

SMBJ-Q Series

Surface Mount – 600W



Additional Information



Resources



Accessories



Samples

Maximum Ratings and Thermal Characteristics

(T_A=25 °C unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation by 10/1000µs Waveform(Fig.1)(Note 1)(Note 2) -Single Die Parts	P _{PPM}	600	W
Power Dissipation on Infinite Heat Sink at T _L =50°C	P _D	5	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)	I _{FSM}	60	A
Maximum Instantaneous Forward Voltage at 50A for Unidirectional Only (Note 4)	V _F	3.5/5.0	V
Operating Temperature Range	T _J	-55 to 150	°C
Storage Temperature Range	T _{STG}	-55 to 150	°C
Typical Thermal Resistance Junction to Lead	R _{θJL}	20	°C/W
Typical Thermal Resistance Junction to Ambient	R _{θJA}	100	°C/W

Notes:

1. Non-repetitive current pulse, per Fig.3 and derated above T_J (initial) =25°C per Fig.2.
2. Mounted on copper pad area of 0.2x0.2" (5.0 x 5.0mm) 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.
4. V_F < 3.5V for single die parts and V_F < 5.0V for stacked-die parts.

Description

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

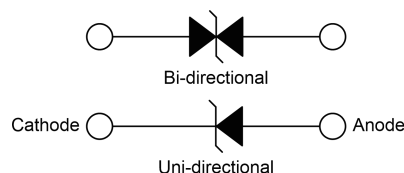
Features

- High reliability application and automotive grade AEC-Q101 qualified
- 600W peak pulse power capability at 10/1000µs waveform, repetition rate (duty cycles):0.01 %
- Excellent clamping capability
- Low incremental surge resistance
- Typical I_R less than 1µA when V_B min>12V
- Optimized surface mount footprint for minimal PCB space impact
- Low profile package
- Typical failure mode due to exceeding maximum ratings is a short circuit condition
- Whisker test conducted based on Table 4a and 4c of JEDEC JESD201A
- 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
- Built-in strain relief
- Fast response time: typically less than 1.0ps from 0V to V_B min
- High temperature to reflow soldering guaranteed: 260°C/20~40sec.
- V_B @ T_J= V_B@25°C x (1+ α T x (T_J - 25)) (α T: Temperature Coefficient, typical value is 0.1%)
- Meet MSL level1, per J-STD-020, LF maximum peak of 260°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



SMBJ-Q Series

Surface Mount – 600W

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.		$V_{B\text{ Min.}}(\text{V})$	$V_{B\text{ Max.}}(\text{V})$				
SMBJ5.0A	SMBJ5.0CA	Q	KE	AE	5.0	6.40	7.00	10	9.2	65.3	800
SMBJ6.0A	SMBJ6.0CA	Q	KG	AG	6.0	6.67	7.37	10	10.3	58.3	800
SMBJ6.5A	SMBJ6.5CA	Q	KK	AK	6.5	7.22	7.98	10	11.2	53.6	500
SMBJ7.0A	SMBJ7.0CA	Q	KM	AM	7.0	7.78	8.60	10	12.0	50.0	200
SMBJ7.5A	SMBJ7.5CA	Q	KP	AP	7.5	8.33	9.21	1	12.9	46.6	100
SMBJ8.0A	SMBJ8.0CA	Q	KR	AR	8.0	8.89	9.83	1	13.6	44.2	50
SMBJ8.5A	SMBJ8.5CA	Q	KT	AT	8.5	9.44	10.40	1	14.4	41.7	20
SMBJ9.0A	SMBJ9.0CA	Q	KV	AV	9.0	10.00	11.10	1	15.4	39.0	10
SMBJ10A	SMBJ10CA	Q	KX	AX	10.0	11.10	12.30	1	17.0	35.3	5
SMBJ11A	SMBJ11CA	Q	KZ	AZ	11.0	12.20	13.50	1	18.2	33.0	1
SMBJ12A	SMBJ12CA	Q	LE	BE	12.0	13.30	14.70	1	19.9	30.2	1
SMBJ13A	SMBJ13CA	Q	LG	BG	13.0	14.40	15.90	1	21.5	28.0	1
SMBJ14A	SMBJ14CA	Q	LK	BK	14.0	15.60	17.20	1	23.2	25.9	1
SMBJ15A	SMBJ15CA	Q	LM	BM	15.0	16.70	18.50	1	24.4	24.6	1
SMBJ16A	SMBJ16CA	Q	LP	BP	16.0	17.80	19.70	1	26.0	23.1	1
SMBJ17A	SMBJ17CA	Q	LR	BR	17.0	18.90	20.90	1	27.6	21.8	1
SMBJ18A	SMBJ18CA	Q	LT	BT	18.0	20.00	22.10	1	29.2	20.6	1
SMBJ20A	SMBJ20CA	Q	LV	BV	20.0	22.20	24.50	1	32.4	18.6	1
SMBJ22A	SMBJ22CA	Q	LX	BX	22.0	24.40	26.90	1	35.5	16.9	1
SMBJ24A	SMBJ24CA	Q	LZ	BZ	24.0	26.70	29.50	1	38.9	15.5	1
SMBJ26A	SMBJ26CA	Q	ME	CE	26.0	28.90	31.90	1	42.1	14.3	1
SMBJ28A	SMBJ28CA	Q	MG	CG	28.0	31.10	34.40	1	45.4	13.3	1
SMBJ30A	SMBJ30CA	Q	MK	CK	30.0	33.30	36.80	1	48.4	12.4	1
SMBJ33A	SMBJ33CA	Q	MM	CM	33.0	36.70	40.60	1	53.3	11.3	1
SMBJ36A	SMBJ36CA	Q	MP	CP	36.0	40.00	44.20	1	58.1	10.4	1
SMBJ40A	SMBJ40CA	Q	MR	CR	40.0	44.40	49.10	1	64.5	9.3	1
SMBJ43A	SMBJ43CA	Q	MT	CT	43.0	47.80	52.80	1	69.4	8.7	1
SMBJ45A	SMBJ45CA	Q	MV	CV	45.0	50.00	55.30	1	72.7	8.3	1
SMBJ48A	SMBJ48CA	Q	MX	CX	48.0	53.30	58.90	1	77.4	7.8	1
SMBJ51A	SMBJ51CA	Q	MZ	CZ	51.0	56.70	62.70	1	82.4	7.3	1
SMBJ54A	SMBJ54CA	Q	NE	DE	54.0	60.00	66.30	1	87.1	6.9	1
SMBJ58A	SMBJ58CA	Q	NG	DG	58.0	64.40	71.20	1	93.6	6.5	1
SMBJ60A	SMBJ60CA	Q	NK	DK	60.0	66.70	73.70	1	96.8	6.2	1
SMBJ64A	SMBJ64CA	Q	NM	DM	64.0	71.10	78.60	1	103.0	5.9	1
SMBJ70A	SMBJ70CA	Q	NP	DP	70.0	77.80	86.00	1	113.0	5.3	1
SMBJ75A	SMBJ75CA	Q	NR	DR	75.0	83.30	92.10	1	121.0	5.0	1
SMBJ78A	SMBJ78CA	Q	NT	DT	78.0	86.70	95.80	1	126.0	4.8	1
SMBJ85A	SMBJ85CA	Q	NV	DV	85.0	94.40	104.00	1	137.0	4.4	1
SMBJ90A	SMBJ90CA	Q	NX	DX	90.0	100.00	111.00	1	146.0	4.1	1
SMBJ100A	SMBJ100CA	Q	NZ	DZ	100.0	111.00	123.00	1	162.0	3.7	1
SMBJ110A	SMBJ110CA	Q	PE	EE	110.0	122.00	135.00	1	177.0	3.4	1
SMBJ120A	SMBJ120CA	Q	PG	EG	120.0	133.00	147.00	1	193.0	3.1	1
SMBJ130A	SMBJ130CA	Q	PK	EK	130.0	144.00	159.00	1	209.0	2.9	1
SMBJ150A	SMBJ150CA	Q	PM	EM	150.0	167.00	185.00	1	243.0	2.5	1
SMBJ160A	SMBJ160CA	Q	PP	EP	160.0	178.00	197.00	1	259.0	2.3	1
SMBJ170A	SMBJ170CA	Q	PR	ER	170.0	189.00	209.00	1	275.0	2.2	1
SMBJ180A	SMBJ180CA	Q	PT	ET	180.0	201.00	222.00	1	292.0	2.1	1
SMBJ190A	SMBJ190CA	Q	PA	EC	190.0	211.00	233.00	1	308.0	2.0	1
SMBJ200A	SMBJ200CA	Q	PV	EV	200.0	224.00	247.00	1	324.0	1.9	1
SMBJ210A	SMBJ210CA	Q	PB	ED	210.0	237.00	263.00	1	340.0	1.8	1
SMBJ220A	SMBJ220CA	Q	PX	EX	220.0	246.00	272.00	1	356.0	1.7	1
SMBJ250A	SMBJ250CA	Q	PZ	EZ	250.0	279.00	309.00	1	405.0	1.5	1

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

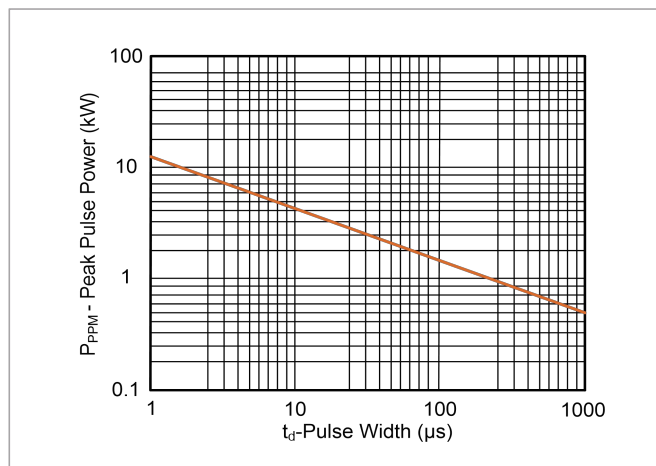


Figure 2:
Pulse Derating Curve

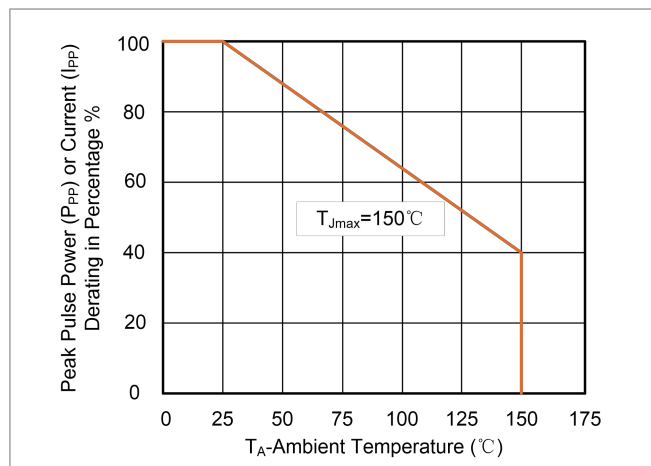


Figure 3:
Pulse Waveform

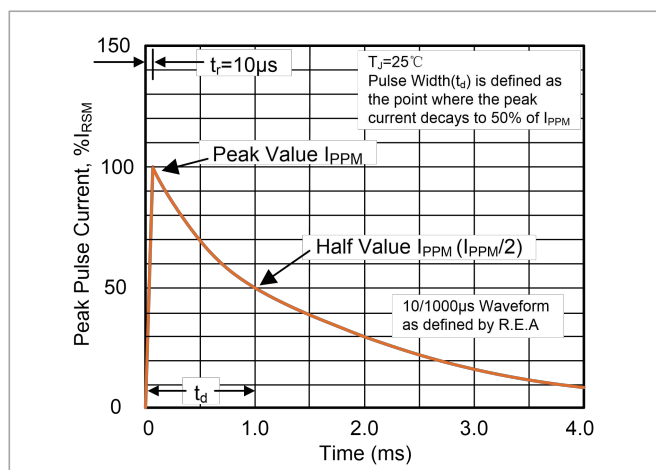


Figure 4:
Typical Junction Capacitance

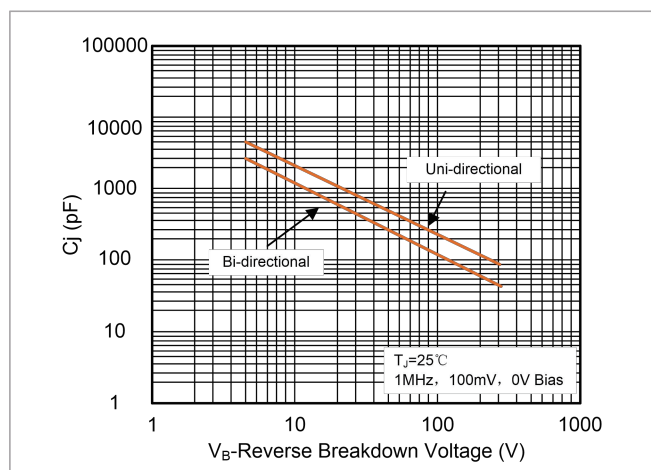


Figure 5:
Steady State Power Dissipation Derating Curve

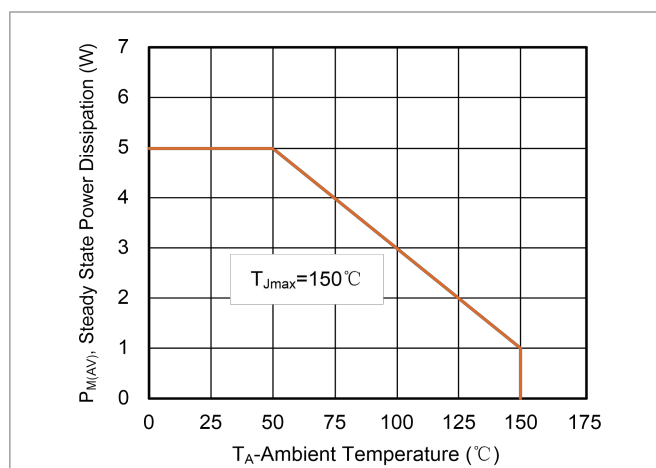
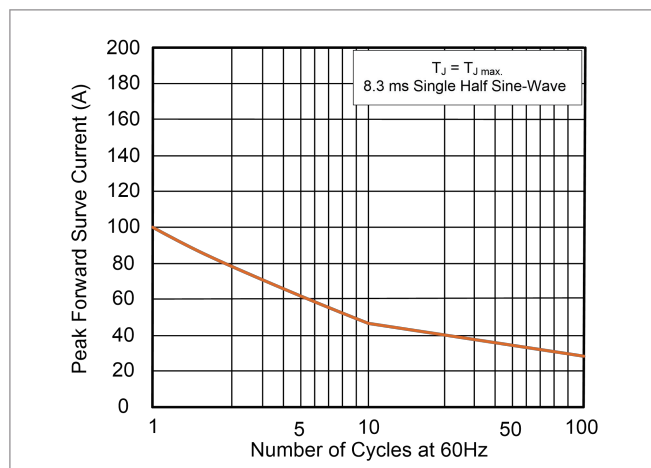


Figure 6:
Maximum Non-Repetitive Forward Surge Current Uni-Directional

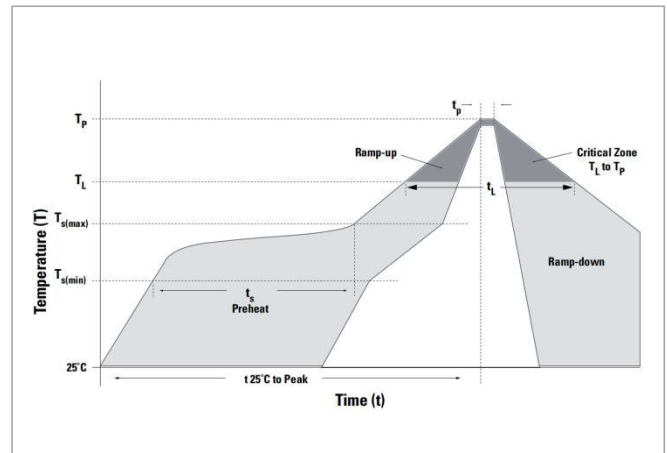


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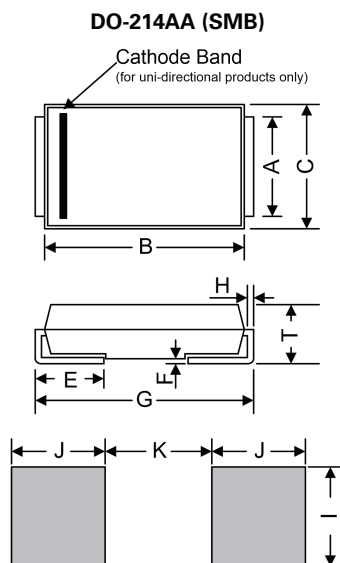
Surface Mount – 600W

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

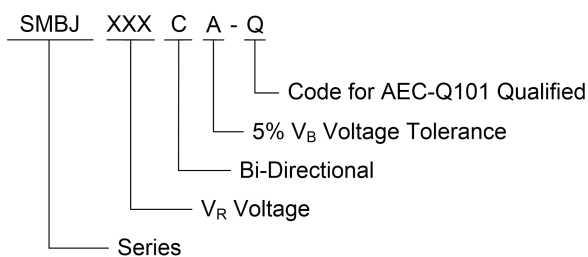


Dimensions

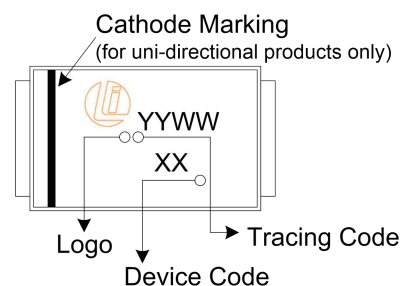


Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.930	2.200	0.076	0.086
B	4.060	4.570	0.160	0.180
C	3.300	3.940	0.130	0.155
E	0.760	1.520	0.030	0.060
F	-	0.203	-	0.008
G	5.100	5.480	0.201	0.216
H	0.152	0.305	0.006	0.012
T	2.160	2.440	0.085	0.096
I	2.260	-	0.089	-
J	2.160	-	0.085	-
K	-	2.740	-	0.107

Part Numbering System



Part Marking System



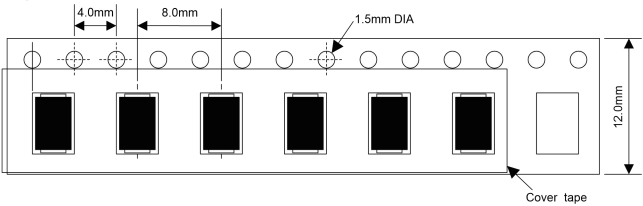
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Packaging

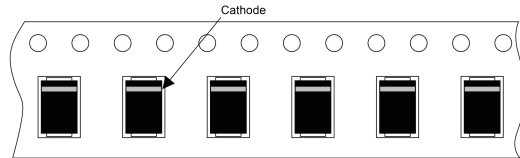
Part number	Component Package	Quantity	Packaging Option	Packaging Specification
SMBJxxxXX-Q	DO-214AA	3000	Tape & Reel - 12mm tape/13" reel	EIA STD RS-481

Tape and Reel Specification

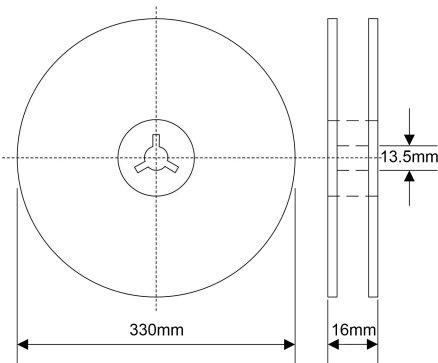
Tape



For Uni-Devices



13 Inches Reel



Quantity: 3000ocs/reel

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