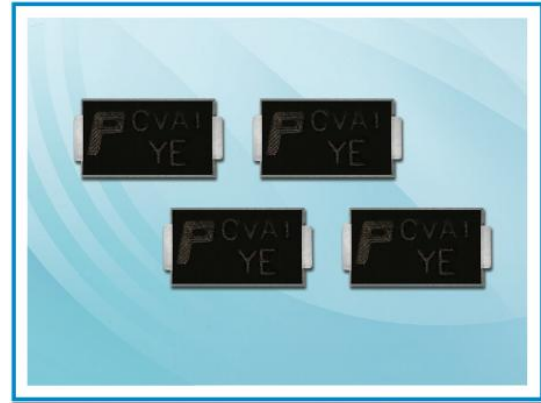


TVS Diode – SMAJ Series

Features

- Plastic package, excellent insulation strength.
- Glass passivated chip junction in SMA package.
- Excellent voltage clamping capability.
- Low Zener impedance.
- 400W peak pulse power capability on 10/1000 μ s waveform.
- Typical leakage current less than 1 μ A 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

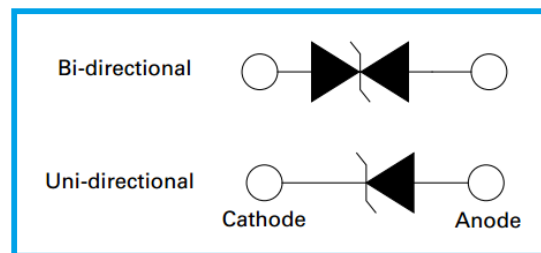


Applications

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

Agency Approval

- UL file no.: E474915



Mechanical and Physical Data

- Case: JEDEC SMA molded plastic.
- Axial leaded, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denoted cathode except bidirectional.

Maximum Ratings and Thermal Characteristics

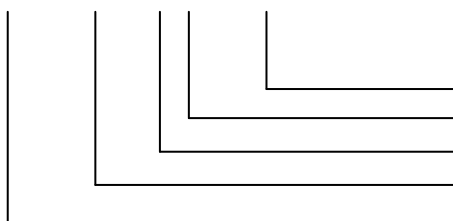
Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation on 10/1000 μ s waveform (Note 1, Fig.1).	P_{PPM}	Min 400	Watt
Peak Pulse Current of 10/1000 μ s waveform (Note 1, Fig.3).	I_{PPM}	See Table	Amp
Steady State Power Dissipation at $T_L = 75^\circ\text{C}$, Lead lengths 0.375", (9.5mm) (Fig.5).	$P_{M(AV)}$	3.3	Watt
Peak Forward Surge Current, 8.3 ms Single Half Sine Wave Superimposed on Rated Load (Note 2, Fig.6).	I_{FSM}	40	Amp
Operating Junction and Storage Temperature Range.	T_J, T_{STG}	-55~150	$^\circ\text{C}$

Note:

1. Non-repetitive current pulse, per Fig.3 and derated above $T_A = 25^\circ\text{C}$ per Fig.2.
2. 8.3ms single half sine wave, or equivalent square wave, Duty cycle = 4 pulses per minutes maximum.

Part Number Code

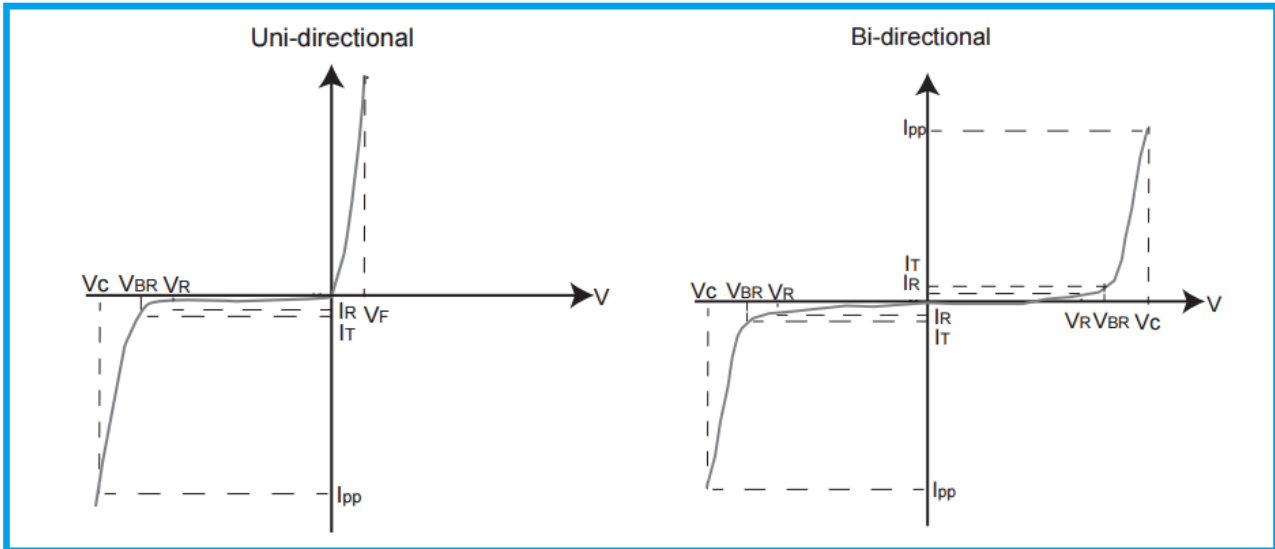
SMAJ □□□ C A - □□□



- 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
- SMAJ Series (400W)

TVS Diode – SMAJ Series

I-V Curve Characteristics



I_{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 (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 (μ A) @ V_R	UL
Uni	Bi	Uni	Bi		Min.	Max.					
SMAJ5.0A	SMAJ5.0CA	AE	WE	5.0	6.40	7.00	10	9.2	43.5	800	✓
SMAJ6.0A	SMAJ6.0CA	AG	WG	6.0	6.67	7.37	10	10.3	38.8	800	✓
SMAJ6.5A	SMAJ6.5CA	AK	WK	6.5	7.22	7.98	10	11.2	35.7	500	✓
SMAJ7.0A	SMAJ7.0CA	AM	WM	7.0	7.78	8.60	10	12.0	33.3	200	✓
SMAJ7.5A	SMAJ7.5CA	AP	WP	7.5	8.33	9.21	1	12.9	31.0	100	✓
SMAJ8.0A	SMAJ8.0CA	AR	WR	8.0	8.89	9.83	1	13.6	29.4	50	✓
SMAJ8.5A	SMAJ8.5CA	AT	WT	8.5	9.44	10.4	1	14.4	27.8	20	✓
SMAJ9.0A	SMAJ9.0CA	AV	WV	9.0	10.0	11.1	1	15.4	26.0	10	✓
SMAJ10A	SMAJ10CA	AX	WX	10.0	11.1	12.3	1	17.0	23.5	5	✓
SMAJ11A	SMAJ11CA	AZ	WZ	11.0	12.2	13.5	1	18.2	22.0	1	✓
SMAJ12A	SMAJ12CA	BE	XE	12.0	13.3	14.7	1	19.9	20.1	1	✓
SMAJ13A	SMAJ13CA	BG	XG	13.0	14.4	15.9	1	21.5	18.6	1	✓
SMAJ14A	SMAJ14CA	BK	XK	14.0	15.6	17.2	1	23.2	17.2	1	✓
SMAJ15A	SMAJ15CA	BM	XM	15.0	16.7	18.5	1	24.4	16.4	1	✓
SMAJ16A	SMAJ16CA	BP	XP	16.0	17.8	19.7	1	26.0	15.4	1	✓
SMAJ17A	SMAJ17CA	BR	XR	17.0	18.9	20.9	1	27.6	14.5	1	✓
SMAJ18A	SMAJ18CA	BT	XT	18.0	20.0	22.1	1	29.2	13.7	1	✓

TVS Diode – SMAJ Series

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 (μ A) @ V_R	UL
Uni	Bi	Uni	Bi		Min.	Max.					
SMAJ20A	SMAJ20CA	BV	XV	20.0	22.2	24.5	1	32.4	12.3	1	✓
SMAJ22A	SMAJ22CA	BX	XX	22.0	24.4	26.9	1	35.5	11.3	1	✓
SMAJ24A	SMAJ24CA	BZ	XZ	24.0	26.7	29.5	1	38.9	10.3	1	✓
SMAJ26A	SMAJ26CA	CE	YE	26.0	28.9	31.9	1	42.1	9.5	1	Pending
SMAJ28A	SMAJ28CA	CG	YG	28.0	31.1	34.4	1	45.4	8.8	1	Pending
SMAJ30A	SMAJ30CA	CK	YK	30.0	33.3	36.8	1	48.4	8.3	1	Pending
SMAJ33A	SMAJ33CA	CM	YM	33.0	36.7	40.6	1	53.3	7.5	1	Pending
SMAJ36A	SMAJ36CA	CP	YP	36.0	40.0	44.2	1	58.1	6.9	1	Pending
SMAJ40A	SMAJ40CA	CR	YR	40.0	44.4	49.1	1	64.5	6.2	1	Pending
SMAJ43A	SMAJ43CA	CT	YT	43.0	47.8	52.8	1	69.4	5.8	1	Pending
SMAJ45A	SMAJ45CA	CV	YV	45.0	50.0	55.3	1	72.7	5.5	1	Pending
SMAJ48A	SMAJ48CA	CX	YX	48.0	53.3	58.9	1	77.4	5.2	1	Pending
SMAJ51A	SMAJ51CA	CZ	YZ	51.0	56.7	62.7	1	82.4	4.9	1	Pending
SMAJ54A	SMAJ54CA	RE	ZE	54.0	60.0	66.3	1	87.1	4.6	1	Pending
SMAJ58A	SMAJ58CA	RG	ZG	58.0	64.4	71.2	1	93.6	4.3	1	Pending
SMAJ60A	SMAJ60CA	RK	ZK	60.0	66.7	73.7	1	96.8	4.1	1	Pending
SMAJ64A	SMAJ64CA	RM	ZM	64.0	71.1	78.6	1	103.0	3.9	1	Pending
SMAJ70A	SMAJ70CA	RP	ZP	70.0	77.8	86.0	1	113.0	3.5	1	Pending
SMAJ75A	SMAJ75CA	RR	ZR	75.0	83.3	92.1	1	121.0	3.3	1	Pending
SMAJ78A	SMAJ78CA	RT	ZT	78.0	86.7	95.8	1	126.0	3.2	1	Pending
SMAJ85A	SMAJ85CA	RV	ZV	85.0	94.4	104.0	1	137.0	2.9	1	Pending
SMAJ90A	SMAJ90CA	RX	ZX	90.0	100.0	111.0	1	146.0	2.7	1	Pending
SMAJ100A	SMAJ100CA	RZ	ZZ	100.0	111.0	123.0	1	162.0	2.5	1	Pending
SMAJ110A	SMAJ110CA	SE	VE	110.0	122.0	135.0	1	177.0	2.3	1	Pending
SMAJ120A	SMAJ120CA	SG	VG	120.0	133.0	147.0	1	193.0	2.1	1	Pending
SMAJ130A	SMAJ130CA	SK	VK	130.0	144.0	159.0	1	209.0	1.9	1	Pending
SMAJ150A	SMAJ150CA	SM	VM	150.0	167.0	185.0	1	243.0	1.6	1	Pending
SMAJ160A	SMAJ160CA	SP	VP	160.0	178.0	197.0	1	259.0	1.5	1	Pending
SMAJ170A	SMAJ170CA	SR	VR	170.0	189.0	209.0	1	275.0	1.5	1	Pending
SMAJ180A	SMAJ180CA	ST	VT	180.0	201.0	222.0	1	292.0	1.4	1	Pending
SMAJ190A	SMAJ190CA	SU	YU	190.0	209.0	243.0	1	308.0	1.3	1	Pending
SMAJ200A	SMAJ200CA	SV	VV	200.0	224.0	247.0	1	324.0	1.2	1	Pending
SMAJ220A	SMAJ220CA	SX	VX	220.0	246.0	272.0	1	356.0	1.1	1	Pending
SMAJ250A	SMAJ250CA	SZ	VZ	250.0	279.0	309.0	1	405.0	1.0	1	Pending
SMAJ300A	SMAJ300CA	TE	UE	300.0	335.0	371.0	1	486.0	0.8	1	Pending
SMAJ350A	SMAJ350CA	TG	UG	350.0	391.0	432.0	1	567.0	0.7	1	Pending
SMAJ400A	SMAJ400CA	TK	UK	400.0	447.0	494.0	1	648.0	0.6	1	Pending
SMAJ440A	SMAJ440CA	TM	UM	440.0	492.0	543.0	1	713.0	0.6	1	Pending

Note:

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

TVS Diode – SMAJ Series

Ratings and Characteristic Curves

Fig 1 - Peak Pulse Power Rating Curve

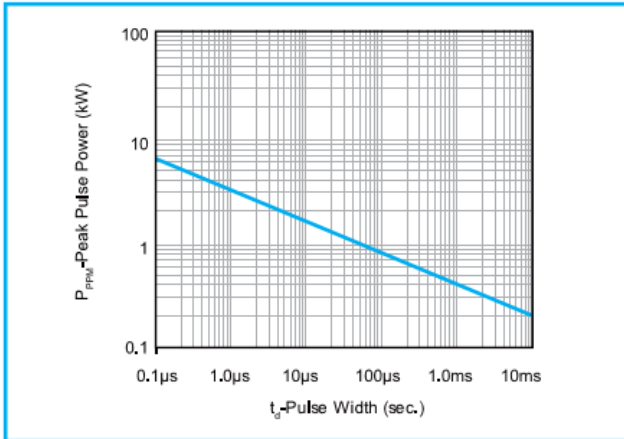


Fig 2 - Pulse Derating Curve

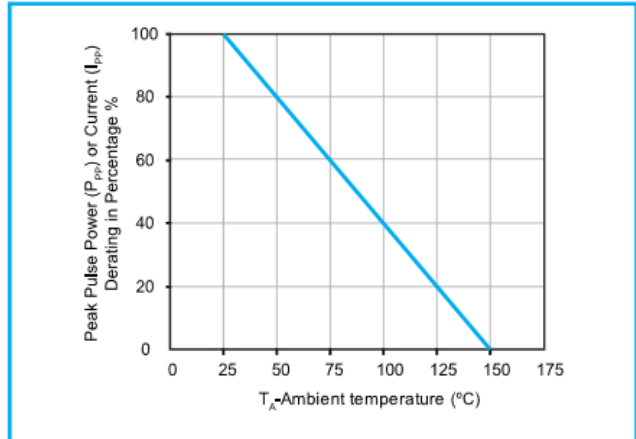


Fig 3 - Pulse Waveform

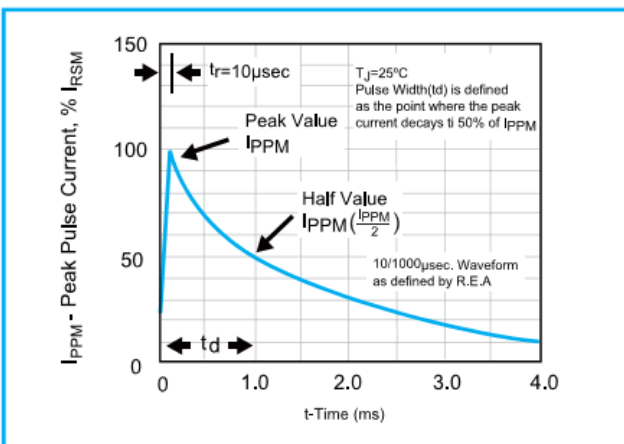


Fig 4 - Typical Junction Capacitance Uni-directional

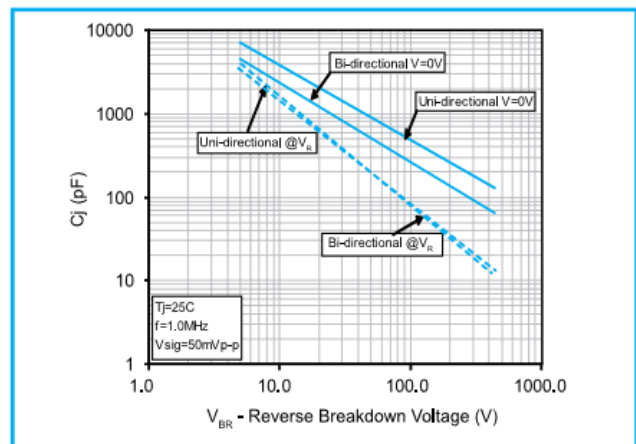


Fig 5 - Steady State Power Dissipation Derating Curve

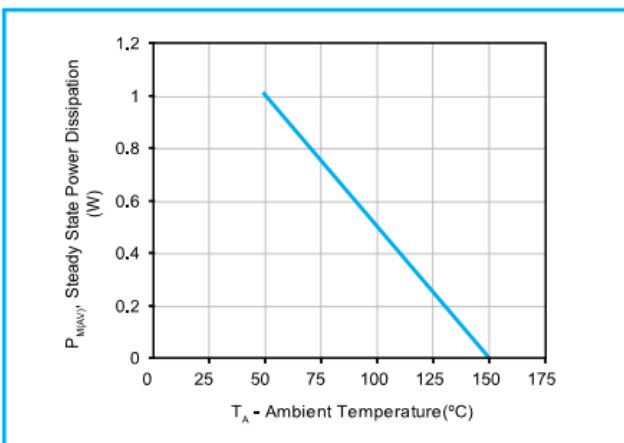
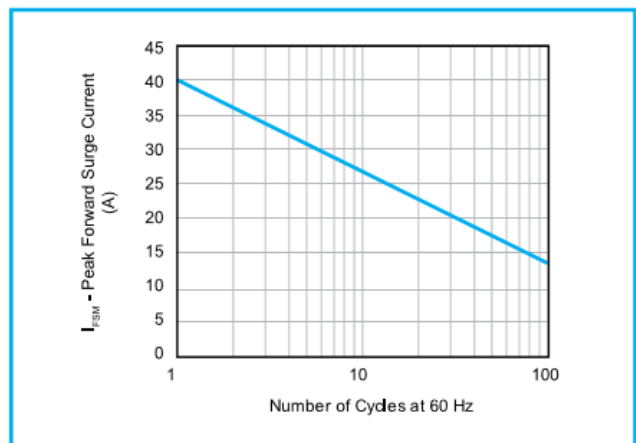
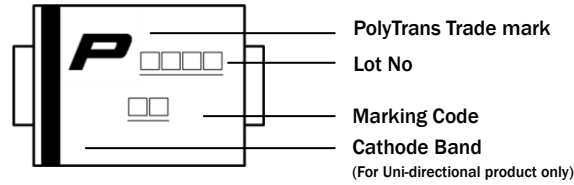


Fig 6 - Maximum Non-Repetitive Forward Surge Current (Uni-directional Only)

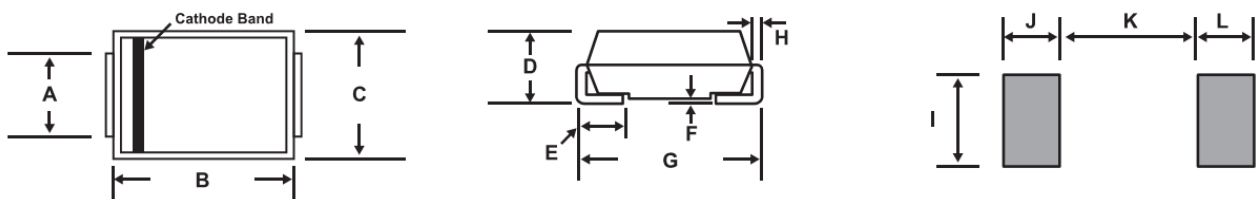


TVS Diode – SMAJ Series

Marking Definitions



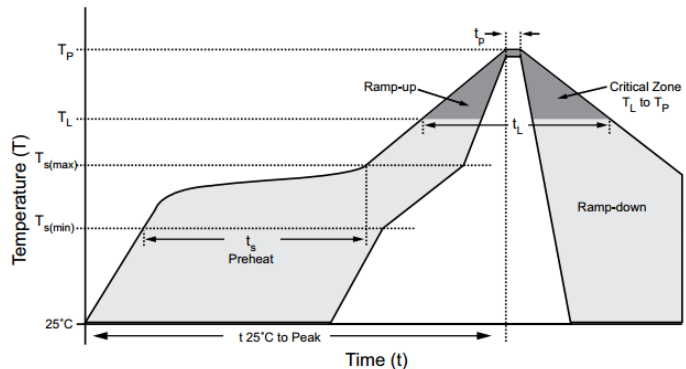
Physical Dimensions



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	0.152	0.305	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.



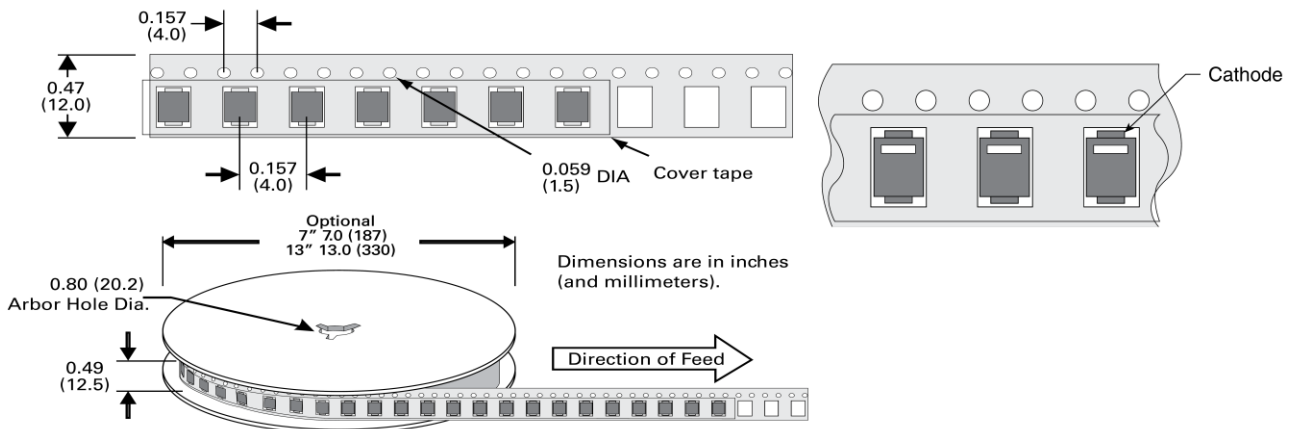
Note: If the soldering temperatures exceed the recommended profile, devices may not meet the performance requirements.

TVS Diode – SMAJ Series

Packaging Information

Part Number	Packaging Code	Component Package	Quantity	Packaging Option	Packaging Specification
SMAJ Series	T13	D0-214AC	5000	Tape & Reel - 12mm tape/13" reel	EIA STD RS-481
SMAJ Series	T7	D0-214AC	2000	Tape & Reel - 12mm tape/7" reel	EIA STD RS-481

Tape and Reel Specifications



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[TP](#) [MMAD1108E3/TR13](#) [D5V0M1U2LP3-7](#) [SMAJ400A-TP](#) [AOZ8811DT-03](#) [AOZ8831DI-05](#) [AOZ8831DT-03](#) [SMAJ188CA](#) [3SMC33CA](#)
[BK](#) [CPDQC3V3C-HF](#) [CPDQC12VE-HF](#) [MPLAD30KP170CA](#) [82357120100](#) [5.0SMLJ15CA-TP](#) [5KP18A-TP](#) [P6KE8.2A-TP](#)
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