

## 1. General description

SMAJ series, 400W transient voltage suppressor (TVS) in SMA package, designed to protect electronic circuits against damage induced by lightning surges or other transient voltage events.

## 2. Features and benefits

- Peak pulse power 400W @ 10/1000µs waveform
- Excellent clamping capability
- Low incremental surge resistance
- Surface mount package for easy assembly and PCB space-saving
- Typical  $I_R < 1\mu A$  when  $V_{BR\ min} > 12V$
- Fast response time: typically  $< 1.0ps$  from 0V to  $V_{BR}$  minimum
- IEC 61000-4-2 ESD 30kV (Air), 30kV (Contact)
- EFT protection of data lines in accordance with IEC 61000-4-4
- Guaranteed high temperature for reflow soldering: 260°C/10sec
- Mold compound complies to UL94V-0 flammability classification
- Meets MSL level 1, per J-STD-020
- Pb-free lead finish
- Halogen free and RoHS compliant



Bi-directional



Uni-directional

## 3. Applications

- Power supplies
- Industrial applications
- Power management circuits
- I/O interfaces



## 4. Ordering information

Type number	Package name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
SMAJxxxXX	SMA	SMAJxxxXXJ	Tape and reel	5000	SMAJ	18-Oct-2020
eg. SMAJ5.0CA	SMA	SMAJ5.0CAJ	Tape and reel	5000	SMAJ	18-Oct-2020

## 5. Absolute maximum ratings

In accordance with the Absolute Maximum Rating System (IEC 60134).

$T_j = 25^\circ C$  unless otherwise specified.

Symbol	Parameter	Conditions	Values	Unit
<b>Absolute maximum rating</b>				
$P_{PPM}$	peak pulse power	[1]	400	W
$P_{M(AV)}$	steady state power dissipation	on infinite heatsink at $T_a = 50^\circ C$	3.3	W
$I_{FSM}$	peak forward surge current	$t_p = 8.3\ ms$ ; single half sine-wave pulse; duty cycle = 4 pulses per minute maximum; unidirectional units only	60	A
$V_F$	forward on-state voltage	$I_F = 35\ A$ ; unidirectional units only	3.5	V
$T_{stg}$	storage temperature range		-65 to 150	$^\circ C$
$T_j$	operating temperature range		-65 to 150	$^\circ C$

[1] In accordance with IEC 61643-321 (10/1000 µs current waveform).

## 6. Characteristics

$T_j = 25^\circ\text{C}$  unless otherwise specified.

PN (Uni)	PN (Bi)	Reverse Stand off Voltage $V_R$ (V)	Breakdown Voltage $V_{BR}$ @ $I_T$ (V)		Test current $I_T$ (mA)	Max. Clamping Voltage $V_C$ @ $I_{pp}$ (V)	Max. Peak Pulse Current $I_{pp}$ (A)	Maximum Reverse Leakage $I_R$ @ $V_R$ ( $\mu\text{A}$ )	Marking	
			Min	Max					Uni	Bi
SMAJ5.0A	SMAJ5.0CA	5	6.45	6.98	10	9.2	43.5	400	A005AJ	A005CJ
SMAJ6.0A	SMAJ6.0CA	6	6.8	7.32	10	10.3	38.8	400	A006AJ	A006CJ
SMAJ6.5A	SMAJ6.5CA	6.5	7.27	7.92	10	11.2	35.7	250	A06FAJ	A06FCJ
SMAJ7.0A	SMAJ7.0CA	7	7.82	8.57	10	12	33.3	100	A007AJ	A007CJ
SMAJ8.0A	SMAJ8.0CA	8	8.95	9.76	1	13.6	29.4	50	A008AJ	A008CJ
SMAJ9.0A	SMAJ9.0CA	9	10.1	11	1	15.4	26	10	A009AJ	A009CJ
SMAJ10A	SMAJ10CA	10	11.21	12.19	1	17	23.5	5	A010AJ	A010CJ
SMAJ11A	SMAJ11CA	11	12.32	13.38	1	18.2	22	1	A011AJ	A011CJ
SMAJ12A	SMAJ12CA	12	13.43	14.57	1	19.9	20.1	1	A012AJ	A012CJ
SMAJ13A	SMAJ13CA	13	14.54	15.76	1	21.5	18.6	1	A013AJ	A013CJ
SMAJ14A	SMAJ14CA	14	15.75	17.04	1	23.2	17.2	1	A014AJ	A014CJ
SMAJ15A	SMAJ15CA	15	16.86	18.34	1	24.4	16.4	1	A015AJ	A015CJ
SMAJ16A	SMAJ16CA	16	17.97	19.52	1	26	15.4	1	A016AJ	A016CJ
SMAJ17A	SMAJ17CA	17	19.08	20.72	1	27.6	14.5	1	A017AJ	A017CJ
SMAJ18A	SMAJ18CA	18	20.19	21.9	1	29.2	13.7	1	A018AJ	A018CJ
SMAJ20A	SMAJ20CA	20	22.41	24.28	1	32.4	12.3	1	A020AJ	A020CJ
SMAJ22A	SMAJ22CA	22	24.63	26.66	1	35.5	11.3	1	A022AJ	A022CJ
SMAJ24A	SMAJ24CA	24	26.95	29.23	1	38.9	10.3	1	A024AJ	A024CJ
SMAJ26A	SMAJ26CA	26	29.12	31.67	1	42.1	9.5	1	A026AJ	A026CJ
SMAJ28A	SMAJ28CA	28	31.33	34.16	1	45.4	8.8	1	A028AJ	A028CJ
SMAJ30A	SMAJ30CA	30	33.55	36.54	1	48.4	8.3	1	A030AJ	A030CJ
SMAJ33A	SMAJ33CA	33	36.98	40.3	1	53.3	7.5	1	A033AJ	A033CJ
SMAJ36A	SMAJ36CA	36	40.3	43.9	1	58.1	6.9	1	A036AJ	A036CJ
SMAJ40A	SMAJ40CA	40	44.7	48.8	1	64.5	6.2	1	A040AJ	A040CJ
SMAJ43A	SMAJ43CA	43	48.2	52.4	1	69.4	5.8	1	A043AJ	A043CJ
SMAJ45A	SMAJ45CA	45	50.4	54.9	1	72.7	5.5	1	A045AJ	A045CJ
SMAJ48A	SMAJ48CA	48	53.7	58.5	1	77.4	5.2	1	A048AJ	A048CJ
SMAJ51A	SMAJ51CA	51	57.1	62.3	1	82.4	4.9	1	A051AJ	A051CJ
SMAJ54A	SMAJ54CA	54	60.5	65.8	1	87.1	4.6	1	A054AJ	A054CJ
SMAJ58A	SMAJ58CA	58	64.9	70.7	1	93.6	4.3	1	A058AJ	A058CJ
SMAJ60A	SMAJ60CA	60	67.2	73.2	1	96.8	4.1	1	A060AJ	A060CJ
SMAJ64A	SMAJ64CA	64	71.6	78	1	103	3.9	1	A064AJ	A064CJ
SMAJ70A	SMAJ70CA	70	78.4	85.4	1	113	3.5	1	A070AJ	A070CJ
SMAJ75A	SMAJ75CA	75	83.9	91.5	1	121	3.3	1	A075AJ	A075CJ
SMAJ78A	SMAJ78CA	78	87.4	95.1	1	126	3.2	1	A078AJ	A078CJ
SMAJ85A	SMAJ85CA	85	95.1	103.3	1	137	2.9	1	A085AJ	A085CJ
SMAJ90A	SMAJ90CA	90	100	111	1	146	2.8	1	A090AJ	A090CJ
SMAJ100A	SMAJ100CA	100	111	123	1	162	2.5	1	A100AJ	A100CJ

T<sub>j</sub> = 25 °C unless otherwise specified.

PN (Uni)	PN (Bi)	Reverse Stand off Voltage V <sub>R</sub> (V)	Breakdown Voltage V <sub>BR</sub> @ I <sub>T</sub> (V)		Test current I <sub>T</sub> (mA)	Max. Clamping Voltage V <sub>C</sub> @ I <sub>pp</sub> (V)	Max. Peak Pulse Current I <sub>pp</sub> (A)	Maximum Reverse Leakage I <sub>R</sub> @ V <sub>R</sub> (µA)	Marking	
			Min	Max					Uni	Bi
SMAJ110A	SMAJ110CA	110	122	135	1	177	2.3	1	A110AJ	A110CJ
SMAJ120A	SMAJ120CA	120	133	147	1	193	2.1	1	A120AJ	A120CJ
SMAJ130A	SMAJ130CA	130	144	159	1	209	1.9	1	A130AJ	A130CJ
SMAJ150A	SMAJ150CA	150	167	185	1	243	1.7	1	A150AJ	A150CJ
SMAJ160A	SMAJ160CA	160	178	197	1	259	1.6	1	A160AJ	A160CJ
SMAJ170A	SMAJ170CA	170	189	209	1	275	1.5	1	A170AJ	A170CJ
SMAJ180A	SMAJ180CA	180	201	222	1	292	1.4	1	A180AJ	A180CJ
SMAJ190A	SMAJ190CA	190	209	231	1	304	1.4	1	A190AJ	A190CJ
SMAJ200A	SMAJ200CA	200	224	247	1	324	1.3	1	A200AJ	A200CJ
SMAJ220A	SMAJ220CA	220	246	272	1	356	1.1	1	A220AJ	A220CJ

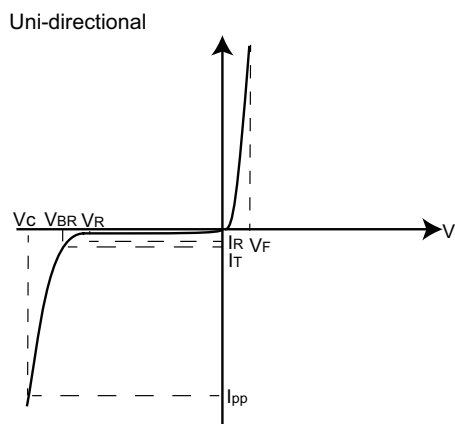


Fig. 1. I-V curve characteristics; Uni-directional

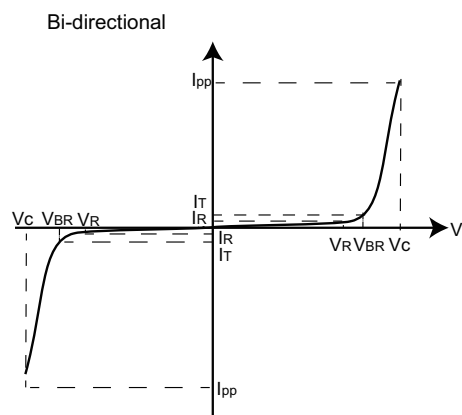


Fig. 2. I-V curve characteristics; Bi-directional

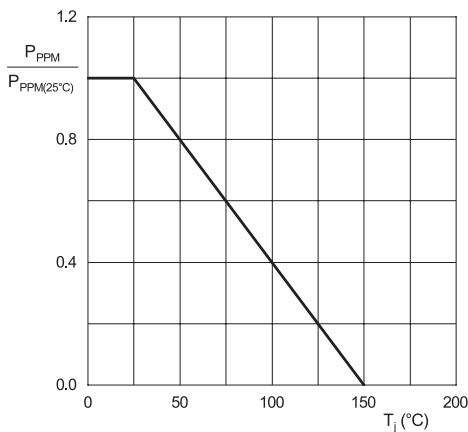


Fig. 3. Peak pulse power derating curve

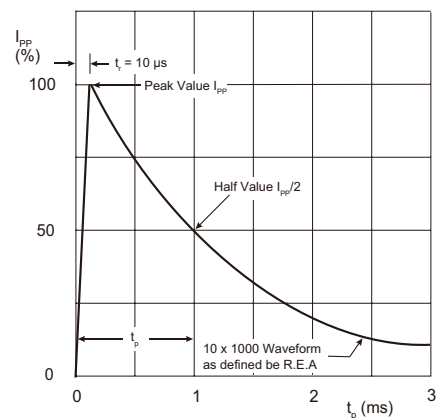


Fig. 4. Pulse waveform

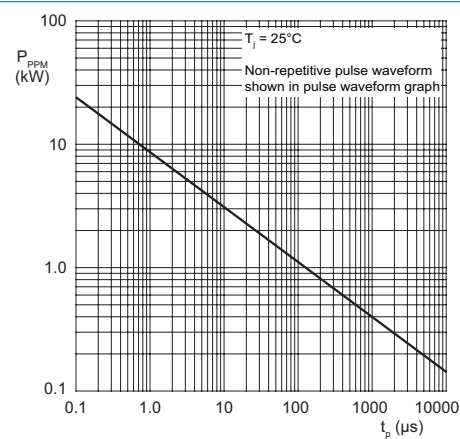


Fig. 5. Peak pulse power rating curve

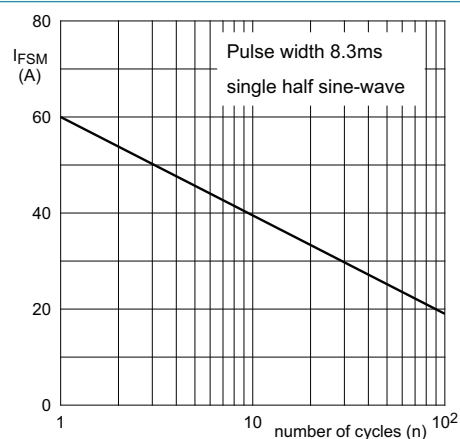


Fig. 6. Maximum non-repetitive surge current  
Uni-directional only

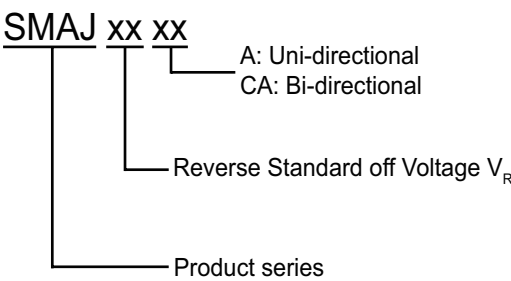


Fig. 7. Part numbering

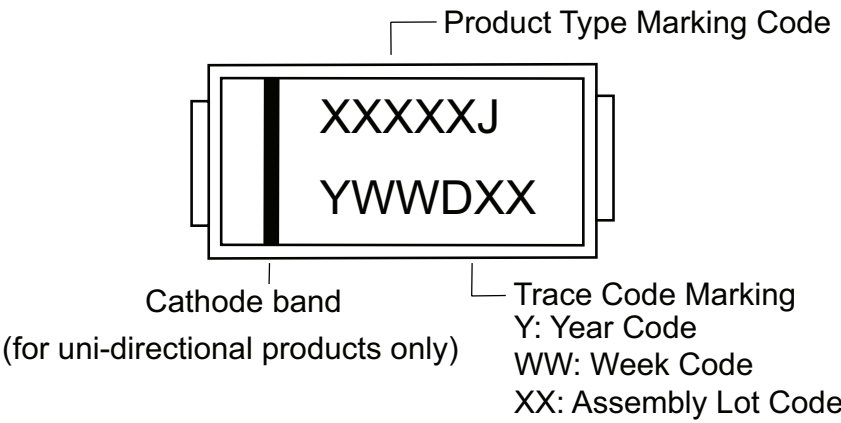
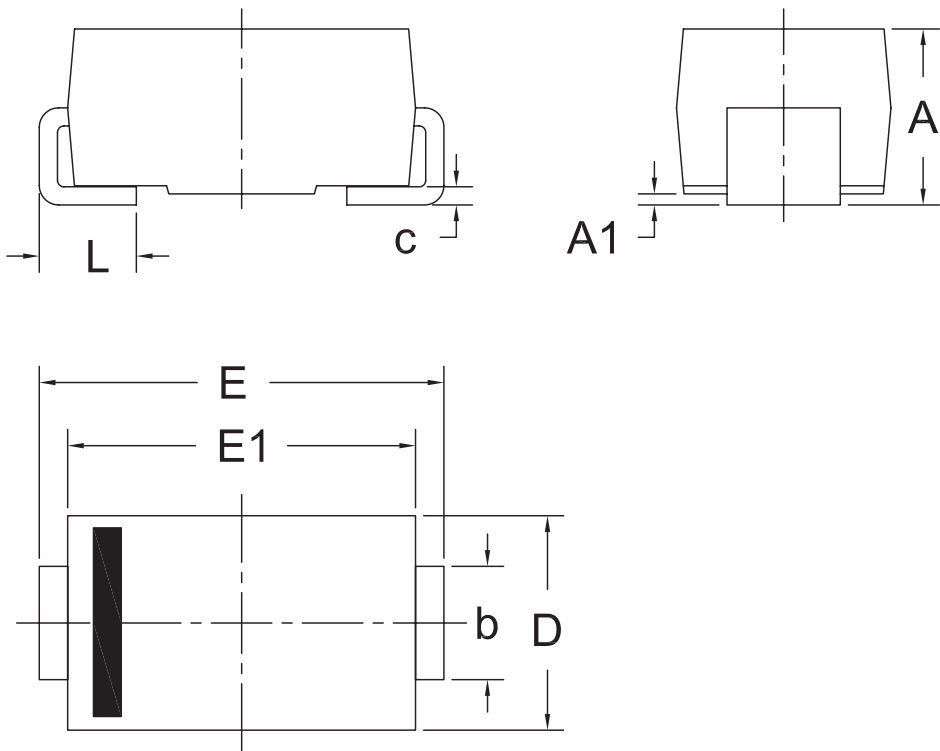


Fig. 8. Part marking

7. Package outline

SMA



UNIT		A	A1	b	c	D	E	E1	L
mm	Max	2.45	0.20	1.65	0.25	2.85	5.25	4.55	1.55
	Min	1.95	0.10	1.35	0.15	2.55	4.75	4.25	0.85

Remark: Dimensions D and E1 do not include mold flash & gate remain.

## 8. Legal information

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Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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