



Features

- ◆ ESD protection for high-speed data lines to IEC 61000-4-2 (ESD) $\pm 15\text{kV}$ (air), $\pm 8\text{kV}$ (contact)
- ◆ IEC 61000-4-2 (ESD) $\pm 15\text{kV}$ (air), $\pm 8\text{kV}$ (contact)
- ◆ Array of surge rated diodes with internal TVS Diode
- ◆ Small package saves board space
- ◆ Protects two I/O lines and a power line
- ◆ Low capacitance: 0.3pF typical
- ◆ Low clamping voltage
- ◆ Solid-state silicon-avalanche technology

Mechanical Characteristics

- ◆ DFN1210N6 Package
- ◆ RoHs/WEEE Compliant
- ◆ Nominal Dimensions: 1.2 x 1.0 x 0.58 mm
- ◆ Lead Pitch: 0.4mm
- ◆ Lead Finish: NiPdAu
- ◆ Packaging : Tape and Reel

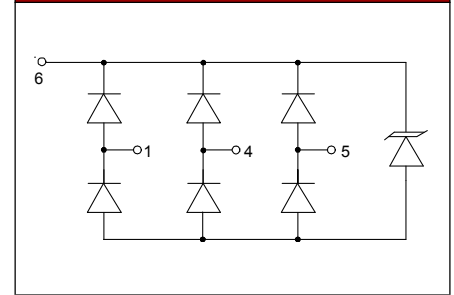
Applications

- ◆ USB
- ◆ MMC Port
- ◆ Serial ATA
- ◆ Video Port

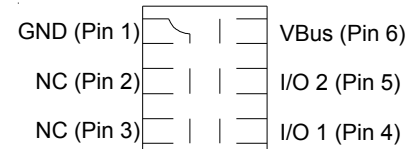
Absolute Maximum Rating

Rating	Symbol	Value	Units
Peak Pulse Power ($t_p = 8/20\mu\text{s}$)	P_{pk}	90	Watts
Peak Pulse Current ($t_p = 8/20\mu\text{s}$)	I_{PP}	3	A
ESD per IEC 61000-4-2 (Air)	V_{ESD}	± 15	kV
ESD per IEC 61000-4-2 (Contact)		± 8	
Operating Temperature	T_J	-55 to +125	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-55 to +150	$^{\circ}\text{C}$

Circuit Diagram



PIN CONFIGURATION

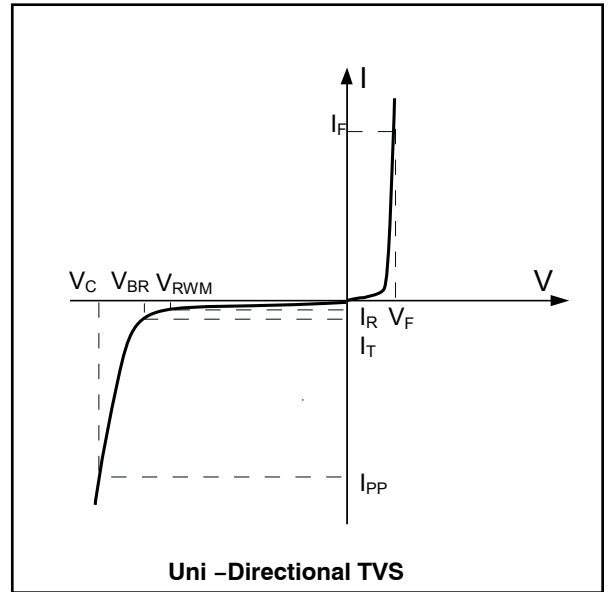




ELECTRICAL CHARACTERISTICS

($T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter
V_{RWM}	Peak Reverse Working Voltage
I_R	Reverse Leakage Current @ V_{RWM}
V_{BR}	Breakdown Voltage @ I_T
I_T	Test Current
I_{PP}	Maximum Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
P_{PP}	Peak Pulse Power
C_J	Junction Capacitance
I_F	Forward Current
V_F	Forward Voltage @ I_F



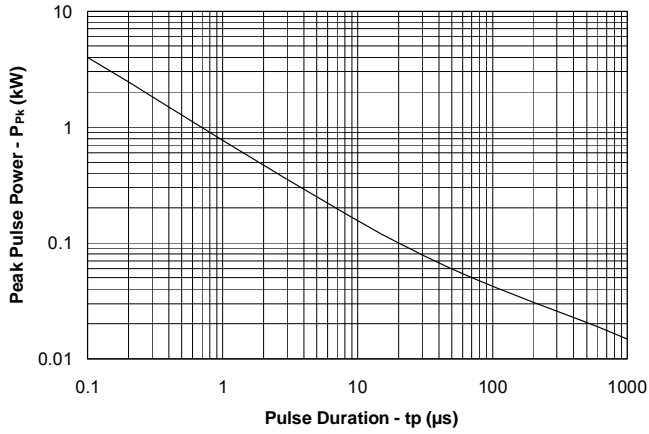
Electrical Characteristics (T = 25°C)

Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	V_{RWM}	Pin 6 to GND			6.5	V
Reverse Breakdown Voltage	V_{BR}	$I_T = 1\text{mA}$ Pin 6 to GND	7	9.5	12	V
Reverse Leakage Current	I_R	$V_{RWM} = 6.5\text{V}$, $T=25^\circ\text{C}$ Pin 6 to GND			1	μA
Forward Voltage	V_F	$I_F = 15\text{mA}$ Any I/O to pin 6		0.9	1.2	V
Clamping Voltage	V_C	$I_{PP} = 1\text{A}$, $t_p = 8/20\mu\text{s}$ Any I/O pin to Ground			16.5	V
Clamping Voltage	V_C	$I_{PP} = 3\text{A}$, $t_p = 8/20\mu\text{s}$ Any I/O pin to Ground			30	V
Junction Capacitance	C_j	$V_R = 0\text{V}$, $f = 1\text{MHz}$ Any I/O pin to Ground		0.3	0.5	pF
		$V_R = 0\text{V}$, $f = 1\text{MHz}$ Between I/O pins		0.3	0.5	pF

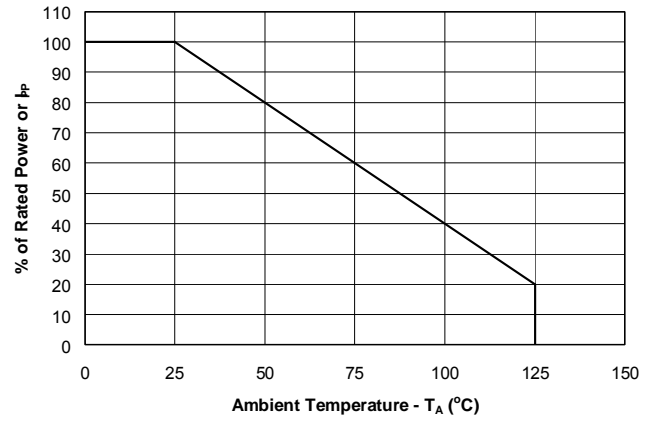


Typical Characteristics

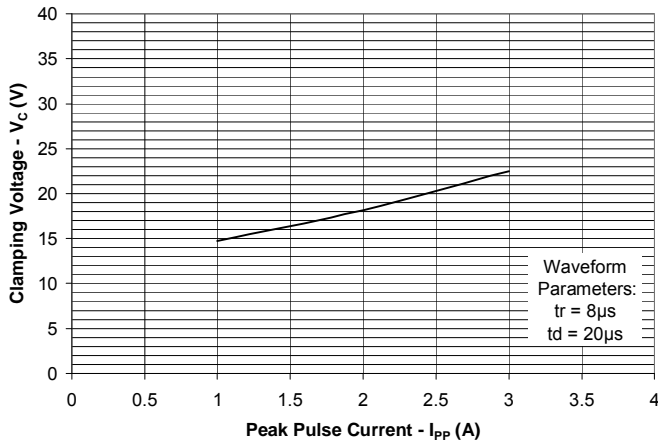
Non-Repetitive Peak Pulse Power vs. Pulse Time



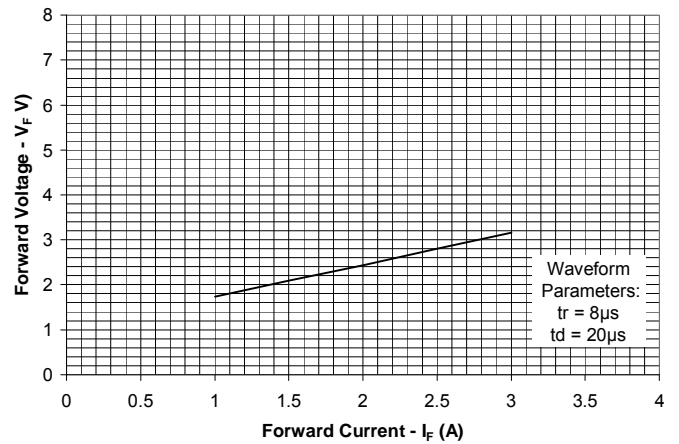
Power Derating Curve



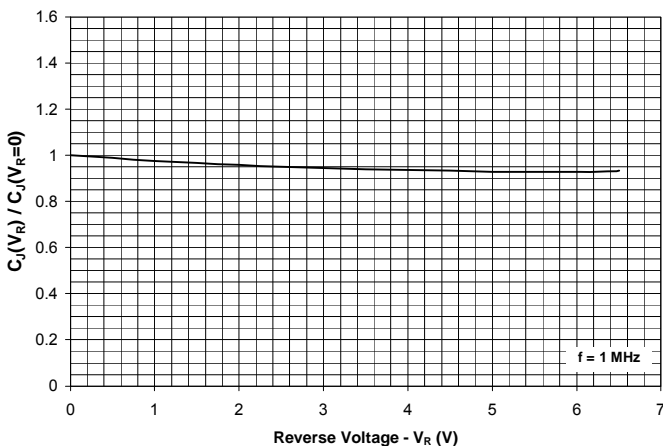
Clamping Voltage vs. Peak Pulse Current I/O to Gnd - Pin 4, 5 to Pin 1



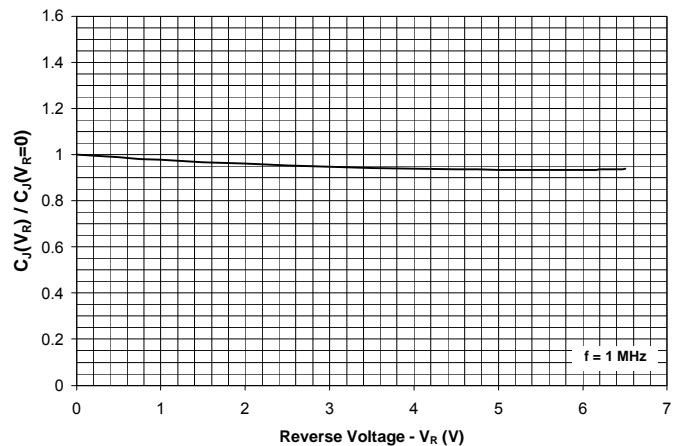
Forward Voltage vs. Forward Current Pin 1 to Pin 4, 5



Normalize Capacitance vs. Reverse Voltage I/O to Gnd - Pin 4, 5 to Pin 1



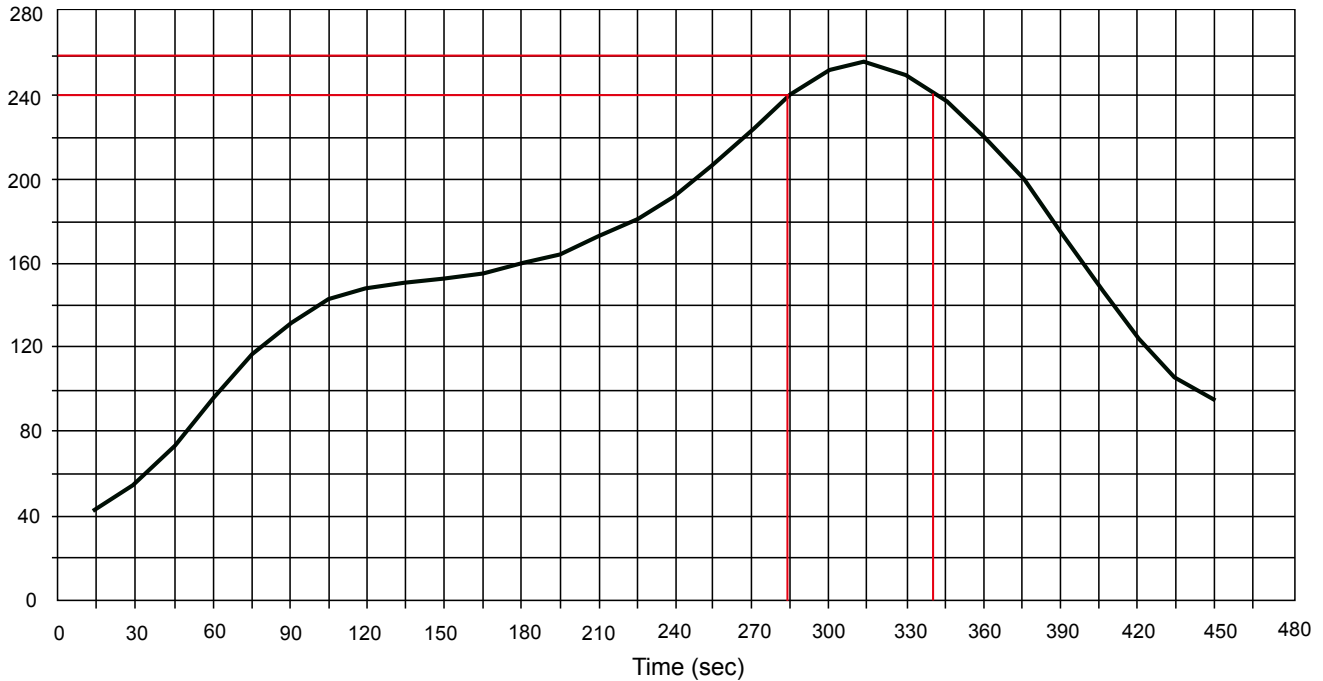
Normalize Capacitance vs. Reverse Voltage I/O to I/O - Pin 4 to Pin 5





Solder Reflow Recommendation

Peak Temp=257°C, Ramp Rate=0.802deg. °C/sec



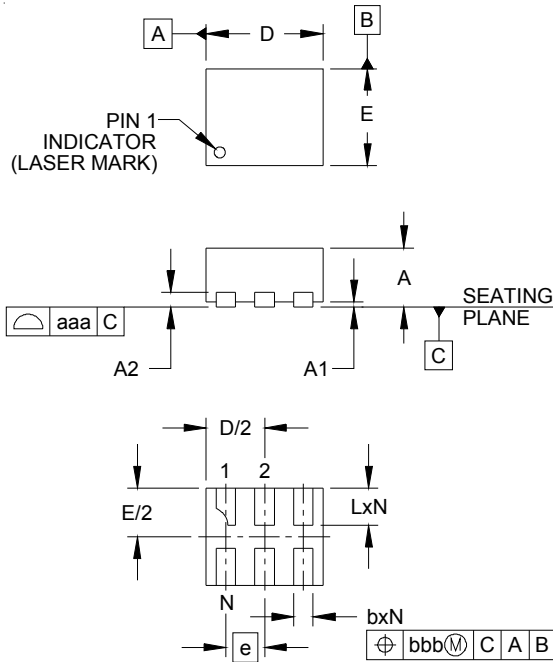
PCB Design

For TVS diodes a low-ohmic and low-inductive path to chassis earth is absolutely mandatory in order to achieve good ESD protection. Novices in the area of ESD protection should take following suggestions to heart:

- Do not use stubs, but place the cathode of the TVS diode directly on the signal trace.
- Do not make false economies and save copper for the ground connection.
- Place via holes to ground as close as possible to the anode of the TVS diode.
- Use as many via holes as possible for the ground connection.
- Keep the length of via holes in mind! The longer the more inductance they will have.



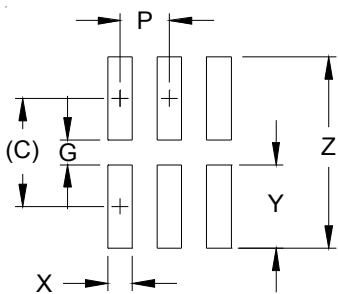
Outline Drawing -DFN1210N6



DIM	INCHES		MILLIMETERS	
	MIN	NOM/MAX	MIN	NOM/MAX
A	.020	.023 .026	0.50	0.58 0.65
A1	0.00	.001 .002	0.00	0.03 0.05
A2		(.005)		(0.13)
b	.006	.008 .010	0.15	0.20 0.25
D	.043	.047 .051	1.10	1.20 1.30
E	.035	.039 .043	0.90	1.00 1.10
e		.016 BSC		0.40 BSC
L	.012	.015 .017	0.30	0.38 0.425
N		6		6
aaa		.003		0.08
bbb		.004		0.10

NOTES:
1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).

Land Pattern -DFN1210N6



DIM	DIMENSIONS	
	INCHES	MILLIMETERS
C	(.034)	(0.875)
G	.008	0.20
P	.016	0.40
X	.008	0.20
Y	.027	0.675
Z	.061	1.55

NOTES:
1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
2. THIS LAND PATTERN IS FOR REFERENCE PURPOSES ONLY. CONSULT YOUR MANUFACTURING GROUP TO ENSURE YOUR COMPANY'S MANUFACTURING GUIDELINES ARE MET.