## 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  $\pm 30~\rm kV$  (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  $2^{\rm nd}$  edition.

#### **Features & Benefits**

- ESD, IEC 61000-4-2, ±30kV contact, ±30kV air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Surge tolerance, IEC 61000-4-5 2nd Edition, 15A (8/20us)
- 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 (MSL -1)
- 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
l <sub>PP</sub>	Peak Current (t <sub>p</sub> =8/20µs)	15	А
T <sub>OP</sub>	Operating Temperature	-40 to 150	°C
T <sub>STOR</sub>	Storage Temperature	-55 to 150	°C

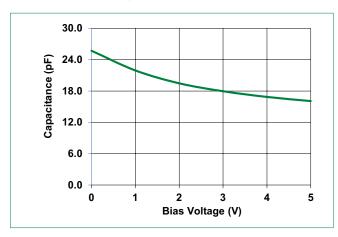
**CAUTION:** Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the component. This is a stress only rating and operation of the component at these or any other conditions above those indicated in the operational sections of this specification is not implied.

## **Electrical Characteristics (T<sub>OP</sub>=25°C)**

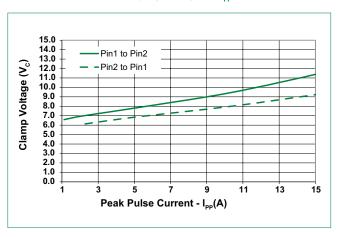
Parameter	Symbol	Test Conditions	Min	Тур	Max	Units
Reverse Standoff Voltage	V <sub>RWM</sub>	I <sub>R</sub> =1µA			5	V
Breakdown Voltage	V <sub>BR</sub>	I <sub>R</sub> =1mA	5.2	5.5		V
Reverse Leakage Current	I <sub>LEAK</sub>	V <sub>R</sub> =5V		0.02	0.1	μΑ
Clamp Voltage <sup>1</sup>	V <sub>c</sub>	I <sub>pp</sub> =15A, t <sub>p</sub> =8/20μs		11		V
Dynamic Resistance <sup>2</sup>	R <sub>DYN</sub>	TLP, t <sub>p</sub> =100ns		0.11		Ω
ESD Withstand Voltage <sup>1</sup>	\/	IEC 61000-4-2 (Contact Discharge)	±30			kV
	V <sub>ESD</sub>	IEC 61000-4-2 (Air Discharge)	±30			kV
Diode Capacitance <sup>1</sup>	C <sub>IO-GND</sub>	Reverse Bias=0V, f=1MHz		25		pF

#### Note:

#### Capacitance vs Reverse Bias



#### Clamping Voltage vs. I<sub>PP</sub>



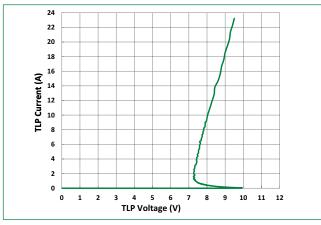


 $<sup>{\</sup>it 1. Parameter is guaranteed by design and/or component characterization.}\\$ 

 $<sup>2.</sup> Transmission\ Line\ Pulse\ (TLP)\ with\ 100 ns\ width,\ 0.2 ns\ rise\ time,\ and\ average\ window\ t1=70 ns\ to\ t2=90 ns$ 

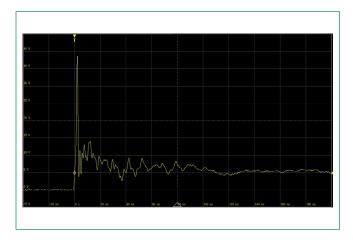
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#### Positive Transmission Line Pulsing (TLP) Plot

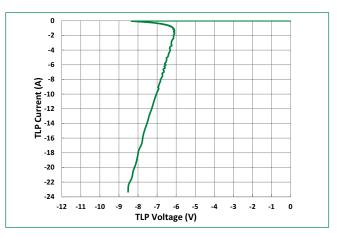




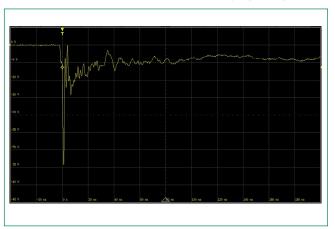
#### ISO10605 contact discharge plot at +8 kV



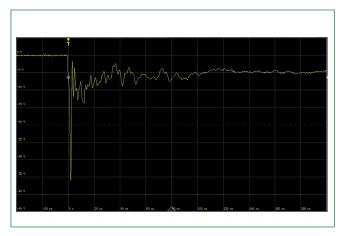
#### Negative Transmission Line Pulsing (TLP) Plot



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



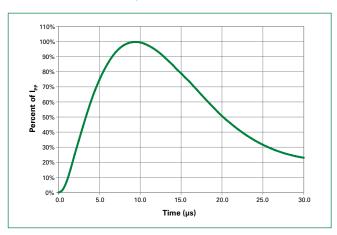
#### ISO10605 contact discharge plot at -8 kV





# Bidirectional Discrete TVS Diode, General Purpose Surge Protection

#### 8/20µs Pulse Waveform



#### **Soldering Parameters**

Reflow Condition Pb – Free assembly		Pb — Free assembly	
Pre Heat	- Temperature Min (T <sub>s(min)</sub> )	150°C	
	- Temperature Max (T <sub>s(max)</sub> )	200°C	
	-Time (min to max) (t <sub>s</sub> )	60 - 120 secs	
Average ramp up rate (Liquidus) Temp (T <sub>L</sub> ) to peak		3°C/second max	
T <sub>S(max)</sub> to T <sub>L</sub> - Ramp-up Rate		3°C/second max	
Reflow	- Temperature (T <sub>L</sub> ) (Liquidus)	217°C	
	- Temperature (t <sub>L</sub> )	60 – 150 seconds	
Peak Temperature (T <sub>p</sub> )		260 <sup>+0/-5</sup> °C	
Time within 5°C of actual peak Temperature (t <sub>p</sub> )		30 seconds	
Ramp-down Rate		6°C/second max	
Time 25°C to peak Temperature (T <sub>p</sub> )		8 minutes Max.	
Do not exceed		260°C	

# **Ordering Information**

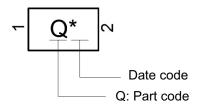
Part Number	Package	Min. Order Qty.
AQ1210-01ETG	SOD882	10,000

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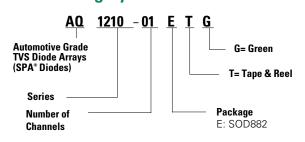
#### **Product Characteristics**

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 Marking System**



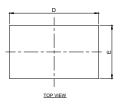
## **Part Numbering System**

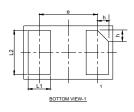


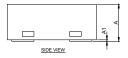


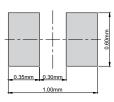
# Bidirectional Discrete TVS Diode, General Purpose Surge Protection

## Package Dimensions — SOD882







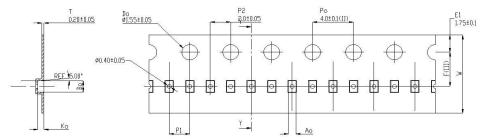


Recommended Soldering Pattern

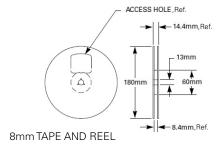
Drawing# : E03-B

SOD882 Millimeters Inches **Symbol** Min Max Min Typ Typ Max 0.40 0.50 0.55 0.016 0.020 0.022 Α Α1 0.00 0.02 0.05 0.000 0.001 0.002 L1 0.20 0.25 0.30 0.008 0.010 0.012 12 0.45 0.50 0.55 0.018 0.020 0.022 0.041 D 0.95 1.00 1.05 0.037 0.039 Ε 0.55 0.60 0.65 0.022 0.024 0.026 0.65 BSC 0.026 BSC 0.07 0.12 0.17 0.003 0.005 0.007 h

## Embossed Carrier Tape & Reel Specification — SOD882



Symbol	Millimeters
A0	0.70+/-0.045
В0	1.10+/-0.045
K0	0.65+/-0.045
F	3.50+/-0.05
P1	2.00+/-0.10
W	8.00 + 0.30 -0.10



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