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Evaluating the AD8253 10 MHz 20 V/µs, G = 1, 10, 100, 1000, *i*CMOS Programmable Gain Instrumentation Amplifier

FEATURES

Does not require software to operate
Runs from dual supply (±7 to ±15 V)
Gain selection through DIP switches
Numerous test points for external stimulus
Signal paths use SMA connectors

EQUIPMENT NEEDED

Dual-output, programmable power supply (±15 V at +50 mA)
Dual-output function generator
Oscilloscope
Banana to grabber test leads
BNC to SMA coaxial cables
A small, flat head screw driver or similar device to set DIP switches

DOCUMENTS NEEDED

AD8253 data sheet

GENERAL DESCRIPTION

The AD8253-EVALZ user guide details how the AD8253-EVALZ evaluation board evaluates the AD8253. The user guide outlines the basic connections required to evaluate the AD8253 and describes the switch settings available to obtain desired outputs.

Many configuration options are available on the AD8253-EVALZ evaluation board that allow additional input filtering and output filtering if there is a noisy environment (see Figure 6). The logic control is covered with an on-board 5.0 V regulator and a dual in-line package (DIP) switch. However, these logic signals can be overridden and clipped on by way of the on-board test points if the DIP switch has each position set to open.

THE AD8253-EVALZ EVALUATION BOARD PHOTOGRAPH

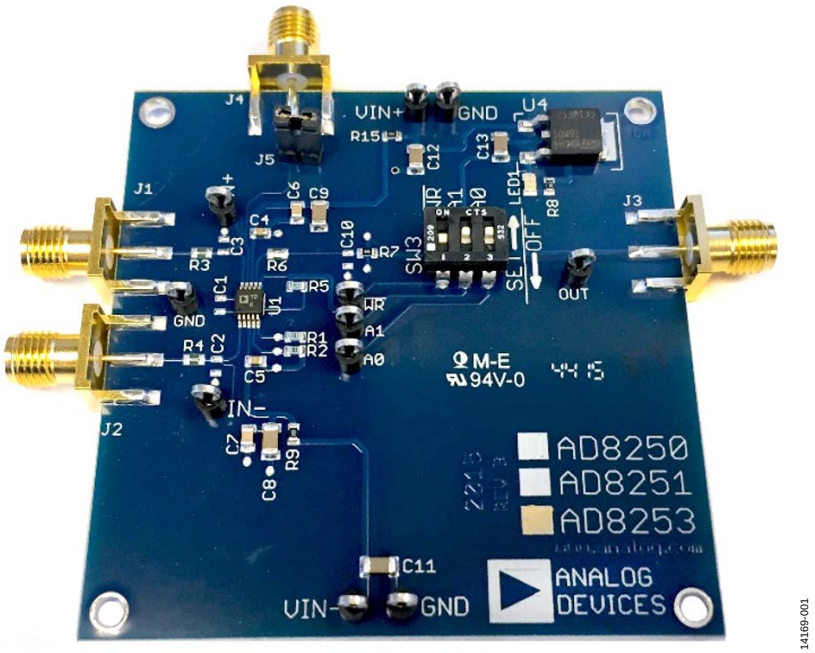

Figure 1.

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REVISION HISTORY

7/2016—Revision 0: Initial Version

EVALUATION BOARD SOFTWARE QUICK START PROCEDURES

REQUIRED EQUIPMENT

To perform the start-up operations outlined in this guide, use the following items:

- A dual-output, programmable power supply, such as the Keithley 2230-30-1 supply.
- A dual-channel function generator, such as the LeCroy WaveStation 2012.
- An oscilloscope, such as the LeCroy WaveSurfer 3034.
- A small slotted screw driver, or similar device, to adjust the three DIP switches within the SW3 DIP switch (see Figure 7).
- Two black banana-to-grabber test leads, such as the Pomona 3782-36-0.
- Two red banana-to-grabber test leads, such as the Pomona 3782-36-2.
- Three BNC (male) to SMA (male) coaxial cables

INITIAL CONFIGURATION PROCEDURE

1. Before any connections are made, verify the initial DIP switch configuration must. Set all switches to the off position, as indicated by the silkscreen (see Figure 7).
2. Set the power supply to ±15 V with a current limit of 25 mA each channel.
3. Set the function generator to produce a complementary (in-phase and out-of-phase), 1 kHz sine wave, at a 50 mV differential amplitude signal. Select the high impedance setting on both outputs of the generator. For a 50 Ω signal source, use 25 mV.
4. Ensure the signal generator outputs are off.
5. Connect the power supply leads from the power supply source: +15 V to VIN+, −15 V to VIN−, and Common/ Ground to GND.
6. Connect the J3 output signal to any channel on the oscilloscope and set the vertical setting to 500 mV/division.

POWERING UP THE AD8253-EVALZ EVALUATION BOARD

1. Enable the power supply output. Observe the indicated current consumption on the supply. The correct operation does not exceed 15 mA.
2. Turn on the two channels of the function generator.
3. Observe the output of the AD8253-EVALZ evaluation board on the oscilloscope. The output must look similar to Figure 2, showing a signal of 50 mV in amplitude.

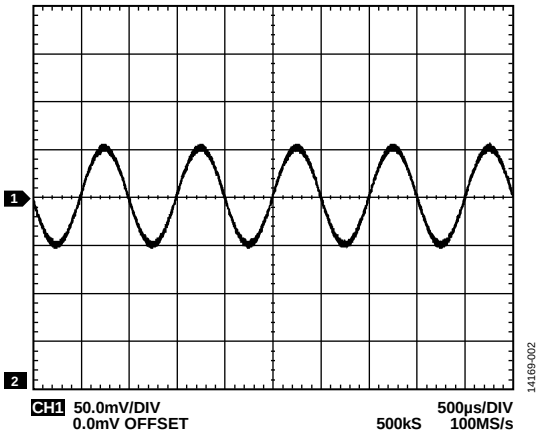

Figure 2. Output of the AD8253-EVALZ when G = 1

4. Set Switch 3 on the SW3 DIP switch to set the gain to Gain (G) = 10. The result must resemble Figure 3.

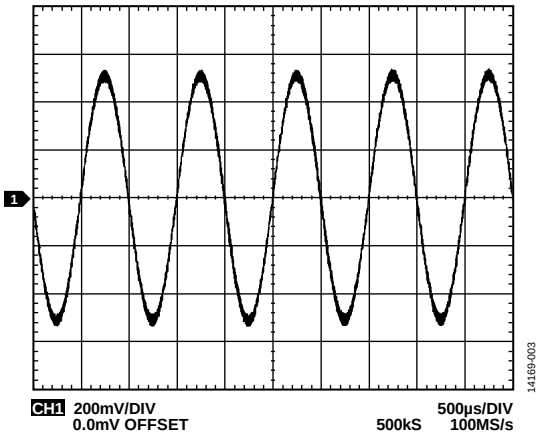

Figure 3. Output of the AD8253-EVALZ when G = 10

5. If the output signal is at 500 mV amplitude, set Switch 3 on the SW3 DIP switch to off and set Switch 2 to the on position. (G = 100). The result must resemble Figure 4.

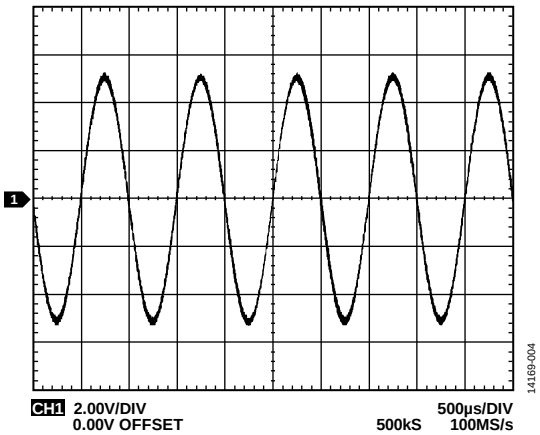

Figure 4. Output of the AD8253-EVALZ when G = 100 (5 V Amplitude)

6. Finally, change the signal generator amplitude to a 10 mV differential signal and set Switch 3 on the SW3 DIP switch to the on position to set G = 1000. The result must resemble Figure 5.

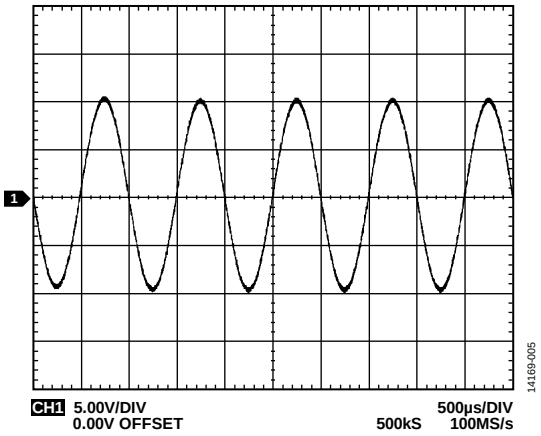

Figure 5. Output of the AD8253-EVALZ when G = 1000 and the Input Signal is 10 mV in Differential Amplitude

7. If Switch 1 is set to on, the device does not update any changes to the gain.
8. Checking the gains validates the basic operation of the AD8253-EVALZ.

EVALUATION BOARD SCHEMATIC AND ARTWORK

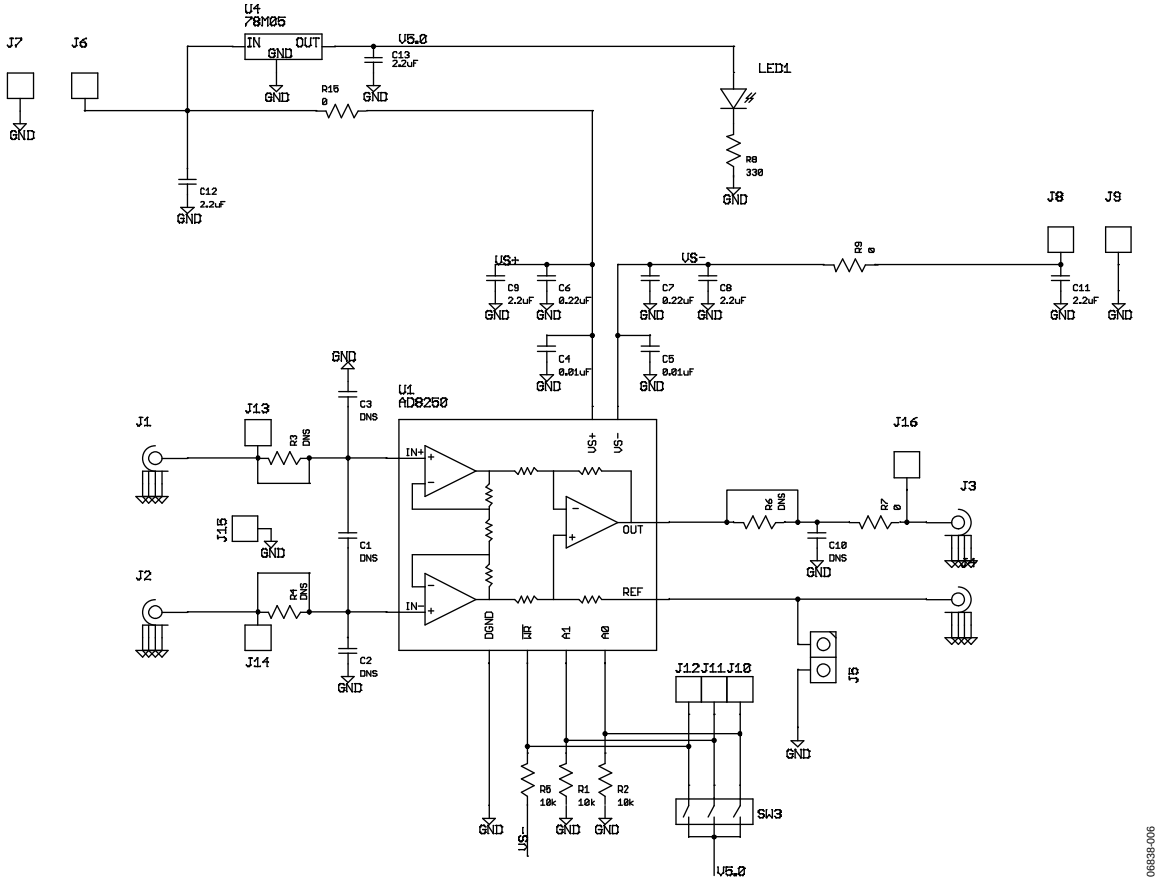

Figure 6. AD8253-EVALZ Evaluation Board Schematic

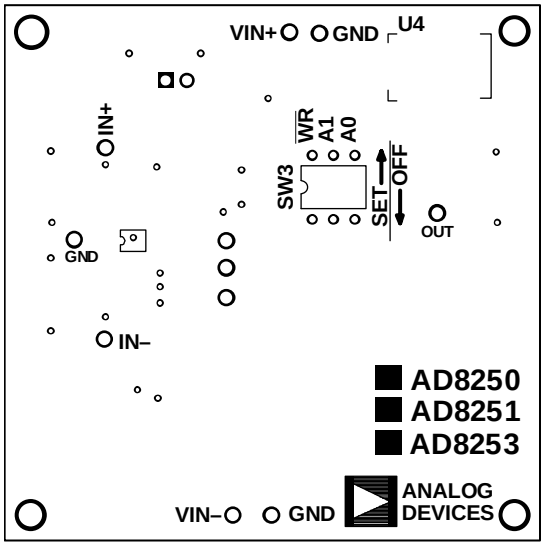

Figure 7. AD8253-EVALZ Evaluation Board Silkscreen

ORDERING INFORMATION

BILL OF MATERIALS

Table 1.

Qty	Reference Designator	Description	Manufacturer	Part Number
1	J5	Standard 2.54 mm spacing, 2-pin header	TE Connectivity	826646-2
6	R3, R4, R6, R7, R9, R15	Resistors 0 Ω short, 0603	Vishay	CRCW06030000Z0EA
2	C4, C5	Capacitors, 0.01 µF, 50 V, 0603	Vishay	VJ0603Y103KXAAC
2	C6, C7	Capacitors, 0.22 µF, 0805, C0G	Kemet	C0603X224K3RACTU
3	R1, R2, R5	Resistors, 10 kΩ, 0603	KOA Speer	RK73H1JTTD1002F
3	J13, J14, J16	Black, large test points	Kobiconn	151-103-RC
6	J7, J9 to J12, J15	Black, large test points	Kobiconn	151-103-RC
2	J6, J8	Red, large test points	Kobiconn	151-107-RC
5	C8, C9, C11 to C13	Capacitors, 2.2 µF, 1206, 25 V	Vishay	VJ1206V225MXXTW1BC
1	R8	Resistor, 330 Ω, 1%	Vishay	CRCW0603330RFKEA
1	SW3	3-way DIP switch	CTS	209-3LPST
1	U4	Standard 12 V linear regulator	STMicroelectronics	L78M05CDT-TR
1	LED1	Blue LED, 3.4 V typical, 0805	Lite-On	LTST-S220TBKT
1	U1	AD8253 programmable gain instrumentation amplifier (PGIA)	Analog Devices, Inc.	AD8253ARMZ
4	J1 to J4	Standard size, end launch SMA connectors	Molex	0732511150