

Surface Mount Transient Voltage Suppressors

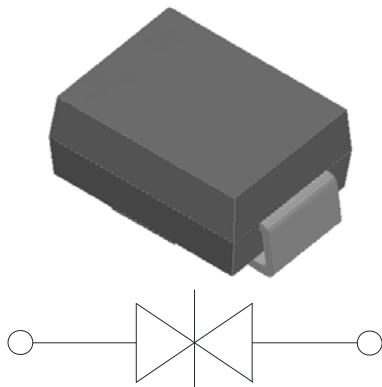
Uni-directional



Features

- Low profile package
- Ideal for automated placement
- Available in Uni-directional and Bi-directional
- 600 W peak pulse power capability with a 10/1000 μ s waveform
- Excellent clamping capability
- Very fast response time
- Low incremental surge resistance
- Meets MSL level 1, per J-STD-020C, LF maximum peak of 260 °C
- ESD protection of data lines in accordance with IEC 61000-4-2, 30kV(Air),30kV (Contact)
- Part no. with suffix "Q" means AEC-Q101 qualified

Bi-directional



Typical Applications

For use in sensitive electronics protection against voltage transients induced by inductive load switching and lighting on ICs, MOSFET, signal lines of sensor units for consumer, automotive, and telecommunication.

Mechanical Data

- **Package:** DO-214AA (SMB)
Molding compound meets UL 94 V-0 flammability rating, RoHS-compliant, halogen-free
- **Terminals:** Matte tin plated leads, solderable per J-STD-002 and JESD22-B102
- **Polarity:** For uni-directional types the band denotes cathode end, no marking on bi-directional types

■Maximum Ratings ($T_A=25^\circ\text{C}$ Unless otherwise specified)

PARAMETER	SYMBOL	UNIT	Max
Peak pulse power dissipation, with a 10/1000us waveform ^{(1) (2)} (Fig.1)	P_{PPM}	W	600
Peak pulse current, with a 10/1000us waveform ⁽¹⁾	I_{PPM}	A	See Next Table
Power dissipation, on infinite heat sink at $T_L=75^\circ\text{C}$	P_D	W	5.0
Peak forward surge current, 8.3 ms single half sine-wave unidirectional only ⁽²⁾	I_{FSM}	A	100
Operating junction	T_J	$^\circ\text{C}$	-55 to +175
Storage temperature range	T_{STG}	$^\circ\text{C}$	-55 to +175

■Electrical Characteristics ($T_A=25^\circ\text{C}$ Unless otherwise specified)

PARAMETER	SYMBOL	UNIT	VALUE
Maximum instantaneous forward voltage @ at 50A for unidirectional only ⁽³⁾	V_F	V	3.5



SMBJ5.0AQ THRU SMBJ190CAQ

■Electrical Characteristics (T_a=25°C Unless otherwise specified)

Part Number(Uni)	Part Number(Bi)	Breakdown Voltage V _{BR@I_T}			Maximum Reverse Leakage I _{R@} V _{RWM} (μA)	Working Peak Reverse Voltage V _{RWM} (V)	Maximum Reverse Surge Current I _{PP} ⁽⁵⁾ (A)	Maximum Clamping Voltage V _c @ I _{PP} (V)
		Min(V)	Max (V)	I _T ⁽⁴⁾ (mA)				
SMBJ5.0AQ	SMBJ5.0CAQ	6.4	7.07	10	800	5	65.2	9.2
SMBJ6.0AQ	SMBJ6.0CAQ	6.67	7.37	10	800	6	58.3	10.3
SMBJ6.5AQ	SMBJ6.5CAQ	7.22	7.98	10	500	6.5	53.6	11.2
SMBJ7.0AQ	SMBJ7.0CAQ	7.78	8.6	10	200	7	50	12
SMBJ7.5AQ	SMBJ7.5CAQ	8.33	9.21	1	100	7.5	46.5	12.9
SMBJ8.0AQ	SMBJ8.0CAQ	8.89	9.83	1	50	8	44.1	13.6
SMBJ8.5AQ	SMBJ8.5CAQ	9.44	10.4	1	10	8.5	41.7	14.4
SMBJ9.0AQ	SMBJ9.0CAQ	10	11.1	1	5	9	39.0	15.4
SMBJ10AQ	SMBJ10CAQ	11.10	12.30	1	5	10.0	35.3	17.0
SMBJ11AQ	SMBJ11CAQ	12.20	13.50	1	5	11.0	33.0	18.2
SMBJ12AQ	SMBJ12CAQ	13.30	14.70	1	5	12.0	30.2	19.9
SMBJ13AQ	SMBJ13CAQ	14.40	15.90	1	1	13.0	27.9	21.5
SMBJ14AQ	SMBJ14CAQ	15.60	17.20	1	1	14.0	25.9	23.2
SMBJ15AQ	SMBJ15CAQ	16.70	18.50	1	1	15.0	24.6	24.4
SMBJ16AQ	SMBJ16CAQ	17.80	19.70	1	1	16.0	23.1	26.0
SMBJ17AQ	SMBJ17CAQ	18.90	20.90	1	1	17.0	21.7	27.6
SMBJ18AQ	SMBJ18CAQ	20.00	22.10	1	1	18.0	20.6	29.2
SMBJ19AQ	SMBJ19CAQ	21.10	23.30	1	1	19.0	19.5	30.8
SMBJ20AQ	SMBJ20CAQ	22.20	24.50	1	1	20.0	18.5	32.4
SMBJ22AQ	SMBJ22CAQ	24.40	26.90	1	1	22.0	16.9	35.5
SMBJ24AQ	SMBJ24CAQ	26.70	29.50	1	1	24.0	15.4	38.9
SMBJ26AQ	SMBJ26CAQ	28.90	31.90	1	1	26.0	14.3	42.1
SMBJ28AQ	SMBJ28CAQ	31.10	34.40	1	1	28.0	13.2	45.4
SMBJ30AQ	SMBJ30CAQ	33.30	36.80	1	1	30.0	12.4	48.4
SMBJ33AQ	SMBJ33CAQ	36.70	40.60	1	1	33.0	11.3	53.3
SMBJ36AQ	SMBJ36CAQ	40.00	44.20	1	1	36.0	10.3	58.1
SMBJ40AQ	SMBJ40CAQ	44.40	49.10	1	1	40.0	9.3	64.5
SMBJ43AQ	SMBJ43CAQ	47.80	52.80	1	1	43.0	8.7	69.4
SMBJ45AQ	SMBJ45CAQ	50.00	55.30	1	1	45.0	8.3	72.7
SMBJ48AQ	SMBJ48CAQ	53.30	58.90	1	1	48.0	7.8	77.4
SMBJ51AQ	SMBJ51CAQ	56.70	62.70	1	1	51.0	7.3	82.4
SMBJ54AQ	SMBJ54CAQ	60.00	66.30	1	1	54.0	6.9	87.1
SMBJ58AQ	SMBJ58CAQ	64.40	71.20	1	1	58.0	6.4	93.6
SMBJ60AQ	SMBJ60CAQ	66.70	73.70	1	1	60.0	6.2	96.8
SMBJ64AQ	SMBJ64CAQ	71.10	78.60	1	1	64.0	5.8	103.0
SMBJ70AQ	SMBJ70CAQ	77.80	86.00	1	1	70.0	5.3	113.0
SMBJ75AQ	SMBJ75CAQ	83.30	92.10	1	1	75.0	5.0	121.0
SMBJ78AQ	SMBJ78CAQ	86.70	95.80	1	1	78.0	4.8	126.0
SMBJ80AQ	SMBJ80CAQ	88.80	97.60	1	1	80.0	4.6	129.6
SMBJ85AQ	SMBJ85CAQ	94.40	104.00	1	1	85.0	4.4	137.0
SMBJ90AQ	SMBJ90CAQ	100.00	111.00	1	1	90.0	4.1	146.0
SMBJ100AQ	SMBJ100CAQ	111.00	123.00	1	1	100.0	3.7	162.0
SMBJ110AQ	SMBJ110CAQ	122.00	135.00	1	1	110.0	3.4	177.0
SMBJ120AQ	SMBJ120CAQ	133.00	147.00	1	1	120.0	3.1	193.0
SMBJ130AQ	SMBJ130CAQ	144.00	159.00	1	1	130.0	2.9	209.0
SMBJ140AQ	SMBJ140CAQ	155.00	171.00	1	1	140.0	2.7	226.8
SMBJ150AQ	SMBJ150CAQ	167.00	185.00	1	1	150.0	2.5	243.0
SMBJ160AQ	SMBJ160CAQ	178.00	197.00	1	1	160.0	2.3	259.0
SMBJ170AQ	SMBJ170CAQ	189.00	209.00	1	1	170.0	2.2	275.0
SMBJ180AQ	SMBJ180CAQ	200.00	220.00	1	1	180.0	2.1	291.6
SMBJ190AQ	SMBJ190CAQ	211.00	232.00	1	1	190.0	2.0	307.8



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■ Thermal Characteristics (T_a=25°C Unless otherwise specified)

PARAMETER	SYMBOL	UNIT	Conditions	VALUE
Thermal resistance(Typical)	R _{θJL}	°C/W	junction to lead	20
	R _{θJA}	°C/W	junction to ambient	100

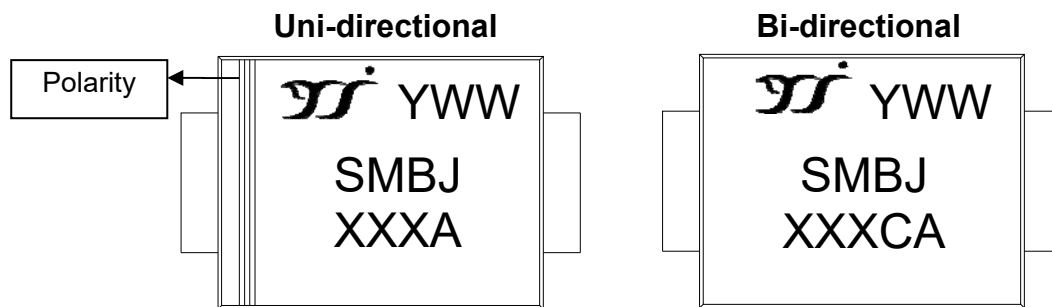
Notes:

- (1) Non-repetitive current pulse, per Fig.3 and derated above T_J= 50°C per Fig.2.
- (2) Mounted on 0.2 x 0.2" (5.0 x 5.0 mm) copper pads to each terminal.
- (3) VF<3.5V for devices of VBR<190V.
- (4) Pulse test: t_p≤50ms
- (5) Surge current waveform per Fig.3 and derated per Fig.2.

■ Ordering Information (Example)

PREFERRED P/N	PACKING CODE	UNIT WEIGHT(g)	MINIMUM PACKAGE(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
SMBJ SERIES	F1	Approximate 0.1003	3000	48000	13" reel

■ Marking Information



Note:

1. All marking is at middle of the product body
2. All marking is in laser printing
3. XXX is marking code, like 190A/190CA marking code is 190
4. Body color: Black
5. YWW is date code, "Y" is year. "WW" is week.

For instance:

The 17th week of 2021, date code is 117

The 17th week of 2022, date code is 217



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■ Characteristics (Typical)

Fig.1 Peak Pulse Power Rating Curve

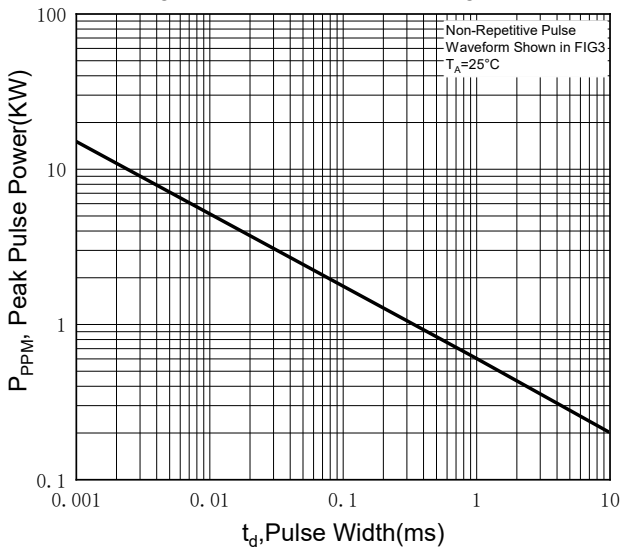


Fig.2 Pulse Power or Current vs. Initial Junction Temperature

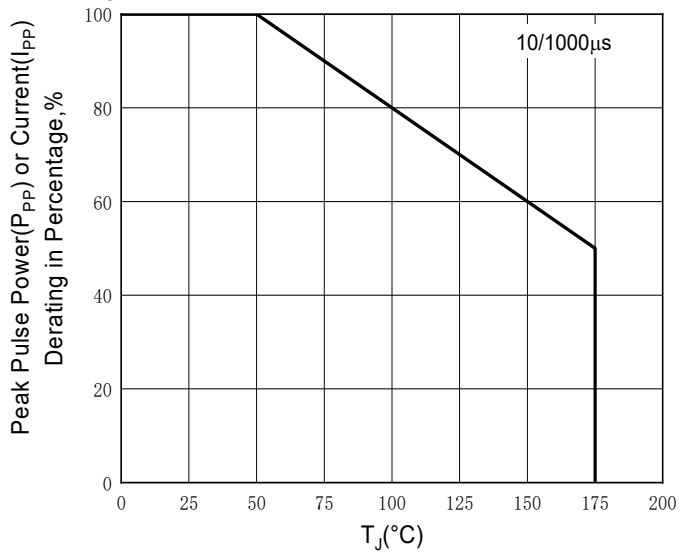


Fig.3 Pulse Waveform

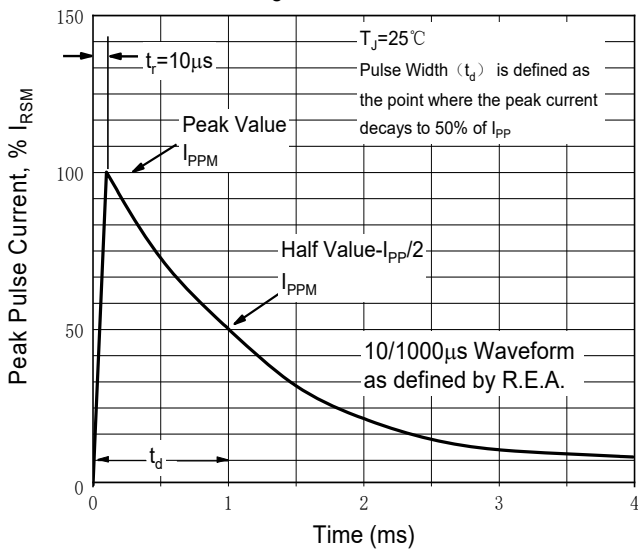


Fig.4 Typical Transient Thermal Impedance

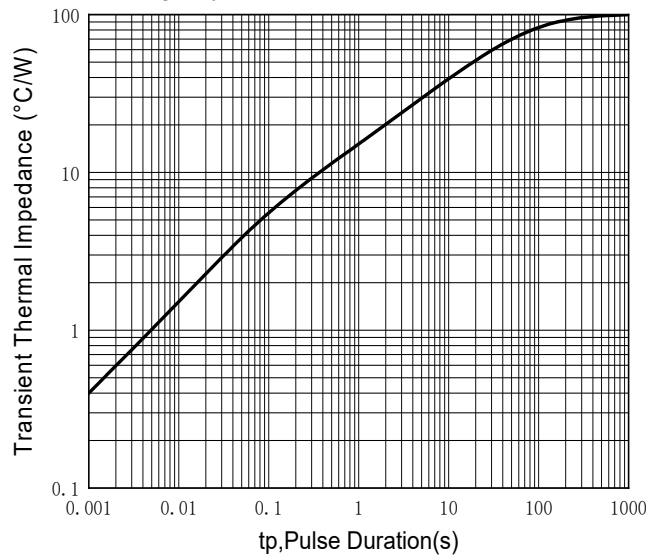


Fig.5 Maximum Non-Repetitive Forward Surge Current

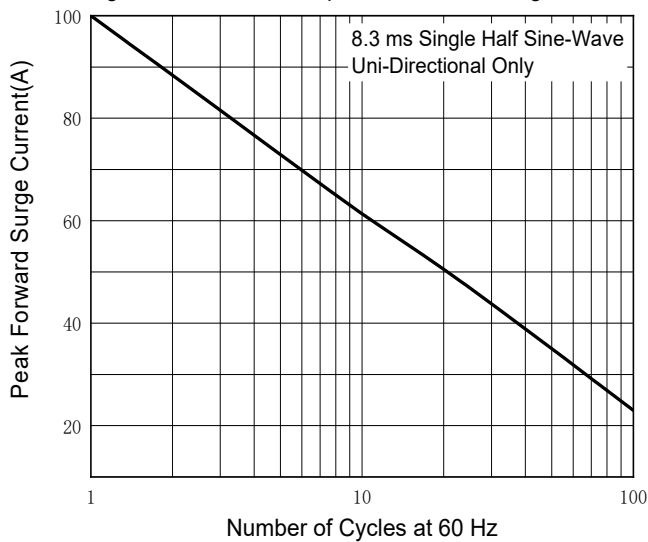
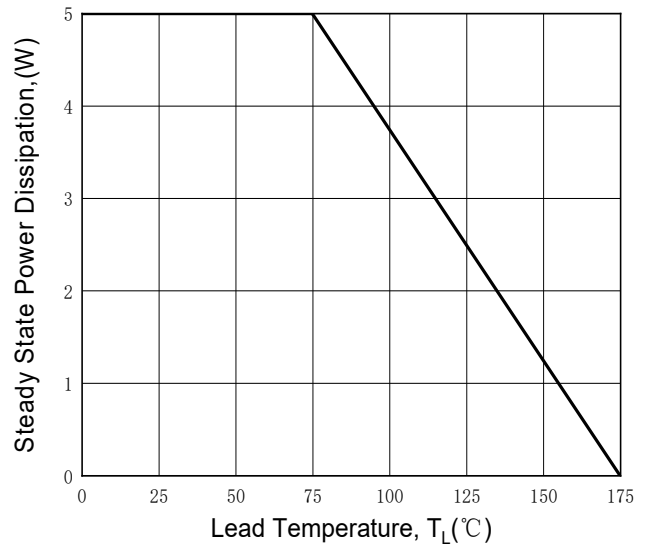


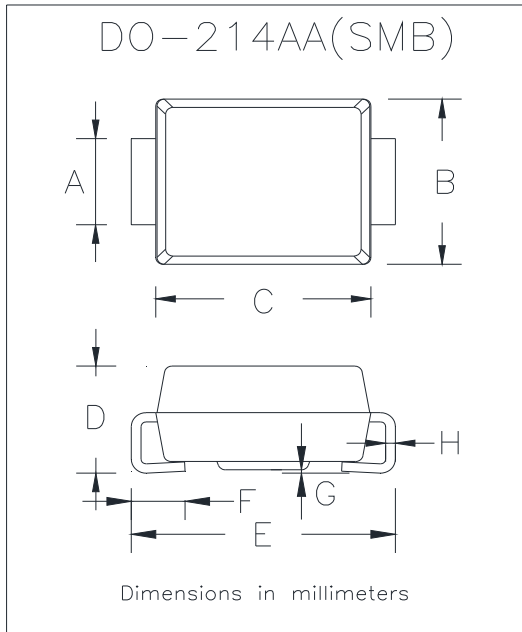
Fig.6 Steady State Power Derating Curve





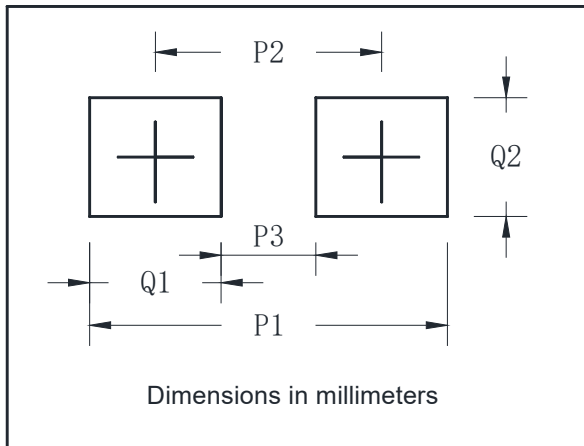
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■ Outline Dimensions



DO-214AA(SMB)		
Dim	Min	MCAx
A	1.85	2.15
B	3.30	3.94
C	4.05	4.75
D	1.99	2.61
E	5.21	5.59
F	0.90	1.41
G	0.05	0.20
H	0.15	0.31

■ Suggested pad layout



DO-214AA(SMB)	
Dim	Millimeters
P1	6.8
P2	4.3
P3	1.8
Q1	2.5
Q2	2.3



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