Transient Voltage Suppression Diodes

Surface Mount – 3000W > TPSMD series

TPSMD Series

Uni-directional

Agency Approvals

AGENCY	AGENCY FILE NUMBER
®	E230531

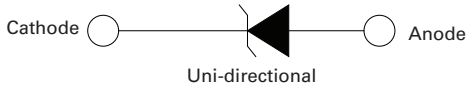
Maximum Ratings and Thermal Characteristics (T_A=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation at T_A=25°C by 10/1000μs Waveform (Fig.2)(Note 1), (Note 2)	P_{PPM}	3000	W
Power Dissipation on Infinite Heat Sink at T_A=50°C	$P_{M(AV)}$	6.5	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)	I_{FSM}	300	A
Maximum Instantaneous Forward Voltage at 100A for Unidirectional Only	V_F	3.5	V
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C
Typical Thermal Resistance Junction to Lead	R_{uJL}	15	°C/W
Typical Thermal Resistance Junction to Ambient	R_{uJA}	75	°C/W

Notes:

1. Non-repetitive current pulse , per Fig. 4 and derated above T_A = 25°C per Fig. 3.
2. Mounted on copper pad area of 0.31x0.31" (8.0 x 8.0mm) to each terminal.
3. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle=4 per minute maximum.

Functional Diagram



Uni-directional

Description

The TPSMD series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

Features

- Hi reliability application and automotive grade AEC Q101 qualified
- For surface mounted applications in order to optimize board space
- Low profile package
- Typical failure mode is short from over-specified voltage or current
- Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)
- Built-in strain relief
- V_{BR} @T_J= V_{BR}@25°C x (1+ αT x (T_J- 25))

  (αT:Temperature Coefficient)
- Glass passivated chip junction
- 3000W peak pulse power capability at 10/1000μs waveform, repetition rate (duty cycles):0.01%
- Fast response time: typically less than 1.0ps from 0V to BV min
- Excellent clamping capability
- Low incremental surge resistance
- Typical I_R less than 2μA above 12V
- High temperature soldering guaranteed: 160°C/10 seconds at terminals
- Plastic package has underwriters laboratory flammability 94V-O
- Meet MSL level1, per J-STD-020, LF maximun peak of 260°C
- Matte tin lead–free plated
- Halogen free and RoHS compliant
- 2nd level interconnect is Pb-free per IPC/JEDEC J-STD-609A.01

Applications

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.

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Electrical Characteristics

Part Number (Uni)	Marking	Reverse Stand off Voltage V_R (Volts)	Breakdown Voltage V_{BR} (Volts) @ 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_R (µA)	Agency Approval
			MIN	MAX					
TPSMD10A	PDXA	10.0	11.10	12.30	1	17.0	176.5	5	X
TPSMD11A	PDZA	11.0	12.20	13.50	1	18.2	164.8	2	X
TPSMD12A	PEEA	12.0	13.30	14.70	1	19.9	150.8	2	X
TPSMD13A	PEGA	13.0	14.40	15.90	1	21.5	139.5	2	X
TPSMD14A	PEKA	14.0	15.60	17.20	1	23.2	129.3	2	X
TPSMD15A	PEMA	15.0	16.70	18.50	1	24.4	123.0	2	X
TPSMD16A	PEPA	16.0	17.80	19.70	1	26.0	115.4	2	X
TPSMD17A	PERA	17.0	18.90	20.90	1	27.6	108.7	2	X
TPSMD18A	PETA	18.0	20.00	22.10	1	29.2	102.7	2	X
TPSMD20A	PEVA	20.0	22.20	24.50	1	32.4	92.6	2	X
TPSMD22A	PEXA	22.0	24.40	26.90	1	35.5	84.5	2	X
TPSMD24A	PEZA	24.0	26.70	29.50	1	38.9	77.1	2	X
TPSMD26A	PFEA	26.0	28.90	31.90	1	42.1	71.3	2	X
TPSMD28A	PFGA	28.0	31.10	34.40	1	45.4	66.1	2	X
TPSMD30A	PFKA	30.0	33.30	36.80	1	48.4	62.0	2	X
TPSMD33A	PFMA	33.0	36.70	40.60	1	53.3	56.3	2	X
TPSMD36A	PFPA	36.0	40.00	44.20	1	58.1	51.6	2	X
TPSMD40A	PFRA	40.0	44.40	49.10	1	64.5	46.5	2	X
TPSMD43A	PFTA	43.0	47.80	52.80	1	69.4	43.2	2	X

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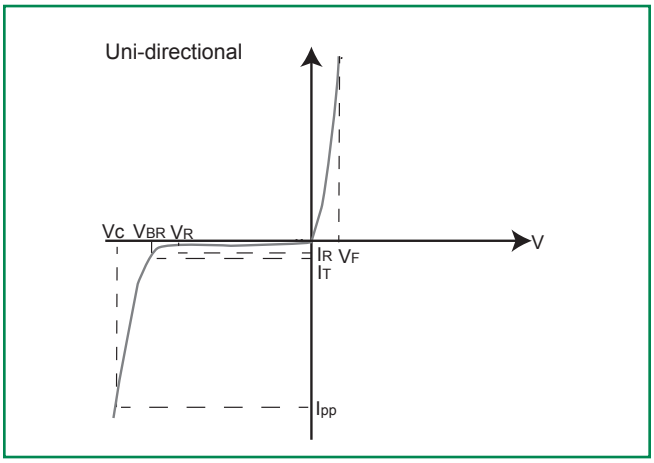
I-V Curve Characteristics



P_{PPM} Peak Pulse Power Dissipation – Max power dissipation
V_R Stand-off Voltage -- Maximum voltage that can be applied to the TVS without operation
V_{BR} Breakdown Voltage -- Maximum voltage that flows though the TVS at a specified test current (I_T)
V_C Clamping Voltage -- Peak voltage measured across the suppressor at a specified Ippm (peak impulse current)
I_R Reverse Leakage Current -- Current measured at V_R
V_F Forward Voltage Drop for Uni-directional

Ratings and Characteristic Curves (T_A=25°C unless otherwise noted)

Figure 1 - TVS Transients Clamping Waveform

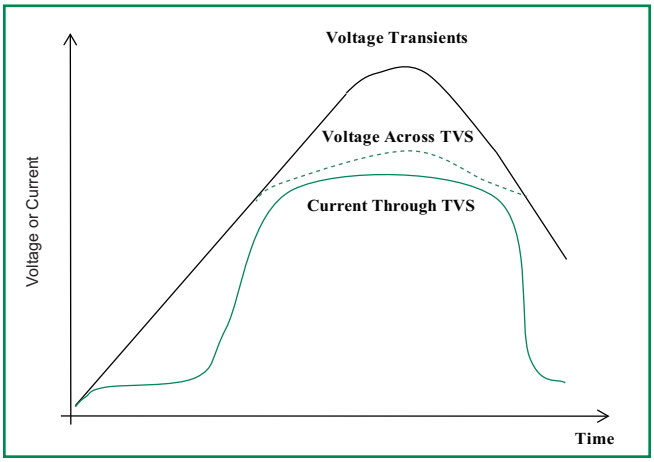
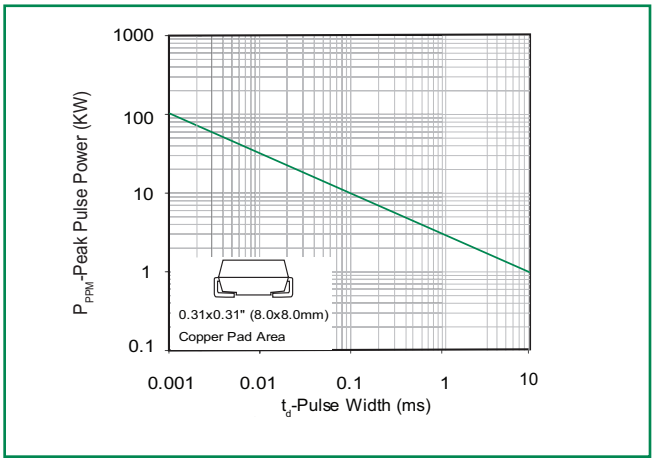


Figure 2 - Peak Pulse Power Rating



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Ratings and Characteristic Curves (T_A=25°C unless otherwise noted) (Continued)

Figure 3 - Peak Pulse Power or Current Derating Curve vs Initial Junction Temperature

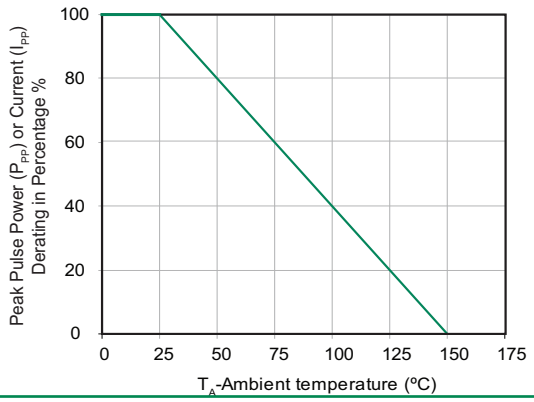


Figure 4 - Pulse Waveform

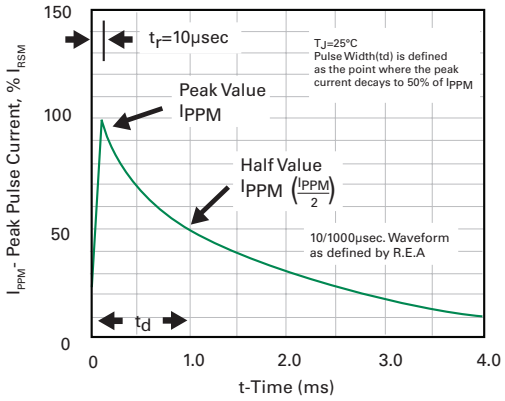


Figure 5 - Typical Junction Capacitance

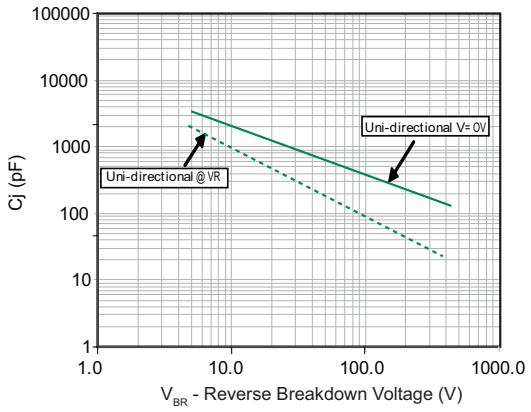


Figure 6 - Steady State Power Derating Curve

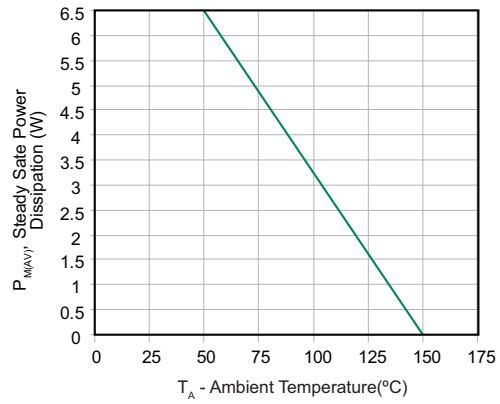
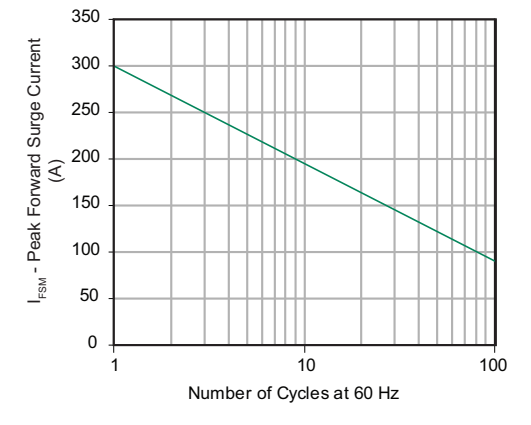
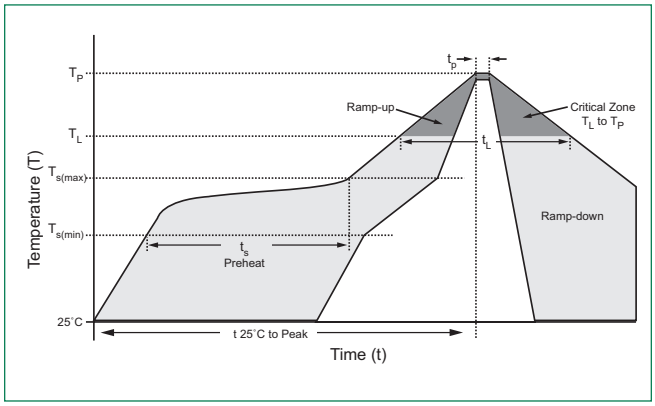


Figure 7 - Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional only



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 – 120 secs
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)		30 seconds max
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes max.
Do not exceed		280°C



Physical Specifications

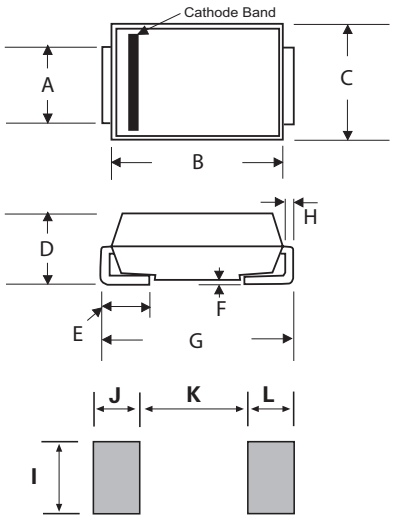
Weight	0.007 ounce, 0.21 grams
Case	JEDEC DO214AB. Molded plastic body over glass passivated junction
Polarity	Color band denotes positive end (cathode) except Bidirectional.
Terminal	Matte Tin-plated leads, Solderable per JESD22-B102

Environmental Specifications

High Temp. Storage	JESD22-A103
HTRB	JESD22-A108
Temperature Cycling	JESD22-A104
MSL	JEDEC-J-STD-020, Level 1
H3TRB	JESD22-A101
RSH	JESD22-B106

Dimensions

DO-214AB (SMC J-Bend)



Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.114	0.126	2.900	3.200
B	0.260	0.280	6.600	7.110
C	0.220	0.245	5.590	6.220
D	0.079	0.103	2.060	2.620
E	0.030	0.060	0.760	1.520
F	-	0.008	-	0.203
G	0.305	0.320	7.750	8.130
H	0.006	0.012	0.152	0.305
I	0.129	-	3.300	-
J	0.094	-	2.400	-
K	-	0.165		4.200
L	0.094	-	2.400	-

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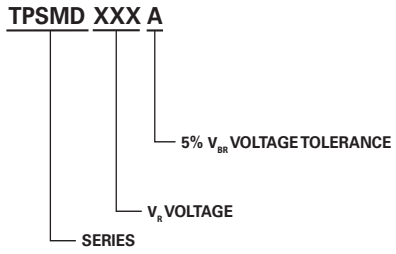
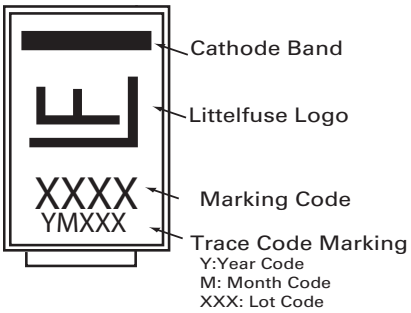
Part Numbering System



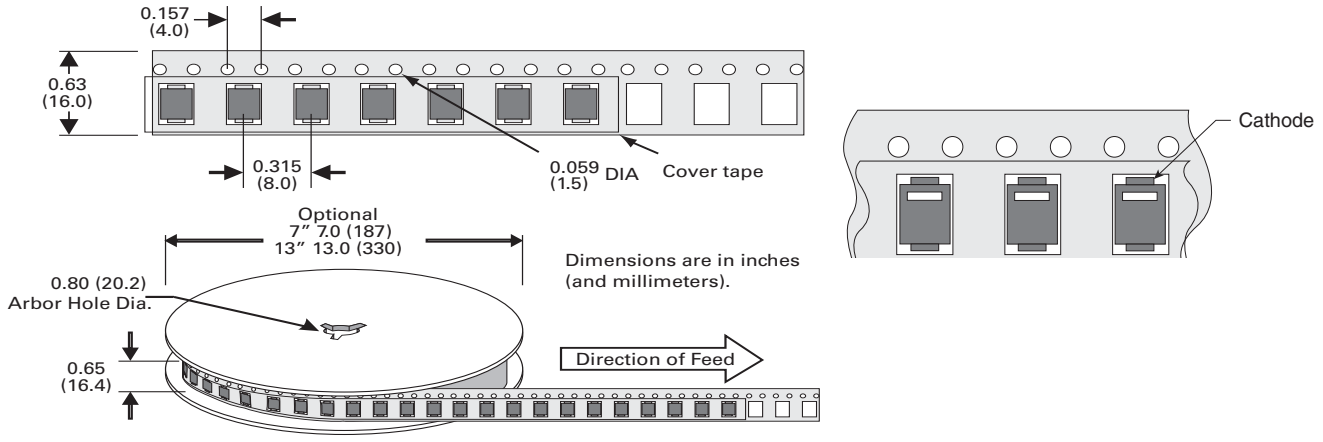
Part Marking System



Packaging Options

Part number	Component Package	Quantity	Packaging Option	Packaging Specification
TPSMDxxxX	DO-214AB	3000	Tape & Reel - 16mm tape/13" reel	EIA STD RS-481
TPSMDxxxX-T7	DO-214AB	500	Tape & Reel – 16mm tape /7" reel	EIA STD RS-481

Tape and Reel Specification



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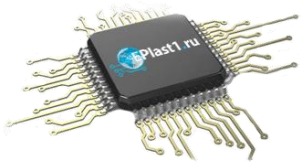
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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