



ADP1829 and ADP1715 Reference Design

Preliminary Technical Data

FCDC 00058

FEATURES

Five Output Voltages: 5.0 V, 3.3 V, 3.3 V low noise, 2.5 V, 1.3 V

Output Current: 0.005 A to 1.65 A

Input voltage: 8-16 V

Ripple 2% ppk of Output Voltage

Transient step $\pm 5\%$, 50% max load

ADP1829 AND ADP1715 REFERENCE DESIGN DESCRIPTION

This ADP1829 and ADP1715 Reference Design uses 8.0 V to 16.0 V for the input voltage. The output voltages and currents are as follows:

- $V_{OUT1} = 5.0$ V with a maximum output current of 1.65 A,
- $V_{OUT2} = 3.3$ V with a maximum output current of 1.3 A,
- $V_{OUT3} = 3.3$ V with a maximum output current of 0.35 A (low noise),
- $V_{OUT4} = 2.5$ V with a maximum output current of 0.005 A (low noise),
- $V_{OUT5} = 1.3$ V with a maximum output current of 0.3 A (low noise).

The ripple and transient assumptions are 2% peak to peak voltage ripple (for the switchers) and 5% deviation due to 50% instantaneous load step respectively. The nominal switching frequency is fixed at 300 kHz for V_{OUT1} and V_{OUT2} . All other outputs are filtered, or linear regulated out of the switching rails.

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 and ADP1715 Reference Design Description..... 1
Revision History..... 2
General Description 3
 ADP1829..... 3
 ADP171X..... 3
 ADP5041..... 3
Schematic 4
Bill of Materials 5

TABLE OF FIGURES

Figure 1. Schematic: V_{OUT1} , V_{OUT2} , V_{OUT3} , V_{OUT4} and V_{OUT5} 4

REVISION HISTORY

9/10/2007—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.

ADP171X

The ADP171X is a family of low drop out CMOS linear regulators that provides versatile and inexpensive step-down voltage regulation. The input voltage range is 2.5 V to 5.5 V and the output current capability is up to 500 mA. The various versions provide features such as Enable, Soft Start, Low Noise Bypass and Tracking. They are available in space saving TSOT-5 and MSOP-8 packages and operate over the -40°C to +125°C temperature range.

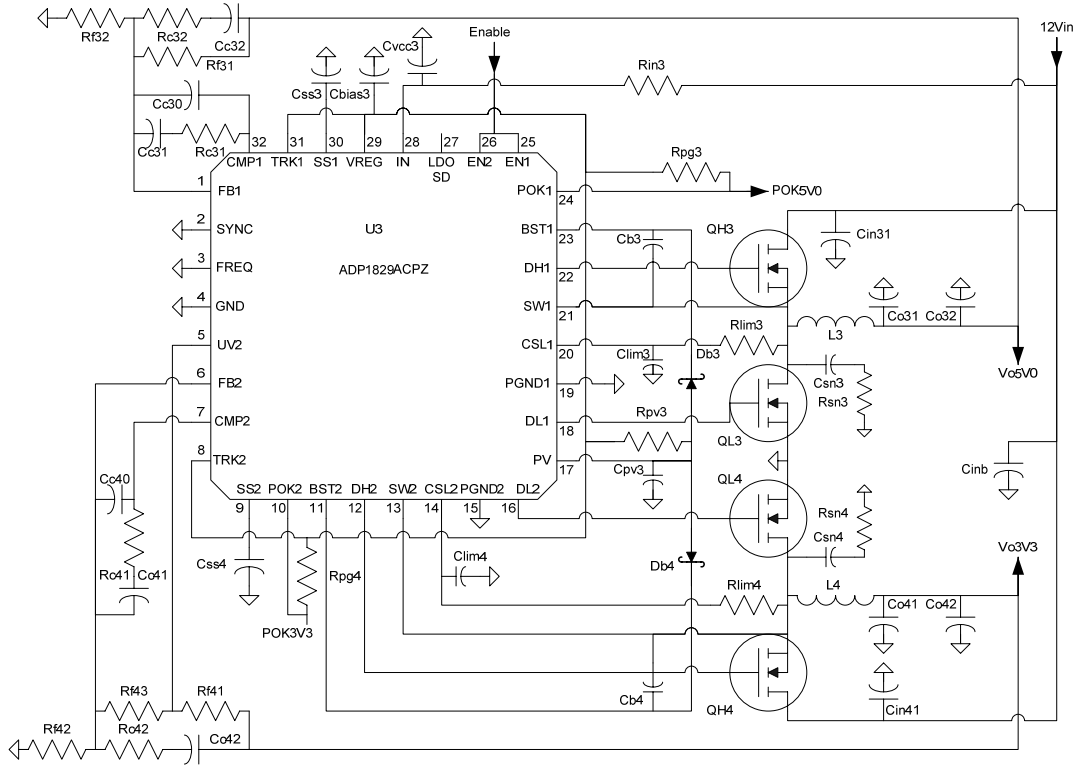
ADP5041

The ADP5041 is a low cost, 2-terminal (shunt), precision voltage reference. It provides an accurate 2.5 V output for input currents between 60 μ A and 15 mA.

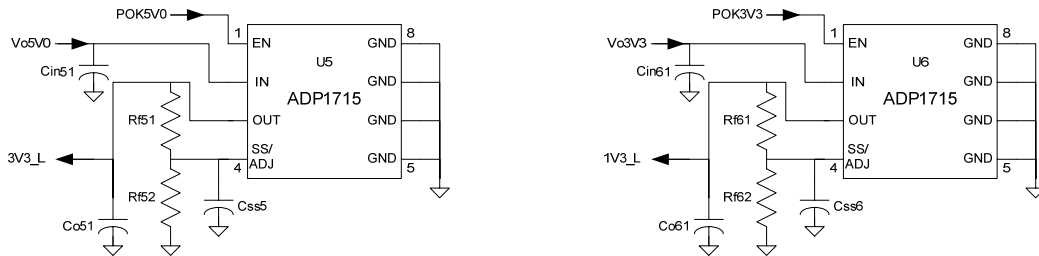
The ADP5041 is available in two grades, A and B, both of which are available in either the SOT-23 or the SC-70 package. Both grades are specified over the extended industrial temperature range of -40°C to +125°C. The ADP5041 is pin compatible with the LM4040 and LM4050.

SCHEMATIC

5.0V at 1.65A (0.35A for linear) and 3.3V at 1.3A (0.3A for linear)



3.3V at 0.35A and 1.3V at 0.3A



2.5V at 5mA Low Noise

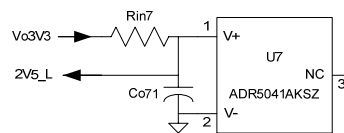


Figure 1. Schematic: V_{OUT1} , V_{OUT2} , V_{OUT3} , V_{OUT4} and V_{OUT5}

BILL OF MATERIALS

Table 1. Vout1, Vout2, Vout3, Vout4, and Vout5 Bill of Materials (Vo5V0, Vo3V3, 3V3_L, 2V5_L and 1V3_L)

Description	Designator	Quantity	Manufacturer	MFR#
Capacitor Ceramic COG 68p 0603 50V	Cc30	1	Vishay	Generic
Capacitor Ceramic X7R 1.8n 0603 50V	Cc31	1	Vishay	Generic
Capacitor Ceramic COG 680p 0603 50V	Cc32	1	Vishay	Generic
Capacitor Ceramic COG 56p 0603 50V	Cc40	1	Vishay	Generic
Capacitor Ceramic X7R 1.5n 0603 50V	Cc41, Co71	2	Vishay	Generic
Capacitor Ceramic COG 820p 0603 50V	Cc42	1	Vishay	Generic
Capacitor Ceramic X7R 1u 0603 25V	Cvcc3	1	Murata	GRM188R71E105KA12D
Capacitor Ceramic X7R 1u 0603 16V	Cbias3, Cpv3	2	Murata	GRM188R71C105KA12D
Capacitor Ceramic X7R 22n 0603 16V	Css3, Css4	2	Vishay	Generic
Capacitor Ceramic X7R 10n 0603 50V	Css5, Css6	2	Vishay	Generic
Capacitor Ceramic X5R 10u 1206 25V	Cin31, Cin41	2	Murata	grm31cr61e106k
Capacitor Ceramic X5R 2.2u 0805 16V	Cin51, Co51, Cin61, Co61	4	Murata	GRM21BR61C225KA88L
Capacitor Ceramic X7R 100n 0603 16V	Cb3, Cb4	2	Vishay	Generic
Capacitor Ceramic COG 33p 0603 50V	Clim3, Clim4	2	Vishay	Generic
Capacitor Ceramic X5R 10u 1210 10V	Co31, Co41	2	Murata	grm32er61a106k
Capacitor Al Poly 105C 82u 10mm x 7.7mm 20V	Cinb	1	Nippon Chemi-con	APXA200ARA820MJ80G
Diode Schottky 200mA SOD-323 30V	Db3, Db4	2	Diodes inc	BAT54WS
Inductor Ferrite 15.0uH 7.6mm x 7.6mm	L3	1	Cooper	DR74-150-R
Inductor Ferrite 22uH 7.6mm x 7.6mm	L4	1	Cooper	DR74-220-R
Single N-Channel MOSFET SOT23-6 30V	QH3, QL3, QH4, QL4	4	Vishay	Si3465BDV
1A Thick Film 0 Ohm jumper 0603	Rf43	1	Vishay	Generic
5% Thick Film 10 Ohms 0603	Rpv3, Rin3	2	Vishay	Generic
1% Thick Film 113 Ohms 0603	Rin7	1	Vishay	Generic
1% Thick Film 10.0k 0603	Rpg3, Rpg4	2	Vishay	Generic
1% Thick Film 4.42k 0603	Rf42	1	Vishay	Generic
1% Thick Film 2.74k 0603	Rf32	1	Vishay	Generic
1% Thick Film 20.0k 0603	Rf31, Rf41	2	Vishay	Generic
1% Thick Film 3.83k 0603	Rlim3	1	Vishay	Generic
1% Thick Film 3.01k 0603	Rlim4	1	Vishay	Generic
1% Thick Film 35.7 Ohms 0603	Rc32	1	Vishay	Generic
1% Thick Film 7.87k 0603	Rc31	1	Vishay	Generic
1% Thick Film 30.1 Ohms 0603	Rc42	1	Vishay	Generic
1% Thick Film 10.2k 0603	Rc41	1	Vishay	Generic
2 chan 300k to 600k PWM LFCSP-32	U3	1	Analog Devices	ADP1829ACPZ
500mA 3.3V Linear Reg MSOP-8 w/SS	U5	1	Analog Devices	ADP1715ARMZ-3.3-R7
500mA 1.3V Linear Reg MSOP-8 w/SS	U6	1	Analog Devices	ADP1715ARMZ-1.3-R7
15mA 2.5V Shunt Ref SC70	U7	1	Analog Devices	ADR5041AKSZ

NOTES

Reference designators shown on the schematic but not listed on the Bill of Materials are place holders for possible design adjustments (snubbers, additional decoupling capacitors and resistors to adjust the output voltage of linear regulators). These components should be put in the layout, but not populated unless after testing it is deemed necessary.

If a different number, or different type of output capacitors are used on the switching outputs the loop compensation components may need adjustment.