

WS05MDA through WS24MDA

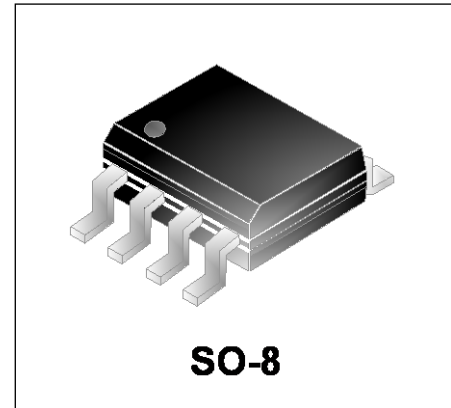
Transient Voltage Suppressor

Features

- Transient protection for data lines
- Protects four I/O lines
- Unidirectional Protection
- Working voltages: 5V, 12V, 15V and 24V
- Low leakage current
- Low operating and clamping voltages
- Solid-state silicon avalanche technology

IEC COMPATIBILITY (EN61000-4)

- IEC 61000-4-2 (ESD) $\pm 15\text{kV}$ (air), $\pm 8\text{kV}$ (contact)
- IEC 61000-4-4 (EFT) 40A (5/50ns)
- IEC 61000-4-5 (Lightning) 12A (8/20 μs)



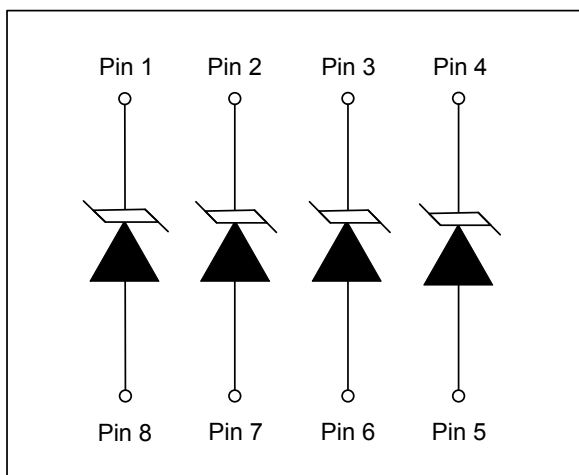
Mechanical Characteristics

- JEDEC SO-8 package
- Molding compound flammability rating: UL 94V-0
- Marking: Part number, date code, logo
- Packaging: Tube or Tape and Reel per EIA 481

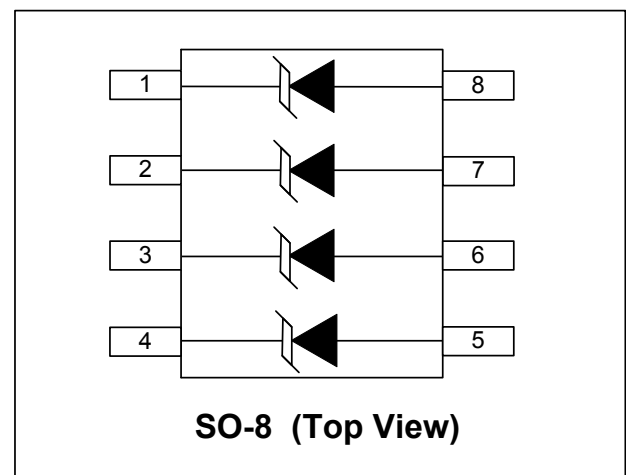
Applications

- RS-232 Data Lines
- LAN/WAN Equipment
- Notebooks, Desktops, and Servers
- Instrumentation
- Peripherals
- Microprocessor based equipment
- Serial and Parallel Port

Circuit Diagram (Each Line Pair)



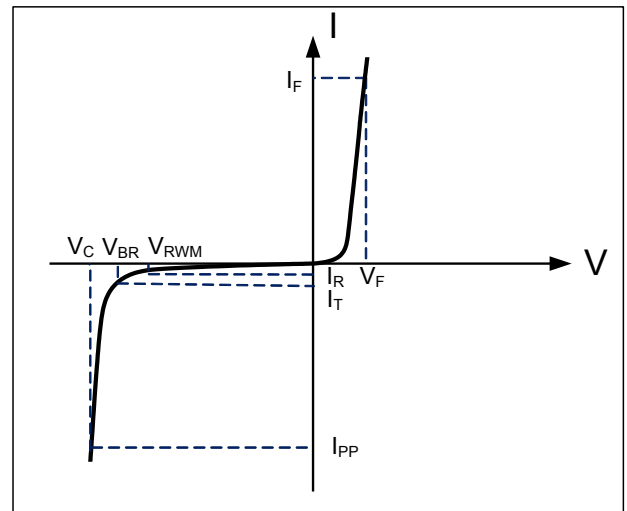
Schematic & PIN Configuration



Absolute Maximum Rating			
Rating	Symbol	Value	Units
Peak Pulse Power ($t_p = 8/20\mu s$)	P_{PK}	300	Watts
ESD Voltage (HBM per IEC 61000-4-2)	V_{ESD}	>25	kV
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°C)

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

WS05MDA						
Parameter	Symbol	Conditions	Min	Typical	Max	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	$V_{RWM} = 5V, T = 25^\circ C$			20	μA
Clamping Voltage	V_C	$I_{PP} = 1A, t_p = 8/20\mu s$			9.8	V
Clamping Voltage	V_C	$I_{PP} = 5A, t_p = 8/20\mu s$			11	V
Maximum Peak Pulse Current	I_{PP}	$t_p = 8/20\mu s$			17	A
Junction Capacitance	C_j	$V_R = 0V, f = 1MHz$			400	pF

Electrical Characteristics(Cont.)

WS12MDA						
Parameter	Symbol	Conditions	Min	Typical	Max	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	$V_{RWM}=12V, T=25^{\circ}C$			1	μA
Clamping Voltage	V_C	$I_{PP}=1A, t_p=8/20\mu s$			19	V
Clamping Voltage	V_C	$I_{PP}=5A, t_p=8/20\mu s$			24	V
Maximum PeakPulse Current	I_{PP}	$t_p=8/20\mu s$			12	A
Junction Capacitance	C_j	$V_R = 0V, f = 1MHz$			150	pF
WS15MDA						
Parameter	Symbol	Conditions	Min	Typical	Max	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	$V_{RWM}=15V, T=25^{\circ}C$			1	μA
Clamping Voltage	V_C	$I_{PP}=1A, t_p=8/20\mu s$			24	V
Clamping Voltage	V_C	$I_{PP}=5A, t_p=8/20\mu s$			30	V
Maximum PeakPulse Current	I_{PP}	$t_p=8/20\mu s$			10	A
Junction Capacitance	C_j	$V_R = 0V, f = 1MHz$			100	pF
WS24MDA						
Parameter	Symbol	Conditions	Min	Typical	Max	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	$V_{RWM}=24V, T=25^{\circ}C$			1	μA
Clamping Voltage	V_C	$I_{PP}=1A, t_p=8/20\mu s$			43	V
Clamping Voltage	V_C	$I_{PP}=5A, t_p=8/20\mu s$			55	V
Maximum PeakPulse Current	I_{PP}	$t_p=8/20\mu s$			5	A
Junction Capacitance	C_j	$V_R = 0V, f = 1MHz$			60	pF

Typical Characteristics

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

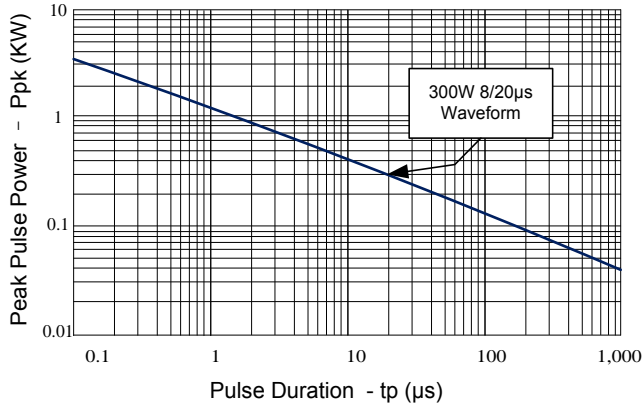


Figure 2: Power Derating Curve

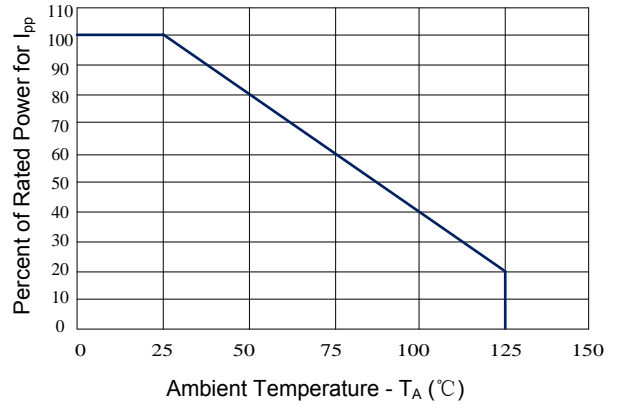


Figure 3: Pulse Waveform

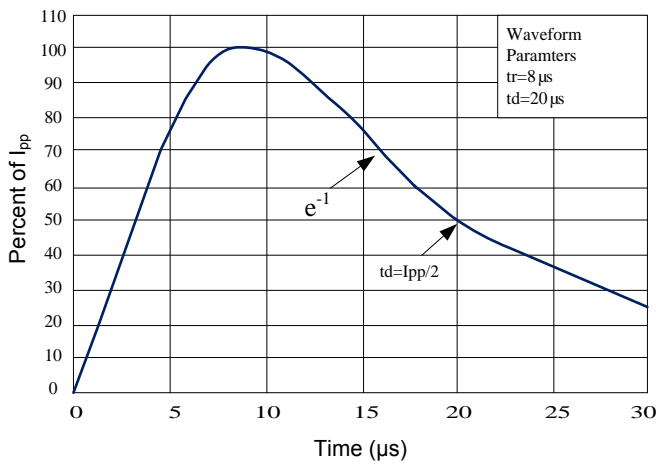


Figure 4: ESD Pulse Waveform (IEC 61000-4-2)

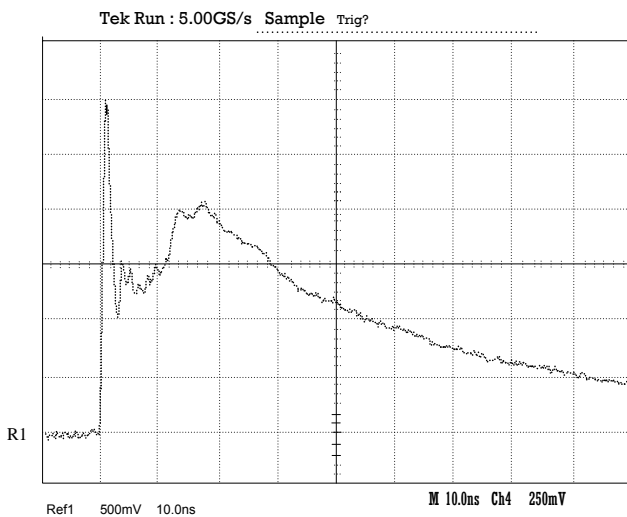


Figure 5: ESD Discharge Parameters Per IEC 61000-4-2

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

NOTES:

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

SO-8

DIMENSIONS

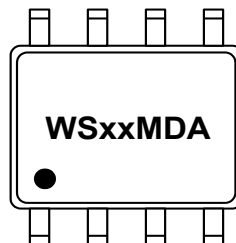
DIM	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	.053	-	.069	1.35	-	1.75
A1	.004	-	.010	0.10	-	0.25
A2	.049	-	.065	1.25	-	1.65
b	.012	-	.020	0.31	-	0.51
c	.007	-	.010	0.17	-	0.25
D	.189	.193	.197	4.80	4.90	5.00
E1	.150	.154	.157	3.80	3.90	4.00
E	.236BSC			6.00BSC		
e	.050 BSC			1.27 BSC		
h	.010	-	.020	0.25	-	0.50
L	.016	.028	.041	0.40	0.72	1.04
θ1	0°	-	8°	0°	-	8°
L1	(.041)			(1.04)		
N	8			8		
aaa	.004			0.10		
bbb	.010			0.25		
ccc	.008			0.20		

Notes

- This Land Pattern Is For Reference Purposes Only. Consult Your Manufacturing Group To Ensure Your Company's Manufacturing Guidelines Are Met.

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

Marking Codes



XX=Reverse Stand-Off Voltage