ANALOG DEVICES

EVAL-ADXL356/EVAL-ADXL357 User Guide

UG-1119

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Evaluating the ADXL356/ADXL357 Low Noise, Low Drift, Low Power, 3-Axis MEMS Accelerometers

FEATURES

2 sets of spaced vias for populating 6-pin headers
Easily attaches to prototyping board or PCB
Small size and board stiffness minimizes impact on the user system and acceleration measurements

EQUIPMENT NEEDED

External host processor

DOCUMENTS NEEDED

ADXL356/ADXL357 data sheet

GENERAL DESCRIPTION

The EVAL-ADXL356BZ, the EVAL-ADXL356CZ, and the EVAL-ADXL357Z are evaluation boards that allow quick evaluation of the performance of the ADXL356 and the ADXL357 low noise, low power, 3-axis, MEMS accelerometers. The EVAL-ADXL356BZ is an analog output supporting a ±10 *g* or ±20 g accelerometer, the EVAL-ADXL356CZ is an analog output supporting a ±10 *g* or ±40 *g*, and the EVAL-ADXL357Z is a digital output supporting a ±10.24 *g*, ±20.48 *g*, or ±40.96 *g* accelerometer.

These evaluation boards are ideal for evaluating the ADXL356 and ADXL357 in an existing system because the stiffness and the small size of the evaluation board minimize the effect of the board on both the system and acceleration measurements.

Full details about the ADXL356/ADXL357 are available in the ADXL356/ADXL357 data sheet, which is available from Analog Devices, Inc., and must be consulted in conjunction with this user guide when using this evaluation board.

Note that the layout for the EVAL-ADXL354BZ/EVAL-ADXL354CZ applies to both the EVAL-ADXL354BZ/EVAL-ADXL354CZ and the EVAL-ADXL356BZ/EVAL-ADXL356CZ, and that the layout for the EVAL-ADXL355Z applies to both the EVAL-ADXL355Z and the EVAL-ADXL357Z.

EVALUATION BOARD PHOTOGRAPHS

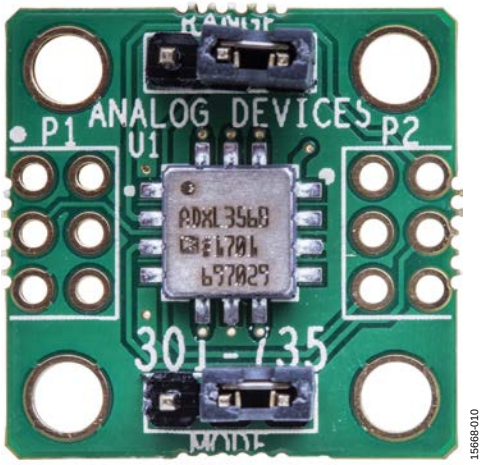

Figure 1. EVAL-ADXL356BZ/EVAL-ADXL356CZ

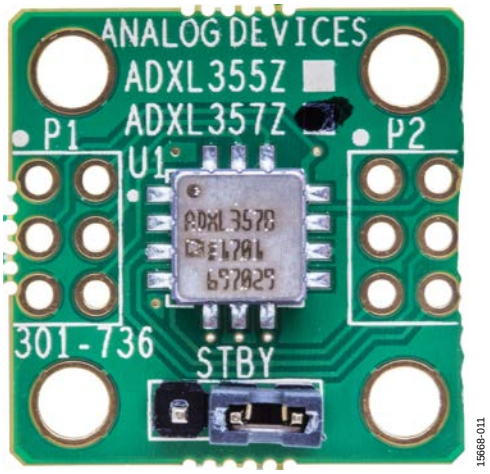

Figure 2. EVAL-ADXL357Z

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REVISION HISTORY

9/2018—Rev. 0 to Rev. A

Changed Printed Circuit Board Layouts Section to Evaluation Board Photographs Section 1
Replaced Figure 1 and Figure 2 1
Changes to General Description Section 1
Changes to Evaluation Board Hardware Section, Figure 3, Figure 4, Figure 5, Figure 6, and Circuit Description Section 3
Changes to Figure 7 and Figure 8 4
Changes to Table 1 and Table 2 5

2/2017—Revision 0: Initial Version

EVALUATION BOARD HARDWARE

The EVAL-ADXL356BZ, the EVAL-ADXL356CZ, and the EVAL-ADXL357Z allow users to access the individual connections of the ADXL356 and the ADXL357. Each of the evaluation boards includes decoupling capacitors for the supplies, a few discrete resistors that provide isolation on the V_{1P8ANA} and V_{1P8DIG} pins, and two 6-pin headers. Refer to the ADXL356/ADXL357 data sheet for more details on the specific pin definitions. The power supplies for the ADXL356 and the ADXL357 are decoupled using multiple 0.1 µF ceramic (0603) capacitors.

The EVAL-ADXL356BZ/EVAL-ADXL356CZ has capacitors on each axis output to set the output low-pass filter and two 3-position jumpers to configure RANGE and MODE (tied to the ADXL356 $\overline{\text{STBY}}$ pin). The two 6-pin headers provide access to all other pins.

Header P1 provides access to V_{DDIO} (used to set the RANGE pin and the $\overline{\text{STBY}}$ levels on the ADXL356), V_{DD} (which supplies the ADXL356 V_{SUPPLY} pin), V_{SS}/V_{SSIO} (supply common connection), and X_{OUT}, Y_{OUT}, and Z_{OUT}, as shown in Figure 3.

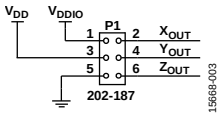

Figure 3. EVAL-ADXL356BZ/EVAL-ADXL356CZ Functional Block Diagram for Header P1

Header P2 provides access to V_{1P8ANA}, V_{1P8DIG}, TEMP, ST1, ST2, and V_{SS} (supply common connection), as shown in Figure 4.

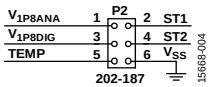

Figure 4. EVAL-ADXL356BZ/EVAL-ADXL356CZ Functional Block Diagram for Header P2

The EVAL-ADXL357Z uses two 6-pin headers to provide access to all pins. Header P1 provides access to V_{DDIO}, V_{DD} (which connects to the ADXL357 V_{SUPPLY} pin), V_{SS}/V_{SSIO} (supply common connection), INT1, INT2, and DRDY, as shown in Figure 5.

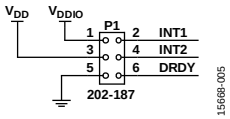

Figure 5. EVAL-ADXL357Z Functional Block Diagram for Header P1

Header P2 provides access to V_{1P8ANA}, V_{1P8DIG}, MISO/ASEL, $\overline{\text{CS}}$/SCL, SCLK/V_{SSIO}, and MOSI/SDA, as shown in Figure 6.

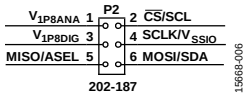

Figure 6. EVAL-ADXL357Z Functional Block Diagram for Header P2

The vias or headers allow the evaluation boards to attach to either a prototyping breadboard or a printed circuit board (PCB) in an existing user system. Four holes are provided in the corners of the evaluation boards for mechanical attachment of the evaluation boards in many applications. An external host processor is required for communication to the ADXL357. The analog output of the ADXL356 must be connected to a band limited analog-to-digital converter (ADC).

The dimensions of the evaluation boards are 0.8 in. × 0.8 in.

CIRCUIT DESCRIPTION

The evaluation board photograph of the EVAL-ADXL356BZ/EVAL-ADXL356CZ is shown in Figure 1, and the evaluation board photograph of the EVAL-ADXL357Z is shown in Figure 2. The ADXL356/ADXL357 each have two power modes. They can be powered either by integrated, low dropout (LDO) regulators or by external user supplied 1.8 V regulated supplies. Refer to the ADXL356/ADXL357 data sheet for more information.

HANDLING CONSIDERATIONS

The EVAL-ADXL356BZ, the EVAL-ADXL356CZ, and the EVAL-ADXL357Z are not reverse polarity protected. Reversing any of the supply connections, including the V_{SS} and the V_{SSIO} pins, can cause damage to the ADXL356/ADXL357.

Dropping the evaluation boards on a hard surface can generate several thousand *g* of acceleration, which can exceed the ADXL356/ADXL357 data sheet absolute maximum limits.

EVALUATION BOARD SCHEMATICS

Note that the layout for the EVAL-ADXL354BZ/EVAL-ADXL354CZ applies to both the EVAL-ADXL354BZ/EVAL-ADXL354CZ and the EVAL-ADXL356BZ/EVAL-ADXL356CZ (see Figure 1), and that the layout for the EVAL-ADXL355Z applies to both the EVAL-ADXL355Z and the EVAL-ADXL357Z (see Figure 2).

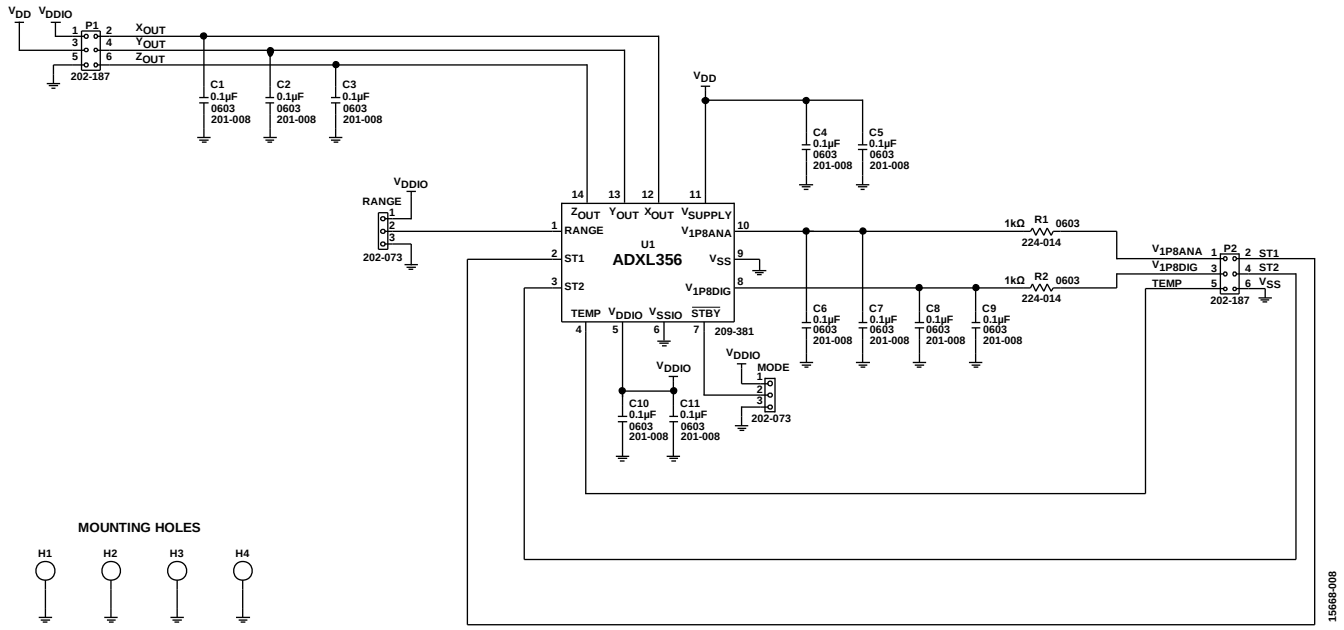

Figure 7. EVAL-ADXL356BZ/EVAL-ADXL356CZ Schematic

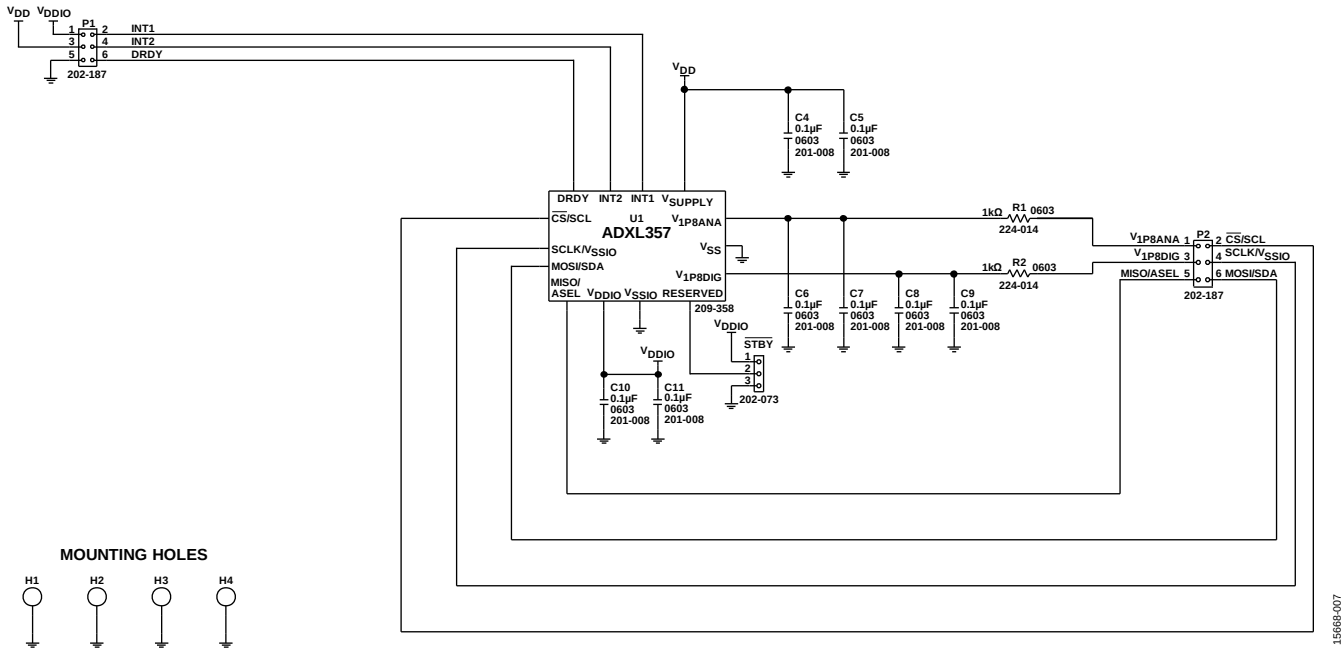

Figure 8. EVAL-ADXL357Z Schematic

ORDERING INFORMATION

BILL OF MATERIALS

Table 1. Bill of Materials for the EVAL-ADXL356BZ/EVAL-ADXL356CZ

Qty	Reference Designator	Description	Manufacturer	Part Number
1	U1	High performance, 3-axis MEMS accelerometer, 14-terminal LCC	Analog Devices, Inc.	ADXL356
11	C1 to C11	Capacitors, ceramic, 0.1 µF, 50 V, 10%, X7R, 0603	Cal-Chip	GMC10X7R104K50NTLF
2	R1, R2	Resistors, 1 kΩ, 0.1 W, 1%, 0603	Cal-Chip	CR0603F1001T1LF
2	MODE, RANGE	Jumpers, 3-position, through hole	Prolex	2556P03UA00
2	P1, P2	Headers, male, nonshrouded, 2 × 3, 0.1 in. spacing, through hole, do not insert	FCI	67996-206HLF
1	PCB	EVAL-ADXL356BZ/EVAL-ADXL356CZ	Analog Devices, Inc.	

Table 2. Bill of Materials for the EVAL-ADXL357Z

Qty	Reference Designator	Description	Manufacturer	Part Number
1	U1	High performance, 3-axis MEMS accelerometer, 14-terminal LCC	Analog Devices, Inc.	ADXL357
8	C4 to C11	Capacitors, ceramic, 0.1 µF, 50 V, 10%, X7R, 0603	Cal-Chip	GMC10X7R104K50NTLF
2	R1, R2	Resistors, 1 kΩ, 0.1 W, 1%, 0603	Cal-Chip	CR0603F1001T1LF
1	$\overline{\text{STBY}}$	Jumper, 3-position, through hole	Prolex	2556P03UA00
2	P1, P2	Headers, male, nonshrouded, 2 × 3, 0.1 in. spacing, through hole, do not insert	FCI	67996-206HLF
1	PCB	EVAL-ADXL357Z	Analog Devices, Inc.	

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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