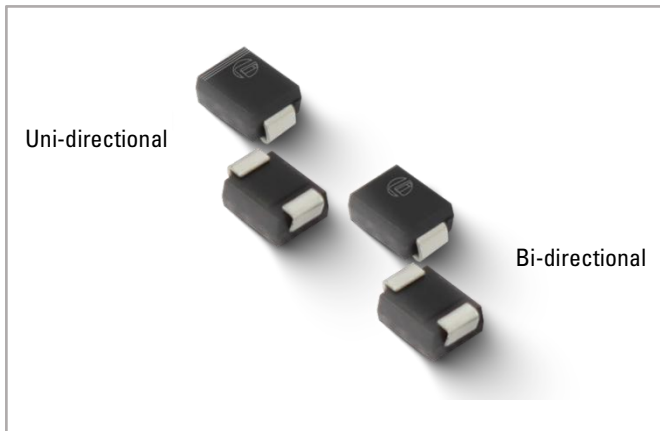


# 1.0SMB-Q Series

## Surface Mount – 1000W



### 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 $\mu\text{s}$ Waveform(Fig.1)(Note 1)(Note 2) -Single Die Parts	$P_{PPM}$	1000	W
Power Dissipation on Infinite Heat Sink at $T_L=50^{\circ}\text{C}$	$P_D$	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	$^{\circ}\text{C}$
Storage Temperature Range	$T_{STG}$	-55 to 150	$^{\circ}\text{C}$
Typical Thermal Resistance Junction to Lead	$R_{\theta JL}$	20	$^{\circ}\text{C}/\text{W}$
Typical Thermal Resistance Junction to Ambient	$R_{\theta JA}$	100	$^{\circ}\text{C}/\text{W}$

#### Notes:

1. Non-repetitive current pulse, per Fig.3 and derated above  $T_J$  (initial)  $=25^{\circ}\text{C}$  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.

### Description

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

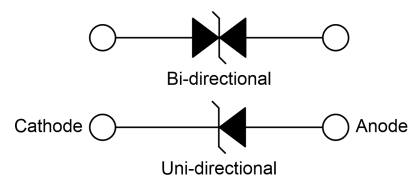
### Features

- High reliability application and automotive grade AEC-Q101 qualified
- 1000W peak pulse power capability at 10/1000 $\mu\text{s}$  waveform, repetition rate (duty cycles):0.01%
- Excellent clamping capability
- Low incremental surge resistance
- Typical  $I_R$  less than 1 $\mu\text{A}$  when  $V_B \text{ min} > 12\text{V}$
- 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  $V_B \text{ min}$
- High temperature to reflow soldering guaranteed: 260 $^{\circ}\text{C}/20\sim 40\text{sec}$ .
- $V_B @ T_J = V_B @ 25^{\circ}\text{C} \times (1 + \alpha T)$  ( $\alpha$ : 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



# 1.0SMB-Q Series

## Surface Mount – 1000W

### Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)

Part Number		Type	Device Marking Code		Reverse Stand-Off Voltage V <sub>R</sub> (V)	Breakdown Voltage @I <sub>T</sub>		Test Current I <sub>T</sub> (mA)	Maximum Clamping Voltage @I <sub>PP</sub> V <sub>C</sub> (V)	Peak Pulse Current I <sub>PP</sub> (A)	Reverse Leakage @V <sub>R</sub> I <sub>R</sub> (μA)
Uni.	Bi.		Uni.	Bi.		V <sub>B Min.</sub> (V)	V <sub>B Max.</sub> (V)				
1.0SMB6.8A	1.0SMB6.8CA	Q	6V8A•	6V8C•	5.80	6.45	7.14	10	10.5	96.8	1000
1.0SMB7.5A	1.0SMB7.5CA	Q	7V5A•	7V5C•	6.40	7.13	7.88	10	11.3	90.0	500
1.0SMB8.2A	1.0SMB8.2CA	Q	8V2A•	8V2C•	7.02	7.79	8.61	10	12.1	84.0	200
1.0SMB9.1A	1.0SMB9.1CA	Q	9V1A•	9V1C•	7.78	8.65	9.55	1	13.4	75.8	50
1.0SMB10A	1.0SMB10CA	Q	10A•	10C•	8.55	9.50	10.50	1	14.5	70.2	10
1.0SMB11A	1.0SMB11CA	Q	11A•	11C•	9.40	10.50	11.60	1	15.6	65.2	5
1.0SMB12A	1.0SMB12CA	Q	12A•	12C•	10.20	11.40	12.60	1	16.7	60.8	5
1.0SMB13A	1.0SMB13CA	Q	13A•	13C•	11.10	12.40	13.70	1	18.2	55.8	1
1.0SMB15A	1.0SMB15CA	Q	15A•	15C•	12.80	14.30	15.80	1	21.2	48.0	1
1.0SMB16A	1.0SMB16CA	Q	16A•	16C•	13.60	15.20	16.80	1	22.5	45.2	1
1.0SMB18A	1.0SMB18CA	Q	18A•	18C•	15.30	17.10	18.90	1	25.2	40.3	1
1.0SMB20A	1.0SMB20CA	Q	20A•	20C•	17.10	19.00	21.00	1	27.7	36.7	1
1.0SMB22A	1.0SMB22CA	Q	22A•	22C•	18.80	20.90	23.10	1	30.6	33.2	1
1.0SMB24A	1.0SMB24CA	Q	24A•	24C•	20.50	22.80	25.20	1	33.2	30.7	1
1.0SMB27A	1.0SMB27CA	Q	27A•	27C•	23.10	25.70	28.40	1	37.5	27.2	1
1.0SMB30A	1.0SMB30CA	Q	30A•	30C•	25.60	28.50	31.50	1	41.4	24.5	1
1.0SMB33A	1.0SMB33CA	Q	33A•	33C•	28.20	31.40	34.70	1	45.7	22.2	1
1.0SMB36A	1.0SMB36CA	Q	36A•	36C•	30.80	34.20	37.80	1	49.9	20.3	1
1.0SMB39A	1.0SMB39CA	Q	39A•	39C•	33.30	37.10	41.00	1	53.9	18.8	1
1.0SMB43A	1.0SMB43CA	Q	43A•	43C•	36.80	40.90	45.20	1	59.3	17.2	1
1.0SMB47A	1.0SMB47CA	Q	47A•	47C•	40.20	44.70	49.40	1	64.8	15.7	1
1.0SMB51A	1.0SMB51CA	Q	51A•	51C•	43.60	48.50	53.60	1	70.1	14.5	1
1.0SMB56A	1.0SMB56CA	Q	56A•	56C•	47.80	53.20	58.80	1	77.0	13.2	1
1.0SMB62A	1.0SMB62CA	Q	62A•	62C•	53.00	58.90	65.10	1	85.0	12.0	1
1.0SMB68A	1.0SMB68CA	Q	68A•	68C•	58.10	64.60	71.40	1	92.0	11.0	1

**Notes:**

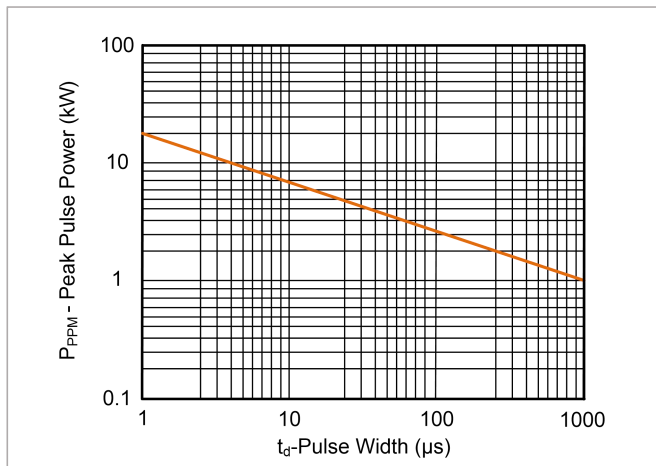
For bidirectional type having V<sub>o</sub> of 10 volts and less, the I<sub>a</sub> limit is double.

# 1.0SMB-Q Series

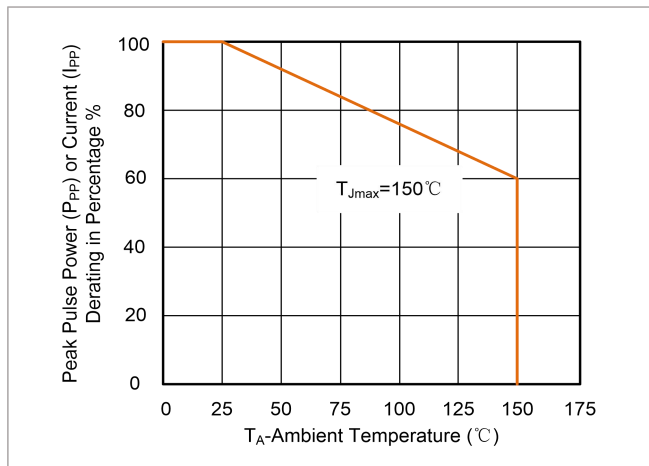
## Surface Mount – 1000W

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

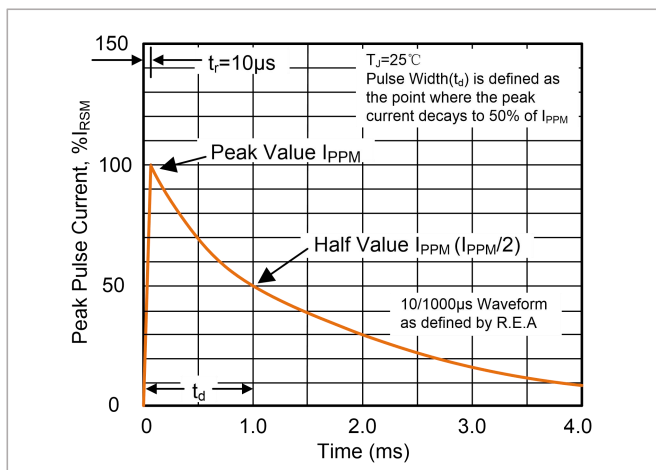
**Figure 1:**  
Peak Pulse Power Rating Curve



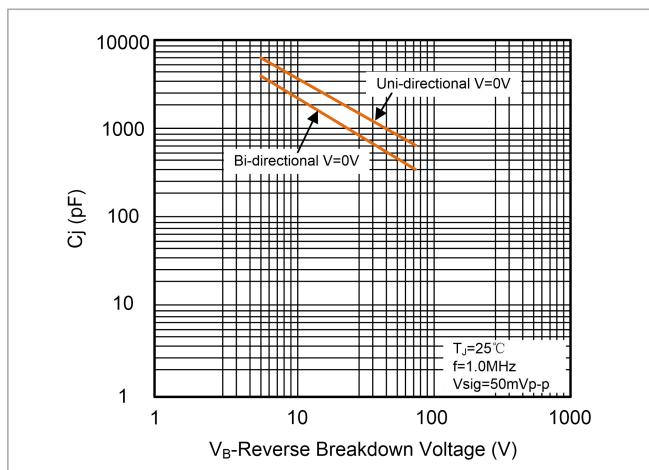
**Figure 2:**  
Pulse Derating Curve



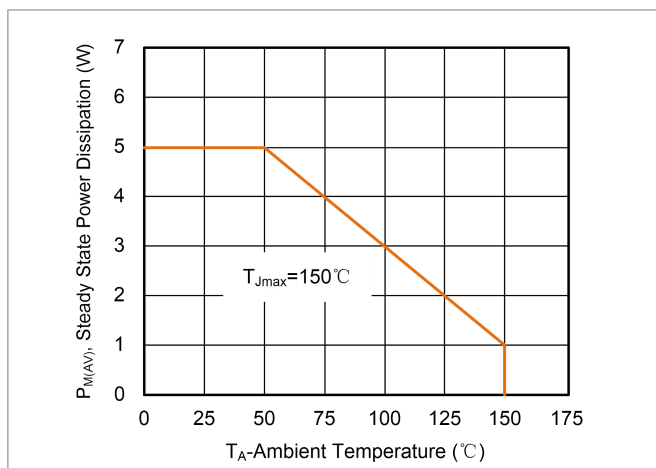
**Figure 3:**  
Pulse Waveform



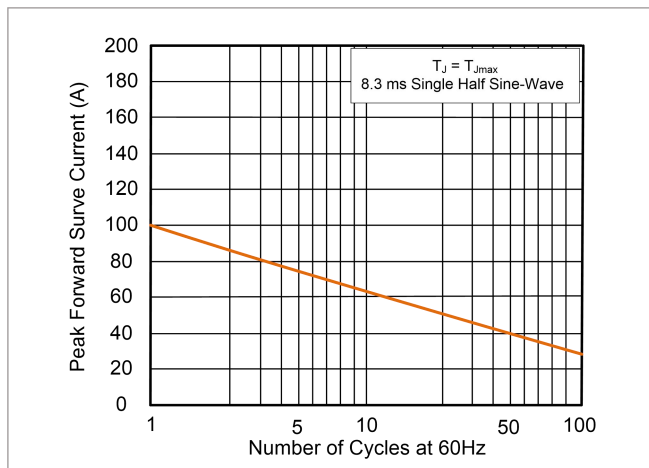
**Figure 4:**  
Typical Junction Capacitance



**Figure 5:**  
Steady State Power Dissipation Derating Curve



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

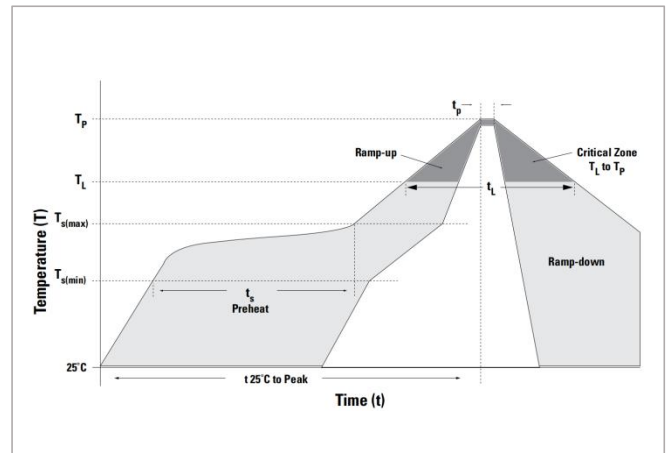


# 1.0SMB-Q Series

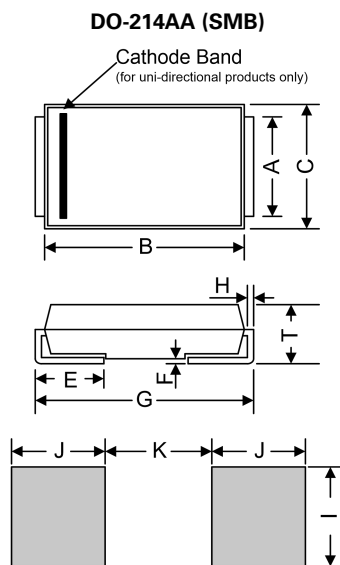
## Surface Mount – 1000W

### Soldering Parameters

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

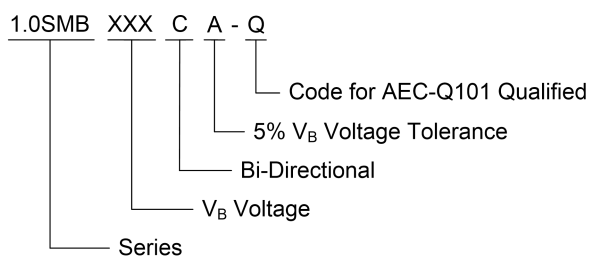


### Dimensions

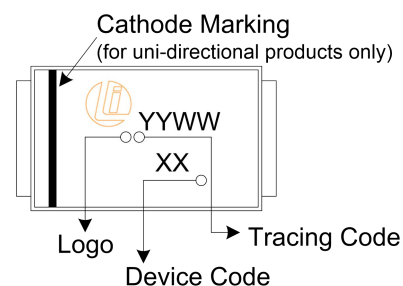


Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
<b>A</b>	1.930	2.200	0.076	0.086
<b>B</b>	4.060	4.570	0.160	0.180
<b>C</b>	3.300	3.940	0.130	0.155
<b>E</b>	0.760	1.520	0.030	0.060
<b>F</b>	-	0.203	-	0.008
<b>G</b>	5.100	5.480	0.201	0.216
<b>H</b>	0.152	0.305	0.006	0.012
<b>T</b>	2.160	2.440	0.085	0.096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

### Part Numbering System



### Part Marking System



# 1.0SMB-Q Series

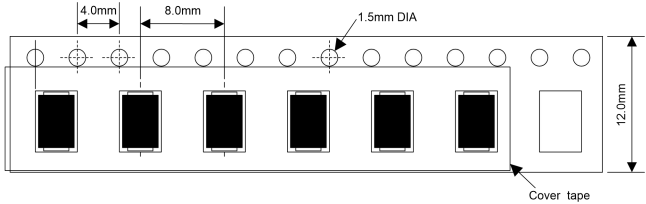
Surface Mount – 1000W

## Packaging

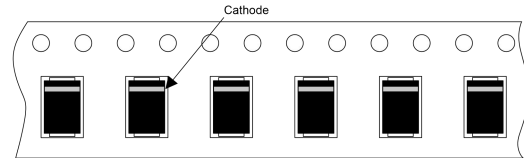
Part number	Component Package	Quantity	Packaging Option	Packaging Specification
1.0SMBxxxXX-Q	DO-214AA	3000	Tape & Reel - 12mm tape/13" reel	EIA STD RS-481

## Tape and Reel Specification

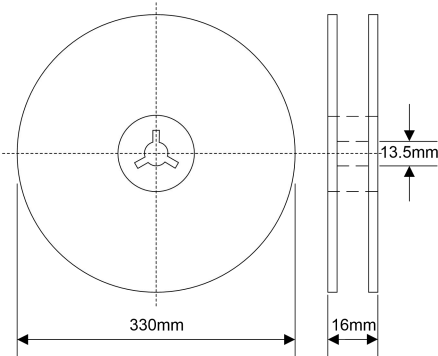
Tape



For Uni-Devices



13 Inches Reel



Quantity: 3000pcs/reel

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