

Transient Voltage Suppressors (TVS) Data Sheet

● Description

The SMAFJ series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events

● Features

- For surface mounted applications in order to optimize board space
- Low leakage
- Glass passivated junction
- Low inductance
- Excellent clamping capability
- 400W peak pulse power capability at 10/1000μs waveform
- Fast response time
- Typical IR less than 5μA above 12V
- High Temperature soldering: 260°C /40 seconds at terminals
- Typical maximum temperature coefficient $\Delta V_{BR} = 0.1\% \times V_{BR} @ 25^{\circ}\text{C} \times \Delta T$
- Plastic package has Underwriters Laboratory Flammability 94V-0
- Matte tin lead-free Plated
- Halogen free and RoHS compliant
- Typical failure mode is short from over-specified voltage or current
- Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- IEC 61000-4-2 ESD 15KV(Air), 8KV(contact)

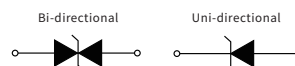
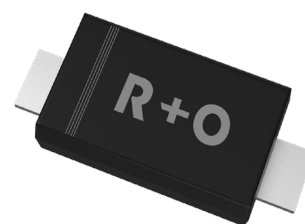
Breakdown Voltage

5 to 440 V

Peak Pulse Power

400 W

SMAF



● Applications

TVS devices are ideal for the protection of I/O interfaces, VCC bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications

● Maximum Ratings (Ta=25°C Unless otherwise specified)

PARAMETER	SYMBOL	VALUE	SYMBOL
Peak Pulse Power Dissipation with a 10/1000μs waveform (Fig.1)(Note 1), (Note 2)	P_{PPM}	400	W
Peak Pulse Current with a 10/1000μs waveform.(Note1, Fig.3)	I_{PP}	See Next Table	A
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)	I_{FSM}	60	A
Operating junction and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C
Typical thermal resistance junction to ambient	$R_{\theta J-A}$	150	°C /W

Note :

(1) Non-repetitive current pulse, per Fig. 3 and derated above Ta = 25°C per Fig. 2.

(2) Mounted on FR-4 PCB single-sided copper, mini pad.

(3) 8.3ms single half sine-wave, or equivalent square wave, Duty cycle = 4 pulses per minutes maximum.

(4) Peak pulse power waveform is 10/1000μs.

● Package Outline Dimensions (SMAF)

Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.30	1.60	0.051	0.063
B	3.30	3.70	0.129	0.145
C	2.40	2.70	0.094	0.105
D	4.40	4.90	0.172	0.191
E	0.90	1.20	0.035	0.047
F	0.80	1.20	0.031	0.047
G	0.12	0.20	0.005	0.008

Note:

- (1) Cathode Band: unidirectional only.
 (2) Bidirectional devices without this marking.

● Suggested Pad Layout

Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
M	1.80	-	0.070	-
J	1.60	-	0.063	-
K	-	2.2	-	0.086

● Electrical Characteristics (Ta=25°C Unless otherwise specified)

Part Number		Marking		Reverse Stand-Off Voltage	Breakdown Voltage V_{BR} (V) @ I_T		Test Current	Maximum Clamping Voltage @ I_{PP}	Peak Pulse Current	Reverse Leakage @ V_{RWM}
Uni	Bi	Uni	Bi	V_{RWM} (V)	Min.	Max.	I_T (mA)	V_C (V)	I_{PP} (A)	I_R (μA)
SMAFJ5.0A	SMAFJ5.0CA	AE	WE	5	6.4	7	10	9.2	43.5	800
SMAFJ6.0A	SMAFJ6.0CA	AG	WG	6	6.67	7.37	10	10.3	38.8	800
SMAFJ6.5A	SMAFJ6.5CA	AK	WK	6.5	7.22	7.98	10	11.2	35.7	500
SMAFJ7.0A	SMAFJ7.0CA	AM	WM	7	7.88	8.6	10	12.0	33.3	200
SMAFJ7.5A	SMAFJ7.5CA	AP	WP	7.5	8.33	9.21	1	12.9	31.0	100
SMAFJ8.0A	SMAFJ8.0CA	AR	WR	8	8.89	9.83	1	13.6	29.4	50
SMAFJ8.5A	SMAFJ8.5CA	AT	WT	8.5	9.44	10.4	1	14.4	27.8	20
SMAFJ9.0A	SMAFJ9.0CA	AV	WV	9	10	11.1	1	15.4	26.0	10
SMAFJ10A	SMAFJ10CA	AX	WX	10	11.1	12.3	1	17.0	23.5	5
SMAFJ11A	SMAFJ11CA	AZ	WZ	11	12.2	13.5	1	18.2	22.0	1
SMAFJ12A	SMAFJ12CA	BE	XE	12	13.3	14.7	1	19.9	20.1	1
SMAFJ13A	SMAFJ13CA	BG	XG	13	14.4	15.9	1	21.5	18.6	1
SMAFJ14A	SMAFJ14CA	BK	XK	14	15.6	17.2	1	23.2	17.2	1
SMAFJ15A	SMAFJ15CA	BM	XM	15	16.7	18.5	1	24.4	16.4	1

● **Electrical Characteristics** (Ta=25°C Unless otherwise specified)

Part Number		Marking		Reverse Stand-Off Voltage	Breakdown Voltage V_{BR} (V) @ I_T		Test Current	Maximum Clamping Voltage @ I_{PP}	Peak Pulse Current	Reverse Leakage @ V_{RWM}
Uni	Bi	Uni	Bi	V_{RWM} (V)	Min.	Max.	I_T (mA)	V_C (V)	I_{PP} (A)	I_R (μA)
SMAFJ16A	SMAFJ16CA	BP	XP	16	17.8	19.7	1	26.0	15.4	1
SMAFJ17A	SMAFJ17CA	BR	XR	17	18.9	20.9	1	27.6	14.5	1
SMAFJ18A	SMAFJ18CA	BT	XT	18	20	22.1	1	29.2	13.7	1
SMAFJ20A	SMAFJ20CA	BV	XV	20	22.2	24.5	1	32.4	12.3	1
SMAFJ22A	SMAFJ22CA	BX	XX	22	24.4	26.9	1	35.5	11.3	1
SMAFJ24A	SMAFJ24CA	BZ	XZ	24	26.7	29.5	1	38.9	10.3	1
SMAFJ26A	SMAFJ26CA	CE	YE	26	28.9	31.9	1	42.1	9.5	1
SMAFJ28A	SMAFJ28CA	CG	YG	28	31.1	34.4	1	45.4	8.8	1
SMAFJ30A	SMAFJ30CA	CK	YK	30	33.3	36.8	1	48.4	8.3	1
SMAFJ33A	SMAFJ33CA	CM	YM	33	36.7	40.6	1	53.3	7.5	1
SMAFJ36A	SMAFJ36CA	CP	YP	36	40	44.2	1	58.1	6.9	1
SMAFJ40A	SMAFJ40CA	CR	YR	40	44.4	49.1	1	64.5	6.2	1
SMAFJ43A	SMAFJ43CA	CT	YT	43	47.8	52.8	1	69.4	5.8	1
SMAFJ45A	SMAFJ45CA	CV	YV	45	50	55.3	1	72.7	5.5	1
SMAFJ48A	SMAFJ48CA	CX	YX	48	53.3	58.9	1	77.4	5.2	1
SMAFJ51A	SMAFJ51CA	CZ	YZ	51	56.7	62.7	1	82.4	4.9	1
SMAFJ54A	SMAFJ54CA	RE	ZE	54	60	66.3	1	87.1	4.6	1
SMAFJ58A	SMAFJ58CA	RG	ZG	58	64.4	71.2	1	93.6	4.3	1
SMAFJ60A	SMAFJ60CA	RK	ZK	60	66.7	73.7	1	96.8	4.1	1
SMAFJ64A	SMAFJ64CA	RM	ZM	64	71.1	78.6	1	103.0	3.9	1
SMAFJ70A	SMAFJ70CA	RP	ZP	70	77.8	86	1	113.0	3.5	1
SMAFJ75A	SMAFJ75CA	RR	ZR	75	83.3	92.1	1	121.0	3.3	1
SMAFJ78A	SMAFJ78CA	RT	ZT	78	86.7	95.8	1	126.0	3.2	1
SMAFJ85A	SMAFJ85CA	RV	ZV	85	94.4	104	1	137.0	2.9	1
SMAFJ90A	SMAFJ90CA	RX	ZX	90	100	111	1	146.0	2.7	1
SMAFJ100A	SMAFJ100CA	RZ	ZZ	100	111	123	1	162.0	2.5	1
SMAFJ110A	SMAFJ110CA	SE	VE	110	122	135	1	177.0	2.3	1
SMAFJ120A	SMAFJ120CA	SG	VG	120	133	147	1	193.0	2.1	1
SMAFJ130A	SMAFJ130CA	SK	VK	130	144	159	1	209.0	1.9	1
SMAFJ150A	SMAFJ150CA	SM	VM	150	167	185	1	243.0	1.6	1
SMAFJ160A	SMAFJ160CA	SP	VP	160	178	197	1	259.0	1.5	1
SMAFJ170A	SMAFJ170CA	SR	VR	170	189	209	1	275.0	1.5	1
SMAFJ180A	SMAFJ180CA	ST	VT	180	201	222	1	292.0	1.4	1
SMAFJ200A	SMAFJ200CA	SV	VV	200	224	247	1	324.0	1.2	1
SMAFJ220A	SMAFJ220CA	SX	VX	220	246	272	1	356.0	1.1	1
SMAFJ250A	SMAFJ250CA	SZ	VZ	250	279	309	1	405.0	1.0	1
SMAFJ300A	SMAFJ300CA	TE	UE	300	335	371	1	486.0	0.8	1
SMAFJ350A	SMAFJ350CA	TG	UG	350	391	432	1	567.0	0.7	1
SMAFJ400A	SMAFJ400CA	TK	UK	400	447	494	1	648.0	0.6	1
SMAFJ440A	SMAFJ440CA	TM	UM	440	492	543	1	713.0	0.6	1

Note :

(1) Suffix 'A' denotes 5% tolerance device.

(2) Add suffix 'CA' after part number to specify Bi-directional devices.

(3) For Bi-Directional devices having VR of 10 volts and under, the IR limit is double.

● Ratings And Characteristics Curves (Ta=25°C Unless otherwise specified)

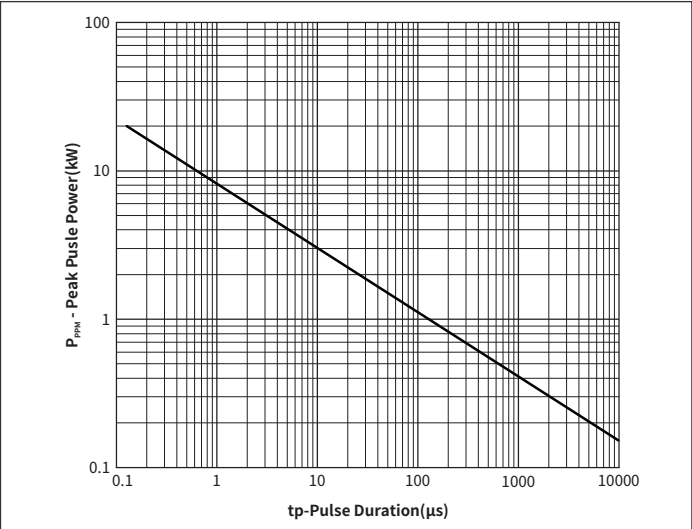


Fig. 1 Peak Pulse Power Rating Curve

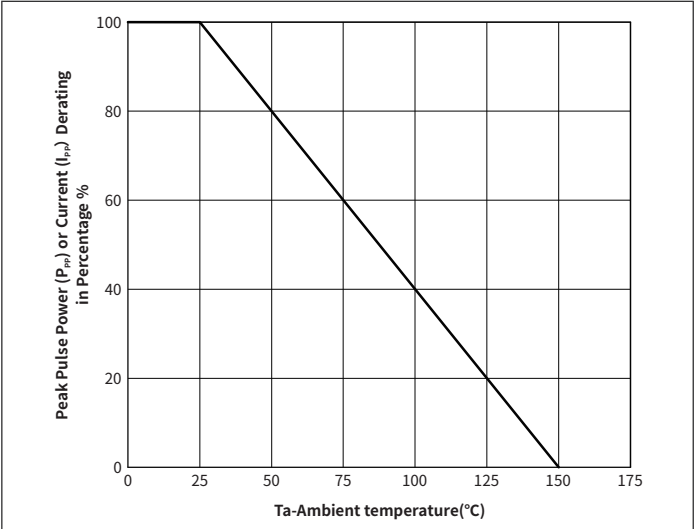


Fig.2 Pulse Derating Curve

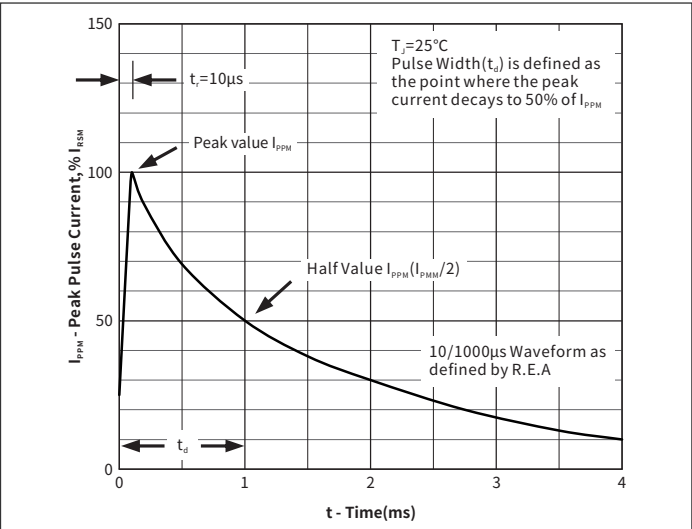


Fig.3 Pulse Waveform

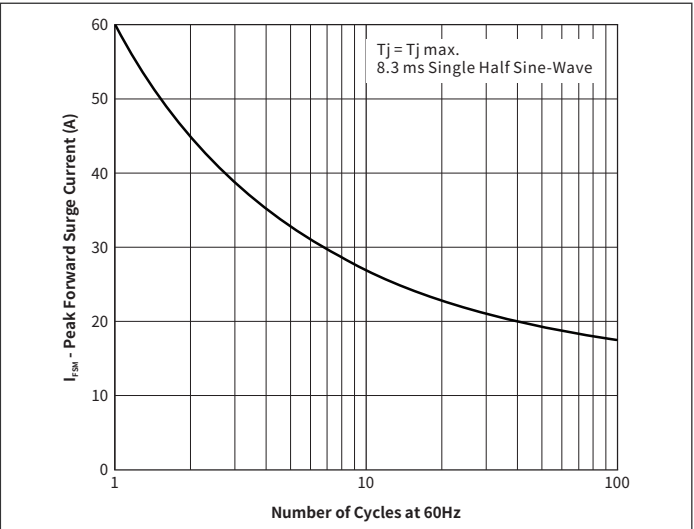
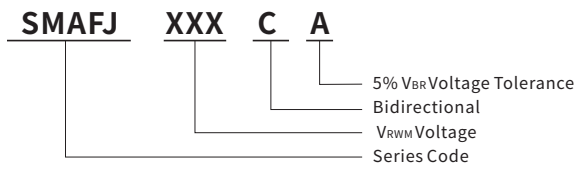


Fig.6 Maximum Non-Repetitive Forward Surge Current Uni-Directional Only

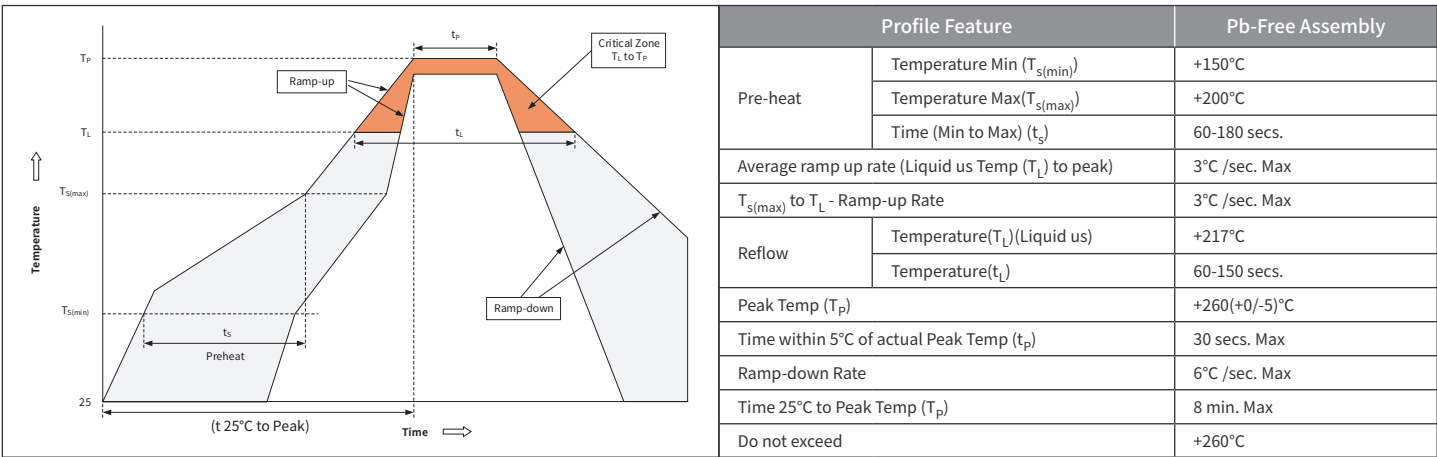
● Ordering Information

PACKAGE	PACKAGE CODE	UNIT WEIGHT(g)	REEL(pcs)	BOX(pcs)	CARTON(pcs)	DELIVERY MODE
SMAF	R1	0.034	3000	18000	180000	7"
SMAF	R2	0.034	7500	15000	120000	11"
SMAF	R3	0.034	7500	/	120000	13"

● Part Numbering



● Soldering Parameters



● Packaging (SMAF)

