General Description

The AOZ8S333UDS-05 is a 1-channel unidirectional high surge transient voltage suppressor designed to protect data lines such as USB2.0 from damaging ESD/surge events.

The AOZ8S333UDS-05 provides a typical capacitance of 0.5 pF and low clamping voltage making it ideally suited for data transmission protection in mobile and computing devices.

The AOZ8S333UDS-05 comes in a RoHS compliant and Halogen Free 1.0 mm × 0.6 mm package and is rated for -40°C to +125°C junction temperature range.

Features

- IEC 61000 4-2, ESD immunity:
  - Air discharge: ±25 kV
  - Contact Discharge: ±22 kV
- IEC61000-4-5 (8/20μS): 6A
- Human Body Mode (HBM): ±8kV
- Low capacitance: 0.5 pF
- Low clamping voltage
- Reverse Working Voltage: 5V

Applications

- USB2.0
- Mobile Phone
- Notebook computers
- Panel and Display

Typical Application

![Signal Line](image)

Pin Configuration

![DFN1.0x0.6-2L](image)
### Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Ambient Temperature Range</th>
<th>Package</th>
<th>Environmental</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOZ8S333UDS-05</td>
<td>-40°C to +125°C</td>
<td>DFN1.0x0.6-2L</td>
<td>Green Product</td>
</tr>
</tbody>
</table>

AOS Green Products use reduced levels of Halogens, and are also RoHS compliant. Please visit [https://aosmd.com/sites/default/files/media/AOSGreenPolicy.pdf](https://aosmd.com/sites/default/files/media/AOSGreenPolicy.pdf) for additional information.

### Absolute Maximum Ratings

Exceeding the Absolute Maximum Ratings may damage the device.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOZ8S333UDS-05 Pin1 to Pin2</td>
<td>5 V</td>
</tr>
<tr>
<td>Peak Pulse Current ($I_{PP}$), $t_P = 8/20\mu s$</td>
<td>±6 A</td>
</tr>
<tr>
<td>Peak Pulse Power ($P_{PP}$), $t_P = 8/20\mu s$</td>
<td>18 W</td>
</tr>
<tr>
<td>Storage Temperature ($T_S$)</td>
<td>-65 °C to +150°C</td>
</tr>
<tr>
<td>ESD Rating per IEC61000-4-2, contact$^{(1)}$</td>
<td>±22 kV</td>
</tr>
<tr>
<td>ESD Rating per IEC61000-4-2, air$^{(1)}$</td>
<td>±25 kV</td>
</tr>
<tr>
<td>EFT Rating per IEC61000-4-4 (5/50ns)</td>
<td>40 A</td>
</tr>
<tr>
<td>ESD Rating per Human Body Mode (HBM)$^{(2)}$</td>
<td>±8 kV</td>
</tr>
</tbody>
</table>

**Notes:**
1. IEC 61000-4-2 discharge with $C_{Discharge} = 150$ pF, $R_{Discharge} = 330$ Ω.
2. Human Body Discharge per MIL-STD-883, Method 3015 $C_{Discharge} = 100$ pF, $R_{Discharge} = 1.5$ kΩ.

### Maximum Operating Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Junction Temperature ($T_J$)</td>
<td>-40 °C to +125 °C</td>
</tr>
</tbody>
</table>
## Electrical Characteristics

\( T_A = 25^\circ C, \) unless otherwise noted. Any Pin to Pin.

### Symbol Table

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>( V_{RWM} )</td>
<td>Reverse Working Voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>( V_{BR} )</td>
<td>Reverse Breakdown Voltage</td>
<td>( I_T = 100\mu A )</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>( I_R )</td>
<td>Reverse Leakage Current</td>
<td>( V_T = \text{Max.} \ V_{RWM} )</td>
<td>100</td>
<td>nA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( V_{CL} )</td>
<td><strong>Clamping Voltage</strong>^{(3)} (100ns Transmission Line Pulse)</td>
<td>( I_{TLP} = 1A )</td>
<td>1.5</td>
<td></td>
<td>-1.5</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( I_{TLP} = -1A )</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>( I_{TLP} = 16A )</td>
<td>5.5</td>
<td></td>
<td>-11</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>( I_{TLP} = -16A )</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>( I_{TLP} = 30A )</td>
<td>10</td>
<td></td>
<td>-16</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>( I_{TLP} = -30A )</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( C_J )</td>
<td>Junction Capacitance</td>
<td>( V_{I/O} = 0 \ V, f = 1\text{MHz} )</td>
<td>0.5</td>
<td></td>
<td>0.9</td>
<td>pF</td>
</tr>
</tbody>
</table>

### Notes:

3. Measurements performed using a 100ns Transmission Line Pulse (TLP) system.
4. These specifications are guaranteed by design and characterization.
Typical Characteristics

Positive Transmission Line Pulse  
(tp = 100ns, tr = 10ns)

TLP Current (A)  
TLP Voltage (V)

Negative Transmission Line Pulse  
(tp = 100ns, tr = 10ns)

TLP Current (A)  
TLP Voltage (V)

Typical Variations of CJ vs. Input Voltage

Input Voltage (V)  
Capacitance (pF)

IEC61000-4-5 Surge 8/20us

Peak Pulse Current, IPP (A)  
Clamping Voltage (V)

Pin1 to Pin2  
Pin2 to Pin1
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