The SP3374NUTG is a low-capacitance, TVS Diode Array designed to provide protection against ESD (electrostatic discharge), CDE (cable discharge events), EFT (electrical fast transients), and lightning induced surges for high-speed, differential data lines. It's packaged in a µDFN package (3.0 x 2.0mm) and each device can protect up 4 channels or 2 differential pairs, up to 40A (IEC 61000-4-5 2nd edition) and up to 30kV ESD (IEC 61000-4-2). The “flow-through” design minimizes signal distortion, reduces voltage overshoot, and provides a simplified PCB design.

The SP3374NUTG with its low capacitance and low clamping voltage makes it ideal for high-speed data interfaces such as 1GbE applications found in notebooks, switches, etc.

**Features**
- ESD, IEC 61000-4-2, ±30kV contact, ±30kV air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, 40A (8/20μs as defined in IEC 61000-4-5 2nd Edition)
- Low capacitance of 3.5pF@0V (TYP) per I/O
- Low leakage current of 0.1μA (TYP) at 3.3V
- µDFN-10 package is optimized for high-speed data line routing
- Provides protection for two differential data pairs (4 channels) up to 40A
- Low operating and clamping voltage
- AEC-Q101 qualified
- Halogen free, Lead free and RoHS compliant

**Applications**
- 10/100/1000 Ethernet
- WAN/LAN Equipment
- Desktops, Servers and Notebooks
- LVDS Interfaces
- Integrated Magnetics
- Smart TV

**Application Example**

*Life Support Note:*
*Not Intended for Use in Life Support or Life Saving Applications*

The products shown herein are not designed for use in life sustaining or life saving applications unless otherwise expressly indicated.

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### Absolute Maximum Ratings

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Value</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_{pp}$</td>
<td>Peak Current ($t_p=8/20\mu s$)</td>
<td>40</td>
<td>A</td>
</tr>
<tr>
<td>$P_{pk}$</td>
<td>Peak Pulse Power ($t_p=8/20\mu s$)</td>
<td>1000</td>
<td>W</td>
</tr>
<tr>
<td>$T_{op}$</td>
<td>Operating Temperature</td>
<td>-40 to 125</td>
<td>°C</td>
</tr>
<tr>
<td>$T_{stor}$</td>
<td>Storage Temperature</td>
<td>-55 to 150</td>
<td>°C</td>
</tr>
</tbody>
</table>

**CAUTION:** Stresses above those listed in “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

### Electrical Characteristics ($T_{op}=25^\circ C$)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Test Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reverse Standoff Voltage</td>
<td>$V_{rwm}$</td>
<td>$I_r \leq 1\mu A$</td>
<td>3.3</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Reverse Leakage Current</td>
<td>$I_g$</td>
<td>$V_{rwm} = 3.3V, T = 25^\circ C$</td>
<td>0.1</td>
<td>0.5</td>
<td></td>
<td>µA</td>
</tr>
<tr>
<td>Snap Back Voltage</td>
<td>$V_{sb}$</td>
<td>$I_{sb} = 50mA$</td>
<td>2.8</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Clamp Voltage</td>
<td>$V_C$</td>
<td>$I_{sb} = 1A, t_s = 8/20\mu s$ $\text{Any I/O to Ground}$</td>
<td>5.5</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_{sb} = 10A, t_s = 8/20\mu s$ $\text{Any I/O to Ground}$</td>
<td>10.5</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_{sb} = 25A, t_s = 8/20\mu s$ $\text{Any I/O to Ground}$</td>
<td>18.0</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_{sb} = 40A, t_s = 8/20\mu s$ Line-to-Line$^1$, two I/O Pins connected together on each line</td>
<td>25.0</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Dynamic Resistance$^2$</td>
<td>$R_{dyn}$</td>
<td>TLP, $t_s=100ns$, Any I/O to Ground</td>
<td>0.15</td>
<td></td>
<td></td>
<td>Ω</td>
</tr>
<tr>
<td>ESD Withstand Voltage</td>
<td>$V_{esd}$</td>
<td>IEC 61000-4-2 (Contact) $\pm 30$</td>
<td></td>
<td></td>
<td></td>
<td>kV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IEC 61000-4-2 (Air) $\pm 30$</td>
<td></td>
<td></td>
<td></td>
<td>kV</td>
</tr>
<tr>
<td>Diode Capacitance</td>
<td>$C_{gs}$</td>
<td>Between I/O Pins and Ground $V_s = 0V, f = 1MHz$</td>
<td>3.5</td>
<td>5.0</td>
<td></td>
<td>pF</td>
</tr>
<tr>
<td></td>
<td>$C_{gd}$</td>
<td>Between I/O Pins $V_s = 0V, f = 1MHz$</td>
<td>1.7</td>
<td></td>
<td></td>
<td>pF</td>
</tr>
</tbody>
</table>

**Notes:**
1. Stresses with 2 pins connected together per suggested diagram (For example, Pin 1 is connected to pin 10; pin 2 is connected to Pin 9; Pin 4 is connected to pin 7 and pin 5 is connected to pin 6)
2. Transmission Line Pulse (TLP) with 100ns width, 2ns rise time, and average window t1=70ns to t2=90ns

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**Soldering Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reflow Condition</td>
<td>Pb – Free assembly</td>
</tr>
<tr>
<td>Pre Heat</td>
<td>- Temperature Min ( (T_{\text{min}}) ) 150°C</td>
</tr>
<tr>
<td></td>
<td>- Temperature Max ( (T_{\text{max}}) ) 200°C</td>
</tr>
<tr>
<td></td>
<td>- Time (min to max) ( (t_p) ) 60 – 180 secs</td>
</tr>
<tr>
<td>Average ramp up rate (Liquidus)</td>
<td>( T_{\text{min}} ) to ( T_{\text{L}} ) - Ramp-up Rate 3°C/second max</td>
</tr>
<tr>
<td>Reflow</td>
<td>- Temperature ( (T_L) ) (Liquidus) 217°C</td>
</tr>
<tr>
<td></td>
<td>- Temperature ( (t_L) ) 60 – 150 seconds</td>
</tr>
<tr>
<td>Peak Temperature ( (T_P) )</td>
<td>260(^\circ)C</td>
</tr>
<tr>
<td>Time within 5°C of actual peak Temperature ( (t_P) )</td>
<td>20 – 40 seconds</td>
</tr>
<tr>
<td>Ramp-down Rate</td>
<td>6°C/second max</td>
</tr>
<tr>
<td>Time 25°C to peak Temperature ( (T_P) )</td>
<td>8 minutes Max.</td>
</tr>
<tr>
<td>Do not exceed</td>
<td>260°C</td>
</tr>
</tbody>
</table>

**Ordering Information**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package</th>
<th>Min. Order Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP3374NUTG</td>
<td>µDFN-10 (3.0x2.0mm)</td>
<td>3000</td>
</tr>
</tbody>
</table>

**Part Numbering System**

- **Series**
  - **TVS Diode Arrays (SPA® Diodes)**
- **Package**
  - µDFN-10 (3.0x2.0mm)

**Part Marking System**

- **Series**
  - SP 3374N
- **Package**
  - U
- **G**
  - Green
- **T**
  - Tape & Reel
- **G**
  - G4

**Product Characteristics**

- **Lead Plating**: Pre-Plated Frame
- **Lead Material**: Copper Alloy
- **Substrate material**: Silicon
- **Body Material**: Molded Compound
- **Flammability**: UL Recognized compound meeting flammability rating V-0

**Reflow Condition**

- **Pre Heat**
  - Temperature Min \( (T_{\text{min}}) \) 150°C
  - Temperature Max \( (T_{\text{max}}) \) 200°C
  - Time (min to max) \( (t_p) \) 60 – 180 secs
- **Average ramp up rate (Liquidus) Temp \( (T_L) \) to peak** 3°C/second max
- **Temperature \( (T_L) \) to \( T_P \) - Ramp-up Rate** 3°C/second max
- **Reflow**
  - Temperature \( (T_L) \) (Liquidus) 217°C
  - Temperature \( (t_L) \) 60 – 150 seconds
- **Peak Temperature \( (T_P) \)** 260\(^\circ\)C
- **Time within 5°C of actual peak Temperature \( (t_P) \)** 20 – 40 seconds
- **Ramp-down Rate** 6°C/second max
- **Time 25°C to peak Temperature \( (T_P) \)** 8 minutes Max.
- **Do not exceed** 260°C

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**Package Dimensions — µDFN-10 (3.0x2.0mm)**

![Diagram of Package Dimensions](image_url)

**Tape & Reel Specification — µDFN-10 (3.0x2.0mm)**

![Diagram of Tape & Reel Specification](image_url)

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