

## Surface Mount Transient Voltage Suppressors

### TPSMA Series 12 To 100V 400W

#### Description

TVS diodes can be used in a wide range of applications which like consumer electronic products, automotive industries, munitions, telecommunications, aerospace industries, and intelligent control systems.

Working Voltage: 12 to 100 V

Peak Pulse Power: 400 W

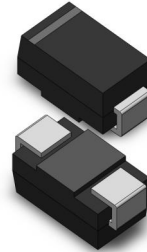
#### Features

- ◆ Glass passivated chip
- ◆ 400W peak pulse power capability with a 10/1000  $\mu$ A waveform, repetitive rate (duty cycle):0.01 %
- ◆ High reliability application and automotive grade AEC Q101 qualified
- ◆ Low leakage
- ◆ Uni and Bidirectional unit
- ◆ Excellent clamping capability
- ◆ Very fast response time
- ◆ RoHS compliant

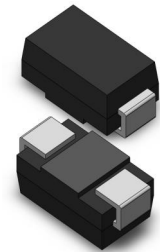
#### Application

TVS devices are ideal for the protection of I/O interfaces,  $V_{CC}$  bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications.

Uni-directional



Bi-directional



#### Mechanical Data

- ◆ Case: Molded plastic
- ◆ Epoxy: UL 94V-0 rate flame retardant
- ◆ Lead: Solderable per MIL-STD-750, method 2026 guranteed
- ◆ Polarity: Color band denotes cathode end except Bipolar
- ◆ Mounting position: Any

#### Maximum Ratings and Thermal Characteristics(TA=25°C Unless otherwise noted)

Parameter	Symbol	Value	Units
Peak power dissipation with a 10/1000 $\mu$ s waveform <sup>(1)</sup>	$P_{PPM}$	400	W
Power Dissipation on Infinite Heat Sink at $T_L=75^\circ\text{C}$	$P_D$	1.0	W
Peak pulse current with a 10/1000 $\mu$ s waveform <sup>(1)</sup>	$I_{PP}$	See Next Table	A
Junction and storage temperature range ( $V_{BR} \leq 47\text{V}$ )	$T_J, T_{STG}$	-55 to +175	$^\circ\text{C}$
Junction and storage temperature range ( $V_{BR} > 47\text{V}$ )		-55 to +150	$^\circ\text{C}$
Operating storage temperature range ( $V_{BR} \leq 47\text{V}$ )	$T_{OP}$	-55 to +150	$^\circ\text{C}$
Operating storage temperature range ( $V_{BR} > 47\text{V}$ )		-40 to +125	$^\circ\text{C}$
Maximum instantaneous forward voltage at 25 A for unidirectional only	$V_F$	3.5	V
Peak forward surge current, 8.3 ms single half sine-wave unidirectional only <sup>(2)</sup>	$I_{FSM}$	40	A

#### Note:

(1)Non-repetitive current pulse per Fig.5 and derated above  $T_A=25^\circ\text{C}$  per Fig.1

(2)Measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum

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Electrical Characteristics(@25C unless otherwise Specified)

Part Number		Marking		Reverse Stand-Off Voltage $V_{RWM}(V)$	Breakdown Voltage $V_{BR}$ (V) @ $I_T$		Test Current $I_T$ (mA)	Maximum Clamping Voltage $V_C$ @ $I_{PP}$ (V)	Maximum Peak Pulse Current $I_{PP}$ (A)	Maximum Reverse Leakage $I_R$ @ $V_{RWM}$ ( $\mu A$ )
Uni	Bi	Uni	Bi		MIN	MAX				
TPSMA12A	TPSMA12CA	12AA	12CA	10.2	11.40	12.60	1	16.7	23.95	5
TPSMA13A	TPSMA13CA	13AA	13CA	11.1	12.35	13.65	1	18.2	21.98	1
TPSMA15A	TPSMA15CA	15AA	15CA	12.8	14.25	15.75	1	21.2	18.87	1
TPSMA16A	TPSMA16CA	16AA	16CA	13.6	15.20	16.80	1	22.5	17.78	1
TPSMA18A	TPSMA18CA	18AA	18CA	15.3	17.10	18.90	1	25.2	15.87	1
TPSMA20A	TPSMA20CA	20AA	20CA	17.1	19.00	21.00	1	27.7	14.44	1
TPSMA22A	TPSMA22CA	22AA	22CA	18.8	20.90	23.10	1	30.6	13.07	1
TPSMA24A	TPSMA24CA	24AA	24CA	20.5	22.80	25.20	1	33.2	12.05	1
TPSMA27A	TPSMA27CA	27AA	27CA	23.1	25.65	28.35	1	37.5	10.67	1
TPSMA30A	TPSMA30CA	30AA	30CA	25.6	28.50	31.50	1	41.4	9.66	1
TPSMA33A	TPSMA33CA	33AA	33CA	28.2	31.35	34.65	1	45.7	8.75	1
TPSMA36A	TPSMA36CA	36AA	36CA	30.8	34.20	37.80	1	49.9	8.02	1
TPSMA39A	TPSMA39CA	39AA	39CA	33.3	37.05	40.95	1	53.9	7.42	1
TPSMA43A	TPSMA43CA	43AA	43CA	36.8	40.85	45.15	1	59.3	6.75	1
TPSMA47A	TPSMA47CA	47AA	47CA	40.2	44.65	49.35	1	64.8	6.17	1
TPSMA51A	TPSMA51CA	51AA	51CA	43.6	48.45	53.55	1	70.1	5.71	1
TPSMA56A	TPSMA56CA	56AA	56CA	47.8	53.20	58.80	1	77.0	5.19	1
TPSMA62A	TPSMA62CA	62AA	62CA	53.0	58.90	65.10	1	85.0	4.71	1
TPSMA68A	TPSMA68CA	68AA	68CA	58.1	64.60	71.40	1	92.0	4.35	1
TPSMA75A	TPSMA75CA	75AA	75CA	64.1	71.25	78.75	1	103.0	3.88	1
TPSMA82A	TPSMA82CA	82AA	82CA	70.1	77.90	86.10	1	113.0	3.54	1
TPSMA91A	TPSMA91CA	91AA	91CA	77.8	86.45	95.55	1	125.0	3.20	1
TPSMA100A	TPSMA100CA	100AA	100CA	85.5	95.00	105.0	1	137.0	2.92	1

**Note:**

(1) Add suffix 'C' or 'CA' after part number to specify Bi-directional devices

Ratings and Characteristics Curves(TA=25C unless otherwise noted)

Figure 1-Pulse Waveform

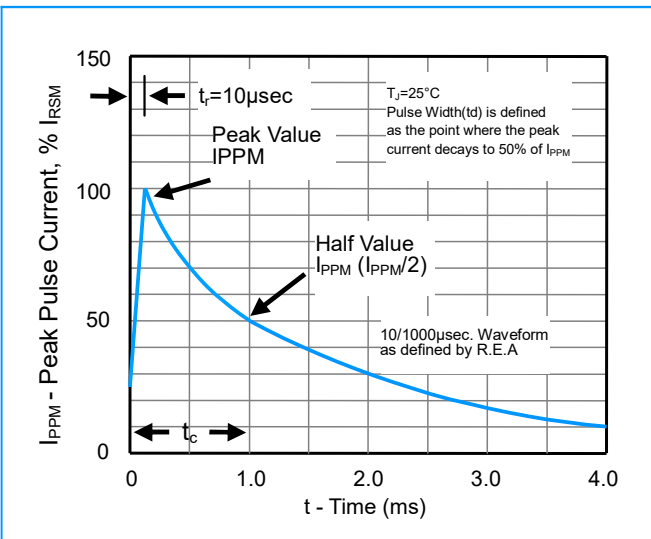
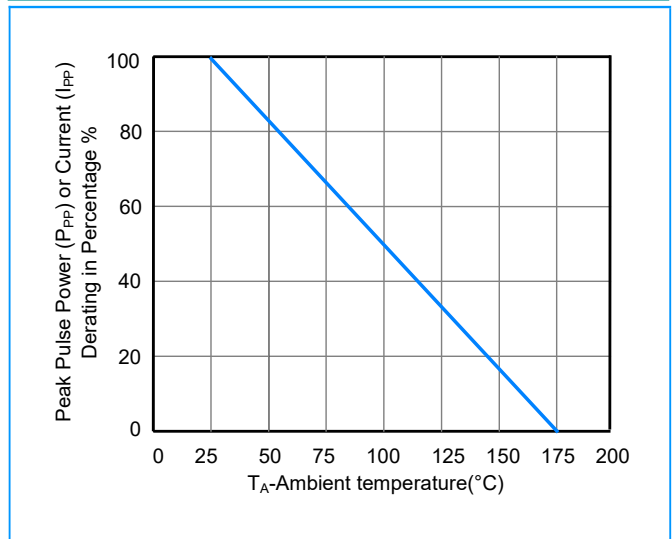


Figure 2-Pulse Derating Curve



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Figure 3-Peak Pulse Power Rating Curve

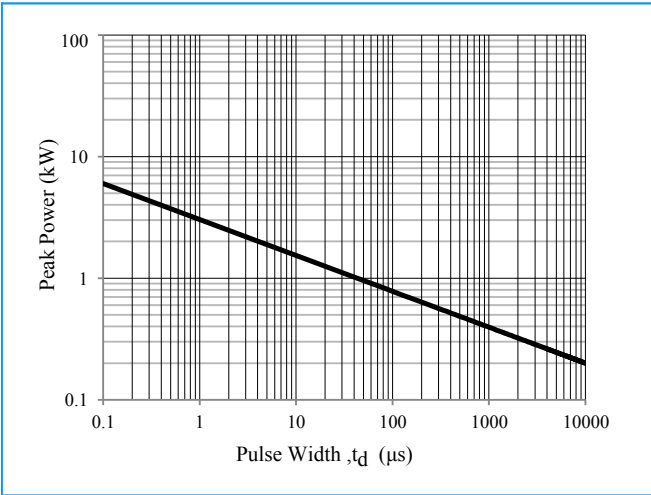


Figure 4-Steady State Power Derating Curve

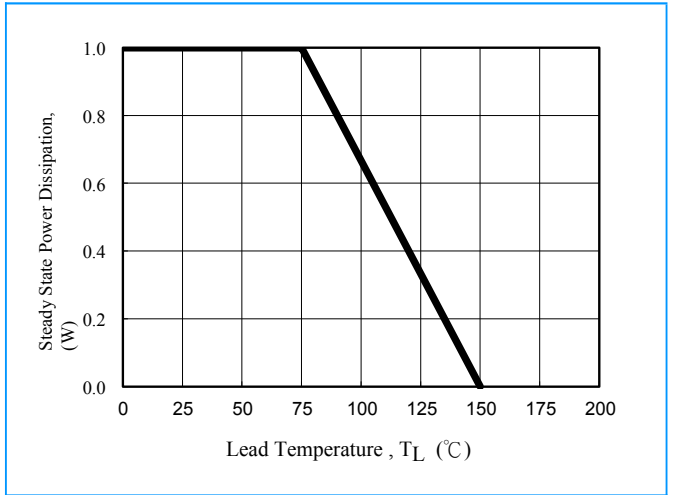


Figure 5-Maximum Non-Repetitive Surge Current

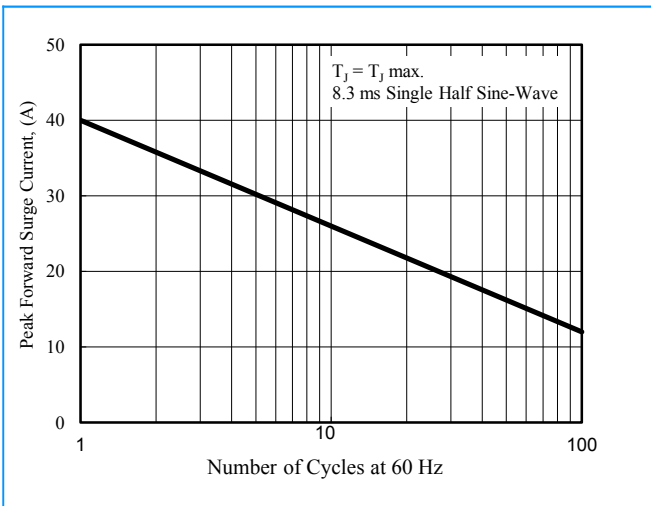
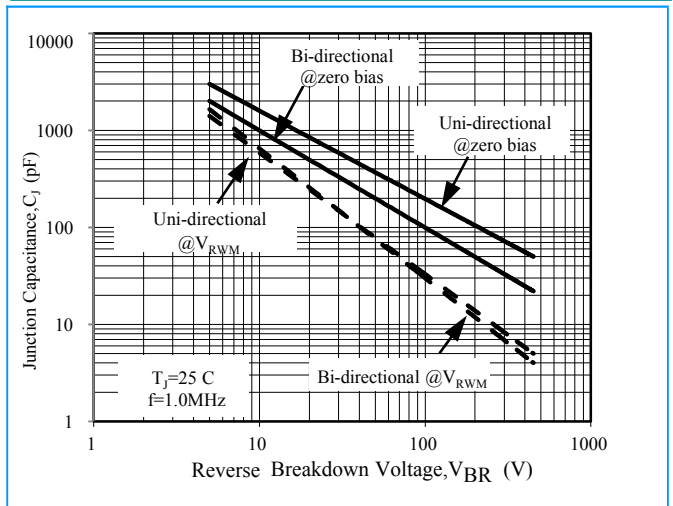
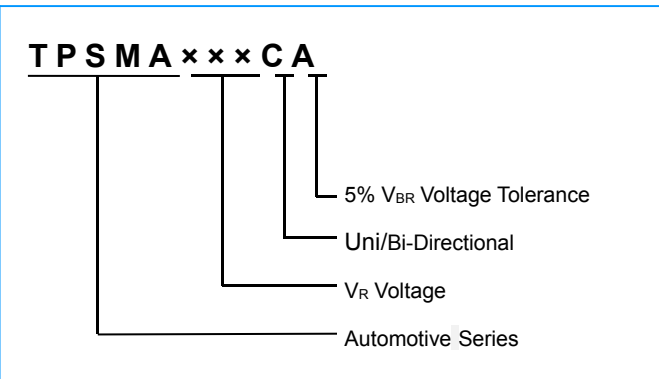


Figure 6-Typical Junction Capacitance



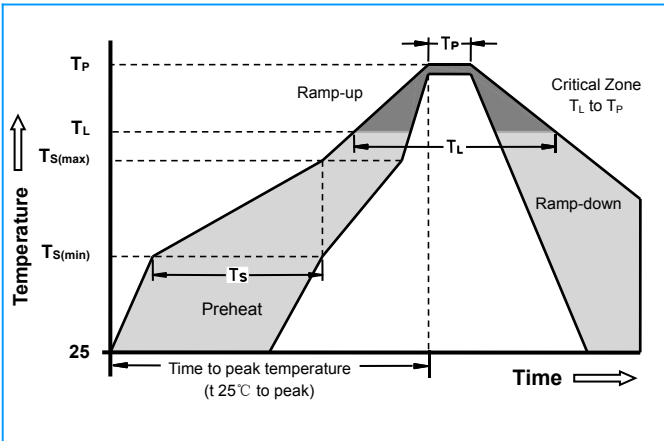
### Parting Numbering



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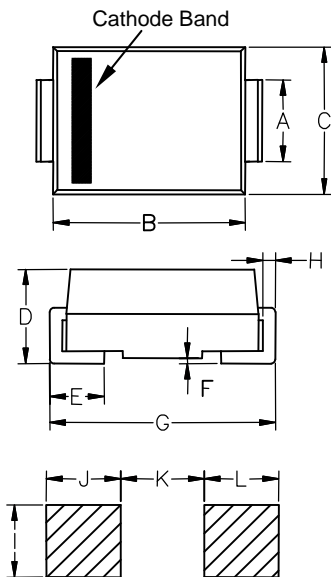
#### Soldering Parameters



Reflow Condition		Lead-free assembly
Pre Heat	- Temperature Min ( $T_{s(min)}$ )	150°C
	- Temperature Max ( $T_{s(max)}$ )	200°C
	- Time (min to max) ( $t_s$ )	60 - 180 Seconds
Average ramp up rate ( Liquidus Temp $T_L$ ) to peak		3°C/second max
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		3°C/second max
Reflow	- Temperature ( $T_L$ ) (Liquidus)	217°C
	- Time (min to max) ( $t_s$ )	60 - 150 Seconds
Peak Temperature ( $T_P$ )		260 +0/-5°C
Time within 5°C of actual peak Temperature ( $t_p$ )		20 - 40 Seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature ( $T_P$ )		8 minutes Max
Do not exceed		280°C

#### Dimensions

##### DO-214AC (SMA)



Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.049	0.064	1.230	1.630
B	0.162	0.179	4.10	4.550
C	0.099	0.109	2.510	2.760
D	0.077	0.089	1.960	2.260
E	0.030	0.060	0.750	1.510
F	-	0.008	-	0.203
G	0.192	0.206	4.87	5.220
H	0.006	0.012	0.152	0.305
I	0.070	-	1.800	-
J	0.082	-	2.100	-
K	-	0.090	-	2.300
L	0.082	-	2.100	-