

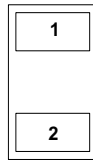
**AQ1003 Series - 30pF 30kV Unidirectional Discrete TVS**     



**Description**

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

**Pinout**



**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, IEC 61000-4-5 2<sup>nd</sup> edition, 7A (8/20 $\mu\text{s}$ )
- Low leakage current of 100nA (MAX) at 5V
- Tiny 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

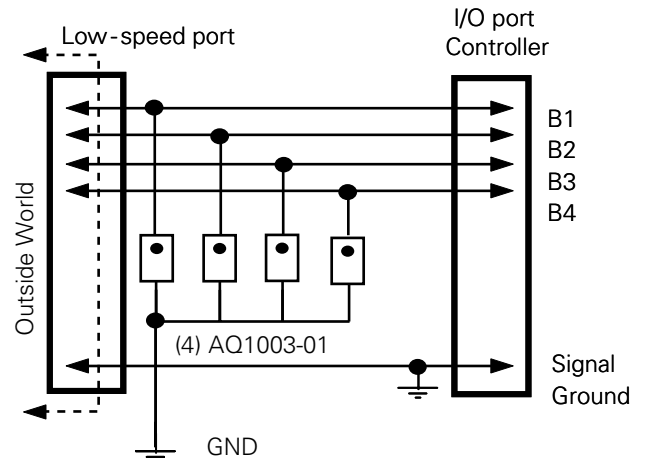
**Functional Block Diagram**



**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.

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### 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.

### Thermal Information

Parameter	Rating	Units
Maximum Junction Temperature	150	°C
Maximum Lead Temperature (Soldering 20-40s)	260	°C

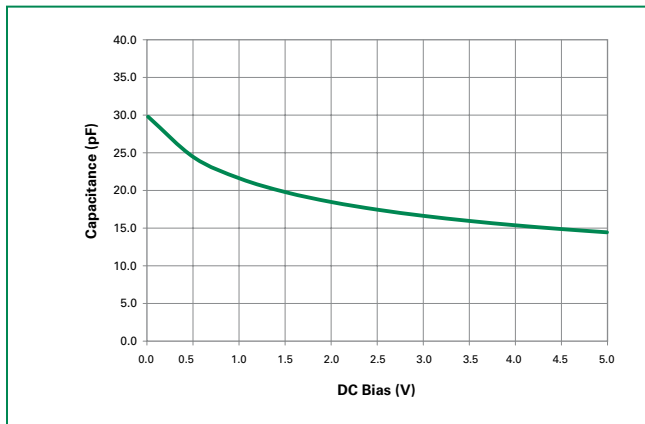
### Electrical Characteristics ( $T_{OP}=25^\circ C$ )

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Forward Voltage Drop	$V_F$	$I_F = 10mA$		0.8	1.2	V
Reverse Voltage Drop	$V_R$	$I_R = 1mA$	6.0	7.8	8.5	V
Reverse Standoff Voltage	$V_{RWM}$	$I_R \leq 1\mu A$			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 Withstand 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>	$C_D$	Reverse Bias=0V		30		pF

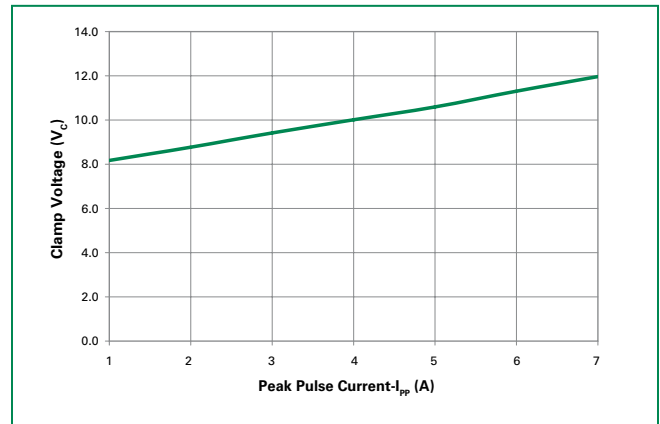
Note: 1 Parameter is guaranteed by design and/or component characterization.

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

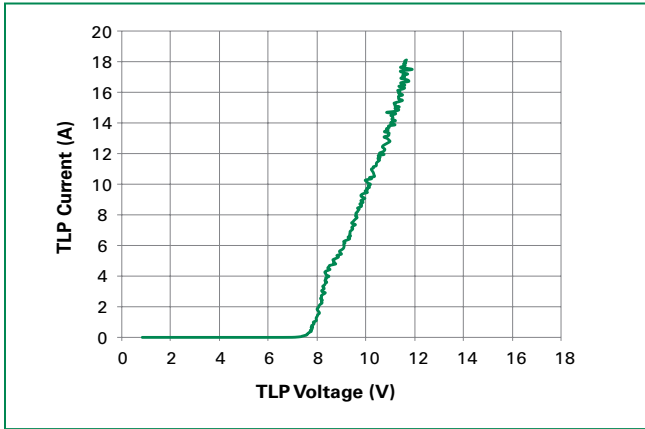
### Capacitance vs. Reverse Bias



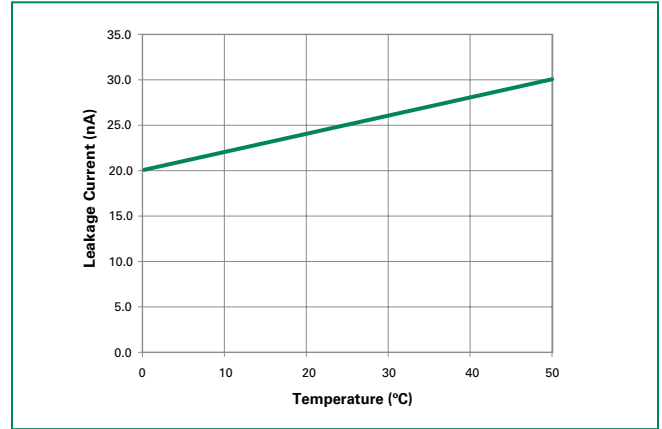
### Clamping Voltage vs. $I_{PP}$



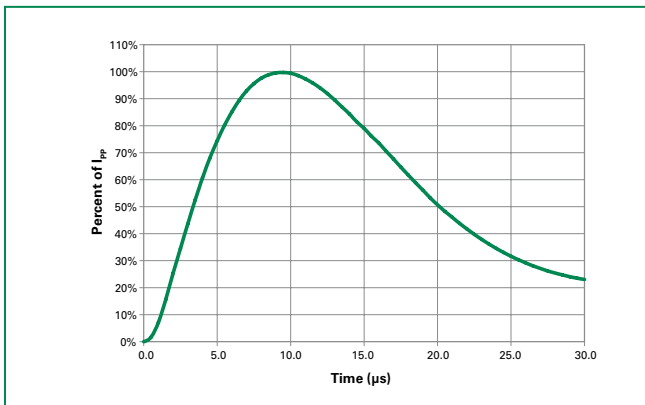
**Transmission Line Pulsing(TLP) Plot**



**Leakage vs. Temperature**

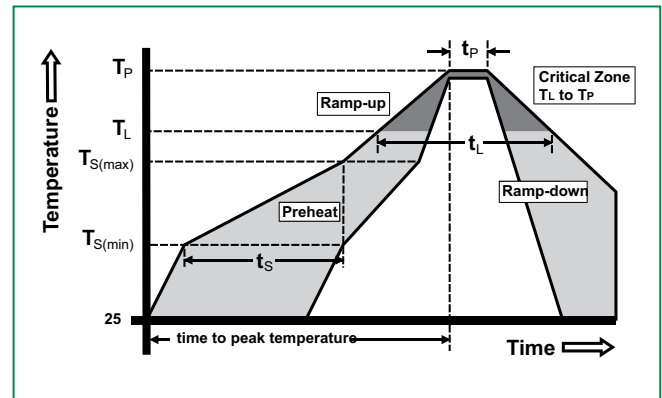


**8/20µs Pulse Waveform**

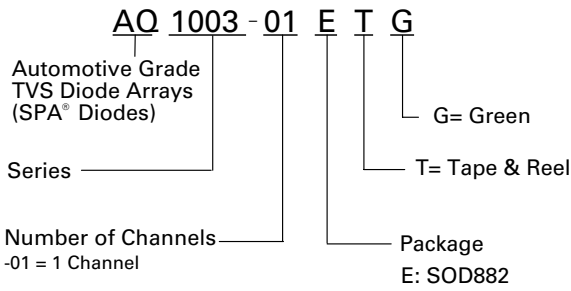


**Soldering Parameters**

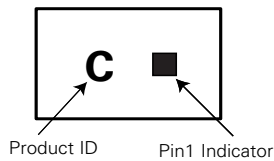
Reflow Condition		Pb – Free assembly
Pre Heat	- Temperature Min ( $T_{s(min)}$ )	150°C
	- Temperature Max ( $T_{s(max)}$ )	200°C
	- Time (min to max) ( $t_s$ )	60 – 180 secs
Average ramp up rate (Liquidus) Temp ( $T_L$ ) to peak		3°C/second max
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		3°C/second max
Reflow	- Temperature ( $T_L$ ) (Liquidus)	217°C
	- Temperature ( $t_L$ )	60 – 150 seconds
Peak Temperature ( $T_p$ )		260 <sup>+0/-5</sup> °C
Time within 5°C of actual peak Temperature ( $t_p$ )		20 – 40 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature ( $T_p$ )		8 minutes Max.
Do not exceed		260°C



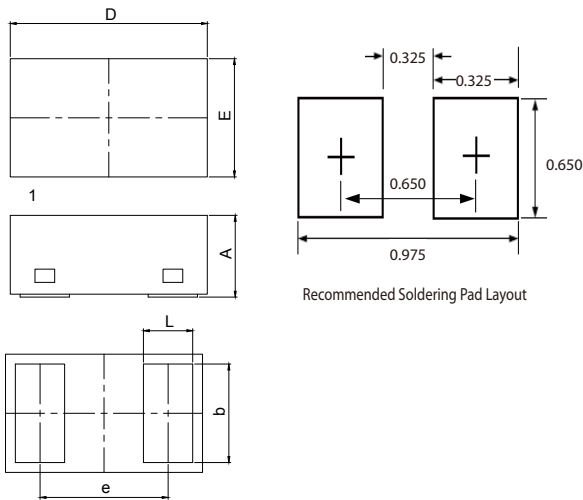
**Part Numbering System**



**Part Marking System**



**Package Dimensions – SOD882**



**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 Epoxy
<b>Flammability</b>	UL Recognized epoxy meeting flammability rating V-0.

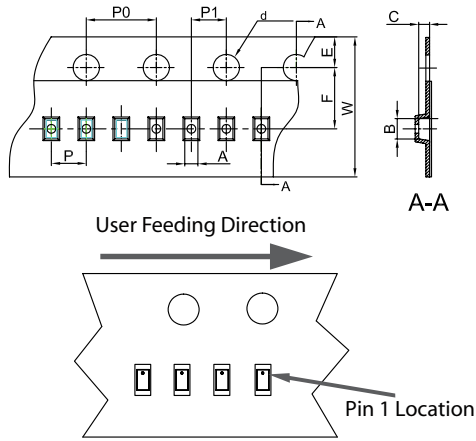
- Notes :
1. All dimensions are in millimeters
  2. Dimensions include solder plating.
  3. Dimensions are exclusive of mold flash & metal burr.
  4. Blo is facing up for mold and facing down for trim/form, i.e. reverse trim/form.
  5. Package surface matte finish VDI 11-13.

**Ordering Information**

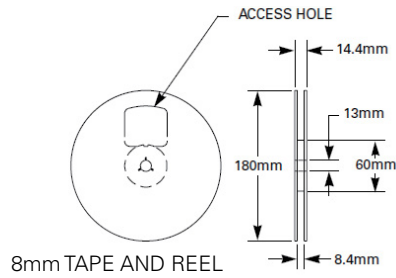
Part Number	Package	Marking	Min. Order Qty.
AQ1003-01ETG	SOD882	C	10000

Symbol	Package	SOD882			
	JEDEC	MO-236			
		Millimeters		Inches	
		Min	Max	Min	Max
<b>A</b>		0.36	0.42	0.014	0.017
<b>b</b>		0.45	0.55	0.018	0.022
<b>L</b>		0.20	0.30	0.008	0.012
<b>e</b>		0.65		0.026	
<b>D</b>		0.93	1.07	0.037	0.042
<b>E</b>		0.53	0.67	0.021	0.026

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



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



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