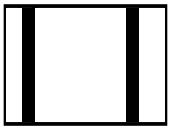
AQ1026 Series 15pF 30kV Bidirectional Discrete TVS

AUTOMOTIVE GRADE HF RoHS Pb GREEN

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 ±30kV (contact discharge, IEC 61000-4-2) without performance degradation. Additionally, each diode can safely dissipate 5A of 8/20µs surge current (IEC 61000-4-5 2nd edition) with very low clamping voltages.

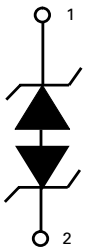
Pinout



Features

- ESD, IEC 61000-4-2, ±30kV contact, ±30kV air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, IEC 61000-4-5 2nd edition, 5A (8/20µs)
- Low leakage current of 0.5µA (MAX) at 5V
- ESD, ISO 10605, 330pF 330Ω, ±25kV contact, ±30kV air
- Space efficient 0201 footprint)
- AEC-Q101 qualified
- Halogen free, lead free and RoHS compliant
- Moisture Sensitivity Level(MSL -1)
- PPAP Capable

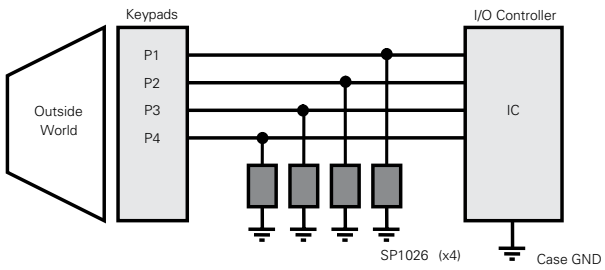
Functional Block Diagram



Applications

- Mobile phones
- Smart phones
- Smart watches
- Tablets
- Portable navigation components
- Portable medical components
- Automotive applications

Application Example



AQ1026(X4)

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 Pulse Current (t_p=8/20μs)	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.

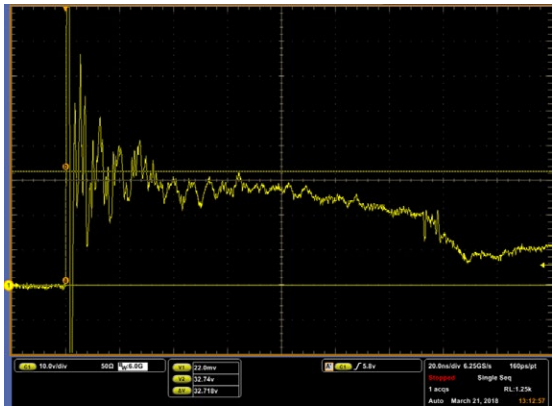
Electrical Characteristics (T_{OP}=25°C)

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		7.8		V
Reverse Leakage Current	I_{LEAK}	V_R=5V		0.1	0.5	μA
Clamp Voltage[1]	V_C	I_{pp}=1A, t_p=8/20μs		12.0		V
		I_{pp}=2A, t_p=8/20μs		13.4		V
Dynamic Resistance[2]	R_{DYN}	$(V_{C2} - V_{C1}) / (I_{PP2} - I_{PP1})$		0.4		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		15		pF
		Reverse Bias=2.5V, f=1MHzz		12		pF

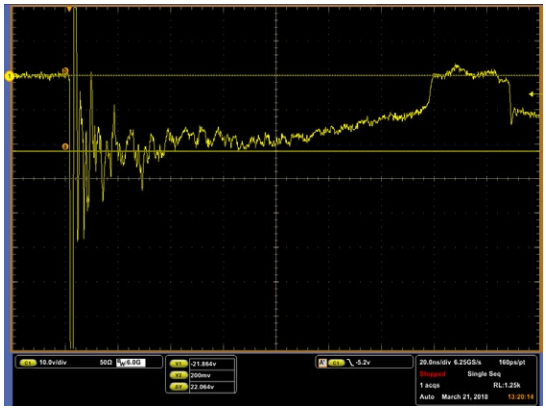
Note: [1] Parameter is guaranteed by design and/or component characterization

[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



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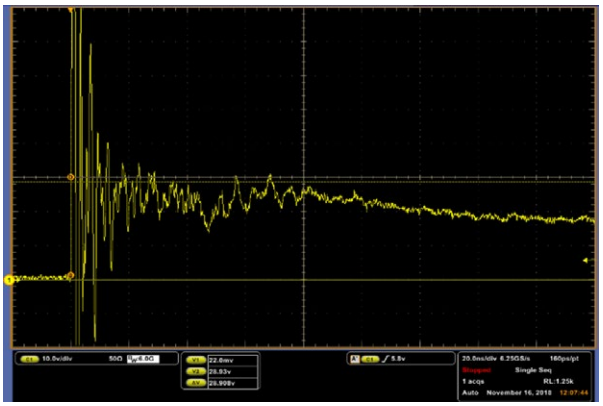
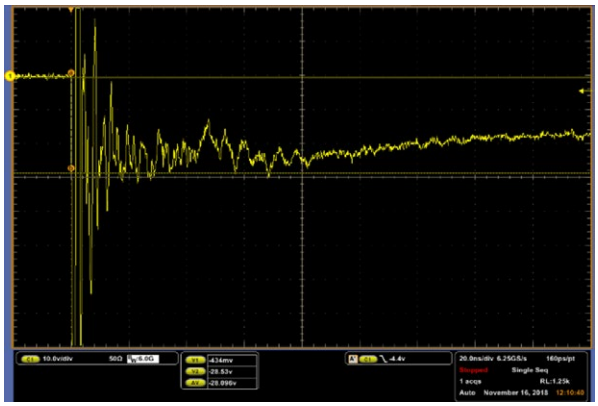
TVS Diode Array (SPA® Diodes)

General Purpose ESD Protection - AQ1026 Series

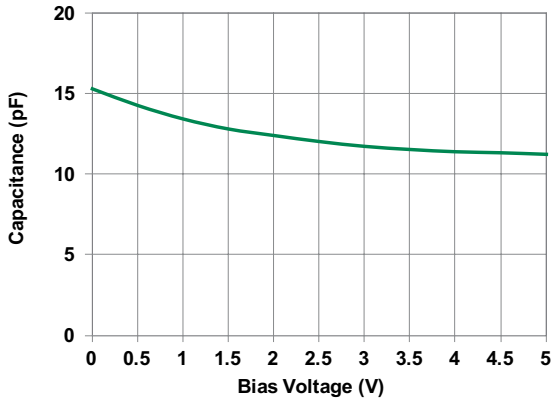
ESD ISO10605 +8 kV Contact ESD Clamping Voltage



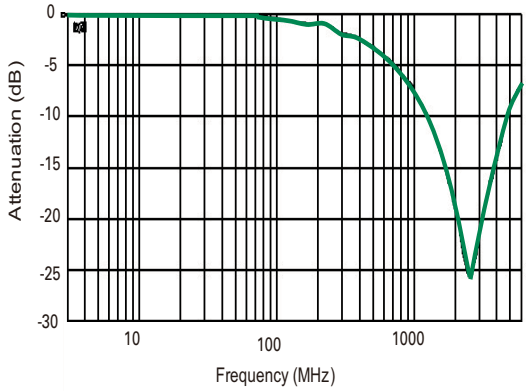
ESD ISO10605 -8 kV Contact ESD Clamping Voltage



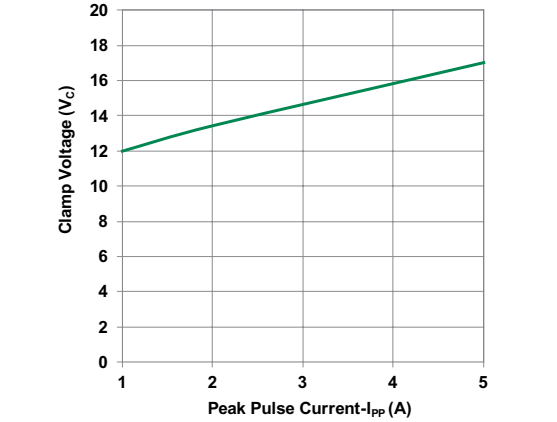
Capacitance vs. Reverse Bias



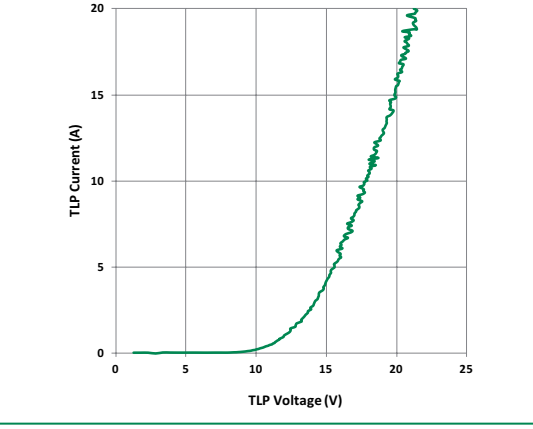
Insertion Loss (S21) I/O to GND



Clamping Voltage vs. I_{PP}



Transmission Line Pulsing(TLP) Plot



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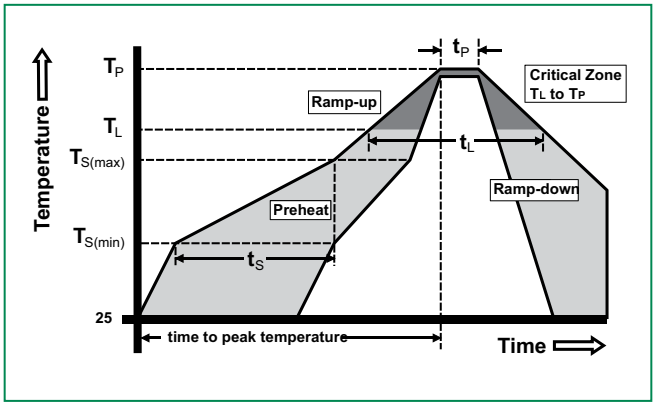
Soldering Parameters

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 – 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

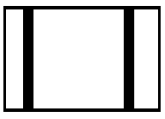
Lead Plating	Pre-Plated Frame
Lead Material	Copper Alloy
Substrate material	Silicon
Body Material	Molded Compound
Flammability	UL Recognized compound meeting flammability rating V-0

Part Numbering System

AQ 1026 - 01 U T G

- AQ: Automotive Grade TVS Diode Arrays (SPA® Diodes)
- 1026: Series
- 01: Number of Channels
- U: Package — U: µDFN-2
- T: T= Tape & Reel
- G: G= Green

Part Marking System



Ordering Information

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

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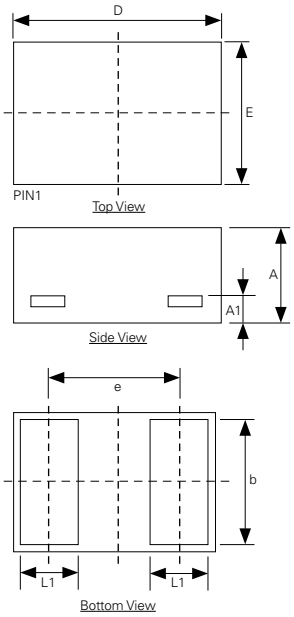
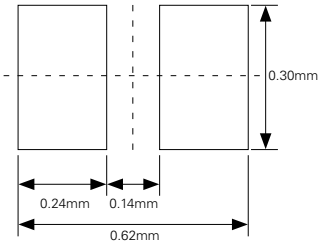
Package Dimensions — µDFN-2 (0201)

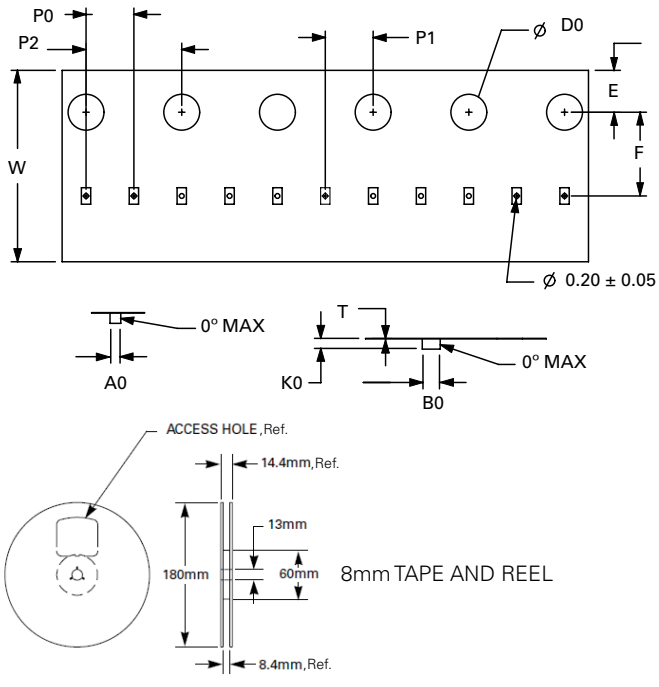




Recommended Soldering Pad Layout

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 — µDFN-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

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