

## Features

- Surface Mount SMA package
- Standoff Voltage: 8.5 to 58 volts
- Power Dissipation: 400 watts
- RoHS compliant\*
- AEC-Q101 compliant\*\*

## Applications

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

# SMAJ-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-214AC (SMA) size format. The Transient Voltage Suppressor series offers a choice of Working Peak Reverse Voltage from 8.5 V up to 58 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.

## 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>	400	Watts
Peak Forward Surge Current 8.3 ms Single Half Sine Wave Superimposed on Rated Load (JEDEC Method) (Note 3)	I <sub>FSM</sub>	40	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 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.

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

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Users should verify actual device performance in their specific applications.

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# SMAJ-Q Transient Voltage Suppressor Diode Series

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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 Reverse Voltage @ I <sub>RSM</sub>	Maximum Reverse Surge Current
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>RSM</sub> (V)	I <sub>RSM</sub> (A)
SMAJ12A-Q	IEQ	SMAJ8.5CA-Q	TTQ	9.44	10.4	1.0	8.5	20.0	14.4	27.8
SMAJ13A-Q	IGQ	SMAJ12CA-Q	UEQ	13.3	14.7	1.0	12	1.0	19.9	20.1
SMAJ14A-Q	IKQ	SMAJ13CA-Q	UGQ	14.4	15.9	1.0	13	1.0	21.5	18.6
SMAJ15A-Q	IMQ	SMAJ14CA-Q	UKQ	15.6	17.2	1.0	14	1.0	23.2	17.2
SMAJ16A-Q	IPQ	SMAJ15CA-Q	UMQ	16.7	18.5	1.0	15	1.0	24.4	16.4
SMAJ17A-Q	IRQ	SMAJ16CA-Q	UPQ	17.8	19.7	1.0	16	1.0	26.0	15.3
SMAJ18A-Q	ITQ	SMAJ17CA-Q	URQ	18.9	20.9	1.0	17	1.0	27.6	14.5
SMAJ20A-Q	IVQ	SMAJ18CA-Q	UTQ	20.0	22.1	1.0	18	1.0	29.2	13.7
SMAJ22A-Q	IXQ	SMAJ20CA-Q	UVQ	22.2	24.5	1.0	20	1.0	32.4	12.3
SMAJ24A-Q	IZQ	SMAJ22CA-Q	UXQ	24.4	26.9	1.0	22	1.0	35.5	11.3
SMAJ26A-Q	JEQ	SMAJ24CA-Q	UZQ	26.7	29.5	1.0	24	1.0	38.9	10.3
SMAJ28A-Q	JGQ	SMAJ26CA-Q	VEQ	28.9	31.9	1.0	26	1.0	42.1	9.5
SMAJ30A-Q	JKQ	SMAJ28CA-Q	VGQ	31.1	34.4	1.0	28	1.0	45.4	8.8
SMAJ33A-Q	JMQ	SMAJ30CA-Q	VKQ	33.3	36.8	1.0	30	1.0	48.4	8.3
SMAJ36A-Q	JPQ	SMAJ33CA-Q	VMQ	36.7	40.6	1.0	33	1.0	53.3	7.5
SMAJ40A-Q	JRQ	SMAJ36CA-Q	VPQ	40.0	44.2	1.0	36	1.0	58.1	6.9
SMAJ43A-Q	JTQ	SMAJ40CA-Q	VRQ	44.4	49.1	1.0	40	1.0	64.5	6.2
SMAJ45A-Q	JVQ	SMAJ43CA-Q	VTQ	47.8	52.8	1.0	43	1.0	69.4	5.8
SMAJ48A-Q	JVQ	SMAJ45CA-Q	VVQ	50.0	55.3	1.0	45	1.0	72.7	5.5
SMAJ51A-Q	JZQ	SMAJ48CA-Q	VXQ	53.3	58.9	1.0	48	1.0	77.4	5.2
SMAJ54A-Q	REQ	SMAJ51CA-Q	VZQ	56.7	62.7	1.0	51	1.0	82.4	4.9
SMAJ58A-Q	RGQ	SMAJ54CA-Q	WEQ	60.0	66.3	1.0	54	1.0	87.1	4.6
		SMAJ58CA-Q	WGQ	64.4	71.2	1.0	58	1.0	93.6	4.3

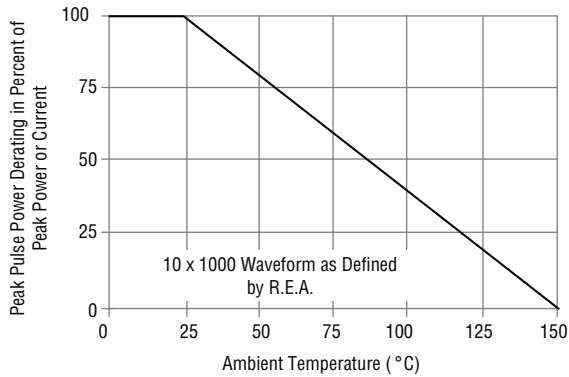
- Notes: 1. Suffix 'A' denotes a 5 % tolerance unidirectional device.  
 2. Suffix 'CA' denotes a 5 % tolerance bidirectional device.

# SMAJ-Q Transient Voltage Suppressor Diode Series

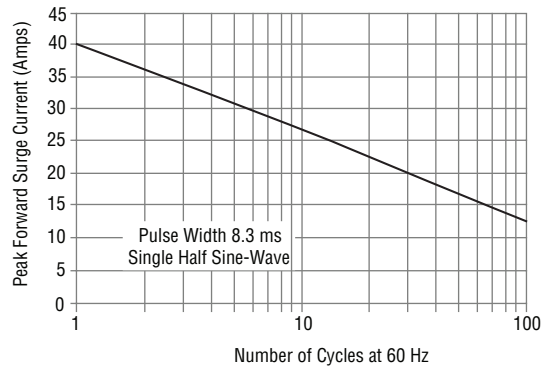


## Performance Graphs

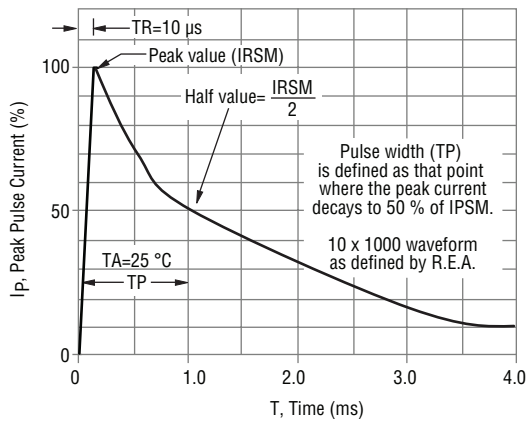
### Peak Pulse Power Derating Curve



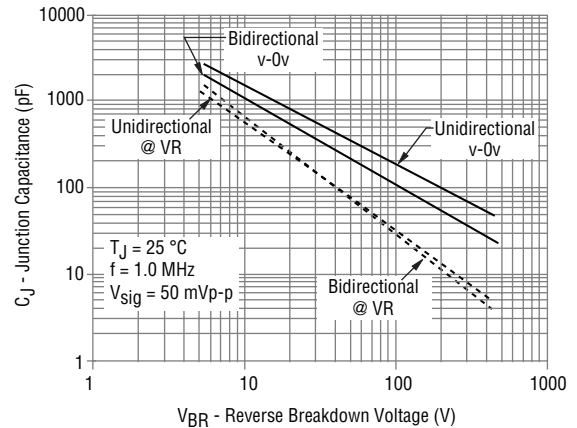
### Maximum Non-Repetitive Surge Current



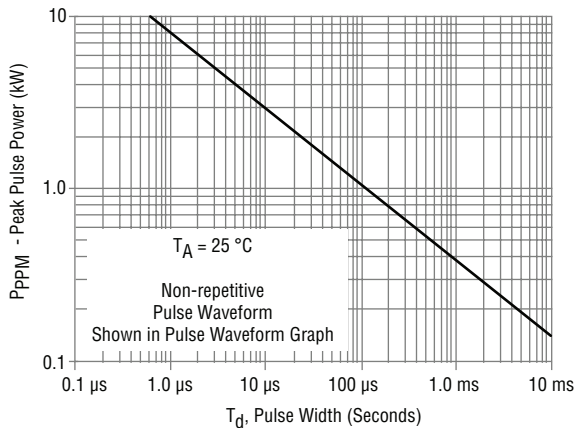
### Pulse Waveform



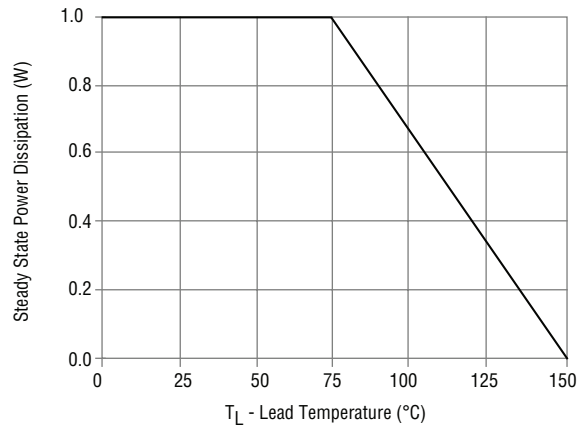
### Typical Junction Capacitance



### Pulse Rating Curve



### Steady State Power Derating Curve



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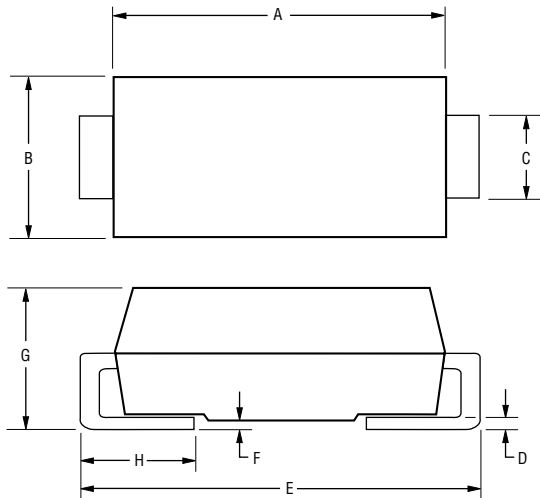
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# SMAJ-Q Transient Voltage Suppressor Diode Series



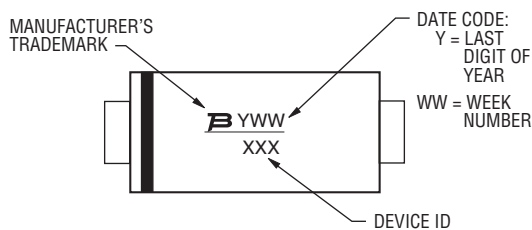
## Product Dimensions



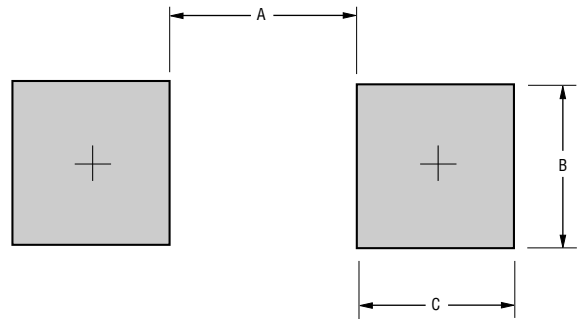
Dimension	SMA (DO-214AC)
A	$\frac{3.99 - 4.50}{(0.157 - 0.157)}$
B	$\frac{2.54 - 2.79}{(0.100 - 0.110)}$
C	$\frac{1.25 - 1.65}{(0.049 - 0.065)}$
D	$\frac{0.15 - 0.31}{(0.006 - 0.112)}$
E	$\frac{4.93 - 5.28}{(0.194 - 0.208)}$
F	$\frac{0.203}{(0.008)}$ MAX.
G	$\frac{1.98 - 2.29}{(0.078 - 0.090)}$
H	$\frac{0.76 - 1.52}{(0.030 - 0.060)}$

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

## Typical Part Marking



## Recommended Footprint



Dimension	SMA (DO-214AC)
A (Max.)	$\frac{2.70}{(0.106)}$
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 ..... **SMAJ 12 CA - Q**  
 SMAJ = SMA/DO-214AC  
 Working Peak Reverse Voltage .....  
 12 = 12 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

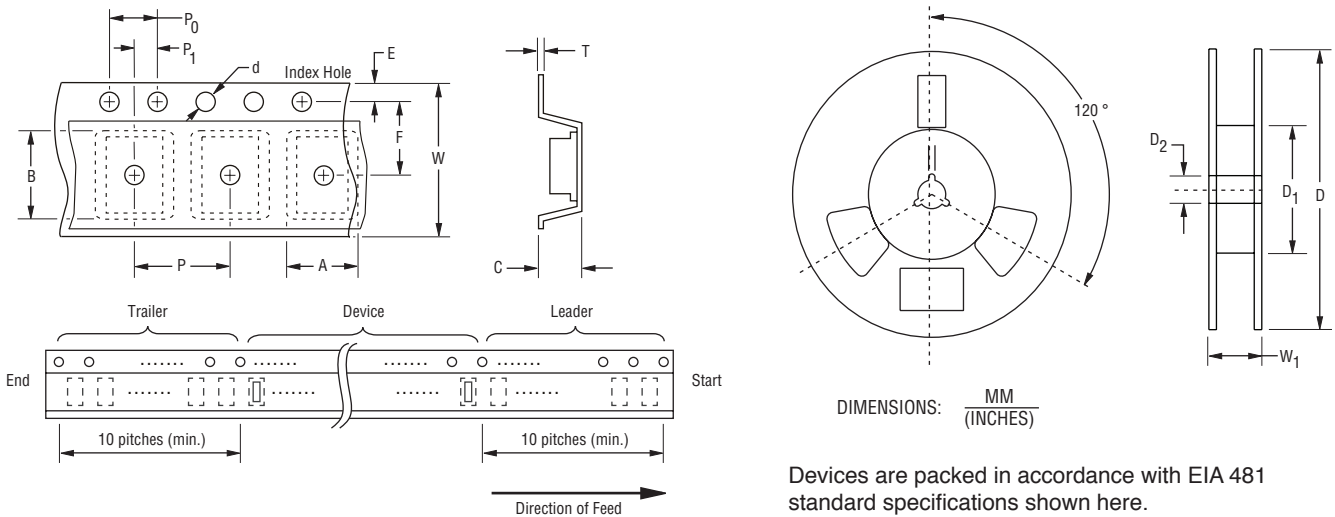
Moisture Sensitivity Level ..... 1  
 ESD Classification (HBM)..... 3B

# SMAJ-Q Transient Voltage Suppressor Diode Series

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## Packaging Information

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



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

Item	Symbol	SMA (DO-214AC)	
		7-Inch Reel	13-Inch Reel
Carrier Width	A	$\frac{2.90 \pm 0.20}{(0.114 \pm 0.008)}$	
Carrier Length	B	$\frac{5.50 \pm 0.20}{(0.217 \pm 0.008)}$	
Carrier Depth	C	$\frac{2.26 \pm 0.20}{(0.089 \pm 0.008)}$	
Sprocket Hole	d	$\frac{1.50 \pm 0.10}{(0.061 \pm 0.004)}$	
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>	$\frac{13.0 \pm 0.20}{(0.512 \pm 0.008)}$	
Sprocket Hole Position	E	$\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$	
Punch Hole Position	F	$\frac{5.50 \pm 0.05}{(0.217 \pm 0.002)}$	
Punch Hole Pitch	P	$\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$	
Sprocket Hole Pitch	P <sub>0</sub>	$\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$	
Embossment Center	P <sub>1</sub>	$\frac{2.00 \pm 0.05}{(0.079 \pm 0.002)}$	
Overall Tape Thickness	T	$\frac{0.30 \pm 0.10}{(0.012 \pm 0.004)}$	
Tape Width	W	$\frac{12.00 \pm 0.30}{(0.472 \pm 0.012)}$	
Reel Width	W <sub>1</sub>	$\frac{18.4}{(0.724)}$ MAX.	
Quantity per Reel	--	1,000	5,000

REV. 07/18

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