Transient Voltage Suppressor Diode

SMAJ60A

(SMAJ5.0 thru SMAJ170CA Series)

Standoff-Voltage 5.0 to 170V

Peak Pulse Power 300W

DATASHEET

from

www.web-bcs.com

OEM – General Semiconductor

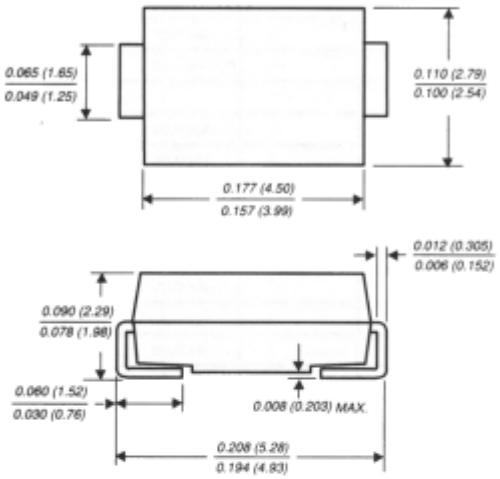
Source: General Semiconductor Databook 1998

SMAJ5.0 THRU SMAJ170CA

SURFACE MOUNT TRANSIENT VOLTAGE SUPPRESSOR

***Stand-off Voltage** - 5.0 to 170 Volts* ***Peak Pulse Power** - 300 Watts*

DO-214AC



Dimensions in inches and (millimeters)

FEATURES

- Optimized for LAN protection applications
- Ideal for ESD protection of data lines in accordance with IEC 1000-4-2 (IEC801-2)
- Ideal for EFT protection of data lines in accordance with IEC1000-4-4 (IEC801-4)
- Plastic package has Underwriters Laboratory Flammability Classification 94V-0
- Glass passivated junction
- Excellent clamping capability
- Low incremental surge resistance
- Fast response time: typically less than 1.0ps from 0 Volts to $V_{(BR)}$ min.
- 300W peak pulse power capability with a 10/1000µs waveform, repetition rate (duty cycle): 0.01%
- High temperature soldering guaranteed: 250°C/10 seconds at terminals

MECHANICAL DATA

Case: JEDEC DO-214AC molded plastic body over passivated chip
Terminals: Solder plated, solderable per MIL-STD-750, Method 2026
Polarity: Color band denotes positive end (cathode)
Mounting Position: Any
Weight: 0.002 ounces, 0.064 gram

DEVICES FOR BIDIRECTIONAL APPLICATIONS

For bidirectional use suffix C or CA for types SMAJ5.0 thru SMAJ170 (I.e. SMAJ5.0C, SMAJ170CA)
Electrical characteristics apply in both directions.

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Ratings at 25°C ambient temperature unless otherwise specified.

	SYMBOLS	VALUE	UNITS
Peak pulse power dissipation with a 10/1000µs waveform (NOTE 1,2,5, FIG.1)	P_{PM}	Minimum 300	Watts
Peak forward surge current (NOTE 4)	I_{FSM}	40.0	Amps
Peak pulse current with a 10/1000µs waveform (NOTE 1)	I_{PPM}	SEE TABLE 1	Amps
Steady state power dissipation (NOTE 3)	$P_{M(AV)}$	1.0	Watts
Maximum instantaneous forward voltage at 25A (NOTE 4)	V_F	3.5	Volts
Operating junction and storage temperature range	T_J, T_{STG}	-55 to +150	°C

NOTES:
(1) Non-repetitive current pulse, per Fig.3 and derated above T_A=25°C per Fig. 2
(2) Mounted on 5.0mm² copper pads to each terminal
(3) Lead temperature at 75°C=T_L per Fig. 5
(4) Measured on 8.3ms single half sine-wave. For uni-directional devices only.
(5) Peak pulse power waveform is 10/1000µS

ELECTRICAL CHARACTERISTICS (T_A=25°C unless otherwise noted)

Device	Device Marking Code		Working Peak Reverse Voltage V_{WM} (Volts)	Breakdown Voltage $V_{(BR)}$ (Volts) at I_T		Test Current I_T	Maximum Clamping Voltage at I_{PPM} V_C (Volts)	Maximum Peak Pulse Surge Current I_{PPM}	Maximum Reverse Leakage a V_{WM} I_D
	UNI	BI		Min.	Max.	(mA)	(NOTES)	(NOTE 5) (Amps)	(μA)
SMAJ5.0	AD	WD	5.0	6.40	7.81	10	9.6	31.3	800
SMAJ5.0A	AE	WE	5.0	6.40	7.08	10	9.2	32.6	800
SMAJ6.0	AF	WF	6.0	6.67	8.15	10	11.4	26.3	800
SMAJ6.0A	AG	WG	6.0	6.67	7.37	10	10.3	29.1	800
SMAJ6.5	AH	WH	6.5	7.22	8.82	10	12.3	24.4	500
SMAJ6.5A	AK	WK	6.5	7.22	7.98	10	11.2	26.8	500
SMAJ7.0	AL	WL	7.0	7.78	9.51	10	13.3	22.6	200
SMAJ7.0A	AM	WM	7.0	7.78	8.60	10	12.0	25.0	200
SMAJ7.5	AN	WN	7.5	8.33	10.3	1.0	14.3	21.0	100
SMAJ7.5A	AP	WP	7.5	8.33	9.21	1.0	12.9	23.3	100
SMAJ8.0	AQ	WQ	8.0	8.89	10.9	1.0	15.0	20.0	50.0
SMAJ8.0A	AR	WR	8.0	8.89	9.83	1.0	13.6	22.1	50.0
SMAJ8.5	AS	WS	8.5	9.44	11.5	1.0	15.9	18.9	10.0
SMAJ8.5A	AT	WT	8.5	9.44	10.4	1.0	14.4	20.8	10.0
SMAJ9.0	AU	WU	9.0	10.0	12.2	1.0	16.9	17.8	5.0
SMA J9.0A	AV	WV	9.0	10.0	11.1	1.0	15.4	19.5	5.0
SMAJ10	AW	WW	10.0	11.1	13.6	1.0	18.8	16.0	5.0
SMAJ10A	AX	WX	10.0	11.1	12.3	1.0	17.0	17.6	5.0
SMAJ11	AY	WY	11.0	12.2	14.9	1.0	20.1	14.9	5.0
SMAJ11A	AZ	WZ	11.0	12.2	13.5	1.0	18.2	16.5	5.0
SMAJ12	BD	XD	12.0	13.3	16.3	1.0	22.0	13.6	5.0
SMAJ12A	BE	XE	12.0	13.3	14.7	1.0	19.9	15.1	5.0
SMAJ13	BF	XF	13.0	14.4	17.6	1.0	23.8	12.6	5.0
SMAJ13A	BG	XG	13.0	14.4	15.9	1.0	21.5	14.0	5.0
SMAJ14	BH	XH	14.0	15.6	19.1	1.0	25.8	11.6	5.0
SMAJ14A	BK	XK	14.0	15.6	17.2	1.0	23.2	12.9	5.0
SMAJ15	BL	XL	15.0	16.7	20.4	1.0	26.9	11.2	5.0
SMAJ15A	BM	XM	15.0	16.7	18.5	1.0	24.4	12.3	5.0
SMAJ16	BN	XN	16.0	17.8	21.8	1.0	28.8	10.4	5.0
SMAJ16A	BP	XP	16.0	17.8	19.7	1.0	26.0	11.5	5.0
SMAJ17	BQ	XQ	17.0	18.9	23.1	1.0	30.5	9.8	5.0
SMAJ17A	BR	XR	17.0	18.9	20.9	1.0	27.6	10.9	5.0
SMAJ18	BS	XS	18.0	20.0	24.4	1.0	32.2	9.3	5.0
SMAJ18A	BT	XT	18.0	20.0	22.1	1.0	29.2	10.3	5.0
SMAJ20	BU	XU	20.0	22.2	27.1	1.0	35.8	8.4	5.0
SMAJ20A	BV	XV	20.0	22.2	24.5	1.0	32.4	9.3	5.0
SMAJ22	BW	XW	22.0	24.4	29.8	1.0	39.4	7.6	5.0
SMAJ22A	BX	XX	22.0	24.4	26.9	1.0	35.5	8.5	5.0
SMAJ24	BY	XY	24.0	26.7	32.6	1.0	43.0	7.0	5.0
SMAJ24A	BZ	XZ	24.0	26.7	29.5	1.0	38.9	7.7	5.0
SMAJ26	CD	YD	26.0	28.9	35.3	1.0	46.6	6.4	5.0
SMAJ26A	CE	YE	26.0	28.9	31.9	1.0	42.1	7.1	5.0
SMAJ28	CF	YF	28.0	31.1	38.0	1.0	50.0	6.0	5.0
SMAJ28A	CG	YG	28.0	31.1	34.4	1.0	45.4	6.6	5.0
SMAJ30	CH	YH	30.0	33.3	40.7	1.0	53.5	5.6	5.0
SMAJ30A	CK	YK	30.0	33.3	36.8	1.0	48.4	6.2	5.0
SMAJ33	CL	YL	33.0	36.7	44.9	1.0	59.0	5.1	5.0
SMAJ33A	CM	YM	33.0	36.7	40.6	1.0	53.3	5.6	5.0
SMAJ36	CN	YN	36.0	40.0	48.9	1.0	64.3	4.7	5.0
SMAJ36A	CP	YP	36.0	40.0	44.2	1.0	58.1	5.2	5.0
SMAJ40	CQ	YQ	40.0	44.4	54.3	1.0	71.4	4.2	5.0
SMAJ40A	CR	YR	40.0	44.4	49.1	1.0	64.5	4.7	5.0
SMAJ43	CS	YS	43.0	47.8	58.4	1.0	76.7	3.9	5.0
SMAJ43A	CT	YT	43.0	47.8	52.8	1.0	69.4	4.3	5.0
SMAJ45	CU	YU	45.0	50.0	61.1	1.0	80.3	3.7	5.0

ELECTRICAL CHARACTERISTICS (T_A=25°C unless otherwise noted)

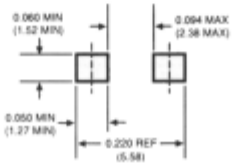
Device	Device Marking Code		Working Peak Reverse Voltage V_{WM} (Volts)	Breakdown Voltage $V_{(BR)}$ (Volts) at I_T		Test Current I_T (mA)	Maximum Clamping Voltage at I_{PPM} V_C (Volts) (NOTES)	Maximum Peak pulse Surge Current I_{PPM} (NOTE 5) (Amps)	Maximum Reverse Leakage at V_{WM} I_D (µA)
	UNI	BI		Min.	Max.				
SMAJ45A	CV	YV	45	50.0	55.3	1.0	72.7	4.1	5.0
SMAJ48	CW	YW	48	53.3	65.1	1.0	85.5	3.5	5.0
SMAJ48A	CX	YX	48	53.3	58.9	1.0	77.4	3.9	5.0
SMAJ51	CY	YY	51	56.7	69.3	1.0	91.1	3.3	5.0
SMAJ51A	CZ	YZ	51	56.7	62.7	1.0	82.4	3.6	5.0
SMAJ54	RD	ZD	54	60.0	73.3	1.0	96.3	3.1	5.0
SMAJ54A	RE	ZE	54	60.0	66.3	1.0	87.1	3.4	5.0
SMAJ58	RF	ZF	58	64.4	78.7	1.0	103.0	2.9	5.0
SMAJ58A	RG	ZG	58	64.4	71.2	1.0	93.6	3.2	5.0
SMAJ60	RH	ZH	60	66.7	81.5	1.0	107.0	2.8	5.0
SMAJ60A	RK	ZK	60	66.7	73.7	1.0	96.8	3.1	5.0
SMAJ64	RL	ZL	64	71.1	86.4	1.0	114.0	2.6	5.0
SMAJ64A	RM	ZM	64	71.1	78.6	1.0	103.0	2.9	5.0
SMAJ70	RN	ZN	70	77.8	95.1	1.0	125	2.4	5.0
SMAJ70A	RP	ZP	70	77.8	86.0	1.0	113	2.7	5.0
SMAJ75	RQ	ZQ	75	83.3	102	1.0	134	2.2	5.0
SMAJ75A	RR	ZR	75	83.3	92.1	1.0	121	2.5	5.0
SMAJ78	RS	ZS	78	86.7	106	1.0	139	2.2	5.0
SMAJ78A	RT	ZT	78	86.7	95.8	1.0	126	2.4	5.0
SMAJ85	RU	ZU	85	94.4	115	1.0	151	2.0	5.0
SMAJ85A	RV	ZV	85	94.4	104	1.0	137	2.2	5.0
SMAJ90	RW	ZW	90	100	122	1.0	160	1.9	5.0
SMAJ90A	RX	ZX	90	100	111	1.0	146	2.1	5.0
SMAJ100	RY	ZY	100	111	136	1.0	179	1.7	5.0
SMAJ100A	RZ	ZZ	100	111	123	1.0	162	1.9	5.0
SMAJ110	SD	VD	110	122	149	1.0	196	1.5	5.0
SMAJ110A	SE	VE	110	122	135	1.0	177	1.7	5.0
SMAJ120	SF	VF	120	133	163	1.0	214	1.4	5.0
SMAJ120A	SG	VG	120	133	147	1.0	193	1.6	5.0
SMAJ130	SH	VH	130	144	176	1.0	231	1.3	5.0
SMAJ130A	SK	VK	130	144	159	1.0	209	1.4	5.0
SMAJ150	SL	VL	150	167	204	1.0	268	1.1	5.0
SMAJ150A	SM	VM	150	167	185	1.0	243	1.2	5.0
SMAJ160	SN	VN	160	178	218	1.0	287	1.0	5.0
SMAJ160A	SP	VP	160	178	197	1.0	259	1.2	5.0
SMAJ170	SQ	VQ	170	189	231	1.0	304	0.99	5.0
SMAJ170A	SR	VR	170	189	209	1.0	275	1.09	5.0

APPLICATION NOTES

RECOMMENDED PAD LAYOUT

The pad dimensions should be 0.010" (2.5mm) longer than the contact size in the lead axis. This allows a solder fillet to form, see figure below. Contact factory for soldering methods.

MODIFIED J-BEND



Dimensions in inches and (millimeters)

This device is designed specifically for transient voltage suppression from threats generated by ESD for board level load switching components.

The wide leads assure a large surface contact for good heat dissipation, and a low resistance path for surge current flow to ground.

This series is designed to optimize board space and for use with surface mount technology automated assembly equipment.

They can be easily mounted on printed circuit boards and ceramic substrates to protect sensitive components from transient voltage damage.

MAXIMUM RATINGS AND CHARACTERISTIC CURVES SMAJ5.0 THRU SMAJ170CA

FIG. 1 - PEAK PULSE POWER RATING CURVE

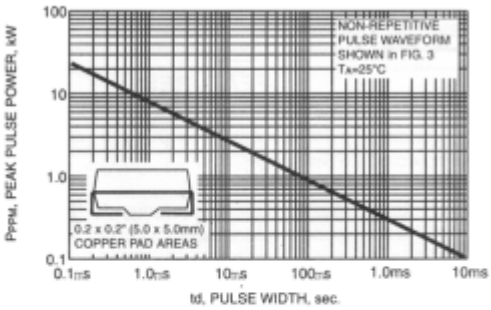


FIG. 2 - PULSE DERATING CURVE

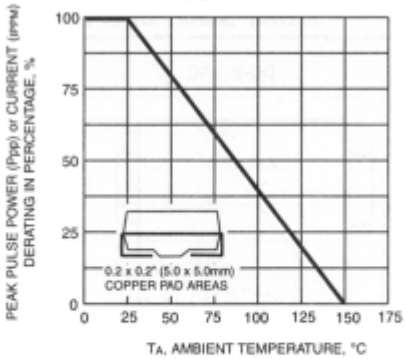


FIG. 3 - PULSE WAVEFORM

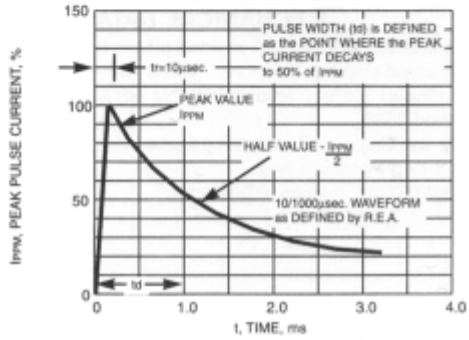


FIG. 4 - TYPICAL JUNCTION CAPACITANCE

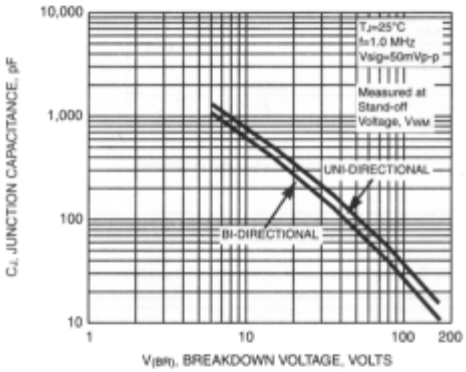


FIG. 5 - STEADY STATE POWER DERATING CURVE

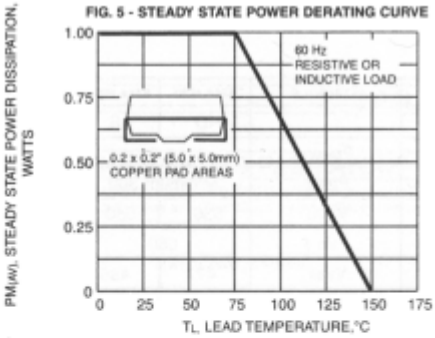


FIG. 6 - MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT UNIDIRECTIONAL ONLY

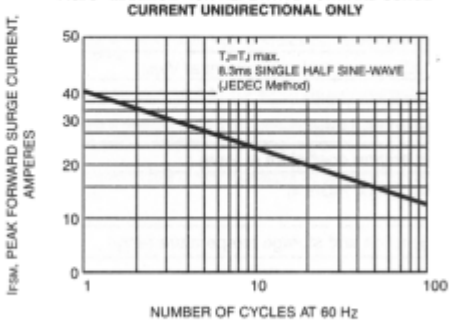
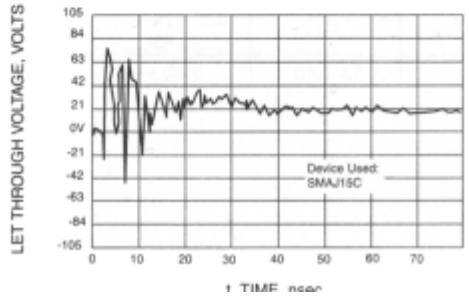



FIG. 7 - Typical Response to 8KV Positive Going ESD Pulse Per IEC1000 - 4-2 (IEC801-2)