

## Transient Voltage Suppressors (TVS) Data Sheet

### Features

- Glass passivated junction
- Low zener impedance
- Excellent clamping capability
- 600W peak pulse power capability at 10/1000µs waveform, repetition rate (duty cycle):0.01%
- Fast response time
- Typical  $I_R$  less than 1µA 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°C ambient temperature unless otherwise specified.

Rating	Symbol	Value	Units
Peak pulse power dissipation at 10/1000µs waveform (Note1, 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 $T_L=75^\circ\text{C}$ (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	°C
Typical thermal resistance junction to lead	$R_{\theta JL}$	20	°C/W
Typical thermal resistance junction to ambient	$R_{\theta JA}$	100	°C/W

Notes: 1. Non-repetitive current pulse, per Fig.3 and derated above  $T_A=25^\circ\text{C}$  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<sub>A</sub>=25°C)

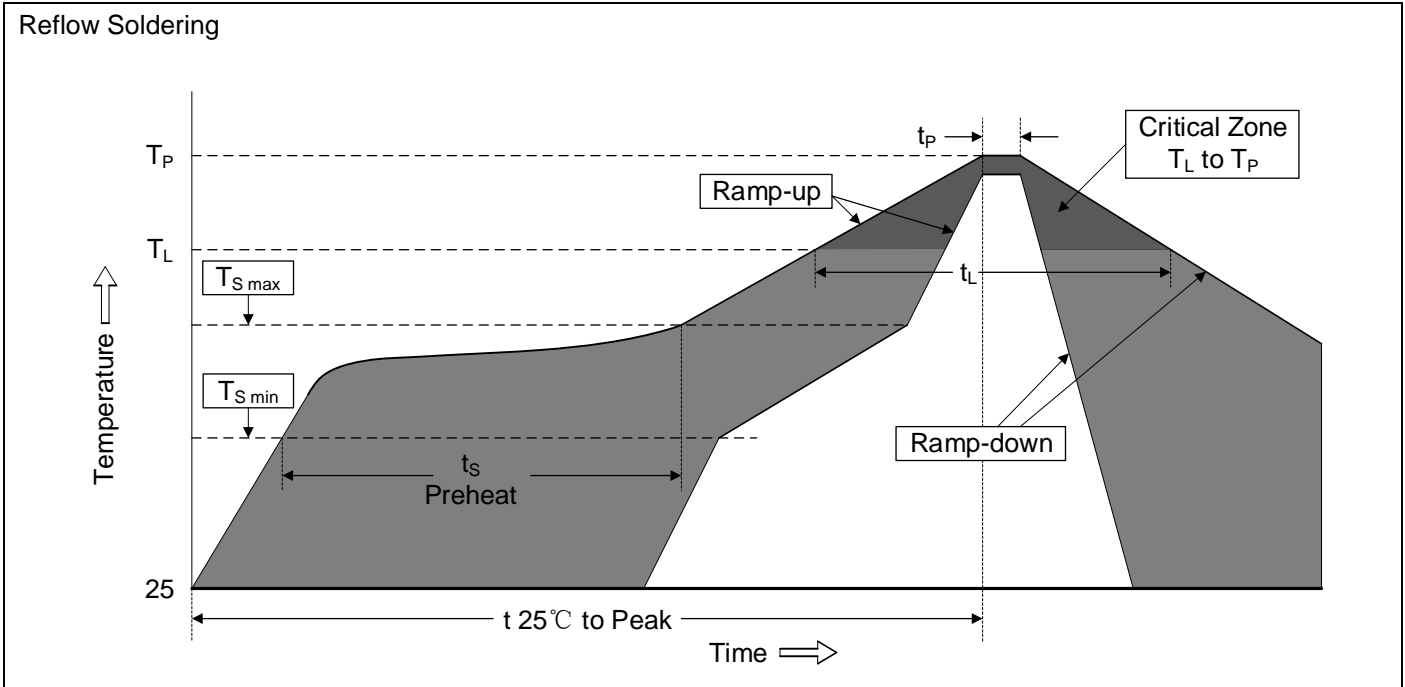
Part Number		Device Marking Code		Reverse Stand-Off Voltage	Breakdown Voltage @ I <sub>T</sub>	Test Current	Maximum Clamping Voltage @ I <sub>PP</sub>	Peak Pulse Current	Reverse Leakage @ V <sub>RWM</sub>
Unidirectional	Bidirectional	UNI	BI	V <sub>RWM</sub> (V)	V <sub>BR</sub> (V)	I <sub>T</sub> (mA)	V <sub>C</sub> (V)	I <sub>PP</sub> (A)	I <sub>R</sub> (μA)
SMBJ5.0A	SMBJ5.0CA	KE	AE	5.0	6.4~7.0	10	9.2	65.2	800
SMBJ6.0A	SMBJ6.0CA	KG	AG	6.0	6.7~7.4	10	10.3	58.3	800
SMBJ6.5A	SMBJ6.5CA	KK	AK	6.5	7.2~8.0	10	11.2	53.57	500
SMBJ7.0A	SMBJ7.0CA	KM	AM	7.0	7.8~8.6	10	12.0	50.0	200
SMBJ7.5A	SMBJ7.5CA	KP	AP	7.5	8.3~9.2	1	12.9	46.5	100
SMBJ8.0A	SMBJ8.0CA	KR	AR	8.0	8.9~9.8	1	13.6	44.1	50
SMBJ8.5A	SMBJ8.5CA	KT	AT	8.5	9.4~10.4	1	14.4	41.7	10
SMBJ9.0A	SMBJ9.0CA	KV	AV	9.0	10.0~11.0	1	15.4	39.0	5
SMBJ10A	SMBJ10CA	KX	AX	10.0	11.1~12.3	1	17.0	35.3	5
SMBJ11A	SMBJ11CA	KZ	AZ	11.0	12.2~13.5	1	18.2	33.0	1
SMBJ12A	SMBJ12CA	LE	BE	12.0	13.3~14.7	1	19.9	30.2	1
SMBJ13A	SMBJ13CA	LG	BG	13.0	14.4~15.9	1	21.5	28.0	1
SMBJ14A	SMBJ14CA	LK	BK	14.0	15.6~17.2	1	23.2	25.9	1
SMBJ15A	SMBJ15CA	LM	BM	15.0	16.7~18.5	1	24.4	24.6	1
SMBJ16A	SMBJ16CA	LP	BP	16.0	17.8~19.7	1	26.0	23.1	1
SMBJ17A	SMBJ17CA	LR	BR	17.0	18.9~20.9	1	27.6	21.8	1
SMBJ18A	SMBJ18CA	LT	BT	18.0	20.0~22.1	1	29.2	20.6	1
SMBJ19A	SMBJ19CA	LW	BW	19.0	21.1~23.3	1	30.8	19.5	1
SMBJ20A	SMBJ20CA	LV	BV	20.0	22.2~24.5	1	32.4	18.6	1
SMBJ22A	SMBJ22CA	LX	BX	22.0	24.4~26.9	1	35.5	16.9	1
SMBJ24A	SMBJ24CA	LZ	BZ	24.0	26.7~29.5	1	38.9	15.5	1
SMBJ26A	SMBJ26CA	ME	CE	26.0	28.9~31.9	1	42.1	14.3	1

## 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	$V_{RWM}(V)$	$V_{BR}(V)$	$I_T(mA)$	$V_C(V)$	$I_{PP}(A)$	$I_R(\mu A)$
SMBJ28A	SMBJ28CA	MG	CG	28.0	31.1~34.4	1	45.4	13.3	1
SMBJ30A	SMBJ30CA	MK	CK	30.0	33.3~36.8	1	48.4	12.4	1
SMBJ33A	SMBJ33CA	MM	CM	33.0	36.7~40.6	1	53.3	11.3	1
SMBJ36A	SMBJ36CA	MP	AP	36.0	40.0~44.2	1	58.1	10.4	1
SMBJ40A	SMBJ40CA	MR	CR	40.0	44.4~49.1	1	64.5	9.3	1
SMBJ43A	SMBJ43CA	MT	CT	43.0	47.8~52.8	1	69.4	8.7	1
SMBJ45A	SMBJ45CA	MV	CV	45.0	50.0~55.3	1	72.7	8.3	1
SMBJ48A	SMBJ48CA	MX	CX	48.0	53.3~58.9	1	77.4	7.8	1
SMBJ51A	SMBJ51CA	MZ	CZ	51.0	56.7~62.7	1	82.4	7.3	1
SMBJ54A	SMBJ54CA	NE	DE	54.0	60.0~66.3	1	87.1	6.9	1
SMBJ58A	SMBJ58CA	NG	DG	58.0	64.4~71.2	1	93.6	6.5	1
SMBJ60A	SMBJ60CA	NK	DK	60.0	66.7~73.7	1	96.8	6.2	1
SMBJ64A	SMBJ64CA	NM	DM	64.0	71.1~78.6	1	103.0	5.9	1
SMBJ70A	SMBJ70CA	NP	DP	70.0	77.8~86.0	1	113.0	5.3	1
SMBJ75A	SMBJ75CA	NR	DR	75.0	83.3~92.1	1	121.0	5.0	1
SMBJ78A	SMBJ78CA	NT	DT	78.0	86.7~95.8	1	126.0	4.8	1
SMBJ80A	SMBJ80CA	NW	DW	80.0	88.8~97.6	1	129.6	4.6	1
SMBJ85A	SMBJ85CA	NV	DV	85.0	94.4~104	1	137.0	4.4	1
SMBJ90A	SMBJ90CA	NX	DX	90.0	100~111	1	146.0	4.1	1
SMBJ100A	SMBJ100CA	NZ	DZ	100.0	111~123	1	162.0	3.7	1
SMBJ110A	SMBJ110CA	PE	FE	110.0	122~135	1	177.0	3.4	1
SMBJ120A	SMBJ120CA	PG	FG	120.0	133~147	1	193.0	3.2	1
SMBJ130A	SMBJ130CA	PK	FK	130.0	144~159	1	209.0	2.9	1
SMBJ140A	SMBJ140CA	PL	FL	140.0	155~171	1	227.0	2.7	1
SMBJ150A	SMBJ150CA	PM	FM	150.0	167~185	1	243.0	2.5	1
SMBJ160A	SMBJ160CA	PP	FP	160.0	178~197	1	259.0	2.3	1
SMBJ170A	SMBJ170CA	PR	FR	170.0	189~209	1	275.0	2.2	1
SMBJ180A	SMBJ180CA	PT	FT	180.0	200~220	1	291.0	2.1	1
SMBJ190A	SMBJ190CA	PU	FU	190.0	211~232	1	308.0	2.0	1
SMBJ200A	SMBJ200CA	PV	FV	200.0	224~247	1	324.0	1.9	1
SMBJ220A	SMBJ220CA	PX	FX	220.0	246~272	1	356.0	1.7	1
SMBJ250A	SMBJ250CA	PZ	FZ	250.0	279~309	1	405.0	1.5	1
SMBJ300A	SMBJ300CA	QE	GE	300.0	335~371	1	486.0	1.3	1
SMBJ350A	SMBJ350CA	QG	GG	350.0	391~432	1	567.0	1.1	1
SMBJ400A	SMBJ400CA	QK	GK	400.0	447~494	1	648.0	0.9	1
SMBJ440A	SMBJ440CA	QM	FM	440.0	492~543	1	713.0	0.9	1

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

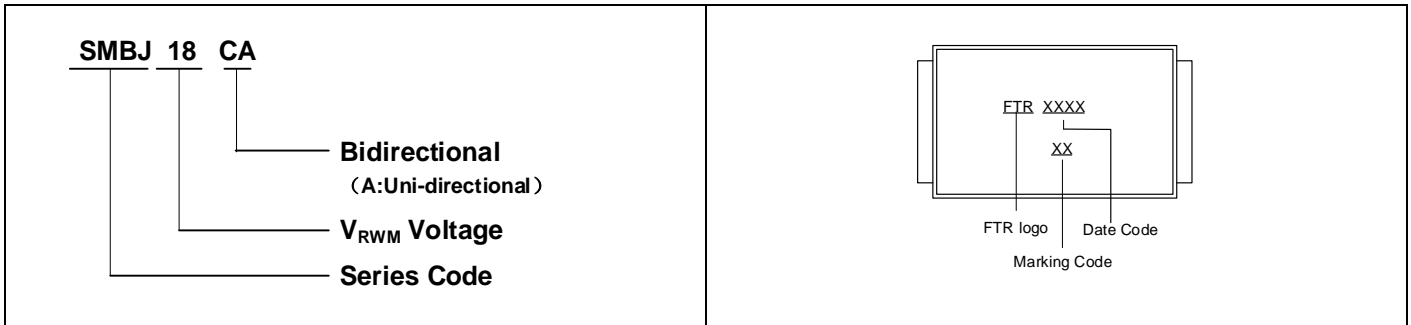
## Recommended Soldering Conditions



### 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.

## Partnumber code



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

Figure 1. Peak Pulse Power Rating Curve

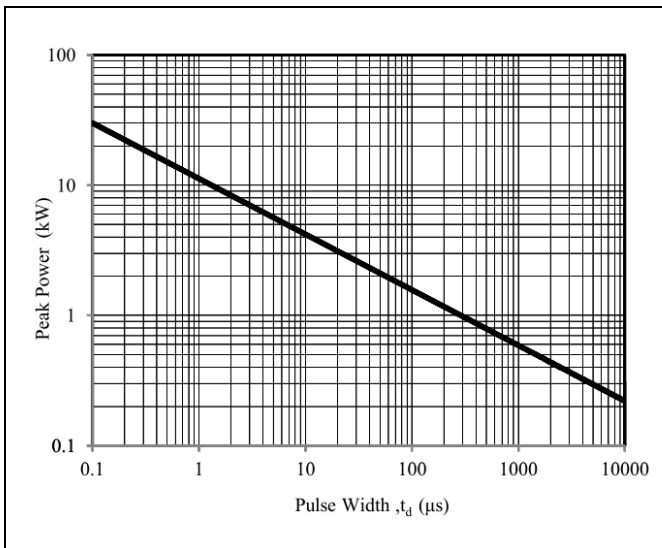


Figure 2. Pulse Derating Curve

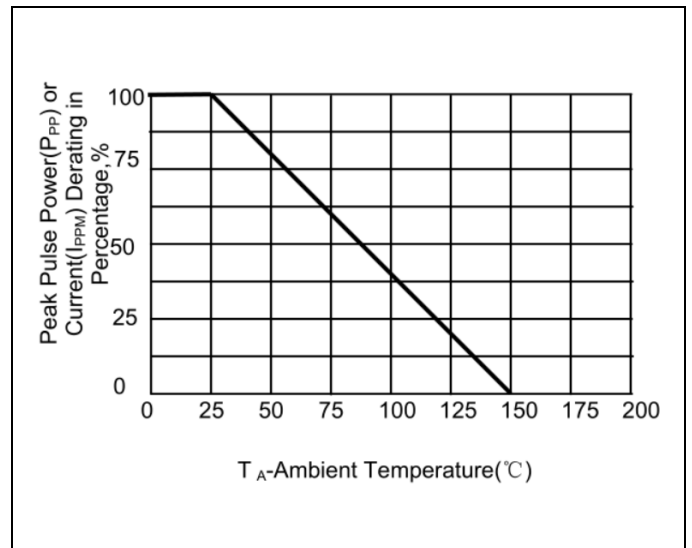
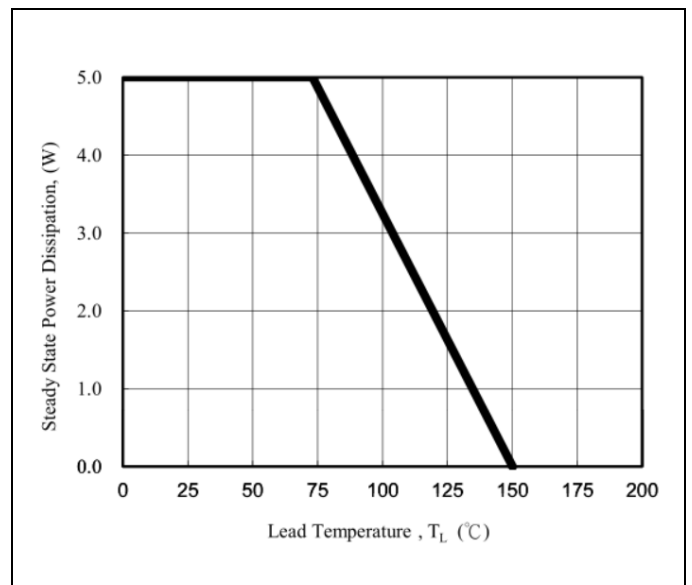


Figure 3. Pulse Waveform



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		
		Reel		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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