

## 400W, 5V - 188V Surface Mount Transient Voltage Suppressor

### FEATURES

- Ideal for automated placement
- Glass passivated junction
- Excellent clamping capability
- Fast response time: Typically less than 1.0ps from 0 V to BV min
- Typical  $I_R$  less than 1 $\mu$ A above 10V
- Moisture sensitivity level: level 1, per J-STD-020
- AEC-Q101 qualified available: ordering code with suffix "H"
- 400 W peak pulse power capability with a 10 / 1000  $\mu$ s waveform(300W above 78V)
- Compliant to RoHS directive 2011/65/EU and in accordance to WEEE 2002/96/EC

KEY PARAMETERS		
PARAMETER	VALUE	UNIT
$V_{WM}$	5 - 188	V
$V_{BR}$	6.4 - 255	V
$P_{PPM}$ $t_p = 10/1000 \mu s$ waveform	400	W
$T_{JMAX}$	150	$^{\circ}C$
Package	DO-214AC (SMA)	
Configuration	Single die	



### APPLICATIONS

- Switching mode power supply (SMPS)
- Adapters
- Lighting application
- On-board DC/DC converter



DO-214AC (SMA)

### MECHANICAL DATA

- Case: DO-214AC (SMA)
- Molding compound meets UL 94V-0 flammability rating
- Matte tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 2 whisker test
- Weight: 0.06g (approximately)

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^{\circ}C$ unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Peak power dissipation at $T_A=25^{\circ}C$ , $t_p=1ms$ (Note 1)	$P_{PK}$	400	W
Steady state power dissipation	$P_D$	1	W
Peak forward surge current, 8.3 ms single half sine-wave superimposed on rated load	$I_{FSM}$	40	A
Maximum instantaneous forward voltage at 25 A for unidirectional only	$V_F$	3.5	V
Operating junction temperature range	$T_J$	-55 to +150	$^{\circ}C$
Storage temperature range	$T_{STG}$	-55 to +150	$^{\circ}C$

**Note:**

1. Non-repetitive current pulse per Fig. 3 and derated above  $T_A=25^{\circ}C$  per Fig. 2

Devices for Bipolar Applications

1. For bidirectional use C or CA suffix for types SMAJ5.0 - Types SMAJ188
2. Electrical characteristics apply in both directions

**ELECTRICAL SPECIFICATIONS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

Part number	Marking code	Breakdown voltage $V_{BR}@I_T^{(1)}$ (V)		Test current $I_T$ (mA)	Working stand-off voltage $V_{WM}$ (V)	Maximum reverse leakage current $I_R@V_{WM}^{(1)}$ ( $\mu\text{A}$ )	Maximum peak impulse current $I_{PPM}$ (A) <sup>(2)</sup>	Maximum clamping voltage $V_C@I_{PPM}$ (V) <sup>(2)</sup>
		Min.	Max.					
SMAJ5.0	AD	6.4	7.30	10	5	800	41.7	9.6
SMAJ5.0A	AE	6.4	7.00	10	5	800	43.5	9.2
SMAJ6.0	AF	6.67	8.15	10	6	800	35.1	11.4
SMAJ6.0A	AG	6.67	7.37	10	6	800	38.8	10.3
SMAJ6.5	AH	7.22	8.82	10	6.5	500	32.5	12.3
SMAJ6.5A	AK	7.22	7.98	10	6.5	500	35.7	11.2
SMAJ7.0	AL	7.78	9.51	10	7	200	30.1	13.3
SMAJ7.0A	AM	7.78	8.60	10	7	200	33.3	12.0
SMAJ7.5	AN	8.33	10.30	1	7.5	100	28.0	14.3
SMAJ7.5A	AP	8.33	9.21	1	7.5	100	31.0	12.9
SMAJ8.0	AQ	8.89	10.90	1	8	50	26.7	15.0
SMAJ8.0A	AR	8.89	9.83	1	8	50	29.4	13.6
SMAJ8.5	AS	9.44	11.50	1	8.5	10	25.2	15.9
SMAJ8.5A	AT	9.44	10.40	1	8.5	10	27.8	14.4
SMAJ9.0	AU	10.0	12.20	1	9	5	23.7	16.9
SMAJ9.0A	AV	10.0	11.10	1	9	5	26.0	15.4
SMAJ10	AW	11.1	13.60	1	10	5	21.3	18.8
SMAJ10A	AX	11.1	12.30	1	10	5	23.5	17.0
SMAJ11	AY	12.2	14.90	1	11	1	19.9	20.1
SMAJ11A	AZ	12.2	13.50	1	11	1	22.0	18.2
SMAJ12	BD	13.3	16.30	1	12	1	18.2	22.0
SMAJ12A	BE	13.3	14.70	1	12	1	20.1	19.9
SMAJ13	BF	14.4	17.60	1	13	1	16.8	23.8
SMAJ13A	BG	14.4	15.90	1	13	1	18.6	21.5
SMAJ14	BH	15.6	19.10	1	14	1	15.5	25.8
SMAJ14A	BK	15.6	17.20	1	14	1	17.2	23.2
SMAJ15	BL	16.7	20.40	1	15	1	14.9	26.9
SMAJ15A	BM	16.7	18.50	1	15	1	16.4	24.4
SMAJ16	BN	17.8	21.80	1	16	1	13.9	28.8
SMAJ16A	BP	17.8	19.70	1	16	1	15.4	26.0
SMAJ17	BQ	18.9	23.10	1	17	1	13.1	30.5
SMAJ17A	BR	18.9	20.90	1	17	1	14.5	27.6
SMAJ18	BS	20.0	24.40	1	18	1	12.4	32.2
SMAJ18A	BT	20.0	22.10	1	18	1	13.7	29.2
SMAJ20	BU	22.2	27.10	1	20	1	11.2	35.8
SMAJ20A	BV	22.2	24.50	1	20	1	12.3	32.4
SMAJ22	BW	24.4	29.80	1	22	1	10.2	39.4
SMAJ22A	BX	24.4	26.90	1	22	1	11.3	35.5
SMAJ24	BY	26.7	32.60	1	24	1	9.3	43.0
SMAJ24A	BZ	26.7	29.50	1	24	1	10.3	38.9
SMAJ26	CD	28.9	35.30	1	26	1	8.6	46.6
SMAJ26A	CE	28.9	31.90	1	26	1	9.5	42.1
SMAJ28	CF	31.1	38.00	1	28	1	8.0	50.0
SMAJ28A	CG	31.1	34.40	1	28	1	8.8	45.4
SMAJ30	CH	33.3	40.7	1	30	1	7.5	53.5
SMAJ30A	CK	33.3	36.8	1	30	1	8.3	48.4
SMAJ33	CL	36.7	44.9	1	33	1	6.8	59.0
SMAJ33A	CM	36.7	40.6	1	33	1	7.5	53.3

**ELECTRICAL SPECIFICATIONS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

Part number	Marking code	Breakdown voltage $V_{BR}@I_T^{(1)}$ (V)		Test current $I_T$ (mA)	Working stand-off voltage $V_{WM}$ (V)	Maximum reverse leakage current $I_R@V_{WM}^{(1)}$ ( $\mu\text{A}$ )	Maximum peak impulse current $I_{PPM}$ (A) <sup>(2)</sup>	Maximum clamping voltage $V_C@I_{PPM}$ (V) <sup>(2)</sup>
		Min.	Max.					
SMAJ36	CN	40.0	48.9	1	36	1	6.2	64.3
SMAJ36A	CP	40.0	44.2	1	36	1	6.9	58.1
SMAJ40	CQ	44.4	54.3	1	40	1	5.6	71.4
SMAJ40A	CR	44.4	49.1	1	40	1	6.2	64.5
SMAJ43	CS	47.8	58.4	1	43	1	5.2	76.7
SMAJ43A	CT	47.8	52.8	1	43	1	5.8	69.4
SMAJ45	CU	50.0	61.1	1	45	1	5.0	80.3
SMAJ45A	CV	50.0	55.3	1	45	1	5.5	72.7
SMAJ48	CW	53.3	65.1	1	48	1	4.7	85.5
SMAJ48A	CX	53.3	58.9	1	48	1	5.2	77.4
SMAJ51	CY	56.7	69.3	1	51	1	4.4	91.1
SMAJ51A	CZ	56.7	62.7	1	51	1	4.9	82.4
SMAJ54	RD	60.0	73.3	1	54	1	4.2	96.3
SMAJ54A	RE	60.0	66.3	1	54	1	4.6	87.1
SMAJ58	RF	64.4	78.7	1	58	1	3.9	103
SMAJ58A	RG	64.4	71.2	1	58	1	4.3	93.6
SMAJ60	RH	66.7	81.5	1	60	1	3.7	107
SMAJ60A	RK	66.7	73.7	1	60	1	4.1	96.8
SMAJ64	RL	71.1	86.9	1	64	1	3.5	114
SMAJ64A	RM	71.1	78.6	1	64	1	3.9	103
SMAJ70	RN	77.8	95.1	1	70	1	3.2	125
SMAJ70A	RP	77.8	86	1	70	1	3.5	113
SMAJ75	RQ	83.3	102	1	75	1	3.0	134
SMAJ75A	RR	83.3	92.1	1	75	1	3.3	121
SMAJ78	RS	86.7	106	1	78	1	2.9	139
SMAJ78A	RT	86.7	95.8	1	78	1	3.2	126
SMAJ85	RU	94.4	115	1	85	1	2.0	151
SMAJ85A	RV	94.4	104	1	85	1	2.2	137
SMAJ90	RW	100	122	1	90	1	1.9	160
SMAJ90A	RX	100	111	1	90	1	2.1	146
SMAJ100	RY	111	136	1	100	1	1.7	179
SMAJ100A	RZ	111	123	1	100	1	1.9	162
SMAJ110	SD	122	149	1	110	1	1.6	196
SMAJ110A	SE	122	135	1	110	1	1.7	177
SMAJ120	SF	133	163	1	120	1	1.4	214
SMAJ120A	SG	133	147	1	120	1	1.6	193
SMAJ130	SH	144	176	1	130	1	1.3	231
SMAJ130A	SK	144	159	1	130	1	1.5	209
SMAJ150	SL	167	204	1	150	1	1.1	266
SMAJ150A	SM	167	185	1	150	1	1.3	243
SMAJ160	SN	178	218	1	160	1	1.0	287
SMAJ160A	SP	178	197	1	160	1	1.2	259
SMAJ170	SQ	189	231	1	170	1	1.0	304
SMAJ170A	SR	189	209	1	170	1	1.1	275
SMAJ188	ST	209	255	1	188	1	0.9	344
SMAJ188A	SS	209	231	1	188	1	0.9	328

**Notes:**

1. Pulse test with PW=30 ms
2. Non-repetitive current pulse, per Fig. 3 and derated above  $T_A=25^\circ\text{C}$  per Fig. 2
3. Peak pulse power waveform is 10/1000 $\mu\text{s}$
4. For bi-directional devices having  $V_R$  of 10 V and under, the  $I_R$  limit is double.

<b>ORDERING INFORMATION</b>		
<b>ORDERING CODE</b> (Note 1,2,3)	<b>PACKAGE</b>	<b>PACKING</b>
SMAJxxxAHR3G	SMA	1,800 / 7" Plastic reel
SMAJxxxAHR2G	SMA	7,500 / 13" Paper reel
SMAJxxxAHM2G	SMA	7,500 / 13" Plastic reel
SMAJxxxAHF3G	Folded SMA	1,800 / 7" Plastic reel
SMAJxxxAHF2G	Folded SMA	7,500 / 13" Paper reel
SMAJxxxAHF4G	Folded SMA	7,500 / 13" Plastic reel
SMAJxxxAHE3G	Clip SMA	1,800 / 7" Plastic reel
SMAJxxxAHE2G	Clip SMA	7,500 / 13" Plastic reel
SMAJxxxA R3G	SMA	1,800 / 7" Plastic reel
SMAJxxxA R2G	SMA	7,500 / 13" Paper reel
SMAJxxxA M2G	SMA	7,500 / 13" Plastic reel
SMAJxxxA F3G	Folded SMA	1,800 / 7" Plastic reel
SMAJxxxA F2G	Folded SMA	7,500 / 13" Paper reel
SMAJxxxA F4G	Folded SMA	7,500 / 13" Plastic reel
SMAJxxxA E3G	Clip SMA	1,800 / 7" Plastic reel
SMAJxxxA E2G	Clip SMA	7,500 / 13" Plastic reel
SMAJxxxAHR3	SMA	1,800 / 7" Plastic reel
SMAJxxxAHR2	SMA	7,500 / 13" Paper reel
SMAJxxxAHM2	SMA	7,500 / 13" Plastic reel
SMAJxxxAHF3	Folded SMA	1,800 / 7" Plastic reel
SMAJxxxAHF2	Folded SMA	7,500 / 13" Paper reel
SMAJxxxAHF4	Folded SMA	7,500 / 13" Plastic reel
SMAJxxxAHE3	Clip SMA	1,800 / 7" Plastic reel
SMAJxxxAHE2	Clip SMA	7,500 / 13" Plastic reel
SMAJxxxA R3	SMA	1,800 / 7" Plastic reel
SMAJxxxA R2	SMA	7,500 / 13" Paper reel
SMAJxxxA M2	SMA	7,500 / 13" Plastic reel
SMAJxxxA F3	Folded SMA	1,800 / 7" Plastic reel
SMAJxxxA F2	Folded SMA	7,500 / 13" Paper reel
SMAJxxxA F4	Folded SMA	7,500 / 13" Plastic reel
SMAJxxxA E3	Clip SMA	1,800 / 7" Plastic reel
SMAJxxxA E2	Clip SMA	7,500 / 13" Plastic reel

**Note 1:**

"xxx" defines voltage from 5V (SMAJ5.0) to 188V (SMAJ188)

**Note 2:**

"H" means AEC-Q101 qualified

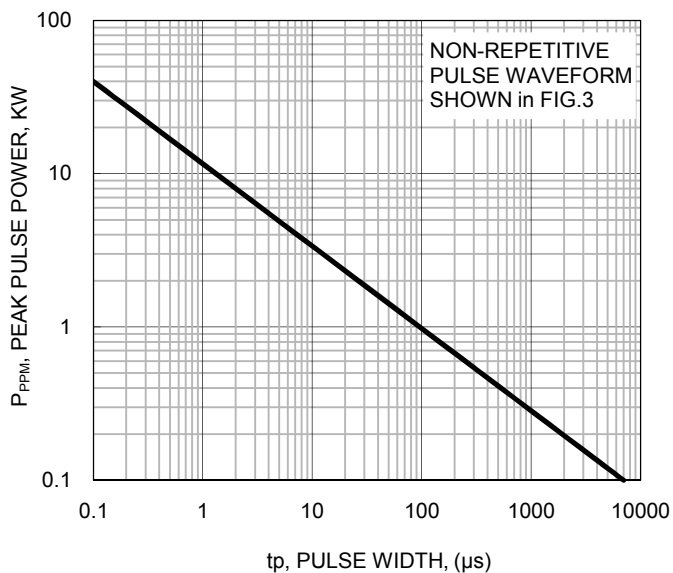
**Note 3:**

"G" means green compound (halogen free)

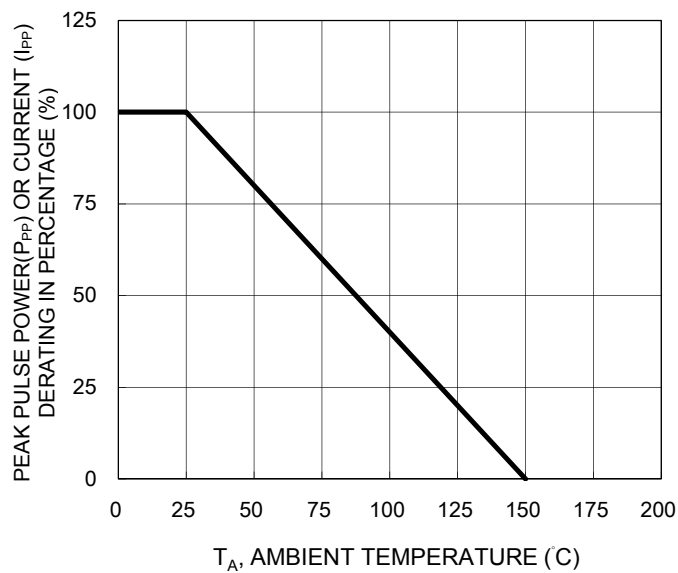
**CHARACTERISTICS CURVES**

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

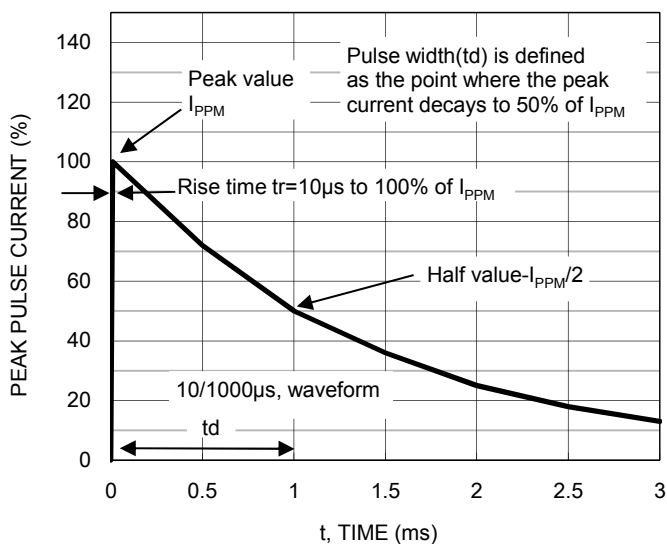
**Fig.1 Peak Pulse Power Rating Curve**



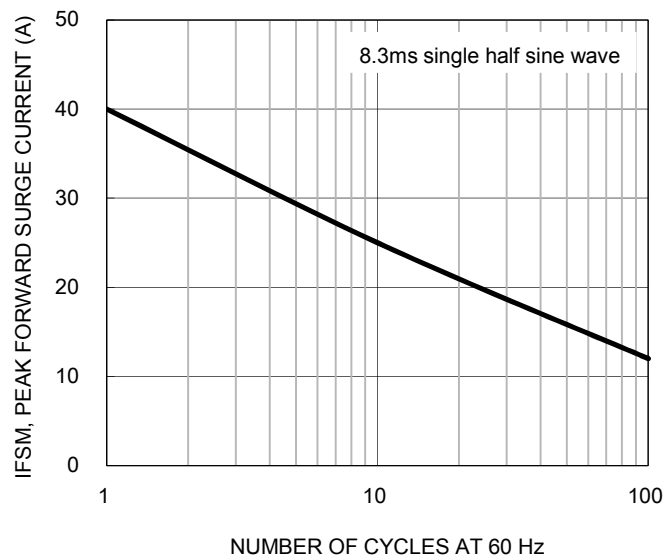
**Fig.2 Pulse Derating Curve**



**Fig.3 Clamping Power Pulse Waveform**



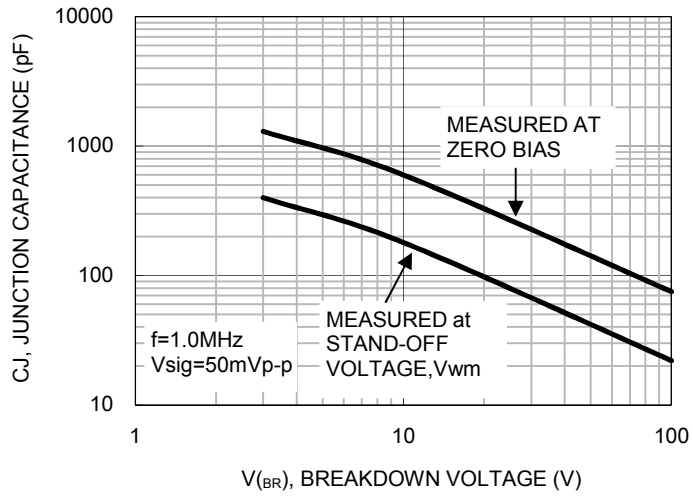
**Fig.4 Maximum Non-repetitive Forward Surge Current**



**CHARACTERISTICS CURVES**

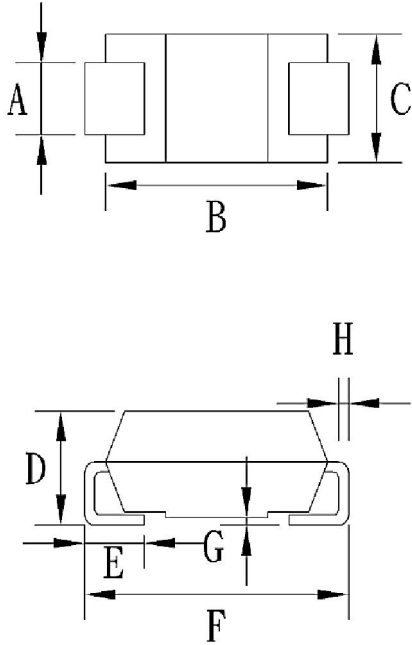
( $T_A = 25^\circ\text{C}$  unless otherwise noted)

**Fig.5 Typical Junction Capacitance**



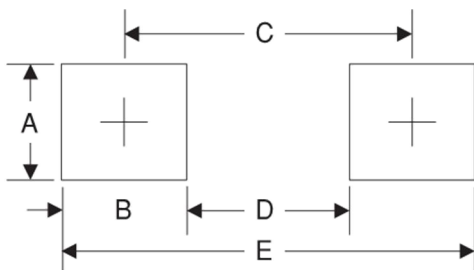
**PACKAGE OUTLINE DIMENSIONS**

DO-214AC (SMA)



DIM	Unit (mm)		Unit (inch)	
	Min	Max	Min	Max
A	1.27	1.58	0.050	0.062
B	4.06	4.60	0.160	0.181
C	2.29	2.83	0.090	0.111
D	1.99	2.50	0.078	0.098
E	0.90	1.41	0.035	0.056
F	4.95	5.33	0.195	0.210
G	0.10	0.20	0.004	0.008
H	0.15	0.31	0.006	0.012

**SUGGESTED PAD LAYOUT**



Symbol	Unit (mm)	Unit (inch)
A	1.68	0.066
B	1.52	0.060
C	3.93	0.155
D	2.41	0.095
E	5.45	0.215

**MARKING DIAGRAM**



- P/N = Marking Code
- G = Green Compound
- YW = Date Code
- F = Factory Code

Note: Cathode band for uni-directional products only

## Notice

Specifications of the products displayed herein are subject to change without notice. TSC or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, to any intellectual property rights is granted by this document. Except as provided in TSC's terms and conditions of sale for such products, TSC assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of TSC products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify TSC for any damages resulting from such improper use or sale.



# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

## Taiwan Semiconductor:

[SMAJ100A](#) [SMAJ100CA](#) [SMAJ10A](#) [SMAJ10CA](#) [SMAJ110A](#) [SMAJ110CA](#) [SMAJ11A](#) [SMAJ11CA](#) [SMAJ120A](#)  
[SMAJ120CA](#) [SMAJ12A](#) [SMAJ12CA](#) [SMAJ130A](#) [SMAJ130CA](#) [SMAJ13A](#) [SMAJ13CA](#) [SMAJ14A](#) [SMAJ14CA](#)  
[SMAJ150A](#) [SMAJ150CA](#) [SMAJ15A](#) [SMAJ15CA](#) [SMAJ160A](#) [SMAJ160CA](#) [SMAJ16A](#) [SMAJ16CA](#) [SMAJ170A](#)  
[SMAJ170CA](#) [SMAJ17A](#) [SMAJ17CA](#) [SMAJ188A](#) [SMAJ188CA](#) [SMAJ18A](#) [SMAJ18CA](#) [SMAJ20A](#) [SMAJ20CA](#)  
[SMAJ22A](#) [SMAJ22CA](#) [SMAJ24A](#) [SMAJ24CA](#) [SMAJ26A](#) [SMAJ26CA](#) [SMAJ28A](#) [SMAJ28CA](#) [SMAJ30A](#)  
[SMAJ30CA](#) [SMAJ33A](#) [SMAJ33CA](#) [SMAJ36A](#) [SMAJ36CA](#) [SMAJ40A](#) [SMAJ40CA](#) [SMAJ43A](#) [SMAJ43CA](#)  
[SMAJ45A](#) [SMAJ45CA](#) [SMAJ48A](#) [SMAJ48CA](#) [SMAJ5.0A](#) [SMAJ5.0CA](#) [SMAJ51A](#) [SMAJ51CA](#) [SMAJ530](#) [SMAJ54A](#)  
[SMAJ54CA](#) [SMAJ550](#) [SMAJ58A](#) [SMAJ58CA](#) [SMAJ6.0A](#) [SMAJ6.0CA](#) [SMAJ6.5A](#) [SMAJ6.5CA](#) [SMAJ60A](#)  
[SMAJ60CA](#) [SMAJ64A](#) [SMAJ64CA](#) [SMAJ7.0A](#) [SMAJ7.0CA](#) [SMAJ7.5A](#) [SMAJ7.5CA](#) [SMAJ70A](#) [SMAJ70CA](#)  
[SMAJ75A](#) [SMAJ75CA](#) [SMAJ78A](#) [SMAJ78CA](#) [SMAJ8.0A](#) [SMAJ8.0CA](#) [SMAJ8.5A](#) [SMAJ8.5CA](#) [SMAJ85A](#)  
[SMAJ85CA](#) [SMAJ9.0A](#) [SMAJ9.0CA](#) [SMAJ90A](#) [SMAJ90CA](#) [SMAJ8.5A R2](#) [SMAJ16CA R2](#) [SMAJ7.5A R2](#)  
[SMAJ110CA R2](#)