

Evaluating the **ADXL354/ADXL355** Low Noise, Low Drift, Low Power, 3-Axis MEMS Accelerometers

FEATURES

- 2 sets of spaced vias for populating 6-pin headers
- Easily attachable to prototyping board or PCB
- Small size and board stiffness minimize impact on the system being monitored and acceleration measurements

EQUIPMENT NEEDED

External host processor

DOCUMENTS NEEDED

ADXL354/ADXL355 data sheet

GENERAL DESCRIPTION

The **EVAL-ADXL354BZ**, **EVAL-ADXL354CZ**, and **EVAL-ADXL355Z** are simple evaluation boards that allow quick evaluation of the performance of the **ADXL354** and the **ADXL355** low noise, low power, 3-axis, MEMS accelerometer. The **EVAL-ADXL354BZ** is an analog output supporting a $\pm 2g$ or $\pm 4g$ accelerometer; the **EVAL-ADXL354CZ** is an analog output supporting a $\pm 2g$ or $\pm 8g$ accelerometer; and the **EVAL-ADXL355Z** is a digital output supporting $\pm 2g$, $\pm 4g$, or $\pm 8g$. These evaluation boards are ideal for evaluating the **ADXL354** and **ADXL355** in an existing system because the stiffness and small size of the evaluation board minimizes the effect of the evaluation board on both the system and acceleration measurements.

Full details about the **ADXL354/ADXL355** are available in the **ADXL354/ADXL355** data sheet, which is available from Analog Devices, Inc., and should be consulted in conjunction with this user guide when using this evaluation board.

PRINTED CIRCUIT BOARD LAYOUT

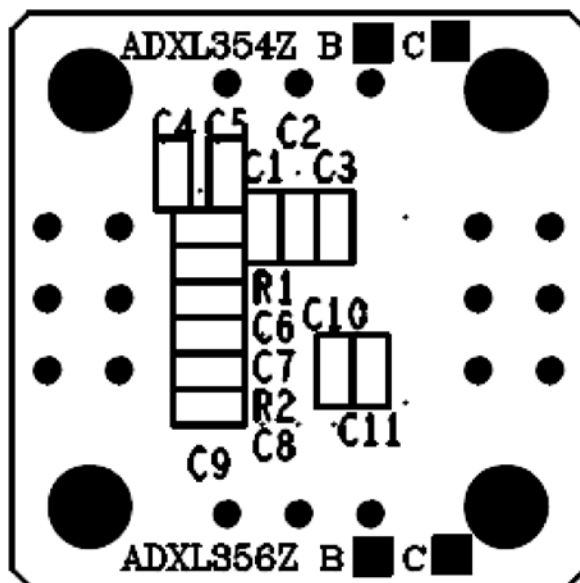


Figure 1. **EVAL-ADXL354BZ** and **EVAL-ADXL354CZ** Evaluation Boards

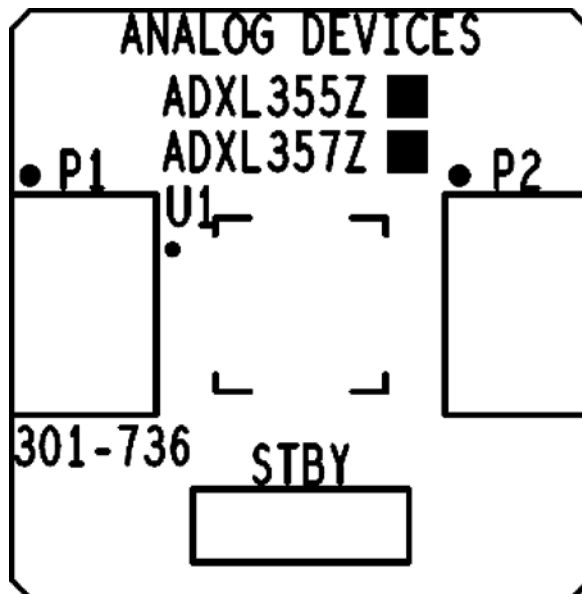


Figure 2. **EVAL-ADXL355Z** Evaluation Board

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REVISION HISTORY

6/2018—Rev. 0 to Rev. A	
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9/2016—Revision 0: Initial Version	

EVALUATION BOARD HARDWARE

The [EVAL-ADXL354BZ](#), [EVAL-ADXL354CZ](#), and [EVAL-ADXL355Z](#) evaluation boards allow users to access the individual connections of the [ADXL354](#) and [ADXL355](#). Each of the evaluation boards include decoupling capacitors for supplies, a few discrete resistors to provide isolation on the V_{IP8ANA} and V_{IP8DIG} pins, and two 6-pin headers. Refer to the [ADXL354/ADXL355](#) data sheet for more detail on specific pin definitions. The power supplies for the [ADXL354/ADXL355](#) is decoupled using multiple 0.1 μ F ceramic (0603) capacitors.

The [EVAL-ADXL354BZ](#) and [EVAL-ADXL354CZ](#) evaluation boards have capacitors on each axis output to set the output low-pass filter and two 3-position jumpers to configure Range and Mode. The two 6-pin headers provide access to all other pins. Header P1 provides access to V_{DDIO} (sets the RANGE pin and the STBY pin levels on the [EVAL-ADXL354BZ](#) and [EVAL-ADXL354CZ](#) evaluation boards), VDD (supplies the [ADXL354](#) V_{SUPPLY} pin), V_{SS}/V_{SSIO} (supplies the ground connection), X_{OUT} , Y_{OUT} , and Z_{OUT} , shown in Figure 3. Header P2 provides access to V_{IP8ANA} , V_{IP8DIG} , TEMP, ST1, ST2, and V_{SS} (supplies the ground connection), shown in Figure 4.

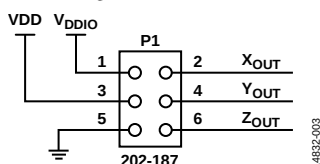


Figure 3. [EVAL-ADXL354BZ](#) and [EVAL-ADXL354CZ](#) Function Block Diagram for Header P1

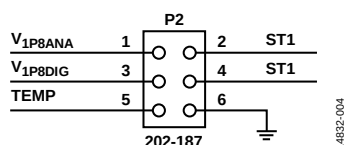


Figure 4. [EVAL-ADXL354BZ](#) and [EVAL-ADXL354CZ](#) Function Block Diagram for Header P2

The [EVAL-ADXL355Z](#) uses two 6-pin headers to provide access to all pins. Header P1 provides access to V_{DDIO} , VDD (which is connected to the [ADXL355](#) V_{SUPPLY} pin), V_{SS}/V_{SSIO} (supply ground connection), INT1, INT2, and DRDY, shown in Figure 5. Header P2 provides access to V_{IP8ANA} , V_{IP8DIG} , MISO/ASEL, $\overline{CS}/SCL$, SCLK/ V_{SSIO} , and MOSI/SDA (see Figure 6).

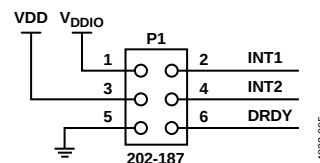


Figure 5. [EVAL-ADXL355Z](#) Function Block Diagram for Header P1

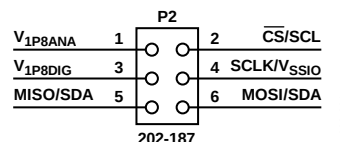


Figure 6. [EVAL-ADXL355Z](#) Function Block Diagram for Header P2

The vias or headers allow the evaluation boards to attach to either a prototyping breadboard or to a printed circuit board (PCB) in an existing user system. Four holes are provided in the corners of the evaluation board for mechanical attachment of the evaluation boards in many applications. An external host processor is required for communication to the [ADXL355](#), while the analog output of the [ADXL354](#) must be connected to a band limited analog-to-digital converter (ADC).

The dimensions of the evaluation boards are 0.8 in $\times$ 0.8 in.

CIRCUIT DESCRIPTION

The PCB layout of the [EVAL-ADXL354BZ](#), [EVAL-ADXL354CZ](#), and [EVAL-ADXL355Z](#) evaluation boards are shown in Figure 2. The [ADXL354](#) and [ADXL355](#) each have two modes by which they can be powered: by integrated low dropout regulators (LDOs) or external, user supplied 1.8 V regulated supplies. Refer to the [ADXL354/ADXL355](#) data sheet for more information.

HANDLING CONSIDERATIONS

The [EVAL-ADXL354BZ](#), [EVAL-ADXL354CZ](#), and [EVAL-ADXL355Z](#) evaluation boards are not reverse polarity protected. Reversing any of the supply connections, including the V_{SS} and V_{SSIO} pins, can cause damage to the [ADXL354/ADXL355](#).

Dropping the evaluation boards on a hard surface can generate several thousand g of acceleration, which can exceed the [ADXL354/ADXL355](#) data sheet absolute maximum limits.

EVALUATION BOARD SCHEMATICS AND ARTWORK

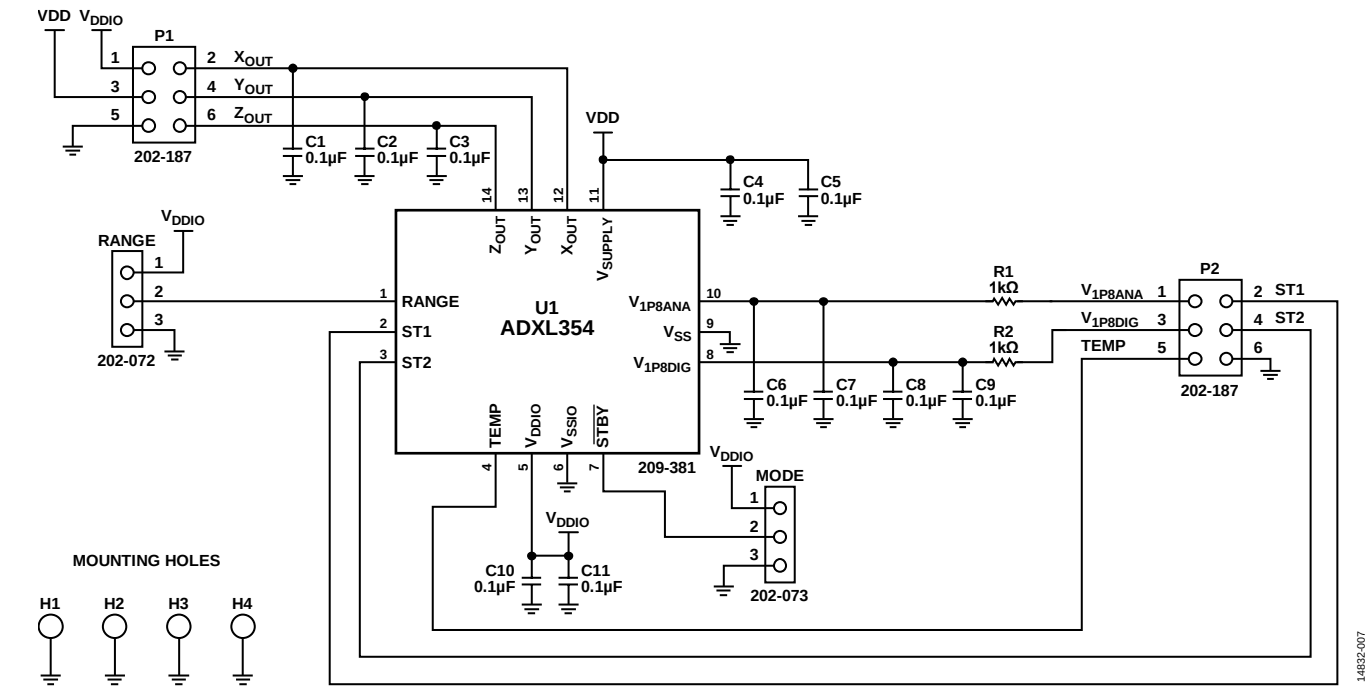


Figure 7. EVAL-ADXL354BZ and EVAL-ADXL354CZ Schematic

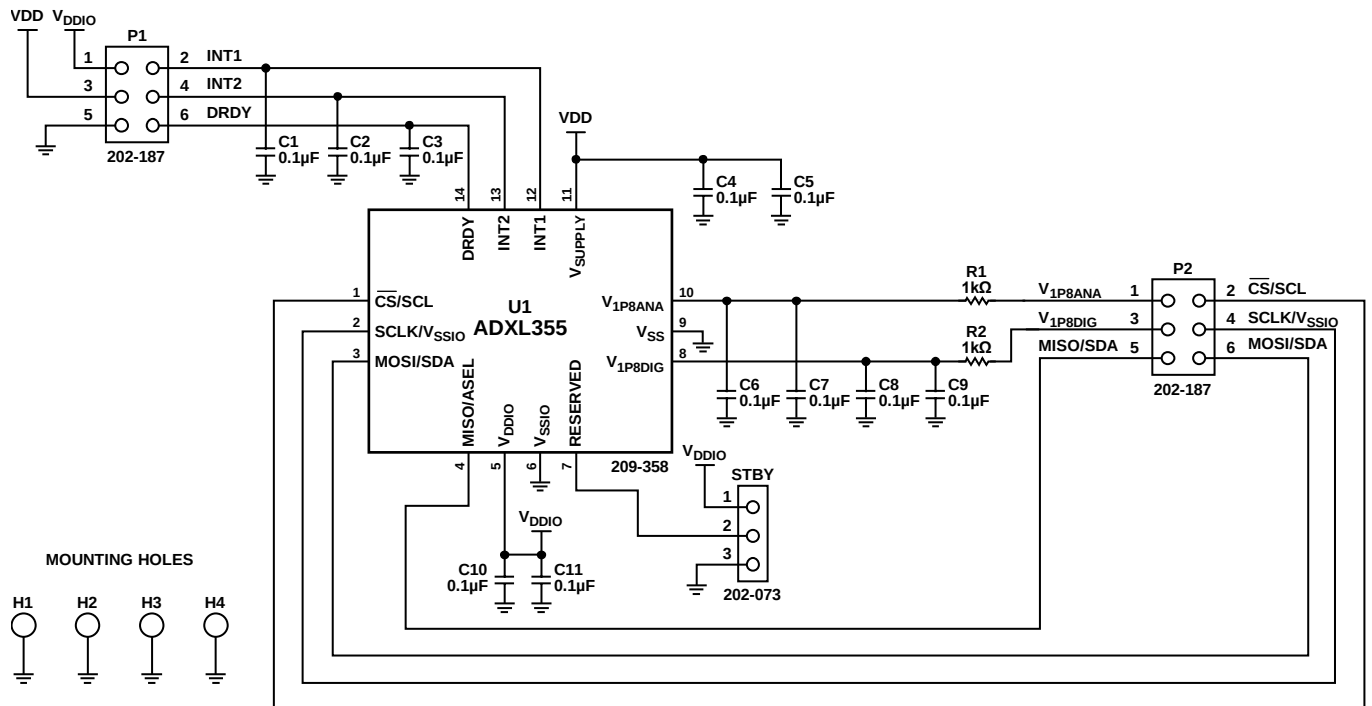


Figure 8. *EVAL-ADXL355Z* Schematic

ORDERING INFORMATION

BILL OF MATERIALS

Table 1. [EVAL-ADXL354BZ](#) and [EVAL-ADXL354CZ](#) Evaluation Boards

Qty	Reference Designator	Description	Manufacturer	Part Number
1	U1	High performance, 3-axis MEMS accelerometer, LC-14	Analog Devices, Inc.	ADXL354
11	C1 to C11	Capacitors, ceramic, 0.1 μ F, 50 V, 10%, X7R, 0603	Cal-Chip	GMC10X7R104K50NTLF
2	R1, R2	Resistors, 100 k Ω , 1/10W, 1%, 0603	Cal-Chip	CR0603F1001T1LF
2	MODE, RANGE	Jumpers, 3-position, through hole	Prolex	2556P03UA00
2	P1, P2	Headers, male, nonshrouded, 2 $\times$ 3, 0.1" spacing, through hole, do not insert	FCI	67996-206HLF
1	PCB	ADXL354 bare board	Analog Devices, Inc.	EVAL-ADXL354BZ or EVAL-ADXL354CZ

Table 2. [EVAL-ADXL355Z](#) Evaluation Board

Qty	Reference Designator	Description	Manufacturer	Part Number
1	U1	High performance, 3-axis MEMS accelerometer, LC-14	Analog Devices, Inc.	ADXL355
8	C4 to C11	Capacitors, ceramic, 0.1 μ F, 50 V, 10%, X7R, 0603	Cal-Chip	GMC10X7R104K50NTLF
2	R1, R2	Resistors, 100 k Ω , 1/10W, 1%, 0603	Cal-Chip	CR0603F1001T1LF
1	STBY	Jumpers, 3-position, through hole	Prolex	2556P03UA00
2	P1, P2	Headers, male, nonshrouded, 2 $\times$ 3, 0.1" spacing, through hole, do not insert	FCI	67996-206HLF
1	PCB	ADXL355 bare board	Analog Devices, Inc.	EVAL-ADXL355Z

RELATED LINKS

Resource	Description
ADXL354/ADXL355	ADXL354/ADXL355 product page



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.

Legal Terms and Conditions

By using the evaluation board discussed herein (together with any tools, components documentation or support materials, the "Evaluation Board"), you are agreeing to be bound by the terms and conditions set forth below ("Agreement") unless you have purchased the Evaluation Board, in which case the Analog Devices Standard Terms and Conditions of Sale shall govern. Do not use the Evaluation Board until you have read and agreed to the Agreement. Your use of the Evaluation Board shall signify your acceptance of the Agreement. This Agreement is made by and between you ("Customer") and Analog Devices, Inc. ("ADI"), with its principal place of business at One Technology Way, Norwood, MA 02062, USA. Subject to the terms and conditions of the Agreement, ADI hereby grants to Customer a free, limited, personal, temporary, non-exclusive, non-sublicensable, non-transferable license to use the Evaluation Board FOR EVALUATION PURPOSES ONLY. Customer understands and agrees that the Evaluation Board is provided for the sole and exclusive purpose referenced above, and agrees not to use the Evaluation Board for any other purpose. Furthermore, the license granted is expressly made subject to the following additional limitations: Customer shall not (i) rent, lease, display, sell, transfer, assign, sublicense, or distribute the Evaluation Board; and (ii) permit any Third Party to access the Evaluation Board. As used herein, the term "Third Party" includes any entity other than ADI, Customer, their employees, affiliates and in-house consultants. The Evaluation Board is NOT sold to Customer; all rights not expressly granted herein, including ownership of the Evaluation Board, are reserved by ADI. CONFIDENTIALITY. This Agreement and the Evaluation Board shall all be considered the confidential and proprietary information of ADI. Customer may not disclose or transfer any portion of the Evaluation Board to any other party for any reason. Upon discontinuation of use of the Evaluation Board or termination of this Agreement, Customer agrees to promptly return the Evaluation Board to ADI. ADDITIONAL RESTRICTIONS. Customer may not disassemble, decompile or reverse engineer chips on the Evaluation Board. Customer shall inform ADI of any occurred damages or any modifications or alterations it makes to the Evaluation Board, including but not limited to soldering or any other activity that affects the material content of the Evaluation Board. Modifications to the Evaluation Board must comply with applicable law, including but not limited to the RoHS Directive. TERMINATION. ADI may terminate this Agreement at any time upon giving written notice to Customer. Customer agrees to return to ADI the Evaluation Board at that time. LIMITATION OF LIABILITY. THE EVALUATION BOARD PROVIDED HEREUNDER IS PROVIDED "AS IS" AND ADI MAKES NO WARRANTIES OR REPRESENTATIONS OF ANY KIND WITH RESPECT TO IT. ADI SPECIFICALLY DISCLAIMS ANY REPRESENTATIONS, ENDORSEMENTS, GUARANTEES, OR WARRANTIES, EXPRESS OR IMPLIED, RELATED TO THE EVALUATION BOARD INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTY OF MERCHANTABILITY, TITLE, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS. IN NO EVENT WILL ADI AND ITS LICENSORS BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES RESULTING FROM CUSTOMER'S POSSESSION OR USE OF THE EVALUATION BOARD, INCLUDING BUT NOT LIMITED TO LOST PROFITS, DELAY COSTS, LABOR COSTS OR LOSS OF GOODWILL. ADI'S TOTAL LIABILITY FROM ANY AND ALL CAUSES SHALL BE LIMITED TO THE AMOUNT OF ONE HUNDRED US DOLLARS (\$100.00). EXPORT. Customer agrees that it will not directly or indirectly export the Evaluation Board to another country, and that it will comply with all applicable United States federal laws and regulations relating to exports. GOVERNING LAW. This Agreement shall be governed by and construed in accordance with the substantive laws of the Commonwealth of Massachusetts (excluding conflict of law rules). Any legal action regarding this Agreement will be heard in the state or federal courts having jurisdiction in Suffolk County, Massachusetts, and Customer hereby submits to the personal jurisdiction and venue of such courts. The United Nations Convention on Contracts for the International Sale of Goods shall not apply to this Agreement and is expressly disclaimed.