20-40 seconds
Ramp-down Rate	6°C/second max.
Time 25°C to Peak Temperature	8 minutes max.

**Marking Code**



**Part Number Code**



**Packaging**

Tape		Symbol	Dimension (mm)
		W	16.00±0.20
		P0	4.00±0.10
		P1	8.00±0.10
		P2	2.00±0.10
		D0	Φ1.5±0.10
		D1	Φ1.5±0.10
		E	1.75±0.10
		F	7.50±0.10
		A0	6.27±0.10
		B0	8.30±0.10
		K0	3.15±0.15
		T	0.30±0.05
		7" Reel	
		D3	Φ50.0Min.
		D4	Φ13.0±0.5
		W1	20.0±2.0
		Quantity: 500PCS	
13" Reel		D5	Φ330.0±2.0
		D6	Φ13.5±0.5
		H	2.5±1.0
		W2	20.0±2.0
		Quantity: 3000PCS	