

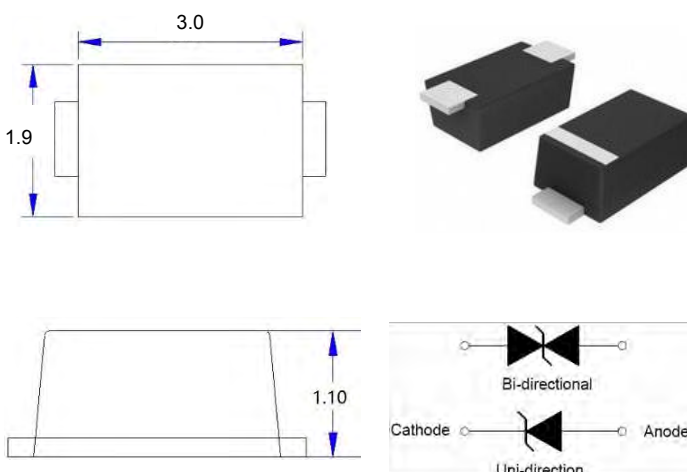
Description

TVS diodes can be used in a wide range of applications which like consumer electronic products, automotive industries, munitions, telecommunications, aerospace industries, and intelligent control systems.

Features

- Glass passivated or planar junction
- Excellent clamping capability
- Repetition rate (duty cycle): 0.01%
- Low profile package and low inductance
- 400W Peak Pulse power capability at 10×1000μs waveform.
- Fast response time: typically less than 1.0ps from 0V to V_{BR} min.
- High temperature soldering: 260°C/10s at terminals.
- Plastic package has Underwriters Laboratory Flammability 94V-0.
- For surface mounted applications in order to optimize board space.

Dimensions & Symbol (Unit: mm Max)



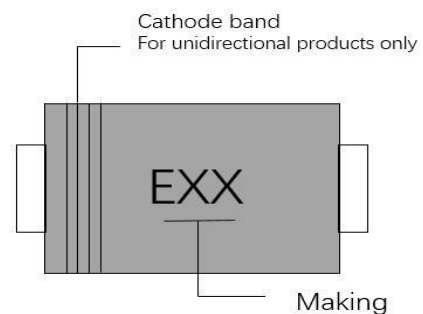
Mechanical characteristics

- Package: SMF/SOD-123FL
- Case Material: “Green” Molding Compound.
- UL Flammability Classification Rating 94V-0
- Polarity: Color band denotes cathode except bi-directional models
- Weight: 0.017g
- Terminal Connections: See Diagram Below

Applications

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

Marking Information



Ordering information

Out line	Reel (pcs)	Reel diameters
Taping	3K	7inch

Electrical characteristics ($T_A=25^\circ\text{C}$)

Part Number		Marking		V_R	$I_R@V_R$	$V_{BR}@I_T$		I_T	$V_C@I_{PP}$	$I_{PP}^{\textcircled{D}}$
Uni-Polar	Bi-Polar	Uni	Bi	V	μA	min(V)	max(V)	mA	max(V)	A
SMF5.0AL	SMF5.0CAL	EHE	ETE	5.0	400	6.40	7.00	10	9.2	43.5
SMF6.0AL	SMF6.0CAL	EHG	ETG	6.0	400	6.67	7.37	10	10.3	38.8
SMF6.5AL	SMF6.5CAL	EHK	ETK	6.5	400	7.22	7.98	10	11.2	35.7
SMF7.0AL	SMF7.0CAL	EHM	ETM	7.0	250	7.78	8.60	10	12.0	33.3
SMF7.5AL	SMF7.5CAL	EHP	ETP	7.5	100	8.33	9.21	10	12.9	31.0
SMF8.0AL	SMF8.0CAL	EHR	ETR	8.0	50	8.89	9.83	1	13.6	29.4
SMF8.5AL	SMF8.5CAL	EHT	ETT	8.5	25	9.44	10.4	1	14.4	27.8
SMF9.0AL	SMF9.0CAL	EHV	ETV	9.0	10	10.0	11.1	1	15.4	26.0
SMF10AL	SMF10CAL	EHX	ETX	10.0	5	11.1	12.3	1	17.0	23.5
SMF11AL	SMF11CAL	EHZ	ETZ	11.0	2.5	12.2	13.5	1	18.2	22.0
SMF12AL	SMF12CAL	EIE	EUE	12.0	2.5	13.3	14.7	1	19.9	20.1
SMF13AL	SMF13CAL	EIG	EUG	13.0	2.5	14.4	15.9	1	21.5	18.6
SMF14AL	SMF14CAL	EIK	EUK	14.0	1	15.6	17.2	1	23.2	17.2
SMF15AL	SMF15CAL	EIM	EUM	15.0	1	16.7	18.5	1	24.4	16.4
SMF16AL	SMF16CAL	EIP	EUP	16.0	1	17.8	19.7	1	26.0	15.4
SMF17AL	SMF17CAL	EIR	EUR	17.0	1	18.9	20.9	1	27.6	14.5
SMF18AL	SMF18CAL	EIT	EUT	18.0	1	20.0	22.1	1	29.2	13.7
SMF20AL	SMF20CAL	EIV	EUV	20.0	1	22.2	24.5	1	32.4	12.3
SMF22AL	SMF22CAL	EIX	EUX	22.0	1	24.4	26.9	1	35.5	11.3
SMF24AL	SMF24CAL	EIZ	EUZ	24.0	1	26.7	29.5	1	38.9	10.3
SMF26AL	SMF26CAL	EJE	EVE	26.0	1	28.9	31.9	1	42.1	9.5
SMF28AL	SMF28CAL	EJG	EVG	28.0	1	31.1	34.4	1	45.4	8.8
SMF30AL	SMF30CAL	EJK	EVK	30.0	1	33.3	36.8	1	48.4	8.3
SMF33AL	SMF33CAL	EJM	EVM	33.0	1	36.7	40.6	1	53.3	7.5
SMF36AL	SMF36CAL	EJP	EVP	36.0	1	40.0	44.2	1	58.1	6.9
SMF40AL	SMF40CAL	EJR	EVR	40.0	1	44.4	49.1	1	64.5	6.2
SMF43AL	SMF43CAL	EJT	EVT	43.0	1	47.8	52.8	1	69.4	5.8
SMF45AL	SMF45CAL	EJV	EVV	45.0	1	50.0	55.3	1	72.7	5.5
SMF48AL	SMF48CAL	EJX	EVX	48.0	1	53.3	58.9	1	77.4	5.2
SMF51AL	SMF51CAL	EJZ	EVZ	51.0	1	56.7	62.7		82.4	4.9

Electrical characteristics (T_A=25°C)

Part Number		Marking		V _R	I _{R@V_R}	V _{BR@I_T}		I _T	V _{C@I_{PP}}	I _{PP} ^①
Uni-Polar	Bi-Polar	Uni	Bi	V	μA	min(V)	max(V)	mA	max(V)	A
SMF54AL	SMF54CAL	ERE	EWE	54.0	1	60.0	66.3	1	87.1	4.6
SMF58AL	SMF58CAL	ERG	EWG	58.0	1	64.4	71.2	1	93.6	4.3
SMF60AL	SMF60CAL	ERK	EWK	60.0	1	66.7	73.7	1	96.8	4.1

① Surge waveform: 10/1000μs

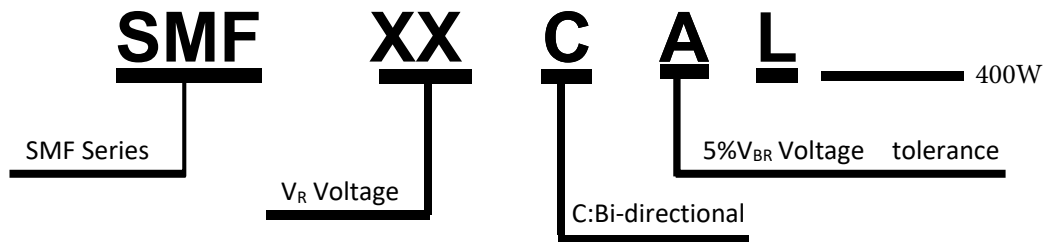
V_R : Stand-off Voltage -- Maximum voltage that can be applied

V_{BR}: Breakdown Voltage

V_C: Clamping Voltage -- Peak voltage measured across the suppressor at a specified I_{pp}

I_R: Reverse Leakage Current

Part number code



Absolute maximum ratings (T_A=25°C, RH=45%-75%, unless otherwise noted)

Parameter	Symbol	Value	Unit
Storage temperature range	T _{stg}	-55 to +150	°C
Operating junction temperature range	T _j	-55 to +150	°C
Peak pulse power dissipation on 10/1000μs waveform	P _{PP}	400	W
Power Dissipation on infinite heat sink Ta=50°C	V _F	6.5	V

Ratings and V-I characteristics curves ($T_A=25^\circ\text{C}$, unless otherwise noted)

FIG.1:V- I curve characteristics (Uni-directional)

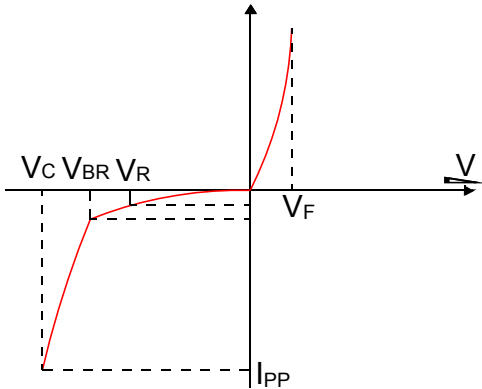
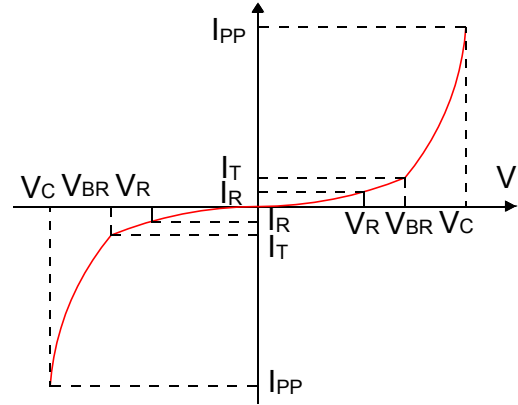


FIG.2:V- I curve characteristics (Bi-directional)



Typical Characteristics

Figure 1: Peak Pulse Power Rating Curve

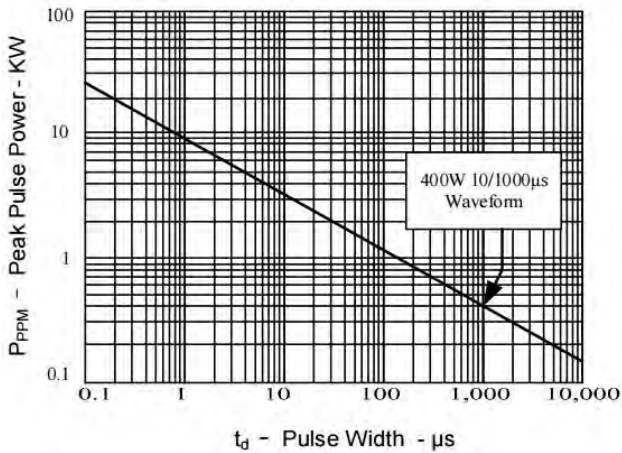


Figure 2: Pulse Derating Curve

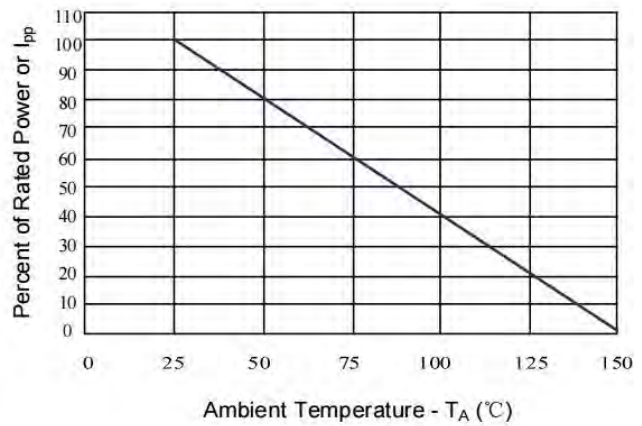


Figure 3: Pulse Waveform

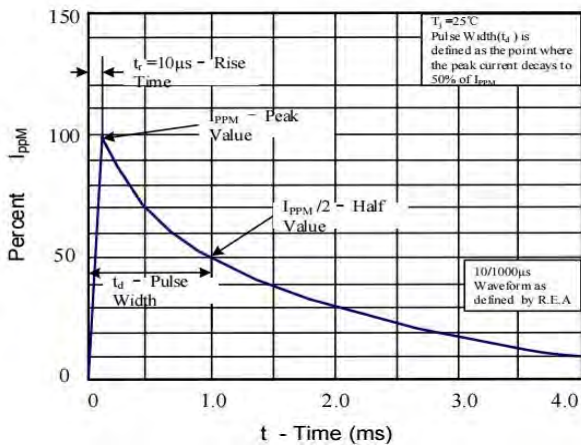


Figure 4: Typical Junction Capacitance

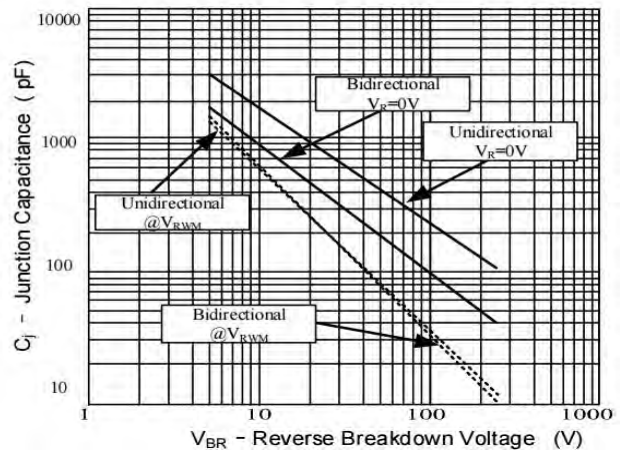


Figure 5: Steady State Power Dissipation Derating Curve

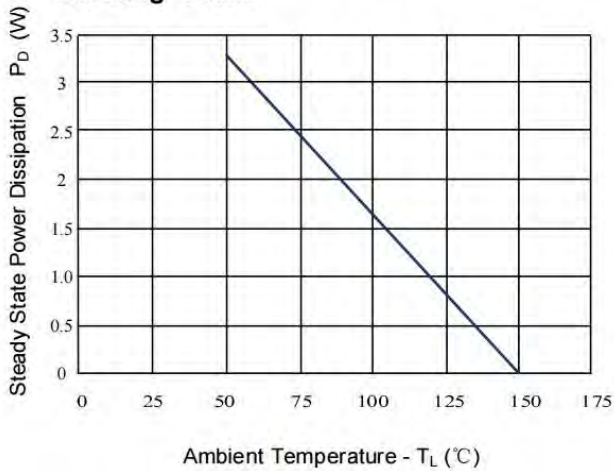
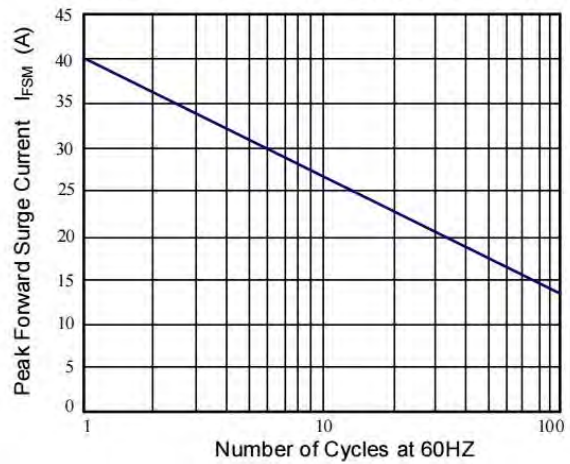
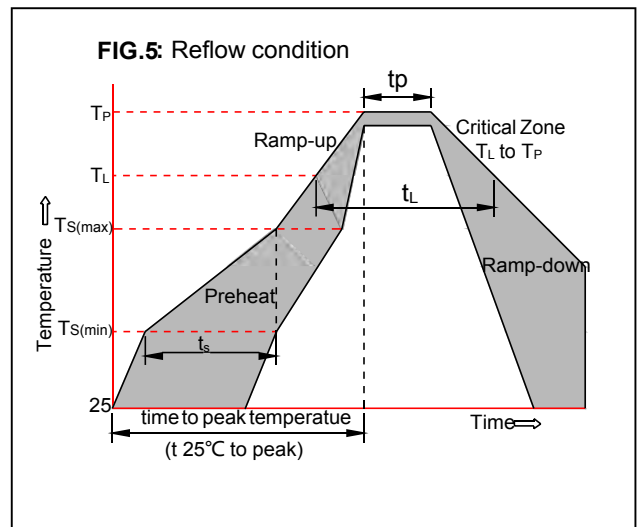


Figure 6: Maximum Non-Repetitive Forward Surge Current Only Unidirectional

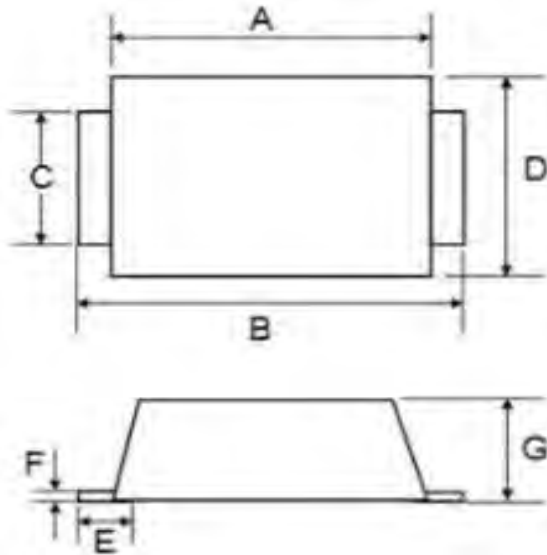


Soldering parameters

Reflow Condition		Pb-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 (Liquid us Temp (T_L) to peak)		3°C/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature(T_L)(Liquid us)	+217°C
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_P)		+260(+0/-5)°C
Time within 5°C of actual Peak Temp (t_p)		30 secs. Max
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp (T_P)		8 min. Max
Do not exceed		+260°C

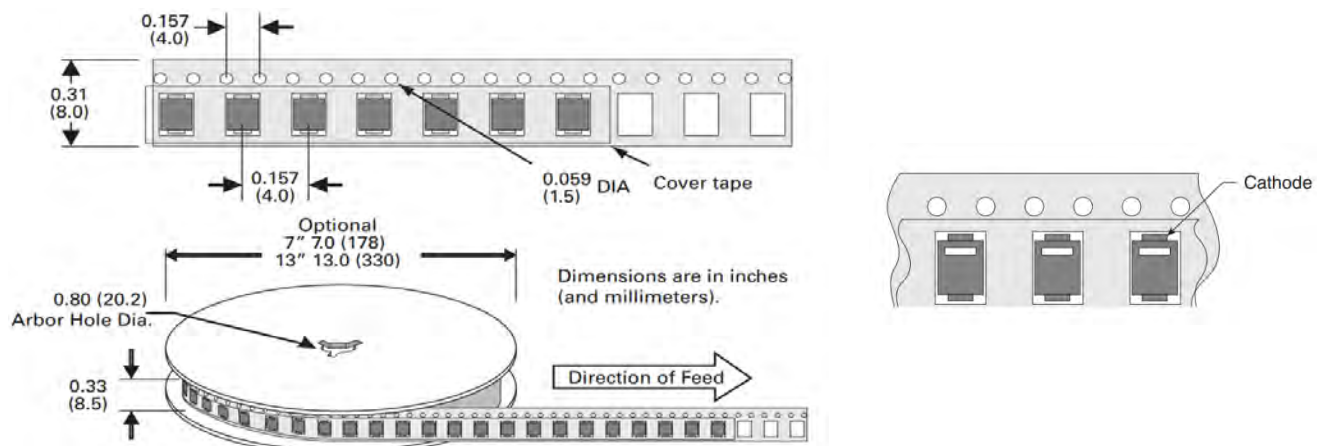


Package mechanical data



Dimension	Millimeters	
	Min	Max
A	2.5	3.0
B	3.4	4.0
C	0.7	1.1
D	1.5	1.9
E	0.45	0.95
F	0.05	0.26
G	0.9	1.1

Tape & reel specification - SMF



Contact information

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