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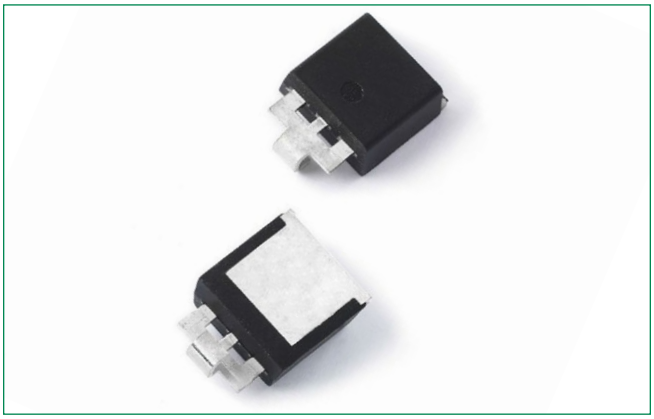
TVS Diode
Surface Mount – SLD6S series

SLD6S Series

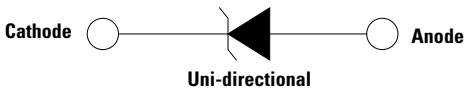
AUTOMOTIVE GRADE HF RoHS Pb e3



Maximum Ratings and Thermal Characteristics (T_A=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation 1. 10ms / 150ms test waveform	P_{PPM}	1800	W
2. 10µs/1000µs test waveform		4600	
Power dissipation on infinite heatsink at T_A= 25 °C	P_D	6	W
Maximum Instantaneous Forward Voltage at 100A for Unidirectional only	V_F	1.8	V
Peak forward surge current 8.3m single half sine-wave	I_{FSM}	800	A
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C
Typical Thermal Resistance Junction to case	$R_{\theta JC}$	1.1	°C/W
Typical Thermal Resistance Junction to Ambient	$R_{\theta JA}$	12.3	°C/W

Functional Diagram



Description

The SLD6S unidirectional TVS Diode series is housed in a SMTO-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

- AEC-Q101 qualified with automotive grade (PPAP capable)
- SMTO-263 package, and foot print is compatible to industrial popular DO-218AB package
- 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°C x (1+αT x (T_J - 25)) (αT: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 V_{BR} min
- Excellent clamping capability
- Low incremental surge resistance
- UL Recognized compound meeting flammability rating V-0
- Meets MSL level 1, per J-STD-020, High temperature reflow soldering guaranteed: 260°C/10sec at terminals
- For surface mounted applications to optimize board space
- Low profile package
- 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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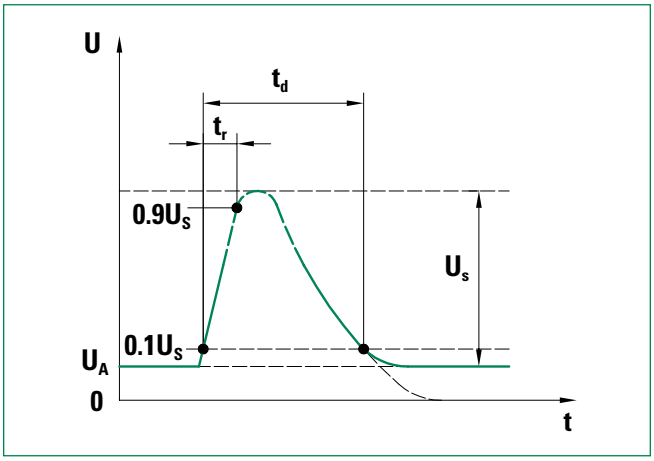
Electrical Characteristics (T_A=25°C unless otherwise noted)

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 (µA)	T_J=150°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						
SLD6S14A	15.6	17.2	5.0	14	10	50	198	23.2
SLD6S15A	16.7	18.5	5.0	15	10	50	189	24.4
SLD6S16A	17.8	19.7	5.0	16	2.0	50	177	26.0
SLD6S17A	18.9	20.9	5.0	17	2.0	50	167	27.6
SLD6S18A	20.0	22.1	5.0	18	2.0	50	158	29.2
SLD6S20A	22.2	24.5	5.0	20	2.0	50	142	32.4
SLD6S22A	24.4	26.9	5.0	22	2.0	50	130	35.5
SLD6S24A	26.7	29.5	5.0	24	2.0	50	118	38.9
SLD6S26A	28.9	31.9	5.0	26	2.0	50	109	42.1
SLD6S27A	29.9	33.1	5.0	27	2.0	50	106	43.6
SLD6S28A	31.1	34.4	5.0	28	2.0	50	101	45.4
SLD6S30A	33.3	36.8	5.0	30	2.0	50	95	48.4
SLD6S33A	36.7	40.6	5.0	33	2.0	50	86	53.3
SLD6S36A	40.0	44.2	5.0	36	2.0	50	79	58.1
SLD6S40A	44.4	49.1	5.0	40	2.0	50	71	64.5
SLD6S43A	47.8	52.8	5.0	43	2.0	50	66	69.4
SLD6S48A	53.3	58.9	5.0	48	2.0	50	59	77.4
SLD6S57A	63.8	69.9	5.0	57	2.0	50	50	92.7

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

Load Dump Test Wave Form



Parameter	12V system	24V system
U_S	65v to 87V	123V to 174V
R_i	0.5Ω to 4Ω	1Ω to 8Ω
t_d	40 ms to 400 ms	100 ms to 350 m
t_r	(10 $_{-5}$)ms	

Note: LF use td=400ms for 12V system test; td=350ms for 24V system

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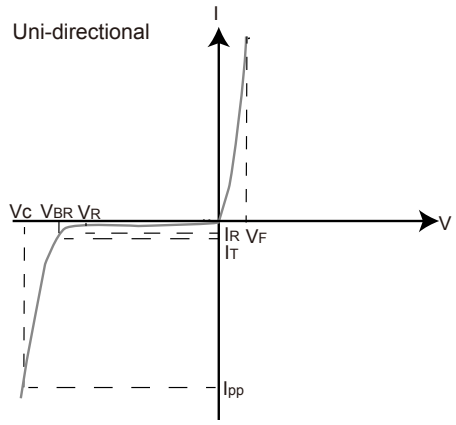
I-V Curve Characteristics



P_{PPM} - Peak Pulse Power Dissipation – 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

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

Figure 1 - Peak Pulse Power Rating Curve

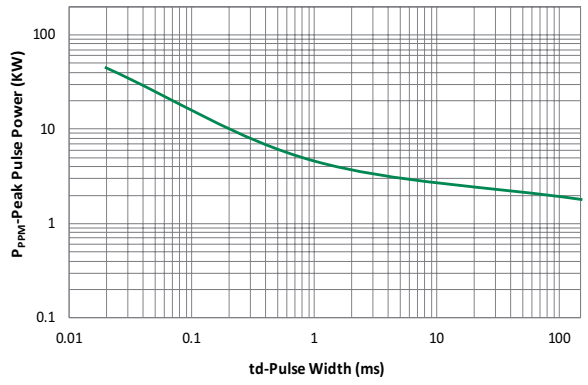


Figure 2 - Peak Pulse Power Derating Curve

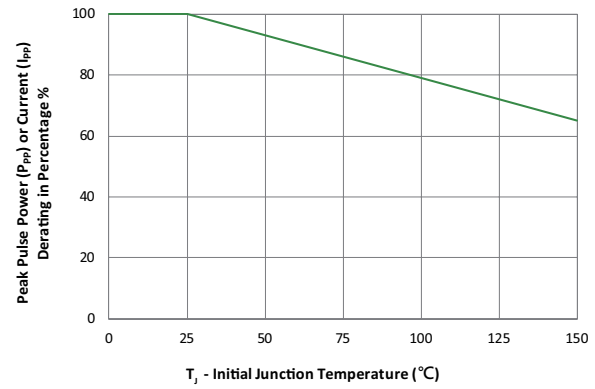


Figure 3 - Typical Transient Thermal Impedance

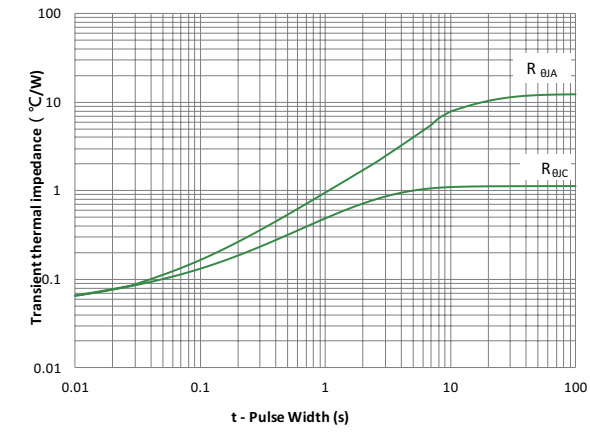


Figure 4 - Typical Junction Capacitance

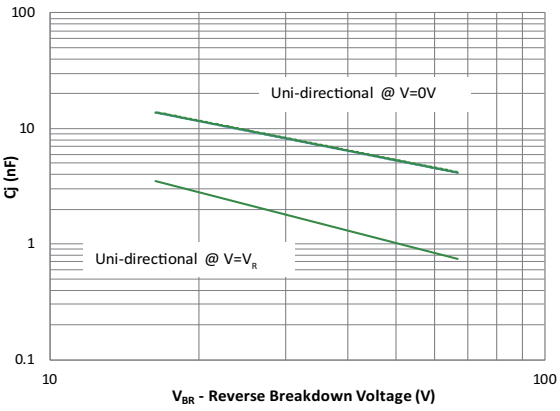


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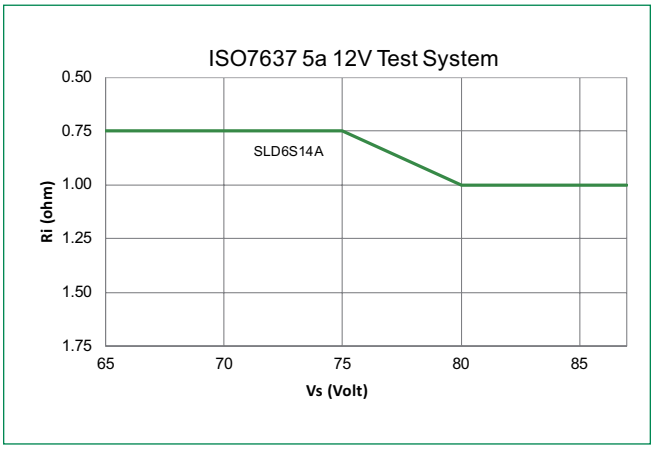
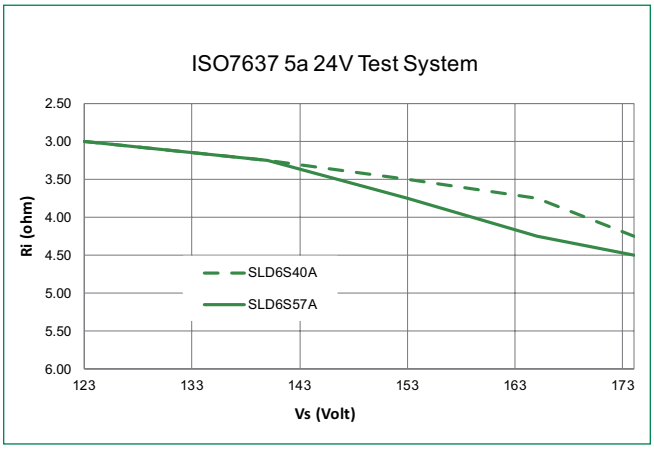
Figure 5 - Typical SOA Chart

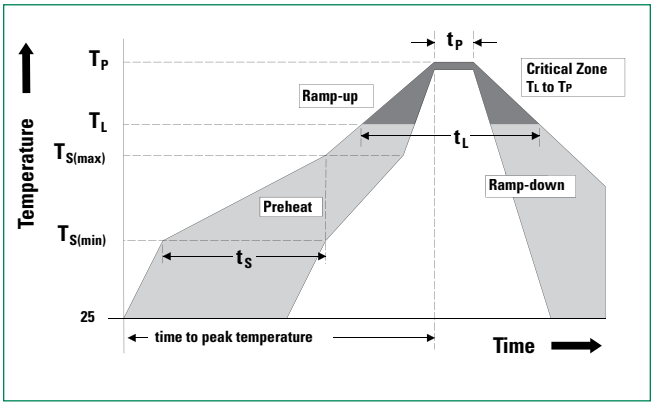




Note: SOA (Safe Operation Area) refer to the area which below the curve line and refer to APP note for details.

Soldering Parameters

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 secs
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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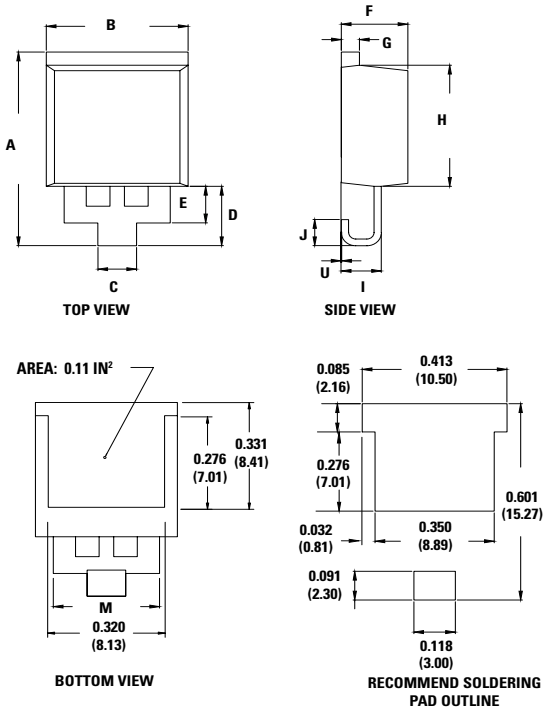
Physical Specifications

Terminal Finish	100% Matte Tin-plated
Body Material	UL Recognized compound meeting flammability classification 94V-0
Lead Material	Copper Alloy

Environmental Specifications

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

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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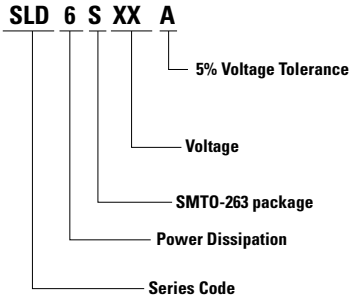
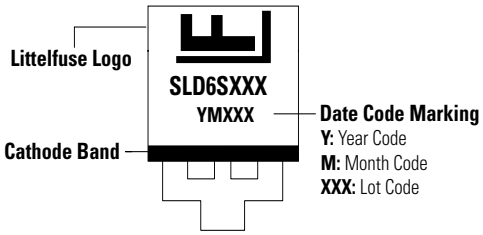
Part Numbering System



Part Marking System

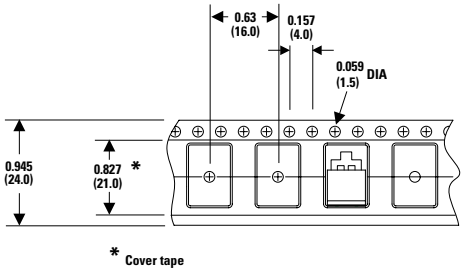


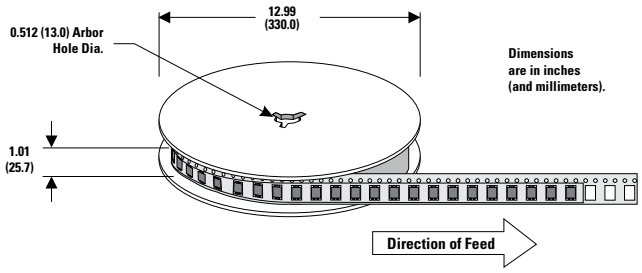
Packaging

Part Number	Component Package	Quantity	Packaging Option
SLD6SxxA	SMTO-263	500	Embossed Carrier

SMTO-263 Embossed Carrier Reel Pack (RP) Specifications

Meets all EIA-481-2 Standards





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