

### 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.



SOD-123FL



Bi-directional



Uni-direction

### FEATURES:

- ✧ Glass passivated or planar junction
- ✧ Excellent clamping capability
- ✧ Repetition rate (duty cycle): 0.01%
- ✧ Typical  $I_R$  less than  $1\mu A$  above 10V.
- ✧ Low profile package and low inductance
- ✧ 200W Peak Pulse power capability at  $10 \times 1000\mu s$  waveform.
- ✧ Fast response time: typically less than 1.0ps from 0V to  $V_{BR}$  min.
- ✧ High temperature soldering:  $260^\circ C/10s$  at terminals.
- ✧ Plastic package has Underwriters Laboratory Flammability 94V-0.
- ✧ For surface mounted applications in order to optimize board space
- ✧ AEC-Q101 qualified.

### ABSOLUTE MAXIMUM RATINGS ( $T_A=25^\circ C$ , RH=45%-75%, unless otherwise noted)

Parameter	Symbol	Value	Unit
Storage temperature range	$T_{stg}$	-55 to +125	$^\circ C$
Operating junction temperature range	$T_j$	-55 to +125	$^\circ C$
Steady state power dissipation at $T_L=75^\circ C$	$P_{M(AV)}$	2.8	W
Peak pulse power dissipation on 10/1000 $\mu s$ waveform	$P_{PP}$	200	W
Maximum Instantaneous Forward Voltage at 20A for Unidirectional	$V_F$	5.0	V

### ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C)

Part Number		V <sub>R</sub>	I <sub>R</sub> @ V <sub>R</sub>	V <sub>BR</sub> @I <sub>T</sub>		I <sub>T</sub>	V <sub>C</sub> @I <sub>PP</sub>	I <sub>PP</sub> <sup>①</sup>
Uni-Polar	Bi-Polar	V	μA	min(V)	max(V)	mA	max(V)	A
SMF5.0A	SMF5.0CA	5.0	150	6.40	7.00	10	9.2	21.7
SMF6.0A	SMF6.0CA	6.0	100	6.67	7.37	10	10.3	19.4
SMF6.5A	SMF6.5CA	6.5	100	7.22	7.98	10	11.2	17.9
SMF7.0A	SMF7.0CA	7.0	50	7.78	8.60	10	12.0	16.7
SMF7.5A	SMF7.5CA	7.5	50	8.33	9.21	1	12.9	15.5
SMF8.0A	SMF8.0CA	8.0	20	8.89	9.83	1	13.6	14.7
SMF9.0A	SMF9.0CA	9.0	5	10.00	11.10	1	15.4	13.0
SMF10A	SMF10CA	10.0	2	11.10	12.30	1	17.0	11.8
SMF11A	SMF11CA	11.0	1	12.20	13.50	1	18.2	11.0
SMF12A	SMF12CA	12.0	1	13.30	14.70	1	19.9	10.1
SMF13A	SMF13CA	13.0	1	14.40	15.90	1	21.5	9.3
SMF14A	SMF14CA	14.0	1	15.60	17.20	1	23.2	8.6
SMF15A	SMF15CA	15.0	1	16.70	18.50	1	24.4	8.2
SMF18A	SMF18CA	18.0	1	20.00	22.10	1	29.2	6.8
SMF20A	SMF20CA	20.0	1	22.20	24.50	1	32.4	6.2
SMF22A	SMF22CA	22.0	1	24.40	26.90	1	35.5	5.6
SMF24A	SMF24CA	24.0	1	26.70	29.50	1	38.9	5.1
SMF26A	SMF26CA	26.0	1	28.90	31.90	1	42.1	4.8
SMF28A	SMF28CA	28.0	1	31.10	34.40	1	45.4	4.4
SMF30A	SMF30CA	30.0	1	33.30	36.80	1	48.4	4.1
SMF33A	SMF33CA	33.0	1	36.70	40.60	1	53.3	3.8
SMF36A	SMF36CA	36.0	1	40.00	44.20	1	58.1	3.4
SMF40A	SMF40CA	40.0	1	44.40	49.10	1	64.5	3.1
SMF43A	SMF43CA	43.0	1	47.80	52.80	1	69.4	2.88
SMF45A	SMF45CA	45.0	1	50.00	55.30	1	72.7	2.75
SMF48A	SMF48CA	48.0	1	53.30	58.90	1	77.4	2.6
SMF51A	SMF51CA	51.0	1	56.70	62.70	1	82.4	2.4
SMF58A	SMF58CA	58.0	1	64.40	71.20	1	93.6	2.1

### ELECTRICAL CHARACTERISTICS( $T_A=25^{\circ}\text{C}$ , continued)

Part Number		$V_R$	$I_R@V_R$	$V_{BR}@I_T$		$I_T$	$V_C@I_{PP}$	$I_{PP}^{\textcircled{1}}$
Uni-Polar	Bi-Polar	V	$\mu\text{A}$	min(V)	max(V)	mA	max(V)	A
SMF60A	SMF60CA	60.0	1	66.70	73.70	1	96.8	2.0
SMF64A	SMF64CA	64.0	1	71.10	78.60	1	103.0	1.9
SMF70A	SMF70CA	70.0	1	77.80	86.00	1	113.0	1.8
SMF75A	SMF75CA	75.0	1	83.30	92.10	1	121.0	1.7
SMF78A	SMF78CA	78.0	1	86.70	95.80	1	126.0	1.6
SMF85A	SMF85CA	85.0	1	94.40	104.0	1	137.0	1.5
SMF90A	SMF90CA	90.0	1	100.0	111.0	1	146.0	1.4
SMF100A	SMF100CA	100.0	1	111.0	123.0	1	162.0	1.2
SMF110A	SMF110CA	110.0	1	122.0	135.0	1	177.0	1.1
SMF120A	SMF120CA	120.0	1	133.0	147.0	1	193.0	1.0
SMF130A	SMF130CA	130.0	1	144.0	159.0	1	209.0	0.9
SMF150A	SMF150CA	150.0	1	167.0	185.0	1	243.0	0.8
SMF160A	SMF160CA	160.0	1	178.0	197.0	1	259.0	0.8
SMF170A	SMF170CA	170.0	1	189.0	209.0	1	275.0	0.7
SMF180A	SMF180CA	180.0	1	201.0	222.0	1	292.0	0.7
SMF200A	SMF200CA	200.0	1	224.0	247.0	1	324.0	0.6
SMF220A	SMF220CA	220.0	1	246.0	272.0	1	356.0	0.5

$\textcircled{1}$  Surge waveform: 10/1000 $\mu\text{s}$

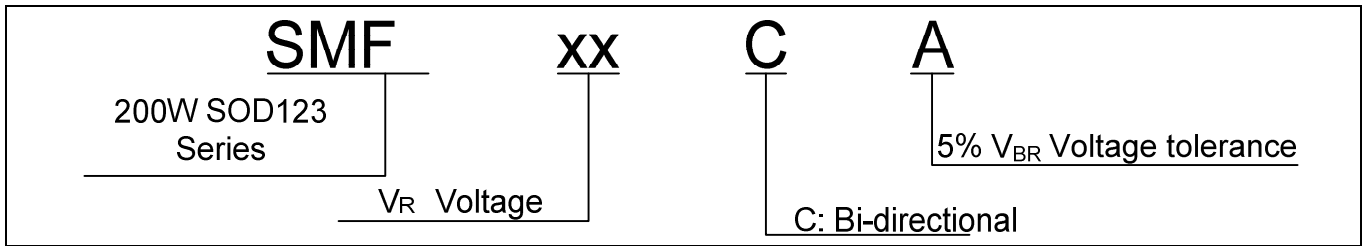
$V_R$ : Stand-off voltage -- maximum voltage that can be applied

$V_{BR}$ : Breakdown voltage

$V_C$ : Clamping voltage -- peak voltage measured across the suppressor at a specified  $I_{PP}$

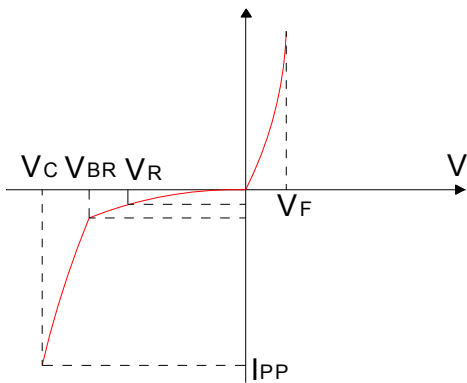
$I_R$ : Reverse leakage current

## ORDERING INFORMATION

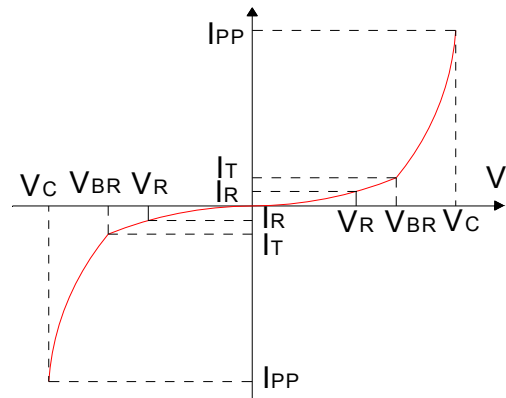


## RATINGS AND V-I CHARACTERISTICS CURVES ( $T_A=25^\circ\text{C}$ , unless otherwise noted)

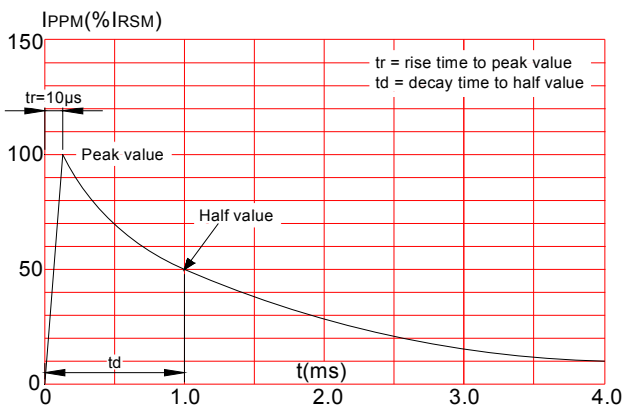
**FIG.1: V- I curve characteristics (Uni-directional)**



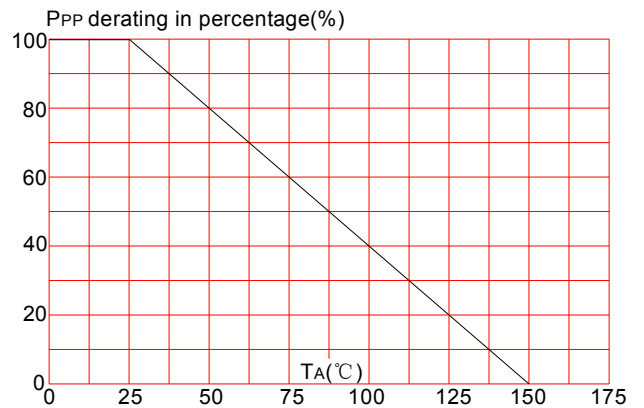
**FIG.2: V- I curve characteristics (Bi-directional)**



**FIG.3: Pulse waveform**

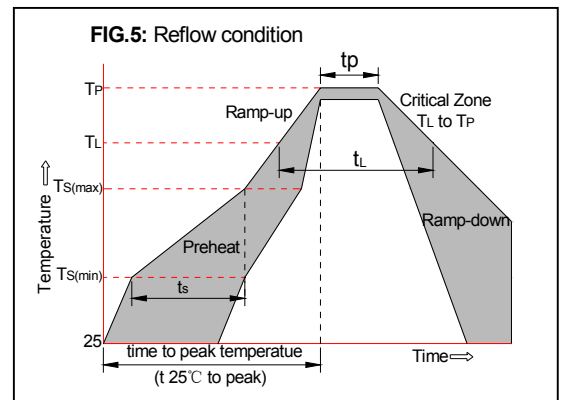


**FIG.4: Pulse derating curve**

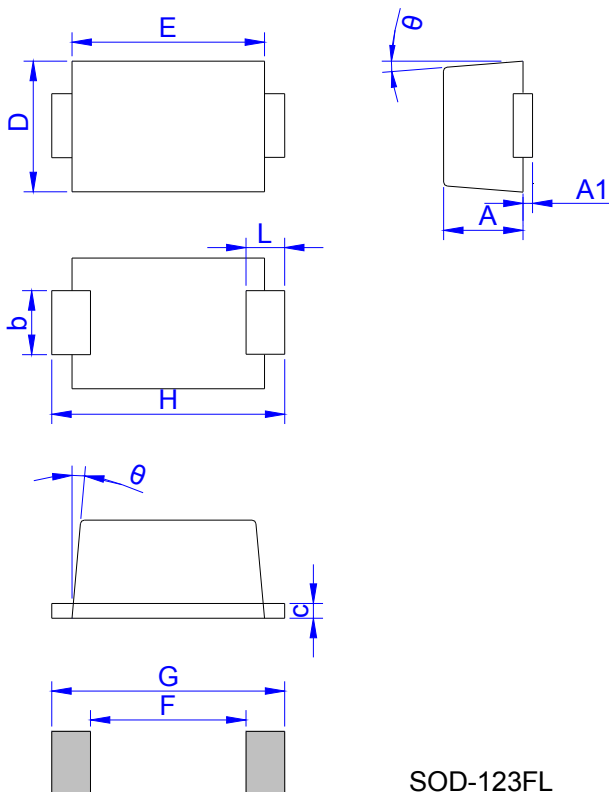


## SOLDERING PARAMETERS

Reflow Condition		Pb-Free assembly (see FIG.5)
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



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.90	1.00	0.035	0.039
A1	0	0.10	0	0.004
b	0.70	1.10	0.028	0.043
c	0.10	0.20	0.004	0.008
D	1.50	1.80	0.059	0.071
E	2.50	2.90	0.098	0.114
F	2.36	-	0.093	-
G	4.19	-	0.165	-
H	3.40	3.80	0.134	0.150
L	0.55	0.95	0.022	0.037
$\theta$	0	8°	0	8°

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