BORN SEMICONDUCTOR

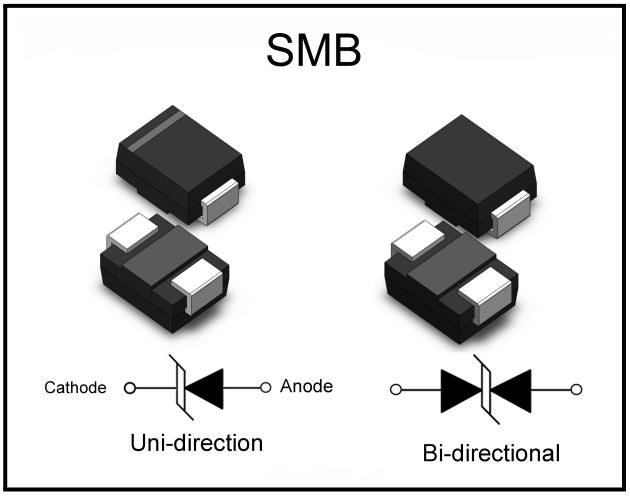
1.0SMBJ Series

Transient Voltage Suppressor

Features

- Excellent clamping capability
- Low leakage current
- High surge capability
- Glass passivated chip
- Epoxy resin package
- Built-in strain relief
- Will not fatigue
- RoHS Compliant
- IEC 61000-4-2 ±30kV contact ; ±30kV air
- Fast response time:
  typically less than 1.0ps from 0 Volts to V_{BR} min

Package



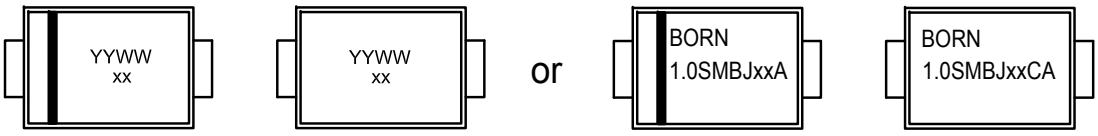
Mechanical Characteristics

- Package: SMB plastic package
- Lead Finish: Matte Tin
- Case Material: Epoxy Molding Compound
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020

Applications

- Telecom
- Computer
- Industrial electronic
- Consumer electronic

Making Code



YYWW = Date Code
xx = Type Code

Unidirection

Bidirection

Summary of Packing Options

Package	Packing Description	Packing Quantity	Industry Standard
SMB	Tape/Reel,13” reel	3000	EIA-481-1

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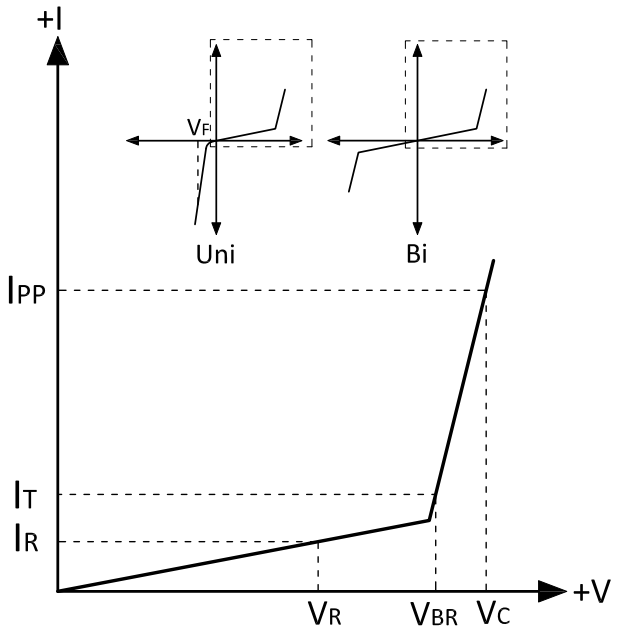
Electrical Parameters

Parameter	Definition
C_J	Junction Capacitance - typical capacitance measured with 0V or V_R bias
I_{PP}	Peak Pulse Current - maximum rated peak impulse current
V_C	Clamping Voltage - Peak voltage measured across the suppressor at a specified Ippm
V_{BR}	Breakdown Voltage - Maximum voltage that flows though the TVS at a specified test current (I_T)
I_R	Leakage Current - maximum peak off-state current measured at V_R
V_R	Peak Off-state Voltage - maximum voltage that can be applied while maintaining off state



Absolute Maximum Ratings (T_A=+25°C, unless otherwise noted)

Parameter	Symbol	Value	Units
Peak Pulse Power Dissipation (Note1,2)	P_{PPM}	1000	W
Steady State Power Dissipation (Note3)	P_D	5	W
Peak Forward Surge Current (Note4)	I_{FSM}	100	A
Maximum Instantaneous Forward Voltage at 50A (Note5)	V_{FM}	3.5	V
Typical Thermal Resistance Junction to Lead	$R_{\theta JL}$	20	°C/W
Typical Thermal Resistance Junction to Ambient	$R_{\theta JA}$	100	°C/W
Operating Temperature Range	T_J	-55 to 150	°C
Storage Temperature Range	T_{STG}	-55 to 150	°C

Notes:

(1) Non-repetitive current pulse , 10/1000us Waveform.

(2) Mounted on copper pad area of 5×5mm to each terminal.

(3) Infinite HeatSink at T_L =50°C

(4) Measured on 8.3ms single half sine wave or equivalent square wave, duty cycle=4 perminute maximum.

(5) For Unidirectional Only

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

Part Number	Part Number	Marking Code		Reverse Stand-Off Votage	Breakdown Voltage V_{BR}@I_T		Test Current I_T	Maximum Clamping Voltage V_C @ I_{pp}	Maximum Peak Pulse Current I_{pp}	Maximun Reverse Leakage I_R @V_R
(Uni)	(Bi)	(Uni)	(Bi)	(V)	Min.(V)	Max.(V)	(mA)	(V)	(A)	(uA)
1.0SMBJ5.0A	1.0SMBJ5.0CA	A5	C5	5	6.4	7	10	9.2	108.7	800
1.0SMBJ6.0A	1.0SMBJ6.0CA	A6	C6	6	6.67	7.37	10	10.3	97.1	800
1.0SMBJ6.5A	1.0SMBJ6.5CA	A6V	C6V	6.5	7.22	7.98	10	11.2	89.3	500
1.0SMBJ7.0A	1.0SMBJ7.0CA	A7	C7	7	7.78	8.6	10	12	83.3	200
1.0SMBJ7.5A	1.0SMBJ7.5CA	A7V	C7V	7.5	8.33	9.21	1	12.9	77.5	100
1.0SMBJ8.0A	1.0SMBJ8.0CA	A8	C8	8	8.89	9.83	1	13.6	73.5	50
1.0SMBJ8.5A	1.0SMBJ8.5CA	A8V	C8V	8.5	9.44	10.4	1	14.4	69.4	20
1.0SMBJ9.0A	1.0SMBJ9.0CA	A9	C9	9	10	11.1	1	15.4	64.9	10
1.0SMBJ10A	1.0SMBJ10CA	A10	C10	10	11.1	12.3	1	17	58.8	5
1.0SMBJ11A	1.0SMBJ11CA	A11	C11	11	12.2	13.5	1	18.2	54.9	1
1.0SMBJ12A	1.0SMBJ12CA	A12	C12	12	13.3	14.7	1	19.9	50.3	1
1.0SMBJ13A	1.0SMBJ13CA	A13	C13	13	14.4	15.9	1	21.5	46.5	1
1.0SMBJ14A	1.0SMBJ14CA	A14	C14	14	15.6	17.2	1	23.2	43.1	1
1.0SMBJ15A	1.0SMBJ15CA	A15	C15	15	16.7	18.5	1	24.4	41.0	1
1.0SMBJ16A	1.0SMBJ16CA	A16	C16	16	17.8	19.7	1	26	38.5	1
1.0SMBJ17A	1.0SMBJ17CA	A17	C17	17	18.9	20.9	1	27.6	36.2	1
1.0SMBJ18A	1.0SMBJ18CA	A18	C18	18	20	22.1	1	29.2	34.2	1
1.0SMBJ20A	1.0SMBJ20CA	A20	C20	20	22.2	24.5	1	32.4	30.9	1
1.0SMBJ22A	1.0SMBJ22CA	A22	C22	22	24.4	26.9	1	35.5	28.2	1
1.0SMBJ24A	1.0SMBJ24CA	A24	C24	24	26.7	29.5	1	38.9	25.7	1
1.0SMBJ26A	1.0SMBJ26CA	A26	C26	26	28.9	31.9	1	42.1	23.8	1
1.0SMBJ28A	1.0SMBJ28CA	A28	C28	28	31.1	34.4	1	45.4	22.0	1
1.0SMBJ30A	1.0SMBJ30CA	A30	C30	30	33.3	36.8	1	48.4	20.7	1
1.0SMBJ33A	1.0SMBJ33CA	A33	C33	33	36.7	40.6	1	53.3	18.8	1
1.0SMBJ36A	1.0SMBJ36CA	A36	C36	36	40	44.2	1	58.1	17.2	1
1.0SMBJ40A	1.0SMBJ40CA	A40	C40	40	44.4	49.1	1	64.5	15.5	1
1.0SMBJ43A	1.0SMBJ43CA	A43	C43	43	47.8	52.8	1	69.4	14.4	1
1.0SMBJ45A	1.0SMBJ45CA	A45	C45	45	50	55.3	1	72.7	13.8	1
1.0SMBJ48A	1.0SMBJ48CA	A48	C48	48	53.3	58.9	1	77.4	12.9	1
1.0SMBJ51A	1.0SMBJ51CA	A51	C51	51	56.7	62.7	1	82.4	12.1	1

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

Part Number	Part Number	Marking Code		Reverse Stand-Off Votage	Breakdown Voltage V_{BR}@I_T		Test Current I_T	Maximum Clamping Voltage V_C @ I_{pp}	Maximum Peak Pulse Current I_{pp}	Maximun Reverse Leakage I_R @V_R
(Uni)	(Bi)	(Uni)	(Bi)	(V)	Min.(V)	Max.(V)	(mA)	(V)	(A)	(uA)
1.0SMBJ54A	1.0SMBJ54CA	A54	C54	54	60	66.3	1	87.1	11.5	1
1.0SMBJ58A	1.0SMBJ58CA	A58	C58	58	64.4	71.2	1	93.6	10.7	1
1.0SMBJ60A	1.0SMBJ60CA	A60	C60	60	66.7	73.7	1	96.8	10.3	1
1.0SMBJ64A	1.0SMBJ64CA	A64	C64	64	71.1	78.6	1	103	9.7	1
1.0SMBJ70A	1.0SMBJ70CA	A70	C70	70	77.8	86	1	113	8.8	1
1.0SMBJ75A	1.0SMBJ75CA	A75	C75	75	83.3	92.1	1	121	8.3	1
1.0SMBJ78A	1.0SMBJ78CA	A78	C78	78	86.7	95.8	1	126	7.9	1
1.0SMBJ85A	1.0SMBJ85CA	A85	C85	85	94.4	104	1	137	7.3	1
1.0SMBJ90A	1.0SMBJ90CA	A90	C90	90	100	111	1	146	6.8	1
1.0SMBJ100A	1.0SMBJ100CA	A100	C100	100	111	123	1	162	6.2	1
1.0SMBJ110A	1.0SMBJ110CA	A110	C110	110	122	135	1	177	5.6	1
1.0SMBJ120A	1.0SMBJ120CA	A120	C120	120	133	147	1	193	5.2	1
1.0SMBJ130A	1.0SMBJ130CA	A130	C130	130	144	159	1	209	4.8	1
1.0SMBJ150A	1.0SMBJ150CA	A150	C150	150	167	185	1	243	4.1	1
1.0SMBJ160A	1.0SMBJ160CA	A160	C160	160	178	197	1	259	3.9	1
1.0SMBJ170A	1.0SMBJ170CA	A170	C170	170	189	209	1	275	3.6	1

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

Figure 1: Peak Pulse Power Rating

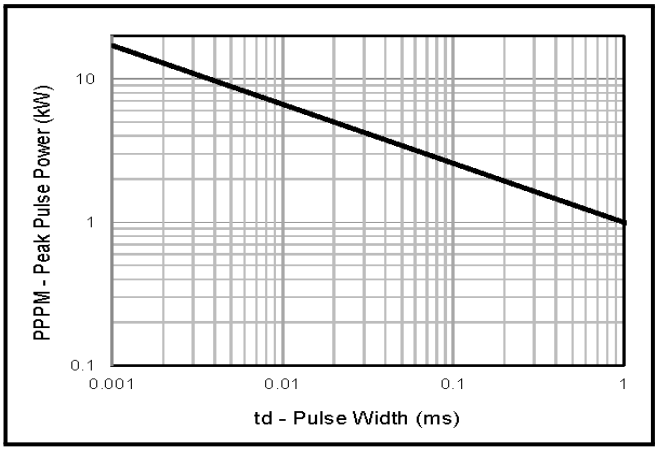


Figure 2: Pulse Derating Curve

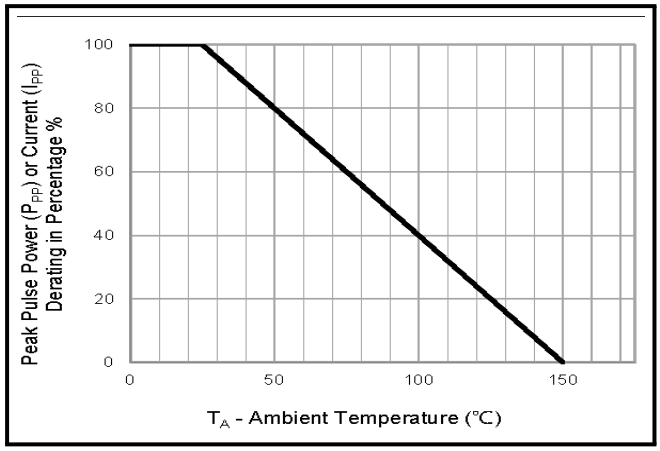


Figure 3: Pulse Waveform

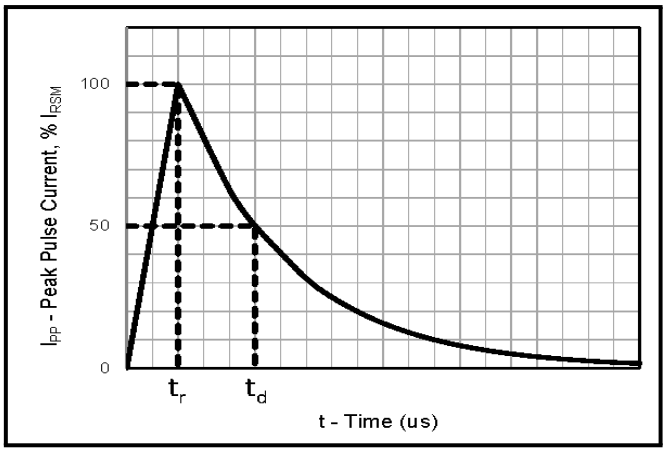


Figure 4 : Typical Junction Capacitance

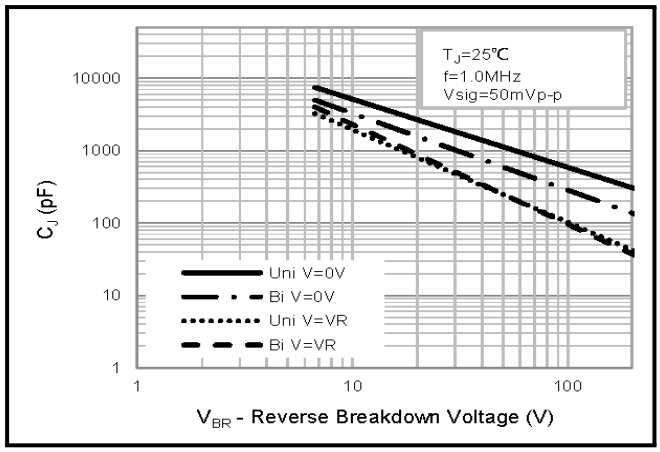


Figure 5: Steady State Power Dissipation Derating Curve

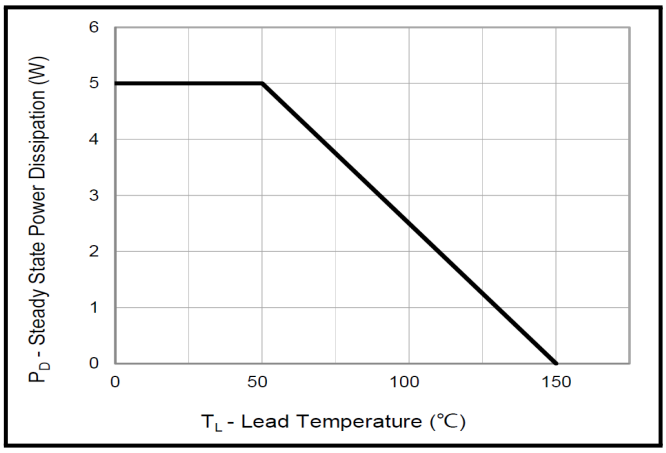
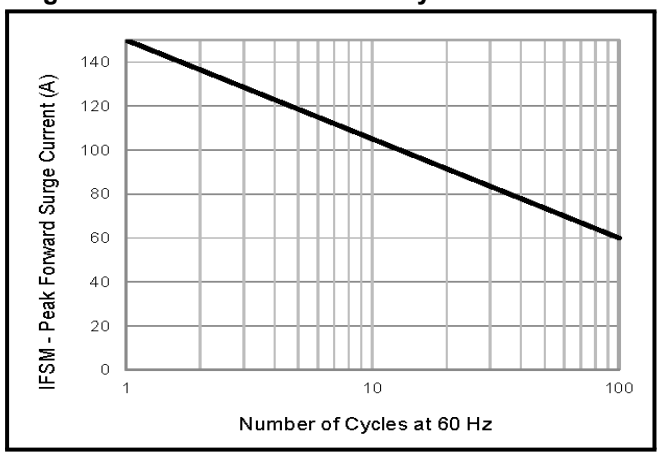


Figure 6 : Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only



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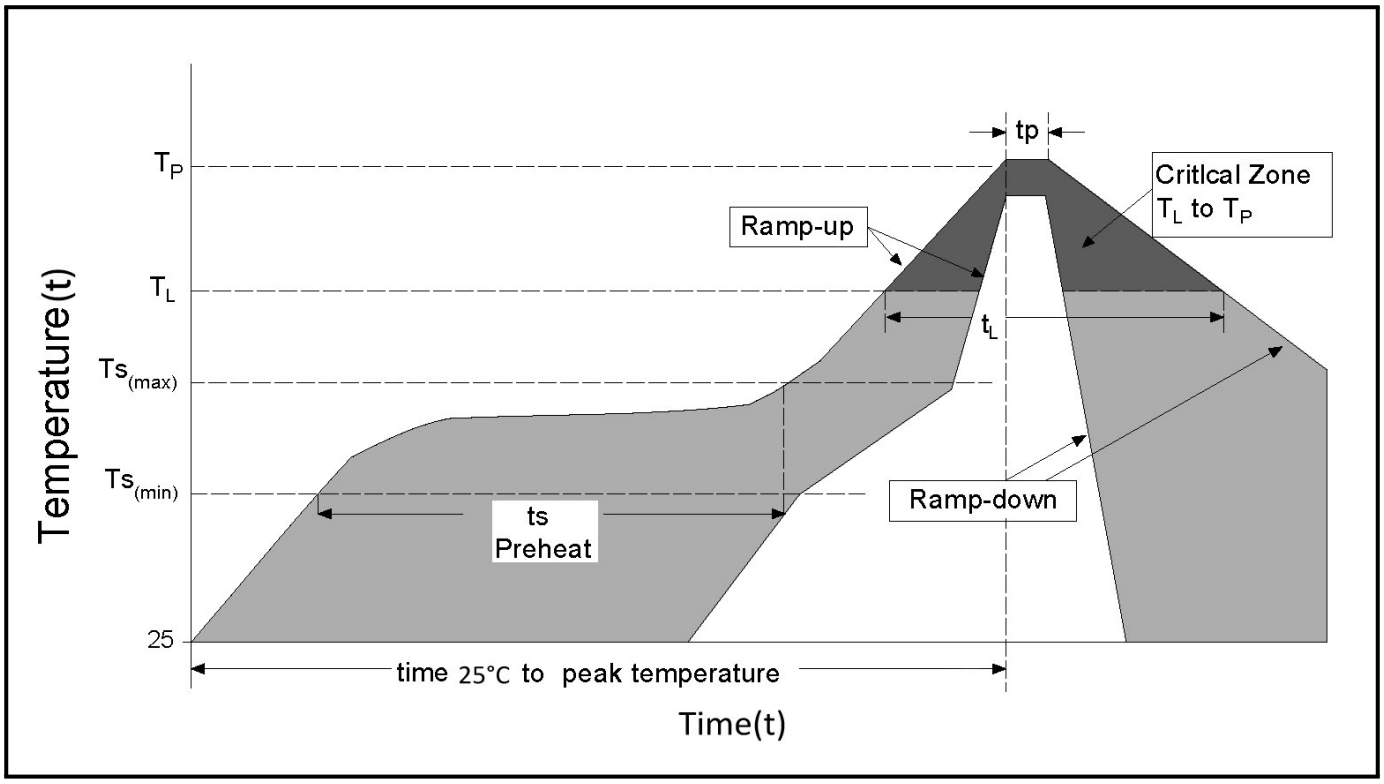
Soldering Parameters



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 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 (t_L)	60 -150 secs
Peak Temperature (T_P)		$260^{+0/-5°C}$
Time within 5°C of actual peak Temperature (t_p)		20 - 40 secs
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (t)		8 minutes Max.
Do not exceed		260°C

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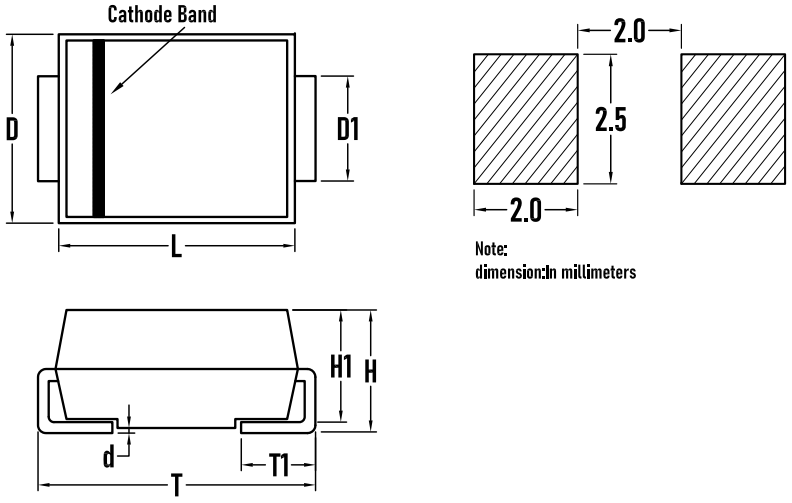
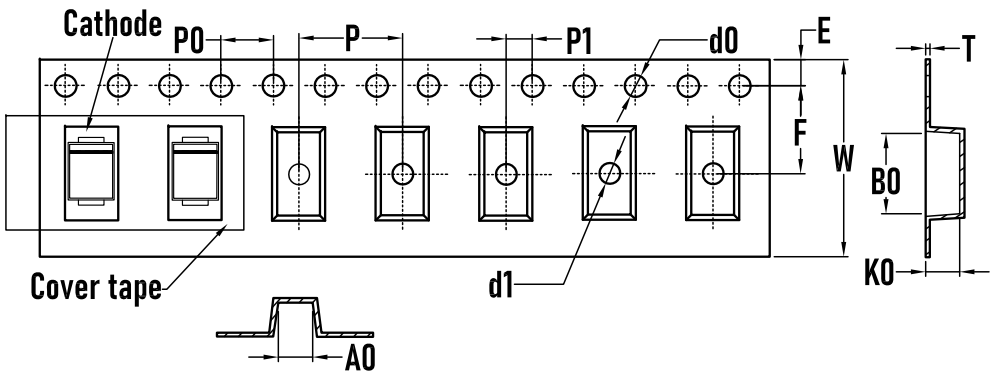
Outline Drawing - SMB



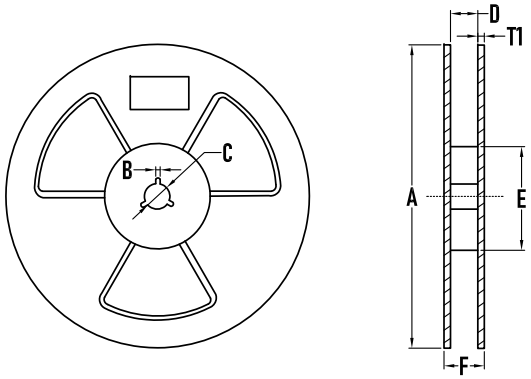
SYMBOL	MILLIMETER		Inches	
	MIN	MAX	MIN	MAX
D	3.3	3.9	0.130	0.154
D1	1.7	2.3	0.067	0.091
T	5.1	5.7	0.201	0.224
T1	0.8	1.6	0.031	0.063
d	–	0.3	–	0.012
H1	2.0	2.4	0.079	0.094
H	2.1	2.5	0.083	0.098
L	4.0	4.7	0.157	0.185

Packaging Tape - SMB



SYMBOL	MILLIMETER
A0	3.60±0.1
B0	5.45±0.1
d0	1.50±0.1
d1	1.50±0.1
E	1.75±0.1
F	5.50±0.1
K0	2.30±0.1
P	8.00±0.1
P0	4.00±0.1
P1	2.00±0.1
W	12.00±0.1
T	0.22±0.02

Packaging Reel



SYMBOL	MILLIMETER
A	323±2
B	3.0±0.2
C	15.0±0.5
D	13±2
E	73±2
T1	2.2±0.2
Quantity	3000PCS

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