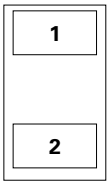
AQ1005 Series

General Purpose ESD Protection

AUTOMOTIVE GRADE HF RoHS Pb

Pinout



Functional Block Diagram

Description

The AQ1005 TVS includes back-to-back breakdown diodes fabricated in a proprietary silicon avalanche technology to provide protection for electronic equipment that may experience destructive electrostatic discharges (ESD). These robust diodes can safely absorb repetitive ESD strikes above the maximum level specified in IEC 61000-4-2 international standard (Level 4, ±8 kV contact discharge and ±15 kV air discharge) without performance degradation. The back-to-back configuration provides symmetrical ESD protection for data lines.

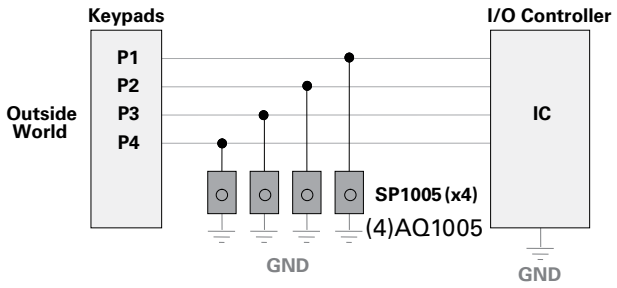
Features

- ESD, IEC 61000-4-2, ±30kV contact, ±30kV air
- ESD, ISO 10605, 330pF 330Ω, ±30kV contact, ±30kV air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, 8A (8/20 as defined in IEC 61000-4-5 2nd edition)
- Low capacitance of 30pF (@ VR=0V)
- Low leakage current of 0.1µA at 5V
- SOD882 footprint compatible to 0402 footprint
- AEC-Q101 qualified
- Halogen free, Lead free and RoHS compliant
- PPAP capable

Applications

- Mobile Phones
- Smart Phones
- Camcorders
- Portable Medical
- Digital Cameras
- MP3/PMP
- Portable Navigation Components
- Tablets
- Point of Sale Terminals
- 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 Current (t_p=8/20µs)	8.0	A
T_{OP}	Operating Temperature	-40 to 150	°C
T_{STOR}	Storage Temperature	-55 to 150	°C

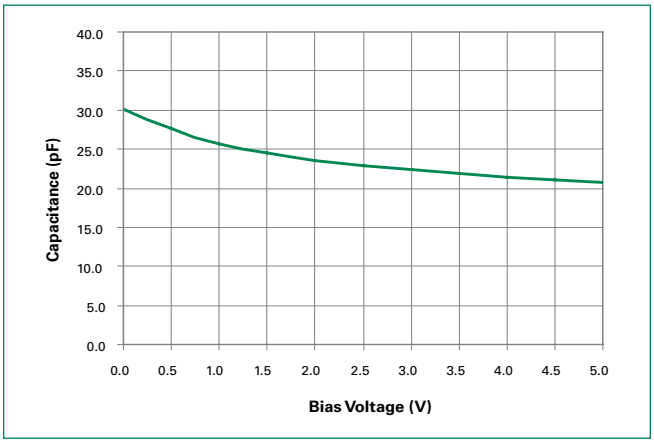
CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the component. This is a stress only rating and operation of the component at these or any other conditions above those indicated in the operational sections of this specification is not implied.

Electrical Characteristics (TOP=25°C)

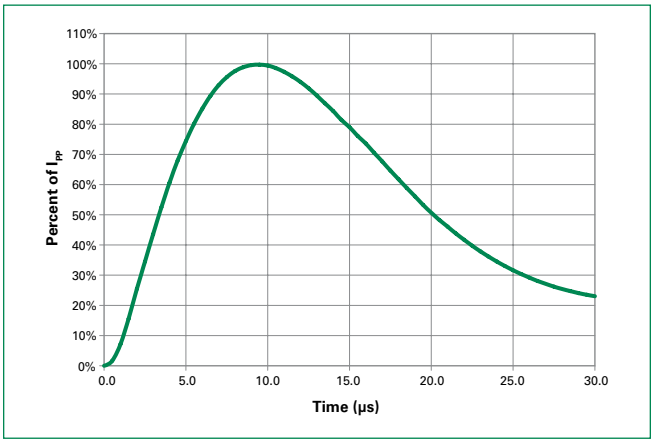
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}	I_R=1µA	-	-	6.0	V
Breakdown Voltage	V_{BR}	I_R=1mA	-	8.5	9.5	V
Reverse Leakage Current	I_{LEAK}	V_R=5V	-	0.1	0.5	µA
Clamp Voltage[1]	V_C	I_{PP}=1A, t_p=8/20µs, I/O to I/O	-	9.3	-	V
		I_{PP}=2A, t_p=8/20µs, I/O to I/O	-	10.0	-	V
Dynamic Resistance[2]	R_{DYN}	TLP, t_p=100ns, I/O to I/O	-	0.25	-	Ω
ESD Withstand Voltage[1]	V_{ESD}	IEC 61000-4-2 (Contact Discharge)	±30	-	-	kV
		IEC 61000-4-2 (Air Discharge)	±30	-	-	kV
Diode Capacitance[1]	$C_{I/O-I/O}$	Reverse Bias=0V f=1MHz	-	30	-	pF
		Reverse Bias=2.5V f=1MHz	-	23	-	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 t1=70ns to t2= 90ns

Capacitance vs. Reverse Bias



8/20µs Pulse Waveform



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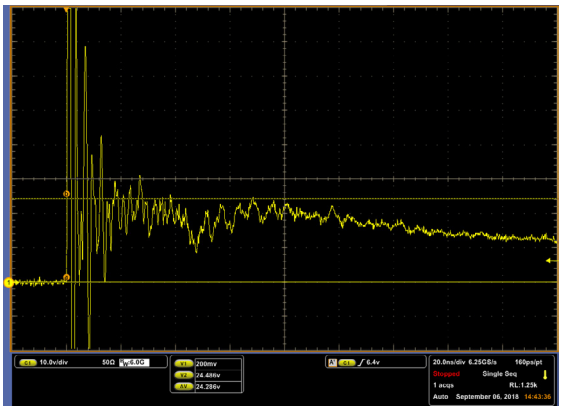
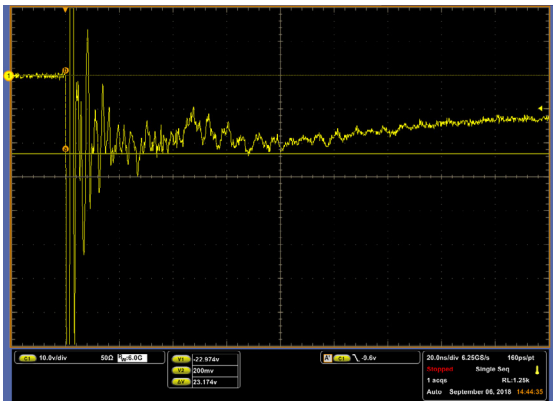
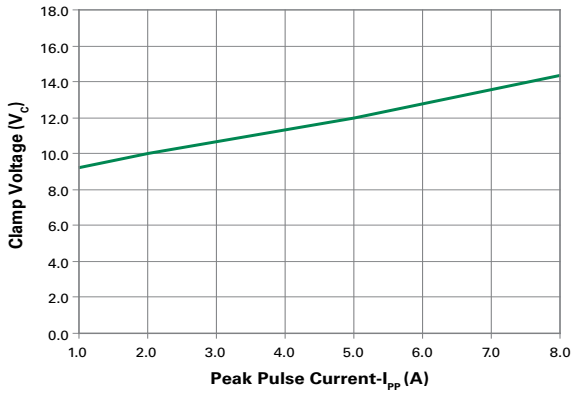
ISO10605 (C:330pF, R:330Ω) contact discharge plot at +8KV



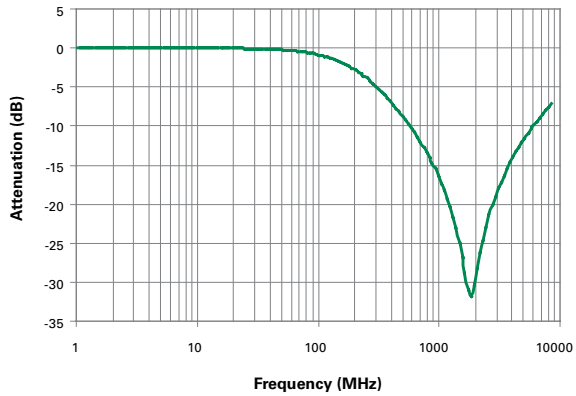
ISO10605 (C:330pF, R:330Ω) contact discharge plot at -8KV



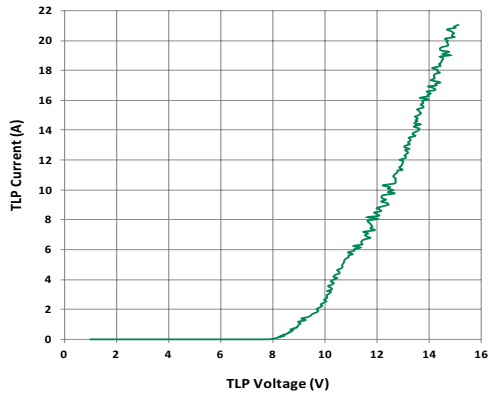
Clamping Voltage vs. IPP



Insertion Loss (S21) I/O to GND



Transmission Line Pulsing(TLP) Plot



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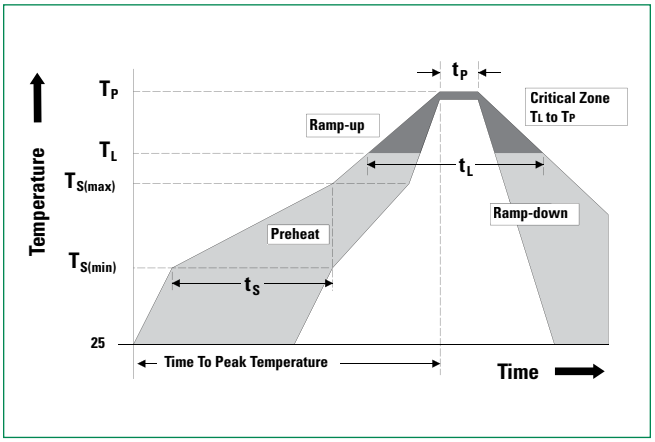
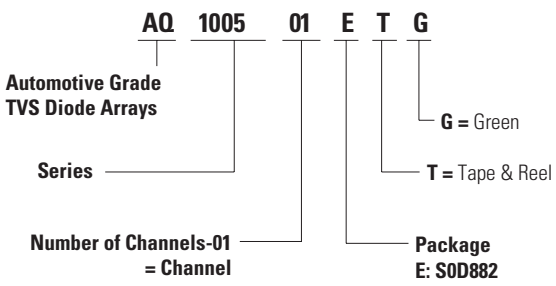
Soldering Parameters

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



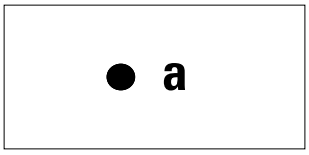
Part Numbering System



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.
AQ1005-01ETG	SOD882	10000

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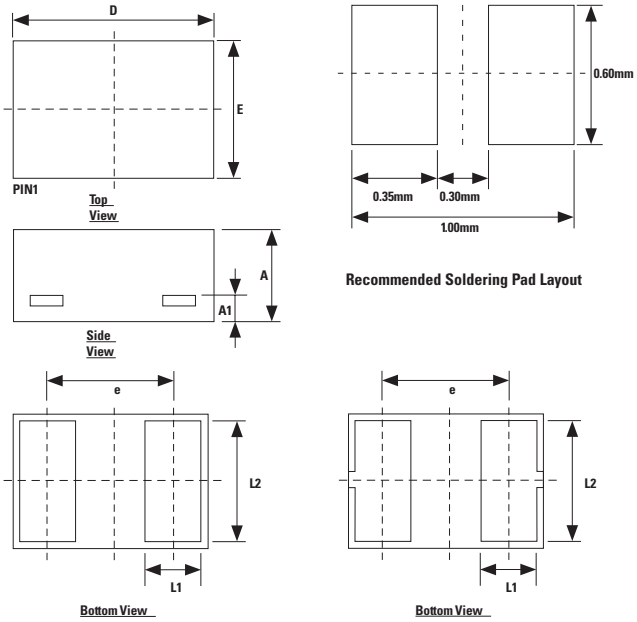
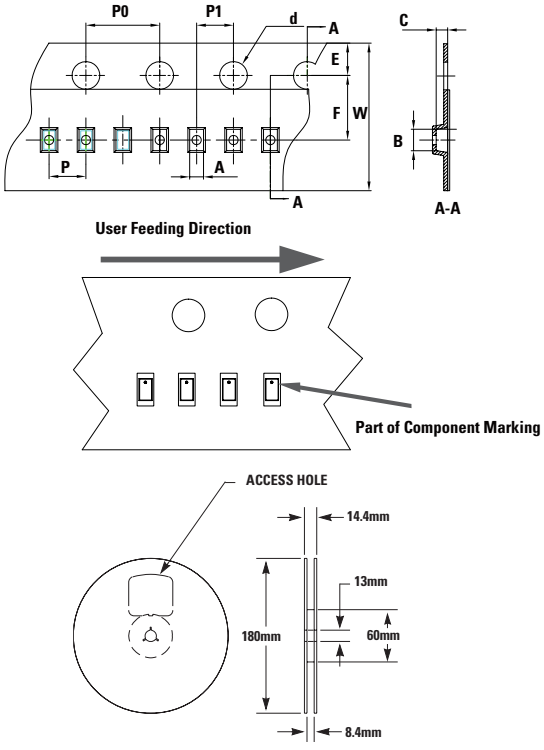
Package Dimensions — SOD882



Symbol	Dimensions (mm)			Dimensions (In)		
	Min.	Nor.	Max.	Min.	Nor.	Max.
A	0.36	0.45	0.55	0.014	0.018	0.022
A1		0.127 REF			0.005 REF	
L1	0.20	0.25	0.30	0.008	0.01	0.012
L2	0.45	0.50	0.55	0.018	0.020	0.023
D	0.93	1.00	1.07	0.037	0.039	0.067
E	0.53	0.60	0.67	0.021	0.024	0.026
e		0.65 BSC			0.026 BSC	

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

Revised: GD. 07/19/22