

Surface Mount Transient Voltage Suppressors

SMCJ-AT Series 1500W Transient Voltage Suppressor

Description

TVS diodes can be used in a wide range of applications which like consumer electronic products, automotive industries, munitions, telecommunications, aerospace industries, and intelligent control systems.

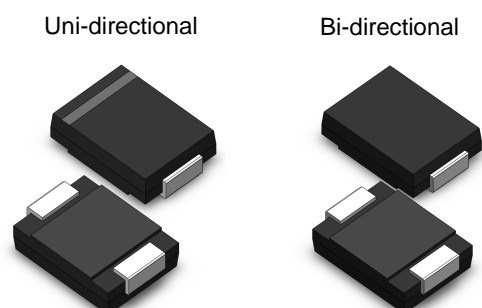
Working Voltage: 5.0 to 440 V

Features

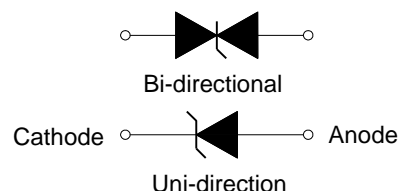
- ◆ Glass passivated or planar junction
- ◆ Excellent clamping capability
- ◆ Repetition rate (duty cycle): 0.01%
- ◆ Low profile package and low inductance
- ◆ 1500W Peak Pulse power capability at 10×1000μs waveform.
- ◆ Fast response time: typically less than 1.0ps from 0V to V_{BR} min.
- ◆ High temperature soldering: 260°C/10s at terminals.
- ◆ Plastic package has Underwriters Laboratory Flammability 94V-0.
- ◆ For surface mounted applications in order to optimize board space.
- ◆ High reliability application and automotive grade AECQ101 qualified .

Applications

- ◆ I/O Interface.
- ◆ AC/DC Power supply
- ◆ Low frequency signal transmission line (RS232, RS485, etc.)



Functional Diagram



Mechanical Data

- ◆ Package: SMC/DO-214AB
- ◆ Case Material: "Green" Molding Compound.
- ◆ UL Flammability Classification Rating 94V-0
- ◆ Polarity: Color band denotes cathode except bi-directional models
- ◆ Standard Packaging: 12mm tape (EIA STD RS-481)
- ◆ Weight: 0.28g
- ◆ Terminal Connections: See Diagram Below
- ◆ Marking Information: See Below

Maximum Ratings and Thermal Characteristics ($T_A=25\text{ }^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Units
Peak power dissipation with a 10/1000μs waveform	P_{PPM}	1500	W
Steady state power dissipation at $T_L=75\text{ }^\circ\text{C}$	$P_{M(AV)}$	8.0	W
Maximum Instantaneous Forward Voltage at 30A for Unidirectional	V_F	5.0	V
Storage temperature range	T_{stg}	-55 to +150	$^\circ\text{C}$
Operating junction temperature range	T_j	-55 to +150	$^\circ\text{C}$

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Electrical Characteristics (@ 25°C Unless Otherwise Specified)

Part Number		Marking		Reverse Stand-Off Voltage $V_{RWM}(V)$	Breakdown Voltage V_{BR} (V) @ I_T		Test Current I_T (mA)	Maximum Clamping Voltage V_C @ I_{PP} (V)	Maximum Peak Pulse Current I_{PP} (A)	Maximum Reverse Leakage I_R @ V_{RWM} (μA)
Uni	Bi	Uni	Bi		MIN	MAX				
SMCJ5.0A-AT	SMCJ5.0CA-AT	GDET	BDET	5.0	6.40	7.00	10	9.2	163.0	800
SMCJ6.0A-AT	SMCJ6.0CA-AT	GDGT	BDGT	6.0	6.67	7.37	10	10.3	145.7	800
SMCJ6.5A-AT	SMCJ6.5CA-AT	GDKT	BDKT	6.5	7.22	7.98	10	11.2	134.0	500
SMCJ7.0A-AT	SMCJ7.0CA-AT	GDMT	BDMT	7.0	7.78	8.60	10	12.0	125.0	200
SMCJ7.5A-AT	SMCJ7.5CA-AT	GDPT	BDPT	7.5	8.33	9.21	1	12.9	116.3	100
SMCJ8.0A-AT	SMCJ8.0CA-AT	GDPT	BDRT	8.0	8.89	9.83	1	13.6	110.3	50
SMCJ8.5A-AT	SMCJ8.5CA-AT	GDTT	BDTT	8.5	9.44	10.4	1	14.4	104.2	20
SMCJ9.0A-AT	SMCJ9.0CA-AT	GDVT	BDVT	9.0	10.0	11.1	1	15.4	97.4	5
SMCJ10A-AT	SMCJ10CA-AT	GDXT	BDXT	10	11.1	12.3	1	17.0	88.3	1
SMCJ11A-AT	SMCJ11CA-AT	GDZT	BDZT	11	12.2	13.5	1	18.2	82.5	1
SMCJ12A-AT	SMCJ12CA-AT	GEET	BEET	12	13.3	14.7	1	19.9	75.4	1
SMCJ13A-AT	SMCJ13CA-AT	GEGT	BEGT	13	14.4	15.9	1	21.5	69.8	1
SMCJ14A-AT	SMCJ14CA-AT	GEKT	BEKT	14	15.6	17.2	1	23.2	64.7	1
SMCJ15A-AT	SMCJ15CA-AT	GEMT	BEMT	15	16.7	18.5	1	24.4	61.5	1
SMCJ16A-AT	SMCJ16CA-AT	GEPT	BEPT	16	17.8	19.7	1	26.0	57.7	1
SMCJ17A-AT	SMCJ17CA-AT	GERT	BERT	17	18.9	20.9	1	27.6	54.4	1
SMCJ18A-AT	SMCJ18CA-AT	GETT	BETT	18	20.0	22.1	1	29.2	51.4	1
SMCJ20A-AT	SMCJ20CA-AT	GEVT	BEVT	20	22.2	24.5	1	32.4	46.3	1
SMCJ22A-AT	SMCJ22CA-AT	GEXT	BEXT	22	24.4	26.9	1	35.5	42.3	1
SMCJ24A-AT	SMCJ24CA-AT	GEZT	BEZT	24	26.7	29.5	1	38.9	38.6	1
SMCJ26A-AT	SMCJ26CA-AT	GFET	BFET	26	28.9	31.9	1	42.1	35.7	1
SMCJ28A-AT	SMCJ28CA-AT	GFGT	BFGT	28	31.1	34.4	1	45.4	33.1	1
SMCJ30A-AT	SMCJ30CA-AT	GFKT	BFKT	30	33.3	36.8	1	48.4	31.0	1
SMCJ33A-AT	SMCJ33CA-AT	GFMT	BFMT	33	36.7	40.6	1	53.3	28.2	1
SMCJ36A-AT	SMCJ36CA-AT	GFPT	BFPT	36	40.0	44.2	1	58.1	25.9	1
SMCJ40A-AT	SMCJ40CA-AT	GFRT	BFRT	40	44.4	49.1	1	64.5	23.3	1
SMCJ43A-AT	SMCJ43CA-AT	GFTT	BFTT	43	47.8	52.8	1	69.4	21.7	1
SMCJ45A-AT	SMCJ45CA-AT	GFVT	BFVT	45	50.0	55.3	1	72.7	20.6	1
SMCJ48A-AT	SMCJ48CA-AT	GFXT	BFXT	48	53.3	58.9	1	77.4	19.4	1
SMCJ51A-AT	SMCJ51CA-AT	GFZT	BFZT	51	56.7	62.7	1	82.4	18.2	1

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Uni	Bi	Uni	Bi		MIN	MAX				
SMCJ54A-AT	SMCJ54CA-AT	GGET	BGET	54	60.0	66.3	1	87.1	17.3	1
SMCJ58A-AT	SMCJ58CA-AT	GGGT	BGGT	58	64.4	71.2	1	93.6	16.1	1
SMCJ60A-AT	SMCJ60CA-AT	GGKT	BGKT	60	66.7	73.7	1	96.8	15.5	1
SMCJ64A-AT	SMCJ64CA-AT	GGMT	BGMT	64	71.1	78.6	1	103.0	14.6	1
SMCJ70A-AT	SMCJ70CA-AT	GGPT	BGPT	70	77.8	86.0	1	113.0	13.3	1
SMCJ75A-AT	SMCJ75CA-AT	GGRT	BGRT	75	83.3	92.1	1	121.0	12.4	1
SMCJ78A-AT	SMCJ78CA-AT	GGTT	BGTT	78	86.7	95.8	1	126.0	11.9	1
SMCJ85A-AT	SMCJ85CA-AT	GGVT	BGVT	85	94.4	104.0	1	137.0	11.0	1
SMCJ90A-AT	SMCJ90CA-AT	GGXT	BGXT	90	100.0	111.0	1	146.0	10.3	1
SMCJ100A-AT	SMCJ100CA-AT	GGZT	BGZT	100	111.0	123.0	1	162.0	9.3	1
SMCJ110A-AT	SMCJ110CA-AT	GHET	BHET	110	122.0	135.0	1	177.0	8.5	1
SMCJ120A-AT	SMCJ120CA-AT	GHGT	BHGT	120	133.0	147.0	1	193.0	7.8	1
SMCJ130A-AT	SMCJ130CA-AT	GHKT	BHKT	130	144.0	159.0	1	209.0	7.2	1
SMCJ150A-AT	SMCJ150CA-AT	GHMT	BHMT	150	167.0	185.0	1	243.0	6.2	1
SMCJ160A-AT	SMCJ160CA-AT	GHPT	BHPT	160	178.0	197.0	1	259.0	5.8	1
SMCJ170A-AT	SMCJ170CA-AT	GHRT	BHRT	170	189.0	209.0	1	275.0	5.5	1
SMCJ180A-AT	SMCJ180CA-AT	GHTT	BHPT	180	201.0	222.0	1	292.0	5.1	1
SMCJ190A-AT	SMCJ190CA-AT	GHVT	BHVT	190	211.0	233.0	1	308.0	4.8	1
SMCJ200A-AT	SMCJ200CA-AT	GHWT	BHWT	200	224.0	247.0	1	324.0	4.6	1
SMCJ210A-AT	SMCJ210CA-AT	GHUT	BHUT	210	237.0	263.0	1	340.0	4.4	1
SMCJ220A-AT	SMCJ220CA-AT	GHXT	BHXT	220	246.0	272.0	1	356.0	4.2	1
SMCJ250A-AT	SMCJ250CA-AT	GHZT	BHZT	250	279.0	309.0	1	405.0	3.7	1
SMCJ300A-AT	SMCJ300CA-AT	GJET	BJET	300	335.0	371.0	1	486.0	3.1	1
SMCJ350A-AT	SMCJ350CA-AT	GJGT	BJGT	350	391.0	432.0	1	567.0	2.6	1
SMCJ400A-AT	SMCJ400CA-AT	GJKT	BJKT	400	447.0	494.0	1	648.0	2.3	1
SMCJ440A-AT	SMCJ440CA-AT	GJMT	BJMT	440	492.0	543.0	1	713.0	2.1	1

Note:

- (1) Add suffix ' CA ' after part number to specify Bi-directional devices
- (2) Suffix 'A ' denotes 5% tolerance device.

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Ratings and Characteristics Curves ($T_A=25^\circ\text{C}$ unless otherwise noted)

Figure 1 - Pulse Waveform

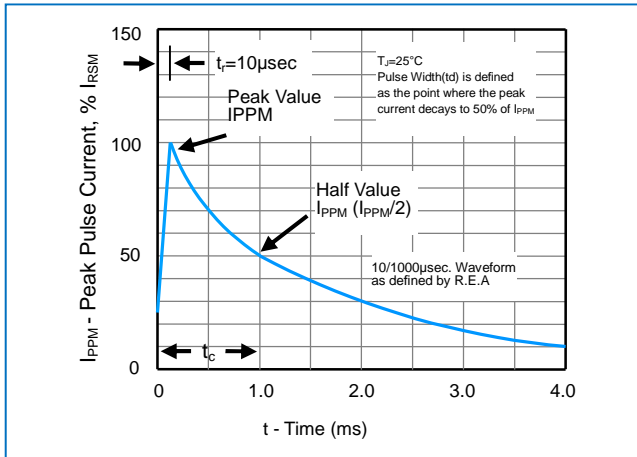
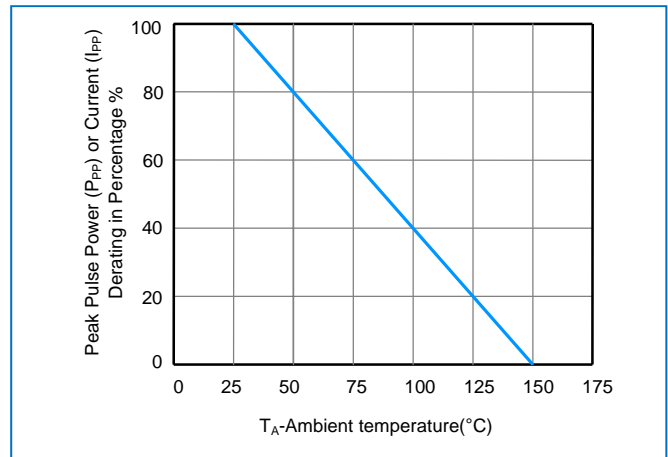
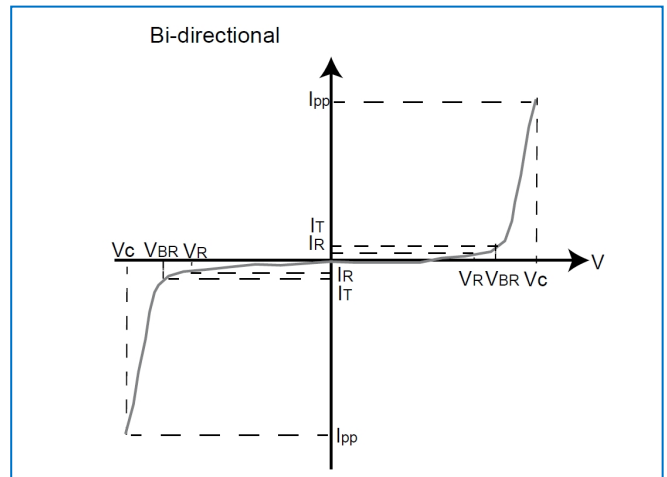
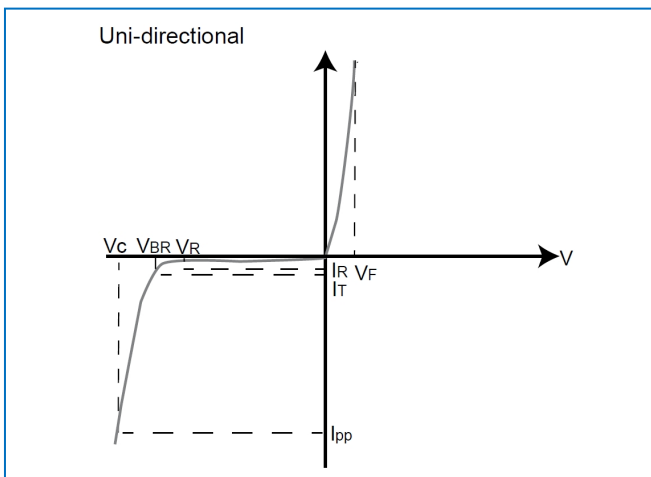


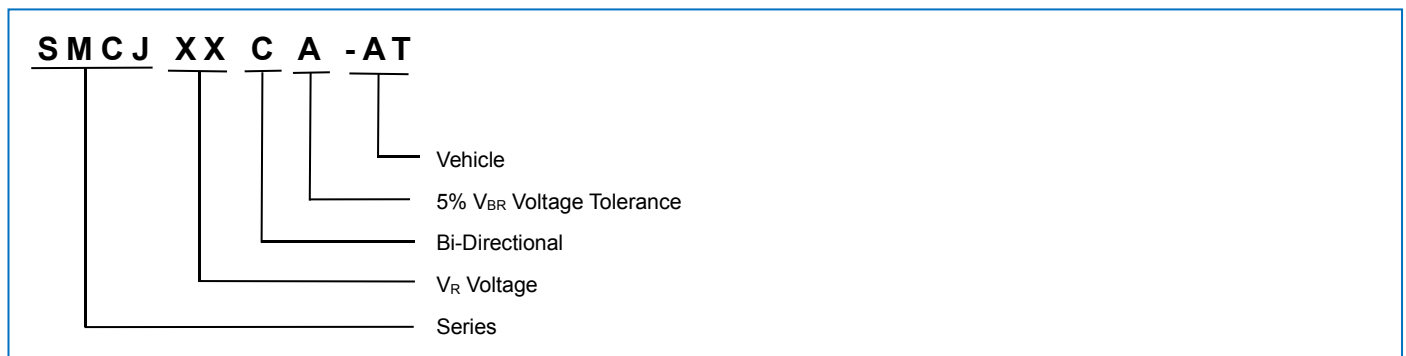
Figure 2 - Pulse Derating Curve



1-V Curves Characteristics



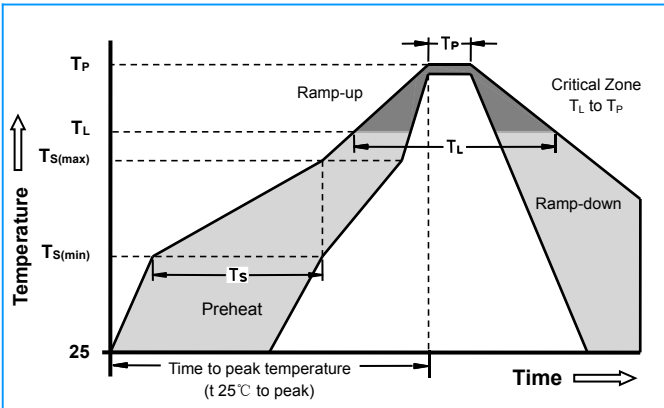
Part Numbering



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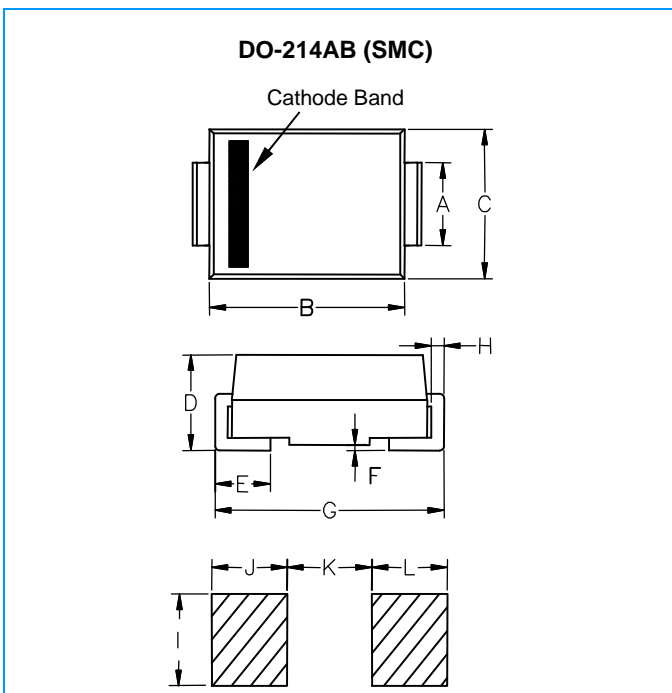
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Soldering Parameters



Reflow Condition		Lead-free assembly
Pre Heat	- Temperature Min ($T_{s(min)}$)	150°C
	- Temperature Max ($T_{s(max)}$)	200°C
	- Time (min to max) (t_s)	60 - 180 Seconds
Average ramp up rate (Liquidus Temp T_L) to peak		3°C/second max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/second max
Reflow	- Temperature (T_L) (Liquidus)	217°C
	- Time (min to max) (t_s)	60 - 150 Seconds
Peak Temperature (T_P)		260 +0/-5°C
Time within 5°C of actual peak Temperature (t_p)		20 - 40 Seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes Max
Do not exceed		260°C

Dimensions



Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.114	0.126	2.86	3.160
B	0.260	0.280	6.520	7.020
C	0.220	0.245	5.520	6.150
D	0.079	0.103	1.980	2.590
E	0.030	0.060	0.750	1.510
F	-	0.008	-	0.203
G	0.305	0.320	7.640	8.020
H	0.006	0.012	0.152	0.305
I	0.129	-	3.300	-
J	0.094	-	2.400	-
K	-	0.165	-	4.200
L	0.094	-	2.400	-