

SMF series



TRANSIENT VOLTAGE SUPPRESSOR DIODES

Voltage: 3.3~440 Volts

Power: 200 W

Package: SOD-123FL

Features

- NH'S Glass Passivated Chip Technology
- Wave And Reflow Solderable
- Low Reverse Leakage
- Very Fast Response Time
- Excellent Clamping Capability
- 10/1000 μ s Waveform, Repetition Rate(Duty Cycle):0.01 %
- ESD Immunity Acc. IEC 61000-4-2

Typical Applications

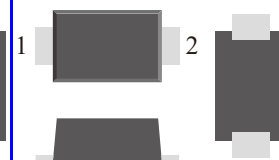
- Power Port
- Communication And Data Port
- ESD Protection And Automotive Electronics
- Industrial Control and Automation

Diagram:

UNI

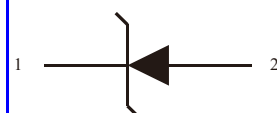


BI

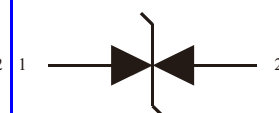


Polarity:

UNI



BI



Single Phase, Half Wave, 60Hz, Resistive Or Inductive Load. For Capacitive Load, Derate Current By 20%

Maximum Ratings (Ta=25°C Unless Otherwise Specified)

Parameter	Test Conditions	Symbol	Value	Unit
Non-Repetitive Peak Pulse Power Dissipation	10/1000 μ s Waveform	P_{PP}	200	W
Peak Pulse Current	10/1000 μ s Waveform	I_{PP}	See Table-1	A
Power Dissipation On Infinite Heatsink	$T_L = 75.0\text{ }^{\circ}\text{C}$	P_D	1.0	W
Maximum Instantaneous Forward Voltage	$I_F = 10.0\text{ A}, V_{BR} < 200\text{V}$	V_F	3.5	V
	$I_F = 10.0\text{ A}, V_{BR} > 201\text{V}$		6.5	

Thermal Characteristics (Ta=25°C Unless Otherwise Specified)

Parameter	Test Conditions	Symbol	Value	Unit
Operating Junction Temperature Range		T_J	-55 ~ 150	$^{\circ}\text{C}$
Storage Temperature Range		T_{STG}	-55 ~ 150	
Thermal Resistance Junction To Ambient With Steady-State	Device Mounted On 1 in2 FR-4 Board With 2oz. Copper	$R_{\theta JA}$	150	$^{\circ}\text{C/W}$

C-V Curve Chart

Symbol Instruction

UNI	BI	Symbol	Instruction
		I_{PP}	Maximum Reverse Peak Pulse Current
		V_C	Clamping Voltage @ I_{PP}
		P_{PP}	Peak Power Dissipation
		V_{RWM}	Working Peak Reverse Voltage
		I_R	Maximum Reverse Leakage Current @ V_{RWM}
		V_{BR}	Breakdown Reverse Voltage
		I_T	Test Current @ V_{RWM}
		I_F	Maximum Average Forward Rectified Current
		V_F	Maximum Instantaneous Forward Voltage
		C_J	Junction Capacitance @ $V_R = 0$ and $f = 1.0\text{ MHz}$

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TRANSIENT VOLTAGE SUPPRESSOR DIODES
Table-1.ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)

Part Number		Device Marking Code		Reverse Stand-off Voltage	Breakdown Voltage VBR @ IT		Test Current	Max. Clamping Voltage @ IPP	Max. Peak Pulse Current	Max. Reverse Leakage @ VRWM
UNI-POLAR	BI-POLAR	UNI	BI	VRWM(V)	Min.(V)	Max.(V)	IT(mA)	VC Max.(V)	IPP(A)	IR(uA)
SMF3.3A	SMF3.3CA	HZ	GZ	3.3	5.20	6.50	10	7.3	27.40	800
SMF5.0A	SMF5.0CA	KE	AE	5.0	6.40	7.00	10	9.2	21.74	800
SMF6.0A	SMF6.0CA	KG	AG	6.0	6.67	7.37	10	10.3	19.42	800
SMF6.5A	SMF6.5CA	KK	AK	6.5	7.22	7.98	10	11.2	17.86	500
SMF7.0A	SMF7.0CA	KM	AM	7.0	7.78	8.60	10	12.0	16.67	200
SMF7.5A	SMF7.5CA	KP	AP	7.5	8.33	9.21	1	12.9	15.50	100
SMF8.0A	SMF8.0CA	KR	AR	8.0	8.89	9.83	1	13.6	14.71	50
SMF8.5A	SMF8.5CA	KT	AT	8.5	9.44	10.40	1	14.4	13.89	20
SMF9.0A	SMF9.0CA	KV	AV	9.0	10.00	11.10	1	15.4	12.99	10
SMF10A	SMF10CA	KX	AX	10.0	11.10	12.30	1	17.0	11.76	5
SMF11A	SMF11CA	KZ	AZ	11.0	12.20	13.50	1	18.2	10.99	1
SMF12A	SMF12CA	LE	BE	12.0	13.30	14.70	1	19.9	10.05	1
SMF13A	SMF13CA	LG	BG	13.0	14.40	15.90	1	21.5	9.30	1
SMF14A	SMF14CA	LK	BK	14.0	15.60	17.20	1	23.2	8.62	1
SMF15A	SMF15CA	LM	BM	15.0	16.70	18.50	1	24.4	8.20	1
SMF16A	SMF16CA	LP	BP	16.0	17.80	19.70	1	26.0	7.69	1
SMF17A	SMF17CA	LR	BR	17.0	18.90	20.90	1	27.6	7.25	1
SMF18A	SMF18CA	LT	BT	18.0	20.00	22.10	1	29.2	6.85	1
SMF20A	SMF20CA	LV	BV	20.0	22.20	24.50	1	32.4	6.17	1
SMF22A	SMF22CA	LX	BX	22.0	24.40	26.90	1	35.5	5.63	1
SMF24A	SMF24CA	LZ	BZ	24.0	26.70	29.50	1	38.9	5.14	1
SMF26A	SMF26CA	ME	CE	26.0	28.90	31.90	1	42.1	4.75	1
SMF28A	SMF28CA	MG	CG	28.0	31.10	34.40	1	45.4	4.41	1
SMF30A	SMF30CA	MK	CK	30.0	33.50	36.80	1	48.4	4.13	1
SMF33A	SMF33CA	MM	CM	33.0	36.70	40.60	1	53.3	3.75	1
SMF36A	SMF36CA	MP	CP	36.0	40.00	44.20	1	58.1	3.44	1
SMF40A	SMF40CA	MR	CR	40.0	44.40	49.10	1	64.5	3.10	1
SMF43A	SMF43CA	MT	CT	43.0	47.80	52.80	1	69.4	2.88	1
SMF45A	SMF45CA	MV	CV	45.0	50.00	55.30	1	72.7	2.75	1
SMF48A	SMF48CA	MX	CX	48.0	53.30	58.90	1	77.4	2.58	1
SMF51A	SMF51CA	MZ	CZ	51.0	56.70	62.70	1	82.4	2.43	1
SMF54A	SMF54CA	NE	DE	54.0	60.00	66.30	1	87.1	2.30	1
SMF58A	SMF58CA	NG	DG	58.0	64.40	71.20	1	93.6	2.14	1
SMF60A	SMF60CA	NK	DK	60.0	66.70	73.70	1	96.8	2.07	1
SMF64A	SMF64CA	NM	DM	64.0	71.10	78.60	1	103.0	1.94	1
SMF70A	SMF70CA	NP	DP	70.0	77.80	86.00	1	113.0	1.77	1
SMF75A	SMF75CA	NR	DR	75.0	83.30	92.10	1	121.0	1.65	1
SMF78A	SMF78CA	NT	DT	78.0	86.70	95.80	1	126.0	1.59	1
SMF85A	SMF85CA	NV	DV	85.0	94.40	104.00	1	137.0	1.46	1
SMF90A	SMF90CA	NX	DX	90.0	100.00	111.00	1	146.0	1.37	1
SMF100A	SMF100CA	NZ	DZ	100.0	111.00	123.00	1	162.0	1.23	1

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UNI-POLAR	BI-POLAR	UNI	BI	VRWM(V)	Min.(V)	Max.(V)	IT(mA)	VC Max.(V)	IPP(A)	IR(uA)
SMF110A	SMF110CA	PE	EE	110.0	122.00	135.00	1	177.0	1.13	1
SMF120A	SMF120CA	PG	EG	120.0	133.00	147.00	1	193.0	1.04	1
SMF130A	SMF130CA	PK	EK	130.0	144.00	159.00	1	209.0	0.96	1
SMF150A	SMF150CA	PM	EM	150.0	167.00	185.00	1	243.0	0.82	1
SMF160A	SMF160CA	PP	EP	160.0	178.00	197.00	1	259.0	0.77	1
SMF170A	SMF170CA	PR	ER	170.0	189.00	209.00	1	275.0	0.73	1
SMF180A	SMF180CA	PT	ET	180.0	201.00	222.00	1	292.0	0.68	1
SMF190A	SMF190CA	PV	EV	190.0	209.00	243.00	1	308.0	0.65	1
SMF200A	SMF200CA	PX	EX	200.0	224.00	247.00	1	324.0	0.62	1
SMF210A	SMF210CA	PZ	EZ	210.0	231.00	268.00	1	340.0	0.59	1
SMF220A	SMF220CA	QE	FE	220.0	246.00	272.00	1	356.0	0.56	1
SMF250A	SMF250CA	QG	FG	250.0	279.00	309.00	1	405.0	0.49	1
SMF300A	SMF300CA	QK	FK	300.0	335.00	371.00	1	486.0	0.41	1
SMF350A		QM		350.0	391.00	432.00	1	567.0	0.35	1
SMF400A		QP		400.0	447.00	494.00	1	648.0	0.31	1
SMF440A		QR		440.0	492.00	543.00	1	713.0	0.28	1

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Typical Characteristics Curves

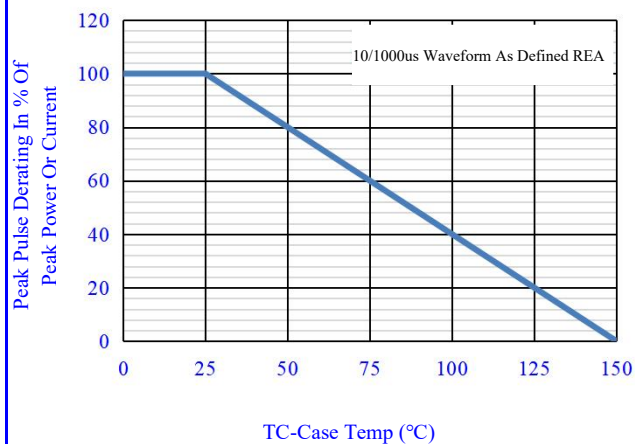


Fig.1-Peak Power Or Current vs.Tc

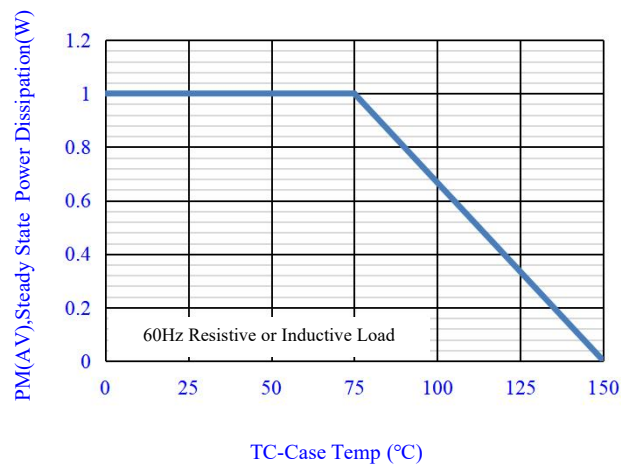


Fig.2-Steady State Power Derating Curve

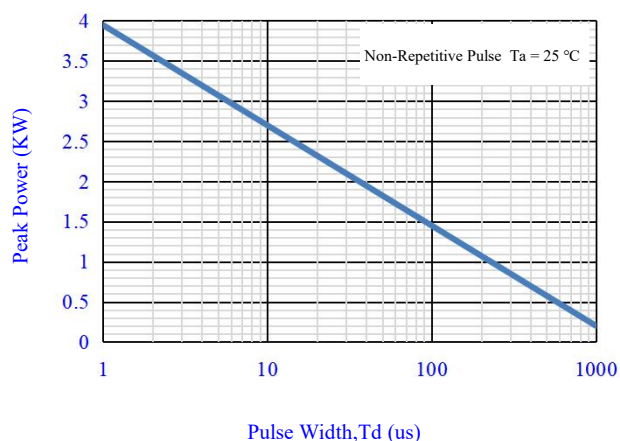


Fig.3-Peak Pulse Power Rating Curve

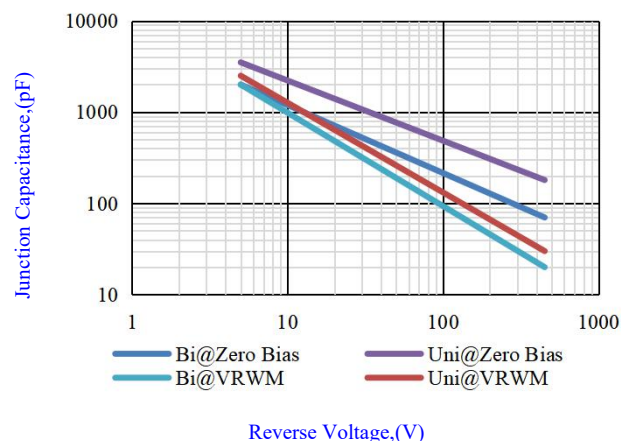


Fig.4-Typical Junction Capacitance

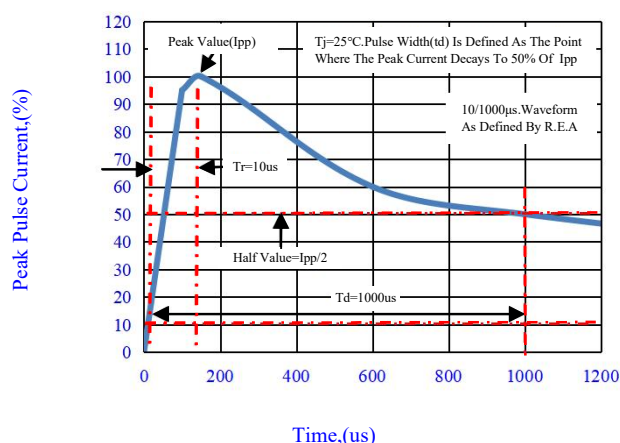


Fig.5-Pulse Waveform

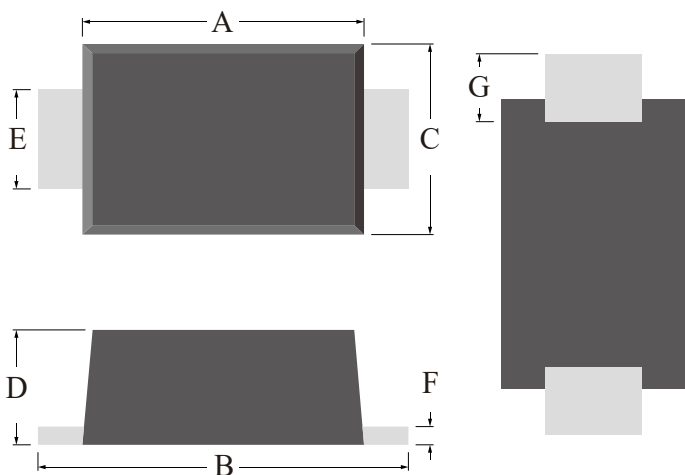
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OUTLINE DRAWINGS

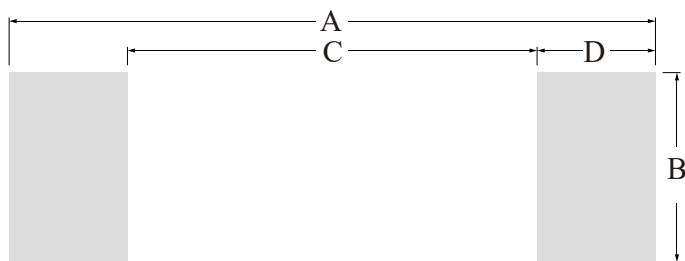
SOD-123FL



OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.65	-	2.90	0.1043	-	0.1142
B	3.50	-	3.80	0.1378	-	0.1496
C	1.70	-	1.95	0.0669	-	0.0768
D	0.90	-	1.30	0.0354	-	0.0512
E	0.80	-	1.10	0.0315	-	0.0433
F	0.10	-	0.25	0.0039	-	0.0098
G	0.45	-	0.85	0.0177	-	0.0335

RECOMMENDED LAYOUT DRAWINGS

SOD-123FL



OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	-	4.26	-	-	0.1677	-
B	-	1.22	-	-	0.0480	-
C	-	2.70	-	-	0.1063	-
D	-	0.78	-	-	0.0307	-

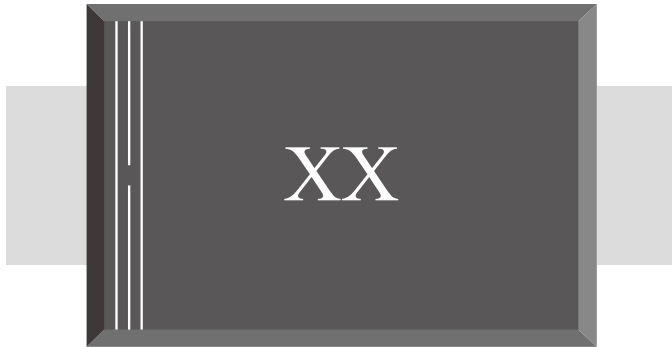
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MARKING

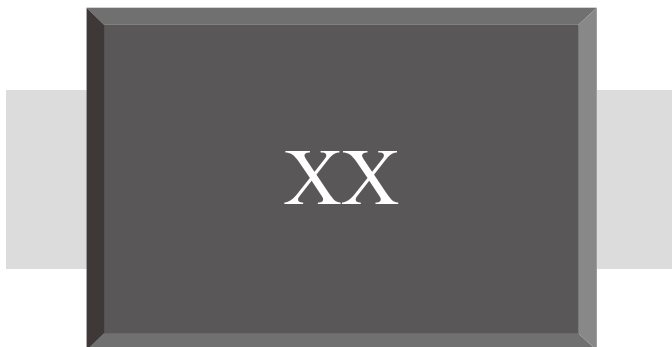
MARKING INSTRUCTION



XX=Make,XX=See Table-1
White band denotes cathode

MARKING

MARKING INSTRUCTION



XX=Make,XX=See Table-1

PACKING INFORMATION

Package Type	Package Code	Product Weight Approx(g/Pcs)	Package Method	Quantity (Pcs/Min. Pack.)	Quantity (Pcs/Inner Box)	Quantity (Pcs/Carton)
SOD-123FL	P1	0.0161	7" Reel	3000	15000	120000
SOD-123FL	P2	0.0161	7" Reel	3000	21000	252000

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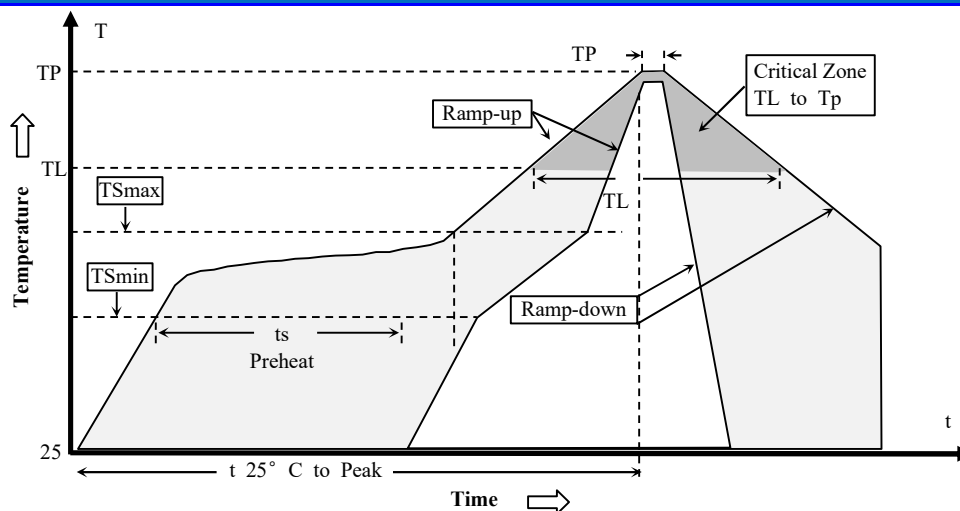


TRANSIENT VOLTAGE SUPPRESSOR DIODES

Recommended wave soldering condition

Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (T _{smax} to T _p)	3°C/second max.	3°C/second max.
Preheat -Temperature Min(TS min) -Temperature Max(TS max) -Time(ts min to ts max)	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
Time maintained above: -Temperature (TL) - Time (tL)	183°C 60-150 seconds	217°C 60-150 seconds
Peak Temperature(TP)	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature(tp)	10-30 seconds	20-40 seconds
Ramp down rate	6°C/second max.	6°C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

Note : All temperatures refer to topside of the package, measured on the package body surface.

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