

SMDJ-Q Series

Surface Mount – 3000W

 AUTOMOTIVE GRADE  HF  RoHS  Pb  e3



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}	3000	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	3.5	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	$^\circ\text{C/W}$
Typical Thermal Resistance Junction to Ambient	$R_{\theta JA}$	75	$^\circ\text{C/W}$

Notes:

1. Non-repetitive current pulse, per Fig.3 and derated above T_J (initial) $\approx 25^\circ\text{C}$ per Fig.2..
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 SMDJ-Q series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

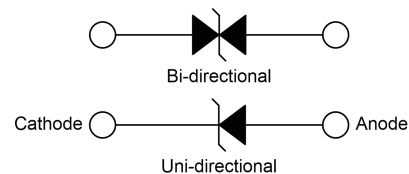
Features

- High reliability application and automotive grade AEC-Q101 qualified
- 3000W peak pulse power capability at 10/1000 μs waveform, repetition rate (duty cycles):0.01%
- Excellent clamping capability
- Low incremental surge resistance
- Typical I_R less than 2 μA when $V_B \text{ min} > 12\text{V}$
- 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 IEC 61000-4-2, 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 $^\circ\text{C}$ /20~40sec.
- $V_B @ T_J = V_B @ 25^\circ\text{C} \times (1 + \alpha T_J - 25)$ (α T: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



SMDJ-Q Series

Surface Mount – 3000W

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_B Min. (V)	V_B Max. (V)				
SMDJ5.0A	SMDJ5.0CA	Q	RDE	DDE	5.0	6.40	7.00	10	9.2	326.1	800
SMDJ6.0A	SMDJ6.0CA	Q	RDG	DDG	6.0	6.67	7.37	10	10.3	291.3	600
SMDJ6.5A	SMDJ6.5CA	Q	RDK	DDK	6.5	7.22	7.98	10	11.2	267.9	300
SMDJ7.0A	SMDJ7.0CA	Q	PDM	DDM	7.0	7.78	8.60	10	12.0	250.0	200
SMDJ7.5A	SMDJ7.5CA	Q	PDP	DDP	7.5	8.33	9.21	1	12.9	232.6	100
SMDJ8.0A	SMDJ8.0CA	Q	PDR	DDR	8.0	8.89	9.83	1	13.6	220.6	50
SMDJ8.5A	SMDJ8.5CA	Q	PDT	DDT	8.5	9.44	10.40	1	14.4	208.3	20
SMDJ9.0A	SMDJ9.0CA	Q	PDV	DDV	9.0	10.00	11.10	1	15.4	194.8	10
SMDJ10A	SMDJ10CA	Q	PDX	DDX	10.0	11.10	12.30	1	17.0	176.5	5
SMDJ11A	SMDJ11CA	Q	PDZ	DDZ	11.0	12.20	13.50	1	18.2	164.8	2
SMDJ12A	SMDJ12CA	Q	PEE	DEE	12.0	13.30	14.70	1	19.9	150.8	2
SMDJ13A	SMDJ13CA	Q	PEG	DEG	13.0	14.40	15.90	1	21.5	139.5	1
SMDJ14A	SMDJ14CA	Q	PEK	DEK	14.0	15.60	17.20	1	23.2	129.3	1
SMDJ15A	SMDJ15CA	Q	PEM	DEM	15.0	16.70	18.50	1	24.4	123.0	1
SMDJ16A	SMDJ16CA	Q	PEP	DEP	16.0	17.80	19.70	1	26.0	115.4	1
SMDJ17A	SMDJ17CA	Q	PER	DER	17.0	18.90	20.90	1	27.6	108.7	1
SMDJ18A	SMDJ18CA	Q	PET	DET	18.0	20.00	22.10	1	29.2	102.7	1
SMDJ20A	SMDJ20CA	Q	PEV	DEV	20.0	22.20	24.50	1	32.4	92.6	1
SMDJ22A	SMDJ22CA	Q	PEX	DEX	22.0	24.40	26.90	1	35.5	84.5	1
SMDJ24A	SMDJ24CA	Q	PEZ	DEZ	24.0	26.70	29.50	1	38.9	77.1	1
SMDJ26A	SMDJ26CA	Q	PFE	DFE	26.0	28.90	31.90	1	42.1	71.3	1
SMDJ28A	SMDJ28CA	Q	PFG	DFG	28.0	31.10	34.40	1	45.4	66.1	1
SMDJ30A	SMDJ30CA	Q	PFK	DFK	30.0	33.30	36.80	1	48.4	62.0	1
SMDJ33A	SMDJ33CA	Q	PFM	DFM	33.0	36.70	40.60	1	53.3	56.3	1
SMDJ36A	SMDJ36CA	Q	PFP	DFP	36.0	40.00	44.20	1	58.1	51.6	1
SMDJ40A	SMDJ40CA	Q	PFR	DFR	40.0	44.40	49.10	1	64.5	46.5	1
SMDJ43A	SMDJ43CA	Q	PFT	DFT	43.0	47.80	52.80	1	69.4	43.2	1
SMDJ45A	SMDJ45CA	Q	PFV	DFV	45.0	50.00	55.30	1	72.7	41.3	1
SMDJ48A	SMDJ48CA	Q	PFX	DFX	48.0	53.30	58.90	1	77.4	38.8	1
SMDJ51A	SMDJ51CA	Q	PFZ	DFZ	51.0	56.70	62.70	1	82.4	36.4	1
SMDJ54A	SMDJ54CA	Q	PGE	DGE	54.0	60.00	66.30	1	87.1	34.4	1
SMDJ58A	SMDJ58CA	Q	PGG	DGG	58.0	64.40	71.20	1	93.6	32.1	1
SMDJ60A	SMDJ60CA	Q	PGK	DGK	60.0	66.70	73.70	1	96.8	31.0	1
SMDJ64A	SMDJ64CA	Q	PGM	DGM	64.0	71.10	78.60	1	103.0	29.1	1
SMDJ70A	SMDJ70CA	Q	PGP	DGP	70.0	77.80	86.00	1	113.0	26.5	1
SMDJ75A	SMDJ75CA	Q	PGR	DGR	75.0	83.30	92.10	1	121.0	24.8	1
SMDJ78A	SMDJ78CA	Q	PGT	DGT	78.0	86.70	95.80	1	126.0	23.8	1
SMDJ85A	SMDJ85CA	Q	PGV	DGV	85.0	94.40	104.00	1	137.0	21.9	1
SMDJ90A	SMDJ90CA	Q	PGX	DGX	90.0	100.00	111.00	1	146.0	20.5	1
SMDJ100A	SMDJ100CA	Q	PGZ	DGZ	100.0	111.00	123.00	1	162.0	18.5	1
SMDJ110A	SMDJ110CA	Q	PHE	DHE	110.0	122.00	135.00	1	177.0	16.9	1
SMDJ120A	SMDJ120CA	Q	PHG	DHG	120.0	133.00	147.00	1	193.0	15.5	1
SMDJ130A	SMDJ130CA	Q	PHK	DHK	130.0	144.00	159.00	1	209.0	14.4	1
SMDJ150A	SMDJ150CA	Q	PHM	DHM	150.0	167.00	185.00	1	243.0	12.3	2
SMDJ160A	SMDJ160CA	Q	PHP	DHP	160.0	178.00	197.00	1	259.0	11.6	2
SMDJ170A	SMDJ170CA	Q	PHR	DHR	170.0	189.00	209.00	1	275.0	10.9	2
SMDJ180A	SMDJ180CA	Q	HHT	IHT	180.0	201.00	222.00	1	292.0	10.3	2
SMDJ190A	SMDJ190CA	Q	HHV	IHV	190.0	211.00	233.00	1	308.0	9.7	2
SMDJ200A	SMDJ200CA	Q	HHX	IHX	200.0	224.00	247.00	1	324.0	9.3	2
SMDJ210A	SMDJ210CA	Q	HHZ	IHZ	210.0	237.00	263.00	1	340.0	8.8	2
SMDJ220A	SMDJ220CA	Q	HIE	IIE	220.0	246.00	272.00	1	356.0	8.4	2

Notes:

For bidirectional type having V_R of 10 volts and less, the I_R limit is double.

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

Figure 1:
Peak Pulse Power Rating Curve

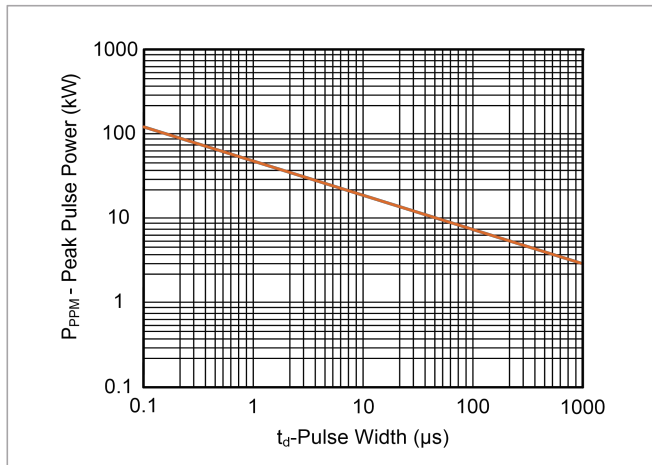


Figure 2:
Pulse Derating Curve

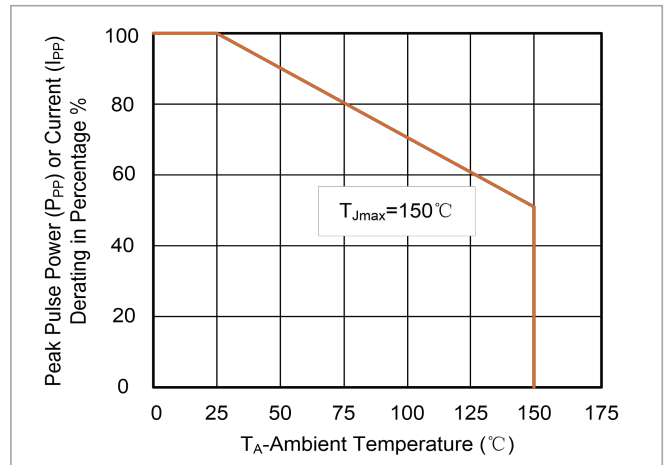


Figure 3:
Pulse Waveform

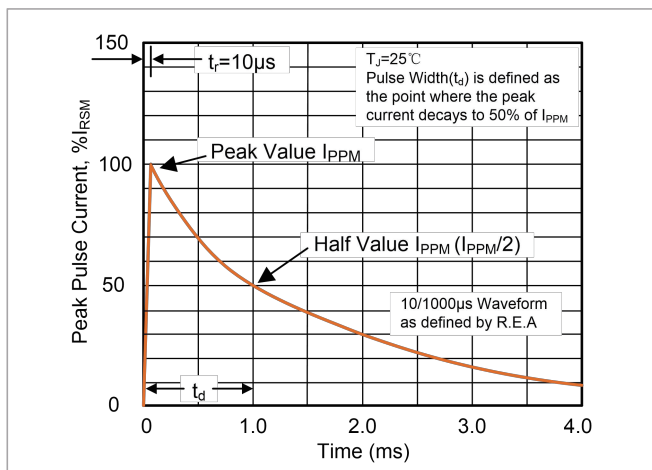


Figure 4:
Typical Junction Capacitance

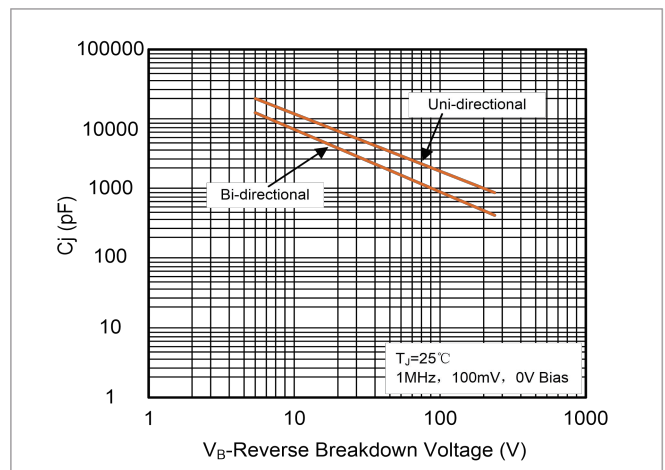


Figure 5:
Steady State Power Dissipation Derating Curve

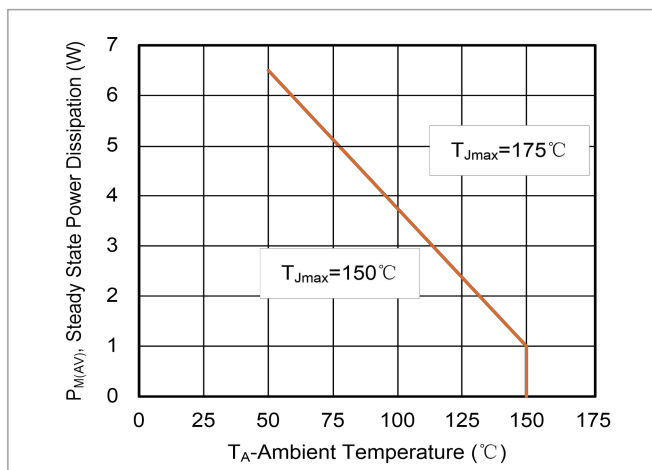
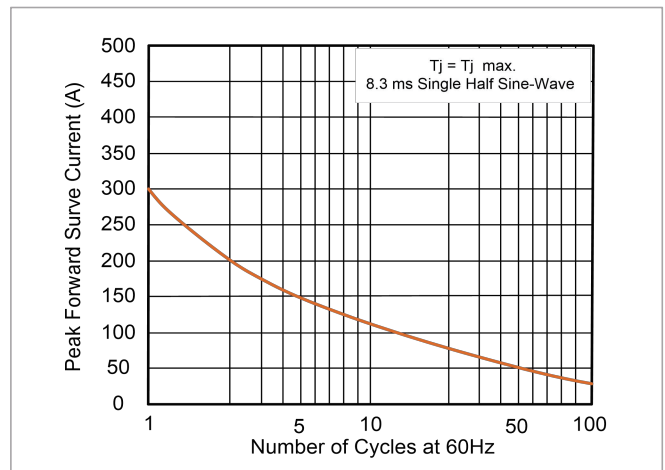


Figure 6:
Maximum Non-Repetitive Forward Surge Current Uni-Directional

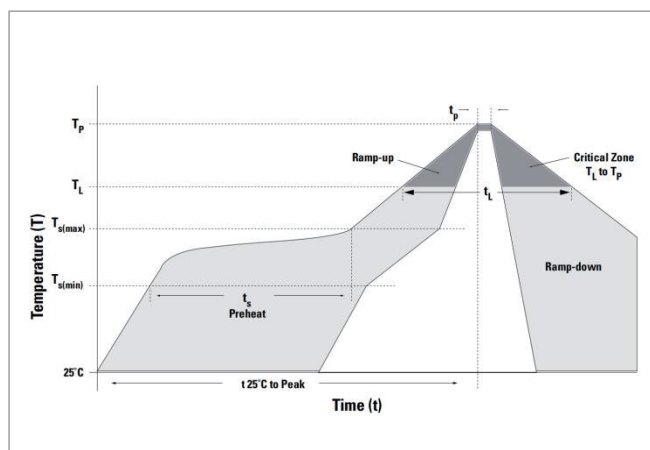


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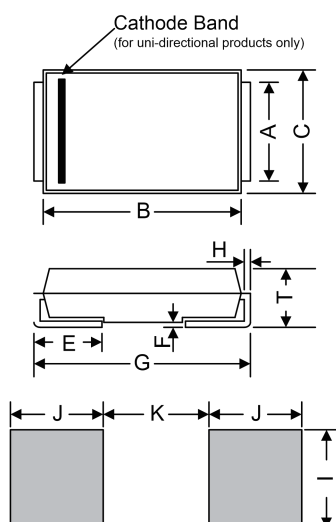
Soldering Parameters

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 – 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



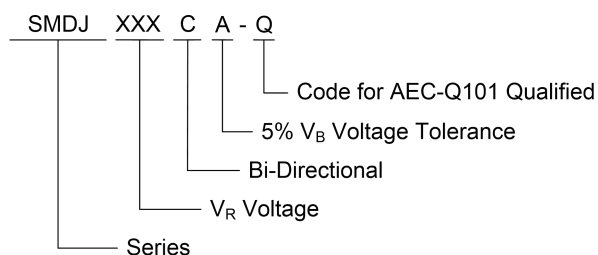
Dimensions

DO-214AB (SMC)

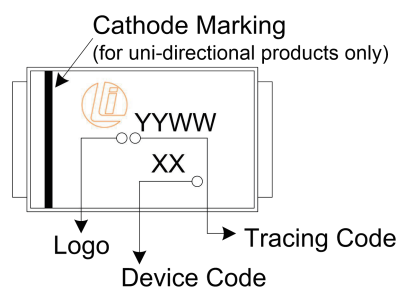


Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.900	3.200	0.114	0.126
B	6.600	7.110	0.260	0.280
C	5.590	6.220	0.220	0.245
E	0.760	1.520	0.030	0.060
F	-	0.203	-	0.008
G	7.750	8.130	0.305	0.320
H	0.152	0.305	0.006	0.012
T	2.200	2.750	0.087	0.108
I	3.300	-	0.129	-
J	2.400	-	0.094	-
K	-	4.200	-	0.165

Part Numbering System



Part Marking System



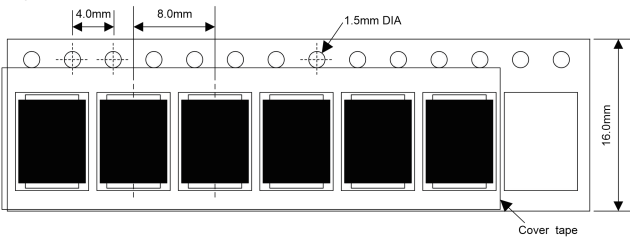
SMDJ-Q Series
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Packaging

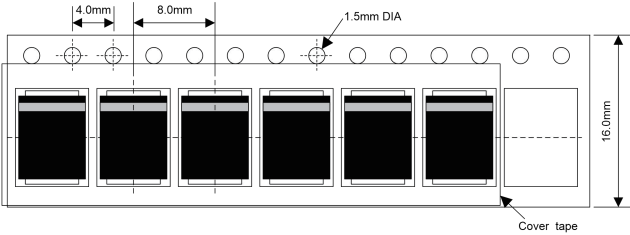
Part number	Component Package	Quantity	Packaging Option	Packaging Specification
SMDJxxxXX-Q	DO-214AB	3000	Tape & Reel - 16mm tape/13" reel	EIA STD RS-481

Tape and Reel Specification

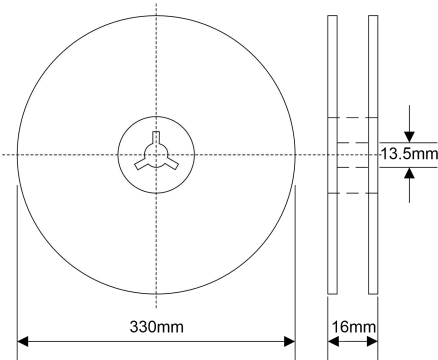
Tape



For Uni-Devices



13 Inches Reel



Quantity: 3000pcs/reel

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