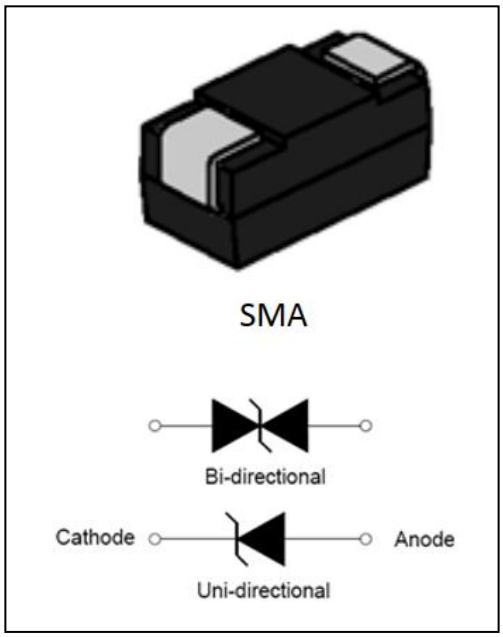
SMAJ Series 400W Transient Voltage Suppressor

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.



FEATURES:

- ◆Low profile package.
- ◆Low inductance.
- ◆Excellent clamping capability.
- ◆400W peak pulse power capability at 10/1000μs waveform.
- ◆Typical I_R less than 1μA above 10V.
- ◆Fast response time: typically less than 1.0ps from 0V to V_{BR} min.
- ◆High temperature to reflow soldering: 260℃/40s at terminals.
- ◆Plastic package has underwriters laboratory flammability 94V-0.
- ◆For surface mounted applications in order to optimize board space.

ABSOLUTE MAXIMUM RATINGS(T_A=25℃, RH=45%-75%, unless otherwise noted)

Parameter	Symbol	Value	Unit
Storage operating junction temperature range	T_{STG} /T_J	-55 to +150	℃
Steady state power dissipation at T_L=75℃	$P_{M(AV)}$	3.3	W
Peak pulse power dissipation on 10/1000μs waveform	P_{PP}	400	W
Maximum instantaneous forward voltage at 50A for unidirectional	V_F	5.0	V
Peak forward surge current, 8.3ms single half sine wave(Note 1)	I_{FSM}	60	A
Typical thermal resistance junction to lead	$R_{\theta JL}$	30	℃/W
Typical thermal resistance junction to ambient	$R_{\theta JA}$	120	℃/W

Notes: 1. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle=4 per minute maximum

ELECTRICAL CHARACTERISTICS(T_A=25℃, continued)

Part Number		V_R	I_R@ V_R	V_{BR}@ I_T		I_T	V_C@ I_{PP}	I_{PP}
Uni-Polar	Bi-Polar	V	μA	Min(V)	Max(V)	mA	Max(V)	A
SMAJ5.0A	SMAJ5.0CA	5.0	120	6.40	7.00	10	9.2	43.5
SMAJ6.0A	SMAJ6.0CA	6.0	120	6.67	7.37	10	10.3	38.8
SMAJ6.5A	SMAJ6.5CA	6.5	120	7.22	7.98	10	11.2	35.7
SMAJ7.0A	SMAJ7.0CA	7.0	50	7.78	8.60	10	12.0	33.3
SMAJ7.5A	SMAJ7.5CA	7.5	50	8.33	9.21	1	12.9	31.0
SMAJ8.0A	SMAJ8.0CA	8.0	20	8.89	9.83	1	13.6	29.4
SMAJ8.5A	SMAJ8.5CA	8.5	10	9.44	10.40	1	14.4	27.8
SMAJ9.0A	SMAJ9.0CA	9.0	5	10.00	11.10	1	15.4	26.0
SMAJ10A	SMAJ10CA	10	2	11.10	12.30	1	17.0	23.5
SMAJ11A	SMAJ11CA	11	1	12.20	13.50	1	18.2	22.0
SMAJ12A	SMAJ12CA	12	1	13.30	14.70	1	19.9	20.1
SMAJ13A	SMAJ13CA	13	1	14.40	15.90	1	21.5	18.6
SMAJ14A	SMAJ14CA	14	1	15.60	17.20	1	23.2	17.3
SMAJ15A	SMAJ15CA	15	1	16.70	18.50	1	24.4	16.4
SMAJ16A	SMAJ16CA	16	1	17.80	19.70	1	26.0	15.4
SMAJ17A	SMAJ17CA	17	1	18.90	20.90	1	27.6	14.5
SMAJ18A	SMAJ18CA	18	1	20.00	22.10	1	29.2	13.7
SMAJ20A	SMAJ20CA	20	1	22.20	24.50	1	32.4	12.4
SMAJ22A	SMAJ22CA	22	1	24.40	26.90	1	35.5	11.3
SMAJ24A	SMAJ24CA	24	1	26.70	29.50	1	38.9	10.3
SMAJ26A	SMAJ26CA	26	1	28.90	31.90	1	42.1	9.5
SMAJ28A	SMAJ28CA	28	1	31.10	34.40	1	45.4	8.8
SMAJ30A	SMAJ30CA	30	1	33.30	36.80	1	48.4	8.3
SMAJ33A	SMAJ33CA	33	1	36.70	40.60	1	53.3	7.5
SMAJ36A	SMAJ36CA	36	1	40.00	44.20	1	58.1	6.9

Uni-Polar	Bi-Polar	V	μA	Min(V)	Max(V)	mA	Max(V)	A
SMAJ40A	SMAJ40CA	40	1	44.40	49.10	1	64.5	6.2
SMAJ43A	SMAJ43CA	43	1	47.80	52.80	1	69.4	5.8
SMAJ45A	SMAJ45CA	45	1	50.00	55.30	1	72.7	5.5
SMAJ48A	SMAJ48CA	48	1	53.30	58.90	1	77.4	5.2
SMAJ51A	SMAJ51CA	51	1	56.70	62.70	1	82.4	4.9
SMAJ54A	SMAJ54CA	54	1	60.00	66.30	1	87.1	4.6
SMAJ58A	SMAJ58CA	58	1	64.40	71.20	1	93.6	4.3
SMAJ60A	SMAJ60CA	60	1	66.70	73.70	1	96.8	4.1
SMAJ64A	SMAJ64CA	64	1	71.10	78.60	1	103.0	3.9
SMAJ70A	SMAJ70CA	70	1	77.80	86.00	1	113.0	3.6
SMAJ75A	SMAJ75CA	75	1	83.30	92.10	1	121.0	3.3
SMAJ78A	SMAJ78CA	78	1	86.70	95.80	1	126.0	3.2
SMAJ85A	SMAJ85CA	85	1	94.40	104.0	1	137.0	2.9
SMAJ90A	SMAJ90CA	90	1	100.0	111.0	1	146.0	2.8
SMAJ100A	SMAJ100CA	100	1	111.0	123.0	1	162.0	2.5
SMAJ110A	SMAJ110CA	110	1	122.0	135.0	1	177.0	2.3
SMAJ120A	SMAJ120CA	120	1	133.0	147.0	1	193.0	2.1
SMAJ130A	SMAJ130CA	130	1	144.0	159.0	1	209.0	1.9
SMAJ150A	SMAJ150CA	150	1	167.0	185.0	1	243.0	1.7
SMAJ160A	SMAJ160CA	160	1	178.0	197.0	1	259.0	1.6
SMAJ170A	SMAJ170CA	170	1	189.0	209.0	1	275.0	1.5
SMAJ180A	SMAJ180CA	180	1	201.0	222.0	1	292.0	1.4
SMAJ200A	SMAJ200CA	20	1	211.0	234.0	1	324.0	1.3
SMAJ220A	SMAJ220CA	22	1	224.0	247.0	1	356.0	1.1
SMAJ250A	SMAJ250CA	250	1	233.0	258.0	1	405.0	1.0
SMAJ300A	SMAJ300CA	300	1	246.0	279.0	1	486.0	0.8
SMAJ350A	SMAJ350CA	350	1	391.0	432.0	1	567.0	0.7

Uni-Polar	Bi-Polar	V	μA	Min(V)	Max(V)	mA	Max(V)	A
SMBJ400A	SMBJ400CA	400	1	447.0	494.0	1	648.0	0.6
SMBJ440A	SMBJ440CA	440	1	492.0	543.0	1	713.0	0.6

① Surge waveform: 10/1000μs

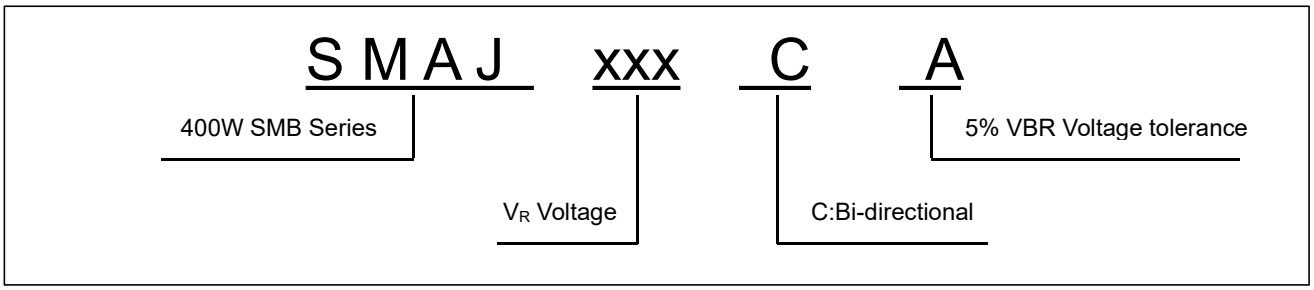
V_R: Stand-off voltage -- Maximum voltage that can be applied

V_{BR}: Breakdown voltage

V_C: clamping voltage -- Peak voltage measured across the suppressor at a specified IPP

I_R: Reverse leakage current

ORDERING INFORMATION



RATINGS AND V-I CHARACTERISTICS CURVES (TA=25℃, unless otherwise noted)

FIG.1:V-I curve characteristics (Uni-directional)

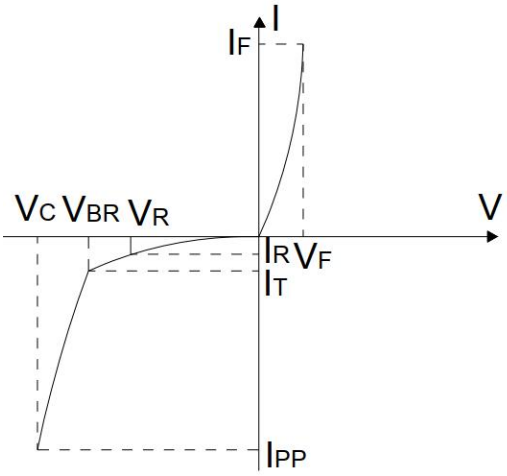


FIG.2:V- I curve characteristics (Bi-directional)

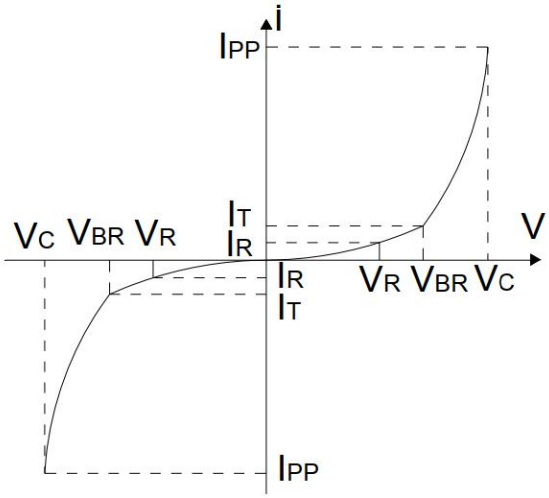


FIG.3: Pulse waveform

I_{PPM}(%I_{RSM})

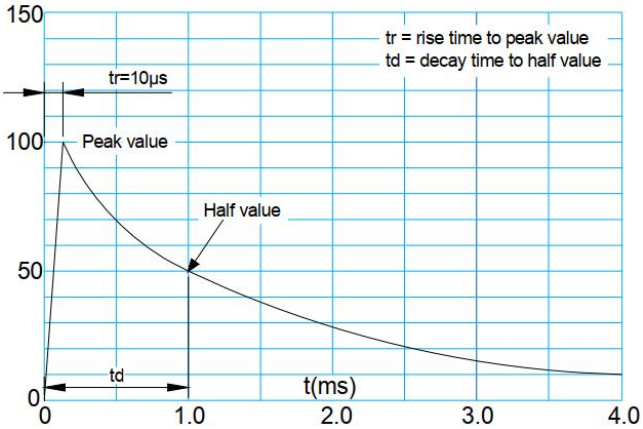
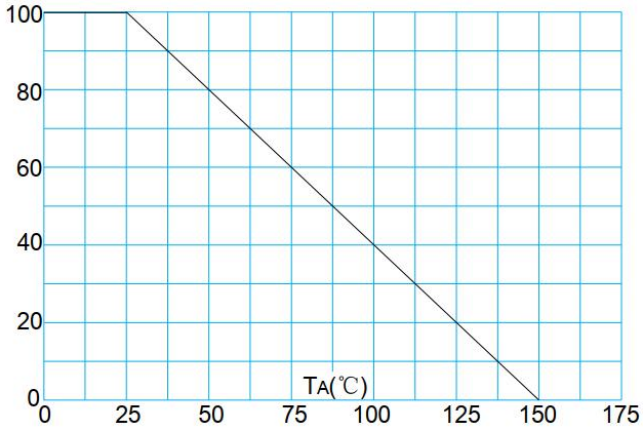


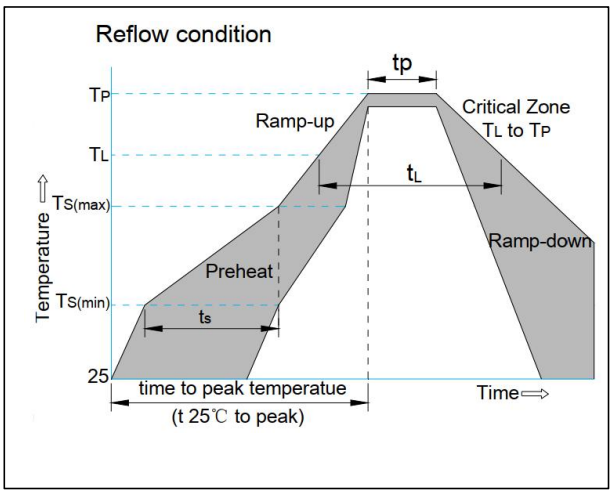
FIG.4: Pulse derating curve

P_{PP}(derating in percentage(%))

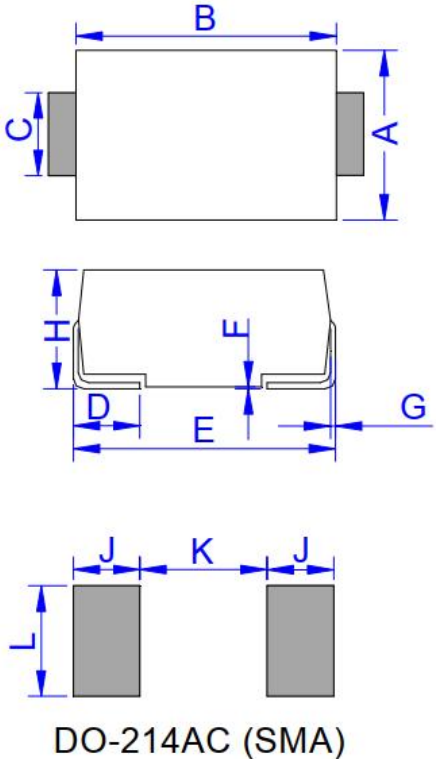


SOLDERING PARAMETERS

Reflow Condition		Pb-Free assembly (see figure at right)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150℃
	-Temperature Max($T_{s(max)}$)	+200℃
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquidus Temp (T_L)to peak)		3℃/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3℃/sec. Max
Reflow	-Temperature(T_L)(Liquidus)	+217℃
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_p)		+260(+0/-5)℃
Time within 5℃of actual Peak Temp (t_p)		20-40secs.
Ramp-down Rate		6℃/sec. Max
Time 25℃to Peak Temp (T_P)		8 min. Max
Do not exceed		+260℃

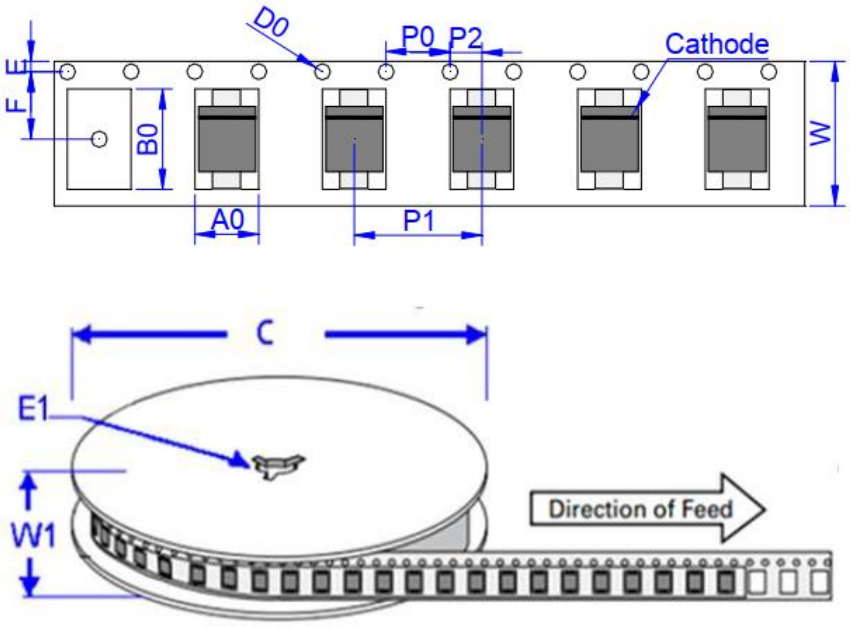


PACKAGE MECHANICAL DATA



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.60	3.00	0.102	0.118
B	4.15	4.65	0.163	0.183
C	1.25	1.65	0.049	0.065
D	0.95	1.52	0.037	0.060
E	4.90	5.30	0.193	0.209
F	0.051	0.203	0.002	0.008
G	0.15	0.31	0.006	0.012
H	2.00	2.44	0.079	0.096
J	2.00		0.079	
K		2.30		0.091
L	1.80		0.071	

TAPE AND REEL SPECIFICATION - SMB



Ref.	Dimensions	
	Millimeters	Inches
A0	2.79 ± 0.3	0.110 ± 0.012
B0	5.33 ± 0.3	0.210 ± 0.012
C	330.0	13.0
D0	1.55 ± 0.1	0.061 ± 0.004
E	1.75 ± 0.2	0.069 ± 0.008
E1	13.3 ± 0.3	0.524± 0.012
F	5.5 ± 0.2	0.217 ± 0.008
P0	4.00 ± 0.2	0.157 ± 0.008
P1	4.00 ± 0.2	0.157 ± 0.008
P2	2.00 ± 0.2	0.079 ± 0.008
W	12.0± 0.2	0.472 ± 0.008
W1	15.7 ± 2.0	0.618 ± 0.079

OUTLINE	UNIT WEIGHT (g/PCS) typ.	REEL (PCS)	PER CARTON (PCS)	REEL DIAMETERS (mm)
TAPING	0.067	5,000	80,000	330

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