

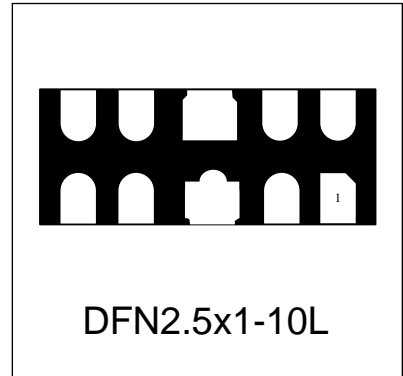


WS3.3-4R2P-AT

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: 0.25pF typical(Between I/O pins)
- Low Leakage
- Low operating voltage:3.3V
- AEC-Q101 Qualified



IEC COMPATIBILITY (EN61000-4)

- IEC 61000-4-2 (ESD) $\pm 18\text{kV}$ (air), $\pm 15\text{kV}$ (contact)
- IEC 61000-4-4 (EFT) 40A (5/50ns)
- IEC 61000-4-5 (Lightning) 5.5A (8/20 μs)

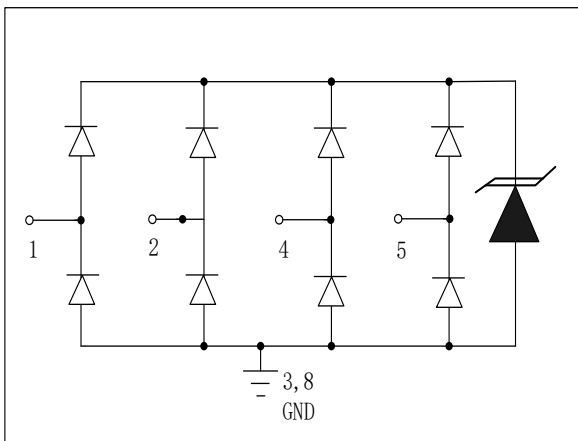
Mechanical Characteristics

- DFN2510-10L package
- Marking: Marking Code
- Packaging: Tape and Reel
- RoHS Compliant & HF
- Device meets MSL1 requirement

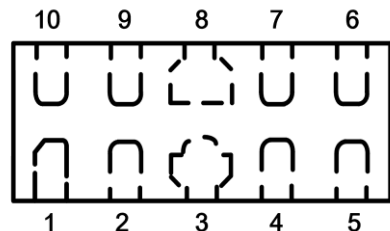
Applications

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

Circuit Diagram



Schematic & PIN Configuration



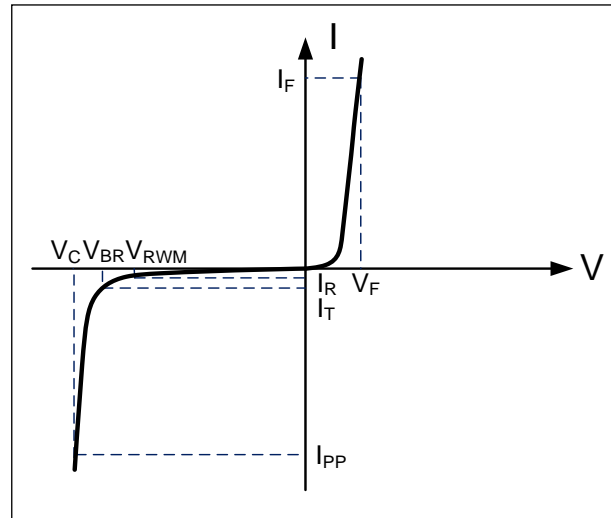
Pin	Identificaion
1,2,4,5	Input Lines
6,7,9,10	Output Lines (No Internal Connection)
3,8	Ground

Absolute Maximum Rating

Rating	Symbol	Value	Units
Peak Pulse Power ($t_p = 8/20\mu s$)	P_{PP}	75	Watts
Peak Pulse Current ($t_p = 8/20\mu s$)	I_{PP}	5.5	A
Operating Temperature	T_J	-55 to + 150	$^{\circ}C$
Storage Temperature	T_{STG}	-55 to + 150	$^{\circ}C$

Electrical Parameters

Symbol	Parameter
I_{PP}	Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
V_{RWM}	Peak Reverse 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 ($T = 25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	V_{RWM}	Any I/O pin to ground			3.3	V
Reverse Breakdown Voltage	V_{BR}	$I_T = 1mA$ Any I/O pin to ground	3.7		7	V
Reverse Leakage Current	I_R	$V_{RWM} = 3.3V$ Any I/O pin to ground			500	nA
Clamping Voltage	V_C	$I_{PP} = 5.5A, t_p = 8/20\mu s$ Any I/O pin to ground		10	13.5	V
Dynamic Resistance ^{1,2}	R_{DYN}	TLP=0.2/100ns		0.3		Ω
ESD Clamping Voltage ¹	V_C	$I_{PP} = 4A,$ $t_p = 0.2/100ns$ (TLP)		8		V
ESD Clamping Voltage ¹	V_C	$I_{PP} = 16A,$ $t_p = 0.2/100ns$ (TLP)		11.7		V
Junction Capacitance	C_j	$V_R = 0V, f = 1MHz$ I/O pin to GND		0.5	0.8	pF
		$V_R = 0V, f = 1MHz$ Between I/O pins		0.25	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

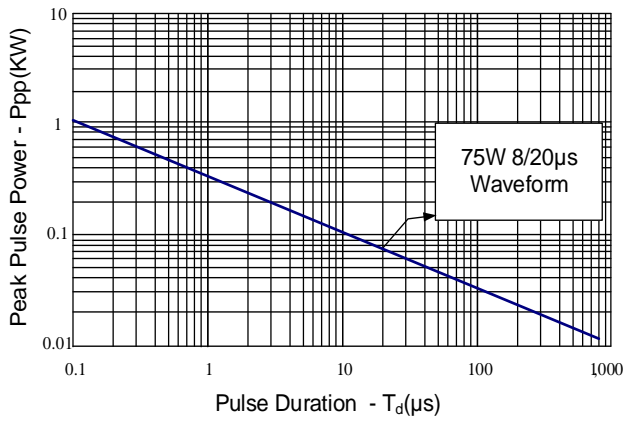


Figure 2: Power Derating Curve

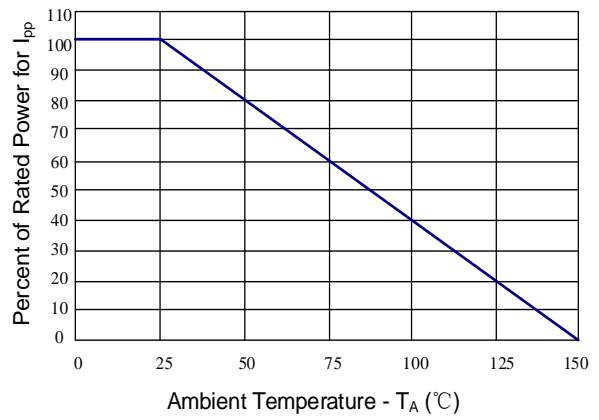


Figure 3: Clamping Voltage vs. Peak Pulse Current

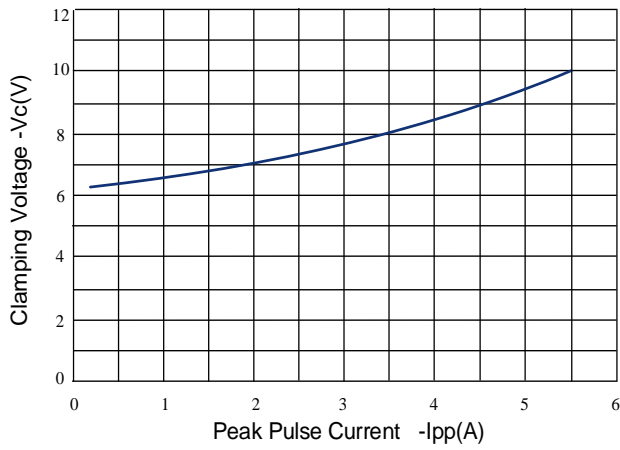


Figure 4: Normalized Junction Capacitance vs. Reverse Voltage

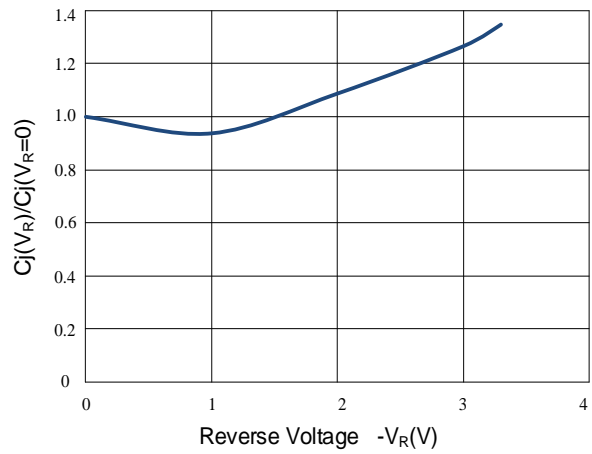


Figure 5: 8/20µs Pulse Waveform

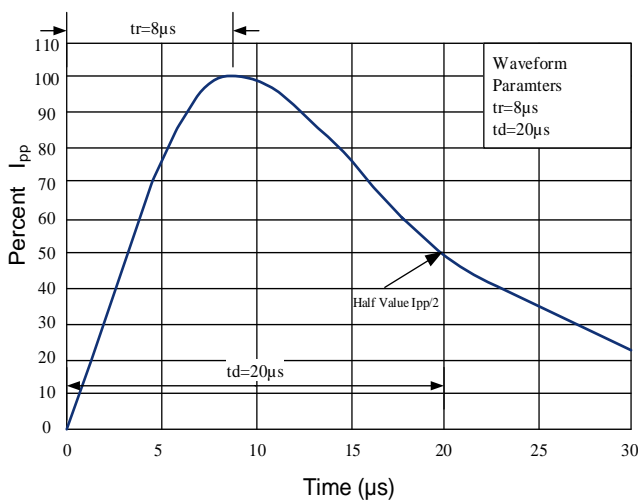
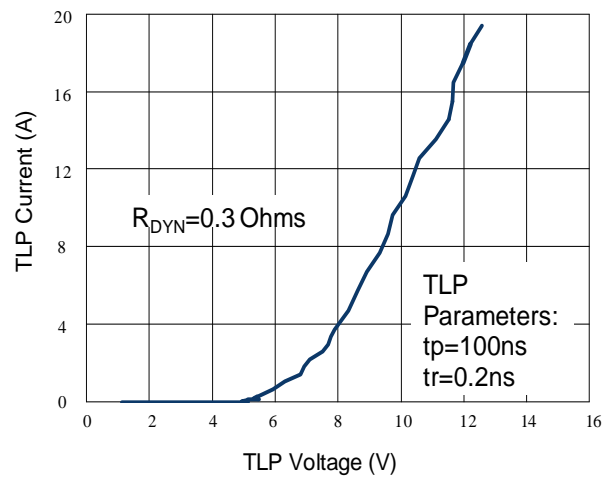
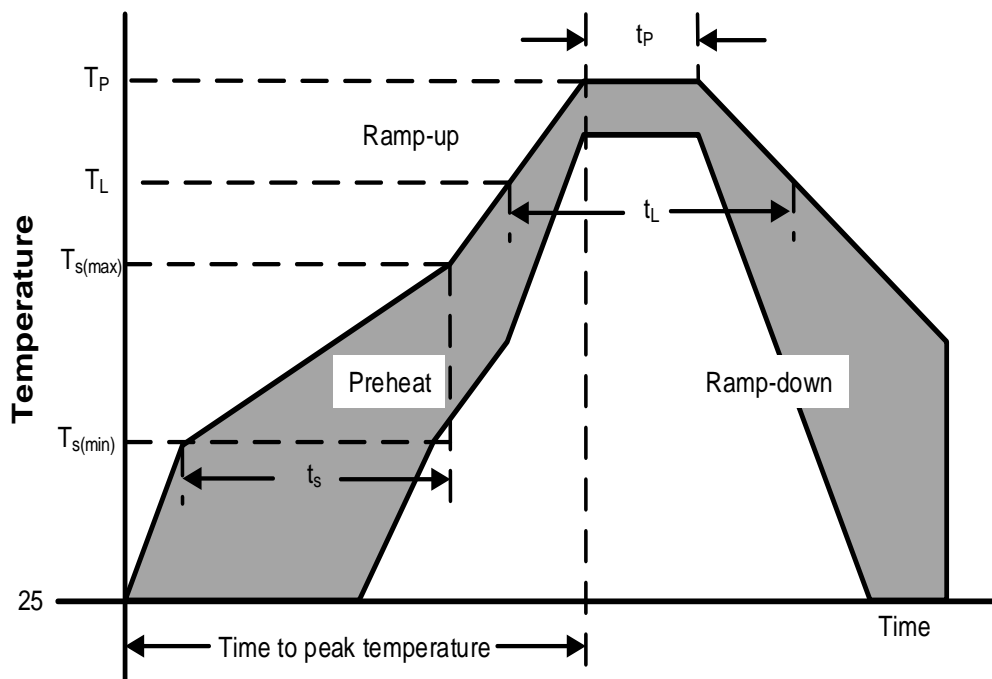


Figure 6: TLP I-V Curve



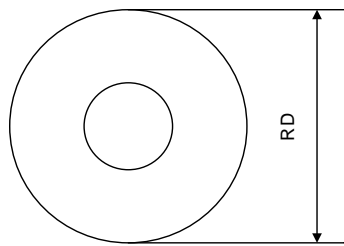
Soldering Parameters

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

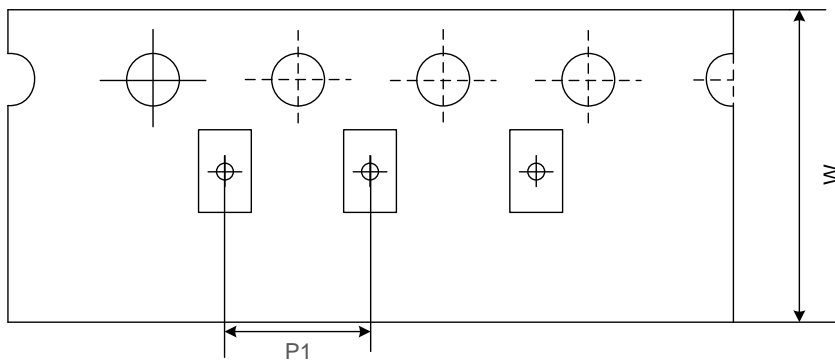


Tape And Reel Information

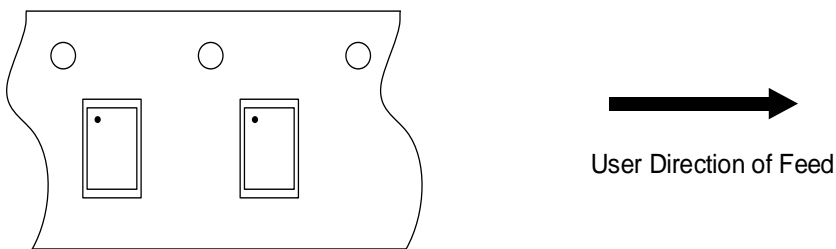
Reel Dimensions



Tape Dimensions

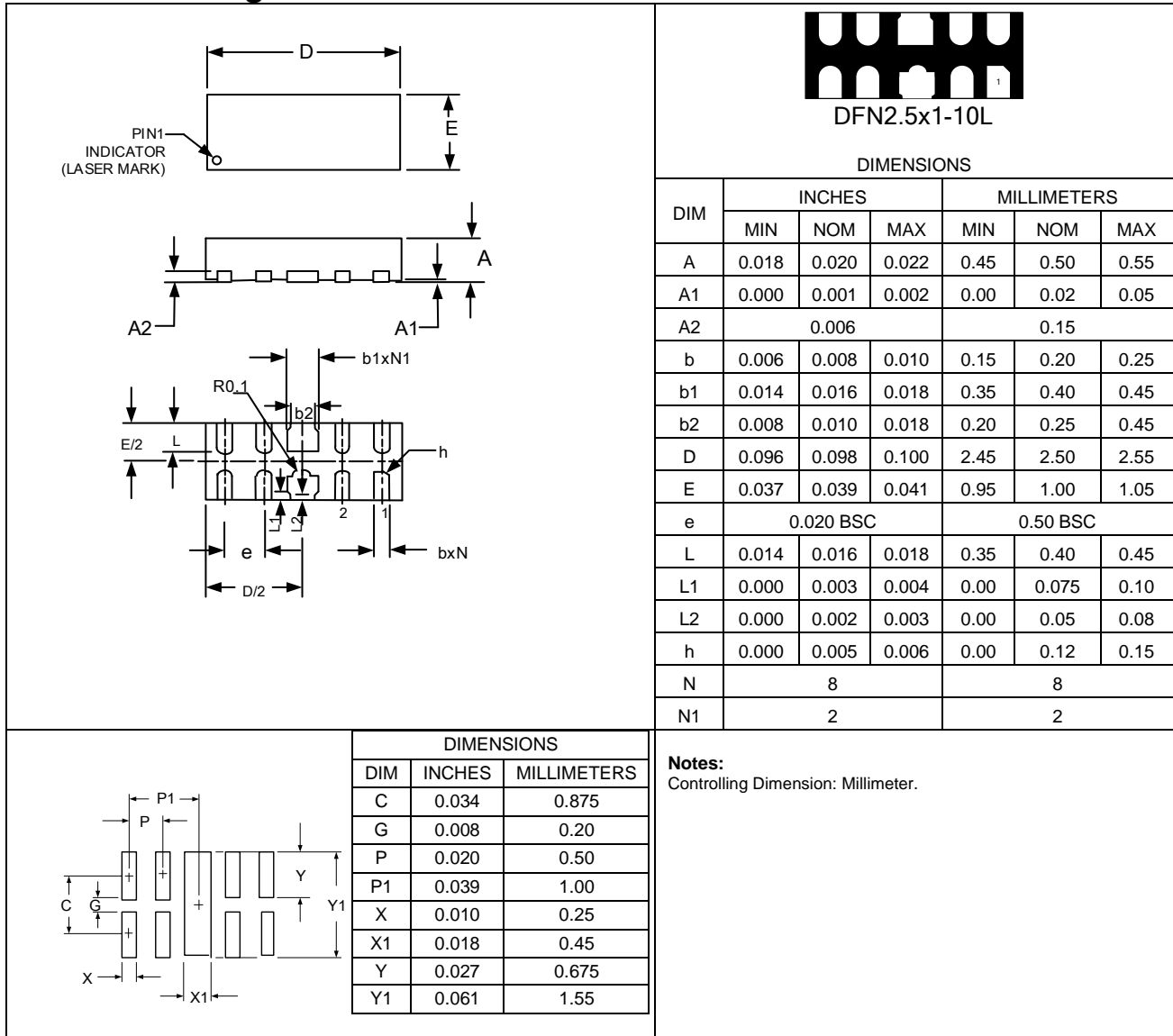


Quadrant Assignments For PIN1 Orientation In Tape



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

Outline Drawing –DFN2510-10L



Marking Codes

Part Number	Marking Code
WS3.3-4R2P-AT	3R2P

Package Information

Qty: 3k/Reel

CONTACT INFORMATION

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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.*