




#### Agency Approvals

AGENCY	AGENCY FILE NUMBER
	E230531

#### Maximum Ratings and Thermal Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation at $T_A=25^\circ\text{C}$ by 10x1000 $\mu\text{s}$ waveform (Fig.1)(Note 1), (Note 2)	$P_{PPM}$	1500	W
Power Dissipation on infinite heat sink at $T_A=50^\circ\text{C}$	$P_{M(AV)}$	6.5	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)	$I_{FSM}$	200	A
Maximum Instantaneous Forward Voltage at 100A for Unidirectional only	$V_F$	3.5	V
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-65 to 150	$^\circ\text{C}$
Typical Thermal Resistance Junction to Lead	$R_{\theta JL}$	15	$^\circ\text{C/W}$
Typical Thermal Resistance Junction to Ambient	$R_{\theta JA}$	75	$^\circ\text{C/W}$

#### Notes:

1. Non-repetitive current pulse, per Fig. 3 and derated above  $T_A = 25^\circ\text{C}$  per Fig. 2.
2. Mounted on copper pad area of 0.31x0.31" (8.0 x 8.0mm) to each terminal.
3. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle=4 per minute maximum.

#### Description

The 1.5SMC Automotive series is designed specifically to protect sensitive automotive electronic equipment from voltage transients.


#### Features

- Halogen-Free
- RoHS compliant
- For surface mounted applications to optimize board space
- Low profile package.
- Built-in strain relief
- Typical maximum temperature coefficient  $\Delta V_{BR} = 0.1\% \times V_{BR}@25^\circ\text{C} \times \Delta T$
- Glass passivated chip junction
- 1500W peak pulse power capability at 10x1000 $\mu\text{s}$  waveform, repetition rate (duty cycles):0.01%
- Fast response time: typically less than 1.0ps from 0V to BV min
- Excellent clamping capability
- Low incremental surge resistance
- Typical  $I_R$  less than 1 $\mu\text{A}$  above 13V
- High Temperature soldering guaranteed: 260 $^\circ\text{C}$ /40 seconds at terminals
- Plastic package has Underwriters Laboratory Flammability 94V-0
- Matte Tin Lead-free Plated

#### Applications

TVS devices are ideal for the protection of I/O Interfaces,  $V_{CC}$  bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications.

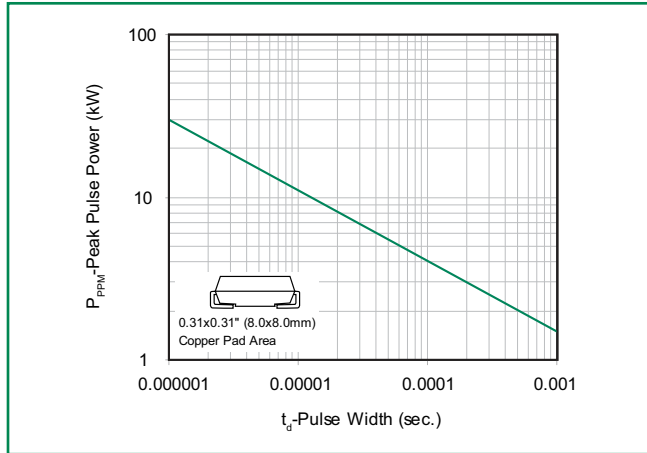
### Electrical Characteristics

Part Number (Uni)	Part Number (Bi)	Marking		Reverse Stand off Voltage $V_R$ (Volts)	Breakdown Voltage $V_{BR}$ (Volts) @ $I_T$		Test Current $I_T$ (mA)	Maximum Clamping Voltage $V_C$ @ $I_{pp}$ (V)	Maximum Peak Pulse Current $I_{pp}$ (A)	Maximum Reverse Leakage $I_R$ @ $V_R$ ( $\mu$ A)	Agency Approval 
		UNI	BI		MIN	MAX					
1.5SMC12AAUTO	1.5SMC12CAAUTO	12AA	12CA	10.20	11.40	12.60	1	16.7	91.0	5	X
1.5SMC13AAUTO	1.5SMC13CAAUTO	13AA	13CA	11.10	12.40	13.70	1	18.2	83.5	1	X
1.5SMC15AAUTO	1.5SMC15CAAUTO	15AA	15CA	12.80	14.30	15.80	1	21.2	71.7	1	X
1.5SMC16AAUTO	1.5SMC16CAAUTO	16AA	16CA	13.60	15.20	16.80	1	22.5	67.6	1	X
1.5SMC18AAUTO	1.5SMC18CAAUTO	18AA	18CA	15.30	17.10	18.90	1	25.2	60.3	1	X
1.5SMC20AAUTO	1.5SMC20CAAUTO	20AA	20CA	17.10	19.00	21.00	1	27.7	54.9	1	X
1.5SMC22AAUTO	1.5SMC22CAAUTO	22AA	22CA	18.80	20.90	23.10	1	30.6	49.7	1	X
1.5SMC24AAUTO	1.5SMC24CAAUTO	24AA	24CA	20.50	22.80	25.20	1	33.2	45.8	1	X
1.5SMC27AAUTO	1.5SMC27CAAUTO	27AA	27CA	23.10	25.70	28.40	1	37.5	40.5	1	X
1.5SMC30AAUTO	1.5SMC30CAAUTO	30AA	30CA	25.60	28.50	31.50	1	41.4	36.7	1	X
1.5SMC33AAUTO	1.5SMC33CAAUTO	33AA	33CA	28.20	31.40	34.70	1	45.7	33.3	1	X
1.5SMC36AAUTO	1.5SMC36CAAUTO	36AA	36CA	30.80	34.20	37.80	1	49.9	30.5	1	X
1.5SMC39AAUTO	1.5SMC39CAAUTO	39AA	39CA	33.30	37.10	41.00	1	53.9	28.2	1	X
1.5SMC43AAUTO	1.5SMC43CAAUTO	43AA	43CA	36.80	40.90	45.20	1	59.3	25.6	1	X
1.5SMC47AAUTO	1.5SMC47CAAUTO	47AA	47CA	40.20	44.70	49.40	1	64.8	23.5	1	X

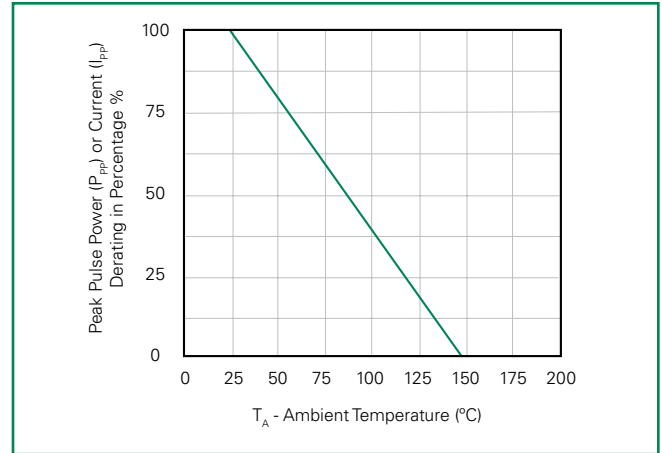
The available parts are "A" type only, the parts without A ( $V_{BR}$  is  $\pm 10\%$ ) is not available.

**Ratings and Characteristic Curves** ( $T_A=25^\circ\text{C}$  unless otherwise noted)

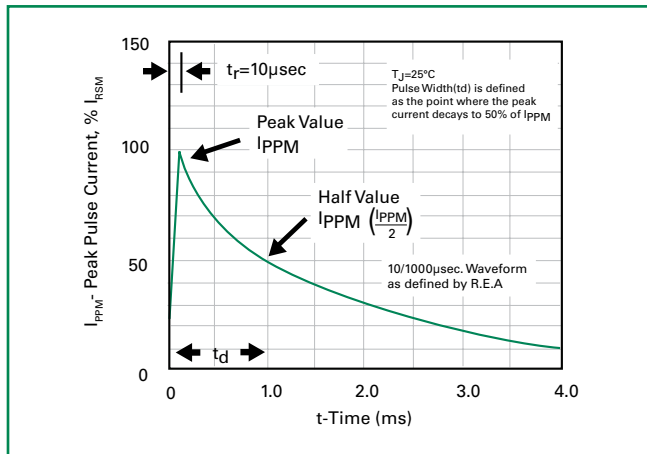
**Figure 1 - Peak Pulse Power Rating**



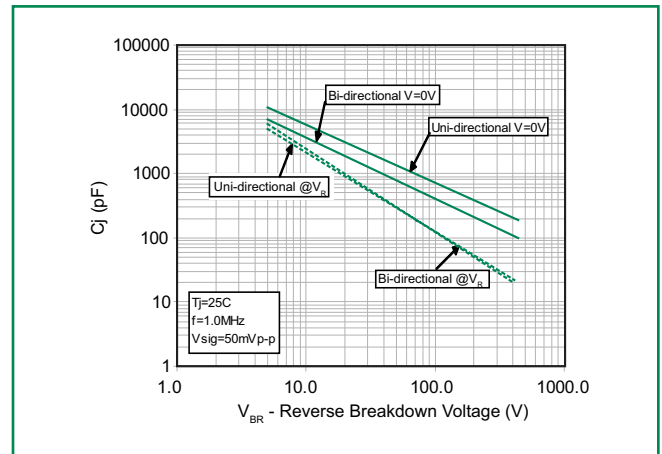
**Figure 2 - Pulse Derating Curve**



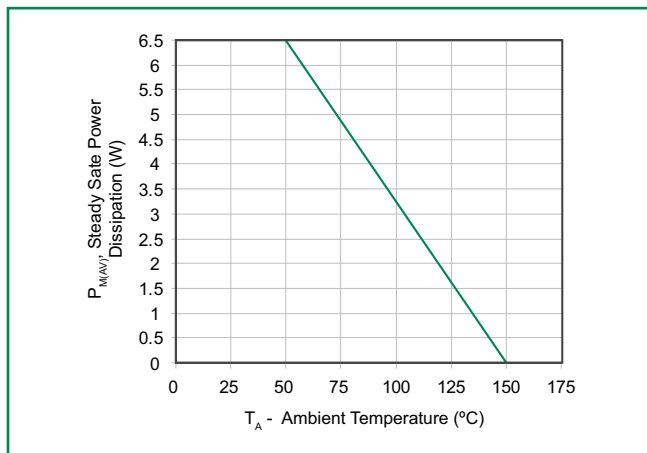
**Figure 3 - Pulse Waveform**



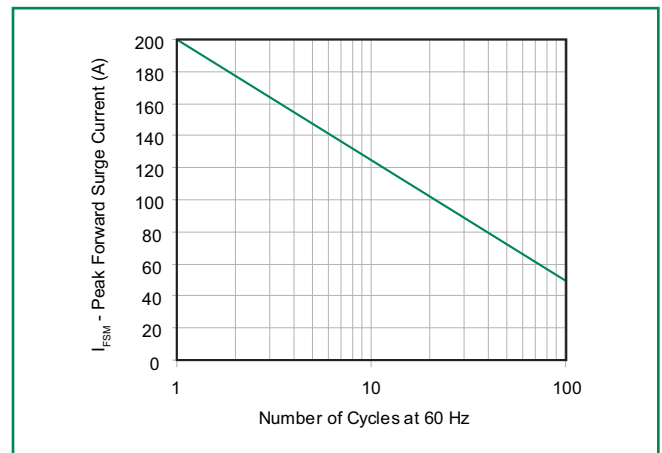
**Figure 4 - Typical Junction Capacitance**



**Figure 5 - Steady State Power Dissipation Derating Curve**

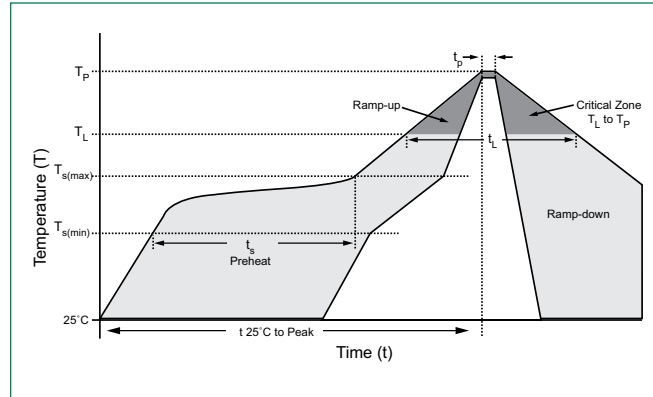


**Figure 6 - Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only**



### Soldering Parameters

Reflow Condition		Lead-free assembly
Pre Heat	- Temperature Min ( $T_{s(min)}$ )	150°C
	- Temperature Max ( $T_{s(max)}$ )	200°C
	- Time (min to max) ( $t_s$ )	60 – 180 secs
Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak)		3°C/second max
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		3°C/second max
Reflow	- Temperature ( $T_L$ ) (Liquidus)	217°C
	- Time (min to max) ( $t_s$ )	60 – 150 seconds
Peak Temperature ( $T_p$ )		260 <sup>+0/-5</sup> °C
Time within 5°C of actual peak Temperature ( $t_p$ )		20 – 40 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature ( $T_p$ )		8 minutes Max.
Do not exceed		280°C



### Physical Specifications

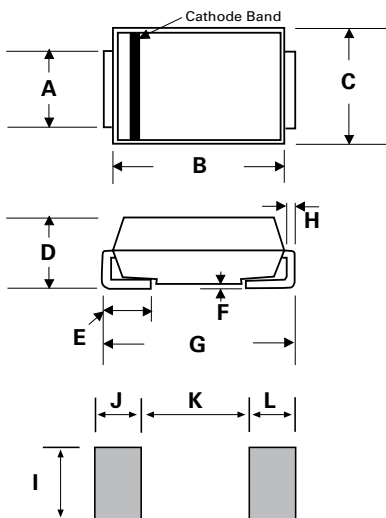
<b>Weight</b>	0.007 ounce, 0.21 grams
<b>Case</b>	JEDEC DO214AB. Molded plastic body over glass passivated junction
<b>Polarity</b>	Color band denotes positive end (cathode) except Bidirectional.
<b>Terminal</b>	Matte Tin-plated leads, Solderable per JESD22-B102D

### Environmental Specifications

<b>Temperature Cycle</b>	JESD22-A104
<b>Pressure Cooker</b>	JESD 22-A102
<b>High Temp. Storage</b>	JESD22-A103
<b>HTRB</b>	JESD22-A108
<b>Thermal Shock</b>	JESD22-A106

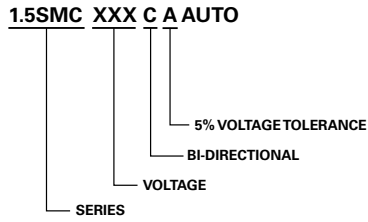
### Dimensions

DO-214AB (SMC J-Bend)

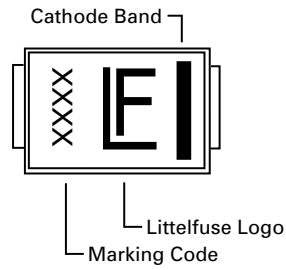


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.114	0.126	2.900	3.200
B	0.260	0.280	6.600	7.110
C	0.220	0.245	5.590	6.220
D	0.079	0.103	2.060	2.620
E	0.030	0.060	0.760	1.520
F	-	0.008	-	0.203
G	0.305	0.320	7.750	8.130
H	0.006	0.012	0.152	0.305
I	0.129	-	3.300	-
J	0.094	-	2.400	-
K	-	0.165	-	4.200
L	0.094	-	2.400	-

### Part Numbering System



### Part Marking System



### Packaging

Part number	Component Package	Quantity	Packaging Option	Packaging Specification
1.5SMCxxxXXAUTO	DO-214AB	3000	Tape & Reel – 16mm/13" tape	EIA STD RS-481

1.5SMC Automotive Series

