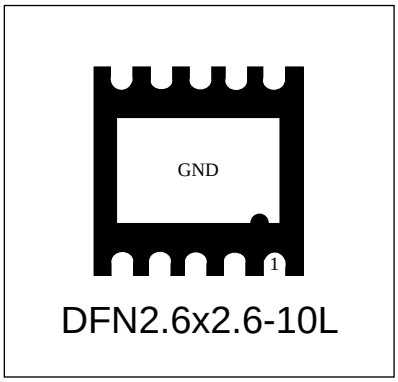
WS2.5-4R1N

Transient Voltage Suppressor

Features

- Array of surge rated diodes with internal TVS Diode
- Small package saves board space
- Protects up to four I/O lines
- Low capacitance for high-speed interfaces
- Low leakage current and clamping voltage
- Low operating voltage: 2.5V
- Solid-state silicon-avalanche technology



DFN2.6x2.6-10L

IEC COMPATIBILITY (EN61000-4)

- **IEC 61000-4-2 (ESD) ±30kV (air), ±30kV (contact)**
- **IEC 61000-4-4 (EFT) 40A (5/50ns)**
- **IEC 61000-4-5 (Lightning) 28A (8/20μs)**

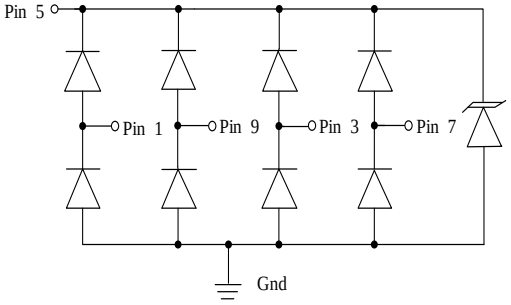
Mechanical Characteristics

- DFN2626-10L package
- Marking : Marking Code
- Packaging : Tape and Reel
- RoHS Compliant & HF

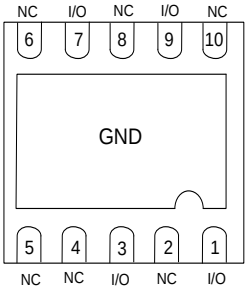
Applications

- USB 2.0
- 10/100/1000 Ethernet
- Digital Visual Interface (DVI)
- T1/E1 Secondary Protection
- T3/E3 Secondary Protection
- Analog Video

Circuit Diagram



Schematic & PIN Configuration

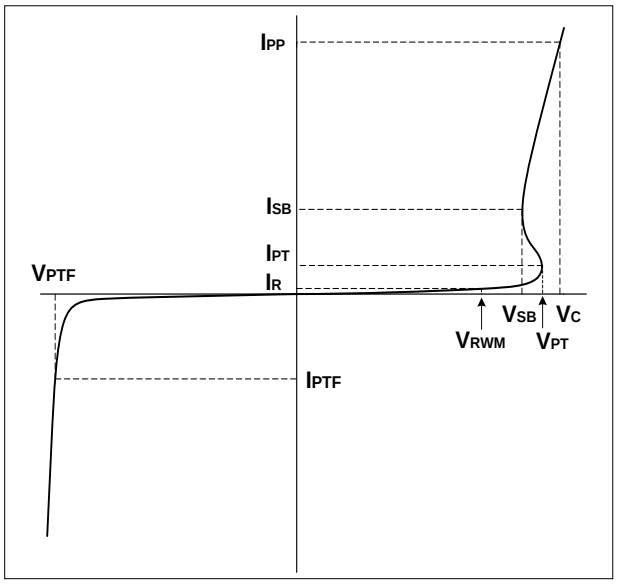


Note: Suggest do not connect pin 5 to a DC supply

Absolute Maximum Rating			
Rating	**Symbol**	**Value**	**Units**
Peak Pulse Power（t_p =8/20μs）	P_{PP}	500	Watts
Peak Pulse Current（t_p =8/20μs）	I_{PP}	28	A
Operating Temperature	T_J	-55 to + 125	°C
Storage Temperature	T_{STG}	-55 to +150	°C

Electrical Parameters

Symb	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_{PT}	Punch-through Breakdown Voltage @ I_T
V_{SB}	Snap-Back Voltage @ I_{SB}
I_{SB}	Snap-Back Current
I_{PT}	Test Current
V_{PTF}	Forward Punch-through Breakdown Voltage @
I_{PTF}	Forward Test Current



Electrical Characteristics (T=25℃ unless otherwise noted)

WS2.5-4R1N						
Parameter	**Symbol**	**Conditions**	**Minimum**	**Typical**	**Maximum**	**Units**
Reverse Stand-Off Voltage	V_{RWM}	Any I/O pin to ground			2.5	V
Reverse Breakdown Voltage	V_{BR}	I_t = 1mA Any I/O pin to ground	3.0			V
Snap-Back Voltage	V_{SB}	I_{SB}= 50mA Any I/O pin to ground	2.8			
Reverse Leakage Current	I_R	V_{RWM} = 2.5V Any I/O pin to ground			500	nA
Clamping Voltage	Vc	I_{pp}=28A, t_p=8/20μs Any I/O pin to ground		14	18	V
ESD Clamping Voltage[1]	V_C	I_{PP} = 4A t_p = 0.2/100ns		8.4		V
ESD Clamping Voltage[1]	V_C	I_{PP} = 16A t_p = 0.2/100ns		11.2		V
Dynamic Resistance[1,2]	R_{DYN}	TLP=0.2/100ns		0.22		Ω
Junction Capacitance	C_j	V_R = 0V, f = 1MHz I/O pin to GND		2.7	4	pF
		V_R = 0V, f = 1MHz Between I/O pins		1.3	3	pF

Note：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

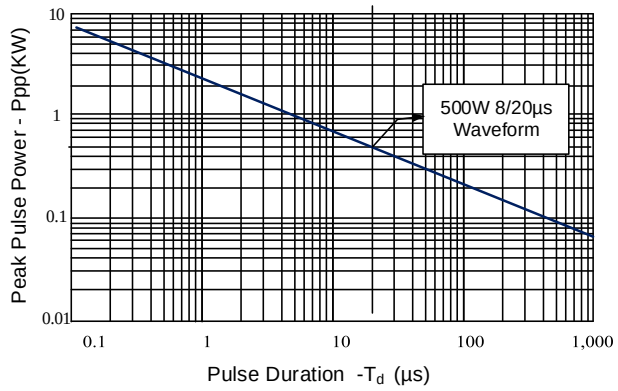


Figure 2: Power Derating Curve

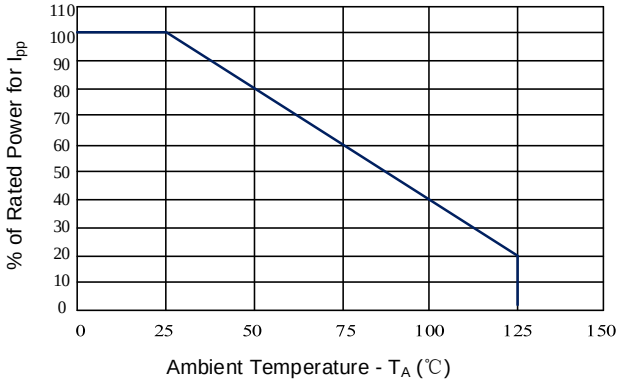


Figure 3: Clamping Voltage vs. Peak Pulse Current

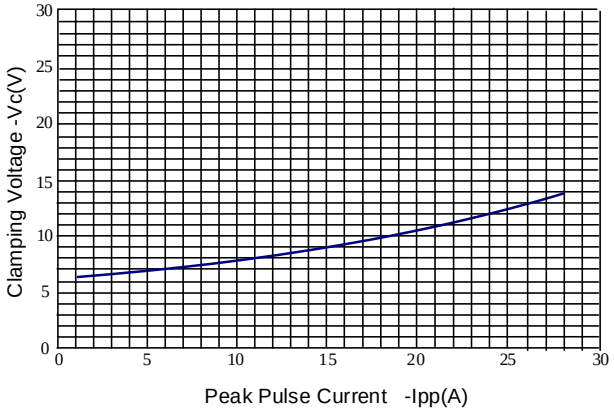


Figure 4: Normalized Junction Capacitance vs. Reverse Voltage

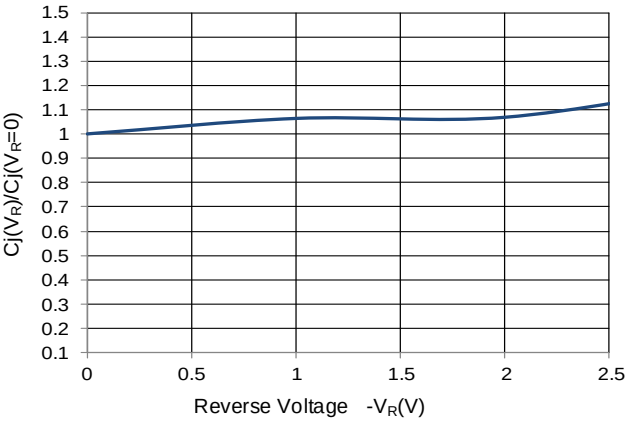


Figure 5: 8/20μs Pulse Waveform

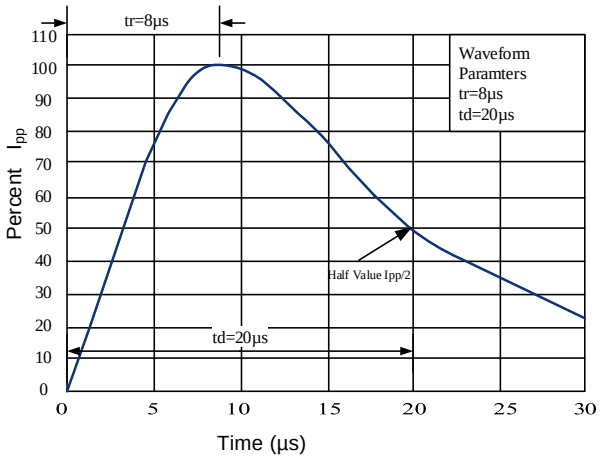
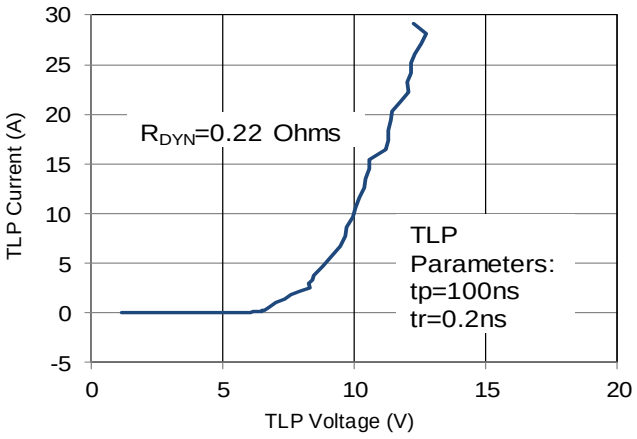
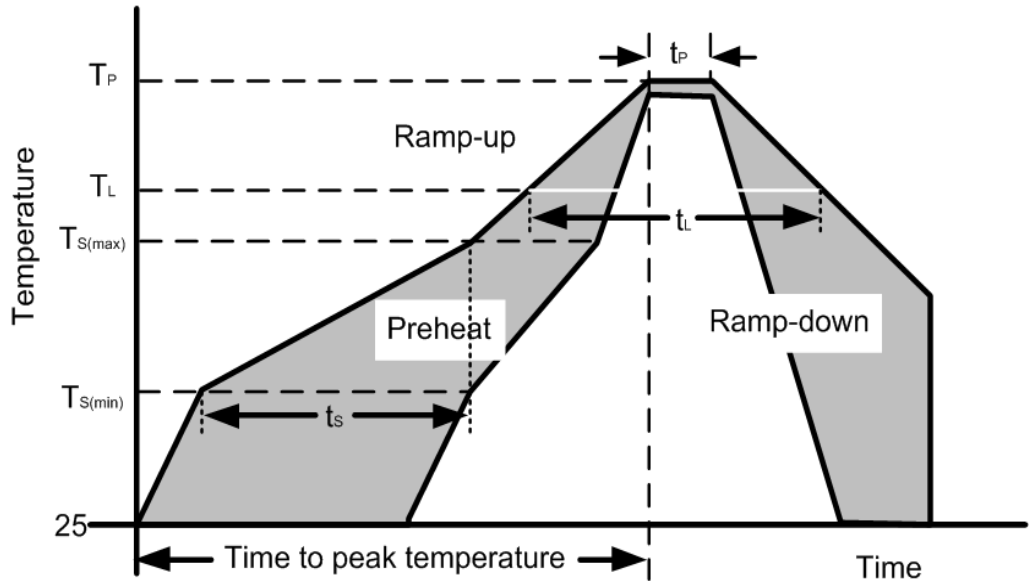


Figure 6: TLP I-V Curve

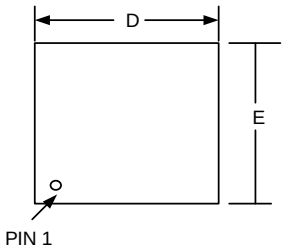


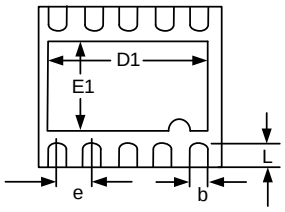
Soldering Parameters

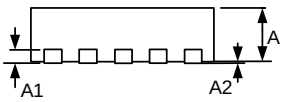
Reflow Condition		Pb – Free assembly
Pre Heat	Temperature Min ($T_{s(min)}$)	150°C
	Temperature Max ($T_{s(max)}$)	200°C
	Time (min to max) (ts)	60 – 190 secs
Average ramp up rate (Liquidus Temp) (T_L) to peak		5°C/second max
$T_{S(max)}$ to T_L——Ramp-up Rate		5°C/second max
Reflow	Temperature (T_L) (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

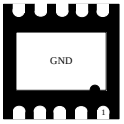


Outline Drawing –DFN2.6x2.6-10L



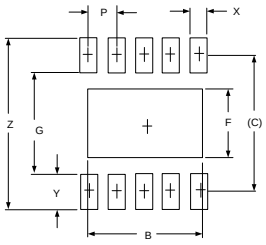






DFN2.6x2.6-10L

DEMENSIONS				
SYMBOL	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.450	0.550	0.018	0.022
A2	0.000	0.050	0.000	0.002
A1	0.150REF		0.006REF	
D	2.550	2.650	0.101	0.105
D1	2.100	2.200	0.083	0.087
E	2.550	2.650	0.101	0.105
E1	1.210	1.310	0.048	0.052
b	0.200	0.300	0.008	0.012
e	0.500BSC.		0.020BSC	
L	0.300	0.400	0.012	0.016



DIMENSIONS		
DIM	INCHES	MILLIMETERS
B	0.081	2.05
C	0.100	2.50
F	0.050	1.26
G	0.073	1.85
P	0.020	0.50
X	0.012	0.30
Y	0.025	0.65
Z	0.124	3.15

NOTES:

Controlling Dimension: Millimeter.

Marking Codes

Part Number	WS2.5-4R1N
Marking Code	2201 YYWW ● YYWW:Date Code

Package Information

Qty：3k/Reel

CONTACT INFORMATION

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