

FEATURES**Three Output Voltages: 1.24 V, 3.3 V, 5 V****Output Current: 2 A to 4 A****Input voltage: 10.8-13.2 V****Ripple 2% ppk of Output Voltage****Transient step $\pm 5\%$, 50% max load****ADP1829, ADP1864 REFERENCE DESIGN DESCRIPTION**

This ADP1829, ADP1864 Reference Design uses 10.8 V to 13.2 V for the input voltage. The output voltages and currents are as follows:

- $V_{OUT1} = 1.24 \text{ V}$ with a maximum output current of 4.0 A,
- $V_{OUT2} = 3.3 \text{ V}$ with a maximum output current of 2.0 A,
- $V_{OUT3} = 5.0 \text{ V}$ with a maximum output current of 2.0 A,

The design criterion is for lowest cost solution. The ripple and transient assumptions are 2% peak to peak voltage ripple and 5% deviation due to 50% instantaneous load step. The switching frequency is fixed at 600 kHz for V_{OUT1} , V_{OUT2} and V_{OUT3}

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.

One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106,
U.S.A.

Tel: 781.329.4700

Fax: 781.461.3113

www.analog.com

©2007 Analog Devices, Inc. All rights reserved.

TABLE OF CONTENTS

Features.....	1
ADP1829, ADP1864 Reference Design Description	1
Revision History.....	2
General Description	3
ADP1829.....	3
ADP1864.....	3
Schematic	4
Bill of Materials	5

TABLE OF FIGURES

Figure 1. Schematic 1.24 V @ 4.0 A, 3.3 V @ 2.0 A	4
Figure 2. Schematic 5.0 V @ 2.0 A	4

REVISION HISTORY

8/10/2007—Revision 0: Initial Version

GENERAL DESCRIPTION

ADP1829

The ADP1829 is a versatile, dual output, interleaved, synchronous PWM buck controller that generates two independent outputs from an input voltage of 2.9 V to 20 V. Each channel can be configured to provide output voltage from 0.6V to 85% of the input voltage. The two channels operate 180° out of phase, which reduces the current stress on the input capacitor and allows the use of a smaller and lower cost input capacitor.

The ADP1829 operates at a pin-selectable fixed switching frequency of either 300 kHz or 600 kHz. For some noise sensitive applications, it can also be synchronized to an external clock to achieve switching frequency between 300 kHz and 1 MHz. The switching frequency chosen is 300 kHz to get good efficiency over a wide range of input and output conditions.

The ADP1829 includes an adjustable soft start to limit input inrush current, voltage tracking for sequencing or DDR termination, independent power-good output, and a power enable pin. It also provides current-limit and short-circuit protection by sensing the voltage on the synchronous MOSFET.

ADP1864

The ADP1864 is a compact, inexpensive, constant-frequency current-mode step-down dc-to-dc controller. The ADP1864 drives a P-channel MOSFET that regulates an output voltage as low as 0.8 V with $\pm 2\%$ accuracy, for up to 10 A load currents, from input voltages as high as 14 V.

The ADP1864 provides system flexibility by allowing accurate setting of the current limit with an external resistor, and the output voltage is easily adjustable using two external resistors. The ADP1864 includes an internal soft start to allow quick power-up while preventing input inrush current. Additional safety features include short-circuit protection, output overvoltage protection, and input undervoltage protection. Current-mode control provides fast and stable load transient performance, while the 580 kHz operating frequency allows a small inductor to be used in the system. To further the life of a battery source, the controller turns on the external P-channel MOSFET 100% of the duty cycle during dropout.

SCHEMATIC

3.3V at 2.0A and 1.24V at 4.0A

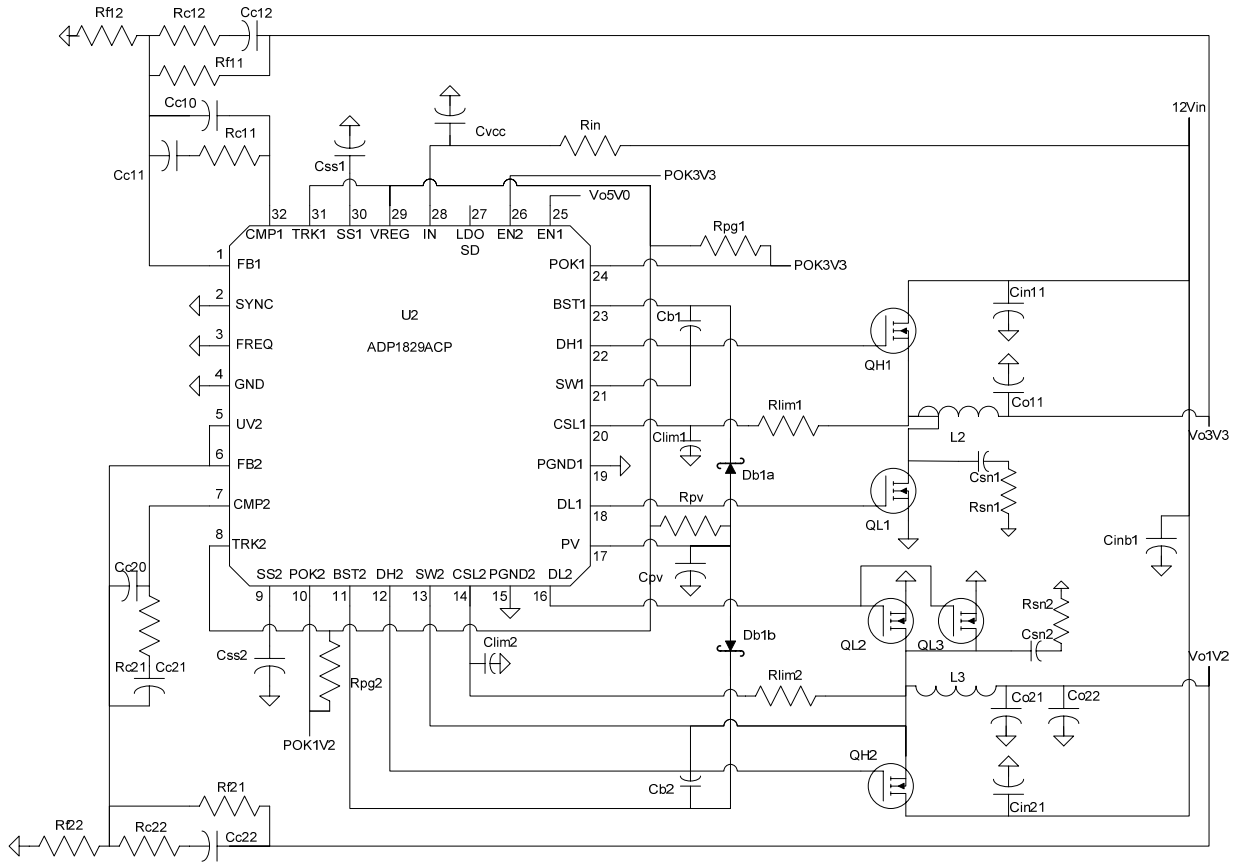


Figure 1. Schematic 1.24V @ 4.0A, 3.3V @ 2.0A

5.0V at 2A

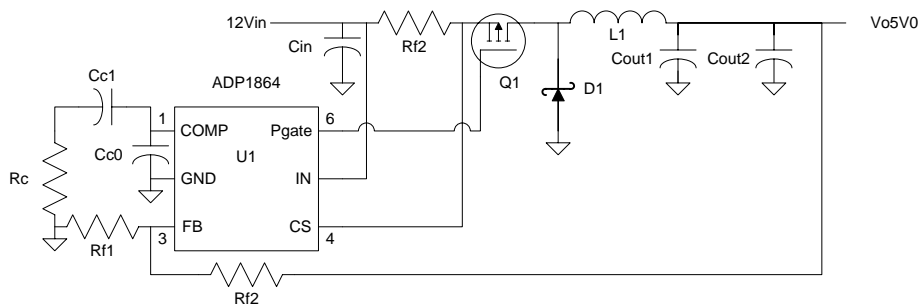


Figure 2. Schematic 5.0V @ 2.0A

BILL OF MATERIALS

Table 1. Vout1, and Vout2 Bill of Materials (1.2 V and 1.8 V)

Description	Designator	Qty	Manufacturer	MFR#
Cap Ceramic C0G 10p 0402 50V	Cc0	1	Vishay	Generic
Cap Ceramic C0G 150p 0402 50V	Cc1	1	Vishay	Generic
Cap Ceramic C0G 22p 0402 50V	Cc10, Cc20	2	Vishay	Generic
Cap Ceramic X7R 1u 0603 16V	Cvcc, Cpv	2	Murata	GRM188R71C105KA12D
Cap Ceramic X7R 47n 0402 10V	Css1	1	Vishay	Generic
Cap Ceramic X5R 4.7u 1206 16V	Cin1, Cin11, Cin21	3	Murata	grm31cr61c475k
Cap Ceramic X5R 22u 1206 6.3V	Co11, Co21, Co22	3	TDK	C3216X5R0J226M
Cap Ceramic X5R 22u 1210 10V	Cout1, Cout2	2	TDK	C3225X5R1A226M
Cap Ceramic X7R 100n 0402 16V	Cb1, Cb2	2	Murata	GRM155R71C104KA88D
Cap Ceramic C0G 33p 0402 50V	Clim1, Clim2	2	Vishay	Generic
Cap Ceramic X7R 15n 0402 16V	Css2	1	Vishay	Generic
Cap ALPOLY 125°C 180uF 10mm x 7.7mm 16V	Cinb1	1	Nippon	APXH160ARA181MJ80G
Cap Ceramic COG 560p 0402 50V	Cc12, Cc21	2	Vishay	Generic
Cap Ceramic X7R 1.0n 0402 50V	Cc11	1	Vishay	Generic
Cap Ceramic COG 390p 0402 50V	Cc22	1	Vishay	Generic
Diode Schottky 3A SMC 15V	D1	1	IR/Vishay	30BQ015
Diode Dual Schottky 200mA SOT-323 30V	Db1	1	Diodes inc	BAT54AW
Inductor Ferrite 7.0uH 10.2mm x 10mm	L1, L2	2	Coilcraft	MSS1038-702
Inductor Ferrite 1.5uH 10.2mm x 10mm	L3	1	Coilcraft	MSS1038-152
Single N-Channel MOSFET SOT-6 30V	QH1, QH2, QL1, QL2, QL3	5	Vishay	Si3456BDV
Single P-Channel MOSFET SOT-6 -30V	Q1	1	Vishay	Si3457BDV
Res 5% Thin Film 33 mOhms 0805	Rcl	1	Susumu	RL1220T-R033-J
Res 5% Thick Film 10 Ohms 0402	Rin, Rpv	2	Vishay	Generic
Res 1% Thick Film 10.0k 0402	Rpg1, Rpg2	2	Vishay	Generic
Res 1% Thick Film 20.0k 0402	Rf11, Rf21	2	Vishay	Generic
Res 1% Thick Film 4.02k 0402	Rlim1	1	Vishay	Generic
Res 1% Thick Film 4.12k 0402	Rlim2	1	Vishay	Generic
Res 1% Thick Film 78.7k 0402	Rc	1	Vishay	Generic
Res 1% Thick Film 4.42k 0402	Rf12	1	Vishay	Generic
Res 1% Thick Film 18.7k 0402	Rf22	1	Vishay	Generic
Res 1% Thick Film 100k 0402	Rf1	1	Vishay	Generic
Res 1% Thick Film 523k 0402	Rf2	1	Vishay	Generic
Res 1% Thick Film 10.7k 0402	Rc11	1	Vishay	Generic
Res 1% Thick Film 93.1 Ohms 0402	Rc12	1	Vishay	Generic
Res 1% Thick Film 13.7k 0402	Rc21	1	Vishay	Generic
Res 1% Thick Film 162 Ohms 0402	Rc22	1	Vishay	Generic
1 chan 580k PWM TSOT-6	U1	1	Analog	ADP1864AUJZ
2 chan 300k to 600k PWM LFCSP-32	U2	1	Analog	ADP1829ACPZ
No Stuff	Csn1, Csn2, Rsn1, Rsn2	4		

NOTES