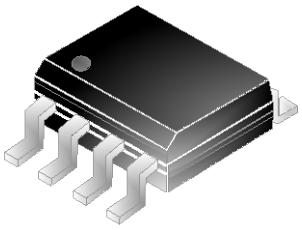
WS05LCDA through WS24LCDA

Transient Voltage Suppressor

Features

- Transient protection for high-speed data lines to
- Protects two I/O lines
- Low capacitance for high-speed data lines
- Working voltage: 5V, 12V, 15V and 24V
- Low leakage current
- Low operating and clamping voltage
- Solid-state silicon-avalanche technology



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IEC COMPATIBILITY (EN61000-4)

- **IEC 61000-4-2 (ESD) ±15kV (air), ±8kV (contact)**
- **IEC 61000-4-4 (EFT) 40A (5/50ns)**
- **IEC 61000-4-5 (Lightning) (8/20μs)***

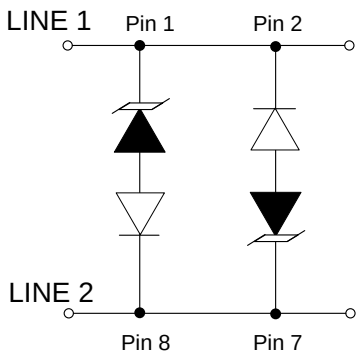
Mechanical Characteristics

- JEDEC SO-8 package
- Molding compound flammability rating: UL 94V-0
- Marking : Part Number, Date Code
- Packaging : Tape and Reel per EIA 481
- RoHS Compliant

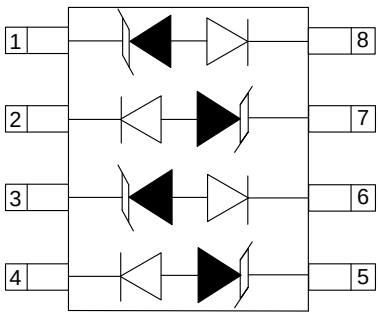
Applications

- High-Speed Data Lines
- Microprocessor Based Equipment
- Universal Serial Bus (USB) Port Protection
- Notebooks, Desktops, and Servers
- Instrumentation
- LAN/WAN Equipment
- Peripherals

Circuit Diagram (Each Line Pair)



Schematic & PIN Configuration

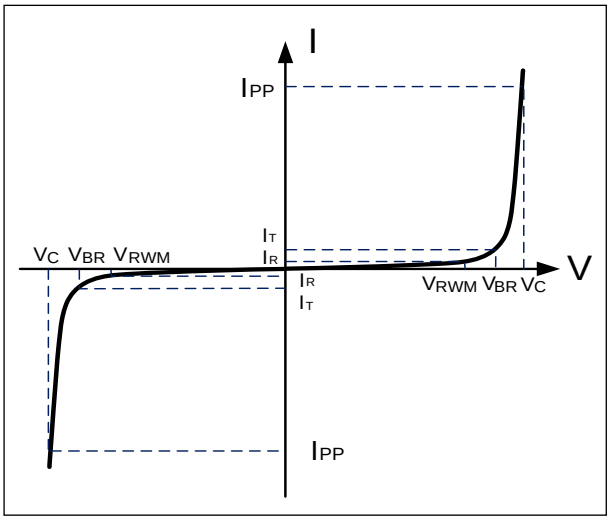


SO-8 (Top View)

Absolute Maximum Rating			
Rating	**Symbol**	**Value**	**Units**
Peak Pulse Power（t_p =8/20μs）	P_{PP}	300	Watts
Lead Soldering Temperature	T_L	260 (10 sec.)	°C
Operating Temperature	T_J	-55 to + 125	°C
Storage Temperature	T_{STG}	-55 to +150	°C

Electrical Parameters (T=25℃)

Symbol	Parameter
I_{PP}	Maximum Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
V_{RWM}	Working Peak Reverse Voltage
I_R	Maximum Reverse Leakage Current @ V_{RWM}
V_{BR}	Breakdown Voltage @ I_T
I_T	Test Current
I_F	Forward Current
V_F	Forward Voltage @ I_F



Electrical Characteristics

WS05LCDA						
Parameter	**Symbol**	**Conditions**	**Minimum**	**Typical**	**Maximum**	**Units**
Reverse Stand-Off Voltage	V_{RWM}				5.0	V
Reverse Breakdown Voltage	V_{BR}	I_T=1mA	6.0			V
Reverse Leakage Current	I_R	V_{RWM}=5V,T=25°C			20	μA
Clamping Voltage	V_C	I_{PP}=1A, t_p=8/20μs			9.8	V
Clamping Voltage	V_C	I_{PP}=5A, t_p=8/20μs			11	V
Maximum Peak Pulse Current	I_{PP}	t_p=8/20μs			17	A
Junction Capacitance	C_j	Between I/O Pins and Ground VR = 0V, f = 1MHz			5	pF

Electrical Characteristics *(continued)*

WS12LCDA						
Parameter	**Symbol**	**Conditions**	**Minimum**	**Typical**	**Maximum**	**Units**
Reverse Stand-Off Voltage	V_{RWM}				12	V
Reverse Breakdown Voltage	V_{BR}	I_T=1mA	13.3			V
Reverse Leakage Current	I_R	V_{RWM}=12V,T=25°C			1	µA
Clamping Voltage	V_C	I_{PP}=1A, t_p=8/20µs			19	V
Clamping Voltage	V_C	I_{PP}=5A, t_p=8/20µs			24	V
Maximum Peak Pulse Current	I_{PP}	t_p=8/20µs			12	A
Junction Capacitance	C_j	Between I/O Pins and Ground VR = 0V, f = 1MHz			5	pF
WS15LCDA						
Parameter	**Symbol**	**Conditions**	**Minimum**	**Typical**	**Maximum**	**Units**
Reverse Stand-Off Voltage	V_{RWM}				15	V
Reverse Breakdown Voltage	V_{BR}	I_T=1mA	16.7			V
Reverse Leakage Current	I_R	V_{RWM}=15V,T=25°C			1	µA
Clamping Voltage	V_C	I_{PP}=1A, t_p=8/20µs			24	V
Clamping Voltage	V_C	I_{PP}=5A, t_p=8/20µs			30	V
Maximum Peak Pulse Current	I_{PP}	t_p=8/20µs			10	A
Junction Capacitance	C_j	Between I/O Pins and Ground VR = 0V, f = 1MHz			5	pF
WS24LCDA						
Parameter	**Symbol**	**Conditions**	**Minimum**	**Typical**	**Maximum**	**Units**
Reverse Stand-Off Voltage	V_{RWM}				24	V
Reverse Breakdown Voltage	V_{BR}	I_T=1mA	26.7			V
Reverse Leakage Current	I_R	V_{RWM}=24V,T=25°C			1	µA
Clamping Voltage	V_C	I_{PP}=1A, t_p=8/20µs			43	V
Clamping Voltage	V_C	I_{PP}=5A, t_p=8/20µs			55	V
Maximum Peak Pulse Current	I_{PP}	t_p=8/20µs			5	A
Junction Capacitance	C_j	Between I/O Pins and Ground VR = 0V, f = 1MHz			5	pF

Typical Characteristics

Figure 1 Non-Repetitive Peak Pulse Power vs. Pulse Time

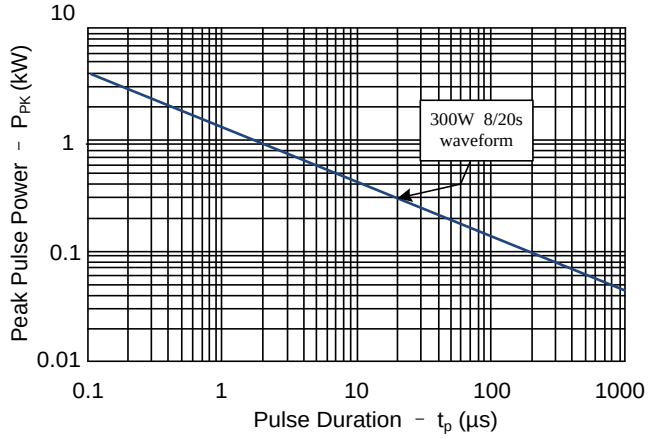


Figure 2 Power Derating Curve

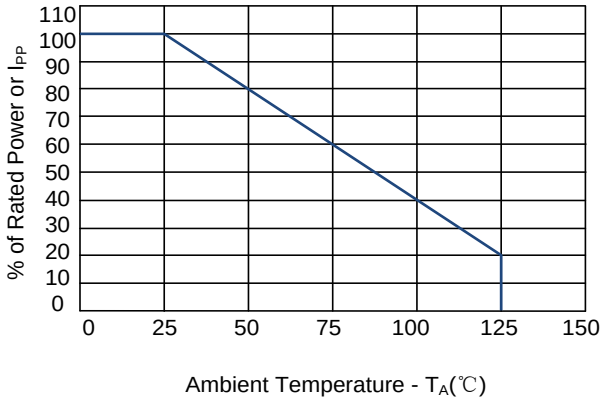


Figure 3 Pulse Waveform

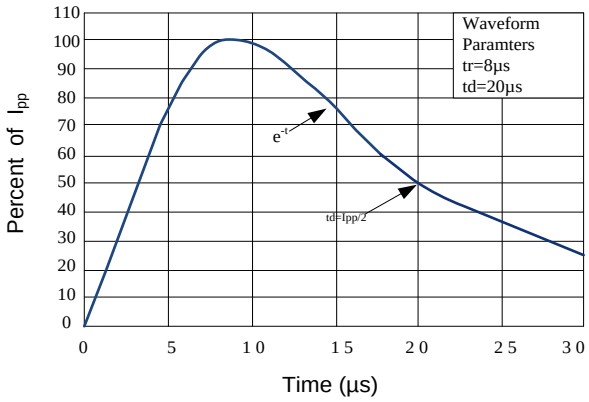


Figure 4 ESD Pulse Waveform (per IEC 61000-4-2)

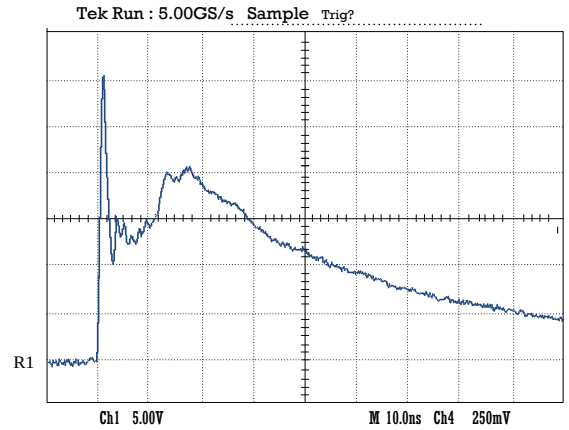
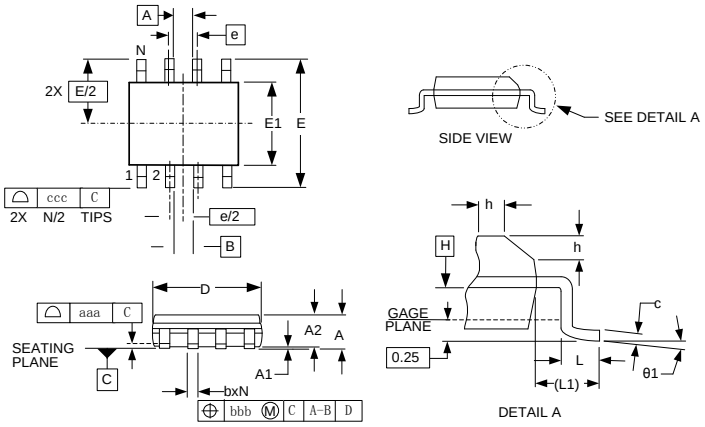


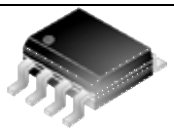
Figure 5 ESD Discharge Parameters Per IEC 61000-4-2

Level	First Peak Current (A)	Peak Current at 30ns (A)	Peak Current at 60ns (A)	Test Voltage (Contact Discharge) (kV)	Test Voltage (Air Discharge) (kV)
1	7.5	4	8	2	2
2	15	8	4	4	4
3	22.5	12	6	6	8
4	30	16	8	8	15

Outline Drawing – SO-8

PACKAGE OUTLINE





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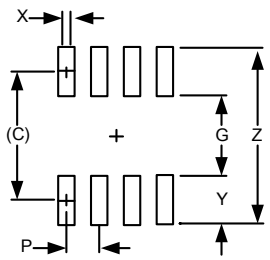
NOTES:

1. Controlling Dimensions Are In Millimeters (Angles In Degrees).
2. Datums -A- And -B- To Be Determined At Datum Plane -H-.
3. Dimensions “E1” And “D” Do Not Include Mold Flash,Protrusions Or Gate Burrs.
4. Reference JEDEC STD MS-012,VARITION AA.

DIMENSIONS						
DIM	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	.053	-	.069	1.35	-	1.75
A1	.004	-	.010	0.10	-	0.25
A2	.049	-	.065	1.25	-	1.65
b	.012	-	.020	0.31	-	0.51
c	.007	-	.010	0.17	-	0.25
D	.189	.193	.197	4.80	4.90	5.00
E1	.150	.154	.157	3.80	3.90	4.00
E	.236BSC			6.00BSC		
e	.050 BSC			1.27 BSC		
h	.010	-	.020	0.25	-	0.50
L	.016	.028	.041	0.40	0.72	1.04
θ 1	0°	-	8°	0°	-	8°
L1	(.041)			(1.04)		
N	8			8		
aaa	.004			0.10		
bbb	.010			0.25		
ccc	.008			0.20		

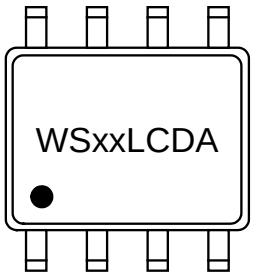


DIMENSIONS		
DIM	INCHES	MILLIMETERS
C	(.205)	(5.20)
G	.118	3.00
P	.050	1.27
X	.024	0.60
Y	.087	2.20
Z	.291	7.40

Notes

1. This Land Pattern Is For Reference Purposes Only.Consult Your Manufacturing Group To Ensure Your Company's Manufacturing Guidelines Are Met.
2. Reference IPC-SM-782A, RLP NO. 300A.

Marking Codes



XX=Reverse Stand-Off Voltage