

## FEATURES

Small Size  
Low Cost

## DESCRIPTION

This application note describes a SEPIC-Cuk converter used to create a dual rail output from a single input voltage. A SEPIC-Cuk converter uses a SEPIC and a Cuk converter both tied to the same switch node to create the two separate output rails. In this design, two readily available coupled inductors are used, though a custom three winding transformer would also work. This design utilizes a cascoded FET (Q1) on the switch node. This technique allows the use of an inexpensive low voltage regulator chip (ADP1613) to control a higher voltage converter. In addition it results in very low switching loss, that is offset somewhat by the conduction loss in the cascoded FET.

**Table 1. Specifications**

<i>Spec</i>	<i>Units</i>	
Vout1	+15V	Volts
Vout2	-15V	Volts
Iout1	0.08	Amps
Iout2	0.020	Amps
Tamb	55	degC
Vinmin	24	Volts
Vinmax	24	Volts

### Rev. 0

Reference designs are as supplied "as is" and without warranties of any kind, express, implied, or statutory including, but not limited to, any implied warranty of merchantability or fitness for a particular purpose. No license is granted by implication or otherwise under any patents or other intellectual property by application or use of reference designs. Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Analog Devices reserves the right to change devices or specifications at any time without notice. Trademarks and registered trademarks are the property of their respective owners. Reference designs are not authorized to be used in life support devices or systems.

## TABLE OF CONTENTS

Features .....1  
Description .....1  
Revision History .....2  
Schematic .....3  
Bill of Materials.....3  
Graphs .....5

## TABLE OF FIGURES

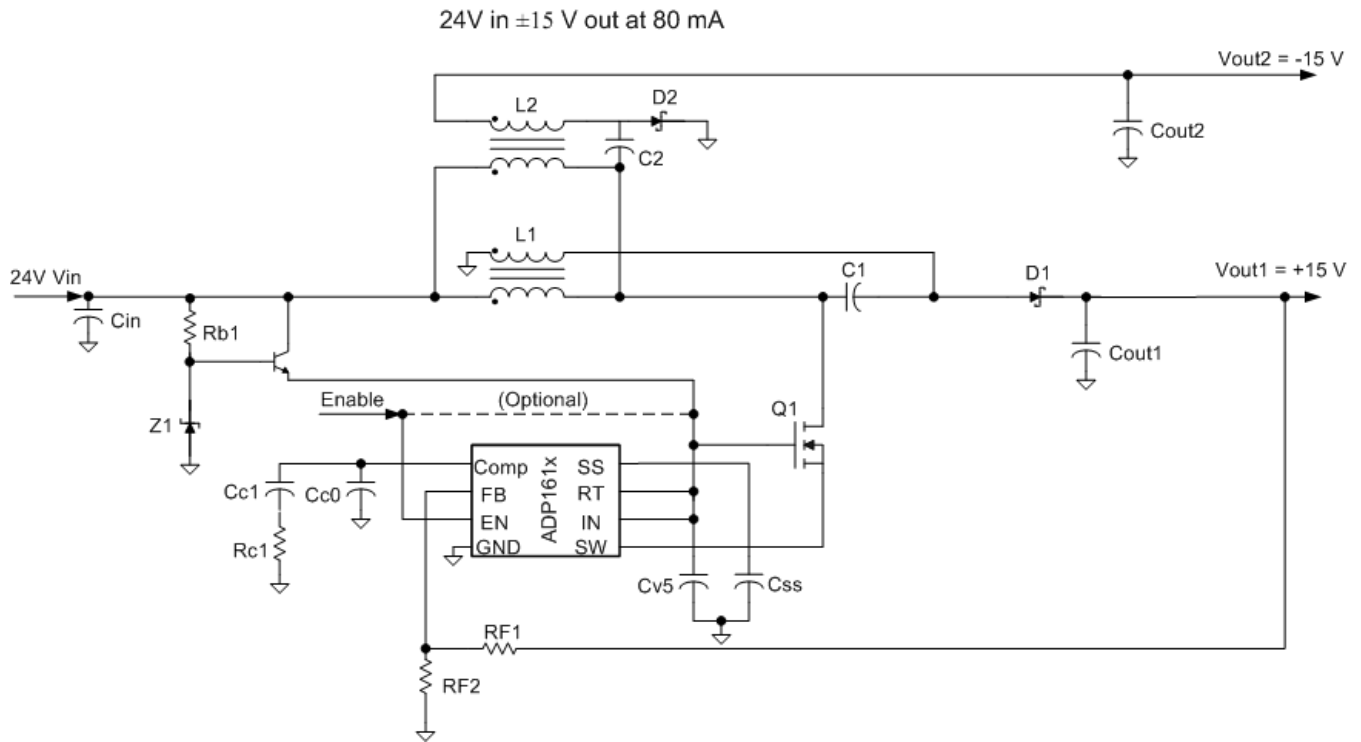
Figure 1. Schematic.....3  
Figure 2. Bode Plot (Full Load both channels) .....5

## REVISION HISTORY

2/17/2010—Revision 1: Initial Version

## SCHEMATIC

Figure 1. Schematic



## BILL OF MATERIALS

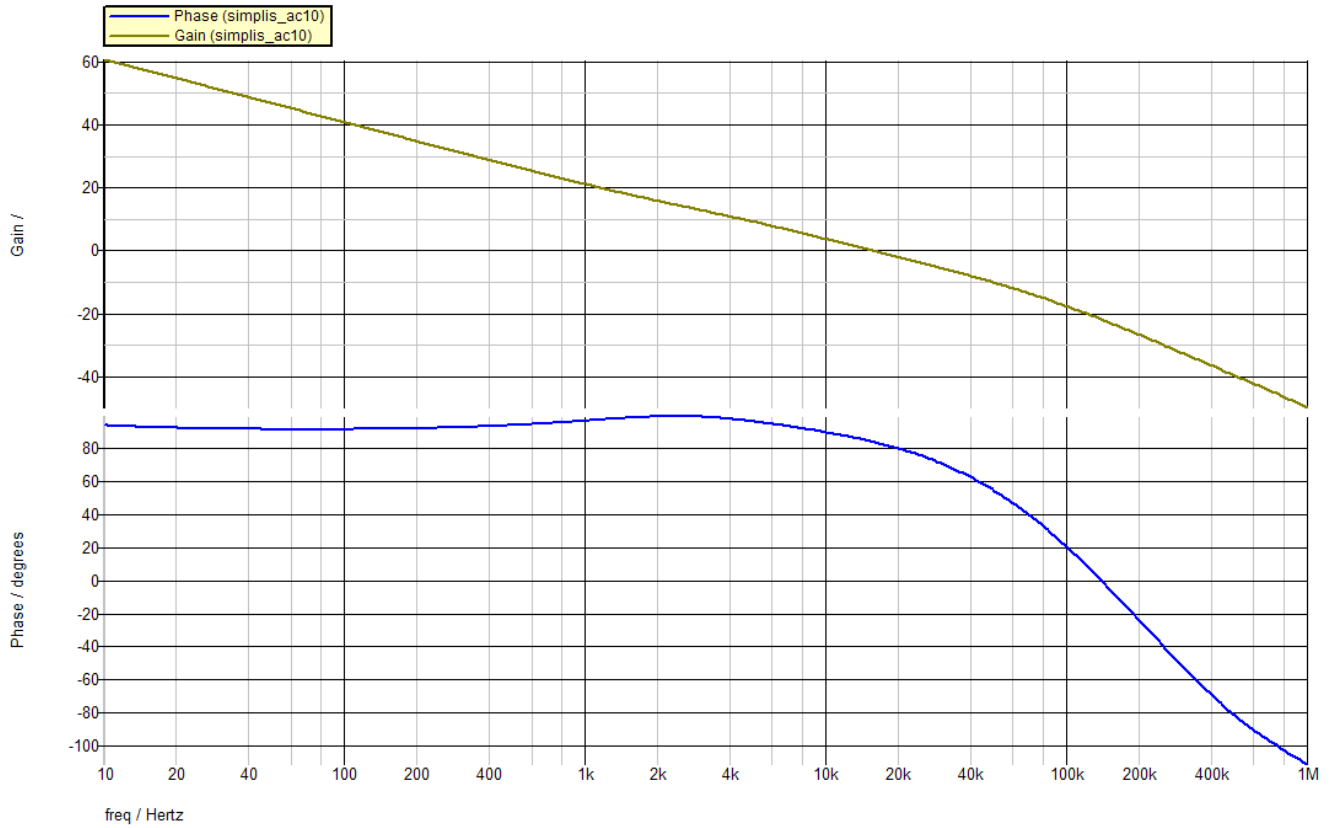
Table 2. Bill of Materials

U1	ADI	Integrated Switching Regulator	ADP1613ARMZ	MSOP-8	1	14.7	1.1	0.700
L1	Coilcraft	82uH, 3410mΩ, 0.3Apk	LPD4012-823	4mm x 4mm x 1.2mm	1	16.1	1.2	0.600
L2	Coilcraft	82uH, 3410mΩ, 0.3Apk	LPD4012-823	4mm x 4mm x 1.2mm	1	16.1	1.2	0.600
Q1	Vishay	128 mΩ, 2.9 Vth, 60 V	Si3458BDV	SOT23-6	1	9.3	1.1	0.700
D1	ON Semi	2 A, 100 V	MBR51100T3G	SMB	1	21.3	2.4	0.100

U1	ADI	<i>Integrated Switching Regulator</i>	ADP1613ARMZ	MSOP-8	1	14.7	1.1	0.700
D2	ON Semi	2 A, 100 V	MBRS1100T3G	SMB	1	21.3	2.4	0.100
Cout1	Taiyo Yuden	1uF, 25V, 11mΩ	TMK107 BJ105MA-T	0603	1	1.3	0.8	0.009
Cout2	Taiyo Yuden	1uF, 25V, 11mΩ	TMK107 BJ105MA-T	0603	1	1.3	0.8	0.009
Cin1	Murata	0.1uF, 100V, 40mΩ	GRM188R72A104	0603	1	1.3	0.8	0.031
C1	Murata	0.1uF, 100V, 40mΩ	GRM188R72A104	0603	1	1.3	0.8	0.031
C2	Murata	0.1uF, 100V, 40mΩ	GRM188R72A104	0603	1	1.3	0.8	0.031
Rc1	Vishay	5% tolerance	2.61 kOhms	0805	1	2.5	0.5	0.005
Cc1	Vishay	10% tolerance	27 nF	0805	1	2.5	0.5	0.010
Cc2	Vishay	10% tolerance	150 pF	0805	1	2.5	0.5	0.010
Rf1B	Vishay	47.5 kOhms	1% tolerance	0805	1	2.5	0.5	0.005
Rf2	Vishay	4.22 kOhms	1% tolerance	0805	1	2.5	0.5	0.005
Cv5	Murata	1uF,10V,X5R	GRM188R61A105K	0603	1	1.3	0.6	0.010
Css	Vishay	10% tolerance	10 nF	0805	1	2.5	0.5	0.010
Z2	Diodes Inc.	5.1V, 500 mW Zener	DDZ9690	SOD-123	1	2.5	1.1	0.026
Rb1	Vishay	95.3 kOhms	5% tolerance	0805	1	2.5	0.5	0.005
Q2	On Semi	40V,NPN,300mW	MMBT3904LT1G	SOT-23	1	7.4	1.11	0.020
<b>Totals</b>					21	134.0	max=2.4	3.02

# GRAPHS

Figure 2. Bode Plot (Full Load both channels)



## NOTES