

SLD263 Uni-directional Series

Surface Mount - 7000 W - TO-263



Maximum Ratings and Thermal Characteristics $(T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation 1. 10 ms/150 ms test waveform	P_{PPM}	1400	W
2. 10 μs /1000 μs test waveform		7000	W
Power Dissipation on Infinite Heatsink at $T_C = 25^\circ\text{C}$	P_D	9	W
Maximum Instantaneous Forward Voltage at 100 A for Un-directional Only	V_F	1.8	V
Peak Forward Surge Current 8.3 ms Single Half Sine-wave	I_{FSM}	650	A
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ\text{C}$
Typical Thermal Resistance Junction to Case	$R_{\theta JC}$	1.3	$^\circ\text{C/W}$

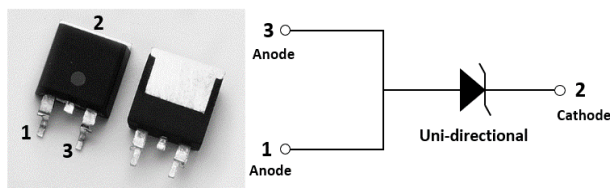
Description

The SLD263 uni-directional TVS diode series is housed in a TO-263 package with lead modifications. It is designed to protect sensitive electronics against ESD, EFT, 10/1000 surge events and inductive load switching voltage transient events for severe automotive load dump applications.

Features & Benefits

- AEC-Q101 qualified and PPAP capable
- Meet ISO7637-2 5a/5b protection, ISO16750 and JASO D-001 load dump test (refer to APP note for details)
- $V_{BR} @ T_J = V_{BR} @ 25^\circ\text{C} \times (1 + \alpha T \times (T_J - 25))$ (α : 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, 30 kV(Air), 30 kV (Contact)
- EFT protection of data lines in accordance with IEC 61000-4-4
- Fast response time: typically less than 1.0 ps from 0 volts to $V_{BR \text{ min}}$
- Excellent clamping capability
- Low incremental surge resistance
- UL recognized compound meeting flammability rating UL94 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 reflow soldering guaranteed: 260 $^\circ\text{C}$ /10 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)

Functional Diagram



Applications

Designed to protect sensitive electronics from:

- Inductive load switching
- Alternator load dump

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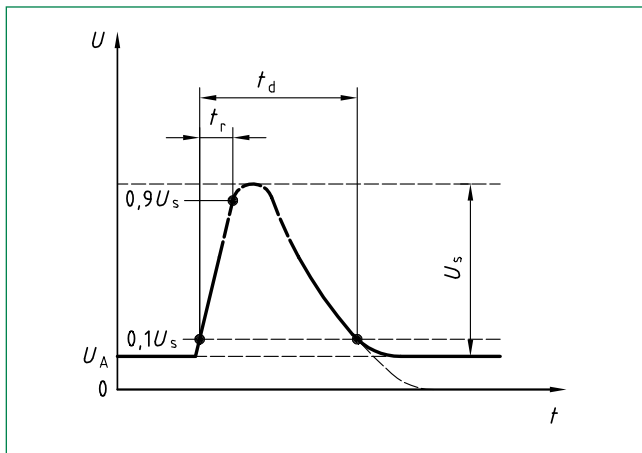
Electrical Characteristics ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)

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)	$T_J = 150\text{ }^{\circ}\text{C}$ Max. Reverse Leakage I_R @ V_R (μA)	Maximum Peak Pulse Surge Current I_{PP} (A)	Maximum Clamping Voltage V_C @ I_{PP} (V)
		Min	Max						
SLD263-22A	263-22A	24.4	26.9	5	22	2	50	197	35.5
SLD263-24A	263-24A	26.7	29.5	5	24	2	50	180	38.9

Notes:

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

Load Dump Test Wave Form



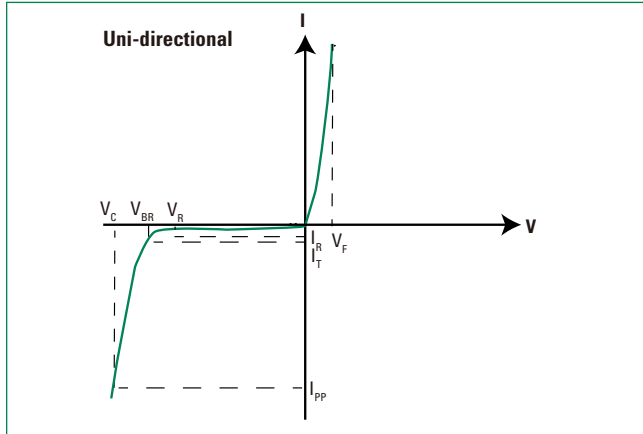
Note: LF use $t_d = 400\text{ ms}$ for 12 V system test; $t_d = 350\text{ ms}$ for 24 V system

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

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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 though the TVS at a specified test current (I_R)
- 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 ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Figure 1 - Peak Pulse Power Rating Curve

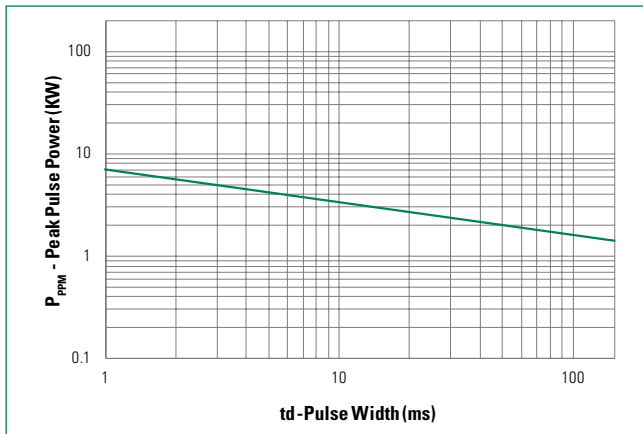


Figure 2 - Peak Pulse Power Derating Curve

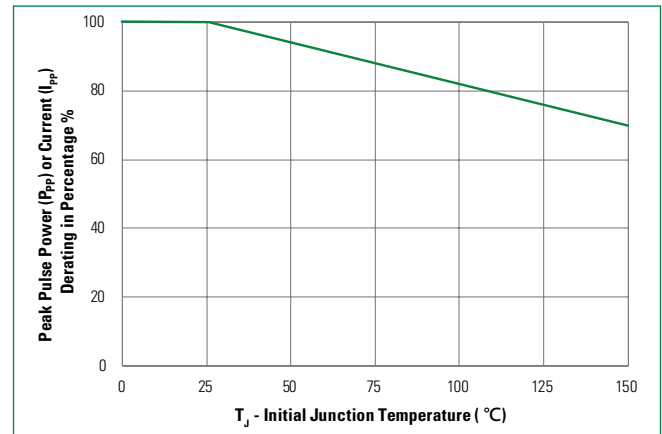


Figure 3 - Typical Transient Thermal Impedance

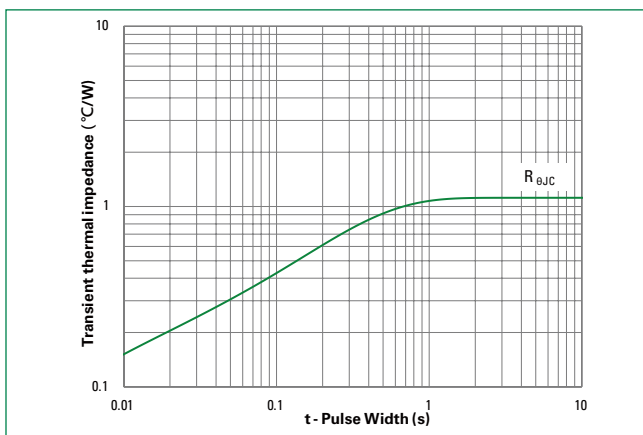
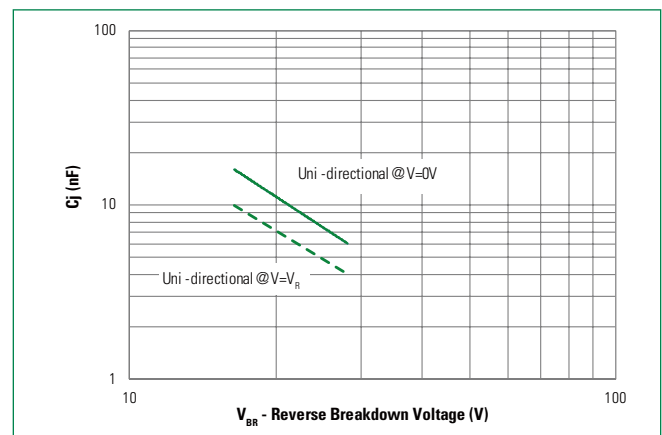


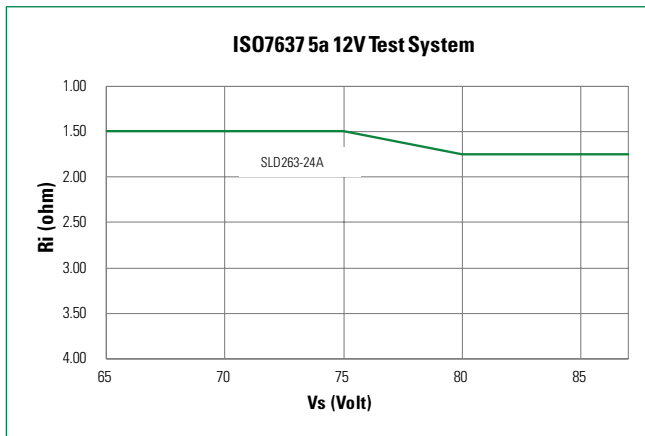
Figure 4 - Typical Junction Capacitance



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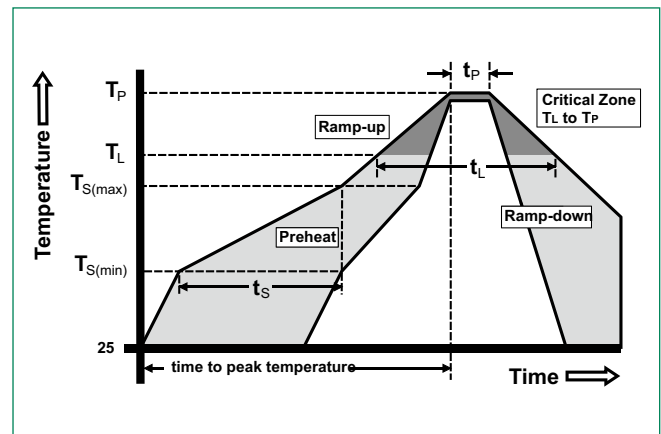
Figure 5 - Typical SOA Chart



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

Soldering Parameters

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



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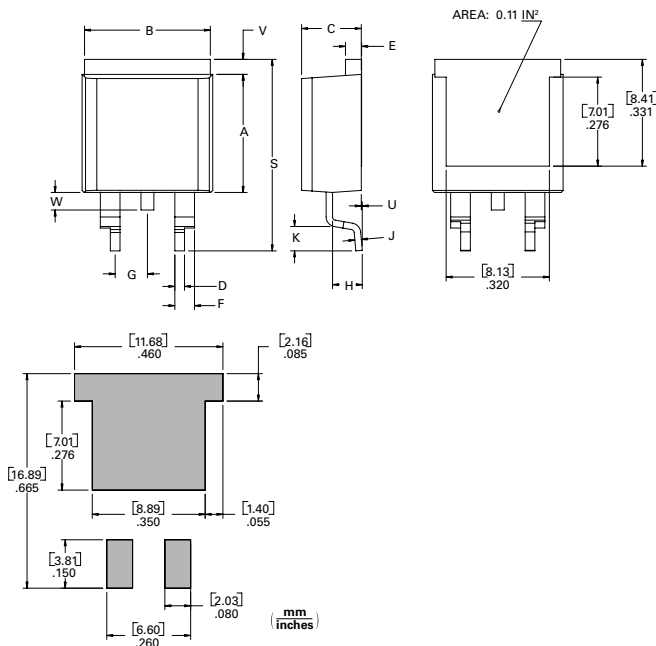
Physical Specifications

Terminal Finish	100 % matte tin-plated
Body Material	UL recognized compound meeting flammability classification UL94 V-0
Lead Material	Copper alloy

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

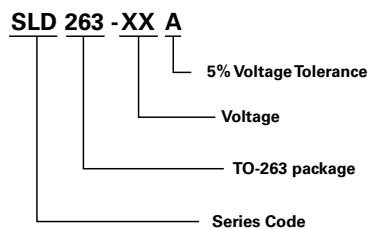
Dimensions



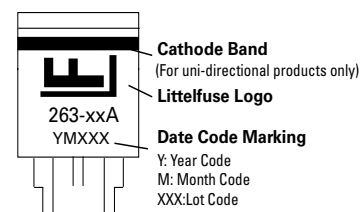
Recommend Soldering Pad Outline

Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.36	0.37	9.14	9.4
B	0.38	0.42	9.65	10.67
C	0.178	0.188	4.52	4.78
D	0.025	0.035	0.64	0.89
E	0.045	0.06	1.14	1.52
F	0.06	0.075	1.52	1.91
G	0.095	0.105	2.41	2.67
H	0.092	0.102	2.34	2.59
J	0.018	0.024	0.46	0.61
K	0.09	0.11	2.29	2.79
S	0.59	0.625	14.99	15.88
V	0.035	0.045	0.89	1.14
U	0.002	0.01	0.05	0.25
W	0.04	0.07	1.016	1.78

Part Numbering System



Part Marking System



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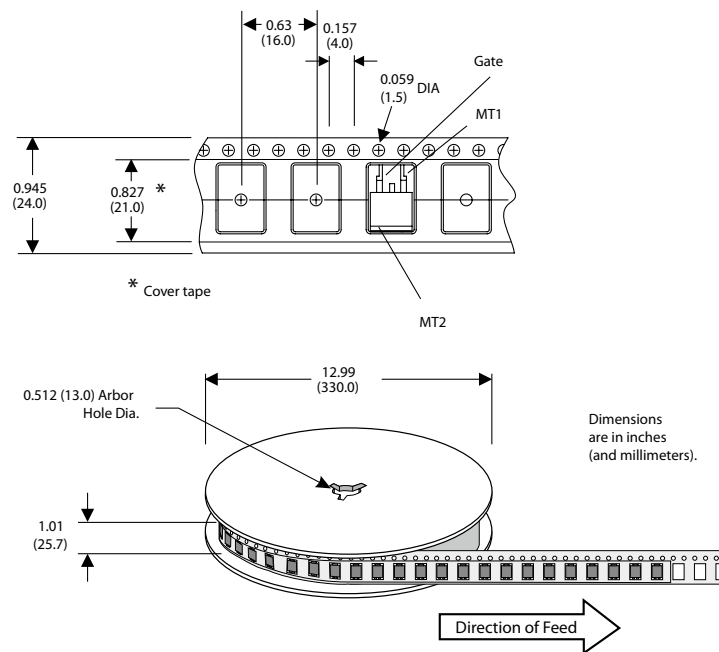
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Packaging

Part Number	Component Package	Quantity	Packaging Option
SLD263-xxA	TO-263	500	Embossed Carrier

TO-263 Embossed Carrier Reel Pack (RP) Specifications

Meets all EIA-481-2 Standards



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