

FEATURES

Low cost
Small Size
Simulation results demonstrating stability
Reasonable Efficiency

DESCRIPTION

This design uses a boost converter with quadrupler charge pump. It utilizes an innovative 4 stage charge pump to increase the output voltage of the boost stage by a factor of 4. This enables the use of many parts not rated to the full output voltage. In addition, a cascoded FET (Q1) is used to increase the voltage capability of the ADP1613. This enable us to use a very inexpensive integrated FET boost controller.

Table 1. Basic Specifications

<i>Spec</i>	<i>Value</i>	<i>Units</i>
Vout	200V	Volts
Iout	0.002	Amps
Tamb	55	degC
Vinmin	3.3	Volts
Vinmax	3.3	Volts

Table 2. Simulation results

<i>Spec</i>	<i>Value</i>	<i>Units</i>
Vout ripple max	0.043	Volts
Ioutstep	0.001	Apk
Vout step error	0.279	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

Features1
Description1
Revision History.....2
Schematic3
Bill of Materials.....3
Graphs4

TABLE OF FIGURES

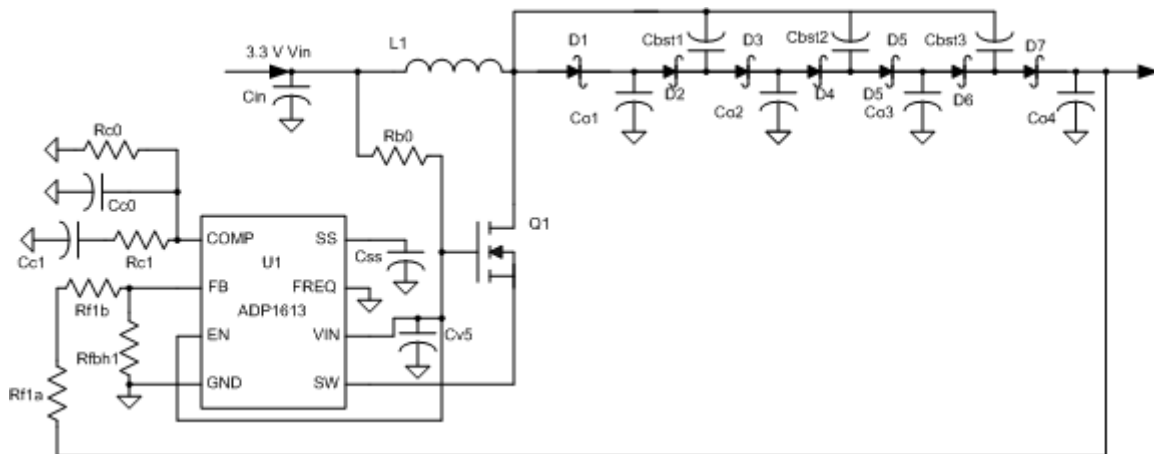
Figure 1. Boost Converter with Quadrupler Charge Pump Topology3
Figure 2. Bode Plot4
Figure 3. Vout Transient Response.....5

REVISION HISTORY

- 11/09/2009—Revision 1: Initial Version
- 11/20/2009—Revision 2: Corrected Schematic

SCHEMATIC

Figure 1. Boost Converter with Quadrupler Charge Pump Topology



BILL OF MATERIALS

Table 3. Bill of Materials

Des	MFG	Part Number	Component Specs	Pkg	Qty	Area (mm ²)	Cost*
U1	ADI	ADP1613ARMZ-R7	Integrated Switching Regulator	MSOP-8	1	14.70	\$0.700
L1	Coilcraft	ME3220-332	3.3uH, 138mOhms, 1.7 Apk	3mm x 3mm x 2mm	1	8.00	\$0.230
D1	Diodes Inc.	1N4148W	150mA ,100V	SOD123	1	6.5	\$0.060
D2	Diodes Inc.	1N4148W	150mA ,100V	SOD123	1	6.5	\$0.060
D3	Diodes Inc.	1N4148W	150mA ,100V	SOD123	1	6.5	\$0.060
D4	Diodes Inc.	1N4148W	150mA ,100V	SOD123	1	6.5	\$0.060
D5	Diodes Inc.	1N4148W	150mA ,100V	SOD123	1	6.5	\$0.060
D6	Diodes Inc.	1N4148W	150mA ,100V	SOD123	1	6.5	\$0.060
D7	Diodes Inc.	1N4148W	150mA ,100V	SOD123	1	6.5	\$0.060
Co1	Murata	GRM188R72A104K	0.1uF, 100V, 0603, X7R	0603	1	1.28	\$0.031
Co2	TDK	C3216X7R2E104K	0.1uF, 250V, 1206, X7R	1206	1	5.1	\$0.063
Co3	TDK	C3216X7R2E104K	0.1uF, 250V, 1206, X7R	1206	1	5.1	\$0.063
Co4	TDK	C3216X7R2E104K	0.1uF, 250V, 1206, X7R	1206	1	5.1	\$0.063
Cbst1	Murata	GRM188R72A104K	0.1uF, 100V, 0603, X7R	0603	1	1.28	\$0.031
Cbst2	Murata	GRM188R72A104K	0.1uF, 100V, 0603, X7R	0603	1	1.28	\$0.031
Cbst3	Murata	GRM188R72A104K	0.1uF, 100V, 0603, X7R	0603	1	1.28	\$0.031

Des	MFG	Part Number	Component Specs	Pkg	Qty	Area (mm ²)	Cost*
Cin	Taiyo Yuden	LMK212 B7105MG-T	1uF, 10V, 805, X7R	0805	1	2.50	\$0.012
Q1	On Semi	NTF3055L108	120 mΩ, 2 Vth,60 V	SOT223	1	50.0	0.187
Cv5	Murata	GRM188R61A105K	1uF,10V,X5R	0603	1	1.30	\$0.010
Css	Vishay	10% tolerance	100 nF	0402	1	0.70	\$0.005
Rc1	Vishay	5% tolerance	200 kohm	0402	1	0.70	\$0.005
Cc1	Vishay	10% tolerance	1.2 nF	0402	1	0.70	\$0.005
Cc0	Vishay	10% tolerance	10 pF	0402	1	0.70	\$0.005
Rf1a	Vishay	1% tolerance	402 kohm	0805	1	0.70	\$0.005
Rf1b	Vishay	1% tolerance	422 kohm	0805	1	0.70	\$0.005
Rf2	Vishay	1% tolerance	5.11 kohm	0402	1	0.70	\$0.005
Rb0	Vishay	5% tolerance	1 Ohm	0402	1	0.70	\$0.005
Totals					27	148.0	1.91

GRAPHS

Figure 2. Bode Plot

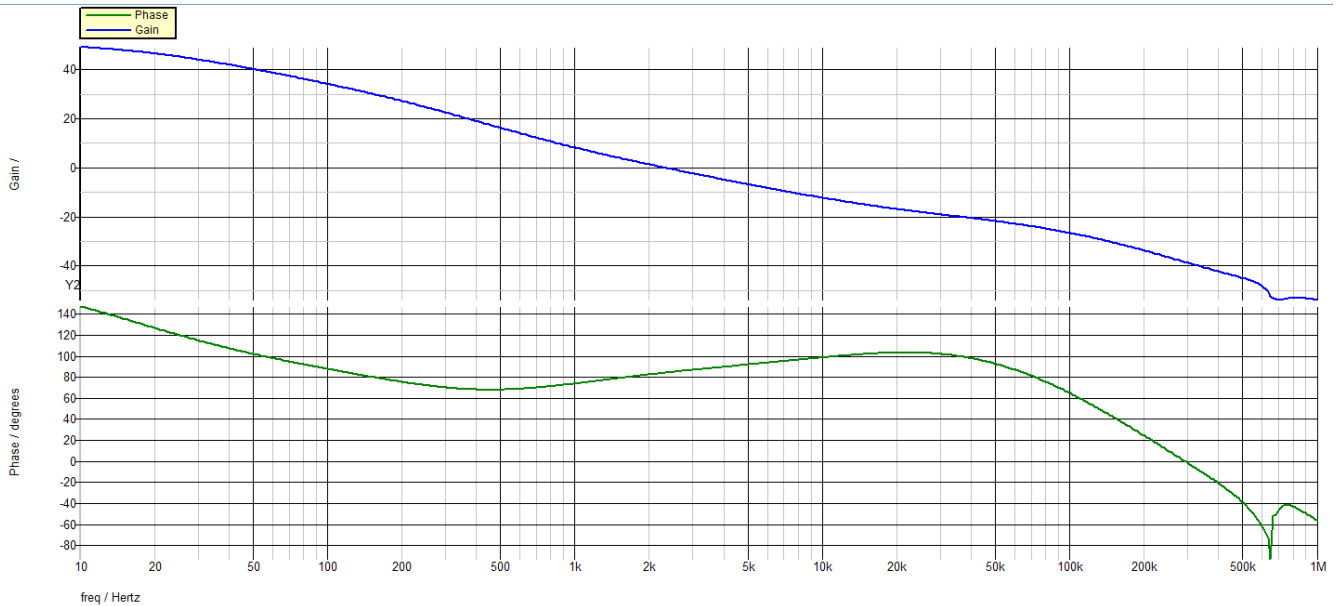
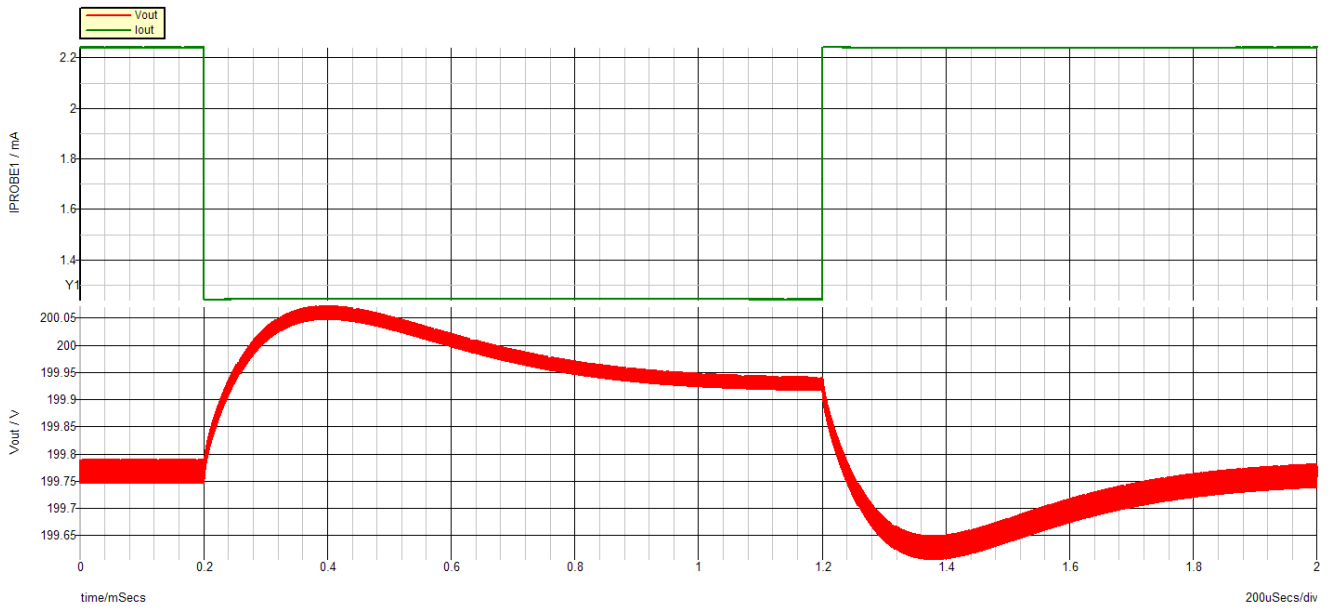


Figure 3. *Vout Transient Response*



NOTES