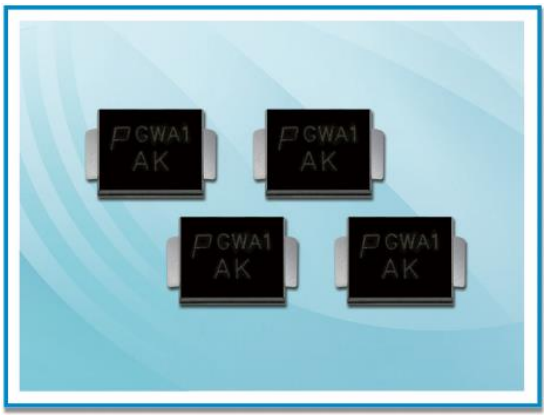
TVS Diode – TPSMAJ6L Series

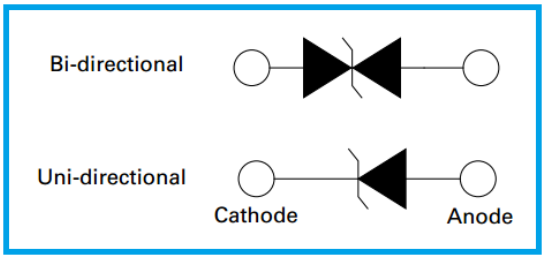
Features

- Plastic package, excellent insulation strength.
- Glass passivated chip junction in SMA package.
- Automotive grade AEC–Q101 qualified.
- Excellent voltage clamping capability.
- 600W peak pulse power capability on 10/1000μs waveform.
- Typical leakage current less than 1μA 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 SMA 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 600	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).	$P_{M(AV)}$	5.0	Watt
Peak Forward Surge Current, 8.3 ms Single Half Sine Wave Superimposed on Rated Load (Note 2, Fig.6).	I_{FSM}	100	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 T_A = 25°C per Fig.2.
2. 8.3ms single half sine wave, or equivalent square wave, Duty cycle = 4 pulses per minutes maximum.

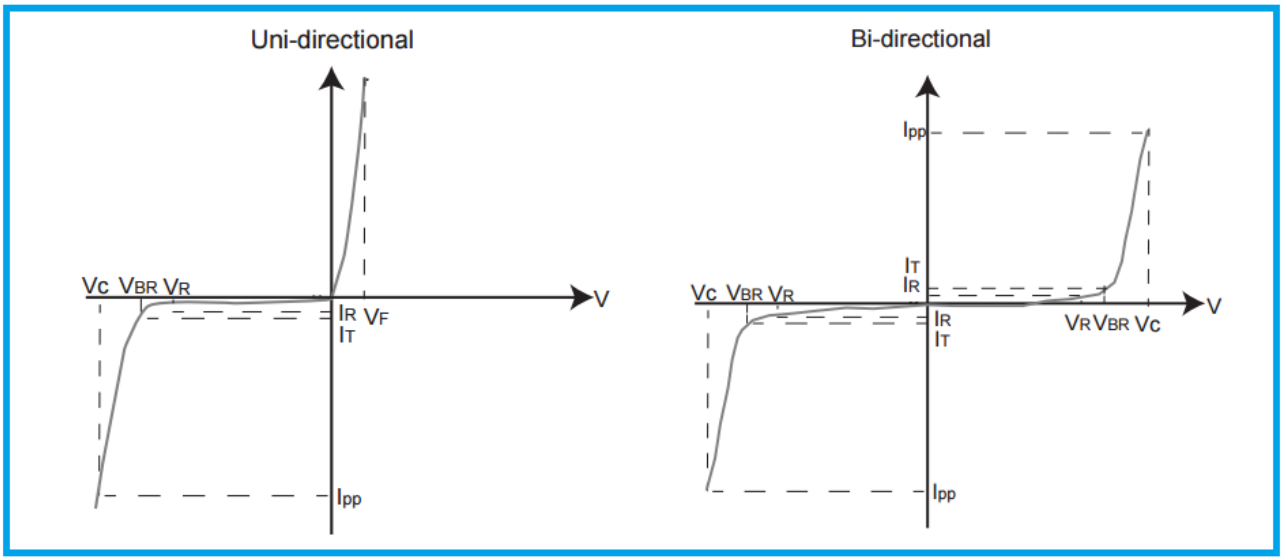
Part Number Code

TPSMAJ6L □□□ C A - □□□

- Packaging Code (T13: Tape with 13" Reel; T7: Tape with 7")
- V_{BR} Voltage tolerance (A: 5%; Blank: 10%)
- C: Bi-directional; Blank: Uni-directional
- Reverse Stand-Off Voltage or Typical Breakdown Voltage
- TPSMAJ6L Series (600W)

TVS Diode – TPSMAJ6L 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 V_C (V) @ I_{PP}	Maximum Peak Pulse Current I_{PP} (A)	Maximum Reverse Leakage I_R (μA) @ V_R
Uni	Bi	Uni	Bi	(V)	Min.	Max.	(mA)			
TPSMAJ6L5.0A	TPSMAJ6L5.0CA	AE6T	WE6T	5.0	6.40	7.00	10	9.2	65.22	800
TPSMAJ6L6.0A	TPSMAJ6L6.0CA	AG6T	WG6T	6.0	6.67	7.37	10	10.3	58.25	800
TPSMAJ6L6.5A	TPSMAJ6L6.5CA	AK6T	WK6T	6.5	7.22	7.98	10	11.2	53.57	500
TPSMAJ6L7.0A	TPSMAJ6L7.0CA	AM6T	WM6T	7.0	7.78	8.60	10	12.0	50.00	200
TPSMAJ6L7.5A	TPSMAJ6L7.5CA	AP6T	WP6T	7.5	8.33	9.21	1	12.9	46.51	100
TPSMAJ6L8.0A	TPSMAJ6L8.0CA	AR6T	WR6T	8.0	8.89	9.83	1	13.6	44.12	50
TPSMAJ6L8.5A	TPSMAJ6L8.5CA	AT6T	WT6T	8.5	9.44	10.4	1	14.4	41.67	20
TPSMAJ6L9.0A	TPSMAJ6L9.0CA	AV6T	WV6T	9.0	10.0	11.1	1	15.4	38.96	10
TPSMAJ6L10A	TPSMAJ6L10CA	AX6T	WX6T	10.0	11.1	12.3	1	17.0	35.29	5
TPSMAJ6L11A	TPSMAJ6L11CA	AZ6T	WZ6T	11.0	12.2	13.5	1	18.2	32.97	1
TPSMAJ6L12A	TPSMAJ6L12CA	BE6T	XE6T	12.0	13.3	14.7	1	19.9	30.15	1
TPSMAJ6L13A	TPSMAJ6L13CA	BG6T	XG6T	13.0	14.4	15.9	1	21.5	27.91	1
TPSMAJ6L14A	TPSMAJ6L14CA	BK6T	XK6T	14.0	15.6	17.2	1	23.2	25.86	1
TPSMAJ6L15A	TPSMAJ6L15CA	BM6T	XM6T	15.0	16.7	18.5	1	24.4	24.59	1
TPSMAJ6L16A	TPSMAJ6L16CA	BP6T	XP6T	16.0	17.8	19.7	1	26.0	23.08	1
TPSMAJ6L17A	TPSMAJ6L17CA	BR6T	XR6T	17.0	18.9	20.9	1	27.6	21.74	1
TPSMAJ6L18A	TPSMAJ6L18CA	BT6T	XT6T	18.0	20.0	22.1	1	29.2	20.55	1

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Part Number		Marking		Reverse Stand Off Voltage V_R (V)	Breakdown Voltage V_{BR} (V) @ I_T		Test Current I_T (mA)	Maximum Clamping Voltage V_C (V) @ I_{PP}	Maximum Peak Pulse Current I_{PP} (A)	Maximum Reverse Leakage I_R (μA) @ V_R
Uni	Bi	Uni	Bi		Min.	Max.				
TPSMAJ6L20A	TPSMAJ6L20CA	BV6T	XV6T	20.0	22.2	24.5	1	32.4	18.52	1
TPSMAJ6L22A	TPSMAJ6L22CA	BX6T	XX6T	22.0	24.4	26.9	1	35.5	16.90	1
TPSMAJ6L24A	TPSMAJ6L24CA	BZ6T	XZ6T	24.0	26.7	29.5	1	38.9	15.42	1
TPSMAJ6L26A	TPSMAJ6L26CA	CE6T	YE6T	26.0	28.9	31.9	1	42.1	14.25	1
TPSMAJ6L28A	TPSMAJ6L28CA	CG6T	YG6T	28.0	31.1	34.4	1	45.4	13.22	1
TPSMAJ6L30A	TPSMAJ6L30CA	CK6T	YK6T	30.0	33.3	36.8	1	48.4	12.40	1
TPSMAJ6L33A	TPSMAJ6L33CA	CM6T	YM6T	33.0	36.7	40.6	1	53.3	11.26	1
TPSMAJ6L36A	TPSMAJ6L36CA	CP6T	YP6T	36.0	40.0	44.2	1	58.1	10.33	1
TPSMAJ6L40A	TPSMAJ6L40CA	CR6T	YR6T	40.0	44.4	49.1	1	64.5	9.30	1
TPSMAJ6L43A	TPSMAJ6L43CA	CT6T	YT6T	43.0	47.8	52.8	1	69.4	8.65	1
TPSMAJ6L45A	TPSMAJ6L45CA	CV6T	YV6T	45.0	50.0	55.3	1	72.7	8.25	1
TPSMAJ6L48A	TPSMAJ6L48CA	CX6T	YX6T	48.0	53.3	58.9	1	77.4	7.75	1
TPSMAJ6L51A	TPSMAJ6L51CA	CZ6T	YZ6T	51.0	56.7	62.7	1	82.4	7.28	1
TPSMAJ6L54A	TPSMAJ6L54CA	RE6T	ZE6T	54.0	60.0	66.3	1	87.1	6.89	1
TPSMAJ6L58A	TPSMAJ6L58CA	RG6T	ZG6T	58.0	64.4	71.2	1	93.6	6.41	1

Note:

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

TVS Diode – TPSMAJ6L Series

Ratings and Characteristic Curves

Fig 1 - Peak Pulse Power Rating Curve

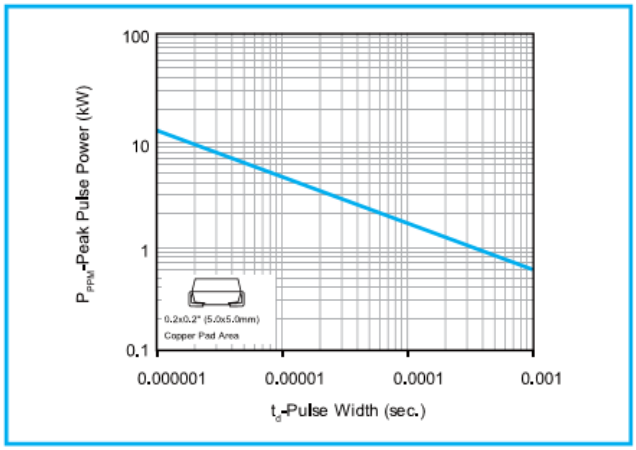


Fig 2 - Pulse Derating Curve

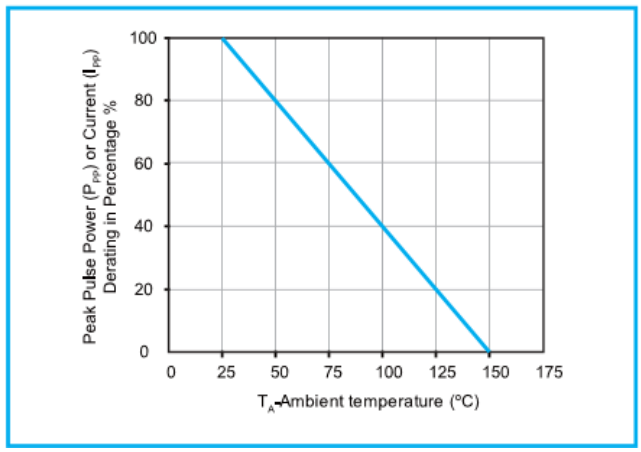


Fig 3 - Pulse Waveform

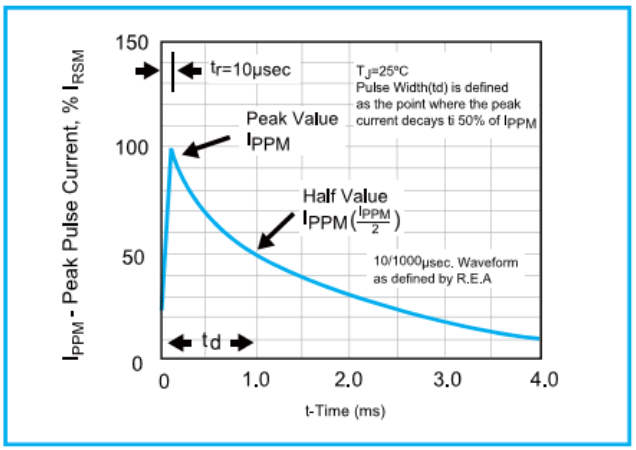


Fig 4 – Typical Junction Capacitance

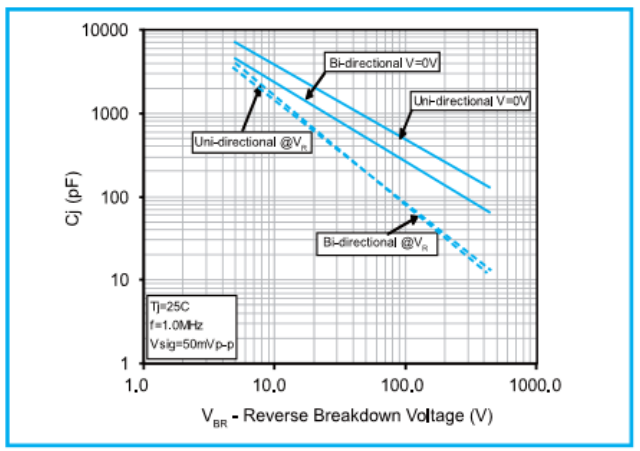


Fig 5 – Steady State Power Dissipation Derating Curve

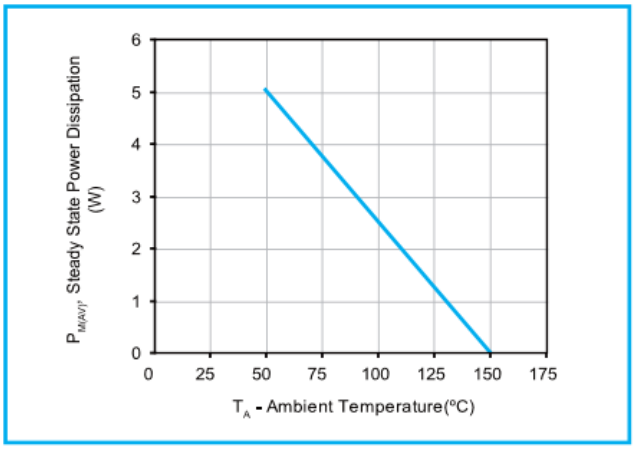
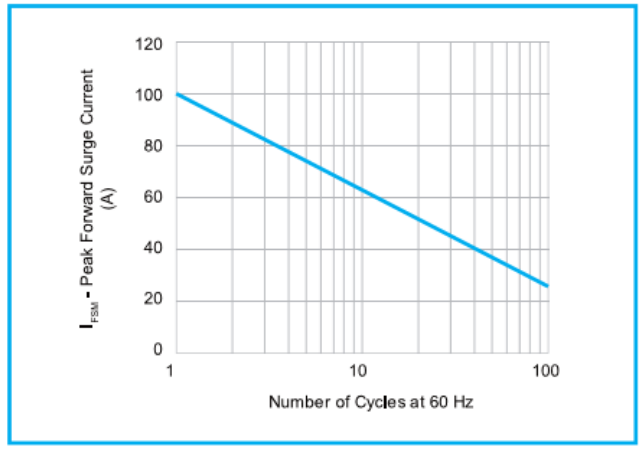


Fig 6 – Maximum Non-Repetitive Forward Surge Current (Uni-directional Only)



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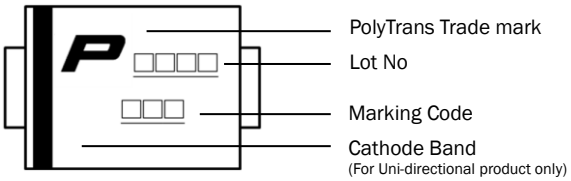
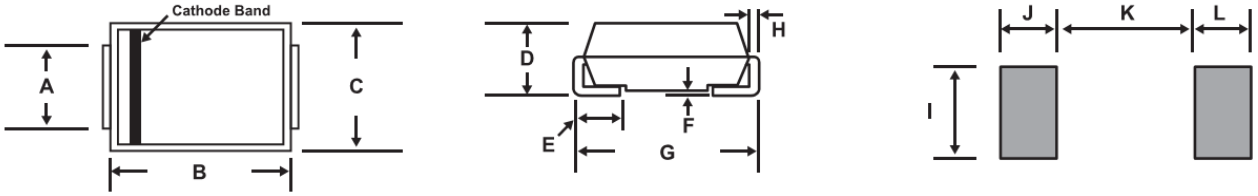
Marking Definitions



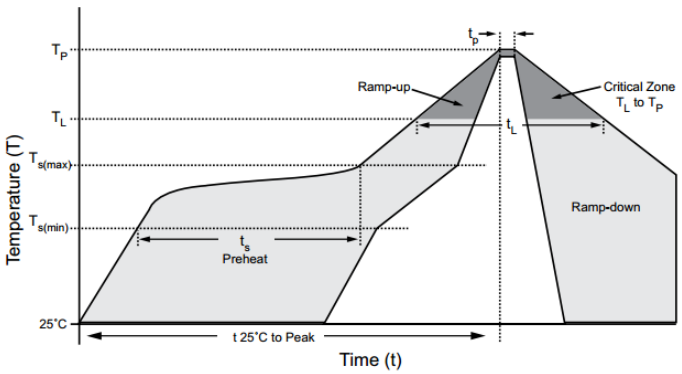
Physical Dimensions



Dimension	Millimeters		Inches	
	Min	Max	Min	Max
A	1.25	1.65	0.049	0.065
B	3.99	4.60	0.157	0.177
C	2.50	2.90	0.100	0.110
D	1.98	2.29	0.078	0.090
E	0.78	1.52	0.030	0.060
F	-	0.203	-	0.008
G	4.93	5.28	0.194	0.208
H	0.15	0.31	0.006	0.012
I	1.80	-	0.070	-
J	2.10	-	0.082	-
K	-	2.30	-	0.090
L	2.10	-	0.082	-

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.

TVS Diode – TPSMAJ6L Series

Packaging Information

Part Number	Packaging Code	Component Package	Quantity	Packaging Option	Packaging Specification
TPSMAJ6L Series	T13	DO-214AC	5000	Tape & Reel – 12mm tape/13" reel	EIA STD RS-481
TPSMAJ6L Series	T7	DO-214AC	2000	Tape & Reel – 12mm tape/7" reel	EIA STD RS-481

Tape and Reel Specifications