±15 Vout from 24 Vin at 80 mA

Reference Design **PRD1210**

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. Sepcifications

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

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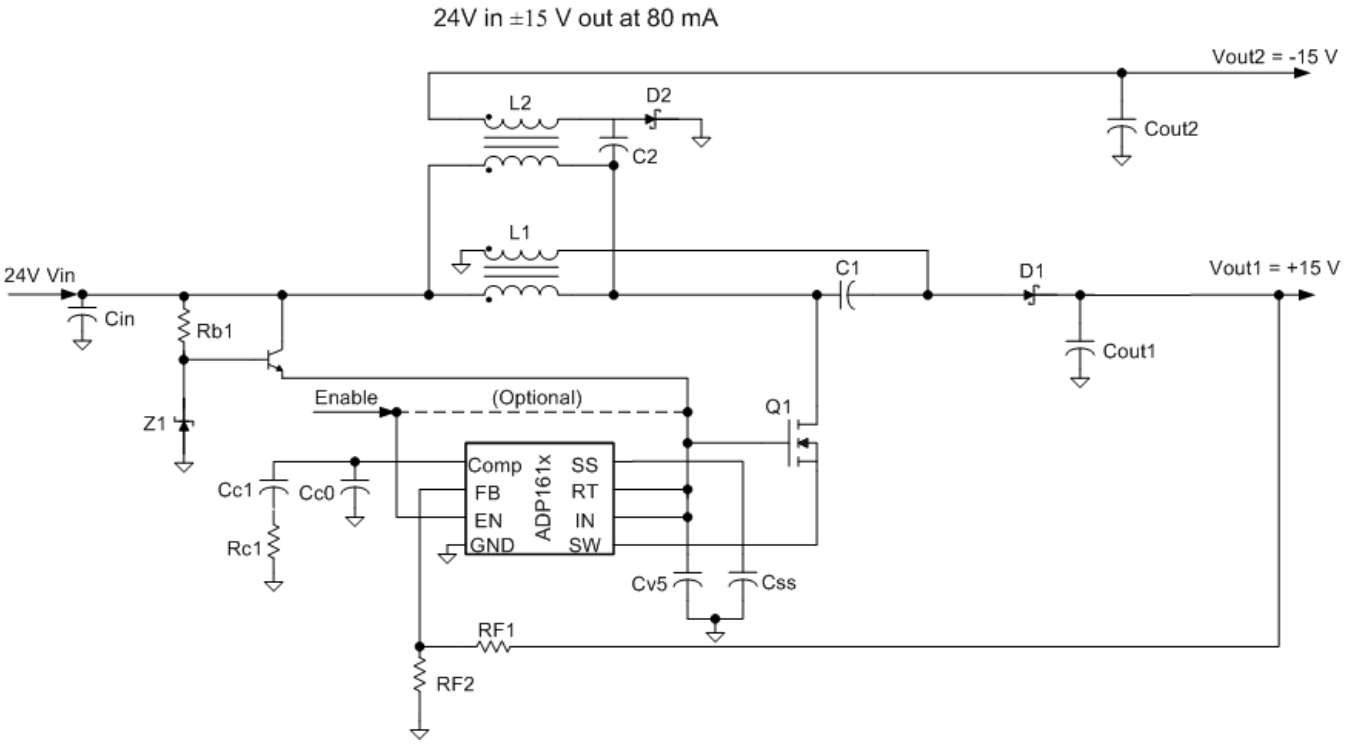
REVISION HISTORY

2/17/2010—Revision 1: Initial Version

SCHEMATIC

Figure 1. Schematic



BILL OF MATERIALS

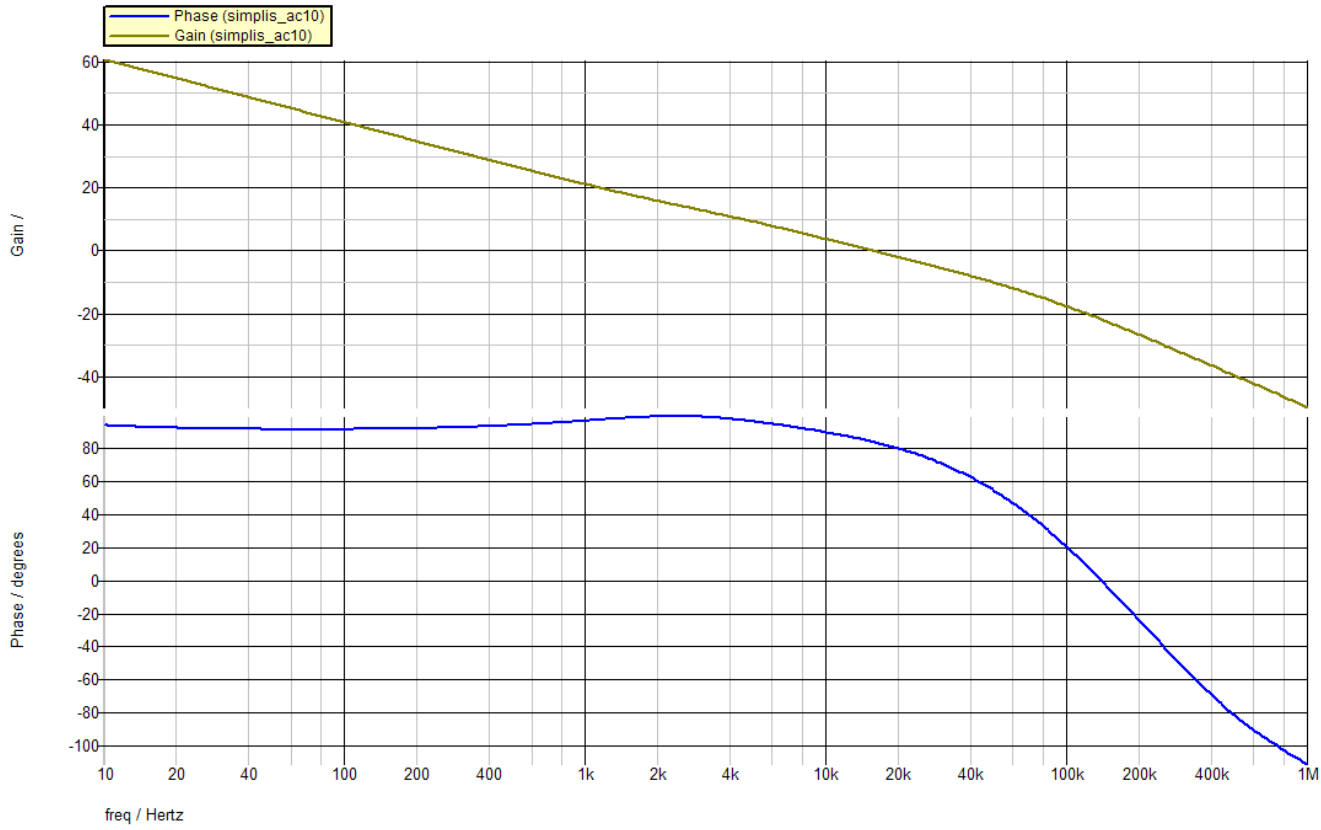
Table 2. Bill of Materials

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	MBRS1100T3G	SMB	1	21.3	2.4	0.100

U1	***ADI***	***Integrated Switching Regulator***	***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
				Totals	21	**134.0**	**max=2.4**	**3.02**

GRAPHS

Figure 2. Bode Plot (Full Load both channels)



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