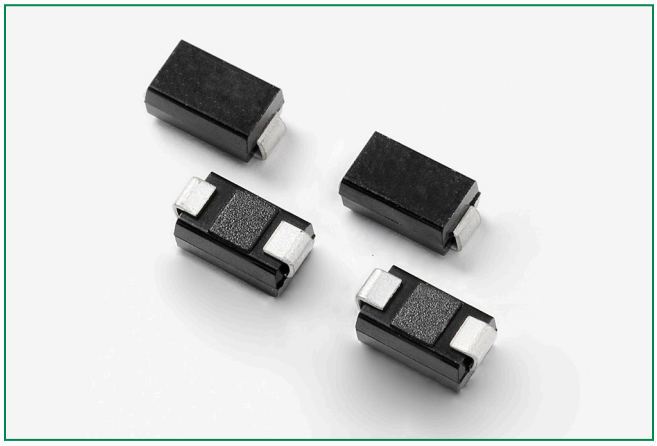
1SMA5.0AT3G Series



Maximum Ratings and Thermal Characteristics

Parameter	Symbol	Value	Unit
Peak Power Dissipation (Note 1) @ T_L = 25°C, Pulse Width = 1 ms	P_{PK}	400	W
DC Power Dissipation @ T_L = 75°C Measured Zero Lead Length (Note 2) Derate Above 75°C Thermal Resistance from Junction to–Lead	PD RJL	1.0 20 50	W mW/°C °C/W
DC Power Dissipation (Note 3) @ TA = 25°C Derate Above 25°C Thermal Resistance from Junction–to–Ambient	P_D R_{0JA}	0.5 4.0 250	W mW/°C °C/W
Forward Surge Current (Note 4) @ TA = 25°C	I_{FSM}	40	A
Operating and Storage Temperature Range	T_J, T_{stg}	-65 to +150	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. 10 X 1000 µs, non–repetitive.
2. 1" square copper pad, FR–4 board.
3. FR–4 board, using Littelfuse minimum recommended footprint, as shown in 403D-02 case outline dimensions spec.
4. 1/2 sine wave (or equivalent square wave), PW = 8.3 ms, duty cycle = 4 pulses per minute maximum.

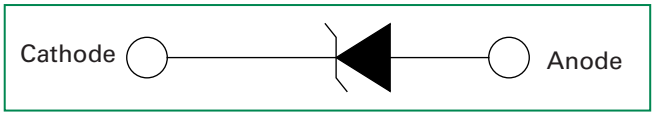
Description

The 1SMA5.0AT3G series is designed to protect voltage sensitive components from high voltage, high energy transients. They have excellent clamping capability, high surge capability, low zener impedance and fast response time. The 1SMA5.0AT3G series is supplied in the Littelfuse exclusive, cost-effective, highly reliable package and is ideally suited for use in communication systems, automotive, numerical controls, process controls, medical equipment, business machines, power supplies and many other industrial/consumer applications.

Features

- Working Peak Reverse Voltage Range – 5.0 V to 78 V
- Standard Zener Breakdown Voltage Range – 6.7 V to 91.25 V
- Peak Power – 400 W @ 1 ms
- ESD Rating of Class 3 (> 16 kV) per Human Body Model
- Response Time is Typically < 1 ns
- Flat Handling Surface for Accurate Placement
- Package Design for Top Slide or Bottom Circuit Board Mounting
- Low Profile Package
- These are Pb–Free Device

Functional Diagram

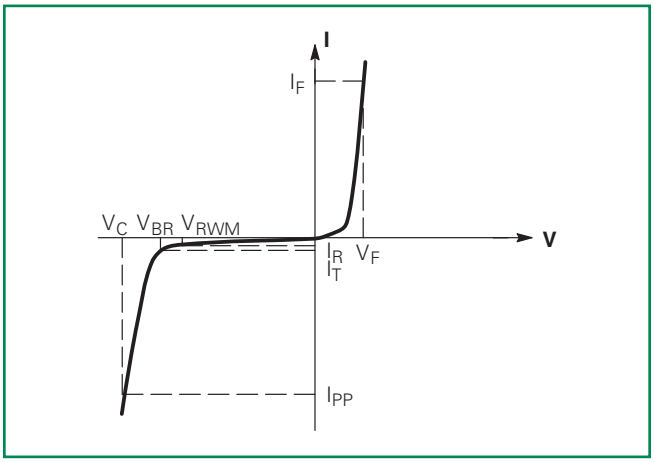


Additional Information

Datasheet | Resources | Samples

Revised: 09/14/17

I-V Curve Characteristics (T_A = 25°C unless otherwise noted, V_F = 3.5 V Max. @ I_F = 30 A for all types) (Note 5)



Symbol	Parameter
I_{PP}	Maximum Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
V_{RWM}	Working Peak Reverse Voltage
I_R	Maximum Reverse Leakage Current @ V_{RWM}
V_{BR}	Breakdown Voltage @ I_T
I_T	Test Current
I_F	Maximum Temperature Coefficient of V_{BR}
V_F	Forward Voltage @ I_F

5. 1/2 sine wave or equivalent, PW = 8.3 ms, non−repetitive duty cycle.

5. 1/2 sine wave or equivalent, PW = 8.3 ms non−repetitive duty cycle

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Electrical Characteristics

Device*	Device Marking	V_{RWM} (Note 6)	I_R @ V_{RWM}	Breakdown Voltage				V_C @ I_{PP} (Note 8)		C Typ. (Note 9)
				V_{BR} @ I_T (V) (Note 7)			@ I_T	V_C	I_{PP}	
		Volts	µA	MIN	NOM	MAX	mA	Volts	Amps	pF
1SMA5.0AT3G	QE	5.0	400	6.4	6.7	7.0	10	9.2	43.5	2035
1SMA6.0AT3G	QG	6.0	400	6.67	7.02	7.37	10	10.3	38.8	1730
1SMA6.5AT3G	QK	6.5	250	7.22	7.6	7.98	10	11.2	35.7	1605
1SMA8.0AT3G	QR	8.0	25	8.89	9.36	9.83	1	13.6	29.4	1035
1SMA8.5AT3G	QT	8.5	5.0	9.44	9.92	10.4	1	14.4	27.8	1265
1SMA9.0AT3G	QV	9.0	2.5	10	10.55	11.1	1	15.4	26.0	1200
1SMA10AT3G	QX	10	2.5	11.1	11.7	12.3	1	17.0	23.5	1090
1SMA11AT3G	QZ	11	2.5	12.2	12.85	13.5	1	18.2	22.0	1000
1SMA12AT3G	RE	12	2.5	13.3	14.0	14.7	1	19.9	20.1	925
1SMA13AT3G	RG	13	2.5	14.4	15.15	15.9	1	21.5	18.6	860
1SMA14AT3G	RH	14	2.5	15.6	16.4	17.2	1	23.2	17.2	800
1SMA15AT3G	RM	15	2.5	16.7	17.6	18.5	1	24.4	16.4	758
1SMA16AT3G	RP	16	2.5	17.8	18.75	19.7	1	26.0	15.4	715
1SMA17AT3G	RR	17	2.5	18.9	19.9	20.9	1	27.6	14.5	680
1SMA18AT3G	RT	18	2.5	20	21.05	22.1	1	29.2	13.7	645
1SMA20AT3G	RV	20	2.5	22.2	23.35	24.5	1	32.4	12.3	585
1SMA22AT3G	RX	22	2.5	24.4	25.65	26.9	1	35.5	11.3	540
1SMA24AT3G	RZ	24	2.5	26.7	28.1	29.5	1	38.9	10.3	500
1SMA26AT3G	SE	26	2.5	28.9	30.4	31.9	1	42.1	9.5	460
1SMA28AT3G	SG	28	2.5	31.1	32.75	34.4	1	45.4	8.8	430
1SMA30AT3G	SK	30	2.5	33.3	35.05	36.8	1	48.4	8.3	405
1SMA33AT3G	SM	33	2.5	36.7	38.65	40.6	1	53.3	7.5	375
1SMA36AT3G	SP	36	2.5	40	42.1	44.2	1	58.1	6.9	345
1SMA40AT3G	SR	40	2.5	44.4	46.75	49.1	1	64.5	6.2	315
1SMA43AT3G	ST	43	2.5	47.8	50.3	52.8	1	69.4	5.8	295
1SMA45AT3G	SV	45	2.5	50	52.65	55.3	1	72.2	5.5	280
1SMA48AT3G	SX	48	2.5	53.3	56.1	58.9	1	77.4	5.2	265
1SMA54AT3G	TE	54	2.5	60	63.15	66.3	1	87.1	4.6	240
1SMA58AT3G	TG	58	2.5	64.4	67.8	71.5	1	93.6	4.3	225
1SMA70AT3G	TP	70	2.5	77.8	81.9	86.0	1	113	3.5	190

6. A transient suppressor is normally selected according to the working peak reverse voltage (V_{RWM}), which should be equal to or greater than the DC or continuous peak operating voltage level.
7. V_{BR} measured at pulse test current I_T at an ambient temperature of 25°C.
8. Surge current waveform per Figure 2 and derate per Figure 3.
9. Bias voltage = 0 V, F = 1.0 MHz, T_J = 25°C.

†Please see 1SMA10CAT3 to 1SMA75CAT3 for Bidirectional devices.

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Ratings and Characteristic Curves

Figure 1. Pulse Rating Curve

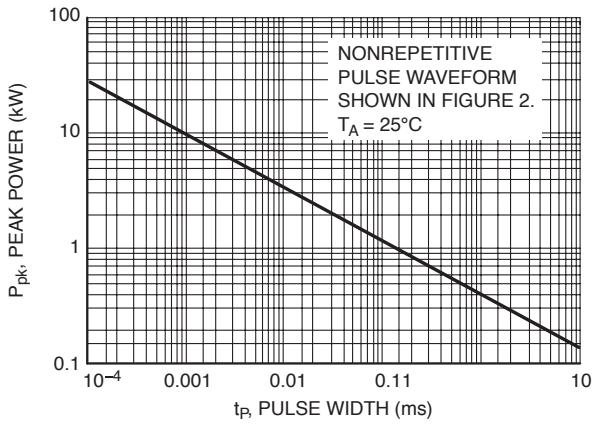


Figure 2. Pulse Waveform

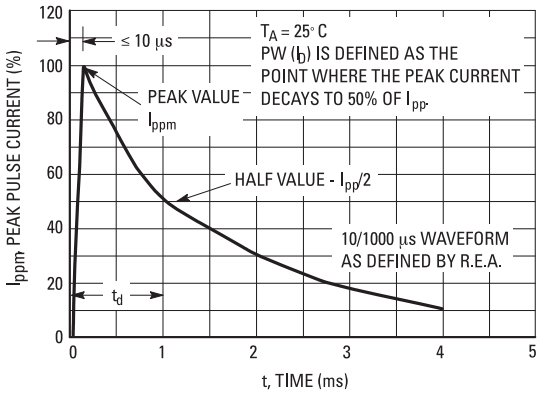


Figure 3 - Pulse Derating Curve

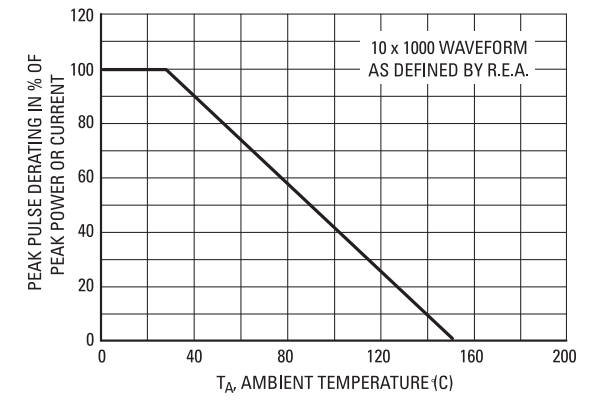


Figure 4. Typical Junction Capacitance vs. Bias Voltage

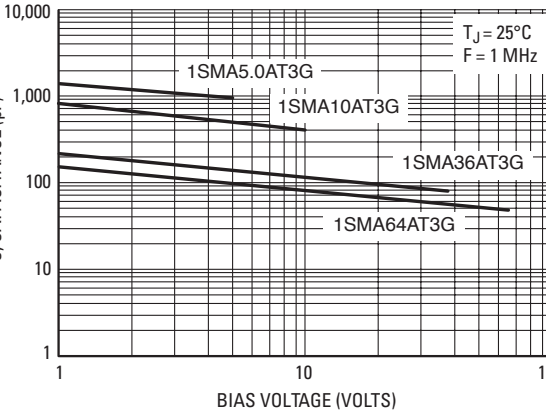
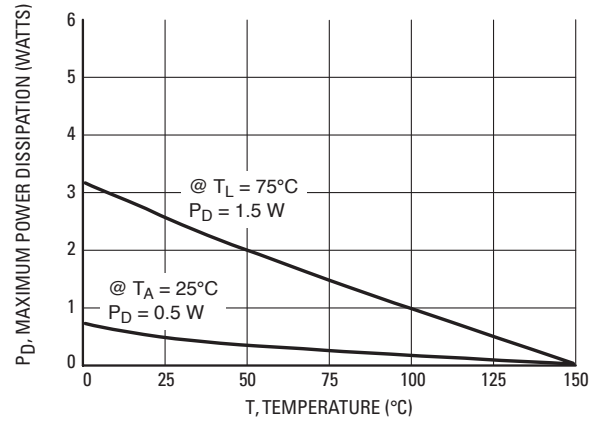


Figure 5. Steady State Power Derating



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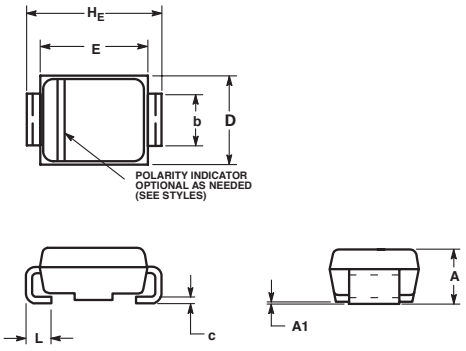
TVS Diodes

Surface Mount > 400W > 1SMA5.0AT3G Series

Dimensions

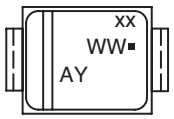


Dim	Inches			Millimeters		
	Min	Nom	Max	Min	Nom	Max
A	0.078	0.083	0.087	1.97	2.10	2.20
A1	0.002	0.004	0.008	0.05	0.10	0.20
b	0.050	0.057	0.064	1.27	1.45	1.63
c	0.006	0.011	0.016	0.15	0.28	0.41
D	0.090	0.103	0.115	2.29	2.60	2.92
E	0.160	0.170	0.180	4.06	4.32	4.57
H_E	0.190	0.205	0.220	4.83	5.21	5.59
L	0.030	0.045	0.060	0.76	1.14	1.52

NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION b SHALL BE MEASURED WITHIN DIMENSION L.

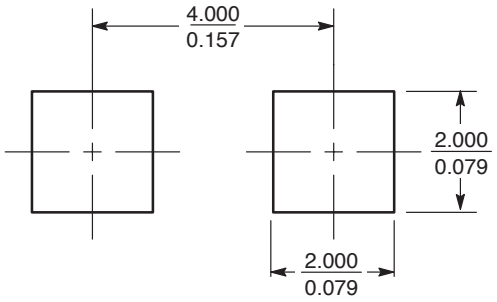
STYLE 1:
PIN 1. CATHODE (POLARITY BAND)
2. ANODE

Part Marking System



xx = Device Code (Refer to page 3)
A= Assembly Location
Y= Year
WW = Work Week
▪ = Pb–Free Package

Soldering Footrpint



SCALE 8:1 (mm / inches)

ORDERING INFORMATION

Device	Package	Shipping†
1SMAxxAT3G	SMA (Pb–Free)	5,000 / Tape & Reel

Flow/Wave Soldering (Solder Dipping)

Peak Temperature :	260°C
Dipping Time :	10 seconds

Physical Specifications

Case	Void-free, transfer-molded, thermosetting plastic
Polarity	Cathode indicated by molded polarity notch
Mounting Position	Any
Finish	All external surfaces are corrosion resistant and leads are readily solderable