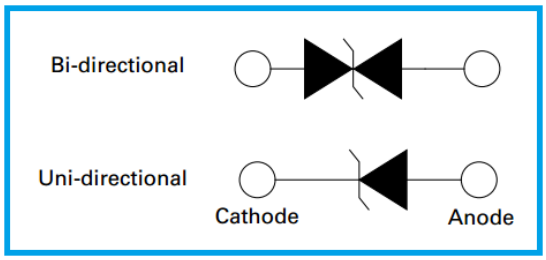
TVS Diode – TPSMDJ Series

Features

- Plastic package, excellent insulation strength.
- Glass passivated chip junction in SMD package.
- Excellent voltage clamping capability.
- Automotive grade AEC–Q101 qualified.
- Low Zener impedance.
- 3000W peak pulse power capability on 10/1000μs waveform.
- Typical leakage current less than 2μA above 13V.
- Very fast response time, typically less than 1.0ps from 0 volt to V_{BR} minimum.
- High temperature soldering guaranteed: 265°C/10 sec.
- MSL: JEDEC-J-STD-020, Level 1

Applications

- I/O interface, V_{CC} bus
- Telecom / Automotive
- Industrial and consumer electronic applications.
- Relay and electromagnetic valve surge absorption.



Mechanical and Physical Data

- Case: JEDEC SMC molded plastic.
- Surface mount device, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denoted cathode except bidirectional.

Maximum Ratings and Thermal Characteristics

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation on 10/1000μs waveform (Note 1, Fig.1).	P_{PPM}	Min 3000	Watt
Peak Pulse Current of 10/1000μs waveform (Note 1, Fig.3).	I_{PPM}	See Table	Amp
Steady State Power Dissipation at TL = 75°C, Lead lengths 0.375", (9.5mm) (Fig.5).	$P_{M(AV)}$	6.5	Watt
Peak Forward Surge Current, 8.3 ms Single Half Sine Wave Superimposed on Rated Load (Note 2, Fig.6).	I_{FSM}	300	Amp
Operating Junction and Storage Temperature Range.	T_J, T_{STG}	-55~150	°C

Note:

1. Non-repetitive current pulse, per Fig.3 and derated above TA = 25°C per Fig.2.
2. 8.3ms single half sine wave, or equivalent square wave, Duty cycle = 4 pulses per minutes maximum.

Part Number Code

TPSMDJ □□□ C A

- A: V_{BR} Voltage tolerance (A: 5%; Blank: 10%)
- C: Bi-directional; Blank: Uni-directional
- □□□: Reverse Stand-Off Voltage or Typical Breakdown Voltage
- TPSMDJ: Automotive TPSMDJ Series (3000W)

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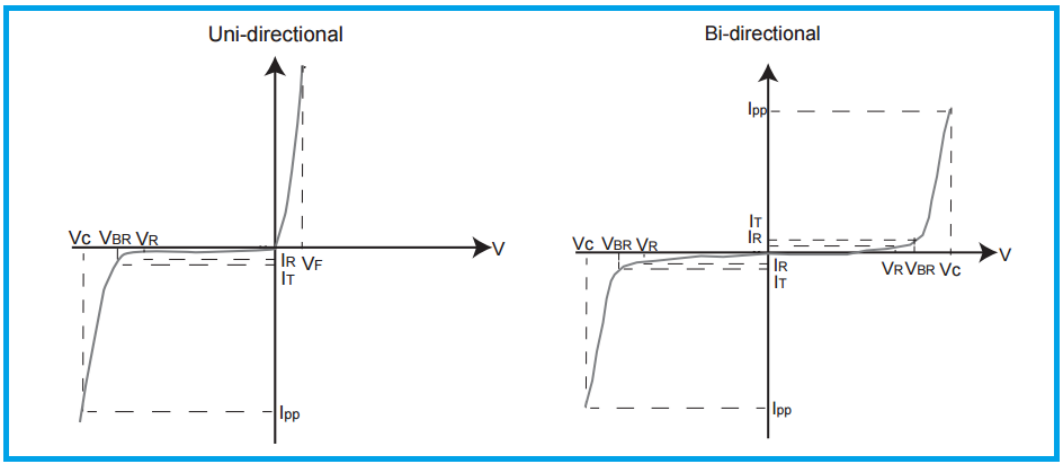
TVS Diode – TPSMDJ Series

I-V Curve Characteristics



P_{PPM} Peak Pulse Power Dissipation – Maximum 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 through the TVS at a specified test current (I_T)

V_C Clamping Voltage – Peak voltage measured across the TVS at a specified I_{PPM} (Peak Impulse Current)

I_R Reverse Leakage Current – Current measured at V_R

V_F Forward Voltage Drop for Uni-directional

Electrical Characteristics

Part Number		Marking		Reverse Stand Off Voltage V_R	Breakdown Voltage V_{BR} (V) @ I_T		Test Current I_T	Maximum Clamping Voltage	Maximum Peak Pulse Current	Maximum Reverse Leakage
Uni	Bi	Uni	Bi	(V)	Min.	Max.	(mA)	V_C (V) @ I_{PP}	I_{PP} (A)	I_R (μA) @ V_R
TPSMDJ10A	TPSMDJ10CA	PDXT	DDXT	10.0	11.1	12.3	5	17.0	176.5	15
TPSMDJ11A	TPSMDJ11CA	PDZT	DDZT	11.0	12.2	13.5	5	18.2	164.8	2
TPSMDJ12A	TPSMDJ12CA	PEET	DEET	12.0	13.3	14.7	5	19.9	150.8	2
TPSMDJ13A	TPSMDJ13CA	PEGT	DEGT	13.0	14.4	15.9	5	21.5	139.5	2
TPSMDJ14A	TPSMDJ14CA	PEKT	DEKT	14.0	15.6	17.2	5	23.2	129.3	2
TPSMDJ15A	TPSMDJ15CA	PEMT	DEMT	15.0	16.7	18.5	5	24.4	123.0	2
TPSMDJ16A	TPSMDJ16CA	PEPT	DEPT	16.0	17.8	19.7	5	26.0	115.4	2
TPSMDJ17A	TPSMDJ17CA	PERT	DERT	17.0	18.9	20.9	5	27.6	108.7	2
TPSMDJ18A	TPSMDJ18CA	PETT	DETT	18.0	20.0	22.1	5	29.2	102.7	2
TPSMDJ19A	TPSMDJ19CA	PEBT	DEBT	19.0	21.1	23.3	5	30.8	97.5	2
TPSMDJ20A	TPSMDJ20CA	PEVT	DEVT	20.0	22.2	24.5	5	32.4	92.6	2
TPSMDJ22A	TPSMDJ22CA	PEXT	DEXT	22.0	24.4	26.9	5	35.5	84.5	2
TPSMDJ24A	TPSMDJ24CA	PEZT	DEZT	24.0	26.7	29.5	5	38.9	77.1	2
TPSMDJ26A	TPSMDJ26CA	PFET	DFET	26.0	28.9	31.9	5	42.1	71.3	2
TPSMDJ28A	TPSMDJ28CA	PFGT	DFGT	28.0	31.1	34.4	5	45.4	66.1	2
TPSMDJ30A	TPSMDJ30CA	PFKT	DFKT	30.0	33.3	36.8	5	48.4	62.0	2
TPSMDJ33A	TPSMDJ33CA	PFMT	DFMT	33.0	36.7	40.6	5	53.3	56.3	2
TPSMDJ36A	TPSMDJ36CA	PFPT	DFPT	36.0	40.0	44.2	5	58.1	51.6	2
TPSMDJ40A	TPSMDJ40CA	PFRT	DFRT	40.0	44.4	49.1	5	64.5	46.5	2
TPSMDJ43A	TPSMDJ43CA	PFTT	DFTT	43.0	47.8	52.8	5	69.4	43.2	2

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Part Number		Marking		Reverse Stand Off Voltage V_R	Breakdown Voltage V_{BR} (V) @ I_T		Test Current I_T	Maximum Clamping Voltage	Maximum Peak Pulse Current	Maximum Reverse Leakage
Uni	Bi	Uni	Bi	(V)	Min.	Max.	(mA)	V_C (V) @ I_{PP}	I_{PP} (A)	I_R (μA) @ V_R
TPSMDJ45A	TPSMDJ45CA	PFVT	DFVT	45.0	50.0	55.3	1	72.7	41.27	2
TPSMDJ48A	TPSMDJ48CA	PFXT	DFXT	48.0	53.3	58.9	1	77.4	38.76	2
TPSMDJ51A	TPSMDJ51CA	PFZT	DFZT	51.0	56.7	62.7	1	82.4	36.41	2
TPSMDJ54A	TPSMDJ54CA	PGET	DGET	54.0	60.0	66.3	1	87.1	34.44	2
TPSMDJ58A	TPSMDJ58CA	PGGT	DGGT	58.0	64.4	71.2	1	93.6	32.05	2
TPSMDJ60A	TPSMDJ60CA	PGKT	DGKT	60.0	66.7	73.7	1	96.8	30.99	2
TPSMDJ64A	TPSMDJ64CA	PGMT	DGMT	64.0	71.0	78.6	1	103.0	29.13	2
TPSMDJ70A	TPSMDJ70CA	PGPT	DGPT	70.0	77.8	86.0	1	113.0	26.55	2
TPSMDJ75A	TPSMDJ75CA	PGRT	DGRT	75.0	83.3	92.1	1	121.0	24.79	2
TPSMDJ78A	TPSMDJ78CA	PGTT	DGTT	78.0	86.7	95.8	1	126.0	23.81	2
TPSMDJ80A	TPSMDJ80CA	PGBT	DGBT	80.0	88.8	97.6	1	129.6	23.15	2
TPSMDJ85A	TPSMDJ85CA	PGVT	DGVT	85.0	94.4	104.0	1	137.0	21.90	2
TPSMDJ90A	TPSMDJ90CA	PGXT	DGXT	90.0	100.0	111.0	1	146.0.	20.55	2
TPSMDJ100A	TPSMDJ100CA	PGZT	DGZT	100.0	111.0	123.0	1	162.0	18.52	2
TPSMDJ110A	TPSMDJ110CA	PHET	DHET	110.0	122.0	135.0	1	177.0	16.95	2
TPSMDJ120A	TPSMDJ120CA	PHGT	DHGT	120.0	133.0	147.0	1	193.0	15.54	2
TPSMDJ130A	TPSMDJ130CA	PHKT	DHKT	130.0	144.0	159.0	1	209.0	14.35	2
TPSMDJ150A	TPSMDJ150CA	PHMT	DHMT	150.0	167.0	185.0	1	243.0	12.35	2
TPSMDJ160A	TPSMDJ160CA	PHPT	DHPT	160.0	178.0	197.0	1	259.0	11.58	2
TPSMDJ170A	TPSMDJ170CA	PHRT	DHRT	170.0	189.0	209.0	1	275.0	10.91	2

Note:

1. For bi-directional type having V_R of 10 volts and less, the I_R limit is double.

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Ratings and Characteristic Curves

Fig 1 - Peak Pulse Power Rating Curve

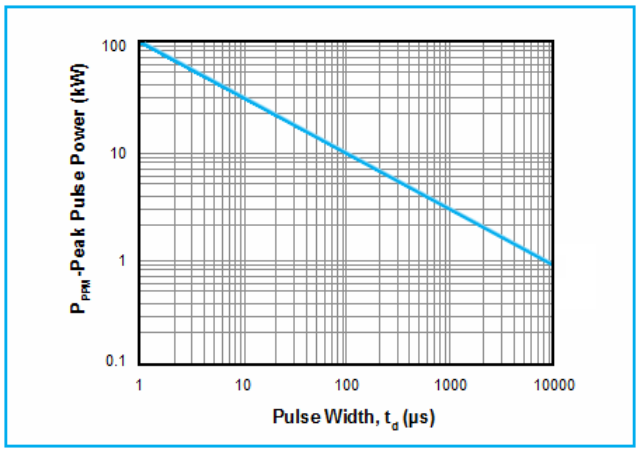


Fig 2 - Pulse Derating Curve

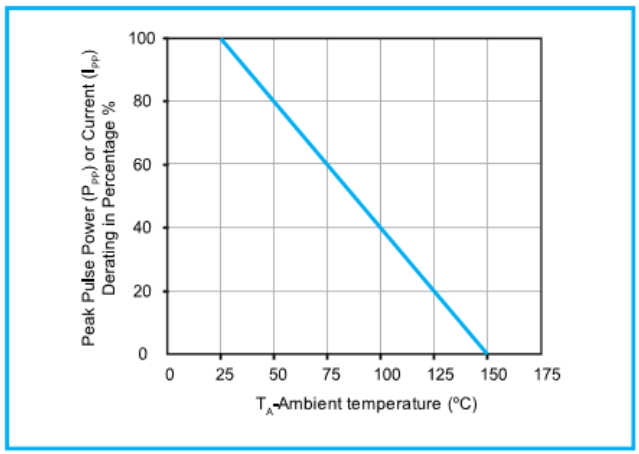


Fig 3 - Pulse Waveform

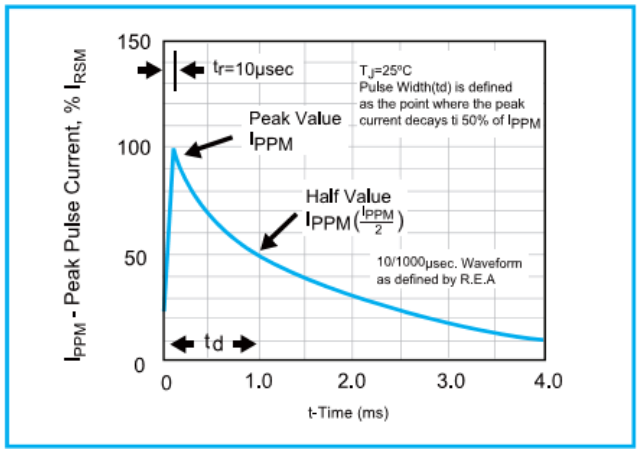


Fig 4 – Typical Junction Capacitance Uni-directional

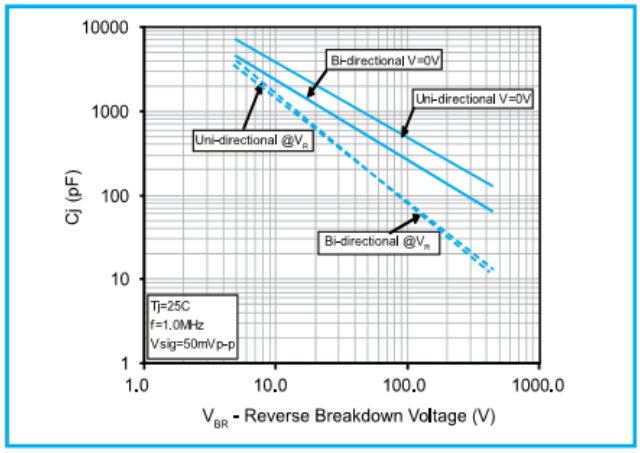


Fig 5 – Steady State Power Dissipation Derating Curve

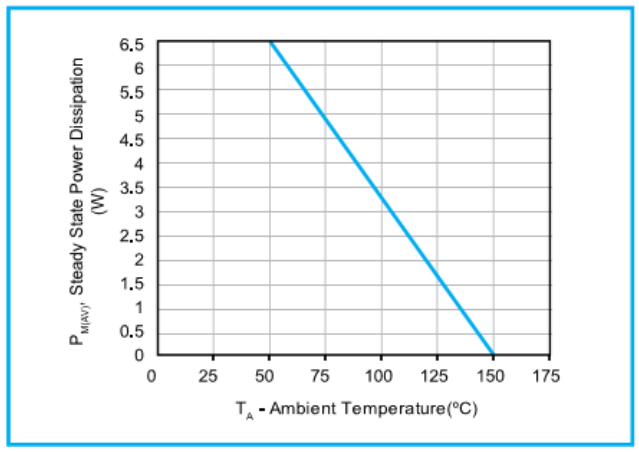
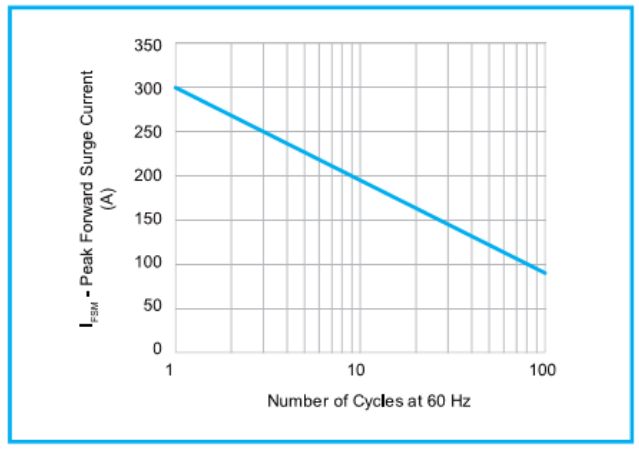
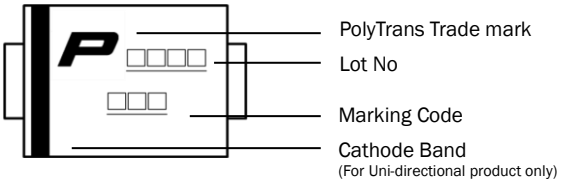


Fig 6 – Maximum Non-Repetitive Forward Surge Current (Uni-directional Only)

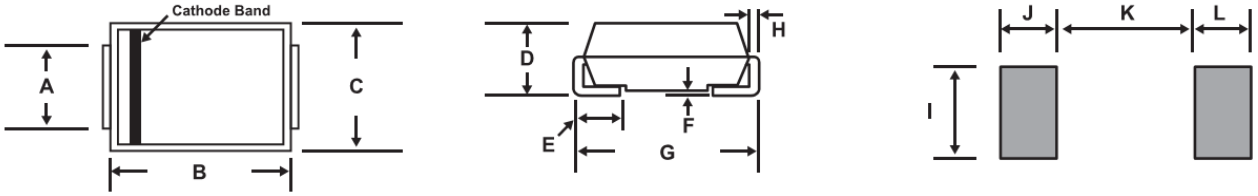


TVS Diode – TPSMDJ Series

Marking Definitions



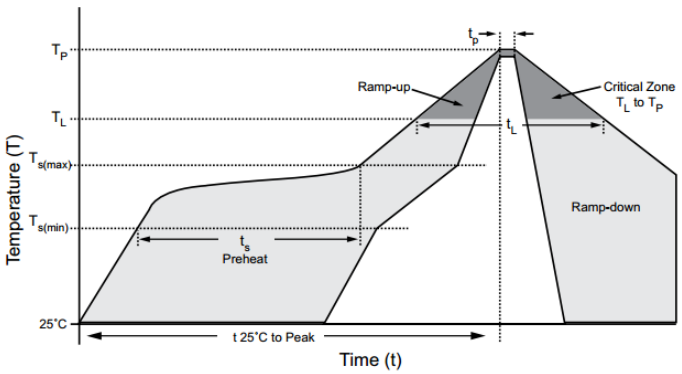
Physical Dimensions



Dimension	Millimeters		Inches	
	Min	Max	Min	Max
A	2.90	3.20	0.114	0.126
B	6.60	7.11	0.260	0.280
C	5.59	6.22	0.220	0.245
D	2.20	2.80	0.087	0.110
E	0.76	1.52	0.030	0.060
F	-	0.20	-	0.008
G	7.75	8.13	0.305	0.320
H	0.15	0.31	0.006	0.012
I	3.30	-	0.129	-
J	2.40	-	0.094	-
K	-	4.20	-	0.165
L	2.40	-	0.094	-

Lead Free Reflow Soldering Recommendations

Preheat	
- Temperature Min (T_{s_min})	150°C
- Temperature Max (T_{s_max})	200°C
- Time (T_{s_min} to T_{s_max})	60-180 seconds
- Average Ramp-Up Rate	1~3°C/second
Peak Temperature	260°C max.
Time within 5°C of actual Peak Temperature (t_p)	40 seconds max.
Ramp-Down Rate	6 °C /second max.



Note: If the soldering temperatures exceed the recommended profile, devices may not meet the performance requirements.

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Packaging Information

Part Number	Component Package	Quantity	Packaging Option	Packaging Specification
TPSMDJ Series	DO-214AB	3000	Tape & Reel – 16mm tape/13" reel	EIA STD RS-481

Tape and Reel Specifications