

## SZ1SMC5.0AT3G Series



### 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) @ $T_A = 25^\circ\text{C}$	$P_D$	0.75	W
Derate Above $25^\circ\text{C}$		6.1	mW/ $^\circ\text{C}$
Thermal Resistance from Junction-to-Ambient	$R_{\theta JA}$	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.  $10 \times 1000 \mu\text{s}$ , 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),  $PW = 8.3 \text{ ms}$ , duty cycle = 4 pulses per minute maximum.

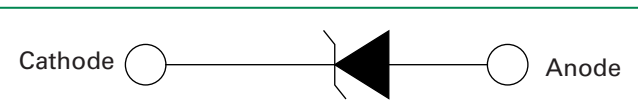
### Description

The SZ1SMC5.0AT3G 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 SZ1SMC5.0AT3G 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 – 1500 W @ 1 ms
- ESD Rating of Class 3 (> 16 KV) per Human Body Model
- Maximum Clamp Voltage @ Peak Pulse Current
- Low Leakage < 5  $\mu\text{A}$  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
- SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable

### Functional Diagram



### Additional Information



Datasheet

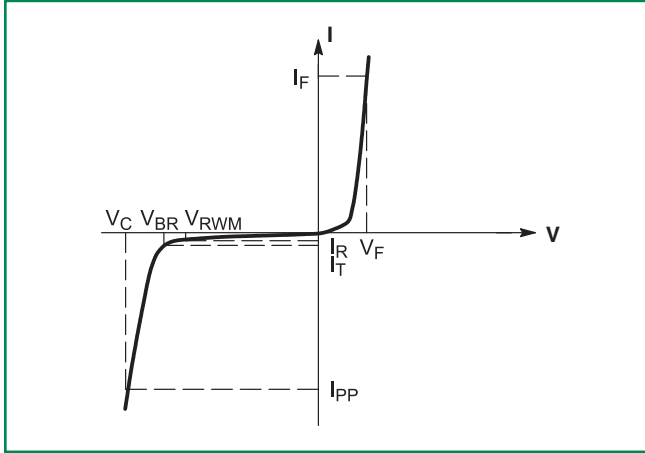


Resources



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 @ $I_F$

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

Device*	Device Marking	V <sub>RWM</sub> (Note 6)	I <sub>R</sub> @ V <sub>RWM</sub>	Breakdown Voltage				V <sub>C</sub> @ I <sub>PP</sub> (Note 8)	
				V <sub>BR</sub> (V) (Note 7)			@ I <sub>T</sub>	V <sub>C</sub>	I <sub>PP</sub>
				Volts	μA	MIN	NOM	MAX	mA
SZ1SMC5.0AT3G	GDE	5.0	1000	6.4	6.7	7.0	10	9.2	163
SZ1SMC6.0AT3G	GDG	6.0	1000	6.67	7.02	7.37	10	10.3	145.6
SZ1SMC6.5AT3G	GDK	6.5	500	7.22	7.6	7.98	10	11.2	133.9
SZ1SMC7.5AT3G	GDP	7.5	100	8.33	8.77	9.21	1	12.9	116.3
SZ1SMC8.0AT3G	GDR	8.0	50	8.89	9.36	9.83	1	13.6	110.3
SZ1SMC9.0AT3G	GDV	9.0	10	10	10.55	11.1	1	15.4	97.4
SZ1SMC10AT3G	GDX	10	5	11.1	11.7	12.3	1	17	88.2
SZ1SMC12AT3G	GEE	12	5	13.3	14	14.7	1	19.9	75.3
SZ1SMC13AT3G	GEG	13	5	14.4	15.15	15.9	1	21.5	69.7
SZ1SMC14AT3G	GEK	14	5	15.6	16.4	17.2	1	23.2	64.7
SZ1SMC15AT3G	GEM	15	5	16.7	17.6	18.5	1	24.4	61.5
SZ1SMC16AT3G	GEP	16	5	17.8	18.75	19.7	1	26	57.7
SZ1SMC17AT3G	GER	17	5	18.9	19.9	20.9	1	27.6	53.3
SZ1SMC18AT3G	GET	18	5	20	21.05	22.1	1	29.2	51.4
SZ1SMC20AT3G	GEV	20	5	22.2	23.35	24.5	1	32.4	46.3
SZ1SMC22AT3G	GEX	22	5	24.4	25.65	26.9	1	35.5	42.2
SZ1SMC24AT3G	GEZ	24	5	26.7	28.1	29.5	1	38.9	38.6
SZ1SMC26AT3G	GFE	26	5	28.9	30.4	31.9	1	42.1	35.6
SZ1SMC28AT3G	GFG	28	5	31.1	32.75	34.4	1	45.4	33
SZ1SMC30AT3G	GFK	30	5	33.3	35.05	36.8	1	48.4	31
SZ1SMC33AT3G	GFM	33	5	36.7	38.65	40.6	1	53.3	28.1
SZ1SMC36AT3G	GFP	36	5	40	42.1	44.2	1	58.1	25.8
SZ1SMC40AT3G	GFR	40	5	44.4	46.75	49.1	1	64.5	32.2
SZ1SMC43AT3G	GFT	43	5	47.8	50.3	52.8	1	69.4	21.6
SZ1SMC48AT3G	GFX	48	5	53.3	56.1	58.9	1	77.4	19.4
SZ1SMC51AT3G	GFZ	51	5	56.7	59.7	62.7	1	82.4	18.2
SZ1SMC54AT3G	GGE	54	5	60	63.15	66.3	1	87.1	17.2
SZ1SMC58AT3G	GGG	58	5	64.4	67.8	71.2	1	93.6	16
SZ1SMC60AT3G	GGK	60	5	66.7	70.2	73.7	1	96.8	15.5
SZ1SMC64AT3G	GGM	64	5	71.1	74.85	78.6	1	103	14.6
SZ1SMC70AT3G	GGP	70	5	77.8	81.9	86	1	113	13.3
SZ1SMC75AT3G	GGR	75	5	83.3	87.7	92.1	1	121	12.4
SZ1SMC78AT3G	GGT	78	5	86.7	91.25	95.8	1	126	11.4

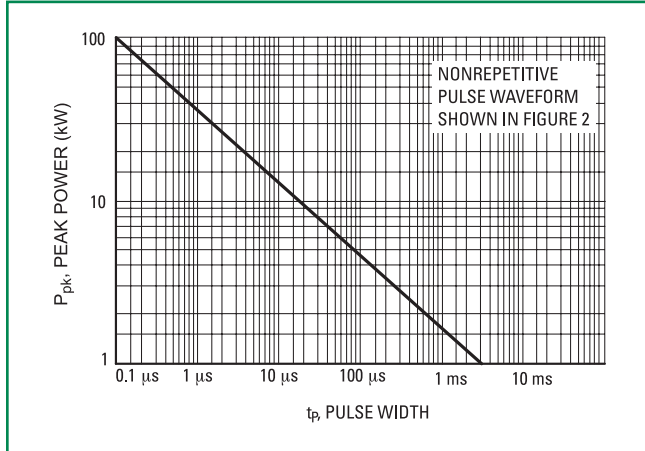
6. A transient suppressor is normally selected according to the maximum working peak reverse voltage (V<sub>RWM</sub>), which should be equal to or greater than the DC or continuous peak operating voltage level.

7. V<sub>BR</sub> measured at pulse test current I<sub>T</sub> at an ambient temperature of 25°C.

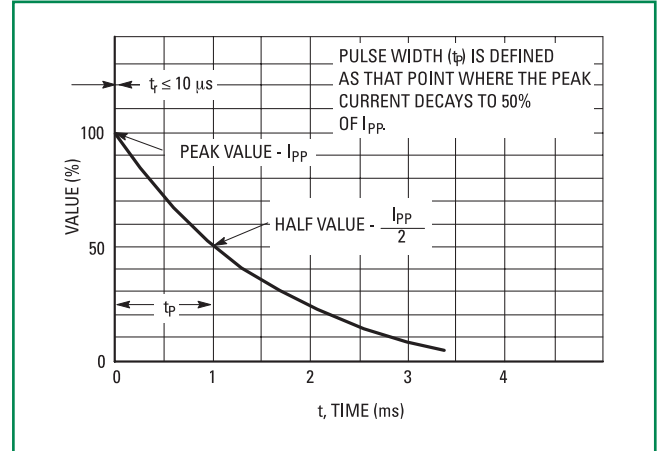
8. Surge current waveform per Figure 2 and derate per Figure 3 of the General Data – 1500 Watt at the beginning of this group.

**Ratings and Characteristic Curves**

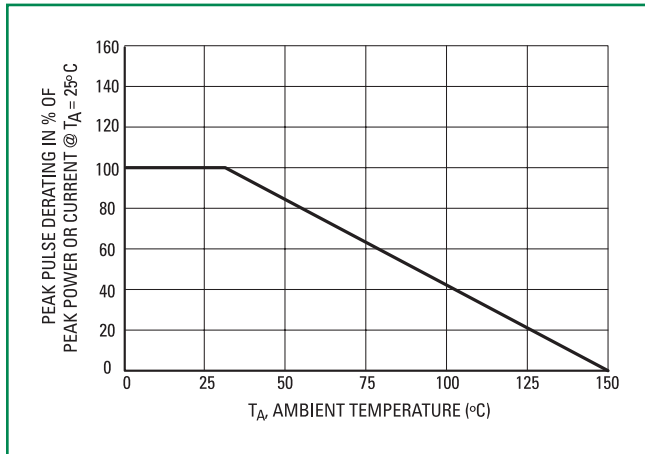
**Figure 1. Pulse Rating Curve**



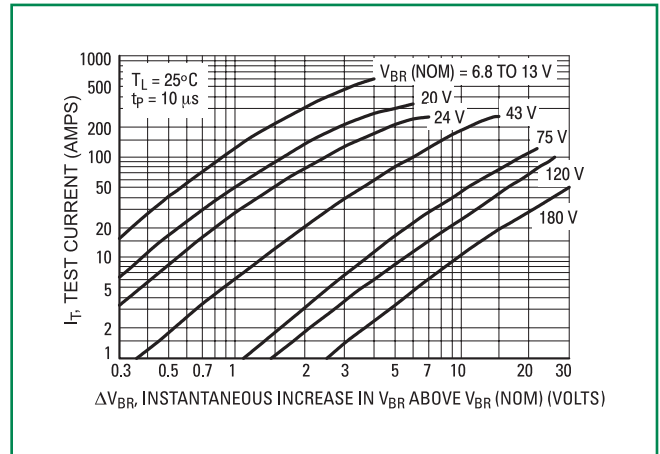
**Figure 2. Pulse Waveform**



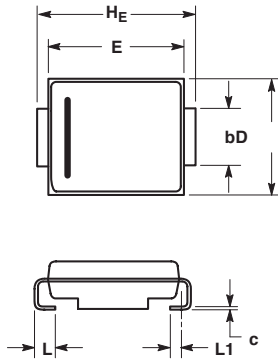
**Figure 3. Pulse Derating Curve**



**Figure 4. Dynamic Impedance**



**Dimensions**

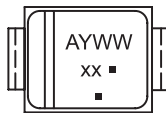


Dim	Inches			Millimeters		
	Min	Nom	Max	Min	Nom	Max
A	0.075	0.084	0.095	1.90	2.13	2.41
A1	0.002	0.004	0.006	0.05	0.10	0.15
b	0.115	0.118	0.121	2.92	3.00	3.07
c	0.006	0.009	0.012	0.15	0.23	0.30
D	0.220	0.230	0.240	5.59	5.84	6.10
E	0.260	0.270	0.280	6.60	6.86	7.11
H <sub>E</sub>	0.305	0.313	0.320	7.75	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**

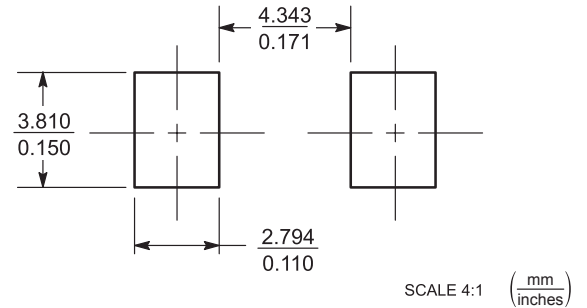


- A = Assembly Location
- Y = Year
- WW = Work Week
- xx = Device Code (Refer to page 3)
- = Pb-Free Package

(Note: Microdot may be in either location)

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

**Soldering Footprint**



**ORDERING INFORMATION**

Device	Package	Shipping†
SZ1SMCxxAT3G	SMC (Pb-Free)	2,500 / Tape & Reel

**Flow/Wave Soldering (Solder Dipping)**

Peak Temperature :	260°C
Dipping Time :	10 seconds

**Physical Specifications**

<b>Case</b>	Void-free, transfer-molded, thermosetting plastic
<b>Polarity</b>	Cathode indicated by polarity band
<b>Mounting Position</b>	Any
<b>Finish</b>	All external surfaces are corrosion resistant and leads are readily solderable
<b>Leads</b>	Modified L-Bend providing more contact area to bond pads