5.0SMDJ Series
Surface Mount – 5000W

Additional Information

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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 at T_L=25°C by 10/1000µs Waveform (Fig.2)(Note 1), (Note 2)	P_{PPM}	5000	W
Power Dissipation on Infinite Heat Sink at T_L=50°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	5.0	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.

Description

The 5.0SMDJ series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

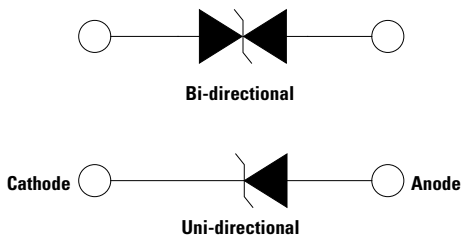
Features & Benefits

- 5000W peak pulse power capability at 10/1000µs waveform, repetition rate (duty cycles):0.01%
- SMD low profile surface mount package minimizing PCB footprint
- 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 30kV(Air), 30kV (Contact)
- ESD protection of data lines in accordance with IEC 61000-4-2
- 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
- Typical IR less than 5µA when VBR min>22V
- High temperature to reflow soldering guaranteed: 260°C/40sec
- VBR @ TJ= VBR@25°C x (1+αT x (TJ - 25))(αT:Temperature Coefficient,)
- 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)
- Recognized to UL 497B as an Isolated Loop Circuit Protector

Applications

TVS devices are ideal for the protection of I/O Interfaces, VCC bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications.

Functional Diagram



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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)	Maximun Clamping Voltage V_C@I_{PP} (10/1000µs) (V)	Maximum Peak Pulse Current I_{PP} (10/1000µs) (A)	Maximum Reverse Leakage I_R@V_R (µA)	Maximum Temperature Coefficient of V_{BR} (%/C)	Agency Approval
		Uni	Bi		Min.	Max.						
5.0SMDJ12A	5.0SMDJ12CA	5PEP	5BEP	12.0	13.3	14.7	10	19.9	252.0	800	0.075	X
5.0SMDJ13A	5.0SMDJ13CA	5PEQ	5BEQ	13.0	14.4	15.9	10	21.5	233.0	500	0.076	X
5.0SMDJ14A	5.0SMDJ14CA	5PER	5BER	14.0	15.6	17.2	10	23.2	216.0	200	0.08	X
5.0SMDJ15A	5.0SMDJ15CA	5PES	5BES	15.0	16.7	18.5	1	24.4	205.0	100	0.083	X
5.0SMDJ16A	5.0SMDJ16CA	5PET	5BET	16.0	17.8	19.7	1	26.0	193.0	50	0.084	X
5.0SMDJ17A	5.0SMDJ17CA	5PEU	5BEU	17.0	18.9	20.9	1	27.6	181.0	20	0.085	X
5.0SMDJ18A	5.0SMDJ18CA	5PEV	5BEV	18.0	20.0	22.1	1	29.2	172.0	10	0.088	X
5.0SMDJ20A	5.0SMDJ20CA	5PEW	5BEW	20.0	22.2	24.5	1	32.4	155.0	5	0.091	X
5.0SMDJ22A	5.0SMDJ22CA	5PEX	5BEX	22.0	24.4	26.9	1	35.5	141.0	5	0.092	X
5.0SMDJ24A	5.0SMDJ24CA	5PEZ	5BEZ	24.0	26.7	29.5	1	38.9	129.0	5	0.092	X
5.0SMDJ26A	5.0SMDJ26CA	5PFE	5BFE	26.0	28.9	31.9	1	42.1	119.0	5	0.093	X
5.0SMDJ28A	5.0SMDJ28CA	5PFG	5BFG	28.0	31.1	34.4	1	45.4	110.0	5	0.094	X
5.0SMDJ30A	5.0SMDJ30CA	5PFK	5BFK	30.0	33.3	36.8	1	48.4	103.0	5	0.096	X
5.0SMDJ33A	5.0SMDJ33CA	5PFM	5BFM	33.0	36.7	40.6	1	53.3	93.9	5	0.097	X
5.0SMDJ36A	5.0SMDJ36CA	5PFP	5BFP	36.0	40.0	44.2	1	58.1	86.1	5	0.098	X
5.0SMDJ40A	5.0SMDJ40CA	5PFR	5BFR	40.0	44.4	49.1	1	64.5	77.6	5	0.099	X
5.0SMDJ43A	5.0SMDJ43CA	5PFT	5BFT	43.0	47.8	52.8	1	69.4	72.1	5	0.1	X
5.0SMDJ45A	5.0SMDJ45CA	5PFV	5BFV	45.0	50.0	55.3	1	72.7	68.8	5	0.101	X
5.0SMDJ48A	5.0SMDJ48CA	5PFX	5BFX	48.0	53.3	58.9	1	77.4	64.7	5	0.101	X
5.0SMDJ51A	5.0SMDJ51CA	5PFZ	5BFZ	51.0	56.7	62.7	1	82.4	60.7	5	0.101	X
5.0SMDJ54A	5.0SMDJ54CA	5PGE	5BGE	54.0	60.0	66.3	1	87.1	57.5	5	0.102	X
5.0SMDJ58A	5.0SMDJ58CA	5PGG	5BGG	58.0	64.4	71.2	1	93.6	53.5	5	0.103	X
5.0SMDJ60A	5.0SMDJ60CA	5PGK	5BGK	60.0	66.7	73.7	1	96.8	51.7	5	0.103	X
5.0SMDJ64A	5.0SMDJ64CA	5PGM	5BGM	64.0	71.1	78.6	1	103.0	48.6	5	0.104	X
5.0SMDJ70A	5.0SMDJ70CA	5PGP	5BGB	70.0	77.8	86.0	1	113.0	44.3	5	0.105	X
5.0SMDJ75A	5.0SMDJ75CA	5PGR	5BGR	75.0	83.3	92.1	1	121.0	41.4	5	0.106	X
5.0SMDJ78A	5.0SMDJ78CA	5PGT	5BGT	78.0	86.7	95.8	1	126.0	39.7	5	0.106	X
5.0SMDJ85A	5.0SMDJ85CA	5PGV	5BGV	85.0	94.4	104.0	1	137.0	36.5	5	0.106	X
5.0SMDJ90A	5.0SMDJ90CA	5PGX	5BGX	90.0	100.0	111.0	1	146.0	34.3	5	0.107	X
5.0SMDJ100A	5.0SMDJ100CA	5PGZ	5BGZ	100.0	111.0	123.0	1	162.0	30.9	5	0.107	X
5.0SMDJ110A	5.0SMDJ110CA	5PHE	5BHE	110.0	122.0	135.0	1	177.0	28.3	5	0.107	X
5.0SMDJ120A	5.0SMDJ120CA	5PHG	5BHG	120.0	133.0	147.0	1	193.0	26.0	5	0.108	X
5.0SMDJ130A	5.0SMDJ130CA	5PHK	5BHK	130.0	144.0	159.0	1	209.0	24.0	5	0.108	X
5.0SMDJ140A	5.0SMDJ140CA	5PHL	5BHL	140.0	156.0	172.0	1	226.1	22.2	5	0.108	X
5.0SMDJ150A	5.0SMDJ150CA	5PHM	5BHM	150.0	167.0	185.0	1	243.0	20.6	5	0.108	X
5.0SMDJ160A	5.0SMDJ160CA	5PHP	5BHB	160.0	178.0	197.0	1	259.0	19.3	5	0.108	X
5.0SMDJ170A	5.0SMDJ170CA	5PHR	5BHR	170.0	189.0	209.0	1	275.0	18.2	5	0.108	X
5.0SMDJ180A	5.0SMDJ180CA	5PHT	5BHT	180	200	221	1	292.0	17.5	5	0.108	-
5.0SMDJ200A	5.0SMDJ200CA	5PHV	5BHV	200	224	247	1	325.0	15.4	5	0.11	-
5.0SMDJ220A	5.0SMDJ220CA	5PHX	5BHX	220	244	270	1	357.0	14.1	5	0.11	-
5.0SMDJ250A	5.0SMDJ250CA	5PHZ	5BHZ	250	279	309	1	406.0	12.4	5	0.11	-
5.0SMDJ300A	5.0SMDJ300CA	5PIE	5BIE	300	335	371	1	487.0	10.3	5	0.112	-
5.0SMDJ350A	5.0SMDJ350CA	5PIG	5BIG	350	391	432	1	568.0	8.9	5	0.112	-
5.0SMDJ400A	5.0SMDJ400CA	5PIK	5BIK	400	447	494	1	649.0	7.8	5	0.112	-
5.0SMDJ440A	5.0SMDJ440CA	5PIM	5BIM	440	492	544	1	714.0	7.1	5	0.112	-

For bidirectional type having V_R of 20 volts and less, the I_R limit is double.
For parts without A , the V_{BR} is ± 10% and V_C is 5% higher than with A parts, the parts without A are currently available, but not recommended for new designs. The parts with A are preferred.

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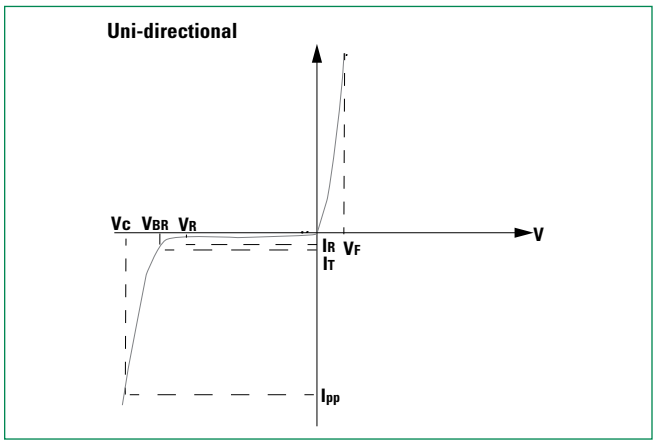
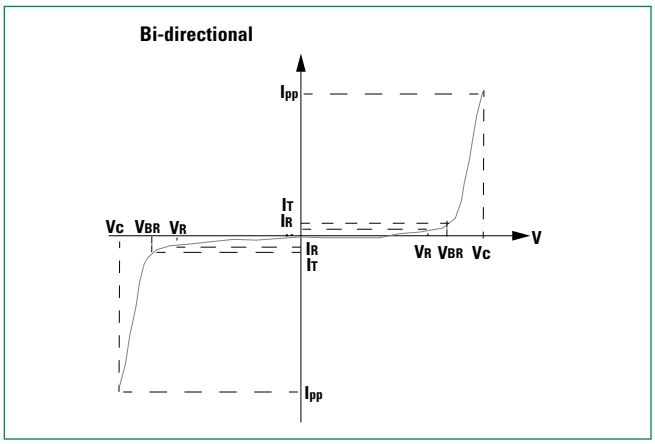
I-V Curve Characteristics





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 VR
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

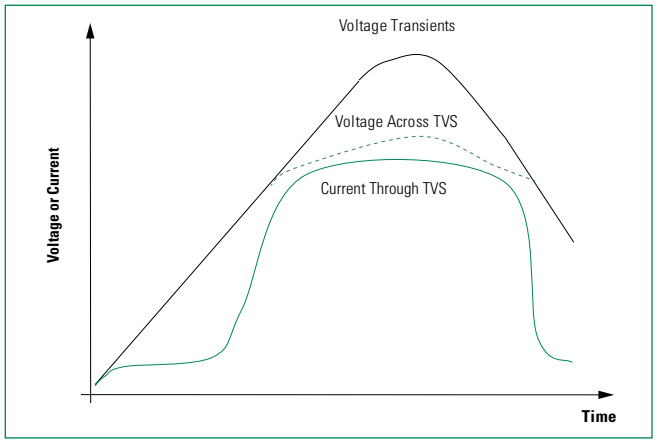
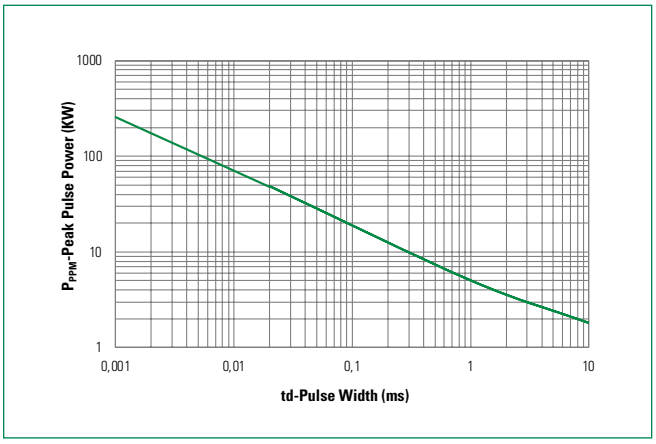


Figure 2:
Peak Pulse Power Rating



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

Figure 3:
Peak Pulse Power Derating Curve

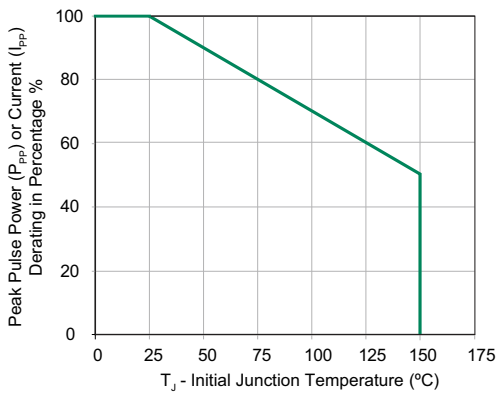


Figure 4:
Pulse Waveform

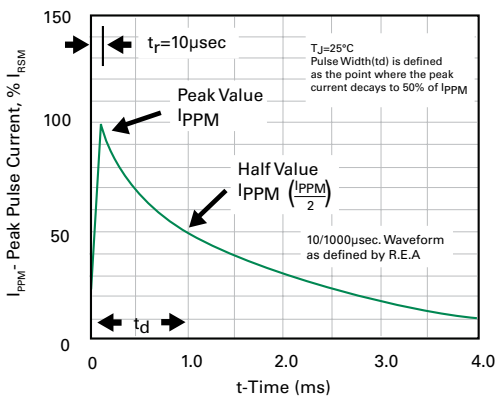


Figure 5:
Typical Junction Capacitance

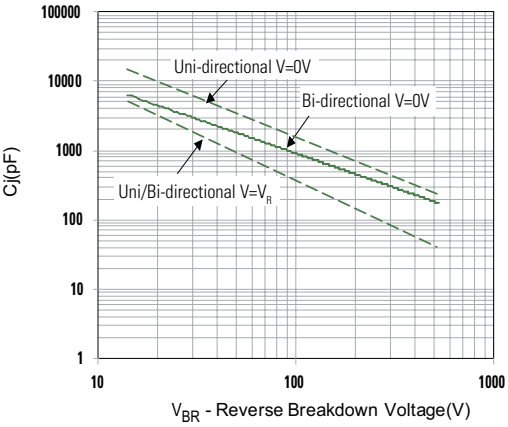


Figure 6:
Typical Transient Thermal Impedance

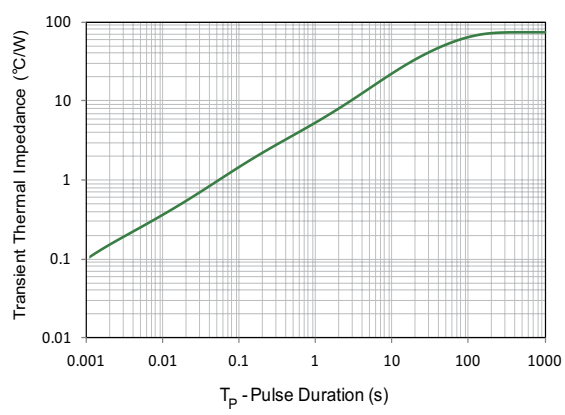


Figure 7:
Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only

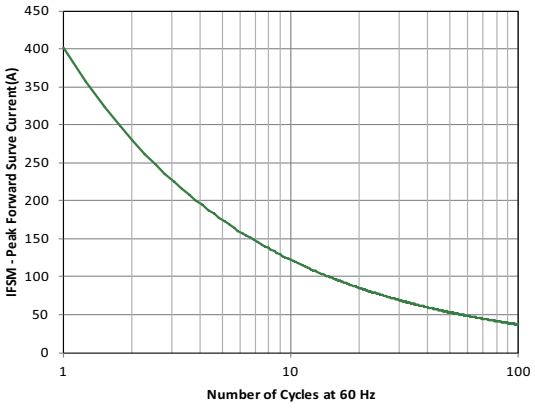
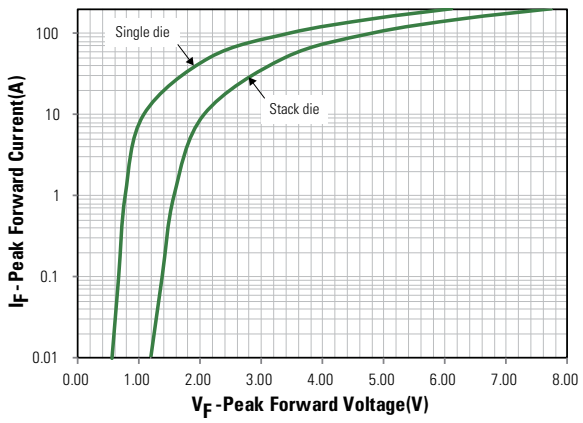


Figure 8:
Peak Forward Voltage Drop vs Peak Forward Current (Typical Values)



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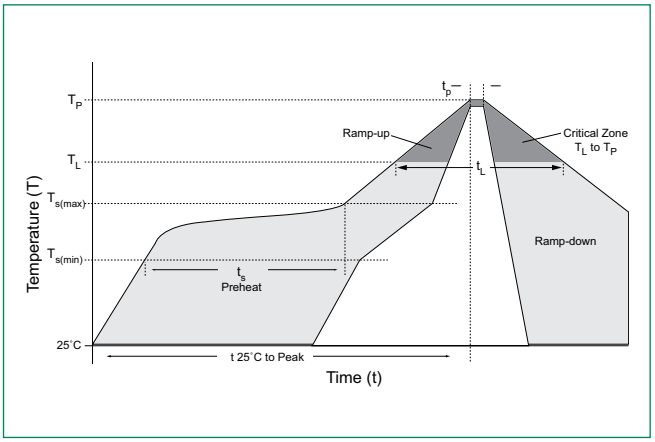
Soldering Parameters

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 – 120 secs
Average ramp up rate (Liquidus Temp (T_A) 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_L)	60 – 150 seconds
Peak Temperature (T_P)		$260^{+0/-5}$ °C
Time within 5°C of actual peak Temperature (t_p)		30 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes Max.
Do not exceed		280°C



Physical Specifications

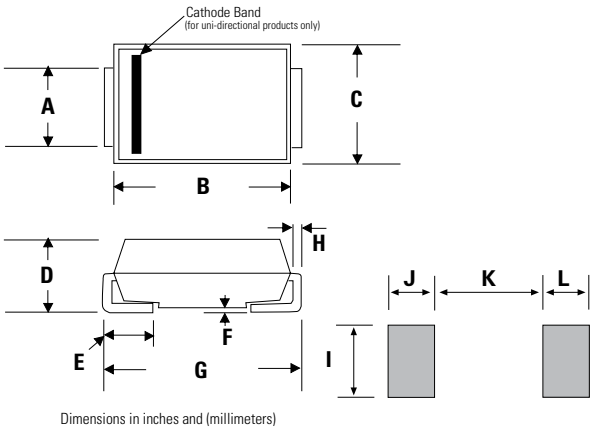
Weight	0.007 ounce, 0.21 grams
Case	JEDEC DO214AB. Molded component over glass passivated junction
Polarity	Color band denotes positive end (cathode) except Bidirectional.
Terminal	Matte Tin-plated leads, Solderable per JESD22-B102

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 in inches and (millimeters)

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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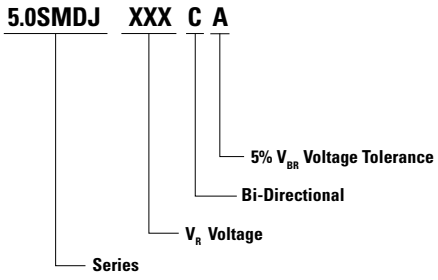
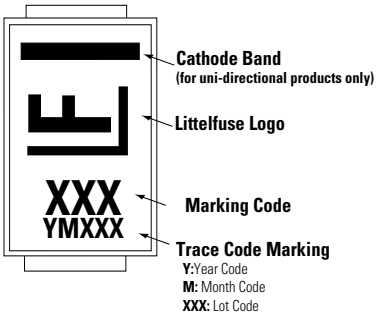
Part Numbering System



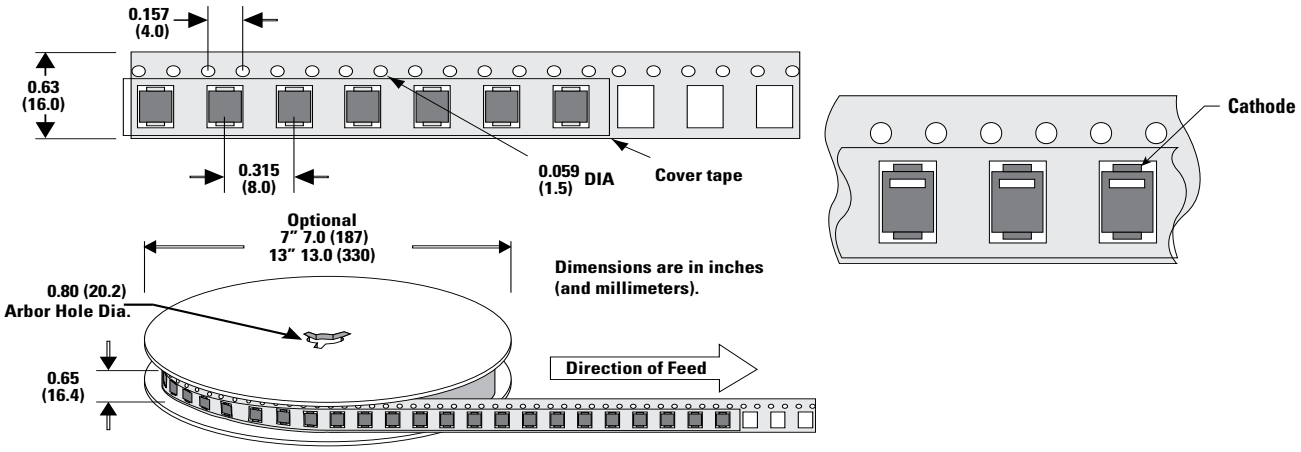
Part Marking System



Packaging Options

Part number	Component Package	Quantity	Packaging Option	Packaging Specification
5.0SMDJxxxXX	DO-214AB	3000	Tape & Reel - 16mm tape/13" reel	EIA STD RS-481
5.0SMDJxxxXX-T7	DO-214AB	500	Tape & Reel – 16mm tape/7" reel	EIA STD RS-481

Tape and Reel Specification



Mouser Electronics

Authorized Distributor

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Littelfuse:

5.0SMDJ130A 5.0SMDJ16CA 5.0SMDJ60A 5.0SMDJ40A 5.0SMDJ170A 5.0SMDJ30CA 5.0SMDJ43CA 5.0SMDJ90A 5.0SMDJ18A 5.0SMDJ45A 5.0SMDJ12A 5.0SMDJ26A 5.0SMDJ13CA 5.0SMDJ75A 5.0SMDJ24CA 5.0SMDJ13A 5.0SMDJ22A 5.0SMDJ51A 5.0SMDJ28A 5.0SMDJ48A 5.0SMDJ17A 5.0SMDJ30A 5.0SMDJ85A 5.0SMDJ28CA 5.0SMDJ14A 5.0SMDJ18CA 5.0SMDJ64A 5.0SMDJ78A 5.0SMDJ15CA 5.0SMDJ54A 5.0SMDJ100A 5.0SMDJ15A 5.0SMDJ120A 5.0SMDJ33CA 5.0SMDJ16A 5.0SMDJ33A 5.0SMDJ20CA 5.0SMDJ36CA 5.0SMDJ110A 5.0SMDJ20A 5.0SMDJ70A 5.0SMDJ45CA 5.0SMDJ22CA 5.0SMDJ26CA 5.0SMDJ40CA 5.0SMDJ17CA 5.0SMDJ150A 5.0SMDJ36A 5.0SMDJ24A 5.0SMDJ58A 5.0SMDJ14CA 5.0SMDJ12CA 5.0SMDJ43A 5.0SMDJ160A 5.0SMDJ48A-T7 5.0SMDJ60A-T7 5.0SMDJ100CA-T7 5.0SMDJ110CA-T7 5.0SMDJ120A-T7 5.0SMDJ120CA-T7 5.0SMDJ130CA-T7 5.0SMDJ13CA-T7 5.0SMDJ14A-T7 5.0SMDJ15CA-T7 5.0SMDJ170A-T7 5.0SMDJ170CA-T7 5.0SMDJ17CA-T7 5.0SMDJ18CA-T7 5.0SMDJ22CA-T7 5.0SMDJ24A-T7 5.0SMDJ33CA-T7 5.0SMDJ36CA-T7 5.0SMDJ40A-T7 5.0SMDJ40CA-T7 5.0SMDJ45A-T7 5.0SMDJ45CA-T7 5.0SMDJ48CA 5.0SMDJ51CA-T7 5.0SMDJ54CA-T7 5.0SMDJ58CA 5.0SMDJ70A-T7 5.0SMDJ70CA-T7 5.0SMDJ75A-T7 5.0SMDJ78A-T7 5.0SMDJ85A-T7 5.0SMDJ90A-T7 5.0SMDJ90CA-T7 5.0SMDJ43A-T7 5.0SMDJ20A-T7 5.0SMDJ75CA-T7 5.0SMDJ12A-T7 5.0SMDJ26A-T7 5.0SMDJ17A-T7 5.0SMDJ60CA-T7 5.0SMDJ36A-T7 5.0SMDJ13A-T7 5.0SMDJ20CA-T7 5.0SMDJ160A-T7 5.0SMDJ30A-T7 5.0SMDJ58A-T7