

400 WATT TVS COMPONENT



DESCRIPTION

The SMAJ-S Series are multi-line transient voltage suppressor arrays that provides board level protection for standard TTL and MOS bus line applications against the damaging effects of ESD, tertiary lightning and switching transients.

The SMAJ-S Series has a peak pulse power rating of 400 Watts for an 10/1000 μ s waveshape. This device series meets the IEC 61000-4-2, IEC 61000-4-4 and IEC 61000-4-5 requirements.

FEATURES

- IEC Compatibility 61000-4-2 (ESD): $\pm 30\text{kV}$ Air, $\pm 30\text{kV}$ Contact
- IEC Compatibility 61000-4-4 (EFT)
- IEC Compatibility 61000-4-5 (Surge)
- Glass Passivated Chip
- 400 Watts Peak Pulse Power per Line ($t_p = 10/1000\mu\text{s}$)
- Low Leakage Current: $< 1\mu\text{A}$ (Min. $V_{BR} > 12\text{V}$)
- Unidirectional & Bidirectional Configurations
- Available in Multiple Voltages
- Excellent Clamping Capability
- Very Fast Response Time
- Low Incremental Surge Resistance
- Low Profile Package
- RoHS & Halogen-free Compliant

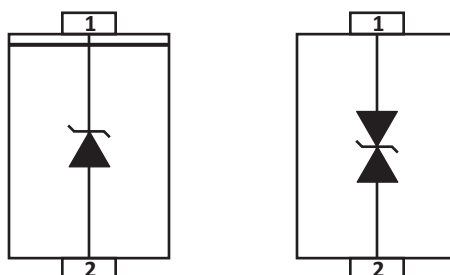
APPLICATIONS

- Communications Equipment
- Industrial Control Equipment
- Power Supply Protection
- Lightning Protection

MECHANICAL CHARACTERISTICS

- Molded JEDEC DO-214AC Package
- Approximate Weight: 0.06 grams
- Lead-Free Matte-Tin Plating
- Solder Reflow Temperature: 260°C Max, ≤ 10 seconds
- 16mm Tape and Reel Per EIA Standard 481
- Terminal: Solderable per MIL-STD-750, Method 2026
- Flammability Rating UL 94V-0

PIN CONFIGURATIONS



TYPICAL DEVICE CHARACTERISTICS

MAXIMUM RATINGS @ 25°C Unless Otherwise Specified

PARAMETER	SYMBOL	VALUE	UNITS
Operating Temperature	T_J	-55 to 150	°C
Storage Temperature	T_{STG}	-55 to 150	°C
Peak Pulse Power (tp = 10/1000µs) - See Figure 1 and Note 1	P_{PP}	400/600*	Watts
Peak Power Dissipation on Infinite Heatsink at $T_L = 50^\circ\text{C}$	P_D	3.3	Watts
Peak Forward Surge Current, 8.3ms single half sinewave - Unidirectional Only (Note 2)	I_{FSM}	60	Amps
Maximum Instantaneous Forward Voltage at 100A - Unidirectional Only	V_F	3.5/5.0	V
Typical Thermal Resistance, Junction to Lead	$R_{\theta JL}$	30	°C/W
Typical Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	120	°C/W

NOTE

1. Non-repetitive current pulse per Figure 2 and derated above $T_J = 25^\circ\text{C}$ per Figure 3. *Denotes stacked die component.
2. Measured on 8.3ms single half sinewave or equivalent square wave, duty cycle = 4 pulses per minute maximum.

ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified

PART NUMBER (Note 1)	DEVICE MARKING (Note 3)		REVERSE STAND-OFF VOLTAGE V_{RWM} VOLTS	BREAKDOWN VOLTAGE $V_{(BR)} @ I_T$ VOLTS		TEST CURRENT $@ I_T$ mA	MAXIMUM CLAMPING VOLTAGE (Fig. 2) $@ I_P$ V_C VOLTS	MAXIMUM REVERSE SURGE CURRENT $@ I_{PP}$ AMPS	MAXIMUM REVERSE LEAKAGE CURRENT (Note 2) $@ V_{RWM}$ I_R µA
	UNI	BI		MIN	MAX				
SMAJ5.0A-S	AE	WE	5.0	6.40	7.00	10	9.2	43.5	400
SMAJ6.0A-S	AG	WG	6.0	6.67	7.37	10	10.3	38.8	400
SMAJ6.5A-S	AK	WK	6.5	7.22	7.98	10	11.2	35.7	250
SMAJ7.0A-S	AM	WM	7.0	7.78	8.60	10	12.0	33.3	100
SMAJ7.5A-S	AP	WP	7.5	8.33	9.21	1	12.9	31.0	50
SMAJ8.0A-S	AR	WR	8.0	8.89	9.83	1	13.6	29.4	25
SMAJ8.5A-S	AT	WT	8.5	9.44	10.40	1	14.4	27.8	10
SMAJ9.0A-S	AV	WV	9.0	10.00	11.10	1	15.4	26.0	10
SMAJ10A-S	AX	WX	10.0	11.10	12.30	1	17.0	23.5	5
SMAJ11A-S	AZ	WZ	11.0	12.20	13.50	1	18.2	22.0	1
SMAJ12A-S	BE	XE	12.0	13.30	14.70	1	19.9	20.1	1
SMAJ13A-S	BG	XG	13.0	14.40	15.90	1	21.5	18.6	1
SMAJ14A-S	BK	XK	14.0	15.60	17.20	1	23.2	17.2	1
SMAJ15A-S	BM	XM	15.0	16.70	18.50	1	24.4	16.4	1
SMAJ16A-S	BP	XP	16.0	17.80	19.70	1	26.0	15.4	1
SMAJ17A-S	BR	XR	17.0	18.90	20.90	1	27.6	14.5	1
SMAJ18A-S	BT	XT	18.0	20.00	22.10	1	29.2	13.7	1
SMAJ20A-S	BV	XV	20.0	22.20	24.50	1	32.4	12.3	1
SMAJ22A-S	BX	XX	22.0	24.40	26.90	1	35.5	11.3	1
SMAJ24A-S	BZ	XZ	24.0	26.70	29.50	1	38.9	10.3	1

TYPICAL DEVICE CHARACTERISTICS

ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified

PART NUMBER (Note 1)	DEVICE MARKING (Note 3)		REVERSE STAND-OFF VOLTAGE V_{RWM} VOLTS	BREAKDOWN VOLTAGE $V_{(BR)}$ @ I_T VOLTS		TEST CURRENT @ I_T mA	MAXIMUM CLAMPING VOLTAGE (Fig. 2) @ I_P V_C VOLTS	MAXIMUM REVERSE SURGE CURRENT @ I_{PP} AMPS	MAXIMUM REVERSE LEAKAGE CURRENT (Note 2) @ V_{RWM} I_R μA
	UNI	BI		MIN	MAX				
SMAJ26A-S	CE	YE	26.0	28.90	31.90	1	42.1	9.5	1
SMAJ28A-S	CG	YG	28.0	31.10	34.40	1	45.4	8.8	1
SMAJ30A-S	CK	YK	30.0	33.30	36.80	1	48.4	8.3	1
SMAJ33A-S	CM	YM	33.0	36.70	40.60	1	53.3	7.5	1
SMAJ36A-S	CP	YP	36.0	40.00	44.20	1	58.1	6.9	1
SMAJ40A-S	CR	YR	40.0	44.40	49.10	1	64.5	6.2	1
SMAJ43A-S	CT	YT	43.0	47.80	52.80	1	69.4	5.8	1
SMAJ45A-S	CV	YV	45.0	50.00	55.30	1	72.7	5.5	1
SMAJ48A-S	CX	YX	48.0	53.30	58.90	1	77.4	5.2	1
SMAJ51A-S	CZ	YZ	51.0	56.70	62.70	1	82.4	4.9	1
SMAJ54A-S	RE	ZE	54.0	60.00	66.30	1	87.1	4.6	1
SMAJ58A-S	RG	ZG	58.0	64.40	71.20	1	93.6	4.3	1
SMAJ60A-S	RK	ZK	60.0	66.70	73.70	1	96.8	4.1	1
SMAJ64A-S	RM	ZM	64.0	71.10	78.60	1	103.0	3.9	1
SMAJ70A-S	RP	ZP	70.0	77.80	86.00	1	113.0	3.5	1
SMAJ75A-S	RR	ZR	75.0	83.30	92.10	1	121.0	3.3	1
SMAJ78A-S	RT	ZT	78.0	86.70	95.80	1	126.0	3.2	1
SMAJ85A-S	RV	ZV	85.0	94.40	104.00	1	137.0	2.9	1
SMAJ90A-S	RX	ZX	90.0	100.00	111.00	1	146.0	2.7	1
SMAJ100A-S	RZ	ZZ	100.0	111.00	123.00	1	162.0	2.5	1
SMAJ110A-S	SE	VE	110.0	122.00	135.00	1	177.0	2.3	1
SMAJ120A-S	SG	VG	120.0	133.00	147.00	1	193.0	2.1	1
SMAJ130A-S	SK	VK	130.0	144.00	159.00	1	209.0	1.9	1
SMAJ150A-S	SM	VM	150.0	167.00	185.00	1	243.0	1.6	1
SMAJ160A-S	SP	VP	160.0	178.00	197.00	1	259.0	1.5	1
SMAJ170A-S	SR	VR	170.0	189.00	209.00	1	275.0	1.5	1
SMAJ180A-S	ST	VT	180.0	201.00	222.00	1	292.0	1.4	1
SMAJ188A-S	SB	VB	188.0	209.00	231.00	1	304.0	1.4	1
SMAJ200A-S	SV	VV	200.0	224.00	247.00	1	324.0	1.2	1
SMAJ220A-S	SX	VX*	220.0	246.00	272.00	1	356.0	1.1	1
SMAJ250A-S	SZ	VZ*	250.0	279.00	309.00	1	405.0	1.0	1
SMAJ300A-S	TE*	UE*	300.0	335.00	371.00	1	486.0	0.80	1

TYPICAL DEVICE CHARACTERISTICS

ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified

PART NUMBER (Note 1)	DEVICE MARKING (Note 3)		REVERSE STAND-OFF VOLTAGE V_{RWM} VOLTS	BREAKDOWN VOLTAGE $V_{(BR)} @ I_T$ VOLTS		TEST CURRENT $@ I_T$ mA	MAXIMUM CLAMPING VOLTAGE (Fig. 2) $@ I_P$ V_C VOLTS	MAXIMUM REVERSE SURGE CURRENT $@ I_{PP}$ AMPS	MAXIMUM REVERSE LEAKAGE CURRENT (Note 2) $@ V_{RWM}$ I_R μA
	UNI	BI		MIN	MAX				
SMAJ350A-S	TG*	UG*	350.0	391.00	432.00	1	567.0	0.7	1
SMAJ400A-S	TK*	UK*	400.0	447.00	494.00	1	648.0	0.6	1
SMAJ440A-S	TM*	UM*	440.0	492.00	543.00	1	713.0	0.6	1

NOTE

1. Add suffix 'CA-S' after part number to specify a bidirectional device. For example: SMAJ78CA-S.
2. V_R less than or equal to 10V, the I_R should be doubled - bidirectional only.
3. * denotes stacked die component.



TYPICAL DEVICE CHARACTERISTICS

FIGURE 1
PEAK PULSE POWER VS PULSE TIME

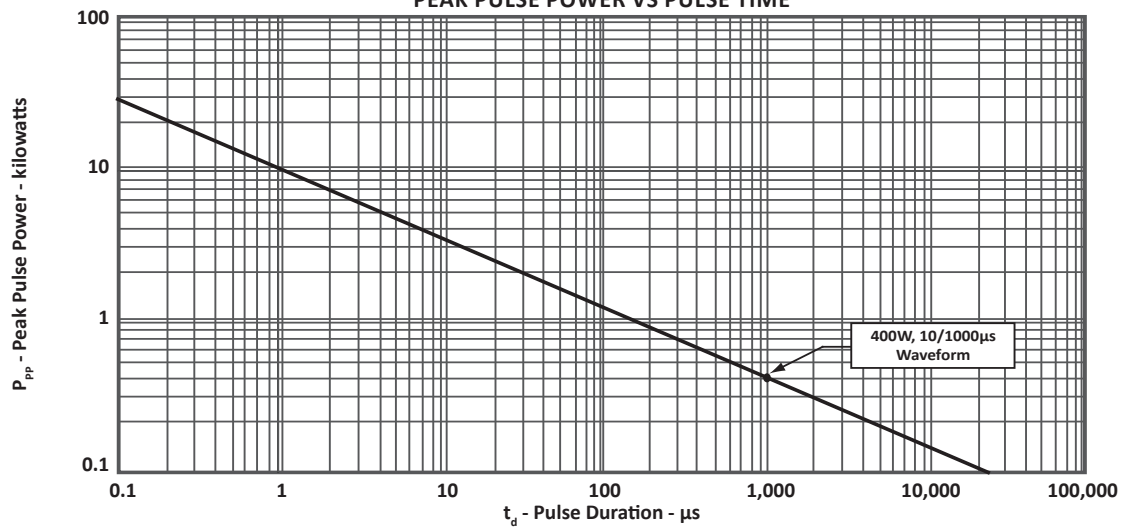


FIGURE 2
PULSE WAVEFORM

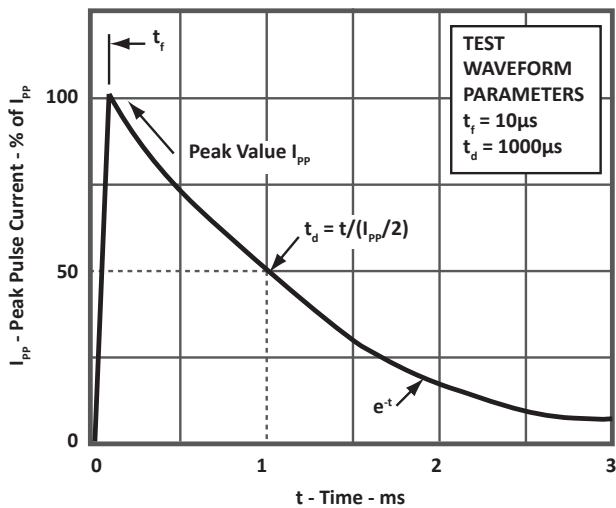
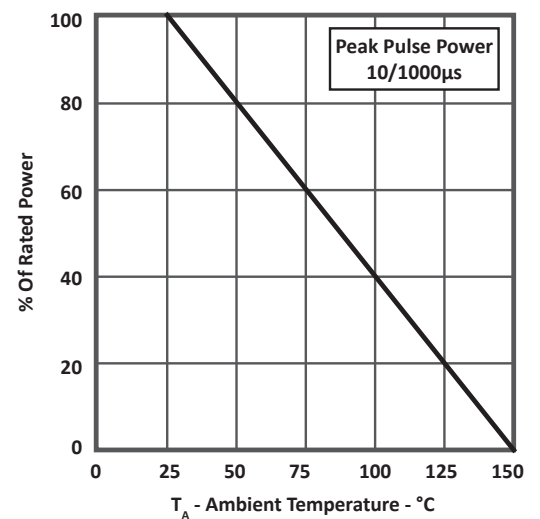


FIGURE 3
POWER DERATING CURVE



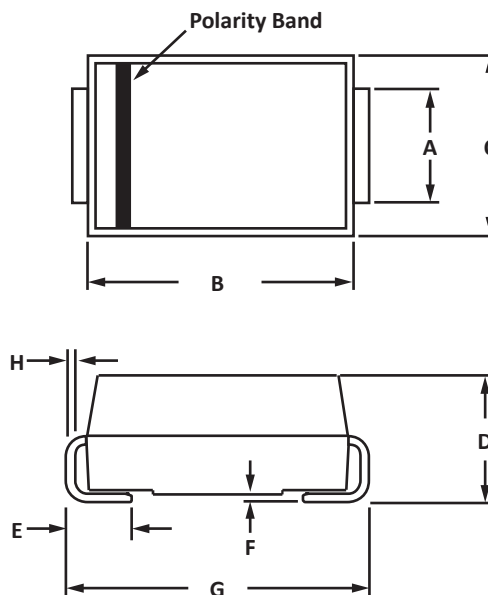
PACKAGE INFORMATION

OUTLINE DIMENSIONS

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.25	1.65	0.049	0.065
B	3.99	4.60	0.157	0.181
C	2.30	2.79	0.95	0.110
D	1.90	2.44	0.075	0.096
E	0.78	1.52	0.03	0.06
F	0.00	0.203	0.000	0.008
G	4.80	5.28	0.189	0.208
H	0.152	0.305	0.006	0.012

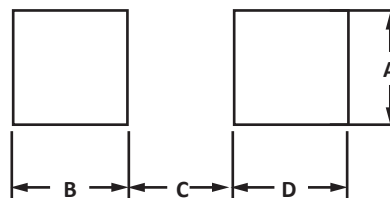
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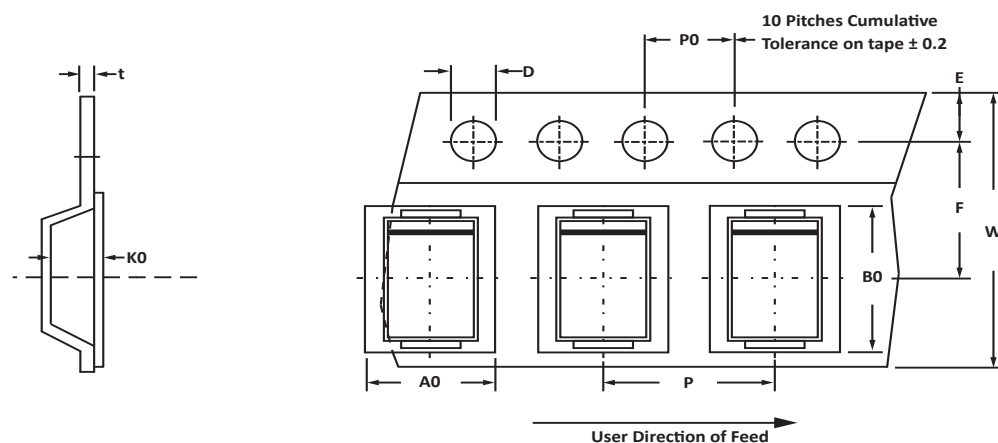
1. Dimensions are exclusive of mold flash and metal burrs.
2. Controlling dimensions in millimeters.



PAD LAYOUT DIMENSIONS

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.80	-	0.070	-
B	2.10	-	0.082	-
C	-	2.30	-	0.090
D	2.10	-	0.082	-



TAPE AND REEL**SPECIFICATIONS**

REEL DIA.	TAPE WIDTH	A0	B0	K0	D	E	F	W	P0	P	tmax
330mm (13")	12mm	2.79 ± 0.10	5.33 ± 0.10	2.36 ± 0.10	1.55 ± 0.10	1.75 ± 0.10	5.5 ± 0.20	12.00 ± 0.30	4.00 ± 0.10	8.00 ± 0.20	0.30 ± 0.10

NOTES

1. Dimensions are in millimeters.
2. Surface mount product is taped and reeled in accordance with EIA-481.
3. Marking on Part - marking code (see page 2), date code, logo and cathode defined by polarity band.

ORDERING INFORMATION

BASE PART NUMBER (Voltage = xx)	LEADFREE SUFFIX	TAPE SUFFIX	QTY/REEL	REEL SIZE	TUBE QTY
SMAJxxA-S	N/A	-T13	7,500	13"	N/A
SMAJxxCA-S	N/A	-T13	7,500	13"	N/A



COMPANY INFORMATION

COMPANY PROFILE

In business more than 30 years, ProTek Devices™ is a privately held semiconductor company. The company offers a product line of overvoltage protection that include Transient Voltage Suppressor (TVS) Arrays, Steering Diode Array Hybrids, High-power Components and Modules, as well as Steering Diodes, EMI Filter/TVS Arrays and Thyristor Surge Suppressors. These components deliver circuit protection in electronic systems from numerous overvoltage events. They include lightning; electrostatic discharge (ESD); nuclear electromagnetic pulses (NEMP); inductive switching; and electromagnetic interference (EMI) / radio frequency interference (RFI). ProTek Devices is an ISO 9001 certified company.

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