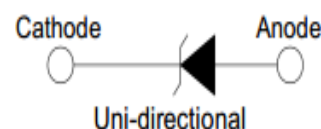


Description

The SMF 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
- RoHS compliant / Halogen-free
- Typical maximum temperature coefficient
 $\Delta V_{BR} = 0.1\% \times V_{BR@25^{\circ}\text{C}} \times \Delta T$
- Glass passivated Chip junction in SOD-123 package
- 200W peak pulse capability at 10×1000μs waveform, repetition rate (duty cycles):0.01%
- Fast response time: typically less than 1.0ps from 0 Volts to BV min
- Excellent clamping capability
- Low incremental surge resistance
- Typical I_R less than 1μA above 11V
- High temperature soldering guaranteed: 260°C/40 seconds / 0.375", (9.5mm) lead length, 5lbs., (2.3kg) tension
- Plastic package has underwriters laboratory flammability classification 94v-0



Application

- I/O interface
- AC/DC power supply
- Low frequency signal transmission line (RS232, RS485, etc.)

Maximum Ratings and Characteristics (Ta=25°C unless otherwise specified)

Rating	Symbol	Value	Units
Peak Pulse Power Dissipation by 10x1000μs test waveform (Fig.1)(Note 1)	P_{PPM}	200	Watts
Steady State Power Dissipation on infinite heat sink at TL=75°C (Fig. 5)	P_D	0.4	Watts
Peak Forward Surge Current, 8.3ms Single Half Sine Wave Unidirectional only (Note 2)	I_{FSM}	20	Amps
Maximum Instantaneous Forward Voltage at 25A for Unidirectional only (Note 3)	V_F	3.5/5.0	V
Operating junction and Storage Temperature Range.	T_J, T_{STG}	-55 to 150	°C
Typical Thermal Resistance Junction to Lead	R_{uJL}	30	°C/W
Typical Thermal Resistance Junction to Ambient	R_{uJA}	120	°C/W

Notes:

1. Non-repetitive current pulse, per Fig. 3 and derated above $T_A = 25^{\circ}\text{C}$ per Fig. 2.
2. Measured on 8.3ms single half sine wave or equivalent square wave, duty cycle=4 per minute maximum.
3. $V_F < 3.5\text{V}$ for devices of $V_{BR} < 200\text{V}$ and $V_F < 5.0\text{V}$ for devices of $V_{BR} > 201\text{V}$.

TECHNOLOGIES SMF SERIES		Device Marking Code		Breakdown voltage VBR @ IT			Maximum Reverse Leakage IR(uA) @VRWM	Working PeakReverse Voltage VRWM (Volts)	Maximum Reverse Surge Current Ipp(A) @10x1000u s sinewave	Maximum Clamping Voltage Vc (Volts) @Ipp
(Uni)	(Bi)	Uni	Bi	Min (V)	Max (V)	IT (mA)				
SMF5.0A	SMF5.0CA	FE	KE	6.40	7.07	10	400	5.0	21.7	9.2
SMF6.0A	SMF6.0CA	FG	KG	6.67	7.37	10	400	6.0	19.4	10.3
SMF6.5A	SMF6.5CA	FK	KK	7.22	7.98	10	250	6.5	17.9	11.2
SMF7.0A	SMF7.0CA	FM	KM	7.78	8.60	10	100	7.0	16.7	12.0
SMF7.5A	SMF7.5CA	FP	KP	8.33	9.21	1	50	7.5	15.5	12.9
SMF8.0A	SMF8.0CA	FR	KR	8.89	9.83	1	25	8.0	14.7	13.6
SMF8.5A	SMF8.5CA	FT	KT	9.44	10.4	1	10	8.5	13.9	14.4
SMF9.0A	SMF9.0CA	FV	KV	10.0	11.1	1	5.0	9.0	13.0	15.4
SMF10A	SMF10CA	FX	KX	11.1	12.3	1	2.5	10	11.8	17.0
SMF11A	SMF11CA	FZ	KZ	12.2	13.5	1	2.5	11	11.0	18.2
SMF12A	SMF12CA	HE	LE	13.3	14.7	1	2.5	12	10.1	19.9
SMF13A	SMF13CA	HB	LG	14.4	15.9	1	1.0	13	9.30	21.5
SMF14A	SMF14CA	HK	LK	15.6	17.2	1	1.0	14	8.62	23.2
SMF15A	SMF15CA	HM	LM	16.7	18.5	1	1.0	15	8.20	24.4
SMF16A	SMF16CA	HP	LP	17.8	19.7	1	1.0	16	7.69	26.0
SMF17A	SMF17CA	HR	LR	18.9	20.9	1	1.0	17	7.25	27.6
SMF18A	SMF18CA	HT	LT	20.0	22.1	1	1.0	18	6.85	29.2
SMF19A	SMF19CA	HB	LB	21.1	23.3	1	1.0	19	6.54	30.6
SMF20A	SMF20CA	HV	LV	22.2	24.5	1	1.0	20	6.17	32.4
SMF22A	SMF22CA	HX	LX	24.4	26.9	1	1.0	22	5.63	35.5
SMF24A	SMF24CA	HZ	LZ	26.7	29.5	1	1.0	24	5.14	38.9
SMF26A	SMF26CA	JE	ME	28.9	31.9	1	1.0	26	4.75	42.1
SMF28A	SMF28CA	JG	MG	31.1	34.4	1	1.0	28	4.41	45.4
SMF30A	SMF30CA	JK	MK	33.3	36.8	1	1.0	30	4.13	48.4
SMF33A	SMF33CA	JM	MM	36.7	40.6	1	1.0	33	3.75	53.3
SMF36A	SMF36CA	JP	MP	40.0	44.2	1	1.0	36	3.44	58.1
SMF40A	SMF40CA	JR	MR	44.4	49.1	1	1.0	40	3.10	64.5
SMF43A	SMF43CA	JT	MT	47.8	52.8	1	1.0	43	2.88	69.4
SMF45A	SMF45CA	JV	MV	50.0	55.3	1	1.0	45	2.75	72.7
SMF48A	SMF48CA	JX	MX	53.3	58.9	1	1.0	48	2.58	77.4
SMF51A	SMF51CA	JZ	MZ	56.7	62.7	1	1.0	51	2.43	82.4
SMF54A	SMF54CA	XE	NE	60.0	66.3	1	1.0	54	2.30	87.1
SMF58A	SMF58CA	XG	NG	64.4	71.2	1	1.0	58	2.14	93.6
SMF60A	SMF60CA	XK	NK	66.7	73.7	1	1.0	60	2.07	96.8
SMF64A	SMF64CA	XM	NM	71.1	78.6	1	1.0	64	1.94	103
SMF70A	SMF70CA	XP	NP	77.8	86.0	1	1.0	70	1.77	113
SMF75A	SMF75CA	XR	NR	83.3	92.1	1	1.0	75	1.65	121
SMF78A	SMF78CA	XT	NT	86.7	95.8	1	1.0	78	1.59	126
SMF80A	SMF80CA	XB	NB	88.8	97.6	1	1.0	80	1.55	129
SMF85A	SMF85CA	XV	NV	94.4	104	1	1.0	85	1.46	137
SMF90A	SMF90CA	XX	NX	100	111	1	1.0	90	1.37	146
SMF100A	SMF100CA	XZ	NZ	111	123	1	1.0	100	1.23	162
SMF110A	SMF110CA	TE	PE	122	135	1	1.0	110	1.13	177
SMF120A	SMF120CA	TG	PG	133	147	1	1.0	120	1.04	193
SMF130A	SMF130CA	TK	PK	144	159	1	1.0	130	0.96	209
SMF140A	SMF140CA	TB	PB	155	171	1	1.0	140	0.89	224
SMF150A	SMF150CA	TM	PM	167	185	1	1.0	150	0.82	243
SMF160A	SMF160CA	TP	PP	178	197	1	1.0	160	0.77	259
SMF170A	SMF170CA	TR	PR	189	209	1	1.0	170	0.73	275
SMF180A	SMF180CA	TT	PT	200	220	1	1.0	180	0.68	292
SMF190A	SMF190CA	TV	PV	211	232	1	1.0	190	0.65	308

Note:

1. Suffix 'A' denotes 5% tolerance device. Without 'A' denotes 10% tolerance device.
2. Add suffix 'C' or '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 Characteristic Curves ($T_A=25^\circ\text{C}$ unless otherwise specified)

SMF Series 200W

Figure 1 - Peak Pulse Power Rating Curve

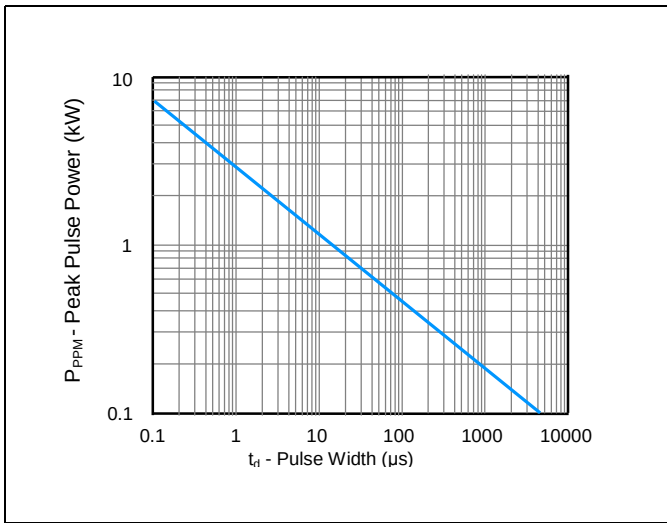


Figure 2 - Pulse Derating Curve

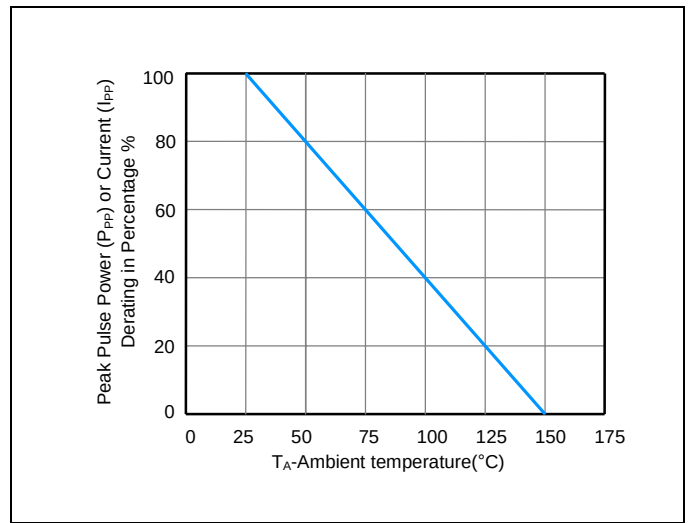


Figure 3 - Pulse Waveform

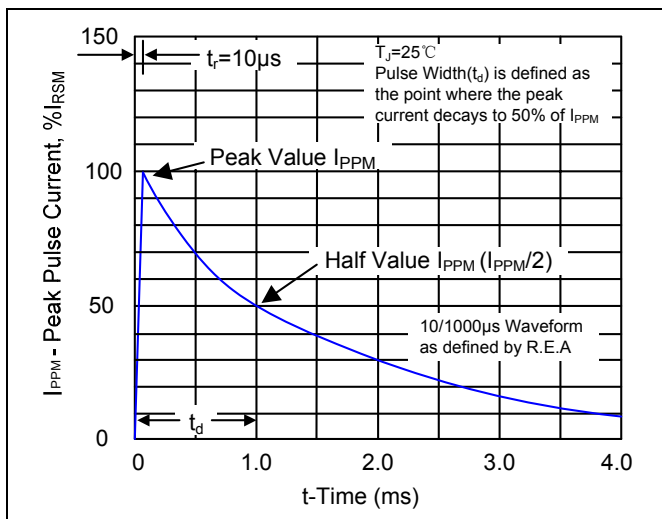


Figure 4 - Typical Junction Capacitance

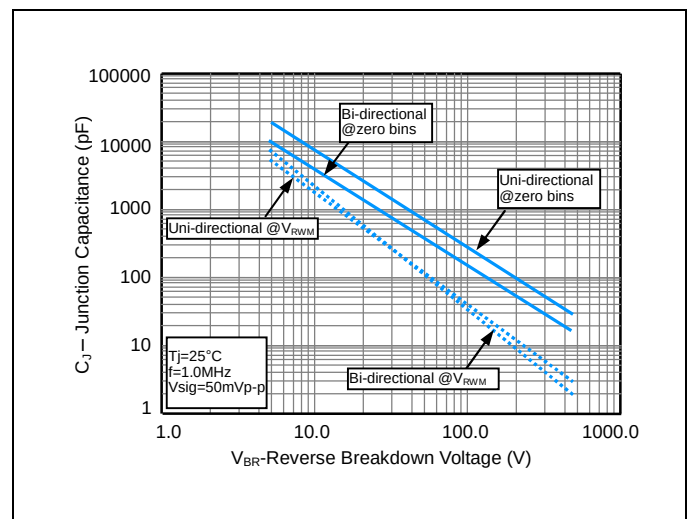


Figure 5. Steady State Power Dissipation Derating Curve

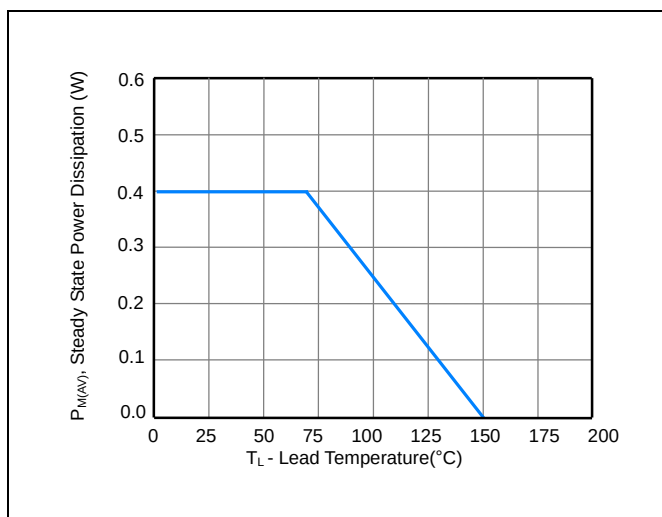
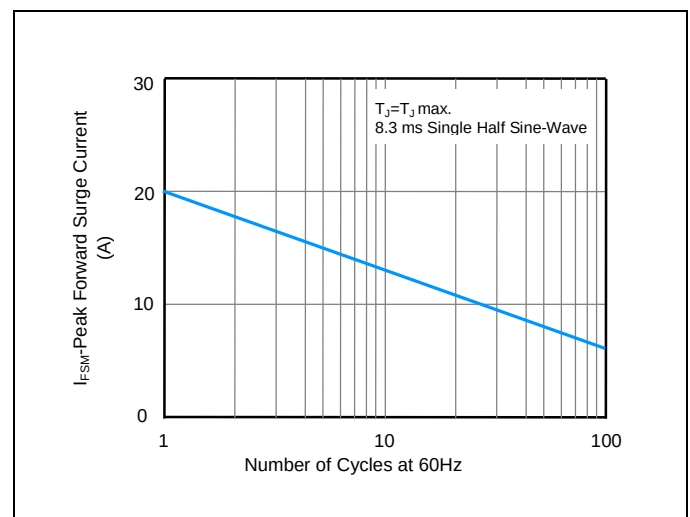
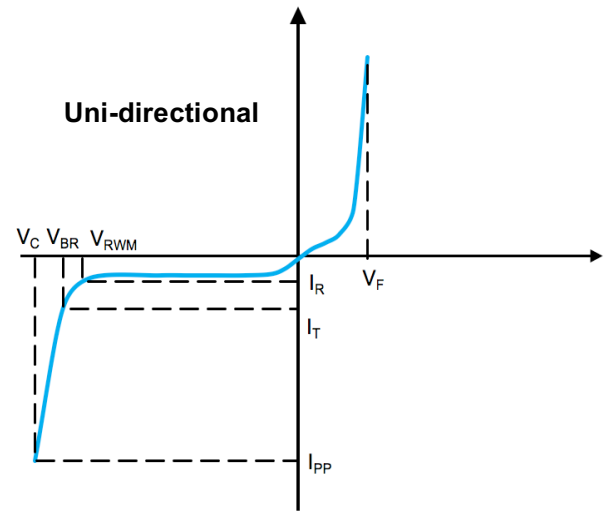
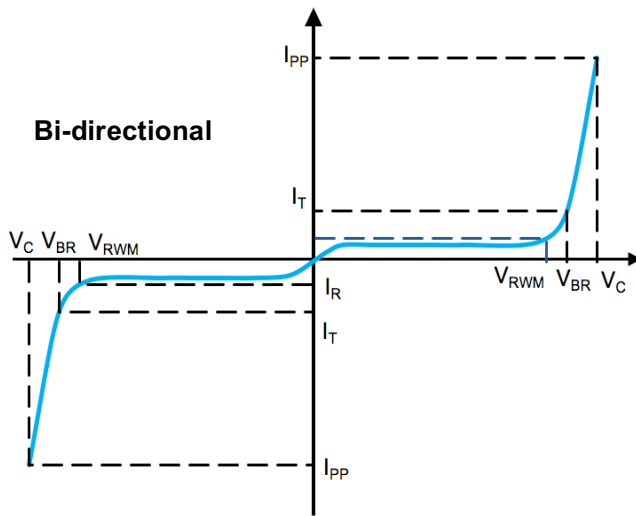


Figure 6 - Maximum Non-Repetitive Forward Surge Current Uni-Directional Only

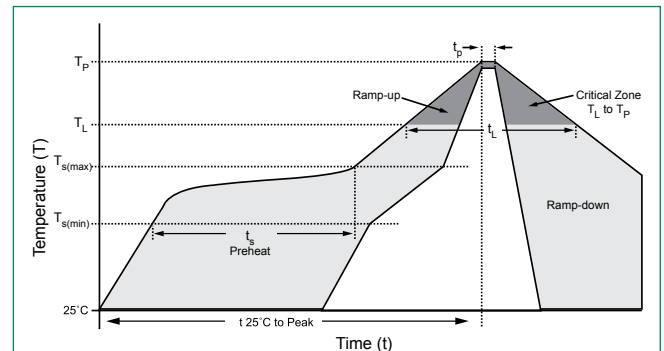


I-V Curve Characteristics



Recommended Soldering Conditions

Reflow Condition		Lead-free assembly
Pre Heat	- Temperature Min ($T_{s(min)}$)	150°C
	- Temperature Max ($T_{s(max)}$)	200°C
	- Time (min to max) (t_s)	60 – 180 secs
Average ramp up rate (Liquidus Temp (T_L) to peak)		3°C/second max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/second max
Reflow	- Temperature (T_L) (Liquidus)	217°C
	- Time (min to max) (t_s)	60 – 150 seconds
Peak Temperature (T_p)		260 ^{+0/-5} °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 (T_p)		8 minutes Max.
Do not exceed		280°C



Flow/Wave Soldering(Solder Dipping)

Peak Temperature :	265°C
Dipping Time :	10 seconds
Soldering :	1 time

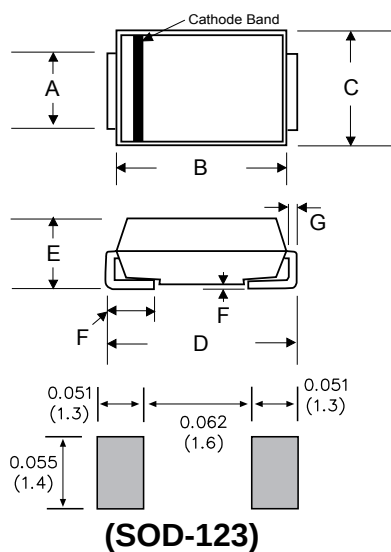
Physical Specifications

Weight	0.015oz., 0.4g
Case	JEDEC DO-204AC (DO-15) molded plastic body over passivated junction.
Polarity	Color band denotes the cathode except Bipolar.
Terminal	Matte Tin axial leads, solderable per JESD22-B102D.

Environmental Specifications

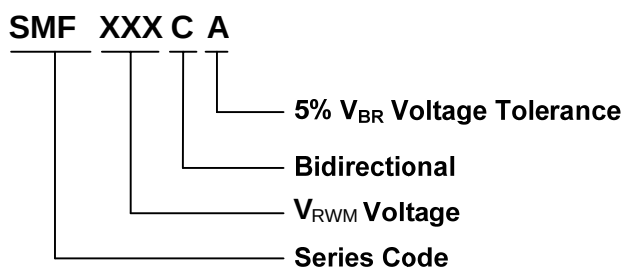
Temperature Cycle	JESD22-A104
Pressure Cooker	JESD 22-A102
High Temp. Storage	JESD22-A103
HTRB	JESD22-A108
Thermal Shock	JESD22-A106

Dimensions

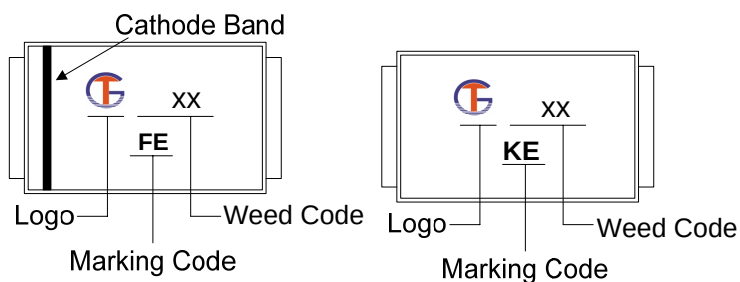


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.031	0.044	0.77	1.09
B	0.1	0.112	2.51	2.81
C	0.055	0.071	1.38	1.78
D	0.140	0.152	3.51	3.82
E	0.037	0.053	0.93	1.33
F	0.01	-	0.25	-
G	-	0.008	-	0.20

Part Number Code



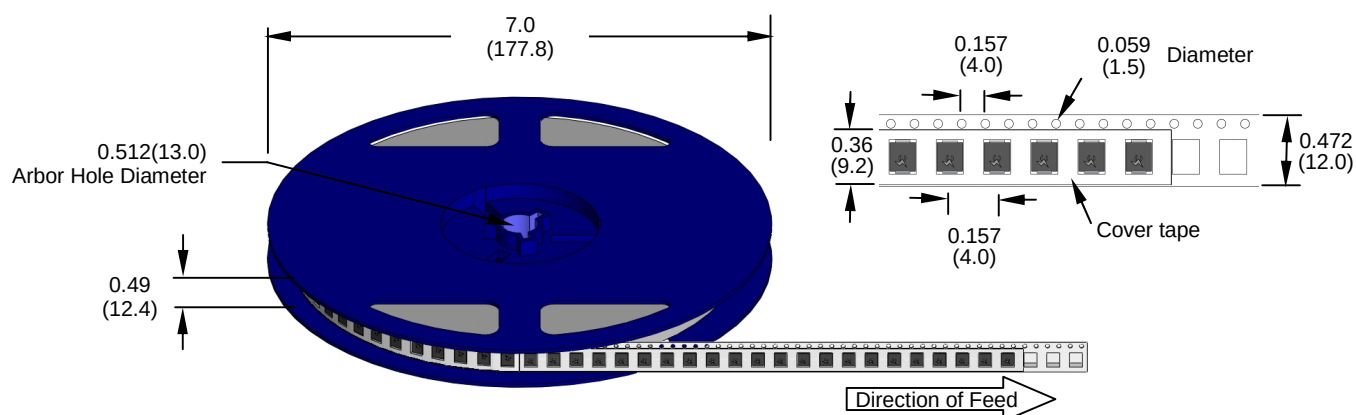
Marking Code



Packaging

Part number	Component Package	Quantity	Packaging Option	Packaging Specification
SMFxxx	SOD-123	3000	Tape&Reel - 7' tape	EIA RS-481

Packaging Dementions Unit:Inches(Millimeters)



Dimensions are in inches
(and millimeters)