SP3422 0.2pF 22kV Diode Array

Description

The SP3422 integrates 4 channels of ultra low capacitance rail-to-rail diodes and an additional zener diode to provide protection for electronic equipment that may experience destructive electrostatic discharges (ESD). This robust component can safely absorb repetitive ESD strikes above the maximum level specified in the IEC 61000-4-2 international standard (±8kV contact discharge) without performance degradation. The extremely low loading capacitance also makes it ideal for protecting high speed signal pins such as V-by-One®, USB3.0, USB2.0, and IEEE 1394.

Features

- ESD, IEC 61000-4-2, +22/-10kV contact, +22/-10kV air
- EFT, IEC 61000-4-4, 40A (tₚ=5/50ns)
- Lightning, IEC 61000-4-5 2nd edition, 2A (tₚ=8/20μs)
- Low capacitance of 0.2pF (TYP) at 3GHz
- Low leakage current of 20nA (TYP) at 5V
- Halogen free, Lead free and RoHS compliant
- Moisture Sensitivity Level (MSL -1)

Applications

- V-by-One®
- Embedded DisplayPort
- USB 2.0/3.0 Ports
- MIPI Camera and Display
- Serial bus interfaces such as IEEE 1394
- Flat Panel Displays
- LCD/LED TVs
- Smartphones
- Mobile Computing

Pinout

Functional Block Diagram

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

### 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}=8/20μs)</td>
<td>2.0</td>
<td>A</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>

### Electrical Characteristics (T_{OP}=25°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_{RVM}</td>
<td>I_{R} = 1μA</td>
<td>5.0</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Reverse Leakage Current</td>
<td>I_{LRM}</td>
<td>V_{R}=5V, Any I/O to GND</td>
<td>0.02</td>
<td>1.00</td>
<td></td>
<td>μA</td>
</tr>
<tr>
<td>Clamp Voltage</td>
<td>V_{C}</td>
<td>I_{P}=1A, t_{p}=8/20μs, Fwd</td>
<td>12.9</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I_{P}=2A, t_{p}=8/20μs, Fwd</td>
<td>16.7</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Dynamic Resistance</td>
<td>R_{DYN}</td>
<td>TLP, t=100ns, I/O to GND</td>
<td>1.8</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)</td>
<td>+22/-10</td>
<td></td>
<td></td>
<td>kV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IEC 61000-4-2 (Air)</td>
<td>+22/-10</td>
<td></td>
<td></td>
<td>kV</td>
</tr>
<tr>
<td>Diode Capacitance</td>
<td>C_{I/O-GND}</td>
<td>Reverse Bias=0V, f=3 GHz</td>
<td>0.2</td>
<td></td>
<td></td>
<td>pF</td>
</tr>
</tbody>
</table>

**Note:**
- Parameter is guaranteed by design and/or component characterization.
- Transmission Line Pulse (TLP) with 100ns width, 2ns rise time, and average window t1=70ns to t2= 90ns.
TVS Diode Arrays (SPA® Diodes)
Low Capacitance ESD Protection - SP3422

### Soldering Parameters

**Reflow Condition**
- Pb – Free assembly

**Pre Heat**
- Temperature Min (T_{stray})
- Temperature Max (T_{stray})
- Time (min to max) (t_s)

**Average ramp up rate (Liquidus) Temp (T_L) to peak**
3°C/second max

**T_{stray} to T_L Ramp-up Rate**
3°C/second max

**Reflow**
- Temperature (T_L) (Liquidus)
- Temperature (t_L)

**Peak Temperature (T_P)**
260°C to 265°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

### Part Numbering System

- **Part Number**: SP3422-04UTG
- **Package**: μDFN-5
- **Marking**: B*
- **Min. Order Qty.**: 3000

### Part Marking System

- **B** = Part code = SP3422-04UTG
- **** = Date code

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Revision: GD. 12/16/20
TVS Diode Arrays (SPA® Diodes)
Low Capacitance ESD Protection - SP3422

Package Dimensions

Recommended Soldering Pad Layout

Embossed Carrier Tape & Reel Specification

Device Orientation in Tape

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