SMCJ5.0 thru 440CA

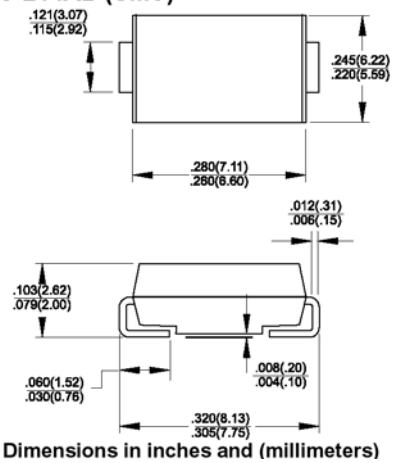
Surface Mount Transient Voltage Suppressors

Peak Pulse Power 1500W Stand-off Voltage 5.0 to 440V

Features

- Plastic package has Underwriters Laboratory Flammability Classification 94V-0
- Low profile package with built-in strain relief for surface mounted applications
- Glass passivated junction
- Low incremental surge resistance, excellent clamping capability
- 1500W peak pulse power capability with a 10/1000us waveform, repetition rate (duty cycle): 0.01%
- Very fast response time
- High temperature soldering guaranteed: 250°C/10 seconds at terminals

DO-214AB (SMC)



Dimensions in inches and (millimeters)

Mechanical Data

- Case: JEDEC DO-214AB(SMC J-Bend) molded plastic over passivated junction
- Terminals: Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity: For unidirectional types the band denotes the cathode, which is positive with respect to the anode under normal TVS operation
- Weight: 0.007oz., 0.21g

Devices for Bidirectional Applications

For bi-directional devices, use suffix CA (e.g. SMCJ10CA). Electrical characteristics apply in both directions.

Maximum Ratings and Thermal Characteristics

(Ratings at 25°C ambient temperature unless otherwise specified.)

Parameter	Symbol	Value	Unit
Peak pulse power dissipation with a 10/1000us waveform (1) (2)	P_{PPM}	Minimum 1500	W
Peak pulse current with a 10/1000us waveform (1)	I_{PPM}	See Next Table	A
Peak forward surge current 8.3ms single half sine-wave uni-directional only (2)	I_{FSM}	200	A
Typical thermal resistance, junction to ambient (3)	$R_{\theta JA}$	75	°C/W
Typical thermal resistance, junction to lead	$R_{\theta JL}$	15	°C/W
Operating junction 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 0.31 x 0.31" (8.0 x 8.0 mm) copper pads to each terminal
3. Mounted on minimum recommended pad layout

Electrical Characteristics

Ratings at 25°C ambient temperature unless otherwise specified. V_F=3.5V at I_F=100A (uni-directional only)

Device type	Device marking code		Breakdown voltage $V_{(BR)}$ (Volts) (1)		Test current at I_T (mA)	Stand-off voltage V_{WM} (Volts)	Maximum reverse leakage at V_{WM} I_D (3) (uA)	Maximum peak pulse surge current I_{PPM} (2) (A)	Maximum clamping voltage at I_{PPM} V_C (Volts)
	UNI	BI	Min.	Max.					
SMCJ5.0	SMCJ5.0	SMCJ5.0C	6.40	7.82	10	5.0	1000	156.3	9.6
SMCJ5.0A (5)	SMCJ5.0A	SMCJ5.0CA	6.40	7.07	10	5.0	1000	163.0	9.2
SMCJ6.0	SMCJ6.0	SMCJ6.0C	6.67	8.15	10	6.0	1000	131.6	11.4
SMCJ6.0A	SMCJ6.0A	SMCJ6.0CA	6.67	7.37	10	6.0	1000	145.6	10.3
SMCJ6.5	SMCJ6.5	SMCJ6.5C	7.22	8.82	10	6.5	500	122.0	12.3
SMCJ6.5A	SMCJ6.5A	SMCJ6.5CA	7.22	7.98	10	6.5	500	133.9	11.2
SMCJ7.0	SMCJ7.0	SMCJ7.0C	7.78	9.51	10	7.0	200	112.8	13.3
SMCJ7.0A	SMCJ7.0A	SMCJ7.0CA	7.78	8.60	10	7.0	200	125.0	12.0
SMCJ7.5	SMCJ7.5	SMCJ7.5C	8.33	10.2	1.0	7.5	100	104.9	14.3
SMCJ7.5A	SMCJ7.5A	SMCJ7.5CA	8.33	9.21	1.0	7.5	100	116.3	12.9
SMCJ8.0	SMCJ8.0	SMCJ8.0C	8.89	10.9	1.0	8.0	50	100.0	15.0
SMCJ8.0A	SMCJ8.0A	SMCJ8.0CA	8.89	9.83	1.0	8.0	50	110.3	13.6
SMCJ8.5	SMCJ8.5	SMCJ8.5C	9.44	11.5	1.0	8.5	20	94.3	15.9
SMCJ8.5A	SMCJ8.5A	SMCJ8.5CA	9.44	10.4	1.0	8.5	20	104.2	14.4
SMCJ9.0	SMCJ9.0	SMCJ9.0C	10.0	12.2	1.0	9.0	10.0	88.8	16.9
SMCJ9.0A	SMCJ9.0A	SMCJ9.0CA	10.0	11.1	1.0	9.0	10.0	97.4	15.4
SMCJ10	SMCJ10	SMCJ10C	11.1	13.6	1.0	10	5.0	79.8	18.8
SMCJ10A	SMCJ10A	SMCJ10CA	11.1	12.3	1.0	10	5.0	88.2	17.0
SMCJ11	SMCJ11	SMCJ11C	12.2	14.9	1.0	11	5.0	74.6	20.1
SMCJ11A	SMCJ11A	SMCJ11CA	12.2	13.5	1.0	11	5.0	82.4	18.2
SMCJ12	SMCJ12	SMCJ12C	13.3	16.3	1.0	12	5.0	68.2	22.0
SMCJ12A	SMCJ12A	SMCJ12CA	13.3	14.7	1.0	12	5.0	75.4	19.9
SMCJ13	SMCJ13	SMCJ13C	14.4	17.6	1.0	13	1.0	63.0	23.8
SMCJ13A	SMCJ13A	SMCJ13CA	14.4	15.9	1.0	13	1.0	69.8	21.5
SMCJ14	SMCJ14	SMCJ14C	15.6	19.1	1.0	14	1.0	58.1	25.8
SMCJ14A	SMCJ14A	SMCJ14CA	15.6	17.2	1.0	14	1.0	64.7	23.2
SMCJ15	SMCJ15	SMCJ15C	16.7	20.4	1.0	15	1.0	55.8	26.9
SMCJ15A	SMCJ15A	SMCJ15CA	16.7	18.5	1.0	15	1.0	61.5	24.4
SMCJ16	SMCJ16	SMCJ16C	17.8	21.8	1.0	16	1.0	52.1	28.8
SMCJ16A	SMCJ16A	SMCJ16CA	17.8	19.7	1.0	16	1.0	57.7	26.0
SMCJ17	SMCJ17	SMCJ17C	18.9	23.1	1.0	17	1.0	49.2	30.5
SMCJ17A	SMCJ17A	SMCJ17CA	18.9	20.9	1.0	17	1.0	54.3	27.6
SMCJ18	SMCJ18	SMCJ18C	20.0	24.4	1.0	18	1.0	46.6	32.2
SMCJ18A	SMCJ18A	SMCJ18CA	20.0	22.1	1.0	18	1.0	51.4	29.2
SMCJ20	SMCJ20	SMCJ20C	22.2	27.1	1.0	20	1.0	41.9	35.8
SMCJ20A	SMCJ20A	SMCJ20CA	22.2	24.5	1.0	20	1.0	46.3	32.4
SMCJ22	SMCJ22	SMCJ22C	24.4	29.8	1.0	22	1.0	38.1	39.4
SMCJ22A	SMCJ22A	SMCJ22CA	24.4	26.9	1.0	22	1.0	42.3	35.5
SMCJ24	SMCJ24	SMCJ24C	26.7	32.6	1.0	24	1.0	34.9	43.0
SMCJ24A	SMCJ24A	SMCJ24CA	26.7	29.5	1.0	24	1.0	38.6	38.9
SMCJ26	SMCJ26	SMCJ26C	28.9	35.3	1.0	26	1.0	32.2	46.6
SMCJ26A	SMCJ26A	SMCJ26CA	28.9	31.9	1.0	26	1.0	35.6	42.1
SMCJ28	SMCJ28	SMCJ28C	31.1	38.0	1.0	28	1.0	30.0	50.0
SMCJ28A	SMCJ28A	SMCJ28CA	31.1	34.4	1.0	28	1.0	33.0	45.4
SMCJ30	SMCJ30	SMCJ30C	33.3	40.7	1.0	30	1.0	28.0	53.5
SMCJ30A	SMCJ30A	SMCJ30CA	33.3	36.8	1.0	30	1.0	31.0	48.4

Notes:
1. $V_{(BR)}$ measured after I_T applied for 300us square wave pulse or equivalent
2. Surge current waveform per Fig. 3 and derate per Fig. 2
3. For bi-directional 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
5. For the bi-directional SMCG/SMCJ5.0CA, the maximum $V_{(BR)}$ is 7.25V.

Electrical Characteristics

Ratings at 25°C ambient temperature unless otherwise specified. V_F=3.5V at I_F=100A (uni-directional only)

Device type	Device marking code		Breakdown voltage $V_{(BR)}$ (Volts) (1)		Test current at I_T (mA)	Stand-off voltage V_{WM} (Volts)	Maximum reverse leakage at V_{WM} I_D (3) (uA)	Maximum peak pulse surge current I_{PPM} (2) (A)	Maximum clamping voltage at I_{PPM} V_C (Volts)
	UNI	BI	Min.	Max.					
SMCJ33	SMCJ33	SMCJ33C	36.7	44.9	1.0	33	1.0	25.4	59.0
SMCJ33A	SMCJ33A	SMCJ33CA	36.7	40.6	1.0	33	1.0	28.1	53.3
SMCJ36	SMCJ36	SMCJ36C	40.0	48.9	1.0	36	1.0	23.3	64.3
SMCJ36A	SMCJ36A	SMCJ36CA	40.0	44.2	1.0	36	1.0	25.8	58.1
SMCJ40	SMCJ40	SMCJ40C	44.4	54.3	1.0	40	1.0	21.0	71.4
SMCJ40A	SMCJ40A	SMCJ40CA	44.4	49.1	1.0	40	1.0	23.3	64.5
SMCJ43	SMCJ43	SMCJ43C	47.8	58.4	1.0	43	1.0	19.6	76.7
SMCJ43A	SMCJ43A	SMCJ43CA	47.8	52.8	1.0	43	1.0	21.6	69.4
SMCJ45	SMCJ45	SMCJ45C	50.0	61.1	1.0	45	1.0	18.7	80.3
SMCJ45A	SMCJ45A	SMCJ45CA	50.0	55.3	1.0	45	1.0	20.6	72.7
SMCJ48	SMCJ48	SMCJ48C	53.3	65.1	1.0	48	1.0	17.5	85.5
SMCJ48A	SMCJ48A	SMCJ48CA	53.3	58.9	1.0	48	1.0	19.4	77.4
SMCJ51	SMCJ51	SMCJ51C	56.7	69.3	1.0	51	1.0	16.5	91.1
SMCJ51A	SMCJ51A	SMCJ51CA	56.7	62.7	1.0	51	1.0	18.2	82.4
SMCJ54	SMCJ54	SMCJ54C	60.0	73.3	1.0	54	1.0	15.6	96.3
SMCJ54A	SMCJ54A	SMCJ54CA	60.0	66.3	1.0	54	1.0	17.2	87.1
SMCJ58	SMCJ58	SMCJ58C	64.4	78.7	1.0	58	1.0	14.6	103
SMCJ58A	SMCJ58A	SMCJ58CA	64.4	71.2	1.0	58	1.0	16.0	93
SMCJ60	SMCJ60	SMCJ60C	66.7	81.5	1.0	60	1.0	14.0	107
SMCJ60A	SMCJ60A	SMCJ60CA	66.7	73.7	1.0	60	1.0	15.5	96
SMCJ64	SMCJ64	SMCJ64C	71.1	86.9	1.0	64	1.0	13.2	114
SMCJ64A	SMCJ64A	SMCJ64CA	71.1	78.6	1.0	64	1.0	14.6	103
SMCJ70	SMCJ70	SMCJ70C	77.8	95.1	1.0	70	1.0	12.0	125
SMCJ70A	SMCJ70A	SMCJ70CA	77.8	86.0	1.0	70	1.0	13.3	113
SMCJ75	SMCJ75	SMCJ75C	83.3	102	1.0	75	1.0	11.2	134
SMCJ75A	SMCJ75A	SMCJ75CA	83.3	92.1	1.0	75	1.0	12.4	121
SMCJ78	SMCJ78	SMCJ78C	86.7	106	1.0	78	1.0	10.8	139
SMCJ78A	SMCJ78A	SMCJ78CA	86.7	95.8	1.0	78	1.0	11.9	126
SMCJ85	SMCJ85	SMCJ85C	94.4	115	1.0	85	1.0	9.9	151
SMCJ85A	SMCJ85A	SMCJ85CA	94.4	104	1.0	85	1.0	10.9	137
SMCJ90	SMCJ90	SMCJ90C	100	122	1.0	90	1.0	9.4	160
SMCJ90A	SMCJ90A	SMCJ90CA	100	111	1.0	90	1.0	10.3	146
SMCJ100	SMCJ100	SMCJ100C	111	136	1.0	100	1.0	8.4	179
SMCJ100A	SMCJ100A	SMCJ100CA	111	123	1.0	100	1.0	9.3	162
SMCJ110	SMCJ110	SMCJ110C	122	149	1.0	110	1.0	7.7	196
SMCJ110A	SMCJ110A	SMCJ110CA	122	135	1.0	110	1.0	8.5	177
SMCJ120	SMCJ120	SMCJ120C	133	163	1.0	120	1.0	7.0	214
SMCJ120A	SMCJ120A	SMCJ120CA	133	147	1.0	120	1.0	7.8	193
SMCJ130	SMCJ130	SMCJ130C	144	176	1.0	130	1.0	6.5	231
SMCJ130A	SMCJ130A	SMCJ130CA	144	159	1.0	130	1.0	7.2	209
SMCJ150	SMCJ150	SMCJ150C	167	204	1.0	150	1.0	5.6	268
SMCJ150A	SMCJ150A	SMCJ150CA	167	185	1.0	150	1.0	6.2	243
SMCJ160	SMCJ160	SMCJ160C	178	218	1.0	160	1.0	5.2	287
SMCJ160A	SMCJ160A	SMCJ160CA	178	197	1.0	160	1.0	5.8	259
SMCJ170	SMCJ170	SMCJ170C	189	231	1.0	170	1.0	4.9	304
SMCJ170A	SMCJ170A	SMCJ170CA	189	209	1.0	170	1.0	5.5	275
SMCJ180A	SMCJ180A	SMCJ180C	209	222	1.0	180	1.0	5.0	292
SMCJ200A	SMCJ200A	SMCJ200CA	224	247	1.0	200	1.0	4.6	324
SMCJ220A	SMCJ220A	SMCJ220CA	246	272	1.0	220	1.0	4.2	356.
SMCJ250A	SMCJ250A	SMCJ250CA	279	309	1.0	250	1.0	3.7	405
SMCJ300A	SMCJ300A	SMCJ300CA	335	371	1.0	300	1.0	3.1	486
SMCJ350A	SMCJ350A	SMCJ350CA	391	432	1.0	350	1.0	2.6	567
SMCJ400A	SMCJ400A	SMCJ400CA	447	494	1.0	400	1.0	2.3	648
SMCJ440A	SMCJ440A	SMCJ440CA	492	543	1.0	440	1.0	2.1	713

Notes:
1. $V_{(BR)}$ measured after I_T applied for 300us square wave pulse or equivalent
2. Surge current waveform per Fig. 3 and derate per Fig. 2
3. For bi-directional 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
5. For parts without A, the V_{BR} is +10%

RATINGS AND CHARACTERISTIC CURVES

(T_A = 25°C unless otherwise noted)

Fig. 1 – Peak Pulse Power Rating Curve

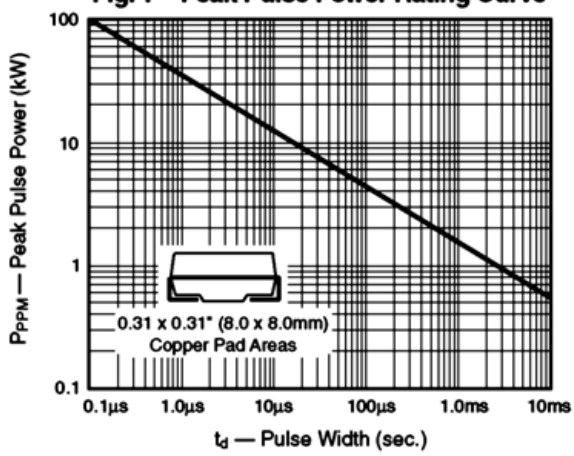


Fig. 2 – Pulse Derating Curve

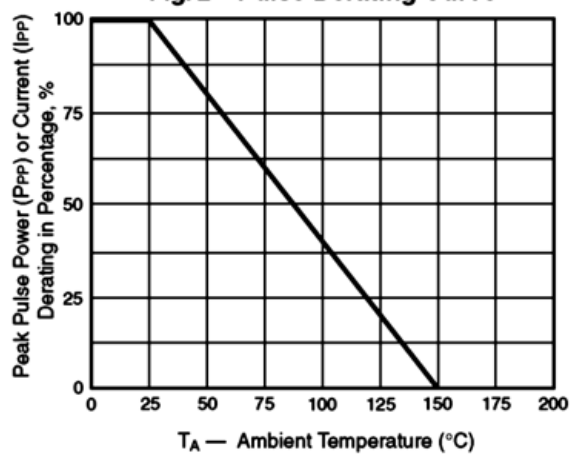


Fig. 3 – Pulse Waveform

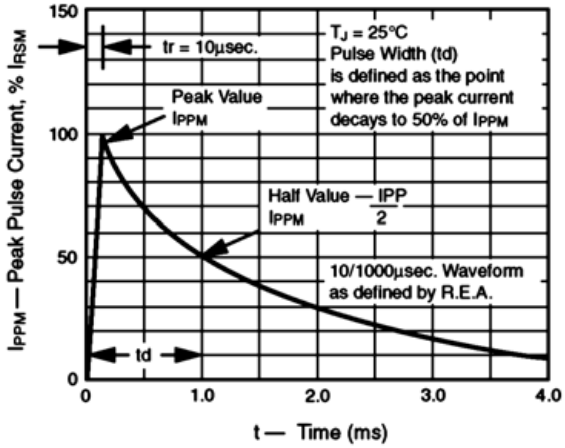


Fig. 4 – Typical Junction Capacitance Uni-Directional

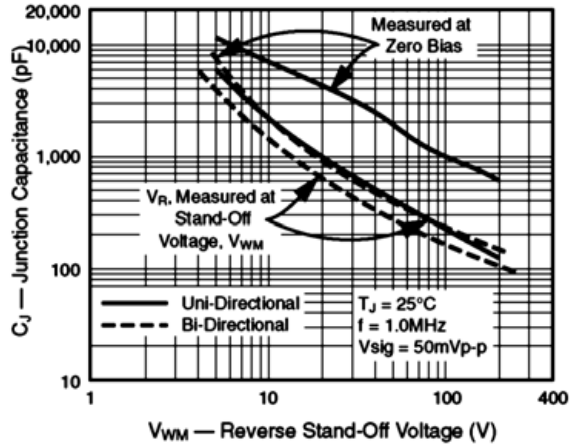


Fig. 5 – Typical Transient Thermal Impedance

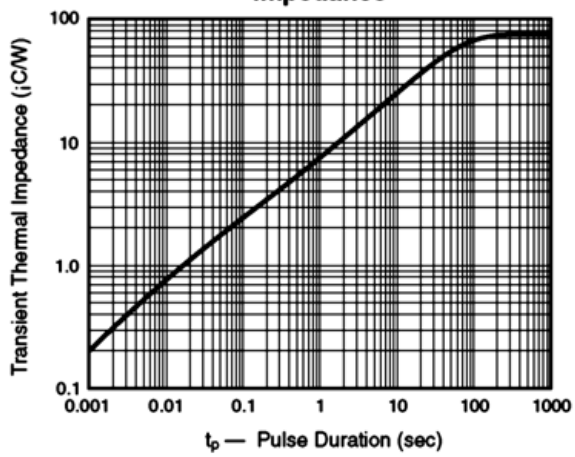


Fig. 6 - Maximum Non-Repetitive Forward Surge Current Uni-Directional Use Only