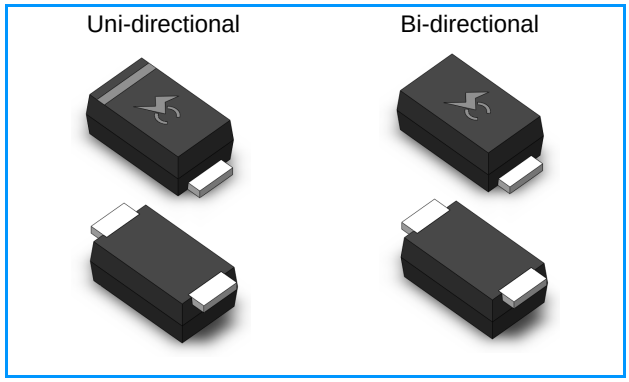
Transient Voltage Suppressors for ESD Protection

SOD123 Series TVS/ESD

Description

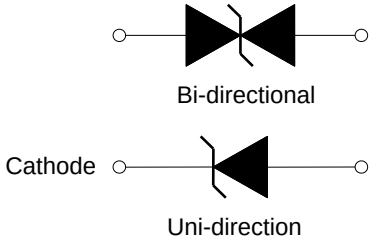
The SOD123 Series TVS/ESD is designed specifically to protect sensitive electronic equipment from voltage transients induced by ESD,lightning surge and other transient voltage events.



Features

- Compatible with industrial standard package SOD-123
- For surface mounted applications in order to optimize board space
- Low leakage
- Uni and Bidirectional unit
- Glass passivated junction
- Low inductance
- Excellent clamping capability
- 200W Peak power capability at 10 × 1000μs waveform Repetition rate (duty cycle):0.01%
- Fast response time: typically less than 1.0ps from 0 Volts to V_{BR} min
- High Temperature soldering: 260°C/40 seconds at terminals
- Typical maximum temperature coefficient ΔV_{BR} = 0.1% × V_{BR}@25°C× ΔT
- Plastic package has Underwriters Laboratory Flammability 94V-0
- Matte tin lead–free Plated
- Halogen free and RoHS compliant
- Typical failure mode is short from over-specified voltage or current
- Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)

Functional Diagram



Applications

TVS/ESD devices are ideal for the protection of low speed I/O interfaces, V_{CC} bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications.

Maximum Ratings (T_A=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation with a 10/1000μs waveform (Note 1), (Note 2)	P_{PPM}	200	Watts
Peak Pulse Power Dissipation with a 8/20μs waveform	P_{PPM}	1000	Watts
Peak Pulse Current with a 10/1000μs waveform.(Note1,Fig.3)	I_{PP}	See Next Table	Amps
Power Dissipation on Infinite Heat Sink at T_L=75°C	$P_{M(AV)}$	0.4	Watt
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)	I_{FSM}	20	Amps
Maximum Instantaneous Forward Voltage at 25A for Unidirectional Only (Note 4)	V_F	3.5	Voltage
Operating junction and Storage Temperature Range.	T_J , T_{STG}	-55 to +150	°C

Notes:

1. Non-repetitive current pulse, per Fig. 3 and derated above T_A = 25°C per Fig. 2.
2. Mounted on 5.0mm x 5.0mm (0.03mm thick) Copper Pads to each terminal.
3. 8.3ms single half sine-wave, or equivalent square wave, Duty cycle = 4 pulses per minutes maximum.
4. V_F < 3.5V for V_{BR} < 200V and V_F< 6.5V for V_{BR} > 201V.

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Transient Voltage Suppressors for ESD Protection

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Electrical Characteristics (T_A=25°C unless otherwise noted)

Part Number		Device Marking		V_{RWM} (V) (Max.)	Breakdown Voltage V_{BR} (V) @I_T		I_T (mA)	V_C		I_R
Uni	Bi	Uni	Bi		Min	Max		Max	@I_{PP}	
ESD3.3V12D-A	ESD3.3V12D-C	FD	-	3.3	5.20	6.00	10	8.0	25.0	400
ESD5.0V12D-A	ESD5.0V12D-C	FE	KE	5.0	6.40	7.00	10	9.2	21.74	400
ESD6.0V12D-A	ESD6.0V12D-C	FG	KG	6.0	6.67	7.37	10	10.3	19.42	400
ESD6.5V12D-A	ESD6.5V12D-C	FK	KK	6.5	7.22	7.98	10	11.2	17.86	250
ESD7.0V12D-A	ESD7.0V12D-C	FM	KM	7.0	7.78	8.60	10	12.0	16.67	100
ESD7.5V12D-A	ESD7.5V12D-C	FP	KP	7.5	8.33	9.21	1	12.9	15.50	50
ESD8.0V12D-A	ESD8.0V12D-C	FR	KR	8.0	8.89	9.83	1	13.6	14.71	25
ESD8.5V12D-A	ESD8.5V12D-C	FT	KT	8.5	9.44	10.40	1	14.4	13.89	10
ESD9.0V12D-A	ESD9.0V12D-C	FV	KV	9.0	10.00	11.10	1	15.4	12.99	5
ESD10V12D-A	ESD10V12D-C	FX	KX	10.0	11.10	12.30	1	17.0	11.76	2.5
ESD11V12D-A	ESD11V12D-C	FZ	KZ	11.0	12.20	13.50	1	18.2	10.99	2.5
ESD12V12D-A	ESD12V12D-C	HE	LE	12.0	13.30	14.70	1	19.9	10.05	2.5
ESD13V12D-A	ESD13V12D-C	HG	LG	13.0	14.40	15.90	1	21.5	9.30	1
ESD14V12D-A	ESD14V12D-C	HK	LK	14.0	15.60	17.20	1	23.2	8.62	1
ESD15V12D-A	ESD15V12D-C	HM	LM	15.0	16.70	18.50	1	24.4	8.20	1
ESD16V12D-A	ESD16V12D-C	HP	LP	16.0	17.80	19.70	1	26.0	7.69	1
ESD17V12D-A	ESD17V12D-C	HR	LR	17.0	18.90	20.90	1	27.6	7.25	1
ESD18V12D-A	ESD18V12D-C	HT	LT	18.0	20.00	22.10	1	29.2	6.85	1
ESD19V12D-A	ESD19V12D-C	HB	LB	19.0	21.10	23.30	1	30.6	6.54	1
ESD20V12D-A	ESD20V12D-C	HV	LV	20.0	22.20	24.50	1	32.4	6.17	1
ESD22V12D-A	ESD22V12D-C	HX	LX	22.0	24.40	26.90	1	35.5	5.63	1
ESD24V12D-A	ESD24V12D-C	HZ	LZ	24.0	26.70	29.50	1	38.9	5.14	1
ESD26V12D-A	ESD26V12D-C	JE	ME	26.0	28.90	31.90	1	42.1	4.75	1
ESD28V12D-A	ESD28V12D-C	JG	MG	28.0	31.10	34.40	1	45.4	4.41	1
ESD30V12D-A	ESD30V12D-C	JK	MK	30.0	33.30	36.80	1	48.4	4.13	1
ESD33V12D-A	ESD33V12D-C	JM	MM	33.0	36.70	40.60	1	53.3	3.75	1
ESD36V12D-A	ESD36V12D-C	JP	MP	36.0	40.00	44.20	1	58.1	3.44	1
ESD40V12D-A	ESD40V12D-C	JR	MR	40.0	44.40	49.10	1	64.5	3.10	1
ESD43V12D-A	ESD43V12D-C	JT	MT	43.0	47.80	52.80	1	69.4	2.88	1
ESD45V12D-A	ESD45V12D-C	JV	MV	45.0	50.00	55.30	1	72.7	2.75	1
ESD48V12D-A	ESD48V12D-C	JX	MX	48.0	53.30	58.90	1	77.4	2.58	1
ESD51V12D-A	ESD51V12D-C	JZ	MZ	51.0	56.70	62.70	1	82.4	2.43	1
ESD54V12D-A	ESD54V12D-C	XE	NE	54.0	60.00	66.30	1	87.1	2.30	1
ESD58V12D-A	ESD58V12D-C	XG	NG	58.0	64.40	71.20	1	93.6	2.14	1
ESD60V12D-A	ESD60V12D-C	XK	NK	60.0	66.70	73.70	1	96.8	2.07	1
ESD64V12D-A	ESD64V12D-C	XM	NM	64.0	71.10	78.60	1	103.0	1.94	1
ESD70V12D-A	ESD70V12D-C	XP	NP	70.0	77.80	86.00	1	113.0	1.77	1
ESD75V12D-A	ESD75V12D-C	XR	NR	75.0	83.30	92.10	1	121.0	1.65	1
ESD78V12D-A	ESD78V12D-C	XT	NT	78.0	86.70	95.80	1	126.0	1.59	1
ESD80V12D-A	ESD80V12D-C	XB	NB	80.0	88.80	97.60	1	129.0	1.55	1
ESD85V12D-A	ESD85V12D-C	XV	NV	85.0	94.40	104.00	1	137.0	1.46	1
ESD90V12D-A	ESD90V12D-C	XX	NX	90.0	100.00	111.00	1	146.0	1.37	1
ESD96V12D-A	ESD96V12D-C	XZ	NZ	96.0	111.00	123.00	1	162.0	1.23	1
ESD110V12D-A	ESD110V12D-C	TE	PE	110.0	122.00	135.00	1	177.0	1.13	1
ESD120V12D-A	ESD120V12D-C	TG	PG	120.0	133.00	147.00	1	193.0	1.04	1
ESD130V12D-A	ESD130V12D-C	TK	PK	130.0	144.00	159.00	1	209.0	0.96	1
ESD140V12D-A	ESD140V12D-C	TB	PB	140.0	155.00	171.00	1	224.0	0.89	1
ESD150V12D-A	ESD150V12D-C	TM	PM	150.0	167.00	185.00	1	243.0	0.82	1
ESD160V12D-A	ESD160V12D-C	TP	PP	160.0	178.00	197.00	1	259.0	0.77	1
ESD170V12D-A	ESD170V12D-C	TR	PR	170.0	189.00	209.00	1	275.0	0.73	1
ESD180V12D-A	ESD180V12D-C	TT	PT	180.0	200.00	220.00	1	292.0	0.69	1
ESD190V12D-A	ESD190V12D-C	TV	PV	190.0	211.00	232.00	1	308.0	0.69	1

Note:

1. Suffix 'A ' denotes 5% tolerance device. Without 'A' denotes 10% tolerance device
2. Add suffix 'C 'or ' CA ' after part number to specify Bi-directional devices
3. For Bi-Directional devices having V_R of 10 volts and under, the I_R limit is double

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Transient Voltage Suppressors for ESD Protection

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Ratings and Characteristic Curves (T_A=25°C unless otherwise noted)

Fig1 – 10/1000 μs Pulse Waveform

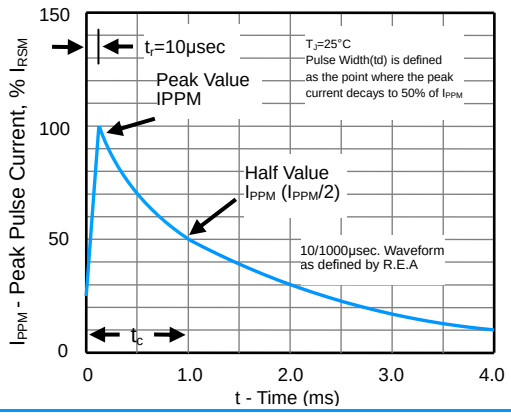


Fig2 - ESD Pulse Waveform (according to IEC 61000-4-2)

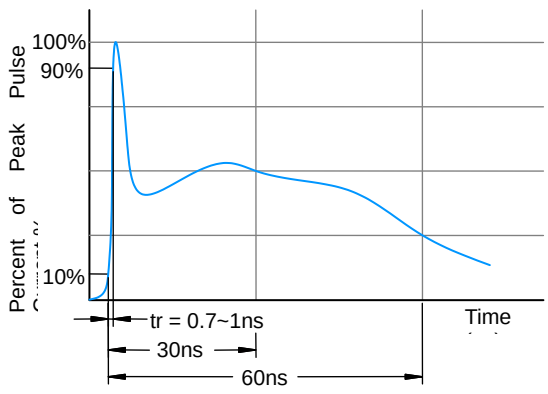


Fig3 - Pulse Derating Curve

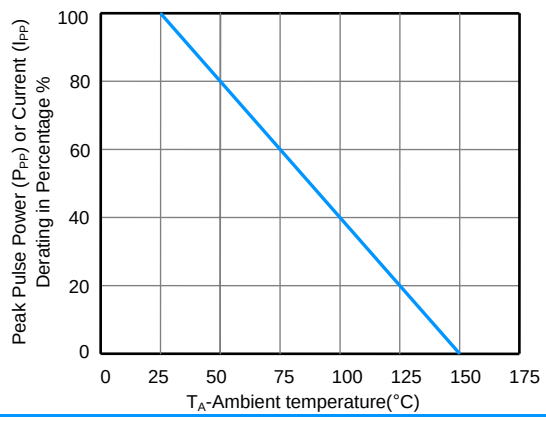


Fig4 - Typical Junction Capacitance

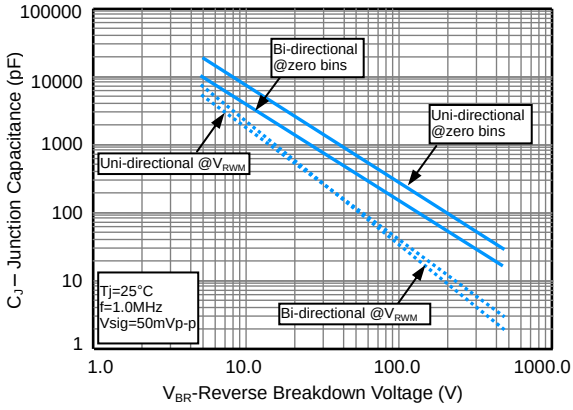


Fig5 - ESD Clamping (+8KV Contac per IEC61000-4-2)

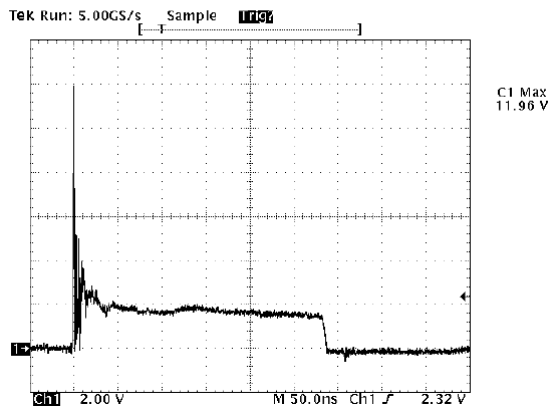
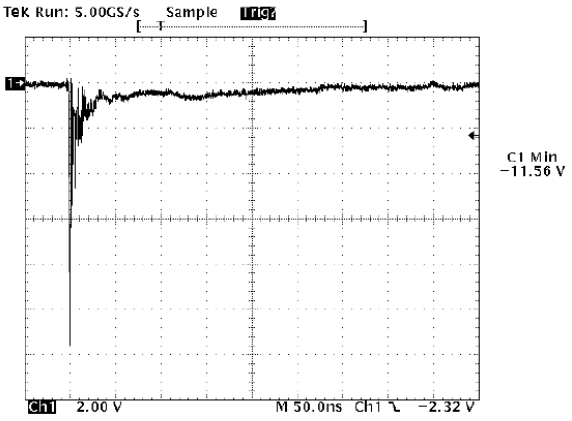


Fig6 - ESD Clamping (-8KV Contac per IEC61000-4-2)

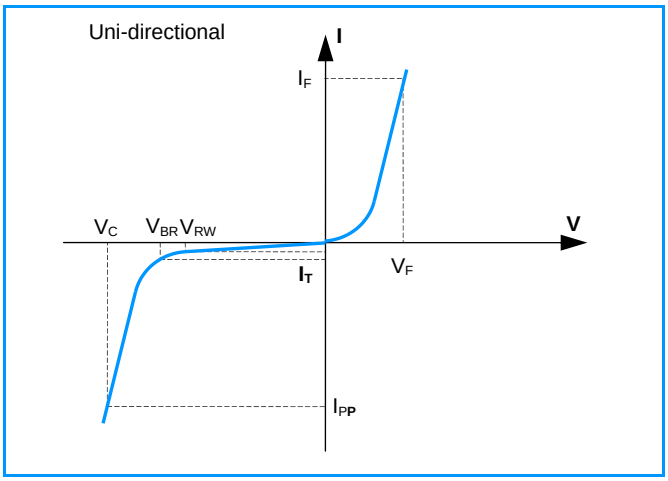


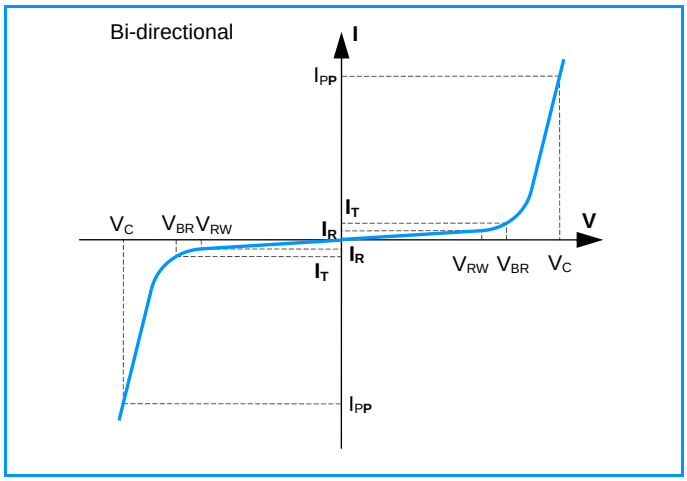
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Transient Voltage Suppressors for ESD Protection

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Fig7 I-V Curve Characteristics





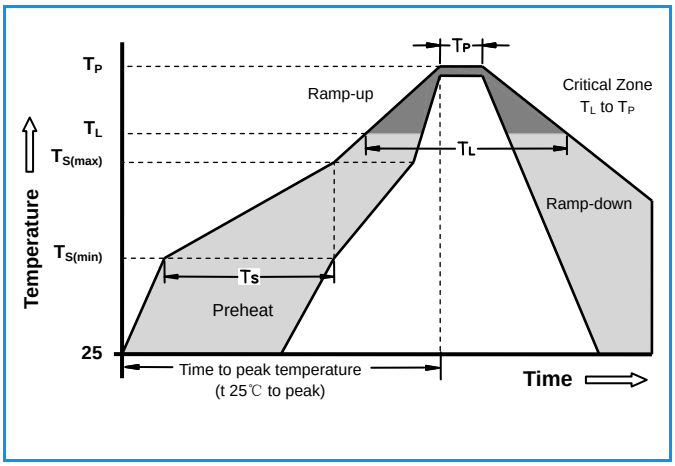
Physical Specifications

Case	SOD-123 Molded Plastic over glass passivated junction
Polarity	Color band denotes cathode except Bipolar
Terminal	Matte Tin-plated leads, Solderable per JESD22-B102D

Environmental Specifications

Temperature Cycle	JESD22-A104
Pressure Cooker	JESD22-A102
High Temp. Storage	JESD22-A103
HTRB	JESD22-A108
Thermal Shock	JESD22-A106

Soldering Parameters



Reflow Condition		Lead–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 -180 Seconds
Average ramp up rate (Liquidus Temp T_L) to peak		3°C/second max
$T_{S(max)}$ to TL - 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 +0/-5°C
Time within 5°C of actual peak Temperature (t_p)		20 -40 Seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes Max
Do not exceed		280°C

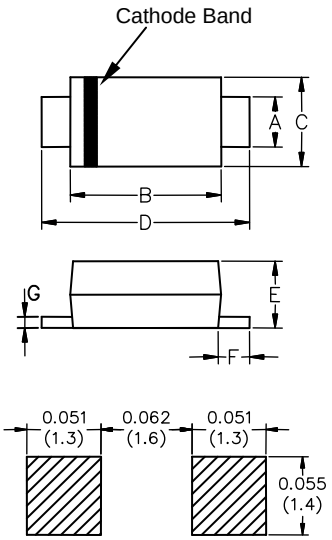
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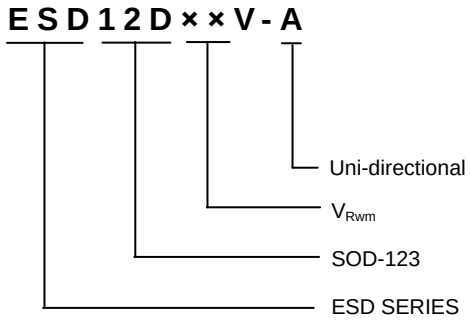
Dimensions

SOD-123

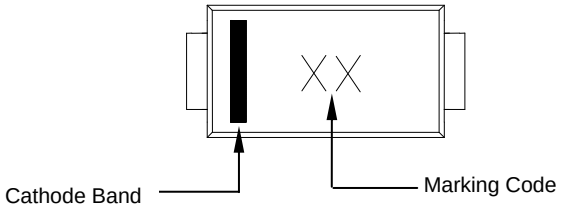


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.031	0.044	0.77	1.09
B	0.1	0.112	2.51	2.81
C	0.055	0.071	1.38	1.78
D	0.140	0.152	3.51	3.82
E	0.037	0.053	0.93	1.33
F	0.01	-	0.25	-
G	-	0.008	-	0.20

Part Numbering



Part Marking



Packaging

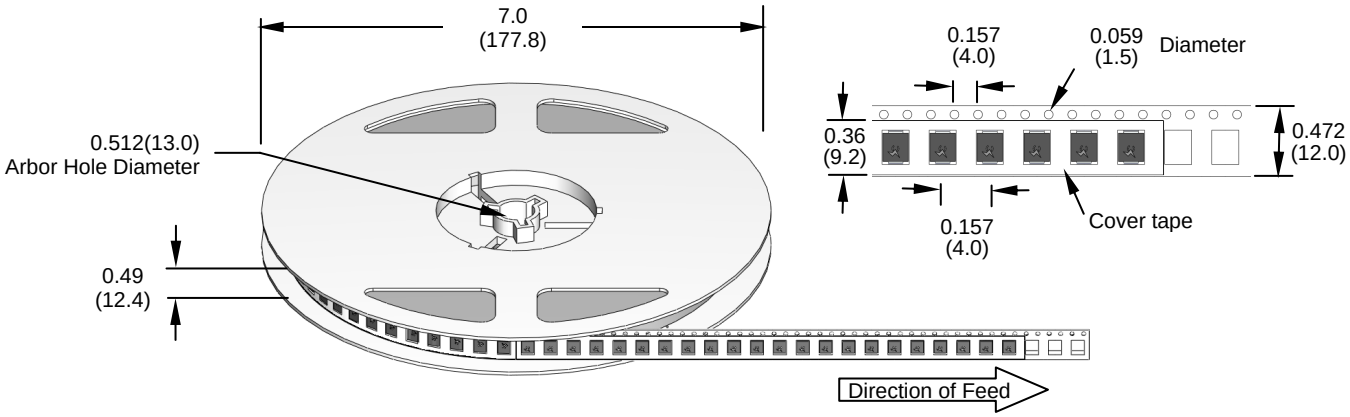
Part Number	Component Package	Quantity	Packaging Option	Packaging Specification
ESD12DXXV-A/C	SOD-123	3000	Tape & Reel -12mm/7"tape	EIA STD RS-481

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Transient Voltage Suppressors for ESD Protection

SOD123 Series TVS/ESD

Tape and Reel Specifications



Dimensions are in inches
(and millimeters)

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