5.0SMDJ-FB Series

Surface Mount - Low Clamping Voltage TVS Series - 5000 W

Agency Approvals

Agency	Agency File Number
	E230531

Maximum Ratings & Thermal Characteristics

(T_A = 25 °C unless otherwise noted)

Parameter	Symbol	Value	Unit
Power Dissipation on Infinite Heat Sink at T_L = 50 °C	P_D	6.5	W
Operating Junction Temperature Range	T_J,	-65 to 150	°C
Storage Temperature Range	T_{STG}	-65 to 175	°C
Typical Thermal Resistance Junction to Lead	$R_{\Theta JL}$	15	°C/W
Typical Thermal Resistance Junction to Ambient	$R_{\Theta JA}$	75	°C/W

Description

The 5.0SMDJ-FB is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

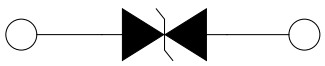
Features

- 5000 W peak pulse power capability at 10/1000 µs waveform, repetition rate (duty cycles): 0.01 %
- SMD low profile surface mount package minimizing PCB footprint
- Foldback technology for superior clamping factor
- Low dynamic resistance
- 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 pass class 1 and class 2
- IEC 61000-4-2 ESD 30 kV(Air), 30 kV(Contact)
- V_{BR} @ T_J = V_{BR}@25 °C x (1+αT x (T_J - 25))(αT:Temperature Coefficient, typical value is 0.1 %)
- Recognized compound meeting flammability rating UL 94 V-0
- Halogen free and RoHS compliant
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin(Sn) (IPC/JEDEC J-STD-609A.01)
- Recognized to UL 497B as an Isolated Loop Circuit Protector

Applications

TVS components 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.

Functional Diagram



Bi-directional

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

Part Number (Bi)	Marking	Reverse Stand off Voltage V_R (V)	Breakdown Voltage V_{BR} (V) @ I_T		Test Current I_T (mA)	Minimum Snapback Voltage V_{SB} (V)	Maximum Clamping Voltage V_C@I_{PP} (10/1000 µs) (V)	Maximum Peak Pulse Current I_{pp} (A)	Maximum Clamping Voltage @ I_{PP} V_C (V) 8/20 µs	Maximum Peak Pulse Current I_{PP} (A) 8/20 µs	Maximum Reverse Leakage I_R @ V_R (µA)	Agency Approval
			Min	Max								
5.0SMDJ58CA-FB	58CF	58	64.4	71.2	1	58	80.0	53.4	80.0	401	5	X
5.0SMDJ60CA-FB	60CF	60	66.7	73.7	1	60	82.2	51.6	82.2	387	5	X
5.0SMDJ64CA-FB	64CF	64	71.1	78.6	1	64	91.4	48.5	91.4	364	5	X

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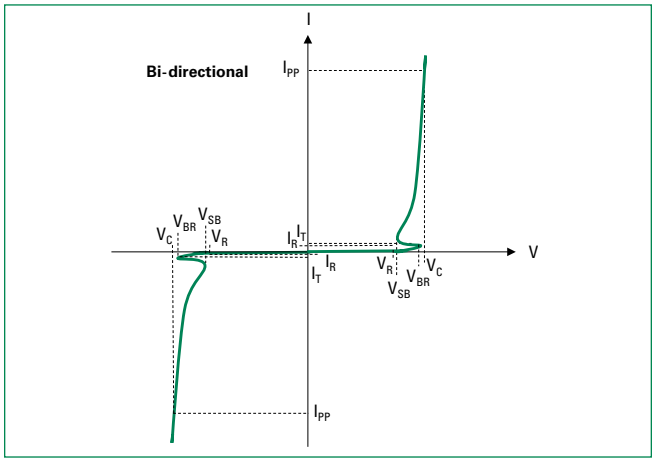
I-V Curve Characteristics



P_{PPM} Peak Pulse Power Dissipation (I_{PP} x V_C) - 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 TVS at a specified I_{PPM} (peak impulse current)
I_R Reverse Leakage Current - Current measured at V_R
V_{SB} Snapback Voltage

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

Figure 1 - Peak Pulse Power Derating Curve

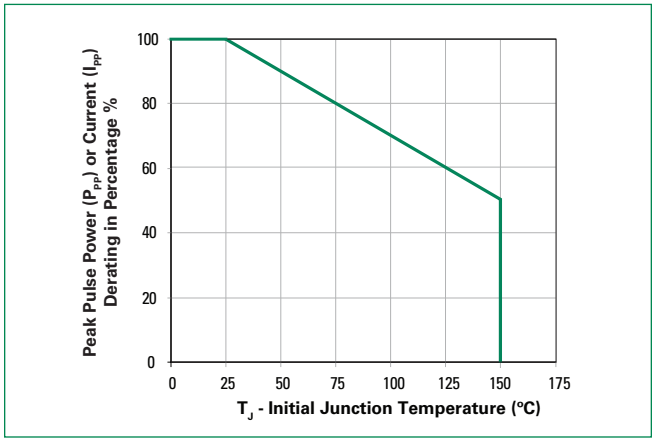


Figure 2 - Typical Power Rating

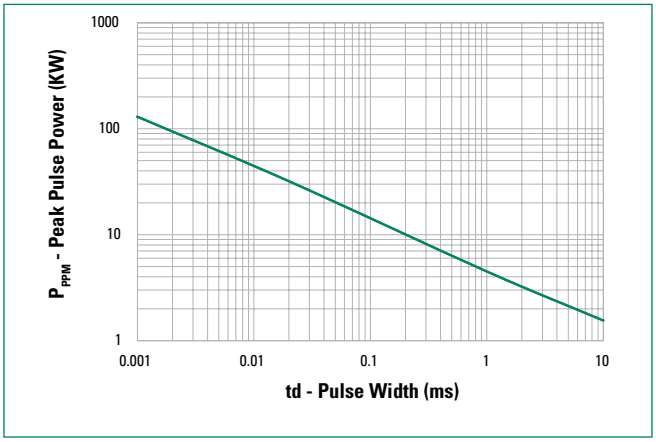


Figure 3 - Pulse Waveform

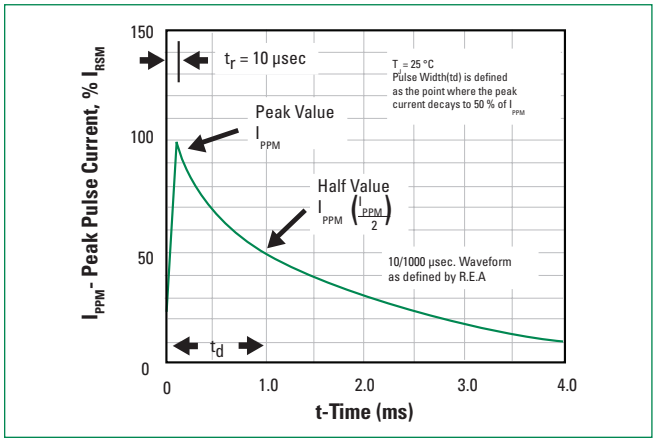
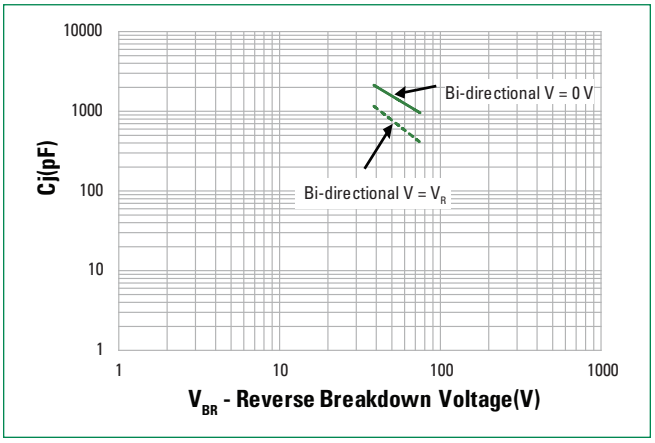


Figure 4: Typical Junction Capacitance



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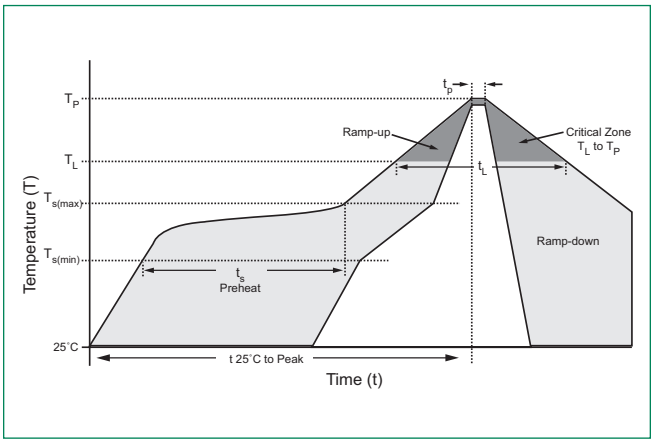
Soldering Parameters

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 – 120 seconds
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)		30 seconds max
Ramp-down Rate		6 °C/second max
Time 25 °C to Peak Temperature (T_p)		8 minutes max
Do Not Exceed		260 °



Physical Specifications

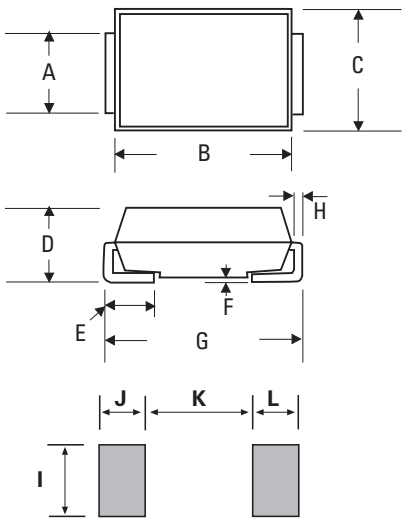
Weight	0.007 ounce, 0.21 grams
Case	JEDEC DO214AB. Molded component over glass passivated junction
Terminal	Matte Tin-plated leads, solderable per JESD22-B102

Environmental Specifications

High Temp Voltage Blocking (HTRB)	100 % DC reverse voltage rated 150 °C, 1008 hours JEDEC, JESD22-A-108
Biased Temp & Humidity (H3TRB)	80 % breakdown voltage (+85 °C) 85 % RH, 1008 hours JEDEC, JESD22-A-101
Unbiased Highly Accelerated Stress Test (UHAST)	96 hours at T_A = 130 °C/85 %RH. JEDEC, JESD22-A-118
Temp Cycling (TC)	-55 °C to +150 °C, 15 min. dwell, 1000 cycles. JEDEC, JESD22-A104
Moisture Sensitivity Level (MSL)	85 % RH, +85 °C, 168 hours, 3 reflow cycles (+260 °C Peak). JEDEC, JEDEC-J-STD-020, Level 1
Resistance to Solder Heat (RSH)	+260 °C, 30 seconds JEDEC, JEDEC JESD22-A-111

Dimensions

DO-214AB (SMC J-Bend)



Recommended Soldering Pad Layout

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	-

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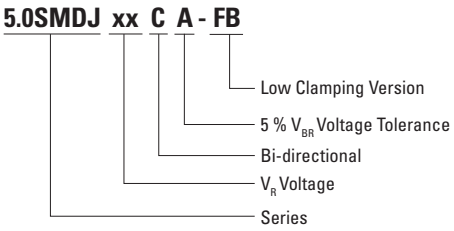
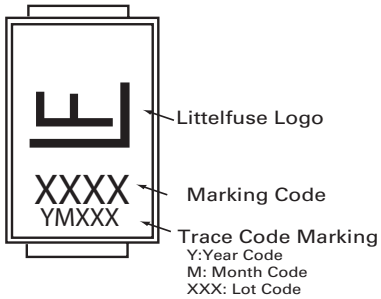
Part Numbering System



Part Marking System



Packaging

Part number	Component Package	Quantity	Packaging Option	Packaging Specification
5.0SMDJxxCA-FB	DO-214AB	3000	Tape & Reel - 16 mm tape/13" reel	EIA STD RS-481

Tape and Reel Specification