

**AQ1006 Series 25pF 30kV Unidirectional Discrete TVS**



**Pinout**



**Functional Block Diagram**



**Description**

Avalanche breakdown diodes fabricated in a proprietary silicon avalanche technology protect each I/O pin from 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, each diode can safely dissipate 5A of 8/20 $\mu\text{s}$  surge current (IEC 61000-4-5 2<sup>nd</sup> edition) with very low clamping voltages.

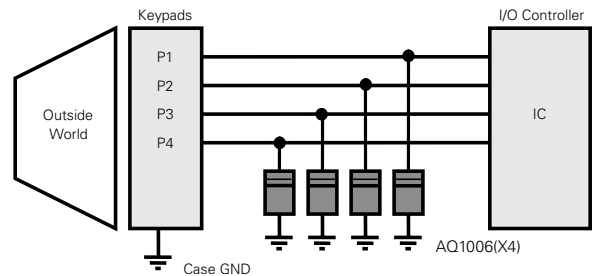
**Features**

- ESD, IEC 61000-4-2,  $\pm 30\text{kV}$  contact,  $\pm 30\text{kV}$  air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, IEC 61000-4-5 2<sup>nd</sup> edition, 5A (8/20 $\mu\text{s}$ )
- Low leakage current of 0.5 $\mu\text{A}$  (MAX) at 5V
- Space efficient 0201 footprint
- AEC-Q101 qualified
- Halogen free, lead free and RoHS compliant
- Moisture Sensitivity Level(MSL -1)

**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.

### Thermal Information

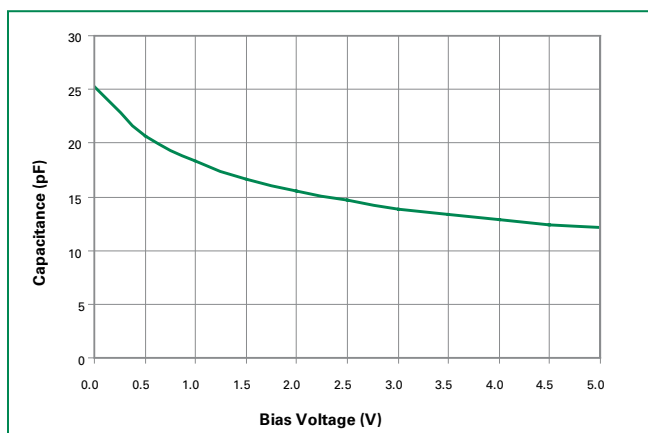
Parameter	Rating	Units
Maximum Junction Temperature	150	°C
Maximum Lead Temperature (Soldering 30s)	260	°C

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

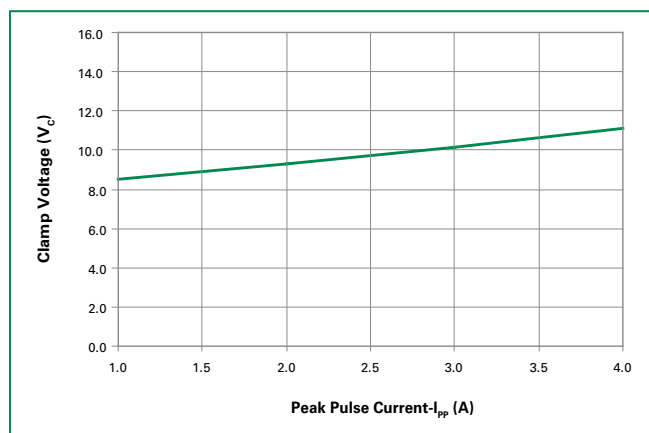
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	$V_{RWM}$				6.0	V
Breakdown Voltage	$V_{BR}$	$I_R=1mA$ (Pin 1 to 2)		7.8		V
Forward Voltage Drop	$V_F$	$I_R=1mA$ (Pin 2 to 1)		0.8		V
Leakage Current	$I_{LEAK}$	$V_R=5V$		0.1	0.5	$\mu A$
Clamp Voltage <sup>1</sup>	$V_C$	$I_{PP}=1A, t_p=8/20\mu s$ (Pin 1 to 2)		8.3		V
		$I_{PP}=2A, t_p=8/20\mu s$ (Pin 1 to 2)		9.2		V
Dynamic Resistance	$R_{DYN}$	$(V_{C2} - V_{C1}) / (I_{PP2} - I_{PP1})$		0.9		$\Omega$
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		25		pF
		Reverse Bias=2.5V		15		pF

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

### Capacitance vs. Reverse Bias

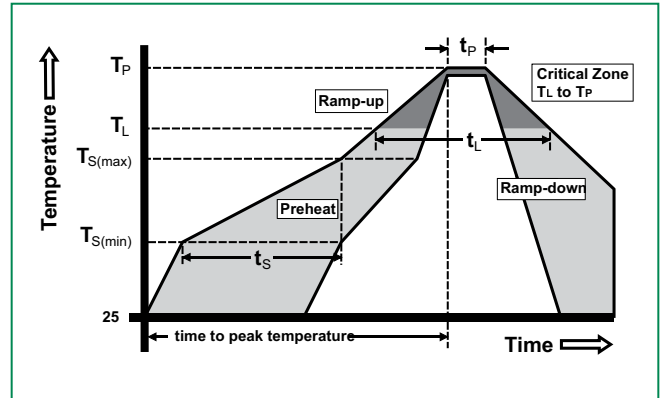


### Clamping Voltage vs. $I_{PP}$



**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.



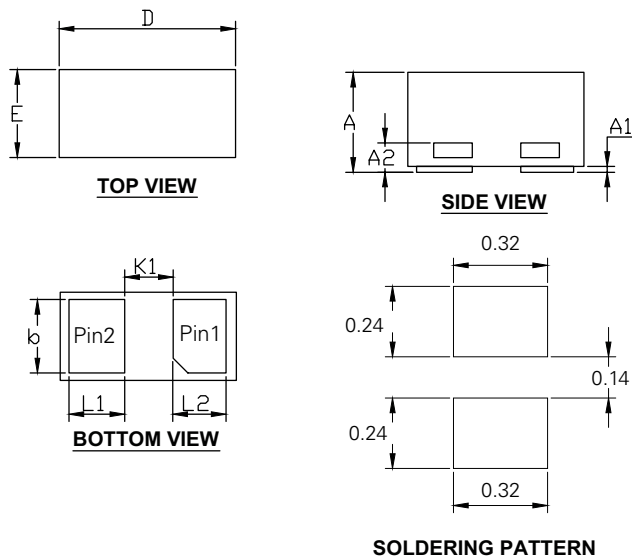
**Product Characteristics**

<b>Lead Plating</b>	Pre-Plating 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 :

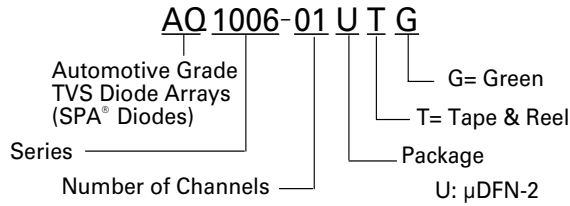
1. All dimensions are in millimeters
2. Dimensions include solder plating.
3. Dimensions are exclusive of mold flash & metal burr.
4. Blo is facing up for mold and facing down for trim/form, i.e. reverse trim/form.
5. Package surface matte finish VDI 11-13.

**Package Dimensions –  $\mu$ DFN-2 (0201)**

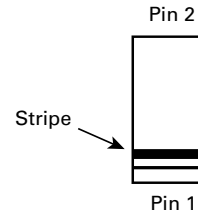


Package	$\mu$ DFN-2 (0201)			
JEDEC	MO-236			
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
<b>A</b>	0.23	0.33	0.009	0.013
<b>A1</b>	0.00	0.05	0.000	0.002
<b>A2</b>	0.10 REF		0.004 REF	
<b>b</b>	0.18	0.30	0.007	0.012
<b>D</b>	0.55	0.65	0.022	0.026
<b>E</b>	0.25	0.35	0.010	0.014
<b>L1</b>	0.12	0.24	0.005	0.009
<b>L2</b>	0.12	0.23	0.005	0.009
<b>K1</b>	0.165 REF		0.006 REF	

**Part Numbering System**



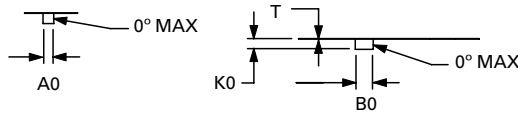
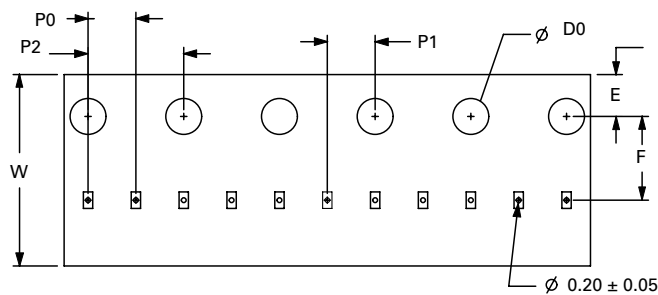
**Part Marking System**



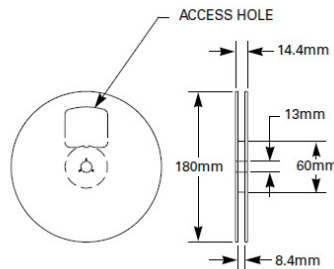
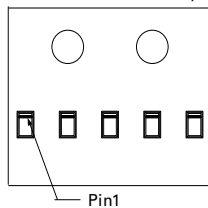
**Ordering Information**

Part Number	Package	Marking	Min. Order Qty.
AQ1006-01UTG	$\mu$ DFN-2		15000

**Embossed Carrier Tape & Reel Specification –  $\mu$ DFN-2**



Component Orientation in Tape



8mm TAPE AND REEL

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

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