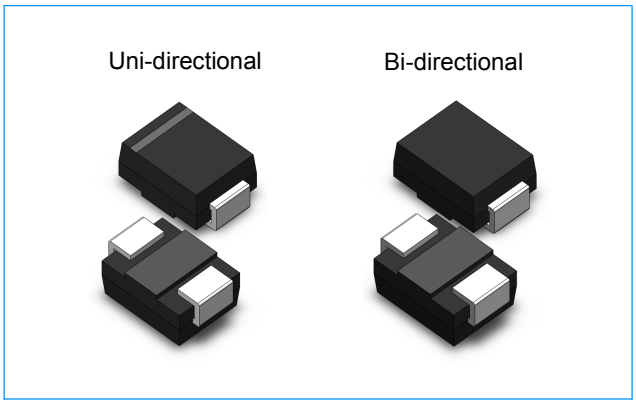
Surface Mount Transient Voltage Suppressors

SMBJ-AT Series 600W Transient Voltage Suppressor

Description

TVS diodes can be used in a wide range of applications which like consumer electronic products, automotive industries, munitions, telecommunications, aerospace industries, and intelligent control systems.

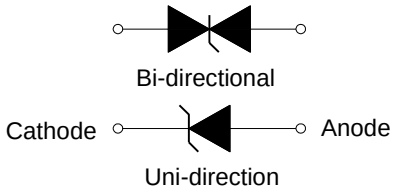
Working Voltage: 5.0 to 440 V



Features

- Glass passivated or planar junction
- Excellent clamping capability
- Repetition rate (duty cycle): 0.01%
- Low profile package and low inductance
- 600W Peak Pulse power capability at 10×1000μs waveform.
- Fast response time: typically less than 1.0ps from 0V to V_{BR} min.
- High temperature soldering: 260℃/10s at terminals.
- Plastic package has Underwriters Laboratory Flammability 94V-0.
- For surface mounted applications in order to optimize board space.
- High reliability application and automotive grade AECQ101 qualified .

Functional Diagram



Applications

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

Mechanical Data

- Package: SMB/DO-214AA
- Case Material: “Green”Molding Compound.
- UL Flammability Classification Rating 94V-0
- Polarity:Color band denotes cathode except bi-directional models
- Standard Packaging:12mm tape (EIA STD RS-481)
- Weight: 0.1g
- Terminal Connections: See Diagram Below
- Marking Information: See Below

Maximum Ratings and Thermal Characteristics (T_A=25 ℃ unless otherwise noted)

Parameter	Symbol	Value	Units
Peak power dissipation with a 10/1000μs waveform	P_{PPM}	600	W
Steady state power dissipation at T_L=75℃	$P_{M(AV)}$	5.0	W
Maximum Instantaneous Forward Voltage at 30A for Unidirectional	V_F	5.0	V
Storage temperature range	T_{stg}	-55 to +150	℃
Operating junction temperature range	T_j	-55 to +150	℃

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Part Number		Marking		Reverse Stand-Off Voltage V_{RWM}(V)	Breakdown Voltage V_{BR} (V) @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_{RWM} (μA)
Uni	Bi	Uni	Bi		MIN	MAX				
SMBJ5.0A-AT	SMBJ5.0CA-AT	KER	AET	5.0	6.40	7.00	10	9.2	65.2	800
SMBJ6.0A-AT	SMBJ6.0CA-AT	KGT	AGT	6.0	6.67	7.37	10	10.3	58.3	800
SMBJ6.5A-AT	SMBJ6.5CA-AT	KKT	AKT	6.5	7.22	7.98	10	11.2	53.6	500
SMBJ7.0A-AT	SMBJ7.0CA-AT	KMT	AMT	7.0	7.78	8.60	10	12.0	50.0	200
SMBJ7.5A-AT	SMBJ7.5CA-AT	KPT	APT	7.5	8.33	9.21	1	12.9	46.5	100
SMBJ8.0A-AT	SMBJ8.0CA-AT	KRT	ART	8.0	8.89	9.83	1	13.6	44.1	50
SMBJ8.5A-AT	SMBJ8.5CA-AT	KTT	ATT	8.5	9.44	10.40	1	14.4	41.7	20
SMBJ9.0A-AT	SMBJ9.0CA-AT	KVT	AVT	9.0	10.00	11.10	1	15.4	39.0	10
SMBJ10A-AT	SMBJ10CA-AT	KXT	AXT	10	11.10	12.30	1	17.0	35.3	5
SMBJ11A-AT	SMBJ11CA-AT	KZT	WZT	11	12.20	13.50	1	18.2	33.0	1
SMBJ12A-AT	SMBJ12CA-AT	LET	BET	12	13.30	14.70	1	19.9	30.2	1
SMBJ13A-AT	SMBJ13CA-AT	LGT	BGT	13	14.40	15.90	1	21.5	27.9	1
SMBJ14A-AT	SMBJ14CA-AT	LKT	BKT	14	15.60	17.20	1	23.2	25.9	1
SMBJ15A-AT	SMBJ15CA-AT	LMT	BMT	15	16.70	18.50	1	24.4	24.6	1
SMBJ16A-AT	SMBJ16CA-AT	LPT	BPT	16	17.80	19.70	1	26.0	23.1	1
SMBJ17A-AT	SMBJ17CA-AT	LRT	BRT	17	18.90	20.90	1	27.6	21.8	1
SMBJ18A-AT	SMBJ18CA-AT	LTT	BTT	18	20.00	22.10	1	29.2	20.6	1
SMBJ20A-AT	SMBJ20CA-AT	LVT	BVT	20	22.20	24.50	1	32.4	18.6	1
SMBJ22A-AT	SMBJ22CA-AT	LXT	BXT	22	24.40	26.90	1	35.5	16.9	1
SMBJ24A-AT	SMBJ24CA-AT	LZT	BZT	24	26.70	29.50	1	38.9	15.4	1
SMBJ26A-AT	SMBJ26CA-AT	MET	CET	26	28.90	31.90	1	42.1	14.3	1
SMBJ28A-AT	SMBJ28CA-AT	MGT	CGT	28	31.10	34.40	1	45.4	13.2	1
SMBJ30A-AT	SMBJ30CA-AT	MKT	CKT	30	33.30	36.80	1	48.4	12.4	1
SMBJ33A-AT	SMBJ33CA-AT	MMT	CMT	33	36.70	40.60	1	53.3	11.3	1
SMBJ36A-AT	SMBJ36CA-AT	MPT	CPT	36	40.00	44.20	1	58.1	10.4	1
SMBJ40A-AT	SMBJ40CA-AT	MRT	CRT	40	44.40	49.10	1	64.5	9.3	1
SMBJ43A-AT	SMBJ43CA-AT	MTT	CTT	43	47.80	52.80	1	69.4	8.7	1
SMBJ45A-AT	SMBJ45CA-AT	MVT	CVT	45	50.00	55.30	1	72.7	8.3	1
SMBJ48A-AT	SMBJ48CA-AT	MXT	CXT	48	53.30	58.90	1	77.4	7.8	1
SMBJ51A-AT	SMBJ51CA-AT	MZT	CZT	51	56.70	62.70	1	82.4	7.3	1

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Part Number		Marking		Reverse Stand-Off Voltage V_{RWM}(V)	Breakdown Voltage V_{BR} (V) @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_{RWM} (μA)
Uni	Bi	Uni	Bi		MIN	MAX				
SMBJ54A-AT	SMBJ54CA-AT	NET	DET	54	60.00	66.30	1	87.1	6.9	1
SMBJ58A-AT	SMBJ58CA-AT	NGT	DGT	58	64.40	71.20	1	93.6	6.4	1
SMBJ60A-AT	SMBJ60CA-AT	NKT	DKT	60	66.70	73.70	1	96.8	6.2	1
SMBJ64A-AT	SMBJ64CA-AT	NMT	DMT	64	71.10	78.60	1	103.0	5.8	1
SMBJ70A-AT	SMBJ70CA-AT	NPT	DPT	70	77.80	86.00	1	113.0	5.3	1
SMBJ75A-AT	SMBJ75CA-AT	NRT	DRT	75	83.30	92.10	1	121.0	5.0	1
SMBJ78A-AT	SMBJ78CA-AT	NTT	DTT	78	86.70	95.80	1	126.0	4.8	1
SMBJ85A-AT	SMBJ85CA-AT	NVT	DVT	85	94.40	104.0	1	137.0	4.4	1
SMBJ90A-AT	SMBJ90CA-AT	NXT	DXT	90	100.0	111.0	1	146.0	4.1	1
SMBJ100A-AT	SMBJ100CA-AT	NZT	DZT	100	111.0	123.0	1	162.0	3.7	1
SMBJ110A-AT	SMBJ110CA-AT	PET	EET	110	122.0	135.0	1	177.0	3.4	1
SMBJ120A-AT	SMBJ120CA-AT	PGT	EGT	120	133.0	147.0	1	193.0	3.1	1
SMBJ130A-AT	SMBJ130CA-AT	PKT	EKT	130	144.0	159.0	1	209.0	2.9	1
SMBJ150A-AT	SMBJ150CA-AT	PMT	EMT	150	167.0	185.0	1	243.0	2.5	1
SMBJ160A-AT	SMBJ160CA-AT	PPT	EPT	160	178.0	197.0	1	259.0	2.3	1
SMBJ170A-AT	SMBJ170CA-AT	PRT	ERT	170	189.0	209.0	1	275.0	2.2	1
SMBJ180A-AT	SMBJ180CA-AT	PTT	ETT	180	201.0	222.0	1	292.0	2.1	1
SMBJ190A-AT	SMBJ190CA-AT	PVT	EVT	190	211.0	234.0	1	307.0	2.0	1
SMBJ200A-AT	SMBJ200CA-AT	PWT	EWT	200	224.0	247.0	1	324.0	1.9	1
SMBJ210A-AT	SMBJ210CA-AT	PUT	EUT	210	233.0	258.0	1	337.0	1.8	1
SMBJ220A-AT	SMBJ220CA-AT	PXT	EXT	220	246.0	272.0	1	356.0	1.7	1
SMBJ250A-AT	SMBJ250CA-AT	PZT	EZT	250	279.0	309.0	1	405.0	1.5	1
SMBJ300A-AT	SMBJ300CA-AT	QET	FET	300	335.0	371.0	1	486.0	1.3	1
SMBJ350A-AT	SMBJ350CA-AT	QGT	FGT	350	391.0	432.0	1	567.0	1.1	1
SMBJ400A-AT	SMBJ400CA-AT	QKT	FKT	400	447.0	494.0	1	648.0	0.9	1
SMBJ440A-AT	SMBJ440CA-AT	QMT	FMT	440	492.0	543.0	1	713.0	0.8	1

Note:

(1) Add suffix ' CA ' after part number to specify Bi-directional devices

(2) Suffix 'A ' denotes 5% tolerance device.

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Ratings and Characteristics Curves (T_A=25℃ unless otherwise noted)

Figure 1 - Pulse Waveform

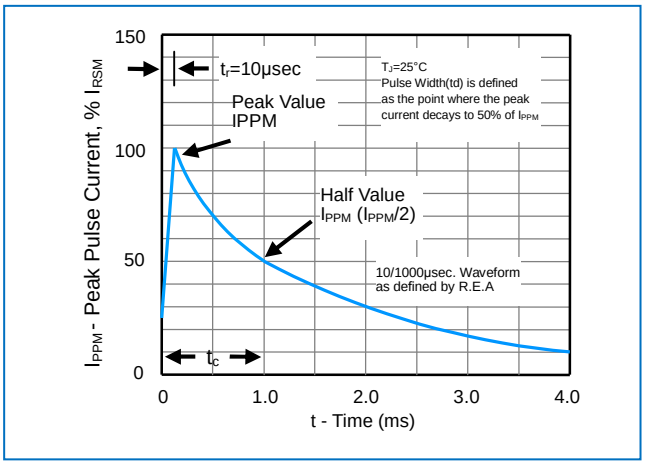


Figure 2 - Pulse Derating Curve

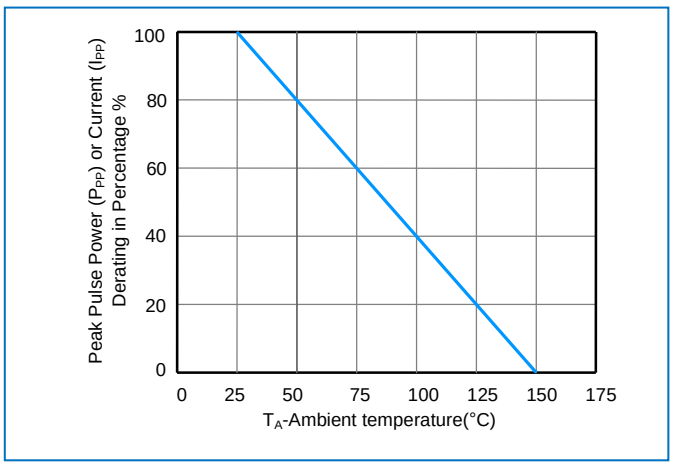


Figure 3 - Peak Pulse Power Rating Curve

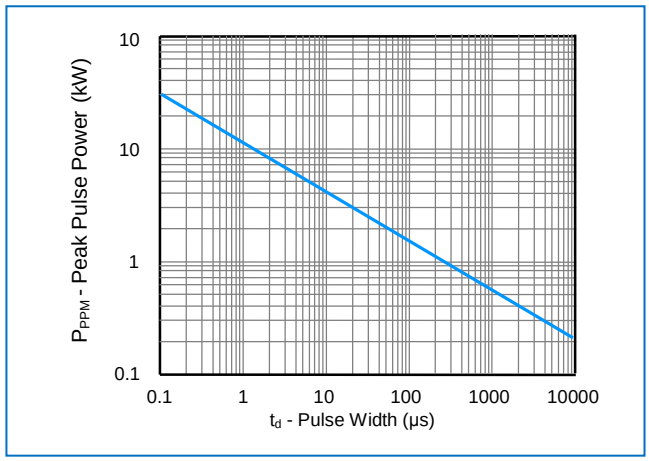


Figure 4 - Steady State Power Derating Curve

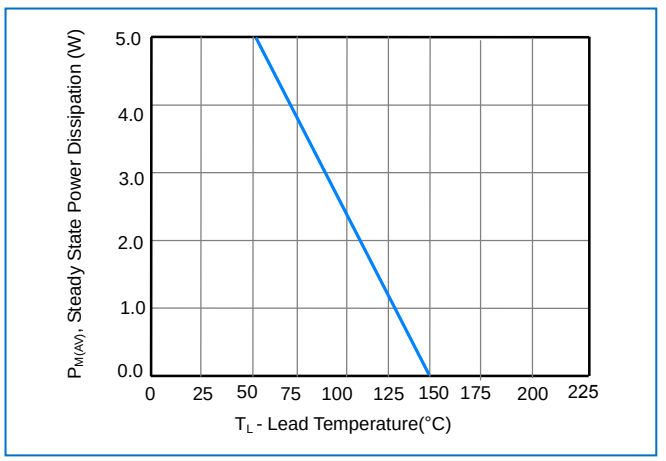


Figure 5 - Maximum Non-Repetitive Surge Current

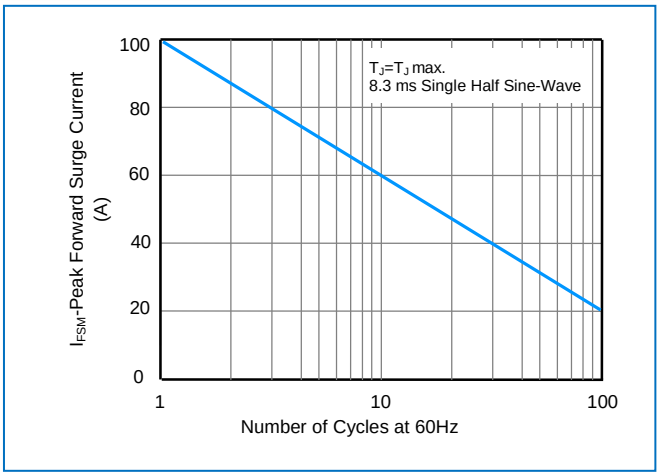
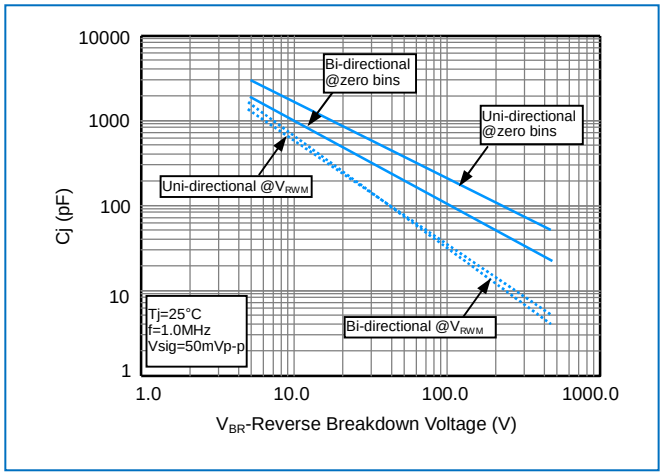


Figure 6 - Typical Junction Capacitance



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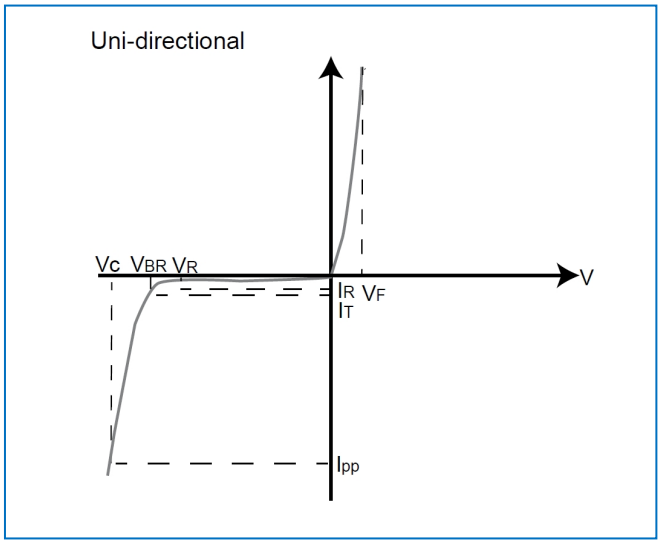
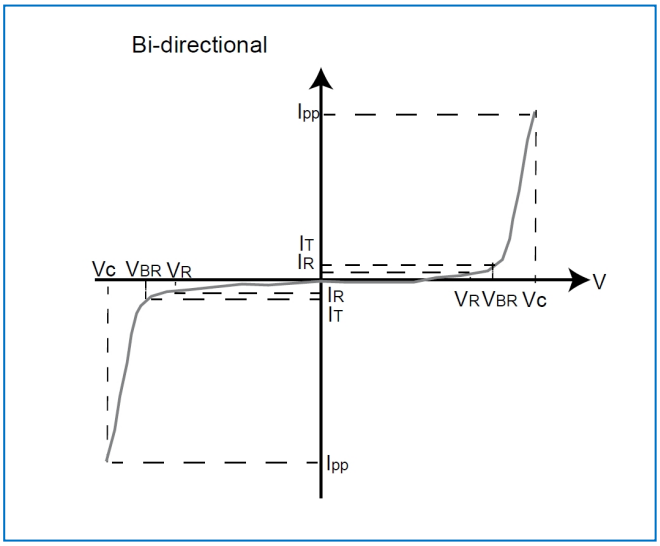
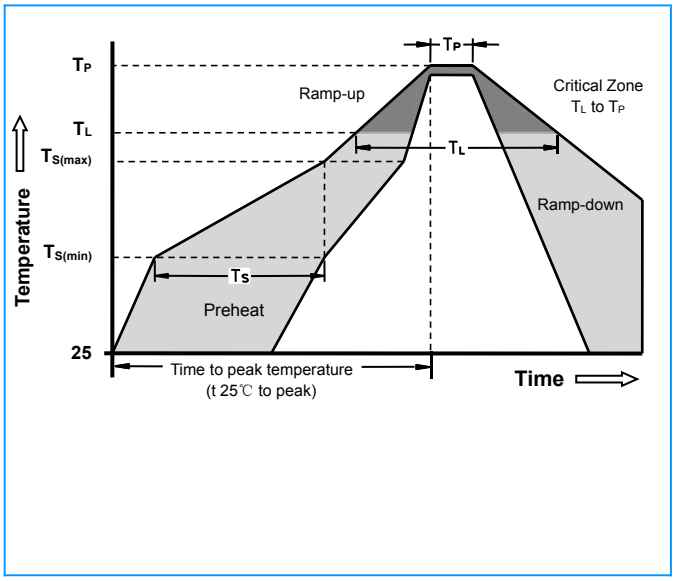
1-V Curves Characteristics





Soldering Parameters



Reflow Condition		Lead–free assembly
Pre Heat	**-Temperature Min ($T_{s(min)}$)**	150°C
	-Temperature Max ($T_{s(max)}$)	200°C
	- Time (min to max) (t_s)	60 -180 Seconds
Average ramp up rate (Liquidus Temp T_L) to peak		3°C/second max
$T_{S(max)}$ to TL - Ramp-up Rate		3°C/second max
Reflow	**- Temperature (T_L) (Liquidus)**	217°C
	- Time (min to max) (t_s)	60 -150 Seconds
Peak Temperature (T_P)		260 +0/-5°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 (T_P)		8 minutes Max
Do not exceed		260°C

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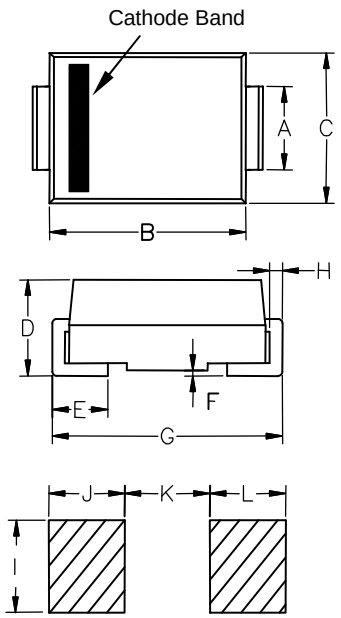
Dimensions

DO-214AA (SMB)



Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.077	0.087	1.960	2.200
B	0.171	0.191	4.350	4.850
C	0.130	0.155	3.300	3.940
D	0.084	0.096	2.130	2.440
E	0.030	0.060	0.750	1.520
F	-	0.008	-	0.203
G	0.201	0.216	5.100	5.500
H	0.006	0.012	0.152	0.305
I	0.089	-	2.260	-
J	0.085	-	2.160	-
K	-	0.107	-	2.740
L	0.085	-	2.160	-

Part Numbering