

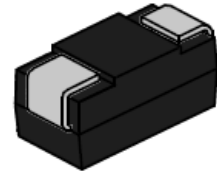


SMAJxx(C)AS Series 400W Transient Voltage Suppressor

Rev.1.4

DESCRIPTION:

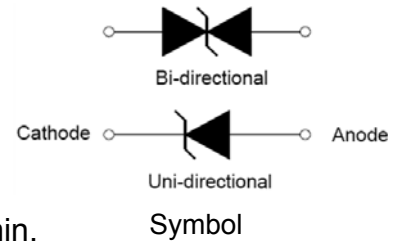
TVS diodes can be used in a wide range of applications which like consumer electronic products, automotive industries, munitions, telecommunications, aerospace industries, and intelligent control systems.



SMA

FEATURES:

- ✧ Low profile package.
- ✧ Low inductance.
- ✧ Excellent clamping capability.
- ✧ 400W peak pulse power capability at 10/1000 μ s waveform.
- ✧ Typical I_R less than 1 μ A above 10V.
- ✧ Fast response time: typically less than 1.0ps from 0V to V_{BR} min.
- ✧ High temperature to reflow soldering: 260 $^{\circ}$ C/40s at terminals.
- ✧ Plastic package has underwriters laboratory flammability 94V-0.
- ✧ Meets MSL level 1, per J-STD-020, LF maximum peak of 260 $^{\circ}$ C.
- ✧ Terminal: solder plated, solderable per J-STD-002.
- ✧ For surface mounted applications in order to optimize board space.
- ✧ UL 497B item recognized. (File No.: E480698).
- ✧ IEC61000-4-2 (ESD) \pm 30kV (air), \pm 30kV (contact).



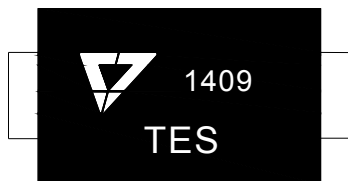
ABSOLUTE MAXIMUM RATINGS($T_A=25^{\circ}$ C, RH=45%-75%, unless otherwise noted)

Parameter	Symbol	Value	Unit
Operating junction and storage temperature range	T_J/T_{STG}	-55 to +150	$^{\circ}$ C
Peak pulse power dissipation at 10/1000 μ s waveform	P_{PP}	400	W
Steady state power dissipation at $T_L=75^{\circ}$ C	$P_{M(AV)}$	3.3	W
Maximum instantaneous forward voltage at 25A 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	$^{\circ}$ C/W
Typical thermal resistance junction to ambient	$R_{\theta JA}$	120	$^{\circ}$ C/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

MARKING



TES: Device Marking Code
1409: In ninth week, 2014

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Part Number		Marking		V _R	I _R @V _R	V _{BR} @I _T		I _T	V _C @I _{PP}	I _{PP} ①
Uni-Polar	Bi-Polar	Uni	Bi	V	max(μA)	min(V)	max(V)	mA	max(V)	A
SMAJ5.0AS	SMAJ5.0CAS	HES	TES	5.0	120	6.40	7.00	10	9.2	43.5
SMAJ6.0AS	SMAJ6.0CAS	HGS	TGS	6.0	120	6.67	7.37	10	10.3	38.8
SMAJ6.5AS	SMAJ6.5CAS	HKS	TKS	6.5	80	7.22	7.98	10	11.2	35.7
SMAJ7.0AS	SMAJ7.0CAS	HMS	TMS	7.0	50	7.78	8.60	10	12.0	33.3
SMAJ7.5AS	SMAJ7.5CAS	HPS	TPS	7.5	50	8.33	9.21	1	12.9	31.0
SMAJ8.0AS	SMAJ8.0CAS	HRS	TRS	8.0	20	8.89	9.83	1	13.6	29.4
SMAJ8.5AS	SMAJ8.5CAS	HTS	TTS	8.5	10	9.44	10.40	1	14.4	27.8
SMAJ9.0AS	SMAJ9.0CAS	HVS	TVS	9.0	5	10.00	11.10	1	15.4	26.0
SMAJ10AS	SMAJ10CAS	HXS	TXS	10.0	2	11.10	12.30	1	17.0	23.5
SMAJ11AS	SMAJ11CAS	HZS	TZS	11.0	1	12.20	13.50	1	18.2	22.0
SMAJ12AS	SMAJ12CAS	IES	UES	12.0	1	13.30	14.70	1	19.9	20.1
SMAJ13AS	SMAJ13CAS	IGS	UGS	13.0	1	14.40	15.90	1	21.5	18.6
SMAJ14AS	SMAJ14CAS	IKS	UKS	14.0	1	15.60	17.20	1	23.2	17.3
SMAJ15AS	SMAJ15CAS	IMS	UMS	15.0	1	16.70	18.50	1	24.4	16.4
SMAJ16AS	SMAJ16CAS	IPS	UPS	16.0	1	17.80	19.70	1	26.0	15.4
SMAJ17AS	SMAJ17CAS	IRS	URS	17.0	1	18.90	20.90	1	27.6	14.5
SMAJ18AS	SMAJ18CAS	ITS	UTS	18.0	1	20.00	22.10	1	29.2	13.7
SMAJ20AS	SMAJ20CAS	IVS	UVS	20.0	1	22.20	24.50	1	32.4	12.4
SMAJ22AS	SMAJ22CAS	IXS	UXS	22.0	1	24.40	26.90	1	35.5	11.3
SMAJ24AS	SMAJ24CAS	IZS	UZS	24.0	1	26.70	29.50	1	38.9	10.3
SMAJ26AS	SMAJ26CAS	JES	VES	26.0	1	28.90	31.90	1	42.1	9.5
SMAJ28AS	SMAJ28CAS	JGS	VGS	28.0	1	31.10	34.40	1	45.4	8.8
SMAJ30AS	SMAJ30CAS	JKS	VKS	30.0	1	33.30	36.80	1	48.4	8.3
SMAJ33AS	SMAJ33CAS	JMS	VMS	33.0	1	36.70	40.60	1	53.3	7.5

ELECTRICAL CHARACTERISTICS (T_A=25°C, continued)

Part Number		Marking		V _R	I _{R@V_R}	V _{BR@I_T}		I _T	V _{C@I_{PP}}	I _{PP} ^①
Uni-Polar	Bi-Polar	Uni	Bi	V	max(μA)	min(V)	max(V)	mA	max(V)	A
SMAJ36AS	SMAJ36CAS	JPS	VPS	36.0	1	40.00	44.20	1	58.1	6.9
SMAJ40AS	SMAJ40CAS	JRS	VRS	40.0	1	44.40	49.10	1	64.5	6.2
SMAJ43AS	SMAJ43CAS	JTS	VTS	43.0	1	47.80	52.80	1	69.4	5.8
SMAJ45AS	SMAJ45CAS	JVS	VVS	45.0	1	50.00	55.30	1	72.7	5.5
SMAJ48AS	SMAJ48CAS	JXS	VXS	48.0	1	53.30	58.90	1	77.4	5.2
SMAJ51AS	SMAJ51CAS	JZS	VZS	51.0	1	56.70	62.70	1	82.4	4.9
SMAJ54AS	SMAJ54CAS	RES	WES	54.0	1	60.00	66.30	1	87.1	4.6
SMAJ58AS	SMAJ58CAS	RGS	WGS	58.0	1	64.40	71.20	1	93.6	4.3
SMAJ60AS	SMAJ60CAS	RKS	WKS	60.0	1	66.70	73.70	1	96.8	4.1
SMAJ64AS	SMAJ64CAS	RMS	WMS	64.0	1	71.10	78.60	1	103.0	3.9
SMAJ70AS	SMAJ70CAS	RPS	WPS	70.0	1	77.80	86.00	1	113.0	3.6
SMAJ75AS	SMAJ75CAS	RRS	WRS	75.0	1	83.30	92.10	1	121.0	3.3
SMAJ78AS	SMAJ78CAS	RTS	WTS	78.0	1	86.70	95.80	1	126.0	3.2
SMAJ85AS	SMAJ85CAS	RVS	WVS	85.0	1	94.40	104.0	1	137.0	2.9
SMAJ90AS	SMAJ90CAS	RXS	WXS	90.0	1	100.0	111.0	1	146.0	2.8
SMAJ100AS	SMAJ100CAS	RZS	WZS	100	1	111.0	123.0	1	162.0	2.5

① Surge waveform: 10/1000μs

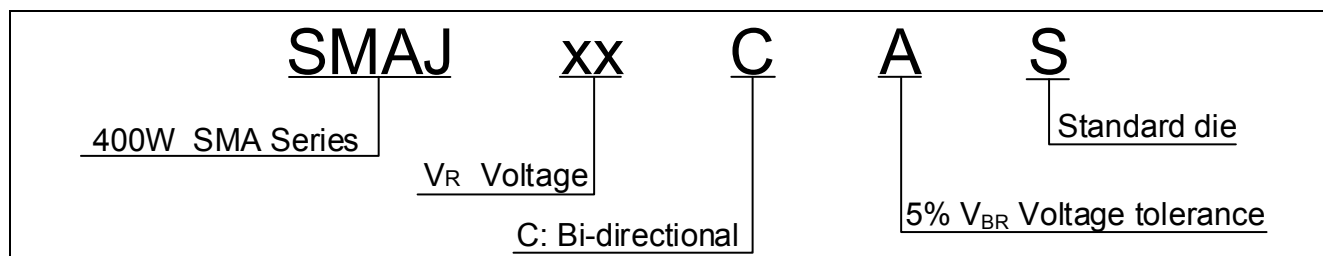
V_R: Stand-off voltage -- Maximum voltage that can be applied

V_{BR}: Breakdown voltage

V_C: Clamping voltage -- Peak voltage measured across the suppressor at a specified I_{PP}

I_R: Reverse leakage current

ORDERING INFORMATION



RATINGS AND V-I CHARACTERISTICS CURVES (T_A=25°C, unless otherwise noted)

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

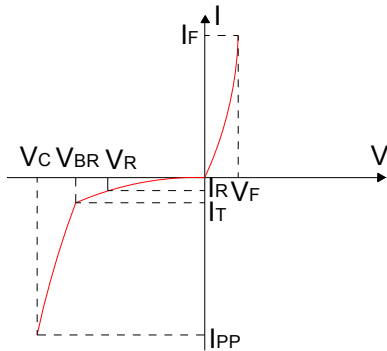


FIG.2: V- I curve characteristics (Bi-directional)

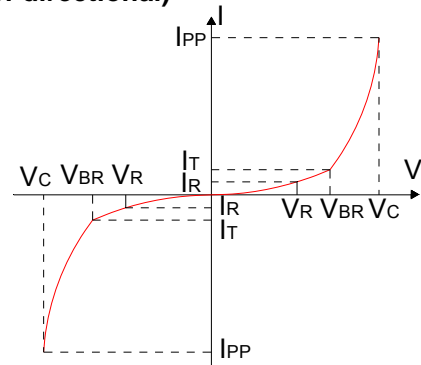


FIG.3: Pulse waveform

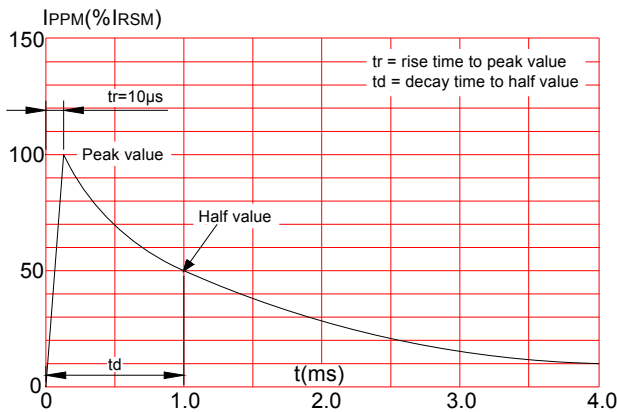
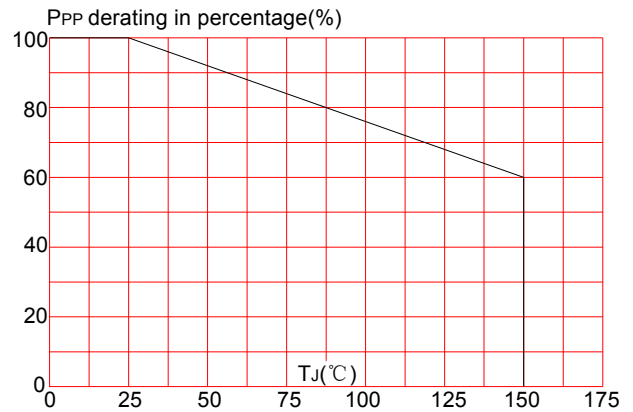
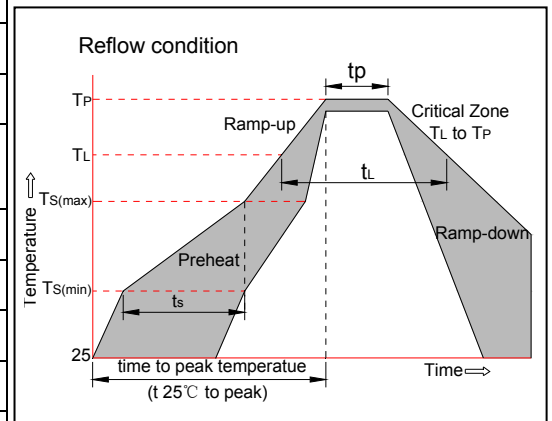


FIG.4: Pulse derating curve

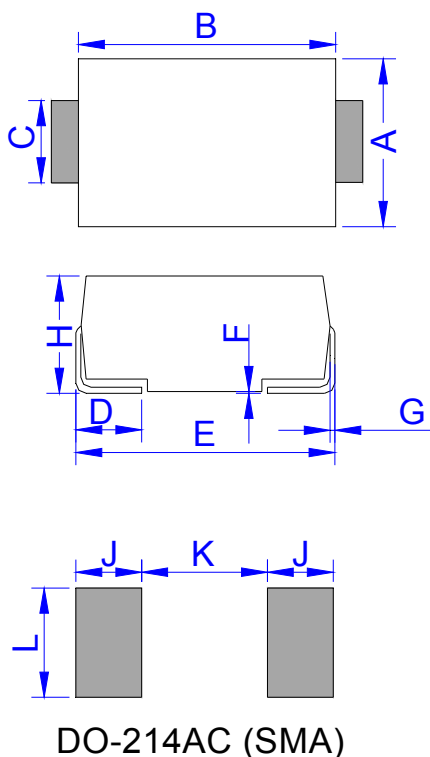


SOLDERING PARAMETERS

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

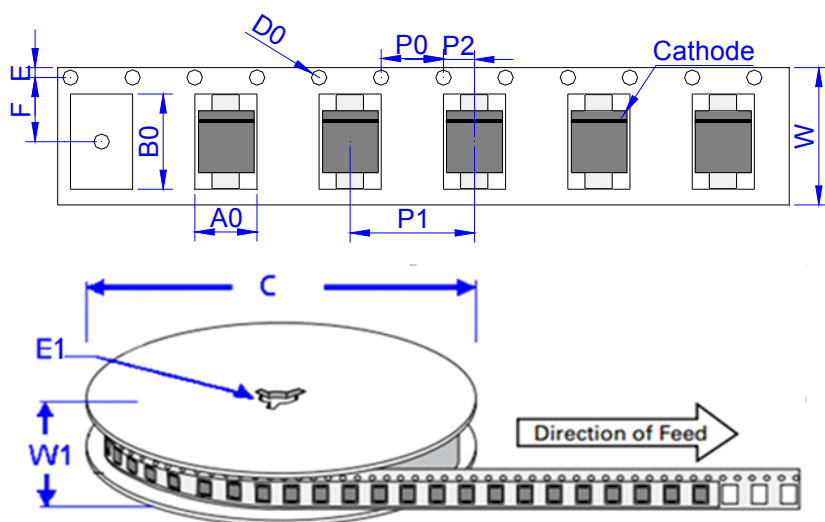


PACKAGE MECHANICAL DATA



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-SMA




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

PART No.	UNIT WEIGHT (g/PCS) typ.	REEL (PCS)	PER CARTON (PCS)	DESCRIPTION
SMAJxxAS/CAS	0.067	7,500	120,000	13 inch reel pack

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