

### 1.5SMC6.8AT3G



#### Description

The 1.5SMC6.8AT3G 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 1.5SMC6.8AT3G series is supplied in the exclusive, cost-effective, highly reliable Littelfuse 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 – 1500 W @ 1 ms
- ESD Rating of Class 3 (> 16 KV) per Human Body Model
- Maximum Clamp Voltage @ Peak Pulse Current
- Low Leakage < 5  $\mu$ A Above 10 V
- UL 497B for Isolated Loop Circuit Protection
- Maximum Temperature Coefficient Specified
- Response Time is Typically < 1 ns
- Pb-Free Packages are Available

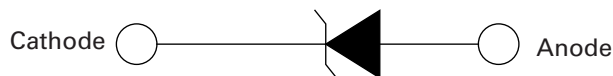
#### Maximum Ratings and Thermal Characteristics

Parameter	Symbol	Value	Unit
Peak Power Dissipation (Note 1) @ $T_L = 25^\circ\text{C}$ , Pulse Width = 1 ms	$P_{PK}$	1500	W
DC Power Dissipation @ $T_L = 75^\circ\text{C}$ Measured Zero Lead Length (Note 2)	$P_D$	4.0	W
Derate Above $75^\circ\text{C}$		54.6	mW/ $^\circ\text{C}$
Thermal Resistance from Junction-to-Lead	$R_{JL}$	18.3	$^\circ\text{C}/\text{W}$
DC Power Dissipation (Note 3) @ $T_A = 25^\circ\text{C}$ Derate Above $25^\circ\text{C}$	$P_D$	0.75	W
Thermal Resistance from Junction-to-Ambient	$R_{\theta JA}$	6.1	mW/ $^\circ\text{C}$
		165	$^\circ\text{C}/\text{W}$
Forward Surge Current (Note 4) @ $T_A = 25^\circ\text{C}$	$I_{FSM}$	200	A
Operating and Storage Temperature Range	$T_J, T_{stg}$	-65 to +150	$^\circ\text{C}$

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  $\mu$ s, non-repetitive.
2. 1 in square copper pad, FR-4 board.
3. FR-4 board, using Littelfuse minimum recommended footprint, as shown in 403-03 case outline dimensions spec.
4. 1/2 sine wave (or equivalent square wave), PW = 8.3 ms, duty cycle = 4 pulses per minute maximum.

#### Functional Diagram



#### Additional Information



**Datasheet**

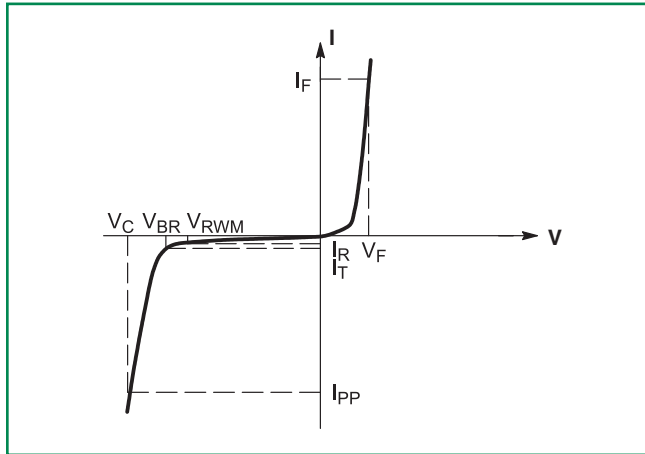


**Resources**



**Samples**

**I-V Curve Characteristics** ( $T_A = 25^\circ\text{C}$  unless otherwise noted,  $V_F = 3.5\text{ V Max @ } I_F = 100\text{ A}$ ) (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 @ $I_F$
$V_F$	Forward Voltage @ $I_F$

5. 1/2 sine wave (or equivalent square wave), PW = 8.3 ms, non-repetitive duty cycle.

### Electrical Characteristics (TA = 25°C unless otherwise noted)

Device*	Device Marking	$V_{RWM}$ (Note 6)	$I_R$ @ $V_{RWM}$	Breakdown Voltage				$V_C$ @ $I_{PP}$ (Note 8)		MV BR
				$V_{BR}$ (V) (Note 7)			@ $I_T$	$V_C$	$I_{PP}$	
		Volts	μA	MIN	NOM	MAX	mA	Volts	Amps	%/ C
1.5SMC6.8AT3G	6V8A	5.8	1000	6.45	6.8	7.14	10	10.5	143	0.057
1.5SMC7.5AT3G	7V5A	6.4	500	7.13	7.5	7.88	10	11.3	132	0.061
1.5SMC8.2AT3G	8V2A	7.02	200	7.79	8.2	8.61	10	12.1	124	0.065
1.5SMC10AT3G	10A	8.55	10	9.5	10	10.5	1	14.5	103	0.073
1.5SMC12AT3G	12A	10.2	5	11.4	12	12.6	1	16.7	90	0.078
1.5SMC13AT3G	13A	11.1	5	12.4	13	13.7	1	18.2	82	0.081
1.5SMC15AT3G	15A	12.8	5	14.3	15	15.8	1	21.2	71	0.084
1.5SMC16AT3G	16A	13.6	5	15.2	16	16.8	1	22.5	67	0.086
1.5SMC18AT3G	18A	15.3	5	17.1	18	18.9	1	25.2	59.5	0.088
1.5SMC20AT3G	20A	17.1	5	19	20	21	1	27.7	54	0.09
1.5SMC22AT3G	22A	18.8	5	20.9	22	23.1	1	30.6	49	0.092
1.5SMC24AT3G	24A	20.5	5	22.8	24	25.2	1	33.2	45	0.094
1.5SMC27AT3G	27A	23.1	5	25.7	27	28.4	1	37.5	40	0.096
1.5SMC30AT3G	30A	25.6	5	28.5	30	31.5	1	41.4	36	0.097
1.5SMC33AT3G	33A	28.2	5	31.4	33	34.7	1	45.7	33	0.098
1.5SMC36AT3G	36A	30.8	5	34.2	36	37.8	1	49.9	30	0.099
1.5SMC39AT3G	39A	33.3	5	37.1	39	41	1	53.9	28	0.1
1.5SMC43AT3G	43A	36.8	5	40.9	43	45.2	1	59.3	25.3	0.101
1.5SMC47AT3G	47A	40.2	5	44.7	47	49.4	1	64.8	23.2	0.101
1.5SMC51AT3G	51A	43.6	5	48.5	51	53.6	1	70.1	21.4	0.102
1.5SMC56AT3G	56A	47.8	5	53.2	56	58.8	1	77	19.5	0.103
1.5SMC62AT3G	62A	53	5	58.9	62	65.1	1	85	17.7	0.104
1.5SMC68AT3G	68A	58.1	5	64.6	68	71.4	1	92	16.3	0.104
1.5SMC75AT3G	75A	64.1	5	71.3	75	78.8	1	103	14.6	0.105
1.5SMC82AT3G	82A	70.1	5	77.9	82	86.1	1	113	13.3	0.105
1.5SMC91AT3G	91A	77.8	5	86.5	91	95.5	1	125	12	0.106

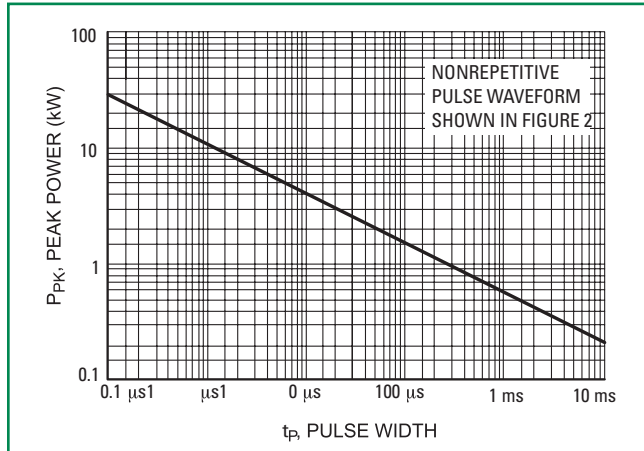
6. A transient suppressor is normally selected according to the maximum working peak reverse voltage ( $V_{RWM}$ ), which should be equal to or greater than the DC or continuous peak operating voltage level.

7.  $V_{BR}$  measured at pulse test current  $I_T$  at an ambient temperature of 25°C.

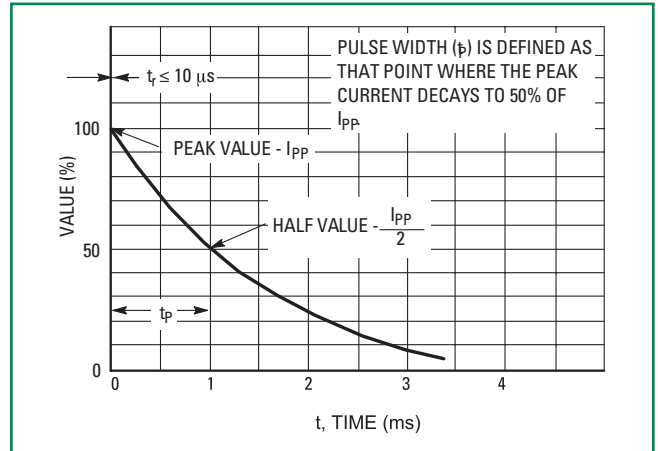
8. Surge current waveform per Figure 2 and derate per Figure 3 of the General Data – 1500 Watt at the beginning of this group.

## Ratings and Characteristic Curves

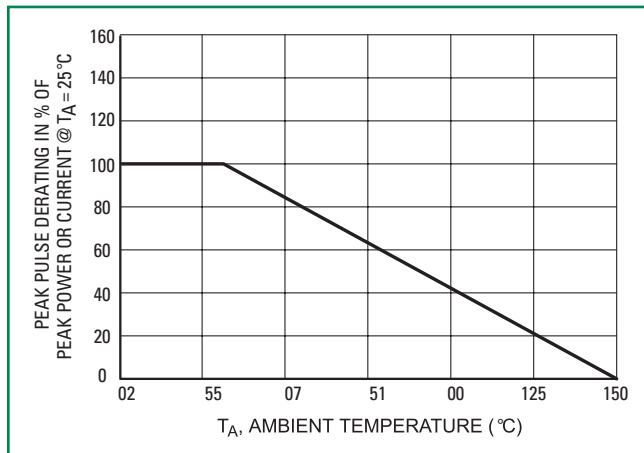
**Figure 1. Pulse Rating Curve**



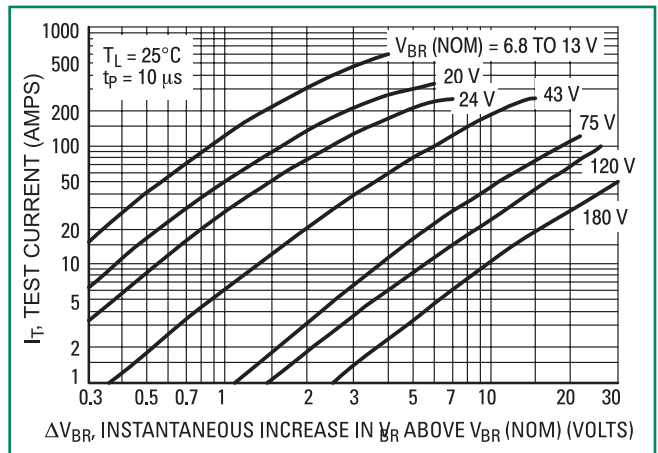
**Figure 2. Pulse Waveform**



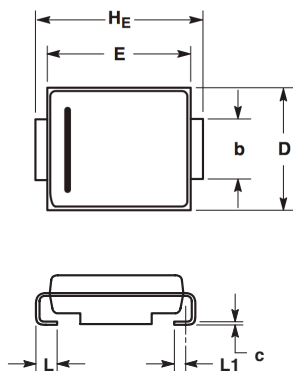
**Figure 3. Pulse Derating Curve**



**Figure 4. Dynamic Impedance**



## Dimensions



Dim	Inches			Millimeters		
	Min	Nom	Max	Min	Nom	Max
A	0.075	0.084	0.095	1.90	2.13	2.41
A1	0.002	0.004	0.006	0.05	0.10	0.15
b	0.115	0.118	0.121	2.92	3.00	3.07
c	0.006	0.009	0.012	0.15	0.23	0.30
D	0.220	0.230	0.240	5.59	5.84	6.10
E	0.260	0.270	0.280	6.60	6.86	7.11
H <sub>E</sub>	0.305	0.313	0.320	7.75	7.94	8.13
L	0.030	0.040	0.050	0.76	1.02	1.27
L1	0.020 REF			0.51 REF		

### 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.

## Part Marking System

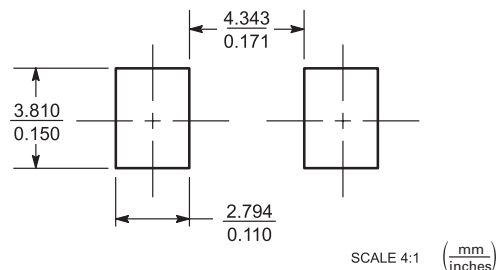


xxxA = Specific Device Code  
(See Table on Page 3)  
A = Assembly Location  
Y = Year  
WW = Work Week  
■ = Pb-Free Package

(Note: Microdot may be in either location)

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

## Soldering Footprint



## ORDERING INFORMATION

Device	Package	Shipping†
1SMCxxAT3G	SMC (Pb-Free)	2,500 / 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 polarity band
Mounting Position	Any
Finish	All external surfaces are corrosion resistant and leads are readily solderable
Leads	Modified L-Bend providing more contact area to bond pads

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