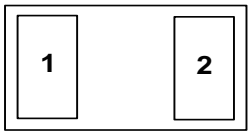
AQ3045 Series
Low Capacitance ESD Protection

AUTOMOTIVE GRADE HF RoHS Pb

Pinout

SOD882



Functional Block Diagram

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 when AC signals are present and the low loading capacitance makes it ideal for protecting high speed data lines such as HDMI,USB2.0, USB3.0 and eSATA.

Features & Benefits

- ESD protection of ±30kV contact discharge, ±30kV air discharge, (IEC 61000-4-2)
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, 3A (8/20µs as defined in IEC 61000-4-5 2nd edition)
- Low capacitance of 0.35pF @ VR=0V (TYP)
- PPAP capable
- 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)

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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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

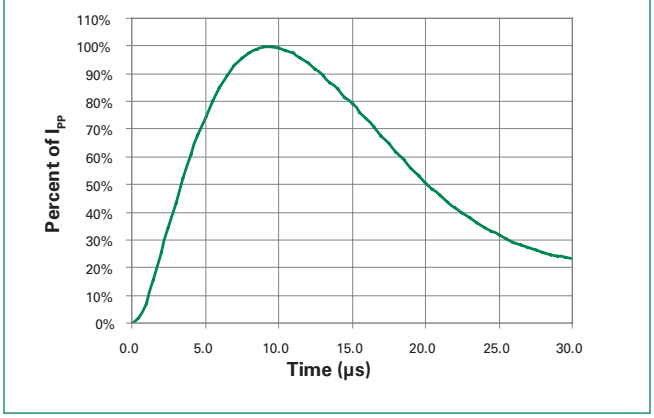
Caution: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the component. This is a stress only rating and operation of the component at these or any other conditions above those indicated in the operational sections of this specification is not implied.

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

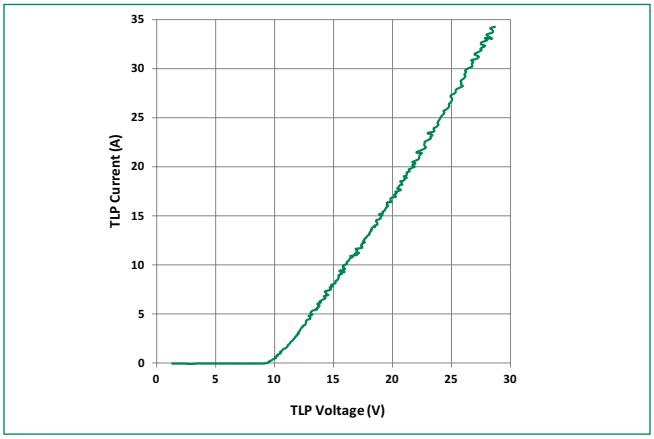
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}	I_R=1uA	-	-	5.3	V
Breakdown Voltage	V_{BR}	I_R=1mA	6.8	7.8	9.0	V
Reverse Leakage Current	I_{LEAK}	V_R=5.3V	-	<10	100	nA
Clamp Voltage[1]	V_C	I_{PP}=1A, t_p=8/20µs, Fwd	-	-	12.0	V
Dynamic Resistance[2]	R_{DYN}	TLP, t_p=100ns, 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]	$C_{I/O-I/O}$	Reverse Bias=0V, f=1MHz	-	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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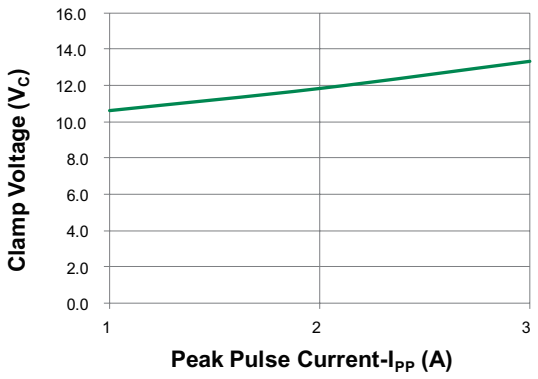
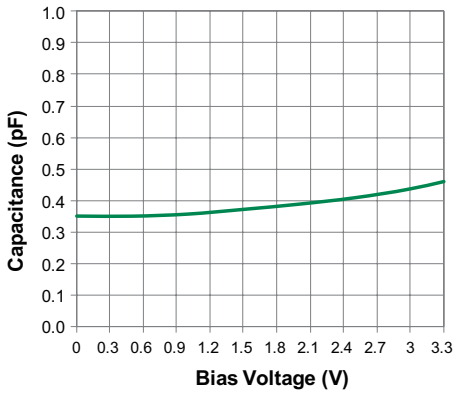
Clamping Voltage vs IPP

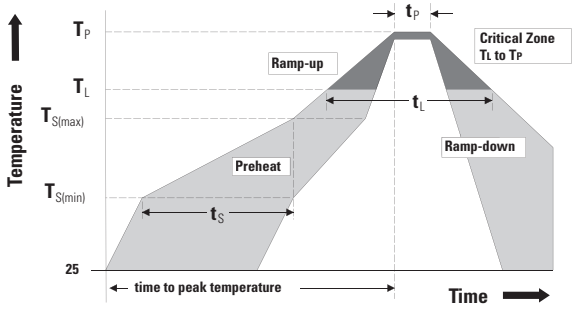


Capacitance vs. Reverse Bias



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 – 120 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)		30 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 Compound
Flammability	UL Recognized compound meeting flammability rating V-0

Part Marking System

Ordering Information

Part Number	Package	Min. Order Qty.
AQ3045-01ETG	SOD882	10000

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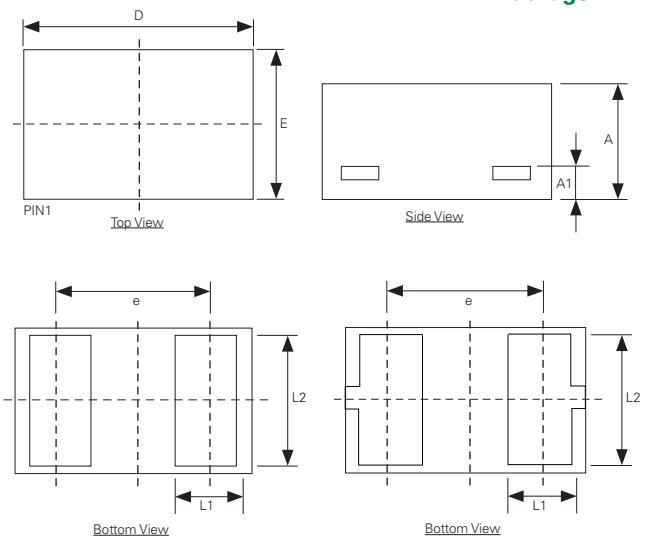
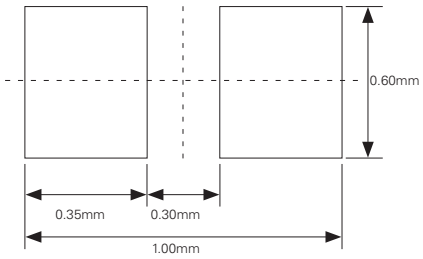
Package Dimensions — SOD882

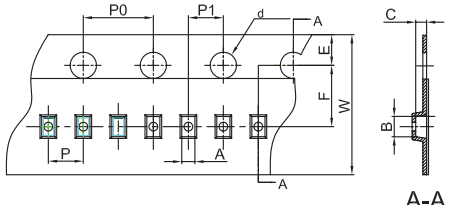


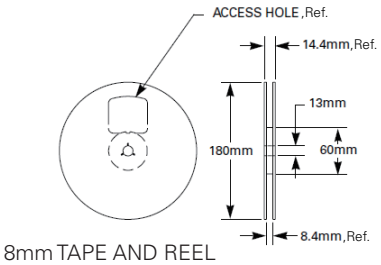
Symbol	DIMENSIONS (mm)		
	Min.	Nor.	Max.
A	0.36	0.45	0.55
A1		0.127 REF	
L1	0.20	0.25	0.30
L2	0.45	0.50	0.55
D	0.93	1.00	1.07
E	0.53	0.60	0.67
e		0.65 BSC	



Recommended Soldering Pad Layout

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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