



# JLE05URF6-6

## 4-Line Low Capacitance Uni-directional TVS Diode

Jialan-Microelectronics

### Description

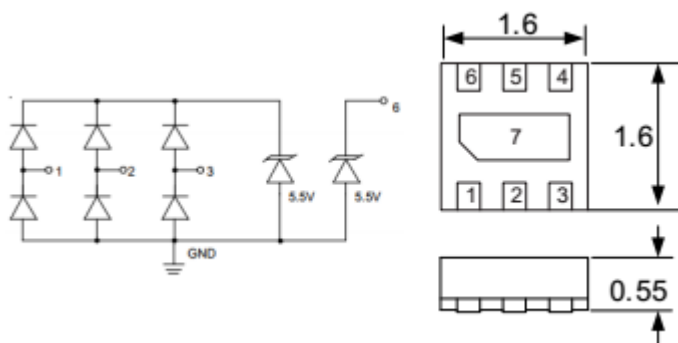
The JLE05URF6-6 is a low capacitance TVS array, utilizing leading monolithic silicon technology to provide fast response time and low ESD clamping voltage, making this device an ideal solution for protecting voltage sensitive high-speed data lines.

The JLE05URF6-6 complies with the IEC 61000-4-2 (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 multi media card interfaces.

### Features

- \* 75W peak pulse power (8/20 $\mu\text{s}$ )
- \* Low leakage:nA level
- \* Operating voltage: 5V
- \* Low clamping voltage
- \* Up to 3 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 $\mu\text{s}$ )
- \* RoHS Compliant
- \* Package: DFN1616-6

### Circuit Diagram



Circuit and Pin Schematic

### Applications

- \* USB2.0 and USB OTG
- \* Multi Media Card Interfaces
- \* SD Card Interfaces
- \* MDDI Ports
- \* SIM Ports

### Marking Diagram



Transparent top view

53M:Device Marking Code

### Ordering Information

Part Number	Packaging	Reel Size
JLE05URF6-6	3000/Tape & Reel	7 inch



## JLE05URF6-6

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

Parameter	Symbol	Value	Unit
<b>DP,DM,USB ID (Pins 1,2,3)</b>			
Peak Pulse Power (8/20 $\mu\text{s}$ )	Ppk	75	W
Peak Pulse Current (8/20 $\mu\text{s}$ )	IPP	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	-55to +125	$^\circ\text{C}$
Storage Temperature Range	Tstg	-55 to +150	$^\circ\text{C}$
<b>VBus (Pins 6)</b>			
Peak Pulse Power (8/20 $\mu\text{s}$ )	Ppk	100	W
Peak Pulse Current (8/20 $\mu\text{s}$ )	IPP	8	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	-55to +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	Test Condition	Min	Typ	Max	Unit
Reverse Working Voltage	$V_{RWM}$	Pin 1,2, or 3 to ground			5	V
Breakdown Voltage	$V_{BR}$	$I_T = 1\text{mA}$ , pin 6 to ground	6			V
Reverse Leakage Current	$I_R$	$V_{RWM} = 5\text{V}$ , pin 6 to ground			0.5	$\mu\text{A}$
Clamping Voltage	$V_C$	$I_{PP} = 1\text{A}$ (8 x 20 $\mu\text{s}$ pulse), any I/O pin to ground			10	V
Clamping Voltage	$V_C$	$I_{PP} = 5\text{A}$ (8 x 20 $\mu\text{s}$ pulse), any I/O pin to ground			15	V
Junction Capacitance	$C_J$	$V_R = 0\text{V}$ , $f = 1\text{MHz}$ , between I/O pins			0.4	pF
Junction Capacitance	$C_J$	$V_R = 0\text{V}$ , $f = 1\text{MHz}$ , any I/O pin to ground		0.6	0.8	pF



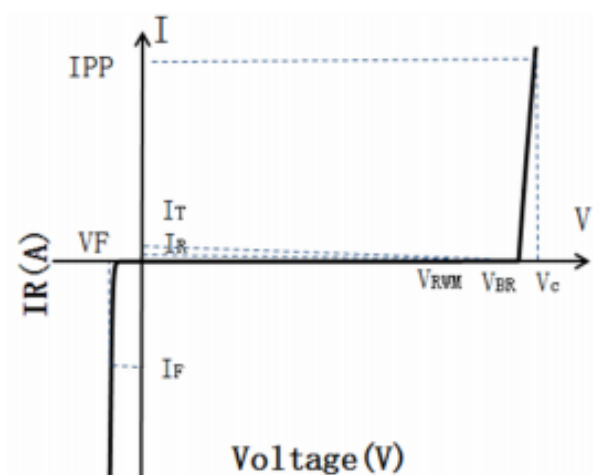
## JLE05URF6-6

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

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

### Portion Electronics Parameter

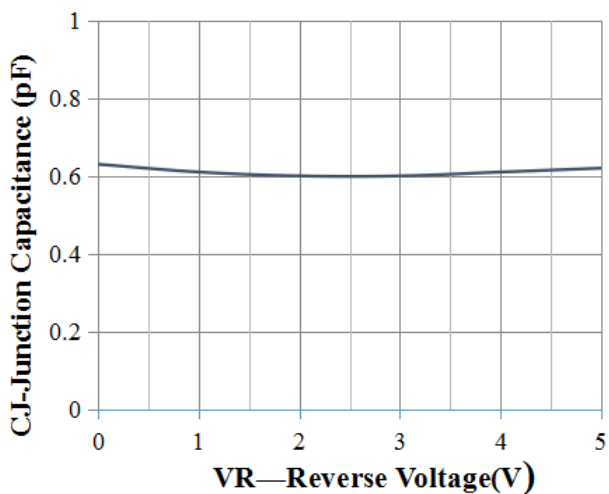
Symbol	Parameter
$I_T$	Test Current
$I_{PP}$	Maximum Reverse Peak Pulse Current
$V_C$	Clamping Voltage @ $I_C$



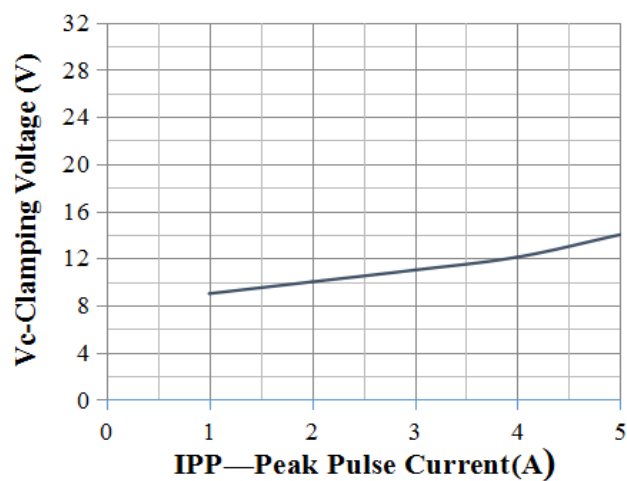


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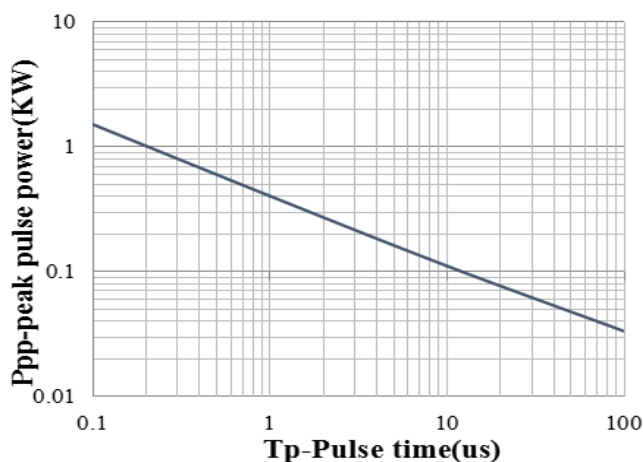
## Typical Performance Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise Specified)



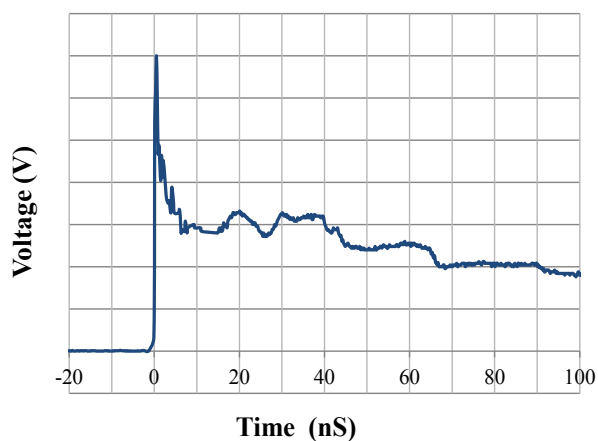
Junction Capacitance vs. Reverse Voltage



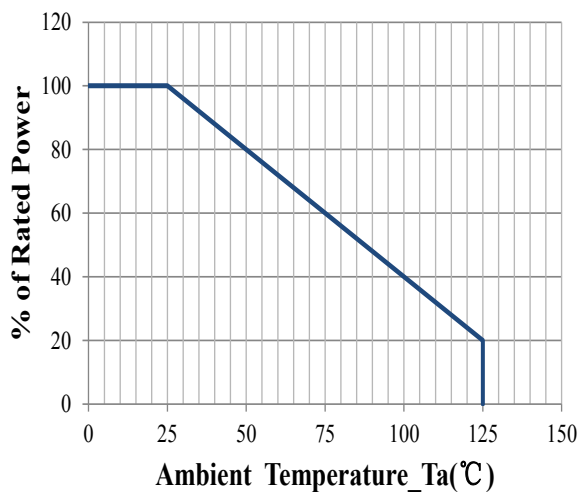
Clamping Voltage vs. Peak Pulse Current



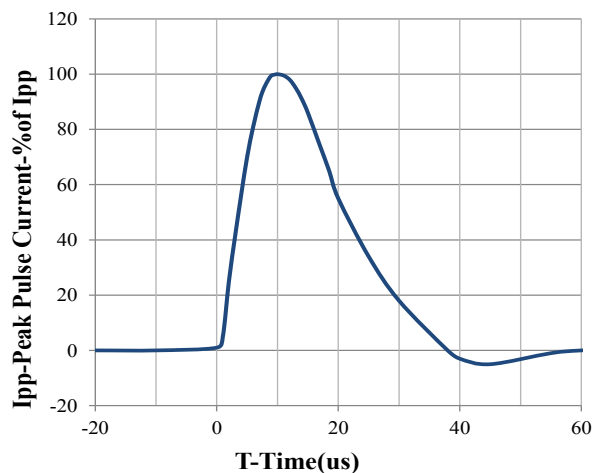
Peak Pulse Power vs. Pulse Time



IEC61000-4-2 Pulse Waveform



Power Derating Curve

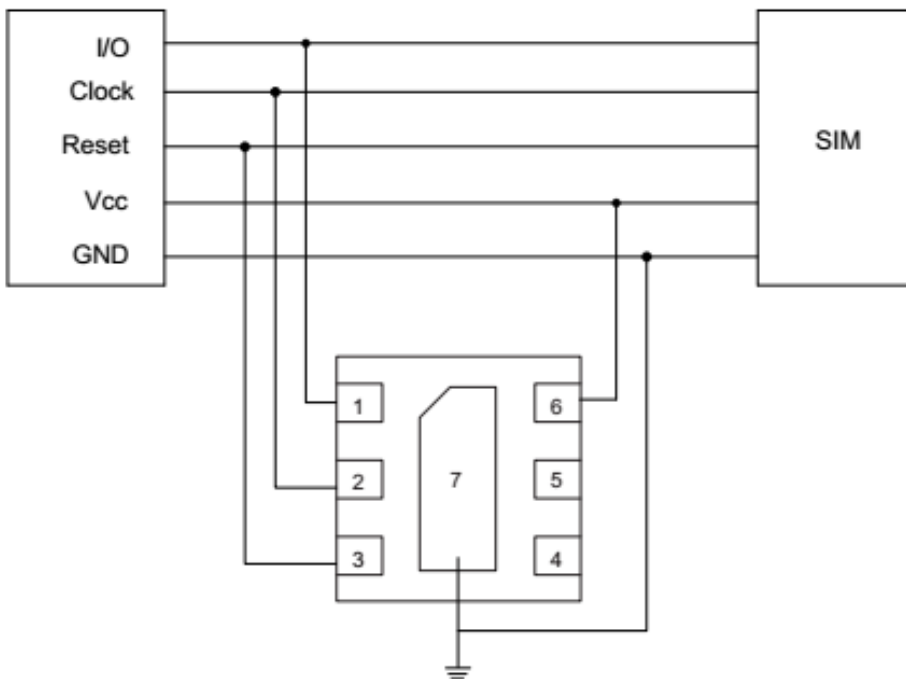


8 X 20us Pulse Waveform

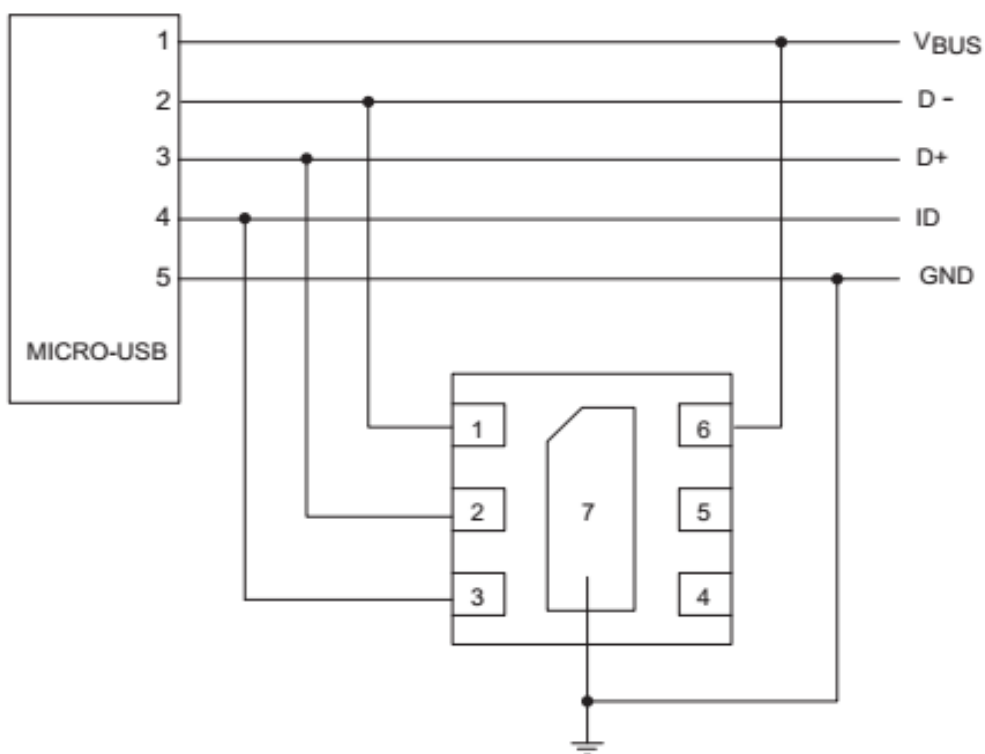


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## On SIM Port Application



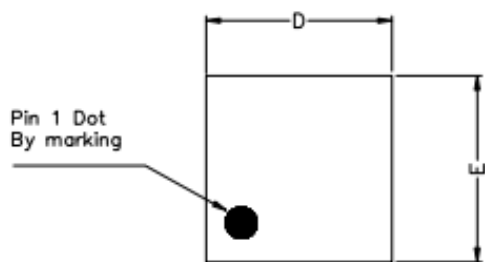
## On USB Port Application



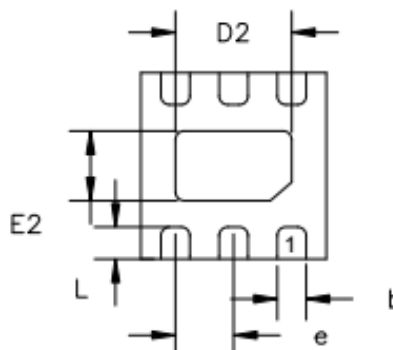


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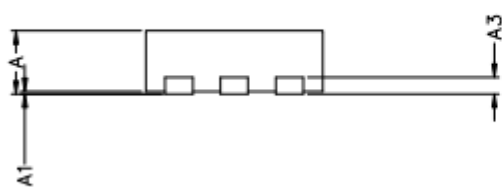
## DFN1616-6 Package Outline Drawing (Dimensions in millimeters)



TOP VIEW



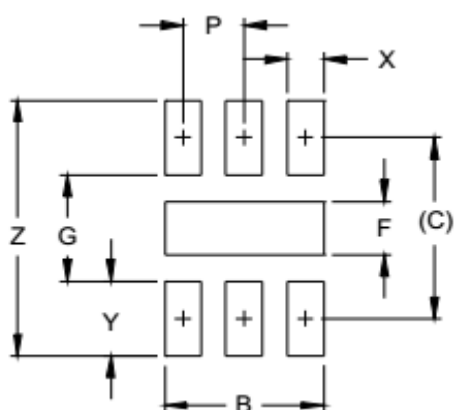
BOTTOM VIEW



SIDE VIEW

PKG. REF.	COMMON DIMENSIONS(MM)		
	MIN.	UT:ULTRA THIN 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

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