

JE05U4RF60-6

4-Line Low Capacitance Uni-directional TVS Diode



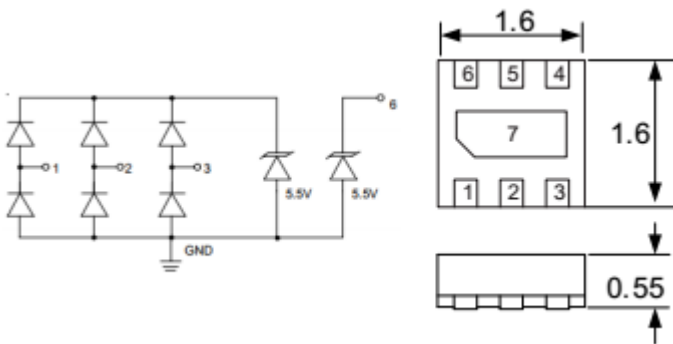
Description

The JE05U4RF60-6 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 JE05U4RF60-6 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 μs)
- * 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 μs)
- * 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
JE05U4RF60-6	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	-55to +125	$^{\circ}\text{C}$
Storage Temperature Range	Tstg	-55 to +150	$^{\circ}\text{C}$
VBus (Pins 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	-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)

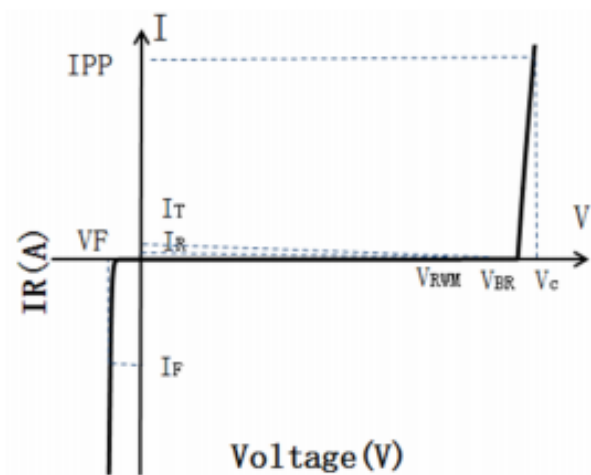
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Reverse Working Voltage	V_{RWM}	Pin 1,2, or 3 to ground			5	V
Breakdown Voltage	V_{BR}	$I_T = 1\text{mA}$,pin 6 to ground	6			V
Reverse Leakage Current	I_R	$V_{RWM} = 5\text{V}$,pin 6 to ground			0.5	μA
Clamping Voltage	V_C	$I_{PP} = 1\text{A}$ (8 x 20 μs pulse), any I/O pin to ground			10	V
Clamping Voltage	V_C	$I_{PP} = 5\text{A}$ (8 x 20 μs 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

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

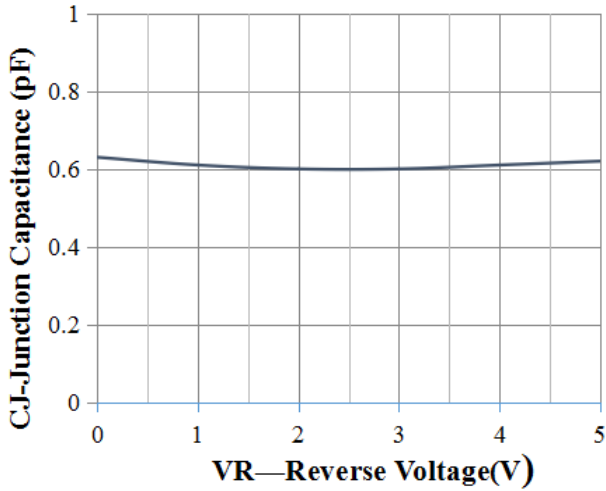
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
VBus TVS						
Reverse Working Voltage	V_{RWM}	Pin 6 to ground			5.5	V
Breakdown Voltage	V_{BR}	$I_T = 1\text{mA}$, pin 6 to ground	6		8.5	V
Reverse Leakage Current	I_R	$V_{RWM} = 5.5\text{V}$, pin 6 to ground			0.5	μA
Clamping Voltage	V_C	$I_{PP} = 1\text{A}$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

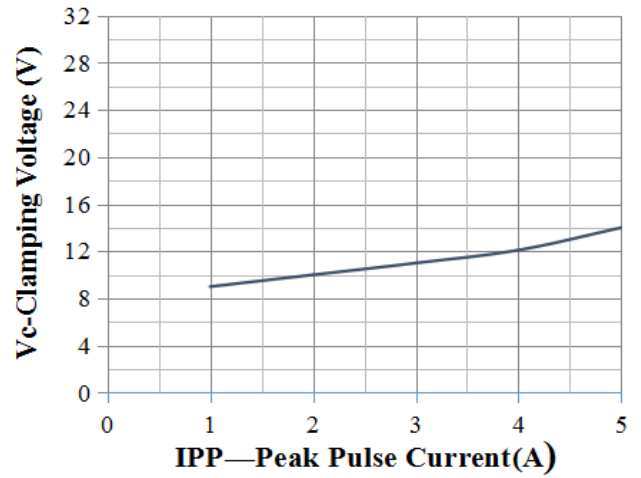
Symbol	Parameter
I_T	Test Current
I_{PP}	Maximum Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_C



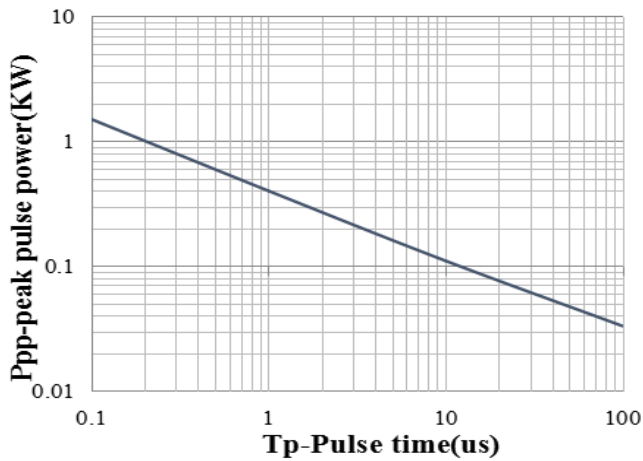
Typical Performance Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise Specified)



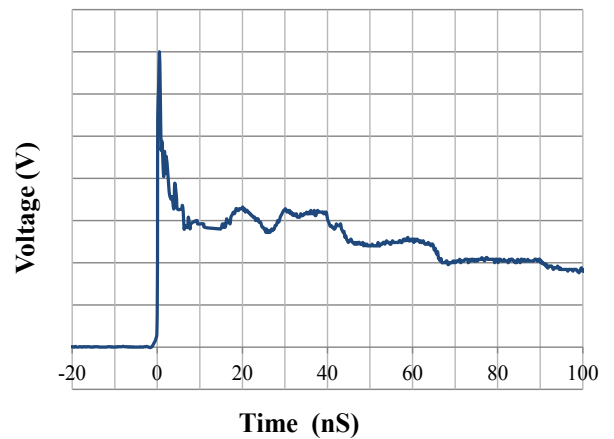
Junction Capacitance vs. Reverse Voltage



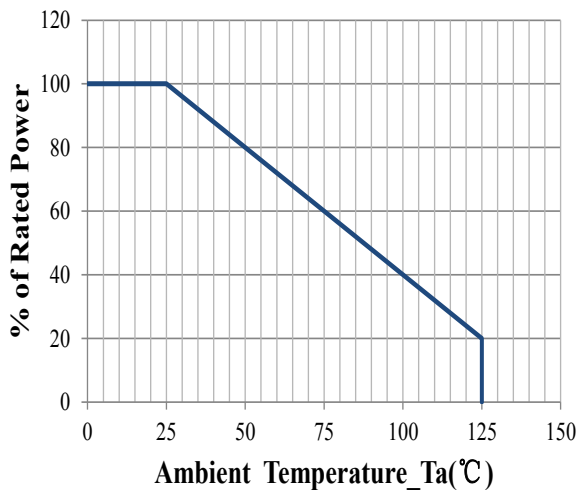
Clamping Voltage vs. Peak Pulse Current



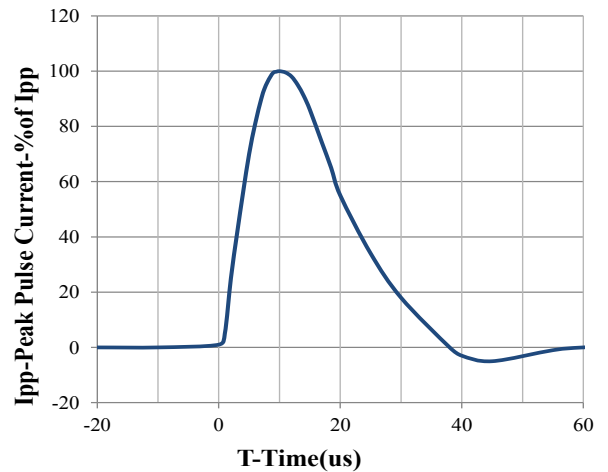
Peak Pulse Power vs. Pulse Time



IEC61000-4-2 Pulse Waveform

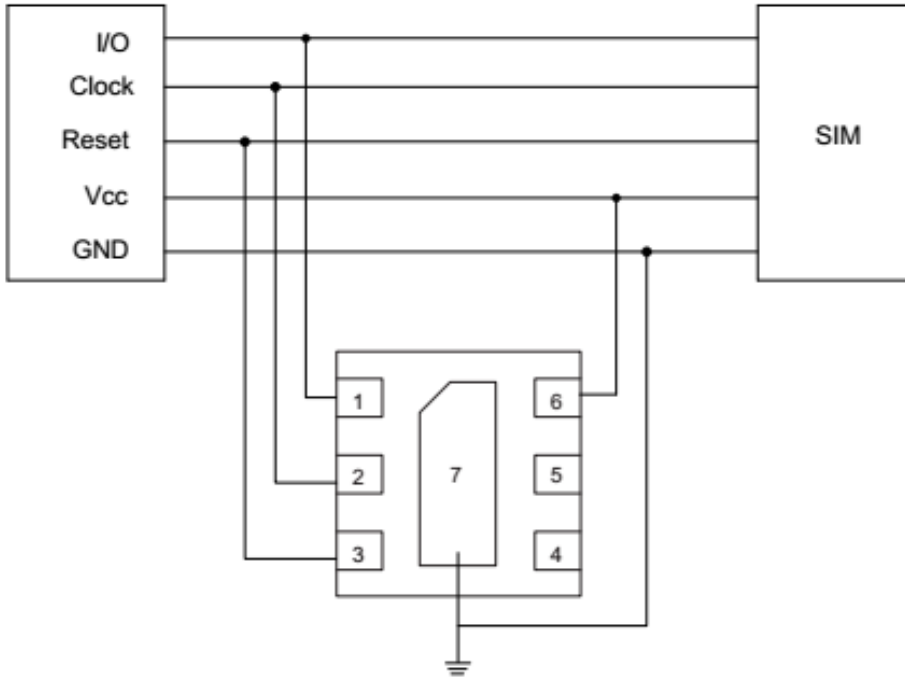


Power Derating Curve

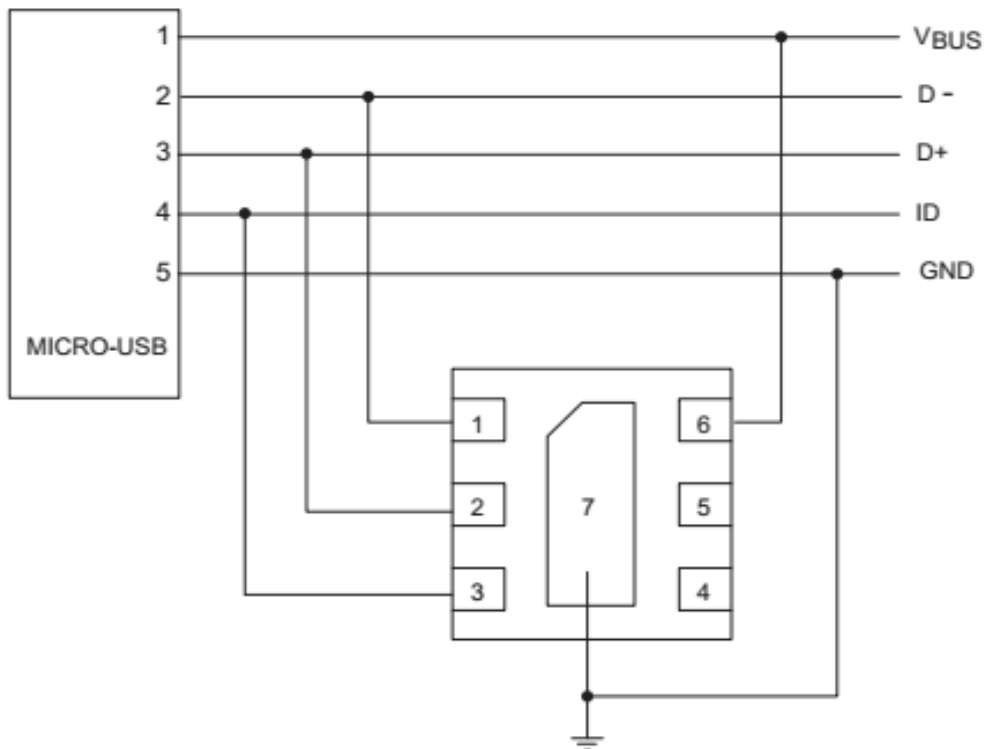


8 X 20us Pulse Waveform

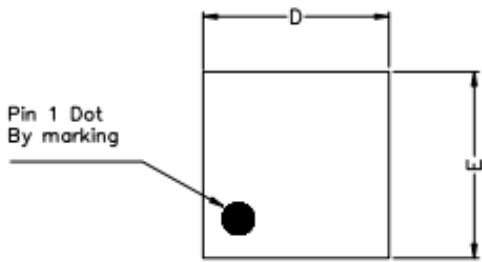
On SIM Port Application



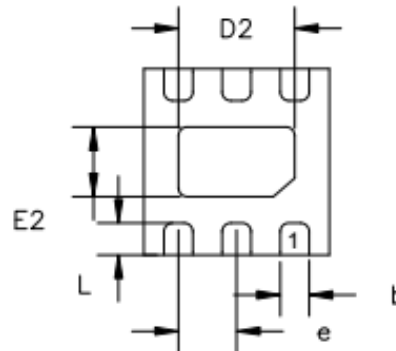
On USB Port Application



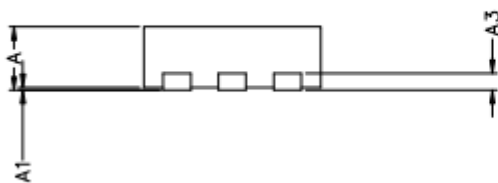
DFN1616-6 Package Outline Drawing (Dimensions in millimeters)



TOP VIEW



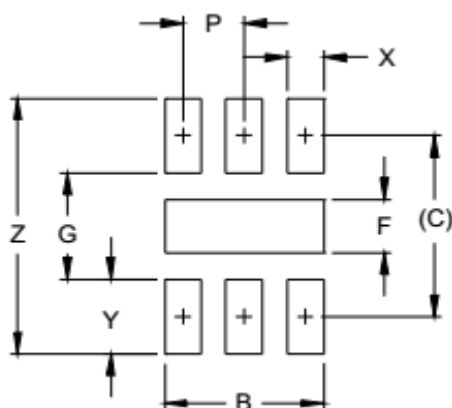
BOTTOM VIEW



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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