SMA6J Series

Agency Approvals

AGENCY	AGENCY FILE NUMBER
®	E230531

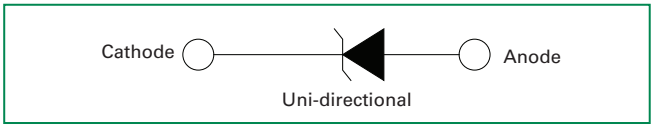
Maximum Ratings and Thermal Characteristics (T_A=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation at T_A=25°C by 10/1000µs Waveform (Fig.2)(Note 1), (Note 2)	P_{PPM}	600	W
Power Dissipation on Infinite Heat Sink at T_A=50°C	$P_{M(AV)}$	3.3	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)	I_{FSM}	60	A
Maximum Instantaneous Forward Voltage at 25A for Unidirectional Only (Note 4)	V_F	3.5V/6.5	V
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C
Typical Thermal Resistance Junction to Lead	R_{uJL}	30	°C/W
Typical Thermal Resistance Junction to Ambient	R_{uJA}	120	°C/W

Notes:

1. Non-repetitive current pulse, per Fig.4 and derated above T_A=25°C per Fig. 3.
2. Mounted on 5.0x5.0mm copper pad to each terminal.
3. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only.
4. V_F < 3.5V for V_{BR} ≤ 200V and V_F< 6.5V for V_{BR} ≥ 201V.

Functional Diagram



Description

The SMA6J series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

Features

- For surface mounted applications to optimize board space
- Low profile package
- Typical failure mode is short from over-specified voltage or current
- Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)
- Built-in strain relief
- Glass passivated junction
- Low inductance
- Excellent clamping capability
- 600W peak pulsepower capability at 10/1000µs waveform, repetition rate (duty cycle): 0.01%
- Fast response time: typically less than 1.0ps from 0 Volts to V_{BR} min
- Typical I_R less than 1µA above 12V
- High temperature soldering: 260°C/40 seconds at terminals
- V_{BR} @T_J= V_{BR}@25°C x (1+ αT x (T_J - 25))
  (αT:Temperature Coefficient)
- Plastic package has underwriters laboratory flammability 94V-O
- Meet MSL level1, per J-STD-020, LF maximun peak of 260°C
- Matte tin lead–free plated
- Halogen free and RoHS compliant
- 2nd level interconnect is Pb-free per IPC/JEDEC J-STD-609A.01

Applications

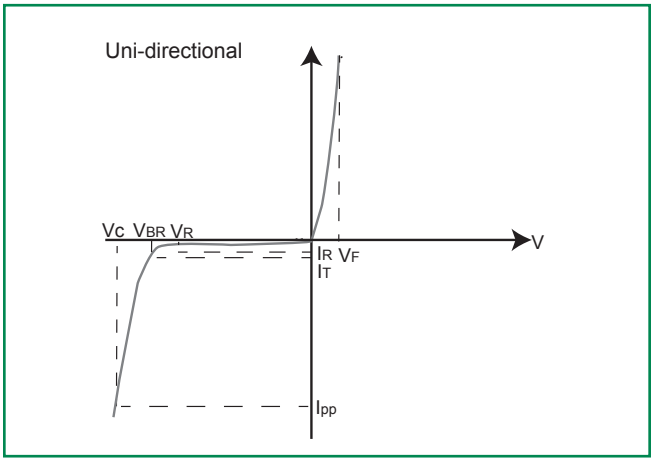
TVS devices are ideal for the protection of I/O Interfaces, V_{CC} bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications.

Revised: 10/09/14

Electrical Characteristics (T_A=25°C unless otherwise noted)

Part Number (Uni)	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 (µA)	Agency Approval
	UNI		MIN	MAX					
SMA6J5.0A	6BA	5.0	6.40	7.00	10	9.2	65.3	800	X
SMA6J12A	6BE	12.0	13.30	14.70	1	19.9	30.2	1.0	X

I-V Curve Characteristics



P_{PPM} Peak Pulse Power Dissipation – Max power dissipation
V_R Stand-off Voltage -- Maximum voltage that can be applied to the TVS without operation
V_{BR} Breakdown Voltage -- Maximum voltage that flows though the TVS at a specified test current (I_T)
V_C Clamping Voltage -- Peak voltage measured across the suppressor at a specified Ippm (peak impulse current)
I_R Reverse Leakage Current -- Current measured at V_R
V_F Forward Voltage Drop for Uni-directional

Ratings and Characteristic Curves (T_A=25°C unless otherwise noted)

Figure 1 - TVS Transients Clamping Waveform

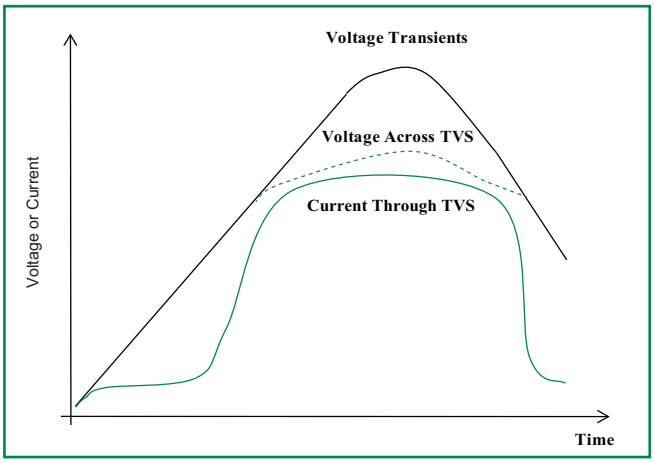
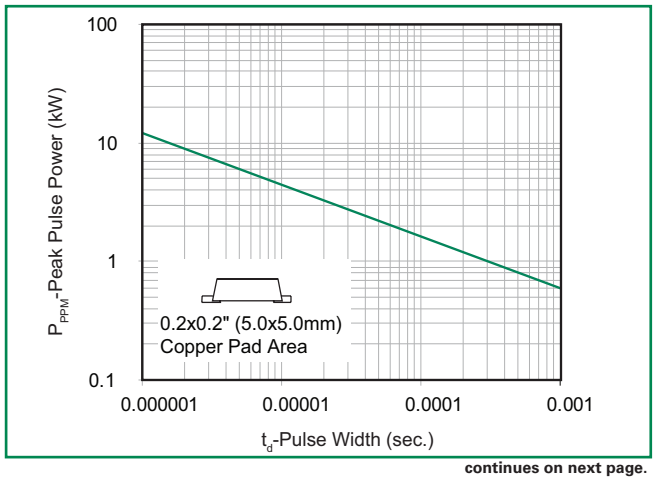


Figure 2 - Peak Pulse Power Rating Curve



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Ratings and Characteristic Curves (T_A=25°C unless otherwise noted) (Continued)

Figure 3 - Pulse Derating Curve

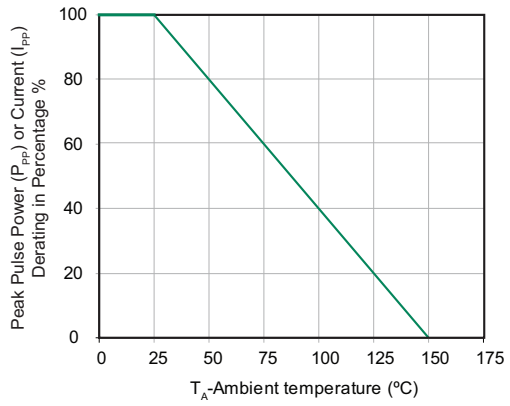


Figure 4 - Pulse Waveform

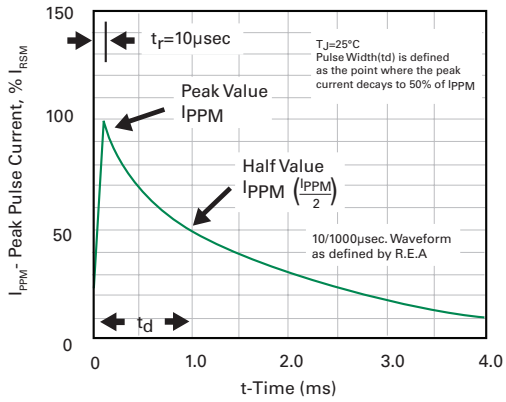


Figure 5 - Typical Junction Capacitance

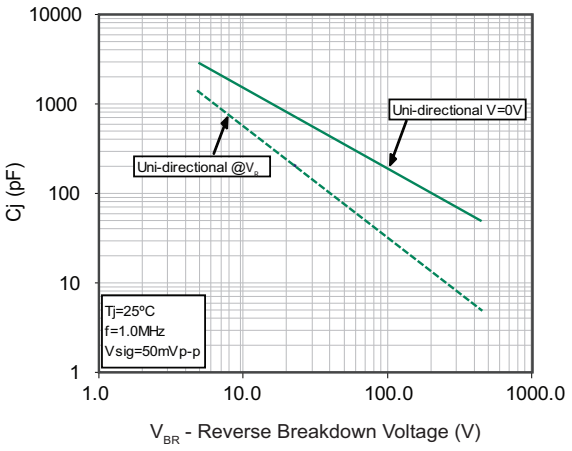


Figure 6 - Steady State Power Dissipation Derating Curve

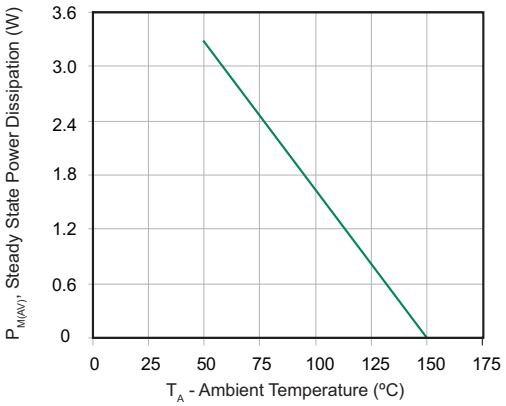
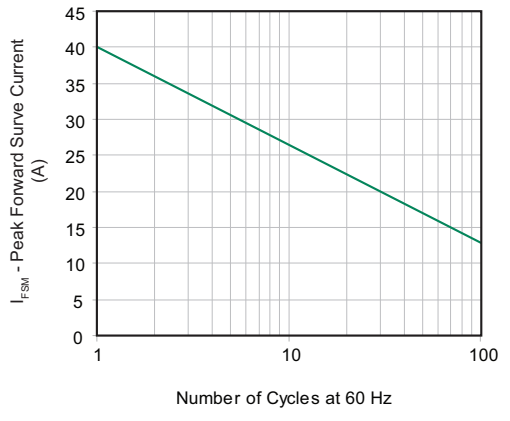
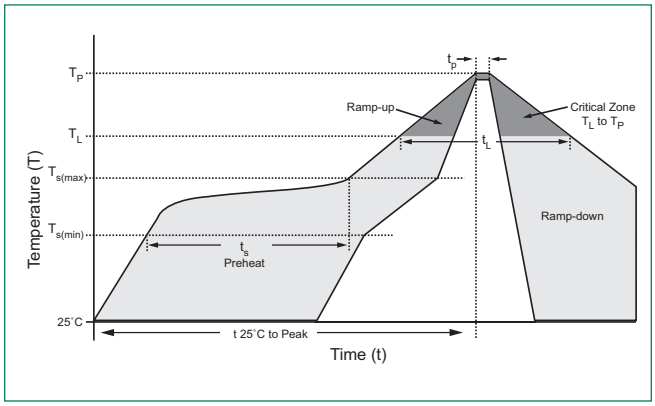


Figure 7 - Maximum Non-Repetitive Forward Surge Current Uni-Directional Only



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)		$260^{+0/-5}$ °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

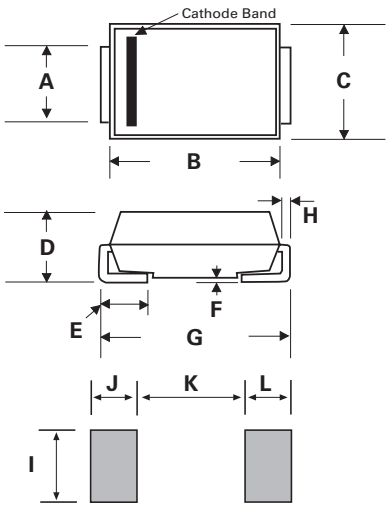
Weight	0.002 ounce, 0.061 gram
Case	JEDEC DO-214AC Molded Plastic over glass passivated junction
Polarity	Color band denotes cathode except Bipolar
Terminal	Matte Tin-plated leads, Solderable per JESD22-B102

Environmental Specifications

High Temp. Storage	JESD22-A103
HTRB	JESD22-A108
Temperature Cycling	JESD22-A104
MSL	JEDEC-J-STD-020, Level 1
H3TRB	JESD22-A101
RSH	JESD22-B106

Dimensions

DO-214AC (SMA)



Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.049	0.065	1.250	1.650
B	0.157	0.177	3.990	4.500
C	0.100	0.110	2.540	2.790
D	0.078	0.090	1.980	2.290
E	0.030	0.060	0.780	1.520
F	-	0.008	-	0.203
G	0.194	0.208	4.930	5.280
H	0.006	0.012	0.152	0.305
I	0.070	-	1.800	-
J	0.082	-	2.100	-
K	-	0.090	-	2.300
L	0.082	-	2.100	-

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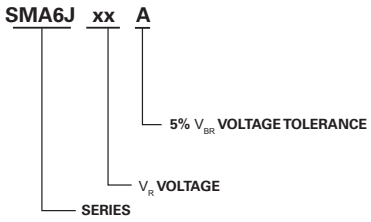
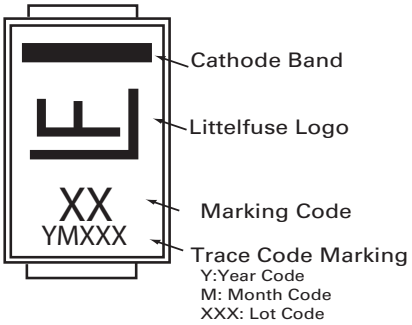
Part Numbering System



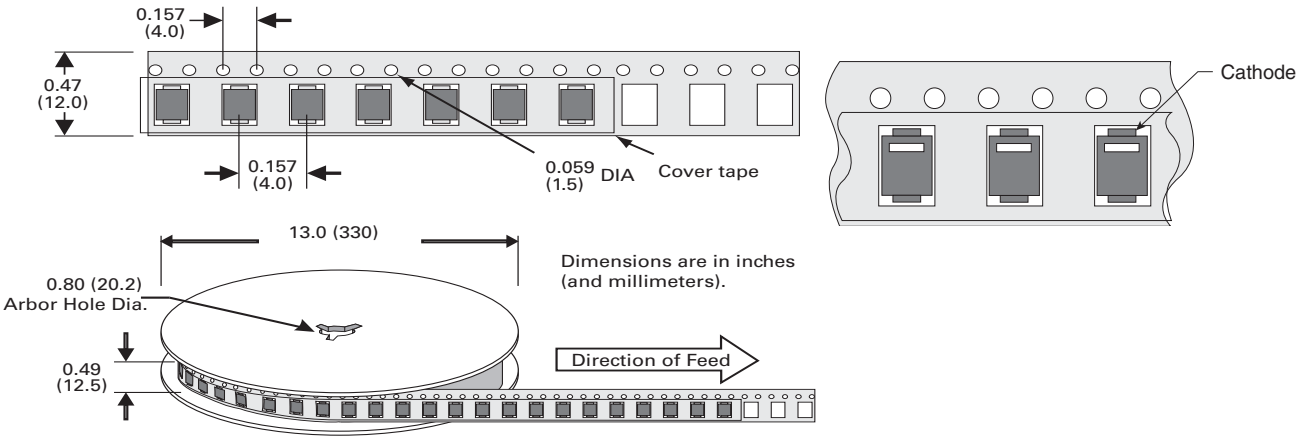
Part Marking System



Packaging

Part number	Component Package	Quantity	Packaging Option	Packaging Specification
SMA6JxxX	DO-214AC	5000	Tape & Reel - 12mm tape/13" reel	EIA RS-481

Tape and Reel Specification



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Littelfuse:

SMA6J12A SMA6J5.0A