BORN SEMICONDUCTOR

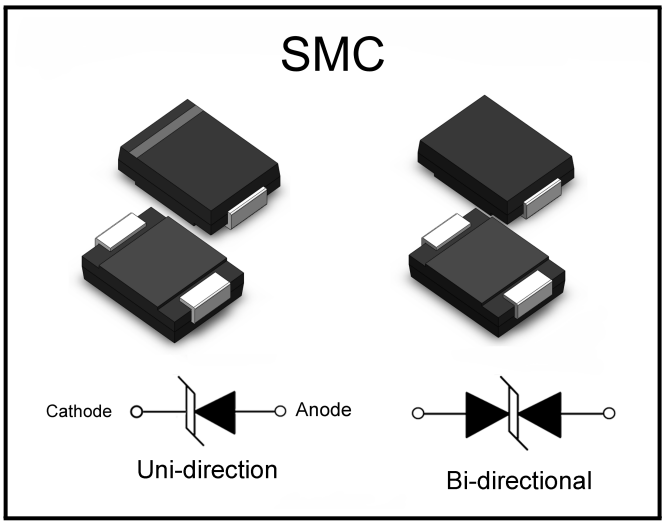
SMCJ / HSMCJ Series

Transient Voltage Suppressor

Features

- Excellent clamping capability
- Low leakage current
- Low capacitance
- High surge capability
- Glass passivated chip
- Epoxy resin package
- Built-in strain relief
- Will not fatigue
- RoHS Compliant
- “H” Prefix is for Automotive applications, AEC-Q101 qualified

Package



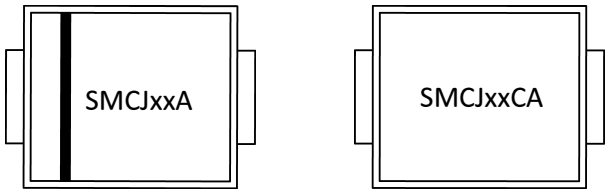
Mechanical Characteristics

- Package: SMC 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
- Automotive electronic

Making Code



Summary of Packing Options

Package	Packing Description	Packing Quantity	Industry Standard
SMC	Tape/Reel,13” reel	3000	EIA-481-1
	Tape/Reel,7” reel	500	EIA-481-1

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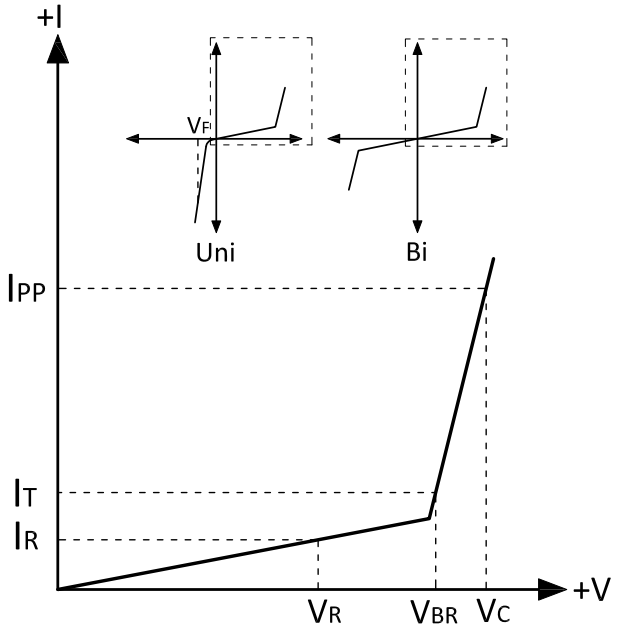
Electrical Parameters

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}	1500	W
Steady State Power Dissipation (Note3)	P_D	6.5	W
Peak Forward Surge Current (Note4)	I_{FSM}	200	A
Maximum Instantaneous Forward Voltage at 100A (Note5)	V_{FM}	3.5/5	V
Typical Thermal Resistance Junction to Lead	$R_{\theta JL}$	15	°C/W
Typical Thermal Resistance Junction to Ambient	$R_{\theta JA}$	75	°C/W
Operating Junction 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 8×8mm to each terminal.

(3) Infinite Heat Sink at T_A =50°C

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

(5) For UnidirectionalOnly, V_{FW}<3.5V for V_{BR} ≤200V and V_{FM}<5.0V for V_{BR}≥201V.

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Part Number		Reverse Stand-Off Votage V_R	Breakdown Voltage V_{BR}@ I_T		Test Current I_T	Maximum Clamping Voltage V_C@ I_{pp}	Maximum Peak Pulse Current I_{pp}	Maximum Reverse Leakage I_R@ V_R
(Uni)	(Bi)	(V)	Min.(V)	Max.(V)	(mA)	(V)	(A)	(uA)
SMCJ5.0A HSMCJ5.0A	SMCJ5.0CA HSMCJ5.0CA	5	6.4	7	10	9.2	163	800
SMCJ6.0A HSMCJ6.0A	SMCJ6.0CA HSMCJ6.0CA	6	6.67	7.37	10	10.3	145.7	800
SMCJ6.5A HSMCJ6.5A	SMCJ6.5CA HSMCJ6.5CA	6.5	7.22	7.98	10	11.2	134	500
SMCJ7.0A HSMCJ7.0A	SMCJ7.0CA HSMCJ7.0CA	7	7.78	8.6	10	12	125	200
SMCJ7.5A HSMCJ7.5A	SMCJ7.5CA HSMCJ7.5CA	7.5	8.33	9.21	1	12.9	116.3	100
SMCJ8.0A HSMCJ8.0A	SMCJ8.0CA HSMCJ8.0CA	8.0	8.89	9.83	1	13.6	110.3	50
SMCJ8.5A HSMCJ8.5A	SMCJ8.5CA HSMCJ8.5CA	8.5	9.44	10.4	1	14.4	104.2	20
SMCJ9.0A HSMCJ9.0A	SMCJ9.0CA HSMCJ9.0CA	9.0	10	11.1	1	15.4	97.4	10
SMCJ10A HSMCJ10A	SMCJ10CA HSMCJ10CA	10	11.1	12.3	1	17	88.3	5
SMCJ11A HSMCJ11A	SMCJ11CA HSMCJ11CA	11	12.2	13.5	1	18.2	82.5	1
SMCJ12A HSMCJ12A	SMCJ12CA HSMCJ12CA	12	13.3	14.7	1	19.9	75.4	1
SMCJ13A HSMCJ13A	SMCJ13CA HSMCJ13CA	13	14.4	15.9	1	21.5	69.8	1
SMCJ14A HSMCJ14A	SMCJ14CA HSMCJ14CA	14	15.6	17.2	1	23.2	64.7	1
SMCJ15A HSMCJ15A	SMCJ15CA HSMCJ15CA	15	16.7	18.5	1	24.4	61.5	1
SMCJ16A HSMCJ16A	SMCJ16CA HSMCJ16CA	16	17.8	19.7	1	26	57.7	1
SMCJ17A HSMCJ17A	SMCJ17CA HSMCJ17CA	17	18.9	20.9	1	27.6	54.4	1
SMCJ18A HSMCJ18A	SMCJ18CA HSMCJ18CA	18	20	22.1	1	29.2	51.4	1

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Part Number		Reverse Stand-Off Votage V_R	Breakdown Voltage V_{BR}@ I_T		Test Current I_T	Maximum Clamping Voltage V_C@ I_{pp}	Maximum Peak Pulse Current I_{pp}	Maximum Reverse Leakage I_R@ V_R
(Uni)	(Bi)	(V)	Min.(V)	Max.(V)	(mA)	(V)	(A)	(uA)
SMCJ20A HSMCJ20A	SMCJ20CA HSMCJ20CA	20	22.2	24.5	1	32.4	46.3	1
SMCJ22A HSMCJ22A	SMCJ22CA HSMCJ22CA	22	24.4	26.9	1	35.5	42.3	1
SMCJ24A HSMCJ24A	SMCJ24CA HSMCJ24CA	24	26.7	29.5	1	38.9	38.6	1
SMCJ26A HSMCJ26A	SMCJ26CA HSMCJ26CA	26	28.9	31.9	1	42.1	35.7	1
SMCJ28A HSMCJ28A	SMCJ28CA HSMCJ28CA	28	31.1	34.4	1	45.4	33.1	1
SMCJ30A HSMCJ30A	SMCJ30CA HSMCJ30CA	30	33.3	36.8	1	48.4	31	1
SMCJ33A HSMCJ33A	SMCJ33CA HSMCJ33CA	33	36.7	40.6	1	53.3	28.2	1
SMCJ36A HSMCJ36A	SMCJ36CA HSMCJ36CA	36	40	44.2	1	58.1	25.9	1
SMCJ40A HSMCJ40A	SMCJ40CA HSMCJ40CA	40	44.4	49.1	1	64.5	23.3	1
SMCJ43A HSMCJ43A	SMCJ43CA HSMCJ43CA	43	47.8	52.8	1	69.4	21.7	1
SMCJ45A HSMCJ45A	SMCJ45CA HSMCJ45CA	45	50	55.3	1	72.7	20.6	1
SMCJ48A HSMCJ48A	SMCJ48CA HSMCJ48CA	48	53.33	58.9	1	77.4	19.4	1
SMCJ51A HSMCJ51A	SMCJ51CA HSMCJ51CA	51	56.7	62.7	1	82.4	18.2	1
SMCJ54A HSMCJ54A	SMCJ54CA HSMCJ54CA	54	60	66.3	1	87.1	17.3	1
SMCJ58A HSMCJ58A	SMCJ58CA HSMCJ58CA	58	64.4	71.2	1	93.6	16.1	1
SMCJ60A HSMCJ60A	SMCJ60CA HSMCJ60CA	60	66.7	73.7	1	96.8	15.5	1
SMCJ64A HSMCJ64A	SMCJ64CA HSMCJ64CA	64	71.1	78.6	1	103	14.6	1

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Part Number		Reverse Stand-Off Votage V_R	Breakdown Voltage V_{BR}@ I_T		Test Current I_T	Maximum Clamping Voltage V_C@ I_{pp}	Maximum Peak Pulse Current I_{pp}	Maximum Reverse Leakage I_R@ V_R
(Uni)	(Bi)	(V)	Min.(V)	Max.(V)	(mA)	(V)	(A)	(uA)
SMCJ70A HSMCJ70A	SMCJ70CA HSMCJ70CA	70	78.8	86	1	113	13.3	1
SMCJ75A HSMCJ75A	SMCJ75CA HSMCJ75CA	75	83.3	92.1	1	121	12.4	1
SMCJ78A HSMCJ78A	SMCJ78CA HSMCJ78CA	78	86.7	95.8	1	126	11.9	1
SMCJ85A HSMCJ85A	SMCJ85CA HSMCJ85CA	85	94.4	104	1	137	11	1
SMCJ90A HSMCJ90A	SMCJ90CA HSMCJ90CA	90	100	111	1	146	10.3	1
SMCJ100A HSMCJ100A	SMCJ100CA HSMCJ100CA	100	111	123	1	162	9.3	1
SMCJ110A HSMCJ110A	SMCJ110CA HSMCJ110CA	110	122	135	1	177	8.5	1
SMCJ120A HSMCJ120A	SMCJ120CA HSMCJ120CA	120	133	147	1	193	7.8	1
SMCJ130A HSMCJ130A	SMCJ130CA HSMCJ130CA	130	144	159	1	209	7.2	1
SMCJ150A HSMCJ150A	SMCJ150CA HSMCJ150CA	150	167	185	1	243	6.2	1
SMCJ160A HSMCJ160A	SMCJ160CA HSMCJ160CA	160	178	197	1	259	5.8	1
SMCJ170A HSMCJ170A	SMCJ170CA HSMCJ170CA	170	189	209	1	275	5.5	1
SMCJ180A HSMCJ180A	SMCJ180CA HSMCJ180CA	180	201	222	1	292	5.1	1
SMCJ200A HSMCJ200A	SMCJ200CA HSMCJ200CA	200	224	247	1	324	4.6	1
SMCJ220A HSMCJ220A	SMCJ220CA HSMCJ220CA	220	246	272	1	356	4.2	1
SMCJ250A HSMCJ250A	SMCJ250CA HSMCJ250CA	250	279	309	1	405	3.7	1
SMCJ300A HSMCJ300A	SMCJ300CA HSMCJ300CA	300	335	371	1	486	3.1	1

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Part Number		Reverse Stand-Off Votage V_R	Breakdown Voltage V_{BR}@ I_T		Test Current I_T	Maximum Clamping Voltage V_C@ I_{pp}	Maximum Peak Pulse Current I_{pp}	Maximum Reverse Leakage I_R@ V_R
(Uni)	(Bi)	(V)	Min.(V)	Max.(V)	(mA)	(V)	(A)	(uA)
SMCJ350A HSMCJ350A	SMCJ350CA HSMCJ350CA	350	391	432	1	567	2.6	1
SMCJ400A HSMCJ400A	SMCJ400CA HSMCJ400CA	400	447	494	1	648	2.3	1
SMCJ440A HSMCJ440A	SMCJ440CA HSMCJ440CA	440	492	543	1	713	2.1	1

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

Figure 1: Peak Pulse Power Rating

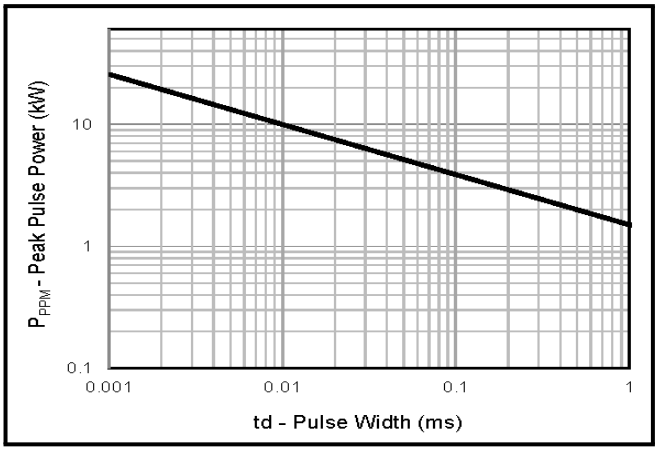


Figure 2: Pulse Derating Curve

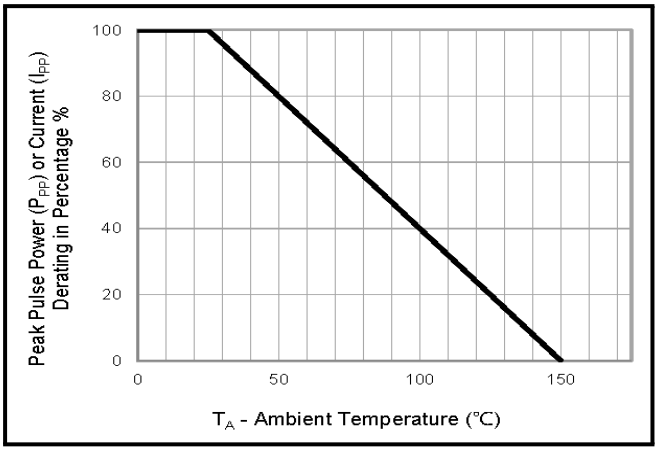


Figure 3: Pulse Waveform

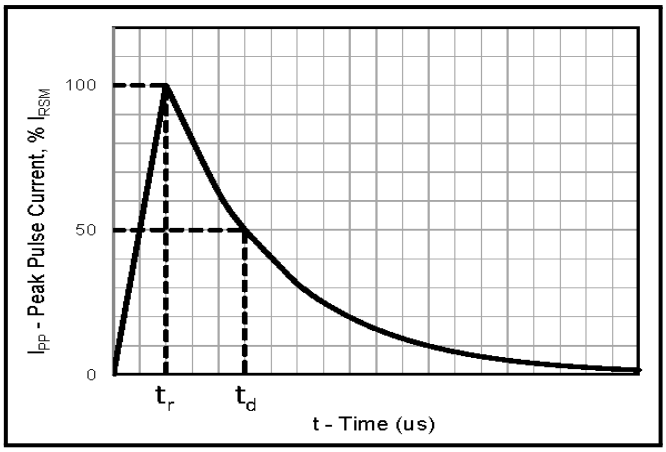


Figure 4 : Typical Junction Capacitance

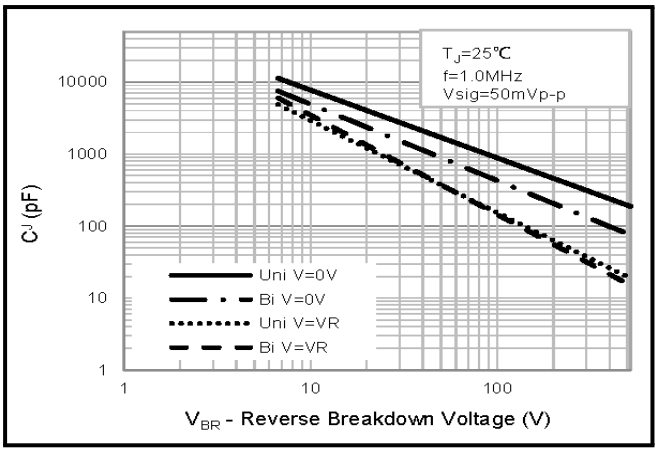


Figure 5: Steady State Power Dissipation Derating Curve

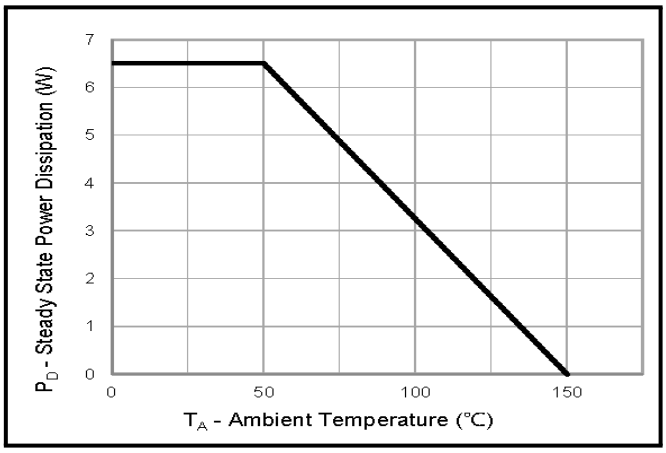
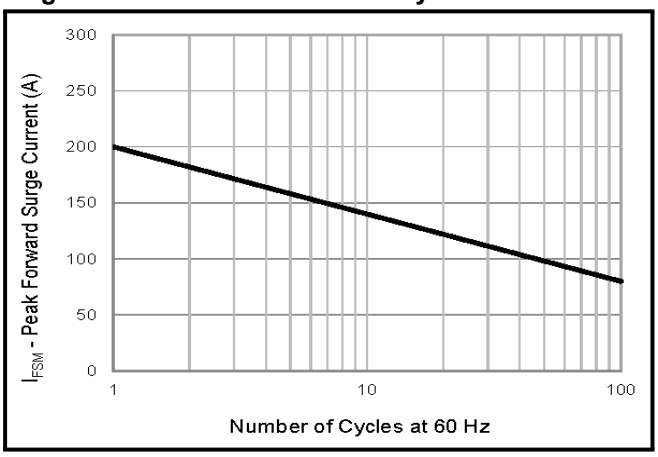
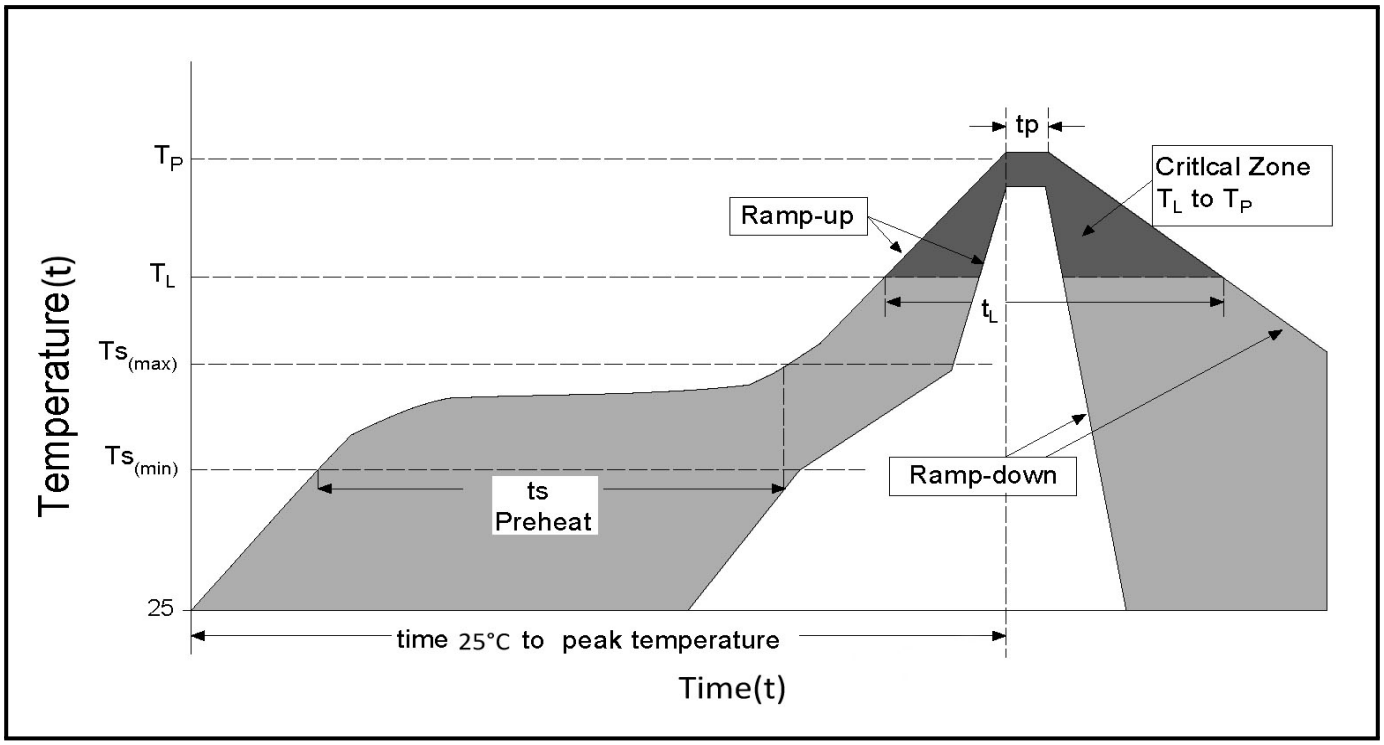


Figure 6 : Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only



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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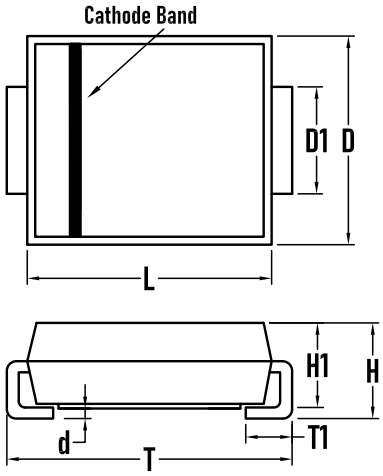
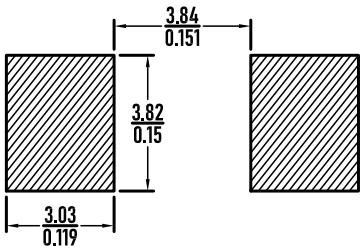
Package Mechanical Data - SMC

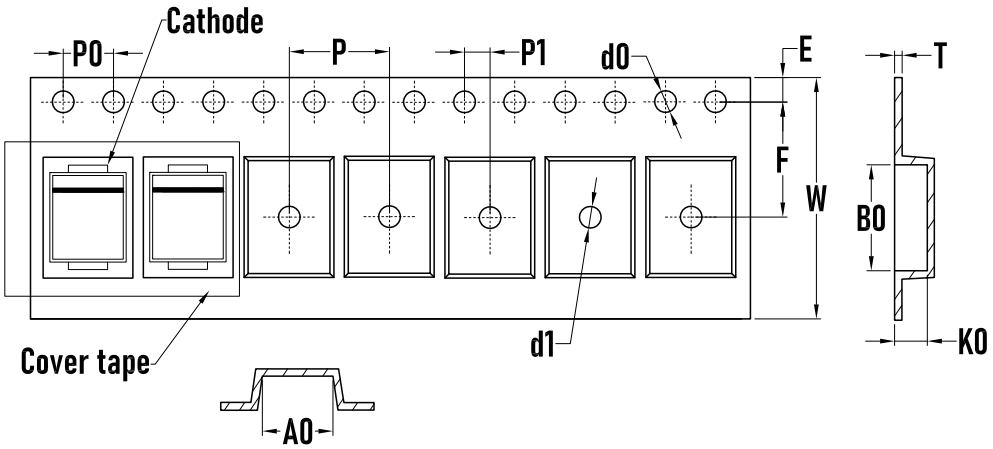




Note:
dimensions: mm / inch

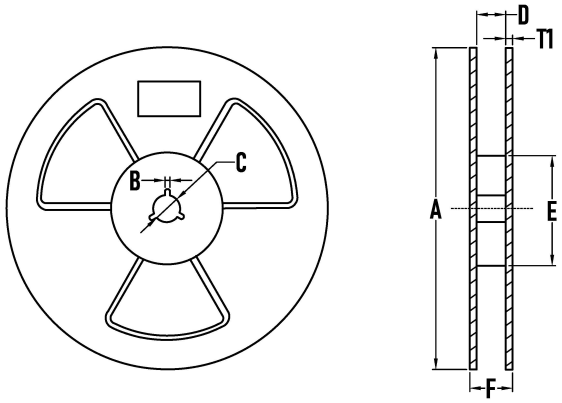
SYMBOL	MILLIMETER		Inches	
	MIN	MAX	MIN	MAX
D	5.75	5.95	0.265	0.274
D1	2.9	3.1	0.114	0.122
T	7.9	8.1	0.311	0.319
T1	0.85	1.3	0.034	0.051
d	–	0.2	–	0.008
H1	2.3	2.5	0.09	0.098
H	2.45	2.65	0.096	0.104
L	6.75	6.95	0.265	0.274

Packaging Tape - SMC



SYMBOL	MILLIMETER
A0	6.00±0.1
B0	8.25±0.02
d0	1.50±0.1
d1	1.50±0.1
E	1.75±0.1
F	7.50±0.1
K0	2.70±0.1
P	8.00±0.1
P0	4.00±0.1
P1	2.00±0.05
W	16.00±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	16±2
E	73±2
T1	2.2±0.2
Quantity	3000PCS