

Description

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

Features

- For surface mounted applications
- Excellent clamping capability
- 1000 W peak pulse power capability with a 10/1000 μ s Waveform.
- V_{RWM} 5.0 - 440V
- Low profile package and low inductance
- Typical IR less than 1 μ A above 10 V
- Fast response time: typically less than 1.0ps from 0V to V_{BR} min.

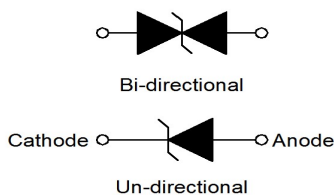
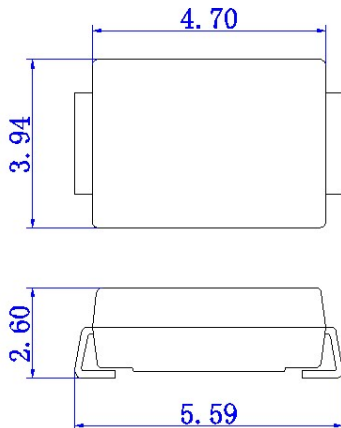
Applications

- computer system
- domestic appliance
- video input

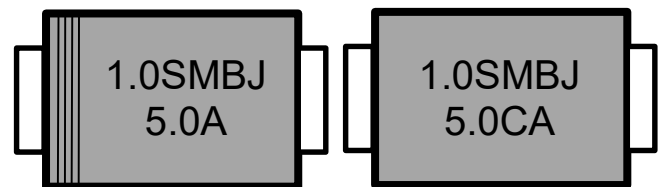
Mechanical Characteristics

- Package: SMB/DO-214AA
- 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: 0.09g(approximate)

Dimensions & Symbol (Unit: mm Max)



Marking Information



1.0SMBJ5.0A: 1.0SMBJ5.0A Marking code
1.0SMBJ5.0CA: 1.0SMBJ5.0CA Marking code

Electrical Characteristics (T=25°C)

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
1.0SMBJ5.0A	1.0SMBJ5.0CA	1.0SMBJ5.0A	1.0SMBJ5.0CA	5.0	800	6.40	7.00	10	9.2	108.70
1.0SMBJ6.0A	1.0SMBJ6.0CA	1.0SMBJ6.0A	1.0SMBJ6.0CA	6.0	800	6.67	7.37	10	10.3	97.09
1.0SMBJ6.5A	1.0SMBJ6.5CA	1.0SMBJ6.5A	1.0SMBJ6.5CA	6.5	500	7.22	7.98	10	11.2	89.29
1.0SMBJ7.0A	1.0SMBJ7.0CA	1.0SMBJ7.0A	1.0SMBJ7.0CA	7.0	200	7.78	8.60	10	12.0	83.34
1.0SMBJ7.5A	1.0SMBJ7.5CA	1.0SMBJ7.5A	1.0SMBJ7.5CA	7.5	100	8.33	9.21	1	12.9	77.52
1.0SMBJ8.0A	1.0SMBJ8.0CA	1.0SMBJ8.0A	1.0SMBJ8.0CA	8.0	50	8.89	9.83	1	13.6	73.53
1.0SMBJ8.5A	1.0SMBJ8.5CA	1.0SMBJ8.5A	1.0SMBJ8.5CA	8.5	20	9.44	10.40	1	14.4	69.45
1.0SMBJ9.0A	1.0SMBJ9.0CA	1.0SMBJ9.0A	1.0SMBJ9.0CA	9.0	10	10.00	11.10	1	15.4	64.94
1.0SMBJ10A	1.0SMBJ10CA	1.0SMBJ10A	1.0SMBJ10CA	10.0	5	11.10	12.30	1	17.0	58.83
1.0SMBJ11A	1.0SMBJ11CA	1.0SMBJ11A	1.0SMBJ11CA	11.0	1	12.20	13.50	1	18.2	54.95
1.0SMBJ12A	1.0SMBJ12CA	1.0SMBJ12A	1.0SMBJ12CA	12.0	1	13.30	14.70	1	19.9	50.26
1.0SMBJ13A	1.0SMBJ13CA	1.0SMBJ13A	1.0SMBJ13CA	13.0	1	14.40	15.90	1	21.5	46.52
1.0SMBJ14A	1.0SMBJ14CA	1.0SMBJ14A	1.0SMBJ14CA	14.0	1	15.60	17.20	1	23.2	43.11
1.0SMBJ15A	1.0SMBJ15CA	1.0SMBJ15A	1.0SMBJ15CA	15.0	1	16.70	18.50	1	24.4	40.99
1.0SMBJ16A	1.0SMBJ16CA	1.0SMBJ16A	1.0SMBJ16CA	16.0	1	17.80	19.70	1	26.0	38.47
1.0SMBJ17A	1.0SMBJ17CA	1.0SMBJ17A	1.0SMBJ17CA	17.0	1	18.90	20.90	1	27.6	36.24
1.0SMBJ18A	1.0SMBJ18CA	1.0SMBJ18A	1.0SMBJ18CA	18.0	1	20.00	22.10	1	29.2	34.25
1.0SMBJ20A	1.0SMBJ20CA	1.0SMBJ20A	1.0SMBJ20CA	20.0	1	22.20	24.50	1	32.4	30.87
1.0SMBJ22A	1.0SMBJ22CA	1.0SMBJ22A	1.0SMBJ22CA	22.0	1	24.40	26.90	1	35.5	28.17
1.0SMBJ24A	1.0SMBJ24CA	1.0SMBJ24A	1.0SMBJ24CA	24.0	1	26.70	29.50	1	38.9	25.71
1.0SMBJ26A	1.0SMBJ26CA	1.0SMBJ26A	1.0SMBJ26CA	26.0	1	28.90	31.90	1	42.1	23.76
1.0SMBJ28A	1.0SMBJ28CA	1.0SMBJ28A	1.0SMBJ28CA	28.0	1	31.10	34.40	1	45.4	22.03
1.0SMBJ30A	1.0SMBJ30CA	1.0SMBJ30A	1.0SMBJ30CA	30.0	1	33.30	36.80	1	48.4	20.67
1.0SMBJ33A	1.0SMBJ33CA	1.0SMBJ33A	1.0SMBJ33CA	33.0	1	36.70	40.60	1	53.3	18.77
1.0SMBJ36A	1.0SMBJ36CA	1.0SMBJ36A	1.0SMBJ36CA	36.0	1	40.00	44.20	1	58.1	17.22
1.0SMBJ40A	1.0SMBJ40CA	1.0SMBJ40A	1.0SMBJ40CA	40.0	1	44.40	49.10	1	64.5	15.75
1.0SMBJ43A	1.0SMBJ43CA	1.0SMBJ43A	1.0SMBJ43CA	43.0	1	47.80	52.80	1	69.4	14.41
1.0SMBJ45A	1.0SMBJ45CA	1.0SMBJ45A	1.0SMBJ45CA	45.0	1	50.00	55.30	1	72.7	13.76
1.0SMBJ48A	1.0SMBJ48CA	1.0SMBJ48A	1.0SMBJ48CA	48.0	1	53.30	58.90	1	77.4	12.92
1.0SMBJ51A	1.0SMBJ51CA	1.0SMBJ51A	1.0SMBJ51CA	51.0	1	56.70	62.70	1	82.4	12.14
1.0SMBJ54A	1.0SMBJ54CA	1.0SMBJ54A	1.0SMBJ54CA	54.0	1	60.00	66.30	1	87.1	11.40
1.0SMBJ58A	1.0SMBJ58CA	1.0SMBJ58A	1.0SMBJ58CA	58.0	1	64.40	71.20	1	93.6	10.69
1.0SMBJ60A	1.0SMBJ60CA	1.0SMBJ60A	1.0SMBJ60CA	60.0	1	66.70	73.70	1	96.8	10.34
1.0SMBJ64A	1.0SMBJ64CA	1.0SMBJ64A	1.0SMBJ64CA	64.0	1	71.10	78.60	1	103.0	9.71
1.0SMBJ70A	1.0SMBJ70CA	1.0SMBJ70A	1.0SMBJ70CA	70.0	1	77.80	86.00	1	113.0	8.85

Electrical Characteristics (T=25°C)

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
1.0SMBJ75A	1.0SMBJ75CA	1.0SMBJ75A	1.0SMBJ75CA	75.0	1	83.30	92.10	1	121.0	8.27
1.0SMBJ78A	1.0SMBJ78CA	1.0SMBJ78A	1.0SMBJ78CA	78.0	1	86.70	95.80	1	126.0	7.94
1.0SMBJ85A	1.0SMBJ85CA	1.0SMBJ85A	1.0SMBJ85CA	85.0	1	94.40	104.0	1	137.0	7.30
1.0SMBJ90A	1.0SMBJ90CA	1.0SMBJ90A	1.0SMBJ90CA	90.0	1	100.0	111.0	1	146.0	6.85
1.0SMBJ100A	1.0SMBJ100CA	1.0SMBJ100A	1.0SMBJ100CA	100.0	1	111.0	123.0	1	162.0	6.18
1.0SMBJ110A	1.0SMBJ110CA	1.0SMBJ110A	1.0SMBJ110CA	110.0	1	122.0	135.0	1	177.0	5.65
1.0SMBJ120A	1.0SMBJ120CA	1.0SMBJ120A	1.0SMBJ120CA	120.0	1	133.0	147.0	1	193.0	5.19
1.0SMBJ130A	1.0SMBJ130CA	1.0SMBJ130A	1.0SMBJ130CA	130.0	1	144.0	159.0	1	209.0	4.79
1.0SMBJ150A	1.0SMBJ150CA	1.0SMBJ150A	1.0SMBJ150CA	150.0	1	167.0	185.0	1	243.0	4.12
1.0SMBJ160A	1.0SMBJ160CA	1.0SMBJ160A	1.0SMBJ160CA	160.0	1	178.0	197.0	1	259.0	3.87
1.0SMBJ170A	1.0SMBJ170CA	1.0SMBJ170A	1.0SMBJ170CA	170.0	1	189.0	209.0	1	275.0	3.64
1.0SMBJ180A	1.0SMBJ180CA	1.0SMBJ180A	1.0SMBJ180CA	180.0	1	201.0	222.0	1	292.0	3.43
1.0SMBJ190A	1.0SMBJ190CA	1.0SMBJ190A	1.0SMBJ190CA	190.0	1	209.0	233.0	1	308.0	3.25
1.0SMBJ200A	1.0SMBJ200CA	1.0SMBJ200A	1.0SMBJ200CA	200.0	1	224.0	247.0	1	324.0	3.09
1.0SMBJ210A	1.0SMBJ210CA	1.0SMBJ210A	1.0SMBJ210CA	210.0	1	237.0	263.0	1	340.0	2.95
1.0SMBJ220A	1.0SMBJ220CA	1.0SMBJ220A	1.0SMBJ220CA	220.0	1	246.0	272.0	1	356.0	2.81
1.0SMBJ250A	1.0SMBJ250CA	1.0SMBJ250A	1.0SMBJ250CA	250.0	1	279.0	309.0	1	405.0	2.47
1.0SMBJ300A	1.0SMBJ300CA	1.0SMBJ300A	1.0SMBJ300CA	300.0	1	335.0	371.0	1	486.0	2.06
1.0SMBJ350A	1.0SMBJ350CA	1.0SMBJ350A	1.0SMBJ350CA	350.0	1	391.0	432.0	1	567.0	1.77
1.0SMBJ400A	1.0SMBJ400CA	1.0SMBJ400A	1.0SMBJ400CA	400.0	1	447.0	494.0	1	648.0	1.55
1.0SMBJ440A	1.0SMBJ440CA	1.0SMBJ440A	1.0SMBJ440CA	440.0	1	492.0	543.0	1	713.0	1.41

Notes:

① Surge waveform: 10/1000μs

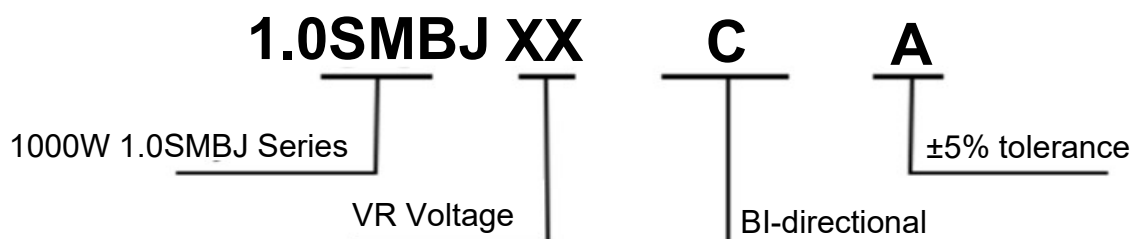
V_R : Stand-off Voltage -- Maximum voltage that can be applied

V_{BR}: Breakdown Voltage

V_C: Clamping Voltage -- Peak voltage measured across the suppressor at a specified I_{pp}

I_R: Reverse Leakage Current

Part number code

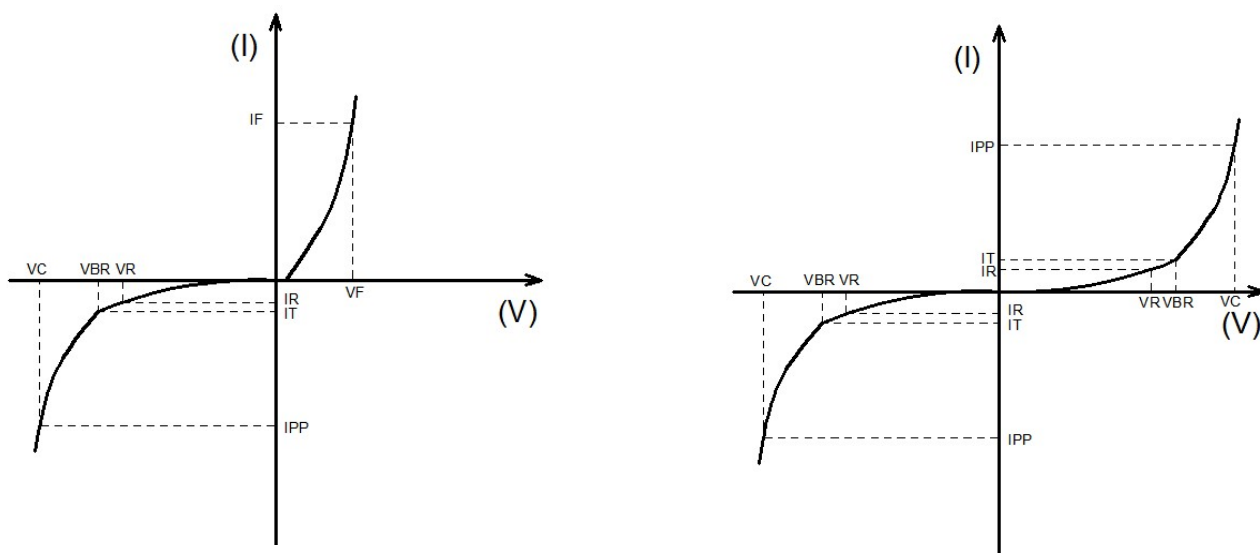


Absolute Maximum Ratings($T=25^{\circ}\text{C}$, $\text{RH}=45\%-75\%$, unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak pulse power dissipation on 10/1000 μs waveform	P_{PP}	1000	W
Steady state power dissipation at $T_L=75^{\circ}\text{C}$	$P_{M(AV)}$	5.0	W
Operating junction temperature range	T_j	-55 to +150	$^{\circ}\text{C}$
Storage temperature range	T_{stg}	-55 to +150	$^{\circ}\text{C}$

Ratings And V-I Characteristics Curves ($T=25^{\circ}\text{C}$, unless otherwise noted)

FIG1: 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

FIG2: Pulse Derating Curve

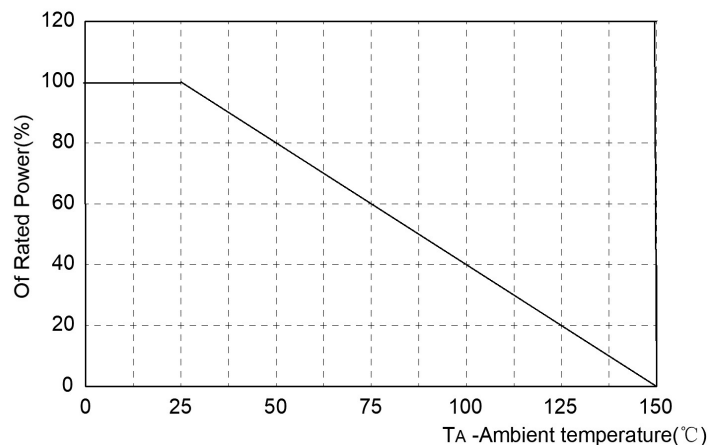


FIG3: Pulse Waveform

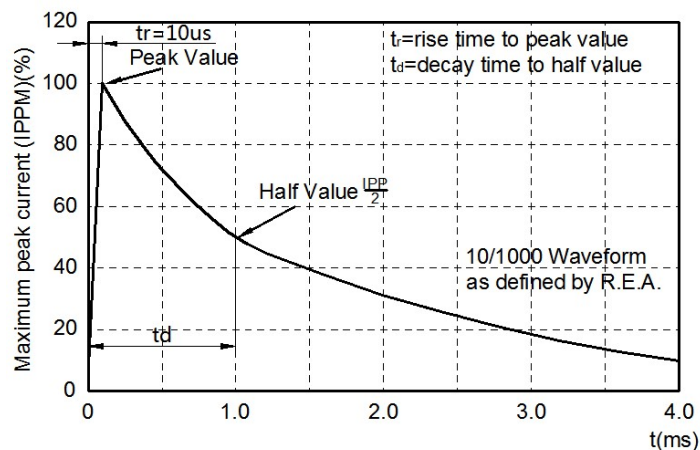


FIG4: Peak Pulse Power Rating Curve

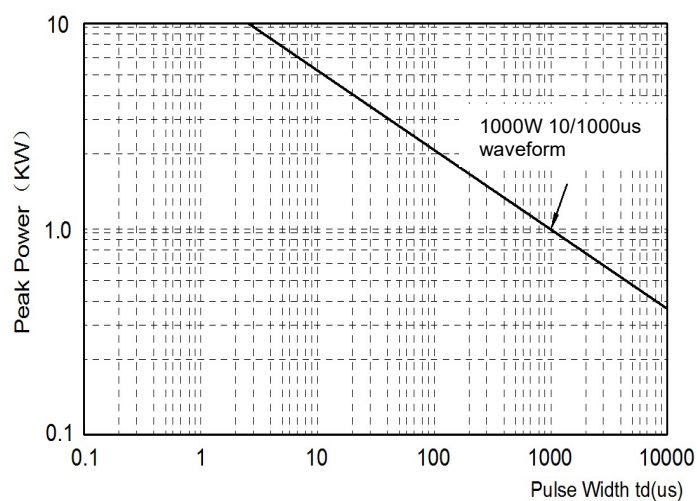
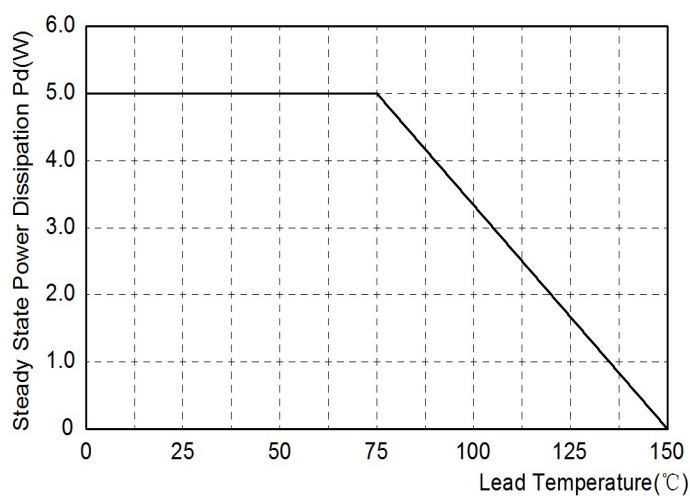
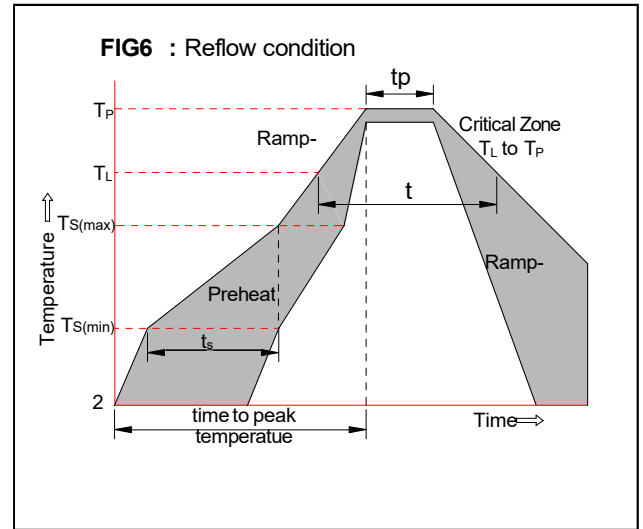


FIG5: Steady State Power Dissipation

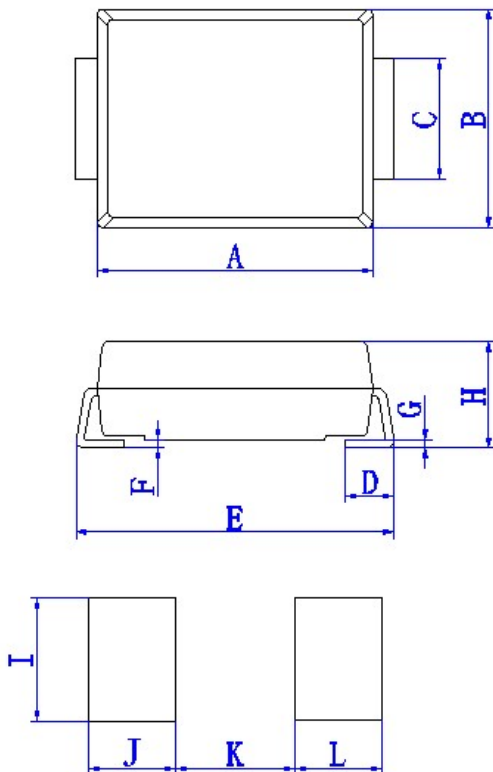


Soldering parameters

Reflow Condition		Pb-Free assembly (see as below)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150°C
	-Temperature Max($T_{s(max)}$)	+200°C
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us 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)(Liquid us)	+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)		30 secs. Max
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp (T_P)		8 min. Max
Do not exceed		+260°C

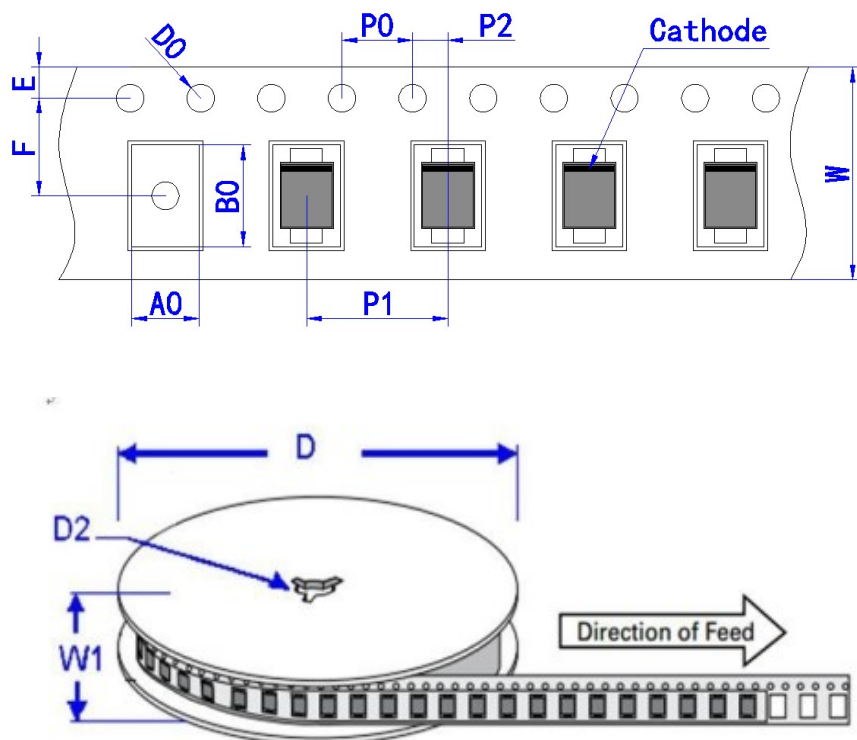


Package mechanical data & Suggested Land Pattern



Ref.(mm)	Millimeters	
	Min.	Max.
A	4.22	4.70
B	3.4	3.94
C	1.9	2.1
D	0.90	1.42
E	5.21	5.59
F	0	0.23
G	0.15	0.25
H	1.95	2.60
I	2.30	
J	1.50	
K		2.80
L	1.50	

Tape & reel specification - SMB



Ref.	Millimeters
A0	3.81±0.20
B0	5.74±0.20
C	330.00
D0	1.55±0.10
E	1.75±0.20
E1	13.50±1.00
F	5.50±0.10
P0	4.00±0.20
P1	8.00±0.20
P2	2.00±0.20
W	12.00±0.30
W1	16.00±4.00
D	333±4.00
D2	13.5±0.2