

# Surface Mount PAR<sup>®</sup> Transient Voltage Suppressors

High Temperature Stability and High Reliability Conditions



**SMB (DO-214AA)**

## PRIMARY CHARACTERISTICS

$V_{BR}$	6.8 V to 43 V
$V_{WM}$	5.8 V to 36.8 V
$P_{PPM}$	600 W
$I_{FSM}$	75 A
$T_J$ max.	185 °C
Polarity	Uni-directional
Package	SMB (DO-214AA)

## 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.

## FEATURES

- Junction passivation optimized design passivated anisotropic rectifier technology
- $T_J = 185$  °C capability suitable for high reliability and automotive requirement
- 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-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available  
- Automotive ordering code: base P/NHE3 or P/NHM3
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
**HALOGEN**  
**FREE**  
Available

## MECHANICAL DATA

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

Molding compound meets UL 94 V-0 flammability rating  
Base P/NHE3\_X - RoHS-compliant and AEC-Q101 qualified  
Base P/NHM3\_X - halogen-free, RoHS-compliant, and AEC-Q101 qualified  
("X" denotes revision code e.g. A, B, ...)

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

HE3 and HM3 suffix meets JESD 201 class 2 whisker test

**Polarity:** color band denotes cathode end

## MAXIMUM RATINGS ( $T_A = 25$ °C, unless otherwise noted)

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

### Notes

<sup>(1)</sup> Non-repetitive current pulse, per fig. 3 and derated above  $T_A = 25$  °C per fig. 2

<sup>(2)</sup> Mounted on 0.2" x 0.2" (5.0 mm x 5.0 mm) copper pads at each terminal

<sup>(3)</sup> Measured on 8.3 ms single half sine-wave, or equivalent square wave, duty cycle = 4 pulses per minute maximum

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

DEVICE TYPE	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 $V_{WM}$ $I_R$ ( $\mu\text{A}$ )	MAXIMUM REVERSE LEAKAGE AT $V_{WM}$ $T_J = 150\text{ }^{\circ}\text{C}$ $I_D$ ( $\mu\text{A}$ )	MAXIMUM PEAK PULSE SURGE CURRENT $I_{PPM}^{(2)}$ (A)	MAXIMUM CLAMPING VOLTAGE AT $I_{PPM}$ $V_C$ (V)
		MIN.	MAX.						
TPSMB6.8A	KEP	6.45	7.14	10	5.8	500	1000	57.1	10.5
TPSMB7.5A	KGP	7.13	7.88	10	6.4	250	500	53.1	11.3
TPSMB8.2A	KKP	7.79	8.61	10	7.02	100	200	49.6	12.1
TPSMB9.1A	KMP	8.65	9.55	1	7.78	25	50	44.8	13.4
TPSMB10A	KPP	9.5	10.5	1	8.55	5	20	41.4	14.5
TPSMB11A	KRP	10.5	11.6	1	9.4	2	5	38.5	15.6
TPSMB12A	KTP	11.4	12.6	1	10.2	2	5	35.9	16.7
TPSMB13A	KVP	12.4	13.7	1	11.1	2	5	33	18.2
TPSMB15A	KXP	14.3	15.8	1	12.8	1	5	28.3	21.2
TPSMB16A	KZP	15.2	16.8	1	13.6	1	5	26.7	22.5
TPSMB18A	LEP	17.1	18.9	1	15.3	1	5	23.8	25.2
TPSMB20A	LGP	19	21	1	17.1	1	5	21.7	27.7
TPSMB22A	LKP	20.9	23.1	1	18.8	1	5	19.6	30.6
TPSMB24A	LMP	22.8	25.2	1	20.5	1	5	18.1	33.2
TPSMB27A	LPP	25.7	28.4	1	23.1	1	5	16	37.5
TPSMB30A	LRP	28.5	31.5	1	25.6	1	5	14.5	41.4
TPSMB33A	LTP	31.4	34.7	1	28.2	1	5	13.1	45.7
TPSMB36A	LVP	34.2	37.8	1	30.8	1	5	12	49.9
TPSMB39A	LXP	37.1	41	1	33.3	1	5	11.1	53.9
TPSMB43A	LZP	40.9	45.2	1	36.8	1	5	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_A/H <sup>(1)</sup>	0.096	H	750	7" diameter plastic tape and reel
TPSMB6.8AHE3_A/I <sup>(1)</sup>	0.096	I	3200	13" diameter plastic tape and reel
TPSMB6.8AHM3_A/H <sup>(1)</sup>	0.096	H	750	7" diameter plastic tape and reel
TPSMB6.8AHM3_A/I <sup>(1)</sup>	0.096	I	3200	13" diameter plastic tape and reel

**Note**

(1) AEC-Q101 qualified

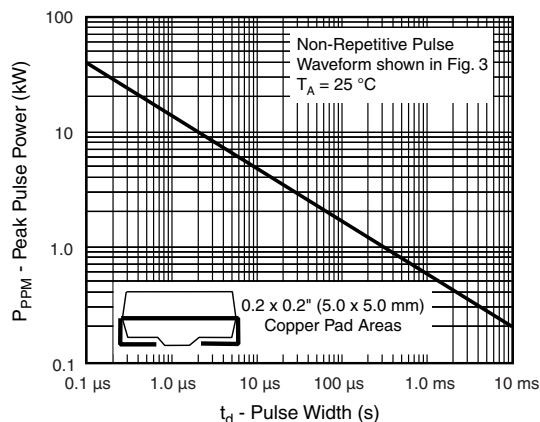
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$ , unless otherwise noted)


Fig. 1 - Peak Pulse Power Rating Curve

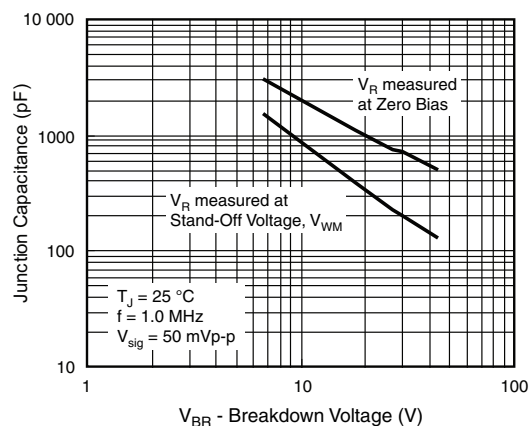


Fig. 4 - Typical Junction Capacitance

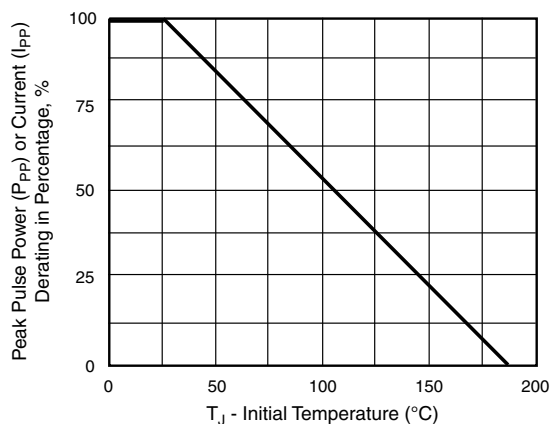


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

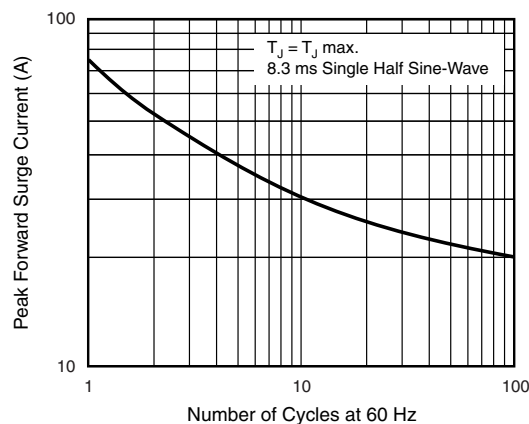


Fig. 5 - Maximum Non-Repetitive/Peak Forward Surge Current

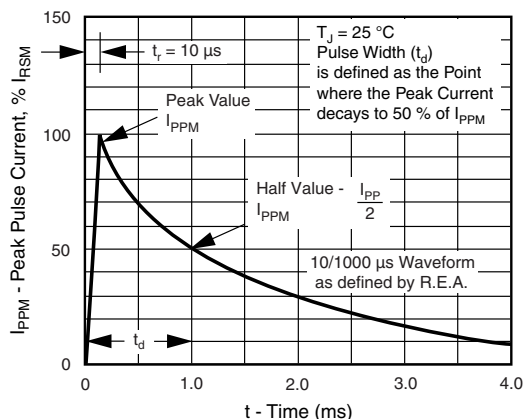
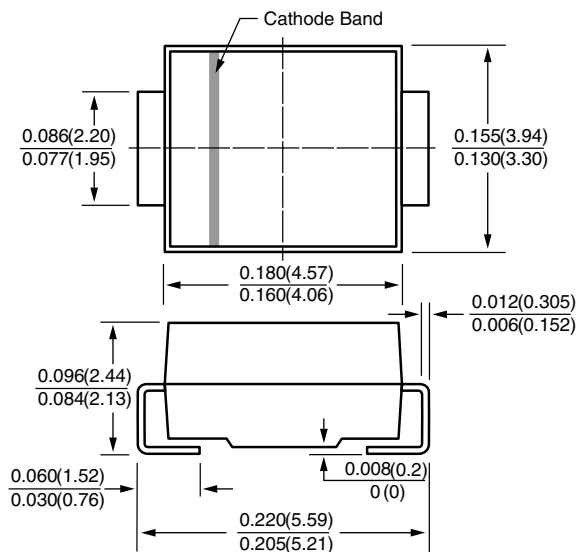


Fig. 3 - Pulse Waveform

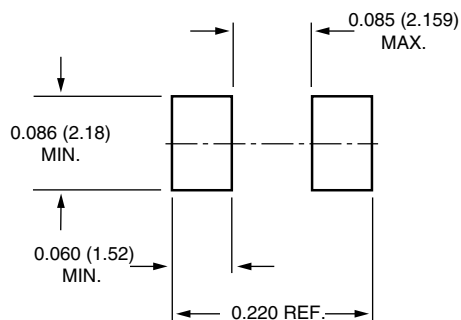


## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

### DO-214AA (SMB)



### Mounting Pad Layout





## Disclaimer

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