

# 8.0SMDJ Series

## Surface Mount – 8000W



### Agency Recognitions

Agency	Agency File Number
	E230531

### Maximum Ratings and Thermal Characteristics

( $T_A=25^{\circ}\text{C}$  unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation at $T_L=25^{\circ}\text{C}$ by 10/1000 $\mu\text{s}$ Waveform (Fig.2)(Note 1), (Note 2)	$P_{PPM}$	8000	W
Power Dissipation on Infinite Heat Sink at $T_L=50^{\circ}\text{C}$	$P_D$	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	$^{\circ}\text{C}$
Storage Temperature Range	$T_{STG}$	-65 to 175	$^{\circ}\text{C}$
Typical Thermal Resistance Junction to Lead	$R_{\theta JL}$	15	$^{\circ}\text{C}/\text{W}$
Typical Thermal Resistance Junction to Ambient	$R_{\theta JA}$	75	$^{\circ}\text{C}/\text{W}$

#### Notes:

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

## Description

The 8.0SMDJ series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

## Features and Benefits

- For surface mounted applications 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
- IEC-61000-4-2 ESD 30kV(Air), 30kV (Contact)
- ESD protection of data lines in accordance with IEC 61000-4-2
- EFT protection of data lines in accordance with IEC 61000-4-4
- Built-in strain relief
- Glass passivated chip junction
- 8kW peak pulse power capability at 10/1000 $\mu\text{s}$  waveform, repetition rate (duty cycles):0.01%
- Fast response time: typically less than 1.0ps from 0V to VBR min
- Excellent clamping capability
- Compact size with high power density in DO-214AB Package
- Low incremental surge resistance
- Typical IR less than 5 $\mu\text{A}$  when  $V_{BR\ min}>22\text{V}$
- High temperature reflow soldering guaranteed: 260 $^{\circ}\text{C}/40\text{sec}$
- $V_{BR} @ T_J = V_{BR} @ 25^{\circ}\text{C} \times (1 + \alpha T \times (T_J - 25))$  ( $\alpha$ : Temperature Coefficient, typical value is 0.1%)
- UL Recognized compound meeting flammability rating V-0
- Meet MSL level1, per J-STD-020, LF maximum peak of 260 $^{\circ}\text{C}$
- 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, VCC bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications.

### Functional Diagram



Bi-directional




Uni-directional

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### Electrical Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise noted)

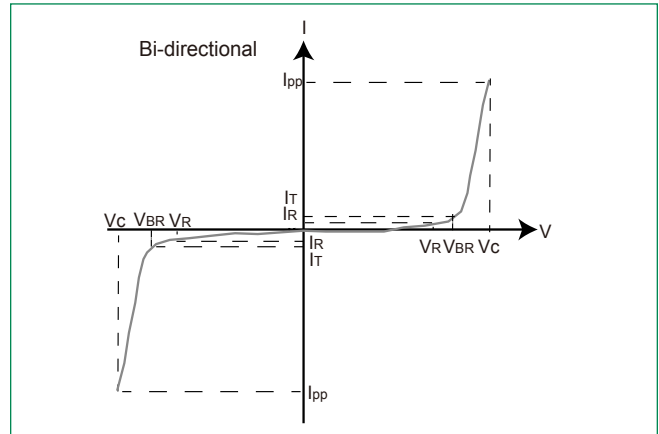
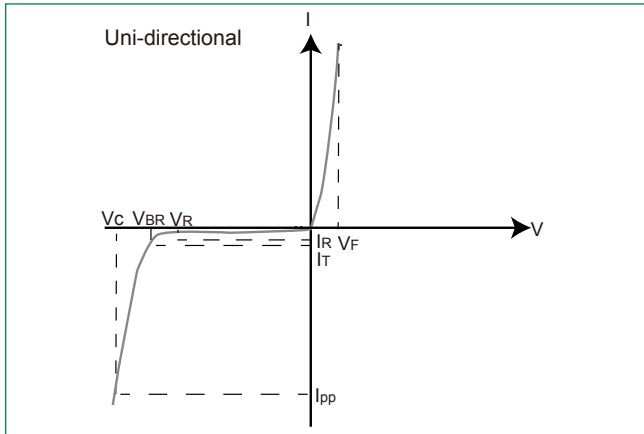
Part Number (Uni)	Part Number (Bi)	Marking		Reverse Stand off Voltage $V_R$ (Volts)	Breakdown Voltage $V_{BR}$ (Volts) @ $I_T$		Test Current $I_T$ (mA)	Maximum Clamping Voltage $V_C$ @ $I_{PP}$ (10/1000 $\mu\text{s}$ ) (V)	Maximum Peak Pulse Current $I_{PP}$ (10/1000 $\mu\text{s}$ ) (A)	Maximum Clamping Voltage $V_C$ @ $I_{PP}$ (8/20 $\mu\text{s}$ ) (V)	Maximum Peak Pulse Current $I_{PP}$ (8/20 $\mu\text{s}$ ) (A)	Maximum Reverse Leakage $I_R$ @ $V_R$ ( $\mu\text{A}$ )	Agency Approval 
		UNI	BI		MIN	MAX							
8.0SMDJ12A	8.0SMDJ12CA	8PEP	8BEP	12	13.3	14.7	10	19.9	402.1	25.7	2613.7	800	X
8.0SMDJ13A	8.0SMDJ13CA	8PEQ	8BEQ	13	14.4	15.9	10	21.5	372.1	27.8	2418.7	500	X
8.0SMDJ14A	8.0SMDJ14CA	8PER	8BER	14	15.6	17.2	10	23.2	344.9	30.0	2241.9	200	X
8.0SMDJ15A	8.0SMDJ15CA	8PES	8BES	15	16.7	18.5	1	24.4	327.9	31.5	2131.4	100	X
8.0SMDJ16A	8.0SMDJ16CA	8PET	8BET	16	17.8	19.7	1	26.0	307.7	33.6	2000.1	50	X
8.0SMDJ17A	8.0SMDJ17CA	8PEU	8BEU	17	18.9	20.9	1	27.6	290.0	35.7	1885.0	20	X
8.0SMDJ18A	8.0SMDJ18CA	8PEV	8BEV	18	20.0	22.1	1	29.2	274.0	37.7	1781.0	10	X
8.0SMDJ20A	8.0SMDJ20CA	8PEW	8BEW	20	22.2	24.5	1	32.4	247.0	41.9	1605.5	5	X
8.0SMDJ22A	8.0SMDJ22CA	8PEX	8BEX	22	24.4	26.9	1	35.5	225.4	45.9	1464.8	5	X
8.0SMDJ24A	8.0SMDJ24CA	8PEZ	8BEZ	24	26.7	29.5	1	38.9	205.7	50.3	1336.8	5	X
8.0SMDJ26A	8.0SMDJ26CA	8PFE	8BFE	26	28.9	31.9	1	42.1	190.1	54.4	1235.7	5	X
8.0SMDJ28A	8.0SMDJ28CA	8PFG	8BFG	28	31.1	34.4	1	45.4	176.2	58.7	1145.4	5	X
8.0SMDJ30A	8.0SMDJ30CA	8PFK	8BFK	30	33.3	36.8	1	48.4	165.3	62.5	1074.5	5	X
8.0SMDJ33A	8.0SMDJ33CA	8PFM	8BFM	33	36.7	40.6	1	53.3	150.1	68.9	975.7	5	X
8.0SMDJ36A	8.0SMDJ36CA	8PFP	8BFP	36	40.0	44.2	1	58.1	137.8	75.1	895.7	5	X
8.0SMDJ40A	8.0SMDJ40CA	8PFR	8BFR	40	44.4	49.1	1	64.5	124.1	83.3	806.7	5	X
8.0SMDJ43A	8.0SMDJ43CA	8PFT	8BFT	43	47.8	52.8	1	69.4	115.3	89.7	749.5	5	X
8.0SMDJ45A	8.0SMDJ45CA	8PFV	8BFV	45	50.0	55.3	1	72.7	110.1	93.9	715.7	5	X
8.0SMDJ48A	8.0SMDJ48CA	8PFX	8BFX	48	53.3	58.9	1	77.4	103.4	100.0	671.8	5	X
8.0SMDJ51A	8.0SMDJ51CA	8PFZ	8BFZ	51	56.7	62.7	1	82.4	97.1	106.5	631.2	5	X
8.0SMDJ54A	8.0SMDJ54CA	8PGE	8BGE	54	60.0	66.3	1	87.1	92.0	112.5	598.0	5	X
8.0SMDJ58A	8.0SMDJ58CA	8PGG	8BGG	58	64.4	71.2	1	93.6	85.5	120.9	555.8	5	X
8.0SMDJ60A	8.0SMDJ60CA	8PGK	8BGK	60	66.7	73.7	1	96.8	82.7	125.1	537.2	5	X
8.0SMDJ64A	8.0SMDJ64CA	8PGM	8BGM	64	71.1	78.6	1	103.0	77.7	133.1	504.9	5	X
8.0SMDJ70A	8.0SMDJ70CA	8PGP	8BGP	70	77.8	86.0	1	113.0	71.0	146.0	461.5	5	X
8.0SMDJ75A	8.0SMDJ75CA	8PGR	8BGR	75	83.3	92.1	1	121.0	66.2	156.3	430.3	5	X
8.0SMDJ78A	8.0SMDJ78CA	8PGT	8BGT	78	86.7	95.8	1	126.0	63.5	162.8	412.8	5	X
8.0SMDJ85A	8.0SMDJ85CA	8PGV	8BGV	85	94.4	104.0	1	137.0	58.4	177.0	379.6	5	X
8.0SMDJ90A	8.0SMDJ90CA	8PGX	8BGX	90	100.0	111.0	1	146.0	55.0	188.6	357.5	5	X
8.0SMDJ100A	8.0SMDJ100CA	8PGZ	8BGZ	100	111.0	123.0	1	162.0	49.4	209.3	321.1	5	X
8.0SMDJ110A	8.0SMDJ110CA	8PHE	8BHE	110	122.0	135.0	1	177.0	45.2	228.7	293.8	5	X

For bidirectional type having  $V_R$  of 20 volts and less, the  $I_R$  limit is double.

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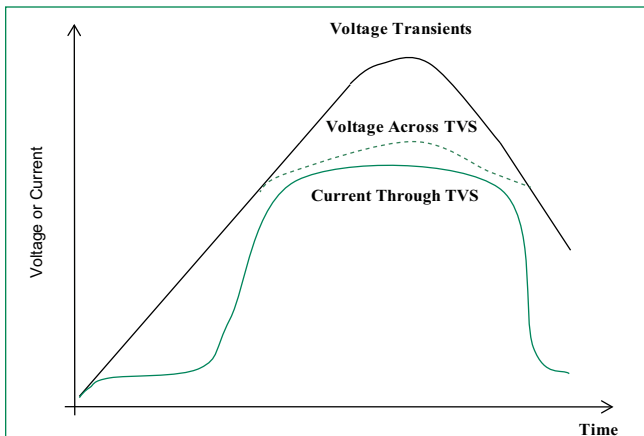
### I-V Curve Characteristics



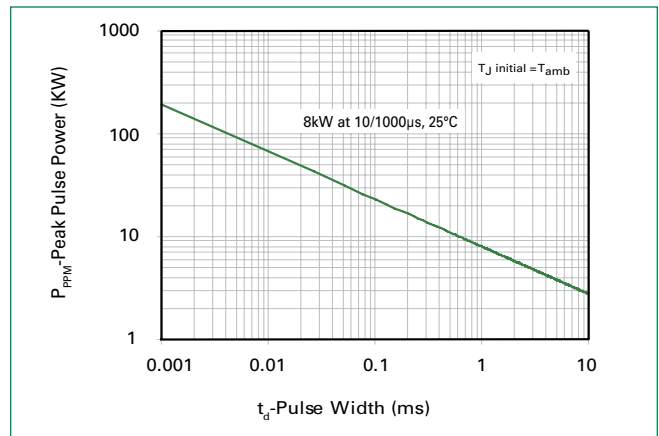
- $P_{PPM}$  Peak Pulse Power Dissipation** -- Max power dissipation
- $V_R$  Stand-off Voltage** -- Maximum voltage that can be applied to the TVS without operation
- $V_{BR}$  Breakdown Voltage** -- Maximum voltage that flows through the TVS at a specified test current ( $I_T$ )
- $V_C$  Clamping Voltage** -- Peak voltage measured across the TVS at a specified  $I_{PPM}$  (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 ( $T_A=25^\circ\text{C}$ unless otherwise noted)

**Figure 1:**  
TVS Transients Clamping Waveform



**Figure 2:**  
Peak Pulse Power Rating



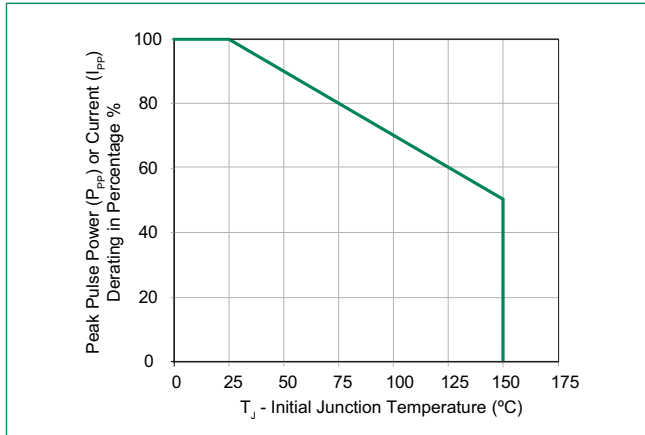
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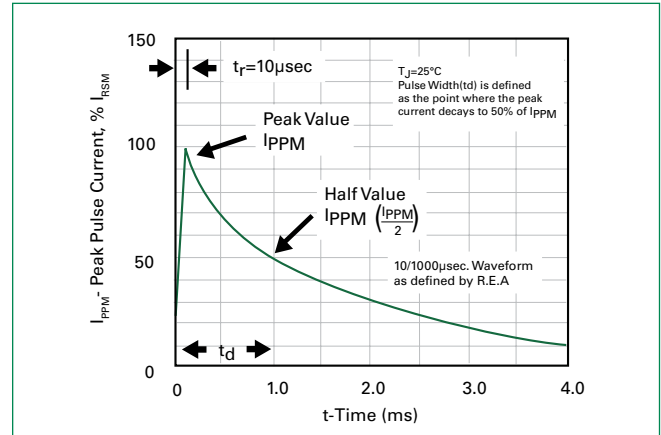
## Surface Mount – 8000W

### Ratings and Characteristic Curves ( $T_A=25^\circ\text{C}$ unless otherwise noted) (Continued)

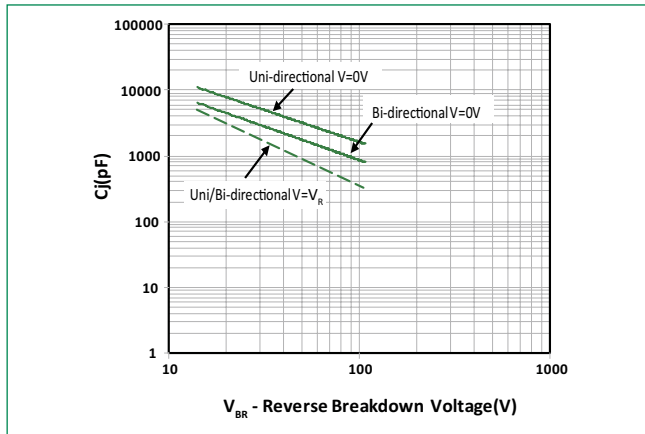
**Figure 3:**  
Peak Pulse Power Derating Curve



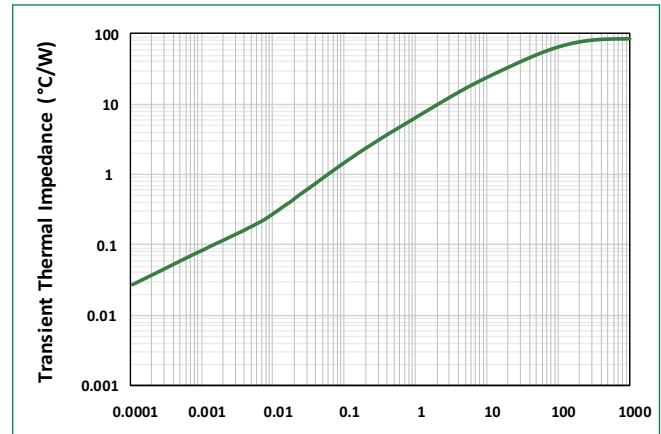
**Figure 4:**  
Pulse Waveform



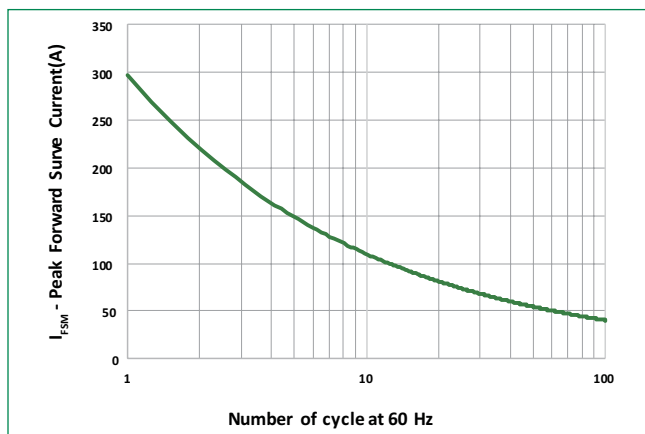
**Figure 5:**  
Typical Junction Capacitance



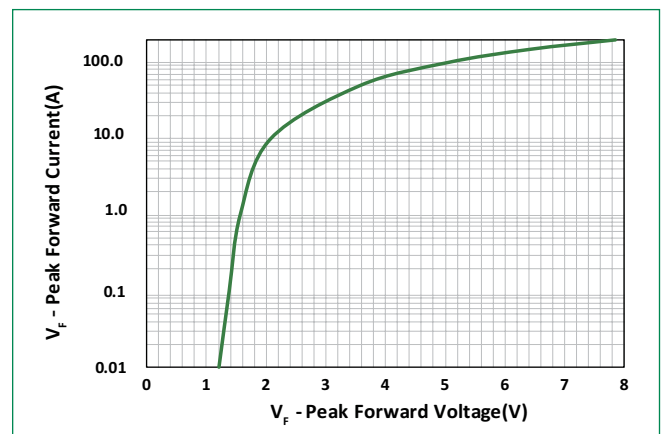
**Figure 6:**  
Typical Transient Thermal Impedance



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



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

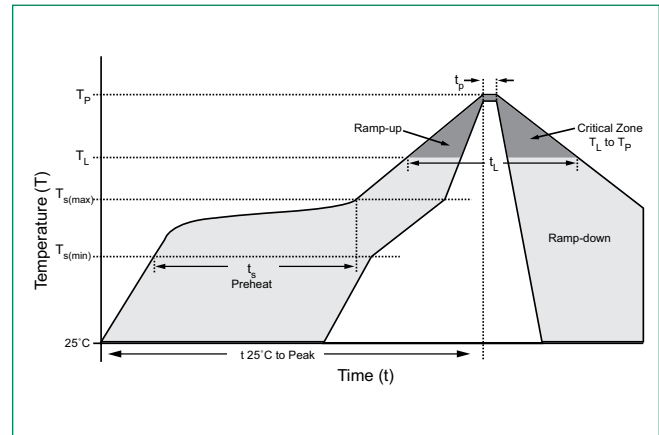


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## Surface Mount – 8000W

### Soldering Parameters

<b>Reflow Condition</b>		Lead-free assembly
<b>Pre Heat</b>	- Temperature Min ( $T_{s(min)}$ )	150°C
	- Temperature Max ( $T_{s(max)}$ )	200°C
	- Time (min to max) ( $t_p$ )	60 – 120 secs
<b>Average ramp up rate (Liquidus Temp (<math>T_A</math>) to peak)</b>		3°C/second max
<b><math>T_{s(max)}</math> to <math>T_A</math> - Ramp-up Rate</b>		3°C/second max
<b>Reflow</b>	- Temperature ( $T_L$ ) (Liquidus)	217°C
	- Time (min to max) ( $t_L$ )	60 – 150 seconds
<b>Peak Temperature (<math>T_p</math>)</b>		260 <sup>+0/-5</sup> °C
<b>Time within 5°C of actual peak Temperature (<math>t_p</math>)</b>		30 seconds
<b>Ramp-down Rate</b>		6°C/second max
<b>Time 25°C to peak Temperature (<math>T_p</math>)</b>		8 minutes Max.
<b>Do not exceed</b>		260°C



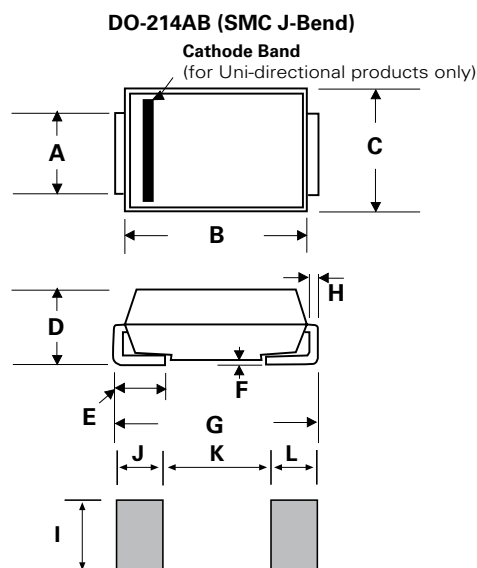
### Physical Specifications

<b>Weight</b>	0.011 ounce ,0.3 grams
<b>Case</b>	JEDEC DO214AB. Molded plastic body over glass passivated junction
<b>Polarity</b>	Color band denotes positive end (cathode) except Bidirectional.
<b>Terminal</b>	Matte Tin-plated leads, Solderable per JESD22-B102

### Environmental Specifications

<b>High Temp. Storage</b>	JESD22-A103
<b>HTRB</b>	JESD22-A108
<b>Temperature Cycling</b>	JESD22-A104
<b>MSL</b>	JEDEC-J-STD-020, Level 1
<b>H3TRB</b>	JESD22-A101
<b>RSH</b>	JESD22-A111

### Dimensions

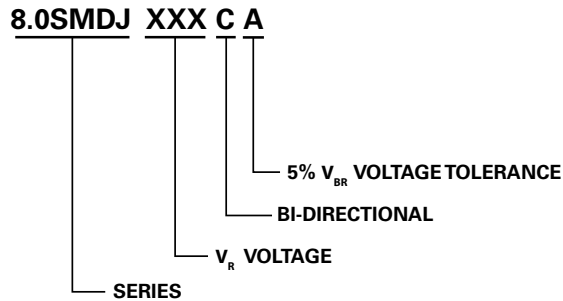


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.114	0.126	2.900	3.200
B	0.260	0.280	6.600	7.110
C	0.220	0.245	5.590	6.220
D	0.079	0.103	2.060	2.620
E	0.030	0.060	0.760	1.520
F	-	0.008	-	0.203
G	0.305	0.320	7.750	8.130
H	0.006	0.012	0.152	0.305
I	0.129	-	3.300	-
J	0.094	-	2.400	-
K	-	0.165	-	4.200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

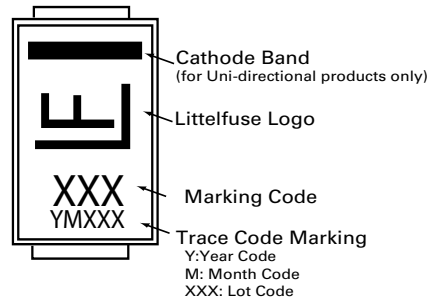
# 8.0SMDJ Series

## Surface Mount – 8000W

### Part Numbering System



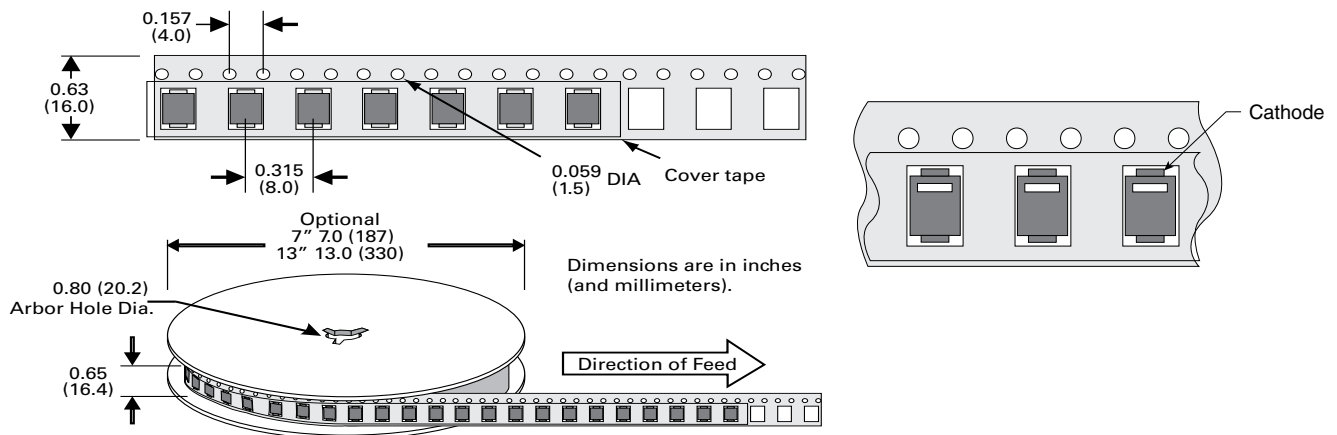
### Part Marking System



### Packaging Options

Part number	Component Package	Quantity	Packaging Option	Packaging Specification
8.0SMDJxxxXX	DO-214AB	3000	Tape & Reel - 16mm tape/13" reel	EIA STD RS-481
8.0SMDJxxxXX-T7	DO-214AB	500	Tape & Reel - 16mm tape/7" reel	EIA STD RS-481

### Tape and Reel Specification



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