

**PRELIMINARY & CONFIDENTIAL**

Littelfuse, Inc. has characterized initial samples of this device and is currently conducting reliability testing. Parts numbers and specifications are subject to change until the datasheet is made final.

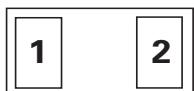
# AQ1210-01ETG

## Bidirectional Discrete TVS Diode, General Purpose Surge Protection




Note: This package image is for example and reference only, for detail package drawing, please refer to the package section in this datasheet.

### Pinout



### Functional Block Diagram



### Description

The AQ1210-01ETG bidirectional TVS is fabricated in a proprietary silicon avalanche technology. These diodes provide a high ESD (electrostatic discharge) protection level for electronic equipment. The AQ1210-01ETG TVS can safely absorb repetitive ESD strikes of  $\pm 30$  kV (contact and air discharge as defined in IEC 61000-4-2) without any performance degradation. Additional, each TVS can safely dissipate a 15A 8/20us surge event as defined in IEC 61000-4-5 2<sup>nd</sup> edition.

### Features

- ESD, IEC 61000-4-2,  $\pm 30$  kV contact,  $\pm 30$  kV air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, 15A (8/20 $\mu$ s as defined in IEC 61000-4-5 2<sup>nd</sup> edition)
- ESD, ISO 10605, 330pF 330 $\Omega$ ,  $\pm 30$  kV contact,  $\pm 30$  kV air
- Low leakage current of 0.02 $\mu$ A (TYP) at 5V
- Halogen free, lead free and RoHS compliant
- Moisture Sensitivity Level
- AECQ-101 qualified and PPAP capable

### Applications

- Switches / Buttons
- Test Equipment / Instrumentation
- Point-of-Sale Terminals
- Medical Equipment
- Automotive
- Computer Peripherals
- Battery

#### 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**

Symbol	Parameter	Value	Units
$I_{PP}$	Peak Current ( $t_p=8/20\mu s$ )	15	A
$T_{OP}$	Operating Temperature	-40 to 150	°C
$T_{STOR}$	Storage Temperature	-55 to 150	°C

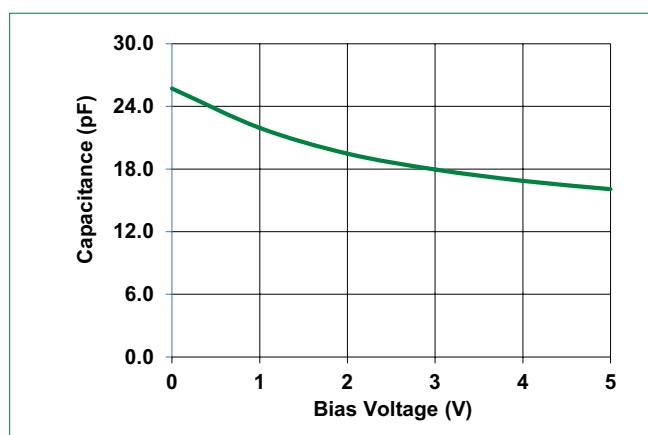
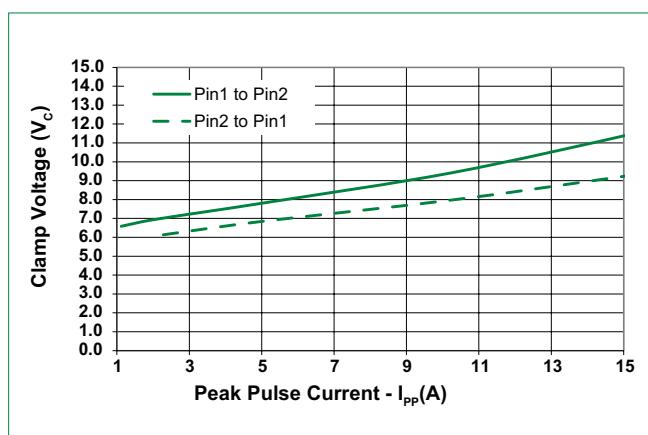
**CAUTION:** Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the component. This is a stress only rating and operation of the component at these or any other conditions above those indicated in the operational sections of this specification is not implied.

**Electrical Characteristics ( $T_{OP}=25^\circ C$ )**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	$V_{RWM}$	$I_R=1\mu A$			5	V
Breakdown Voltage	$V_{BR}$	$I_R=1mA$	5.2	5.5		V
Reverse Leakage Current	$I_{LEAK}$	$V_R=5V$		0.02	0.1	$\mu A$
Clamp Voltage <sup>1</sup>	$V_c$	$I_{PP}=15A, t_p=8/20\mu s$		11		V
Dynamic Resistance <sup>2</sup>	$R_{DYN}$	TLP $t_p=100ns$		0.11		$\Omega$
ESD Withstand Voltage <sup>1</sup>	$V_{ESD}$	IEC 61000-4-2 (Contact Discharge)	±30			kV
		IEC 61000-4-2 (Air Discharge)	±30			kV
Diode Capacitance <sup>1</sup>	$C_{IO-GND}$	Reverse Bias=0V, $f=1MHz$		25		pF

**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  $t1=70ns$  to  $t2=90ns$ **Capacitance vs Reverse Bias****Clamping Voltage vs.  $I_{PP}$** 

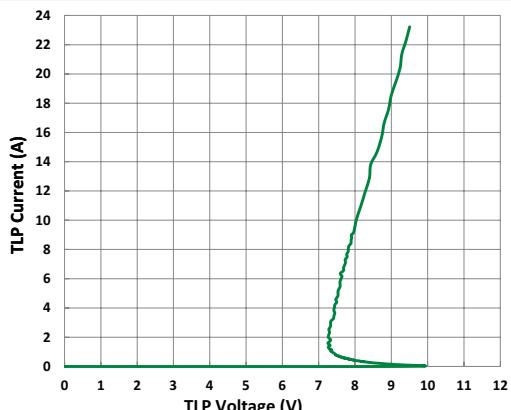
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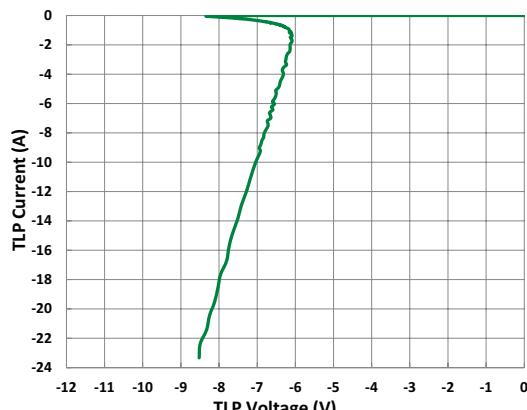
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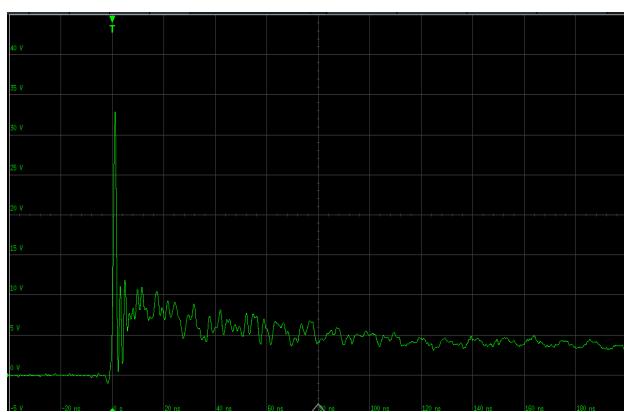
Positive Transmission Line Pulsing (TLP) Plot



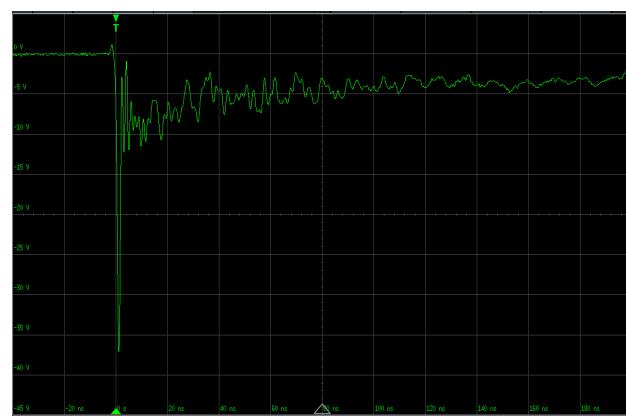
Negative Transmission Line Pulsing (TLP) Plot



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

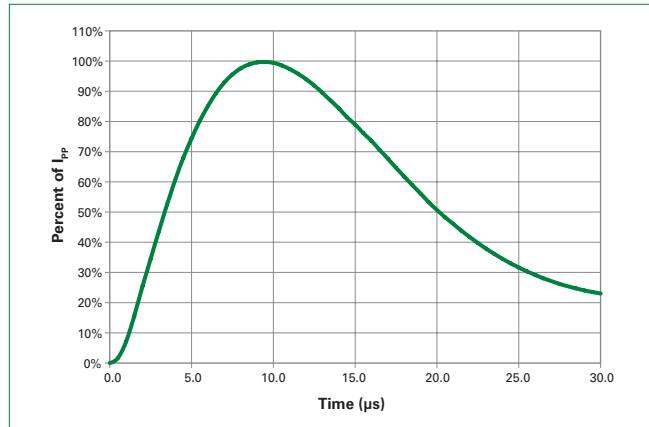


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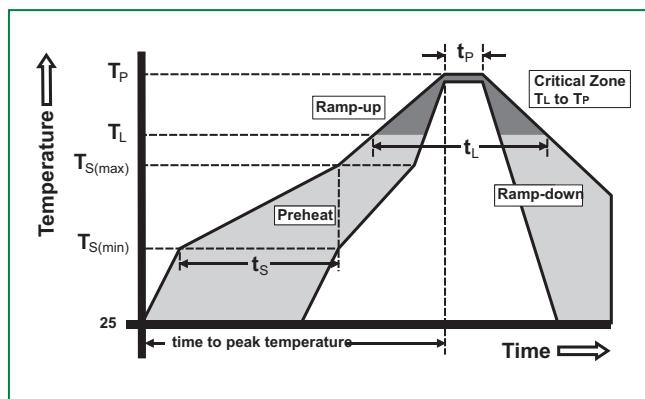
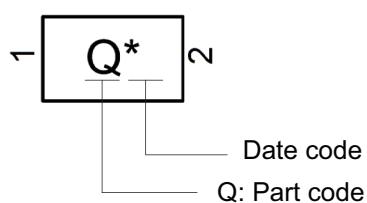
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**8/20 $\mu$ s Pulse Waveform****Soldering Parameters**

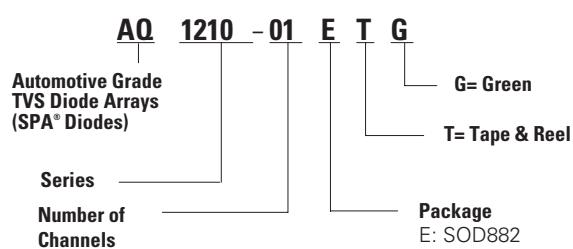
Reflow Condition		Pb – Free assembly
Pre Heat	- Temperature Min ( $T_{s(\min)}$ )	150°C
	- Temperature Max ( $T_{s(\max)}$ )	200°C
	- Time (min to max) ( $t_s$ )	60 – 120 secs
Average ramp up rate (Liquidus) Temp ( $T_L$ ) to peak		3°C/second max
Reflow	$T_{s(\max)}$ to $T_L$ - Ramp-up Rate	3°C/second max
	- Temperature ( $T_L$ ) (Liquidus)	217°C
Reflow	- Temperature ( $t_L$ )	60 – 150 seconds
	Peak Temperature ( $T_p$ )	260 <sup>0/-5</sup> °C
Time within 5°C of actual peak Temperature ( $t_p$ )		30 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature ( $T_p$ )		8 minutes Max.
Do not exceed		260°C

**Ordering Information**

Part Number	Package	Min. Order Qty.
AQ1210-01ETG	SOD882	10,000

**Part Marking System****Product Characteristics**

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

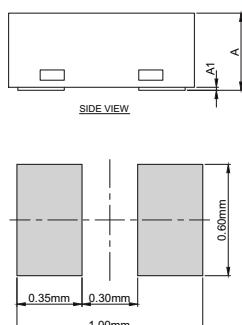
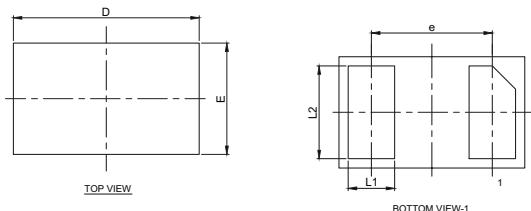
**Part Numbering System**

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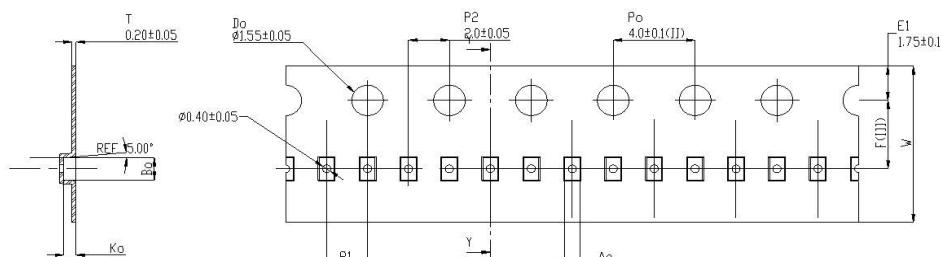
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**Package Dimensions — SOD882**

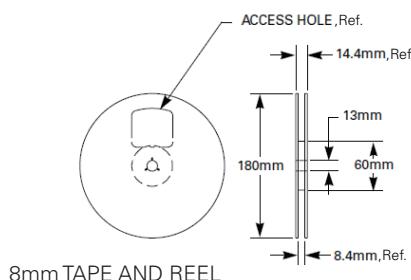
Recommended Soldering Pattern

Drawing# : E03-B

Symbol	SOD882					
	Millimeters			Inches		
	Min	Typ	Max	Min	Typ	Max
<b>A</b>	0.40	0.50	0.55	0.016	0.020	0.022
<b>A1</b>	0.00	0.02	0.05	0.000	0.001	0.002
<b>L1</b>	0.20	0.25	0.30	0.008	0.010	0.012
<b>L2</b>	0.45	0.50	0.55	0.018	0.020	0.022
<b>D</b>	0.95	1.00	1.05	0.037	0.039	0.041
<b>E</b>	0.55	0.60	0.65	0.022	0.024	0.026
<b>e</b>	0.65 BSC			0.026 BSC		

**Embossed Carrier Tape & Reel Specification — SOD882**

Symbol	Millimeters
<b>A0</b>	0.70+/-0.045
<b>B0</b>	1.10+/-0.045
<b>K0</b>	0.65+/-0.045
<b>F</b>	3.50+/-0.05
<b>P1</b>	2.00+/-0.10
<b>W</b>	8.00 + 0.30 -0.10



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