



WS05-4R2PJ

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 GND)
- Low Leakage
- Low operating voltage:5V
- Flow-Through design

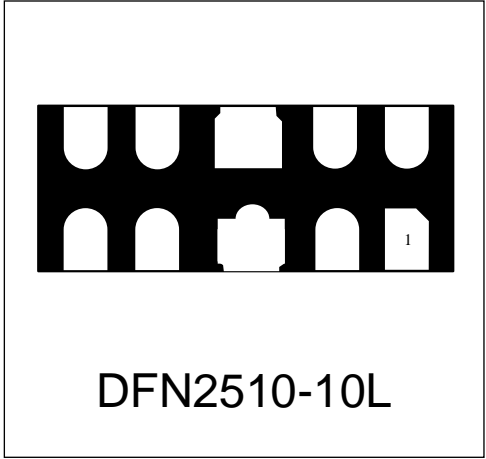
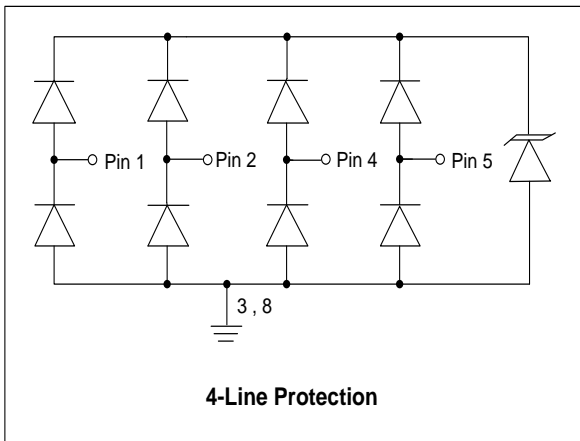
IEC COMPATIBILITY (EN61000-4)

- IEC 61000-4-2 (ESD) ±25kV (air), ±12kV (contact)
- IEC 61000-4-4 (EFT) 40A (5/50ns)
- IEC 61000-4-5 (Lightning) 3A (8/20µs)

Mechanical Characteristics

- DFN2510-10L package
- Marking: Marking Code
- Packaging: Tape and Reel
- RoHS Compliant

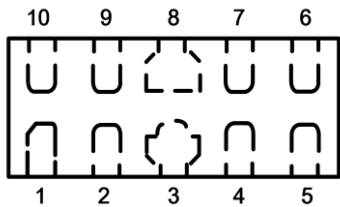
Circuit Diagram



Applications

- USB3.0/USB3.1
- HDMI 2.0
- Digital Visual Interface(DVI)
- MDDI Ports
- DisplayPort™ Interface
- PCI Express
- eSATA Interfaces

Schematic & PIN Configuration



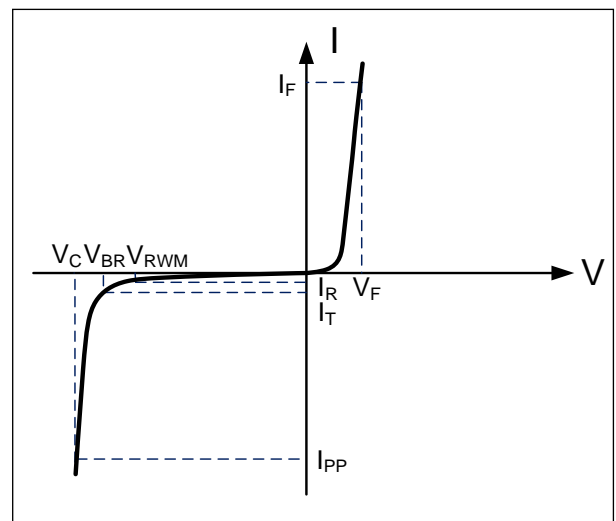
Pin	Identificaion
1,2,4,5	Input Lines
6,7,9,10	Output Lines (No Internal Connection)
3,8	Ground

Absolute Maximum Rating

Rating	Symbol	Value	Units
Peak Pulse Power ($t_p = 8/20\mu s$)	P_{PP}	39	Watts
Peak Pulse Current ($t_p = 8/20\mu s$)	I_{PP}	3	A
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}	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
I_F	Forward Current
V_F	Forward Voltage @ I_F



Electrical Characteristics

WS05-4R2PJ						
Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	V_{RWM}	Any I/O pin to ground			5.0	V
Reverse Breakdown Voltage	V_{BR}	$I_T = 1mA$ Any I/O pin to ground	6.0			V
Reverse Leakage Current	I_R	$V_{RWM} = 5V, T = 25^\circ C$ Any I/O pin to ground			200	nA
Clamping Voltage	V_C	$I_{PP} = 3A, t_p = 8/20\mu s$ Any I/O pin to ground		11.0	13.0	V
ESD Clamping Voltage ¹	V_C	$I_{PP} = 4A,$ $t_p = 0.2/100ns$ (TLP)		10.5		V
ESD Clamping Voltage ¹	V_C	$I_{PP} = 16A,$ $t_p = 0.2/100ns$ (TLP)		20.0		V
Dynamic Resistance ^{1,2}	R_{DYN}	TLP=0.2/100ns		0.75		Ω
Junction Capacitance	C_j	$V_R = 1.5V, f = 1MHz$ I/O pin to GND		0.35	0.45	pF
		$V_R = 1.5V, f = 1MHz$ Between I/O pins,		0.15	0.20	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

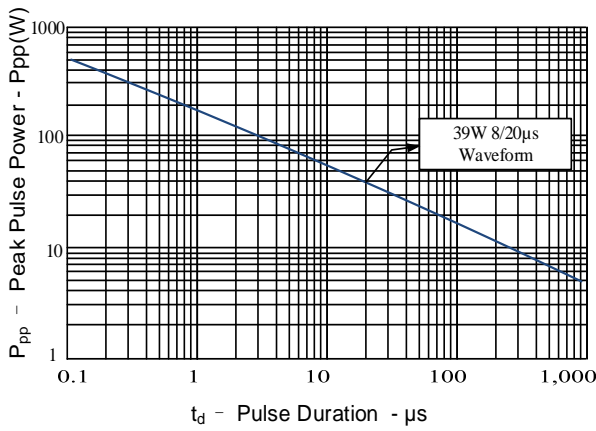


Figure 2: Power Derating Curve

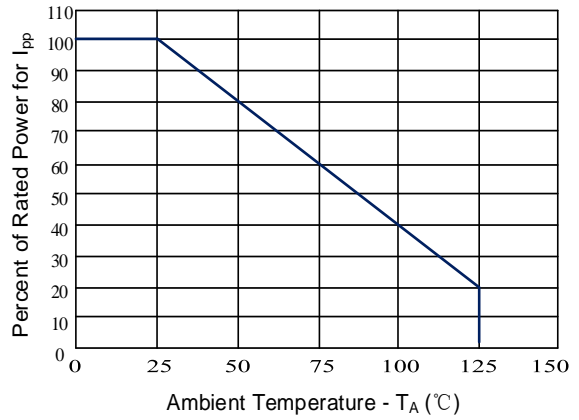


Figure 3: Clamping Voltage vs. Peak Pulse Current

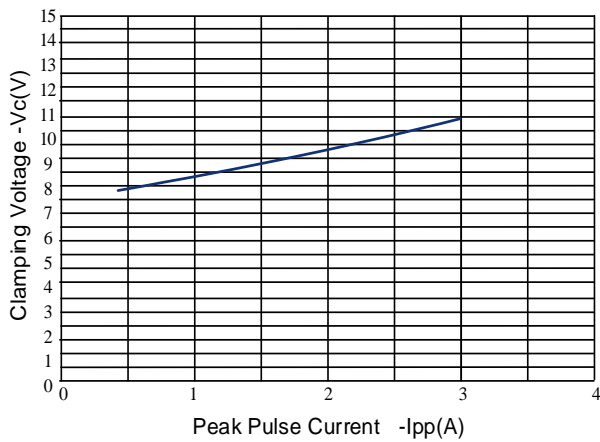


Figure 4: Normalized Junction Capacitance vs. Reverse Voltage

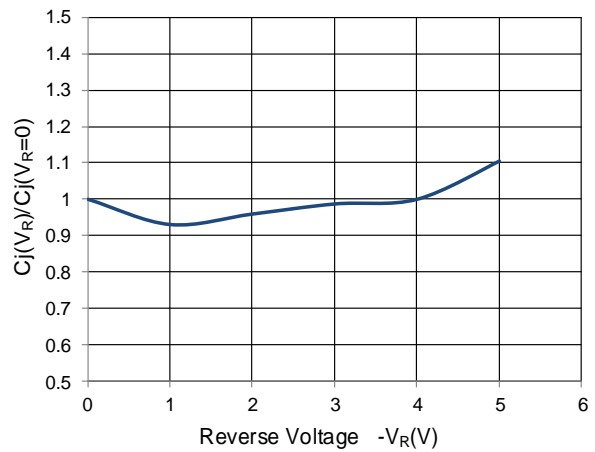


Figure 5: 8/20μs Pulse Waveform

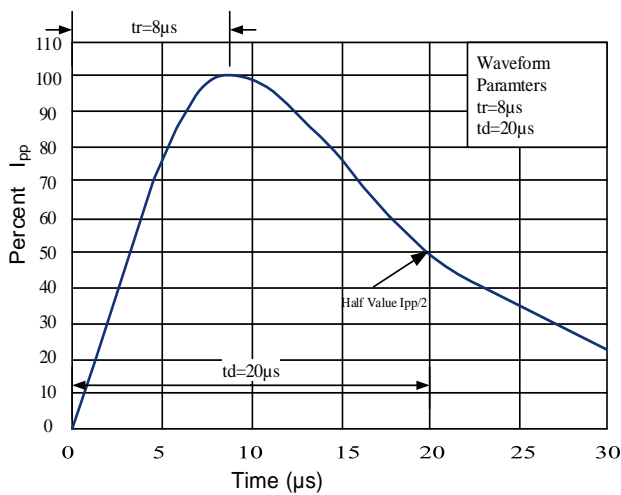
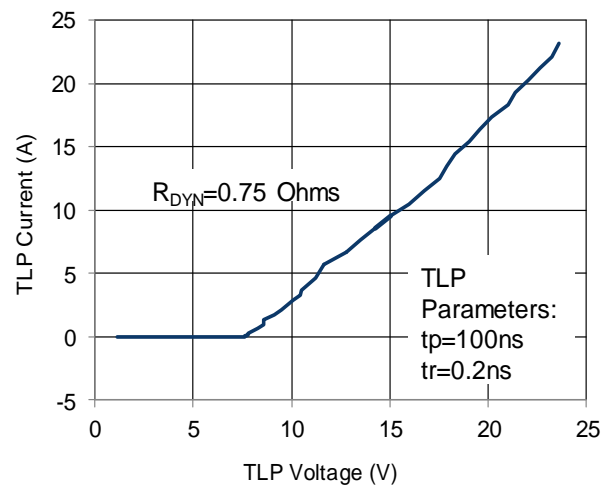
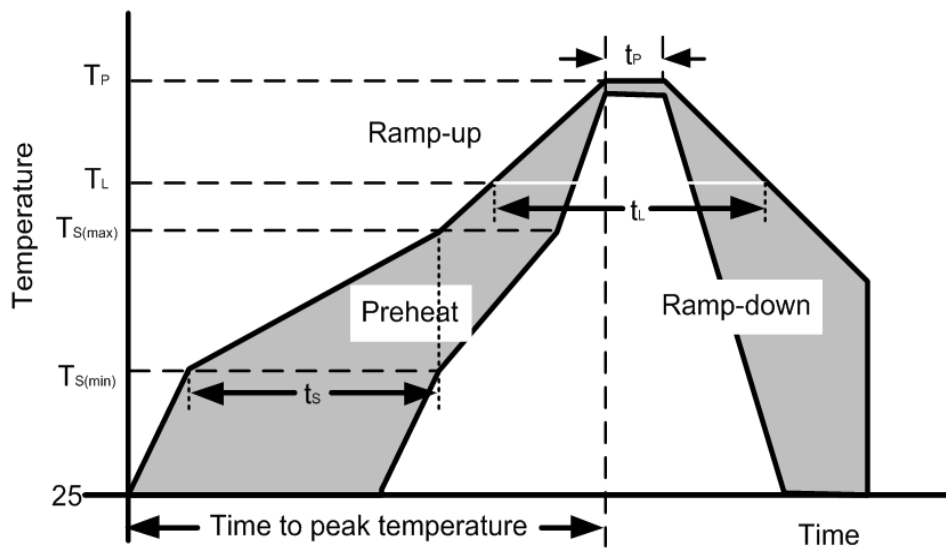


Figure 6: TLP I-V Curve



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



Outline Drawing –DFN2510-10L

PIN1 INDICATOR (LASER MARK)

Dimensions: D, E, A, A1, A2, b1xN1, R0.1, b2, h, E/2, L, e, D/2, bxN, 1, 2

DFN2.5x1-10L

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, C, G, X, X1, Y, Y1

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

Notes:
Controlling Dimension: Millimeter.

Marking Codes

Part Number	WS05-4R2PJ
Marking Code	<div style="border: 1px solid black; display: inline-block; padding: 2px;"> 5R2P </div>

Package Information

Qty: 3k/Reel

CONTACT INFORMATION

No.1001, Shiwan (7) Road, Pudong District, Shanghai, P.R.China.201207

Tel: 86-21-68969993 Fax: 86-21-50757680 Email: market@way-on.com

WAYON website: <http://www.way-on.com>

For additional information, please contact your local Sales Representative.

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Specifications are subject to change without notice.
The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time.
Users should verify actual device performance in their specific applications.