1.5SMC6.8AT3 Series

1500 Watt Peak Power Zener Transient Voltage Suppressors

Unidirectional*

The SMC 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 SMC 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 − 5.8 to 77.8 V
- Standard Zener Breakdown Voltage Range − 6.8 to 91 V
- Peak Power − 1500 W @ 1.0 ms
- ESD Rating of Class 3 (>16 kV) per Human Body Model
- Maximum Clamp Voltage @ Peak Pulse Current
- Low Leakage < 5.0 μA Above 10 V
- UL 497B for Isolated Loop Circuit Protection
- Maximum Temperature Coefficient Specified
- Response Time is Typically < 1.0 ns
- Pb−Free Packages are Available

Mechanical Characteristics

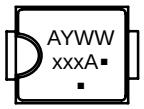
CASE: Void-free, transfer-molded, thermosetting plastic
FINISH: All external surfaces are corrosion resistant and leads are readily solderable
MAXIMUM CASE TEMPERATURE FOR SOLDERING PURPOSES: 260°C for 10 Seconds
LEADS: Modified L−Bend providing more contact area to bond pads
POLARITY: Cathode indicated by molded polarity notch
MOUNTING POSITION: Any

ON Semiconductor®

PLASTIC SURFACE MOUNT ZENER OVERVOLTAGE TRANSIENT SUPPRESSORS 5.8 − 78 VOLTS 1500 WATT PEAK POWER

SMC
CASE 403
PLASTIC

MARKING DIAGRAM



xxxA = Specific Device Code (See Table on Page 3)
A = Assembly Location
Y = Year
WW = Work Week
▪ = Pb−Free Package
(Note: Microdot may be in either location)

ORDERING INFORMATION

Device*	Package	Shipping†
1.5SMCxxxAT3	SMC	2500/Tape & Reel
1.5SMCxxxAT3G	SMC (Pb−Free)	2500/Tape & Reel

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

*The "T3" suffix refers to a 13 inch 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.

**Bidirectional devices will not be available in this series.

Publication Order Number:
1.5SMC6.8AT3/D

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak Power Dissipation (Note 1) @ T_L = 25°C, Pulse Width = 1 ms	P_{PK}	1500	W
DC Power Dissipation @ T_L = 75°C Measured Zero Lead Length (Note 2) Derate Above 75°C Thermal Resistance, Junction−to−Lead	P_D $R_{\theta JL}$	4.0 54.6 18.3	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 $R_{\theta JA}$	0.75 6.1 165	W mW/°C °C/W
Forward Surge Current (Note 4) @ T_A = 25°C	I_{FSM}	200	A
Operating and Storage Temperature Range	T_J, T_{stg}	−65 to +150	°C

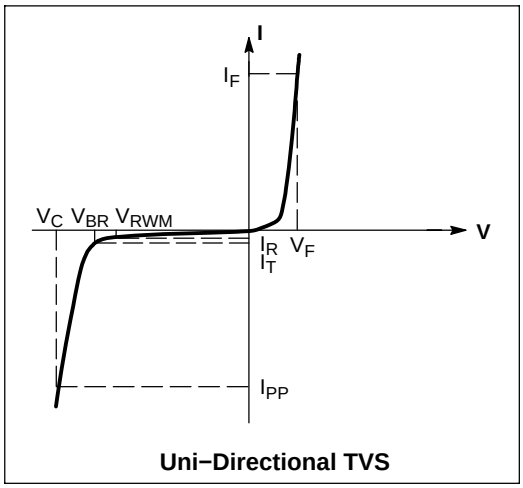
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted, V_F = 3.5 V Max. @ I_F (Note 5) = 100 A)

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
ΘV_{BR}	Maximum Temperature Coefficient of V_{BR}
I_F	Forward Current
V_F	Forward Voltage @ I_F

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



Uni−Directional TVS

ELECTRICAL CHARACTERISTICS (Devices listed in ***bold, italic*** are ON Semiconductor Preferred devices.)

Device*	Device Marking	V_{RWM} (Note 6)	I_R @ V_{RWM}	Breakdown Voltage V_{BR} V (Note 7)			@ I_T	V_C @ I_{PP} (Note 8)		ΘV_{BR}
								V_C	I_{PP}	
		V	μA	Min	Nom	Max	mA	V	A	%/°C
1.5SMC6.8AT3, G	6V8A	5.8	1000	6.45	6.8	7.14	10	10.5	143	0.057
1.5SMC7.5AT3, G	7V5A	6.4	500	7.13	7.5	7.88	10	11.3	132	0.061
1.5SMC8.2AT3, G	8V2A	7.02	200	7.79	8.2	8.61	10	12.1	124	0.065
1.5SMC9.1AT3	9V1A	7.78	50	8.65	9.1	9.55	1	13.4	112	0.068
1.5SMC10AT3	10A	8.55	10	9.5	10	10.5	1	14.5	103	0.073
1.5SMC11AT3	11A	9.4	5	10.5	11	11.6	1	15.6	96	0.075
1.5SMC12AT3, G	12A	10.2	5	11.4	12	12.6	1	16.7	90	0.078
1.5SMC13AT3, G	13A	11.1	5	12.4	13	13.7	1	18.2	82	0.081
1.5SMC15AT3, G	***15A***	***12.8***	***5***	***14.3***	***15***	***15.8***	***1***	***21.2***	***71***	***0.084***
1.5SMC16AT3, G	16A	13.6	5	15.2	16	16.8	1	22.5	67	0.086
1.5SMC18AT3, G	18A	15.3	5	17.1	18	18.9	1	25.2	59.5	0.088
1.5SMC20AT3, G	20A	17.1	5	19	20	21	1	27.7	54	0.09
1.5SMC22AT3, G	22A	18.8	5	20.9	22	23.1	1	30.6	49	0.092
1.5SMC24AT3, G	***24A***	***20.5***	***5***	***22.8***	***24***	***25.2***	***1***	***33.2***	***45***	***0.094***
1.5SMC27AT3, G	27A	23.1	5	25.7	27	28.4	1	37.5	40	0.096
1.5SMC30AT3, G	30A	25.6	5	28.5	30	31.5	1	41.4	36	0.097
1.5SMC33AT3, G	***33A***	***28.2***	***5***	***31.4***	***33***	***34.7***	***1***	***45.7***	***33***	***0.098***
1.5SMC36AT3, G	***36A***	***30.8***	***5***	***34.2***	***36***	***37.8***	***1***	***49.9***	***30***	***0.099***
1.5SMC39AT3, G	***39A***	***33.3***	***5***	***37.1***	***39***	***41***	***1***	***53.9***	***28***	***0.1***
1.5SMC43AT3, G	***43A***	***36.8***	***5***	***40.9***	***43***	***45.2***	***1***	***59.3***	***25.3***	***0.101***
1.5SMC47AT3, G	***47A***	***40.2***	***5***	***44.7***	***47***	***49.4***	***1***	***64.8***	***23.2***	***0.101***
1.5SMC51AT3, G	51A	43.6	5	48.5	51	53.6	1	70.1	21.4	0.102
1.5SMC56AT3, G	56A	47.8	5	53.2	56	58.8	1	77	19.5	0.103
1.5SMC62AT3, G	62A	53	5	58.9	62	65.1	1	85	17.7	0.104
1.5SMC68AT3, G	68A	58.1	5	64.6	68	71.4	1	92	16.3	0.104
1.5SMC75AT3, G	***75A***	***64.1***	***5***	***71.3***	***75***	***78.8***	***1***	***103***	***14.6***	***0.105***
1.5SMC82AT3, G	82A	70.1	5	77.9	82	86.1	1	113	13.3	0.105
1.5SMC91AT3, G	91A	77.8	5	86.5	91	95.5	1	125	12	0.106

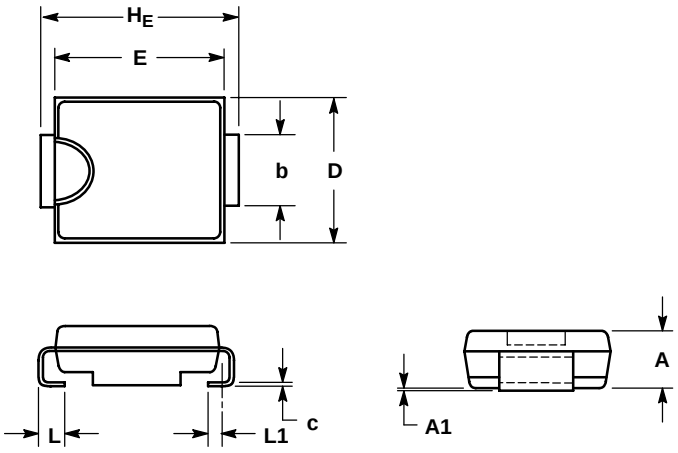
Devices listed in ***bold, italic*** are ON Semiconductor **Preferred** devices. **Preferred** devices are recommended choices for future use and best overall value.

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 of the General Data − 1500 Watt at the beginning of this group.

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

PACKAGE DIMENSIONS

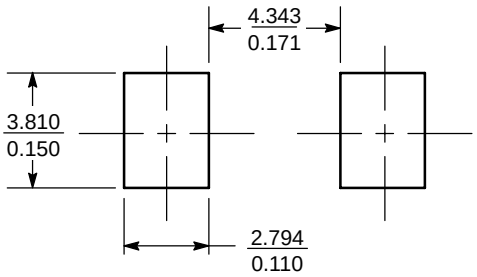
SMC
CASE 403−03
ISSUE E



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. D DIMENSION SHALL BE MEASURED WITHIN DIMENSION P.
4. 403−01 THRU −02 OBSOLETE, NEW STANDARD 403−03.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	1.90	2.13	2.41	0.075	0.084	0.095
A1	0.05	0.10	0.15	0.002	0.004	0.006
b	2.92	3.00	3.07	0.115	0.118	0.121
c	0.15	0.23	0.30	0.006	0.009	0.012
D	5.59	5.84	6.10	0.220	0.230	0.240
E	6.60	6.86	7.11	0.260	0.270	0.280
H_E	7.75	7.94	8.13	0.305	0.313	0.320
L	0.76	1.02	1.27	0.030	0.040	0.050
L1	0.51 REF			0.020 REF		

SOLDERING FOOTPRINT*



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