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.
TABLE OF CONTENTS
Features................................................................. 1
Equipment Needed.................................................. 1
Documents Needed.................................................. 1
General Description............................................... 1
Evaluation Board Photographs............................... 1
Revision History.................................................... 2
Evaluation Board Hardware.................................... 3

Circuit Description.................................................. 3
Handling Considerations.......................................... 3
Evaluation Board Schematics................................. 4
Ordering Information.............................................. 5
Bill of Materials.................................................... 5

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<sub>IPANA</sub> and V<sub>IDNEG</sub> 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 STBY pin). The two 6-pin headers provide access to all other pins. Header P1 provides access to V<sub>DDIO</sub> (used to set the RANGE pin and the STBY levels on the ADXL356), V<sub>DD</sub> (which supplies the ADXL356 V<sub>SUPPLY</sub> pin), V<sub>SS</sub>/V<sub>SSIO</sub> (supply common connection), and X<sub>OUT</sub>, Y<sub>OUT</sub>, and Z<sub>OUT</sub>, as shown in Figure 3.

Header P2 provides access to V<sub>IPANA</sub>, V<sub>IDNEG</sub>, MISO/ASEL, CS/SCL, SCLK/V<sub>SSIO</sub>, and MOSI/SDA, as shown in Figure 6.

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

CIRCUIT DESCRIPTION

The evaluation board photograph of the EVAL-ADXL356BZ/ADXL357Z 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<sub>SS</sub> and the V<sub>SSIO</sub> 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

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

Table 2. Bill of Materials for the EVAL-ADXL357Z

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

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