



## Features

- Surface Mount SMB package
- Standoff Voltage: 5 to 220 volts
- Power Dissipation: 600 watts
- RoHS compliant\*
- AEC-Q101 compliant\*\*

## Applications

- Protection of power buses
- Protection of I/O interfaces
- Overvoltage transient protection
- Entertainment applications
- Comfort applications
- Telecom, computer, industrial and consumer electronics applications

# SMBJ-Q Transient Voltage Suppressor Diode Series

### General Information

Bourns offers Transient Voltage Suppressor Diodes for surge and ESD protection applications, in compact chip package DO-214AA (SMB) size format. The Transient Voltage Suppressor series offers a choice of Working Peak Reverse Voltage from 5 V up to 220 V. Typical fast response times are less than 1.0 picosecond from 0 V to Breakdown Voltage.

Bourns® Chip Diodes conform to JEDEC standards, are easy to handle with standard pick and place equipment and the flat configuration minimizes roll away.

### Agency Recognition

Description	
UL	File Number: <a href="#">E153537</a>

### Electrical Characteristics (@ T<sub>A</sub> = 25 °C Unless Otherwise Noted)

Parameter	Symbol	Value	Unit
Minimum Peak Pulse Power Dissipation (T <sub>p</sub> = 1 ms) (Note 1,2)	P <sub>PK</sub>	600	Watts
Peak Forward Surge Current 8.3 ms Single Half Sine Wave Superimposed on Rated Load (JEDEC Method) (Note 3)	I <sub>FSM</sub>	100	Amps
Operating Temperature Range	T <sub>J</sub>	-55 to +150	°C
Storage Temperature Range	T <sub>STG</sub>	-55 to +150	°C

1. Non-repetitive current pulse, per Pulse Waveform graph and derated above T<sub>A</sub> = 25 °C per Pulse Derating Curve.
2. Mounted on 5.0 mm<sup>2</sup> (0.03 mm thick) copper pads to each terminal.
3. 8.3 ms Single Half-Sine Wave duty cycle = 4 pulses maximum per minute (unidirectional units only).

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\*RoHS Directive 2015/863, Mar 31, 2015 and Annex.

\*\*"Q" part number suffix indicates AEC-Q101 compliance.

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## Electrical Characteristics (@ T<sub>A</sub> = 25 °C Unless Otherwise Noted)

Unidirectional Device		Bidirectional Device		Breakdown Voltage V <sub>BR</sub> (Volts)			Working Peak Reverse Voltage	Maximum Reverse Leakage @ V <sub>RWM</sub>	Maximum Clamping Voltage @ I <sub>pp</sub> (10/1000 μs)	Maximum Peak Pulse Current (10/1000 μs)	Maximum Clamping Voltage @ I <sub>pp</sub> (8/20 μs)	Maximum Peak Pulse Current (8/20 μs)
Part No.	Marking	Part No.	Marking	Min.	Max.	@ I <sub>T</sub> (mA)	V <sub>RWM</sub> (V)	I <sub>R</sub> (μA)	V <sub>c</sub> (V)	I <sub>pp</sub> (A)	V <sub>c</sub> (V)	I <sub>pp</sub> (A)
SMBJ5.0A-Q	KEQ	SMBJ5.0CA-Q	AEQ	6.40	7.00	10	5.0	800	9.2	65.3	12.0	326.5
SMBJ6.0A-Q	KGQ	SMBJ6.0CA-Q	AGQ	6.67	7.37	10	6.0	800	10.3	58.3	13.4	291.5
SMBJ6.5A-Q	KKQ	SMBJ6.5CA-Q	AKQ	7.22	7.98	10	6.5	500	11.2	53.6	14.6	268.0
SMBJ7.0A-Q	KMQ	SMBJ7.0CA-Q	AMQ	7.78	8.60	10	7.0	200	12.0	50.0	15.6	250.0
SMBJ7.5A-Q	KPQ	SMBJ7.5CA-Q	APQ	8.33	9.21	1.0	7.5	100	12.9	46.6	16.8	233.0
SMBJ8.0A-Q	KRQ	SMBJ8.0CA-Q	ARQ	8.89	9.83	1.0	8.0	50	13.6	44.2	17.7	221.0
SMBJ8.5A-Q	KTQ	SMBJ8.5CA-Q	ATQ	9.44	10.4	1.0	8.5	20	14.4	41.7	18.7	208.5
SMBJ9.0A-Q	KVQ	SMBJ9.0CA-Q	AVQ	10.0	11.1	1.0	9.0	10	15.4	39.0	20.0	195.0
SMBJ10A-Q	KXQ	SMBJ10CA-Q	AXQ	11.1	12.3	1.0	10	5.0	17.0	35.3	22.1	176.5
SMBJ11A-Q	KZQ	SMBJ11CA-Q	AZQ	12.2	13.5	1.0	11	1.0	18.2	33.0	23.7	165.0
SMBJ12A-Q	LEQ	SMBJ12CA-Q	BEQ	13.3	14.7	1.0	12	1.0	19.9	30.2	25.9	151.0
SMBJ13A-Q	LGQ	SMBJ13CA-Q	BGQ	14.4	15.9	1.0	13	1.0	21.5	28.0	28.0	140.0
SMBJ14A-Q	LKQ	SMBJ14CA-Q	BKQ	15.6	17.2	1.0	14	1.0	23.2	25.9	30.2	129.5
SMBJ15A-Q	LMQ	SMBJ15CA-Q	BMQ	16.7	18.5	1.0	15	1.0	24.4	24.6	31.7	123.0
SMBJ16A-Q	LPQ	SMBJ16CA-Q	BPQ	17.8	19.7	1.0	16	1.0	26.0	23.1	33.8	115.5
SMBJ17A-Q	LRQ	SMBJ17CA-Q	BRQ	18.9	20.9	1.0	17	1.0	27.6	21.8	35.9	109.0
SMBJ18A-Q	LTQ	SMBJ18CA-Q	BTQ	20.0	22.1	1.0	18	1.0	29.2	20.6	38.0	103.0
SMBJ20A-Q	LVQ	SMBJ20CA-Q	BVQ	22.2	24.5	1.0	20	1.0	32.4	18.6	42.1	93.0
SMBJ22A-Q	LXQ	SMBJ22CA-Q	BXQ	24.4	26.9	1.0	22	1.0	35.5	16.9	46.2	84.5
SMBJ24A-Q	LZQ	SMBJ24CA-Q	BZQ	26.7	29.5	1.0	24	1.0	38.9	15.5	50.6	77.5
SMBJ26A-Q	MEQ	SMBJ26CA-Q	CEQ	28.9	31.9	1.0	26	1.0	42.1	14.3	54.7	71.5
SMBJ28A-Q	MGQ	SMBJ28CA-Q	CGQ	31.1	34.4	1.0	28	1.0	45.4	13.3	59.0	66.5
SMBJ30A-Q	MKQ	SMBJ30CA-Q	CKQ	33.3	36.8	1.0	30	1.0	48.4	12.4	62.9	62.0
SMBJ33A-Q	MMQ	SMBJ33CA-Q	CMQ	36.7	40.6	1.0	33	1.0	53.3	11.3	69.3	56.5
SMBJ36A-Q	MPQ	SMBJ36CA-Q	CPQ	40	44.2	1.0	36	1.0	58.1	10.4	75.5	52.0
SMBJ40A-Q	MRQ	SMBJ40CA-Q	CRQ	44.4	49.1	1.0	40	1.0	64.5	9.3	83.9	46.5
SMBJ43A-Q	MTQ	SMBJ43CA-Q	CTQ	47.8	52.8	1.0	43	1.0	69.4	8.7	90.2	43.5
SMBJ45A-Q	MVQ	SMBJ45CA-Q	CVQ	50	55.3	1.0	45	1.0	72.7	8.3	94.5	41.5
SMBJ48A-Q	MXQ	SMBJ48CA-Q	CXQ	53.3	58.9	1.0	48	1.0	77.4	7.8	100.6	39.0
SMBJ51A-Q	MZQ	SMBJ51CA-Q	CZQ	56.7	62.7	1.0	51	1.0	82.4	7.3	107.1	36.5
SMBJ54A-Q	NEQ	SMBJ54CA-Q	DEQ	60	66.3	1.0	54	1.0	87.1	6.9	113.2	34.5
SMBJ58A-Q	NGQ	SMBJ58CA-Q	DGQ	64.4	71.2	1.0	58	1.0	93.6	6.5	121.7	32.5
SMBJ60A-Q	NKQ	SMBJ60CA-Q	DKQ	66.7	73.7	1.0	60	1.0	96.8	6.2	125.8	31.0
SMBJ64A-Q	NMQ	SMBJ64CA-Q	DMQ	71.1	78.6	1.0	64	1.0	103	5.9	133.9	29.5
SMBJ70A-Q	NPQ	SMBJ70CA-Q	DPQ	77.8	86.0	1.0	70	1.0	113	5.3	146.9	26.5
SMBJ75A-Q	NRQ	SMBJ75CA-Q	DRQ	83.3	92.1	1.0	75	1.0	121	5.0	157.3	25.0
SMBJ78A-Q	NTQ	SMBJ78CA-Q	DTQ	86.7	95.8	1.0	78	1.0	126	4.8	163.8	24.0
SMBJ85A-Q	NVQ	SMBJ85CA-Q	DVQ	94.4	104	1.0	85	1.0	137	4.4	178.1	22.0
SMBJ90A-Q	NXQ	SMBJ90CA-Q	DXQ	100	111	1.0	90	1.0	146	4.1	189.8	20.5
SMBJ100A-Q	NZQ	SMBJ100CA-Q	DZQ	111	123	1.0	100	1.0	162	3.7	210.6	18.5
SMBJ110A-Q	PEQ	SMBJ110CA-Q	EEQ	122	135	1.0	110	1.0	177	3.4	230.1	17.0
SMBJ120A-Q	PGQ	SMBJ120CA-Q	EGQ	133	147	1.0	120	1.0	193	3.1	250.9	15.5
SMBJ130A-Q	PKQ	SMBJ130CA-Q	EKQ	144	159	1.0	130	1.0	209	2.9	271.7	14.5
SMBJ150A-Q	PMQ	SMBJ150CA-Q	EMQ	167	185	1.0	150	1.0	243	2.5	315.9	12.5
SMBJ160A-Q	PPQ	SMBJ160CA-Q	EPQ	178	197	1.0	160	1.0	259	2.3	336.7	11.5
SMBJ170A-Q	PRQ	SMBJ170CA-Q	ERQ	189	209	1.0	170	1.0	275	2.2	357.5	11.0
SMBJ180A-Q	PTQ	SMBJ180CA-Q	ETQ	201	222	1.0	180	1.0	292	2.1	379.6	10.5
SMBJ200A-Q	PVQ	SMBJ200CA-Q	EVQ	224	247	1.0	200	1.0	324	1.9	421.2	9.5
SMBJ220A-Q	PXQ	SMBJ220CA-Q	EXQ	246	272	1.0	220	1.0	356	1.7	462.8	8.5

Notes: 1. Suffix 'A' denotes a 5 % tolerance unidirectional device.  
 2. Suffix 'CA' denotes a 5 % tolerance bidirectional device.

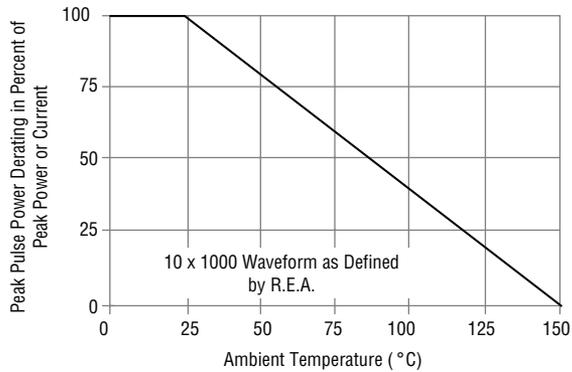
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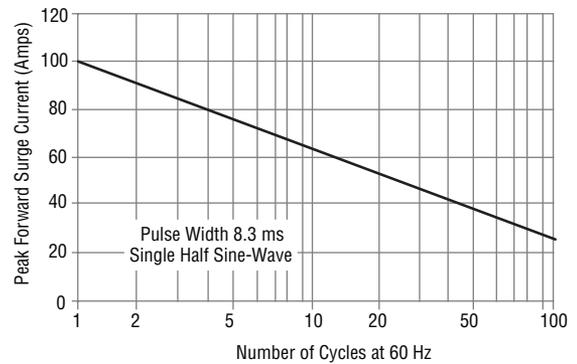
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## Performance Graphs

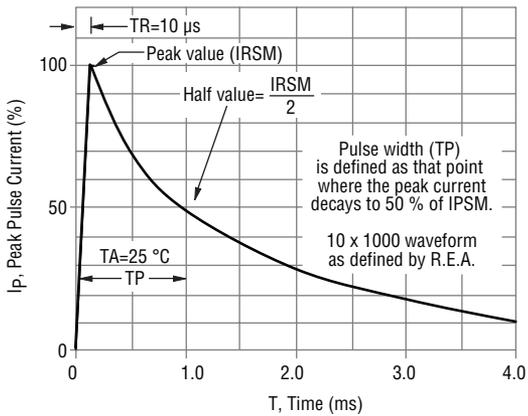
### Peak Pulse Power Derating Curve



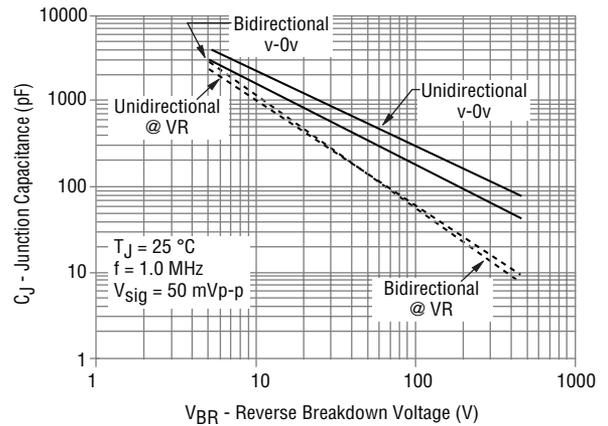
### Maximum Non-Repetitive Surge Current



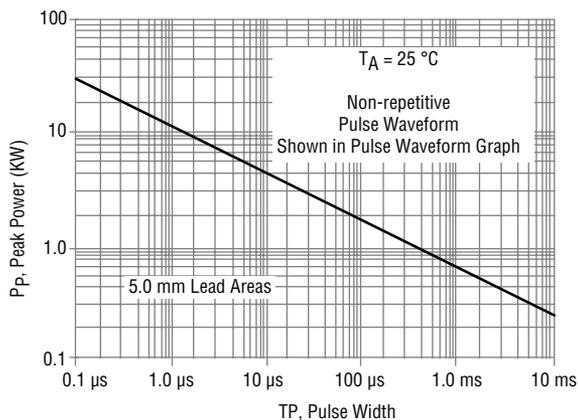
### Pulse Waveform



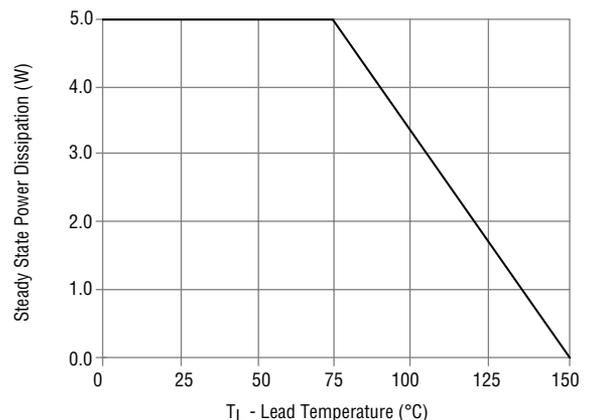
### Typical Junction Capacitance



### Pulse Rating Curve



### Steady State Power Derating Curve



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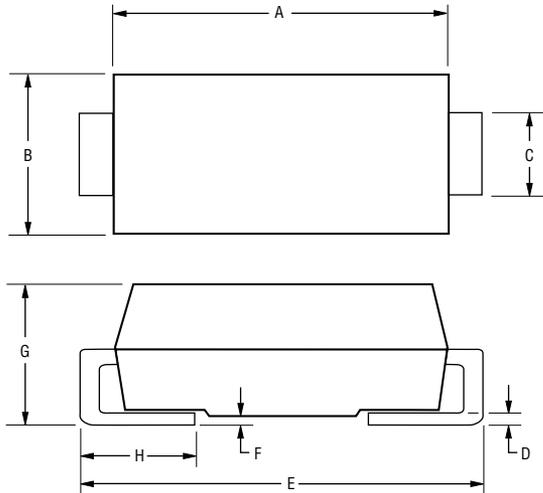
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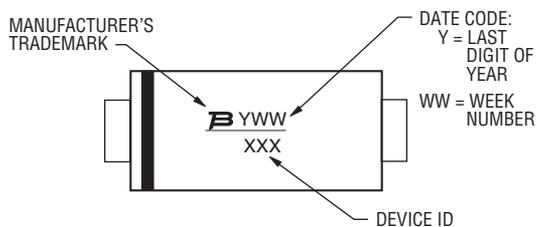
## Product Dimensions



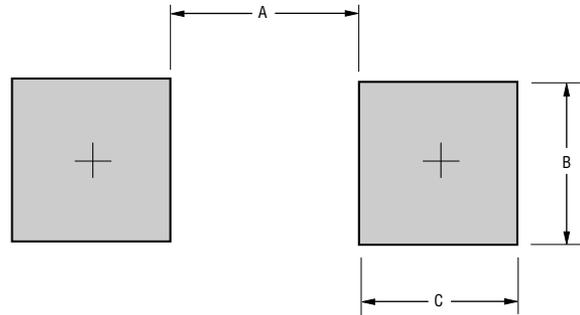
Dimension	SMB (DO-214AA)
A	$\frac{4.06 - 4.57}{(0.160 - 0.180)}$
B	$\frac{3.30 - 3.94}{(0.130 - 0.155)}$
C	$\frac{1.95 - 2.20}{(0.077 - 0.087)}$
D	$\frac{0.15 - 0.31}{(0.006 - 0.012)}$
E	$\frac{5.21 - 5.59}{(0.205 - 0.220)}$
F	$\frac{0.203}{(0.008)}$ MAX.
G	$\frac{2.13 - 2.44}{(0.084 - 0.096)}$
H	$\frac{0.76 - 1.52}{(0.030 - 0.060)}$

DIMENSIONS:  $\frac{\text{MM}}{\text{(INCHES)}}$

## Typical Part Marking



## Recommended Footprint



Dimension	SMB (DO-214AA)
A (Max.)	$\frac{2.69}{(0.106)}$
B (Min.)	$\frac{2.10}{(0.083)}$
C (Min.)	$\frac{1.27}{(0.050)}$

DIMENSIONS:  $\frac{\text{MM}}{\text{(INCHES)}}$

## Physical Specifications

Case ..... Molded plastic per UL Class 94V-0  
 Polarity..... Cathode band indicates unidirectional device  
 No cathode band indicates bidirectional device

## How to Order

Package ..... **SMBJ 12 CA - Q**  
 SMBJ = SMB/DO-214AA  
 Working Peak Reverse Voltage .....  
 5 ~ 220 = 5 ~ 220 V<sub>RWM</sub> (Volts)  
 Suffix .....  
 A = 5 % Tolerance Unidirectional Device  
 CA = 5 % Tolerance Bidirectional Device  
 AEC-Q101 Suffix .....  
 Q = AEC-Q101 Compliant, 13-inch Reel  
 QH = AEC-Q101 Compliant, 7-inch Reel

## Environmental Specifications

Moisture Sensitivity Level ..... 1  
 ESD Classification (HBM)..... 3B

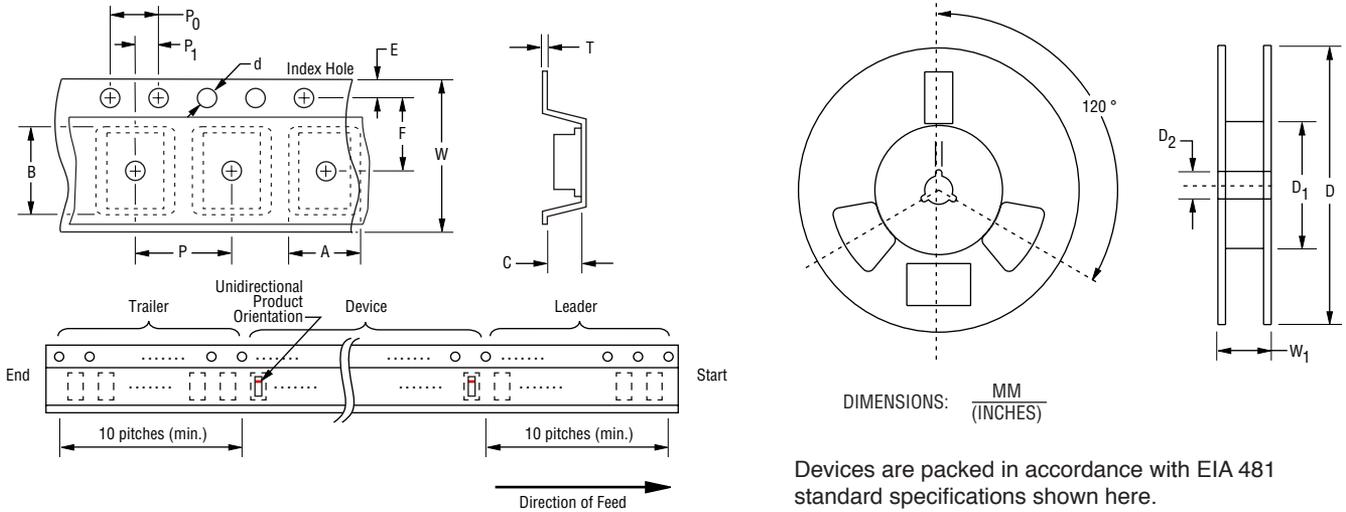
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## Packaging Information

The product will be dispensed in tape and reel format (see diagram below).



Item	Symbol	SMB (DO-214AA)	
		7-Inch Reel	13-Inch Reel
Carrier Width	A	$3.67 \pm 0.20$ (0.144 ± 0.008)	
Carrier Length	B	$5.60 \pm 0.20$ (0.220 ± 0.008)	
Carrier Depth	C	$2.57 \pm 0.20$ (0.101 ± 0.008)	
Sprocket Hole	d	$1.50 \pm 0.10$ (0.059 ± 0.004)	
Reel Outside Diameter	D	$\frac{178}{(7.008)}$	$\frac{330}{(12.992)}$
Reel Inner Diameter	D <sub>1</sub>	$\frac{50.0}{(1.969)}$ MIN.	
Feed Hole Diameter	D <sub>2</sub>	$13.0 \pm 0.20$ (0.512 ± 0.008)	
Sprocket Hole Position	E	$1.75 \pm 0.10$ (0.069 ± 0.004)	
Punch Hole Position	F	$5.50 \pm 0.05$ (0.217 ± 0.002)	
Punch Hole Pitch	P	$8.00 \pm 0.10$ (0.315 ± 0.004)	
Sprocket Hole Pitch	P <sub>0</sub>	$4.00 \pm 0.10$ (0.157 ± 0.004)	
Embossment Center	P <sub>1</sub>	$2.00 \pm 0.05$ (0.079 ± 0.002)	
Overall Tape Thickness	T	$0.30 \pm 0.10$ (0.012 ± 0.004)	
Tape Width	W	$12.00 \pm 0.30$ (0.472 ± 0.012)	
Reel Width	W <sub>1</sub>	$\frac{18.4}{(0.724)}$ MAX.	
Quantity per Reel	--	500	3,000

REV. 10/20

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