AOZ1020AI-EVB

EZBuck™ 2A Synchronous Buck Regulator Evaluation Board Note

General Description

The AOZ1020AI evaluation board is a fully assembled and tested circuit board built with the AOZ1020AI buck regulator IC. It outputs an adjustable voltage up to 2A of continuous current. The evaluation board requires an input voltage from 4.5 to 16V. The output voltage is preset at 3.3V and can be adjusted down to 0.8V.

The AOZ1020AI-EVB 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 integrated internal MOSFETs minimize component count, board area and total cost.

The AOZ1020AI-EVB demonstrates the simple buck converter design. Only one resistor value change is needed for different output voltage designs. The AOZ1020AI-EVB also supports single layer board design.

Features

- 4.5V to 16V operating input voltage range
- Output voltage preset to 3.3V, adjustable to as low as 0.8V
- 2A continuous output current
- Fixed 500kHz PWM operation
- Internal soft start
- Open-drain Power Good output
- Cycle-by-cycle current limit
- Short-circuit protection
- Thermal shutdown
- Enables single layer board design

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

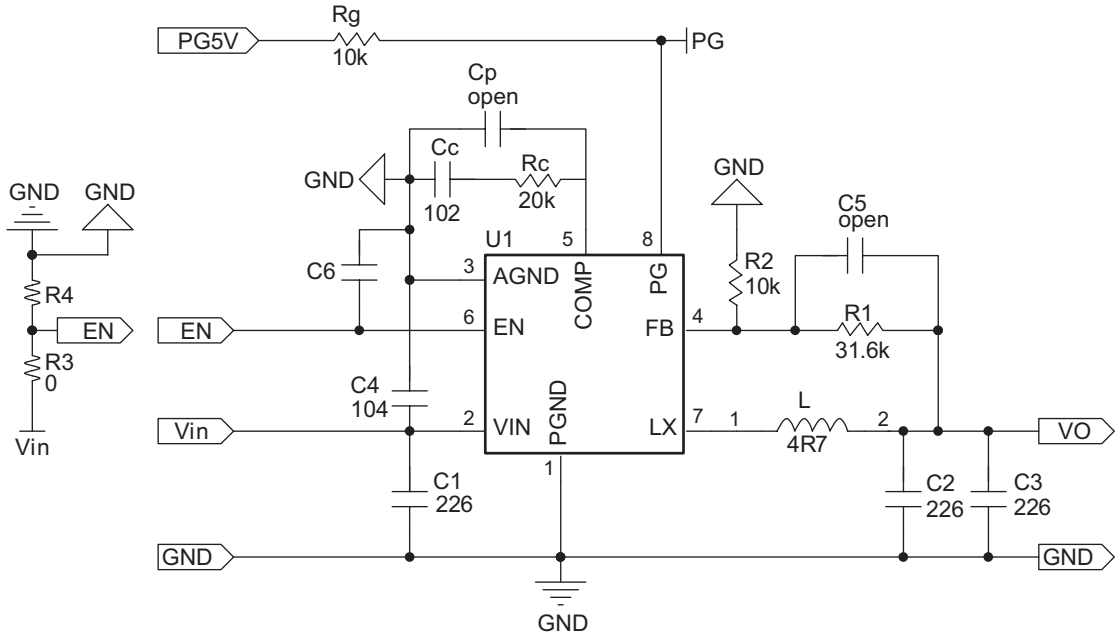

Table 1. Component List

Ref Designation	Part Number	Description	Manufacturer
C1, C2, C3	GRM32ER61E226KE15L	Cap, 22µF/25V, 1210, X5R, 10%	muRata
C4	GRM188R71H104KA01D	Cap, 0.1µF/50V, 0603, X7R, 10%	muRata
C5, Cp	Open	Cap, 0603	TDK, muRata
C6, Cc	C1608C0G1H102J	Cap, 1nF/50V, 0603, X7R 10%	TDK
	GRM188R71H102KA01D		muRata
L	VLF10040T-4R7N5R4	Inductor, 4.7µH, 5.4A	TDK
R1	31.6k	Res, 31.6k, 0603, 1%	
R2	20k	Res, 20k, 0603, 1%	
R3	0	Res, 0, 0603	
R4	Open	Res, 0603, 5%	
R5, Rc	10k	Res, 10k, 0603, 5%	
U1	AOZ1020AI	IC, MAX 2A, SO8	AOS

Output voltage is set by R1: R1= R2 • (Vout – 0.8) / 0.8. Table 2 below shows the value of R1 at typical output voltages.

Table 2.

Vout (V)	R1 (kΩ)	R2 (kΩ)
0.8	1	Open
1	2.49	10
1.2	4.99	10
1.5	8.66	10
1.8	12.7	10
2.5	21.5	10
3.3	31.6	10
5	52.3	10

PCB Layout

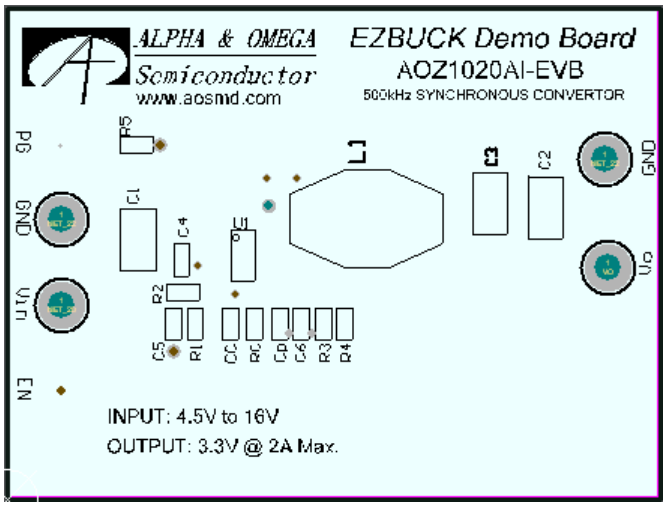

Figure 1. Top Silk Screen

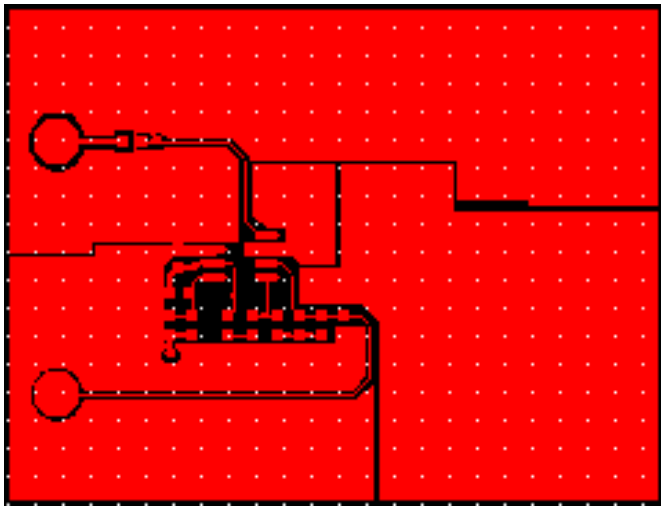

Figure 2. Top Layer

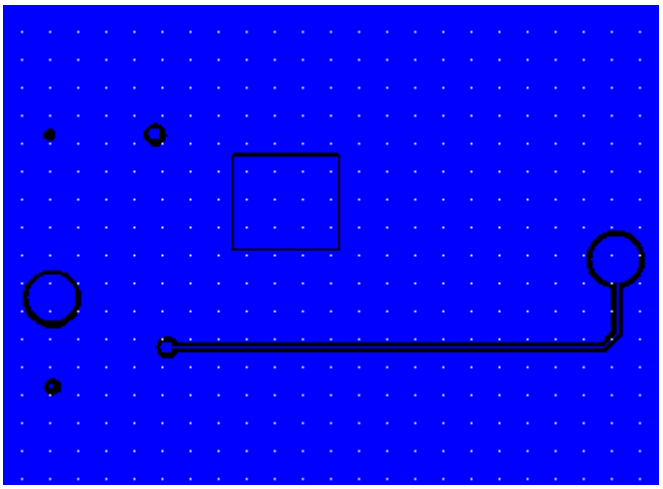

Figure 3. Bottom Layer

Quick Start Guide

1. Connect the terminals of load to Vout and GND port.
2. Connect the DC power supply to Vin and GND port. Set DC power supply voltage to between 4.5V and 16V.
3. EN pin is connected to Vin via a 0Ohm resistor in the demo board. If a separate enable signal is desired, connect EN pin to any voltage source between 2.0V and 16V.
4. Measure input voltage at the Vin and GND ports to eliminate the effect of voltage drop on the wire between DC power supply and evaluation board.
5. Measure output voltage at the Vout and GND ports to eliminate the effect of voltage drop on the wire between load and evaluation board.
6. Use an oscilloscope to monitor the input ripple voltage across input capacitor C1.
7. Use an oscilloscope to monitor the output ripple voltage across output capacitor C2.

Note:
When testing the ripple voltage, remove the cap of the voltage probe and touch the probe tip directly across the Vin or Vout and GND terminals, as shown in Figure 4.

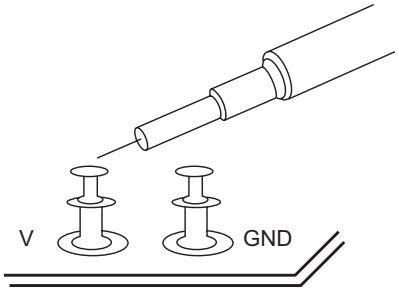

Figure 4. Voltage Ripple Test