



1.0 Design Specifications

Inputs	Outputs #1
VinMin=2.97	Vout1=-5.2
VinMax=5.5	Iout1=3.3

2.0 Design Description

The design uses a CUK topology with an LM3488 controller. LM3488 uses a fixed frequency (400KHz) PWM current mode control architecture. Peak current through external FETs Q1 and Q2 is sensed by the controller through an external sense resistor - Rsen.

CUK topology provides low input and output ripple due to the use of input and output inductors. Blocking capacitor C5 also provides capacitive isolation from input and output as well as protection from switch failure. CUK converter performs DC-DC conversion function similar to buck-boost converter. It can either increase or decrease the magnitude of the output voltage and provide inversion of output polarity.

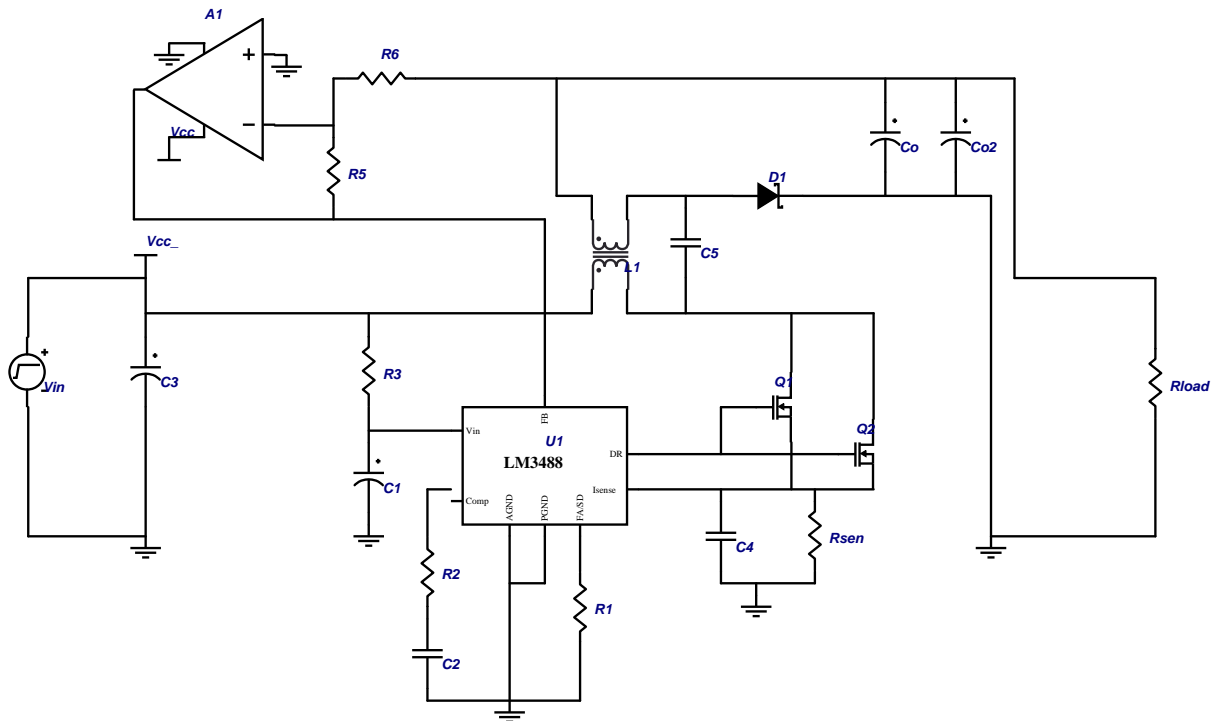
Theory of operation:

CUK converter operates via capacitive energy transfer. The capacitor C5 is connected to the input source through the input inductor L1 (coupled inductor) and stores the energy from the source. When switches Q1/Q2 are ON the stored energy in capacitor C5 is released to the output via output inductor L1 (coupled inductor).

Notes:

1. L1 is a coupled inductor.
2. Please note that the LM321 op-amp "A1" in the schematic is designated as "U" in the board layout.

3.0 Schematic



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FIGURE 1. Example Schematic Showing Connection for all Components.

4.0 Bill Of Materials

Part	Manufacturer	Part#	Attributes
A1	National Semiconductor	LM321	
C1	TDK	C2012X7R1H104K	0.1u F
C2	Vishay	VJ0805Y563KXXAT	56n F
C3	Sprague	595D227X06R3C2T	220u F, 0.18 Ohms
C4	Vishay	VJ0805A102KXAAT	1n F
C5	TDK	C3216X5R0J106	10u F
Co	Sprague	595D227X06R3C2T	220u F, 0.18 Ohms
Co2	Sprague	595D227X06R3C2T	220u F, 0.18 Ohms
D1	ONSEMI	MBRD1035CTL	
L1	Pulse	P0398	6u H, 93 Ohms
Q1	IR	IRLR3715	
Q2	IR	IRLR3715	
R1	Vishay	CRCW08054002FRT6	40k Ohms
R2	Vishay	CRCW08051801FRT6	1.8k Ohms
R3	Vishay	CRCW080520R0FRT6	20 Ohms
R5	Vishay	CRCW08051262FRT6	12.6k Ohms
R6	Vishay	CRCW08055202FRT6	52k Ohms
Rsen	Vishay	WSL1206 .01 1% R86	0.01 Ohms
U1	National Semiconductor	LM3488	

5.0 Layout

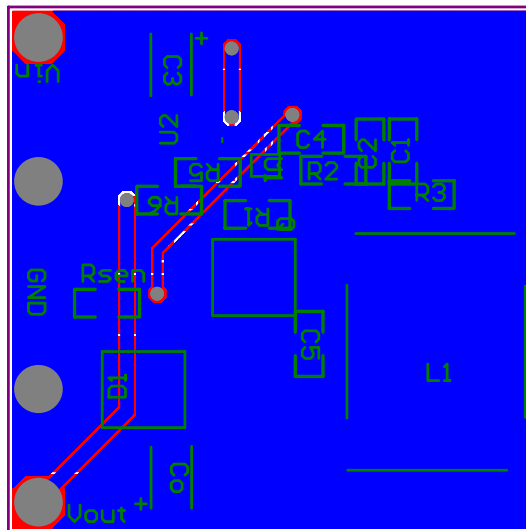


FIGURE 2. Board's Bottom View

PADC_NSC0060_lo_1

Notes

Notes

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