

# SLD8S Series

## Surface Mount



### Agency Approvals

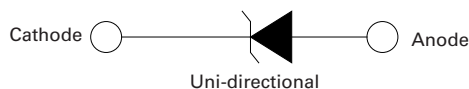
Agency	Agency File Number
	E230531

### Maximum Ratings and Thermal Characteristics

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

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation 1. 10ms x 150ms test waveform	$P_{PPM}$	2200	W
2. 10/1000 test waveform		7000	W
Power dissipation on infinite heatsink at $T_C = 25^\circ\text{C}$	$P_D$	8.0	W
Maximum Instantaneous Forward Voltage at 100A for Unidirectional only	$V_F$	1.8	V
Peak forward surge current 8.3ms single half sine-wave	$I_{FSM}$	1000	A
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 175	$^\circ\text{C}$
Typical Thermal Resistance Junction to case	$R_{\theta JC}$	0.9	$^\circ\text{C/W}$

### Functional Diagram



## Description

The SLD8S Series TVS Diode is housed in a SMT0-263 package with lead modifications. It is designed to protect sensitive electronics against lightning and inductive load switching voltage transient events for severe Automotive Load Dump applications.

## Features & Benefits

- AEC-Q101 qualified
- SMT0-263 package, and foot print is compatible to industrial popular DO-218AB package
- Meet ISO7637-2 5a/5b protection and ISO16750 load dump test (refer to APP note for details)
- $V_{BR} @ T_J = V_{BR} @ 25^\circ\text{C} \times (1 + \alpha T \times (T_J - 25))$  ( $\alpha$ : Temperature Coefficient, typical value is 0.1%)
- Glass passivated chip junction in modified TO-263 package
- ESD protection of data lines in accordance with IEC 61000-4-2, 30kV(Air), 30kV(Contact)
- EFT protection of data lines in accordance with IEC 61000-4-4
- Fast response time: typically less than 1.0ps from 0 Volts to BV min
- Excellent clamping capability
- Low incremental surge resistance
- UL Recognized compound meeting flammability rating V-0
- Meets MSL level 1, per J-STD-020, LF maximum peak of  $260^\circ\text{C}$
- For surface mounted applications to optimize board space
- Low profile package
- High temperature to reflow soldering guaranteed:  $260^\circ\text{C}/10\text{sec}$  at terminals
- Matte tin lead-free plated
- 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)

## Applications


Designed to protect sensitive electronics from:

- Inductive Load Switching
- Alternator Load Dump

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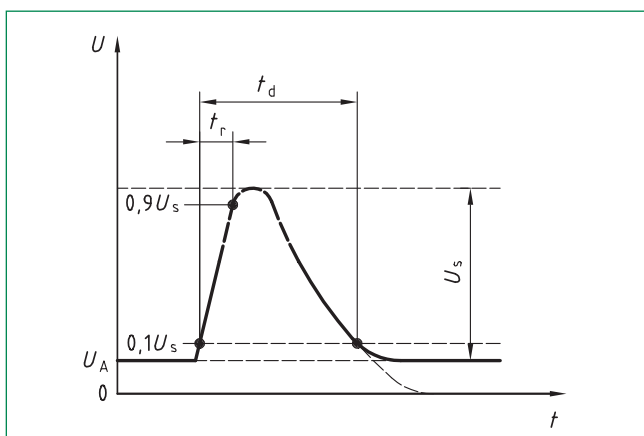
### Electrical Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Part Number (Uni)	Breakdown Voltage $V_{BR}$ @ $I_T$ (V)		Test Current $I_T$ (mA)	Reverse Stand off Voltage $V_R$ (Volts)	Maximum Reverse Leakage $I_R$ @ $V_R$ ( $\mu\text{A}$ )	$T_J=150^\circ\text{C}$ Max. Reverse Leakage $I_R$ @ $V_R$ ( $\mu\text{A}$ )	Maximum Peak Pulse Surge Current $I_{PP}$ (A)	Maximum Clamping Voltage $V_C$ @ $I_{PP}$ (V)	Agency Approval 
	MIN	MAX							
SLD8S14A	15.6	17.2	5.0	14	10	50	301	23.2	X
SLD8S15A	16.7	18.5	5.0	15	10	50	286	24.4	X
SLD8S16A	17.8	19.7	5.0	16	2.0	50	269	26.0	X
SLD8S17A	18.9	20.9	5.0	17	2.0	50	253	27.6	X
SLD8S18A	20.0	22.1	5.0	18	2.0	50	240	29.2	X
SLD8S20A	22.2	24.5	5.0	20	2.0	50	216	32.4	X
SLD8S22A	24.4	26.9	5.0	22	2.0	50	197	35.5	X
SLD8S24A	26.7	29.5	5.0	24	2.0	50	180	38.9	X
SLD8S26A	28.9	31.9	5.0	26	2.0	50	167	42.1	X
SLD8S27A	29.9	33.1	5.0	27	2.0	50	160	43.6	X
SLD8S28A	31.1	34.4	5.0	28	2.0	50	154	45.4	X
SLD8S30A	33.3	36.8	5.0	30	2.0	50	144	48.4	X
SLD8S33A	36.7	40.6	5.0	33	2.0	50	132	53.3	X
SLD8S36A	40.0	44.2	5.0	36	2.0	50	121	58.1	X
SLD8S40A	44.4	49.1	5.0	40	2.0	50	108	64.5	X
SLD8S43A	47.8	52.8	5.0	43	2.0	50	101	69.4	X
SLD8S48A	53.3	58.9	5.0	48	2.0	50	89.7	77.4	X
SLD8S57A	63.8	69.9	5.0	57	2.0	50	75.5	92.7	X
SLD8S60A	66.7	73.7	5.0	60	2.0	50	72.3	96.8	X
SLD8S64A	71.1	78.6	5.0	64	2.0	50	68.0	103.0	X

#### Notes:

- $V_{BR}$  measured after  $I_T$  applied for 300 $\mu\text{s}$ ,  $I_T$ = square wave pulse or equivalent.
- Surge current waveform per 10/1000 exponential wave and derated per Fig. 2
- All terms and symbols are consistent with ANSI/IEEE C62.35.

### Load Dump Test Wave Form



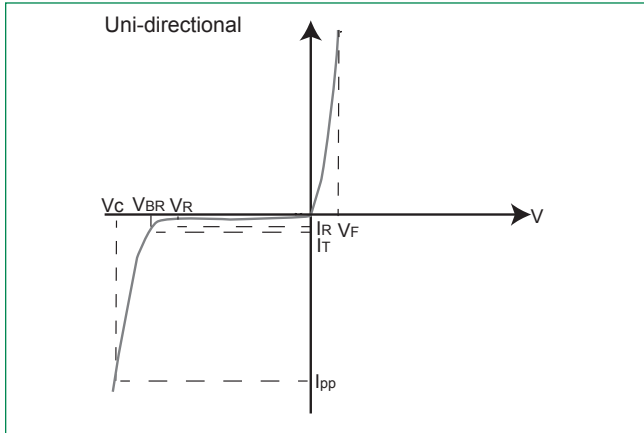
Note: LF use  $t_d=400\text{ms}$  for 12V system test;  $t_d=350\text{ms}$  for 24V system

Parameter	12V system	24V system
$U_s$	65v to 87V	123V to 174V
$R_l$	0.5 $\Omega$ to 4 $\Omega$	1 $\Omega$ to 8 $\Omega$
$t_d$	40 ms to 400 ms	100 ms to 350 ms
$t_r$	(10 $^{-0.5}$ )ms	

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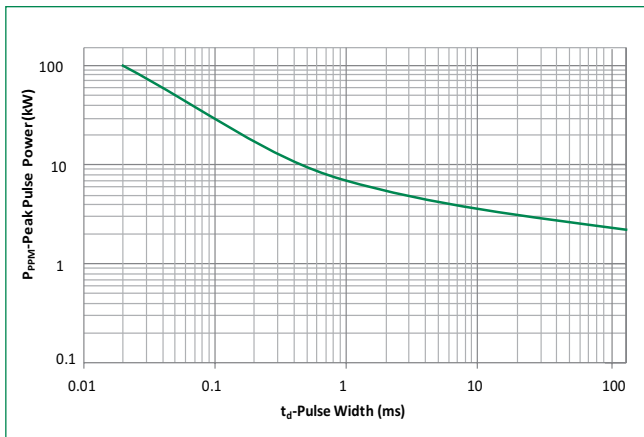
### I-V Curve Characteristics



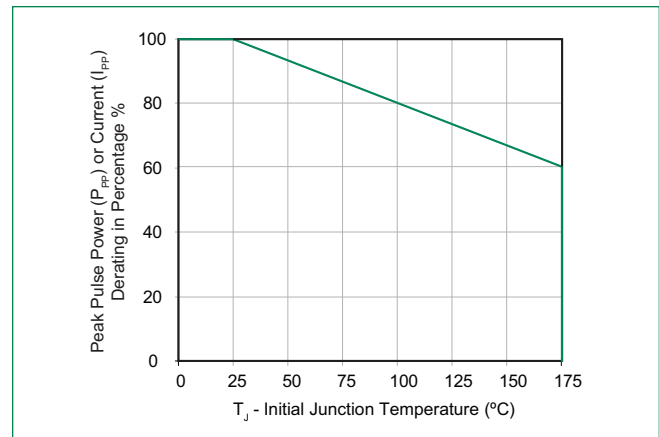
- P<sub>PPM</sub> Peak Pulse Power Dissipation** – Max power dissipation
- V<sub>R</sub> Stand-off Voltage** – Maximum voltage that can be applied to the TVS without operation
- V<sub>BR</sub> Breakdown Voltage** – Maximum voltage that flows through the TVS at a specified test current (I<sub>T</sub>)
- V<sub>C</sub> Clamping Voltage** – Peak voltage measured across the TVS at a specified I<sub>ppm</sub> (peak impulse current)
- I<sub>R</sub> Reverse Leakage Current** – Current measured at V<sub>R</sub>
- V<sub>F</sub> Forward Voltage Drop for Uni-directional**

### Ratings and Characteristic Curves (T<sub>A</sub>=25°C unless otherwise noted)

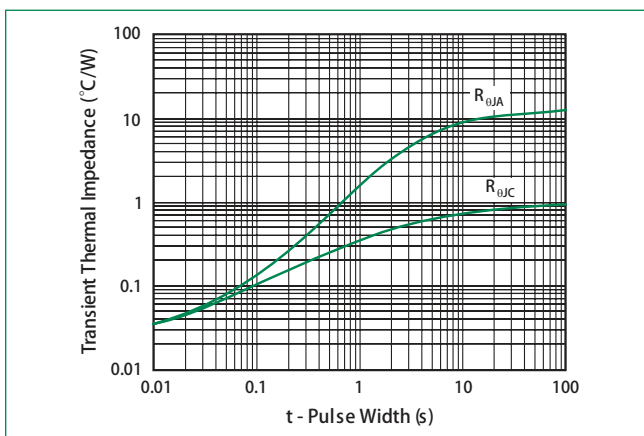
**Figure 1 - Peak Pulse Power Rating Curve**



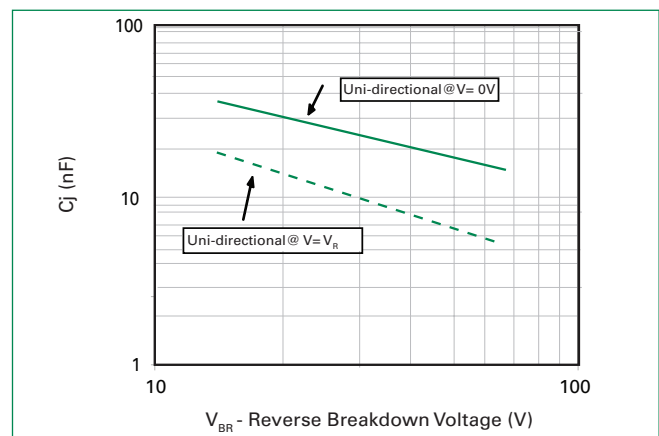
**Figure 2 - Peak Pulse Power Derating Curve**



**Figure 3 - Typical Transient Thermal Impedance**



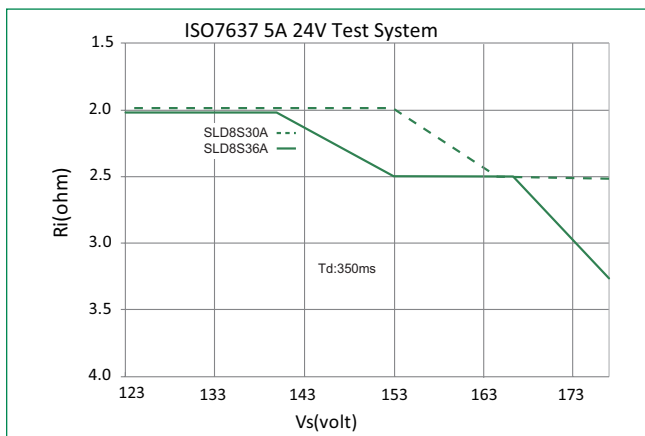
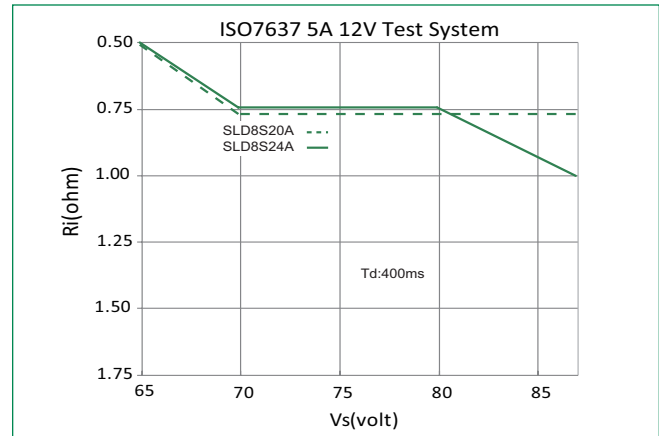
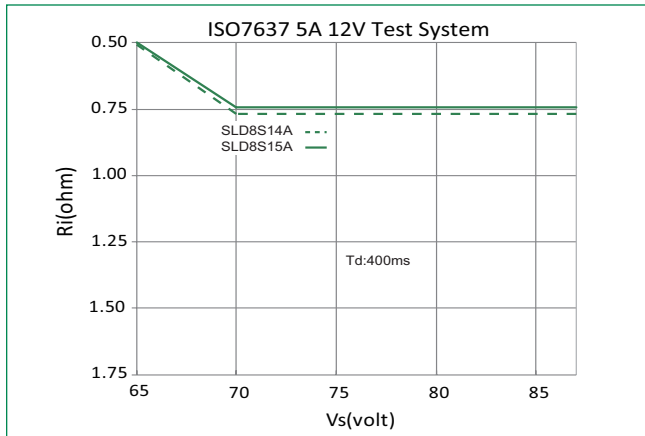
**Figure 4 - Typical Junction Capacitance**



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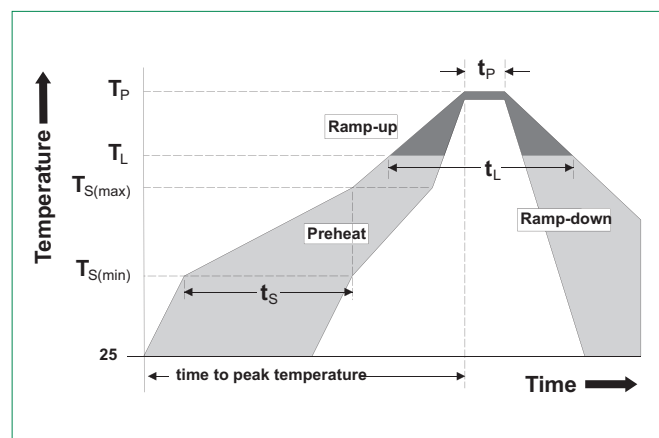
Figure 5 - Typical SOA Chart



Note: SOA (Safe Operation Area) refer to the area which below the curve line and refer to APP note for details.

### Soldering Parameters

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



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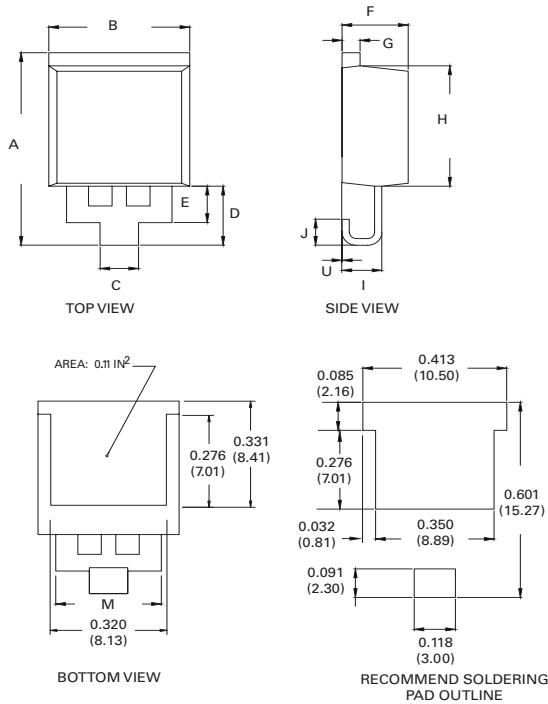
### Physical Specifications

<b>Terminal Finish</b>	100% Matte Tin-plated
<b>Body Material</b>	UL Recognized compound meeting flammability rating V-0
<b>Lead Material</b>	Copper Alloy

### Environmental Specifications

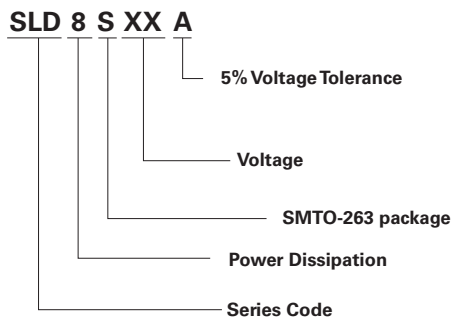
<b>High Temp. Storage</b>	JESD22-A103
<b>HTRB</b>	JESD22-A108
<b>Temperature Cycling</b>	JESD22-A104
<b>MSL</b>	JEDEC-J-STD-020, LEVEL 1
<b>H3TRB</b>	JESD22-A101
<b>RSH</b>	JESD22-A111

### Dimensions

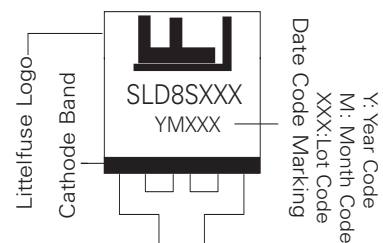


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
<b>A</b>	0.568	0.600	14.44	15.24
<b>B</b>	0.380	0.420	9.65	10.67
<b>C</b>	0.098	0.114	2.50	2.90
<b>D</b>	0.169	0.189	4.30	4.80
<b>E</b>	0.102	0.118	2.60	3.00
<b>F</b>	0.178	0.188	4.52	4.78
<b>G</b>	0.045	0.060	1.14	1.52
<b>H</b>	0.360	0.370	9.14	9.40
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

### Part Numbering System



### Part Marking System



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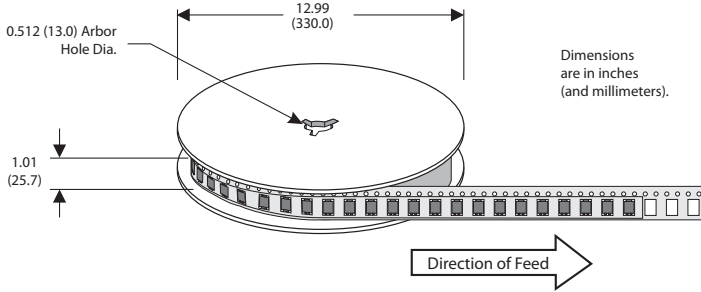
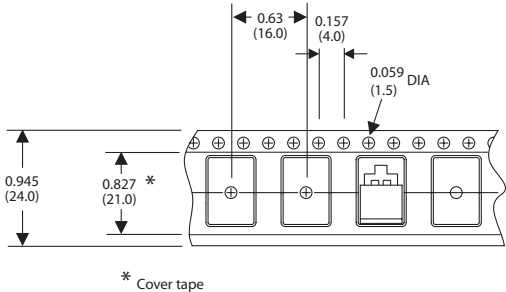
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### Packaging

Part Number	Component Package	Quantity	Packaging Option
SLD8SxxA	SMTO-263	500	Embossed Carrier

### SMTO-263 Embossed Carrier Reel Pack (RP) Specifications

Meets all EIA-481-2 Standards



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