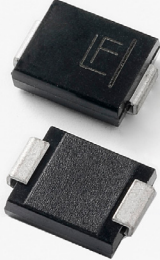


4.0SMDJ

Surface Mount – 4000W



Uni-directional



Agency Approvals

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 $T_A=25^{\circ}\text{C}$ by 10/1000 μs Waveform (Fig.2)(Note 1), (Note 2)	P_{PPM}	4000	W
Power Dissipation on Infinite Heat Sink at $T_A=50^{\circ}\text{C}$	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	3.5	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 $T_A = 25^{\circ}\text{C}$ 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 device only, duty cycle=4 per minute maximum.

Description

The 4.0SMDJ is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

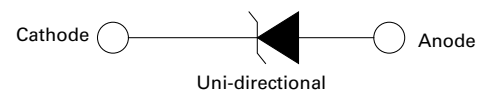
Features and Benefits

- For surface mounted applications 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
- IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)
- Built-in strain relief
- Glass passivated chip junction
- 4000W peak pulse power capability at 10/1000 μs waveform, repetition rate (duty cycles):0.01%
- Fast response time: typically less than 1.0ps from 0V to BV min
- Excellent clamping capability
- Low incremental surge resistance
- Meet MSL level 1 per J-STD-020, and high temperature soldering guaranteed: 260 $^{\circ}\text{C}/10\text{sec}$
- Matte tin lead-free plated
- Halogen free and RoHS compliant
- Plastic package is flammability rated V-0 per UL 94

Applications

TVS devices 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.


Functional Diagram



4.0SMDJ

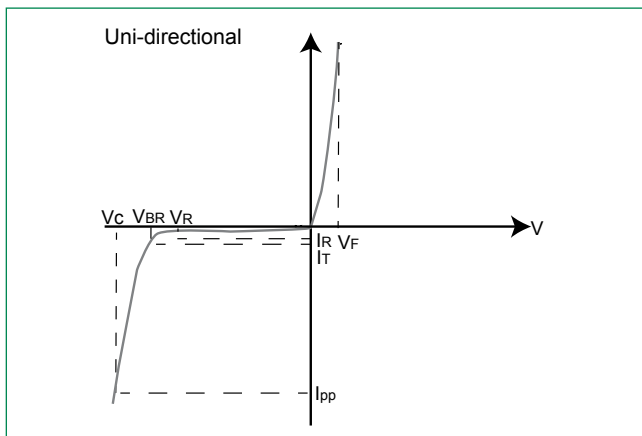
Surface Mount – 4000W

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

Part Number	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 μS) (V)	Maximum Clamping Voltage V_C @ I_{PP} (8/20 μS) (V)	Maximum Peak Pulse Current I_{PP} (10/1000 μS) (A)	Maximum Peak Pulse Current I_{PP} (8/20 μS) (A)	Maximum Reverse Leakage I_R @ V_R (μA)	Maximum Temperature Coefficient of V_{BR} (%/C)	Agency Approval 
			MIN	MAX								
4.0SMDJ10A	4PDX	10.0	11.10	12.30	1	17.0	29.0	235.5	1480.0	5	0.071	x
4.0SMDJ11A	4PDZ	11.0	12.20	13.50	1	18.2	31.0	220.0	1385.0	2	0.074	x
4.0SMDJ12A	4PEE	12.0	13.30	14.70	1	19.9	32.0	201.5	1270.0	2	0.075	x
4.0SMDJ13A	4PEG	13.0	14.40	15.90	1	21.5	34.0	186.5	1175.0	2	0.076	x
4.0SMDJ14A	4PEK	14.0	15.60	17.20	1	23.2	35.0	172.5	1085.0	2	0.080	x
4.0SMDJ15A	4PEM	15.0	16.70	18.50	1	24.4	37.0	164.0	1033.0	2	0.083	x
4.0SMDJ18A	4PET	18.0	20.00	22.10	1	29.2	42.0	137.0	860.0	2	0.088	x
4.0SMDJ20A	4PEV	20.0	22.20	24.50	1	32.4	45.0	123.5	780.0	2	0.091	x
4.0SMDJ24A	4PEZ	24.0	26.70	29.50	1	38.9	51.0	103.0	650.0	2	0.092	x

$V_{BR} @ T_J = V_{BR} @ 25^\circ\text{C} \times (1 + \alpha T \times (T_J - 25))$ (α : Temperature Coefficient)

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 suppressor 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

4.0SMDJ

Surface Mount – 4000W

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

Figure 1 - TVS Transients Clamping Waveform

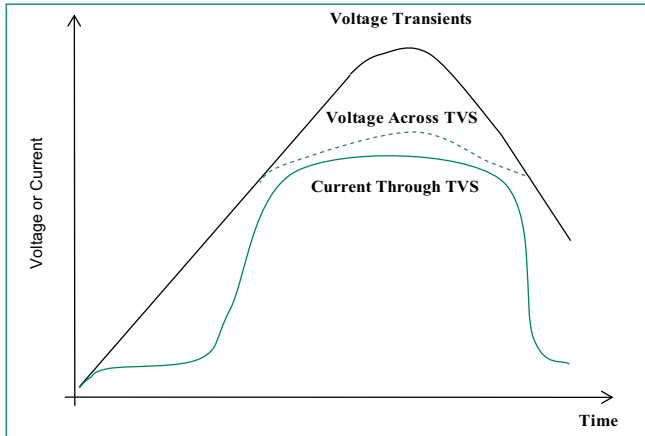


Figure 2 - Peak Pulse Power Rating

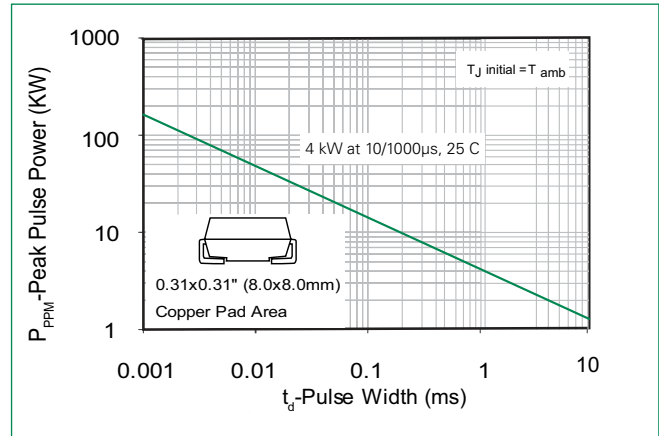


Figure 3 - Peak Pulse Power Derating Curve

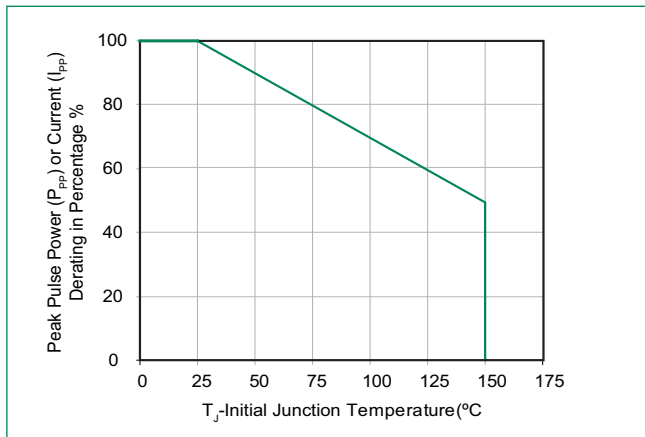


Figure 4 - Pulse Waveform

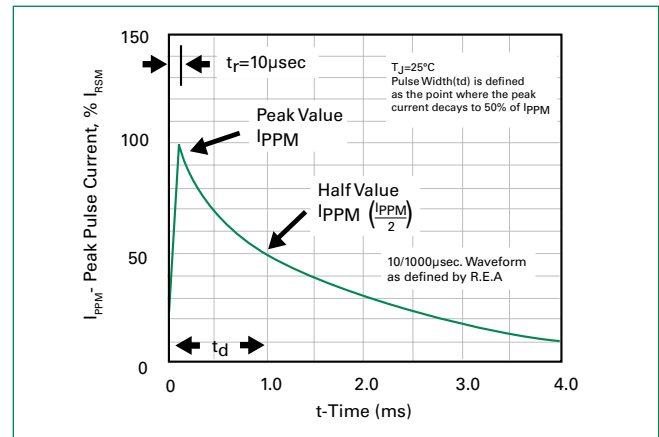


Figure 5 - Typical Transient Thermal Impedance

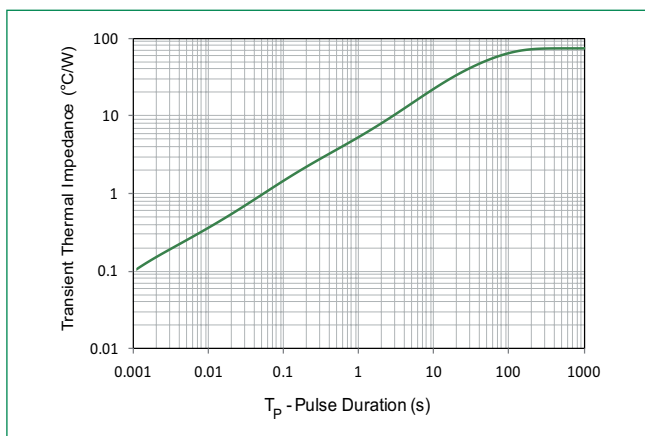
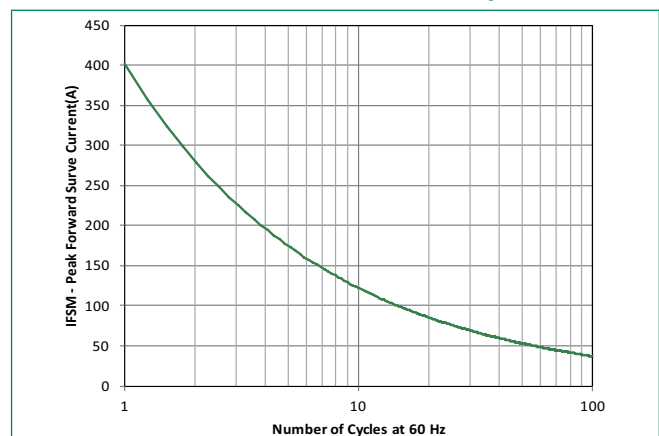


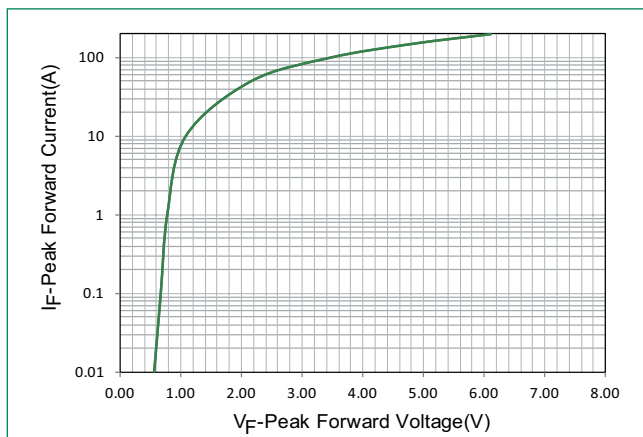
Figure 6 - Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only



4.0SMDJ

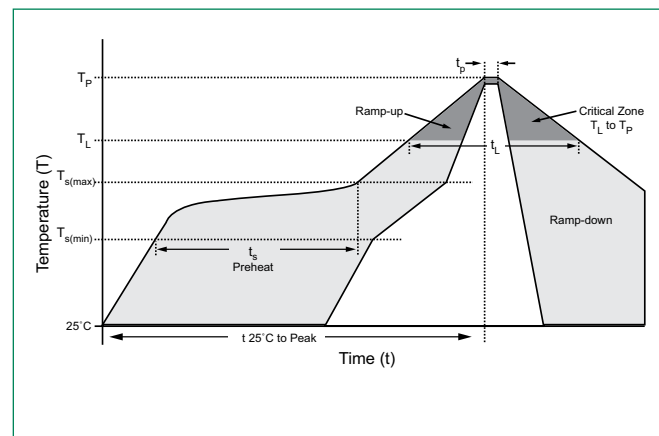
Surface Mount – 4000W

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

Figure 7 - Peak Forward Voltage Drop vs Peak Forward Current (Typical Values)

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_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 (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)		30 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
Polarity	Color band denotes positive end (cathode) except Bidirectional.
Terminal	Matte Tin-plated leads, Solderable per JESD22-B102

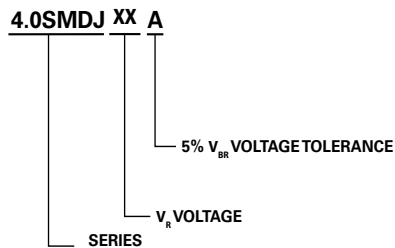
Environmental Specifications

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

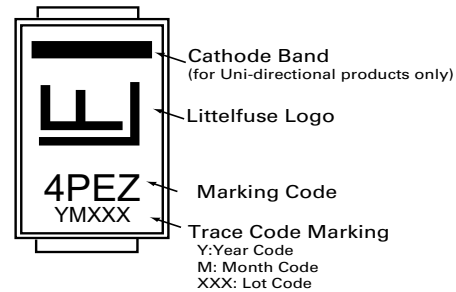
4.0SMDJ

Surface Mount – 4000W

Part Numbering System



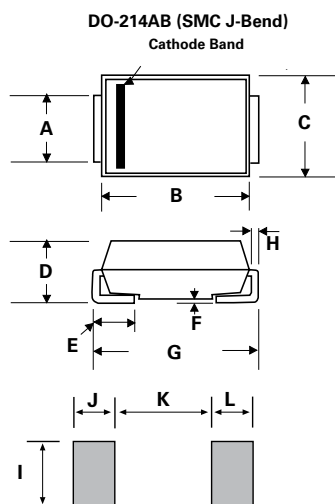
Part Marking System



Packaging Options

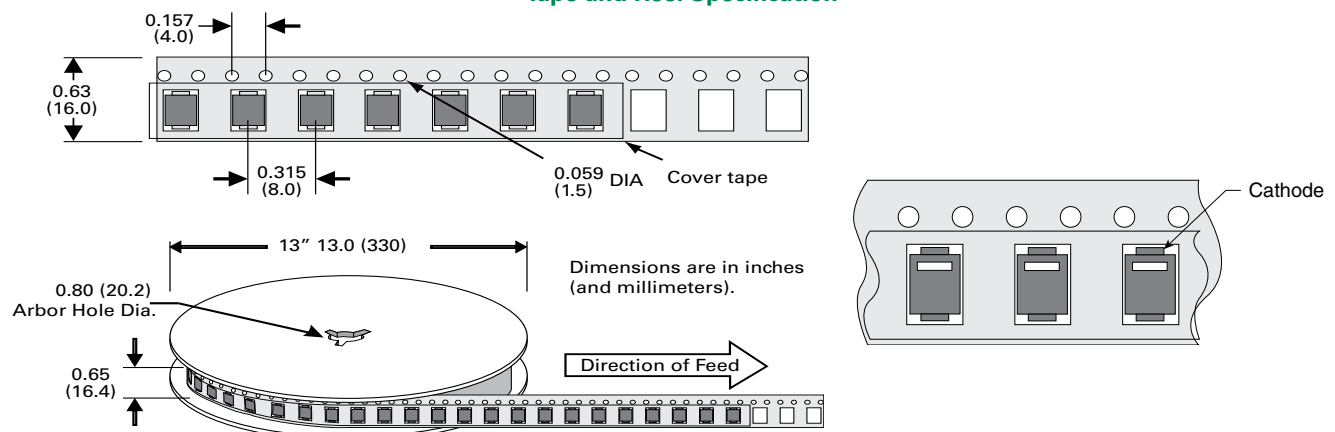
Part number	Component Package	Quantity	Packaging Option	Packaging Specification
4.0SMDJxxA	DO-214AB	3000	Tape & Reel - 16mm tape/13" reel	EIA STD RS-481

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	-

Tape and Reel Specification



Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at <http://www.littelfuse.com/disclaimer-electronics>.