AQ3045 Series 0.35pF 30kV Bidirectional Discrete TVS

AUTOMOTIVE GRADE HF RoHS Pb GREEN

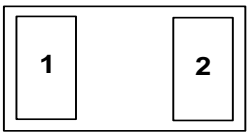


Description

The AQ3045 includes back-to-back TVS 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 up to the maximum level specified in IEC 61000-4-2 international standard (±30kV contact discharge) without performance degradation. The back-to-back configuration provides symmetrical ESD protection for data lines and the low loading capacitance makes it ideal for protecting high speed data lines such as HDMI,USB2.0, USB3.0 and eSATA.

Pinout

SOD882

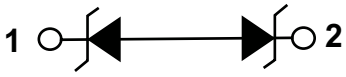


(AEC-Q101 qualified)

Features

- ESD protection of ±30kV contact discharge, ±30kV air discharge, (IEC 61000-4-2)
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning protection, IEC 61000-4-5 2nd edition, 3A (t_p=8/20µs)
- Low capacitance of 0.35pF @ V_R=0V (TYP)
- Low leakage current of 100nA at 5.3V (MAX)
- Small SOD882 packaging helps save board space
- Extremely low dynamic resistance (0.55 Ω TYP)
- AEC-Q101 qualified
- Halogen free, lead free and RoHS compliant
- Moisture Sensitivity Level(MSL -1)

Functional Block Diagram



Applications

- USB 3.0/USB 2.0/MHL
- MIPI Camera and Display
- HDMI 2.0, DisplayPort 1.3, eSATA
- Set Top Boxes, Game Consoles
- Smart Phones
- External Storage
- Ultrabooks, Notebooks
- Tablets, eReaders
- High Speed Serial Interfaces
- Automotive Applications

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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TVS Diode Arrays (SPA® Diodes)

Low Capacitance ESD Protection - AQ3045 Series

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
P_{PK}	Peak Pulse Power (t_p=8/20µs)	40	W
I_{PP}	Peak Current (t_p=8/20µs)	3.0	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.

Thermal Information

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

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

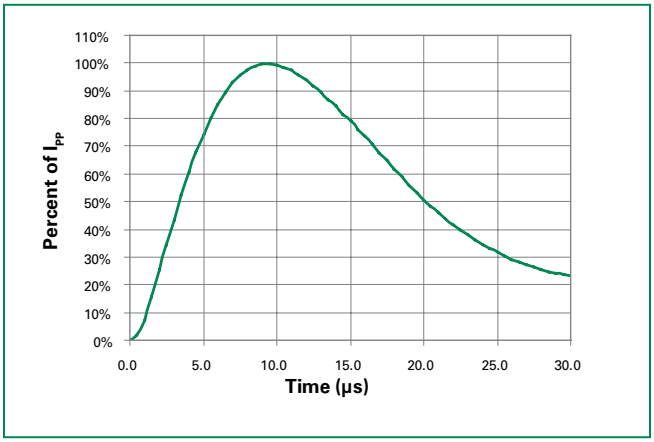
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}				5.3	V
Reverse Breakdown Voltage	V_{BR}	1_R=1mA	6.8	7.8	9.0	V
Reverse Leakage Current	I_{LEAK}	V_R=5.3V		<10	100	nA
Clamp Voltage[1]	V_C	I_{PP}=1A, t_p=8/20µs, Fwd			12.0	V
Dynamic Resistance[2]	R_{DYN}	TLP, tp=100ns, I/O to GND		0.55		Ω
ESD Withstand Voltage[1]	V_{ESD}	IEC 61000-4-2 (Contact)	±30			kV
		IEC 61000-4-2 (Air)	±30			kV
Diode Capacitance[1]	C_D	Reverse Bias=0V		0.35	0.5	pF

Note:

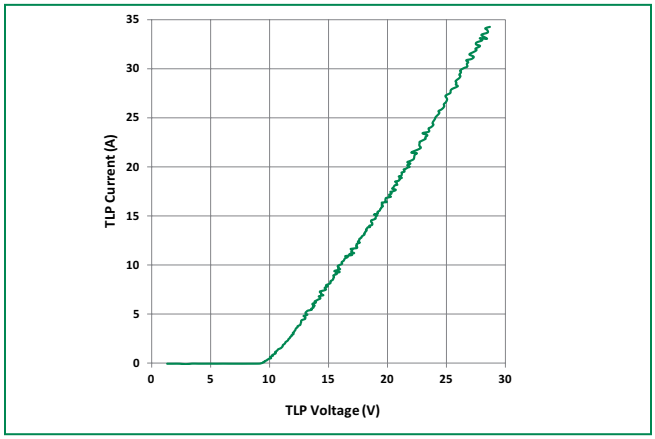
[1] Parameter is guaranteed by design and/or component characterization.

[2] Transmission Line Pulse (TLP) with 100ns width, 2ns rise time, and average window t1=70ns to t2= 90ns

8/20µs Pulse Waveform



Transmission Line Pulsing(TLP) Plot



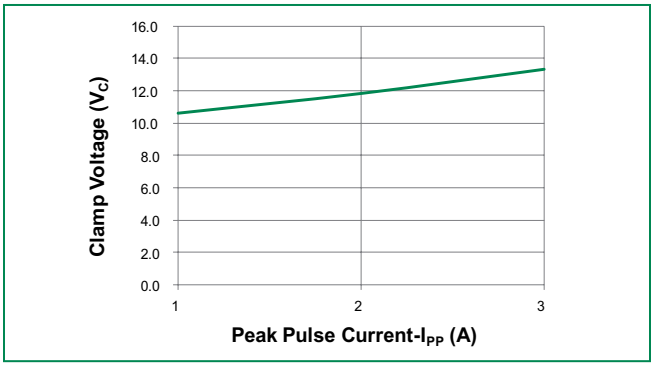
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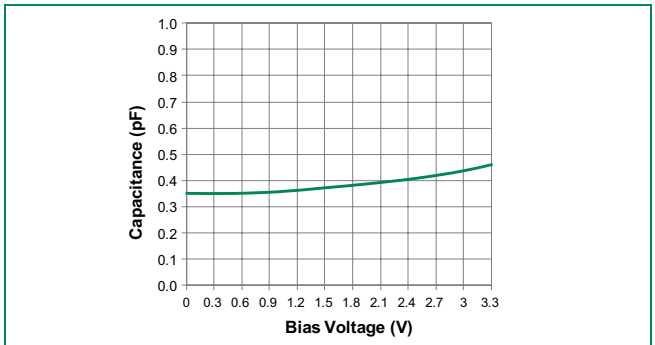
TVS Diode Arrays (SPA® Diodes)

Low Capacitance ESD Protection - AQ3045 Series

Clamping Voltage vs I_{PP}

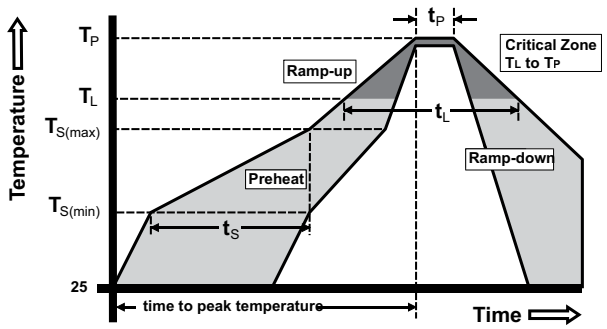


Capacitance vs. Reverse Bias



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.
Do not exceed		260°C



Part Numbering System

AQ 3045 - 01 E T G

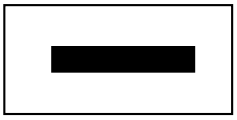
- AQ: Automotive Grade TVS Diode Arrays (SPA® Diodes)
- 3045: Series
- 01: Number of Channels
- E: Package E: SOD882
- T: T= Tape & Reel
- G: G= Green

Product Characteristics

Lead Plating	Pre-Plated Frame
Lead Material	Copper Alloy
Substrate material	Silicon
Body Material	Molded Epoxy
Flammability	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.

Part Marking System



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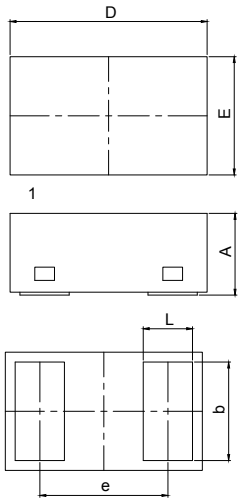
TVS Diode Arrays (SPA® Diodes)

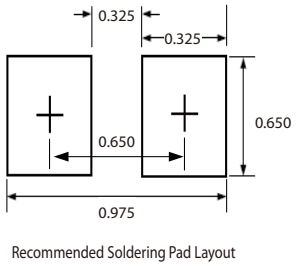
Low Capacitance ESD Protection - AQ3045 Series

Ordering Information

Part Number	Package	Marking	Min. Order Qty.	Packaging Option	P0/P1	Packaging Specification
AQ3045-01ETG	SOD882	-	10000	Tape & Reel – 8mm tape/7" reel	4mm/2mm	EIA RS-481

Package Dimensions — SOD882

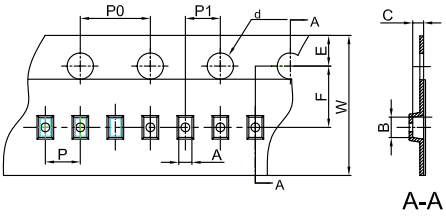


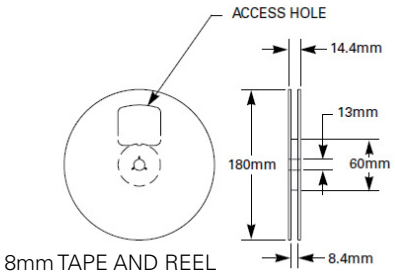


Recommended Soldering Pad Layout

Symbol	Package	SOD882		
	JEDEC	MO-236		
	Millimeters		Inches	
	Min	Max	Min	Max
A	0.36	0.42	0.014	0.017
b	0.45	0.55	0.018	0.022
L	0.20	0.30	0.008	0.012
e	0.65		0.026	
D	0.93	1.07	0.037	0.042
E	0.53	0.67	0.021	0.026

Embossed Carrier Tape & Reel Specification — SOD882





8mm TAPE AND REEL

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

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