

**AQ1026 Series 15pF 30kV Bidirectional Discrete TVS**



**Pinout**



**Functional Block Diagram**



**Description**

The AQ1026 back-to-back diodes are fabricated in a proprietary silicon avalanche technology. These diodes provide a high ESD (electrostatic discharge) protection level for electronic equipment. The AQ1026 TVS 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.

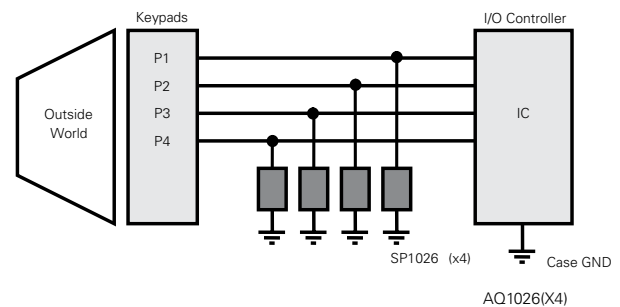
**Features**

- 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
- ESD, ISO 10605, 330pF 330 $\Omega$ ,  $\pm 25\text{kV}$  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

**Applications**

- Mobile phones
- Smart phones
- Smart watches
- Tablets
- 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.

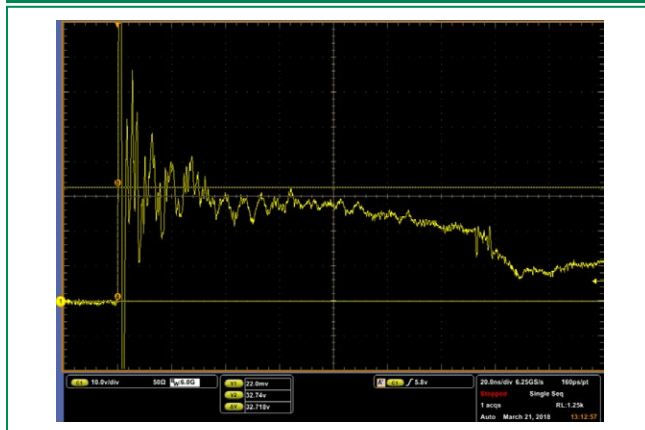
**Electrical Characteristics ( $T_{OP}=25^\circ C$ )**

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
Reverse Leakage Current	$I_{LEAK}$	$V_R=5V$		0.1	0.5	$\mu A$
Clamp Voltage <sup>1</sup>	$V_C$	$I_{PP}=1A, t_p=8/20\mu s$		12.0		V
		$I_{PP}=2A, t_p=8/20\mu s$		13.4		V
Dynamic Resistance <sup>2</sup>	$R_{DYN}$	$(V_{C2} - V_{C1}) / (I_{PP2} - I_{PP1})$		0.4		$\Omega$
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>	$C_{I/O-I/O}$	Reverse Bias=0V, f=1MHz		15		pF
		Reverse Bias=2.5V, f=1MHz		12		pF

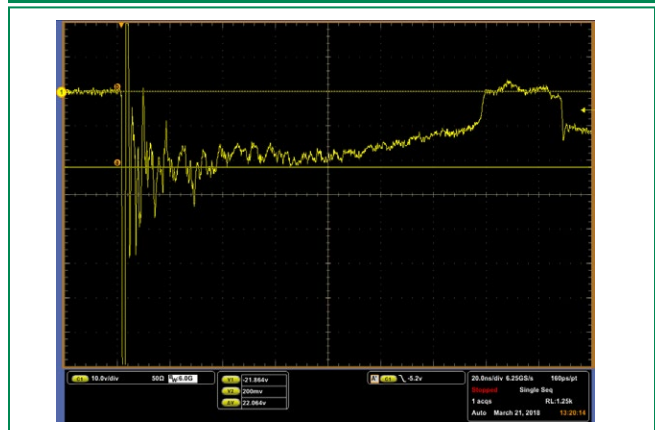
Note: <sup>1</sup> Parameter is guaranteed by design and/or component characterization

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

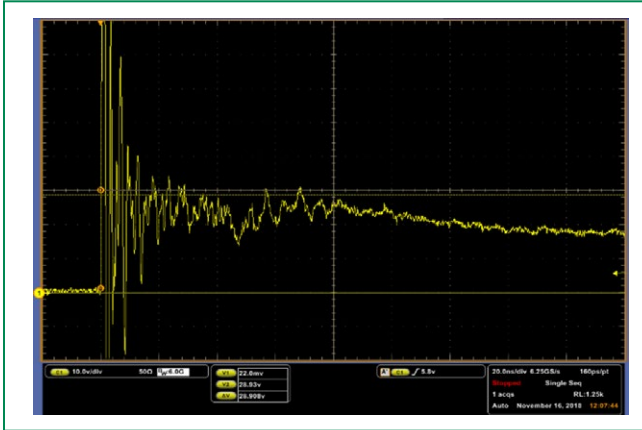
**IEC 61000-4-2 +8 kV Contact ESD Clamping Voltage**



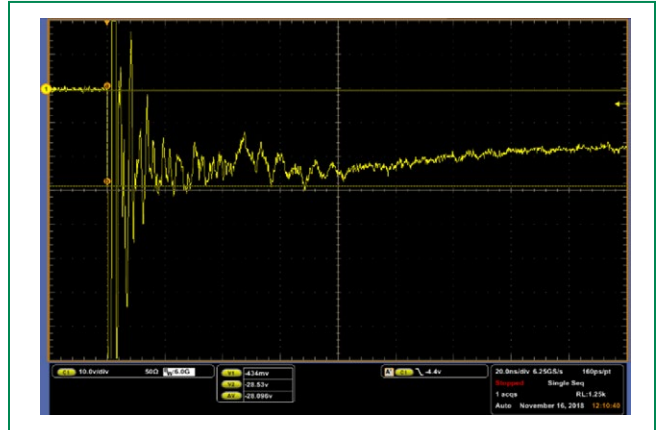
**IEC 61000-4-2 -8 kV Contact ESD Clamping Voltage**



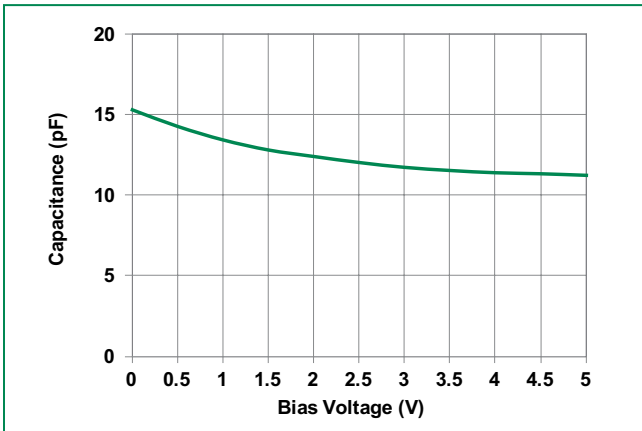
**ESD ISO10605 +8 kV Contact ESD Clamping Voltage**



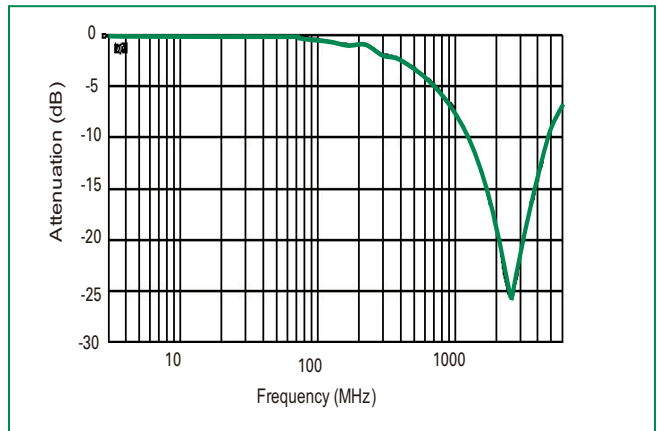
**ESD ISO10605 -8 kV Contact ESD Clamping Voltage**



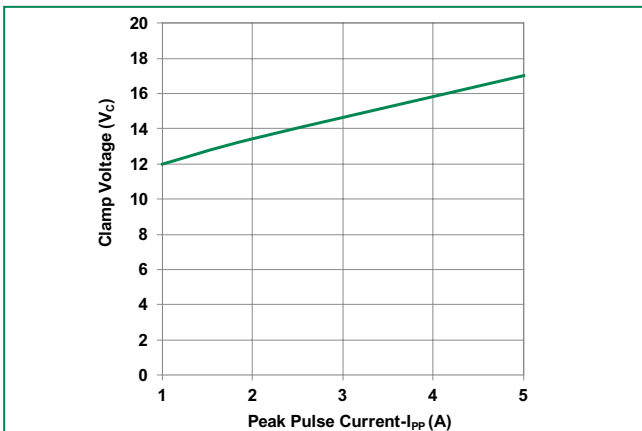
**Capacitance vs. Reverse Bias**



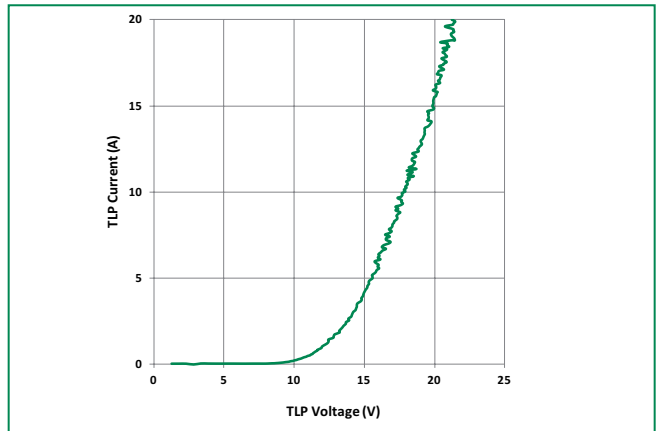
**Insertion Loss (S21) I/O to GND**



**Clamping Voltage vs. I<sub>pp</sub>**

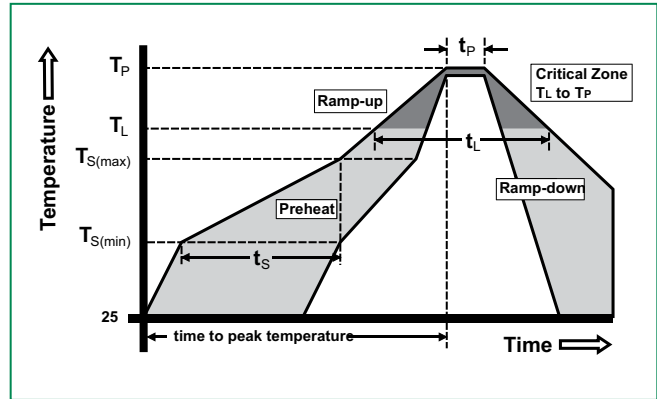


**Transmission Line Pulsing(TLP) Plot**



**Soldering Parameters**

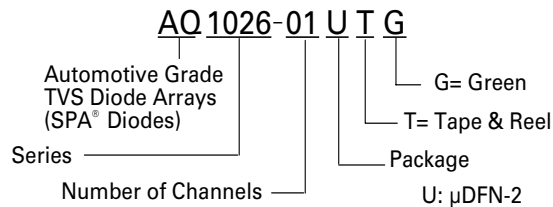
Reflow Condition	Pb – Free assembly	
Pre Heat	- Temperature Min ( $T_{s(min)}$ )	150°C
	- Temperature Max ( $T_{s(max)}$ )	200°C
	- Time (min to max) ( $t_s$ )	60 – 180 secs
Average ramp up rate (Liquidus) Temp ( $T_L$ ) to peak	3°C/second max	
$T_{s(max)}$ to $T_L$ - Ramp-up Rate	3°C/second max	
Reflow	- Temperature ( $T_L$ ) (Liquidus)	217°C
	- Temperature ( $t_L$ )	60 – 150 seconds
Peak Temperature ( $T_p$ )	260 <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-Plated Frame
<b>Lead Material</b>	Copper Alloy
<b>Substrate material</b>	Silicon
<b>Body Material</b>	Molded Compound
<b>Flammability</b>	UL Recognized compound meeting flammability rating V-0

**Part Numbering System**



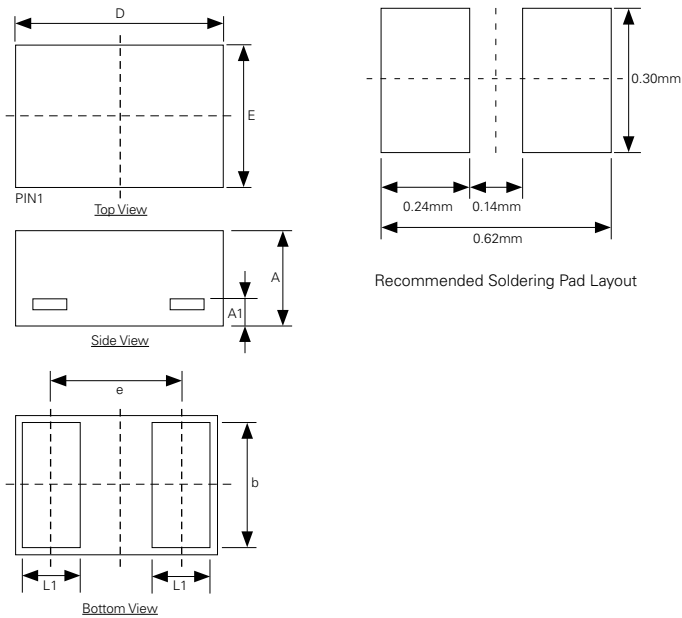
**Ordering Information**

Part Number	Package	Min. Order Qty.
AQ1026-01UTG	μDFN-2	15000

**Part Marking System**

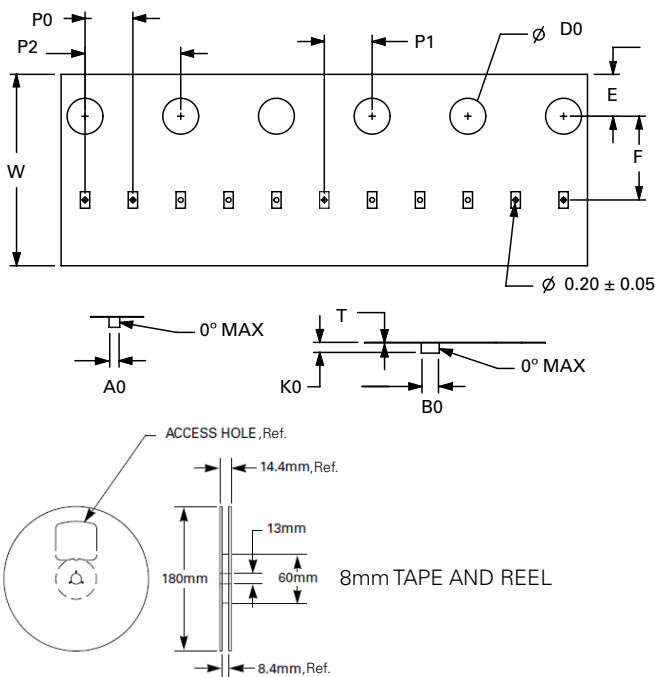


**Package Dimensions —  $\mu$ DFN-2 (0201)**



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

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



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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