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Daughter Card Evaluation Board for the ADP1053 Digital Power Supply Controller

FEATURES

ADP1053 daughter card with 40-pin connector and I²C interface
Plugs into ADP1053 evaluation motherboard
PMBus compliant
Low component count
PCB size: 28 mm × 50 mm
Robust design

GENERAL DESCRIPTION

The ADP1053, based on a voltage mode PWM architecture, is a flexible, application dedicated digital controller designed for isolated and nonisolated dc-to-dc power supply applications. The ADP1053 enables highly efficient power supply design and facilitates the introduction of intelligent power management techniques to improve energy efficiency at a system level. The ADP1053 operates from a single 3.3 V supply.

The ADP1053 provides control, monitoring, and protection of up to three independent channel outputs. The eight flexible PWM outputs can be configured as three independent channels: two regulated channels with feedback control plus one additional unregulated channel with a fixed duty cycle. The frequency of these three channels can be programmed individually from 50 kHz to 625 kHz; all channels can be synchronized internally or to an external signal.

Features include differential voltage sensing, fast current sensing, flexible start-up sequencing and tracking, and synchronization between devices to reduce low frequency system noise. Protection and monitoring features include overcurrent protection (OCP), undervoltage protection (UVP), overvoltage protection (OVP), and overtemperature protection (OTP).

EVALUATION BOARD DESCRIPTION

The ADP1053 daughter card evaluation board allows the user to quickly evaluate the ADP1053 (see Figure 1). The ADP1053 daughter card plugs into an existing ADP1053 evaluation motherboard. Communication to the daughter card is established by connecting the USB-to-I²C dongle interface between the daughter card and a PC running Windows® 2000, Windows NT, Windows XP, Windows Vista®, or Windows 7.

The USB-to-I²C dongle interface (Part No. ADP-I2C-USB-Z) must be purchased separately from Analog Devices, Inc. The graphical user interface (GUI) software for the ADP1053 daughter card evaluation board can be downloaded from the ADP1053 product page.

This user guide describes how to set up and use the ADP1053 daughter card evaluation board. The user guide should be read in conjunction with the ADP1053 data sheet, which provides detailed information about the ADP1053 3-channel digital power supply controller.

ADP1053DC-EVALZ DAUGHTER CARD EVALUATION BOARD

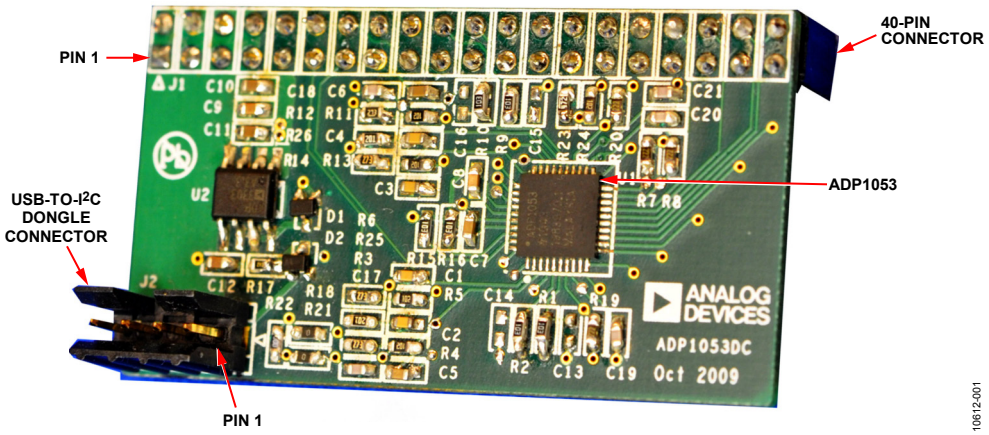


Figure 1.

TABLE OF CONTENTS

Features 1
General Description 1
Evaluation Board Description 1
ADP1053DC-EVALZ Daughter Card Evaluation Board 1
Revision History 2
Hardware Description 3
40-Pin Connector 3
USB-to-I²C Dongle 3
Operating Instructions for the Evaluation Board 4
Evaluation Board Schematic and Artwork 5
Ordering Information 7
Bill of Materials 7
Related Links 7

REVISION HISTORY

5/12—Revision 0: Initial Version

HARDWARE DESCRIPTION

40-PIN CONNECTOR

The ADP1053 daughter card PCB is 28 mm × 50 mm. A 40-pin connector is soldered to the back of the daughter card evaluation board (see Figure 2).

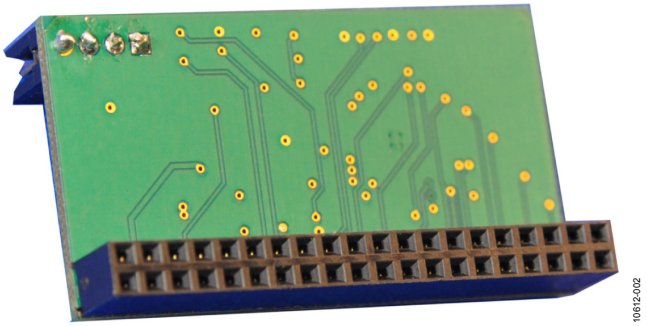


Figure 2. Backside of the Daughter Card

The 40-pin connector plugs directly into an existing ADP1053 evaluation motherboard. A 5 V source from the USB connection provides power to the on-board ADP3303 LDO, which, in turn, provides the 3.3 V power to the ADP1053.

Figure 3 shows the pin assignments for the 40-pin connector on the ADP1053 daughter card evaluation board.

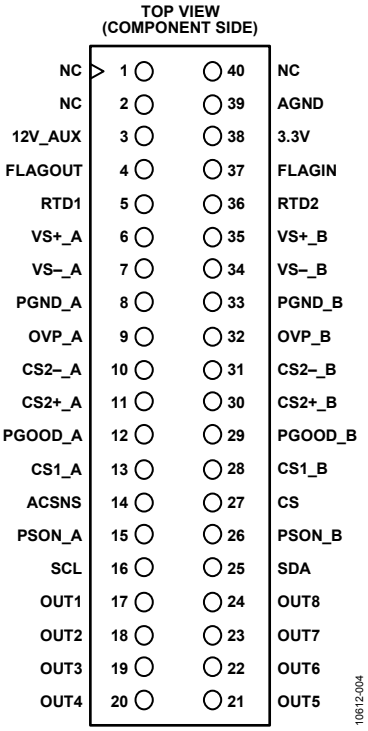


Figure 3. 40-Pin Connector Pin Assignments

USB-TO-I²C DONGLE

For a complete evaluation of the ADP1053, the following items are required:

- ADP1053 evaluation motherboard
- ADP1053 evaluation daughter card
- USB-to-I²C dongle interface
- Software GUI

Figure 4 shows how to use the USB-to-I²C dongle to connect the ADP1053 daughter card to the PC.

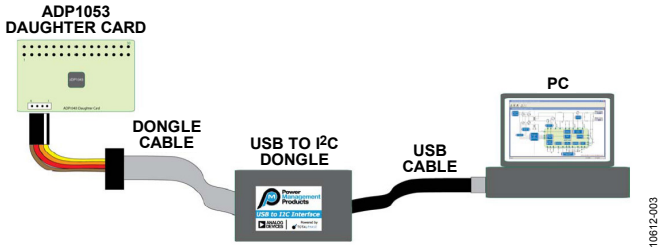


Figure 4. Connecting the ADP1053 Daughter Card to a PC Using the USB-to-I²C Dongle

The USB-to-I²C dongle interface has four pins (see Table 1).

Table 1. I²C Connector Pin Assignment

Pin No.	Evaluation Board Function
1	5 V
2	SCL (clock)
3	SDA (data)
4	Ground

OPERATING INSTRUCTIONS FOR THE EVALUATION BOARD

To use the ADP1053 evaluation board, follow these steps:

1. Insert the ADP1053DC-EVALZ daughter card into the ADP1053 evaluation motherboard (see Figure 5). Note that users must create a motherboard for the ADP1053 evaluation daughter card (the motherboard shown in Figure 5 is a prototype).
2. Connect the cables of the USB-to-I²C dongle to the daughter card and to the PC (see Figure 4).

   The USB interface provides the 5 V supply to the daughter card. The daughter card has an on-board LDO (the ADP3303) that provides the 3.3 V power to the ADP1053.
3. Download the ADP1053 GUI software from the ADP1053 product page and install the software on a PC.
4. Run the GUI software to verify the connection to the ADP1053 before applying the input supply voltage to the motherboard.
5. Apply power to the input terminals of the motherboard.

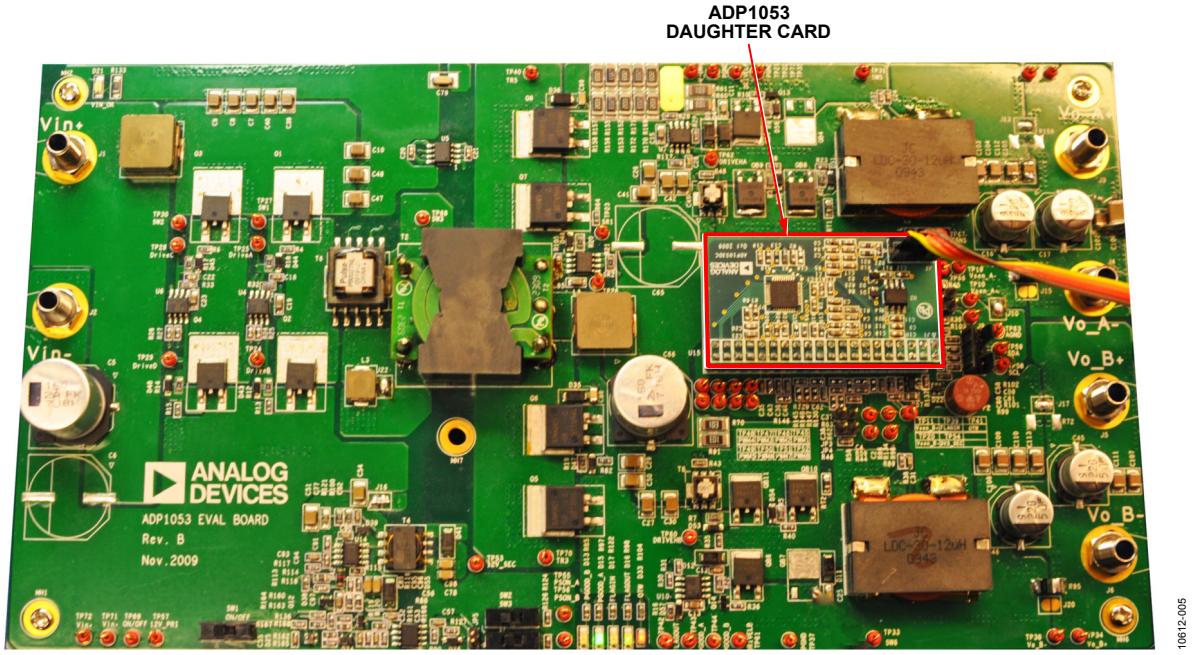


Figure 5. ADP1053 Evaluation Board with Daughter Card Plugged In

EVALUATION BOARD SCHEMATIC AND ARTWORK

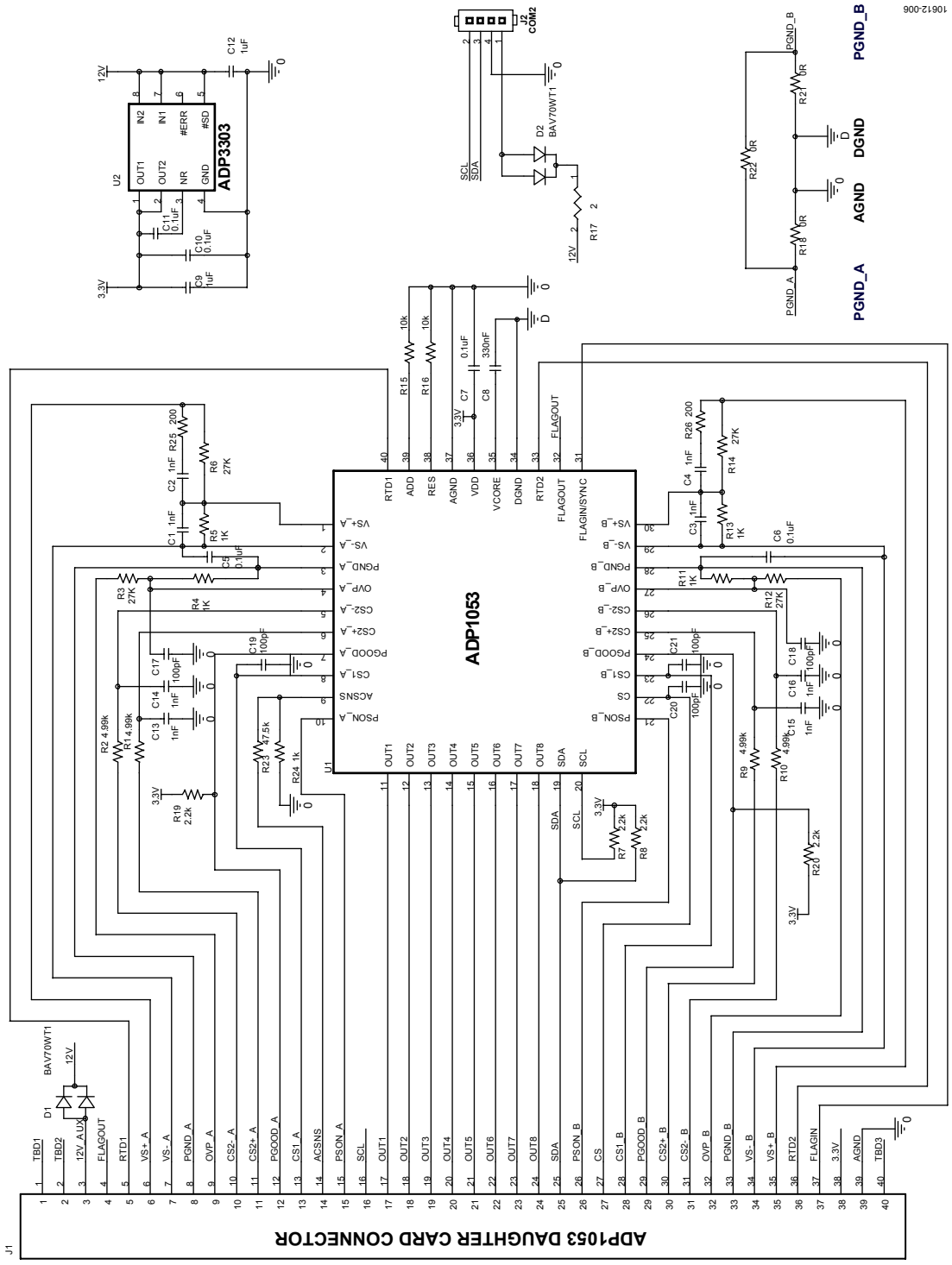


Figure 6. Schematic of the Evaluation Board

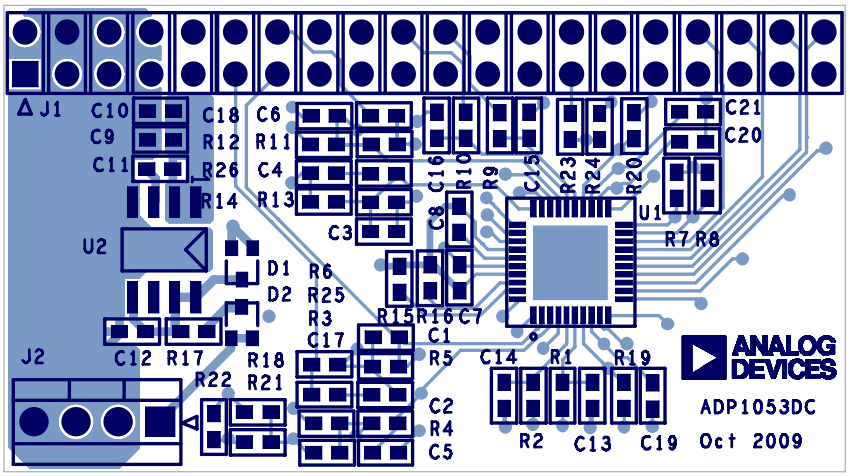


Figure 7. Top Layer and Silkscreen

ORDERING INFORMATION

BILL OF MATERIALS

Table 2.

Qty	Reference	Description	Vendor	Part No.
1	U1	ADP1053 (device under test), 40-lead LFCSP	Analog Devices	ADP1053ACPZ-R7
1	U2	ADP3303 low dropout linear regulator	Analog Devices	ADP3303ARZ-3.3
8	C1, C2, C3, C4, C13, C14, C15, C16	Capacitor, MLCC, 1 nF, 50 V, C0G, 0603	Digi-Key	C1608C0G1H102J
5	C5, C6, C7, C10, C11	Capacitor, MLCC, 0.1 µF, 50 V, X7R, 0603	Digi-Key	C1608X7R1H104K
1	C8	Capacitor, MLCC, 330 nF, 50 V, X7R, 0603	Digi-Key	C1608X7R1H334K
2	C9, C12	Capacitor, MLCC, 1 µF, 16 V, X7R, 0603	Digi-Key	C1608X7R1C105K
5	C17, C18, C19, C20, C21	Capacitor, MLCC, 100 pF, 50 V, C0G, 0603	Digi-Key	C1608C0G1H101J
2	D1, D2	Diode, 200 mA, 70 V	Digi-Key	BAV70WT1G
1	J1	40-pin connector	Digi-Key	PPTC202LFBN-RC
1	J2	Connector, header, 4-pin, single, PCB 30GOLD	Digi-Key	609-2411-ND
4	R1, R2, R9, R10	Resistor, 4.99 kΩ, 0.1%, 1/10 W, 0603	Digi-Key	TNPW06034K99BEEA
4	R3, R6, R12, R14	Resistor, 27 kΩ, 1%, 1/10 W, 0603	Digi-Key	ERJ-3EKF2702V
5	R4, R5, R11, R13, R24	Resistor, 1 kΩ, 1%, 1/10 W, 0603	Digi-Key	ERJ-3EKF1001V
4	R7, R8, R19, R20	Resistor, 2.2 kΩ, 1%, 1/10 W, 0603	Digi-Key	ERJ-3EKF2201V
2	R15, R16	Resistor, 10 kΩ, 1%, 1/10 W, 0603	Digi-Key	ERJ-3EKF1002V
1	R17	Resistor, 2 Ω, 5%, 1/10 W, 0603	Digi-Key	ERJ-3GEYJ2R0V
3	R18, R21, R22	Resistor, 0 Ω, 50 mΩ max, 1/10 W, 0603	Digi-Key	ERJ-3GEY0R00V
1	R23	Resistor, 47.5 kΩ, 1%, 1/10 W, 0603	Digi-Key	ERJ-3EKF4752V
2	R25, R26	Resistor, 200 Ω, 1%, 1/10 W, 0603	Digi-Key	ERJ-3EKF2000V

RELATED LINKS

Resource	Description
ADP1053	Product Page, 3-Channel Digital Power Supply Controller
ADP-I2C-USB-Z	Product Page, USB to I^2C Interface Connector

NOTES



ESD Caution

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

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