



Features

- Surface Mount SMB package
- Breakdown Voltage: 6.8 to 250 volts
- Power Dissipation: 600 watts
- RoHS compliant* and halogen free**
- AEC-Q101 compliant***

Applications

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

P6SMB-Q Transient Voltage Suppressor Diode Series

General Information

The markets of portable communications, computing and video equipment are challenging the semiconductor industry to develop increasingly smaller electronic components.

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 Breakdown Voltages from 6.8 V up to 250 V. Typical fast response times are less than 1.0 picosecond for unidirectional devices and less than 5.0 picoseconds for bidirectional devices from 0 V to Minimum 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.

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

Parameter	Symbol	Value	Unit
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
Maximum Instantaneous Forward Voltage @ I _{PP} = 50 A (For Unidirectional Units Only)	V _F	3.5	Volts
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. Thermal Resistance Junction to Lead.
3. 8.3 ms Single Half-Sine Wave duty cycle = 4 pulses maximum per minute (unidirectional units only).

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How to Order

P6SMB 15 CA - Q

Series _____
P6SMB= SMB/DO-214AA

Breakdown Voltage _____
6.8 to 250 = 6.8 to 250 V_{BR} (Volts)

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

AEC-Q101 Suffix _____
Q = AEC-Q101 Compliant, 13-inch Reel (3000 pcs.)



WARNING Cancer and Reproductive Harm - www.P65Warnings.ca.gov

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

** Bourns considers a product to be "halogen free" if (a) the Bromine (Br) content is 900 ppm or less; (b) the Chlorine (Cl) content is 900 ppm or less; and (c) the total Bromine (Br) and Chlorine (Cl) content is 1500 ppm or less.

*** Q suffix for applications requiring appropriate AEC-Q101 compliance for electronic limiters.

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

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P6SMB-Q Transient Voltage Suppressor Diode Series

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)
P6SMB6.8A-Q	6V8AQ	P6SMB6.8CA-Q	6V8CQ	6.45	7.14	10	5.8	1000	10.5	58.1	13.7	290.5
P6SMB7.5A-Q	7V5AQ	P6SMB7.5CA-Q	7V5CQ	7.13	7.88	10	6.4	500	11.3	54	15	270
P6SMB8.2A-Q	8V2AQ	P6SMB8.2CA-Q	8V2CQ	7.79	8.61	10	7.02	200	12.1	50.4	15.7	252.0
P6SMB9.1A-Q	9V1AQ	P6SMB9.1CA-Q	9V1CQ	8.65	9.55	1	7.78	50	13.4	45.5	17.4	227.5
P6SMB10A-Q	10AQ	P6SMB10CA-Q	10CQ	9.5	10.5	1	8.55	10	14.5	42.1	18.9	210.5
P6SMB11A-Q	11AQ	P6SMB11CA-Q	11CQ	10.5	11.6	1	9.4	5	15.6	39.1	20.3	195.5
P6SMB12A-Q	12AQ	P6SMB12CA-Q	12CQ	11.4	12.6	1	10.2	5	16.7	36.5	21.7	182.5
P6SMB13A-Q	13AQ	P6SMB13CA-Q	13CQ	12.4	13.7	1	11.1	1	18.2	33.5	23.7	167.5
P6SMB15A-Q	15AQ	P6SMB15CA-Q	15CQ	14.3	15.8	1	12.8	1	21.2	28.8	27.6	144.0
P6SMB16A-Q	16AQ	P6SMB16CA-Q	16CQ	15.2	16.8	1	13.6	1	22.5	27.1	29.3	135.5
P6SMB18A-Q	18AQ	P6SMB18CA-Q	18CQ	17.1	18.9	1	15.3	1	25.5	24.2	33.2	121.0
P6SMB20A-Q	20AQ	P6SMB20CA-Q	20CQ	19	21	1	17.1	1	27.7	22	36	110
P6SMB22A-Q	22AQ	P6SMB22CA-Q	22CQ	20.9	23.1	1	18.8	1	30.6	19.9	39.8	99.5
P6SMB24A-Q	24AQ	P6SMB24CA-Q	24CQ	22.8	25.2	1	20.5	1	33.2	18.4	43.2	92.0
P6SMB27A-Q	27AQ	P6SMB27CA-Q	27CQ	25.7	28.4	1	23.1	1	37.5	16.3	48.8	81.5
P6SMB30A-Q	30AQ	P6SMB30CA-Q	30CQ	28.5	31.5	1	25.6	1	41.4	14.7	53.8	73.5
P6SMB33A-Q	33AQ	P6SMB33CA-Q	33CQ	31.4	34.7	1	28.2	1	45.7	13.3	59.4	66.5
P6SMB36A-Q	36AQ	P6SMB36CA-Q	36CQ	34.2	37.8	1	30.8	1	49.9	12.2	64.9	61.0
P6SMB39A-Q	39AQ	P6SMB39CA-Q	39CQ	37.1	41	1	33.3	1	53.9	11.3	70.1	56.5
P6SMB43A-Q	43AQ	P6SMB43CA-Q	43CQ	40.9	45.2	1	36.8	1	59.3	10.3	77.1	51.5
P6SMB47A-Q	47AQ	P6SMB47CA-Q	47CQ	44.7	49.4	1	40.2	1	64.8	9.4	84.2	47.0
P6SMB51A-Q	51AQ	P6SMB51CA-Q	51CQ	48.5	53.6	1	43.6	1	70.1	8.7	91.1	43.5
P6SMB56A-Q	56AQ	P6SMB56CA-Q	56CQ	53.2	58.8	1	47.8	1	77	7.9	100.1	39.5
P6SMB62A-Q	62AQ	P6SMB62CA-Q	62CQ	58.9	65.1	1	53	1	85	7.2	110.5	36.0
P6SMB68A-Q	68AQ	P6SMB68CA-Q	68CQ	64.6	71.4	1	58.1	1	92	6.6	119.6	33.0
P6SMB75A-Q	75AQ	P6SMB75CA-Q	75CQ	71.3	78.8	1	64.1	1	103	5.9	133.9	29.5
P6SMB82A-Q	82AQ	P6SMB82CA-Q	82CQ	77.9	86.1	1	70.1	1	113	5.4	146.9	27.0
P6SMB91A-Q	91AQ	P6SMB91CA-Q	91CQ	86.5	95.5	1	77.8	1	125	4.9	162.5	24.5
P6SMB100A-Q	100AQ	P6SMB100CA-Q	100CQ	95	105	1	85.5	1	137	4.5	178.1	22.5
P6SMB110A-Q	110AQ	P6SMB110CA-Q	110CQ	105	116	1	94	1	152	4	198	20
P6SMB120A-Q	120AQ	P6SMB120CA-Q	120CQ	114	126	1	102	1	165	3.7	214.5	18.5
P6SMB130A-Q	130AQ	P6SMB130CA-Q	130CQ	124	137	1	111	1	179	3.4	232.7	17.0
P6SMB150A-Q	150AQ	P6SMB150CA-Q	150CQ	143	158	1	128	1	207	2.9	269.1	14.5
P6SMB160A-Q	160AQ	P6SMB160CA-Q	160CQ	152	168	1	136	1	219	2.8	284.7	14.0
P6SMB170A-Q	170AQ	P6SMB170CA-Q	170CQ	162	179	1	145	1	234	2.6	304.2	13.0
P6SMB180A-Q	180AQ	P6SMB180CA-Q	180CQ	171	189	1	154	1	246	2.5	319.8	12.5
P6SMB200A-Q	200AQ	P6SMB200CA-Q	200CQ	190	210	1	171	1	274	2.2	356.2	11.0
P6SMB220A-Q	220AQ	P6SMB220CA-Q	220CQ	209	231	1	185	1	328	1.9	426.4	9.5
P6SMB250A-Q	250AQ	P6SMB250CA-Q	250CQ	237	263	1	214	1	344	1.8	447.2	9.0

Notes:

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

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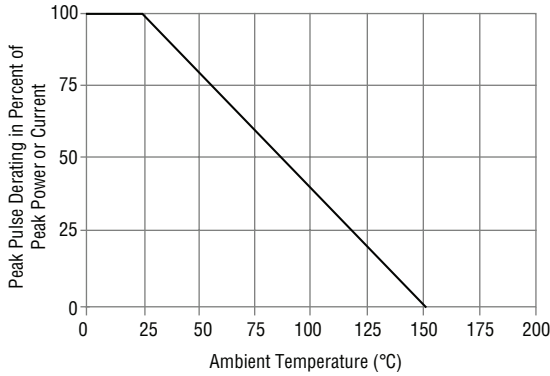
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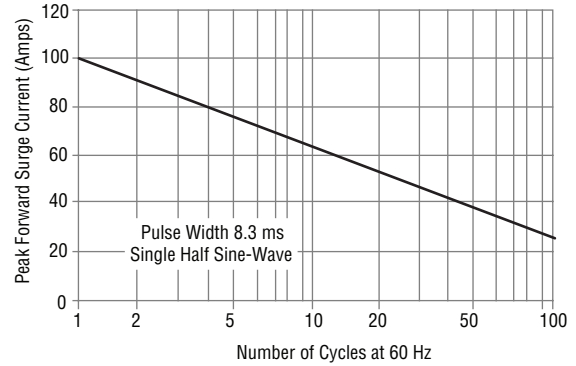
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Rating & Characteristic Curves

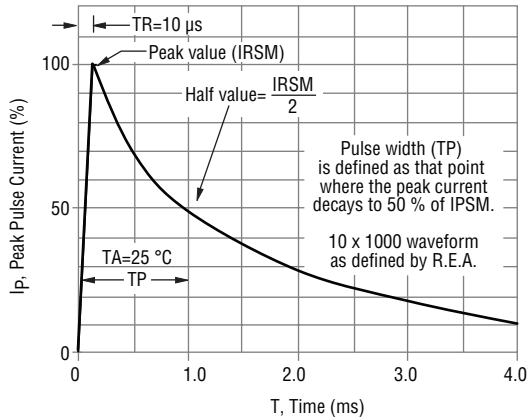
Pulse Derating Curve



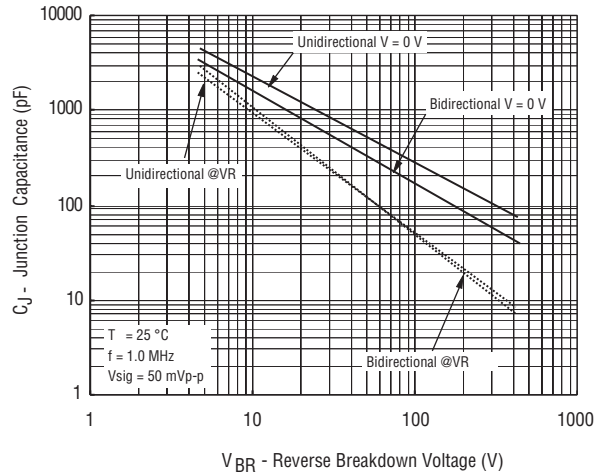
Maximum Non-Repetitive Surge Current



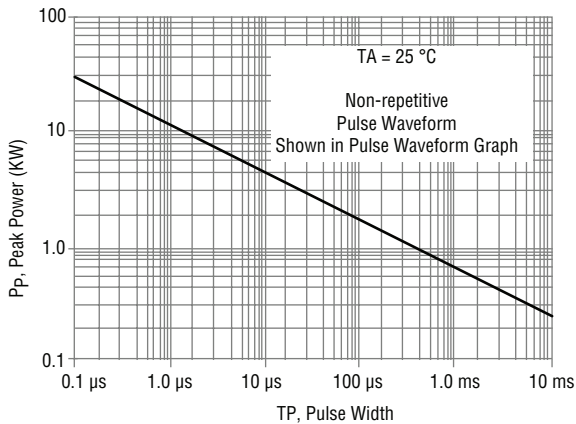
Pulse Waveform



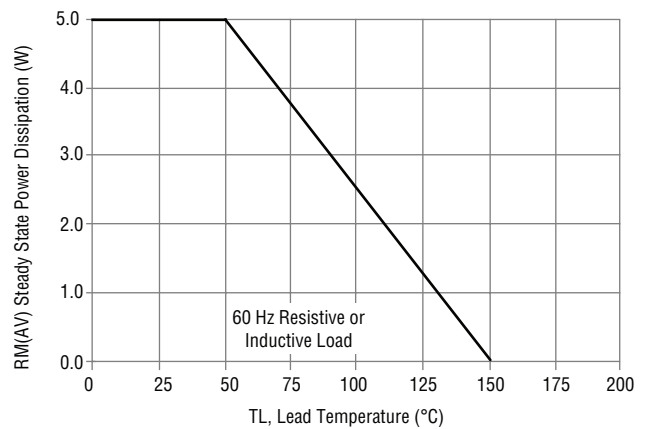
Typical Junction Capacitance



Pulse Rating Curve



Steady State Power Derating Curve



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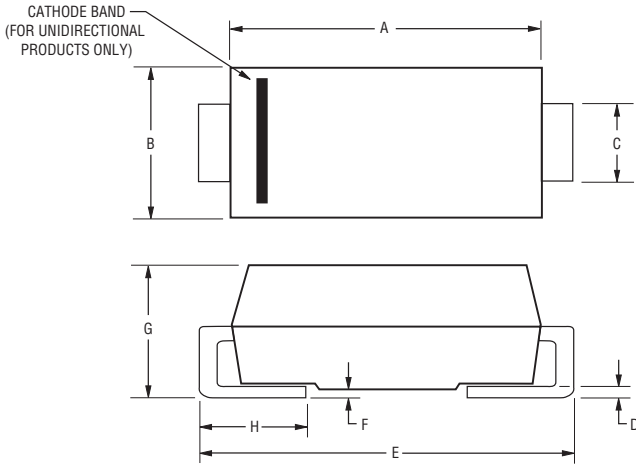
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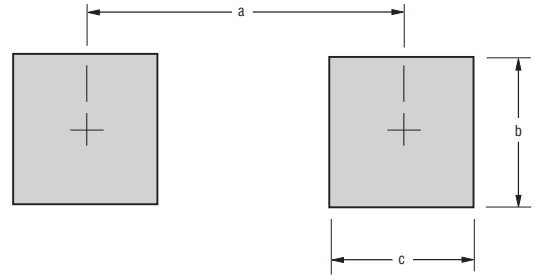
Product Dimensions



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

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

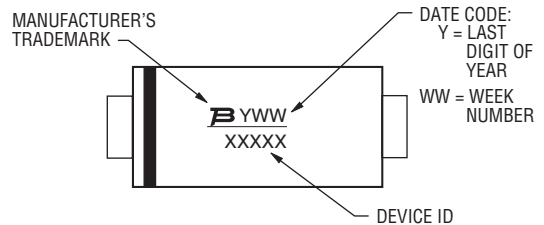
Physical Specifications

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

Environmental Specifications

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

Typical Part Marking



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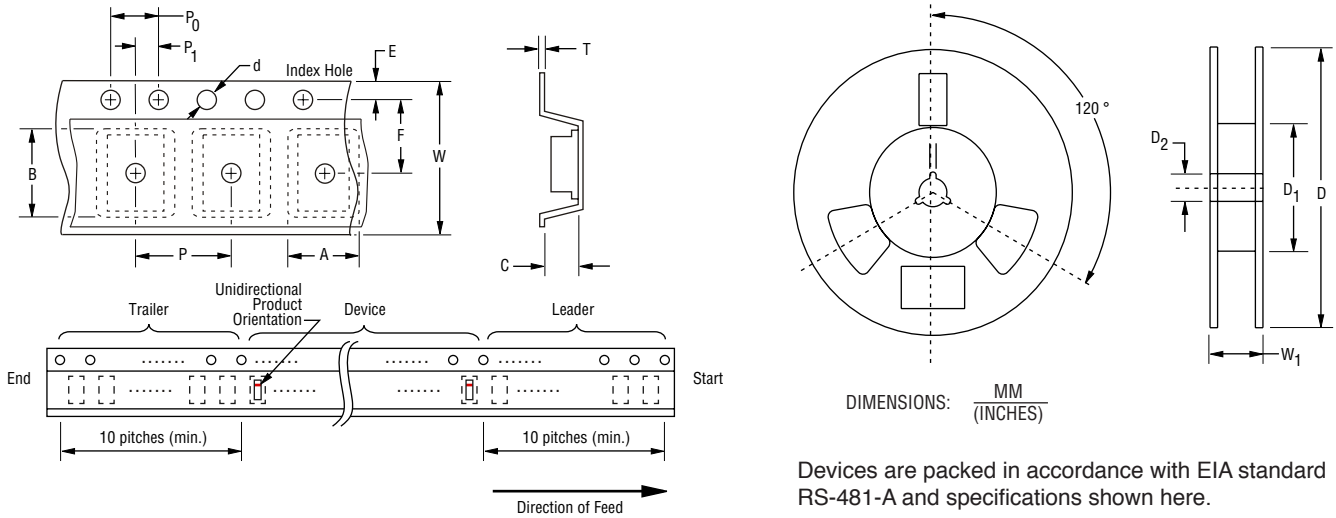
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P6SMB-Q Transient Voltage Suppressor Diode Series

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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 standard RS-481-A and specifications shown here.

Item	Symbol	SMB (DO-214AA)
		13-Inch Reel
Carrier Width	A	$\frac{3.67 \pm 0.20}{(0.144 \pm 0.008)}$
Carrier Length	B	$\frac{5.60 \pm 0.20}{(0.220 \pm 0.008)}$
Carrier Depth	C	$\frac{2.57 \pm 0.20}{(0.101 \pm 0.008)}$
Sprocket Hole	d	$\frac{1.50 \pm 0.10}{(0.059 \pm 0.004)}$
Reel Outside Diameter	D	$\frac{330}{(12.992)}$
Reel Inner Diameter	D ₁	$\frac{50.0}{(1.969)}$ MIN.
Feed Hole Diameter	D ₂	$\frac{13.0 \pm 0.20}{(0.512 \pm 0.008)}$
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	$\frac{8.00 \pm 0.10}{(0.315 \pm 0.004)}$
Sprocket Hole Pitch	P ₀	$\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$
Embossment Center	P ₁	$\frac{2.00 \pm 0.05}{(0.079 \pm 0.002)}$
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 ₁	$\frac{18.4}{(0.724)}$ MAX.
Quantity per Reel	--	3000

REV. 10/20

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