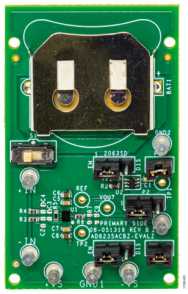

ANALOG DEVICES AD8235 Micropower Instrumentation Amplifier User Guide

AD8235ACBZ-EVALZ User Guide
UG-1478

Evaluating the AD8235 40 µA, Micropower Instrumentation Amplifier

Contents

FEATURES

Simple evaluation of the AD8235
CR2032 battery provision
On-board voltage reference using the LTC2063 low power amplifier
2 in × 1.35 in small form factor

APPLICATIONS

Fast and easy product evaluation and characterization Portable system applications

GENERAL DESCRIPTION

The AD8235ACBZ-EVALZ contains a CR2032 battery provision that is capable of powering up the AD8235 40 µA, micropower instrumentation amplifier and the LTC2063 low power operational amplifier. This feature allows the AD8235ACBZ-EVALZ to be a standalone board ready for product evaluation.
The AD8235ACBZ-EVALZ design allows the user to easily adjust the gain resistors and common discrete components on the board. The on-board male headers set the AD8235ACBZ-EVALZ to different configurations using the jumper shunt.
The AD8235ACBZ-EVALZ allows battery-powered configuration to showcase the portable nature of the AD8235. In battery-powered configuration, the LTC2063 acts as the voltage reference for the single-supply configuration.
For full details on the AD8235, see the AD8235 data sheet, which must be consulted in conjunction with this user guide when using the AD8235ACBZ-EVALZ.

EVALUATION BOARD PHOTOGRAPH

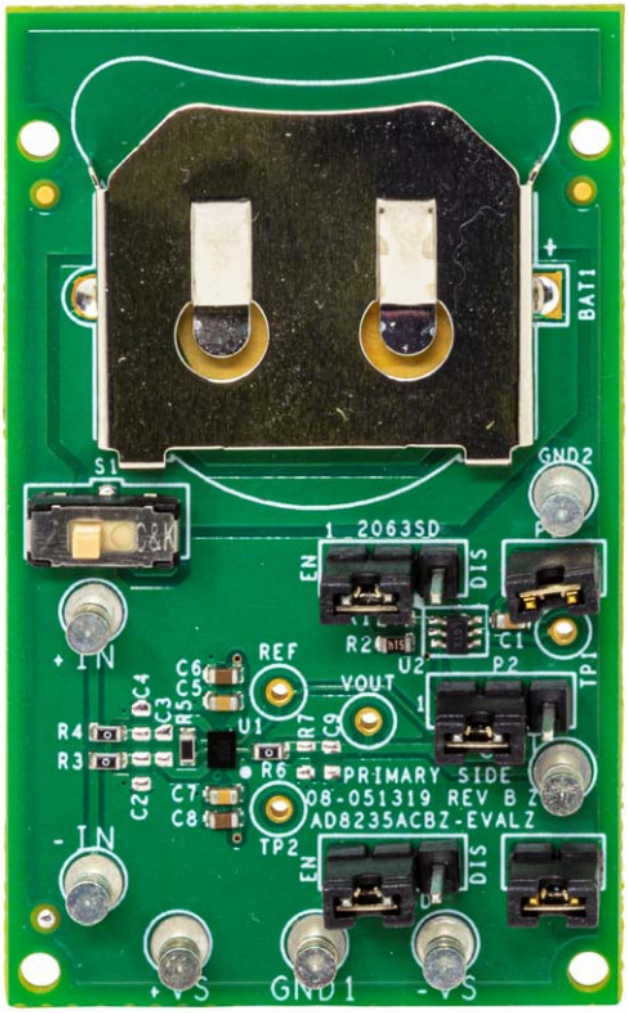

Figure 1.

EVALUATION BOARD HARDWARE

SINGLE-SUPPLY OPERATION

A switch (S1) is provided on the AD8235ACBZ-EVALZ to select either a battery-powered configuration or an external supply configuration. The AD8235ACBZ-EVALZ is shipped in battery operated single-supply mode and is configured on the P2, P3, and P5 jumpers.

ON-BOARD AD8235

The AD8235 shutdown pin (SDN) can allow continuous operation of the AD8235, or this pin can interface to allow a microcontroller to be set when the AD8235 must operate in shutdown mode to conserve further energy.

Gain Adjustment

The AD8235 gain is pin-selectable where the gain (G) = 5 (default) and where the gain resistor (RG) is unpopulated. The AD8235 gain is resistor dependent. The resistor is connected between the RG pins. Table 1 provides calculated gains for the AD8235. See the
AD8235 data sheet for the gain equation.

Table 1. AD8235 Gain Resistor Values

1% Standard Value of RG (kΩ)	Calculated Gain
422	6.0
210	7.0
140	8.0
105	9.0
84.5	10.0
28	20.0
9.31	50.1
4.42	100.0
2.15	200.3

COMPONENT LOCATIONS

See Figure 4 for the AD8235ACBZ-EVALZ component layout, connector locations, and male header locations.

LOAD RESISTOR

Although not required for normal operation, a load resistor can be inserted at Position R7.

Voltage Reference or Offset Adjustment

The default configuration of the AD8235ACBZ-EVALZ reference is set on the midsup ply level driven by the LTC2063.

The on-board voltage reference can be set at the P2 jumper to power up the LTC2063, and at the P3 jumper to connect the LTC2063 OUT pin to the AD8235 REF pin. See Figure 2 for the schematic design of the on-board voltage reference.

The LTC2063 features a shutdown control pin (SHDN) to disable the device. The 2063SD header on the AD8235ACBZ-EVALZ connects the LTC2063 SHDN pin to either the +VS pin or the GND1 pin of the AD8235ACBZ-EVALZ, and can interface to a microcontroller. See Table 2 for the LTC2063 options.

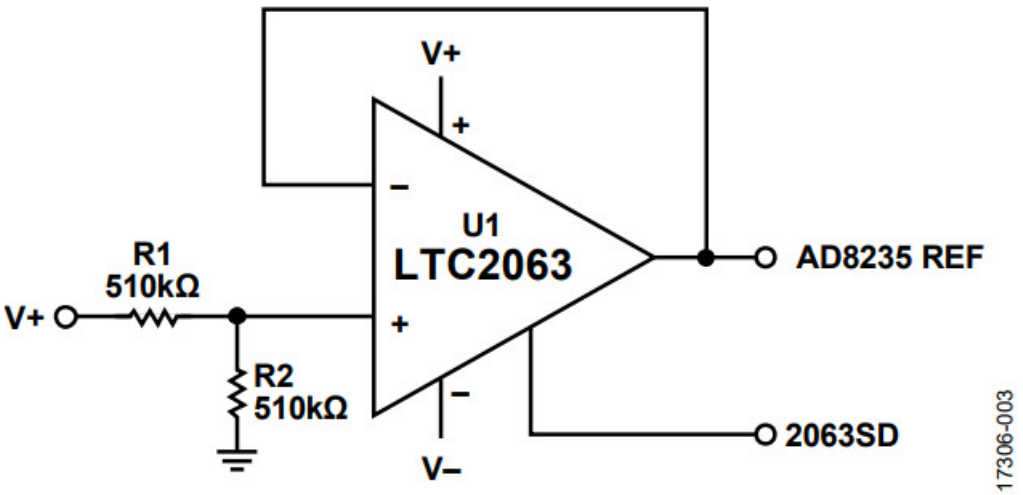

Figure 2. On-Board Voltage Reference

Table 2. Jumpers and Switch Configuration Options

Jumper	Function	Default Position
8235SD	Allows the AD8235 SDN pin to connect to either the +VS inp ut or the –VS input on the AD8235ACBZ-EVALZ.	EN
2063SD	Allows the LTC2063 SHDN pin to connect to either the +VS i nput or the GND1 input on the AD8235ACBZ-EVALZ.	EN
P1	Connects the LTC2063 V + pin to the power supply to power up the LTC2063.	Installed
P2	Allows the AD8235 REF pin to connect to either the LTC2063 OUT pin or the GND1 pin on the AD8235ACBZ-EVALZ.	Position 1, connected to the LT C2063 OUT pin
P3	Connects the AD8235 –VS pin to the GND1 pin on the AD82 35ACBZ-EVALZ for single supply operation.	Installed
S1	Allows the AD8235ACBZ-EVALZ to be powered up by the C R2032 battery.	Position 1, battery not connecte d to the AD8235 +VS pin or the LTC2063 V + pin

Table 3. AD8235ACBZ-EVALZ Input/Output Pins and Function Descriptions

Input/Output Pin	Function
+VS and –VS	Positive and negative rails of the amplifiers.
GND1 and GND2	Ground for the board.
+IN and –IN	Positive and negative AD8235 inputs.
REF	Reference input for the AD8235.
VOUT	AD8235 output.

AD8235ACBZ-EVALZ SCHEMATIC AND ARTWORK

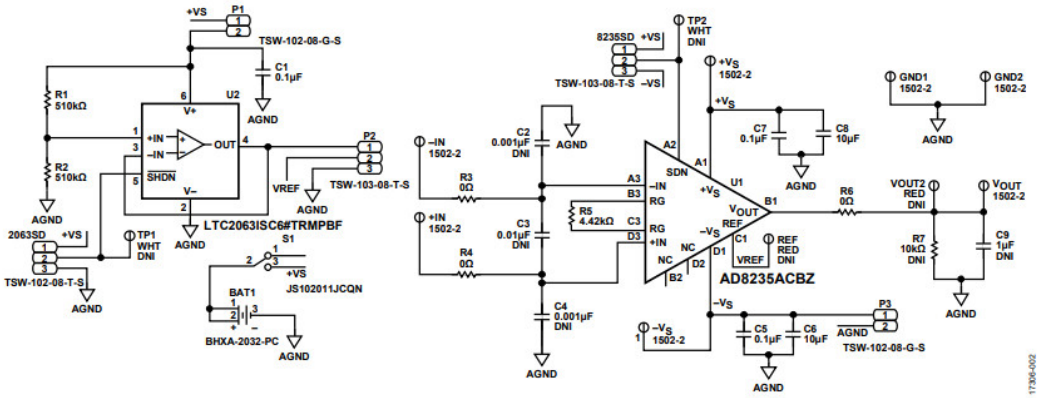

Figure 3. AD8235ACBZ-EVALZ Schematic

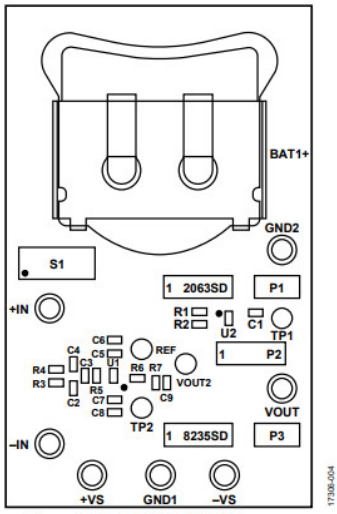

Figure 4. AD8235ACBZ-EVALZ Components

ORDERING INFORMATION

BILL OF MATERIALS

Table 4.

Reference Designator	Description	Manufacturer	Part Number
R5	Precision thin film chip resistor, 4.42 kΩ, R0603	Panasonic	ERJ-3EKF4421V
R1, R2	Precision thin film chip resistors, 510 kΩ, R0603	TE Connectivity	CPF0603B510KE1
R3, R4, R6	Surface mount device (SMD) resistor chips, 0 Ω, R 0603	Vishay	CRCW0603000ZRT1
C6, C8	X5R ceramic capacitors, 10 µF, R0603	TDK	C1608X5R1A106K080 AC
C1, C5, C7	X7R ceramic capacitors, 0.1 µF, R0603	Kemet	C0603C104K4RAC
P1, P3	2-position, male printed circuit board (PCB) header s	SAMTEC	TSW-102-08-G-S
P2, 8235S D, 2063SD	3-position, male PCB headers	SAMTEC	TSW-103-08-T-S
S1	Subminiature single-pole double throw (SPDT) swit ch	C&K	JS102011JCQN
+VS, –VS, +IN, –IN, G ND1, GND 2, VOUT	Turret style test points	Keystone Electro nics	1502-2
BAT1	CR2032 battery holder	Memory Protectio n Devices	BHX1-2032-PC
U2	Low bias current (IB), zero drift operational amplifie r	Analog Devices	LTC2063ISC6#TRMPB F
U1	Micropower instrumentation amplifier, 40 µA	Analog Devices	AD8235ACBZ-P7

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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Documents / Resources

	ANALOG DEVICES AD8235 Micropower Instrumentation Amplifier [pdf] User Guide AD8235 Micropower Instrumentation Amplifier, AD8235, Micropower Instrumentation Amplifier, Instrumentation Amplifier, Amplifier

References

- Mixed-signal and digital signal processing ICs | Analog Devices
- User Manual