

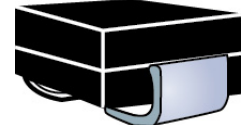


# Surface Mount 1500 Watt Transient Voltage Suppressor

Screening in  
reference to  
MIL-PRF-19500  
available

## DESCRIPTION

The MSMCJ5.0A thru MXLSMCJ170A series of 1500 watt high-reliability controlled Transient Voltage Suppressors (TVSs) protects a variety of voltage-sensitive components. This J-bend design (SMCJ) in the DO-214AB package allows for greater PC board mounting density. Selections include unidirectional and bidirectional as well as RoHS compliant versions. These are available in a variety of screened versions. They can protect from secondary lightning effects per IEC61000-4-5 and class levels defined herein, or for inductive switching environments and induced RF protection. Since their response time is virtually instantaneous, they can also be used in protection from ESD and EFT per IEC61000-4-2 and IEC61000-4-4. Microsemi also offers numerous other products to meet higher and lower power voltage regulation applications.



### DO-214AB J-Bend Package

NOTE: All SMC series are equivalent to prior SMM package identifications.

**Important:** For the latest information, visit our website <http://www.microsemi.com>.

## FEATURES

- High reliability controlled devices with fabrication and assembly lot traceability.
- 100% surge tested devices.
- 3 $\sigma$  lot norm screening performed on standby current  $I_D$ .
- Available in both unidirectional and bidirectional construction.
- Moisture classification is "Level 1" with no dry pack required per IPC/JEDEC J-STD-020B.
- Other screening options are available in reference to MIL-PRF-19500. (See [part nomenclature](#) for all available options). Refer to [MicroNote 129](#) for more details on the screening options.
- RoHS compliant versions available.
- Axial-lead equivalent packages for thru-hole mounting are available as 1.5KE6.8A to 1.5KE200CA or 1N6267 thru 1N6303A and 1N5908 (contact Microsemi for other surface mount options).

Also available in:

### Commercial DO-214AB package

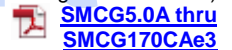
(J-bend surface mount)



[SMCJ5.0A thru SMCJ170CAe3](#)

### Commercial DO-215AB package

(Gull-Wing surface mount)



[SMCG5.0A thru SMCG170CAe3](#)

### Hi-Rel DO-215AB package

(Gull-Wing surface mount)



[MSMCG5.0A thru MXLMSMCG170CAe3](#)

## APPLICATIONS / BENEFITS

- High-reliability controlled devices.
- Selections for 5.0 to 170 volts standoff voltages ( $V_{WM}$ ).
- Protection from switching transients and induced RF.
- Protection from ESD, and EFT per IEC 61000-4-2 and IEC 61000-4-4.
- Secondary lightning protection per IEC61000-4-5 with 42 ohms source impedance:
  - Class 1: MSMCJ 5.0A to MXLSMCJ 170A or CA
  - Class 2: MSMCJ 5.0A to MXLSMCJ 150A or CA
  - Class 3: MSMCJ 5.0A to MXLSMCJ 75A or CA
  - Class 4: MSMCJ 5.0A to MXLSMCJ 36A or CA
- Secondary lightning protection per IEC61000-4-5 with 12 ohms source impedance:
  - Class 1: MSMCJ 5.0A to MXLSMCJ 90A or CA
  - Class 2: MSMCJ 5.0A to MXLSMCJ 45A or CA
  - Class 3: MSMCJ 5.0A to MXLSMCJ 24A or CA
  - Class 4: MSMCJ 5.0A to MXLSMCJ 11A or CA
- Secondary lightning protection per IEC61000-4-5 with 2 ohms source impedance:
  - Class 2: MSMCJ 5.0A to MXLSMCJ 22A or CA
  - Class 3: MSMCJ 5.0A to MXLSMCJ 10A or CA

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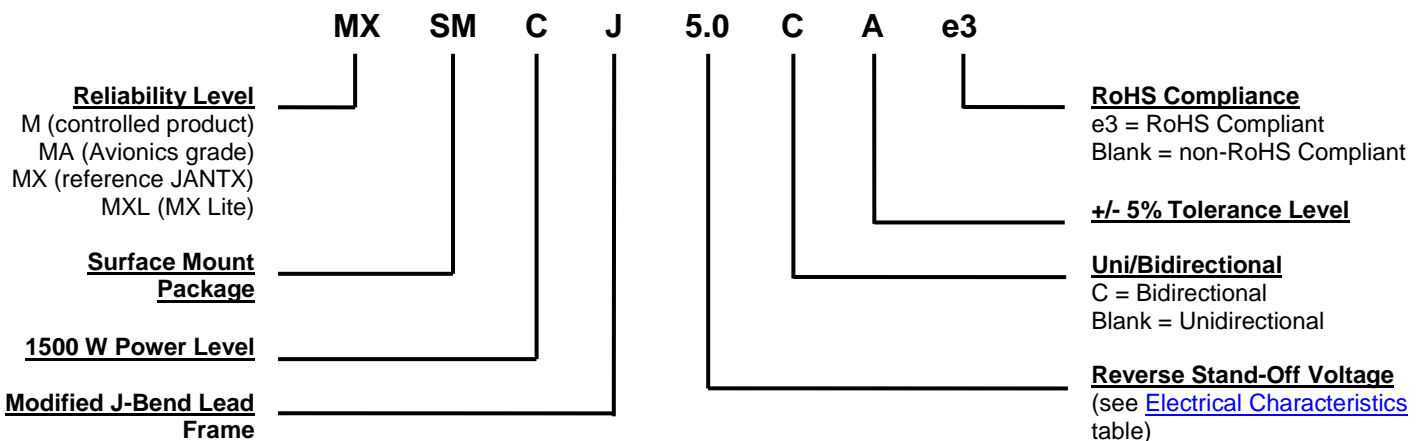
**MAXIMUM RATINGS**

Parameters/Test Conditions	Symbol	Value	Unit
Junction and Storage Temperature	T <sub>J</sub> and T <sub>STG</sub>	-65 to +150	°C
Thermal Resistance Junction-to-Lead	R <sub>θJL</sub>	20	°C/W
Thermal Resistance Junction-to-Ambient <sup>(1)</sup>	R <sub>θJA</sub>	80	°C/W
Peak Pulse Power dissipation @ 25 °C (at 10/1000 μs, see <a href="#">Figures 1, 2, and 3</a> )	P <sub>PP</sub>	1500	W
Impulse Repetition Rate (duty factor)	df	0.01	%
t <sub>clamping</sub> (0 volts to V <sub>(BR)</sub> min.)	Unidirectional	<100	ps
	Bidirectional	<5	ns
Off-State Power Dissipation	T <sub>L</sub> = +30 °C	6	W
	T <sub>A</sub> = +25 °C	1.56 <sup>(1)</sup>	
Maximum Forward Surge Current <sup>(2)</sup>	I <sub>FSM</sub>	200	A (pk)
Solder Temperature @ 10 s	T <sub>SP</sub>	260	°C

- Notes:** 1. When mounted on FR4 PC board (1oz Cu) with recommended footprint (see [last page](#)).  
 2. Peak impulse of 8.3 ms half-sine wave at 25 °C (unidirectional only).

**MECHANICAL and PACKAGING**

- CASE: Void-free transfer molded thermosetting epoxy body meeting UL94V-0.
- TERMINALS: J-bend, tin-lead (90% Sn, 10% Pb) or RoHS compliant annealed matte-tin (100% Sn) plating. Solderable to MIL-STD-750, method 2026.
- MARKING: Part number marked on package.
- POLARITY: Cathode indicated by band. No cathode band on bi-directional devices.
- TAPE & REEL option: Standard per EIA-481-2 with 16 mm tape (add "TR" suffix to part number). Consult factory for quantities.
- WEIGHT: 0.25 grams (approximate).
- See [Package Dimensions](#) on last page.

**PART NOMENCLATURE**


**SYMBOLS & DEFINITIONS**

Symbol	Definition
$I_{(BR)}$	Breakdown Current: The current used for measuring breakdown voltage $V_{(BR)}$ .
$I_D$	Standby Current: The current at the rated standoff voltage ( $V_{WM}$ ).
$I_F$	Forward Current: The forward current dc value, no alternating component.
$I_o$	Average Rectified Output Current: The output current averaged over a full cycle with a 50 Hz or 60 Hz sine-wave input and a 180 degree conduction angle.
$I_{PP}$	Peak Impulse Current: The peak current during the impulse.
$P_{PP}$	Peak Pulse Power: The peak power dissipation resulting from the peak impulse current $I_{PP}$ .
$V_C$	Maximum Clamping Voltage at specified $I_{PP}$ (Peak Pulse Current) at the specified pulse conditions.
$V_{(BR)}$	Minimum Breakdown Voltage: The minimum voltage the device will exhibit at a specified current.
$V_{WM}$	Working Peak Voltage: The maximum peak voltage that can be applied over the operating temperature range. This is also referred to as standoff voltage.

**ELECTRICAL CHARACTERISTICS @ 25 °C unless otherwise stated**

MICROSEMI PART NUMBER	REVERSE STAND-OFF VOLTAGE $V_{WM}$  Volts	BREAKDOWN VOLTAGE $V_{(BR)}$ @ $I_{(BR)}$ Volts		MAXIMUM CLAMPING VOLTAGE @ $I_{PP}$  Volts	PEAK PULSE CURRENT (See Fig. 2) $I_{PP}$  Amps	MAXIMUM STANDBY CURRENT @ $V_{WM}$ $I_D$ $\mu A$
		MIN.	MAX.			
MSMCJ5.0A	5.0	6.40	7.00	10	9.2	163.0
MSMCJ6.0A	6.0	6.67	7.37	10	10.3	145.6
MSMCJ6.5A	6.5	7.22	7.98	10	11.2	133.9
MSMCJ7.0A	7.0	7.78	8.60	10	12.0	125.0
MSMCJ7.5A	7.5	8.33	9.21	1	12.9	116.3
MSMCJ8.0A	8.0	8.89	9.83	1	13.6	110.3
MSMCJ8.5A	8.5	9.44	10.4	1	14.4	104.2
MSMCJ9.0A	9.0	10.0	11.1	1	15.4	97.4
MSMCJ10A	10	11.1	12.3	1	17.0	88.2
MSMCJ11A	11	12.2	13.5	1	18.2	82.4
MSMCJ12A	12	13.3	14.7	1	19.9	75.3
MSMCJ13A	13	14.4	15.9	1	21.5	69.7
MSMCJ14A	14	15.6	17.2	1	23.2	64.7
MSMCJ15A	15	16.7	18.5	1	24.4	61.5
MSMCJ16A	16	17.8	19.7	1	26.0	57.7
MSMCJ17A	17	18.9	20.9	1	27.6	53.3
MSMCJ18A	18	20.0	22.1	1	29.2	51.4
MSMCJ20A	20	22.2	24.5	1	32.4	46.3
MSMCJ22A	22	24.4	26.9	1	35.5	42.2
MSMCJ24A	24	26.7	29.5	1	38.9	38.6
MSMCJ26A	26	28.9	31.9	1	42.1	35.6
MSMCJ28A	28	31.1	34.4	1	45.4	33.0
MSMCJ30A	30	33.3	36.8	1	48.4	31.0
MSMCJ33A	33	36.7	40.6	1	53.3	28.1
MSMCJ36A	36	40.0	44.2	1	58.1	25.8
MSMCJ40A	40	44.4	49.1	1	64.5	23.2
MSMCJ43A	43	47.8	52.8	1	69.4	21.6
MSMCJ45A	45	50.0	55.3	1	72.7	20.6
MSMCJ48A	48	53.3	58.9	1	77.4	19.4
MSMCJ51A	51	56.7	62.7	1	82.4	18.2
MSMCJ54A	54	60.0	66.3	1	87.1	17.2
MSMCJ58A	58	64.4	71.2	1	93.6	16.0
MSMCJ60A	60	66.7	73.7	1	96.8	15.5
MSMCJ64A	64	71.1	78.6	1	103.0	14.6
MSMCJ70A	70	77.8	86.0	1	113	13.3
MSMCJ75A	75	83.3	92.1	1	121	12.4

*Continued.*

**ELECTRICAL CHARACTERISTICS @ 25 °C unless otherwise stated (continued)**

MICROSEMI PART NUMBER	REVERSE STAND-OFF VOLTAGE $V_{WM}$ Volts	BREAKDOWN VOLTAGE $V_{(BR)}$ @ $I_{(BR)}$ Volts		$I_{(BR)}$ mA	MAXIMUM CLAMPING VOLTAGE @ $I_{PP}$ Volts	PEAK PULSE CURRENT (See Fig. 2) $I_{PP}$ Amps	MAXIMUM STANDBY CURRENT @ $V_{WM}$ $I_D$ $\mu A$
		MIN.	MAX.				
MSMCJ78A	78	86.7	95.8	1	126	11.4	1
MSMCJ85A	85	94.4	104.0	1	137	10.4	1
MSMCJ90A	90	100	111	1	146	10.3	1
MSMCJ100A	100	111	123	1	162	9.3	1
MSMCJ110A	110	122	135	1	177	8.4	1
MSMCJ120A	120	133	147	1	193	7.8	1
MSMCJ130A	130	144	159	1	209	7.2	1
MSMCJ150A	150	167	185	1	243	6.2	1
MSMCJ160A	160	178	197	1	259	5.8	1
MSMCJ170A	170	189	209	1	275	5.5	1

**NOTE 1:** For bidirectional device types indicate a CA suffix after the part number. (i.e.: MASMJC170CA). Bidirectional capacitance is half that shown in [Figure 4](#) at zero volts.

**NOTE 2:** Microsemi Corp's MSMC series (1500 W) surface mountable packages are designed specifically for transient voltage suppression. The wide leads assure a large surface contact for good heat dissipation, and a low resistance path for surge current flow to ground. These high speed transient voltage suppressors can be used to effectively protect sensitive components such as integrated circuits and MOS device.

GRAPHS

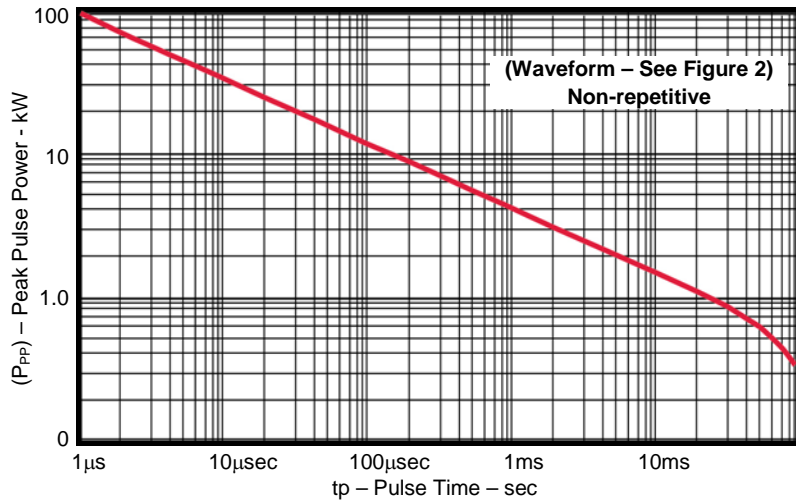


FIGURE 1 – Peak Pulse Power vs. Pulse Time

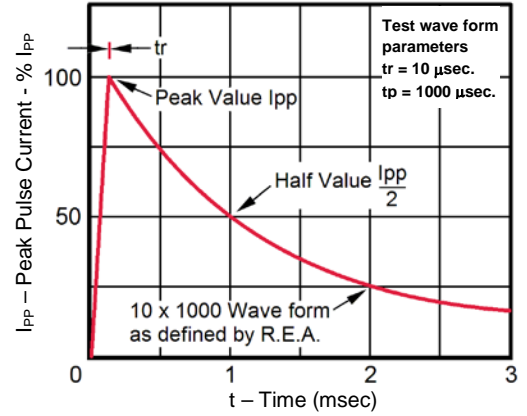


FIGURE 2 – Pulse Waveform

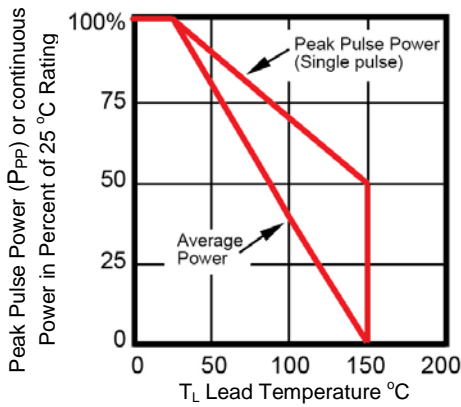


FIGURE 3 – Derating Curve

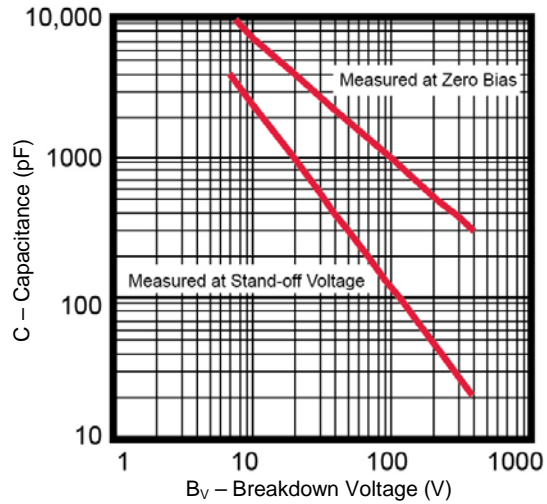
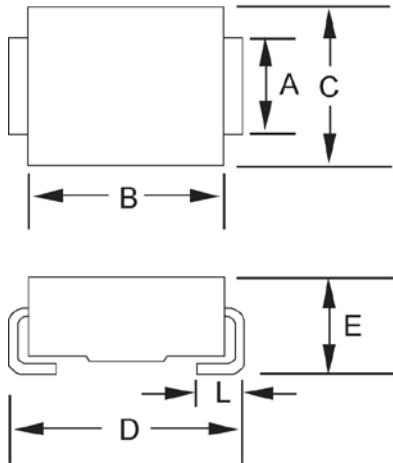
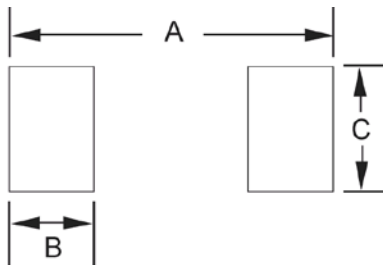


FIGURE 4  
Typical Capacitance vs.  
Breakdown Voltage

**PACKAGE DIMENSIONS**


Ltr	Dimensions			
	Inch		Millimeters	
	Min	Max	Min	Max
<b>A</b>	.115	.121	2.92	3.07
<b>B</b>	.260	.280	6.60	7.11
<b>C</b>	.220	.245	5.59	6.22
<b>D</b>	.305	.320	7.75	8.13
<b>E</b>	.077	.110	1.95	2.80
<b>L</b>	.030	.060	.760	1.52

**NOTES:** Dimension "E" exceeds the JEDEC outline in height as shown.  
 Typical Standoff Height: 0.004" – 0.008" (0.1 mm – 0.2 mm).

**PAD LAYOUT**


Ltr	Inch	Millimeters
<b>A</b>	.390	9.90
<b>B</b>	.110	2.79
<b>C</b>	.150	3.81