4.0SMDJ

Surface Mount – 4000W

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_A=25°C by 10/1000µs Waveform (Fig.2)(Note 1), (Note 2)	P_{PPM}	4000	W
Power Dissipation on Infinite Heat Sink at T_A=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	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_A = 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 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.

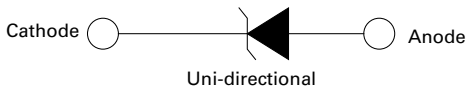
Features and Benefits

- 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 10/1000µs 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°C/10sec
- 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



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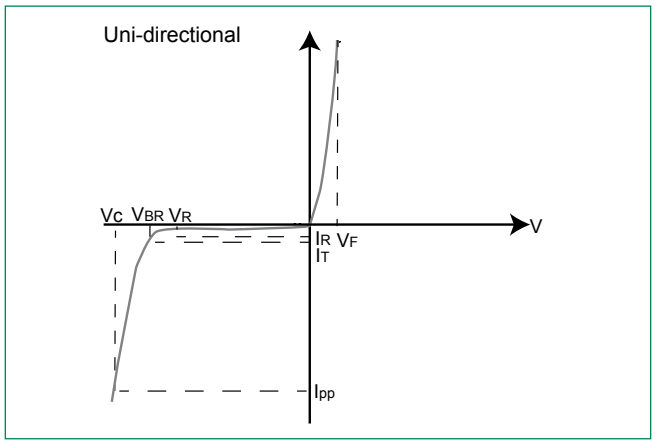
Electrical Characteristics (T_A=25°C unless otherwise noted)

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} (10/1000µS) (V)	Maximum Clamping Voltage V_C @ I_{pp} (8/20µS) (V)	Maximum Peak Pulse CurrentI_{pp} (10/1000µS) (A)	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
			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°C x (1+ α T x (T_J- 25)) (α T: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 though the TVS at a specified test current (I_T)
V_C Clamping Voltage – Peak voltage measured across the suppressor 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

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

Figure 1 - TVS Transients Clamping Waveform

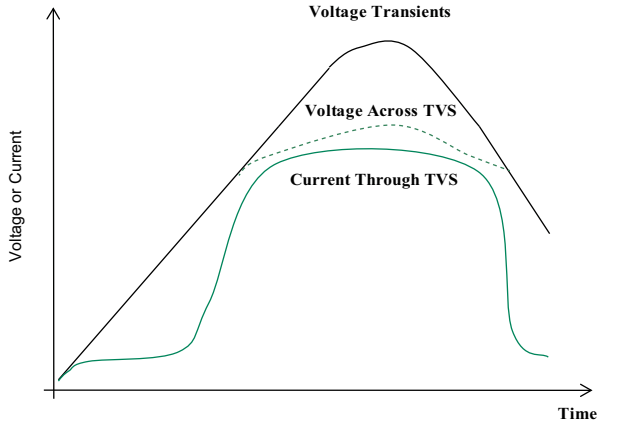


Figure 2 - Peak Pulse Power Rating

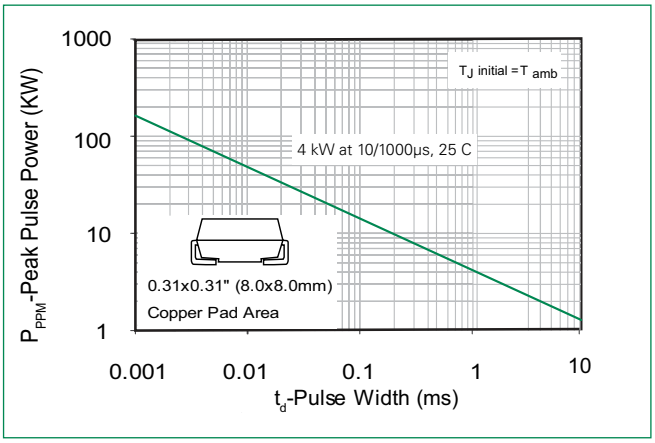


Figure 3 - Peak Pulse Power Derating Curve

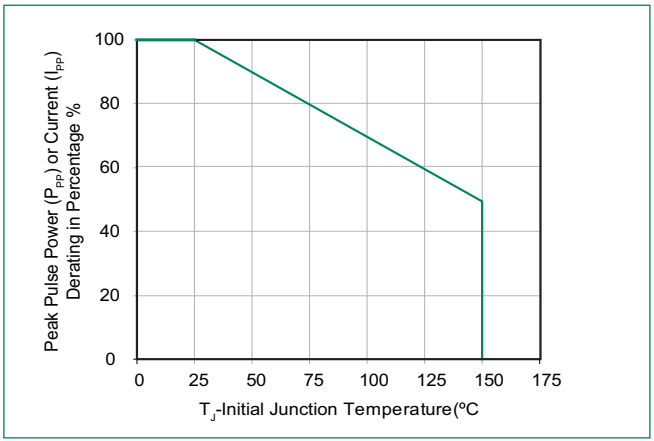


Figure 4 - Pulse Waveform

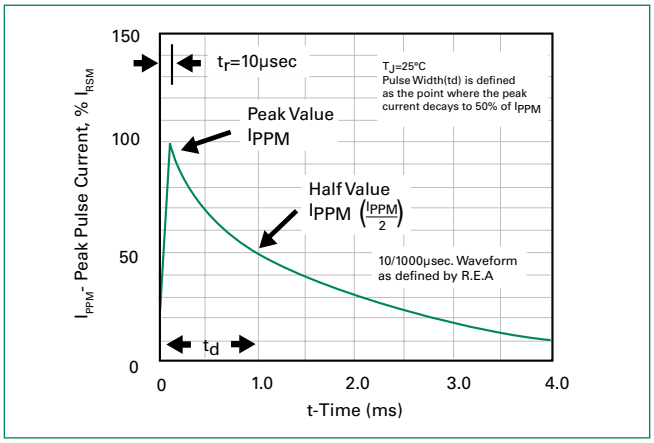


Figure 5 - Typical Transient Thermal Impedance

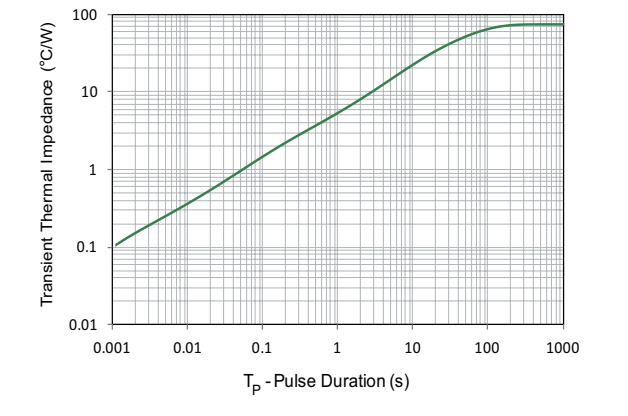
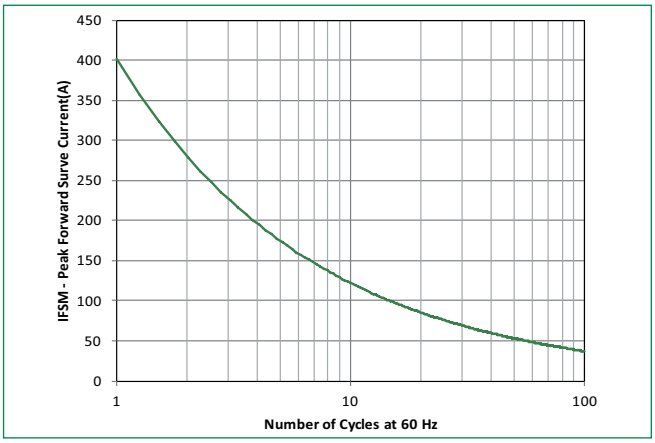


Figure 6 - Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only



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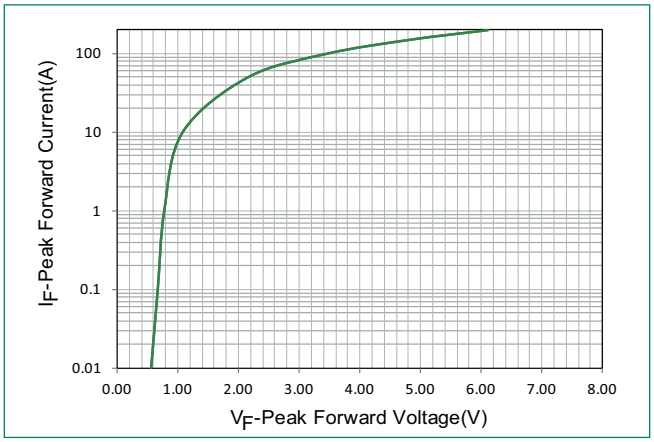
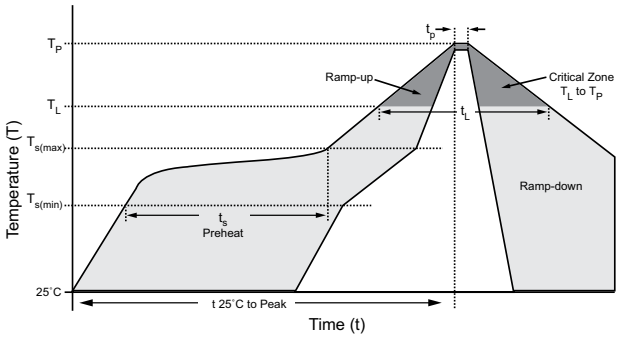
Ratings and Characteristic Curves (T_A=25°C unless otherwise noted)

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

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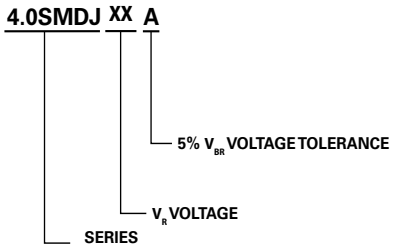
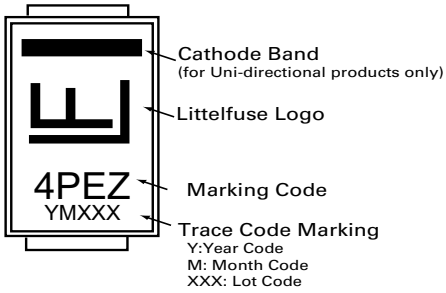
Part Numbering System



Part Marking System

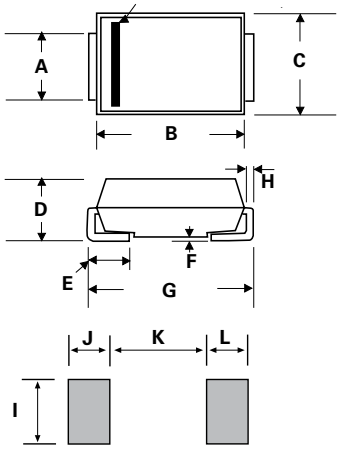


Packaging Options

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

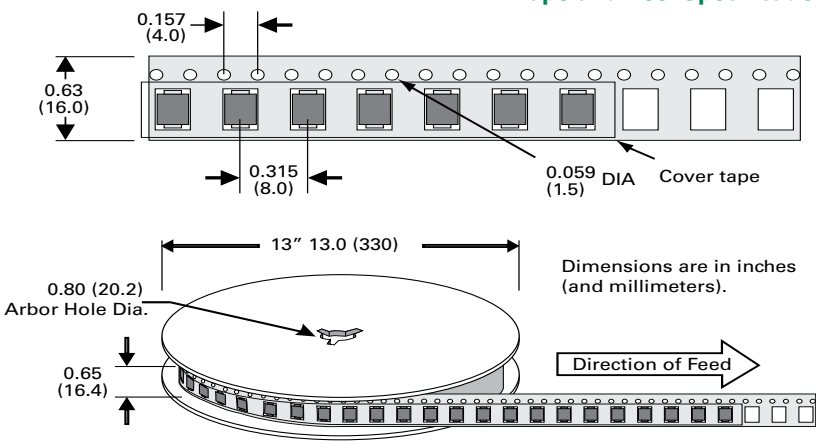
Dimensions

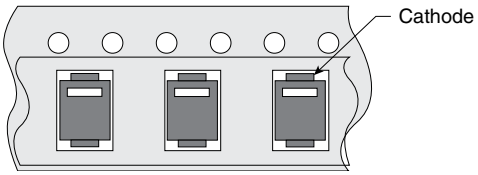
DO-214AB (SMC J-Bend)
Cathode Band



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





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