

## 600W, 6.8V - 220V Surface Mount Transient Voltage Suppressor

### FEATURES

- AEC-Q101 qualified
- Low profile package
- Ideal for automated placement
- Glass passivated junction
- Excellent clamping capability
- Typical  $I_R$  less than  $1\mu A$  above 10V
- Fast response time: Typically less than 1.0ps from 0 volt to BV min
- Meets ISO 7637-2 (Pulse 1/2a/2b/3a/3b)
- Moisture sensitivity level: level 1, per J-STD-020
- RoHS Compliant
- Halogen-free according to IEC 61249-2-21

KEY PARAMETERS		
PARAMETER	VALUE	UNIT
$V_{WM}$	5.5 - 185	V
$V_{BR}$	6.8 - 220	V
$P_{PPSM}$	600	W
$T_{JMAX}$	150	°C
Package	DO-214AA (SMB)	
Configuration	Single die	



### APPLICATIONS

- Protect sensitive circuit from damage by high voltage transients
- Lighting, ESD transient voltage protection of IC, system
- Inductive switching load protection of IC, system
- Electrical Fast Transient Immunity protection of IC, system



DO-214AA (SMB)

### MECHANICAL DATA

- Case: DO-214AA (SMB)
- Molding compound meets UL 94V-0 flammability rating
- Terminal: Matte tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 2 whisker test
- Polarity: As marked
- Weight: 0.090g (approximately)

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ C$ unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Non-repetitive peak impulse power dissipation with 10/1000 $\mu s$ waveform <sup>(1)</sup>	$P_{PPSM}$	600	W
Steady state power dissipation at $T_A = 25^\circ C$	$P_{tot}$	3	W
Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load	$I_{FSM}$	100	A
Forward Voltage @ $I_F = 50A$ for Uni-directional only <sup>(2)</sup>	$V_F$	3.5/5.0	V
Junction temperature	$T_J$	-55 to +150	°C
Storage temperature	$T_{STG}$	-55 to +150	°C

#### Notes:

1. Non-repetitive current pulse per Fig. 3 and derated above  $T_A = 25^\circ C$  per Fig. 2
2.  $V_F = 3.5V$  on P6SMB6.8H - P6SMB91H device and  $V_F = 5.0V$  on P6SMB100H - P6SMB220H device.

#### Devices for Bipolar Applications

1. For bidirectional use CH or CAH suffix for types P6SMB6.8H - types P6SMB220AH
2. Electrical characteristics apply in both directions

## THERMAL PERFORMANCE

PARAMETER	SYMBOL	TYP	UNIT
Junction-to-case thermal resistance	$R_{\theta JC}$	10	°C/W
Junction-to-ambient thermal resistance	$R_{\theta JA}$	55	°C/W

## ELECTRICAL SPECIFICATIONS (T<sub>A</sub> = 25°C unless otherwise noted)

Device	Device Marking Code	Breakdown Voltage V <sub>BR</sub> (V) (Note 1)		Test Current I <sub>T</sub> (mA)	Stand-Off Voltage V <sub>WM</sub> (V)	Maximum Reverse Leakage @ V <sub>WM</sub> I <sub>D</sub> (μA)	Maximum Peak Pulse Current I <sub>PPM</sub> (A) (Note 2)	Maximum clamping voltage V <sub>C</sub> @I <sub>PPM</sub> (V)	Maximum Temperature Coefficient of V <sub>BR</sub> (%/°C)
		Min	Max						
P6SMB6.8H	KDJ	6.12	7.48	10	5.50	1000	58	10.8	0.057
P6SMB6.8AH	KEJ	6.46	7.14	10	5.80	1000	60	10.5	0.057
P6SMB7.5H	KFJ	6.75	8.25	10	6.05	500	53	11.7	0.061
P6SMB7.5AH	KGJ	7.13	7.88	10	6.40	500	55	11.3	0.061
P6SMB8.2H	KHJ	7.38	9.02	10	6.63	200	50	12.5	0.065
P6SMB8.2AH	KKJ	7.79	8.61	10	7.02	200	52	12.1	0.065
P6SMB9.1H	KLJ	8.19	10.00	1.0	7.37	50	45	13.8	0.068
P6SMB9.1AH	KMJ	8.65	9.55	1.0	7.78	50	47	13.4	0.068
P6SMB10H	KNJ	9.00	11.00	1.0	8.10	10	42	15.0	0.073
P6SMB10AH	KPJ	9.50	10.5	1.0	8.55	10	43	14.5	0.073
P6SMB11H	KQJ	9.90	12.1	1.0	8.92	1	38	16.2	0.075
P6SMB11AH	KRJ	10.5	11.6	1.0	9.40	1	40	15.6	0.075
P6SMB12H	KSJ	10.8	13.2	1.0	9.72	1	36	17.3	0.078
P6SMB12AH	KTJ	11.4	12.6	1.0	10.2	1	37	16.7	0.078
P6SMB13H	KUJ	11.7	14.3	1.0	10.5	1	33	19.0	0.081
P6SMB13AH	KVJ	12.4	13.7	1.0	11.1	1	34	18.2	0.081
P6SMB15H	KWJ	13.5	16.5	1.0	12.1	1	28	22.0	0.084
P6SMB15AH	KXJ	14.3	15.8	1.0	12.8	1	29	21.2	0.084
P6SMB16H	KYJ	14.4	17.6	1.0	12.9	1	26	23.5	0.086
P6SMB16AH	KZJ	15.2	16.8	1.0	13.6	1	28	22.5	0.086
P6SMB18H	LDJ	16.2	19.8	1.0	14.5	1	23	26.5	0.088
P6SMB18AH	LEJ	17.1	18.9	1.0	15.3	1	25	25.5	0.088
P6SMB20H	LFJ	18.0	22.0	1.0	16.2	1	21	29.1	0.090
P6SMB20AH	LGJ	19.0	21.0	1.0	17.1	1	22	27.7	0.090
P6SMB22H	LHJ	19.8	24.2	1.0	17.8	1	19	31.9	0.092
P6SMB22AH	LKJ	20.9	23.1	1.0	18.8	1	20	30.6	0.092
P6SMB24H	LLJ	21.6	26.4	1.0	19.4	1	18	34.7	0.094
P6SMB24AH	LMJ	22.8	25.2	1.0	20.5	1	19	33.2	0.094
P6SMB27H	LNJ	24.3	29.7	1.0	21.8	1	16	39.1	0.096
P6SMB27AH	LPJ	25.7	28.4	1.0	23.1	1	16.8	37.5	0.096
P6SMB30H	LQJ	27.0	33.0	1.0	24.3	1	14.0	43.5	0.097
P6SMB30AH	LRJ	28.5	31.5	1.0	25.6	1	15.0	41.4	0.097
P6SMB33H	LSJ	29.7	36.3	1.0	26.8	1	13.0	47.7	0.098
P6SMB33AH	LTJ	31.4	34.7	1.0	28.2	1	13.8	45.7	0.098
P6SMB36H	LUJ	32.4	39.6	1.0	29.1	1	12.0	52.0	0.099
P6SMB36AH	LVJ	34.2	37.8	1.0	30.8	1	12.6	49.9	0.099
P6SMB39H	LWJ	35.1	42.9	1.0	31.6	1	11.1	56.4	0.100
P6SMB39AH	LXJ	37.1	41.0	1.0	33.3	1	11.6	53.9	0.100
P6SMB43H	LYJ	38.7	47.3	1.0	34.8	1	10.0	61.9	0.101
P6SMB43AH	LZJ	40.9	45.2	1.0	36.8	1	10.6	59.3	0.101
P6SMB47H	MDJ	42.3	51.7	1.0	38.1	1	9.2	67.8	0.101
P6SMB47AH	MEJ	44.7	49.4	1.0	40.2	1	9.7	64.8	0.101
P6SMB51H	MFJ	45.9	56.1	1.0	41.3	1	8.5	73.5	0.102

## ELECTRICAL SPECIFICATIONS (T<sub>A</sub> = 25°C unless otherwise noted)

Device	Device Marking Code	Breakdown Voltage V <sub>BR</sub> (V) (Note 1)		Test Current I <sub>T</sub> (mA)	Stand-Off Voltage V <sub>WM</sub> (V)	Maximum Reverse Leakage @V <sub>WM</sub> I <sub>D</sub> (μA)	Maximum Peak Pulse Current I <sub>PPM</sub> (A) (Note 2)	Maximum clamping voltage V <sub>C</sub> @I <sub>PPM</sub> (V)	Maximum Temperature Coefficient of V <sub>BR</sub> (%/°C)
		Min	Max						
P6SMB51AH	MGJ	48.5	53.6	1.0	43.6	1	8.9	70.1	0.102
P6SMB56H	MHJ	50.4	61.6	1.0	45.4	1	7.8	80.5	0.103
P6SMB56AH	MKJ	53.2	58.8	1.0	47.8	1	8.1	77.0	0.103
P6SMB62H	MLJ	55.8	68.2	1.0	50.2	1	7.0	89.0	0.104
P6SMB62AH	MMJ	58.9	65.1	1.0	53.0	1	7.4	85.0	0.104
P6SMB68H	MNJ	61.2	74.8	1.0	55.1	1	6.4	98.0	0.104
P6SMB68AH	MPJ	64.6	71.4	1.0	58.1	1	6.8	92.0	0.104
P6SMB75H	MQJ	67.5	82.5	1.0	60.7	1	5.8	108	0.105
P6SMB75AH	MRJ	71.3	78.8	1.0	64.1	1	6.1	103	0.105
P6SMB82H	MSJ	73.8	90.2	1.0	66.4	1	5.3	118	0.105
P6SMB82AH	MTJ	77.9	86.1	1.0	70.1	1	5.5	113	0.105
P6SMB91H	MUJ	81.9	100	1.0	73.7	1	4.8	131	0.106
P6SMB91AH	MVJ	86.5	95.5	1.0	77.8	1	5.0	125	0.106
P6SMB100H	MWJ	90	110	1.0	81.0	1	4.3	144	0.106
P6SMB100AH	MXJ	95	105	1.0	85.5	1	4.5	137	0.106
P6SMB110H	MYJ	99	121	1.0	89.2	1	3.9	158	0.107
P6SMB110AH	MZJ	105	116	1.0	94.0	1	4.1	152	0.107
P6SMB120H	NDJ	108	132	1.0	97.2	1	3.6	173	0.107
P6SMB120AH	NEJ	114	126	1.0	102.0	1	3.8	165	0.107
P6SMB130H	NFJ	117	143	1.0	105.0	1	3.3	187	0.107
P6SMB130AH	NGJ	124	137	1.0	111.0	1	3.5	179	0.107
P6SMB150H	NHJ	135	165	1.0	121.0	1	2.9	215	0.108
P6SMB150AH	NKJ	143	158	1.0	128.0	1	3.0	207	0.108
P6SMB160H	NLJ	144	176	1.0	130.0	1	2.7	230	0.108
P6SMB160AH	NMJ	152	168	1.0	136.0	1	2.8	219	0.108
P6SMB170H	NNJ	153	187	1.0	138.0	1	2.5	244	0.108
P6SMB170AH	NPJ	162	179	1.0	145.0	1	2.6	234	0.108
P6SMB180H	NQJ	162	198	1.0	146.0	1	2.4	258	0.108
P6SMB180AH	NRJ	171	189	1.0	154.0	1	2.5	246	0.108
P6SMB200H	NSJ	180	220	1.0	162.0	1	2.1	287	0.108
P6SMB200AH	NTJ	190	210	1.0	171.0	1	2.2	274	0.108
P6SMB220H	NUJ	198	242	1.0	175.0	1	1.8	342	0.108
P6SMB220AH	NVJ	209	231	1.0	185.0	1	1.9	328	0.108

### Notes:

1. V<sub>BR</sub> measure after I<sub>T</sub> applied for 30ms, I<sub>T</sub> = square wave pulse or equivalent.
2. Surge current waveform per Figure.3 and derate per Figure.2.
3. For bipolar types having V<sub>WM</sub> of 10 V and under, the I<sub>D</sub> limit is doubled.
4. For bidirectional use CH or CAH suffix for types P6SMB6.8H - P6SMB220AH.
5. All terms and symbols are consistent with ANSI/IEEE C62.35.

## ORDERING INFORMATION

ORDERING CODE <sup>(1)</sup>	PACKAGE	PACKING
P6SMBxH	DO-214AA (SMB)	3,000 / Tape & Reel

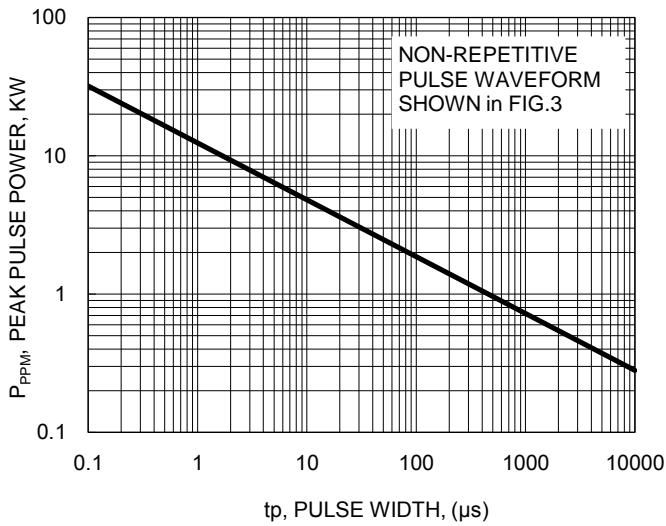
### Notes:

1. "x" defines voltage from 6.8V(P6SMB6.8H) to 220V(P6SMB220AH)

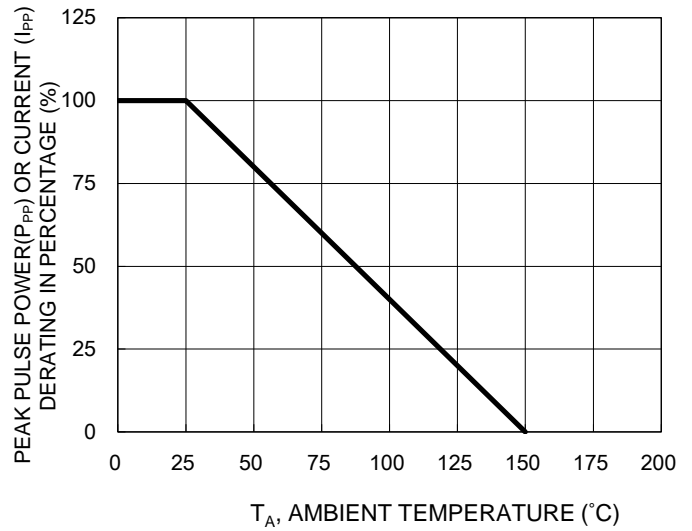
**CHARACTERISTICS CURVES**

( $T_A = 25^\circ\text{C}$  unless otherwise noted)

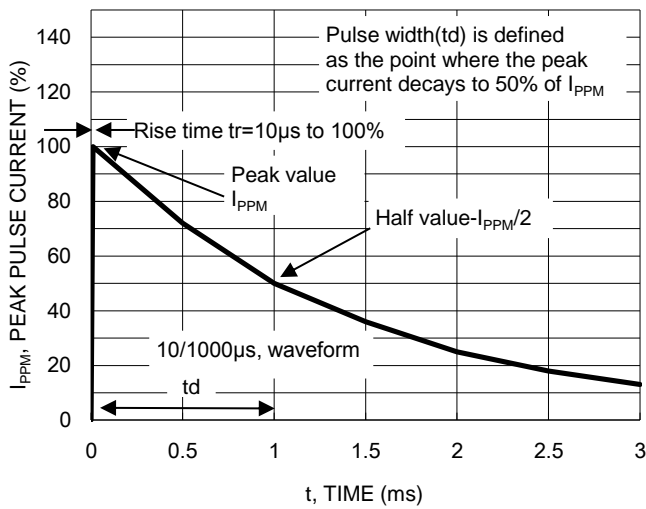
**Fig.1 Peak Pulse Power Rating Curve**



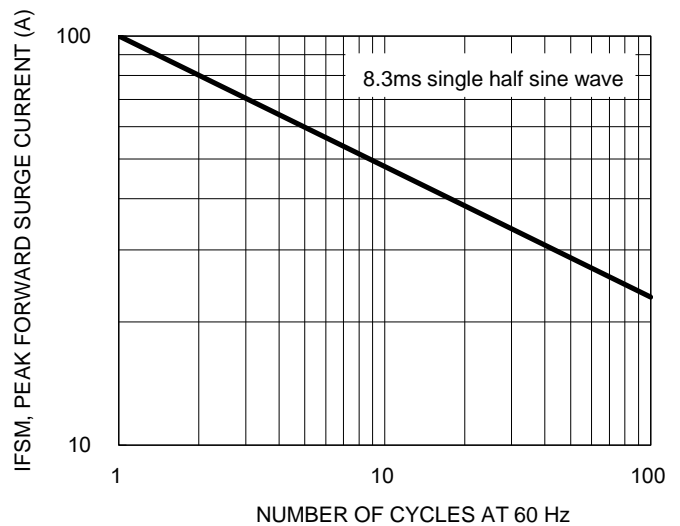
**Fig.2 Pulse Derating Curve**



**Fig.3 Clamping Power Pulse Waveform**



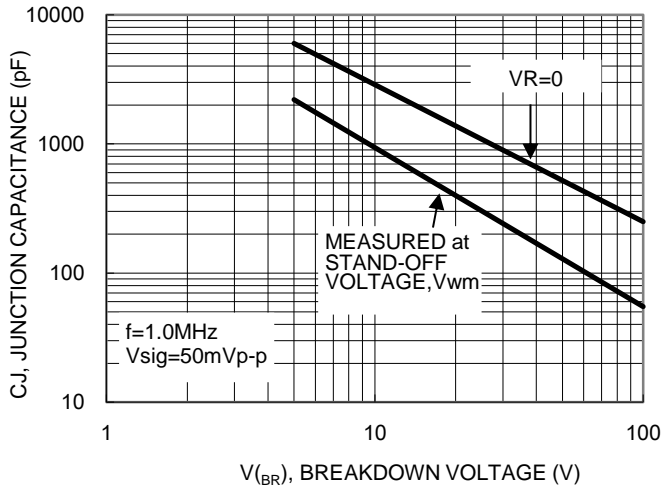
**Fig.4 Maximum Non-Repetitive Forward Surge Current Unidirectional Only**



**CHARACTERISTICS CURVES**

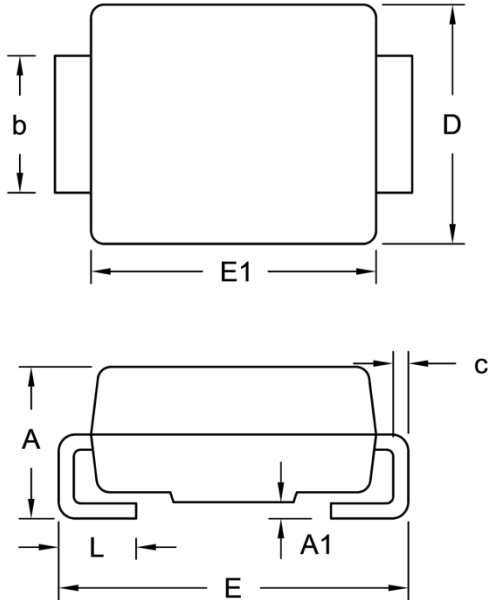
( $T_A = 25^\circ\text{C}$  unless otherwise noted)

**Fig.5 Typical Junction Capacitance**



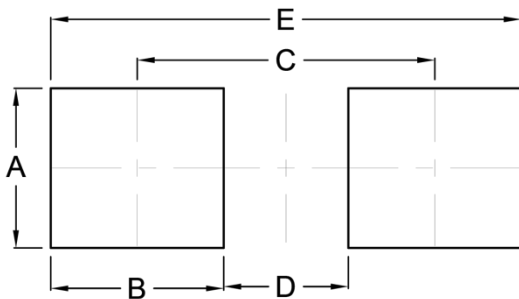
**PACKAGE OUTLINE DIMENSIONS**

DO-214AA (SMB)



DIM.	Unit (mm)		Unit (inch)	
	Min.	Max.	Min.	Max.
A	1.95	2.65	0.077	0.104
A1	0.05	0.20	0.002	0.008
b	1.95	2.20	0.077	0.087
c	0.15	0.31	0.006	0.012
D	3.30	3.95	0.130	0.156
E	5.10	5.60	0.201	0.220
E1	4.05	4.60	0.159	0.181
L	0.75	1.60	0.030	0.063

**SUGGESTED PAD LAYOUT**



Symbol	Unit (mm)	Unit (inch)
A	2.30	0.091
B	2.50	0.098
C	4.30	0.169
D	1.80	0.071
E	6.80	0.268

**MARKING DIAGRAM**



- P/N = Marking Code
- G = Green Compound
- YW = Date Code
- F = Factory Code

Cathode band for uni-directional products only

## Notice

Specifications of the products displayed herein are subject to change without notice. TSC or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Purchasers are solely responsible for the choice, selection, and use of TSC products and TSC assumes no liability for application assistance or the design of Purchasers' products.

Information contained herein is intended to provide a product description only. No license, express or implied, to any intellectual property rights is granted by this document. Except as provided in TSC's terms and conditions of sale for such products, TSC assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of TSC products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify TSC for any damages resulting from such improper use or sale.