

SM8S Series

Surface Mount - SMT0-263 - 7000 W



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 by 10/1000 μs test waveform	P _{PPM}	7000	W
Power dissipation on infinite heatsink at T _C = 25 °C	P _D	8.0	W
Maximum instantaneous forward voltage at 100 A for unidirectional only	V _F	1.8	V
Peak forward surge current 8.3 ms single half sine-wave	I _{FSM}	1000	A
Operating junction and storage temperature range	T _J , T _{STG}	-55 to 175	°C
Typical thermal resistance junction to ambient	R _{θJA}	55	°C/W
Typical thermal resistance junction to case	R _{θJC}	0.9	°C/W

Functional Diagram



Description

The SM8S Series TVS Diode utilizes an SMT0-263 package with lead modifications. It protects sensitive electronics against lightning and inductive load-switching voltage transient events.

Features & Benefits

- 7000 W peak pulse power capability at 10/1000 μs waveform, repetition rate (duty cycles): 0.01 %
- SMT0-263 low-profile, surface-mount package minimizing PCB
- 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 30kV(Air), 30kV (Contact)
- Glass passivated chip junction
- Low dynamic resistance
- $V_{BR} @ T_J = V_{BR} @ 25^\circ C \times (1 + \alpha_T \times (T_J - 25))$ (α_T: Temperature Coefficient, typical value is 0.1 %)
- UL recognized compound meeting flammability rating 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, VCC bus and other vulnerable circuits used in telecom, computer, industrial and consumer electronic applications.

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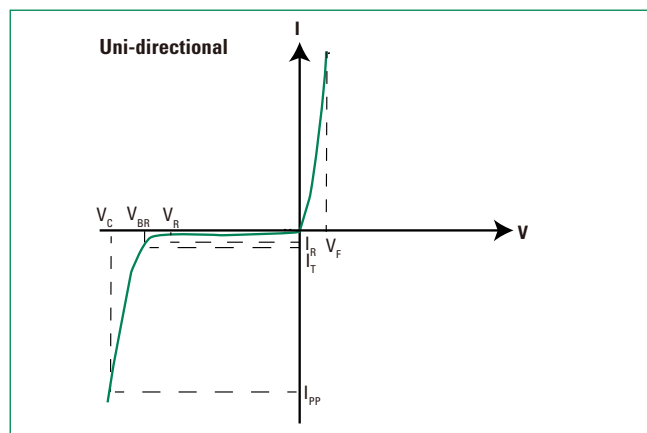
Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Part Number (Uni)	Marking	Breakdown Voltage V_{BR} @ I_T (V)		Test Current I_T (mA)	Reverse Stand off Voltage V_R (V)	Maximum Reverse Leakage I_R @ V_R (μA)	$T_J = 150^\circ\text{C}$ Max. Reverse Leakage I_R @ V_R (μA)	Maximum Peak Pulse Surge Current I_{PP} (A)	Maximum Clamping Voltage V_C @ I_{PP} (V)	Agency Approval
		Min	Max							
SM8S14A	SM8S14A	15.6	17.2	5.0	14	10	50	301	23.2	x
SM8S15A	SM8S15A	16.7	18.5	5.0	15	10	50	286	24.4	x
SM8S16A	SM8S16A	17.8	19.7	5.0	16	2.0	50	269	26.0	x
SM8S17A	SM8S17A	18.9	20.9	5.0	17	2.0	50	253	27.6	x
SM8S18A	SM8S18A	20.0	22.1	5.0	18	2.0	50	240	29.2	x
SM8S20A	SM8S20A	22.2	24.5	5.0	20	2.0	50	216	32.4	x
SM8S22A	SM8S22A	24.4	26.9	5.0	22	2.0	50	197	35.5	x
SM8S24A	SM8S24A	26.7	29.5	5.0	24	2.0	50	180	38.9	x
SM8S26A	SM8S26A	28.9	31.9	5.0	26	2.0	50	167	42.1	x
SM8S27A	SM8S27A	29.9	33.1	5.0	27	2.0	50	160	43.6	x
SM8S28A	SM8S28A	31.1	34.4	5.0	28	2.0	50	154	45.4	x
SM8S30A	SM8S30A	33.3	36.8	5.0	30	2.0	50	144	48.4	x
SM8S33A	SM8S33A	36.7	40.6	5.0	33	2.0	50	132	53.3	x
SM8S36A	SM8S36A	40.0	44.2	5.0	36	2.0	50	121	58.1	x
SM8S40A	SM8S40A	44.4	49.1	5.0	40	2.0	50	108	64.5	x
SM8S43A	SM8S43A	47.8	52.8	5.0	43	2.0	50	101	69.4	x
SM8S45A	SM8S45A	50.0	55.3	5.0	45	2.0	50	96.3	72.7	x
SM8S48A	SM8S48A	53.3	58.9	5.0	48	2.0	50	89.7	77.4	x
SM8S51A	SM8S51A	56.7	62.7	5.0	51	2.0	50	85.0	82.4	x
SM8S57A	SM8S57A	63.8	69.9	5.0	57	2.0	50	75.5	92.7	x
SM8S60A	SM8S60A	66.7	73.7	5.0	60	2.0	50	72.3	96.8	x
SM8S64A	SM8S64A	71.1	78.6	5.0	64	2.0	50	68.0	103.0	x

Notes:

Surge current waveform per 10/1000 exponential wave and derated per Fig. 5

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 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_F Forward Voltage Drop for Uni-directional**

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

Figure 1 - TVS Transients Clamping Waveform

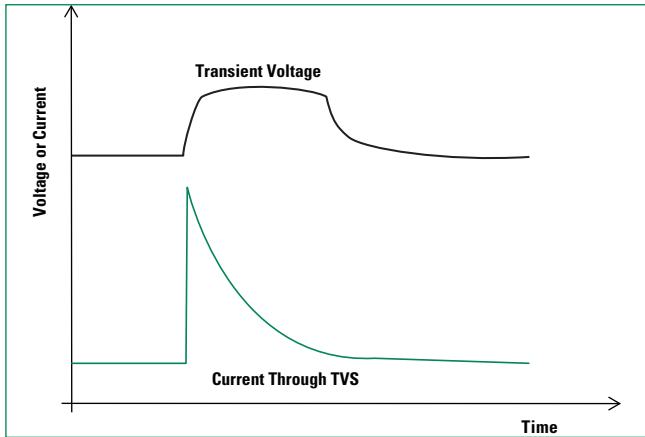


Figure 2 - Peak Pulse Power Rating Curve

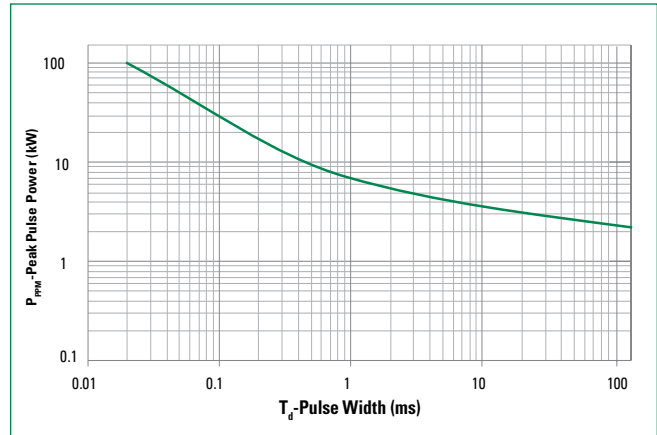


Figure 3 - Peak Pulse Power Derating Curve

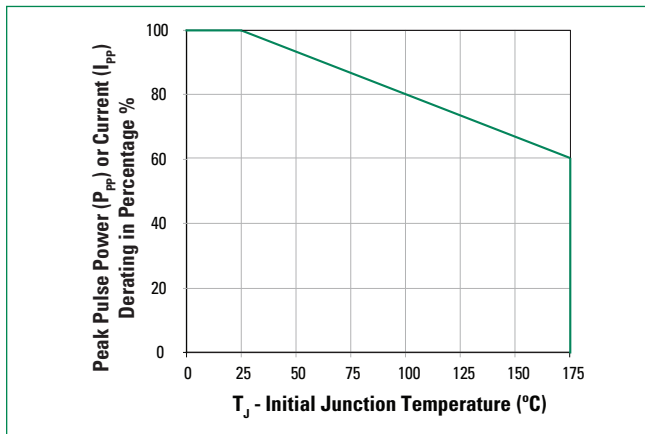


Figure 4 - Typical Transient Thermal Impedance

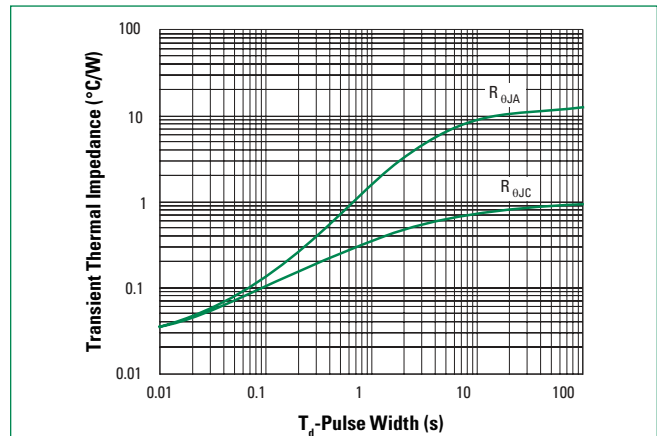


Figure 5 - Typical Junction Capacitance

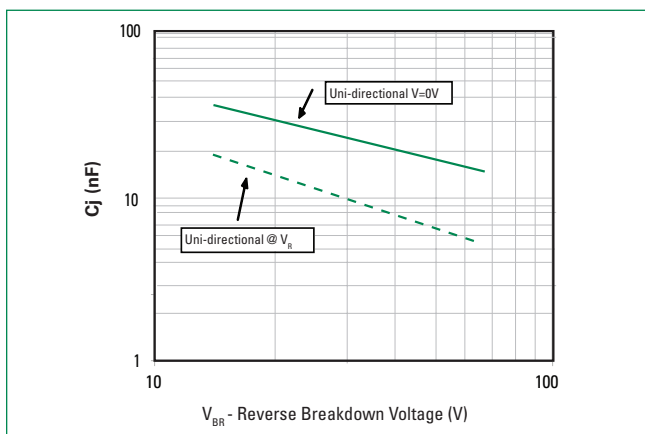
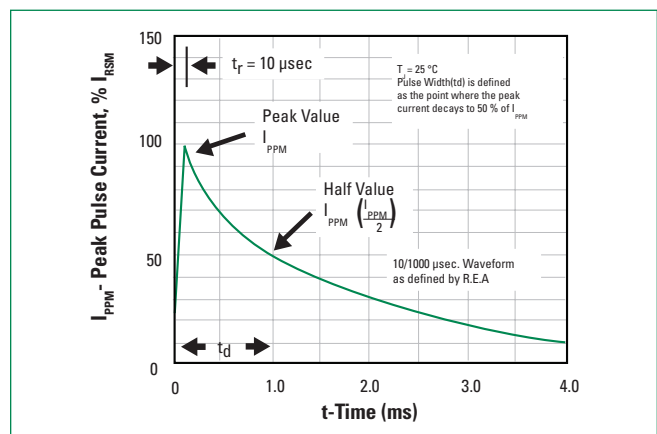


Figure 6: 10/1000 μs Pulse Waveform

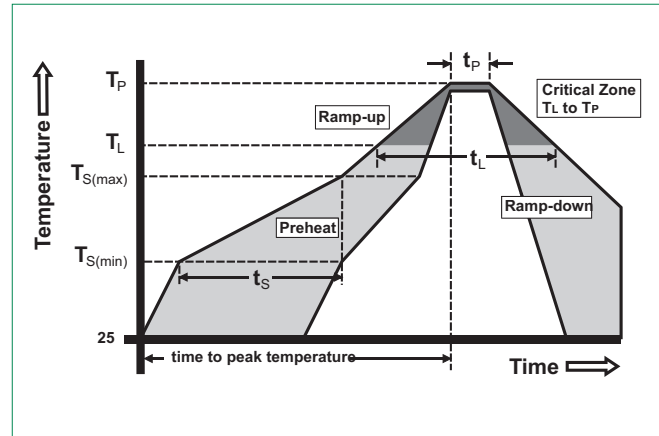


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Soldering Parameters

Reflow Condition		Pb – free assembly
Pre Heat	- Temperature Min ($T_{s(min)}$)	150 °C
	- Temperature Max ($T_{s(max)}$)	200 °C
	- Time (min to max) (t_p)	60 – 120 seconds
Average Ramp Up Rate (Liquidus Temp) (T_L) to Peak		5 °C/second max
$T_{s(max)}$ to T_L - Ramp-up Rate		5 °C/second max
Reflow	- Temperature (T_L) (Liquidus)	217 °C
	- Time (min to max) (T_{s_i})	60 – 150 seconds
Peak Temperature (T_p)		260 ^{+0/-5} °C
Time Within 5°C of Actual Peak Temperature (t_p)		30 seconds
Ramp-down Rate		5 °C/second max
Time 25°C to Peak Temperature (T_p)		8 minutes max
Do Not Exceed		260 °C



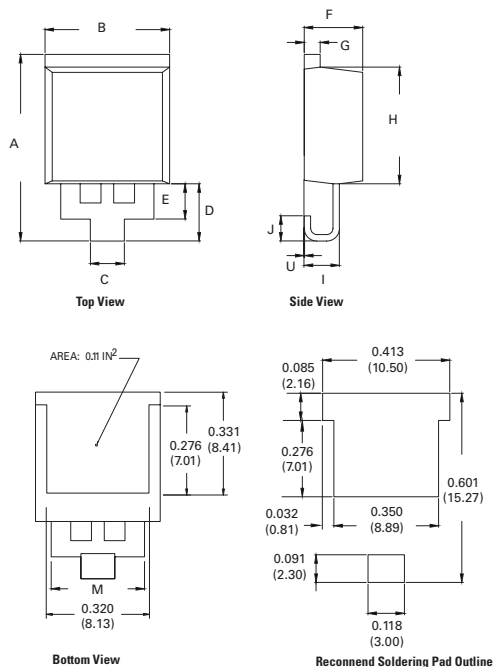
Physical Specifications

Weight	0.069 ounce, 1.95 grams
Case	SMT0-263 molded component over glass passivated junction
Polarity	Uni-directional products are denoted with a cathode band
Terminal	Matte tin-plated leads, Solderable per JESD22-B102

Environmental Specifications

High Temp Voltage Blocking (HTRB)	100 % DC reverse voltage rated 150°C, 1008 hrs. JEDEC, JESD22-A-108
Biased Temp & Humidity (H3TRB)	1008 hours at $T_A = 85$ °C/85 % RH with part reverse biased at 80 % of rated breakdown voltage. JEDEC, JESD22-A-101
UAHST	96 hours at $T_A = 130$ °C/85 % RH. JEDEC, JESD22-A-118
Temp Cycle (TC)	-55 °C to +150 °C, 15min. dwell, 1000 cycles. JEDEC, JESD22-A104
Resistance to soldering heat (RSH)	+260°C, 30 secs. JEDEC JESD22-A111
Moisture Sensitivity Level (MSL)	85 %RH, +85 °C, 168 hrs., 3 reflow cycles (+260 °C Peak). JEDEC-J-STD-020, Level 1

Dimensions

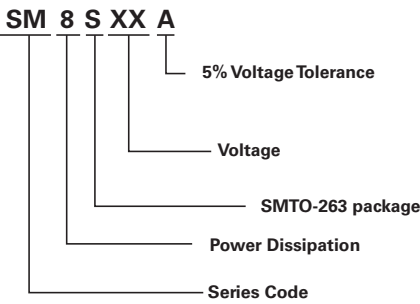


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.568	0.600	14.44	15.24
B	0.380	0.420	9.65	10.67
C	0.098	0.114	2.50	2.90
D	0.169	0.189	4.30	4.80
E	0.102	0.118	2.60	3.00
F	0.178	0.188	4.52	4.78
G	0.045	0.060	1.14	1.52
H	0.360	0.370	9.14	9.40
I	0.106	0.122	2.69	3.09
J	0.069	0.089	1.75	2.25
M	0.284	0.300	7.22	7.62
U	0	0.010	0	0.25

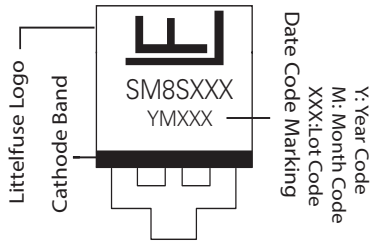
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Part Numbering System



Part Marking System

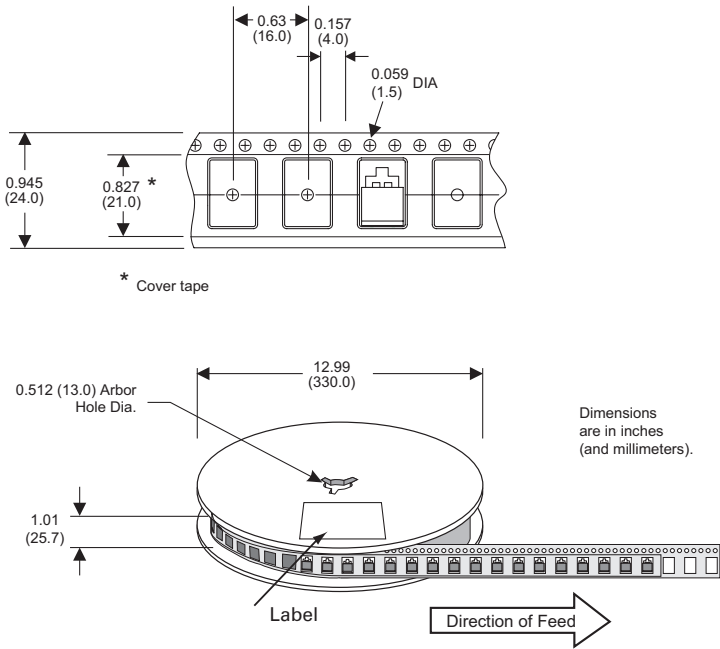


Packaging

Part Number	Component Package	Quantity	Packaging Option
SM8SxxA	SMT0-263	500	Embossed Carrier

SMTO-263 Embossed Carrier Reel Pack (RP) Specifications

Meets all EIA-481-2 Standards



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