1SMA5.0AT3 Series

400 Watt Peak Power Zener Transient Voltage Suppressors

Unidirectional*

The SMA 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 SMA series is supplied in ON Semiconductor's exclusive, cost-effective, highly reliable Surmetic™ 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.

Specification 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
- Pb−Free Packages are Available

Mechanical Characteristics

CASE: Void-free, transfer-molded plastic

FINISH: All external surfaces are corrosion resistant and leads are readily solderable

MAXIMUM CASE TEMPERATURE FOR SOLDERING PURPOSES: 260°C for 10 Seconds

POLARITY: Cathode indicated by molded polarity notch or polarity band

MOUNTING POSITION: Any

ON Semiconductor®

http://onsemi.com

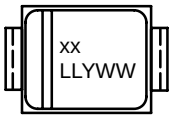
PLASTIC SURFACE MOUNT ZENER OVERVOLTAGE TRANSIENT SUPPRESSORS 5.0 − 78 V, 400 W PEAK POWER





SMA
CASE 403D
PLASTIC

MARKING DIAGRAM



xx = Specific Device Code (See Table on Page 3)
LL = Assembly Location
Y = Year
WW = Work Week

ORDERING INFORMATION

Device	Package	Shipping†
1SMAxxAT3	SMA	5000/Tape & Reel
1SMAxxAT3G	SMA (Pb−Free)	5000/Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

Individual devices are listed on page 3 of this data sheet.

*Please see 1SMA10CAT3 to 1SMA78CAT3 for Bidirectional devices.

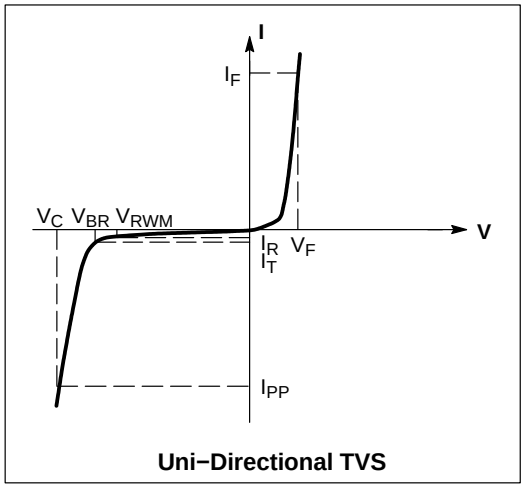
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MAXIMUM RATINGS

Rating	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	P_D $R_{\theta JL}$	1.5 20 50	W mW/°C °C/W
DC Power Dissipation (Note 3) @ T_A = 25°C Derate Above 25°C Thermal Resistance from Junction to Ambient	P_D $R_{\theta JA}$	0.5 4.0 250	W mW/°C °C/W
Forward Surge Current (Note 4) @ T_A = 25°C	I_{FSM}	40	A
Operating and Storage Temperature Range	T_J, T_{stg}	−65 to +150	°C

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, 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 ON Semiconductor minimum recommended footprint, as shown in 403B case outline dimensions spec.
4. 1/2 sine wave (or equivalent square wave), PW = 8.3 ms, duty cycle = 4 pulses per minute maximum.



Uni−Directional TVS

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

ELECTRICAL 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	Forward Current
V_F	Forward Voltage @ I_F

ELECTRICAL CHARACTERISTICS

Device	Device Marking	V_{RWM} (Note 6)	I_R @ V_{RWM}	Breakdown Voltage				V_C @ I_{PP} (Note 8)	
				V_{BR} (Volts) (Note 7)			@ I_T	V_C	I_{PP}
		Volts	μA	Min	Nom	Max	mA	Volts	Amps
1SMA5.0AT3	QE	5.0	400	6.4	6.7	7.0	10	9.2	43.5
1SMA6.0AT3	QG	6.0	400	6.67	7.02	7.37	10	10.3	38.8
1SMA6.5AT3	QK	6.5	250	7.22	7.6	7.98	10	11.2	35.7
1SMA7.0AT3	QM	7.0	250	7.78	8.19	8.6	10	12.0	33.3
1SMA7.5AT3	QP	7.5	50	8.33	8.77	9.21	1	12.9	31.0
1SMA8.0AT3	QR	8.0	25	8.89	9.36	9.83	1	13.6	29.4
1SMA8.5AT3	QT	8.5	5.0	9.44	9.92	10.4	1	14.4	27.8
1SMA9.0AT3	QV	9.0	2.5	10	10.55	11.1	1	15.4	26.0
1SMA10AT3	QX	10	2.5	11.1	11.7	12.3	1	17.0	23.5
1SMA11AT3	QZ	11	2.5	12.2	12.85	13.5	1	18.2	22.0
1SMA12AT3	RE	12	2.5	13.3	14.0	14.7	1	19.9	20.1
1SMA13AT3	RG	13	2.5	14.4	15.15	15.9	1	21.5	18.6
1SMA14AT3	RK	14	2.5	15.6	16.4	17.2	1	23.2	17.2
1SMA15AT3	RM	15	2.5	16.7	17.6	18.5	1	24.4	16.4
1SMA16AT3, G*	RP	16	2.5	17.8	18.75	19.7	1	26.0	15.4
1SMA17AT3	RR	17	2.5	18.9	19.9	20.9	1	27.6	14.5
1SMA18AT3, G*	RT	18	2.5	20	21.05	22.1	1	29.2	13.7
1SMA20AT3	RV	20	2.5	22.2	23.35	24.5	1	32.4	12.3
1SMA22AT3	RX	22	2.5	24.4	25.65	26.9	1	35.5	11.3
1SMA24AT3	RZ	24	2.5	26.7	28.1	29.5	1	38.9	10.3
1SMA26AT3	SE	26	2.5	28.9	30.4	31.9	1	42.1	9.5
1SMA28AT3	SG	28	2.5	31.1	32.75	34.4	1	45.4	8.8
1SMA30AT3	SK	30	2.5	33.3	35.05	36.8	1	48.4	8.3
1SMA33AT3	SM	33	2.5	36.7	38.65	40.6	1	53.3	7.5
1SMA36AT3	SP	36	2.5	40	42.1	44.2	1	58.1	6.9
1SMA40AT3	SR	40	2.5	44.4	46.75	49.1	1	64.5	6.2
1SMA43AT3	ST	43	2.5	47.8	50.3	52.8	1	69.4	5.8
1SMA45AT3	SV	45	2.5	50	52.65	55.3	1	72.2	5.5
1SMA48AT3	SX	48	2.5	53.3	56.1	58.9	1	77.4	5.2
1SMA51AT3	SZ	51	2.5	56.7	59.7	62.7	1	82.4	4.9
1SMA54AT3	TE	54	2.5	60	63.15	66.3	1	87.1	4.6
1SMA58AT3	TG	58	2.5	64.4	67.8	71.5	1	93.6	4.3
1SMA60AT3	TK	60	2.5	66.7	70.2	73.7	1	96.8	4.1
1SMA64AT3	TM	64	2.5	71.1	74.85	78.6	1	103	3.9
1SMA70AT3	TP	70	2.5	77.8	81.9	86.0	1	113	3.5
1SMA75AT3	TR	75	2.5	83.3	87.7	92.1	1	121	3.3
1SMA78AT3	TS	78	2.5	86.7	91.25	95.8	1	126	3.2

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

* The “G” suffix indicates Pb−Free package available.

RATING AND TYPICAL CHARACTERISTIC CURVES

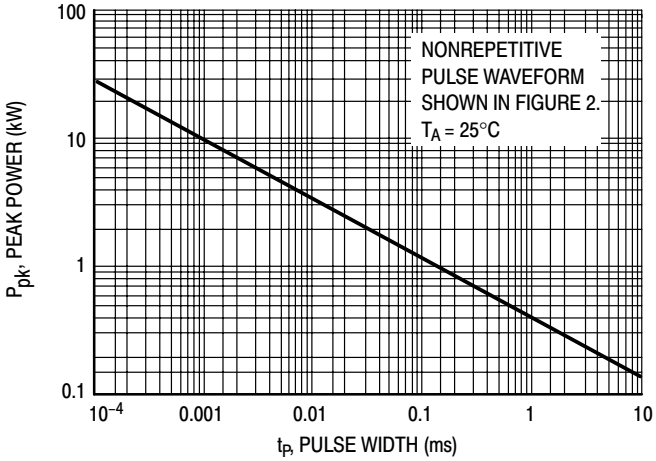


Figure 1. Pulse Rating Curve

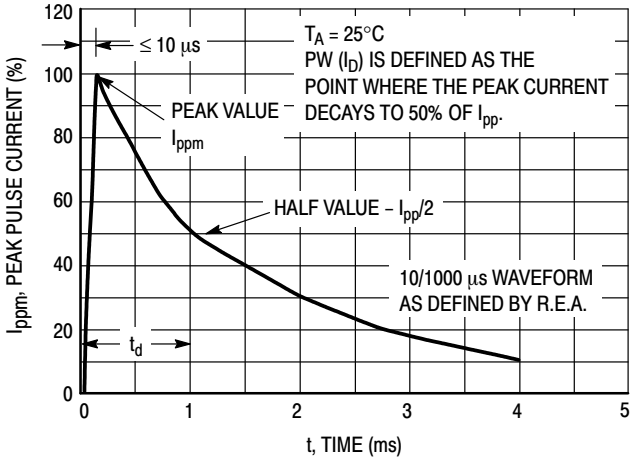


Figure 2. Pulse Waveform

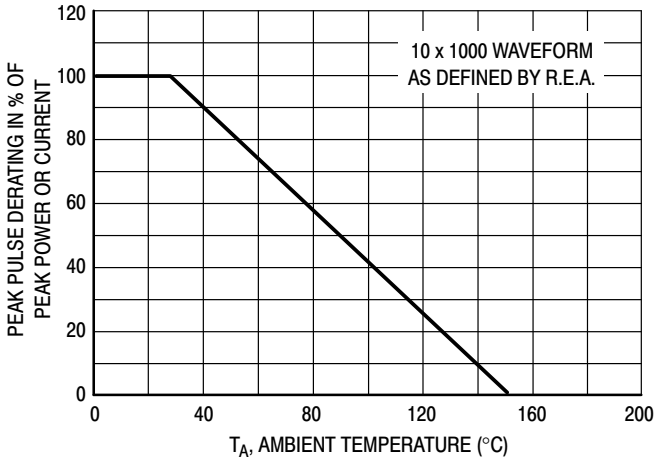


Figure 3. Pulse Derating Curve

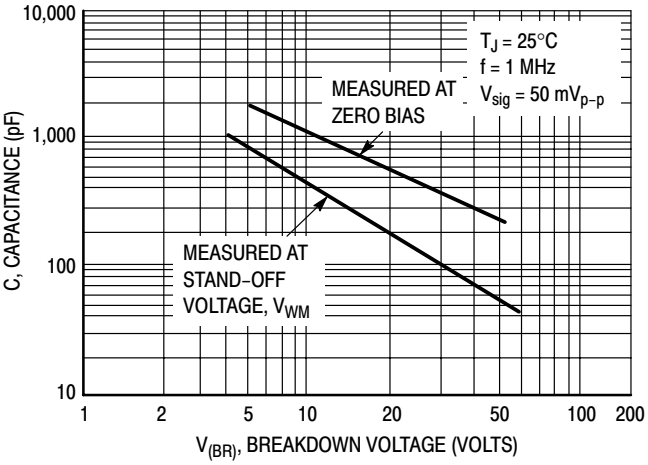


Figure 4. Typical Junction Capacitance

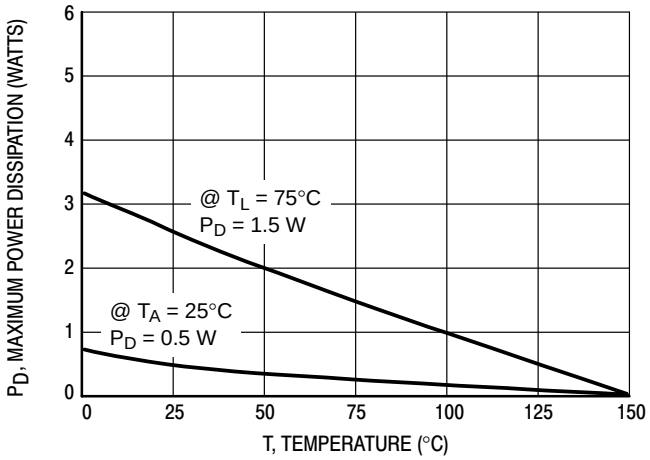
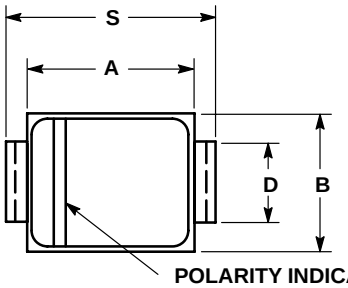


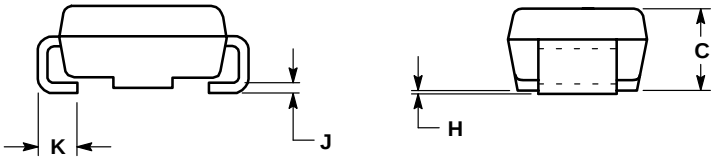
Figure 5. Steady State Power Derating

SMA
CASE 403D−02
ISSUE A

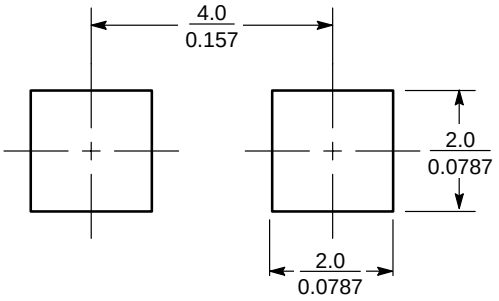


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 403D−01 OBSOLETE, NEW STANDARD IS 403D−02.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.160	0.180	4.06	4.57
B	0.090	0.115	2.29	2.92
C	0.075	0.095	1.91	2.41
D	0.050	0.064	1.27	1.63
H	0.002	0.006	0.05	0.15
J	0.006	0.016	0.15	0.41
K	0.030	0.060	0.76	1.52
S	0.190	0.220	4.83	5.59



SOLDERING FOOTPRINT*



SCALE 8:1 $\left(\frac{mm}{inches}\right)$

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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1SMA5.0AT3/D

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