

SZSMF3.3

Surface Mount - 200 W



Uni-Directional



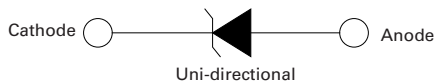
Maximum Ratings and Thermal Characteristics

Rating	Symbol	Value	Unit
Peak Pulse Power Dissipation at $T_A = 25^\circ\text{C}$ by 10/1000 μs (Note 1)	P_{PPM}	200	W
Peak Pulse Power Dissipation at $T_A = 25^\circ\text{C}$ by 8/20 μs (Note 2)	P_{PPM}	1000	W
DC Power Dissipation @ $T_A = 25^\circ\text{C}$ (Note 3) Derate Above 25°C	P_D	1.7	W
		6.6	mW/ $^\circ\text{C}$
Thermal Resistance from Junction-to-Ambient (Note 3)	$R_{\theta JA}$	200	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Lead (Note3)	$R_{\theta JL}$	60	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	T_J, T_{stg}	-55 to +175	$^\circ\text{C}$

Stresses exceeding Maximum Ratings may damage the component. 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 component reliability.

1. Non-repetitive current pulse at $T_A = 25^\circ\text{C}$, per waveform of Figure 3.
2. Non-repetitive current pulse at $T_A = 25^\circ\text{C}$, per waveform of Figure 4.
3. 1/2 sine wave (or equivalent square wave), PW = 8.3 ms, duty cycle = 4 pulses per minute maximum.

Functional Diagram



Description

The SZSMF3.3 is designed to protect sensitive systems or components from high voltage, high energy transients. It offers a fast response time, low Zener impedance, high surge and excellent clamping capabilities. Because of its small size, it is ideal for use in cellular phones, portable devices, business machines, power supplies, industrial and automotive electronics applications.

Features & Benefits

- Zener transient overvoltage suppressors
- Stand-off voltage: 3.3 volts
- Peak power: 200 watts @ 1 ms
- Low leakage
- Response time is typically < 1 ns
- $V_{BR} @ T_J = V_{BR} @ 25^\circ\text{C} \times (1 + \alpha_T \times (T_J - 25))$ (α_T : Temperature Coefficient)
- ESD rating of class 3 (> 16 kV) per human body model
- ESD protection of data lines in accordance with IEC 61000-4-2 30 kV(Air), 30 kV (Contact)
- SOD-123FL low profile package: maximum height of 1.08 mm
- Supplied in 8 mm tape and reel – 3,000 units per reel
- Cathode indicated by polarity band
- Lead orientation in tape: cathode lead to sprocket holes
- These components are Pb-free and are RoHS compliant
- SZ Prefix for automotive and other applications requiring
- Unique site and control change requirements; AEC-Q101 qualified and PPAP capable

Applications

TVS components are ideal for the protection of I/O Interfaces, V_{CC} bus and other vulnerable circuits used in Automotive applications.

Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Part Number	Marking Code	Breakdown Voltage V_{BR} (Volts) @ I_T		Test Current I_T (mA)	Reverse Stand off Voltage V_R (V)	Maximum Reverse Leakage @ V_R I_R (μA)	Maximum Peak Pulse Current (10/1000 μs) I_{PP} (A)	Maximum Clamping Voltage @ I_{PP} (10/1000 μs) V_C (V)	Maximum Peak Pulse Current (8/20 μs) I_{PP} (A)	Maximum Clamping Voltage @ I_{PP} (8/20 μs) V_C (V)	Forward Voltage V_F @ 1mA (V)		Typ. Temp Coefficient of V_{BR} ($10^{-5}/^\circ\text{C}$)
		Min	Max								Min	Max	
SZSMF3.3	A3	3.4	4.3	10	3.3	0.5	30.0	6.8	120.0	10.0	7	16	-5.0

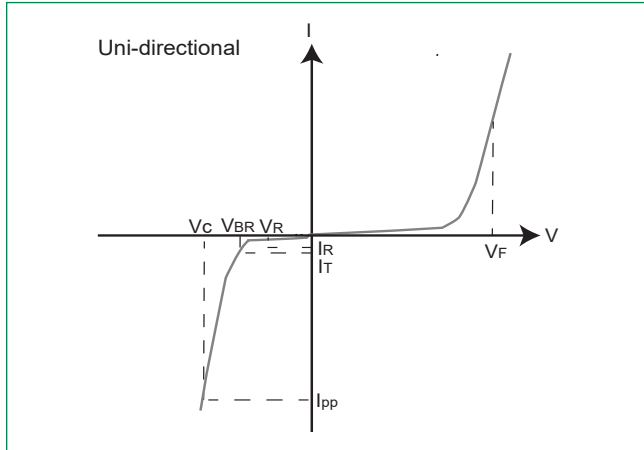
Notes:

1. A transient suppressor is normally selected according to the Working Peak Reverse Voltage (V_{RWM}) which should be equal to or greater than the DC or continuous peak operating voltage level.
2. V_{BR} measured at pulse test current I_T at ambient temperature of 25°C .
3. Surge current waveform per Figure 3,4 and derate per Figure 2.

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I-V Curve Characteristics



- P_{PPM} Peak Pulse Power Dissipation ($I_{pp} \times V_c$)** – 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 through 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_F Forward Voltage Drop for Uni-directional**

Ratings and Characteristic Curves

Figure 1. Pulse Rating Curve

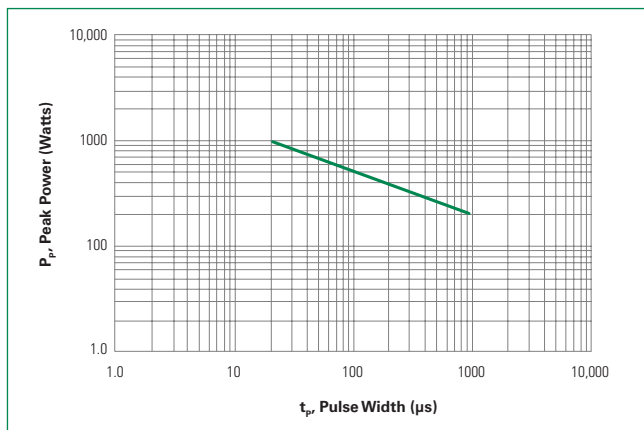


Figure 2. Surge Derating Curve

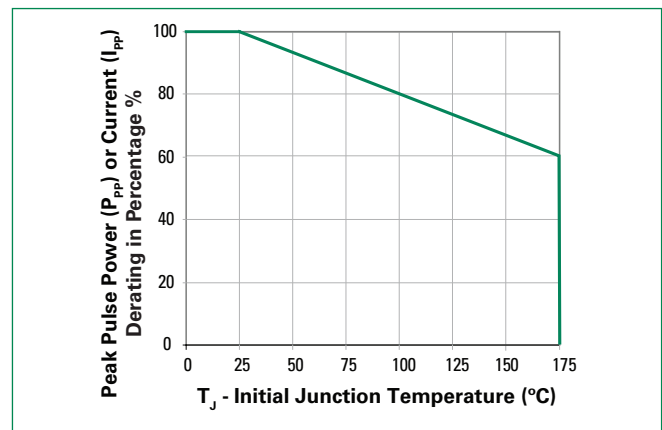


Figure 3 - Pulse Waveform - 10/1000 μs

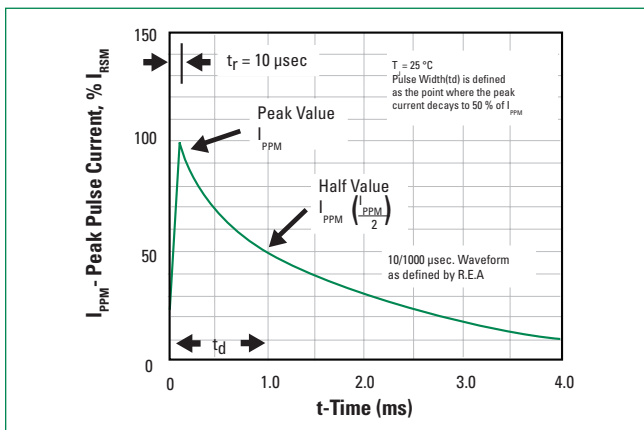
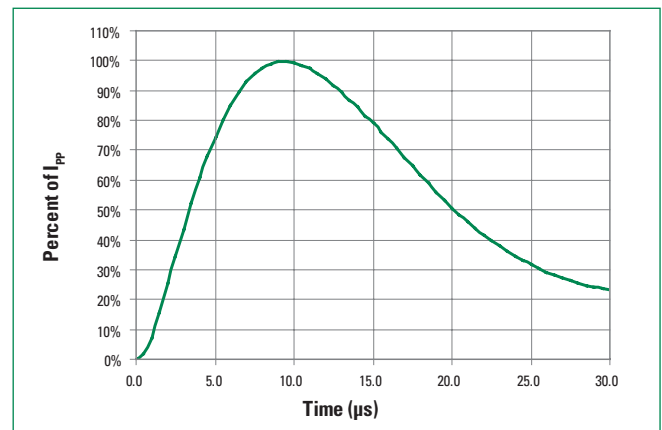


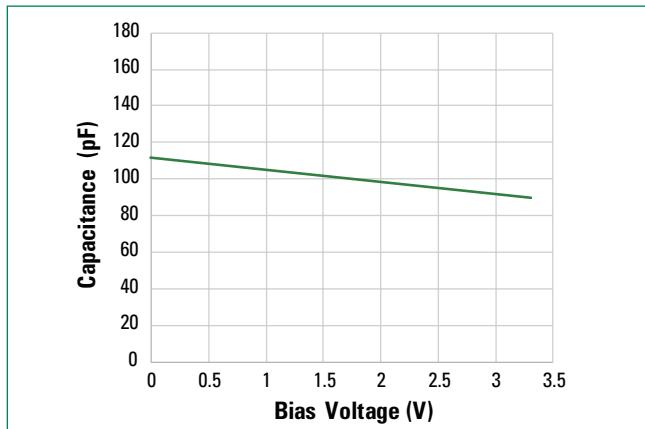
Figure 4 - Pulse Waveform - 8/20 μs



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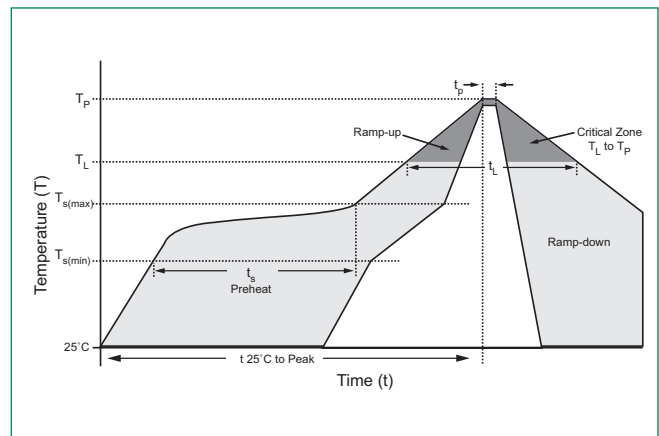
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Figure 5. Capacitance vs. Working Peak Reverse Voltage



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_L)	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 °C



Physical Specifications

Weight	0.004 ounce ,0.0116 grams
Case	JEDEC SOD-123FL. Void-free, transfer-molded, thermosetting plastic epoxy meets UL 94V-0
Polarity	Color band denotes positive end (cathode) except bidirectional
Terminal	Matte Tin-plated leads, solderable per JESD22-B102

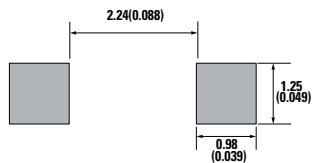
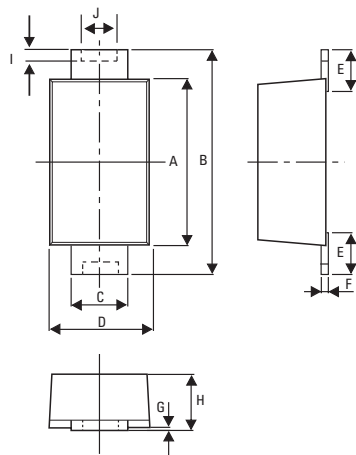
Environmental Specifications

High Temperature Storage	JESD22-A103
HTRB	JESD22-A108
Temperature Cycling	JESD22-A104
MSL	JEDEC-J-STD-020, Level 1
H3TRB	JESD22-A101
RSH	JESD22-A111

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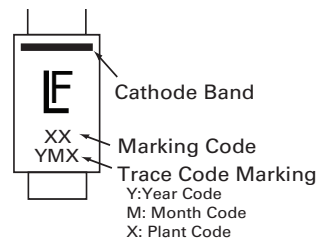
Dimensions



Mounting Pad Layout

Dimensions	Millimeters		Inches	
	Min	Max	Min	Max
A	2.70	3.10	0.106	0.122
B	3.50	3.90	0.138	0.154
C	0.85	1.05	0.033	0.041
D	1.70	2.08	0.067	0.082
E	0.43	0.83	0.017	0.033
F	0.10	0.25	0.004	0.010
G	0.00	0.10	0.000	0.004
H	0.90	1.08	0.035	0.043
I	0.00	0.20	0.000	0.008
J	0.40	0.60	0.016	0.024

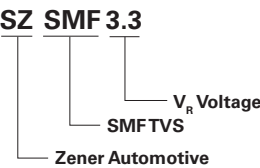
Part Marking System



Ordering Information

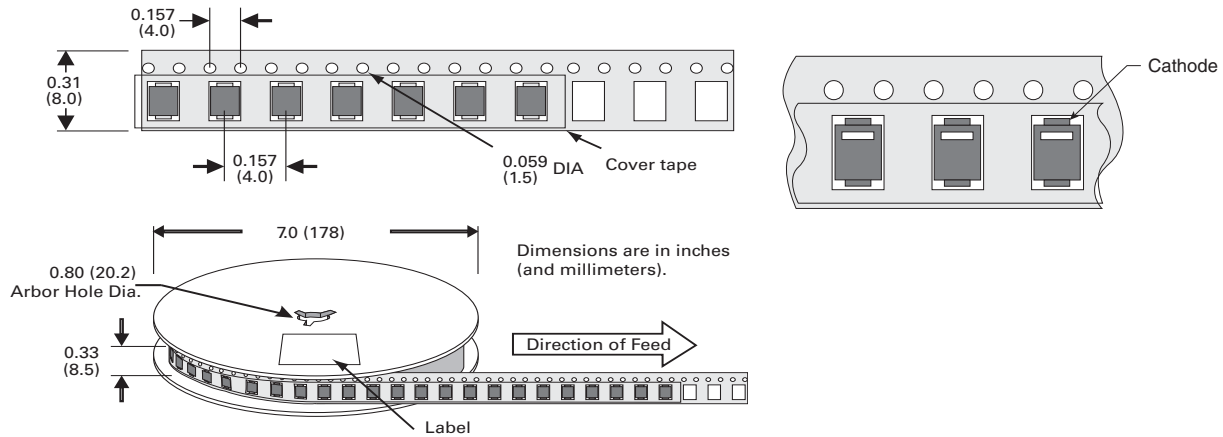
Device	Package	Shipping
SZSMF3.3	SOD-123FL (Pb-Free)	3,000 / Tape & Reel

Part Numbering System



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Tape and Reel Specification

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