

Surface-Mount TRANSZORB® Transient Voltage Suppressors



LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
V_{BR}	11.1 V to 104 V
V_{WM}	10 V to 85 V
P_{PPM} (10 x 1000 μ s)	600 W
P_{PPM} (8 x 20 μ s)	4000 W
P_D at $T_M = 55\text{ }^{\circ}\text{C}$	8 W
T_J max.	175 $^{\circ}\text{C}$
Polarity	Bidirectional
Package	SlimSMA (DO-221AC)

FEATURES

- Very low profile - typical height of 0.95 mm
- Ideal for automated placement
- Bidirectional
- Excellent clamping capability
- Peak pulse power:
 - 600 W (10/1000 μ s)
 - 4 kW (8/20 μ s)
- IEC 61000-4-2 ESD capability:
 - 30 kV (air)
 - 30 kV (contact)
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 $^{\circ}\text{C}$
- 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 lightning on ICs, MOSFET, signal lines of sensor units for consumer, computer, industrial, and telecommunication.

MECHANICAL DATA

Case: SlimSMA (DO-221AC)

Molding compound meets UL 94 V-0 flammability rating

Base P/N-M3 - halogen-free, RoHS-compliant, and industrial grade

Terminals: matte tin plated leads, solderable per J-STD-002 and JESD22-B102

M3 suffix meets JESD 201 class 2 whisker test

Polarity: no cathode band for bidirectional types

MAXIMUM RATINGS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)				
PARAMETER		SYMBOL	VALUE	UNIT
Peak pulse power dissipation	with a 10/1000 μ s waveform	$P_{PPM}^{(1)}$	600	W
Peak pulse power dissipation	with a 8/20 μ s waveform	$P_{PPM}^{(1)}$	4000	W
Peak pulse current	with a 10/1000 μ s waveform	$I_{PPM}^{(1)}$	See next table	A
Peak pulse current	with a 8/20 μ s waveform	$I_{PPM}^{(1)}$		A
Power dissipation	$T_M = 55\text{ }^{\circ}\text{C}$	$P_D^{(2)}$	8	W
	$T_A = 25\text{ }^{\circ}\text{C}$	$P_D^{(3)}$	1.0	
Operating junction and storage temperature range		T_J, T_{STG}	-55 to +175	$^{\circ}\text{C}$

Notes

(1) Non-repetitive current pulse, per fig. 3 and fig. 4, and derated above $T_A = 25\text{ }^{\circ}\text{C}$ per fig. 2.

(2) Power dissipation mounted on infinite heat sink

(3) Power dissipation mounted on FR4 PCB, 2 oz. standard footprint

**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			STAND-OFF VOLTAGE V _{WM} (V)	MAXIMUM REVERSE LEAKAGE AT V _{WM} I _R (μA)	10/1000 (μs)			8/20 (μs)			TYPICAL TEMP. COEFFICIENT OF V _{BR} ⁽³⁾ α _T (%/°C)						
		MIN.	MAX.	mA			V _C	I _{PPM}	R _D ⁽²⁾	V _C	I _{PPM}	R _D ⁽²⁾							
														MAX.	A	MAX.	MAX.	A	MAX.
SMA6F10CA	6AX	11.1	12.3	1.0	10	2.0	15.7	38.2	0.089	21.7	184	0.051	0.070						
SMA6F11CA	6AZ	12.2	13.5	1.0	11	2.0	17.2	34.8	0.106	24.0	167	0.063	0.072						
SMA6F12CA	6BE	13.3	14.7	1.0	12	1.0	18.8	31.9	0.129	25.5	157	0.069	0.076						
SMA6F13CA	6BG	14.4	15.9	1.0	13	1.0	20.4	29.4	0.153	27.2	147	0.077	0.076						
SMA6F14CA	6BK	15.6	17.2	1.0	14	1.0	22.0	27.2	0.176	29.4	136	0.090	0.078						
SMA6F15CA	6BM	16.7	18.5	1.0	15	1.0	23.6	25.4	0.201	32.5	123	0.114	0.080						
SMA6F16CA	6BP	17.8	19.7	1.0	16	1.0	25.2	23.8	0.231	34.8	115	0.131	0.082						
SMA6F17CA	6BR	18.9	20.9	1.0	17	1.0	26.7	22.5	0.258	37.0	108	0.149	0.082						
SMA6F18CA	6BT	20.0	22.1	1.0	18	1.0	28.3	21.2	0.292	39.2	102	0.168	0.084						
SMA6F20CA	6BV	22.2	24.5	1.0	20	1.0	31.4	19.1	0.361	43.0	93.0	0.199	0.085						
SMA6F22CA	6BX	24.4	26.9	1.0	22	1.0	35.5	16.9	0.509	48.2	83.0	0.257	0.087						
SMA6F24CA	6BZ	26.7	29.5	1.0	24	1.0	39.0	15.4	0.617	50.0	80.0	0.256	0.087						
SMA6F26CA	6CE	28.9	31.9	1.0	26	1.0	42.0	14.3	0.706	53.3	75.0	0.285	0.088						
SMA6F28CA	6CG	31.1	34.4	1.0	28	1.0	45.5	13.2	0.841	58.8	68.0	0.359	0.089						
SMA6F30CA	6CK	33.3	36.8	1.0	30	1.0	48.4	12.4	0.935	64.5	62.0	0.447	0.090						
SMA6F33CA	6CM	36.7	40.6	1.0	33	1.0	53.1	11.3	1.11	70.2	57.0	0.519	0.091						
SMA6F36CA	6CP	40.0	44.2	1.0	36	1.0	58.3	10.3	1.37	76.9	52.0	0.629	0.092						
SMA6F40CA	6CR	44.4	49.1	1.0	40	1.0	64.5	9.3	1.66	83.3	48.0	0.713	0.092						
SMA6F43CA	6CT	47.8	52.8	1.0	43	1.0	69.8	8.6	1.98	89.9	44.5	0.834	0.093						
SMA6F45CA	6CV	50.0	55.3	1.0	45	1.0	72.3	8.3	2.05	93.9	42.6	0.906	0.093						
SMA6F48CA	6CX	53.3	58.9	1.0	48	1.0	76.9	7.8	2.31	100	40.0	1.03	0.093						
SMA6F51CA	6CZ	56.7	62.7	1.0	51	1.0	82.2	7.3	2.67	107	37.5	1.18	0.094						
SMA6F54CA	6RE	60.0	66.3	1.0	54	1.0	87.0	6.9	3.00	113	35.5	1.32	0.094						
SMA6F58CA	6RG	64.4	71.2	1.0	58	1.0	93.8	6.4	3.53	121	33.0	1.51	0.095						
SMA6F60CA	6RK	66.7	73.7	1.0	60	1.0	96.8	6.2	3.73	125	32.0	1.60	0.095						
SMA6F64CA	6RM	71.1	78.6	1.0	64	1.0	103	5.8	4.21	134	29.9	1.85	0.095						
SMA6F70CA	6RP	77.8	86.0	1.0	70	1.0	113	5.3	5.09	148	27.0	2.30	0.095						
SMA6F75CA	6RR	83.3	92.1	1.0	75	1.0	120	5.0	5.58	156	25.6	2.50	0.096						
SMA6F78CA	6RT	86.7	95.8	1.0	78	1.0	125	4.8	6.08	163	24.6	2.73	0.096						
SMA6F85CA	6RV	94.4	104	1.0	85	1.0	136	4.4	7.27	178	22.5	3.29	0.096						

Notes(1) Pulse test: $t_p \leq 50\text{ ms}$ (2) To calculate maximum clamping voltage at other surge currents, use following formula: $V_{CL\text{ max.}} = R_D \times I_{PP} + V_{BR\text{ max.}}$ (3) To calculate V_{BR} vs. junction temperature, use the following formula: V_{BR} at $T_J = V_{BR}$ at $25\text{ }^{\circ}\text{C} \times (1 + \alpha_T \times (T_J - 25))$

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

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

PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Thermal resistance	$R_{\theta JA}^{(1)}$	120	150	$^{\circ}\text{C/W}$
	$R_{\theta JM}^{(2)}$	12	15	$^{\circ}\text{C/W}$

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 TDIM (transient dual interface test method)

**IMMUNITY TO STATIC ELECTRICAL DISCHARGE TO THE FOLLOWING STANDARDS**(T_A = 25 °C unless otherwise noted)

STANDARD	TEST TYPE	TEST CONDITIONS	SYMBOL	VALUE
IEC 61000-4-2	Contact discharge	C = 150 pF, R = 330 Ω	ESD	30 kV
	Air discharge			30 kV

ORDERING INFORMATION TABLE

Device code

SM	A	6	F	xxx	CA	-	M3
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① ② ③ ④ ⑤ ⑥ ⑦ ⑧

- 1** - Surface-mount
- 2** - SlimSMA (DO-221AC) package
- 3** - Peak pulse power rating (6 = 600 W)
- 4** - Package type (F = flat package)
- 5** - Stand-off voltage
- 6** - Breakdown voltage tolerance and polarity (CA ± 5 %, bidirectional)
- 7** - Quality grade (H = AEC-Q101 qualified, - = industry grade)
- 8** - Material / environment category (M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free)

ORDERING INFORMATION (Example)

PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
SMA6F10CA-M3/H	0.032	H	3500	7" diameter plastic tape and reel
SMA6F10CA-M3/I	0.032	I	14 000	13" diameter plastic tape and reel

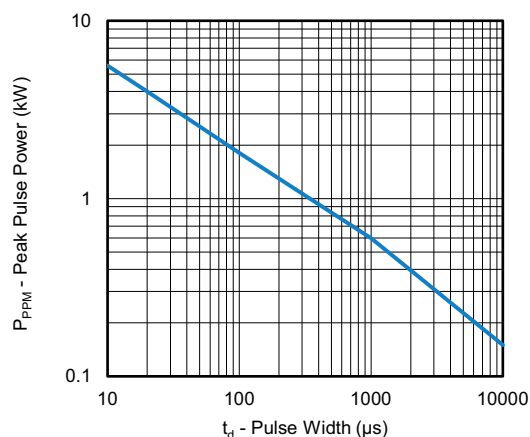
RATINGS AND CHARACTERISTICS CURVES (T_A = 25 °C unless otherwise noted)

Fig. 1 - Peak Pulse Power Rating Curve

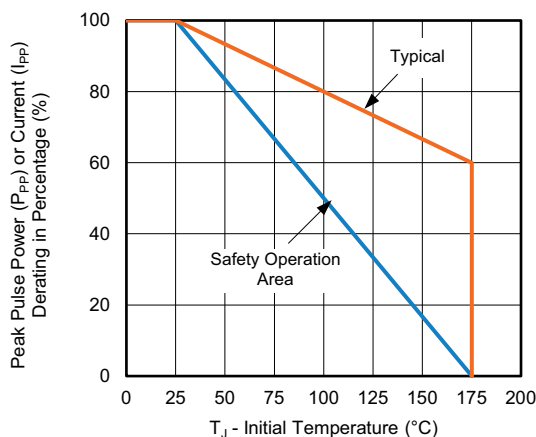
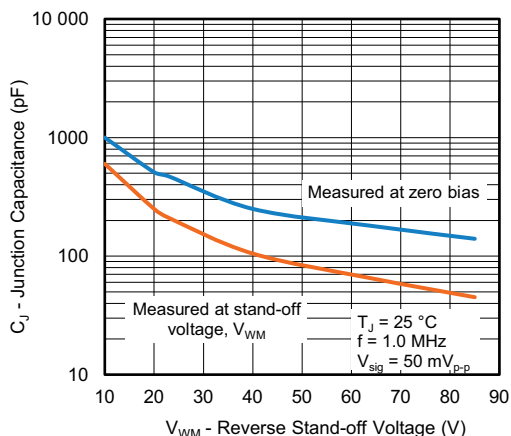
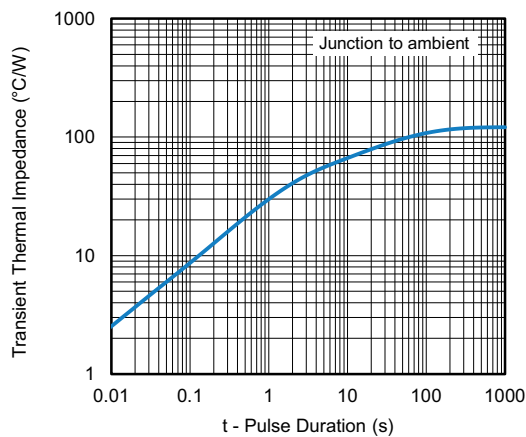
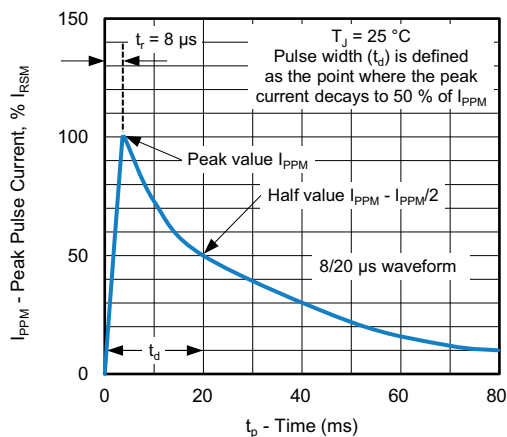
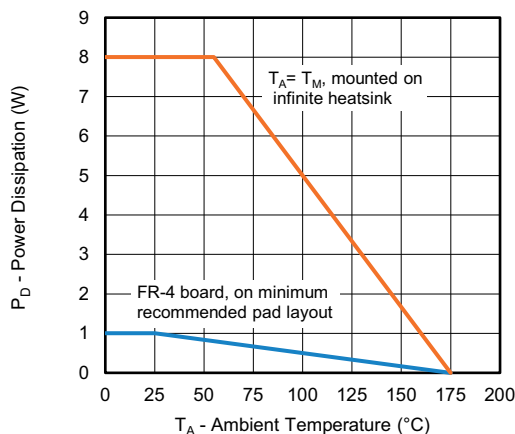
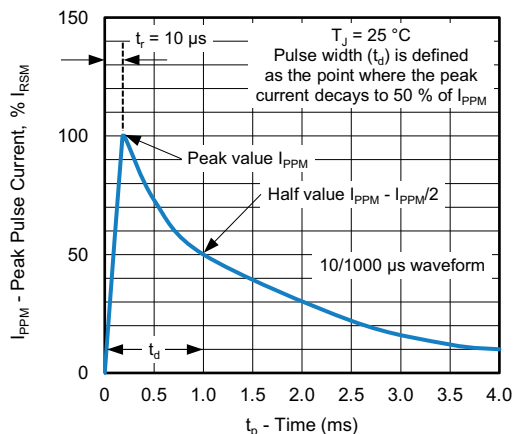


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature



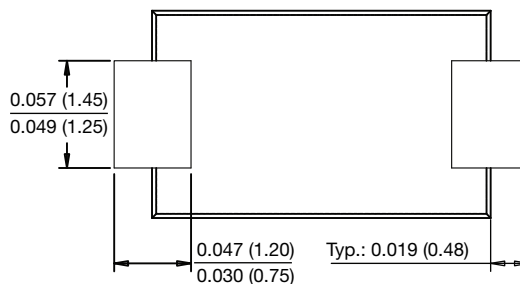
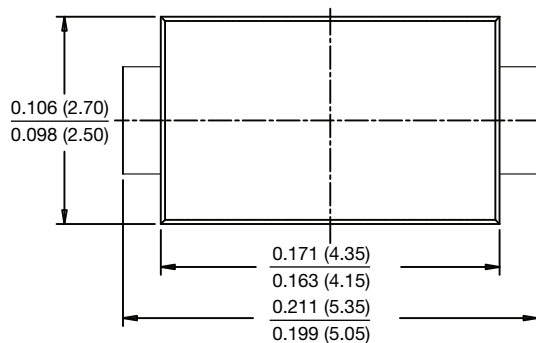
Note

- Fig. 1, power calculations is based on IPPM times defined maximum clamping voltage by pulse width

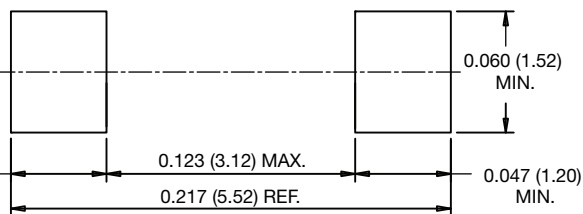
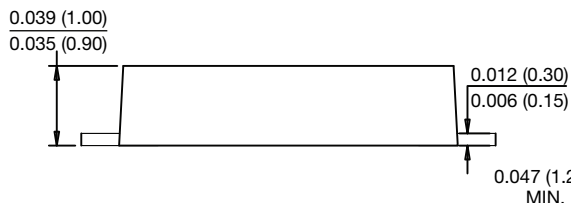


PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SlimSMA (DO-221AC)



Mounting Pad Layout





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