AQ1250-01ETG
50A Discrete Unidirectional TVS Diode, General Purpose Surge Protection

Description
The AQ1250-01ETG unidirectional TVS is fabricated in a proprietary silicon avalanche technology. These diodes provide a high ESD (electrostatic discharge) protection level for electronic equipment. The AQ1250 TVS can safely absorb repetitive ESD strikes of ±30 kV (contact and air discharge as defined in IEC 61000-4-2) without any performance degradation. Additionally, each TVS can safely dissipate a 50A 8/20μs surge event as defined in IEC 61000-4-5 2nd edition.

Features
- ESD, IEC 61000-4-2, ±30kV contact, ±30kV air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, 50A (8/20μs as defined in IEC 61000-4-5 2nd edition)
- ESD, ISO 10605, 330pF 330Ω, ±30kV contact, ±30kV air
- Low leakage current of 0.02μA (TYP) at 5V
- Halogen free, lead free and RoHS compliant
- Moisture Sensitivity Level 1
- AEC-Q101 qualified and PPAP capable

Applications
- Switches / Buttons
- Test Equipment / Instrumentation
- Medical Equipment
- Battery
- Automotive applications

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.
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>50</td>
<td>A</td>
</tr>
<tr>
<td>$T_{OP}$</td>
<td>Operating Temperature</td>
<td>-40 to 150</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 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 ($T_{OP}=25^\circ C$)

<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>$V_{NW}$</td>
<td>$I_r=1\mu A$</td>
<td>5</td>
<td>5</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Breakdown Voltage</td>
<td>$V_{BR}$</td>
<td>$I_r=1mA$</td>
<td>5.2</td>
<td>5.5</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Reverse Leakage Current</td>
<td>$I_{LEAK}$</td>
<td>$V_r=5V$</td>
<td>0.02</td>
<td>0.1</td>
<td>μA</td>
<td></td>
</tr>
<tr>
<td>Clamp Voltage</td>
<td>$V_C$</td>
<td>$I_{PP}=50A, t_p=8/20\mu s$</td>
<td>8.7</td>
<td>10</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Dynamic Resistance</td>
<td>$R_{QIN}$</td>
<td>TLP; $t_p=100ns$</td>
<td>0.05</td>
<td></td>
<td>Ω</td>
<td></td>
</tr>
<tr>
<td>ESD Withstand Voltage</td>
<td>$V_{ESD}$</td>
<td>IEC 61000-4-2 (Contact Discharge)</td>
<td>±30</td>
<td></td>
<td>kV</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>IEC 61000-4-2 (Air Discharge)</td>
<td>±30</td>
<td></td>
<td>kV</td>
<td></td>
</tr>
<tr>
<td>Diode Capacitance</td>
<td>$C_{IO-GND}$</td>
<td>Reverse Bias=0V, f=1MHz</td>
<td>120</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, 0.2ns rise time, and average window $t_1=70ns$ to $t_2=90ns$
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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

ISO10605 contact discharge plot at +8 kV

ISO10605 contact discharge plot at -8 kV
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Soldering Parameters

Reflow Condition
- Pb – Free assembly

Pre Heat
- Temperature Min \( T_{\text{min}} \) 150°C
- Temperature Max \( T_{\text{max}} \) 200°C
- Time (min to max) \( t_{\text{L}} \) 60 – 180 secs

Average ramp up rate (Liquidus) Temp \( T_{\text{L}} \) to peak 3°C/second max

\( T_{\text{max}} \) to \( T_{\text{L}} \) - Ramp-up Rate 3°C/second max

Reflow
- Temperature \( T_{\text{L}} \) (Liquidus) 217°C
- Temperature \( t_{\text{L}} \) 60 – 150 seconds

Peak Temperature \( T_{\text{p}} \) 260°C

Time within 5°C of actual peak Temperature \( t_{\text{p}} \) 20 – 40 seconds

Ramp-down Rate 6°C/second max

Time 25°C to peak Temperature \( T_{\text{p}} \) 8 minutes Max.

Do not exceed 260°C

Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package</th>
<th>Min. Order Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AQ1250-01ETG</td>
<td>SOD882</td>
<td>10,000</td>
</tr>
</tbody>
</table>

Part Marking System

Date code
U: Part code

Product Characteristics

Lead Plating Matte Tin
Lead material Copper Alloy
Substrate Material Silicon
Body Material Molded Compound
Flammability UL Recognized compound meeting flammability rating V-0

Part Numbering System

Series: Automotive Grade TVS Diode Arrays (SPA® Diodes)
Number of Channels
Package E: SOD882

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Specifications are subject to change without notice.
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### Package Dimensions — SOD882

![Package Diagram](image1)

### Embossed Carrier Tape & Reel Specification — SOD882

![Carrier Tape Diagram](image2)

### Recommended Soldering Pattern

![Soldering Pattern](image3)

### Product Disclaimer

Littelfuse products are not designed for, and shall not be used for, any purpose (including, without limitation, automotive, military, aerospace, medical, life-saving, life-sustaining or nuclear facility applications, devices intended for surgical implant into the body, or any other application in which the failure or lack of desired operation of the product may result in personal injury, death, or property damage) other than those expressly set forth in applicable Littelfuse product documentation. Warranties granted by Littelfuse shall be deemed void for products used for any purpose not expressly set forth in applicable Littelfuse documentation. Littelfuse shall not be liable for any claims or damages arising out of products used in applications not expressly intended by Littelfuse as set forth in applicable Littelfuse documentation. The sale and use of Littelfuse products is subject to Littelfuse Terms and Conditions of Sale, unless otherwise agreed by Littelfuse. “Littelfuse” includes Littelfuse, Inc., and all of its affiliate entities. [http://www.littelfuse.com/disclaimer-electronics](http://www.littelfuse.com/disclaimer-electronics).