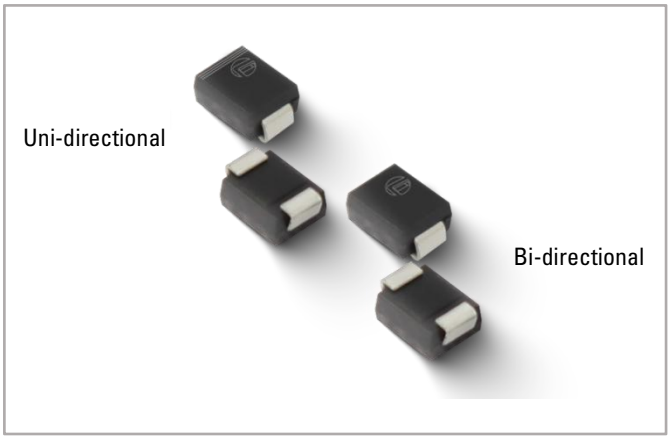
1.0SMBJ-Q Series
Surface Mount – 1000W

AUTOMOTIVE GRADE HF RoHS Pb e3



Additional Information

Resources | Accessories | Samples

Maximum Ratings and Thermal Characteristics

(T_A=25℃ 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}	1000	W
Power Dissipation on Infinite Heat Sink at T_L=50℃	P_D	5	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)	I_{FSM}	100	A
Maximum Instantaneous Forward Voltage at 50A for Unidirectional Only	V_F	3.5	V
Operating Temperature Range	T_J	-55 to 150	℃
Storage Temperature Range	T_{STG}	-55 to 150	℃
Typical Thermal Resistance Junction to Lead	$R_{\theta JL}$	20	℃/W
Typical Thermal Resistance Junction to Ambient	$R_{\theta JA}$	100	℃/W

Notes:

1. Non-repetitive current pulse , per Fig.3 and derated above T_J (initial) =25℃ 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.

Description

The 1.0SMBJ-Q series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

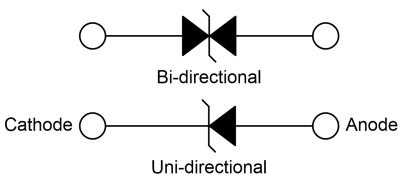
Features

- High reliability application and automotive grade AEC-Q101 qualified
- 1000W 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 1.0psfrom 0V to V_B min
- High temperature to reflow soldering guaranteed: 260℃/20~40sec.
- V_B @ T_J= V_B@25℃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℃
- 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



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Electrical Characteristics (T_A=25℃ 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)	$V_{B\ Min.}$(V)	$V_{B\ Max.}$(V)	I_T(mA)	V_C(V)	I_{PP}(A)	I_R(μA)
1.0SMBJ5.0A	1.0SMBJ5.0CA	Q	KE·	AE·	5.0	6.40	7.00	10	9.2	108.70	800
1.0SMBJ6.0A	1.0SMBJ6.0CA	Q	KG·	AG·	6.0	6.67	7.37	10	10.3	97.10	800
1.0SMBJ6.5A	1.0SMBJ6.5CA	Q	KK·	AK·	6.5	7.22	7.98	10	11.2	89.30	500
1.0SMBJ7.0A	1.0SMBJ7.0CA	Q	KM·	AM·	7.0	7.78	8.60	10	12.0	83.40	200
1.0SMBJ7.5A	1.0SMBJ7.5CA	Q	KP·	AP·	7.5	8.33	9.21	1	12.9	77.60	100
1.0SMBJ8.0A	1.0SMBJ8.0CA	Q	KR·	AR·	8.0	8.89	9.83	1	13.6	73.60	50
1.0SMBJ8.5A	1.0SMBJ8.5CA	Q	KT·	AT·	8.5	9.44	10.40	1	14.4	69.50	20
1.0SMBJ9.0A	1.0SMBJ9.0CA	Q	KV·	AV·	9.0	10.00	11.10	1	15.4	65.00	10
1.0SMBJ10A	1.0SMBJ10CA	Q	KX·	AX·	10.0	11.10	12.30	1	17.0	58.90	5
1.0SMBJ11A	1.0SMBJ11CA	Q	KZ·	AZ·	11.0	12.20	13.50	1	18.2	55.00	1
1.0SMBJ12A	1.0SMBJ12CA	Q	LE·	BE·	12.0	13.30	14.70	1	19.9	50.30	1
1.0SMBJ13A	1.0SMBJ13CA	Q	LG·	BG·	13.0	14.40	15.90	1	21.5	46.60	1
1.0SMBJ14A	1.0SMBJ14CA	Q	LK·	BK·	14.0	15.60	17.20	1	23.2	43.20	1
1.0SMBJ15A	1.0SMBJ15CA	Q	LM·	BM·	15.0	16.70	18.50	1	24.4	41.00	1
1.0SMBJ16A	1.0SMBJ16CA	Q	LP·	BP·	16.0	17.80	19.70	1	26.0	38.50	1
1.0SMBJ17A	1.0SMBJ17CA	Q	LR·	BR·	17.0	18.90	20.90	1	27.6	36.30	1
1.0SMBJ18A	1.0SMBJ18CA	Q	LT·	BT·	18.0	20.00	22.10	1	29.2	34.30	1
1.0SMBJ20A	1.0SMBJ20CA	Q	LV·	BV·	20.0	22.20	24.50	1	32.4	30.90	1
1.0SMBJ22A	1.0SMBJ22CA	Q	LX·	BX·	22.0	24.40	26.90	1	35.5	28.20	1
1.0SMBJ24A	1.0SMBJ24CA	Q	LZ·	BZ·	24.0	26.70	29.50	1	38.9	25.80	1
1.0SMBJ26A	1.0SMBJ26CA	Q	ME·	CE·	26.0	28.90	31.90	1	42.1	23.80	1
1.0SMBJ28A	1.0SMBJ28CA	Q	MG·	CG·	28.0	31.10	34.40	1	45.4	22.10	1
1.0SMBJ30A	1.0SMBJ30CA	Q	MK·	CK·	30.0	33.30	36.80	1	48.4	20.70	1
1.0SMBJ33A	1.0SMBJ33CA	Q	MM·	CM·	33.0	36.70	40.60	1	53.3	18.80	1
1.0SMBJ36A	1.0SMBJ36CA	Q	MP·	CP·	36.0	40.00	44.20	1	58.1	17.30	1
1.0SMBJ40A	1.0SMBJ40CA	Q	MR·	CR·	40.0	44.40	49.10	1	64.5	15.60	1
1.0SMBJ43A	1.0SMBJ43CA	Q	MT·	CT·	43.0	47.80	52.80	1	69.4	14.50	1
1.0SMBJ45A	1.0SMBJ45CA	Q	MV·	CV·	45.0	50.00	55.30	1	72.7	13.80	1
1.0SMBJ48A	1.0SMBJ48CA	Q	MX·	CX·	48.0	53.30	58.90	1	77.4	13.00	1
1.0SMBJ51A	1.0SMBJ51CA	Q	MZ·	CZ·	51.0	56.70	62.70	1	82.4	12.20	1
1.0SMBJ54A	1.0SMBJ54CA	Q	NE·	DE·	54.0	60.00	66.30	1	87.1	11.50	1
1.0SMBJ58A	1.0SMBJ58CA	Q	NG·	DG·	58.0	64.40	71.20	1	93.6	10.70	1
1.0SMBJ60A	1.0SMBJ60CA	Q	NK·	DK·	60.0	66.70	73.70	1	96.8	10.40	1
1.0SMBJ64A	1.0SMBJ64CA	Q	NM·	DM·	64.0	71.10	78.60	1	103.0	9.84	1
1.0SMBJ70A	1.0SMBJ70CA	Q	NP·	DP·	70.0	77.80	86.00	1	113.0	8.84	1
1.0SMBJ75A	1.0SMBJ75CA	Q	NR·	DR·	75.0	83.30	92.10	1	121.0	8.34	1
1.0SMBJ78A	1.0SMBJ78CA	Q	NT·	DT·	78.0	86.70	95.80	1	126.0	8.00	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℃ unless otherwise noted)

Figure 1:
Peak Pulse Power Rating Curve

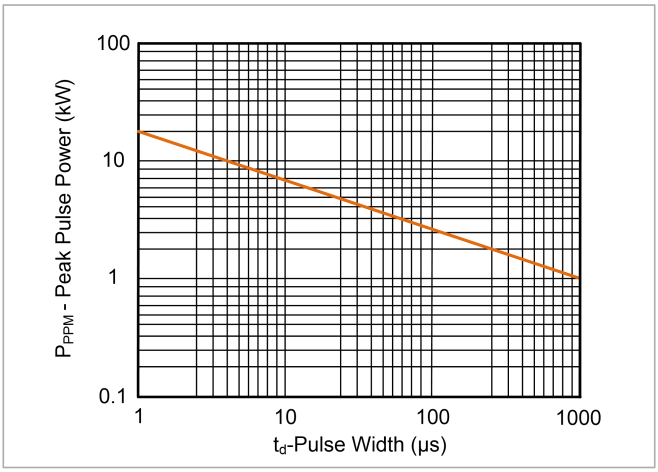


Figure 2:
Pulse Derating Curve

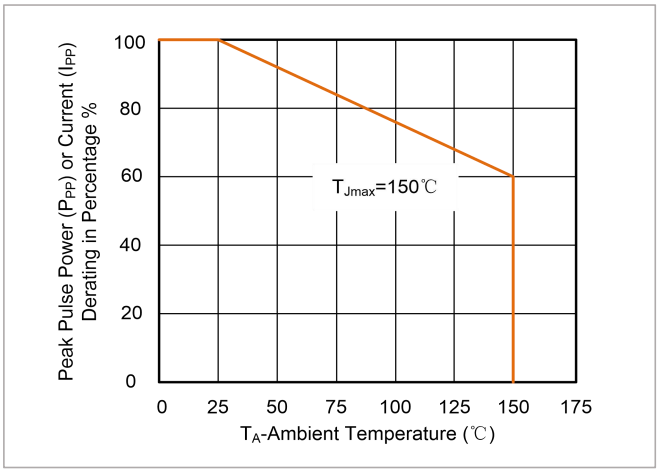


Figure 3:
Pulse Waveform

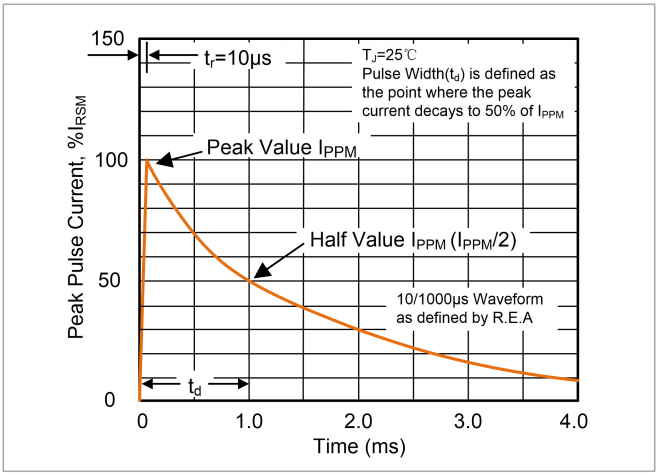


Figure 4:
Typical Junction Capacitance

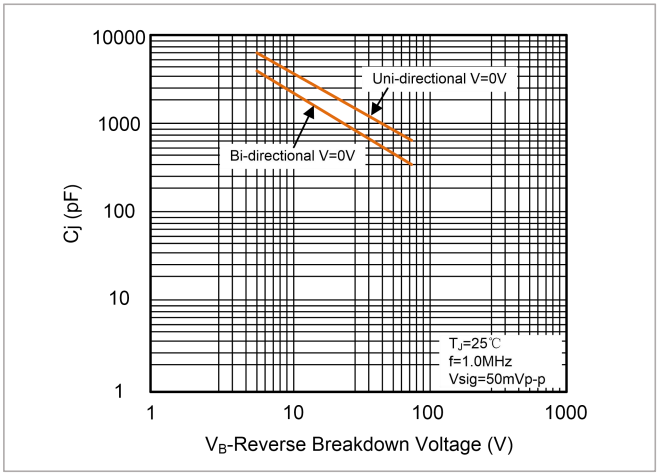


Figure 5:
Steady State Power Dissipation Derating Curve

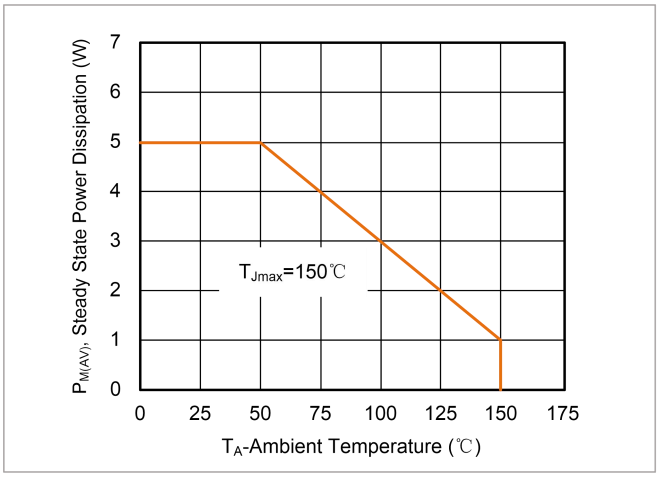
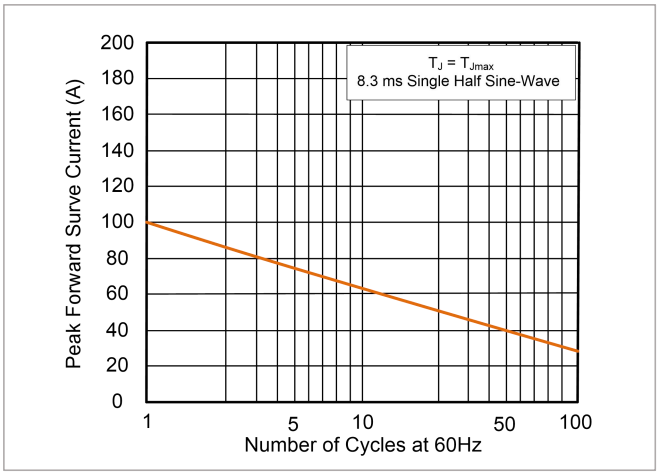


Figure 6:
Maximum Non-Repetitive Forward Surge Current Uni-Directional



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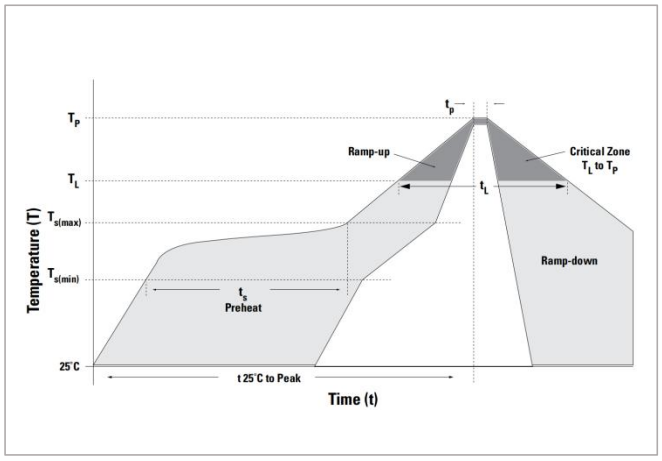
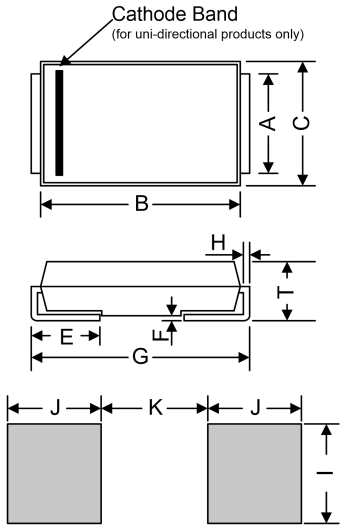
Soldering Parameters

Reflow Condition		Lead–free assembly
Pre Heat	**-Temperature Min ($T_{S\ min}$)**	150℃
	-Temperature Max ($T_{S\ max}$)	200℃
	-Time (min to max) (t_S)	60 – 180 secs
Average ramp-up rate(Liquidus Temp (T_L) to peak		3℃/second max.
$T_{S\ (max)}$ to T_L-Ramp-up Rate		3℃/second max.
Reflow	**-Temperature (T_L) (Liquidus)**	217℃
	-Time (min to max) (t_L)	60-150 seconds
Peak Temperature (T_P)		260℃
Time within 5℃ of actual Peak Temperature (t_P)		20-40 seconds
Ramp-down Rate		6℃/second max.
Time 25℃ to Peak Temperature		8 minutes max.
Do not exceed		260℃



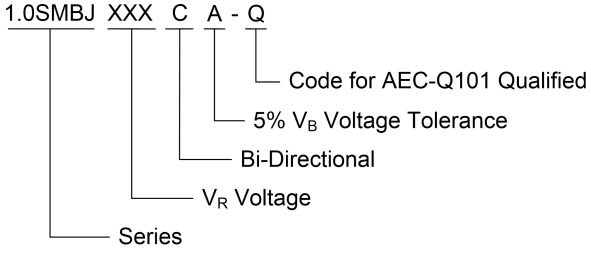
Dimensions

DO-214AA (SMB)

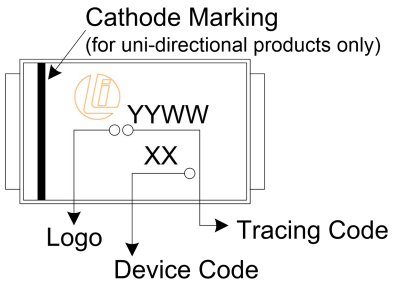


Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.930	2.200	0.076	0.086
B	4.060	4.570	0.160	0.180
C	3.300	3.940	0.130	0.155
E	0.760	1.520	0.030	0.060
F	-	0.203	-	0.008
G	5.100	5.480	0.201	0.216
H	0.152	0.305	0.006	0.012
T	2.160	2.440	0.085	0.096
I	2.260	-	0.089	-
J	2.160	-	0.085	-
K	-	2.740	-	0.107

Part Numbering System



Part Marking System

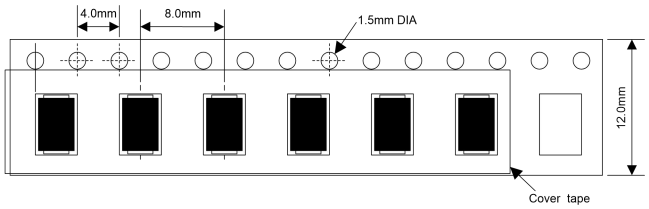


Packaging

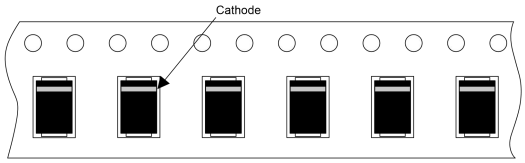
Part number	Component Package	Quantity	Packaging Option	Packaging Specification
1.0SMBJxxxXX-Q	DO-214AA	3000	Tape & Reel - 12mm tape/13" reel	EIA STD RS-481

Tape and Reel Specification

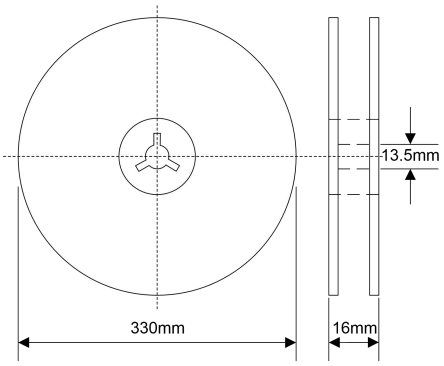
Tape



For Uni-Devices



13 Inches Reel



Quantity：3000pcs/reel