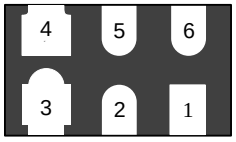
WS05-2R2P

Transient Voltage Suppressor

Features

- Solid-state silicon-avalanche technology
- Low operating and clamping voltage
- Up to two I/O Lines of Protection
- Ultra low capacitance
- Low operating voltage:5V
- Low Leakage Current



DFN1610-6L

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) 5A (8/20μs)**

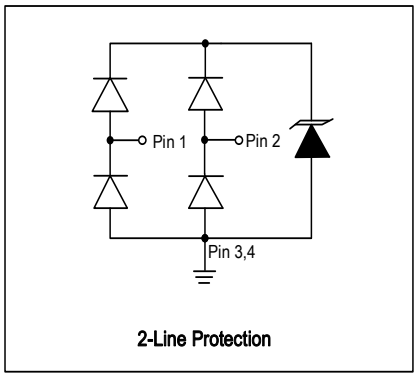
Mechanical Characteristics

- DFN1610-6L package
- Marking : Marking Code
- Packaging : Tape and Reel per EIA 481
- RoHS Compliant

Applications

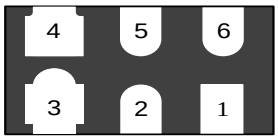
- Digital Visual Interface(DVI)
- MDDI Ports
- Display Port TM Interface
- PCI Express
- High Definition Multi-Media Interface(HDMI)
- HDMI Interfaces

Circuit Diagram



2-Line Protection

Schematic & PIN Configuration

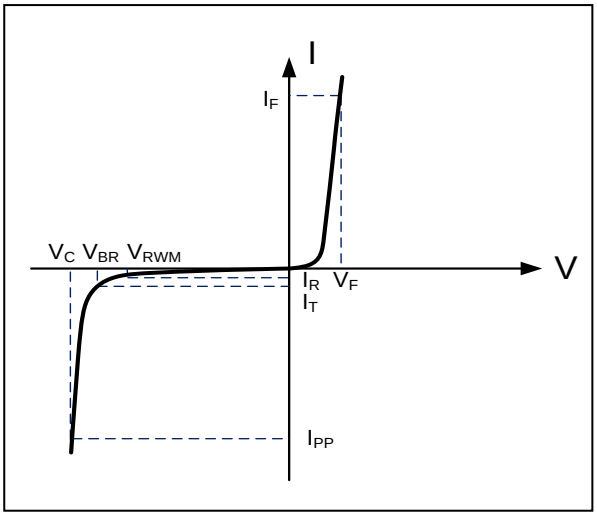


Pin	Identificaion
1,2	Input line
5,6	Output Lines (No Internal Connection)
3,4	Ground

Absolute Maximum Rating			
Rating	**Symbol**	**Value**	**Units**
Peak Pulse Power（t_p =8/20μs）	P_{PP}	65	Watts
Peak Pulse Current（t_p =8/20μs）	I_{PP}	5	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}	Breakdown Voltage @ I_T
I_T	Test Current
I_F	Forward Current
V_F	Forward Voltage @ I_F



Electrical Characteristics

WS05-2R2P						
Parameter	**Symbol**	**Conditions**	**Minimum**	**Typical**	**Maximum**	**Units**
Reverse Stand-Off Voltage	V_{RWM}				5	V
Reverse Breakdown Voltage	V_{BR}	I_T=1mA	5.6		10	V
Reverse Leakage Current	I_R	V_{RWM}=5V,T=25°C			500	nA
Clamping Voltage	V_C	I_{PP}=5A, t_p=8/20μs		10	13	V
Dynamic Resistance[1,2]	R_{DYN}	TLP=0.2/100ns		0.23		Ω
ESD Clamping Voltage[1]	V_C	I_{PP} = 4A t_p = 0.2/100ns		8.9		V
ESD Clamping Voltage[1]	V_C	I_{PP} = 16A t_p = 0.2/100ns		11.7		V
Junction Capacitance	C_j	VR = 0V, f = 1MHz I/O pin to GND		0.8	1.2	pF
		VR = 0V, f = 1MHz Between I/O pins		0.4	0.6	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

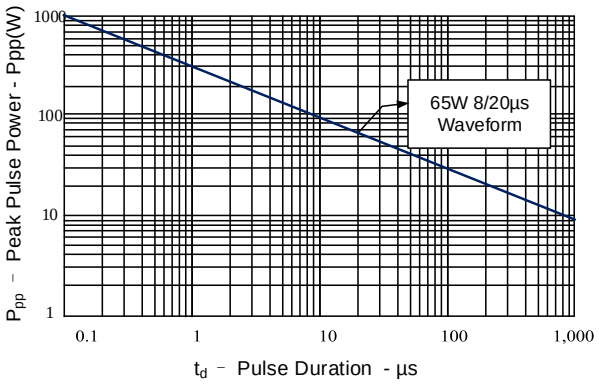


Figure 2: Power Derating Curve

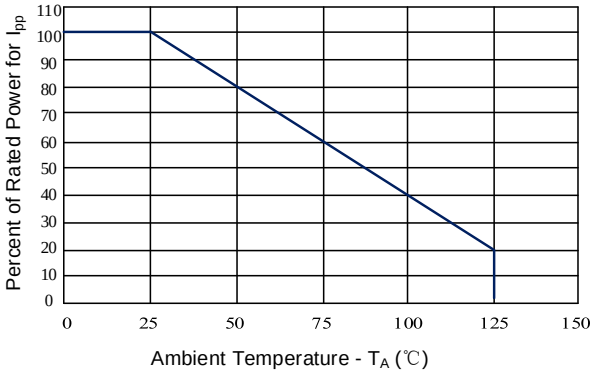


Figure 3: Clamping Voltage vs. Peak Pulse Current

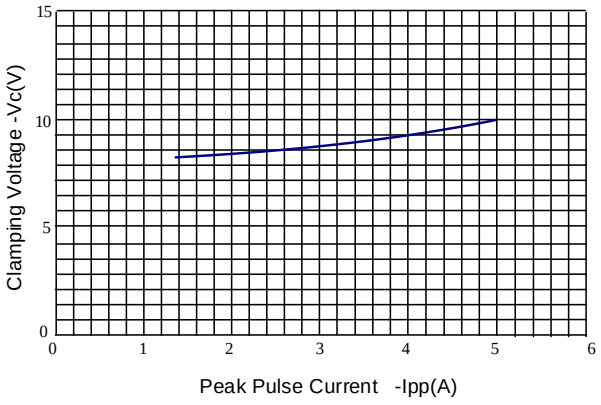


Figure 4: Normalized Junction Capacitance vs. Reverse Voltage

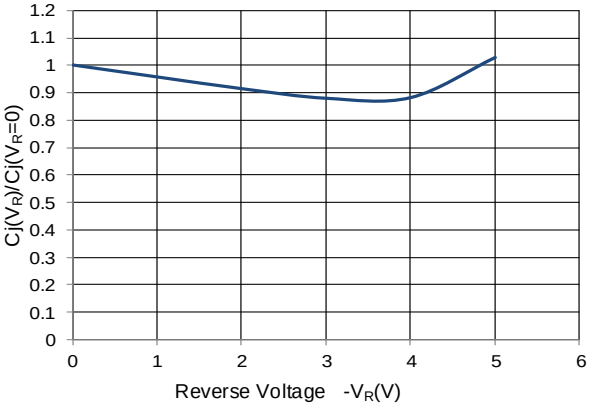


Figure 5: Pulse Waveform

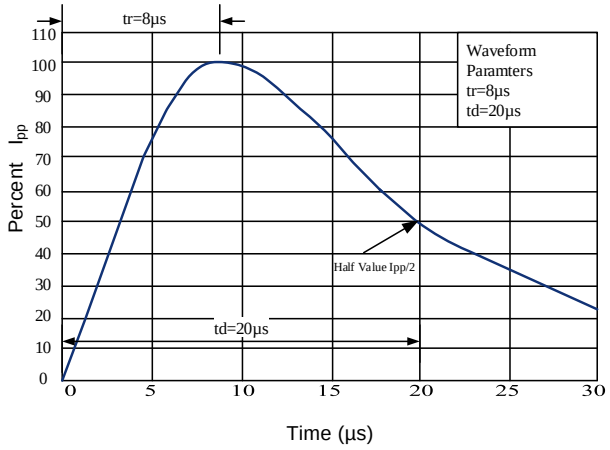
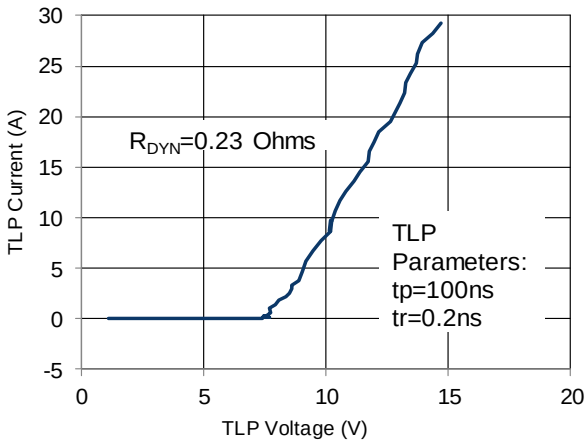
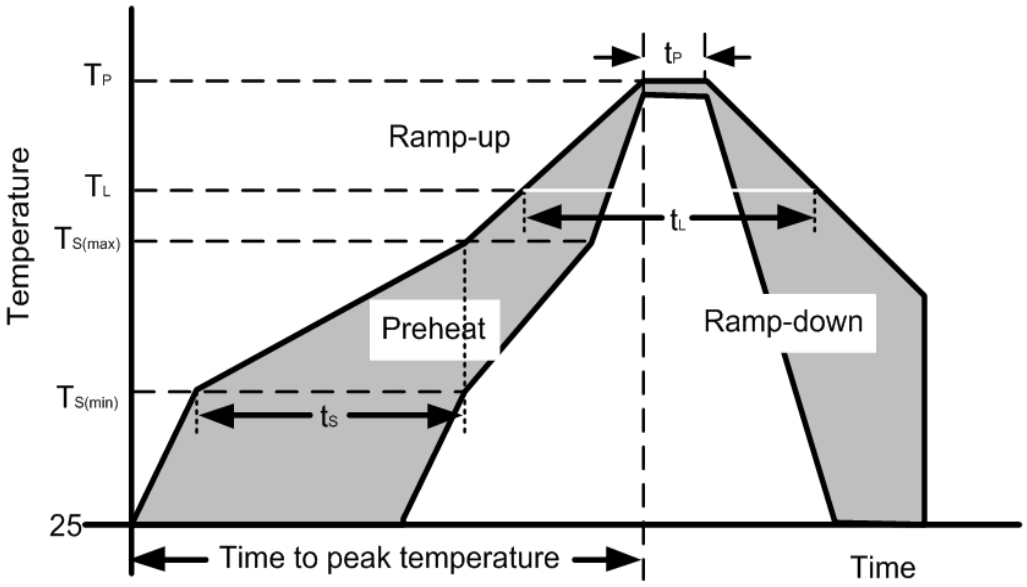


Figure 6: TLP I-V Curve

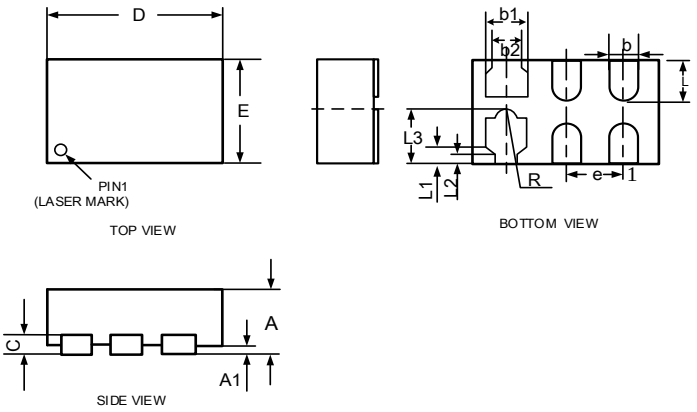


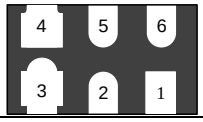
Soldering Parameters

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

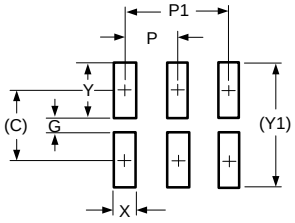


Outline Drawing – DFN1610-6L





SYMBOL	MILLIMETERS		
	MIN	NOM	MAX
A	0.50	0.55	0.60
A1	-	0.02	0.05
b	0.15	0.20	0.25
b1	0.35	0.40	0.45
b2	0.20	0.25	0.30
c	0.10	0.15	0.20
D	1.55	1.60	1.65
e	0.50BSC		
E	0.95	1.00	1.05
L	0.33	0.38	0.43
L1	0.10REF		
L2	0.05REF		
L3	0.49REF		
R	0.08	0.13	0.18



DIMENSIONS		
DIM	INCHES	MILLIMETERS
C	0.024	0.60
G	0.004	0.10
P	0.020	0.50
P1	0.039	1.00
X	0.012	0.30
Y	0.020	0.50
Y1	0.043	1.10

Notes:
Controlling Dimension: Millimeter.

Marking Codes

Part Number	Marking Code
WS05-2R2P	2R2P

Package Information

Qty：3k/Reel

CONTACT INFORMATION

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