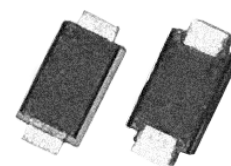


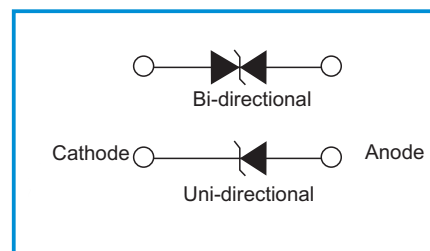
## Transient Voltage Suppressors (TVS) Data Sheet

### Features

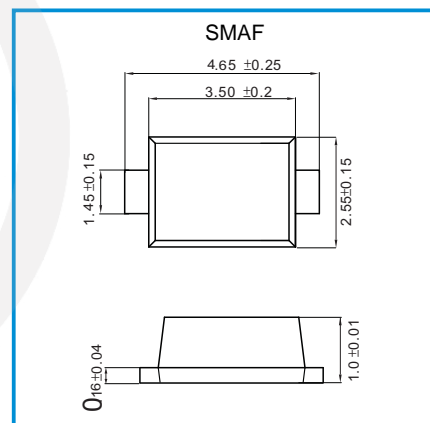
- 400W peak pulse power capability at 10/1000 $\mu$ s waveform, repetition rate (duty cycle): 0.01%
- Typical  $I_R$  less than 1 $\mu$ A above 10V
- High Temperature soldering: 260 $^{\circ}$ C/10 seconds at terminals
- Plastic package has underwriters laboratory flammability 94V-0
- Meets MSL level 1, per J-STD-020
- Fast response time
- For surface mounted applications in order to optimize board space
- Low profile package
- Glass passivated junction
- Low inductance
- Excellent clamping capability



Functional Diagram



Dimensions



### MECHANICAL DATA

- Case: JEDEC SMAF. Molded plastic over glass passivated junction
- Terminal: Solder plated, solderable per MIL-STD-750, Method 2026
- Standard Packaging: 12mm tape (EIA STD RS-481)
- Weight: 0.07g
- Polarity: Color band denotes cathode except bi-directional models

### Maximum Ratings and Electrical characteristics

Ratings at 25  $^{\circ}$ C ambient temperature unless otherwise specified.

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation on 10/1000 $\mu$ s waveform	PPPM	Min400	W
Peak Forward Surge Current (Note 2, Fig 4)	$I_{FSM}$	40	A
Peak Pulse Current on 10/1000 $\mu$ s waveform (Note 1, Fig 2)	$I_{PPM}$	see Table 1	A
Typical Junction capacitance at $V_R=4V$ , $f=1MHz$	$C_J$	390	pF
ESD Voltage per IEC6100-4-2	Contact	$\pm 8$	kV
	Air	$\pm 15$	
Typical Thermal Resistance Junction to Ambient(Note 2)	$R_{\theta JA}$	150	$^{\circ}$ C/W
Operating Junction Temperature and Storage Temperature Range	$T_j, T_{stg}$	-55 ~ +150	$^{\circ}$ C

#### NOTES:

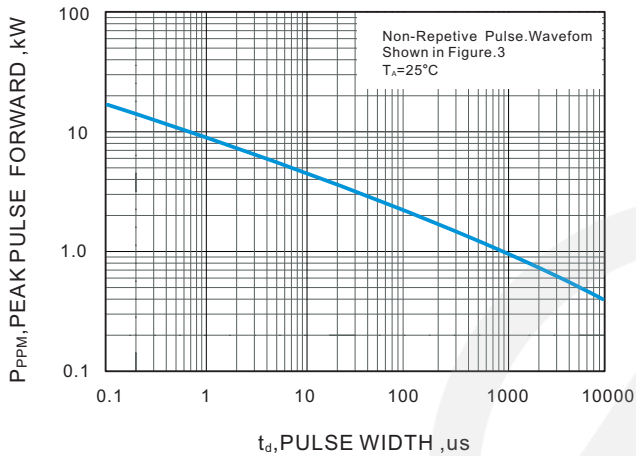
1. Non-repetitive current pulse, per Fig.3 and derated above  $T_A=25^{\circ}$ C per Fig. 2.
2. Mounted on FR-4 PCB single-sided copper, mini pad.
3. Peak Forward Surge Current : 8.3ms single half sine-wave Superimposed on rated load (JEDEC method).
4. Peak pulse power waveform is 10/1000 $\mu$ s.

## Electrical Characteristics (T<sub>A</sub>=25°C)

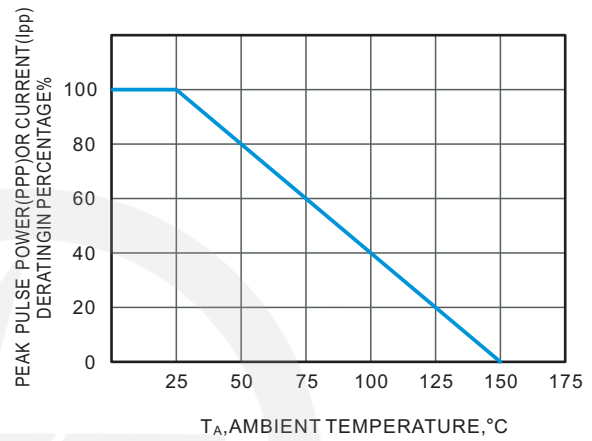
Part Number		Device Marking Code		Reverse Stand-Off Voltage	Breakdown Voltage @I <sub>T</sub>	Breakdown Voltage @I <sub>T</sub>	Test Current	Maximum Clamping Voltage @I <sub>PP</sub>	Peak Pulse Current	Reverse Leakage @V <sub>RWM</sub>
UNI-POLAR	BI-POLAR	Uni	Bi	V <sub>RWM</sub> (V)	V <sub>BR MIN</sub> (V)	V <sub>BR MAX</sub> (V)	I <sub>T</sub> (m)	V <sub>C</sub> (A)	I <sub>PP</sub> (A)	I <sub>R</sub> (uA)
SMAF5.0A	SMAF5.0CA	FAE	FWE	5.0	6.40	7.00	10	9.2	43.5	800
SMAF6.0A	SMAF6.0CA	FAG	FWG	6.0	6.67	7.37	10	10.3	38.8	800
SMAF6.5A	SMAF6.5CA	FAK	FWK	6.5	7.22	7.98	10	11.2	35.7	500
SMAF7.0A	SMAF7.0CA	FAM	FWM	7.0	7.78	8.60	10	12.0	33.3	200
SMAF7.5A	SMAF7.5CA	FAP	FWP	7.5	8.33	9.21	1	12.9	31.0	100
SMAF8.0A	SMAF8.0CA	FAR	FWR	8.0	8.89	9.83	1	13.6	29.4	50
SMAF8.5A	SMAF8.5CA	FAT	FWT	8.5	9.44	10.40	1	14.4	27.8	20
SMAF9.0A	SMAF9.0CA	FAV	FWV	9.0	10.00	11.10	1	15.4	26.0	10
SMAF10A	SMAF10CA	FAX	FWX	10.0	11.10	12.30	1	17.0	23.5	5
SMAF11A	SMAF11CA	FAZ	FWZ	11.0	12.20	13.50	1	18.2	22.0	1
SMAF12A	SMAF12CA	FBE	FXE	12.0	13.30	14.70	1	19.9	20.1	1
SMAF13A	SMAF13CA	FBG	FXG	13.0	14.40	15.90	1	21.5	18.6	1
SMAF14A	SMAF14CA	FBK	FXK	14.0	15.60	17.20	1	23.2	17.2	1
SMAF15A	SMAF15CA	FBM	FXM	15.0	16.70	18.50	1	24.4	16.4	1
SMAF16A	SMAF16CA	FBP	FXP	16.0	17.80	19.70	1	26.0	15.4	1
SMAF17A	SMAF17CA	FBR	FXR	17.0	18.9	20.9	1	27.6	14.5	1
SMAF18A	SMAF18CA	FBT	FXT	18.0	20.0	22.1	1	29.2	13.7	1
SMAF19A	SMAF19CA	FBB	FXB	19.0	21.1	23.3	1	30.8	12.3	1
SMAF20A	SMAF20CA	FBV	FXV	20.0	22.2	24.5	1	32.4	12.3	1
SMAF22A	SMAF22CA	FBX	FXX	22.0	24.4	26.9	1	35.5	11.3	1
SMAF24A	SMAF24CA	FBZ	FXZ	24.0	26.7	29.5	1	38.9	10.3	1
SMAF26A	SMAF26CA	FCE	FYE	26.0	28.9	31.9	1	42.1	9.5	1
SMAF28A	SMAF28CA	FCG	FYG	28.0	31.10	34.40	1	45.4	8.8	1
SMAF30A	SMAF30CA	FCK	FYK	30.0	33.30	36.80	1	48.4	8.3	1
SMAF33A	SMAF33CA	FCM	FYM	33.0	36.70	40.60	1	53.3	7.5	1
SMAF36A	SMAF36CA	FCP	FYP	36.0	40.00	44.20	1	58.1	6.9	1
SMAF40A	SMAF40CA	FCR	FYR	40.0	44.40	49.10	1	64.5	6.2	1
SMAF43A	SMAF43CA	FCT	FYT	43.0	47.80	52.80	1	69.4	5.8	1
SMAF45A	SMAF45CA	FCV	FYV	45.0	50.00	55.30	1	72.7	5.5	1
SMAF48A	SMAF48CA	FCX	FYX	48.0	53.30	58.90	1	77.4	5.2	1
SMAF51A	SMAF51CA	FCZ	FYZ	51.0	56.70	62.70	1	82.4	4.9	1
SMAF54A	SMAF54CA	FRE	FZE	54.0	60.00	66.30	1	87.1	4.6	1
SMAF58A	SMAF58CA	FRG	FZG	58.0	64.4	71.2	1	93.6	4.3	1
SMAF60A	SMAF60CA	FRK	FZK	60.0	66.70	73.70	1	96.8	4.1	1
SMAF64A	SMAF64CA	FRM	FZM	64.0	71.1	78.6	1	103	3.9	1
SMAF70A	SMAF70CA	FRP	FZP	70.0	77.80	86.00	1	113.0	3.5	1
SMAF75A	SMAF75CA	FRR	FZR	75.0	83.30	92.10	1	121.0	3.3	1
SMAF78A	SMAF78CA	FRT	FZT	78.0	86.70	95.80	1	126.0	3.2	1
SMAF80A	SMAF80CA	FRB	FZB	80.0	88.80	97.60	1	129.6	3.0	1
SMAF85A	SMAF85CA	FRV	FZV	85.0	94.40	104.00	1	137.0	2.9	1
SMAF90A	SMAF90CA	FRX	FZX	90.0	100.00	111.00	1	146.0	2.7	1
SMAF100A	SMAF100CA	FRZ	FZZ	100.0	111.00	123.00	1	162.0	2.5	1
SMAF110A	SMAF110CA	FSE	FVE	110.0	122.00	135.00	1	177.0	2.3	1
SMAF120A	SMAF120CA	FSG	FVG	120.0	133.00	147.00	1	193.0	2.1	1
SMAF130A	SMAF130CA	FSK	FVK	130.0	144.00	159.00	1	209.0	1.9	1
SMAF140A	SMAF140CA	FSB	FVB	140.0	155.00	171.00	1	226.8	1.6	1
SMAF150A	SMAF150CA	FSM	FVM	150.0	167.00	185.00	1	243.0	1.6	1
SMAF160A	SMAF160CA	FSP	FVP	160.0	178.00	197.00	1	259.0	1.5	1
SMAF170A	SMAF170CA	FSR	FVR	170.0	189.00	209.00	1	275.0	1.5	1
SMAF180A	SMAF180CA	FST	FVT	180.0	201.00	222.00	1	292.0	1.4	1
SMAF190A	SMAF190CA	FSU	FYU	190.0	211.00	233.00	1	308.0	1.3	1
SMAF200A	SMAF200CA	FSV	FYX	200.0	224.00	247.00	1	324.0	1.2	1
SMAF210A	SMAF210CA	FSW	FYW	210.0	237.00	263.00	1	340.0	1.2	1
SMAF220A	SMAF220CA	FGE	FVX	220.0	246.00	272.00	1	356.0	1.1	1
SMAF250A	SMAF250CA	FSZ	FVZ	250.0	279.00	309.00	1	405.0	1.0	1
SMAF300A	SMAF300CA	FTE	FUE	300.0	335.00	371.00	1	486.0	0.8	1
SMAF350A	SMAF350CA	FTG	FUG	350.0	391.00	432.00	1	567.0	0.7	1
SMAF400A	SMAF400CA	FTK	FUK	400.0	447.00	494.00	1	648.0	0.6	1
SMAF440A	SMAF440CA	FTM	FUM	440.0	492.00	543.00	1	713.0	0.6	1

**Ratings and Characteristic Curves ( $T_A = 25^\circ\text{C}$  unless otherwise noted)**

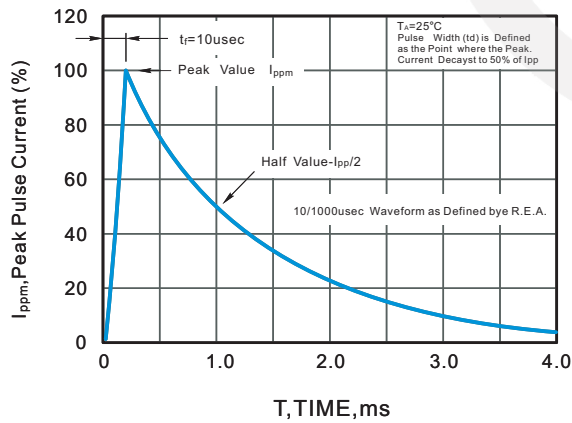
**Figure 1. Peak Pulse Power Rating Curve**



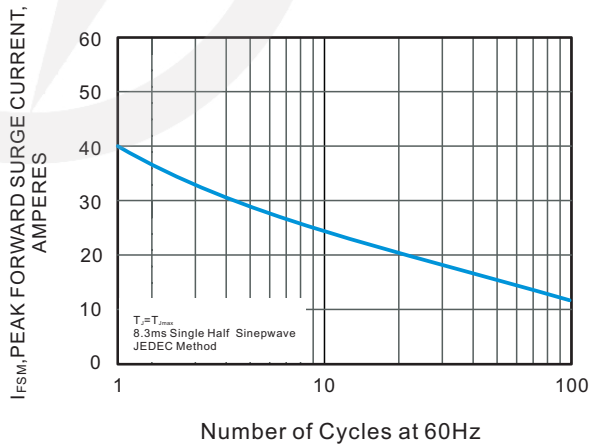
**Figure 2. Forward current Derating Curve**

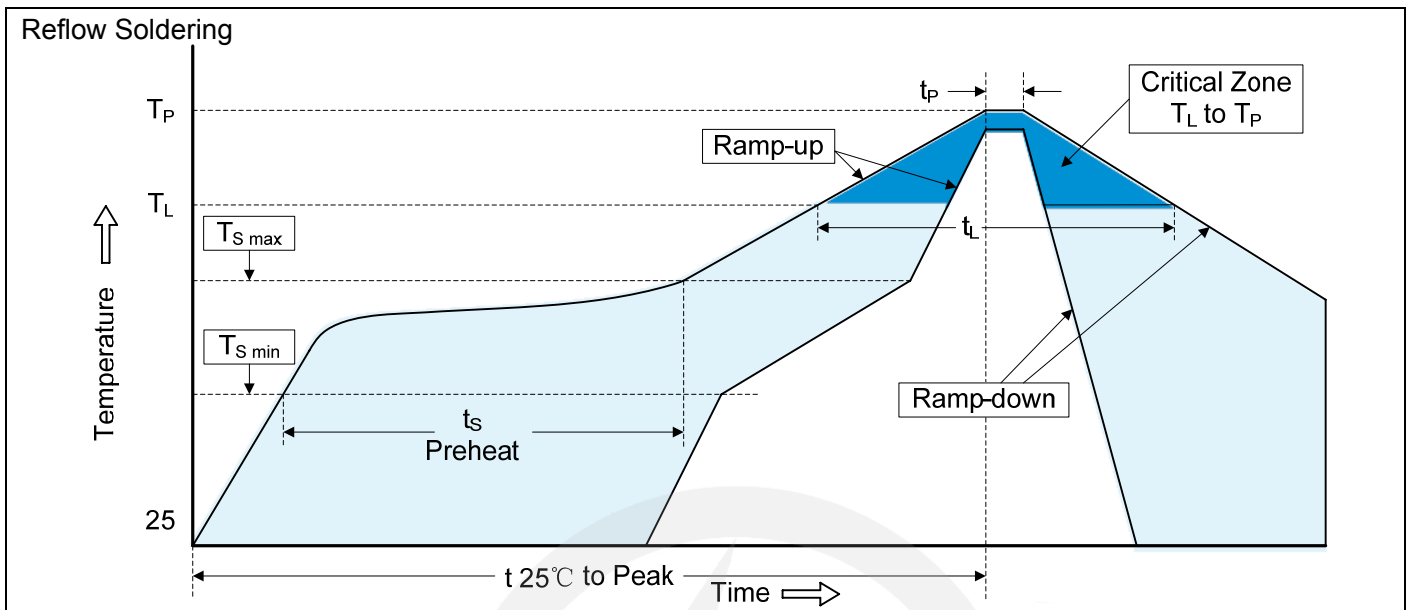


**Figure 3. Pulse Waveform**



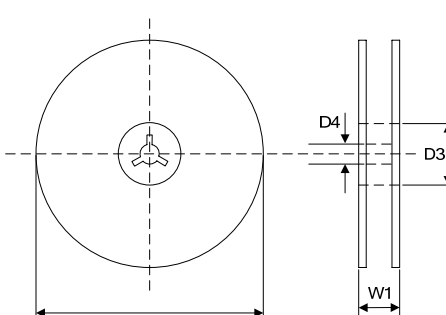
**Figure 4. Maximum Non-Repetitive Forward Surge Current**



**Recommended Soldering Conditions**

**Recommended Conditions**

Profile Feature	Pb-Free Assembly
Average ramp-up rate ( $T_L$ to $T_P$ )	3°C/second max.
Preheat -Temperature Min ( $T_{S\ min}$ ) -Temperature Max ( $T_{S\ max}$ ) -Time (min to max) ( $t_s$ )	150°C 200°C 60-180 seconds
$T_{S\ max}$ to $T_L$ -Ramp-up Rate	3°C/second max.
Time maintained above: -Temperature ( $T_L$ ) -Time ( $t_L$ )	217°C 60-150 seconds
Peak Temperature ( $T_P$ )	260°C
Time within 5°C of actual Peak Temperature ( $t_P$ )	20-40 seconds
Ramp-down Rate	6°C/second max.
Time 25°C to Peak Temperature	8 minutes max.

**Packaging**

7" Reel 	D2	Φ178.0±2.0
	D3	Φ50.0Min.
	D4	Φ13.0±0.5
	W1	16.0±2.0
	Quantity: 3000PCS	