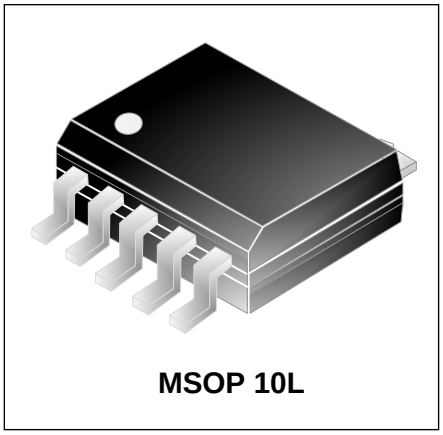
WS05-4RM

Transient Voltage Suppressor

Features

- 120 Watts Peak Pulse Power per Line (t_p=8/20μs)
- Up to four I/O Lines of Protection
- Low operating voltage: 5V
- Low capacitance
- Low clamping voltage



MSOP 10L

IEC COMPATIBILITY (EN61000-4)

- **IEC 61000-4-2 (ESD) ±25kV (air), ±25kV (contact)**
- **IEC 61000-4-4 (EFT) 40A (5/50ns)**
- **IEC 61000-4-5 (Lightning) 8A (8/20μs)**

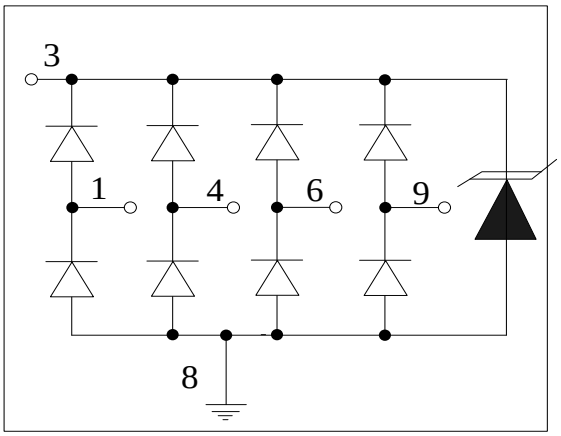
Mechanical Characteristics

- MSOP 10L package
- Marking: Marking Code
- Packaging: Tape and Reel per EIA 481
- RoHS Compliant

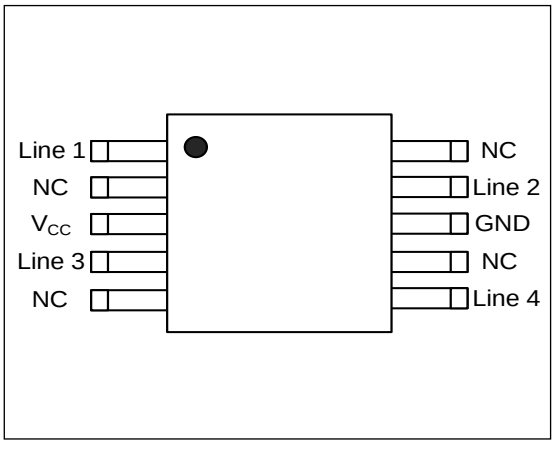
Applications

- Digital Video interface (DVI)
- Monitors and Flat Panel Displays
- Notebook Computers
- High Definition Multi-Media Interface (HDMI)
- USB 2.0 Power & Data Line Protection
- 10/100/1000 Ethernet
- Projection TV

Circuit Diagram



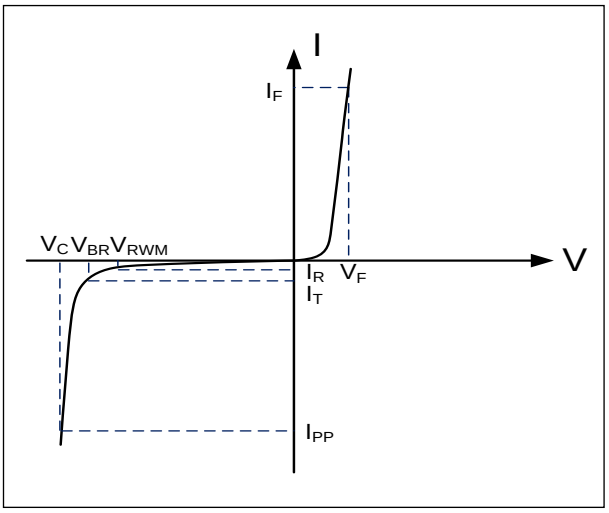
Schematic & PIN Configuration



Absolute Maximum Rating			
Rating	**Symbol**	**Value**	**Units**
Peak Pulse Power (t_p =8/20μs)	P_{PP}	120	Watts
Peak Pulse Current (t_p =8/20μs)	I_{pp}	8	A
Operating Temperature	T_J	-55 to + 125	°C
Storage Temperature	T_{STG}	-55 to +150	°C

Electrical Parameters (T=25℃)

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



Electrical Characteristics

WS05-4RM						
Parameter	**Symbol**	**Conditions**	**Minimum**	**Typical**	**Maximum**	**Units**
Reverse Stand-Off Voltage	V_{RWM}				5	V
Reverse Breakdown Voltage	V_{BR}	I_T=1mA	6			V
Reverse Leakage Current	I_R	V_{RWM}=5V, T=25°C			500	nA
Clamping Voltage	V_C	I_{PP}=8A, t_p=8/20μs Any I/O pin to GND		11	15	V
Dynamic Resistance[1,2]	R_{DYN}	TLP=0.2/100ns		0.3		Ω
ESD Clamping Voltage[1]	V_C	IPP = 4A, tp = 0.2/100ns (TLP)		9		V
ESD Clamping Voltage[1]	V_C	IPP = 16A, tp = 0.2/100ns (TLP)		12.5		V
Junction Capacitance	C_j	V_R = 0V, f = 1MHz Any I/O pin to GND		2.5	3	pF
		V_R = 0V, f = 1MHz Between I/O pins		1.2	1.5	pF

Notes：1、TLP Setting：t_p=100ns, t_r=0.2ns, I_{TLP} and V_{TLP} sample window:t_1=70ns to t_2=90ns.
2、Dynamic resistance calculated from I_{PP}=4A to I_{PP}=16A using “Best Fit”.

Typical Characteristics

Figure 1: Peak Pulse Power vs. Pulse Time

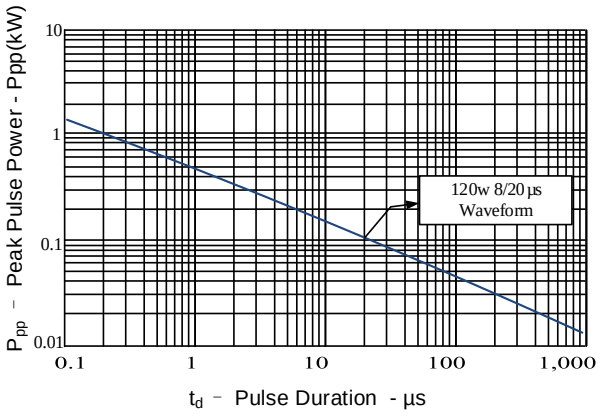


Figure 2: Power Derating Curve

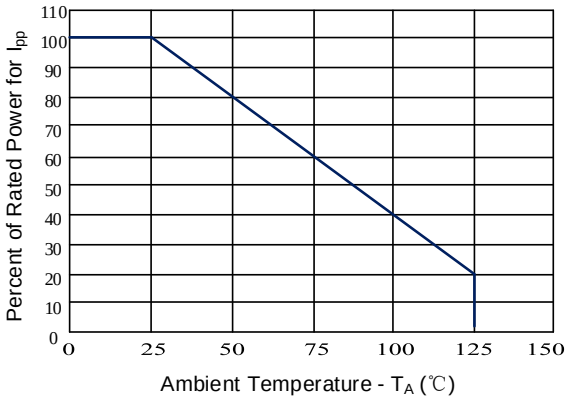


Figure 3: Clamping Voltage vs. Peak Pulse Current

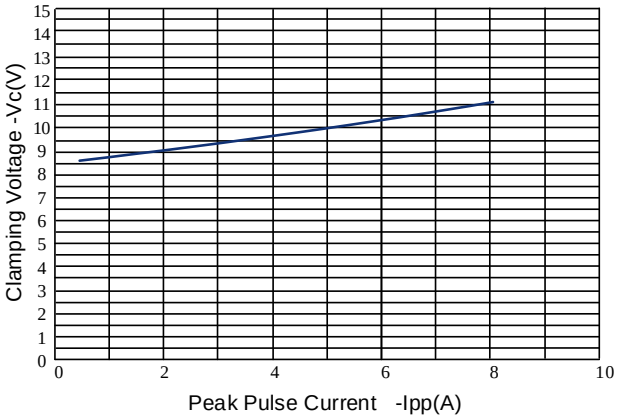


Figure 4: Normalized Junction Capacitance vs. Reverse Voltage（I/O-GND）

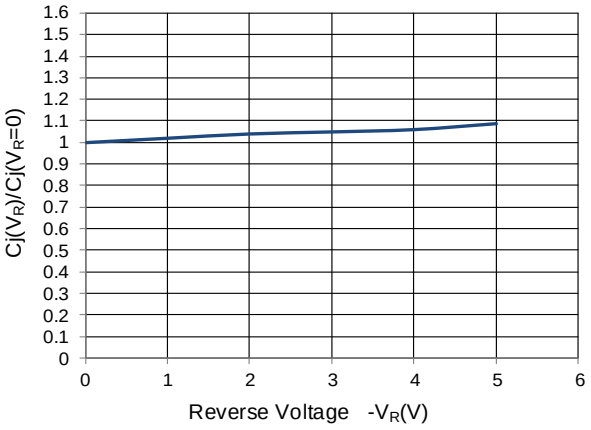


Figure 5: 8/20μs Pulse Waveform

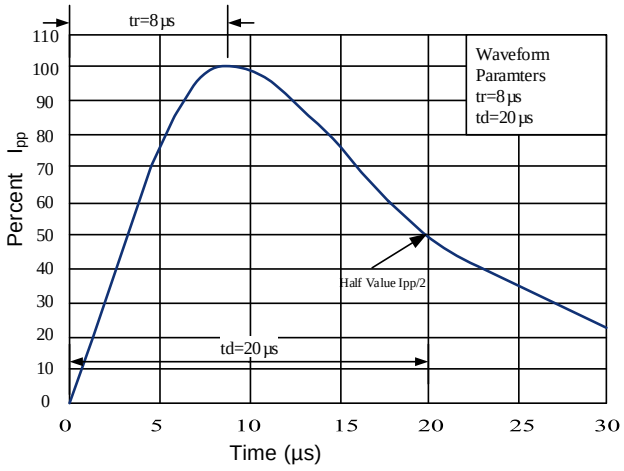
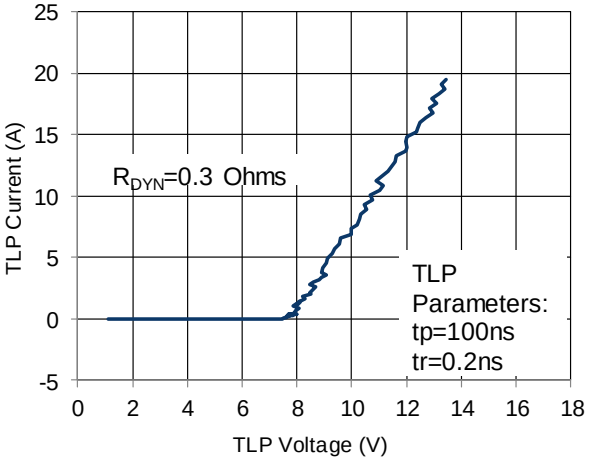
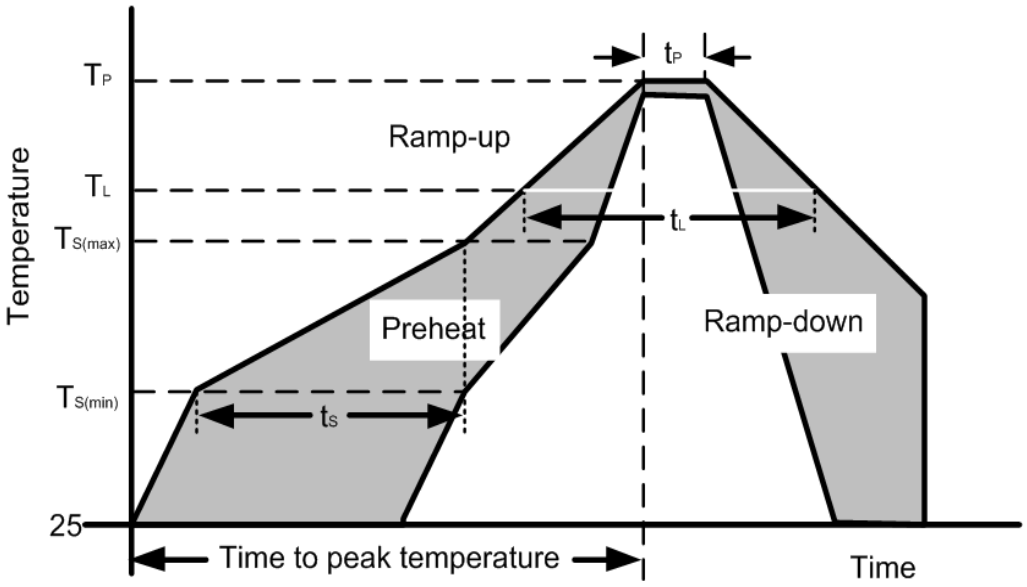


Figure 6: TLP I-V Curve



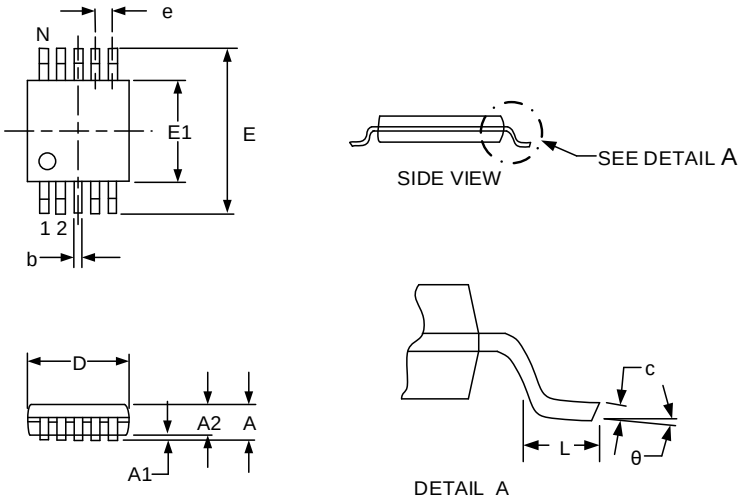
Soldering Parameters

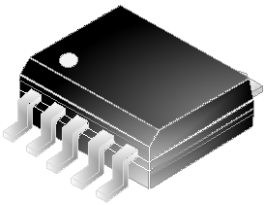
Reflow Condition		Pb – Free assembly
Pre Heat	Temperature Min ($T_{s(min)}$)	150°C
	Temperature Max ($T_{s(max)}$)	200°C
	Time (min to max) (ts)	60 – 190 secs
Average ramp up rate (Liquidus Temp) (T_L) to peak		5°C/second max
$T_{S(max)}$ to T_L——Ramp-up Rate		5°C/second max
Reflow	Temperature (T_L) (Liquidus)	217°C
	Temperature (t_L)	60 – 150 seconds
Peak Temperature (T_P)		260+0/-5 °C
Time within actual peak Temperature (t_p)		20 – 40 seconds
Ramp-down Rate		5°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes Max.
Do not exceed		280°C



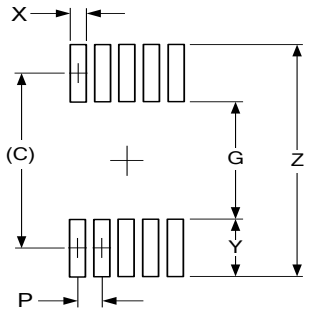
Outline Drawing – MSOP 10L

PACKAGE OUTLINE





DIMENSIONS				
SYMBOL	INCHES		MILLMETERS	
	MIN	MAX	MIN	MAX
A	0.032	0.043	0.82	1.10
A1	0.001	0.006	0.02	0.15
A2	0.030	0.037	0.75	0.95
b	0.007	0.013	0.18	0.33
c	0.003	0.009	0.08	0.23
D	0.114	0.122	2.90	3.10
E1	0.114	0.122	2.90	3.10
E	0.187	0.199	4.75	5.05
e	0.020 BSC		0.50 BSC	
L	0.016	0.031	0.40	0.80
N	10		10	
θ	0°	8°	0°	8°



DIMENSIONS		
DIM	INCHES	MILLMETERS
C	(0.161)	(4.10)
G	0.098	2.50
P	0.020	0.50
X	0.012	0.30
Y	0.063	1.60
Z	0.224	5.70

NOTES:

1. CONTROLLING DIMENSIONS ARE IN MILLMETERS (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 MO-187, VARIATION BA.

Marking Codes

Part Number	WS05-4RM
Marking Code	 5RM=Specific Device Code YYMM=Lot Code

Package Information

Qty：3k/Reel

CONTACT INFORMATION

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