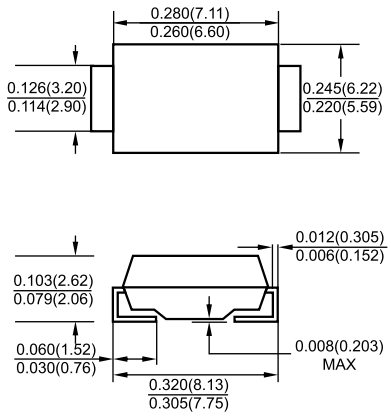
SMCJ SERIES

1500Watts Surface Mount Transient Voltage Suppressor

SMC/DO-214AB



Dimensions in inches and (millimeters)

Features

- ✧ For surface mounted application
- ✧ Low profile package
- ✧ Built-in strain relief
- ✧ Glass passivated junction
- ✧ Excellent clamping capability
- ✧ Fast response time: Typically less than 1.0ps from 0 volt to BV min.
- ✧ Typical I_R less than 1 μA above 10V
- ✧ High temperature soldering guaranteed: 260°C / 10 seconds at terminals
- ✧ Plastic material used carries Underwriters Laboratory Flammability Classification 94V-0
- ✧ 1500 watts peak pulse power capability with a 10 X 1000 us waveform by 0.01% duty cycle

Mechanical Data

- ✧ Case: Molded plastic
- ✧ Terminals: Pure tin plated lead free.
- ✧ Polarity: Indicated by cathode band
- ✧ Weight: 0.21gram

Maximum Ratings and Electrical Characteristics

Rating at 25 °C ambient temperature unless otherwise specified.

Type Number	Symbol	Value	Units
Peak Power Dissipation at T_A=25°C, Tp=1ms (Note 1)	P_{PK}	Minimum 1500	Watts
Steady State Power Dissipation	Pd	5	Watts
Peak Forward Surge Current, 8.3 ms Single Half Sine-wave Superimposed on Rated Load (JEDEC method) (Note 2, 3) - Unidirectional Only	I_{FSM}	200	Amps
Maximum Instantaneous Forward Voltage at 100.0A for Unidirectional Only (Note 4)	V_F	3.5 / 5.0	Volts
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to + 150	°C

Notes:
1. Non-repetitive Current Pulse Per Fig. 3 and Derated above T_A=25°C Per Fig. 2.
2. Mounted on 8.0mm^2 (.013mm Thick) Copper Pads to Each Terminal.
3. 8.3ms Single Half Sine-wave or Equivalent Square Wave, Duty Cycle=4 Pulses Per Minute Maximum.
4. V_F=3.5V on SMCJ5.0 thru SMCJ90 Devices and V_F=5.0V on SMCJ100 thru SMCJ170 Devices.

Devices for Bipolar Applications

1. For Bidirectional Use C or CA Suffix for Types SMCJ5.0 through Types SMCJ170.
2. Electrical Characteristics Apply in Both Directions.

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RATINGS AND CHARACTERISTIC CURVES (SMCJ SERIES)

FIG.1- PEAK PULSE POWER RATING CURVE

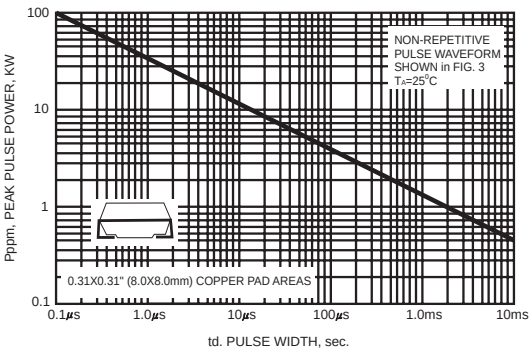


FIG.2- DERATING CURVE

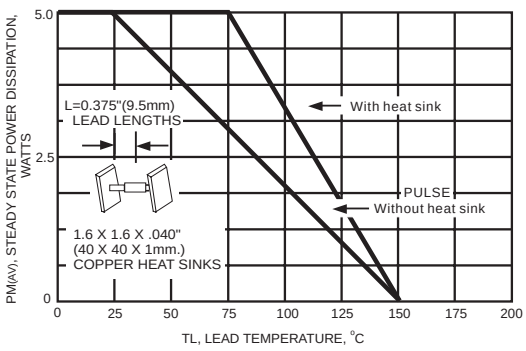


FIG.3- CLAMPING POWER PULSE WAVEFORM

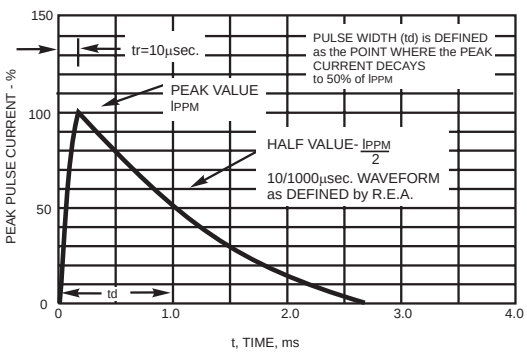


FIG.4- MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT

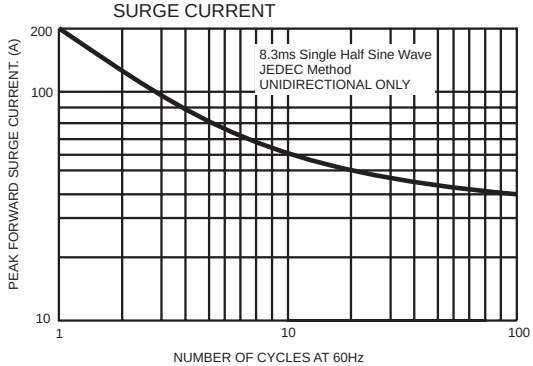
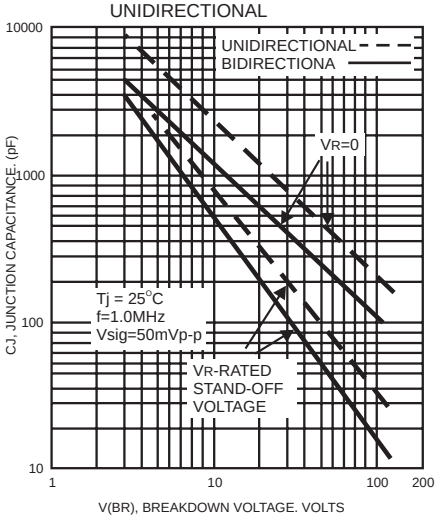


FIG.5- TYPICAL JUNCTION CAPACITANCE
UNIDIRECTIONAL



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ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)

Device Type Modified "J" Bend Lead	Marking Code	Breakdown Voltage V(BR) (Volts) (Note 1) (MIN / MAX)	Test Current at I_T(mA)	Stand-off voltage V_{WM}(Volts)	Maximum Reverse Leakage at V_{WM} (Note 3) I_D(uA)	Maximum Peak Pulse Surge Current I_{PPM} (Note 2) (Amps)	Maximum Clamping Voltage at I_{PPM} V_C(Volts)
SMCJ5.0	SMCJ5.0	6.40 / 7.3	10.0	5.0	1000	164.0	9.6
SMCJ5.0A	SMCJ5.0A	6.40 / 7.0	10.0	5.0	1000	171.0	9.2
SMCJ6.0	SMCJ6.0	6.67 / 8.15	10.0	6.0	1000	138.0	11.4
SMCJ6.0A	SMCJ6.0A	6.67 / 7.37	10.0	6.0	1000	152.0	10.3
SMCJ6.5	SMCJ6.5	7.22 / 8.82	10.0	6.5	500	128.0	12.3
SMCJ6.5A	SMCJ6.5A	7.22 / 7.98	10.0	6.5	500	140.0	11.2
SMCJ7.0	SMCJ7.0	7.78 / 9.51	10.0	7.0	200	118.0	13.3
SMCJ7.0A	SMCJ7.0A	7.78 / 8.60	10.0	7.0	200	131.0	12.0
SMCJ7.5	SMCJ7.5	8.33 / 10.3	1.0	7.5	100	110.0	14.3
SMCJ7.5A	SMCJ7.5A	8.33 / 9.21	1.0	7.5	100	122.0	12.9
SMCJ8.0	SMCJ8.0	8.89 / 10.9	1.0	8.0	50	105.0	15.0
SMCJ8.0A	SMCJ8.0A	8.89 / 9.83	1.0	8.0	50	115.0	13.6
SMCJ8.5	SMCJ8.5	9.44 / 11.5	1.0	8.5	20	99.0	15.9
SMCJ8.5A	SMCJ8.5A	9.44 / 10.4	1.0	8.5	20	109.0	14.4
SMCJ9.0	SMCJ9.0	10.0 / 12.2	1.0	9.0	10	93.0	16.9
SMCJ9.0A	SMCJ9.0A	10.0 / 11.1	1.0	9.0	10	102.0	15.4
SMCJ10	SMCJ10	11.1 / 13.6	1.0	10.0	5.0	83.0	18.8
SMCJ10A	SMCJ10A	11.1 / 12.3	1.0	10.0	5.0	92.0	17.0
SMCJ11	SMCJ11	12.2 / 14.9	1.0	11.0	5.0	78.0	20.1
SMCJ11A	SMCJ11A	12.2 / 13.5	1.0	11.0	5.0	86.0	18.2
SMCJ12	SMCJ12	13.3 / 16.3	1.0	12.0	5.0	71.0	22.0
SMCJ12A	SMCJ12A	13.3 / 14.7	1.0	12.0	5.0	79.0	19.9
SMCJ13	SMCJ13	14.4 / 17.6	1.0	13.0	5.0	66.0	23.8
SMCJ13A	SMCJ13A	14.4 / 15.9	1.0	13.0	5.0	73.0	21.5
SMCJ14	SMCJ14	15.6 / 19.1	1.0	14.0	5.0	61.0	25.8
SMCJ14A	SMCJ14A	15.6 / 17.2	1.0	14.0	5.0	67.0	23.2
SMCJ15	SMCJ15	16.7 / 20.4	1.0	15.0	5.0	58.0	26.9
SMCJ15A	SMCJ15A	16.7 / 18.5	1.0	15.0	5.0	64.0	24.4
SMCJ16	SMCJ16	17.8 / 21.8	1.0	16.0	5.0	54.0	28.8
SMCJ16A	SMCJ16A	17.8 / 19.7	1.0	16.0	5.0	60.0	26.0
SMCJ17	SMCJ17	18.9 / 23.1	1.0	17.0	5.0	51.0	30.5
SMCJ17A	SMCJ17A	18.9 / 20.9	1.0	17.0	5.0	57.0	27.6
SMCJ18	SMCJ18	20.0 / 24.4	1.0	18.0	5.0	48.0	32.2
SMCJ18A	SMCJ18A	20.0 / 22.1	1.0	18.0	5.0	53.0	29.2
SMCJ20	SMCJ20	22.2 / 27.1	1.0	20.0	5.0	43.0	35.8
SMCJ20A	SMCJ20A	22.2 /24.5	1.0	20.0	5.0	48.0	32.4
SMCJ22	SMCJ22	24.4 / 29.8	1.0	22.0	5.0	39.0	39.4
SMCJ22A	SMCJ22A	24.4 / 26.9	1.0	22.0	5.0	44.0	35.5
SMCJ24	SMCJ24	26.7 / 32.6	1.0	24.0	5.0	36.0	43.0
SMCJ24A	SMCJ24A	26.7 / 29.5	1.0	24.0	5.0	40.0	38.9
SMCJ26	SMCJ26	28.9 / 35.3	1.0	26.0	5.0	33.0	46.6
SMCJ26A	SMCJ26A	28.9 / 31.9	1.0	26.0	5.0	37.0	42.1
SMCJ28	SMCJ28	31.1 / 38.0	1.0	28.0	5.0	31.0	50.0
SMCJ28A	SMCJ28A	31.1 / 34.4	1.0	28.0	5.0	34.0	45.4
SMCJ30	SMCJ30	33.3 / 40.7	1.0	30.0	5.0	29.0	53.5
SMCJ30A	SMCJ30A	33.3 / 36.8	1.0	30.0	5.0	32.0	48.4
SMCJ33	SMCJ33	36.7 / 44.9	1.0	33.0	5.0	26.0	59.0
SMCJ33A	SMCJ33A	36.7 / 40.6	1.0	33.0	5.0	29.0	53.3
SMCJ36	SMCJ36	40.0 / 48.9	1.0	36.0	5.0	24.0	64.3
SMCJ36A	SMCJ36A	40.0 / 44.2	1.0	36.0	5.0	27.0	58.1
SMCJ40	SMCJ40	44.4 / 54.3	1.0	40.0	5.0	22.0	71.4
SMCJ40A	SMCJ40A	44.4 / 49.1	1.0	40.0	5.0	24.0	64.5
SMCJ43	SMCJ43	47.8 / 58.4	1.0	43.0	5.0	20.0	76.7
SMCJ43A	SMCJ43A	47.8 / 52.8	1.0	43.0	5.0	22.0	69.4

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Device Type Modified "J" Bend Lead	Device Marking Code	Breakdown Voltage $V_{(BR)}$ (Volts) (Note 1) (MIN / MAX)	Test Current at I_T(mA)	Stand-off voltage V_{WM}(Volts)	Maximum Reverse Leakage at V_{WM} (Note 3) I_D(uA)	Maximum Peak Pulse Surge Current I_{PPM} (Note 2) (Amps)	Maximum Clamping Voltage at I_{PPM} V_C(Volts)
SMCJ45	SMCJ45	50.0 / 61.1	1.0	45.0	5.0	19.0	80.3
SMCJ45A	SMCJ45A	50.0 / 55.3	1.0	45.0	5.0	21.0	72.7
SMCJ48	SMCJ48	53.3 / 65.1	1.0	48.0	5.0	18.0	85.5
SMCJ48A	SMCJ48A	53.3 / 58.9	1.0	48.0	5.0	20.0	77.4
SMCJ51	SMCJ51	56.7 / 69.3	1.0	51.0	5.0	17.0	91.1
SMCJ51A	SMCJ51A	56.7 / 62.7	1.0	51.0	5.0	19.0	82.4
SMCJ54	SMCJ54	60.0 / 73.3	1.0	54.0	5.0	16.0	96.3
SMCJ54A	SMCJ54A	60.0 / 66.3	1.0	54.0	5.0	18.0	87.1
SMCJ58	SMCJ58	64.4 / 78.7	1.0	58.0	5.0	15.0	103.0
SMCJ58A	SMCJ58A	64.4 / 71.2	1.0	58.0	5.0	16.0	93.6
SMCJ60	SMCJ60	66.7 / 81.5	1.0	60.0	5.0	14.0	107.0
SMCJ60A	SMCJ60A	66.7 / 73.7	1.0	60.0	5.0	16.0	96.8
SMCJ64	SMCJ64	71.1 / 86.9	1.0	64.0	5.0	13.8	114.0
SMCJ64A	SMCJ64A	71.1 / 78.6	1.0	64.0	5.0	15.0	103.0
SMCJ70	SMCJ70	77.8 / 95.1	1.0	70.0	5.0	12.6	125.0
SMCJ70A	SMCJ70A	77.8 / 86.0	1.0	70.0	5.0	13.9	113.0
SMCJ75	SMCJ75	83.3 / 102	1.0	75.0	5.0	11.7	134.0
SMCJ75A	SMCJ75A	83.3 / 92.1	1.0	75.0	5.0	13.0	121.0
MSJC78	MSJC78	86.7 / 106	1.0	78.0	5.0	11.3	139.0
SMCJ78A	SMCJ78A	86.7 / 95.8	1.0	78.0	5.0	12.5	126.0
SMCJ85	SMCJ85	94.4 / 115	1.0	85.0	5.0	10.4	151.0
SMCJ85A	SMCJ85A	94.4 / 104	1.0	85.0	5.0	11.5	137.0
SMCJ90	SMCJ90	100 / 122	1.0	90.0	5.0	9.8	160.0
SMCJ90A	SMCJ90A	100 / 111	1.0	90.0	5.0	10.7	146.0
SMCJ100	SMCJ100	111 / 136	1.0	100.0	5.0	8.8	179.0
SMCJ100A	SMCJ100A	111 / 123	1.0	100.0	5.0	9.7	162.0
SMCJ110	SMCJ110	122 / 149	1.0	110.0	5.0	8.0	196.0
SMCJ110A	SMCJ110A	122 / 135	1.0	110.0	5.0	8.9	177.0
SMCJ120	SMCJ120	133 / 163	1.0	120.0	5.0	7.3	214.0
SMCJ120A	SMCJ120A	133 / 147	1.0	120.0	5.0	8.1	193.0
SMCJ130	SMCJ130	144 / 176	1.0	130.0	5.0	6.8	231.0
SMCJ130A	SMCJ130A	144 / 159	1.0	130.0	5.0	7.5	209.0
SMCJ150	SMCJ150	167 / 204	1.0	150.0	5.0	5.8	268.0
SMCJ150A	SMCJ150A	167 / 185	1.0	150.0	5.0	6.4	243.0
SMCJ160	SMCJ160	178 / 218	1.0	160.0	5.0	5.4	287.0
SMCJ160A	SMCJ160A	178 / 197	1.0	160.0	5.0	6.0	259.0
SMCJ170	SMCJ170	189 / 231	1.0	170.0	5.0	5.1	304.0
SMCJ170A	SMCJ170A	189 / 209	1.0	170.0		5.7	275.0

Notes:

1. $V_{(BR)}$ measured after I_T applied for 300us, I_T=Square wave pulse or equivalent.
2. Surge current waveform per Fig. 3 and derate per Figure 2.
3. For bidirectional types having V_{WM} of 10 Volts and less, the I_D limit is doubled
4. all terms and symbols are consistent with ANSI/IEEE C62.35

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TVS APPLICATION NOTES:

Transient Voltage Suppressors may be used at various points in a circuit to provide various degrees of protection. The following is a typical linear power supply with transient voltage suppressor units placed at different points. All provide protection of the load.

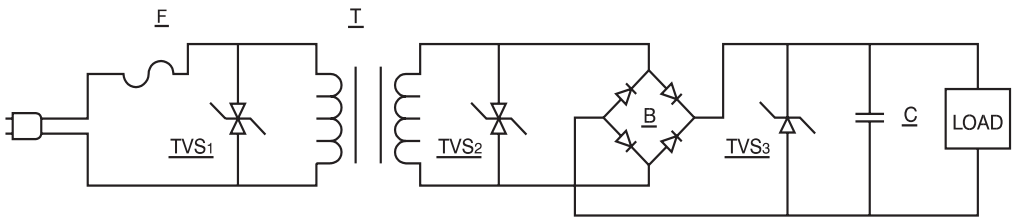

FIGURE 1

Transient Voltage Suppressors 1 provides maximum protection. However, the system will probably require replacement of the line fuse(F) since it provides a dominant portion of the series impedance when a surge is encountered.

However, we do not recommend to use the TVS diode here, unless we can know the electric circuit impedance and the magnitude of surge rushed into the circuit. Otherwise the TVS diode is easy to be destroyed by voltage surge.

Transient Voltage Suppressor 2 provides execllent protection of circuitry excluding the transformer(T). However, since the transformer is a large part of the series impedance, the chance of the line fuse opening during the surge condition is reduced.

Dimensions in inches and (millimeters)

Transient Voltage Suppressor 3 provides the load with complete protection. It uses a unidirectional Transient Voltage Suppressor, which is a cost advantage. The series impedance now includes the line fuse, transformer, and bridge rectifier(B) so failure of the line fuse is further reduced. If only Transient Voltage Suppressor 3 is in use, then the bridge rectifier is unprotected and would require a higher voltage and current rating to prevent failure by transients.

Any combination of these three, or any one of these applications, will prevent damage to the load. This would require varying trade-offs in power supply protection versus maintenance(changing the time fuse).

An additional method is to utilize the Transient Voltage Suppressor units as a controlled avalanche bridge. This reduces the parts count and incorporates the protection within the bridge rectifier.

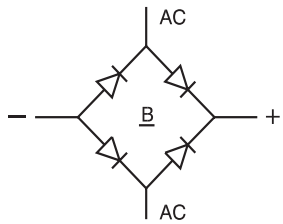

FIGURE 2

RECOMMENDED PAD SIZES

The pad dimensions should be 0.010"(0.25mm) longer than the contact size, in the lead axis.
This allows a solder fillet to form, see figure below. Contact factory for soldering methods.