Applications

- Computer system
- Domestic appliance
- Video input

Description

- Transient voltage suppression diodes, also known as TVS diodes, are protective electronic parts that protect electrical equipment from voltage spikes introduced by wires.

Mechanical Data

- Package：SMF/SOD-123FL
- Case Material：Molded Plastic. UL Flammability Classification Rating 94V-0. RoHS compliant
- Moisture Sensitivity：Meet MSL 1
- Terminal：Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity：Color band denotes cathode except bi-directional models
- Weight：0.017g(approximate)

Features

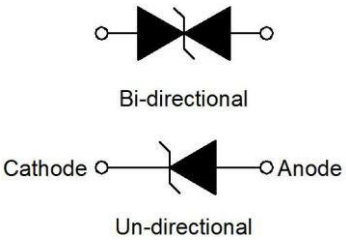
- For surface mounted applications
- Excellent clamping capability
- 200 W peak pulse power capability with a 10/1000μs Waveform.
- VRWM 5.0-190V
- Low profile package and low inductance
- Typical IR less than 1uA above 12V
- Fast response time: typically less than 1.0ps from 0V to VBR min.
- AEC-Q101 Qualified

Mechanical Data

Part Number	QTY/Reel	Reel Size
SMFxx(C)A-AT	3,000	7 inch

Features

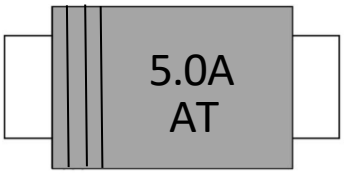
SOD-123FL



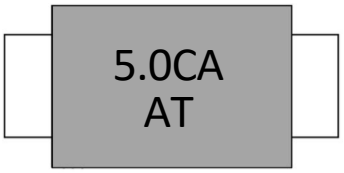
Mechanical Data

EX :

5.0AAT : SMF5.0A-AT Marking Code



5.0CAAT : SMF5.0CA-AT Marking code



Electrical Characteristics (T=25℃)

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
SMF5.0A-AT	SMF5.0CA-AT	5.0AAT	5.0CAAT	5.0	400	6.40	7.00	10	9.2	21.74
SMF6.0A-AT	SMF6.0CA-AT	6.0AAT	6.0CAAT	6.0	400	6.67	7.37	10	10.3	19.42
SMF6.5A-AT	SMF6.5CA-AT	6.5AAT	6.5CAAT	6.5	250	7.22	7.98	10	11.2	17.86
SMF7.0A-AT	SMF7.0CA-AT	7.0AAT	7.0CAAT	7.0	100	7.78	8.60	10	12.0	16.67
SMF7.5A-AT	SMF7.5CA-AT	7.5AAT	7.5CAAT	7.5	50	8.33	9.21	1	12.9	15.51
SMF8.0A-AT	SMF8.0CA-AT	8.0AAT	8.0CAAT	8.0	25	8.89	9.83	1	13.6	14.71
SMF8.5A-AT	SMF8.5CA-AT	8.5AAT	8.5CAAT	8.5	10	9.44	10.40	1	14.4	13.89
SMF9.0A-AT	SMF9.0CA-AT	9.0AAT	9.0CAAT	9.0	5	10.00	11.10	1	15.4	12.99
SMF10A-AT	SMF10CA-AT	10AAT	10CAAT	10.0	2.5	11.10	12.30	1	17.0	11.77
SMF11A-AT	SMF11CA-AT	11AAT	11CAAT	11.0	2.5	12.20	13.50	1	18.2	10.99
SMF12A-AT	SMF12CA-AT	12AAT	12CAAT	12.0	2.5	13.30	14.70	1	19.9	10.06
SMF13A-AT	SMF13CA-AT	13AAT	13CAAT	13.0	1	14.40	15.90	1	21.5	9.31
SMF14A-AT	SMF14CA-AT	14AAT	14CAAT	14.0	1	15.60	17.20	1	23.2	8.63
SMF15A-AT	SMF15CA-AT	15AAT	15CAAT	15.0	1	16.70	18.50	1	24.4	8.20
SMF16A-AT	SMF16CA-AT	16AAT	16CAAT	16.0	1	17.80	19.70	1	26.0	7.70
SMF17A-AT	SMF17CA-AT	17AAT	17CAAT	17.0	1	18.90	20.90	1	27.6	7.25
SMF18A-AT	SMF18CA-AT	18AAT	18CAAT	18.0	1	20.00	22.10	1	29.2	6.85
SMF20A-AT	SMF20CA-AT	20AAT	20CAAT	20.0	1	22.20	24.50	1	32.4	6.18
SMF22A-AT	SMF22CA-AT	22AAT	22CAAT	22.0	1	24.40	26.90	1	35.5	5.64
SMF24A-AT	SMF24CA-AT	24AAT	24CAAT	24.0	1	26.70	29.50	1	38.9	5.15
SMF26A-AT	SMF26CA-AT	26AAT	26CAAT	26.0	1	28.90	31.90	1	42.1	4.76
SMF28A-AT	SMF28CA-AT	28AAT	28CAAT	28.0	1	31.10	34.40	1	45.4	4.41
SMF30A-AT	SMF30CA-AT	30AAT	30CAAT	30.0	1	33.30	36.80	1	48.4	4.14
SMF33A-AT	SMF33CA-AT	33AAT	33CAAT	33.0	1	36.70	40.60	1	53.3	3.76
SMF36A-AT	SMF36CA-AT	36AAT	36CAAT	36.0	1	40.00	44.20	1	58.1	3.45
SMF40A-AT	SMF40CA-AT	40AAT	40CAAT	40.0	1	44.40	49.10	1	64.5	3.11
SMF43A-AT	SMF43CA-AT	43AAT	43CAAT	43.0	1	47.8	52.80	1	69.4	2.89
SMF45A-AT	SMF45CA-AT	45AAT	45CAAT	45.0	1	50.00	55.30	1	72.7	2.76
SMF48A-AT	SMF48CA-AT	48AAT	48CAAT	48.0	1	53.30	58.90	1	77.4	2.59
SMF51A-AT	SMF51CA-AT	51AAT	51CAAT	51.0	1	56.70	62.70	1	82.4	2.43
SMF54A-AT	SMF54CA-AT	54AAT	54CAAT	54.0	1	60.00	66.30	1	87.1	2.30

Electrical Characteristics (T=25℃)

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
SMF58A-AT	SMF58CA-AT	58AAT	58CAAT	58.0	1	64.4	71.20	1	93.6	2.14
SMF60A-AT	SMF60CA-AT	60AAT	60CAAT	60.0	1	66.7	73.70	1	96.8	2.07
SMF64A-AT	SMF64CA-AT	64AAT	64CAAT	64.0	1	71.10	78.60	1	103.0	1.95
SMF70A-AT	SMF70CA-AT	70AAT	70CAAT	70.0	1	77.8	86.00	1	113.0	1.77
SMF75A-AT	SMF75CA-AT	75AAT	75CAAT	75.0	1	83.3	92.10	1	121.0	1.66
SMF78A-AT	SMF78CA-AT	78AAT	78CAAT	78.0	1	86.70	95.8	1	126.0	1.59
SMF85A-AT	SMF85CA-AT	85AAT	85CAAT	85.0	1	94.40	104.0	1	137.0	1.46
SMF90A-AT	SMF90CA-AT	90AAT	90CAAT	90.0	1	100.0	111.0	1	146.0	1.37
SMF100A-AT	SMF100CA-AT	100AAT	100CAAT	100.0	1	111.0	123.0	1	162.0	1.24
SMF110A-AT	SMF110CA-AT	110AAT	110CAAT	110.0	1	122.0	135.0	1	177.0	1.13
SMF120A-AT	SMF120CA-AT	120AAT	120CAAT	120.0	1	133.0	147.0	1	193.0	1.04
SMF130A-AT	SMF130CA-AT	130AAT	130CAAT	130.0	1	144.0	159.0	1	209.0	0.96
SMF150A-AT	SMF150CA-AT	150AAT	150CAAT	150.0	1	167.0	185.0	1	243.0	0.83
SMF160A-AT	SMF160CA-AT	160AAT	160CAAT	160.0	1	178.0	197.00	1	259.0	0.78
SMF170A-AT	SMF170CA-AT	170AAT	170CAAT	170.0	1	189.0	209.0	1	275.0	0.73
SMF180A-AT	SMF180CA-AT	180AAT	180CAAT	180.0	1	201.1	222.0	1	292.0	0.69
SMF190A-AT	SMF190CA-AT	190AAT	180CAAT	190.0	1	211.0	243.0	1	308.0	0.65

Note: 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}

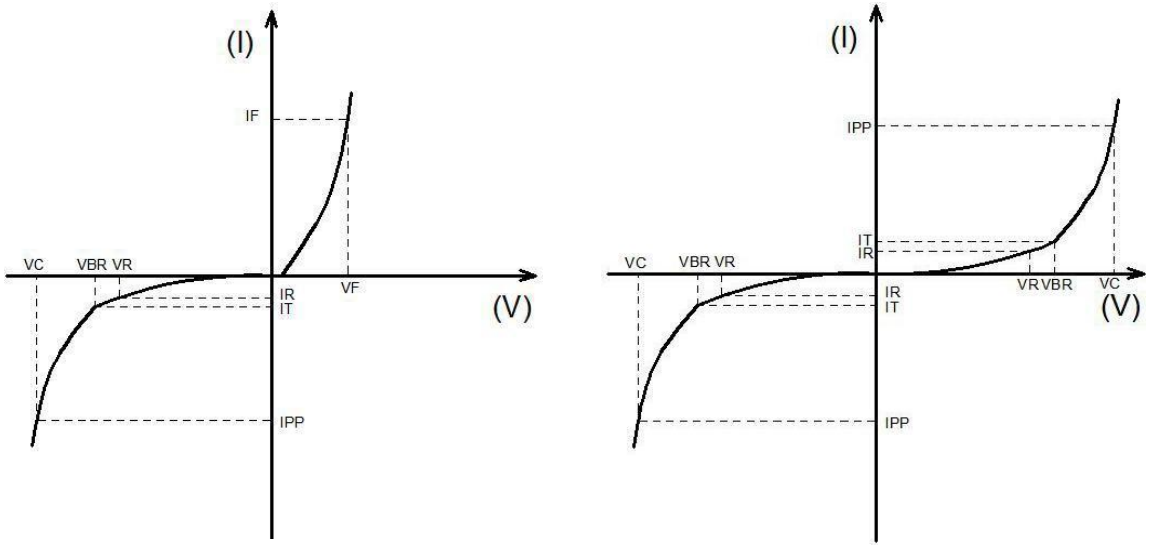
I_R: Reverse leakage current

I_T: Test current

Maximum Ratings (T=25°C, RH=45% ~ 75%, unless otherwise

Parameter	Symbol	Value	Unit
Peak pulse power dissipation on 10/1000μs waveform	P_{PP}	200	W
Steady state power dissipation at T_L=75℃	$P_{M(AV)}$	1.0	W
Operating junction temperature range	T_j	-55 to +175	℃
Storage temperature range	T_{stg}	-55 to +175	℃

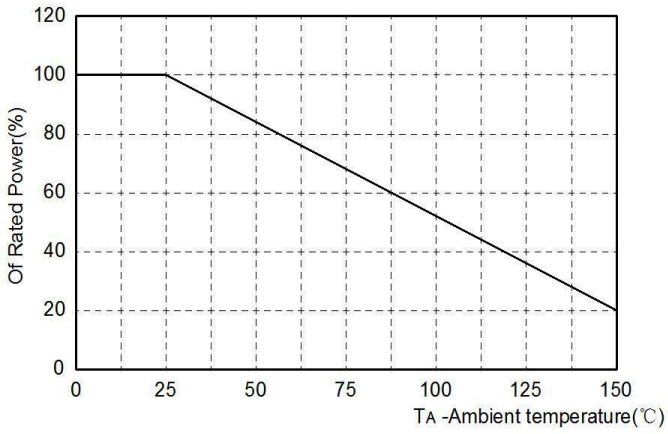
Ratings And V-I Characteristics Curves (T=25ºC, unless otherwise



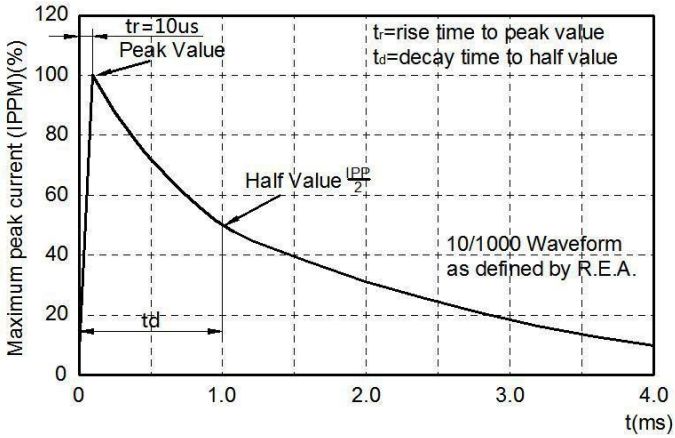
V-I cure characteristics

Symbol	Parameter
I_F	Mean Forward Current
V_F	Maximum Forward Voltage @I_F
V_R	Peak Reverse Working Voltage
I_R	Reverse Leakage Current @ V_R
V_{BR}	Breakdown Voltage @ I_T
I_T	Test Current
I_{PP}	Maximum Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}

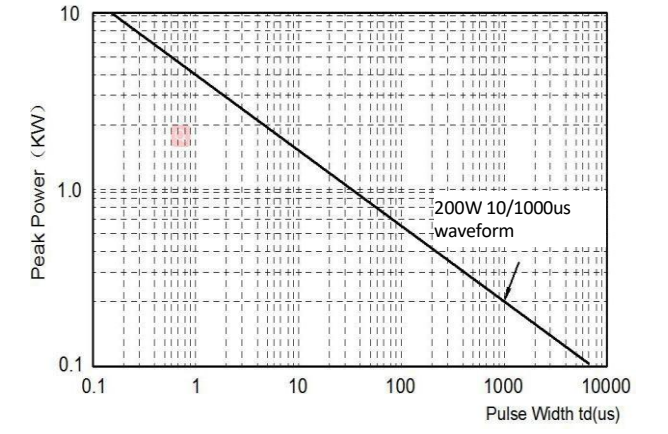
Typical Characteristics



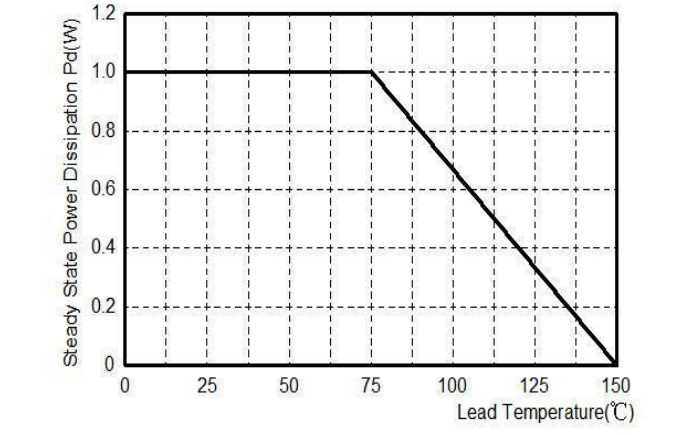
Pulse Derating Curve



Pulse Waveform



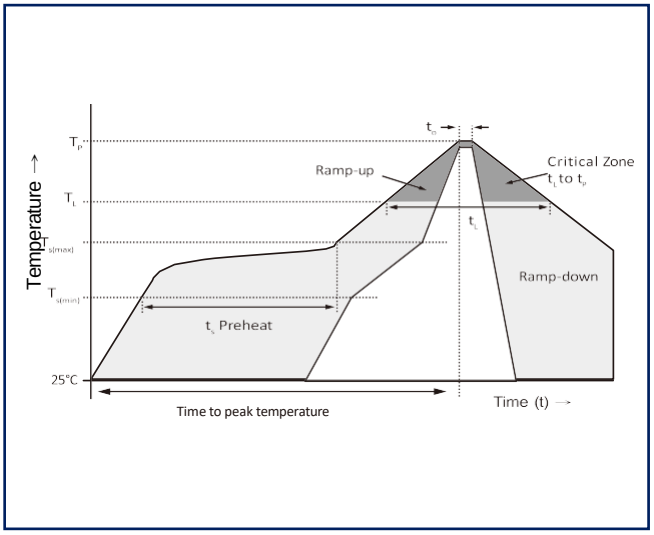
Pulse Derating Curve



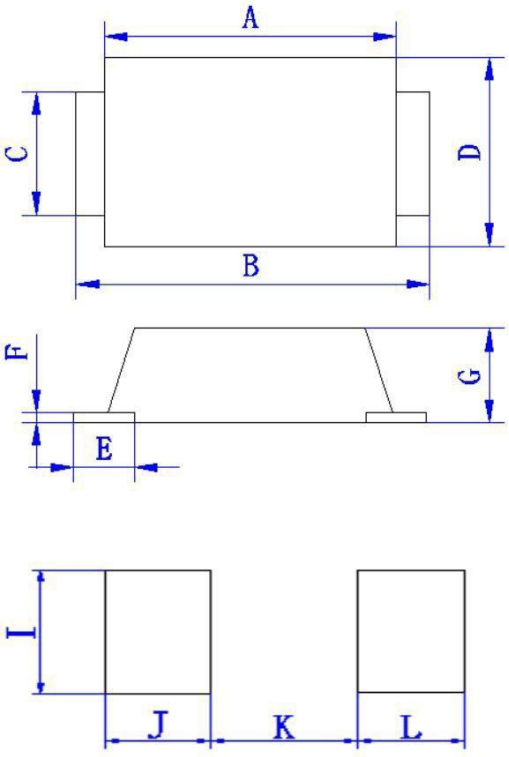
V-I cure characteristics

Soldering Parameters

Reflow Condition		Lead–free assembly
Pre Heat	Temperature Max ($T_{s(min)}$)	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_L)	60 – 150 seconds
Peak Temperature (T_P)		260°C (+0/-5)
Time within 5°C of actual peak Temperature (t_p)		30 seconds Max
Ramp-down Rate		6°C/second Max
Time 25°C to peak Temperature (T_P)		8 minutes Max.
Do not exceed		260°C

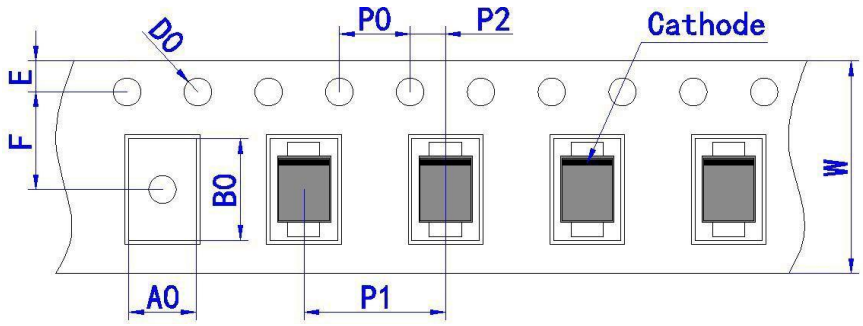


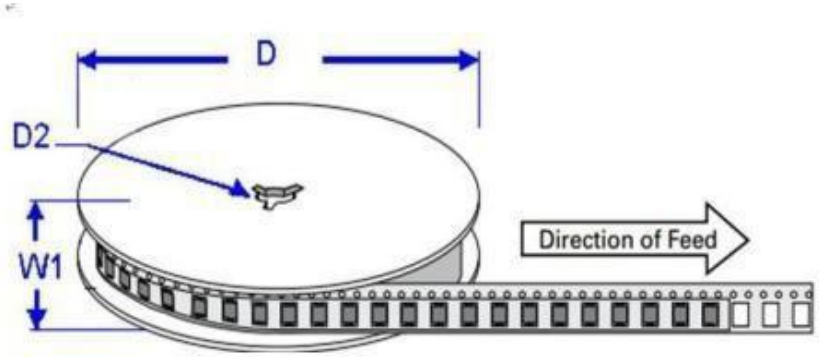
Package mechanical data & Suggested Land Pattern



Ref. (mm)	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
I	1.2	
J	0.85	
K		2.3
L	0.85	

Tape And Reel Specification SOD-123FL





Ref.	Millimeters
A0	2.15±0.20
B0	3.95±0.20
C	178.00
D0	1.55±0.10
E	1.75±0.20
E1	13.50±1.00
F	3.50±0.10
P0	4.00±0.20
P1	4.00±0.20
P2	2.00±0.20
W	8.00±0.30
W1	9.00±4.00
D	177.8±4.00
D2	13.5±0.2