

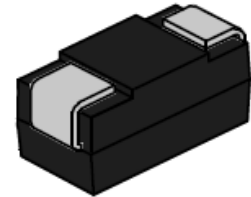


## SMBJxxAH、SMBJxxCAH Series 600W TVS

Rev.4.1

### 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.



SMB



Bi-directional



Uni-directional

Symbol

### FEATURES:

- ✧ Low profile package.
- ✧ Low inductance.
- ✧ Excellent clamping capability.
- ✧ 600W peak pulse power capability at 10/1000μs waveform.
- ✧ Typical  $I_R$  less than 1μA.
- ✧ Fast response time: typically less than 1.0ps from 0V to  $V_{BR}$  min.
- ✧ High temperature to reflow soldering: 260°C/40s at terminals.
- ✧ Plastic package has underwriters laboratory flammability 94V-0.
- ✧ Meets MSL level 1, per J-STD-020, LF maximum peak of 260°C.
- ✧ Terminal: solder plated, solderable per J-STD-002.
- ✧ For surface mounted applications in order to optimize board space.
- ✧ High reliability application and automotive grade (AEC-Q101 qualified).

### ABSOLUTE MAXIMUM RATINGS ( $T_A=25^\circ\text{C}$ , RH=45%-75%, unless otherwise noted)

Parameter	Symbol	Value	Unit
Operating junction and storage temperature range	$T_J/T_{STG}$	-55 to +150	°C
Steady state power dissipation at $T_L=75^\circ\text{C}$	$P_{M(AV)}$	5.0	W
Peak pulse power dissipation at 10/1000μs waveform	$P_{PP}$	600	W
Maximum instantaneous forward voltage at 50A for unidirectional	$V_F$	5.0	V
Peak forward surge current, 8.3ms single half sine wave (Note 1)	$I_{FSM}$	100	A
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. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle=4 per minute maximum

## MARKING



AZ: Device Marking Code  
1409: In ninth week, 2014

ELECTRICAL CHARACTERISTICS( $T_A=25^{\circ}\text{C}$ )

Part Number		Marking		$V_R$	$I_R@V_R$	$V_{BR}@I_T$		$I_T$	$V_C@I_{PP}$	$I_{PP}^{\text{①}}$
Uni-Polar	Bi-Polar	Uni	Bi	V	max( $\mu\text{A}$ )	min(V)	max(V)	mA	max(V)	A
SMBJ11AH	SMBJ11CAH	KZ	AZ	11	1	12.20	13.50	1	18.2	33.0
SMBJ12AH	SMBJ12CAH	LE	BE	12	1	13.30	14.70	1	19.9	30.2
SMBJ13AH	SMBJ13CAH	LG	BG	13	1	14.40	15.90	1	21.5	27.9
SMBJ14AH	SMBJ14CAH	LK	BK	14	1	15.60	17.20	1	23.2	25.9
SMBJ15AH	SMBJ15CAH	LM	BM	15	1	16.70	18.50	1	24.4	24.6
SMBJ16AH	SMBJ16CAH	LP	BP	16	1	17.80	19.70	1	26.0	23.1
SMBJ17AH	SMBJ17CAH	LR	BR	17	1	18.90	20.90	1	27.6	21.8
SMBJ18AH	SMBJ18CAH	LT	BT	18	1	20.00	22.10	1	29.2	20.6
SMBJ20AH	SMBJ20CAH	LV	BV	20	1	22.20	24.50	1	32.4	18.6
SMBJ22AH	SMBJ22CAH	LX	BX	22	1	24.40	26.90	1	35.5	16.9
SMBJ24AH	SMBJ24CAH	LZ	BZ	24	1	26.70	29.50	1	38.9	15.4
SMBJ26AH	SMBJ26CAH	ME	CE	26	1	28.90	31.90	1	42.1	14.3
SMBJ28AH	SMBJ28CAH	MG	CG	28	1	31.10	34.40	1	45.4	13.2
SMBJ30AH	SMBJ30CAH	MK	CK	30	1	33.30	36.80	1	48.4	12.4
SMBJ33AH	SMBJ33CAH	MM	CM	33	1	36.70	40.60	1	53.3	11.3
SMBJ36AH	SMBJ36CAH	MP	CP	36	1	40.00	44.20	1	58.1	10.4
SMBJ40AH	SMBJ40CAH	MR	CR	40	1	44.40	49.10	1	64.5	9.3
SMBJ43AH	SMBJ43CAH	MT	CT	43	1	47.80	52.80	1	69.4	8.7
SMBJ45AH	SMBJ45CAH	MV	CV	45	1	50.00	55.30	1	72.7	8.3
SMBJ48AH	SMBJ48CAH	MX	CX	48	1	53.30	58.90	1	77.4	7.8
SMBJ51AH	SMBJ51CAH	MZ	CZ	51	1	56.70	62.70	1	82.4	7.3
SMBJ54AH	SMBJ54CAH	NE	DE	54	1	60.00	66.30	1	87.1	6.9
SMBJ58AH	SMBJ58CAH	NG	DG	58	1	64.40	71.20	1	93.6	6.4

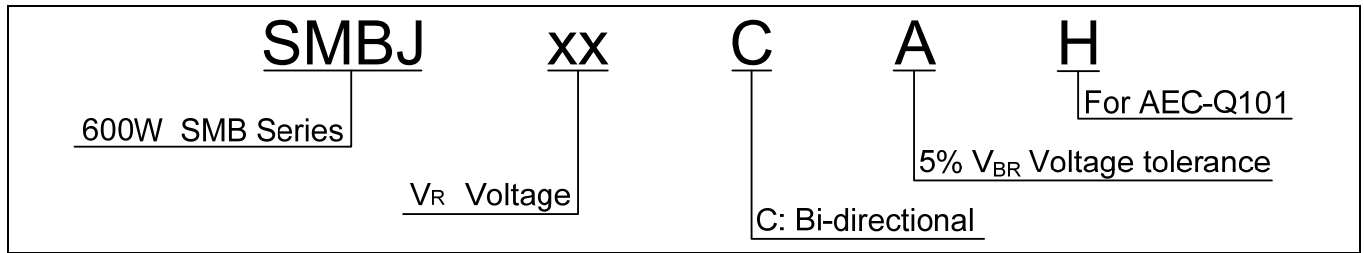
ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C, continued)

Part Number		Marking		V <sub>R</sub>	I <sub>R</sub> @V <sub>R</sub>	V <sub>BR</sub> @I <sub>T</sub>		I <sub>T</sub>	V <sub>C</sub> @I <sub>PP</sub>	I <sub>PP</sub> <sup>①</sup>
Uni-Polar	Bi-Polar	Uni	Bi	V	max(μA)	min(V)	max(V)	mA	max(V)	A
SMBJ60AH	SMBJ60CAH	NK	DK	60	1	66.70	73.70	1	96.8	6.2
SMBJ64AH	SMBJ64CAH	NM	DM	64	1	71.10	78.60	1	103.0	5.8
SMBJ70AH	SMBJ70CAH	NP	DP	70	1	77.80	86.00	1	113.0	5.3
SMBJ75AH	SMBJ75CAH	NR	DR	75	1	83.30	92.10	1	121.0	5.0
SMBJ78AH	SMBJ78CAH	NT	DT	78	1	86.70	95.80	1	126.0	4.8
SMBJ85AH	SMBJ85CAH	NV	DV	85	1	94.40	104.0	1	137.0	4.4
SMBJ90AH	SMBJ90CAH	NX	DX	90	1	100.0	111.0	1	146.0	4.1
SMBJ100AH	SMBJ100CAH	NZ	DZ	100	1	111.0	123.0	1	162.0	3.7
SMBJ110AH	SMBJ110CAH	PE	EE	110	1	122.0	135.0	1	177.0	3.4
SMBJ120AH	SMBJ120CAH	PG	EG	120	1	133.0	147.0	1	193.0	3.1
SMBJ130AH	SMBJ130CAH	PK	EK	130	1	144.0	159.0	1	209.0	2.9
SMBJ150AH	SMBJ150CAH	PM	EM	150	1	167.0	185.0	1	243.0	2.5
SMBJ160AH	SMBJ160CAH	PP	EP	160	1	178.0	197.0	1	259.0	2.3
SMBJ170AH	SMBJ170CAH	PR	ER	170	1	189.0	209.0	1	275.0	2.2
SMBJ180AH	SMBJ180CAH	PT	ET	180	1	201.0	222.0	1	292.0	2.1
SMBJ190AH	SMBJ190CAH	PV	EV	190	1	211.0	234.0	1	307.0	2.0
SMBJ200AH	SMBJ200CAH	PX	EX	200	1	224.0	247.0	1	324.0	1.9
SMBJ210AH	SMBJ210CAH	PZ	EZ	210	1	233.0	258.0	1	337.0	1.8
SMBJ220AH	SMBJ220CAH	QE	FE	220	1	246.0	272.0	1	356.0	1.7
SMBJ250AH	SMBJ250CAH	QG	FG	250	1	279.0	309.0	1	405.0	1.5
SMBJ300AH	SMBJ300CAH	QK	FK	300	1	335.0	371.0	1	486.0	1.3
SMBJ350AH	SMBJ350CAH	QM	FM	350	1	391.0	432.0	1	567.0	1.1
SMBJ400AH	SMBJ400CAH	QP	FP	400	1	447.0	494.0	1	648.0	0.9
SMBJ440AH	SMBJ440CAH	QR	FR	440	1	492.0	543.0	1	713.0	0.8
SMBJ460AH	SMBJ460CAH	QT	FT	460	1	510.0	560.0	1	735.0	0.8

① Surge waveform: 10/1000μs

V<sub>R</sub>: Stand-off voltage -- Maximum voltage that can be appliedV<sub>BR</sub>: Breakdown voltageV<sub>C</sub>: Clamping voltage -- Peak voltage measured across the suppressor at a specified I<sub>pp</sub>I<sub>R</sub>: Reverse leakage current

ORDERING INFORMATION



RATINGS AND V-I CHARACTERISTICS CURVES (T<sub>A</sub>=25°C, unless otherwise noted)

FIG.1: V- I curve characteristics (Uni-directional)

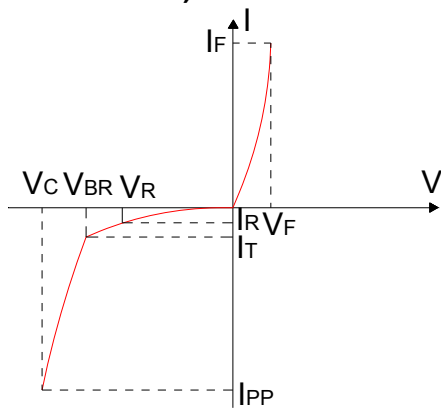


FIG.2: V- I curve characteristics (Bi-directional)

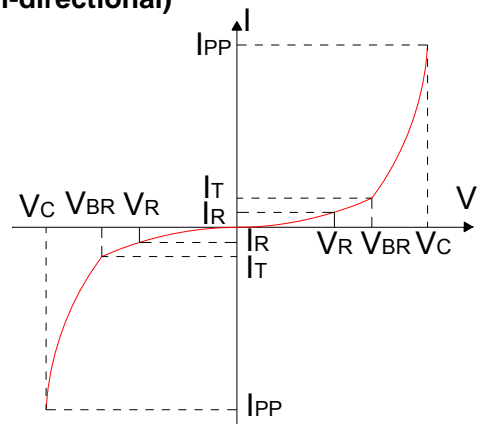


FIG.3: Pulse waveform

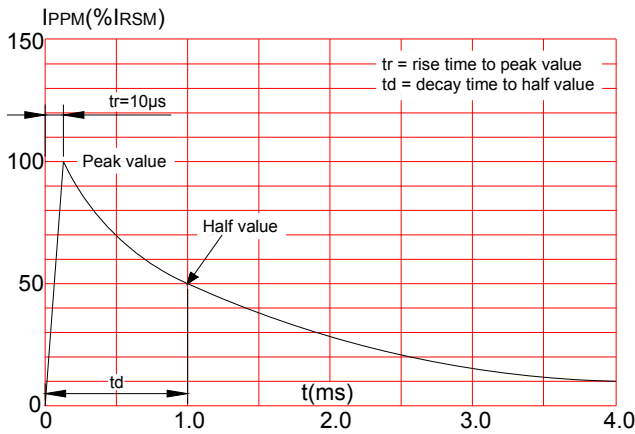


FIG.4: Pulse derating curve

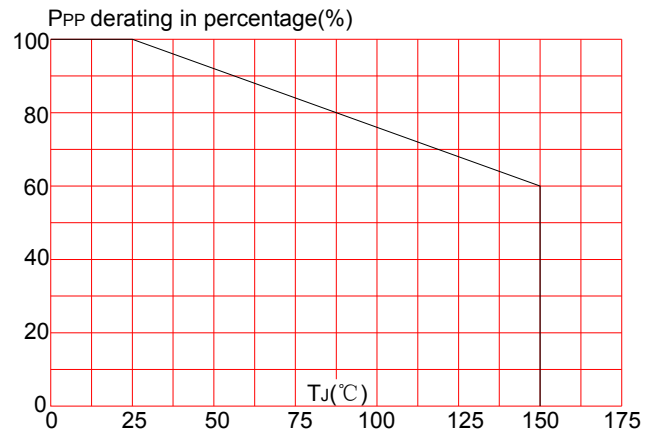
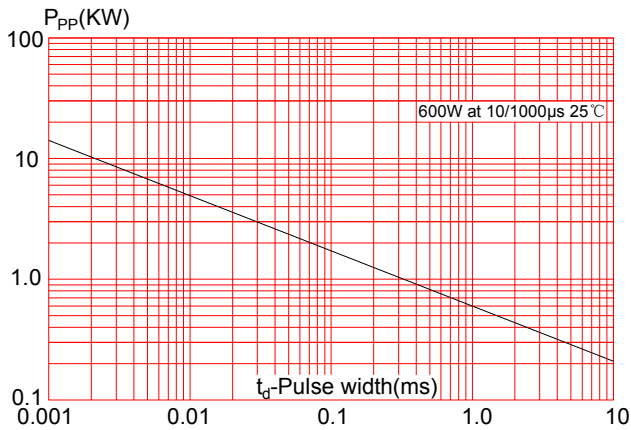
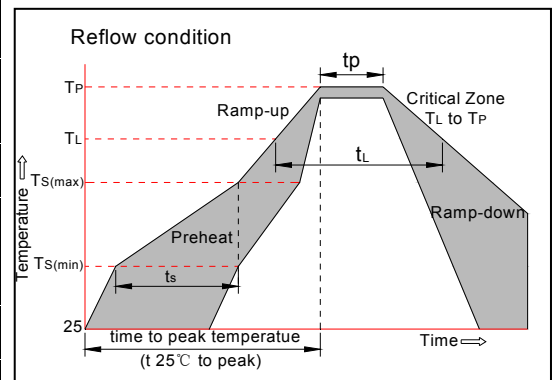


FIG.5: Peak pulse power dissipation vs. pulse width

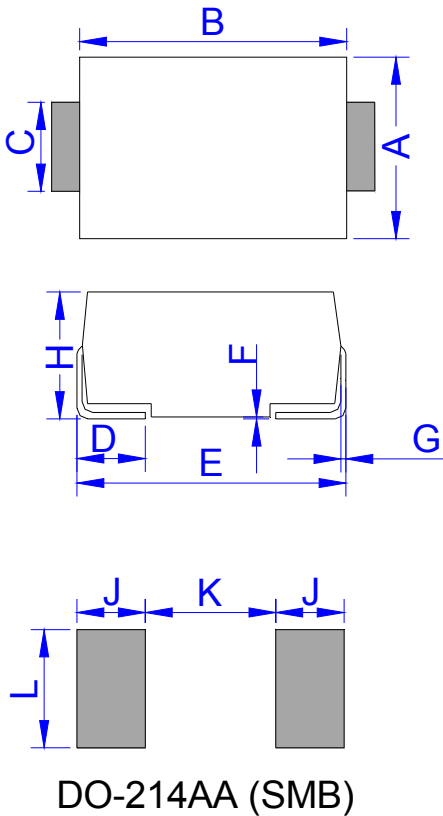


SOLDERING PARAMETERS

Reflow Condition		Pb-Free assembly (see figure at right)
Pre Heat	-Temperature Min ( $T_{s(min)}$ )	+150°C
	-Temperature Max ( $T_{s(max)}$ )	+200°C
	-Time (Min to Max) ( $t_s$ )	60-180 secs.
Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak)		3°C/sec. Max
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature ( $T_L$ ) (Liquidus)	+217°C
	-Temperature ( $t_L$ )	60-150 secs.
Peak Temp ( $T_p$ )		+260(+0/-5)°C
Time within 5°C of actual Peak Temp ( $t_p$ )		20-40secs.
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp ( $T_p$ )		8 min. Max
Do not exceed		+260°C

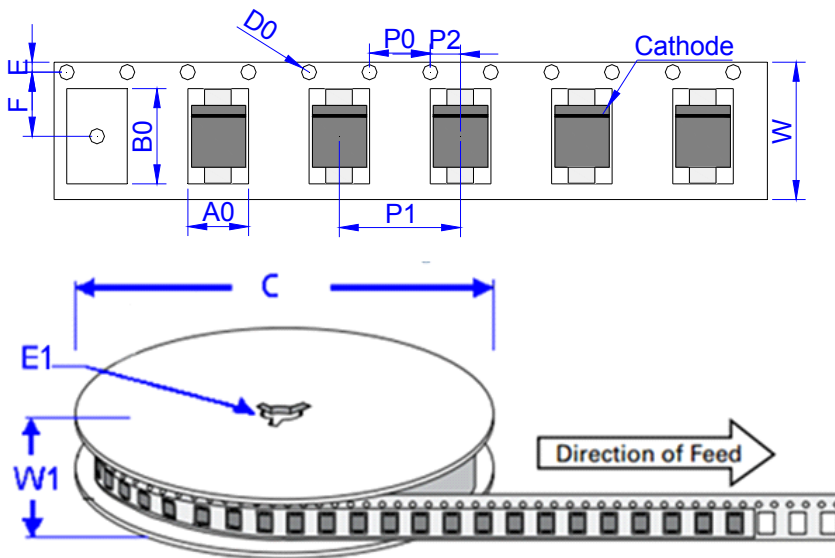


PACKAGE MECHANICAL DATA



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	3.30	3.94	0.130	0.155
B	4.30	4.80	0.169	0.189
C	1.90	2.20	0.075	0.087
D	0.95	1.52	0.037	0.060
E	5.20	5.60	0.205	0.220
F	0.051	0.203	0.002	0.008
G	0.15	0.31	0.006	0.012
H	2.10	2.40	0.083	0.094
J	2.20		0.087	
K		2.60		0.102
L	2.30		0.091	

TAPE AND REEL SPECIFICATION-SMB



Ref.	Dimensions	
	Millimeters	Inches
A0	3.76 ± 0.3	0.148 ± 0.012
B0	5.69 ± 0.3	0.224 ± 0.012
C	330.0	13.0
D0	1.55 ± 0.1	0.061 ± 0.004
E	1.75 ± 0.2	0.069 ± 0.008
E1	13.3 ± 0.3	0.524 ± 0.012
F	5.5 ± 0.2	0.217 ± 0.008
P0	4.00 ± 0.2	0.157 ± 0.008
P1	8.00 ± 0.2	0.3145 ± 0.008
P2	2.00 ± 0.2	0.079 ± 0.008
W	12.0 ± 0.2	0.472 ± 0.008
W1	15.7 ± 2.0	0.618 ± 0.079

PART No.	UNIT WEIGHT (g/PCS) typ.	REEL (PCS)	PER CARTON (PCS)	DESCRIPTION
SMBJxxAH/CAH	0.098	3,000	48,000	13 inch reel pack

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