

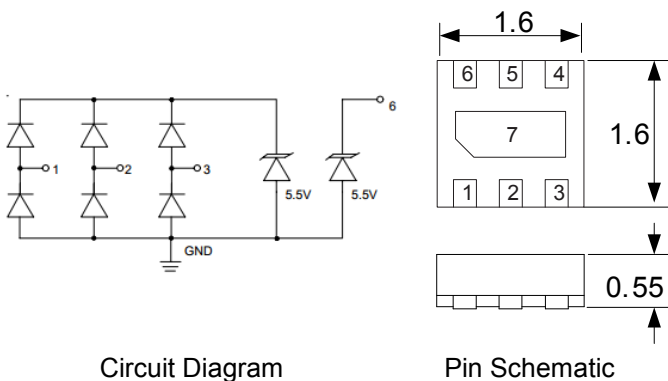
Description

The DL0504P3 is a low capacitance TVS array, utilizing leading monolithic silicon technology to provide fast response time and low ESD clamping voltage, making this device an ideal solution for protecting voltage sensitive high-speed data lines. The DL0504P3 complies with the IEC61000-4-2 (ESD) standard with $\pm 25\text{kV}$ air and $\pm 20\text{kV}$ contact discharge. It is assembled into a 6-pin DFN1616-6 lead-free package. The leads are finished with NiPdAu. Each device will protect up to four high-speed lines. The combination of small size, low capacitance and high surge capability makes them ideal for use in applications such as cellular phones, LCD displays, USB, and multimedia card interfaces.

Mechanical Characteristics

- ◆ Package: DFN1616-6
- ◆ Lead Finish: NiPdAu
- ◆ Case Material: "Green" Molding Compound.
- ◆ Moisture Sensitivity: Level 3 per J-STD-020
- ◆ Terminal Connections: See Diagram Below
- ◆ Marking Information: See Below

Dimensions and Pin Configuration



Circuit Diagram

Pin Schematic

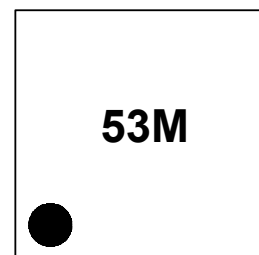
Features

- ◆ Low capacitance: 0.4pF typical(I/O to I/O)
- ◆ Ultra low leakage: nA level
- ◆ Low operating voltage: 5V
- ◆ Low clamping voltage
- ◆ Up to 4 lines and one power line protects
- ◆ Complies with following standards:
 - IEC 61000-4-2 (ESD) immunity test
 - Air discharge: $\pm 25\text{kV}$
 - Contact discharge: $\pm 20\text{kV}$
 - IEC61000-4-5 (Lightning) 5A (8/20 μs)
- ◆ RoHS Compliant

Applications

- ◆ USB 2.0 and USB OTG
- ◆ Multi Media Card Interfaces
- ◆ SD Card Interfaces
- ◆ MDDI Ports
- ◆ SIM Ports

Marking Information



53M = Device Marking Code

Dot denotes Pin1

Ordering Information

Part Number	Marking	Packaging	Reel Size
DL0504P3	53M	3000/Tape & Reel	7 inch

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

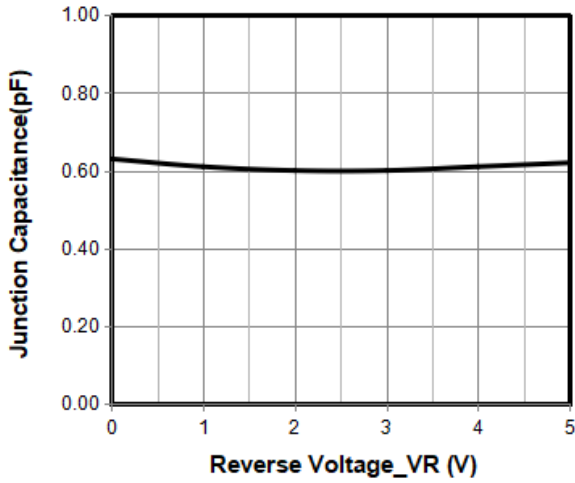
Parameter	Symbol	Value	Unit
DP, DM, USB ID (Pins 1, 2, 3)			
Peak Pulse Power (8/20 μs)	Ppk	75	W
Peak Pulse Current (8/20 μs)	IPP	5	A
ESD per IEC 61000-4-2 (Air)	VESD	± 25	kV
ESD per IEC 61000-4-2 (Contact)		± 20	
Operating Temperature Range	TJ	-55 to +125	$^\circ\text{C}$
Storage Temperature Range	Tstg	-55 to +150	$^\circ\text{C}$
VBus (Pin 6)			
Peak Pulse Power (8/20 μs)	Ppk	100	W
Peak Pulse Current (8/20 μs)	IPP	8	A
ESD per IEC 61000-4-2 (Air)	VESD	± 25	kV
ESD per IEC 61000-4-2 (Contact)		± 20	
Operating Temperature Range	TJ	-55 to +125	$^\circ\text{C}$
Storage Temperature Range	Tstg	-55 to +150	$^\circ\text{C}$

Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise specified)

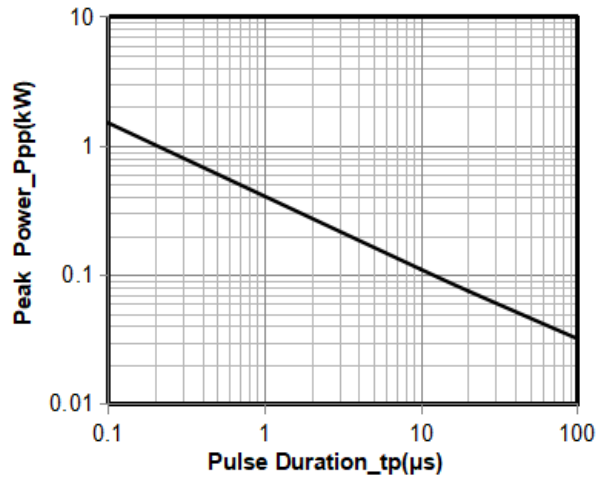
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			5	V	Pin 1, 2, or 3 to ground
Breakdown Voltage	VBR	6			V	$I_T = 1\text{mA}$, pin 6 to ground
Reverse Leakage Current	I_R			0.5	μA	VRWM = 5V, pin 6 to ground
Clamping Voltage	VC			10	V	IPP = 1A (8 x 20 μs pulse), any I/O pin to ground
Clamping Voltage	VC			15	V	IPP = 5A (8 x 20 μs pulse), any I/O pin to ground
Junction Capacitance	CJ			0.4	pF	VR = 0V, f = 1MHz, between I/O pins
Junction Capacitance	CJ		0.6	0.8	pF	VR = 0V, f = 1MHz, any I/O pin to ground

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
VBus TVS						
Reverse Working Voltage	V_{RWM}			5.5	V	Pin 6 to ground
Breakdown Voltage	V_{BR}	6		8.5	V	$I_T = 1\text{mA}$, pin 6 to ground
Reverse Leakage Current	I_R			0.5	μA	$V_{RWM} = 5.5\text{V}$, pin 6 to ground
Clamping Voltage	V_C			8	V	$I_{PP} = 1\text{A}$ (8 x 20 μs pulse), pin 6 to ground
Clamping Voltage	V_C			12	V	$I_{PP} = 8\text{A}$ (8 x 20 μs pulse), pin 6 to ground
Junction Capacitance	C_J		60		pF	$V_R = 0\text{V}$, $f = 1\text{MHz}$, pin 6 to ground

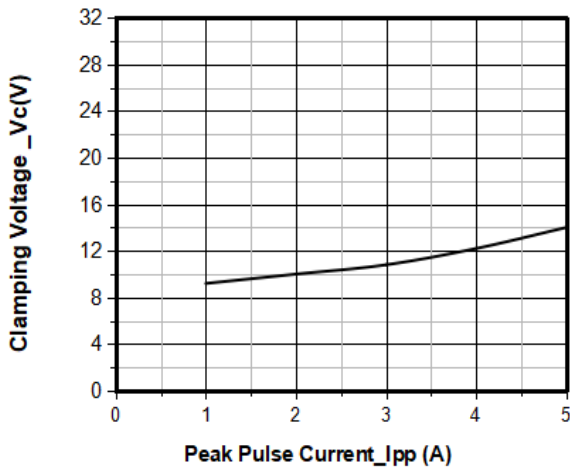
Typical Performance Characteristics (TA=25°C unless otherwise Specified)



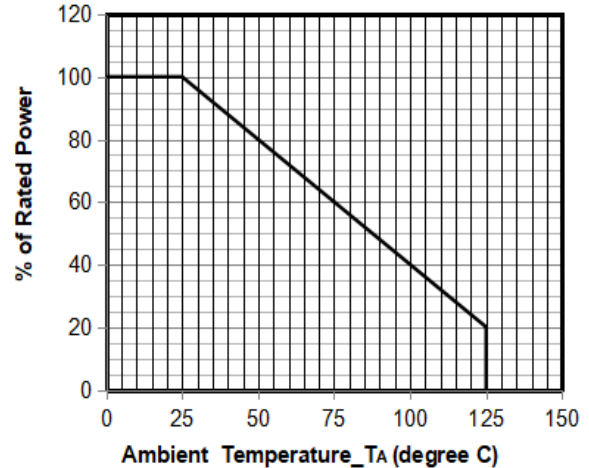
Junction Capacitance vs. Reverse Voltage



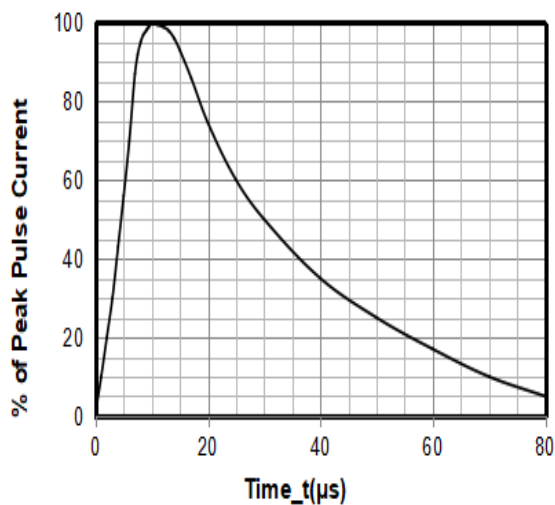
Peak Pulse Power vs. Pulse Time



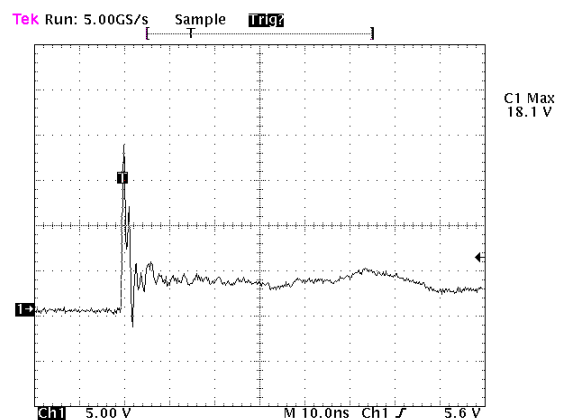
Clamping Voltage vs. Peak Pulse Current



Power Derating Curve



8 X 20μs Pulse Waveform

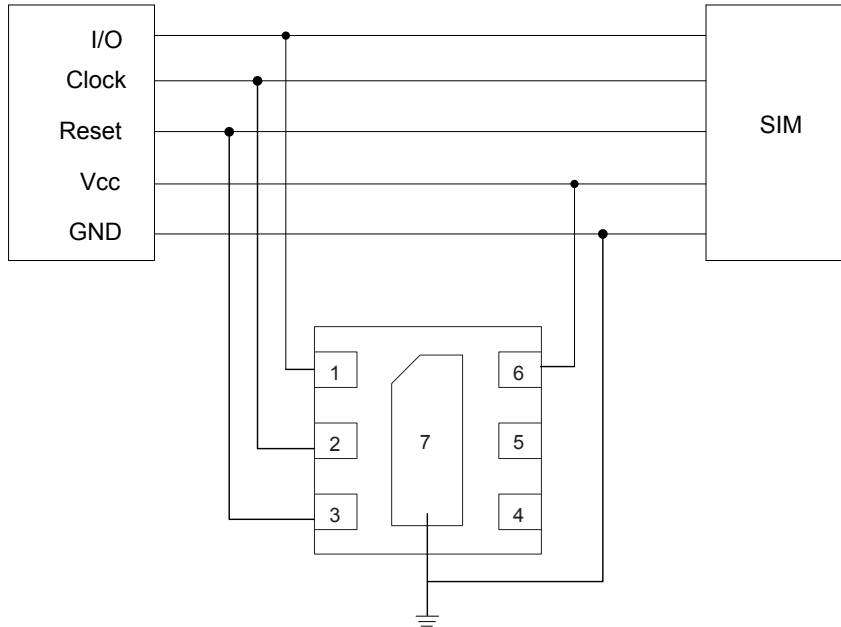


Note: Data is taken with a 10x attenuator

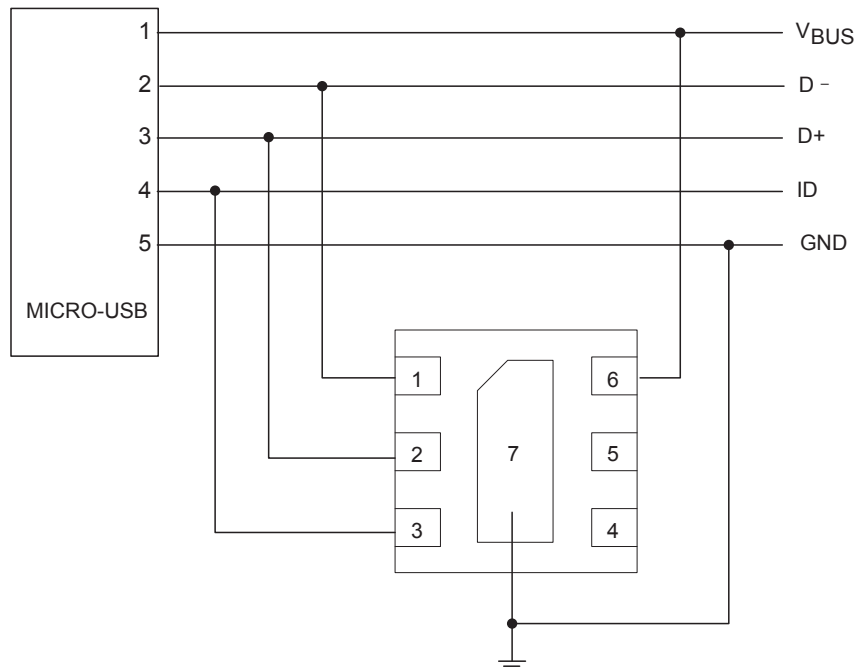
ESD Clamping Voltage

8 kV Contact per IEC61000-4-2

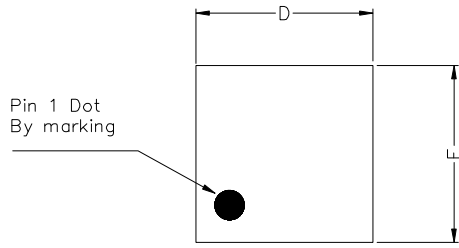
DL0504P3 on SIM Port Application



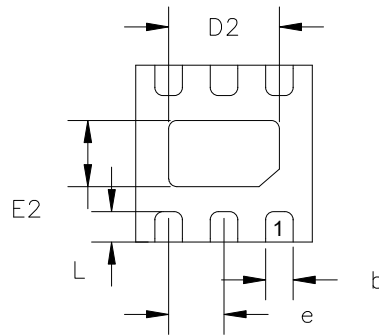
DL0504P3 on USB Port Application



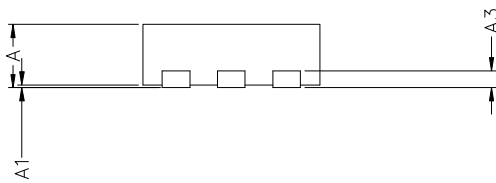
DFN1616-6 Package Outline Drawing



TOP VIEW



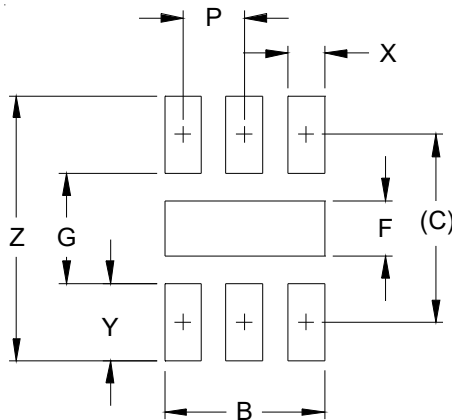
BOTTOM VIEW



SIDE VIEW

PKG. REF.	COMMON DIMENSIONS(MM)		
	UT: ULTRA THIN		
	MIN.	NOM.	MAX.
A	0.50	0.55	0.60
A1	0.00	—	0.05
A3	0.15 REF.		
D	1.55	1.60	1.65
E	1.55	1.60	1.65
D2	0.90	1.00	1.05
E2	0.50	0.60	0.65
L	0.20	0.25	0.30
b	0.20	0.25	0.30
e	0.50 BSC		

Suggested Land Pattern



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

Contact Information

Changzhou D-first Electronics CO.,Ltd.

www.first-electronic.com

Email: xhf@first-electronic.cn

Phone: +86 (0519) 8817 1671