

## Features

- Ultra low capacitance: 0.35pF(IO to IO)
- Ultra low leakage: nA level
- Low operating voltage: 5.5V
- Low clamping voltage
- Protects one power line and four data lines
- Flow-through package
- Complies with following standards:
  - IEC 61000-4-2 (ESD) immunity test  
Air discharge:  $\pm 25\text{kV}$   
Contact discharge:  $\pm 20\text{kV}$
  - IEC61000-4-4 (EFT) 40A (5/50ns)
  - IEC61000-4-5 (Lightning) 4.5A (8/20 $\mu\text{s}$ )
- RoHS Compliant

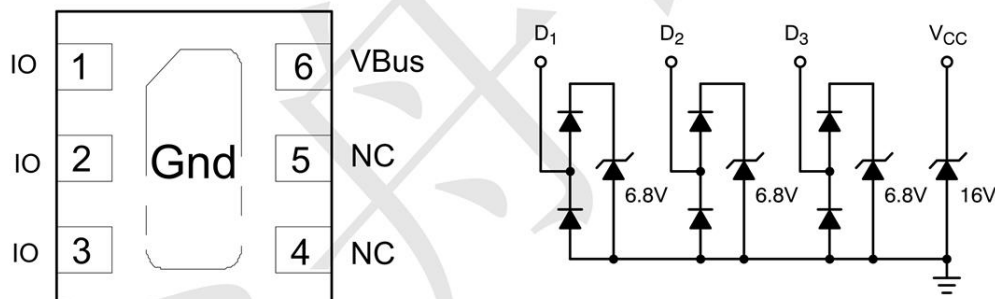
## Mechanical Characteristics

- Package: DFN1616-6
- Lead Finish: Matte Tin
- Case Material: “Green” Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Shipping Qty :3000pcs/7Inch Tape & Reel

## Applications

- USB 2.0 and USB OTG
- Multi Media Card (MMC) Interfaces
- SD Card Interfaces
- MDDI Ports
- SIM Ports
- Key Pads

## Dimensions and Pin Configuration



**Marking: 1654P Or P3P**

**Absolute Maximum Ratings ( $T_A=25^{\circ}\text{C}$  unless otherwise specified)**

IO (Pins 1, 2, 3)			
Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20 $\mu\text{s}$ )	Ppk	100	W
Peak Pulse Current (8/20 $\mu\text{s}$ )	IPP	4.5	A
ESD per IEC 61000-4-2 (Air)	VESD	$\pm 25$	kV
ESD per IEC 61000-4-2 (Contact)		$\pm 20$	
Operating Temperature Range	TJ	-55 to +125	$^{\circ}\text{C}$
Storage Temperature Range	Tstg	-55 to +150	$^{\circ}\text{C}$

VBus TVS (Pin 6)			
Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20 $\mu\text{s}$ )	Ppk	150	W
Peak Pulse Current (8/20 $\mu\text{s}$ )	IPP	7	A
ESD per IEC 61000-4-2 (Air)	VESD	$\pm 30$	kV
ESD per IEC 61000-4-2 (Contact)		$\pm 30$	
Operating Temperature Range	TJ	-55 to +125	$^{\circ}\text{C}$
Storage Temperature Range	Tstg	-55 to +150	$^{\circ}\text{C}$

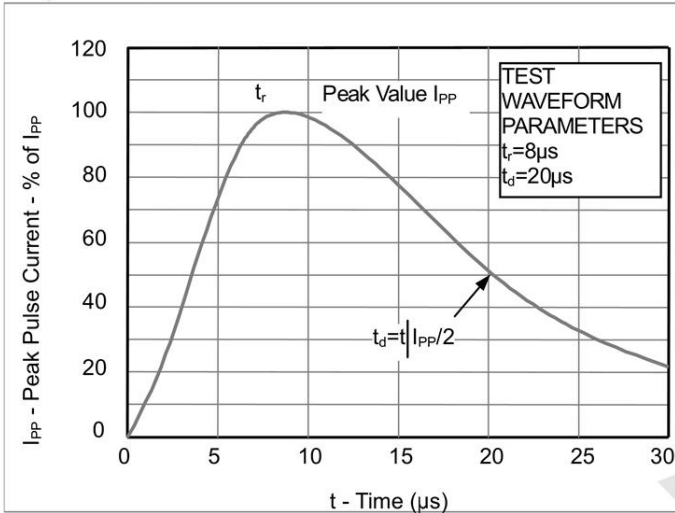
**Electrical Characteristics (TA=25°C unless otherwise specified)**

IO (Pins 1, 2, 3)						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			5.5	V	Any I/O pin to ground
Breakdown Voltage	VBR	6.4	6.8		V	IT = 1mA, any I/O pin to ground
Reverse Leakage Current	IR			0.1	μA	VRWM = 5.5V, any I/O pin to ground
Clamping Voltage	VC			10	V	I <sub>PP</sub> = 1A (8 x 20μs pulse), any I/O pin to ground
Clamping Voltage	VC			16	V	I <sub>PP</sub> = 4.5A (8 x 20μs pulse), any I/O pin to ground
Junction Capacitance	CJ		0.7	1.2	pF	VR = 0V, f = 1MHz, any I/O pin to ground
Junction Capacitance	CJ		0.35	0.6	pF	VR = 0V, f = 1MHz, between I/O pins

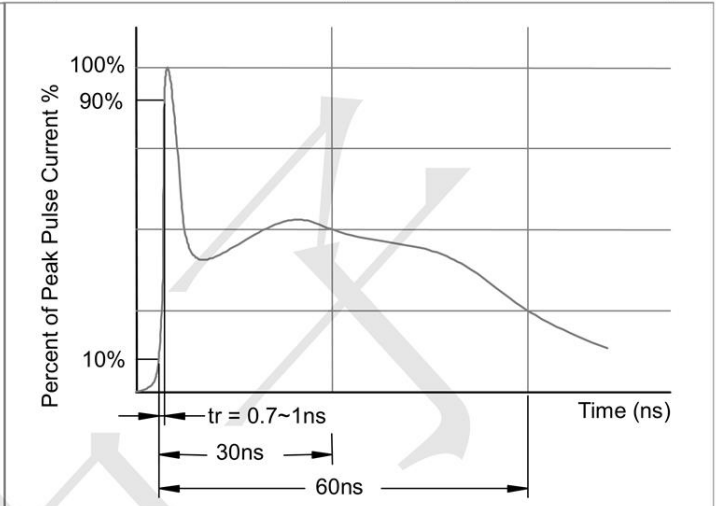
VBus TVS (Pin 6)						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			12	V	Any I/O pin to ground
Breakdown Voltage	VBR	15	16		V	IT = 1mA, any I/O pin to ground
Reverse Leakage Current	IR			0.1	μA	VRWM = 12V, any I/O pin to ground
Clamping Voltage	VC			10	V	I <sub>PP</sub> = 1A (8 x 20μs pulse), any I/O pin to ground
Clamping Voltage	VC		20	30	V	I <sub>PP</sub> = 7 A (8 x 20μs pulse), any I/O pin to ground
Junction Capacitance	CJ			100	pF	VR = 0V, f = 1MHz, any I/O pin to ground

**Typical Performance Characteristics ( $T_A=25^\circ\text{C}$  unless otherwise Specified)**

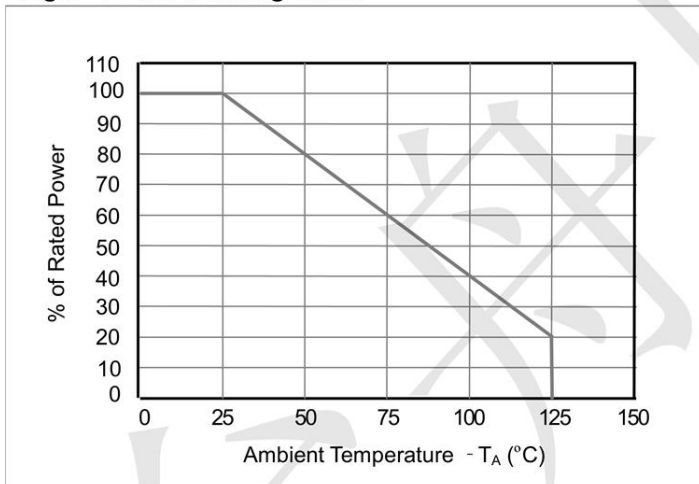
**Fig1. 8/20 $\mu\text{s}$  Pulse Waveform**



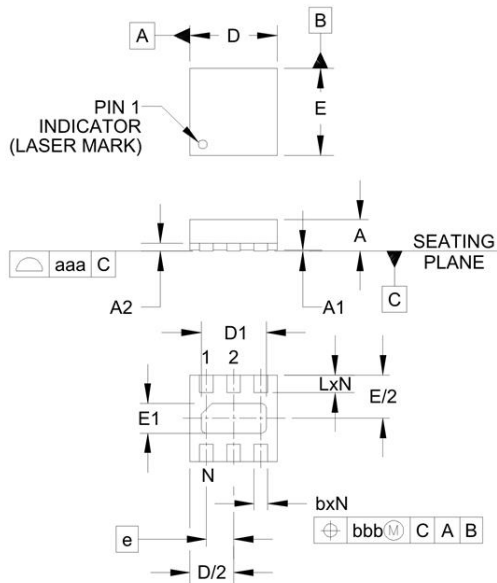
**Fig2. ESD Pulse Waveform (according to IEC 61000-4-2)**



**Fig3. Power Derating Curve**

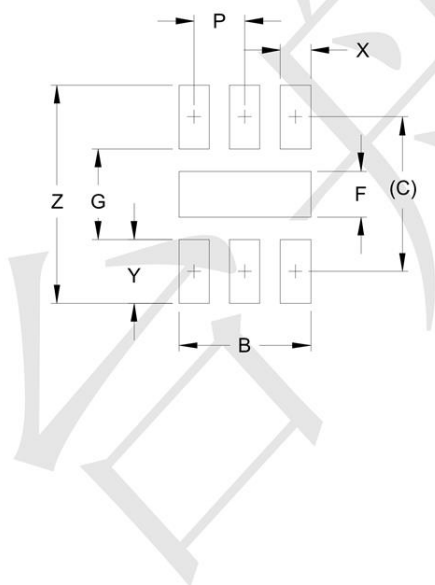


**Outline Drawing -DFN1616-6**



DIM	DIMENSIONS					
	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		(.006)			(0.15)	
b	.007	.010	.012	0.20	0.25	0.30
D	.059	.063	.067	1.50	1.60	1.70
D1	.041	.047	.051	1.05	1.20	1.30
E	.059	.063	.067	1.50	1.60	1.70
E1	.016	.022	.026	0.40	0.55	0.65
e		.020 BSC			0.50 BSC	
L	.013	.013	.016	0.25	0.33	0.40
N		6			6	
aaa		.004			0.09	
bbb		.004			0.09	

**Land Pattern -DFN1616-6**



DIM	DIMENSIONS	
	INCHES	MILLIMETERS
B	.051	1.30
C	.060	1.52
P	.020	0.50
F	.018	0.45
G	.035	0.89
X	.012	0.30
Y	.025	0.63
Z	.085	2.15