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SMPC5.0A thru SMPC36A, SMPC22AN thru SMPC85AN

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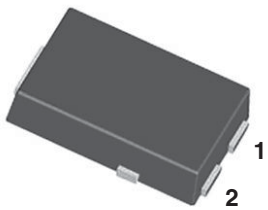
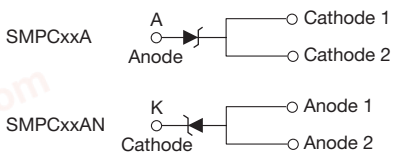
Vishay General Semiconductor

Surface Mount TRANSZORB® Transient Voltage Suppressors

eSMP® Series



SMPC (TO-277A)



DESIGN SUPPORT TOOLS AVAILABLE

3D Models

FEATURES

- Very low profile - typical height of 1.1 mm
- Ideal for automated placement
- Uni-direction
- Excellent clamping capability
- Low incremental surge resistance
- Very fast response time
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available
  - Automotive ordering code: base P/NHM3
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT
HALOGEN FREE

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 and telecommunication. Sensitive equipment against transient overvoltages.

PRIMARY CHARACTERISTICS	
V_{BR} uni-directional	6.40 V to 104 V
V_{WM}	5.0 V to 85 V
P_{PPM}	1500 W
P_D at T_A = 25 °C	1.25 W
T_J max.	150 °C
Polarity	Uni-directional
Package	SMPC (TO-277A)

Note

- All electrical characteristics are only applicable when two identical polarity terminals are connected

MECHANICAL DATA

Case: SMPC (TO-277A)
Molding compound meets UL 94 V-0 flammability rating
Base P/N-M3 - halogen-free, RoHS-compliant, and industrial grade
Base P/NHM3 - halogen-free, RoHS-compliant, and AEC-Q101 qualified

Terminals: matte tin plated leads, solderable per J-STD-002 and JESD 22-B102
M3 and HM3 suffix meet JESD 201 class 2 whisker test

Polarity: the band denotes cathode end

MAXIMUM RATINGS (T_A = 25 °C unless otherwise noted)			
PARAMETER	**SYMBOL**	**VALUE**	**UNIT**
Peak power dissipation with a 10/1000 µs waveform (fig. 3)	P_{PPM} (1)	1500	W
Peak pulse current with a 10/1000 µs waveform (fig. 1)	I_{PPM} (1)	See next table	A
Power dissipation, T_A = 25 °C	P_D (2)	1.25	W
Operating junction and storage temperature range	T_J, T_{STG}	-55 to +150	°C

Note

(1) Non-repetitive current pulse, per fig. 3 and derated above T_A = 25 °C per fig. 2
(2) Power dissipation mounted on FR4 PCB, 2 oz. standard footprint

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ELECTRICAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)

DEVICE TYPE		DEVICE MARKING CODE		BREAKDOWN VOLTAGE V_{BR} AT I_T (1) (V)		TEST CURRENT I_T (mA)	STAND-OFF VOLTAGE V_{WM} (V)	MAXIMUM REVERSE LEAKAGE CURRENT I_R AT V_{WM} (µA)	MAXIMUM PEAK PULSE SURGE CURRENT I_{PPM} (2) (A)	MAXIMUM CLAMPING VOLTAGE AT I_{PPM} V_C (V)
ANODE ON HEATSINK	CATHODE ON HEATSINK	SUFFIX A	SUFFIX AN	MIN.	MAX.					
SMPC5.0A	-	GDE	-	6.40	7.07	10	5.0	1500	150.0	10.0
SMPC6.0A	-	GDG	-	6.67	7.37	10	6.0	1000	145.6	10.3
SMPC6.5A	-	GDK	-	7.22	7.98	10	6.5	500	133.9	11.2
SMPC7.0A	-	GDM	-	7.78	8.60	10	7.0	200	125.0	12.0
SMPC7.5A	-	GDP	-	8.33	9.21	1.0	7.5	100	116.3	12.9
SMPC8.0A	-	GDR	-	8.89	9.83	1.0	8.0	50	110.3	13.6
SMPC8.5A	-	GDT	-	9.44	10.4	1.0	8.5	20	104.2	14.4
SMPC9.0A	-	GDV	-	10.0	11.1	1.0	9.0	5.0	97.4	15.4
SMPC10A	-	GDX	-	11.1	12.3	1.0	10.0	2.0	88.2	17.0
SMPC11A	-	GDZ	-	12.2	13.5	1.0	11.0	2.0	82.4	18.2
SMPC12A	-	GEE	-	13.3	14.7	1.0	12.0	2.0	75.4	19.9
SMPC13A	-	GEG	-	14.4	15.9	1.0	13.0	1.0	69.8	21.5
SMPC14A	-	GEK	-	15.6	17.2	1.0	14.0	1.0	64.7	23.2
SMPC15A	-	GEM	-	16.7	18.5	1.0	15.0	1.0	61.5	24.4
SMPC16A	-	GEP	-	17.8	19.7	1.0	16.0	1.0	57.7	26.0
SMPC17A	-	GER	-	18.9	20.9	1.0	17.0	1.0	54.3	27.6
SMPC18A	-	GET	-	20.0	22.1	1.0	18.0	1.0	51.4	29.2
SMPC20A	-	GEV	-	22.2	24.5	1.0	20.0	1.0	46.3	32.4
SMPC22A	SMPC22AN	GEX	PAV	24.4	26.9	1.0	22.0	1.0	42.3	35.5
SMPC24A	SMPC24AN	GEZ	PAW	26.7	29.5	1.0	24.0	1.0	38.6	38.9
SMPC26A	SMPC26AN	GFE	PAX	28.9	31.9	1.0	26.0	1.0	35.6	42.1
SMPC28A	SMPC28AN	GFG	PAY	31.1	34.4	1.0	28.0	1.0	33.0	45.4
SMPC30A	SMPC30AN	GFK	PAZ	33.3	36.8	1.0	30.0	1.0	31.0	48.4
SMPC33A	SMPC33AN	GFM	PBA	36.7	40.6	1.0	33.0	1.0	28.1	53.3
SMPC36A	SMPC36AN	GFP	PBB	40.0	44.2	1.0	36.0	1.0	25.8	58.1
-	SMPC40AN	-	PBC	44.4	49.1	1.0	40.0	1.0	23.3	64.5
-	SMPC43AN	-	PBD	47.8	52.8	1.0	43.0	1.0	21.6	69.4
-	SMPC45AN	-	PBE	50.0	55.3	1.0	45.0	1.0	20.6	72.7
-	SMPC48AN	-	PBF	53.3	58.9	1.0	48.0	1.0	19.4	77.4
-	SMPC51AN	-	PBG	56.7	62.7	1.0	51.0	1.0	18.2	82.4
-	SMPC54AN	-	PBH	60.0	66.3	1.0	54.0	1.0	17.2	87.1
-	SMPC58AN	-	PBK	64.4	71.2	1.0	58.0	1.0	16.0	93.6
-	SMPC60AN	-	PBL	66.7	73.7	1.0	60.0	1.0	15.5	96.8
-	SMPC64AN	-	PBM	71.1	78.6	1.0	64.0	1.0	14.6	103
-	SMPC70AN	-	PBN	77.8	86.0	1.0	70.0	1.0	13.3	113
-	SMPC75AN	-	PBP	83.3	92.1	1.0	75.0	1.0	12.4	121
-	SMPC78AN	-	PBQ	86.7	95.8	1.0	78.0	1.0	11.9	126
-	SMPC85AN	-	PBR	94.4	104	1.0	85.0	1.0	10.9	137

Notes

(1) Pulse test: t ≤ 50 ms

(2) Surge current waveform per fig. 3 and derated per fig. 2

(3) All terms and symbols are consistent with ANSI/IEEE C62.35

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THERMAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)				
PARAMETER	**SYMBOL**	**TYP.**	**MAX.**	**UNIT**
Typical thermal resistance	$R_{\theta JA}$ (1)	85	100	°C/W
	$R_{\theta JM}$ (2)	2.5	3	

Notes

(1) Thermal resistance junction-to-ambient to follow JEDEC® 51-2A, device mounted on FR4 PCB, 2 oz. standard footprint

(2) Thermal resistance junction-to-mount to follow JEDEC® 51-14 using Transient Dual Interface Test Method (TDIM)

ORDERING INFORMATION (Example)				
PREFERRED P/N	**UNIT WEIGHT (g)**	**PREFERRED PACKAGE CODE**	**BASE QUANTITY**	**DELIVERY MODE**
SMPC5.0A-M3/86A (1)	0.10	86A	1500	7" diameter plastic tape and reel
SMPC5.0A-M3/87A (1)	0.10	87A	6500	13" diameter plastic tape and reel
SMPC22AN-M3/H	0.10	H	1500	7" diameter plastic tape and reel
SMPC22AN-M3/I	0.10	I	6500	13" diameter plastic tape and reel
SMPC22ANHM3/H (2)	0.10	H	1500	7" diameter plastic tape and reel
SMPC22ANHM3/I (2)	0.10	I	6500	13" diameter plastic tape and reel

Notes

(1) Package code /86A and /87A are available for SMPC5.0A-M3 to SMPC36A-M3

(2) AEC-Q101 qualified, is available for SMPC22AN to SMPC85AN only

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RATINGS AND CHARACTERISTICS CURVES (T_A = 25 °C unless otherwise noted)

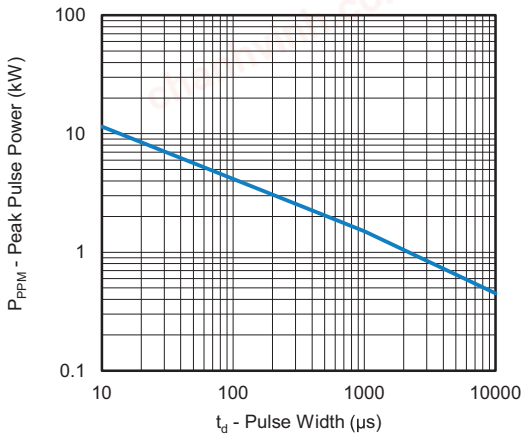

Fig. 1 - Peak Pulse Power Rating Curve

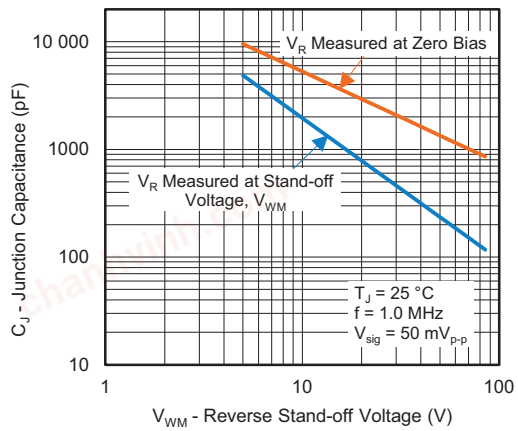

Fig. 3 - Typical Junction Capacitance

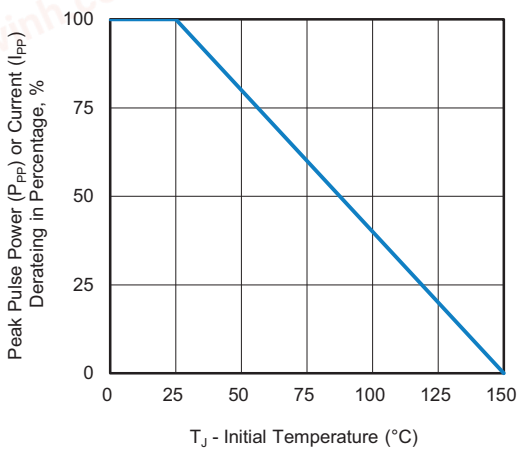

Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

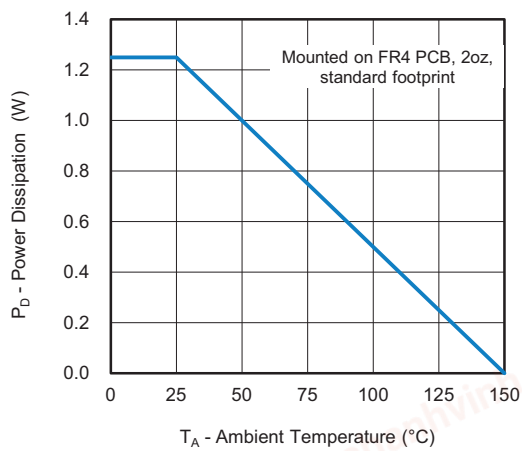

Fig. 4 - Steady State Power Dissipation

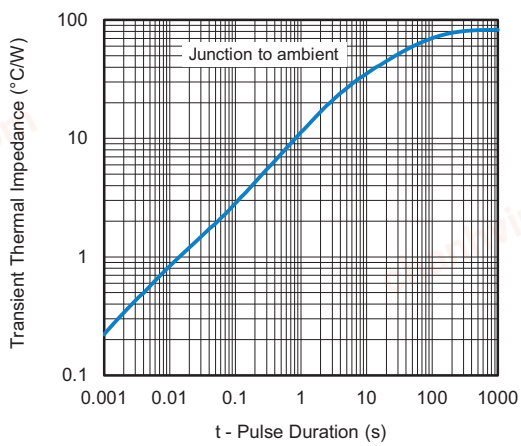

Fig. 5 - Typical Transient Thermal Impedance

Note

- Fig. 1 - Power calculation is based on I_{PPM} times defined maximum clamping voltage by pulse width
  Fig. 1 - 10 000 µs P_{PPM} is actual tested for $V_{WM} \leq 60$ V types, over 60 V types 10 000 µs P_{PPM} is curve extensional value

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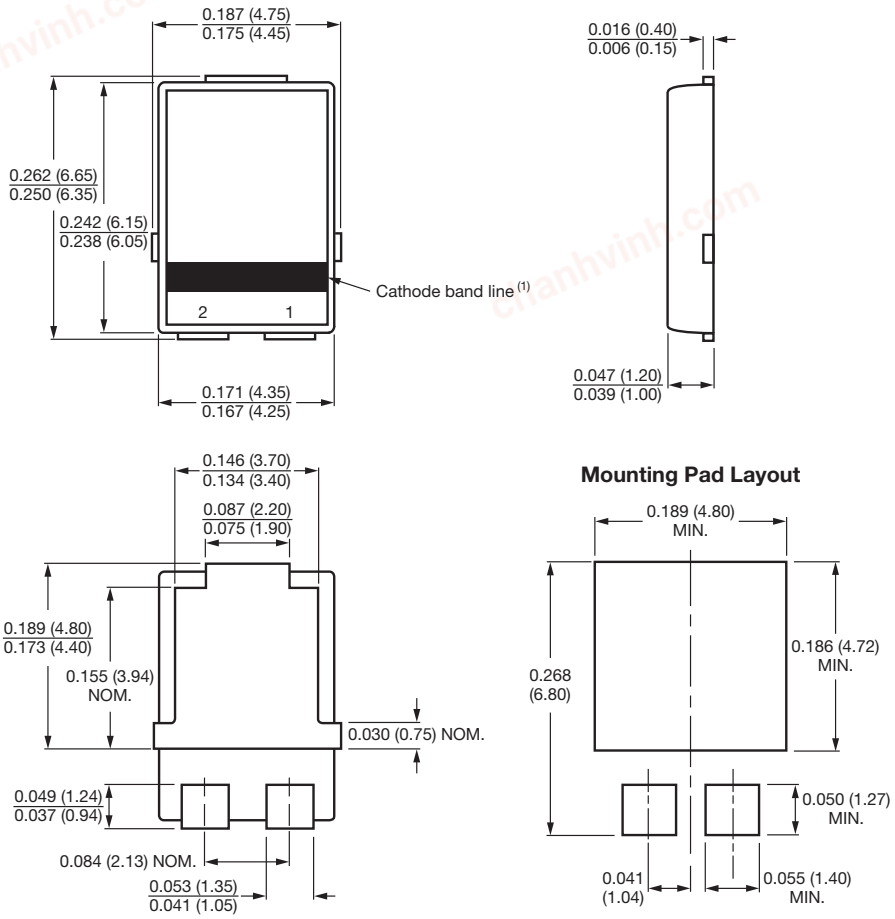
PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMPC (TO-277A)



Conform to JEDEC® TO-277A

Note

(1) Cathode band orientation depends on device actual polarity direction

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