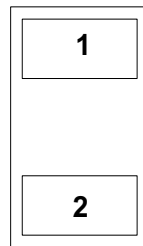


# AQ1003-01ETG Series

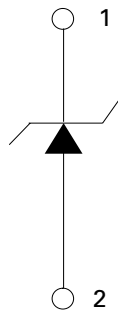
## General Purpose ESD Protection



**Pinout**



**Functional Block Diagram**



## Description

This TVS diode is fabricated in a proprietary silicon avalanche technology that offers each I/O pin a high level of protection for electronic equipment that may experience destructive electrostatic discharges (ESD). These robust TVS diodes can safely absorb repetitive ESD strikes at  $\pm 30\text{kV}$  (contact discharge, IEC 61000-4-2) without performance degradation. Additionally, the TVS diode can safely dissipate 7A of 8/20 $\mu\text{s}$  surge current (IEC 61000-4-5 2nd Edition) with very low clamping voltages.

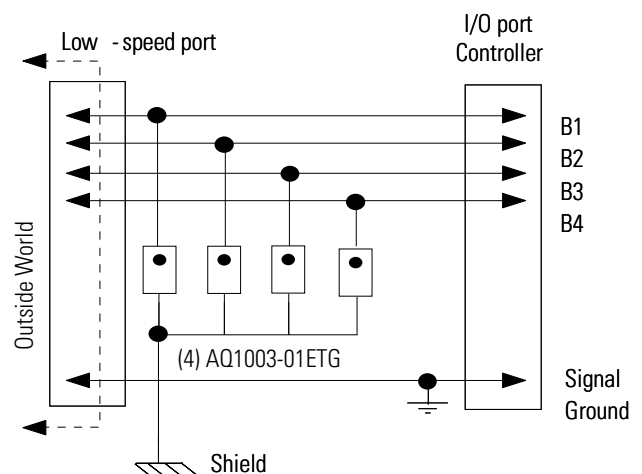
## Features

- ESD, IEC 61000-4-2,  $\pm 30\text{kV}$  contact,  $\pm 30\text{kV}$  air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, 7A (8/20 $\mu\text{s}$  as defined in IEC 61000-4-5 2nd edition)
- Low leakage current of 100nA (MAX) at 5V
- PPAP Capable
- Small SOD882 (JEDEC MO-236) package saves board space
- Fits solder footprint of industry standard 0402 (1005) components
- AEC-Q101 qualified
- Halogen free, Lead free and RoHS compliant
- Moisture Sensitivity Level (MSL -1)
- ESD, ISO 10605, 330pF 330 $\Omega$ ,  $\pm 29\text{kV}$  contact,  $\pm 30\text{kV}$  air

## Applications

- Mobile phones
- Smart phones
- PDAs
- Portable navigation components
- Digital cameras
- Portable medical components
- Automotive applications

## Application Example



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.

# AQ1003-01ETG Series

## General Purpose ESD Protection

### Absolute Maximum Ratings

Symbol	Parameter	Value	Units
$I_{PP}$	Peak Pulse Current ( $t_p=8/20\mu s$ )	7.0	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.

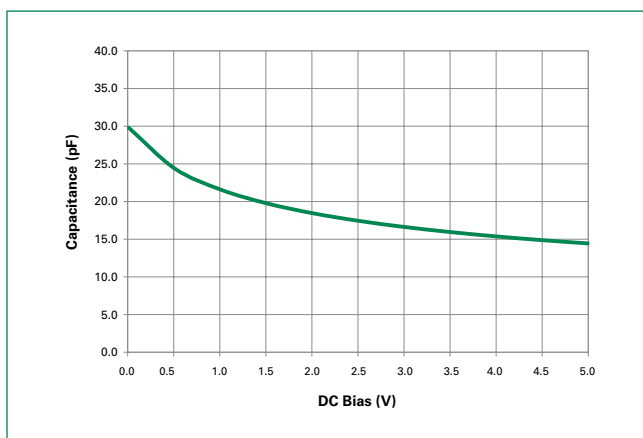
### Electrical Characteristics ( $T_{OP}=25^\circ C$ )

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Forward Voltage Drop	$V_F$	$I_F = 10mA$		0.8	1.2	V
Breakdown Voltage	$V_{BR}$	$I_R = 1mA$	6.0	7.8	8.5	V
Reverse Standoff Voltage	$V_{RWM}$	$I_R = 1\mu A$			5.0	V
Reverse Leakage Current	$I_{LEAK}$	$V_R = 5V$			100	nA
Clamp Voltage <sup>1</sup>	$V_C$	$I_{PP} = 6A$ $t_p = 8/20\mu s$		11.4		V
		$I_{PP} = 7A$ $t_p = 8/20\mu s$		12.0		V
Dynamic Resistance <sup>2</sup>	$R_{DYN}$	TLP, $t_p = 100ns$ , I/O to GND		0.25		$\Omega$
ESD Voltage <sup>1</sup>	$V_{ESD}$	IEC 61000-4-2 (Contact Discharge)	$\pm 30$			kV
		IEC 61000-4-2 (Air Discharge)	$\pm 30$			kV
Diode Capacitance <sup>1</sup>	$C_{I/O-GND}$	Reverse Bias=0V $f=1MHz$		30		pF

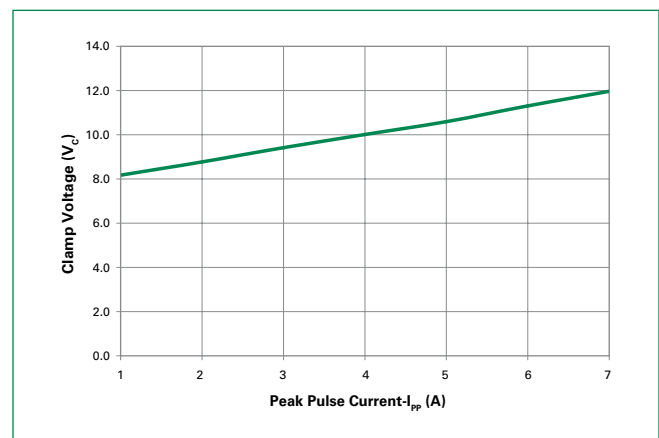
**Note:** 1 Parameter is guaranteed by design and/or component characterization.

2 Transmission Line Pulse (TLP) with 100ns width, 2ns rise time, and average window  $t_1=70ns$  to  $t_2=90ns$

### Capacitance vs. Reverse Bias



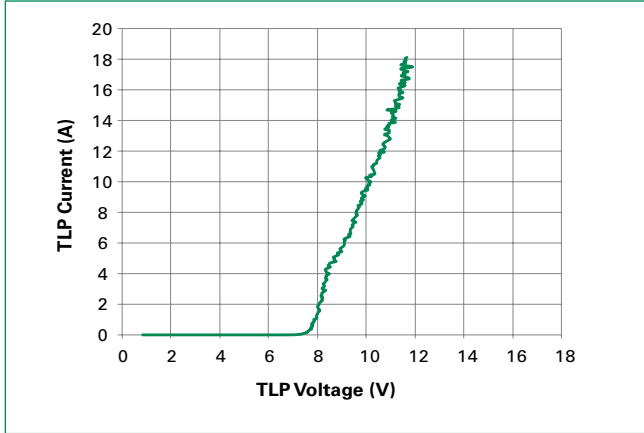
### Clamping Voltage vs. $I_{PP}$



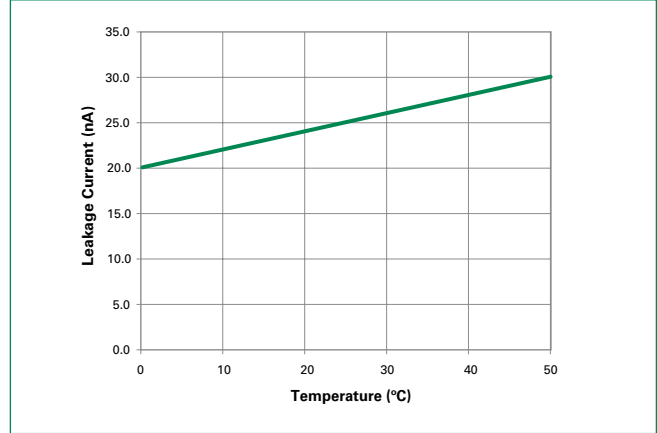
# AQ1003-01ETG Series

## General Purpose ESD Protection

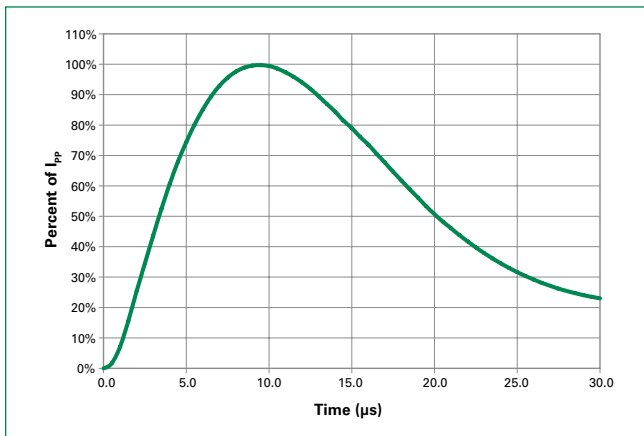
Transmission Line Pulsing(TLP) Plot



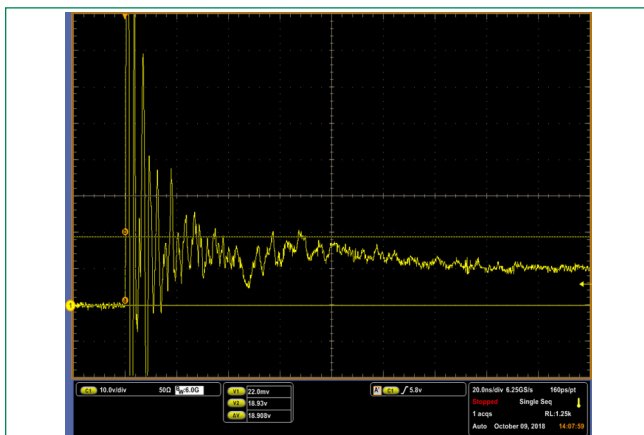
Leakage vs. Temperature



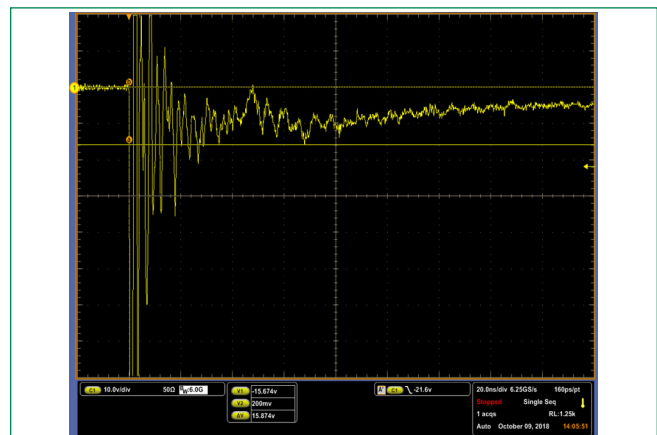
8/20µs Pulse Waveform



ISO10605 (C:330pF, R:330Ω) contact discharge plot at +8KV



ISO10605 (C:330pF, R:330Ω) contact discharge plot at -8KV

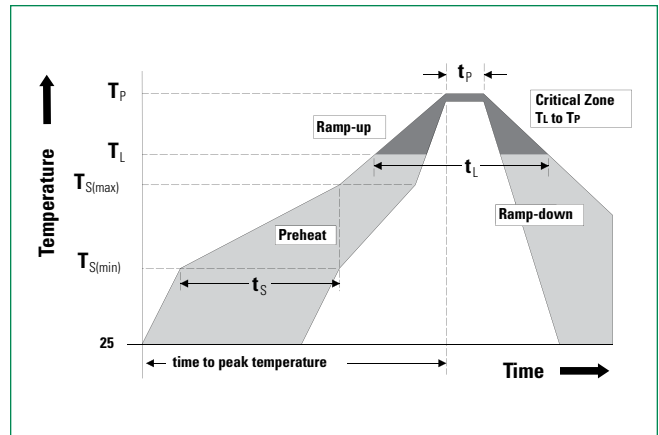


# AQ1003-01ETG Series

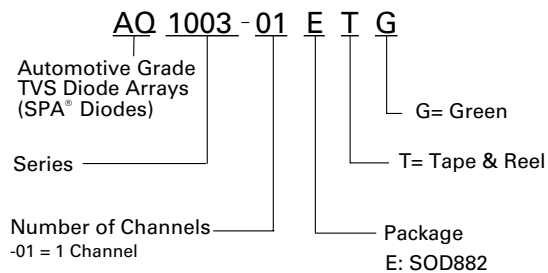
## General Purpose ESD Protection

### Soldering Parameters

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



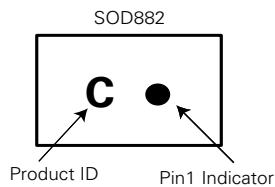
### Part Numbering System



### Product Characteristics

<b>Lead Plating</b>	Pre-Plated Frame
<b>Lead Material</b>	Copper Alloy
<b>Substrate material</b>	Silicon
<b>Body Material</b>	Molded Compound
<b>Flammability</b>	UL Recognized compound meeting flammability rating V-0

### Part Marking System



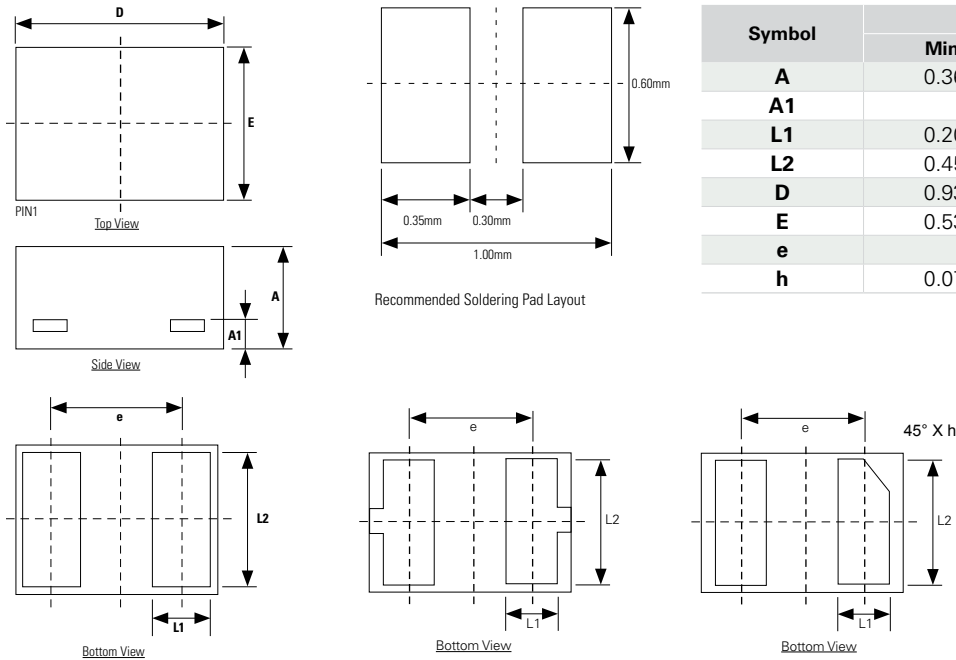
### Ordering Information

Part Number	Package	Min. Order Qty.
AQ1003-01ETG	SOD882	10000

# AQ1003-01ETG Series

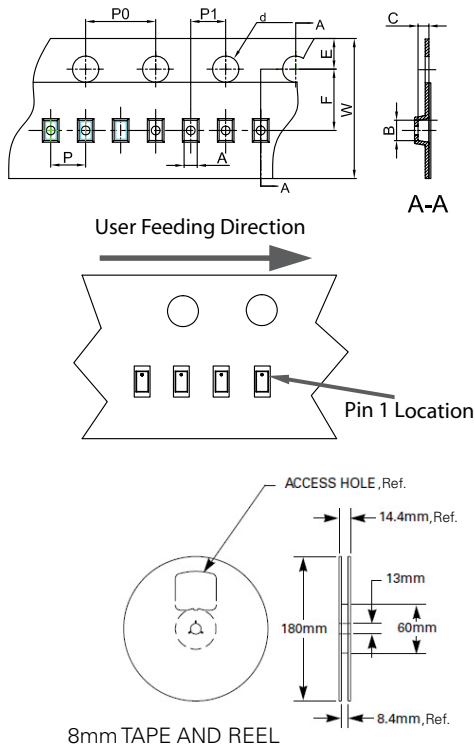
## General Purpose ESD Protection

### Package Dimensions – SOD882



Symbol	DIMENSIONS (mm)		
	Min.	Nor.	Max.
A	0.36	0.45	0.55
A1	0.127 REF		
L1	0.20	0.25	0.30
L2	0.45	0.50	0.55
D	0.93	1.00	1.07
E	0.53	0.60	0.67
e	0.65 BSC		
h	0.07	0.12	0.17

### Embossed Carrier Tape & Reel Specification – SOD882



Symbol	Millimetres		Inches	
	Min	Max	Min	Max
A	0.65	0.70	0.026	0.028
B	1.10	1.20	0.043	0.047
C	0.50	0.60	0.020	0.024
dØ	1.40	1.60	0.055	0.063
E	1.65	1.85	0.065	0.073
F	3.40	3.60	0.134	0.142
P0	3.90	4.10	0.154	0.161
P	1.90	2.10	0.075	0.083
P1	1.90	2.10	0.075	0.083
W	7.90	8.10	0.311	0.319

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