

## Surface Mount Automotive Transient Voltage Suppressors

High Temperature Stability and High Reliability Conditions

Patented\*

\*Patent #'s  
4,980,315  
5,166,769  
5,278,094



DO-214AA (SMB)



### FEATURES

- Patented PAR<sup>®</sup> construction
- Available in uni-directional polarity only
- 600 W peak pulse power capability with a 10/1000  $\mu$ s waveform, repetitive rate (duty cycle): 0.01 %
- Excellent clamping capability
- Very fast response time
- Low incremental surge resistance
- Meets MSL level 1, per J-STD-020C, LF max peak of 260 °C
- Solder dip 260 °C, 40 seconds
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

### TYPICAL APPLICATIONS

Use in sensitive electronics protection against voltage transients induced by inductive load switching and lighting on ICs, MOSFET, signal lines of sensor units for consumer, computer, industrial, automotive and telecommunication.

### MECHANICAL DATA

**Case:** DO-214AA (SMB)

Epoxy meets UL 94V-0 flammability rating

**Terminals:** Matte tin plated leads, solderable per J-STD-002B and JESD22-B102D

HE3 suffix for high reliability grade (AEC Q101 qualified)

**Polarity:** Color band denotes cathode end

PRIMARY CHARACTERISTICS	
$V_{BR}$	6.8 V to 43 V
$P_{PPM}$	600 W
$I_{FSM}$	75 A
$T_J$ max.	185 °C

MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Peak pulse power dissipation with a 10/1000 $\mu$ s waveform <sup>(1)(2)</sup> (Fig. 1)	$P_{PPM}$	600	W
Peak pulse current with a 10/1000 $\mu$ s waveform <sup>(1)</sup> (Fig. 3)	$I_{PPM}$	See next table	A
Peak forward surge current 8.3 ms single half sine-wave <sup>(2)(3)</sup>	$I_{FSM}$	75	A
Instantaneous forward voltage at 50 A <sup>(3)</sup>	$V_F$	3.5	V
Operating junction and storage temperature range	$T_J, T_{STG}$	- 65 to + 185	°C

**Notes:**

- (1) Non-repetitive current pulse, per Fig. 3 and derated above  $T_A = 25$  °C per Fig. 2
- (2) Mounted on 0.2 x 0.2" (5.0 x 5.0 mm) land areas per figure
- (3) Mounted on 8.3 ms single half sine-wave duty cycle = 4 pulses per minute maximum



<b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)									
DEVICE	DEVICE MARKING CODE	BREAKDOWN VOLTAGE $V_{BR}^{(1)}$ AT $I_T$ (V)		TEST CURRENT $I_T$ (mA)	STAND-OFF VOLTAGE $V_{WM}$ (V)	MAXIMUM REVERSE LEAKAGE AT $V_{WM}$ $I_D$ ( $\mu\text{A}$ )	$T_J = 150\text{ }^\circ\text{C}$ MAXIMUM REVERSE LEAKAGE AT $V_{WM}$ $I_D$ ( $\mu\text{A}$ )	MAXIMUM PEAK PULSE SURGE CURRENT $I_{PPM}^{(2)}$ (A)	MAXIMUM CLAMPING VOLTAGE AT $I_{PPM}$ $V_C$ (V)
		MIN.	MAX.						
TPSMB6.8	KDP	6.12	7.48	10	5.50	500	1000	55.6	10.8
TPSMB6.8A	KEP	6.45	7.14	10	5.80	500	1000	57.1	10.5
TPSMB7.5	KFP	6.75	8.25	10	6.05	250	500	51.3	11.7
TPSMB7.5A	KGP	7.13	7.88	10	6.40	250	500	53.1	11.3
TPSMB8.2	KHP	7.38	9.02	10	6.63	100	200	48.0	12.5
TPSMB8.2A	KKP	7.79	8.61	10	7.02	100	200	49.6	12.1
TPSMB9.1	KLP	8.19	10.0	1.0	7.37	25.0	50.0	43.5	13.8
TPSMB9.1A	KMP	8.65	9.55	1.0	7.78	25.0	50.0	44.8	13.4
TPSMB10	KNP	9.00	11.0	1.0	8.10	5.0	20.0	40.0	15.0
TPSMB10A	KPP	9.50	10.5	1.0	8.55	5.0	20.0	41.4	14.5
TPSMB11	KQP	9.90	12.1	1.0	8.92	2.0	5.0	37.0	16.2
TPSMB11A	KRP	10.5	11.6	1.0	9.40	2.0	5.0	38.5	15.6
TPSMB12	KSP	10.8	13.2	1.0	9.72	2.0	5.0	34.7	17.3
TPSMB12A	KTP	11.4	12.6	1.0	10.2	2.0	5.0	35.9	16.7
TPSMB13	KUP	11.7	14.3	1.0	10.5	2.0	5.0	31.6	19.0
TPSMB13A	KVP	12.4	13.7	1.0	11.1	2.0	5.0	33.0	18.2
TPSMB15	KWP	13.5	16.5	1.0	12.1	1.0	5.0	27.3	22.0
TPSMB15A	KXP	14.3	15.8	1.0	12.8	1.0	5.0	28.3	21.2
TPSMB16	KYP	14.4	17.6	1.0	12.9	1.0	5.0	25.5	23.5
TPSMB16A	KZP	15.2	16.8	1.0	13.6	1.0	5.0	26.7	22.5
TPSMB18	LDP	16.2	19.8	1.0	14.5	1.0	5.0	22.6	26.5
TPSMB18A	LEP	17.1	18.9	1.0	15.3	1.0	5.0	23.8	25.2
TPSMB20	LFP	18.0	22.0	1.0	16.2	1.0	5.0	20.6	29.1
TPSMB20A	LGP	19.0	21.0	1.0	17.1	1.0	5.0	21.7	27.7
TPSMB22	LHP	19.8	24.2	1.0	17.8	1.0	5.0	18.8	31.9
TPSMB22A	LKP	20.9	23.1	1.0	18.8	1.0	5.0	19.6	30.6
TPSMB24	LLP	21.6	26.4	1.0	19.4	1.0	5.0	17.3	34.7
TPSMB24A	LMP	22.8	25.2	1.0	20.5	1.0	5.0	18.1	33.2
TPSMB27	LNP	24.3	29.7	1.0	21.8	1.0	5.0	15.3	39.1
TPSMB27A	LPP	25.7	28.4	1.0	23.1	1.0	5.0	16.0	37.5
TPSMB30	LQP	27.0	33.0	1.0	24.3	1.0	5.0	13.8	43.5
TPSMB30A	LRP	28.5	31.5	1.0	25.6	1.0	5.0	14.5	41.4
TPSMB33	LSP	29.7	36.3	1.0	26.8	1.0	5.0	12.6	47.7
TPSMB33A	LTP	31.4	34.7	1.0	28.2	1.0	5.0	13.1	45.7
TPSMB36	LUP	32.4	39.6	1.0	29.1	1.0	5.0	11.5	52.0
TPSMB36A	LVP	34.2	37.8	1.0	30.8	1.0	5.0	12.0	49.9
TPSMB39	LWP	35.1	42.9	1.0	31.6	1.0	5.0	10.6	56.4
TPSMB39A	LXP	37.1	41.0	1.0	33.3	1.0	5.0	11.1	53.9
TPSMB43	LYP	38.7	47.3	1.0	34.8	1.0	5.0	9.70	61.9
TPSMB43A	LZP	40.9	45.2	1.0	36.8	1.0	5.0	10.1	59.3

**Notes:**

- (1)  $V_{BR}$  measured after  $I_T$  applied for 300  $\mu\text{s}$ ,  $I_T$  = square wave pulse or equivalent
- (2) Surge current waveform per Fig. 3 and derated per Fig. 2
- (3) All terms and symbols are consistent with ANSI/IEEE C62.35

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
TPSMB6.8AHE3/52T <sup>(1)</sup>	0.096	52T	750	7" diameter plastic tape and reel
TPSMB6.8AHE3/5BT <sup>(1)</sup>	0.096	5BT	3200	13" diameter plastic tape and reel

**Note:**

(1) Automotive grade AEC Q101 qualified

## RATINGS AND CHARACTERISTICS CURVES

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



Figure 1. Peak Pulse Power Rating Curve

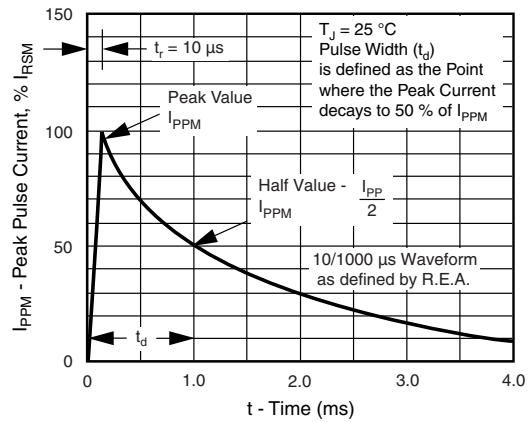


Figure 3. Pulse Waveform

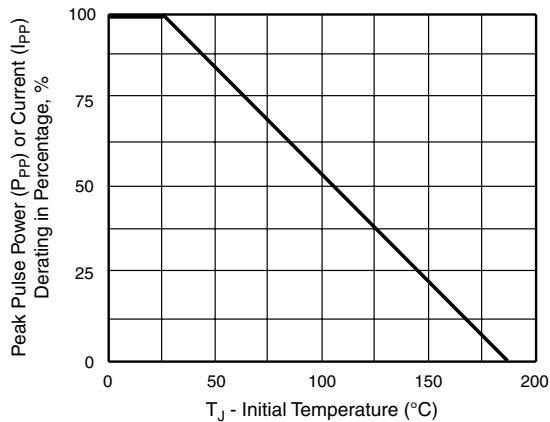


Figure 2. Pulse Power or Current vs. Initial Junction Temperature

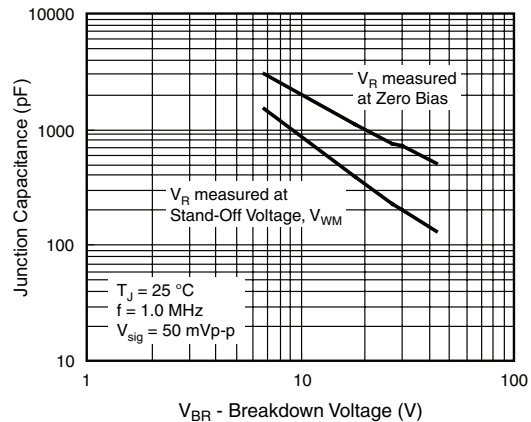


Figure 4. Typical Junction Capacitance

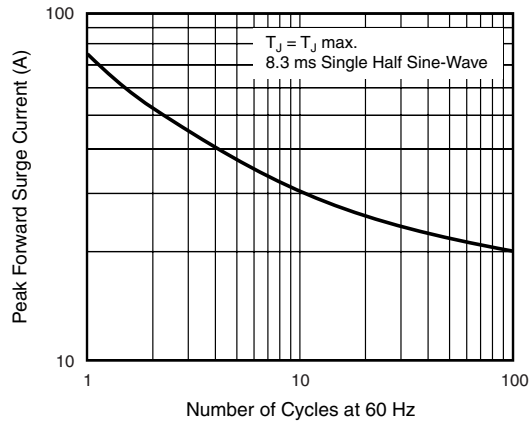
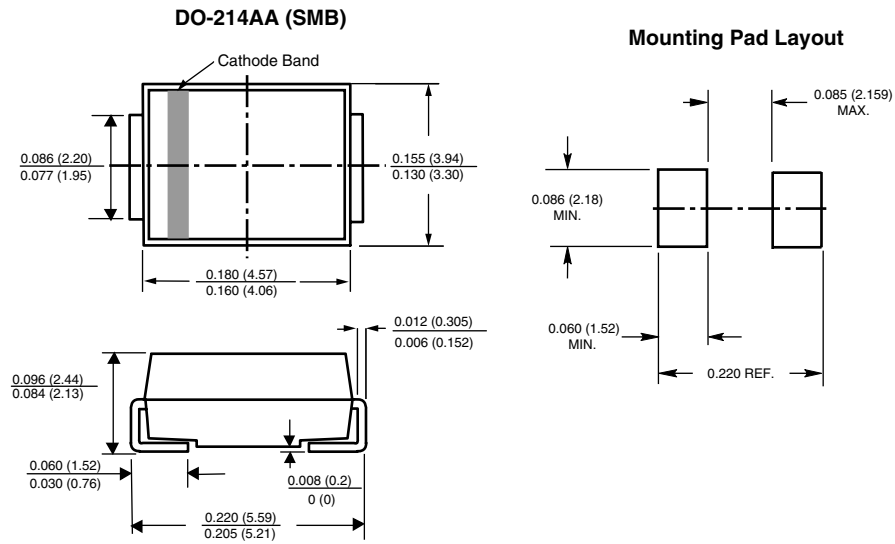


Figure 5. Maximum Non-Repetitive Peak Forward Surge Current

## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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