

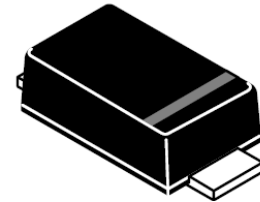


DONGGUAN NANJING ELECTRONICS LTD.,
SOD-123FL Plastic-Encapsulate Diodes

MM4F Series 400W Surface Mount Transient Voltage Suppressors

Features

- Peak power dissipation 400W@10x 1000 μ s pulse.
- Low profile package. .
- Excellent clamping capability
- Fast response time: typical less than 1ps from 0 Volts to BV min
- High surge capability.
- Typical I_R less than 1uA when V_{BR} min above 12V
- IEC 61000-4-2 ESD 30KV(Air), 30KV(Contact)
- ESD protection of data lines in accordance with IEC 61000-4-2
- EFT protection of data lines in accordance with IEC 61000-4-4
- Halogen free and RoHS compliant
- Lead free finish.



SOD-123FL



Bi-directional



Uni-directional

Mechanical Characteristics

- CASE: SOD-123FL.
- Terminals: tin plated, lead free.
- Mounting Position: Any
- Polarity: cathode band for uni-directional device.

Application

- Telecom, VCC bus etc.
- Inductive load switching

Maximum Ratings and Characteristics @ 25°C Ambient Temperature (unless otherwise noted)

Parameter	Symbol	Value	Units
Peak Pulse Power Dissipation on 10/1000 μ s Waveform (Note 1, 2, FIG.1)	P_{PPM}	Min 400	W
Power Dissipation on Infinite Heat Sink at $T_L=25^\circ\text{C}$	P_D	1	W
Peak Pulse Current of on 10/1000us Waveform (Note 1, FIG.3)	I_{PPM}	See Table 1	A
Peak Forward Surge Current, 8.3ms Single Half Sine-Wave (Note 2. 3)	I_{FSM}	30	A
Operating Junction Temperature Range	T_J	-55 to 150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 to 150	$^\circ\text{C}$

Notes:

1. Non-repetitive current pulse, per Fig.3 and derated above $T_A=25^\circ\text{C}$ per Fig.2.
2. Mounted on 8.0x8.0mm² (0.03mm thick) Copper Pads to each terminal.
3. Measured on 8.3ms single half sine-wave, or equivalent square wave, for Unidirectional device only.

Electrical Specification @Tamb 25°C

Part Number		Marking		Reverse Stand-off Voltage	Breakdown Voltage Min. @I _T	Breakdown Voltage Max. @ I _T	Test Current	Maximum Clamping Voltage @I _{PP}	Peak Pulse Current	Reverse Leakage @V _{RWM}
(Uni)	(Bi)	(Uni)	(Bi)	V _{RWM} (V)	V _{BR MIN} (V)	V _{BR MAX} (V)	I _T (mA)	V _C (V)	I _{PP} (A)	I _R (uA)
MM4F5.0A	MM4F5.0CA	F5.0	F5.0C	5.0	6.40	7.07	10	9.6	41.6	100
MM4F6.0A	MM4F6.0CA	F6.0	F6.0C	6.0	6.67	7.37	10	10.3	38.8	100
MM4F6.5A	MM4F6.5CA	F6.5	F6.5C	6.5	7.22	7.98	10	11.2	35.8	50
MM4F7.0A	MM4F7.0CA	F7.0	F7.0C	7.0	7.78	8.60	10	12	33.4	30
MM4F7.5A	MM4F7.5CA	F7.5	F7.5C	7.5	8.33	9.21	1	12.9	31.0	30
MM4F8.0A	MM4F8.0CA	F8.0	F8.0C	8.0	8.89	9.83	1	13.6	29.4	10
MM4F8.5A	MM4F8.5CA	F8.5	F8.5C	8.5	9.44	10.40	1	14.4	27.8	5
MM4F9.0A	MM4F9.0CA	F9.0	F9.0C	9.0	10.00	11.10	1	15.4	26.0	3
MM4F10A	MM4F10CA	F10	F10C	10	11.10	12.30	1	17	23.6	1
MM4F11A	MM4F11CA	F11	F11C	11	12.20	13.50	1	18.2	22.0	1
MM4F12A	MM4F12CA	F12	F12C	12	13.30	14.70	1	19.9	20.1	1
MM4F13A	MM4F13CA	F13	F13C	13	14.40	15.90	1	21.5	18.6	1
MM4F14A	MM4F14CA	F14	F14C	14	15.60	17.20	1	23.2	17.2	1
MM4F15A	MM4F15CA	F15	F15C	15	16.70	18.50	1	24.4	16.4	1
MM4F16A	MM4F16CA	F16	F16C	16	17.80	19.70	1	26	15.4	1
MM4F17A	MM4F17CA	F17	F17C	17	18.90	20.90	1	27.6	14.5	1
MM4F18A	MM4F18CA	F18	F18C	18	20.00	22.10	1	29.2	13.7	1
MM4F20A	MM4F20CA	F20	F20C	20	22.20	24.50	1	32.4	12.3	1
MM4F22A	MM4F22CA	F22	F22C	22	24.40	26.90	1	35.5	11.3	1
MM4F24A	MM4F24CA	F24	F24C	24	26.70	29.50	1	38.9	10.3	1
MM4F26A	MM4F26CA	F26	F26C	26	28.90	31.90	1	42.1	9.5	1
MM4F28A	MM4F28CA	F28	F28C	28	31.10	34.40	1	45.4	8.8	1
MM4F30A	MM4F30CA	F30	F30C	30	33.30	36.80	1	48.4	8.3	1
MM4F33A	MM4F33CA	F33	F33C	33	36.70	40.60	1	53.3	7.5	1
MM4F36A	MM4F36CA	F36	F36C	36	40.00	44.20	1	58.1	6.9	1
MM4F40A	MM4F40CA	F40	F40C	40	44.40	49.10	1	64.5	6.2	1
MM4F43A	MM4F43CA	F43	F43C	43	47.80	52.80	1	69.4	5.8	1
MM4F45A	MM4F45CA	F45	F45C	45	50.00	55.30	1	72.7	5.5	1
MM4F48A	MM4F48CA	F48	F48C	48	53.30	58.90	1	77.4	5.2	1
MM4F51A	MM4F51CA	F51	F51C	51	56.70	62.70	1	82.4	4.9	1
MM4F54A	MM4F54CA	F54	F54C	54	60.00	66.30	1	87.1	4.6	1
MM4F58A	MM4F58CA	F58	F58C	58	64.40	71.20	1	93.6	4.3	1

※ For Bi-directional type having V_{RWM} of 10 Volts and less, the I_R limit is double.

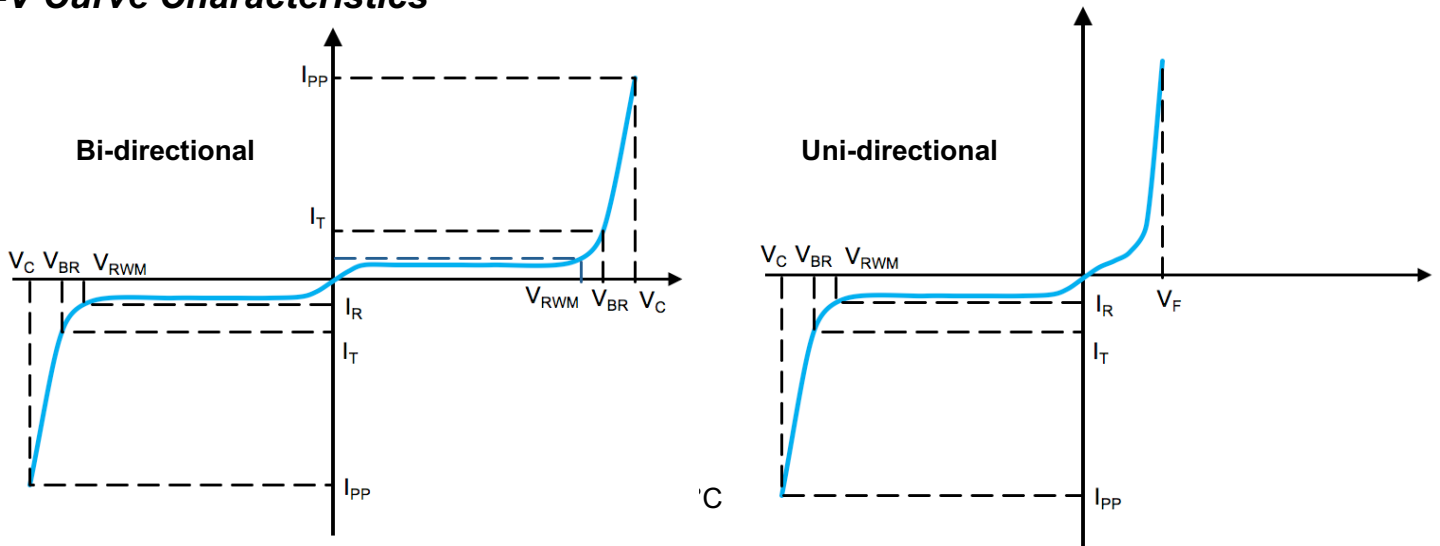
※ For parts without A, the V_{BR} is ± 10% and V_C is 5% higher than with A parts.

Part Number		Marking		Reverse Stand-off Voltage	Breakdown Voltage Min. @I _T	Breakdown Voltage Max. @ I _T	Test Current	Maximum Clamping Voltage @I _{PP}	Peak Pulse Current	Reverse Leakage @V _{RWM}
(Uni)	(Bi)	(Uni)	(Bi)	V _{RWM} (V)	V _{BR} MIN(V)	V _{BR} MAX(V)	I _T (mA)	V _C (V)	I _{PP} (A)	I _R (uA)
MM4F60A	MM4F60CA	F60	F60C	60	66.70	73.70	1	96.8	4.1	1
MM4F64A	MM4F64CA	F64	F64C	64	71.10	78.60	1	103	3.9	1
MM4F70A	MM4F70CA	F70	F70C	70	77.80	86.00	1	113	3.5	1
MM4F75A	MM4F75CA	F75	F75C	75	83.30	92.10	1	121	3.3	1
MM4F78A	MM4F78CA	F78	F78C	78	86.7	95.8	1	126	3.2	1
MM4F85A	MM4F85CA	F85	F85C	85	94.4	104.0	1	137	2.9	1
MM4F90A	MM4F90CA	F90	F90C	90	100	111	1	146	2.7	1
MM4F100A	MM4F100CA	F100	F100C	100	111	123	1	162	2.5	1
MM4F110A	MM4F110CA	F110	F110C	110	122	135	1	177	2.3	1
MM4F120A	MM4F120CA	F120	F120C	120	133	147	1	193	2.1	1
MM4F130A	MM4F130CA	F130	F130C	130	144	159	1	209	1.9	1
MM4F150A	MM4F150CA	F150	F150C	150	167	185	1	243	1.6	1

※ For Bi-directional type having V_{RWM} of 10 Volts and less, the I_R limit is double.

※ For parts without A, the V_{BR} is ± 10% and V_C is 5% higher than with A parts.

I-V Curve Characteristics



P_{PPM} Peak Pulse Power Dissipation - Max power dissipation

V_{RWM} Reverse Stand-off Voltage - Maximum voltage that can be applied to TVS without operation

V_{BR} Breakdown Voltage – Maximum voltage that flows though the TVS at a specified current (I_T)

V_C Clamping Voltage – Peak voltage measured across the TVS at a specified I_{PPM} (peak impulse current)

I_R Reverse Leakage Current – Current measured at V_R

V_F Forward Voltage Drop for Uni-directional

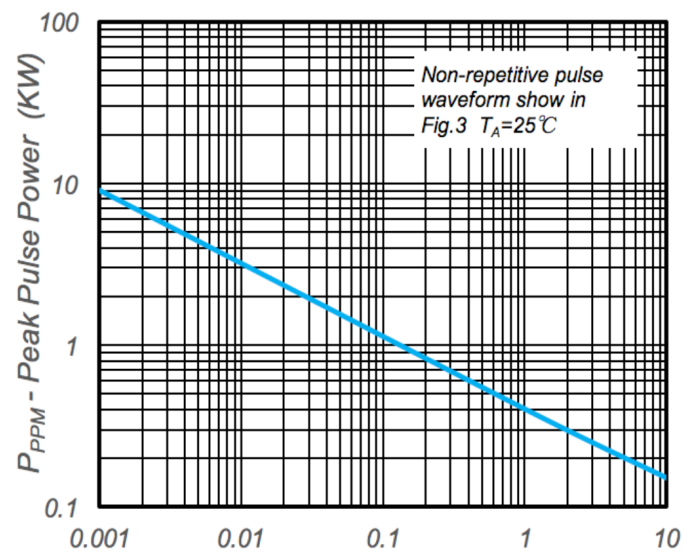


Fig.1 - Peak Pulse Power Rating

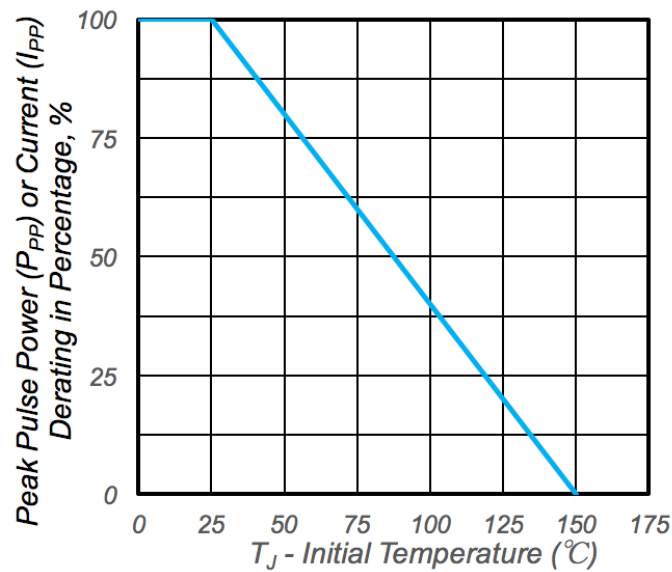


Fig.2 - Pulse Derating Curve

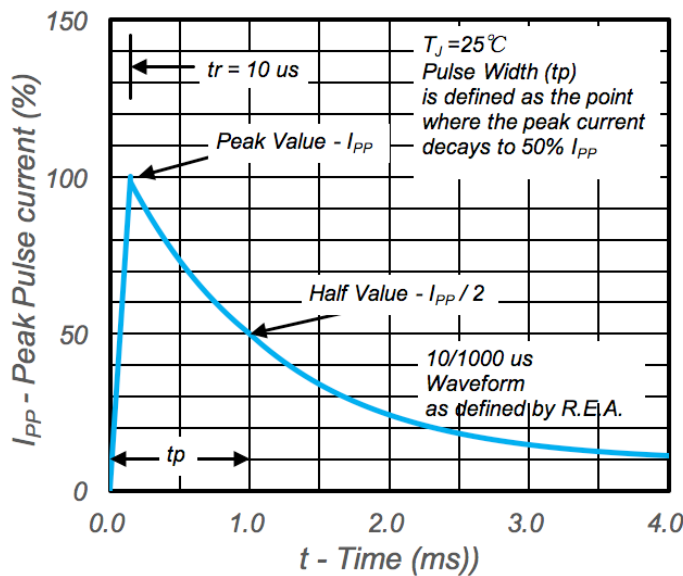


Fig.3 - Pulse Waveform

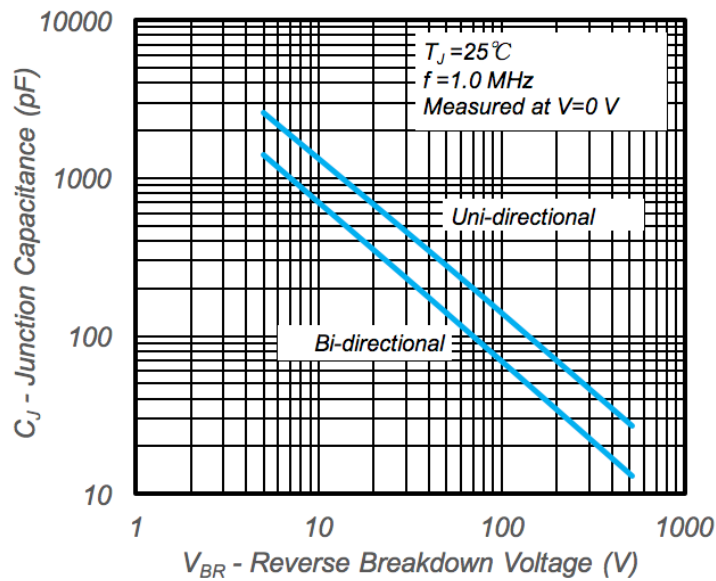
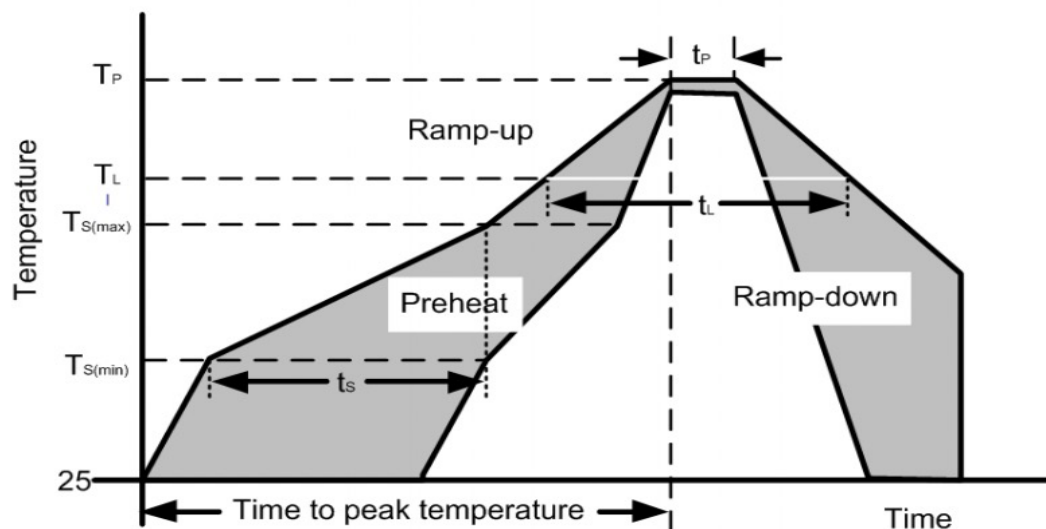


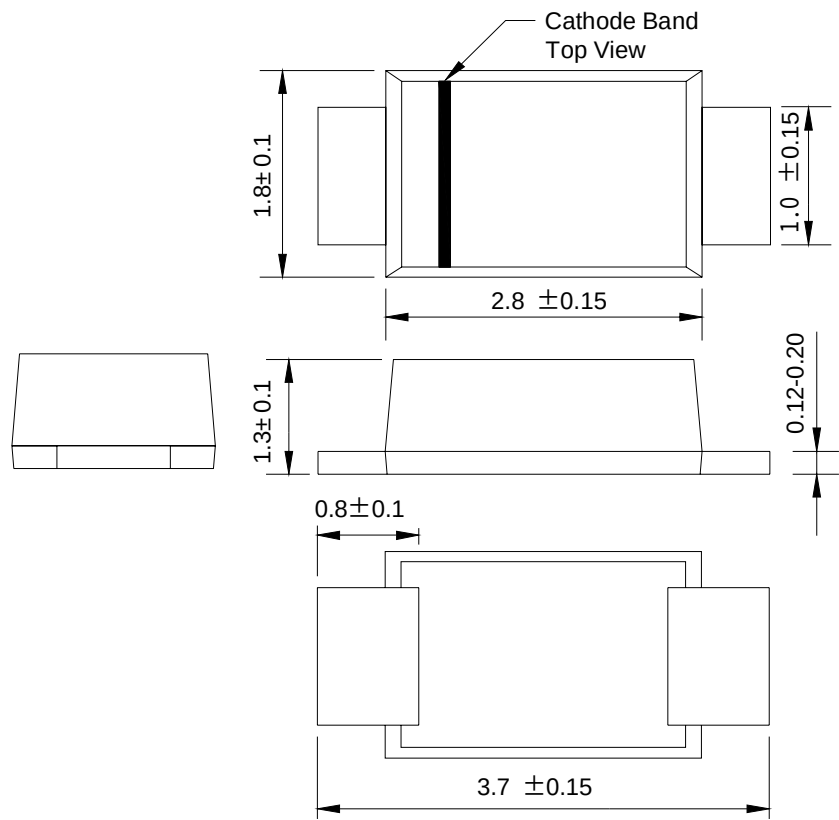
Fig.4 - Typical Junction Capacitance

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 – 190 secs
Average ramp up rate (Liquidus Temp) (T_L) to peak		5°C/second max
$T_{s(max)}$ to T_L ——Ramp-up Rate		5°C/second max
Reflow	Temperature (T_L) (Liquidus)	217°C
	Temperature (t_L)	60 – 150 seconds
Peak Temperature (T_P)		260+0/-5 °C
Time within actual peak Temperature (t_p)		20 – 40 seconds
Ramp-down Rate		5°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes Max.
Do not exceed		280°C

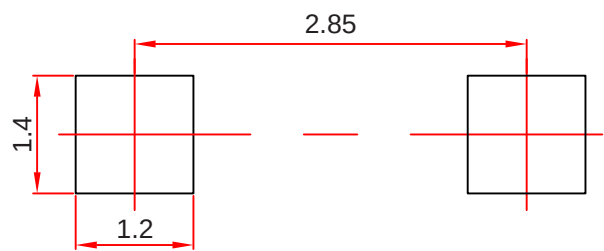


SOD-123FL Package Outline Dimensions



Dimensions in millimeters

SOD-123FL Suggested Pad Layout



- Note:**
- 1. Controlling dimension: in millimeters.
 - 2. General tolerance: ± 0.05 mm.
 - 3. The pad layout is for reference purposes only.

Reel Taping Specifications For Surface Mount Devices–SOD-123FL

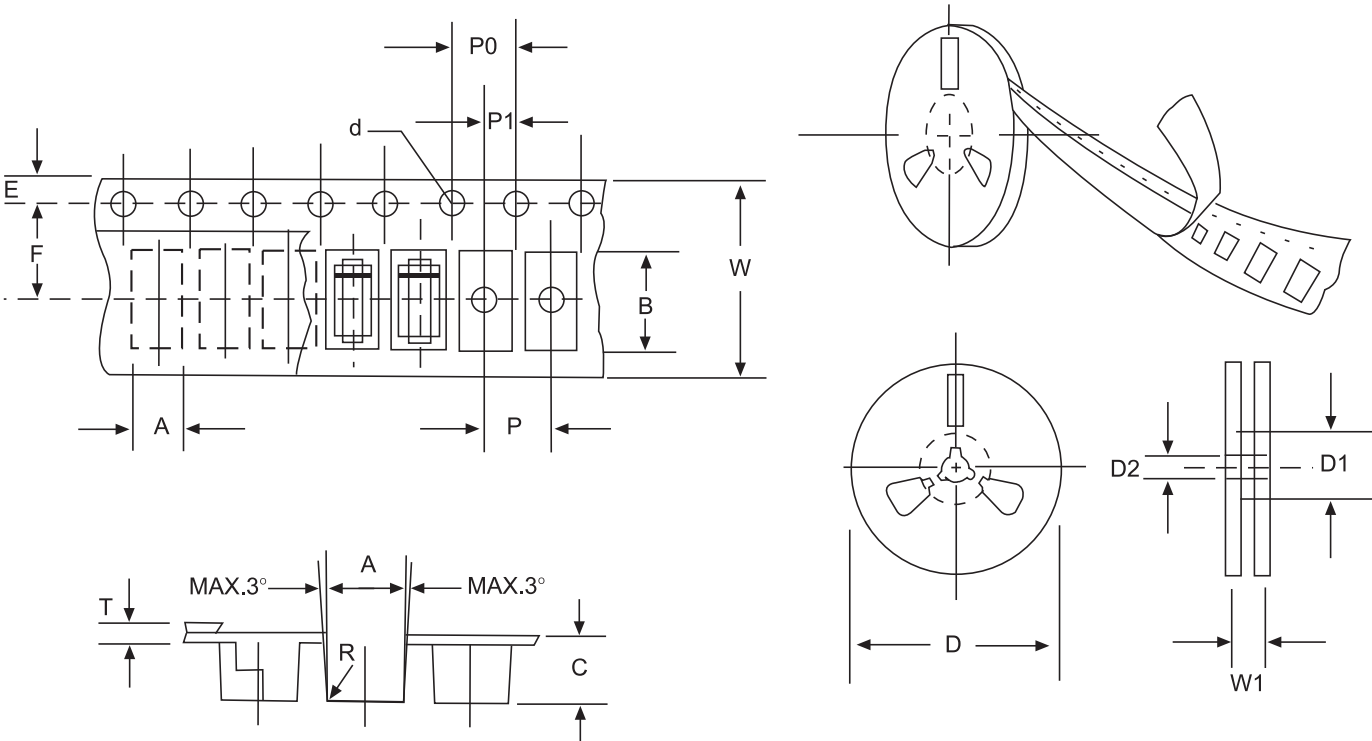


FIG:CONFIGURATION OF SURFACE MOUNTED DEVICES TAPING

ITEM	SYMBOL	SOD-123FLmm(inch)
Carrier width	A	2.05±0.1(0.081±0.004)
Carrier length	B	3.95±0.1(0.156±0.004)
Carrier depth	C	1.45±0.1(0.057±0.004)
Sprocket hole	d	1.55±0.05(0.061±0.002)
Reel outside diameter	D	178±2.0(7.0±0.079)
Reel inner diameter	D1	54±1.0(2.13 ±0.039)
Feed hole diameter	D2	13±0.5(0.512±0.020)
Strocket hole position	E	1.75±0.1(0.069±0.004)
Punch hole position	F	3.50±0.1(0.138±0.002)
Punch hole pitch	P	4.0±0.1(0.157±0.004)
Sprocket hole pitch	P0	4.0±0.1(0.157±0.004)
Embossment center	P1	2.0±0.1(0.079±0.004)
Totall tape thickness	T	0.21±0.25(0.008±0.010)
Tape width	W	8.0±0.2(0.315±0.008)
Reel width	W1	10.0±2.0(0.394±0.079)

NOTE:Devices are packed in accordance with EIA standard RS-481-A and specification given above.