

SuperTVS – 600W Transient Voltage Suppressor

1. 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
- Meets MSL level 1, per J-STD-020
- IEC 61000-4-2(ESD) $\pm 30\text{KV}$ (air) $\pm 30\text{KV}$ (contact)
- 600W peak pulse power capability at 10/1000 μs waveform, repetition rate (duty cycle): 0.01%
- Fast response time
- Typical IR less than 1 μA above 10V
- Plastic package has underwriters laboratory flammability 94V-0
- High Temperature soldering: 260 $^{\circ}\text{C}$ /10 seconds at terminals

2. Mechanical Data

- Case: JEDEC DO-214AA. 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: 12mm tape
- Weight: 0.10g

3. Marking Information

BI- directional	UNI-directional	Marking
		XXXX= Product type marking code (See Electrical Characteristics Table)
		

4. Maximum Ratings and Characteristics

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

Rating	Symbol	Value	Units
Peak pulse power dissipation at 10/1000 μs waveform (Note1,2)	P _{PPM}	600	W
Peak pulse current of at 10/1000 μs waveform (Note1)	I _{PPM}	See Table	A
Steady state power dissipation at TA=50 $^{\circ}\text{C}$	P _{M(AV)}	5.0	W
Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load (JEDEC Method) (Note3)	I _{FSM}	100	A

SMBJ SERIES

Rev-1.5

Operating junction and Storage Temperature Range	T_J, T_{STG}	-65 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
Maximum instantaneous forward voltage @ at 50A for unidirectional only (Note4)	V_F	3.5/5	V

Notes:

1. Non-repetitive current pulse, per Fig.3 and derated above $T_A=25^\circ\text{C}$ per Fig.2.
2. Mounted on 5.0mm×5.0mm 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 devices of $V_{BR}<200\text{V}$ and $V_F<5.0\text{V}$ for devices of $V_{BR}>201\text{V}$.

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

Part Number	Marking		Reverse Stand off Voltage V_R	Breakdown Voltage V_{BR} (Volts) @ I_T		Test Current I_T	Maximum Clamping Voltage V_C @ I_{PP}	Maximum Peak Pulse Current I_{PP}	Maximum Reverse Leakage I_R @ V_R	ROHS2.0
BI	UNI	BI	(V)	MIN	MAX	(mA)	(V)	(A)	(μA)	
SMBJ5.0CA/TR13(ES)	KE	AE	5	6.4	7	10	9.2	65.3	400	y
SMBJ6.0CA/TR13(ES)	KG	AG	6	6.67	7.37	10	10.3	58.3	400	y
SMBJ6.5CA/TR13(ES)	KK	AK	6.5	7.22	7.98	10	11.2	53.6	250	y
SMBJ7.0CA/TR13(ES)	KM	AM	7	7.78	8.6	10	12	50	100	y
SMBJ7.5CA/TR13(ES)	KP	AP	7.5	8.33	9.21	1	12.9	46.6	80	y
SMBJ8.0CA/TR13(ES)	KR	AR	8	8.89	9.83	1	13.6	44.2	50	y
SMBJ8.5CA/TR13(ES)	KT	AT	8.5	9.44	10.4	1	14.4	41.7	20	y
SMBJ9.0CA/TR13(ES)	KV	AV	9	10	11.1	1	15.4	39	10	y
SMBJ10CA/TR13(ES)	KX	AX	10	11.1	12.3	1	17	35.3	5	y
SMBJ11CA/TR13(ES)	KZ	AZ	11	12.2	13.5	1	18.2	33	1	y
SMBJ12CA/TR13(ES)	LE	BE	12	13.3	14.7	1	19.9	30.2	1	y
SMBJ13CA/TR13(ES)	LG	BG	13	14.4	15.9	1	21.5	28	1	y
SMBJ14CA/TR13(ES)	LK	BK	14	15.6	17.2	1	23.2	25.9	1	y
SMBJ15CA/TR13(ES)	LM	BM	15	16.7	18.5	1	24.4	24.6	1	y
SMBJ16CA/TR13(ES)	LP	BP	16	17.8	19.7	1	26	23.1	1	y
SMBJ17CA/TR13(ES)	LR	BR	17	18.9	20.9	1	27.6	21.8	1	y
SMBJ18CA/TR13(ES)	LT	BT	18	20	22.1	1	29.2	20.6	1	y
SMBJ20CA/TR13(ES)	LV	BV	20	22.2	24.5	1	32.4	18.6	1	y
SMBJ22CA/TR13(ES)	LX	BX	22	24.4	26.9	1	35.5	16.9	1	y
SMBJ24CA/TR13(ES)	LZ	BZ	24	26.7	29.5	1	38.9	15.5	1	y
SMBJ26CA/TR13(ES)	ME	CE	26	28.9	31.9	1	42.1	14.3	1	y

SMBJ SERIES

Rev-1.5

Part Number	Marking		Reverse Stand off Voltage V_R (Volts)	Breakdown Voltage V_{BR} (Volts) @ I_T		Test Current I_T (mA)	Maximum Clamping Voltage $V_C @ I_{PP}$ (V)	Maximum Peak Pulse Current I_{PP} (A)	Maximum Reverse Leakage $I_R @ V_R$ (μA)	ROHS2.0
BI	UNI	BI	(Volts)	MIN	MAX	(mA)	(V)			
SMBJ28CA/TR13(ES)	MG	CG	28	31.1	34.4	1	45.4	13.3	1	y
SMBJ30CA/TR13(ES)	MK	CK	30	33.3	36.8	1	48.4	12.4	1	y
SMBJ33CA/TR13(ES)	MM	CM	33	36.7	40.6	1	53.3	11.3	1	y
SMBJ36CA/TR13(ES)	MP	CP	36	40	44.2	1	58.1	10.4	1	y
SMBJ40CA/TR13(ES)	MR	CR	40	44.4	49.1	1	64.5	9.3	1	y
SMBJ43CA/TR13(ES)	MT	CT	43	47.8	52.8	1	69.4	8.7	1	y
SMBJ45CA/TR13(ES)	MV	CV	45	50	55.3	1	72.7	8.3	1	y
SMBJ48CA/TR13(ES)	MX	CX	48	53.3	58.9	1	77.4	7.8	1	y
SMBJ51CA/TR13(ES)	MZ	CZ	51	56.7	62.7	1	82.4	7.3	1	y
SMBJ54CA/TR13(ES)	NE	DE	54	60	66.3	1	87.1	6.9	1	y
SMBJ58CA/TR13(ES)	NG	DG	58	64.4	71.2	1	93.6	6.5	1	y
SMBJ60CA/TR13(ES)	NK	DK	60	66.7	73.7	1	96.8	6.2	1	y
SMBJ64CA/TR13(ES)	NM	DM	64	71.1	78.6	1	103	5.9	1	y
SMBJ70CA/TR13(ES)	NP	DP	70	77.8	86	1	113	5.3	1	y
SMBJ75CA/TR13(ES)	NR	DR	75	83.3	92.1	1	121	5	1	y
SMBJ78CA/TR13(ES)	NT	DT	78	86.7	95.8	1	126	4.8	1	y
SMBJ85CA/TR13(ES)	NV	DV	85	94.4	104	1	137	4.4	1	y
SMBJ90CA/TR13(ES)	NX	DX	90	100	111	1	146	4.1	1	y
SMBJ100CA/TR13(ES)	NZ	DZ	100	111	123	1	162	3.7	1	y
SMBJ110CA/TR13(ES)	PE	EE	110	122	135	1	177	3.4	1	y
SMBJ120CA/TR13(ES)	PG	EG	120	133	147	1	193	3.1	1	y
SMBJ130CA/TR13(ES)	PK	EK	130	144	159	1	209	2.9	1	y
SMBJ150CA/TR13(ES)	PM	EM	150	167	185	1	243	2.5	1	y
SMBJ160CA/TR13(ES)	PP	EP	160	178	197	1	259	2.3	1	y
SMBJ170CA/TR13(ES)	PR	ER	170	189	209	1	275	2.2	1	y
SMBJ180CA/TR13(ES)	PT	ET	180	201	222	1	292	2.1	1	y
SMBJ200CA/TR13(ES)	PV	EV	200	224	247	1	324	1.9	1	y
SMBJ220CA/TR13(ES)	PX	EX	220	246	272	1	356	1.7	1	y
SMBJ250CA/TR13(ES)	PZ	EZ	250	279	309	1	405	1.5	1	y
SMBJ300CA/TR13(ES)	QE	FE	300	335	371	1	486	1.3	1	y
SMBJ350CA/TR13(ES)	QG	FG	350	391	432	1	567	1.1	1	y
SMBJ400CA/TR13(ES)	QK	FK	400	447	494	1	648	0.9	1	y
SMBJ440CA/TR13(ES)	QM	FM	440	492	543	1	713	0.9	1	y

For bidirectional type having V_{RWM} of 10 volts and less, the IR limit is double.

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

Figure 1. Peak Pulse Power Rating Curve

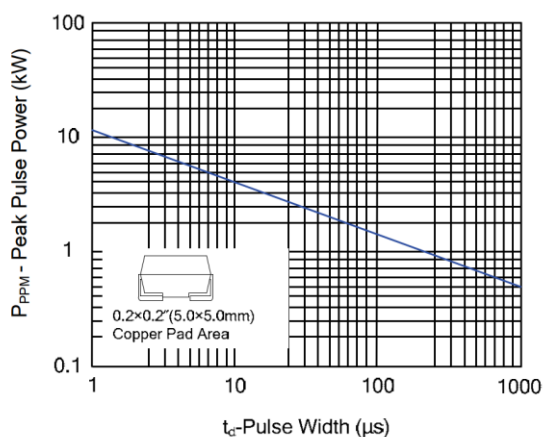


Figure 2 Pulse Derating Curve

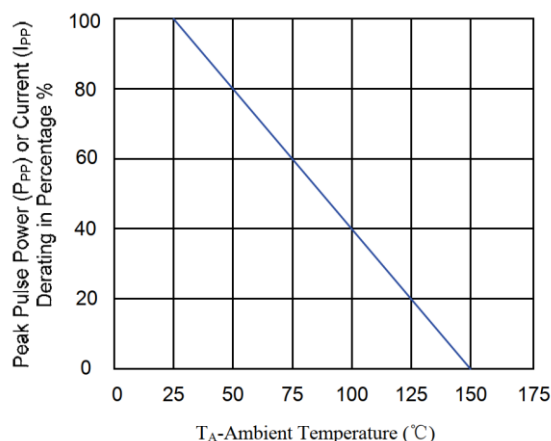


Figure 3 Pulse Waveform

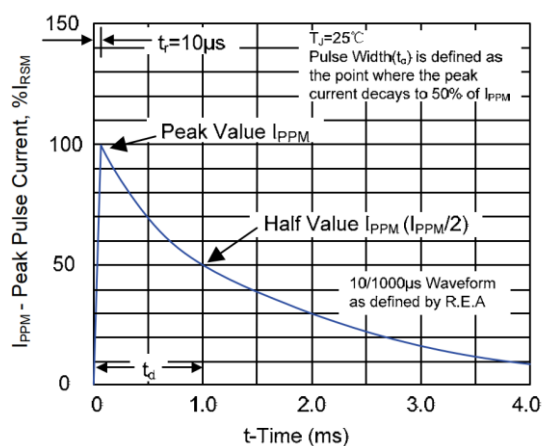


Figure 4 Typical Junction Capacitance

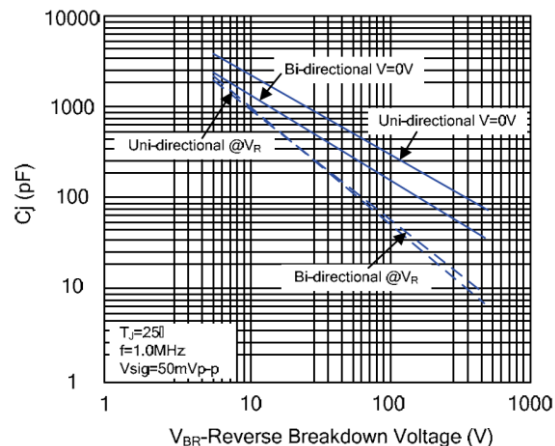


Figure 5 Steady State Power Dissipation Derating Curve

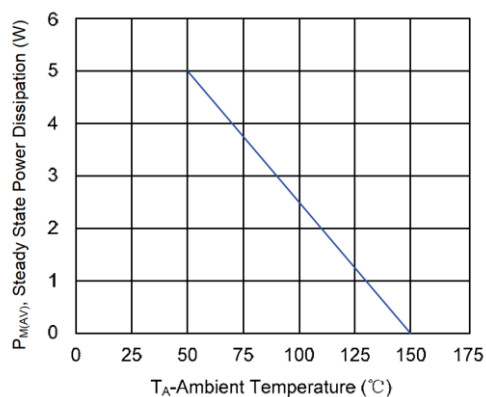
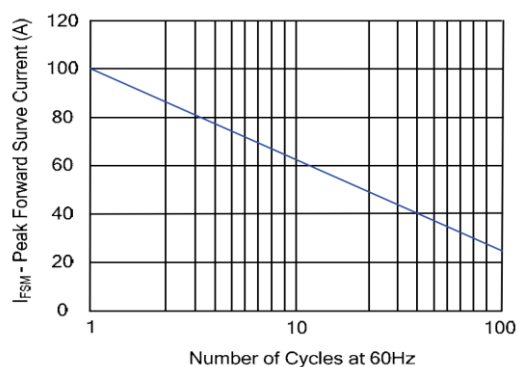


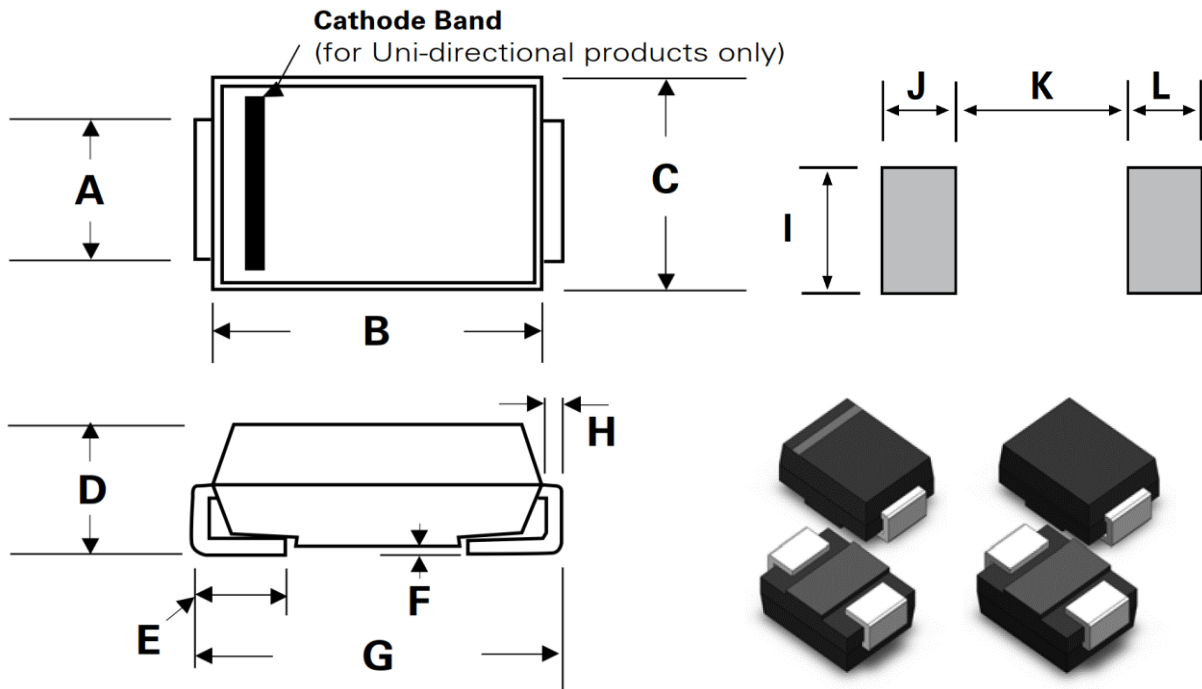
Figure 6 Maximum Non-Repetitive Forward Surge Current
Uni-Directional Only



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Rev-1.5

7. Dimension (SMB/DO-214AA)

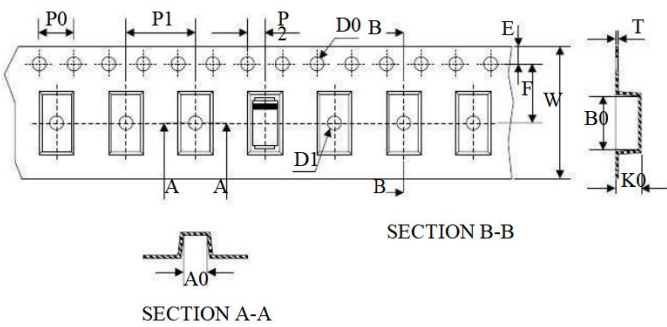
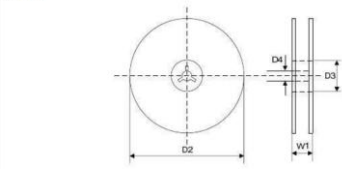
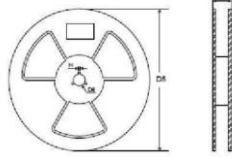


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.077	0.086	1.80	2.2
B	0.16	0.18	4.06	4.57
C	0.13	0.155	3.3	3.94
D	0.084	0.096	2.13	2.44
E	0.03	0.06	0.76	1.52
F	-	0.008	-	0.203
G	0.205	0.22	5.08	5.59
H	0.006	0.012	0.152	0.305
I	0.089	-	2.26	-
J	0.085	-	2.16	-
K	-	0.107	-	2.74
L	0.085	-	2.16	-

SMBJ SERIES

Rev-1.5

8. Packaging

	Symbol	Dimension
	W	12.0±0.20
	P0	4.0±0.10
	P1	8.00±0.10
	P2	2.0±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
	D2	φ178.0±2.0
	D3	φ50.0min.
	D4	φ13.0±0.5
	W1	16.0±2.0
	Quantity: 500PCS	
	D5	330.0±2.0
	D6	13.5±0.5
	H	2.5±1.0
	W2	16.0±2.0
	Quantity: 3000PCS	

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