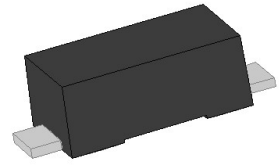


## SMFxx(C)A-AU Series 200W Transient Voltage Suppressor

Rev.1.0

### DESCRIPTION

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



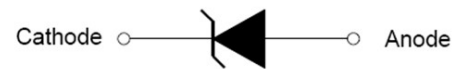
SOD-123FL

### FEATURES

- ✧ Low profile package.
- ✧ Low inductance.
- ✧ Excellent clamping capability.
- ✧ 200W peak pulse power capability at 10/1000 $\mu$ s waveform.
- ✧ Typical  $I_R$  less than 1 $\mu$ A.
- ✧ Fast response time: typically less than 1.0ps from 0V to  $V_{BR}$  min.
- ✧ High temperature reflow soldering: 260 $^{\circ}$ C/40s at terminals.
- ✧ Plastic package has underwriters laboratory flammability 94V-0.
- ✧ Meets MSL level 1, per J-STD-020, LF maximum peak of 260 $^{\circ}$ C.
- ✧ Terminal: solder plated, solderable per J-STD-002.
- ✧ IEC61000-4-2 (ESD)  $\pm$ 30kV (air),  $\pm$ 30kV (contact).
- ✧ For surface mounted applications in order to optimize board space.
- ✧ High reliability application and automotive grade (AEC-Q101 qualified).



Bi-directional



Uni-directional

Symbol

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

Parameter	Symbol	Value	Unit
Storage and operating junction temperature range	$T_{STG}/T_J$	-55 to +150	$^{\circ}$ C
Peak pulse power dissipation at 10/1000 $\mu$ s waveform	$P_{PP}$	200	W
Maximum instantaneous forward voltage at 20A for unidirectional	$V_F$	3.5	V
Typical thermal resistance junction to lead	$R_{\theta JL}$	100	$^{\circ}$ C/W
Typical thermal resistance junction to ambient	$R_{\theta JA}$	220	$^{\circ}$ C/W

## MARKING



10CH : Device Marking Code

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

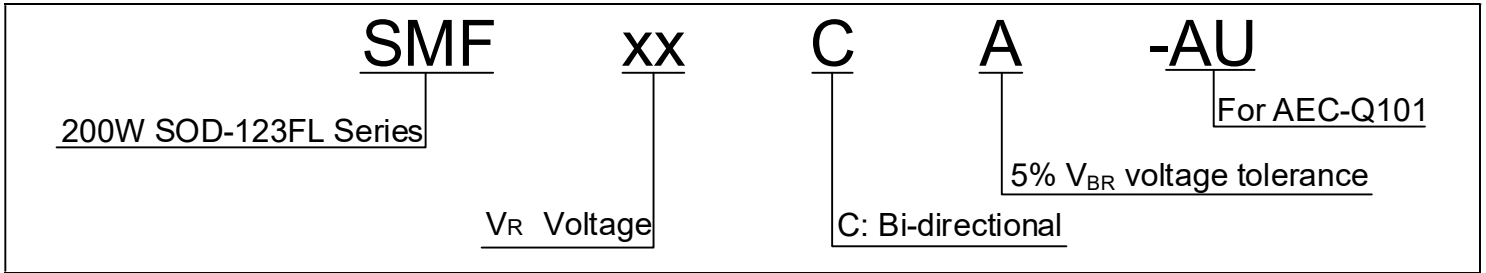
Part Number		Marking		$V_R$	$I_R @ V_R$	$V_{BR} @ I_T$		$I_T$	$V_C @ I_{PP}$	$I_{PP}^{\circ}$
Uni-Polar	Bi-Polar	Uni	Bi	V	Max ( $\mu\text{A}$ )	Min (V)	Max (V)	mA	Max (V)	A
SMF10A-AU	SMF10CA-AU	KXH	10CH	10.0	1	11.10	12.30	1	17.0	11.8
SMF11A-AU	SMF11CA-AU	KZH	11CH	11.0	1	12.20	13.50	1	18.2	11.0
SMF12A-AU	SMF12CA-AU	LEH	12CH	12.0	1	13.30	14.70	1	19.9	10.1
SMF13A-AU	SMF13CA-AU	LGH	13CH	13.0	1	14.40	15.90	1	21.5	9.3
SMF14A-AU	SMF14CA-AU	LKH	14CH	14.0	1	15.60	17.20	1	23.2	8.6
SMF15A-AU	SMF15CA-AU	LMH	15CH	15.0	1	16.70	18.50	1	24.4	8.2
SMF16A-AU	SMF16CA-AU	LPH	16CH	16.0	1	17.80	19.70	1	26.0	7.7
SMF17A-AU	SMF17CA-AU	LRH	17CH	17.0	1	18.90	20.90	1	27.6	7.2
SMF18A-AU	SMF18CA-AU	LTH	18CH	18.0	1	20.00	22.10	1	29.2	6.8
SMF20A-AU	SMF20CA-AU	LVH	20CH	20.0	1	22.20	24.50	1	32.4	6.2
SMF22A-AU	SMF22CA-AU	LXH	22CH	22.0	1	24.40	26.90	1	35.5	5.6
SMF24A-AU	SMF24CA-AU	LZH	24CH	24.0	1	26.70	29.50	1	38.9	5.1
SMF26A-AU	SMF26CA-AU	MEH	26CH	26.0	1	28.90	31.90	1	42.1	4.8
SMF28A-AU	SMF28CA-AU	MGH	28CH	28.0	1	31.10	34.40	1	45.4	4.4
SMF30A-AU	SMF30CA-AU	MKH	30CH	30.0	1	33.30	36.80	1	48.4	4.1
SMF33A-AU	SMF33CA-AU	MMH	33CH	33.0	1	36.70	40.60	1	53.3	3.8
SMF36A-AU	SMF36CA-AU	MPH	36CH	36.0	1	40.00	44.20	1	58.1	3.4
SMF40A-AU	SMF40CA-AU	MRH	40CH	40.0	1	44.40	49.10	1	64.5	3.1
SMF43A-AU	SMF43CA-AU	MTH	43CH	43.0	1	47.80	52.80	1	69.4	2.8
SMF45A-AU	SMF45CA-AU	MVH	45CH	45.0	1	50.00	55.30	1	72.7	2.7
SMF48A-AU	SMF48CA-AU	MXH	48CH	48.0	1	53.30	58.90	1	77.4	2.6
SMF51A-AU	SMF51CA-AU	MZH	51CH	51.0	1	56.70	62.70	1	82.4	2.4
SMF54A-AU	SMF54CA-AU	NEH	54CH	54.0	1	60.00	66.30	1	87.1	2.3

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

Part Number		Marking		$V_R$	$I_R @ V_R$	$V_{BR} @ I_T$		$I_T$	$V_C @ I_{PP}$	$I_{PP}^{\text{①}}$
Uni-Polar	Bi-Polar	Uni	Bi	V	Max ( $\mu\text{A}$ )	Min (V)	Max (V)	mA	Max (V)	A
SMF58A-AU	SMF58CA-AU	NGH	58CH	58.0	1	64.40	71.20	1	93.6	2.1
SMF60A-AU	SMF60CA-AU	NKH	60CH	60.0	1	66.70	73.70	1	96.8	2.0
SMF64A-AU	SMF64CA-AU	NMH	64CH	64.0	1	71.10	78.60	1	103.0	1.9
SMF70A-AU	SMF70CA-AU	NPH	70CH	70.0	1	77.80	86.00	1	113.0	1.8
SMF75A-AU	SMF75CA-AU	NRH	75CH	75.0	1	83.30	92.10	1	121.0	1.7
SMF78A-AU	SMF78CA-AU	NVH	78CH	78.0	1	86.70	95.80	1	126.0	1.6
SMF85A-AU	SMF85CA-AU	NXH	85CH	85.0	1	94.40	104.0	1	137.0	1.5
SMF90A-AU	SMF90CA-AU	NZH	90CH	90.0	1	100.0	111.0	1	146.0	1.4
SMF100A-AU	SMF100CA-AU	PEH	100CH	100.0	1	111.0	123.0	1	162.0	1.2
SMF110A-AU	SMF110CA-AU	PGH	110CH	110.0	1	122.0	135.0	1	177.0	1.1
SMF120A-AU	SMF120CA-AU	PKH	120CH	120.0	1	133.0	147.0	1	193.0	1.0
SMF130A-AU	SMF130CA-AU	PMH	130CH	130.0	1	144.0	159.0	1	209.0	0.9
SMF150A-AU	SMF150CA-AU	PRH	150CH	150.0	1	167.0	185.0	1	243.0	0.8
SMF160A-AU	SMF160CA-AU	PVH	160CH	160.0	1	178.0	197.0	1	259.0	0.8
SMF170A-AU	SMF170CA-AU	PXH	170CH	170.0	1	189.0	209.0	1	275.0	0.7
SMF180A-AU	SMF180CA-AU	PZH	180CH	180.0	1	201.0	222.0	1	292.0	0.7
SMF200A-AU	SMF200CA-AU	QEH	200CH	200.0	1	224.0	247.0	1	324.0	0.6
SMF220A-AU	SMF220CA-AU	QRH	220CH	220.0	1	246.0	272.0	1	356.0	0.5

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)

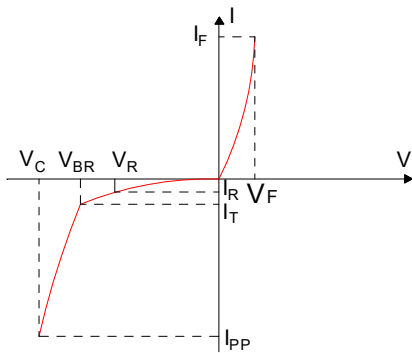


FIG.2: V- I curve characteristics (Bi-directional)

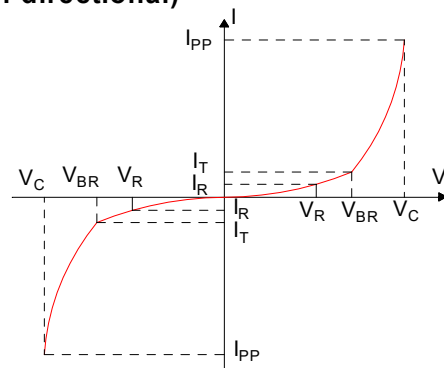


FIG.3: Pulse waveform

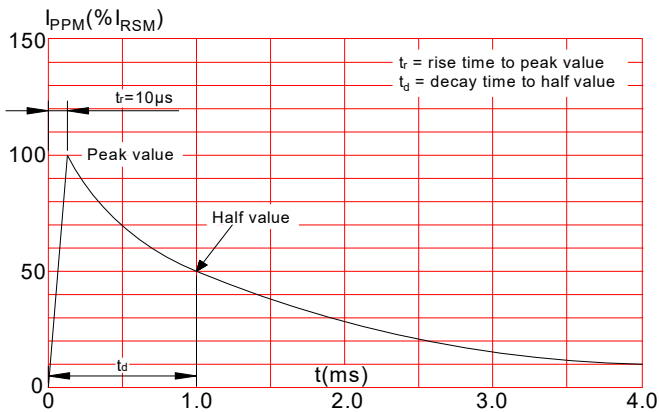
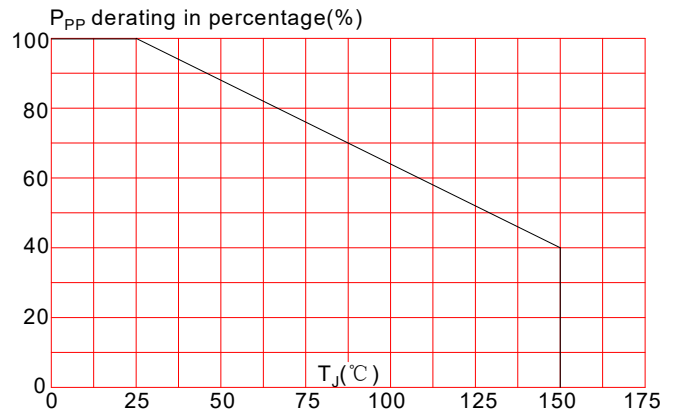
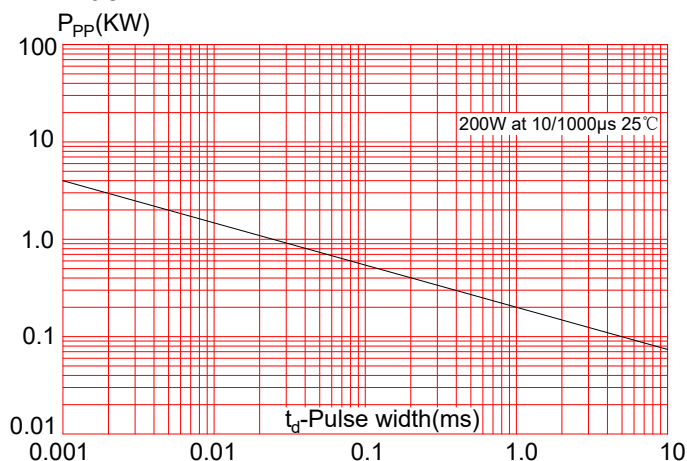


FIG.4: Pulse derating curve

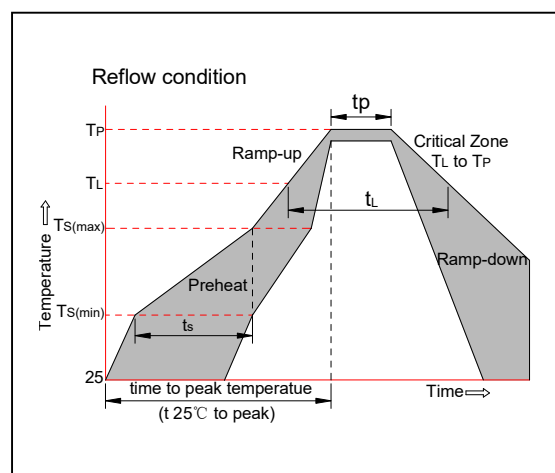


**FIG.5: Peak pulse power dissipation vs. pulse width**

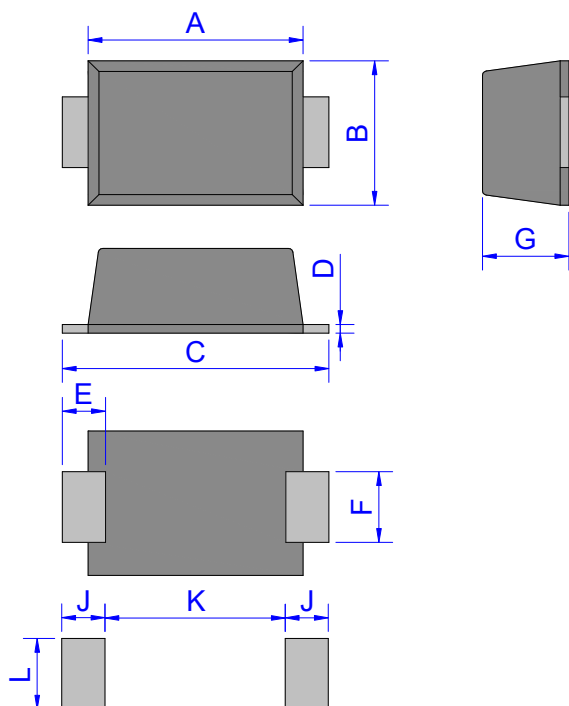


## SOLDERING PARAMETERS

Reflow Condition		Pb-Free assembly (see figure at right)
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/sec. Max
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature( $T_L$ )(Liquidus)	+217°C
	-Temperature( $t_L$ )	60-150 secs.
Peak Temp ( $T_p$ )		+260(+0/-5)°C
Time within 5°C of actual Peak Temp ( $t_p$ )		20-40secs.
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp ( $T_p$ )		8 min. Max
Do not exceed		+260°C



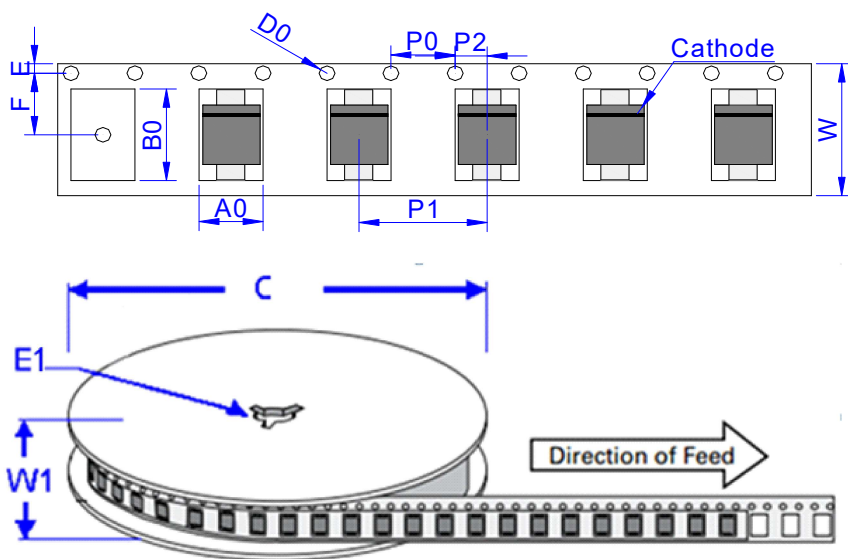
PACKAGE MECHANICAL DATA



SOD-123FL

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.60	3.00	0.102	0.118
B	1.60	2.00	0.063	0.079
C	3.45	3.95	0.136	0.156
D	0.10	0.25	0.004	0.01
E	0.3	0.9	0.012	0.035
F	0.80	1.20	0.031	0.047
G	0.70	1.00	0.028	0.039
J	1.30		0.051	
K		1.70		0.067
L	1.30		0.051	

TAPE AND REEL SPECIFICATION-SOD-123FL



Ref.	Dimensions	
	Millimeters	Inches
A0	1.95 ± 0.3	0.077 ± 0.012
B0	3.95 ± 0.3	0.156 ± 0.012
C	178	7.0
D0	1.55 ± 0.1	0.061 ± 0.004
E	1.75 ± 0.2	0.069 ± 0.008
E1	13.3 ± 0.3	0.524 ± 0.012
F	3.50 ± 0.2	0.138 ± 0.008
P0	4.00 ± 0.2	0.157 ± 0.008
P1	4.00 ± 0.2	0.157 ± 0.008
P2	2.00 ± 0.2	0.079 ± 0.008
W	8.0 ± 0.2	0.315 ± 0.008
W1	11.5 ± 1.0	0.453 ± 0.039

PART No.	UNIT WEIGHT (g/PCS) TYP	REEL (PCS)	PER CARTON (PCS)	DESCRIPTION
SMFxxA/CA-AU	0.0144	3000	150,000	7 inch reel pack

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