

General Description

The AOZ1020 evaluation board is a fully assembled and tested circuit board built with the AOZ1020 buck regulator IC. It outputs a preset or adjustable voltage at up to 2A 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 0.8V to $V_{IN}-0.4V$.

The AOZ1020-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 AOZ1020 comes in SO-8 packages and is rated over a -40°C to $+85^{\circ}\text{C}$ ambient temperature range.

Features

- 4.5V to 16V operating input voltage range
- Output voltage is preset to 3.3V and adjustable down to 0.8V
- 2A 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

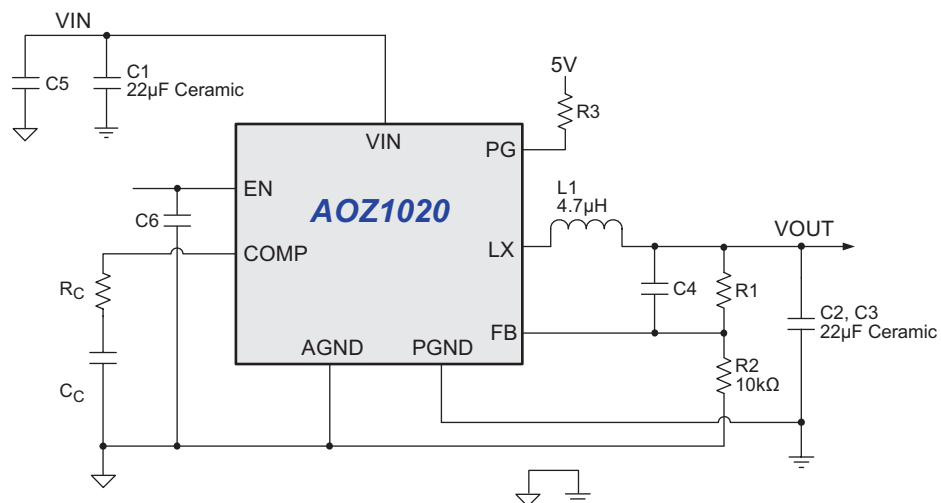


Figure 1.

Component List

Ref Designation	Value	Description	Manufacturer Part Number	Manufacturer
C1	22μF	Ceramic Cap, 22uF, 25V, 1210, X5R	GRM32ER61E226KE15L	Murata
C2	22μF	Ceramic Cap, 22uF, 25V, 1210, X5R	GRM32ER61E226KE15L	
C3	22μF	Ceramic Cap, 22uF, 25V, 1210, X5R	GRM32ER61E226KE15L	
C4	NU			
C5	1μF	Ceramic Cap, 1uF, 25V, 0603, X5R	GRM188R61E105KA12D	
C6	1000pF	Ceramic Cap, 1000pF, 50V, 0603, X7R	GRM188R71E102K	
Cc ⁽²⁾	2200pF	Ceramic Cap, 2200pF, 50V, 0603, X7R	GRM188R71E222K	
R _C ⁽²⁾	8.5kΩ	Thick Film Res, 1%, 31.6k, 0603	CRCW060385K5FKTAP	DALE
R1 ⁽¹⁾	31.6kΩ	Thick Film Res, 1%, 31.6k, 0603	CRCW060331K6FKTAP	
R2	10kΩ	Thick Film Res, 1%, 10k, 0603	CRCW060310K0FKTAP	
R3	10kΩ	Thick Film Res, 1%, 10k, 0603	CRCW060310K0FKTAP	
L1 ⁽²⁾	4.7μH	Inductor, 4.7uH, 2.9A	LQH55DN4R7M03	Murata
U1	AOZ1020AI	Buck regulator IC, 2A, 16V	AOZ1020AI	AOS

Notes:

- For evaluation board with different output voltage, these values might be different.
- Output voltage is set by R1; $R1 = \frac{8 + (10 \times V_O)}{0.8k\Omega}$. Table 1 shows that the value of R1 with typical output voltages.

Table 1.

V _o (V)	R1 (kΩ)
1.2	4.99
1.8	12.7
2.5	21.5
3.3	31.6
5.0	52.3

PCB Layout

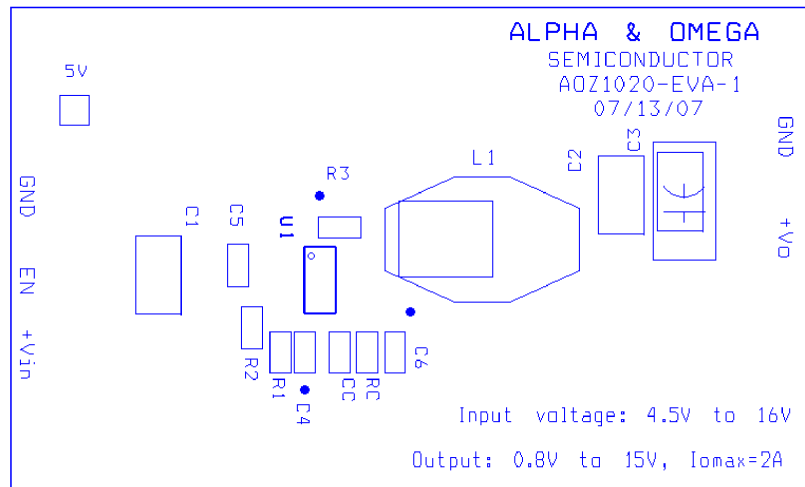


Figure 1. Top Silk Screen

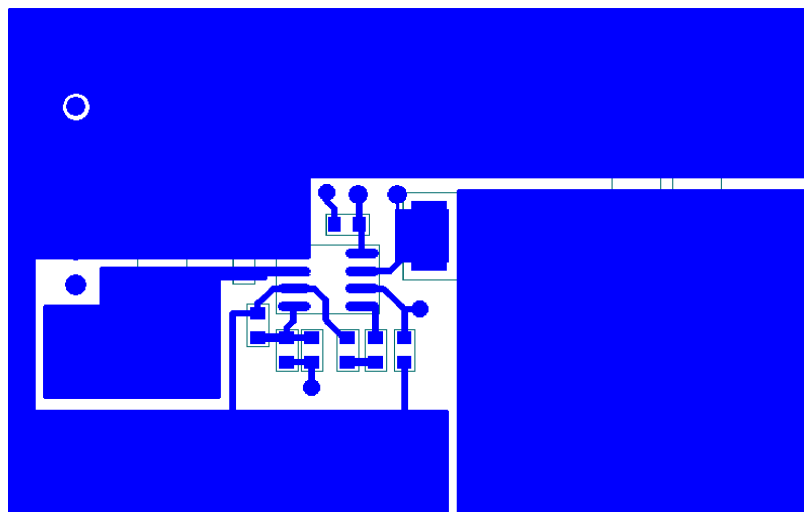


Figure 2. Top Layer

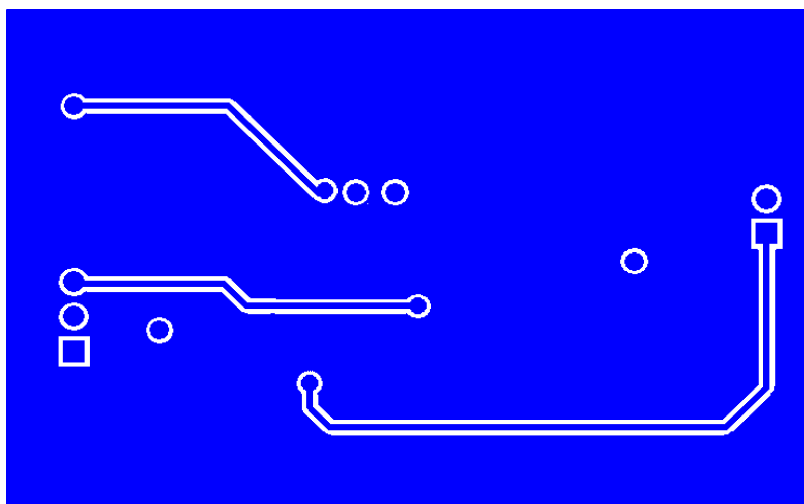


Figure 3. Bottom Layer

Quick Start Guide

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

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