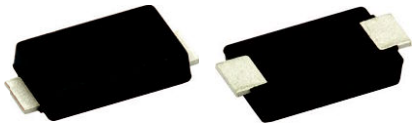
SMA6F5.0A thru SMA6F20A

Vishay General Semiconductor

Surface Mount TRANSZORB® Transient Voltage Suppressors

SlimSMA™



Top View Bottom View

DO-221AC

FEATURES

- Very low profile - typical height of 0.95 mm
- Ideal for automated placement
- Uni-directional only
- Excellent clamping capability
- Peak pulse power:
  - 600 W (10/1000 µs)
  - 4 kW (8/20 µs)
- ESD capability: IEC 61000-4-2 level 4
  - 15 kV (air)
  - 8 kV (contact)
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- **Halogen-free according to IEC 61249-2-21 definition**

RoHS COMPLIANT HALOGEN FREE

PRIMARY CHARACTERISTICS	
V_{WM}	5.0 V to 20 V
P_{PPM} (10 x 1000 µs)	600 W
P_{PPM} (8 x 20 µs)	4000 W
P_D at T_M = 55 °C	6 W
T_J max.	175 °C

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.

MECHANICAL DATA

Case: DO-221AC (SlimSMA)
Molding compound meets UL 94 V-0 flammability rating
Base P/N-M3 - halogen-free, RoHS compliant, and commercial grade

Terminals: Matte tin plated leads, solderable per J-STD-002 and JESD22-B102
M3 suffix meets JESD 201 class 1A whisker test

Polarity: Color band denotes cathode end

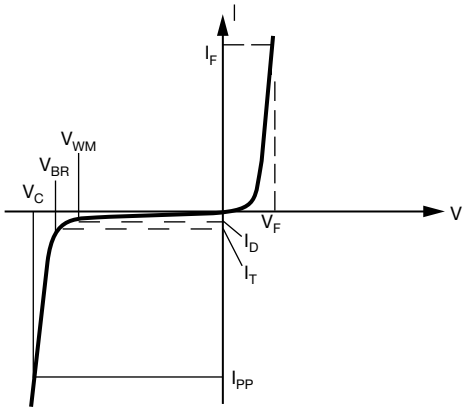
MAXIMUM RATINGS (T_A = 25 °C, unless otherwise noted)

PARAMETER		SYMBOL	VALUE	UNIT
Peak pulse power dissipation	with a 10/1000 µs waveform	P_{PPM} (1)	600	W
	with a 8/20 µs waveform		4000	
Peak pulse current	with a 10/1000 µs waveform	I_{PPM} (1)	See next table	A
	with a 8/20 µs waveform			
Power dissipation	T_M = 55 °C	P_D (2)	6	W
	T_A = 25 °C	P_D (3)	1.0	
Storage temperature range		T_{STG}	- 65 to + 175	°C
Operating junction temperature range		T_J	- 55 to + 175	

Notes

(1) Non-repetitive current pulse, per fig. 3 and derated above T_A = 25 °C per fig. 2.
(2) Power dissipation mounted on infinite heatsink
(3) Power dissipation mounted on minimum recommended pad layout

ELECTRICAL CHARACTERISTICS	
SYMBOL	**PARAMETER**
V_{WM}	Stand-off voltage
V_{BR}	Breakdown voltage
V_C	Clamping voltage
I_D	Leakage current at V_{WM}
I_{PP}	Peak pulse current
αT	Voltage temperature coefficient
V_F	Forward voltage drop
R_D	Dynamic resistance



Zener Voltage Regulator

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

DEVICE TYPE	DEVICE MARKING CODE	BREAKDOWN VOLTAGE V_{BR} AT I_T (1)			MAXIMUM REVERSE LEAKAGE I_D AT V_{WM} (3)			V_C AT I_{PP} 10/1000 µs		R_D (2)	V_C AT I_{PP} 8/20 µs		R_D (2)	αT (3)
		MIN.	MAX.		25 °C	85 °C		MAX.			MAX.			MAX.
		V		mA	µA		V	V	A	Ω	V	A	Ω	10^{-4}/°C
SMA6F5.0A	6AE	6.40	7.07	10	150	375	5.0	9.2	68.0	0.031	13.4	298	0.021	5.7
SMA6F6.0A	6AG	6.70	7.41	10	600	1500	6.0	9.5	63.2	0.033	13.7	290	0.022	5.9
SMA6F6.5A	6AK	7.20	7.96	10	100	250	6.5	10.2	58.8	0.038	14.5	276	0.024	6.1
SMA6F7.5A	6AP	8.33	9.21	1	50	125	7.5	11.8	50.8	0.051	17.0	235	0.033	6.5
SMA6F8.0A	6AR	8.89	9.83	1	20	50	8.0	12.8	46.9	0.063	18.2	220	0.038	7.0
SMA6F8.5A	6AT	9.4	10.4	1	20	50	8.5	13.3	45.1	0.064	18.7	205	0.040	7.3
SMA6F10A	6AX	11.1	12.3	1	1.0	5.0	10	15.7	38.2	0.089	19.6	184	0.040	7.8
SMA6F11A	6AZ	12.2	13.5	1	1.0	5.0	11	17.2	34.8	0.107	21.5	172	0.047	8.1
SMA6F12A	6BE	13.3	14.7	1	0.2	1.0	12	18.8	31.9	0.128	23.5	157	0.056	8.3
SMA6F12AHD	6BF	13.2	14.3	1	0.2	1.0	12	18.5	32.4	0.130	22.9	157	0.055	8.4
SMA6F13A	6BG	14.4	15.9	1	0.2	1.0	13	20.4	29.4	0.153	23.9	147	0.064	8.4
SMA6F15A	6BM	16.7	18.5	1	0.2	1.0	15	23.6	25.4	0.201	27.7	123	0.075	8.8
SMA6F16A	6BP	17.8	19.7	1	0.2	1.0	16	25.2	23.8	0.229	29.5	119	0.082	8.8
SMA6F17A	6BR	18.9	20.9	1	0.2	1.0	17	26.7	22.5	0.259	31.4	111	0.095	9.0
SMA6F18A	6BT	20.0	22.1	1	0.2	1.0	18	28.3	21.2	0.292	33.2	102	0.109	9.2
SMA6F20A	6BV	22.2	24.5	1	0.2	1.0	20	31.4	19.1	0.361	36.8	93	0.132	9.4

Notes

(1) Pulse test: $t_p \leq 50$ ms

(2) To calculate maximum clamping voltage at other surge currents, use following formula: V_{CL} max. = R_D x I_{PP} + V_{BR} max.

(3) To calculate V_{BR} vs. junction temperature, use following formula: V_{BR} at T_J = V_{BR} at 25 °C x (1 + αT x (T_J - 25))

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

PARAMETER	SYMBOL	VALUE	UNIT
Typical thermal resistance, junction to ambient	$R_{\theta JA}$ (1)	150	°C/W
Typical thermal resistance, junction to mount	$R_{\theta JM}$(2)	20	°C/W

Notes

(1) Mounted on minimum recommended pad layout

(2) Mounted on infinite heatsink

IMMUNITY TO STATIC ELECTRICAL DISCHARGE TO THE FOLLOWING STANDARDS (T_A = 25 °C unless otherwise noted)					
STANDARD	**TEST TYPE**	**TEST CONDITIONS**	**SYMBOL**	**CLASS**	**VALUE**
IEC 61000-4-2	Human body model (contact mode)	C = 150 pF, R = 330 Ω	V_C	4	> 8 kV
	Human body model (air discharge mode)				> 15 kV

ORDERING INFORMATION (Example)				
PREFERRED P/N	**UNIT WEIGHT (g)**	**PREFERRED PACKAGE CODE**	**BASE QUANTITY**	**DELIVERY MODE**
SMA6F5.0A-M3/6A	0.032	6A	3500	7" diameter plastic tape and reel
SMA6F5.0A-M3/6B	0.032	6B	14 000	13" diameter plastic tape and reel

RATINGS AND CHARACTERISTICS CURVES

(T_A = 25 °C unless otherwise noted)

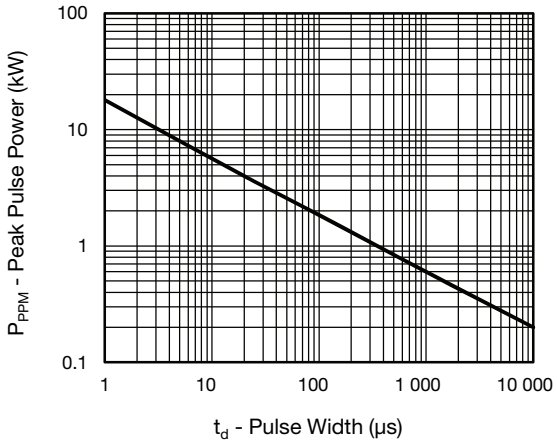


Fig. 1 - Peak Pulse Power Rating Curve

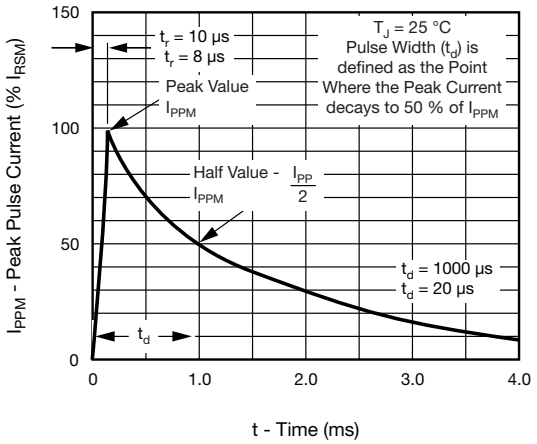


Fig. 3 - Pulse Waveform

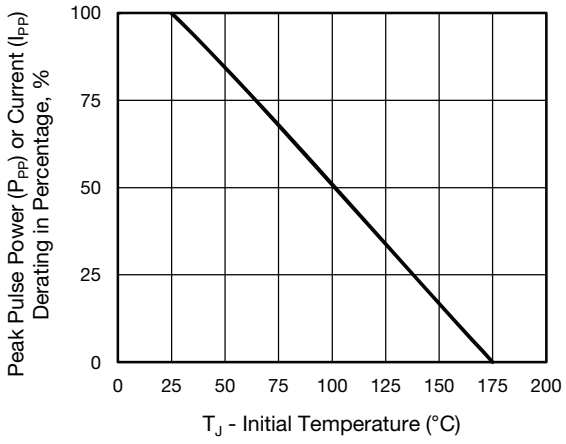


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

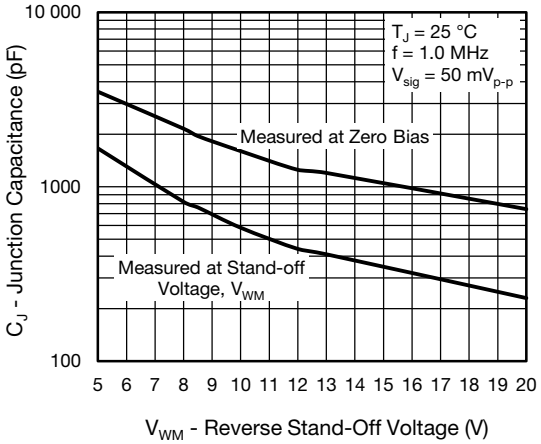


Fig. 4 - Typical Junction Capacitance

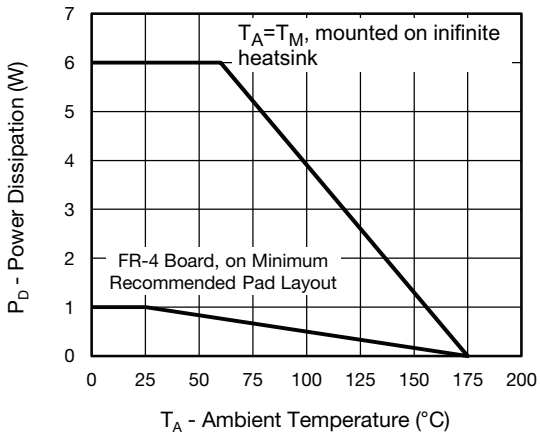


Fig. 5 - Power Dissipation Derating Curve

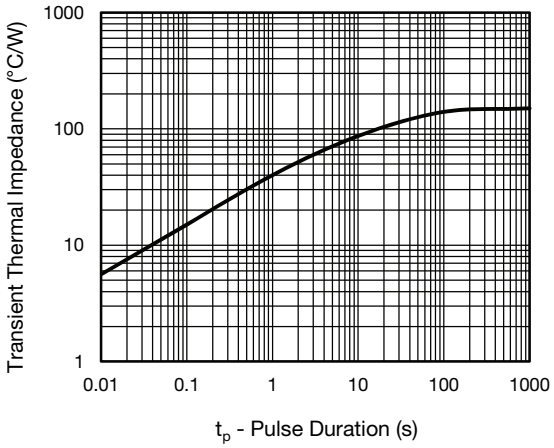
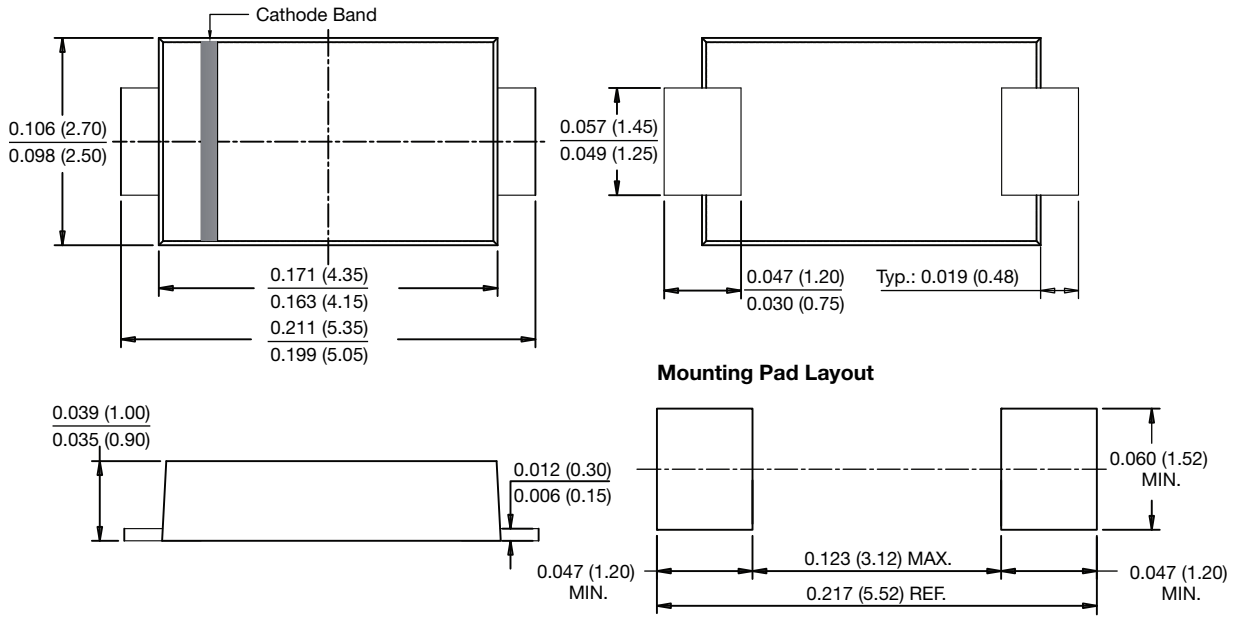


Fig. 6 - Typical Transient Thermal Impedance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

DO-221AC (SlimSMA)



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