HJKE

RClamp3324P

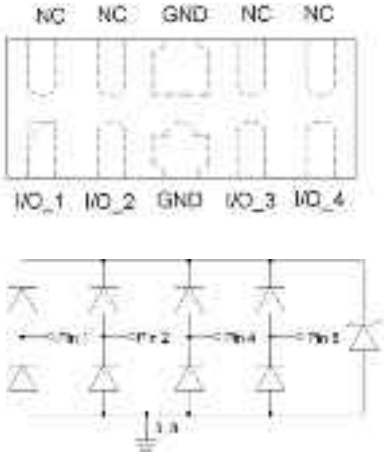
4-Line Ultra Low Capacitance TVS Diode Array

Description

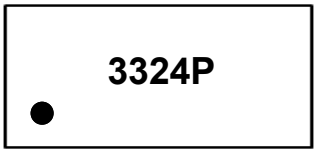
The RClamp3324P is an ultra low capacitance TVS array, utilizing leading monolithic silicon technology to provide fast response time and low ESD clamping voltage, mak-ing this device an ideal solution for protecting voltage sensitive high-speed data lines. The RClamp3324P com-plies with the IEC 61000-4-2 (ESD) with ±20kV air and ±15kV contact discharge.

It is assembled into a 10-pin 2.5x1.0x0.5mm lead-free DFN package. The flow through style package allows for easy PCB layout and matched trace lengths necessary to maintain consistent imped-ance between high speed differential lines such as USB 3.0 and HDMI The small size, ultra-low capacitance and high ESD surge protection make RClamp3324P an ideal choice to protect HDMI, MDDI, USB 3.0 and other high speed ports.

DFN2510-10



Circuit and Pin Schematic



3324P = Device Marking
The larger black dot denotes pin 1

Marking (Top View)

Features

- Ultra low leakage: nA level
- Ultra low capacitance: 0.3pF typical (I/O to I/O)
- Operating voltage: 3.3V
- Low clamping voltage
- Up to 4 lines protects
- Complies with following standards:
  - – IEC 61000-4-2 (ESD) immunity test
    Air discharge: ±20V
    Contact discharge: ±15kV
  - – IEC61000-4-5 (Lightning) 5A (8/20μs)
- RoHS Compliant

Mechanical Characteristics

- Package: DFN2510-10 (2.5×1.0×0.5mm)
- Case Material: “Green” Molding Compound.
- Terminal Connections: See Diagram Below
- Marking Information: See Below

Applications

- HDMI 1.3 & 1.4, USB 3.0 & 3.1 and MDDI ports
- Monitors and flat panel displays
- Set-top box and Digital TV
- Video graphics cards
- HDMI 2.0
- Digital Visual Interface (DVI)
- Notebook Computers
- PCI Express and Serial SATA Ports

Ordering Information

Part Number	Packaging	Reel Size
QR3324P5	3000/Tape & Reel	7 inch

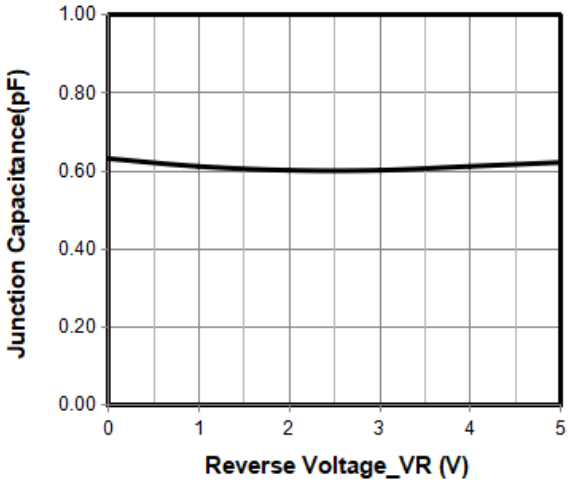
Absolute Maximum Ratings (T_A=25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20μs)	Ppk	75	W
Peak Pulse Current (8/20μs)	I_{PP}	5	A
ESD per IEC 61000−4−2 (Air) ESD per IEC 61000−4−2 (Contact)	V_{ESD}	±20 ±15	kV
Operating Temperature Range	T_J	−55 to +125	°C
Storage Temperature Range	Tstg	−55 to +150	°C

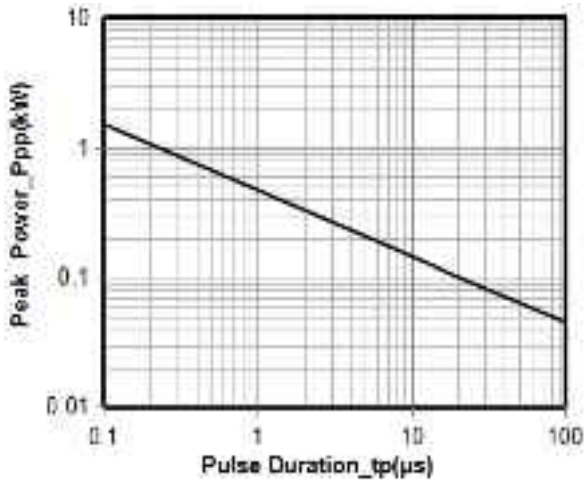
Electrical Characteristics (T_A=25°C unless otherwise specified)

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V_{RWM}			3.3	V	Any I/O pin to ground
Breakdown Voltage	V_{BR}	4			V	I_T = 1mA, any I/O pin to ground
Reverse Leakage Current	I_R			0.5	μA	V_{RWM}= 3.3V, any I/O pin to ground
Clamping Voltage	V_C			10	V	I_{PP} = 1A (8 x 20μs pulse), any I/O pin to ground
Clamping Voltage	V_C			15	V	I_{PP} = 5A (8 x 20μs pulse), any I/O pin to ground
Junction Capacitance	C_J		0.30		pF	VR = 0V, f = 1MHz, between I/O pins
Junction Capacitance	C_J		0.70	0.80	pF	VR = 0V, f = 1MHz, any I/O pin to ground

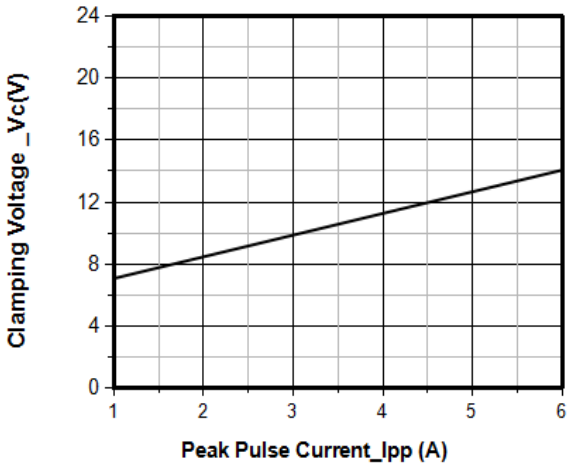
Typical Performance Characteristics (TA=25°C unless otherwise Specified)



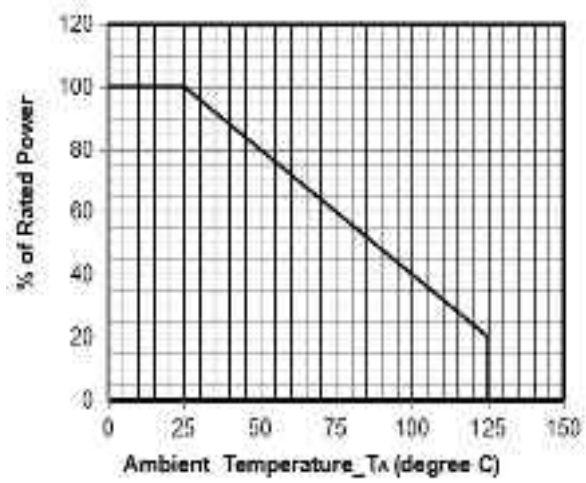
Junction Capacitance vs. Reverse Voltage



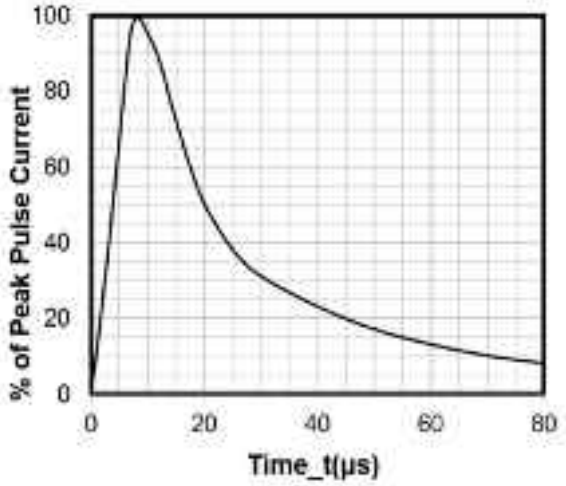
Peak Pulse Power vs. Pulse Time



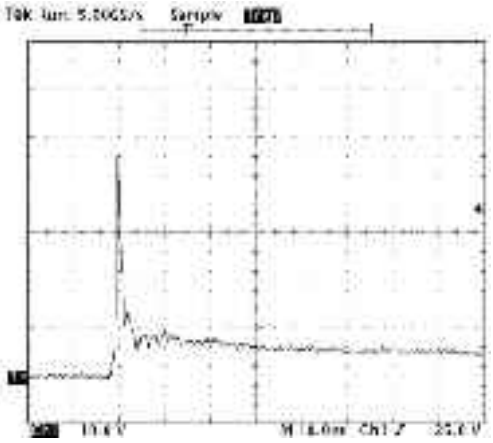
Clamping Voltage vs. Peak Pulse Current



Power Derating Curve



8 X 20μs Pulse Waveform

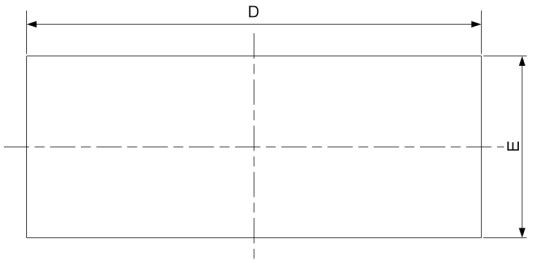


Note：Data is taken with a 10x attenuator

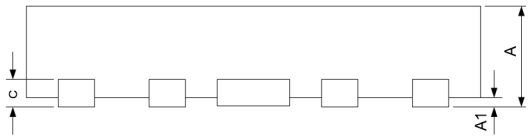
ESD Clamping Voltage

8 kV Contact per IEC61000−4−2

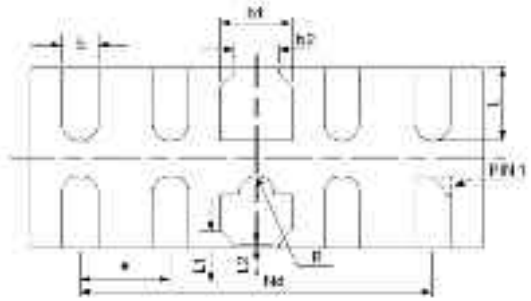
DFN2510-10 Package Outline Drawing



TOP VIEW



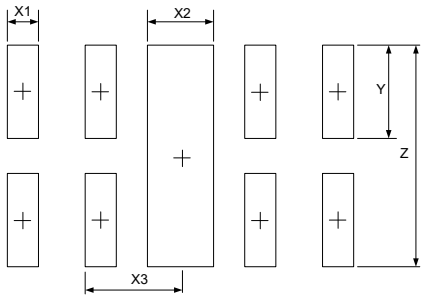
SIDE VIEW



BOTTOM VIEW

SYM	DIMENSIONS					
	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.45	-	0.60	0.018	-	0.024
A1	0.00	0.02	0.05	0.000	0.001	0.002
b	0.15	0.20	0.25	0.006	0.008	0.010
b1	0.35	0.40	0.45	0.014	0.016	0.018
b2	0.20	0.25	0.30	0.008	0.010	0.012
c	0.10	0.15	0.20	0.004	0.006	0.008
D	2.45	2.50	2.55	0.098	0.100	0.102
e	0.50BSC			0.020BSC		
Nd	2.00BSC			0.080BSC		
E	0.95	1.00	1.05	0.038	0.040	0.042
L	0.33	-	0.45	0.013	-	0.018
L1	0.075REF			0.003REF		
L2	0.050REF			0.002REF		
R	0.05	0.10	0.15	0.002	0.004	0.006

Suggested Land Pattern



SYM	DIMENSIONS	
	MILLIMETERS	INCHES
X1	0.200	0.008
X2	0.400	0.016
X3	0.600	0.024
Y	0.600	0.024
Z	1.400	0.056