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3.0SMCJ Series

Surface Mount – 3000W – DO-214AB



Agency Approvals

Agency	Agency File Number
	E230531

Maximum Ratings and Thermal Characteristics

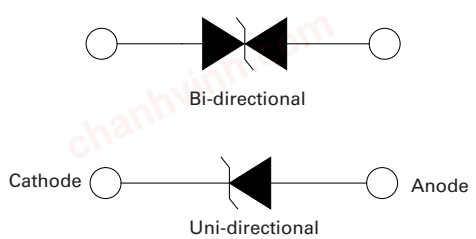
(T_A=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation by 10/1000µs Waveform (Fig.4)(Note 1), (Note 2)	P_{PPM}	3000	W
Power dissipation on infinite heatsink at T_C = 25 °C	P_D	6.5	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)	I_{FSM}	300	A
Maximum Instantaneous Forward Voltage at 100A for Unidirectional Only	V_F	3.5	V
Operating Temperature Range	T_J	-65 to 150	°C
Storage Temperature Range	T_{STG}	-65 to 175	°C
Typical Thermal Resistance Junction to Lead	$R_{\theta JL}$	15	°C/W
Typical Thermal Resistance Junction to Ambient	$R_{\theta JA}$	75	°C/W

Notes:

1. Non-repetitive current pulse , per Fig. 4 and derated above T_J (initial) =25°C per Fig. 3.
2. Mounted on copper pad area of 0.31x0.31" (8.0 x 8.0mm) to each terminal.
3. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional component only, duty cycle=4 per minute maximum.

Functional Diagram



Description

The 3.0SMCJ Series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

Features

- 3000W P_{PPM} peak pulse power capability at 10/1000µs waveform, repetition rate (duty cycles):0.01%
- For surface mounted applications in order to optimize board space
- Low profile package
- 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
- ESD protection of data lines in accordance with IEC 61000-4-2,30kV(Air), 30kV (Contact)
- EFT protection of data lines in accordance with IEC 61000-4-4
- Built-in strain relief
- Glass passivated chip junction
- Fast response time: typically less than 1.0ps from 0V to BV min
- Excellent clamping capability
- Low incremental surge resistance
- High temperature to reflow soldering guaranteed: 260°C/40sec
- V_{BR} @ T_J= V_{BR}@25°C x (1+ α T x (T_J - 25)) (α T:Temperature Coefficient, typical value is 0.1%)
- UL Recognized compound meeting flammability rating V-0.
- Meet MSL level1, per J-STD-020, LF maximun peak of 260°C
- Matte tin lead–free plated
- Halogen free and RoHS compliant
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin(Sn) (IPC/JEDEC J-STD-609A.01)

Applications

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

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

Part Number (Uni)	Part Number (Bi)	Marking		Reverse Stand off Voltage V_R (Volts)	Breakdown Voltage V_{BR} (Volts) @ I_T		Test Current I_T (mA)	Maximum Clamping Voltage V_C @ I_{PP} (10/1000µs) (V)	Maximum Peak Pulse Current I_{PP} (10/1000µs) (A)	Maximum Clamping Voltage V_C @ I_{PP} (8/20µs) (V)	Maximum Peak Pulse Current I_{PP} (8/20µs) (A)	Maximum Reverse Leakage I_R @ V_R (µA)	Maximum Temperature coefficient of V_{BR} (%/C)	Agency Approval
		UNI	BI		MIN	MAX								
-	3.0SMCJ5.0CA	-	3DDE	5.00	6.40	7.00	10	9.2	326.1	11.89	1630.5	800	0.041	X
-	3.0SMCJ6.0CA	-	3DDG	6.00	6.67	7.37	10	10.3	291.3	13.31	1456.5	800	0.046	X
-	3.0SMCJ6.5CA	-	3DDK	6.50	7.22	7.98	10	11.2	267.9	14.47	1339.5	500	0.052	X
-	3.0SMCJ7.0CA	-	3DDM	7.00	7.78	8.60	10	12.0	250.0	15.50	1250.0	200	0.058	X
-	3.0SMCJ7.5CA	-	3DDP	7.50	8.33	9.21	1	12.9	232.6	16.67	1163.0	100	0.061	X
-	3.0SMCJ8.0CA	-	3DDR	8.00	8.89	9.83	1	13.6	220.6	17.57	1103.0	50	0.064	X
-	3.0SMCJ8.5CA	-	3DDT	8.50	9.44	10.40	1	14.4	208.3	18.60	1041.5	20	0.066	X
3.0SMCJ9.0A	3.0SMCJ9.0CA	3PDV	3DDV	9.00	10.00	11.10	1	15.4	194.8	19.90	974.0	10	0.069	X
3.0SMCJ10A	3.0SMCJ10CA	3PDX	3DDX	10.00	11.10	12.30	1	17.0	176.5	21.96	882.5	5	0.071	X
3.0SMCJ11A	3.0SMCJ11CA	3PDZ	3DDZ	11.00	12.20	13.50	1	18.2	164.8	23.51	824.0	2	0.074	X
3.0SMCJ12A	3.0SMCJ12CA	3PEE	3DEE	12.00	13.30	14.70	1	19.9	150.8	25.71	754.0	2	0.075	X
3.0SMCJ13A	3.0SMCJ13CA	3PEG	3DEG	13.00	14.40	15.90	1	21.5	139.5	27.78	697.5	2	0.076	X
3.0SMCJ14A	3.0SMCJ14CA	3PEK	3DEK	14.00	15.60	17.20	1	23.2	129.3	29.97	646.5	2	0.080	X
3.0SMCJ15A	3.0SMCJ15CA	3PEM	3DEM	15.00	16.70	18.50	1	24.4	123.0	31.52	615.0	2	0.083	X
3.0SMCJ16A	3.0SMCJ16CA	3PEP	3DEP	16.00	17.80	19.70	1	26.0	115.4	33.59	577.0	2	0.084	X
3.0SMCJ17A	3.0SMCJ17CA	3PER	3DER	17.00	18.90	20.90	1	27.6	108.7	35.66	543.5	2	0.085	X
3.0SMCJ18A	3.0SMCJ18CA	3PET	3DET	18.00	20.00	22.10	1	29.2	102.7	37.73	513.5	2	0.088	X
3.0SMCJ20A	3.0SMCJ20CA	3PEV	3DEV	20.00	22.20	24.50	1	32.4	92.6	41.86	463.0	2	0.091	X
3.0SMCJ22A	3.0SMCJ22CA	3PEX	3DEX	22.00	24.40	26.90	1	35.5	84.5	45.87	422.5	2	0.092	X
3.0SMCJ24A	3.0SMCJ24CA	3PEZ	3DEZ	24.00	26.70	29.50	1	38.9	77.1	50.26	385.5	2	0.092	X
3.0SMCJ26A	3.0SMCJ26CA	3PFE	3DFE	26.00	28.90	31.90	1	42.1	71.3	54.39	356.5	2	0.093	X
3.0SMCJ28A	3.0SMCJ28CA	3PFG	3DFG	28.00	31.10	34.40	1	45.4	66.1	58.66	330.5	2	0.094	X
3.0SMCJ30A	3.0SMCJ30CA	3PFK	3DFK	30.00	33.30	36.80	1	48.4	62.0	62.53	310.0	2	0.096	X
3.0SMCJ33A	3.0SMCJ33CA	3PFM	3DFM	33.00	36.70	40.60	1	53.3	56.3	68.86	281.5	2	0.097	X
3.0SMCJ36A	3.0SMCJ36CA	3PFP	3DFP	36.00	40.00	44.20	1	58.1	51.6	75.06	258.0	2	0.098	X
3.0SMCJ40A	3.0SMCJ40CA	3PFR	3DFR	40.00	44.40	49.10	1	64.5	46.5	83.33	232.5	2	0.099	X
-	3.0SMCJ43CA	-	3DFT	43.00	47.80	52.80	1	69.4	43.2	89.66	216.0	2	0.100	X
-	3.0SMCJ45CA	-	3DFV	45.00	50.00	55.30	1	72.7	41.3	93.93	206.5	2	0.101	X
-	3.0SMCJ48CA	-	3DFX	48.00	53.30	58.90	1	77.4	38.8	100.00	194.0	2	0.101	X
-	3.0SMCJ51CA	-	3DFZ	51.00	56.70	62.70	1	82.4	36.4	106.46	182.0	2	0.101	X
-	3.0SMCJ54CA	-	3DGE	54.00	60.00	66.30	1	87.1	34.4	112.53	172.0	2	0.102	X
-	3.0SMCJ58CA	-	3DGG	58.00	64.40	71.20	1	93.6	32.1	120.93	160.5	2	0.103	X

Notes:
1. V_{BR} measured after I_T applied for 300µs, I_T= square wave pulse or equivalent.
2. Surge current waveform per 10µs/1000µs exponential wave and derated per Fig. 2
3. All terms and symbols are consistent with ANSI/IEEE C62.35

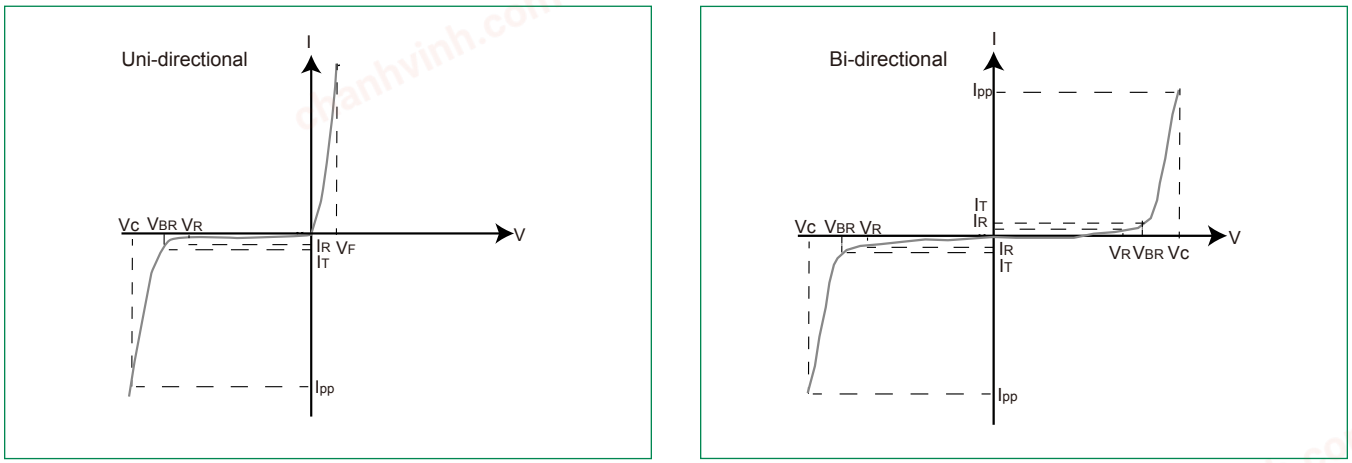
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I-V Curve Characteristics



P_{PPM} **Peak Pulse Power Dissipation** -- Max power dissipation
V_R **Stand-off Voltage** -- Maximum voltage that can be applied to the TVS without operation
V_{BR} **Breakdown Voltage** -- Maximum voltage that flows though the TVS at a specified test current (I_T)
V_C **Clamping Voltage** -- Peak voltage measured across the TVS at a specified Ippm (peak impulse current)
I_R **Reverse Leakage Current** -- Current measured at V_R
V_F **Forward Voltage Drop for Uni-directional**

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

Figure 1 - TVS Transients Clamping Waveform

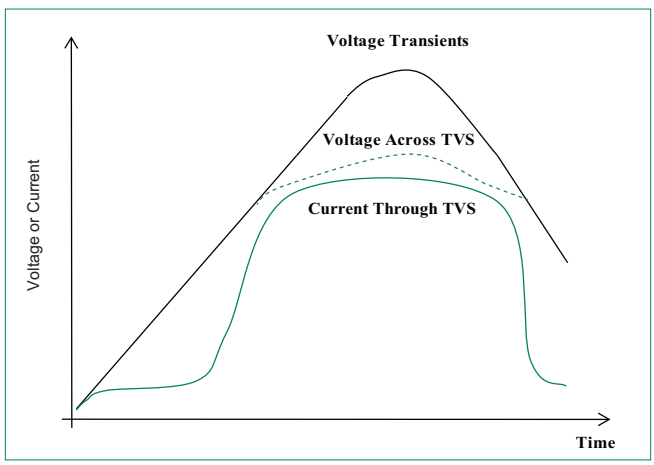
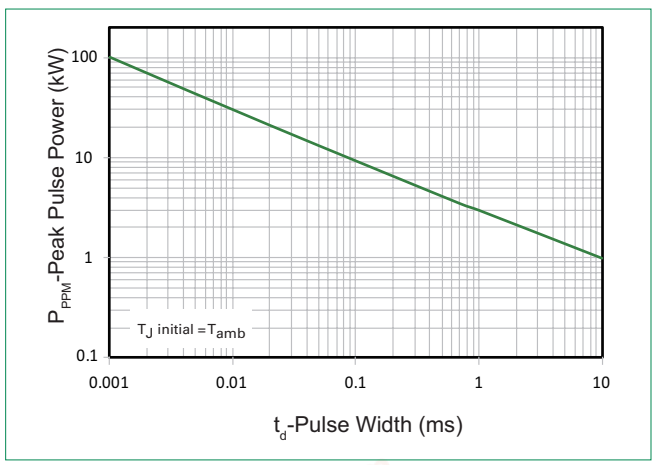


Figure 2 - Peak Pulse Power Rating



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Figure 3 - Peak Pulse Power Derating Curve

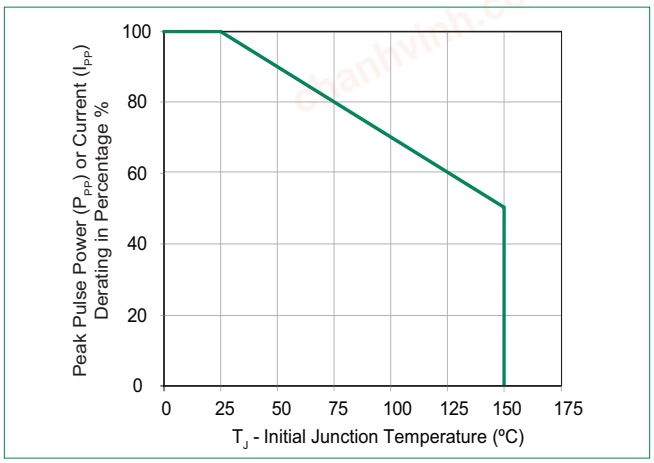


Figure 4 - Pulse Waveform

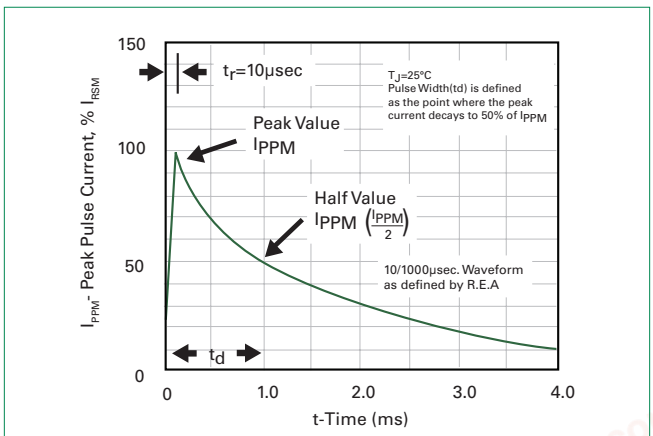


Figure 5 - Typical Junction Capacitance

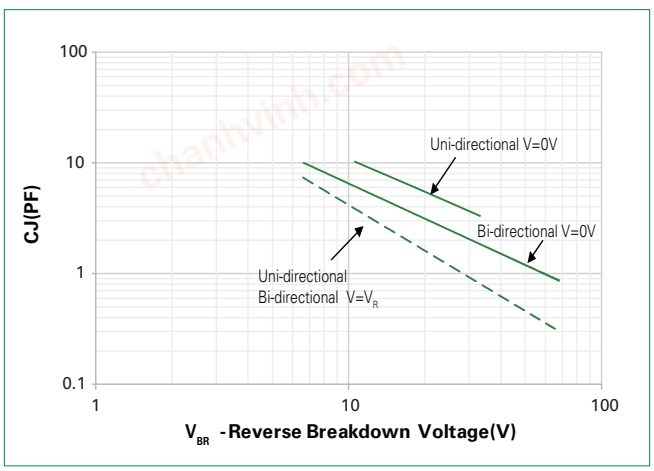


Figure 6 - Typical Transient Thermal Impedance

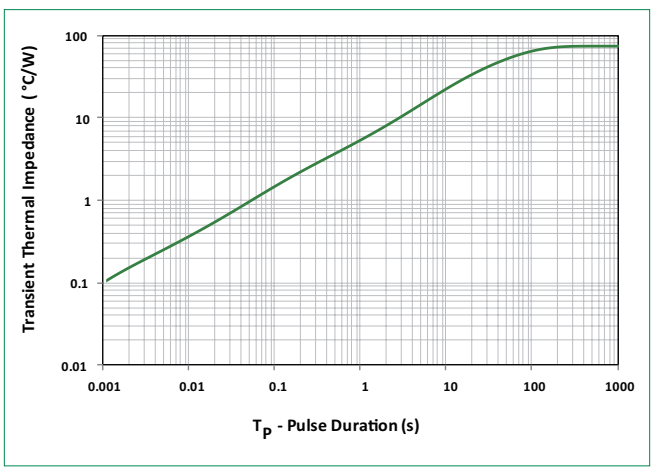


Figure 7 - Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only

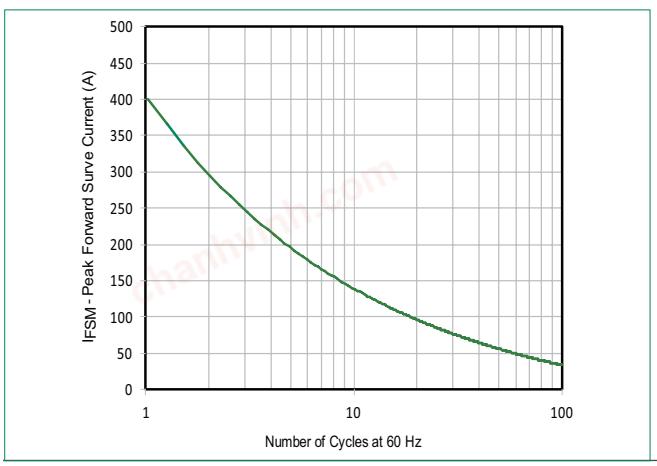
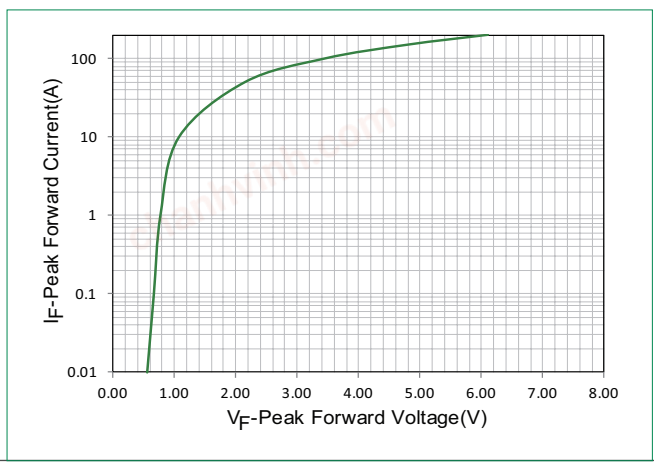


Figure 8 -Peak Forward Voltage Drop vs Peak Forward Current (Typical Values)



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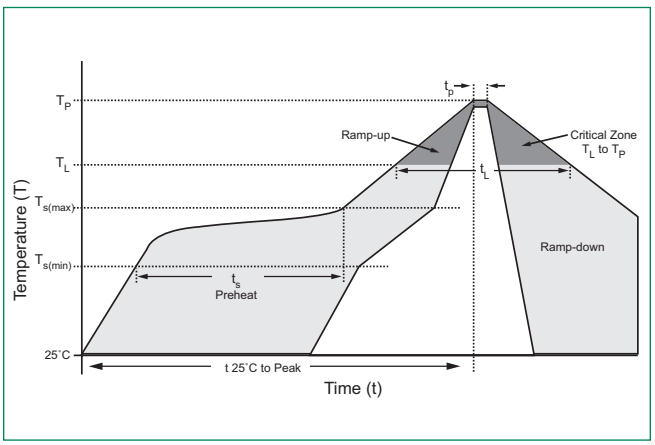
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Soldering Parameters

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_A - Ramp-up Rate		3°C/second max
Reflow	**- Temperature (T_L) (Liquidus)**	217°C
	- Time (min to max) (T_S)	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		260°C



Physical Specifications

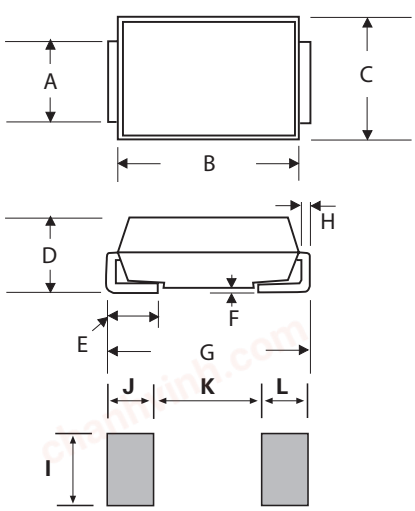
Weight	0.007 ounce, 0.21 grams
Case	JEDEC DO214AB. Molded plastic body over glass passivated junction
Terminal	Matte Tin-plated leads, Solderable per JESD22-B102

Environmental Specifications

High Temp. Storage	JESD22-A103
HTRB	JESD22-A108
Temperature Cycling	JESD22-A104
MSL	JEDEC-J-STD-020, LEVEL 1
H3TRB	JESD22-A101
RSH	JESD22-A111

Dimensions

DO-214AB (SMC J-Bend)



Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.114	0.126	2.900	3.200
B	0.260	0.280	6.600	7.110
C	0.220	0.245	5.590	6.220
D	0.079	0.103	2.060	2.620
E	0.030	0.060	0.760	1.520
F	-	0.008	-	0.203
G	0.305	0.320	7.750	8.130
H	0.006	0.012	0.152	0.305
I	0.129	-	3.300	-
J	0.094	-	2.400	-
K	-	0.165	-	4.200
L	0.094	-	2.400	-

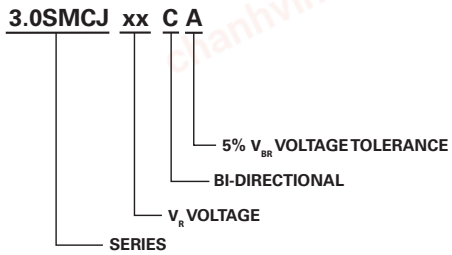
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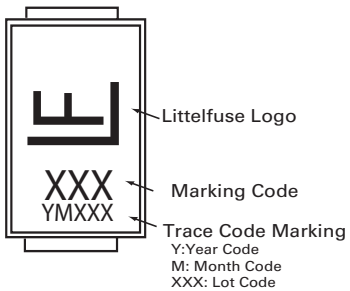
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Part Marking System



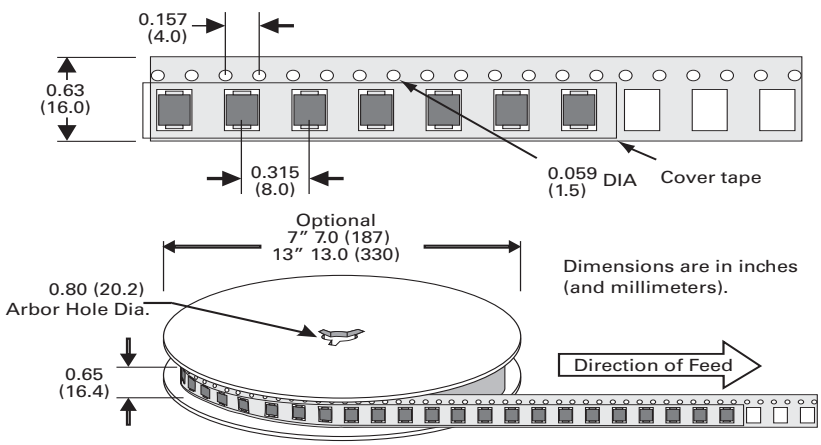
Part Marking System



Packing Options

Part Number	Component Package	Quantity	Packaging Option	Packaging Specification
3.0SMCJxxCA	DO-214AB	3000	Tape & Reel - 16mm tape/13" reel	EIA-481

Tape and Reel Specification



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