TPSMC6.8 thru TPSMC47A

Vishay Semiconductors

Surface Mount Automotive Transient Voltage Suppressors

High Temperature Stability & High Reliability Conditions

Major Ratings and Characteristics

$V_{(BR)}$	6.8 V to 47 V
P_{PPM}	1500 W
I_{FSM}	200 A
T_j max.	185 °C

Patented*

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

DO-214AB (SMC)

Features

- Patented PAR® construction
- Available in Unidirectional polarity only
- 1500 W peak pulse power capability with a 10/1000 µs waveform
- Excellent clamping capability
- Very fast response time
- Low incremental surge resistance
- Typical I_D less than 1.0 µA above 15 V rating
- Meets MSL level 1, per J-STD-020C
- Solder Dip 260 °C, 40 seconds

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-214AB (SMC)

Epoxy meets UL-94V-0 Flammability rating

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

E3 suffix for commercial grade, HE3 suffix for high reliability grade (AEC Q101 qualified)

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 µs waveform(1)(2) (Fig. 3)	P_{PPM}	Minimum 1500	W
Peak power pulse current with a 10/1000 µs waveform(1) (Fig. 1)	I_{PPM}	See Next Table	A
Peak forward surge current 8.3 ms single half sine-wave(2)	I_{FSM}	200	A
Maximum instantaneous forward voltage at 100 A(2)	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) 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 °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 (µA)	T_J = 150 °C Maximum Reverse Leakage at V_{WM} I_D (µA)	Maximum. Peak Pulse Surge Current I_{PPM}[2] [A]	Maximum Clamping Voltage at I_{PPM} V_C (V)
		Min	Max						
TPSMC6.8	DDP	6.12	7.48	10.0	5.50	1000	10000	139.0	10.8
TPSMC6.8A	DEP	6.45	7.14	10.0	5.80	1000	10000	143.0	10.5
TPSMC7.5	DFP	6.75	8.25	10.0	6.05	500	5000	128.0	11.7
TPSMC7.5A	DGP	7.13	7.88	10.0	6.40	500	5000	133.0	11.3
TPSMC8.2	DHP	7.38	9.02	10.0	6.63	200	2000	120.0	12.5
TPSMC8.2A	DKP	7.79	8.61	10.0	7.02	200	2000	124.0	12.1
TPSMC9.1	DLP	8.19	10.0	1.0	7.37	50	500	109.0	13.8
TPSMC9.1A	DMP	8.65	9.55	1.0	7.78	50	500	112.0	13.4
TPSMC10	DNP	9.00	11.0	1.0	8.10	20	200	100.0	15.0
TPSMC10A	DPP	9.50	10.5	1.0	8.55	20	200	103.0	14.5
TPSMC11	DQP	9.90	12.1	1.0	8.92	5.0	50	92.6	16.2
TPSMC11A	DRP	10.5	11.6	1.0	9.40	5.0	50	96.2	15.6
TPSMC12	DSP	10.8	13.2	1.0	9.72	2.0	10	86.7	17.3
TPSMC12A	DTP	11.4	12.6	1.0	10.2	2.0	10	89.8	16.7
TPSMC13	DUP	11.7	14.3	1.0	10.5	2.0	10	78.9	19.0
TPSMC13A	DVP	12.4	13.7	1.0	11.1	2.0	10	82.4	18.2
TPSMC15	DWP	13.5	16.5	1.0	12.1	1.0	10	68.2	22.0
TPSMC15A	DXP	14.3	15.8	1.0	12.8	1.0	10	70.8	21.2
TPSMC16	DYP	14.4	17.6	1.0	12.9	1.0	10	63.8	23.5
TPSMC16A	DZP	15.2	16.8	1.0	13.6	1.0	10	66.7	22.5
TPSMC18	EDP	16.2	19.8	1.0	14.5	1.0	10	56.6	26.5
TPSMC18A	EEP	17.1	18.9	1.0	15.3	1.0	10	59.5	25.2
TPSMC20	EFP	18.0	22.0	1.0	16.2	1.0	10	51.5	29.1
TPSMC20A	EGP	19.0	21.0	1.0	17.1	1.0	10	54.2	27.7
TPSMC22	EHP	19.8	24.2	1.0	17.8	1.0	10	47.0	31.9
TPSMC22A	EKP	20.9	23.1	1.0	18.8	1.0	10	49.0	30.6
TPSMC24	ELP	21.6	26.4	1.0	19.4	1.0	10	43.2	34.7
TPSMC24A	EMP	22.8	25.2	1.0	20.5	1.0	10	45.2	33.2
TPSMC27	ENP	24.3	29.7	1.0	21.8	1.0	10	38.4	39.1
TPSMC27A	EPP	25.7	28.4	1.0	23.1	1.0	10	40.0	37.5
TPSMC30	EQP	27.0	33.0	1.0	24.3	1.0	10	34.5	43.5
TPSMC30A	ERP	28.5	31.5	1.0	25.6	1.0	10	36.2	41.4
TPSMC33	ESP	29.7	36.3	1.0	26.8	1.0	10	31.4	47.7
TPSMC33A	ETP	31.4	34.7	1.0	28.2	1.0	10	32.8	45.7
TPSMC36	EUP	32.4	39.6	1.0	29.1	1.0	10	28.8	52.0
TPSMC36A	EVP	34.2	37.8	1.0	30.8	1.0	10	30.1	49.9
TPSMC39	EWP	35.1	42.9	1.0	31.6	1.0	10	26.6	56.4
TPMSC39A	EXP	37.1	41.0	1.0	33.3	1.0	10	27.8	53.9
TPSMC43	EYP	38.7	47.3	1.0	34.8	1.0	10	24.2	61.9
TPSMC43A	EZP	40.9	45.2	1.0	36.8	1.0	10	25.3	59.3
TPSMC47	FDP	42.3	51.7	1.0	38.1	1.0	20	22.1	67.8
TPSMC47A	FEP	44.7	49.4	1.0	40.2	1.0	20	23.1	64.8

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 °C unless otherwise specified)

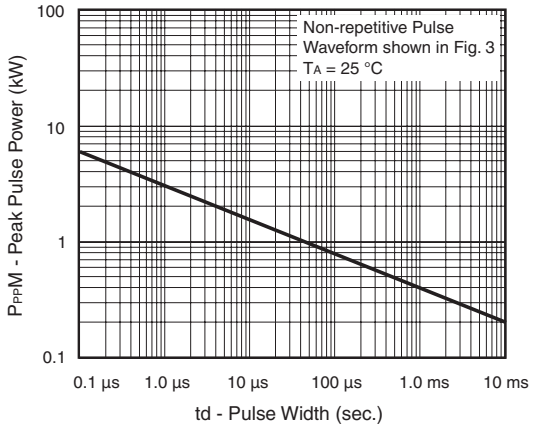


Figure 1. Peak Pulse Power Rating Curve

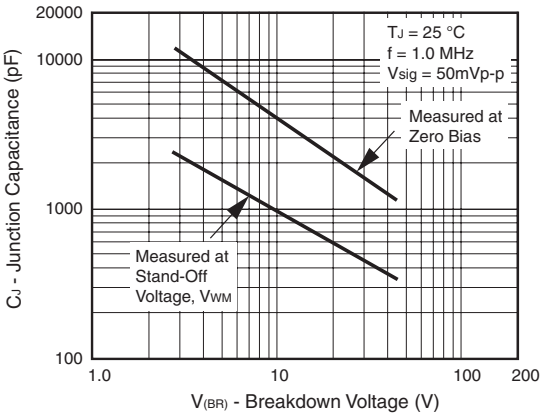


Figure 4. Typical Junction Capacitance

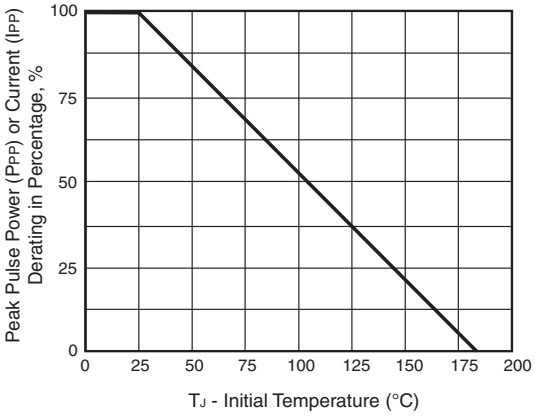


Figure 2. Pulse Power or Current versus Initial Junction Temperature

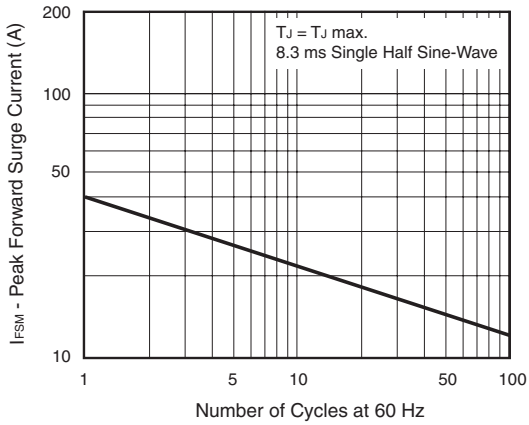


Figure 5. Maximum Non-Repetitive/Peak Forward Surge Current

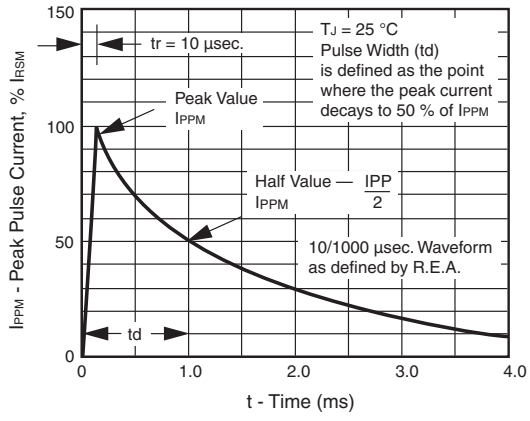
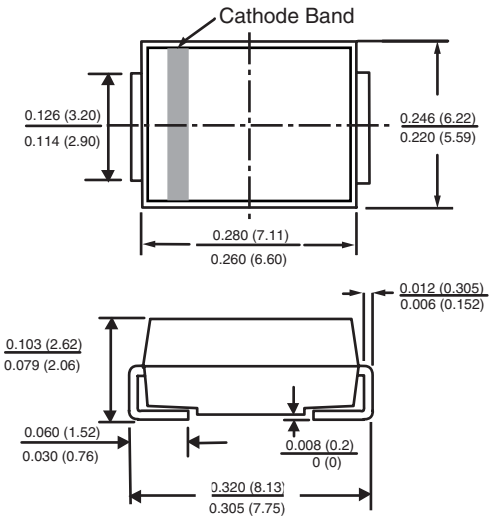


Figure 3. Pulse Waveform

Package outline dimensions in inches (millimeters)

DO-214AB (SMC)



Mounting Pad Layout