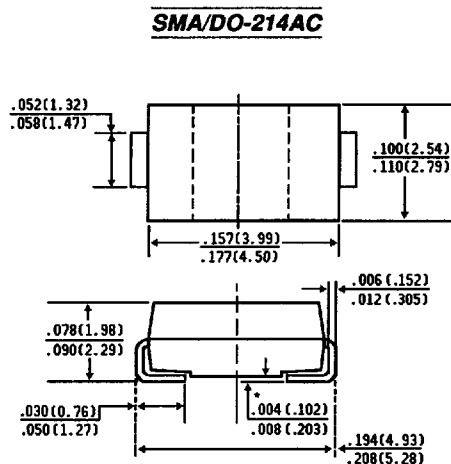


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. P . R . E . L . I . M . I . N . A . R . Y

T SMA 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 1 μ A above 10V
- ◆ High temperature soldering: 250°C/10 seconds at terminals



* 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**

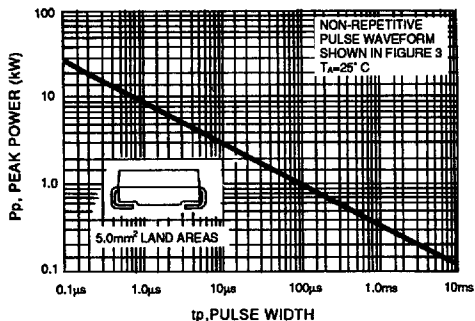
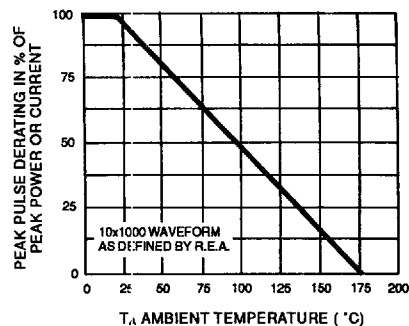
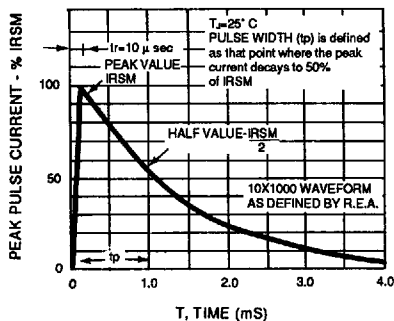
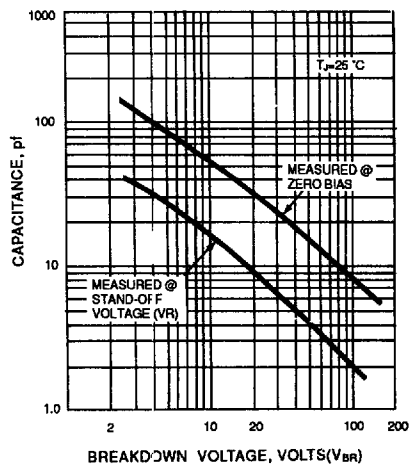
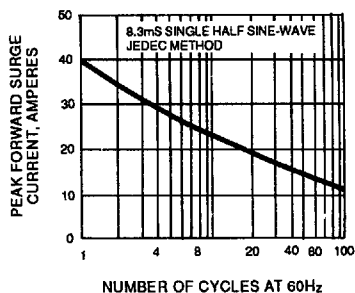
Ratings at 25°C ambient temperature unless otherwise specified.

	SYMBOLS	VALUE	UNITS
Peak Power Dissipation at $T_A=25^\circ\text{C}$, $T_p=1\text{ms}$ (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 $T_A=25^\circ\text{C}$ per Fig. 2.
2. Mounted on 5.0mm² 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)		@ I _T mA	Working Peak Reverse Voltage V _{RRM} (Volts)	Maximum Reverse Leakage at V _{RRM} I _{gA} (A)	Maximum Reverse Surge Current I _{RSM} (NOTE 2) (Amps)	Maximum Reverse Voltage at I _{RSM} (Clamping Voltage) V _{RSU} (Volts)
		Min.	Max.					
T SMA6.8	AD	6.12	7.48	10	5.50	1000	38	10.8
T SMA6.8A	AE	6.45	7.14	10	5.80	1000	40	10.5
T SMA7.5	AF	6.75	8.25	10	6.05	500	36	11.7
T SMA7.5A	AG	7.13	7.88	10	6.40	500	37	11.3
T SMA8.2	AH	7.38	9.02	10	6.63	200	33	12.5
T SMA8.2A	AK	7.79	8.61	10	7.02	200	35	12.1
T SMA9.1	AL	8.19	10.0	1.0	7.37	50	30	13.8
T SMA9.1A	AM	8.65	9.55	1.0	7.78	50	31	13.4
T SMA10	AN	9.00	11.0	1.0	8.10	10	28	15.0
T SMA10A	AP	9.50	10.5	1.0	8.55	10	29	14.5
T SMA11	AQ	9.90	12.1	1.0	8.92	5.0	26	16.2
T SMA11A	AR	10.5	11.6	1.0	9.40	5.0	27	15.6
T SMA12	AS	10.8	13.2	1.0	9.72	5.0	24	17.3
T SMA12A	AT	11.4	12.6	1.0	10.2	5.0	25	16.7
T SMA13	AU	11.7	14.3	1.0	10.5	5.0	22	19.0
T SMA13A	AV	12.4	13.7	1.0	11.1	5.0	23	18.2
T SMA15	AW	13.5	16.3	1.0	12.1	5.0	19	22.0
T SMA15A	AX	14.3	15.8	1.0	12.8	5.0	20	21.2
T SMA16	AY	14.4	17.6	1.0	12.9	5.0	18	23.5
T SMA16A	AZ	15.2	16.8	1.0	13.6	5.0	19	22.5
T SMA18	BD	16.2	19.8	1.0	14.5	5.0	16	26.5
T SMA18A	BE	17.1	18.9	1.0	15.3	5.0	17	25.5
T SMA20	BF	18.0	22.0	1.0	16.2	5.0	14	29.1
T SMA20A	BG	19.0	21.0	1.0	17.1	5.0	15	27.7
T SMA22	BH	19.8	24.2	1.0	17.8	5.0	13	31.9
T SMA22A	BK	20.9	23.1	1.0	18.8	5.0	14	30.6
T SMA24	BL	21.6	26.4	1.0	19.4	5.0	12	34.7
T SMA24A	BM	22.8	25.2	1.0	20.5	5.0	13	33.2
T SMA27	BN	24.3	29.7	1.0	21.8	5.0	11	39.1
T SMA27A	BP	25.7	28.4	1.0	23.1	5.0	11.2	37.5
T SMA30	BQ	27.0	33.0	1.0	24.3	5.0	10	43.5
T SMA30A	BR	28.5	31.5	1.0	25.6	5.0	10	41.4
T SMA33	BS	29.7	36.3	1.0	26.8	5.0	9	47.7
T SMA33A	BT	31.4	34.7	1.0	28.2	5.0	9	45.7
T SMA36	BU	32.4	39.6	1.0	29.1	5.0	8	52.0
T SMA36A	BV	34.2	37.8	1.0	30.8	5.0	8.4	49.9
T SMA39	BW	35.1	42.9	1.0	31.6	5.0	7.4	56.4
T SMA39A	BX	37.1	41.0	1.0	33.3	5.0	7.8	53.9
T SMA43	BY	38.7	47.3	1.0	34.8	5.0	6.8	61.9
T SMA43A	BZ	40.9	45.2	1.0	36.8	5.0	7.1	59.3
T SMA47	CD	42.3	51.7	1.0	38.1	5.0	6.2	67.8
T SMA47A	CE	44.7	49.4	1.0	40.2	5.0	5.0	64.8
T SMA51	CF	45.9	56.1	1.0	41.3	5.0	5.7	73.5
T SMA51A	CG	48.5	53.6	1.0	43.6	5.0	5.0	70.1
T SMA56	CH	50.4	61.6	1.0	45.4	5.0	5.2	80.5
T SMA56A	CK	53.2	58.8	1.0	47.8	5.0	5.5	77.0
T SMA62	CL	55.8	68.2	1.0	50.2	5.0	4.7	89.0
T SMA62A	CM	58.9	65.1	1.0	53.0	5.0	5.0	85.0
T SMA68	CN	61.2	74.8	1.0	55.1	5.0	4.3	98.0
T SMA68A	CP	64.6	71.4	1.0	58.1	5.0	4.6	92.0
T SMA75	CQ	67.5	82.5	1.0	60.7	5.0	3.9	108
T SMA75A	CR	71.3	78.8	1.0	64.1	5.0	4.1	103
T SMA82	CS	73.8	90.2	1.0	66.4	5.0	3.6	118
T SMA82A	CT	77.9	86.1	1.0	70.1	5.0	3.7	113
T SMA91	CU	81.9	100	1.0	73.7	5.0	3.2	131
T SMA91A	CV	86.5	95.5	1.0	77.8	5.0	3.4	125
T SMA100	CW	90.0	110	1.0	81.0	5.0	2.9	144
T SMA100A	CX	95.0	105	1.0	85.5	5.0	3.1	137
T SMA110	CY	99.0	121	1.0	89.2	5.0	2.7	158
T SMA110A	CZ	105	116	1.0	94.0	5.0	2.8	152
T SMA120	RD	108	132	1.0	97.2	5.0	2.4	173

GENERAL
INSTRUMENT

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ELECTRICAL CHARACTERISTICS @25°C

Device	Device Marking Code	Breakdown Voltage V _{BR} Volts (NOTE 1)		@ I _T mA	Working Peak Reverse Voltage V _{WRM} (Volts)	Maximum Reverse Leakage at V _{RM} /M I _{RP} (A)	Maximum Reverse Surge Current I _{RS} (NOTE 2) (Amps)	Maximum Reverse Voltage at I _{RS} (Clamping Voltage) V _{RS} (Volts)
		Min.	Max.					
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.

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.

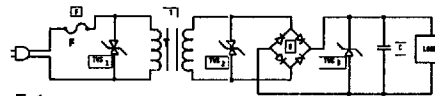


Fig.1

Any combination of these three, or any one of these applications, will prevent damage to the load. This would require varying trade-offs 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.

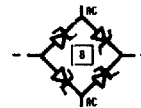


Fig.2

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