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• • • • • • P • R • E • L • I • M • I • N • A • R • Y • • • • • •

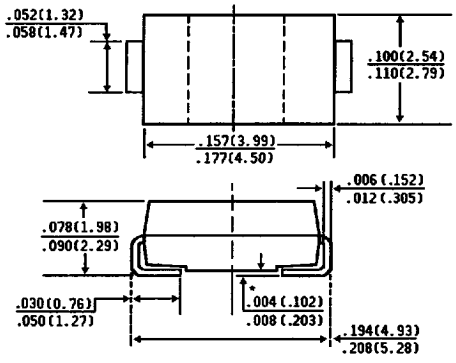
TSMA SERIES

SURFACE MOUNT TRANSIENT VOLTAGE SUPPRESSOR
VOLTAGE - *6.8 - 200 Volts*

FEATURES

- For surface mounted applications
- Low profile package
- Built-in strain relief
- Glass passivated junction
- Excellent clamping capability
- Fast response time: typically less than 1.0ps from 0 volts to BV min.
- Typical I_R less than 1μA above 10V
- High temperature soldering: 250°C/10 seconds at terminals

SMA/DO-214AC



* Typical Range

Dimensions in inches and (millimeters)

MECHANICAL DATA

Case: Molded plastic

Terminals: Solder plated

Polarity: Indicated by cathode band

Standard Packaging: 12mm Tape *(E1A STD RS-481)*

Weight: .002 ounces, .064 gram

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Ratings at 25°C ambient temperature unless otherwise specified.

	SYMBOLS	VALUE	UNITS
Peak Power Dissipation at T_A=25°C, Tp=1ms (NOTE 1,2)	Ppk	Minimum 400	Watts
Peak forward Surge Current 8.3ms single half sine-wave superimposed on rated load (JEDEC Method) (NOTE 3)	I_{FSM}	40.0	Amps
Operating and Storage Temperature Range	T_J,T_{STG}	-65 to 175	°C

NOTES:

1. Non-repetitive current pulse, per Fig.3 and derated above T_A=25°C per Fig. 2.
2. Mounted on 5.0mm^2 copper pads to each terminal.
3. 8.3ms single half sine-wave duty cycle=4 pulses per minutes maximum.

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MAXIMUM RATINGS AND CHARACTERISTIC CURVES TSMA SERIES

FIG.1 - PULSE RATING CURVE

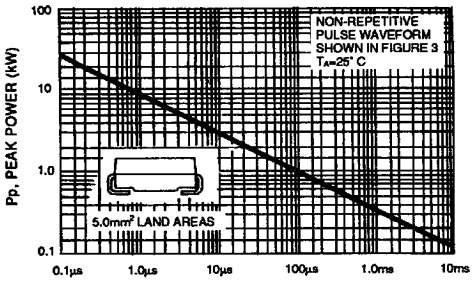


FIG 2 - PULSE DERATING CURVE

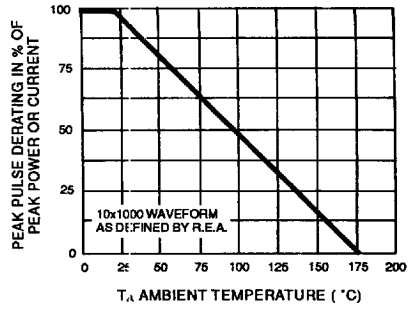


FIG. 3 - PULSE WAVEFORM

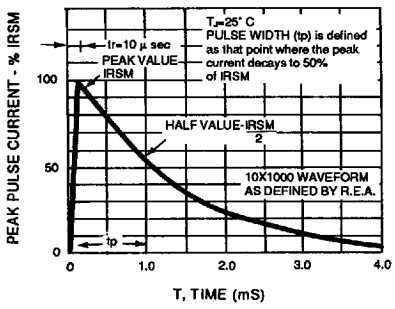


FIG. 4 - TYPICAL JUNCTION CAPACITANCE

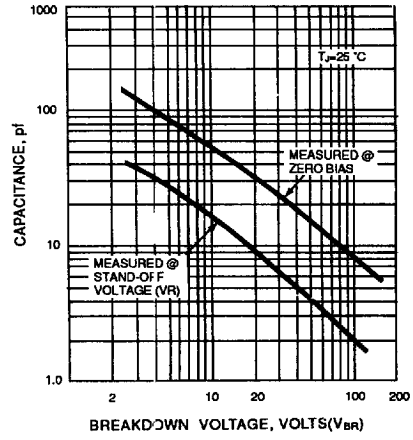
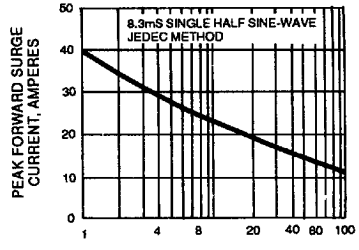


FIG.5 - MAXIMUM NON-REPETITIVE SURGE CURRENT



GENERAL INSTRUMENT

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ELECTRICAL CHARACTERISTICS@25°C

Device	Device Marking Code	Breakdown Voltage V_{BR} Volts(NOTE 1) Min.	Max.	@ IT mA	Working Peak Reverse Voltage V_{RWM} (Volts)	Maximum Reverse Leakage at VRWM $I_{R@}$ (μA)	Maximum Reverse Surge Current I_{RSM} (NOTE 2) (Amps)	Maximum Reverse Voltage at I_{RSM} (Clamping Voltage) V_{RSM} (Volts)
TSMA6.8	AD	6.12	7.48	10	5.50	1000	38	10.8
TSMA6.8A	AE	6.45	7.14	10	5.80	1000	40	10.5
TSMA7.5	AF	6.75	8.25	10	6.05	500	36	11.7
TSMA7.5A	AG	7.13	7.88	10	6.40	500	37	11.3
TSMA8.2	AH	7.38	9.02	10	6.63	200	33	12.5
TSMA8.2A	AK	7.79	8.61	10	7.02	200	35	12.1
TSMA9.1	AL	8.19	10.0	1.0	7.37	50	30	13.8
TSMA9.1A	AM	8.65	9.55	1.0	7.78	50	31	13.4
TSMA10	AN	9.00	11.0	1.0	8.10	10	28	15.0
TSMA10A	AP	9.50	10.5	1.0	8.55	10	29	14.5
TSMA11	AQ	9.90	12.1	1.0	8.92	5.0	26	16.2
TSMA11A	AR	10.5	11.6	1.0	9.40	5.0	27	15.6
TSMA12	AS	10.8	13.2	1.0	9.72	5.0	24	17.3
TSMA12A	AT	11.4	12.6	1.0	10.2	5.0	25	16.7
TSMA13	AU	11.7	14.3	1.0	10.5	5.0	22	19.0
TSMA13A	AV	12.4	13.7	1.0	11.1	5.0	23	18.2
TSMA15	AW	13.5	16.3	1.0	12.1	5.0	19	22.0
TSMA15A	AX	14.3	15.8	1.0	12.8	5.0	20	21.2
TSMA16	AY	14.4	17.6	1.0	12.9	5.0	18	23.5
TSMA16A	AZ	15.2	16.8	1.0	13.6	5.0	19	22.5
TSMA18	BD	16.2	19.8	1.0	14.5	5.0	16	26.5
TSMA18A	BE	17.1	18.9	1.0	15.3	5.0	17	25.5
TSMA20	BF	18.0	22.0	1.0	16.2	5.0	14	29.1
TSMA20A	BG	19.0	21.0	1.0	17.1	5.0	15	27.7
TSMA22	BH	19.8	24.2	1.0	17.8	5.0	13	31.9
TSMA22A	BK	20.9	23.1	1.0	18.8	5.0	14	30.6
TSMA24	BL	21.6	26.4	1.0	19.4	5.0	12	34.7
TSMA24A	BM	22.8	25.2	1.0	20.5	5.0	13	33.2
TSMA27	BN	24.3	29.7	1.0	21.8	5.0	11	39.1
TSMA27A	BP	25.7	28.4	1.0	23.1	5.0	11.2	37.5
TSMA30	BQ	27.0	33.0	1.0	24.3	5.0	10	43.5
TSMA30A	BR	28.5	31.5	1.0	25.6	5.0	10	41.4
TSMA33	BS	29.7	36.3	1.0	26.8	5.0	9	47.7
TSMA33A	BT	31.4	34.7	1.0	28.2	5.0	9	45.7
TSMA36	BU	32.4	39.6	1.0	29.1	5.0	8	52.0
TSMA36A	BV	34.2	37.8	1.0	30.8	5.0	8.4	49.9
TSMA39	BW	35.1	42.9	1.0	31.6	5.0	7.4	56.4
TSMA39A	BX	37.1	41.0	1.0	33.3	5.0	7.8	53.9
TSMA43	BY	38.7	47.3	1.0	34.8	5.0	6.8	61.9
TSMA43A	BZ	40.9	45.2	1.0	36.8	5.0	7.1	59.3
TSMA47	CD	42.3	51.7	1.0	38.1	5.0	6.2	67.8
TSMA47A	CE	44.7	49.4	1.0	40.2	5.0	5.0	64.8
TSMA51	CF	45.9	56.1	1.0	41.3	5.0	5.7	73.5
TSMA51A	CG	48.5	53.6	1.0	43.6	5.0	5.0	70.1
TSMA56	CH	50.4	61.6	1.0	45.4	5.0	5.2	80.5
TSMA56A	CK	53.2	58.8	1.0	47.8	5.0	5.5	77.0
TSMA62	CL	55.8	68.2	1.0	50.2	5.0	4.7	89.0
TSMA62A	CM	58.9	65.1	1.0	53.0	5.0	5.0	85.0
TSMA68	CN	61.2	74.8	1.0	55.1	5.0	4.3	98.0
TSMA68A	CP	64.6	71.4	1.0	58.1	5.0	4.6	92.0
TSMA75	CQ	67.5	82.5	1.0	60.7	5.0	3.9	108
TSMA75A	CR	71.3	78.8	1.0	64.1	5.0	4.1	103
TSMA82	CS	73.8	90.2	1.0	66.4	5.0	3.6	118
TSMA82A	CT	77.9	86.1	1.0	70.1	5.0	3.7	113
TSMA91	CU	81.9	100	1.0	73.7	5.0	3.2	131
TSMA91A	CV	86.5	95.5	1.0	77.8	5.0	3.4	125
TSMA100	CW	90.0	110	1.0	81.0	5.0	2.9	144
TSMA100A	CX	95.0	105	1.0	85.5	5.0	3.1	137
TSMA110	CY	99.0	121	1.0	89.2	5.0	2.7	158
TSMA110A	CZ	105	116	1.0	94.0	5.0	2.8	152
TSMA120	RD	108	132	1.0	97.2	5.0	2.4	173

GENERAL INSTRUMENT

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ELECTRICAL CHARACTERISTICS @25°C

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TSMA120A	RE	114	126	1.0	102	5.0	2.5	165
TSMA130	RF	117	143	1.0	105	5.0	2.2	187
TSMA130A	RG	124	137	1.0	111	5.0	2.3	179
TSMA150	RH	135	165	1.0	121	5.0	2.0	215
TSMA150A	RK	143	158	1.0	128	5.0	2.0	207
TSMA160	RL	144	176	1.0	130	5.0	1.8	230
TSMA160A	RM	152	168	1.0	136	5.0	1.9	219
TSMA170	RN	153	187	1.0	138	5.0	1.7	244
TSMA170A	RP	162	179	1.0	145	5.0	1.8	234
TSMA180	RQ	162	198	1.0	146	5.0	1.6	258
TSMA180A	RR	171	189	1.0	154	5.0	1.7	246
TSMA200	RS	180	220	1.0	162	5.0	1.5	287
TSMA200A	RT	190	210	1.0	171	5.0	1.53	274

NOTES:
1. V_{BR} measured after I_T applied for 300μs I_T = Square Wave Pulse or equivalent.
2. Surge Current Waveform per Figure 3 and Derate per Figure 2.
3. V_F = 3.5V at I_F = 50A (TSMA6.8 thru TSMA91A)
   V_F= 5.0V at I_F = 50A (TSMA100 thru TSMA200A) on 1/2 Square or equivalent Sine Wave.
   PW = 8.3ms, Duty Cycle = 4 Pulses per minute maximum.
4. For bipolar types having V_R of 10 volts and under, the I_R limit is doubled.

APPLICATION NOTES:

Transient Voltage Suppressors may be used at various points in a circuit to provide various degrees of protection. The following is a typical linear power supply with transient voltage suppressor units placed at different points. All provide protection of the load.

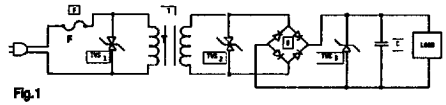

Fig.1

Transient Voltage Suppressor 1 provides maximum protection. However, the system will probably require replacement of the line fuse (F) since it provides a dominant portion of the series impedance when a surge is encountered.

Transient Voltage Suppressor 2 provides excellent protection of circuitry excluding the transformer (T). However, since the transformer is a large part of the series impedance, the chance of the line fuse opening during the surge condition is reduced.

Transient Voltage Suppressor 3 provides the load with complete protection. It uses a unidirectional Transient Voltage Suppressor, which is a cost advantage. The series impedance now includes the line fuse, transformer, and bridge rectifier (B) so failure of the line fuse is further reduced. If only Transient Voltage Suppressor 3 is in use, then the bridge rectifier is unprotected and would require a higher voltage and current rating to prevent failure by transients.

Any combination of these three, or any one of these applications, will prevent damage to the load This would require varying tradeoffs in power supply protection versus maintenance (time changing the fuse).

An additional method is to utilize the Transient Voltage Suppressor units as a controlled avalanche bridge. This reduces the parts count and incorporates the protection within the bridge rectifier.

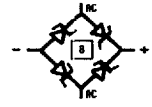

Fig.2

Higher wattage devices are available in the TSMB series of 600 W and TSMC series of 1500 W surface mount suppressors.

GENERAL INSTRUMENT