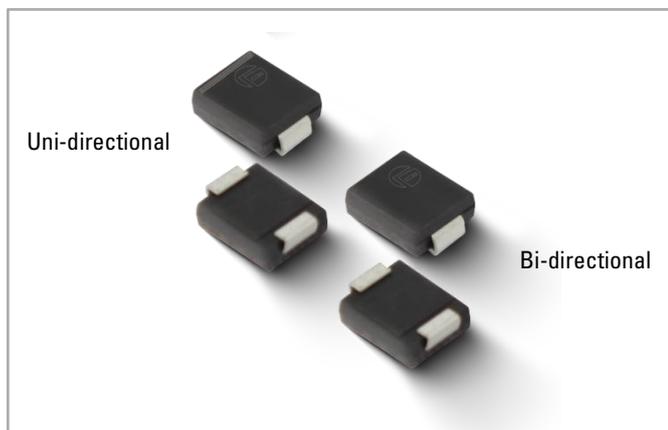


5.0SMDJ-Q Series

Surface Mount – 5000W



Additional Information



Resources



Accessories



Samples

Maximum Ratings and Thermal Characteristics

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

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation by 10/1000 μs Waveform(Fig.1)(Note1)(Note2) -Single Die Parts	P_{PPM}	5000	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 (Note 4)	V_F	3.5/5.0	V
Operating Temperature Range	T_J	-55 to 150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 to 150	$^\circ\text{C}$
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.3 and derated above T_J (initial) $=25^\circ\text{C}$ per Fig.2.
- 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.
- $V_F < 3.5\text{V}$ for single die parts and $V_F < 5.0\text{V}$ for stacked-die parts.

Description

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

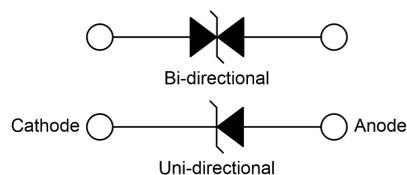
Features

- High reliability application and automotive grade AEC-Q101 qualified
- 5000W peak pulse power capability at 10/1000 μs waveform, repetition rate (duty cycles):0.01%
- SMD low profile surface mount package minimizing PCB footprint
- Excellent clamping capability
- Low incremental surge resistance
- Typical I_R less than 5 μA when $V_B \text{ min} > 22\text{V}$
- For surface mounted applications to optimize board space
- Low profile package
- Built-in strain relief
- 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 IEC61000-4-2, 30kV(Air), 30kV (Contact)
- EFT protection of data lines in accordance with IEC61000-4-4
- Fast response time: typically less than 1.0ps from 0V to $V_B \text{ min}$
- Glass passivated chip junction
- High temperature to reflow soldering guaranteed: 260 $^\circ\text{C}/20\sim 40\text{sec}$.
- $V_B @ T_J = V_B @ 25^\circ\text{C} \times (1 + \alpha T_J - 25)$ (αT : Temperature Coefficient, typical value is 0.1%)
- 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 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



5.0SMDJ-Q Series

Surface Mount – 5000W

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

Part Number		Type	Device Marking Code		Reverse Stand-Off Voltage	Breakdown Voltage @ I_T		Test Current	Maximum Clamping Voltage @ I_{PP}	Peak Pulse Current	Reverse Leakage @ V_R
Uni.	Bi.		Uni.	Bi.		V_R (V)	$V_{B\text{ Min}}$ (V)				
5.0SMDJ11A	5.0SMDJ11CA	Q	5PEN	5BEN	11.0	12.20	13.50	10	18.2	275.0	800
5.0SMDJ12A	5.0SMDJ12CA	Q	5PEP	5BEP	12.0	13.30	14.70	10	19.9	252.0	800
5.0SMDJ13A	5.0SMDJ13CA	Q	5PEQ	5BEQ	13.0	14.40	15.90	10	21.5	233.0	500
5.0SMDJ14A	5.0SMDJ14CA	Q	5PER	5BER	14.0	15.60	17.20	10	23.2	216.0	200
5.0SMDJ15A	5.0SMDJ15CA	Q	5PES	5BES	15.0	16.70	18.50	1	24.4	205.0	100
5.0SMDJ16A	5.0SMDJ16CA	Q	5PET	5BET	16.0	17.80	19.70	1	26.0	193.0	50
5.0SMDJ17A	5.0SMDJ17CA	Q	5PEU	5BEU	17.0	18.90	20.90	1	27.6	181.0	20
5.0SMDJ18A	5.0SMDJ18CA	Q	5PEV	5BEV	18.0	20.00	22.10	1	29.2	172.0	10
5.0SMDJ20A	5.0SMDJ20CA	Q	5PEW	5BEW	20.0	22.20	24.50	1	32.4	155.0	5
5.0SMDJ22A	5.0SMDJ22CA	Q	5PEX	5BEX	22.0	24.40	26.90	1	35.5	141.0	5
5.0SMDJ24A	5.0SMDJ24CA	Q	5PEZ	5BEZ	24.0	26.70	29.50	1	38.9	129.0	5
5.0SMDJ26A	5.0SMDJ26CA	Q	5PFE	5BFE	26.0	28.90	31.90	1	42.1	119.0	5
5.0SMDJ28A	5.0SMDJ28CA	Q	5PFG	5BFG	28.0	31.10	34.40	1	45.4	110.0	5
5.0SMDJ30A	5.0SMDJ30CA	Q	5PFK	5BFK	30.0	33.30	36.80	1	48.4	103.0	5
5.0SMDJ33A	5.0SMDJ33CA	Q	5PFM	5BFM	33.0	36.70	40.60	1	53.3	93.9	5
5.0SMDJ36A	5.0SMDJ36CA	Q	5PFP	5BFP	36.0	40.00	44.20	1	58.1	86.1	5
5.0SMDJ40A	5.0SMDJ40CA	Q	5PFR	5BFR	40.0	44.40	49.10	1	64.5	77.6	5
5.0SMDJ43A	5.0SMDJ43CA	Q	5PFT	5BFT	43.0	47.80	52.80	1	69.4	72.1	5
5.0SMDJ45A	5.0SMDJ45CA	Q	5PFV	5BFV	45.0	50.00	55.30	1	72.7	68.8	5
5.0SMDJ48A	5.0SMDJ48CA	Q	5PFX	5BFX	48.0	53.30	58.90	1	77.4	64.7	5
5.0SMDJ51A	5.0SMDJ51CA	Q	5PFZ	5BFZ	51.0	56.70	62.70	1	82.4	60.7	5
5.0SMDJ54A	5.0SMDJ54CA	Q	5PGE	5BGE	54.0	60.00	66.30	1	87.1	57.5	5
5.0SMDJ58A	5.0SMDJ58CA	Q	5PGG	5BGG	58.0	64.40	71.20	1	93.6	53.5	5
5.0SMDJ60A	5.0SMDJ60CA	Q	5PGK	5BGK	60.0	66.70	73.70	1	96.8	51.7	5
5.0SMDJ64A	5.0SMDJ64CA	Q	5PGM	5BGM	64.0	71.10	78.60	1	103.0	48.6	5
5.0SMDJ70A	5.0SMDJ70CA	Q	5PGP	5BGP	70.0	77.80	86.00	1	113.0	44.3	5
5.0SMDJ75A	5.0SMDJ75CA	Q	5PGR	5BGR	75.0	83.30	92.10	1	121.0	41.4	5
5.0SMDJ78A	5.0SMDJ78CA	Q	5PGT	5BGT	78.0	86.70	95.80	1	126.0	39.7	5
5.0SMDJ85A	5.0SMDJ85CA	Q	5PGV	5BGV	85.0	94.40	104.00	1	137.0	36.5	5
5.0SMDJ90A	5.0SMDJ90CA	Q	5PGX	5BGX	90.0	100.00	111.00	1	146.0	34.3	5
5.0SMDJ100A	5.0SMDJ100CA	Q	5PGZ	5BGZ	100.0	111.00	123.00	1	162.0	30.9	5
5.0SMDJ110A	5.0SMDJ110CA	Q	5PHE	5BHE	110.0	122.00	135.00	1	177.0	28.3	5
5.0SMDJ120A	5.0SMDJ120CA	Q	5PHG	5BHG	120.0	133.00	147.00	1	193.0	26.0	5
5.0SMDJ130A	5.0SMDJ130CA	Q	5PHK	5BHK	130.0	144.00	159.00	1	209.0	24.0	5
5.0SMDJ150A	5.0SMDJ150CA	Q	5PHM	5BHM	150.0	167.00	185.00	1	243.0	20.6	5
5.0SMDJ160A	5.0SMDJ160CA	Q	5PHP	5BHP	160.0	178.00	197.00	1	259.0	19.3	5
5.0SMDJ170A	5.0SMDJ170CA	Q	5PHR	5BHR	170.0	189.00	209.00	1	275.0	18.2	5

Notes:

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

5.0SMDJ-Q Series

Surface Mount – 5000W

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

Figure 1:
Peak Pulse Power Rating Curve

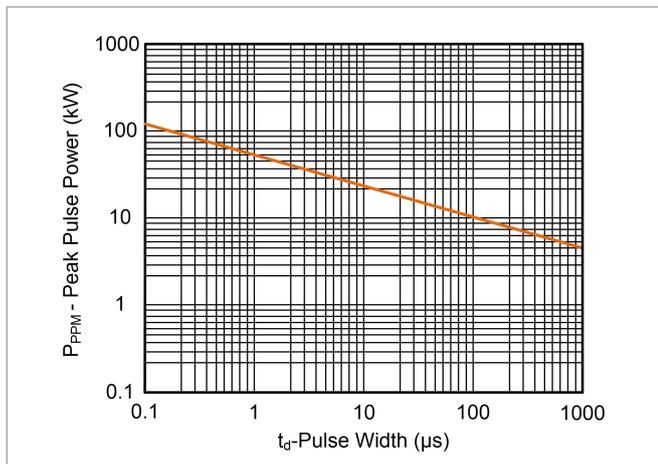


Figure 2:
Pulse Derating Curve

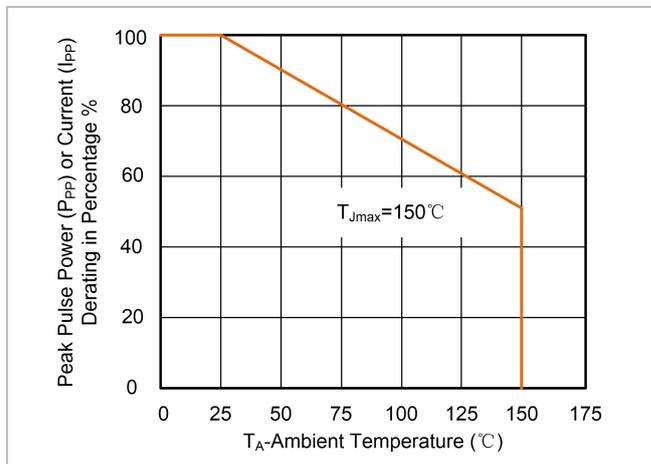


Figure 3:
Pulse Waveform

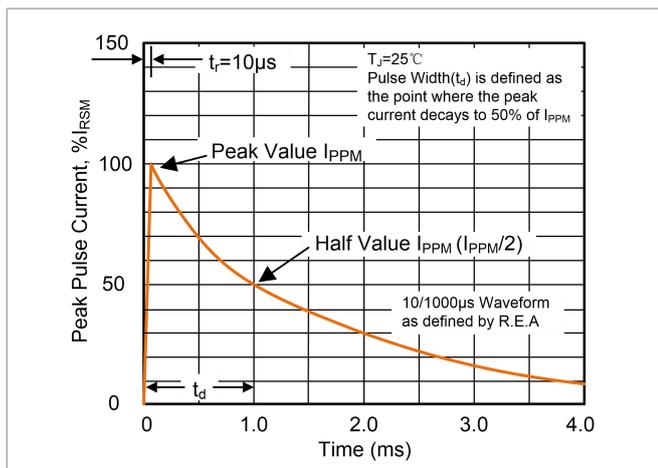


Figure 4:
Typical Junction Capacitance

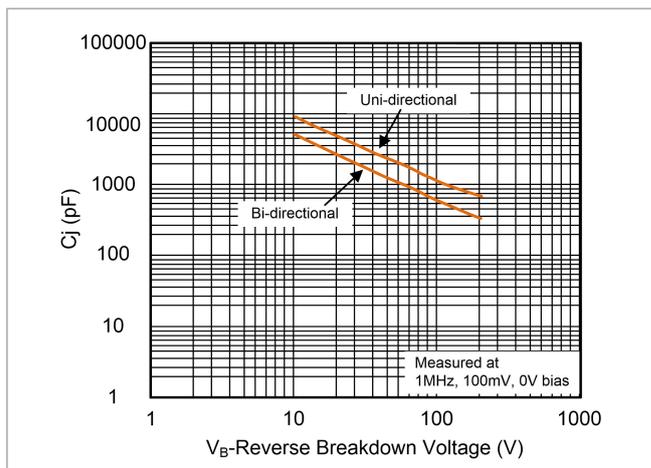


Figure 5:
Steady State Power Dissipation Derating Curve

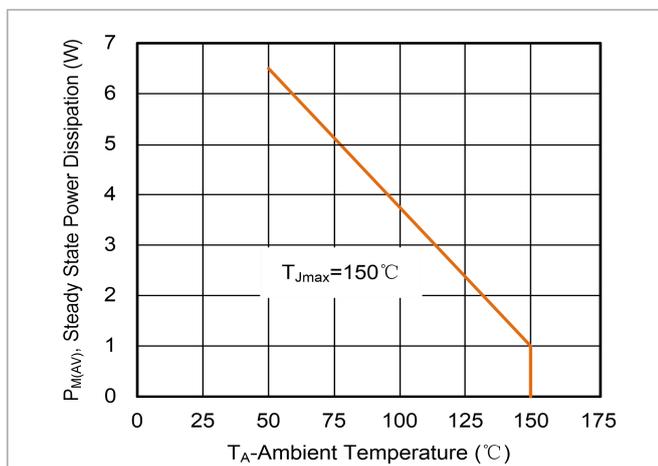
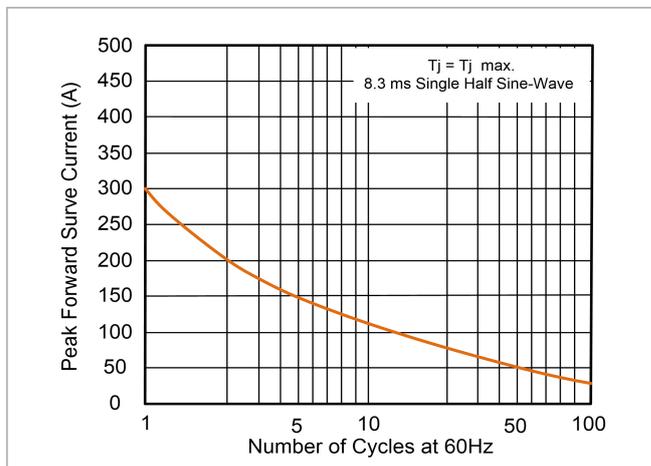


Figure 6:
Maximum Non-Repetitive Forward Surge Current Uni-Directional

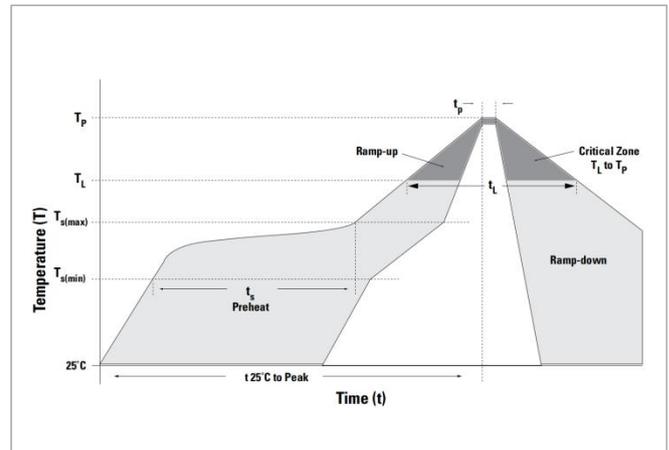


5.0SMDJ-Q Series

Surface Mount – 5000W

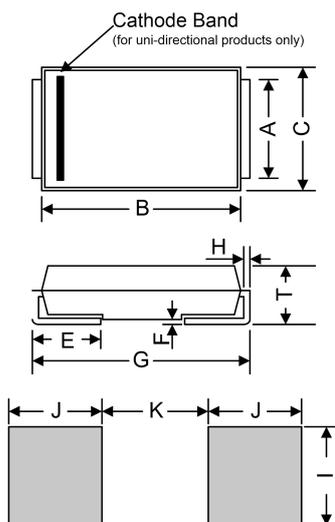
Soldering Parameters

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_L-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°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		8 minutes max.
Do not exceed		260°C



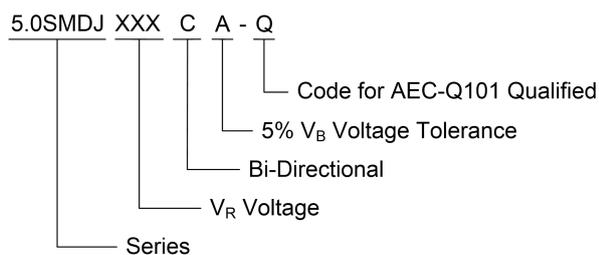
Dimensions

DO-214AB (SMC)

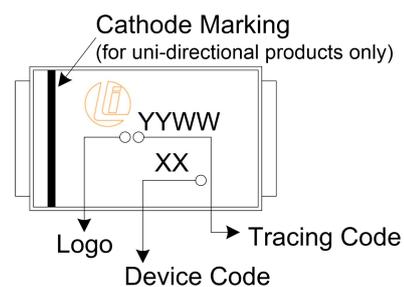


Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.900	3.200	0.114	0.126
B	6.600	7.110	0.260	0.280
C	5.590	6.220	0.220	0.245
E	0.760	1.520	0.030	0.060
F	-	0.203	-	0.008
G	7.750	8.130	0.305	0.320
H	0.152	0.305	0.006	0.012
T	2.200	2.750	0.087	0.108
I	3.300	-	0.129	-
J	2.400	-	0.094	-
K	-	4.200	-	0.165

Part Numbering System



Part Marking System



5.0SMDJ-Q Series

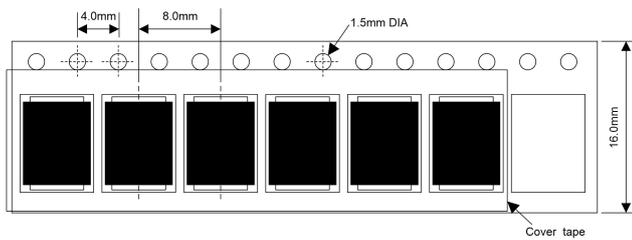
Surface Mount – 5000W

Packaging

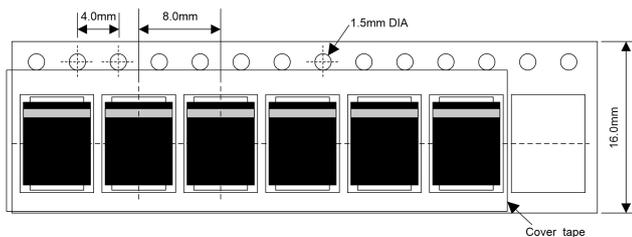
Part number	Component Package	Quantity	Packaging Option	Packaging Specification
5.0SMDJxxxXX-Q	DO-214AB	3000	Tape & Reel - 16mm tape/13" reel	EIA STD RS-481

Tape and Reel Specification

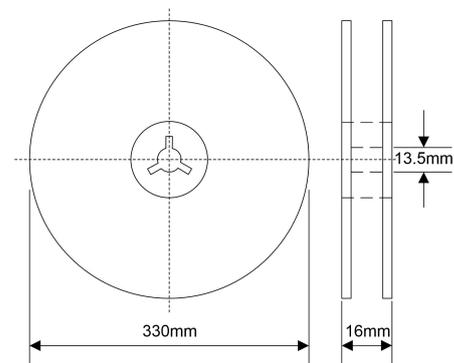
Tape



For Uni-Devices



13 Inches Reel



Quantity: 3000pcs/reel