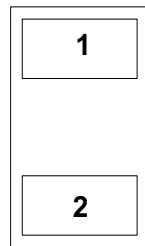


AQ1003-01ETG Series

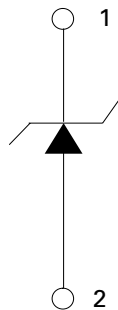
General Purpose ESD Protection



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 μs surge current (IEC 61000-4-5 2nd Edition) with very low clamping voltages.

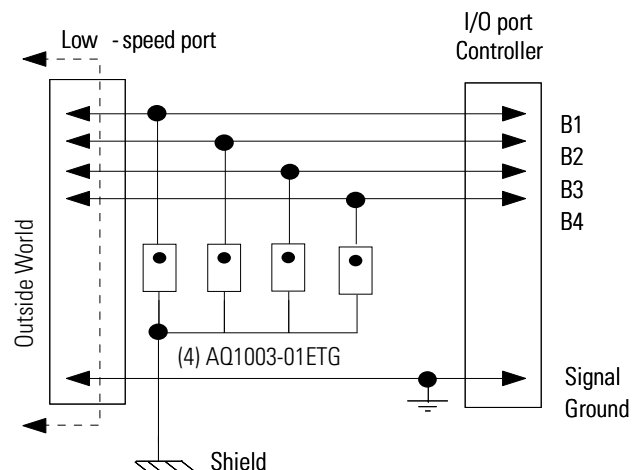
Features

- 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 μs 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 Ω , $\pm 29\text{kV}$ 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.

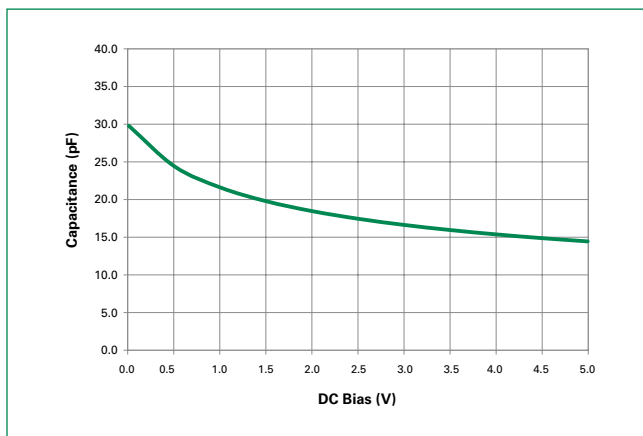
Electrical Characteristics ($T_{OP}=25^{\circ}C$)

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 ¹	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 ²	R_{DYN}	TLP, $t_p = 100ns$, I/O to GND		0.25		Ω
ESD Voltage ¹	V_{ESD}	IEC 61000-4-2 (Contact Discharge)	± 30			kV
		IEC 61000-4-2 (Air Discharge)	± 30			kV
Diode Capacitance ¹	$C_{I/O-GND}$	Reverse Bias=0V $f=1MHz$		30		pF

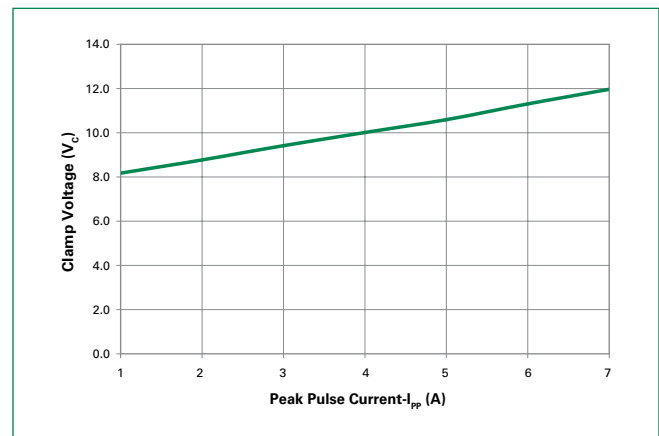
Note: 1 Parameter is guaranteed by design and/or component characterization.

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



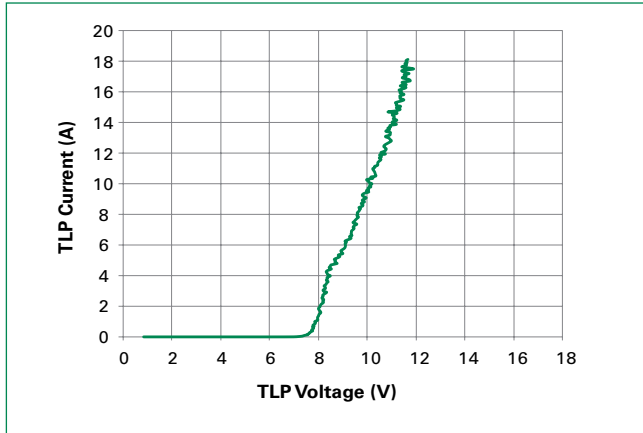
Clamping Voltage vs. I_{PP}



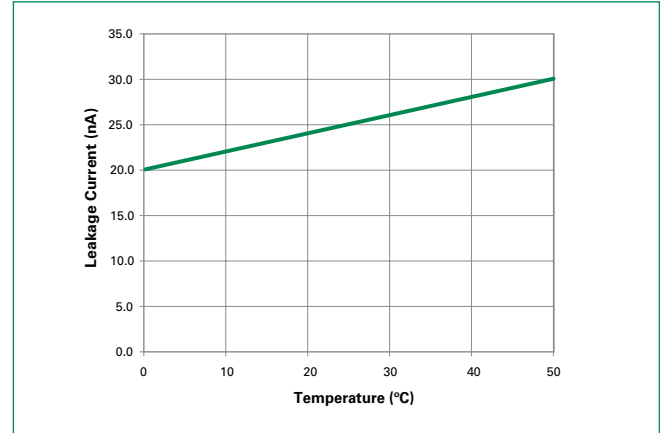
AQ1003-01ETG Series

General Purpose ESD Protection

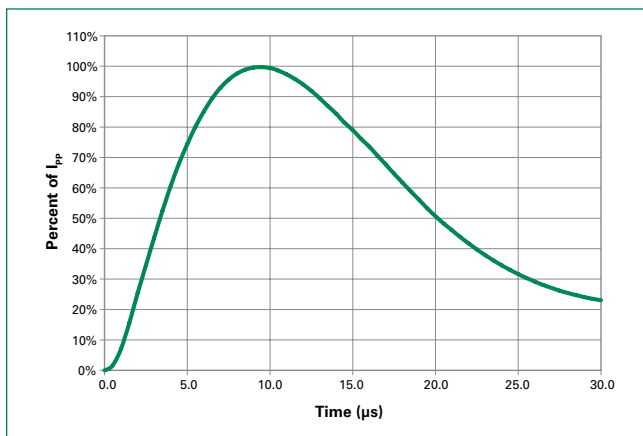
Transmission Line Pulsing(TLP) Plot



Leakage vs. Temperature



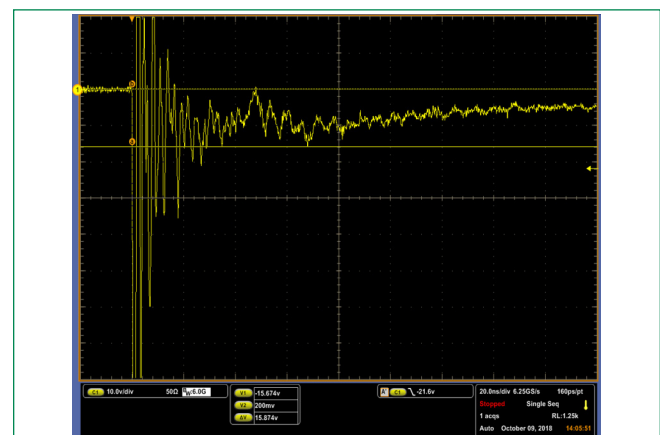
8/20μs Pulse Waveform



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



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

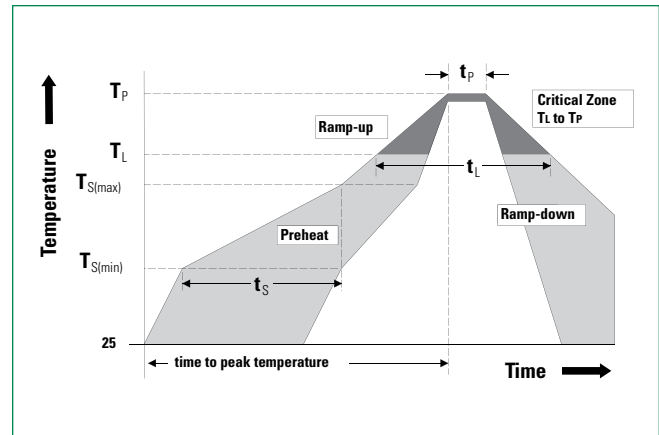


AQ1003-01ETG Series

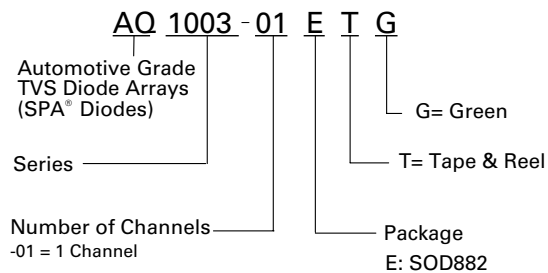
General Purpose ESD Protection

Soldering Parameters

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
$T_{s(max)}$ 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 ^{+0/-5} °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



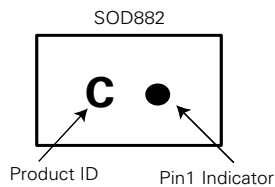
Part Numbering System



Product Characteristics

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

Part Marking System



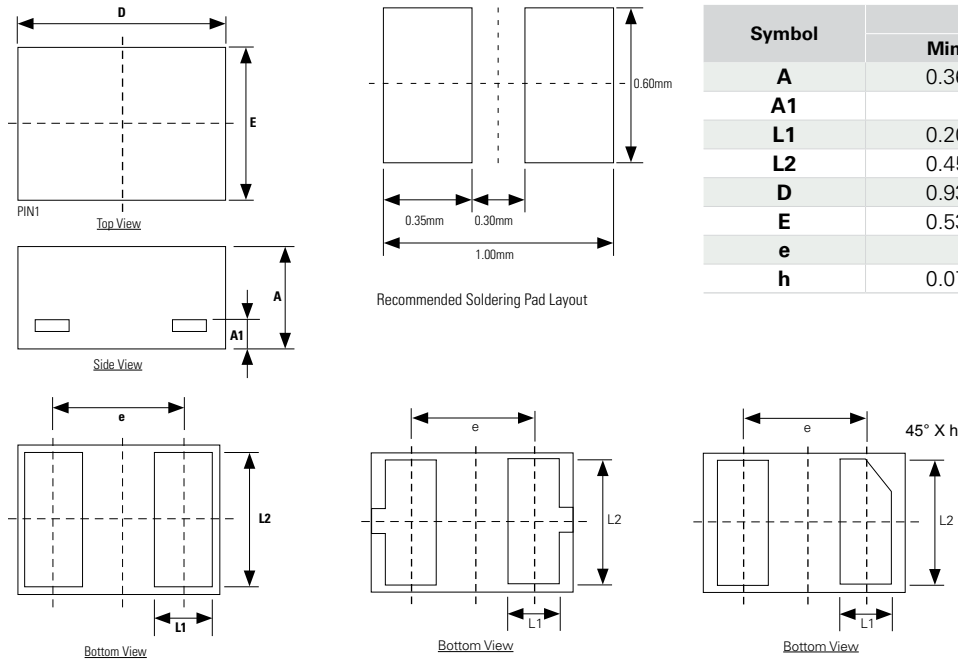
Ordering Information

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

AQ1003-01ETG Series

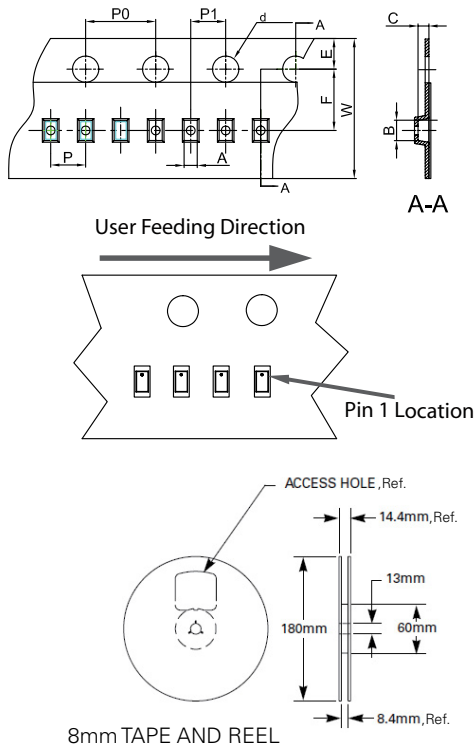
General Purpose ESD Protection

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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