THE DATASHEET OF

SMBJ24CA-QH

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.

Additional Information

Click these links for more information:

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Agency Recognition

Description	
UL	File Number: E153537

Electrical Characteristics (@ T_A = 25 °C Unless Otherwise Noted)

Parameter	Symbol	Value	Unit
Minimum Peak Pulse Power Dissipation (T_P = 1 ms) (Note 1,2)	P_{PK}	600	Watts
Peak Forward Surge Current 8.3 ms Single Half Sine Wave Superimposed on Rated Load (JEDEC Method) (Note 3)	I_{FSM}	100	Amps
Operating Temperature Range	T_J	-55 to +150	°C
Storage Temperature Range	T_{STG}	-55 to +150	°C

1. Non-repetitive current pulse, per Pulse Waveform graph and derated above T_A = 25 °C per Pulse Derating Curve.
2. Mounted on 5.0 mm^2 (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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WARNING Cancer and Reproductive Harm - www.P65Warnings.ca.gov

*RoHS Directive 2015/863, Mar 31, 2015 and Annex.
**"Q" part number suffix indicates AEC-Q101 compliance.
Specifications are subject to change without notice.
Users should verify actual device performance in their specific applications.

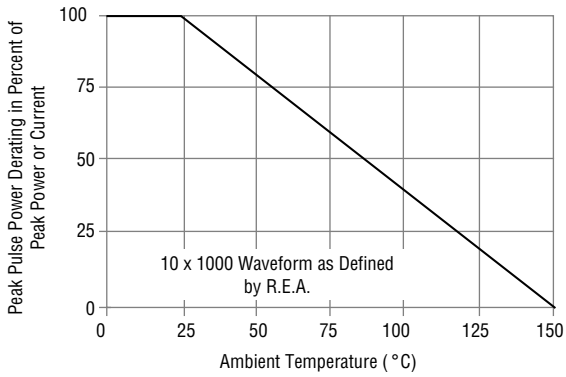
Electrical Characteristics (@ T_A = 25 °C Unless Otherwise Noted)

Unidirectional Device		Bidirectional Device		Breakdown Voltage V_{BR} (Volts)			Working Peak Reverse Voltage	Maximum Reverse Leakage @ V_{RWM}	Maximum Clamping Voltage @ I_{pp} (10/1000 μs)	Maximum Peak Pulse Current (10/1000 μs)	Maximum Clamping Voltage @ I_{pp} (8/20 μs)	Maximum Peak Pulse Current (8/20 μs)
Part No.	Marking	Part No.	Marking	Min.	Max.	@ I_T (mA)	V_{RWM} (V)	I_R (μA)	V_C (V)	I_{pp} (A)	V_C (V)	I_{pp} (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

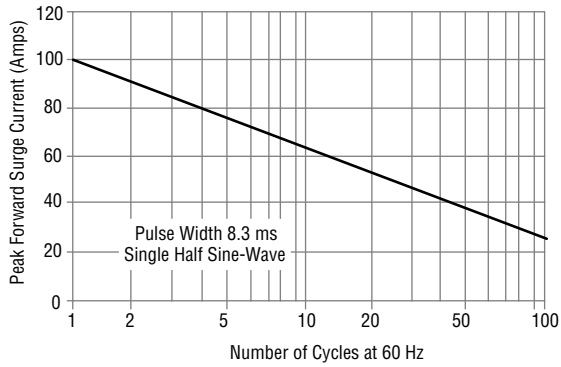
Notes: 1. Suffix 'A' denotes a 5 % tolerance unidirectional device.
2. Suffix 'CA' denotes a 5 % tolerance bidirectional device.

Performance Graphs

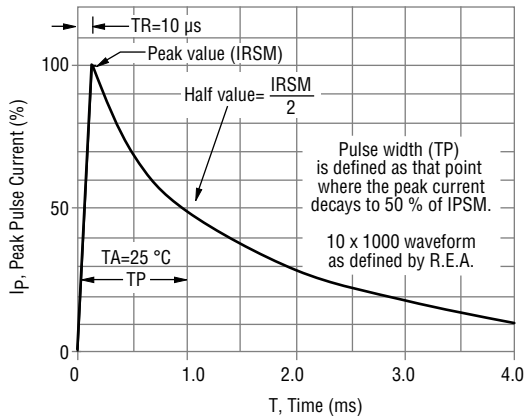
Peak Pulse Power Derating Curve



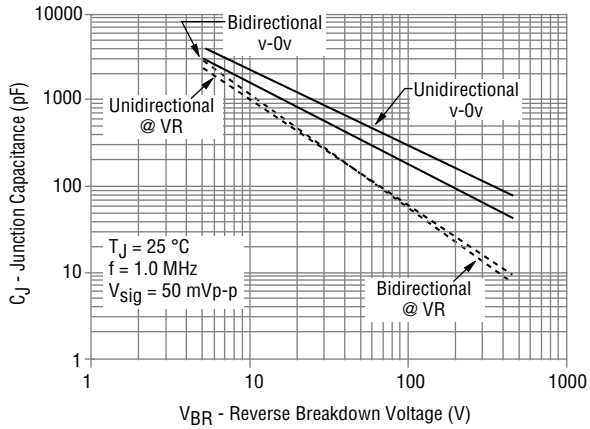
Maximum Non-Repetitive Surge Current



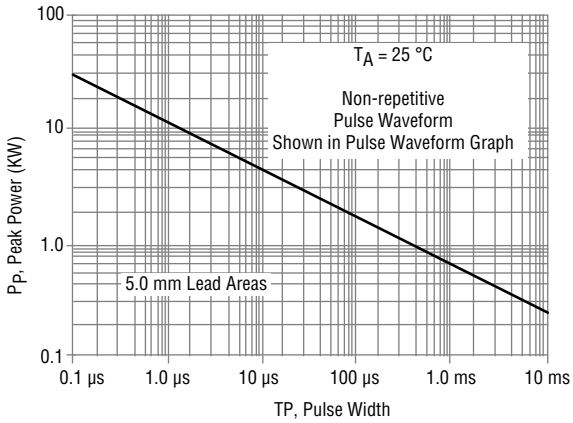
Pulse Waveform



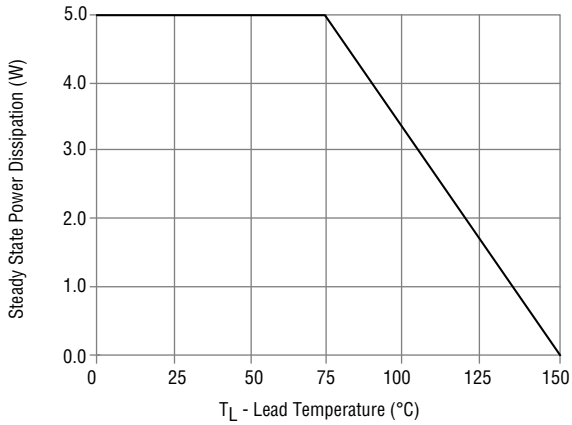
Typical Junction Capacitance



Pulse Rating Curve



Steady State Power Derating Curve



SMBJ-Q Transient Voltage Suppressor Diode Series

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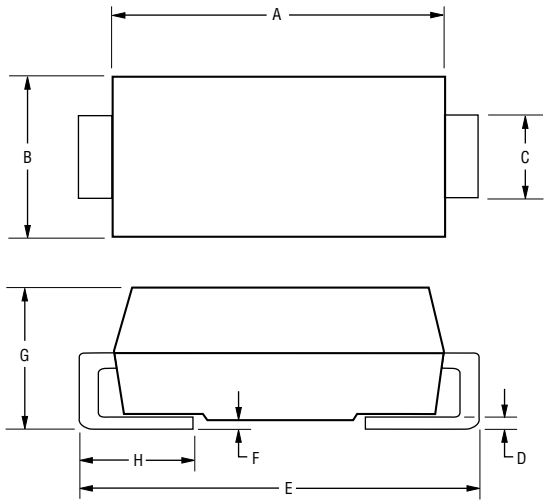
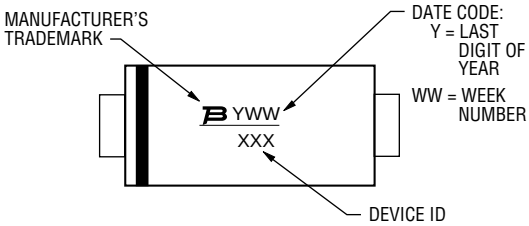
Product Dimensions



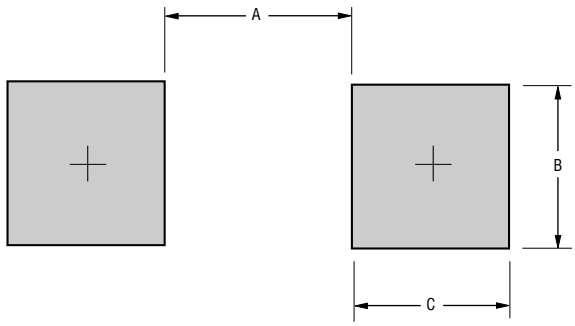
Dimension	SMB (DO-214AA)
A	4.06 - 4.57 (0.160 - 0.180)
B	3.30 - 3.94 (0.130 - 0.155)
C	1.95 - 2.20 (0.077 - 0.087)
D	0.15 - 0.31 (0.006 - 0.012)
E	5.21 - 5.59 (0.205 - 0.220)
F	0.203 (0.008) MAX.
G	2.13 - 2.44 (0.084 - 0.096)
H	0.76 - 1.52 (0.030 - 0.060)

DIMENSIONS: MM (INCHES)

Typical Part Marking



Recommended Footprint



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

DIMENSIONS: MM (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

SMBJ 12 CA - Q

Package
SMBJ = SMB/DO-214AA

Working Peak Reverse Voltage
5 ~ 220 = 5 ~ 220 V_{RWM} (Volts)

Suffix
A = 5 % Tolerance Unidirectional Device
CA = 5 % Tolerance Bidirectional Device

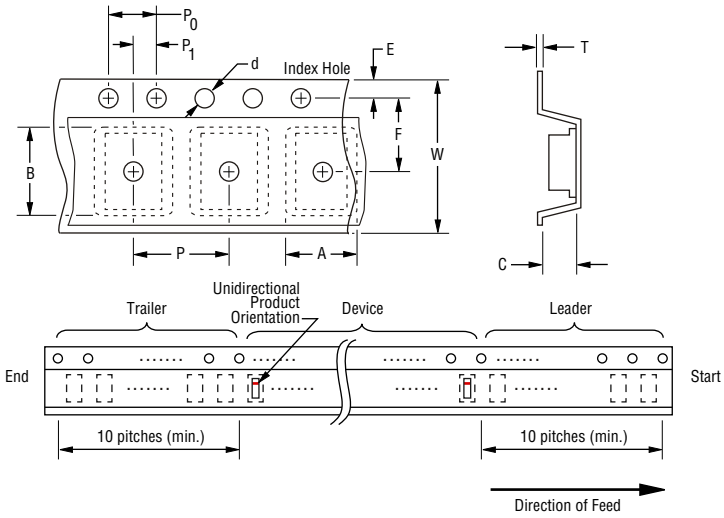
AEC-Q101 Suffix
Q = AEC-Q101 Compliant, 13-inch Reel
QH = AEC-Q101 Compliant, 7-inch Reel

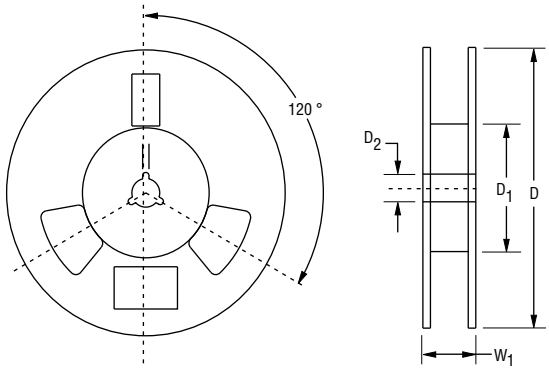
Environmental Specifications

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

Packaging Information

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





DIMENSIONS: MM / (INCHES)

Devices are packed in accordance with EIA 481 standard specifications shown here.

Item	Symbol	SMB (DO-214AA)	
		7-Inch Reel	13-Inch Reel
Carrier Width	A	3.67 ± 0.20 (0.144 ± 0.008)	
Carrier Length	B	5.60 ± 0.20 (0.220 ± 0.008)	
Carrier Depth	C	2.57 ± 0.20 (0.101 ± 0.008)	
Sprocket Hole	d	1.50 ± 0.10 (0.059 ± 0.004)	
Reel Outside Diameter	D	178 (7.008)	330 (12.992)
Reel Inner Diameter	D_1	50.0 (1.969) MIN.	
Feed Hole Diameter	D_2	13.0 ± 0.20 (0.512 ± 0.008)	
Sprocket Hole Position	E	1.75 ± 0.10 (0.069 ± 0.004)	
Punch Hole Position	F	5.50 ± 0.05 (0.217 ± 0.002)	
Punch Hole Pitch	P	8.00 ± 0.10 (0.315 ± 0.004)	
Sprocket Hole Pitch	P_0	4.00 ± 0.10 (0.157 ± 0.004)	
Embossment Center	P_1	2.00 ± 0.05 (0.079 ± 0.002)	
Overall Tape Thickness	T	0.30 ± 0.10 (0.012 ± 0.004)	
Tape Width	W	12.00 ± 0.30 (0.472 ± 0.012)	
Reel Width	W_1	18.4 (0.724) MAX.	
Quantity per Reel	--	500	3,000

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- Shortage Management
- Alternative Solution
- Excess Inventory Management