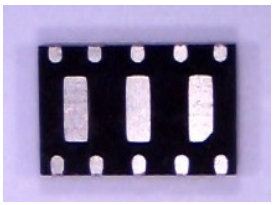
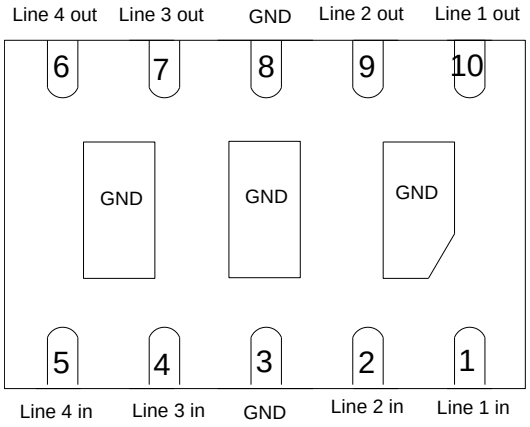
# UPE3374N

Ultra Low Capacitance Array for ESD Protection

The UPE3374N provides a typical line to line capacitance of 1.3pF and low insertion loss up to 2GHz providing greater signal integrity making it ideally suited for GbE, USB 2.0 applications, such as Digital TVs, DVD players, Computer, set-top boxes and MDDI applications in mobile computing devices.

It has been specifically designed to protect sensitive components which are connected to high-speed data and transmission lines from overvoltage caused by Lighting, ESD(electrostatic discharge), CDE (Cable Discharge Events),and EFT (electrical fast transients).



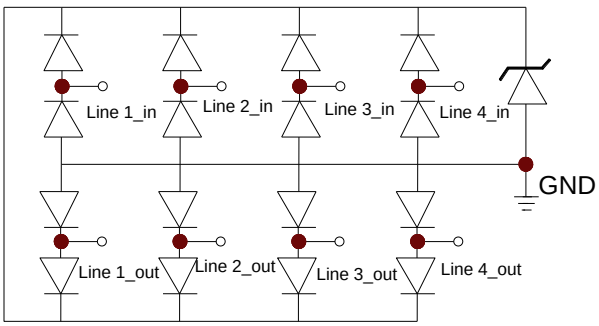

**DFN3020-10L**

## Features

- Protects eight I/O lines
- Low capacitance
- Working voltages : 3.3V
- Low leakage current
- Response Time is < 1 ns
- Low capacitance (<3.2pF) for high-speed interfaces
- No insertion loss to 2.0GHz
- **Solid-state silicon avalanche technology**
- Meets MSL 1 Requirements
- ROHS compliant

## Main applications

- Digital Visual Interface (DVI)
- 10/100/1000 Ethernet
- USB 1.1/2.0/OTG
- IEEE 1394 Firewire Ports
- Projection TV Monitors and Flat Panel Displays
- Notebook Computers
- Set Top Box
- Projection TV




## Protection solution to meet

- IEC61000-4-2 (ESD) ±30kV (air), ±30kV (contact)
- IEC61000-4-4 (EFT) 40A (5/50ns)
- IEC61000-4-5 (Lightning) 40A (8/20μs)

## Ordering Information

| Device | Qty per Reel | Reel Size |
|---|---|---|
| UPE3374N | 3000 | 7 Inch |

| Maximum ratings (Tamb=25℃ Unless Otherwise Specified) | | | |
|---|---|---|---|
| **Parameter** | **Symbol** | **Value** | **Unit** |
| Peak Pulse Power (tp=8/20μs waveform) | $P_{PPP}$ | 1000 | Watts |
| Peak Pulse Current(tp=8/20μs waveform) | $I_{PP}$ | 40 | A |
| ESD Rating per IEC61000-4-2： Contact<br>Air | | +/- 30<br>+/- 30 | KV |
| Lead Soldering Temperature | $T_L$ | 260 (10 sec.) | ℃ |
| Operating Temperature Range | $T_J$ | -55 ~ 150 | ℃ |
| Storage Temperature Range | $T_{STG}$ | -55 ~ 150 | ℃ |

*Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.*

**Other voltages may be available upon request.*

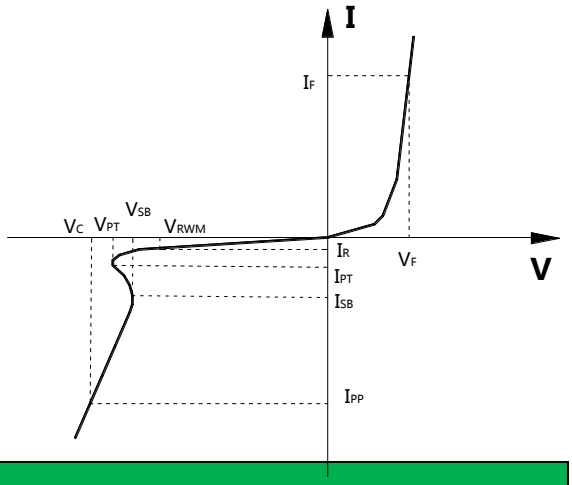
*1. Non-repetitive current pulse, per Figure 1.*

## Electrical characteristics ( Tamb=25℃ Unless Otherwise Specified)

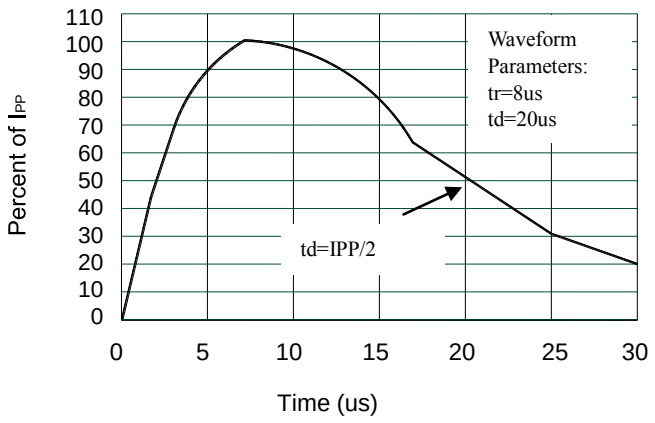
| Parameter | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| Reverse Working Voltage | $V_{RWM}$ | | | 3.3 | V | |
| Punch-Through Voltage | $V_{PT}$ | 3.5 | | | V | $I_T$ = 2μA |
| Snap-Back Voltage | $V_{SB}$ | 2.8 | | | V | $I_{SB}$ = 50mA |
| Reverse Leakage Current | $I_R$ | | | 0.5 | μA | $V_{RWM}$ = 3.3V |
| Clamping Voltage | $V_C$ | | | 5.5 | V | $I_{PP}$ = 1A (8 x 20μs pulse), any I/O pin to ground |
| Clamping Voltage | $V_C$ | | | 10.5 | V | $I_{PP}$ = 10A (8 x 20μs pulse), any I/O pin to ground |
| Clamping Voltage | $V_C$ | | | 18 | V | $I_{PP}$ = 25A (8 x 20μs pulse), any I/O pin to ground |
| Clamping Voltage | $V_C$ | | | 25 | V | $I_{PP}$ = 40A (8 x 20μs pulse), line to line ( two I/O pins connected together on each line) |
| Junction Capacitance | $C_J$ | | 1.7 | 2.5 | pF | VR = 0V, f = 1MHz, between I/O pins |
| Junction Capacitance | $C_J$ | | 3.8 | 5.0 | pF | VR = 0V, f = 1MHz, any I/O pin to ground |

*Junction capacitance is measured in VR=0V,F=1MHz*

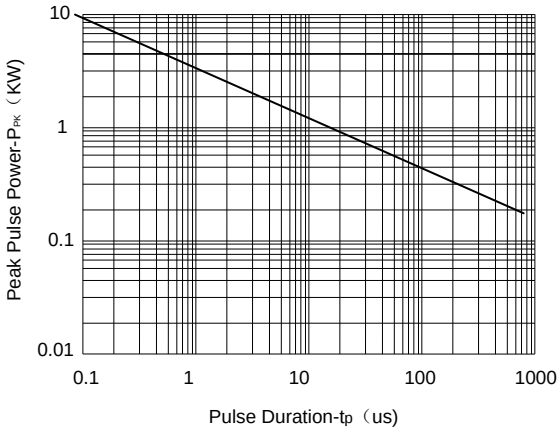
| Symbol | Parameter |
|---|---|
| $V_{RWM}$ | Working Peak Reverse Voltage |
| $V_{PT}$ | Punch-Through Voltage@ $I_{PT}$ |
| $V_{SB}$ | Snap-Back Voltage@ $I_{SB}$ |
| $V_C$ | Clamping Voltage @ $I_{PP}$ |
| $I_T$ | Test Current |
| $I_{RM}$ | Leakage current at $V_{RWM}$ |
| $I_{PP}$ | Peak pulse current |
| $C_O$ | Off-state Capacitance |
| $C_J$ | Junction Capacitance |



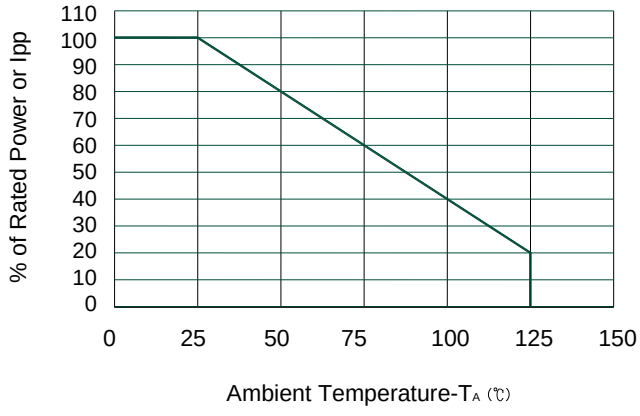

## Typical electrical characterist applications



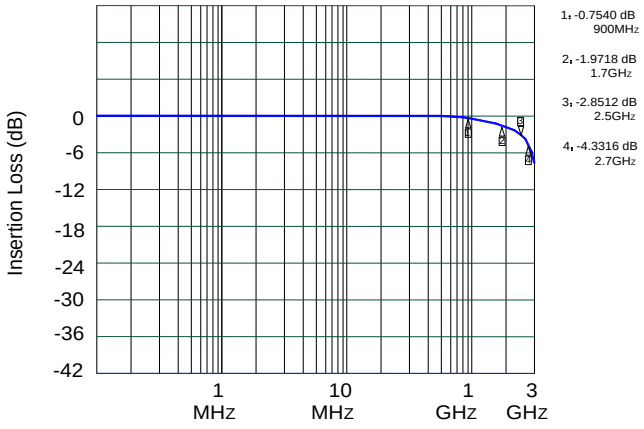

**Pulse Waveform**




**Non-Repetitive Peak Pulse Power vs. Pulse Time**



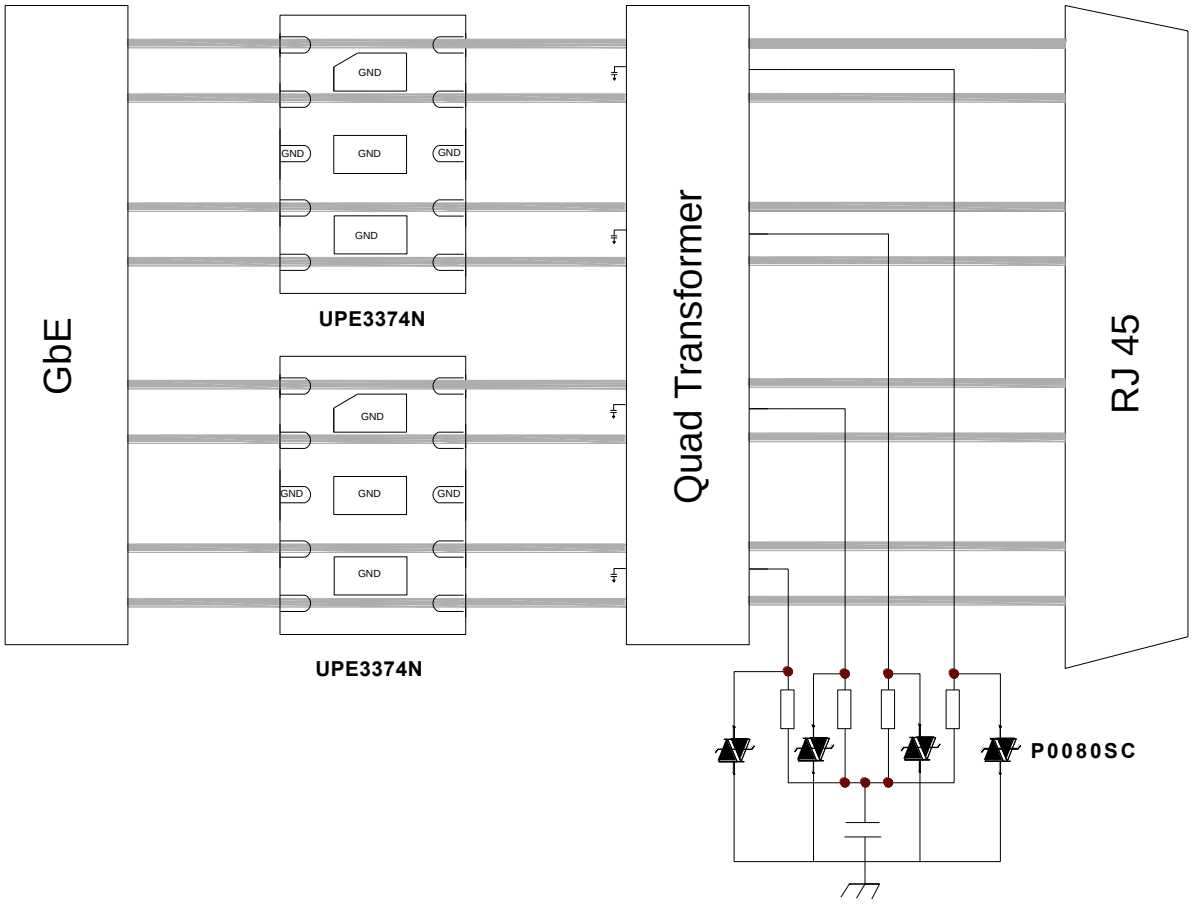

**Power Derating Curve**




**Insertion Loss S21**

## Typical applications

### GbE Lightning & ESD Protection




**Schematic Diagram for Gigabit Ethernet ESD/Surge Protection using UPE3374N**

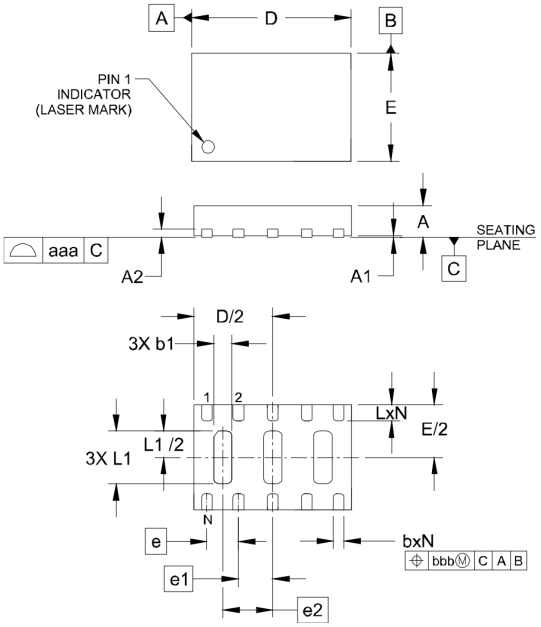
Electronic equipment is susceptible to damage caused by a variety of sources, including Electrostatic Discharge (ESD), Electrical Fast Transients (EFT) and Lightning strikes. The UPE3374N was designed to protect the sensitive equipment from damage which may be induced by such transient events. This product can be configured in different connections to meet the requirement of common-mode and differential-mode as follows:

## Package information

### DFN3020-10L

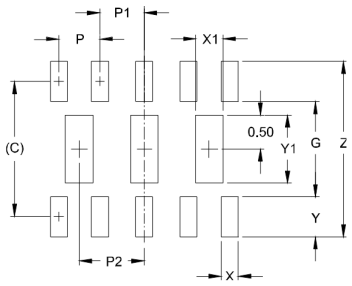
### Mechanical Data

- Case: DFN3020-10L
- Case Material: Molded Plastic. UL Flammability




| DIMENSIONS | | | |
|---|---|---|---|
| DIM | MILLIMETERS | | |
| | MIN | NOM | MAX |
| A | 0.50 | 0.60 | 0.65 |
| A1 | 0.00 | 0.03 | 0.05 |
| A2 | | (0.15) | |
| b | 0.15 | 0.20 | 0.25 |
| b1 | 0.25 | 0.35 | 0.45 |
| D | 2.90 | 3.00 | 3.10 |
| E | 1.90 | 2.00 | 2.10 |
| e | | 0.60 BSC | |
| e1 | | 0.65 BSC | |
| e2 | | 0.95 BSC | |
| L | 0.25 | 0.30 | 0.35 |
| L1 | 0.95 | 1.00 | 1.05 |
| N | | 10 | |
| aaa | | 0.08 | |
| bbb | | 0.10 | |

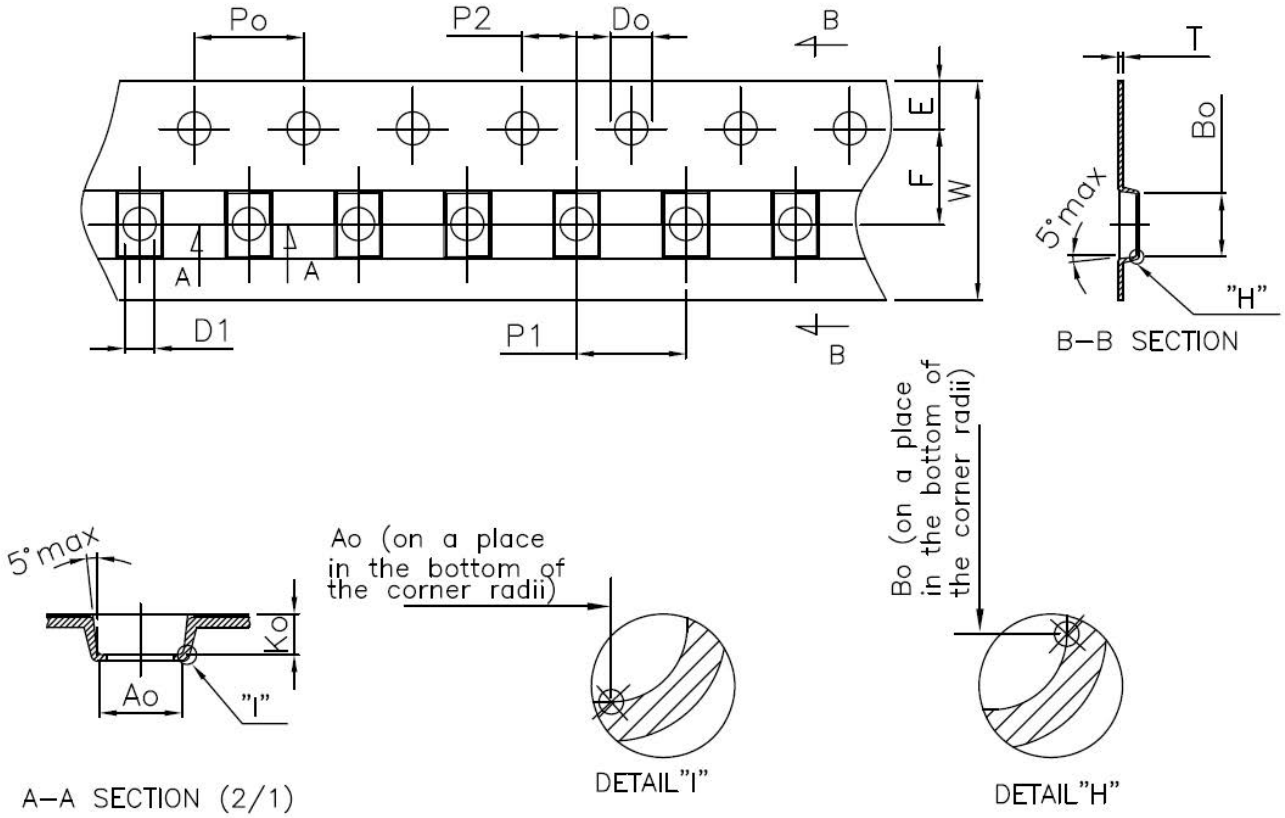
### Suggested Land Pattern




| DIMENSIONS | |
|---|---|
| DIM | MILLIMETERS |
| C | (1.98) |
| G | 1.40 |
| P | 0.60 |
| P1 | 0.65 |
| P2 | 0.95 |
| X | 0.25 |
| X1 | 0.40 |
| Y | 0.58 |
| Y1 | 1.00 |
| Z | 2.56 |

## Package information

**DFN3020-10L Reel Dim**




**Unit: mm**

| Symbol | A0 | B0 | K0 | P0 | P1 | P2 |
|---|---|---|---|---|---|---|
| Spec | 2.40±0.10 | 3.15±0.10 | 1.05±0.10 | 4.0±0.10 | 4.0±0.10 | 2.0±0.05 |
| Symbol | E | F | D0 | D1 | W | 10P0 |
| Spec | 1.75±0.10 | 5.50±0.05 | 1.55±0.05 | $1.0\ ^{+0.25}_{0}$ | 12±0.30 | 40.0±0.10 |