

High Power Density Surface Mount Automotive Transient Voltage Suppressors

Major Ratings and Characteristics

$V_{(BR)}$	13 V to 43 V
P_{PPM}	400 W
I_{FSM}	40 A
T_j max.	185 °C



DO-220AA (SMP)

Features

- Very low profile - typical height of 1.0 mm
- Ideal for automated placement
- Unidirection only
- Exclusive patented PAR oxide passivated chip construction
- Excellent clamping capability
- Low incremental surge resistance
- Very fast response time
- Meets MSL level 1, per J-STD-020C
- AEC-Q 101 qualified

Typical Applications

Protection for Ics, drive transistors, signal lines of sensor units, and electronic units in consumer, computer, industrial, and automotive applications.

Mechanical Data

Case: DO-220AA (SMP)

Epoxy meets UL 94V-0 flammability rating

Terminals: Matte tin plated (E3 Suffix) leads, solderable per J-STD-002B and MIL-STD-750, Method 2026

Polarity: Color band denotes the cathode end

Maximum Ratings

$T_A = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Value	Unit
Peak power dissipation with a 10/1000 μs waveform ⁽¹⁾⁽²⁾ Fig.3	P_{PPM}	Minimum 400	W
Peak power pulse current with a 10/1000 μs waveform ⁽¹⁾ Fig.1	I_{PPM}	see table next page	A
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	I_{FSM}	40	A
Maximum instantaneous forward voltage at 25A ⁽³⁾	VF	2.5	V
Operating junction and storage temperature range	T_J, T_{STG}	-65 to +185	°C

Note:

(1) Non-repetitive current pulse, per fig.3 and derated above $T_A = 25\text{ °C}$ per fig.2

(2) Mounted on P.C.B. with 5.0 x 5.0 mm copper pads attached to each terminal

(3) Pulse test: 300 μs pulse width, 1% duty cycle

Electrical Characteristics

$T_A = 25\text{ }^\circ\text{C}$, unless otherwise specified

Device Type	Device Marking Code	Breakdown Voltage $V_{(BR)}$ ⁽¹⁾ at I_T		Test Current I_T (mA)	Stand-off Voltage V_{WM} (Volts)	Maximum Reverse Leakage at V_{WM} I_R (μA)	Maximum Reverse Leakage at V_{WM} $T_J = 150\text{ }^\circ\text{C}$ I_D (μA)	Maximum Peak Pulse Surge Current I_{PPM} (Note 2) (Amps)	Maximum Clamping Voltage at I_{PPM} V_C (Volts)	Maximum Temperature Coefficient of $V_{(BR)}$ ($\%/^\circ\text{C}$)
		Min	Max							
TPSMP13	AUP	11.7	14.3	1.0	10.5	1.0	5.0	21.1	19.0	0.081
TPSMP13A	AVP	12.4	13.7	1.0	11.1	1.0	5.0	22.0	18.2	0.081
TPSMP15	AWP	13.5	16.3	1.0	12.1	1.0	5.0	18.2	22.0	0.084
TPSMP15A	AXP	14.3	15.8	1.0	12.8	1.0	5.0	18.9	21.2	0.084
TPSMP16	AYP	14.4	17.6	1.0	12.9	1.0	5.0	17.0	23.5	0.086
TPSMP16A	AZP	15.2	16.8	1.0	13.6	1.0	5.0	17.8	22.5	0.086
TPSMP18	BDP	16.2	19.8	1.0	14.5	1.0	5.0	15.1	26.5	0.088
TPSMP18A	BEP	17.1	18.9	1.0	15.3	1.0	5.0	15.9	25.5	0.088
TPSMP20	BFP	18.0	22.0	1.0	16.2	1.0	5.0	13.7	29.1	0.090
TPSMP20A	BGP	19.0	21.0	1.0	17.1	1.0	5.0	14.4	27.7	0.090
TPSMP22	BHP	19.8	24.2	1.0	17.8	1.0	5.0	12.5	31.9	0.092
TPSMP22A	BKP	20.9	23.1	1.0	18.8	1.0	5.0	13.1	30.6	0.092
TPSMP24	BLP	21.6	26.4	1.0	19.4	1.0	5.0	11.5	34.7	0.094
TPSMP24A	BMP	22.8	25.2	1.0	20.5	1.0	5.0	12.0	33.2	0.094
TPSMP27	BNP	24.3	29.7	1.0	21.8	1.0	5.0	10.2	39.1	0.100
TPSMP27A	BPP	25.7	28.4	1.0	23.1	1.0	5.0	10.7	37.5	0.096
TPSMP30	BQP	27.0	33.0	1.0	24.3	1.0	5.0	9.2	43.5	0.097
TPSMP30A	BRP	28.5	31.5	1.0	25.6	1.0	5.0	9.7	41.4	0.097
TPSMP33	BSP	29.7	36.3	1.0	26.8	1.0	5.0	8.4	47.7	0.098
TPSMP33A	BTP	31.4	34.7	1.0	28.2	1.0	5.0	8.8	45.7	0.098
TPSMP36	BUP	32.4	39.6	1.0	29.1	1.0	5.0	7.7	52.0	0.099
TPSMP36A	BVP	34.2	37.8	1.0	30.8	1.0	5.0	8.0	49.9	0.099
TPSMP39	BWP	35.1	42.9	1.0	31.6	1.0	5.0	7.1	56.4	0.100
TPSMP39A	BXP	37.1	41.0	1.0	33.3	1.0	5.0	7.4	53.9	0.100
TPSMP43	BYP	38.7	47.3	1.0	34.8	1.0	5.0	6.5	61.9	0.101
TPSMP43A	BZP	40.9	45.2	1.0	36.8	1.0	5.0	6.7	59.3	0.101

Notes:

- (1) $V_{(BR)}$ measured after I_T applied for 300 μs , 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

Ratings and Characteristics Curves

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

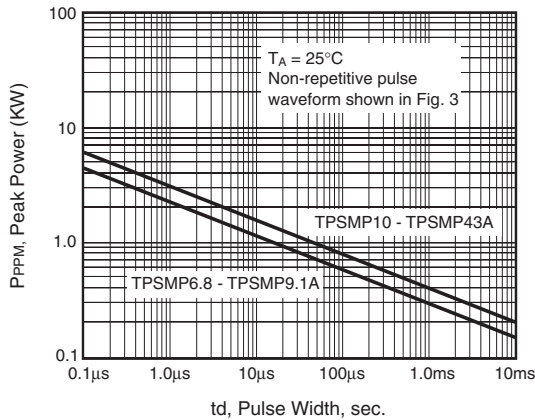


Figure 1. Peak Pulse Power Rating Curve

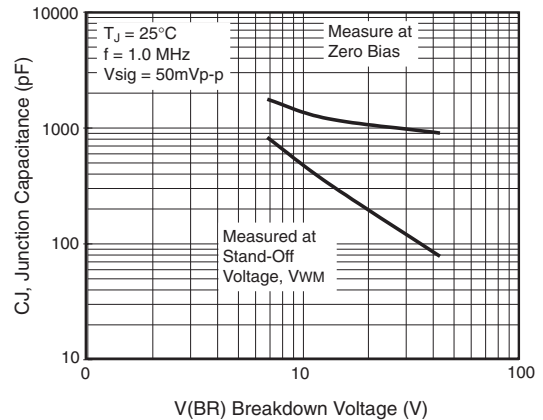


Figure 4. Typical Junction Capacitance

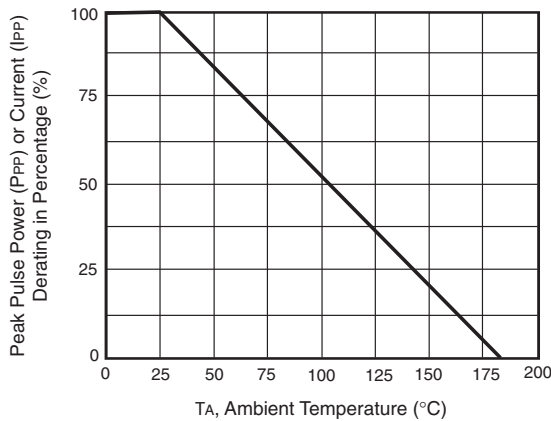


Figure 2. Pulse Derating Curve

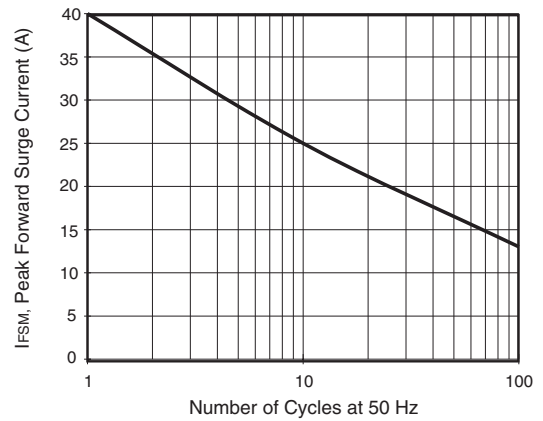


Figure 5. Maximum Peak Forward Surge Current

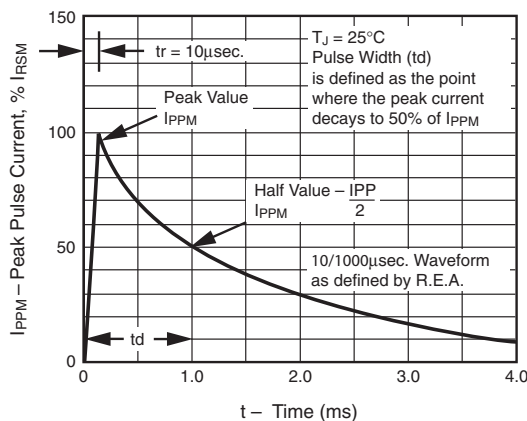


Figure 3. Pulse Waveform

TPSMP13 thru TPSMP43A

Vishay Semiconductors



Package Dimensions in Inches (millimeters)

DO-220AA (SMP)

