

General Description

The AOZ1014 evaluation board is a fully assembled and tested circuit board built with the AOZ1014 buck regulator IC. It outputs a preset or adjustable voltage at up to 5A of continuous current. The evaluation board requires an input voltage from 4.5V to 16V. The output voltage is preset and can be adjusted from 0.8 V to $V_{IN}-0.4V$

The AOZ1014-EVA circuit has features like current limit, short circuit protection, input under voltage lock out, internal soft start and thermal shut down. It operates at a fixed 500kHz switching frequency. The current mode control and integrated internal MOSFET minimize component count, board area and total cost.

The AOZ1014 comes in SO-8 and DFN-8 packages and is rated over a $-40^{\circ}C$ to $+85^{\circ}C$ ambient temperature range.

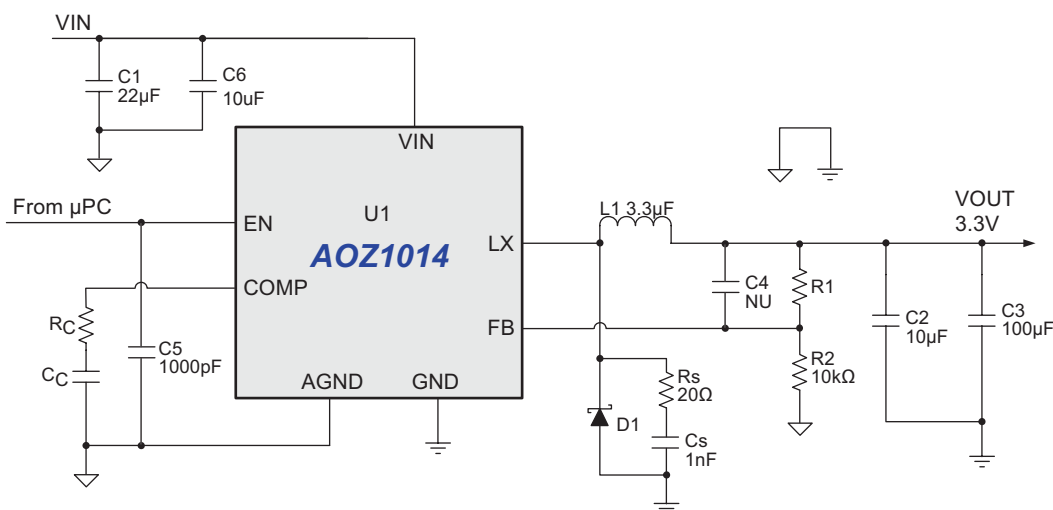
Features

- 4.5V to 16V operating input voltage range
- Output voltage was preset to 3.3 V, adjustable to as low as 0.8V
- 5A continuous output current
- Fixed 500kHz PWM operation
- Internal soft start
- Cycle-by-cycle current limit
- Short-circuit protection
- Thermal shutdown

Applications

- Point of load DC/DC conversion
- PCIe graphics cards
- Set top boxes
- DVD drives and HDD
- LCD panels
- Cable modems
- Telecom/networking/datacom equipment

Evaluation Board Schematic



Component List

Ref Designation	Value	Description	Manufacture Part Number	Manufacturer
C1	22 μ F	Ceramic Cap, 22uF, 25V, 1210, X5R	GRM32ER61E226KE15L	Murata
C2	10 μ F	Ceramic Cap, 10uF, 25V, 1210, X7R	GRM32ER71E106KE12L	
C4	NU			
C5	1000pF	Ceramic Cap, 1000pF, 50V, 0603, X7R	GRM188R71E102K	
C6	10 μ F	Ceramic Cap, 10uF, 25V, 1210, X7R	GRM32ER71E106KE12L	
C7 (Cs)	1000pF	Ceramic Cap, 1000pF, 50V, 0603, X7R	GRM188R71E102K	
C _C *	1000pF	Ceramic Cap, 1000pF, 50V, 0603, X7R	GRM188R71E102K	
C3	100 μ F	Tantalum Cap, 100uf, 16V SMD		KEMET
R1*	29.4k Ω	Thick Film Res, 1%, 29.4k, 0603	CRCW060329K4FKTAP	DALE
R2	10k Ω	Thick Film Res, 1%, 10k, 0603	CRCW060310K0FKTAP	
R3 (R _S)	20 Ω	Thick Film Res, 20, 1206	CRCW0120620R0FKTAP	
R _C *	44.2k Ω	Thick Film Res, 1%, 44.2k, 0603	CRCW060344K2FKTAP	
L1*	3.3 μ H	Inductor, 3.3uH, 6.4A	DO3316-332MLD	Coilcraft
D1	50WQ03FN	Diode Schottky, 30V, 5.5A, DPAK	50WQ03FN	IR
U1	AOZ1014AI	Buck regulator IC, 5A, 16V	AOZ1014AI	AOS

*For evaluation board with different output voltage, these values might be different.

Ordering Information

Part Number	Output Preset Voltage	IC Package	Ambient Temperature Range
AOZ1014-EVA-8V0	8 V	SO-8	-40°C to +85°C
AOZ1014-EVA-5V0	5 V	SO-8	-40°C to +85°C
AOZ1014-EVA-3V3	3.3 V	SO-8	-40°C to +85°C
AOZ1014-EVA-2V5	2.5 V	SO-8	-40°C to +85°C
AOZ1014-EVA-1V8	1.8V	SO-8	-40°C to +85°C
AOZ1014D-EVA-8V0	8 V	DFN	-40°C to +85°C
AOZ1014D-EVA-5V0	5 V	DFN	-40°C to +85°C
AOZ1014D-EVA-3V3	3.3 V	DFN	-40°C to +85°C
AOZ1014D-EVA-2V5	2.5 V	DFN	-40°C to +85°C
AOZ1014D-EVA-1V8	1.8V	DFN	-40°C to +85°C

PCB Layout, AOZ1014A, (SO8 Package)

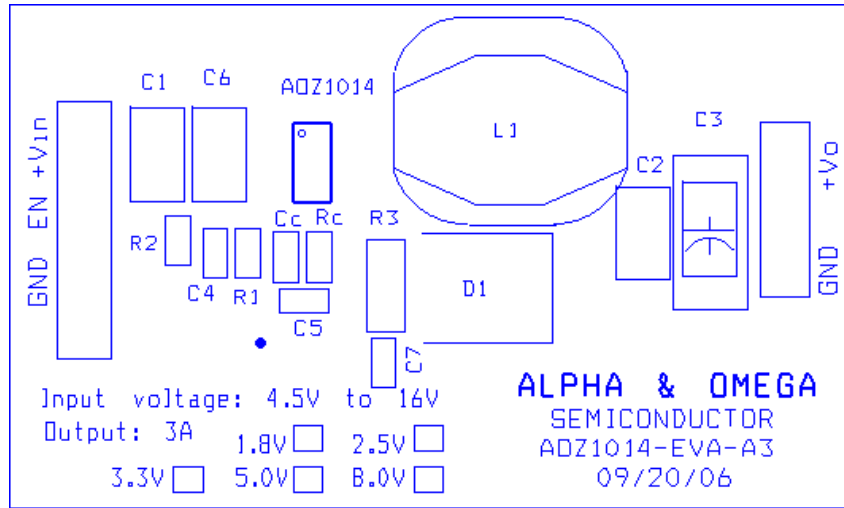


Figure 1. Top Silk Screen

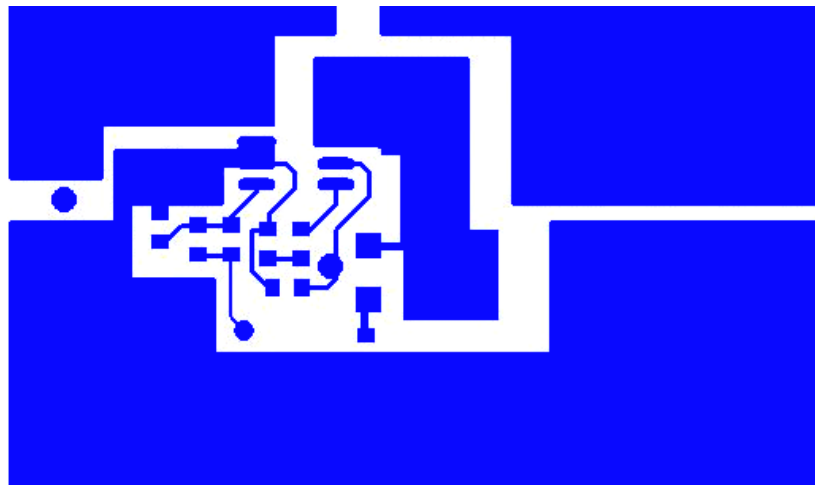


Figure 2. Top Layer

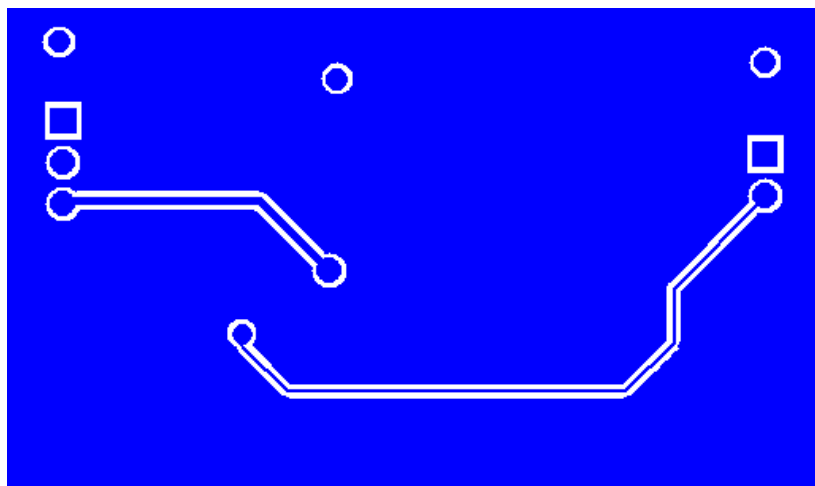


Figure 3. Bottom Layer

PCB Layout, AOZ1014D, (DFN 4 x 5)

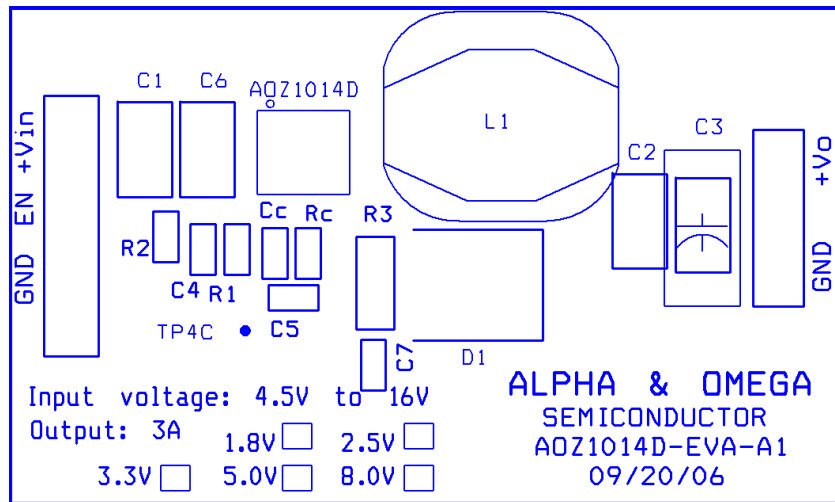


Figure 4. Top Silk Screen

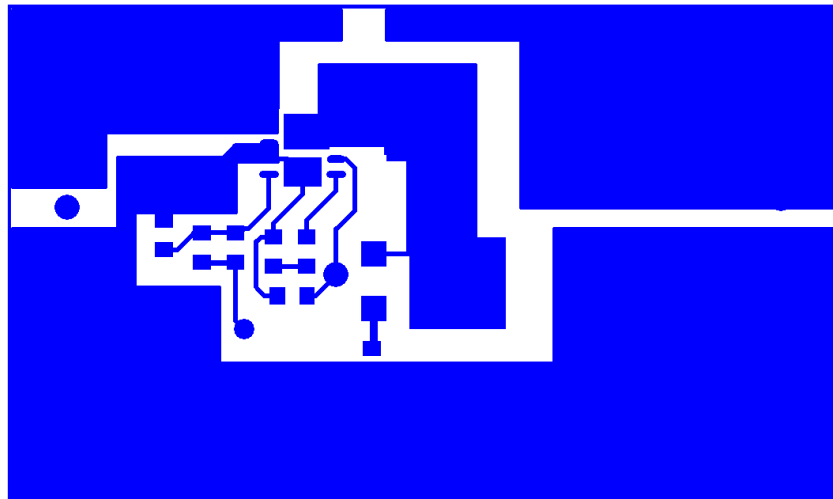


Figure 5. Top Layer

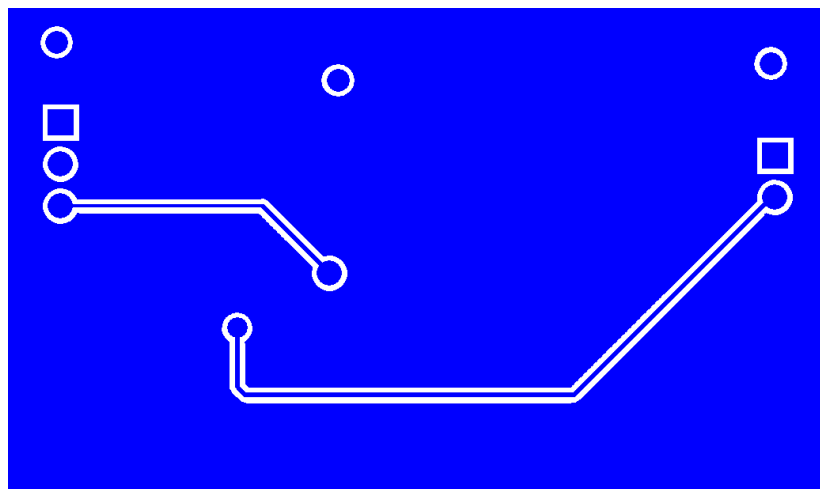


Figure 6. Bottom Layer

BOM of 8V/5A AOZ1014 Regulator

Ref Designation	Value	Description	Package	Manufactures
C1	22 μ F	Ceramic Cap, 25V, X7R	1210	Murata, AVX
C2	10 μ F	Ceramic Cap, 25V, X7R	1210	
C4	NC		0603	
C5	1000pF	Ceramic Cap, 50V, X7R	0603	
C6	10 μ F	Ceramic Cap, 25V, X7R	1210	
C7 (C _S)	1000pF	Ceramic Cap, 50V, X7R	0603	
C _C	1000pF	Ceramic Cap, 50V, X7R	0603	
C3	100 μ F	Tantalum Cap, 16V	D	
R1	90.9k Ω	Thick Film Res, 1%	0603	DALE
R2	10k Ω	Thick Film Res, 1%	0603	
R _C	49.9k Ω	Thick Film Res, 1%	0603	
R3 (R _S)	20 Ω	Thick Film Res,	1206	
L1	10 μ H	Inductor MSS1278 series		Coilcraft
D1	50WQ03FN	IR	DPAK	IR
U1	AOZ1014A(D)	Buck regulator IC	SO-8	AOS

BOM of 5V/5A AOZ1014 Regulator

Ref Designation	Value	Description	Package	Manufactures
C1	22 μ F	Ceramic Cap, 25V, X7R	1210	Murata, AVX
C2	10 μ F	Ceramic Cap, 25V, X7R	1210	
C4	NC		0603	
C5	1000pF	Ceramic Cap, 50V, X7R	0603	
C6	10 μ F	Ceramic Cap, 25V, X7R	1210	
C7 (C _S)	1000pF	Ceramic Cap, 50V, X7R	0603	
C _C	1200pF	Ceramic Cap, 50V, X7R	0603	
C3	100 μ F	Tantalum Cap, 16V	D	
R1	52.3k Ω	Thick Film Res, 1%	0603	DALE
R2	10k Ω	Thick Film Res, 1%	0603	
R _C	31.6k Ω	Thick Film Res, 1%	0603	
R3 (R _S)	20 Ω	Thick Film Res,	1206	
L1	5.6 μ H	Inductor MSS1278 series		Coilcraft
D1	50WQ03FN	IR	DPAK	IR
U1	AOZ1014A(D)	Buck regulator IC	SO-8	AOS

BOM of 3.3V/5A AOZ1014 Regulator

Ref Designation	Value	Description	Package	Manufactures
C1	22 μ F	Ceramic Cap, 25V, X7R	1210	Murata, AVX
C2	10 μ F	Ceramic Cap, 25V, X7R	1210	
C4	NC		0603	
C5	1000pF	Ceramic Cap, 50V, X7R	0603	
C6	10uF	Ceramic Cap, 25V, X7R	1210	
C7 (C _S)	1000pF	Ceramic Cap, 50V, X7R	0603	
C _C	3300pF	Ceramic Cap, 50V, X7R	0603	
C3	100 μ F	Tantalum Cap, 16V	D	
R1	31.6k Ω	Thick Film Res, 1%	0603	DALE
R2	10k Ω	Thick Film Res, 1%	0603	
R _C	20k Ω	Thick Film Res, 1%	0603	
R3 (R _S)	20 Ω	Thick Film Res,	1206	
L1	3.3 μ H	Inductor DO3316 series		Coilcraft
D1	50WQ03FN	IR	DPAK	IR
U1	AOZ1014A(D)	Buck regulator IC	SO-8	AOS

BOM of 1.8V/5A AOZ1014 Regulator

Ref Designation	Value	Description	Package	Manufactures
C1	22 μ F	Ceramic Cap, 25V, X7R	1210	Murata, AVX
C2	10 μ F	Ceramic Cap, 25V, X7R	1210	
C4	NC		0603	
C5	1000pF	Ceramic Cap, 50V, X7R	0603	
C6	10uF	Ceramic Cap, 25V, X7R	1210	
C7 (C _S)	1000pF	Ceramic Cap, 50V, X7R	0603	
C _C	1000pF	Ceramic Cap, 50V, X7R	0603	
C3	100 μ F	Tantalum Cap, 16V	D	
R1	12.4k Ω	Thick Film Res, 1%	0603	DALE
R2	10k Ω	Thick Film Res, 1%	0603	
R _C	51.1k Ω	Thick Film Res, 1%	0603	
R3 (R _S)	20 Ω	Thick Film Res	1206	
L1	2.2 μ H	Inductor DO3316 series		Coilcraft
D1	50WQ03FN	IR	DPAK	IR
U1	AOZ1014A(D)	Buck regulator IC	SO-8	AOS

Quick Start Guide

1. Connect the terminals of load to +V_{OUT} pins and GND pins. Set load current between 0A and 5A.
2. Connect the DC power supply to +V_{IN} pin and GND pins. Set DC power supply voltage between 4.5V and 16V.
3. Connect EN pin to +V_{IN} or any voltage source which is between 2.0V and 16V.
4. Turn on DC power supply and evaluation circuit will start.
5. Measure input voltage at the +V_{IN} pin and GND pins to eliminate the effect of voltage drop on wire between DC power supply and the evaluation board.
6. Measure output voltage at the +V_{OUT} pin and GND pins to eliminate the effect of voltage drop on wire between load and the evaluation board.
7. Use an oscilloscope to monitor input ripple voltage across input capacitor C1.
8. Use an oscilloscope to monitor output ripple voltage across output capacitor C2.