TVS Diode Array (SPA® Diodes)
Enhanced ESD Discrete TVS Series - AQ3530-01LTG

AQ3530-01LTG, 0.3pF 22kV unidirectional TVS diode

Description
This AQ3530 unidirectional diode provides a high level of protection for electronic equipment that may be exposed to 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 (Level 4, ±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®, HDMI, USB3.0, USB2.0, and IEEE 1394.

Features
- ESD, IEC 61000-4-2, ±22kV contact, ±30kV air
- EFT, IEC 61000-4-4, 40A (t<sub>P</sub>=5/50ns)
- Lightning, 2.5A (8/20μs as defined in IEC 61000-4-5 2nd edition)
- Low capacitance of 0.3pF (TYP) at 3GHz
- ESD, ISO 10605, 330pF 330Ω, ±26kV contact, ±30kV air
- Facilitates excellent signal integrity
- PPAP capable
- AEC-Q101 qualified
- Halogen free, Lead free and RoHS compliant
- Moisture Sensitivity Level (MSL -1)

Applications
- Ultra-high speed data lines
- USB 3.1, 3.0, 2.0
- HDMI 2.0, 1.4a, 1.3
- DisplayPort™
- V-by-One®
- LVDS interfaces
- Automotive application
- Consumer, mobile and portable electronics
- Tablet PC and external storage with high speed interfaces
- Applications requiring high ESD performance in small packages

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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>IPP</td>
<td>Peak Current (tp=8/20μs)</td>
<td>2.5</td>
<td>A</td>
</tr>
<tr>
<td>TOP</td>
<td>Operating Temperature</td>
<td>-40 to 150</td>
<td>°C</td>
</tr>
<tr>
<td>TSTOR</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 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.

Electrical Characteristics - (TOP=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_{BAM}</td>
<td>I_p = 1μA</td>
<td>5</td>
<td></td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Breakdown Voltage</td>
<td>V_{BR}</td>
<td>I_p = 1mA</td>
<td>75</td>
<td>8.5</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Reverse Leakage Current</td>
<td>I_{LEAK}</td>
<td>V_p = 5V</td>
<td>0.02</td>
<td>0.1</td>
<td>μA</td>
<td></td>
</tr>
<tr>
<td>Clamp Voltage¹</td>
<td>V_C</td>
<td>I_p = 2.5A, t_p = 8/20μs, I/O to GND</td>
<td>12.5</td>
<td>15</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Dynamic Resistance²</td>
<td>R_{DYN}</td>
<td>TLP, t_p = 100ns, I/O to GND</td>
<td>0.78</td>
<td></td>
<td>Ω</td>
<td></td>
</tr>
<tr>
<td>ESD Withstand Voltage¹</td>
<td>V_{ESD}</td>
<td>IEC 61000-4-2 (Contact)</td>
<td>±22</td>
<td></td>
<td>kV</td>
<td></td>
</tr>
<tr>
<td>Diode Capacitance¹,³</td>
<td>C_{O-GND}</td>
<td>Reverse Bias = 0V, f = 3 GHz</td>
<td>0.30</td>
<td></td>
<td>pF</td>
<td></td>
</tr>
</tbody>
</table>

Note:
1. Parameter is guaranteed by design and/or component characterization.
2. Transmission Line Pulse (TLP) with 100ns width, 2ns rise time, and average window t1 = 70ns to t2 = 90ns.
3. Package sizes larger than 0201 can add parasitic capacitance, inductance and resistance.

Clamping voltage vs. IPP for 8/20μs waveshape

8/20μs Pulse Waveform
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Positive Transmission Line Pulsing (TLP) Plot

Negative Transmission Line Pulsing (TLP) Plot

IEC 61000−4−2 +8 kV Contact ESD Clamping Voltage

IEC 61000−4−2 -8 kV Contact ESD Clamping Voltage

ESD ISO10605 +8 kV Contact ESD Clamping Voltage

ESD ISO10605 -8 kV Contact ESD Clamping Voltage
TVS Diode Array (SPA® Diodes)
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Soldering Parameters

<table>
<thead>
<tr>
<th>Reflow Condition</th>
<th>Pb – Free assembly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre Heat</td>
<td></td>
</tr>
<tr>
<td>- Temperature Min ($T_{min}$)</td>
<td>150°C</td>
</tr>
<tr>
<td>- Temperature Max ($T_{max}$)</td>
<td>200°C</td>
</tr>
<tr>
<td>- Time (min to max) ($t_L$)</td>
<td>60 – 180 secs</td>
</tr>
<tr>
<td>Average ramp up rate (Liquidus)</td>
<td>3°C/second max</td>
</tr>
<tr>
<td>$T_{\text{max}}$ to $T_L$ - Ramp-up Rate</td>
<td>3°C/second max</td>
</tr>
<tr>
<td>Reflow</td>
<td></td>
</tr>
<tr>
<td>- Temperature ($T_r$) (Liquidus)</td>
<td>217°C</td>
</tr>
<tr>
<td>- Temperature ($t_r$)</td>
<td>60 – 150 seconds</td>
</tr>
<tr>
<td>Peak Temperature ($T_p$)</td>
<td>260 ± 5°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>

Part Numbering System

- AQ 3530-01 L T G
  - Automotive Grade TVS Diode Arrays (SPA® Diodes)
  - Series: AQ
  - Number of Channels: 3530
  - Package: SOD523
  - G: Green
  - T: Tape & Reel

Part Marking System

- [ ]

Product Characteristics

- **Lead Plating**: Matte Tin
- **Lead Material**: Copper Alloy
- **Lead Coplanarity**: 0.004 inches (0.102mm)
- **Substrate Material**: Silicon
- **Body Material**: Molded Compound
- **Flammability**: UL Recognized compound meeting flammability rating V-0

Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package</th>
<th>Min. Order Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AQ3530-01LTG</td>
<td>SOD523</td>
<td>5000</td>
</tr>
</tbody>
</table>

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**Package Dimensions — SOD-523**

**Embossed Carrier Tape & Reel Specification — SOD-523**

### Embossed Carrier Tape & Reel Specification — SOD-523

- **Symbol**
  - A
  - A1
  - b
  - c
  - D
  - E
  - E1
  - E2
  - L
  - θ

- **Dimensions (Millimeters & Inches)**
  - Min
  - Max
  - Min
  - Max

- **Recommended Soldering Pad Layout**

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