



# TVS: SMF5.0 thru SMF170A

## Glass Passivated TVS

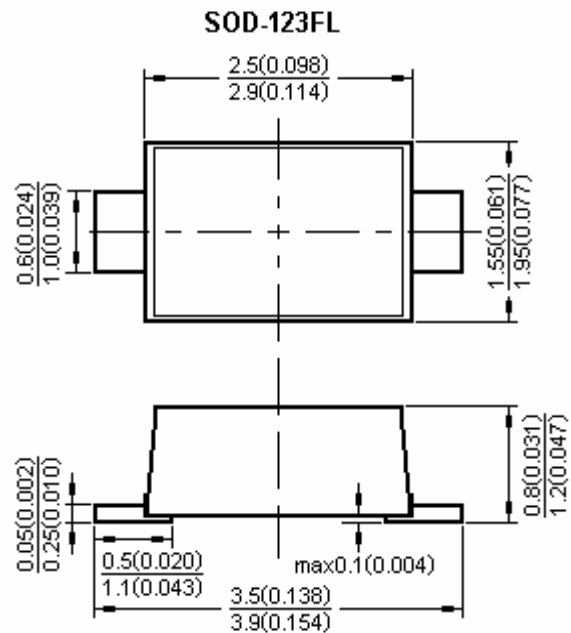
### Features

- For surface mounted applications in order to optimize board space
- Low profile space
- Glass passivated chip
- Low inductance
- Excellent clamping capability
- Very fast response time
- Typical  $I_D$  less than  $1\mu A$  at  $V_{WM}$
- 200 W peak pulse power capability with a 10/1000  $\mu s$  waveform
- Component in accordance to RoHS 2002/95/1 and WEEE 2002/96/EC



### Mechanical Date

- Case: JEDEC SOD-123FL molded plastic over passivated chip
- Terminals: Solder plated, solderable per MIL-STD-750 Method 2026
- Polarity: For uni-directional types the band by laser denotes the cathode, which is positive with respect to the anode under normal TVS operation



Dimensions in millimeters and (inches)

### Maximum Ratings & Thermal Characteristics & Electrical Characteristics

( $T_A = 25^\circ C$  unless otherwise noted)

	Symbol	VALUE	UNIT
Peak pulse power dissipation with a 10/1000 $\mu s$ waveform (Note1,2)	$P_{PPM}$	200	W
Peak pulse current 10/1000 $\mu s$ waveform(Note 1)	$I_{PPM}$	See Next Table	A
Forward voltage @ $I_F=200mA$	$V_F$	1.25	V
Peak forward surge current 8.3ms single half sine-wave	$I_{FSM}$	20	A
Operating junction and storage temperature range	$T_J T_{STG}$	-55 to +150	$^\circ C$

**Notes:** 1.Non-repetitive current pulse and derated above  $T_A=25^\circ C$

2.Mounted on 5.0mm<sup>2</sup> copper pads to each terminal.



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

TRR House No.	Marking Code	Breakdown Voltage at $I_T^{(2)}$		Test Current	Stand-off Voltage	Maximum Reverse Leakage at $V_{WM}^{(4)}$	Maximum Peak Pulse Surge Current $I_{PPM}^{(3)}$	Maximum Clamping Voltage at $I_{PPM}$
		Min	Max					
UNI	UNI	Min	Max	$I_T$ (mA)	$V_{WM}$ (V)	$I_D$ ( $\mu\text{A}$ )	$I_{PPM}$ (A)	$V_C$ (V)
SMF5.0	KD	6.40	7.82	10	5.0	400	20.80	9.6
SMF5.0A	KE	6.40	7.00	10	5.0	400	21.70	9.2
SMF6.0	KF	6.67	8.15	10	6.0	400	17.55	11.4
SMF6.0A	KG	6.67	7.37	10	6.0	400	19.40	10.3
SMF6.5	KH	7.22	8.82	10	6.5	250	16.30	12.3
SMF6.5A	KK	7.22	7.98	10	6.5	250	17.90	11.2
SMF7.0	KL	7.78	9.51	10	7.0	100	15.10	13.3
SMF7.0A	KM	7.78	8.60	10	7.0	100	16.70	12.0
SMF7.5	KN	8.33	10.20	1.0	7.5	50	14.00	14.3
SMF7.5A	KP	8.33	9.21	1.0	7.5	50	15.50	12.9
SMF8.0	KQ	8.89	10.90	1.0	8.0	25	13.35	15.0
SMF8.0A	KR	8.89	9.83	1.0	8.0	25	14.70	13.6
SMF8.5	KS	9.44	11.50	1.0	8.5	10	12.60	15.9
SMF8.5A	KT	9.44	10.40	1.0	8.5	10	13.90	14.4
SMF9.0	KU	10.00	12.20	1.0	9.0	5.0	11.85	16.9
SMF9.0A	KV	10.00	11.10	1.0	9.0	5.0	13.00	15.4
SMF10	KW	11.10	13.60	1.0	10	2.5	10.70	18.8
SMF10A	KX	11.10	12.30	1.0	10	2.5	11.80	17.0
SMF11	KY	12.20	14.90	1.0	11	2.5	9.95	20.1
SMF11A	KZ	12.20	13.50	1.0	11	2.5	11.00	18.2
SMF12	LD	13.30	16.30	1.0	12	2.5	9.15	22.0
SMF12A	LE	13.30	14.70	1.0	12	2.5	10.10	19.9
SMF13	LF	14.40	17.60	1.0	13	1.0	8.40	23.8
SMF13A	LG	14.40	15.90	1.0	13	1.0	9.30	21.5
SMF14	LH	15.60	19.10	1.0	14	1.0	7.75	25.8
SMF14A	LK	15.60	17.20	1.0	14	1.0	8.60	23.2
SMF15	LL	16.70	20.40	1.0	15	1.0	7.45	26.9
SMF15A	LM	16.70	18.50	1.0	15	1.0	8.20	24.4
SMF16	LN	17.80	21.80	1.0	16	1.0	6.95	28.8
SMF16A	LP	17.80	19.70	1.0	16	1.0	7.70	17.0
SMF17	LQ	18.90	23.10	1.0	17	1.0	6.50	30.5
SMF17A	LR	18.90	20.90	1.0	17	1.0	7.20	27.6
SMF18	LS	20.00	24.40	1.0	18	1.0	6.15	32.2
SMF18A	LT	20.00	22.10	1.0	18	1.0	6.80	29.2
SMF20	LU	22.20	27.10	1.0	20	1.0	5.65	35.8
SMF20A	LV	22.20	24.50	1.0	20	1.0	6.20	32.4
SMF22	LW	24.40	29.80	1.0	22	1.0	5.05	39.4
SMF22A	LX	24.40	26.90	1.0	22	1.0	5.60	35.5
SMF24	LY	26.70	32.60	1.0	24	1.0	4.60	43.0
SMF24A	LZ	26.70	29.50	1.0	24	1.0	5.10	38.9
SMF26	MD	28.90	35.30	1.0	26	1.0	4.35	46.6
SMF26A	ME	28.90	31.90	1.0	26	1.0	4.80	42.1
SMF28	MF	31.10	38.00	1.0	28	1.0	4.00	50.0
SMF28A	MG	31.10	34.40	1.0	28	1.0	4.40	45.4
SMF30	MH	33.30	40.70	1.0	30	1.0	3.70	53.5
SMF30A	MK	33.30	36.80	1.0	30	1.0	4.10	48.4

Notes: (1) For bi-directional devices, use suffix C or CA (e.g. SMF5.0C, SMF5.0CA). Electrical characteristics apply in both directions.

(2)  $I_T$  pulse test:  $t_p \leq 5.0\text{mS}$

(3) Surge current waveform 10 / 1000  $\mu\text{S}$ .

(4) For bidirectional types with  $V_{WM}$  of 10 volts and less, the  $I_D$  limit is doubled.





# TVS: SMF5.0 thru SMF170A

## Glass Passivated TVS

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

TRR House No.	Marking Code	Breakdown Voltage at $I_T^{(2)}$		Test Current	Stand-off Voltage	Maximum Reverse Leakage at $V_{WM}^{(4)}$	Maximum Peak Pulse Surge Current $I_{PPM}^{(3)}$	Maximum Clamping Voltage at $I_{PPM}$
		$V_{(BR)}$ (V) Min	$V_{(BR)}$ (V) Max					
UNI	UNI	Min	Max	$I_T$ (mA)	$V_{WM}$ (V)	$I_D$ ( $\mu$ A)	$I_{PPM}$ (A)	$V_C$ (V)
SMF33	ML	36.70	44.90	1.0	33	1.0	3.45	59.0
SMF33A	MM	36.70	40.60	1.0	33	1.0	3.80	53.3
SMF36	MN	40.00	48.90	1.0	36	1.0	3.06	64.3
SMF36A	MP	40.00	44.20	1.0	36	1.0	3.40	58.1
SMF40	MQ	44.40	54.30	1.0	40	1.0	2.80	71.4
SMF40A	MR	44.40	49.10	1.0	40	1.0	3.10	64.5
SMF43	MS	47.80	58.40	1.0	43	1.0	2.60	76.7
SMF43A	MT	47.80	52.80	1.0	43	1.0	2.90	69.4
SMF45	MU	50.00	61.10	1.0	45	1.0	2.55	80.3
SMF45A	MV	50.00	55.30	1.0	45	1.0	2.80	72.7
SMF48	MW	53.30	65.10	1.0	48	1.0	2.35	85.5
SMF48A	MX	53.30	58.90	1.0	48	1.0	2.60	77.4
SMF51	MY	56.70	69.30	1.0	51	1.0	2.16	91.1
SMF51A	MZ	56.70	62.70	1.0	51	1.0	2.40	82.4
SMF54	ND	60.00	73.30	1.0	54	1.0	2.10	96.3
SMF54A	NE	60.00	66.30	1.0	54	1.0	2.30	87.1
SMF58	NF	64.40	78.70	1.0	58	1.0	2.00	103
SMF58A	NG	64.40	71.20	1.0	58	1.0	2.20	93.6
SMF60	NH	66.70	81.50	1.0	60	1.0	1.90	107
SMF60A	NK	66.70	73.70	1.0	60	1.0	2.10	96.8
SMF64	NL	71.10	86.90	1.0	64	1.0	1.79	114
SMF64A	NM	71.10	78.60	1.0	64	1.0	2.00	103
SMF70	NN	77.80	95.10	1.0	70	1.0	1.65	125
SMF70A	NP	77.80	86.00	1.0	70	1.0	1.80	113
SMF75	NQ	83.30	102.0	1.0	75	1.0	1.55	134
SMF75A	NR	83.30	92.10	1.0	75	1.0	1.70	121
SMF78	NS	86.70	106.0	1.0	78	1.0	1.45	139
SMF78A	NT	86.70	95.80	1.0	78	1.0	1.60	126
SMF85	NU	94.40	115.0	1.0	85	1.0	1.34	151
SMF85A	NV	94.40	104.0	1.0	85	1.0	1.50	137
SMF90	NW	100.0	122.0	1.0	90	1.0	1.30	160
SMF90A	NX	100.0	111.0	1.0	90	1.0	1.40	146
SMF100	NY	111.0	136.0	1.0	100	1.0	1.14	179
SMF100A	NZ	111.0	123.0	1.0	100	1.0	1.30	162
SMF110	PD	122.0	149.0	1.0	110	1.0	1.04	196
SMF110A	PE	122.0	135.0	1.0	110	1.0	1.20	177
SMF120	PF	133.0	163.0	1.0	120	1.0	0.95	214
SMF120A	PG	133.0	147.0	1.0	120	1.0	1.00	193
SMF130	PH	144.0	176.0	1.0	130	1.0	0.89	231
SMF130A	PK	144.0	159.0	1.0	130	1.0	1.00	209
SMF150	PL	167.0	204.0	1.0	150	1.0	0.75	268
SMF150A	PM	167.0	185.0	1.0	150	1.0	0.80	243
SMF160	PN	178.0	218.0	1.0	160	1.0	0.75	287
SMF160A	PP	178.0	197.0	1.0	160	1.0	0.80	259
SMF170	PQ	189.0	231.0	1.0	170	1.0	0.65	304
SMF170A	PR	189.0	209.0	1.0	170	1.0	0.70	275

Notes: (1) For bi-directional devices, use suffix C or CA (e.g. SMF5.0C, SMF5.0CA). Electrical characteristics apply in both directions.

(2)  $I_T$  pulse test:  $t_p \leq 5.0\text{ms}$

(3) Surge current waveform 10 / 1000  $\mu$ S.

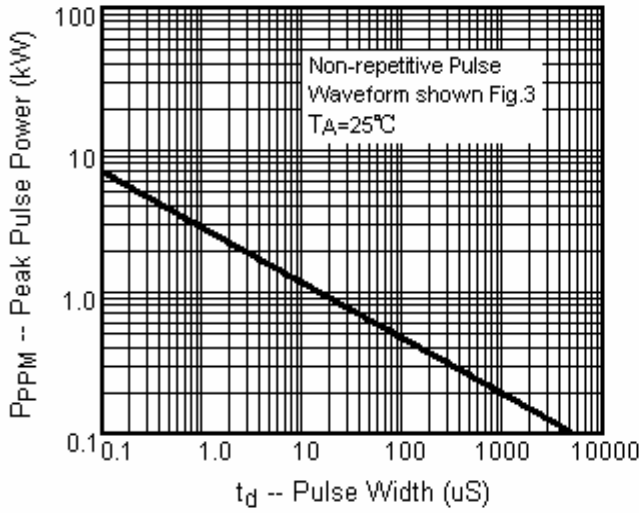
(4) For bidirectional types with  $V_{WM}$  of 10 volts and less, the  $I_D$  limit is doubled.



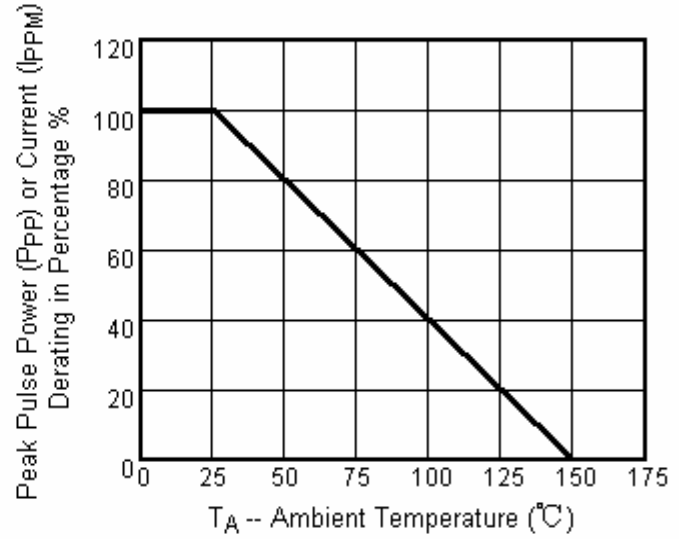


## Characteristic Curves ( $T_A=25^\circ\text{C}$ unless otherwise noted)

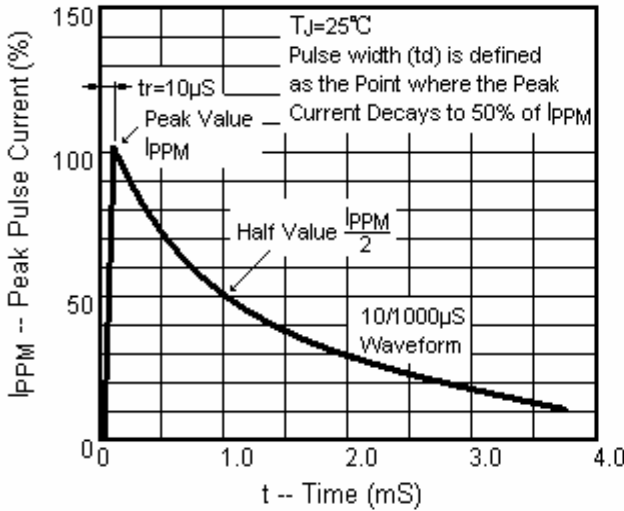
**Fig.1 Peak Pulse Power Rating Curve**



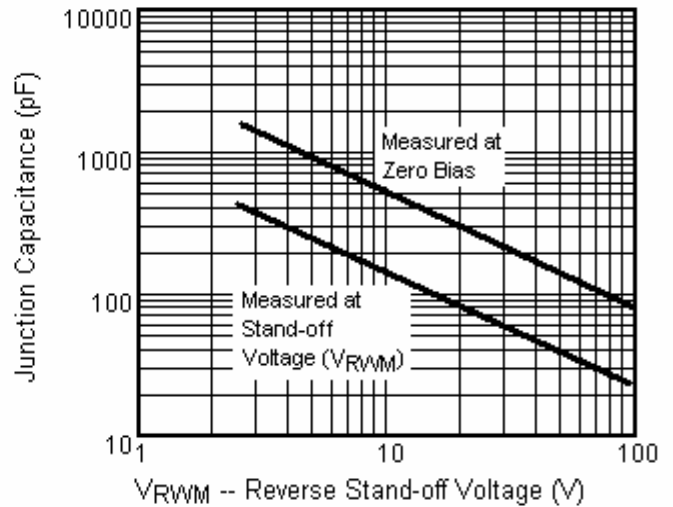
**Fig.2 Pulse Derating Curve**



**Fig.3 Pulse Waverform**



**Fig.4 Typical Junction Capacitance**



**Fig.2 Maximum Non-Repetitive Peak Forward Surge Current**

