

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		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

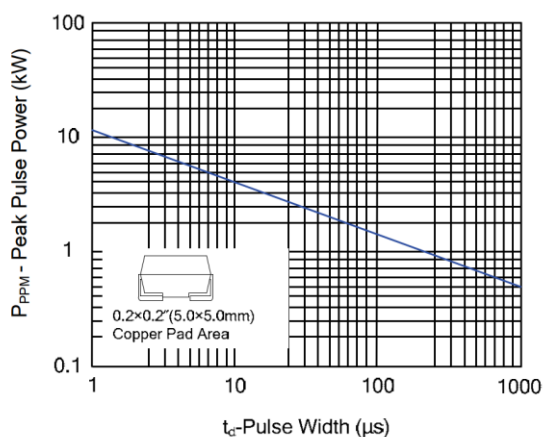


Figure 2 Pulse Derating Curve

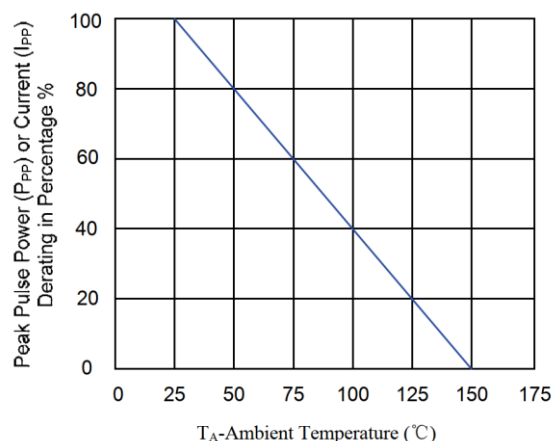


Figure 3 Pulse Waveform

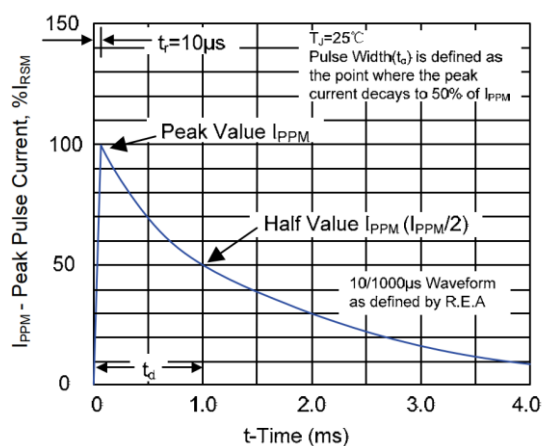


Figure 4 Typical Junction Capacitance

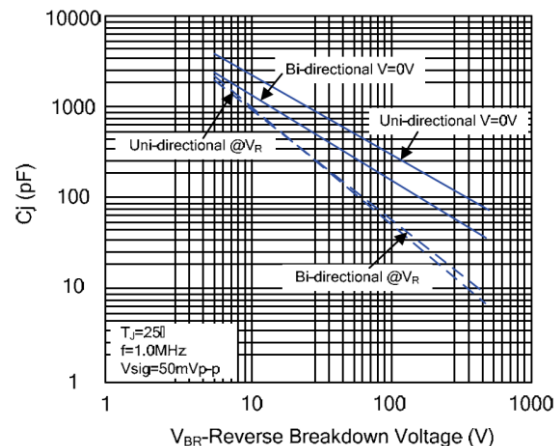


Figure 5 Steady State Power Dissipation Derating Curve

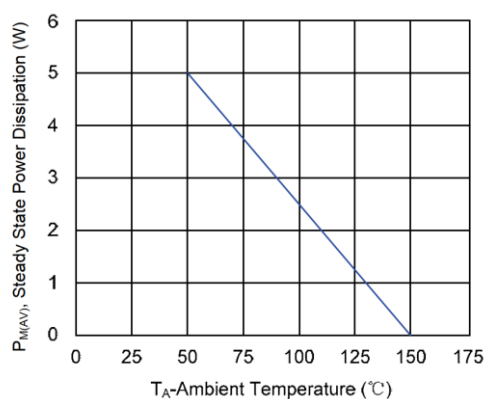
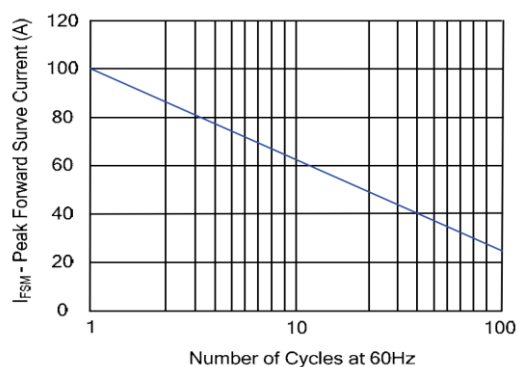


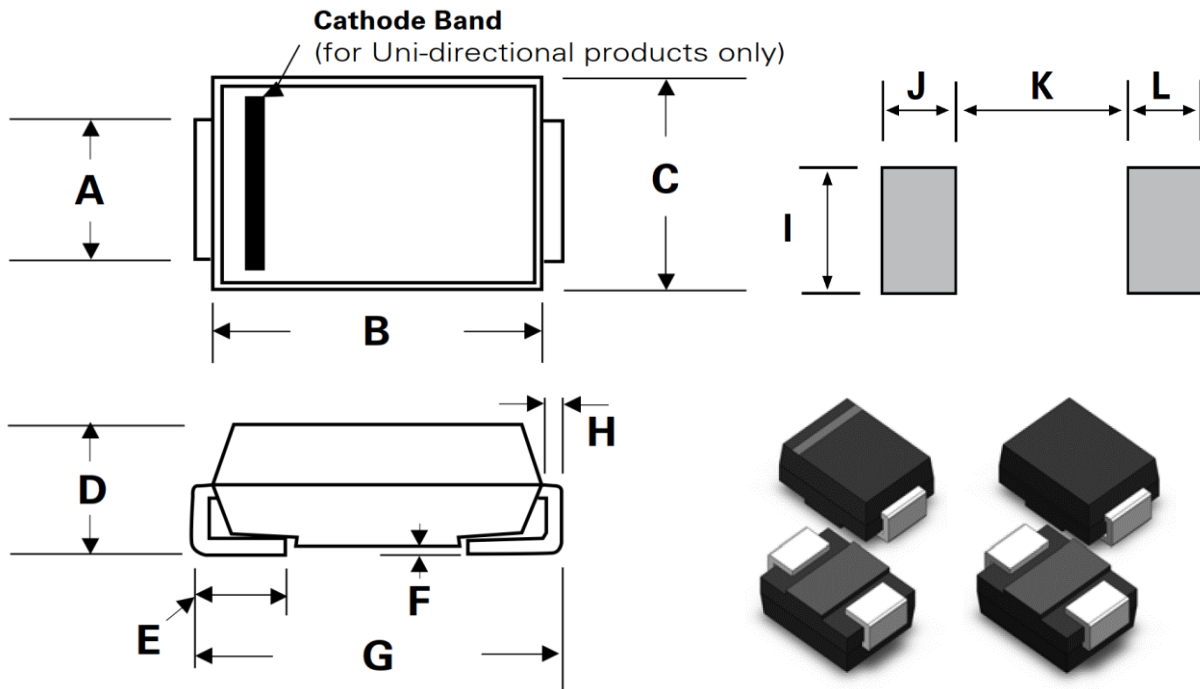
Figure 6 Maximum Non-Repetitive Forward Surge Current
Uni-Directional Only



SMBJ SERIES

Rev-1.5

7. Dimension (SMB/DO-214AA)

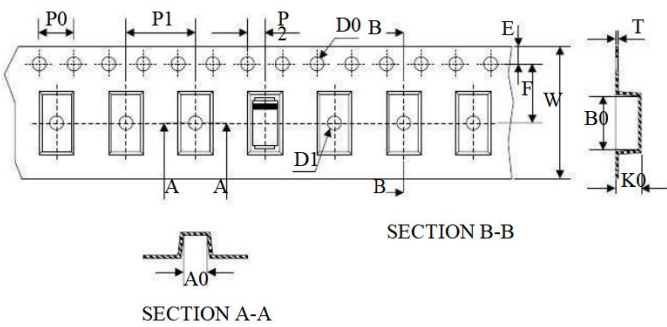
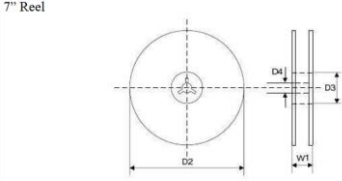
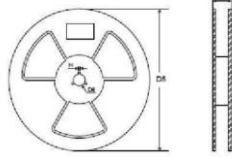


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.077	0.086	1.80	2.2
B	0.16	0.18	4.06	4.57
C	0.13	0.155	3.3	3.94
D	0.084	0.096	2.13	2.44
E	0.03	0.06	0.76	1.52
F	-	0.008	-	0.203
G	0.205	0.22	5.08	5.59
H	0.006	0.012	0.152	0.305
I	0.089	-	2.26	-
J	0.085	-	2.16	-
K	-	0.107	-	2.74
L	0.085	-	2.16	-

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	

DISCLAIMER

ELECSUPER SUPERTVS PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, SAFETY INFORMATION, AND OTHER RESOURCES "AS IS" AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with ElecSuper products. You are solely responsible for

- (1) selecting the appropriate ElecSuper products for your application;
- (2) designing, validating and testing your application;
- (3) ensuring your application meets applicable standards, and any other safety, security, or other requirements.

These resources are subject to change without notice. ElecSuper grants you permission to use these resources only for development of an application that uses the ElecSuper products described in the resource. Other reproduction and display of these resources are prohibited. No license is granted to any other ElecSuper intellectual property right or to any third party intellectual property right. ElecSuper disclaims responsibility for, and you will fully indemnify ElecSuper and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources. ElecSuper's products are provided subject to ElecSuper's Terms of Sale or other applicable terms available either on www.elecsuper.com or provided in conjunction with such ElecSuper products. ElecSuper's provision of these resources does not expand or otherwise alter ElecSuper's applicable warranties or warranty disclaimers for ElecSuper products.