

AQ1006 Series 25pF 30kV Unidirectional Discrete TVS



Description

This TVS protects each I/O pin from destructive electrostatic discharges (ESD). This robust TVS can safely absorb repetitive ESD strikes at $\pm 30\text{kV}$ (contact discharge, IEC 61000-4-2) without performance degradation.

Additionally, each TVS can safely dissipate $8/20\mu\text{s}$ 5A surge current (IEC 61000-4-5 2nd edition) with very low clamping voltages.

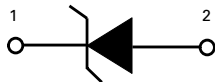
Pinout



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 2nd edition, 5A ($8/20\mu\text{s}$)
- Low leakage current of $0.5\mu\text{A}$ (MAX) at 5V
- ESD, ISO 10605, 330pF 330Ω , $\pm 25\text{kV}$ contact, $\pm 30\text{kV}$ air
- Space efficient 0201 footprint)
- AEC-Q101 qualified
- Halogen free, lead free and RoHS compliant
- Moisture Sensitivity Level (MSL -1)
- PPAP Capable

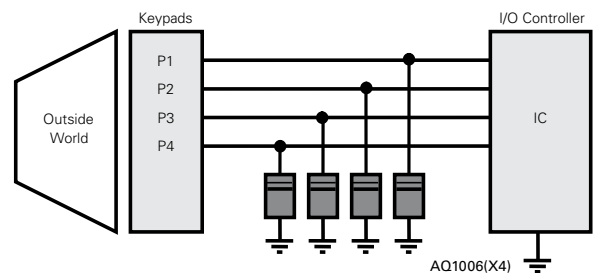
Functional Block Diagram



Applications

- Mobile phones
- Smart phones
- PDAs
- Digital cameras
- Portable navigation components
- 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.

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
I_{PP}	Peak Pulse Current ($t_p=8/20\mu s$)	5	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.

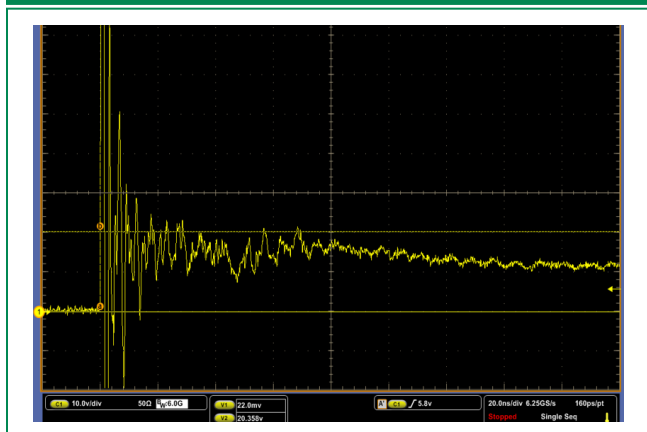
Electrical Characteristics ($T_{OP}=25^\circ C$)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}	$I_R=1\mu A$			6.0	V
Breakdown Voltage	V_{BR}	$I_R=1mA$		7.8		V
Forward Voltage Drop	V_F	$I_F=1mA$		0.8		V
Reverse Leakage Current	I_{LEAK}	$V_R=5V$		0.1	0.5	μA
Clamp Voltage ¹	V_C	$I_{PP}=1A, t_p=8/20\mu s$		8.3		V
		$I_{PP}=2A, t_p=8/20\mu s$		9.2		V
Dynamic Resistance ²	R_{DYN}	TLP, $t_p=100ns$, I/O to GND		0.9		Ω
ESD Withstand Voltage ¹	V_{ESD}	IEC 61000-4-2 (Contact Discharge)	± 30	0.21		kV
		IEC 61000-4-2 (Air Discharge)	± 30			kV
Diode Capacitance ¹	$C_{I/O-GND}$	Reverse Bias=0V, $f=1MHz$		25		pF
		Reverse Bias=2.5V, $f=1MHz$		15		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 $t2=90ns$

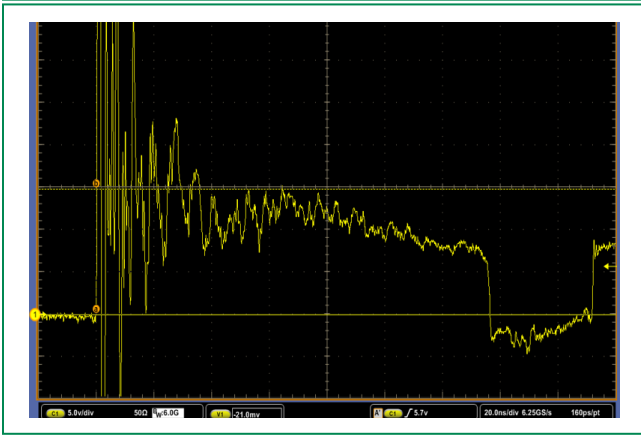
IEC 61000-4-2 +8 kV Contact ESD Clamping Voltage



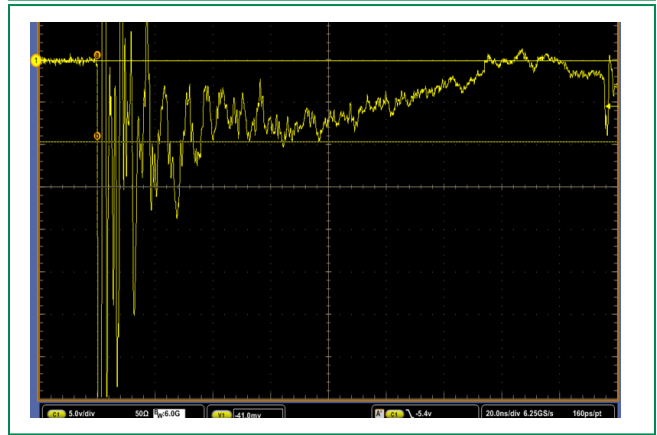
IEC 61000-4-2 -8 kV Contact ESD Clamping Voltage



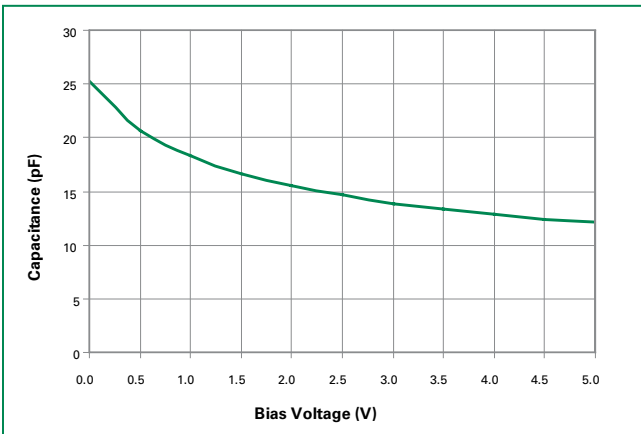
ESD ISO10605 +8 kV Contact ESD Clamping Voltage



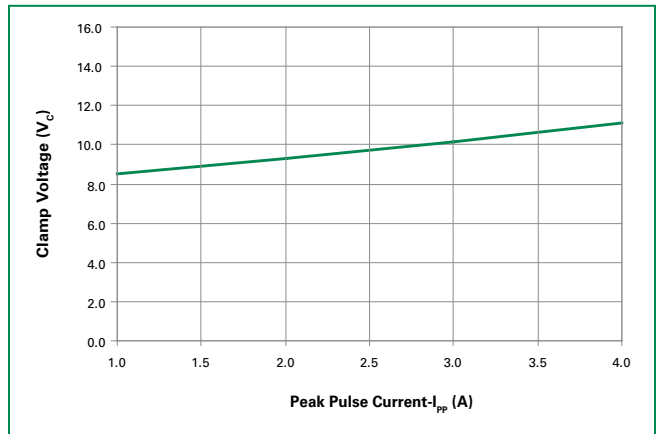
ESD ISO10605 -8 kV Contact ESD Clamping Voltage



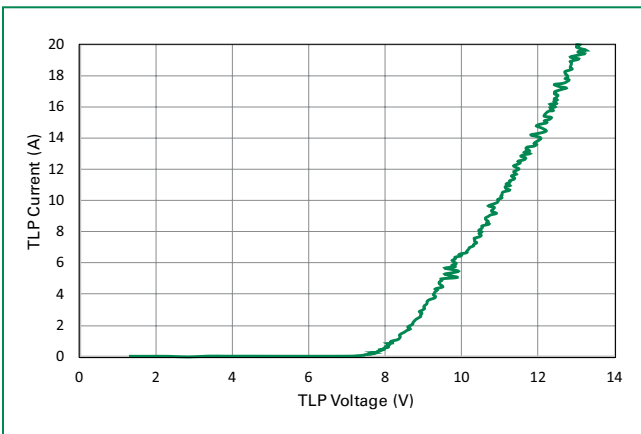
Capacitance vs. Reverse Bias



Clamping Voltage vs. I_{pp}

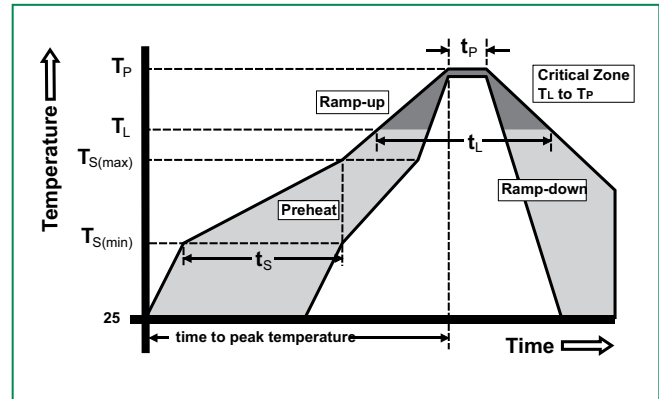


Transmission Line Pulsing(TLP) Plot



Soldering Parameters

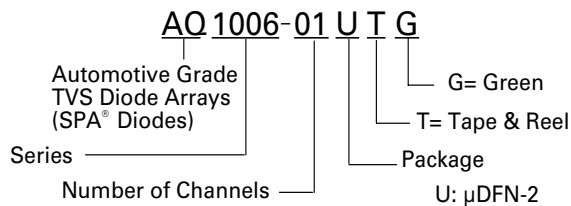
Reflow Condition	Pb – Free assembly	
Pre Heat	- Temperature Min ($T_{s(min)}$)	150°C
	- Temperature Max ($T_{s(max)}$)	200°C
	- Time (min to max) (t_s)	60 – 180 secs
Average ramp up rate (Liquidus) Temp (T_L) to peak	3°C/second max	
$T_{s(max)}$ to T_L - Ramp-up Rate	3°C/second max	
Reflow	- Temperature (T_L) (Liquidus)	217°C
	- Temperature (t_L)	60 – 150 seconds
Peak Temperature (T_p)	260 ^{+0/-5} °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.	



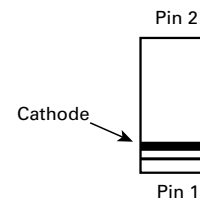
Product Characteristics

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

Part Numbering System



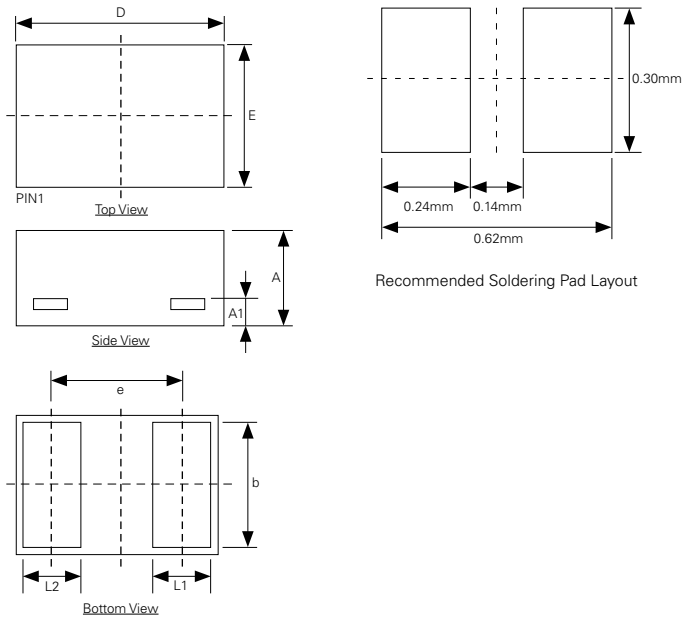
Part Marking System



Ordering Information

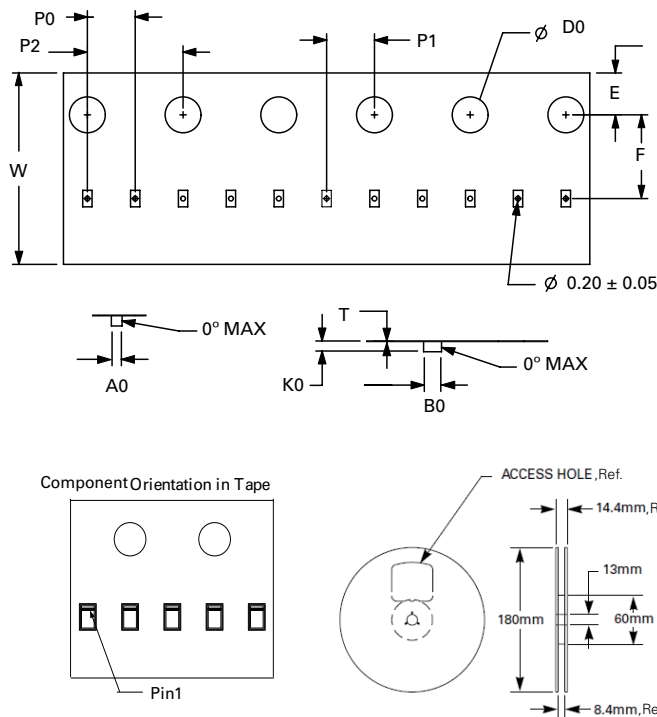
Part Number	Package	Min. Order Qty.
AQ1006-01UTG	μ DFN-2	15000

Package Dimensions – μ DFN-2 (0201)



Symbol	DIMENSIONS (mm)		
	Min.	Nor.	Max.
A	0.30	0.31	0.32
A1	0.00	0.02	0.05
b	0.18	0.23	0.28
L1	0.12	0.17	0.22
L2	0.13	0.18	0.23
D	0.55	0.60	0.65
E	0.25	0.30	0.35
e	0.35 BSC		

Embossed Carrier Tape & Reel Specification – μ DFN-2



Symbol	Millimetres		Inches	
	Min	Max	Min	Max
A0	0.33	0.40	0.013	0.016
B0	0.63	0.70	0.025	0.028
D0	1.40	1.60	0.055	0.063
E	1.65	1.85	0.065	0.073
F	3.45	3.55	0.136	0.140
K0	0.30	0.39	0.012	0.015
P0	1.90	2.10	0.075	0.083
P1	1.95	2.05	0.077	0.081
P2	3.90	4.10	0.154	0.161
T	0.13	0.25	0.005	0.010
W	7.90	8.30	0.311	0.327

8mm TAPE AND REEL

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