

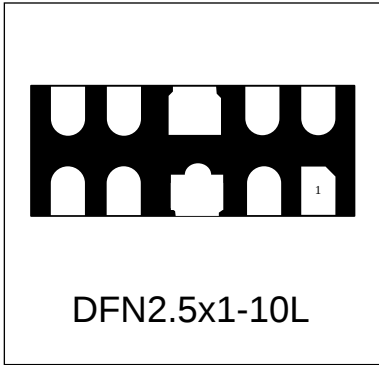


WS05-4R2P

Transient Voltage Suppressor

Features

- Solid-state silicon-avalanche technology
- Low operating and clamping voltage
- Up to four I/O Lines of Protection
- Ultra low capacitance: 0.3pF typical(I/O to I/O)
- Low Leakage
- Low operating voltage:5V
- Flow-Through design



IEC COMPATIBILITY (EN61000-4)

- IEC 61000-4-2 (ESD) $\pm 25\text{kV}$ (air), $\pm 22\text{kV}$ (contact)
- IEC 61000-4-4 (EFT) 40A (5/50ns)
- IEC 61000-4-5 (Lightning) 4.5A (8/20 μs)

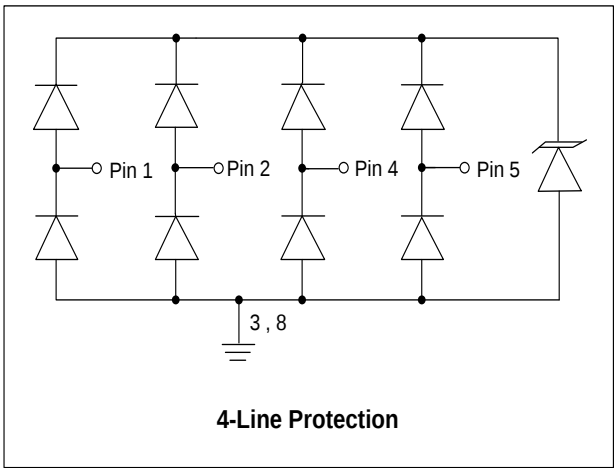
Mechanical Characteristics

- DFN-10L package (2.5 $\times$ 1.0 $\times$ 0.50mm)
- Marking: Marking Code
- Packaging: Tape and Reel
- RoHS Compliant

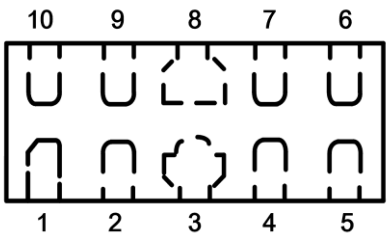
Applications

- Digital Visual Interface(DVI)
- MDDI Ports
- DisplayPort TM Interface
- PCI Express
- High Definition Multi-Media Interface(HDMI)

Circuit Diagram



Schematic & PIN Configuration



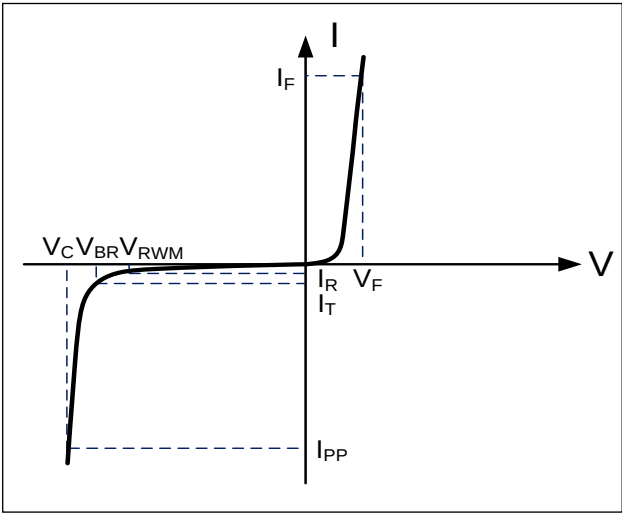
Pin	Identificaion
1,2,4,5	Input Lines
6,7,9,10	Output Lines (No Internal Connection)
3,8	Ground

Absolute Maximum Rating

Rating	Symbol	Value	Units
Peak Pulse Power ($t_p=8/20\mu s$)	P_{PP}	68	Watts
Peak Pulse Current ($t_p=8/20\mu s$)	I_{pp}	4.5	A
Operating Temperature	T_J	-55 to + 125	°C
Storage Temperature	T_{STG}	-55 to +150	°C

Electrical Parameters

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}	Breakdown Voltage @ I_T
I_T	Test Current
V_{SB}	Snap-Back Voltage @ I_{SB}
I_{SB}	Snap-Back Current



Electrical Characteristics (T=25°C unless otherwise noted)

WS05-4R2P						
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	$V_{RWM} = 5V$			500	nA
Clamping Voltage	V_C	$I_{pp}=1A, t_p=8/20\mu s$			9	V
Clamping Voltage	V_C	$I_{pp}=4.5A, t_p=8/20\mu s$			15	V
Dynamic Resistance ^{1,2}	R_{DYN}	$TLP=0.2/100ns$		0.5		Ω
ESD Clamping Voltage ¹	V_C	$I_{pp} = 4A, t_p = 0.2/100ns$ (TLP)		10		V
ESD Clamping Voltage ¹	V_C	$I_{pp} = 16A, t_p = 0.2/100ns$ (TLP)		16		V
Junction Capacitance	C_j	$V_R = 0V, f = 1MHz$			0.8	pF
		$V_{Pin3,8}=0V, V_R = 0V, f = 1MHz$ Between I/O pins		0.3	0.4	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

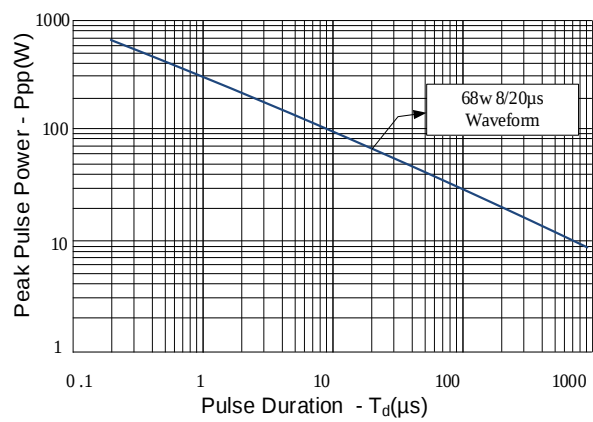


Figure 2: Power Derating Curve

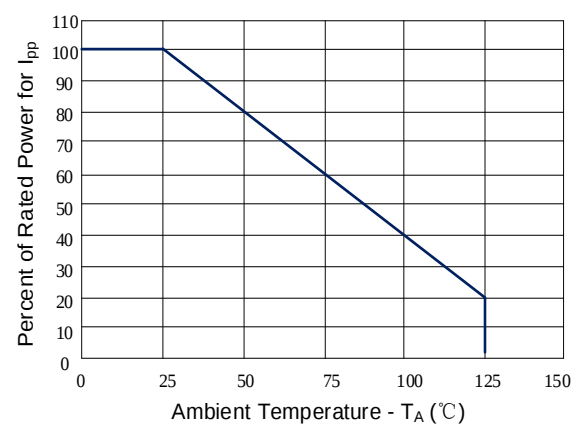


Figure 3: Clamping Voltage vs. Peak Pulse Current

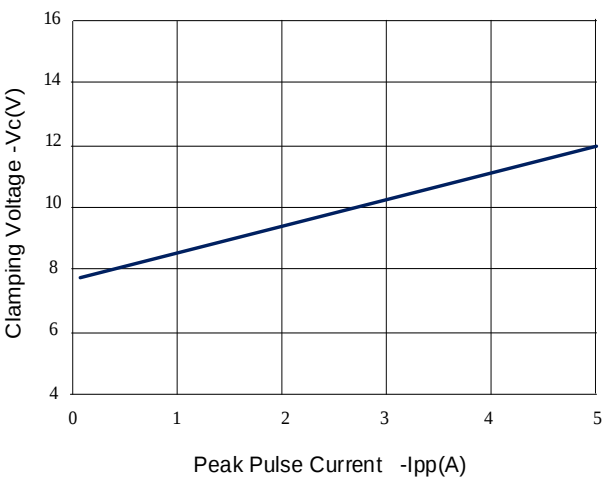


Figure 4: Normalized Junction Capacitance vs. Reverse Voltage

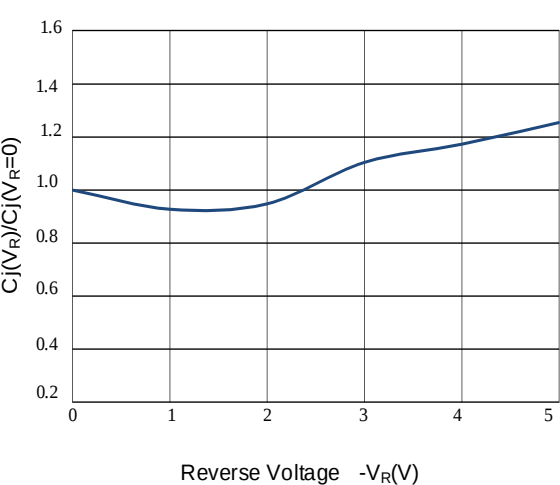


Figure 5: 8/20μs Pulse Waveform

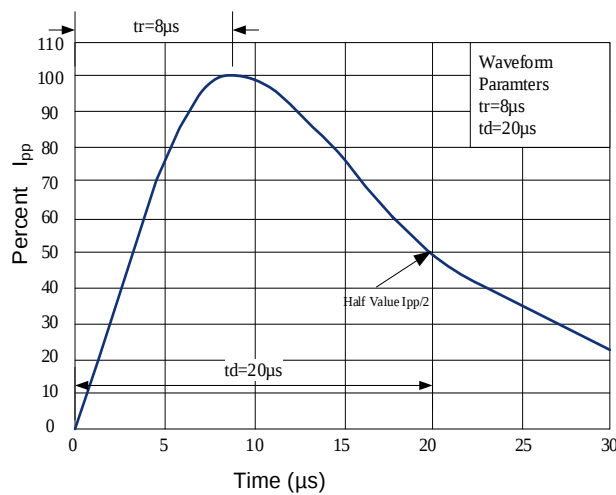
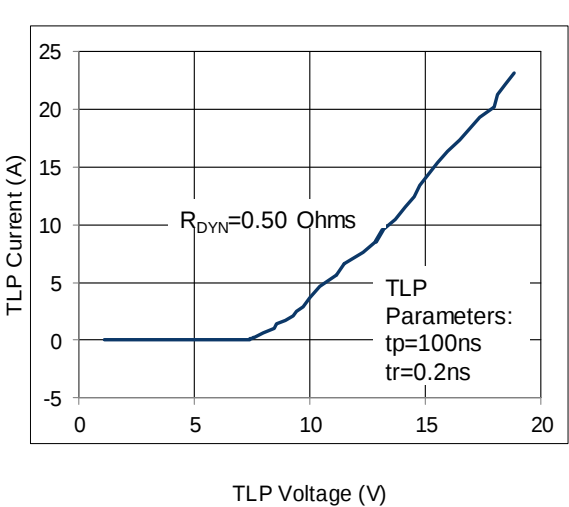
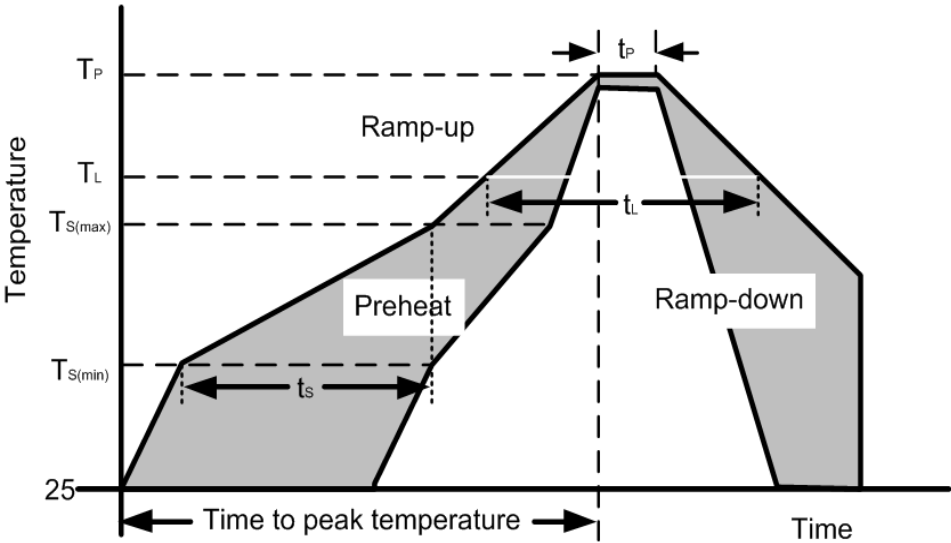


Figure 6: TLP I-V Curve



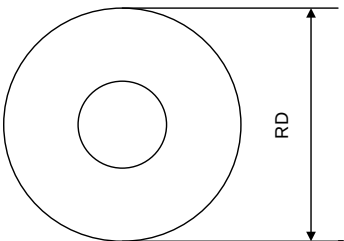
Soldering Parameters

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) (t_s)	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

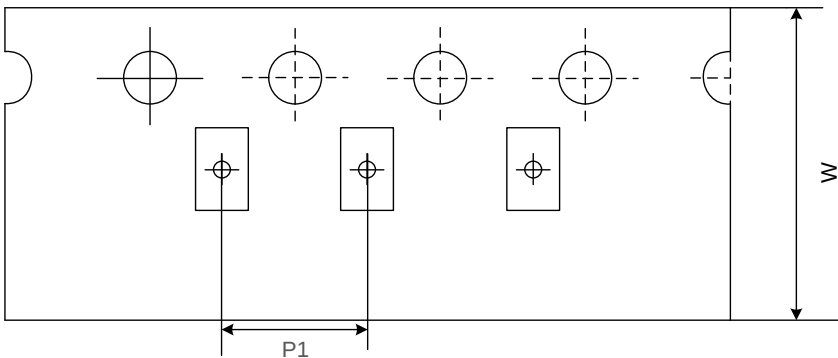


Tape And Reel Information

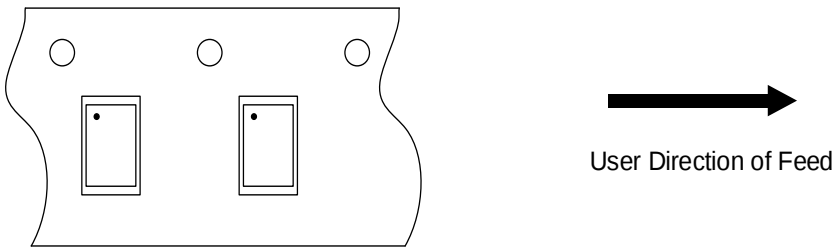
Reel Dimensions



Tape Dimensions



Quadrant Assignments For PIN1 Orientation In Tape



RD	Reel Dimensions	7 inch
W	Overall width of the carrier tape	8 mm
P1	Pitch between successive cavity centers	4mm

PIN 1 INDICATOR (LASER MARK)

Dimensions: D, E, A, A1, A2, b1, b2, b, e, L, R0.1, h, d/2, b x N1

DIMENSIONS						
DIM	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.018	0.020	0.022	0.45	0.50	0.55
A1	0.000	0.001	0.002	0.00	0.02	0.05
A2	0.006			0.15		
b	0.006	0.008	0.010	0.15	0.20	0.25
b1	0.014	0.016	0.018	0.35	0.40	0.45
b2	0.008	0.010	0.018	0.20	0.25	0.45
D	0.096	0.098	0.100	2.45	2.50	2.55
E	0.037	0.039	0.041	0.95	1.00	1.05
e	0.020 BSC			0.50 BSC		
L	0.014	0.016	0.018	0.35	0.40	0.45
L1	0.000	0.003	0.004	0.00	0.075	0.10
L2	0.000	0.002	0.003	0.00	0.05	0.08
h	0.000	0.005	0.006	0.00	0.12	0.15
N	8			8		
N1	2			2		

Dimensions: P1, P, G, Y, Y1, X, X1

DIMENSIONS		
DIM	INCHES	MILLIMETERS
C	0.034	0.875
G	0.008	0.20
P	0.020	0.50
P1	0.039	1.00
X	0.010	0.25
X1	0.018	0.45
Y	0.027	0.675
Y1	0.061	1.55

DFN2.5x1-10L

Notes:
Controlling Dimension: Millimeter.

Part Number	WS05-4R2P
Marking Code	5R2P

Qty: 3k/Reel

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Product Specification Statement

1. The product specification aims to provide users with a reference regarding various product parameters, performance, and usage. It presents certain aspects of the product's performance in graphical form and is intended solely for users to select product and make product comparisons, enabling users to better understand and evaluate the characteristics and advantages of the product. It does not constitute any commitment, warranty, or guarantee.
2. The product parameters described in the product specification are numerical values, characteristics, and functions obtained through actual testing or theoretical calculations of the product in an independent or ideal state. Due to the complexity of product applications and variations in test conditions and equipment, there may be slight fluctuations in parameter test values. WAYON shall not guarantee that the actual performance of the product when installed in the customer's system or equipment will be entirely consistent with the product specification, especially concerning dynamic parameters. It is recommended that users consult with professionals for product selection and system design. Users should also thoroughly validate and assess whether the actual parameters and performance when installed in their respective systems or equipment meet their requirements or expectations. Additionally, users should exercise caution in verifying product compatibility issues, and WAYON assumes no responsibility for the application of the product.
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