**Evaluating the ADA4099-2 50 V, 8 MHz, 1.5 mA per Channel, Robust, Over-the-Top Precision Op Amp**

## FEATURES

- Fully featured evaluation board for the ADA4099-2
- Enables efficient prototyping
- User defined circuit configuration
- Simplified connection to test equipment and other circuits

## EVALUATION KIT CONTENTS

- EVAL-ADA4099-2EBZ

## EQUIPMENT NEEDED

- Dual-output dc power supply
- Dual-channel signal generator
- Oscilloscope
- Banana jack to grabber cables
- BNC to SMA cables

## DOCUMENTS NEEDED

- ADA4099-2 data sheet

## GENERAL DESCRIPTION

The EVAL-ADA4099-2EBZ evaluates the ADA4099-2 10-lead, lead frame chip scale package (LFCSP), robust Over-The-Top™ precision operational amplifier (op amp). The EVAL-ADA4099-2EBZ is a prepopulated board using a gain of 1 configuration.

The EVAL-ADA4099-2EBZ design allows simplified and efficient use. The EVAL-ADA4099-2EBZ has edge mounted Subminiature Version A (SMA) connectors on the inputs and outputs to allow efficient connection to test equipment or other circuits. Bulk test points are also incorporated as an alternative option to be used for the inputs and outputs. The optimized EVAL-ADA4099-2EBZ ground plane, component placement, and power supply allow maximum circuit flexibility and performance. The EVAL-ADA4099-2EBZ uses a combination of surface-mount technology (SMT) with majority of components in 0603 case size, except for the 10 µF bypass capacitor. The EVAL-ADA4099-2EBZ also has unpopulated resistor and capacitor pads, which provide the user with the options and flexibility to implement different application circuits and configurations.

Figure 1 shows the top view of the EVAL-ADA4099-2EBZ, and Figure 2 shows the bottom view of the EVAL-ADA4099-2EBZ.

For full details on the ADA4099-2, see the ADA4099-2 data sheet, which must be consulted in conjunction with this user guide when using the EVAL-ADA4099-2EBZ.

## EVALUATION BOARD PHOTOGRAPHS

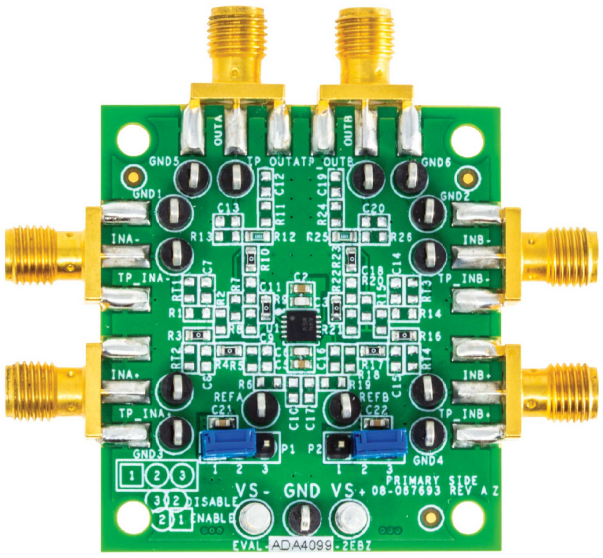


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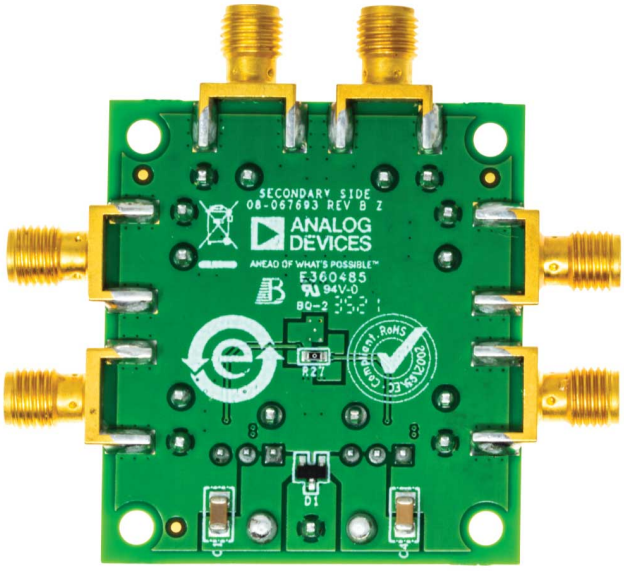
*Figure 1. EVAL-ADA4099-2EBZ, Primary Side*




002

*Figure 2. EVAL-ADA4099-2EBZ, Secondary Side*

## TABLE OF CONTENTS

Features ..... 1
Evaluation Kit Contents ..... 1
Equipment Needed ..... 1
Documents Needed ..... 1
General Description ..... 1
Evaluation Board Photographs ..... 1
Evaluation Board Quick Start Procedures ..... 3
Power Supply Consideration ..... 3
Initial Board Configuration ..... 3
Using the Evaluation Board for Testing ..... 3
Evaluation Board Schematics and Artwork ..... 4
Ordering Information ..... 6
Bill of Materials ..... 6

## REVISION HISTORY

**1/2022—Revision 0: Initial Version**

## EVALUATION BOARD QUICK START PROCEDURES

The Power Supply Consideration section, the Initial Board Configuration section, and the Using the Evaluation Board for Testing section outline the basic, prepopulated EVAL-ADA4099-2EBZ configuration required to test the basic functionality of the device.

### POWER SUPPLY CONSIDERATION

Use the turret pins (VS+, VS−, and GND) to power up the EVAL-ADA4099-2EBZ. Ensure that the correct polarity and voltage level is used to avoid reverse polarity and overvoltage, which can permanently damage the EVAL-ADA4099-2EBZ. The operating supply voltage range is 3.15 V to 50 V. Higher voltages can damage the amplifier. Decoupling capacitors of 10 µF, 0.1 µF, and 100 pF are preinstalled on the EVAL-ADA4099-2EBZ for ready operation.

### INITIAL BOARD CONFIGURATION

To set up the initial EVAL-ADA4099-2EBZ configuration, perform the following steps:

1. Ensure that all equipment is powered down, including the power supply and the signal generator. Use the banana jack to grabber cables to connect the positive supply, ground, and negative supply to the VS+, VS−, and GND turret pins, respectively.
2. Verify that the P1 jumper for SHDN1 is in Position 1 (labeled ENABLE) to tie SHDN1 to VS−, or leave Position 1 open without the jumper connection to enable the device at Channel A. Also, verify that the P2 jumper for SHDN2 is in Position 3 (labeled DISABLE) to tie SHDN1 to VS+ and disable Channel B or shutdown mode. The unused or inactive channel (Channel B), non-inverting input INB+, and output OUTB must all be tied to GND.
3. Connect the signal generator at the INA+ SMA pad using a Bayonet Neill-Concelman (BNC) to SMA cable, or at the INA+ bulk test point and adjacent GND bulk test point using a BNC to grabber cable.
4. Connect OUTA on the EVAL-ADA4099-2EBZ to the oscilloscope using a BNC to SMA cable, or connect an oscilloscope probe with a 10× attenuation factor to the OUTA bulk test point, and clip the ground of the oscilloscope probe with a 10× attenuation factor to the adjacent GND bulk test point.
5. To use Channel B instead of Channel A, repeat Step 1 to Step 4 and move the P2 jumper on the EVAL-ADA4099-2EBZ from Position 3 to Position 1 to tie SHDN2 to VS−, or leave Position 1 open without the jumper connection. Verify that the P1 jumper is moved from Position 1 to Position 3 to tie SHDN1 to VS+ and disable Channel A. The unused or inactive channel (Channel A), non-inverting input INB+, and output OUTB must all be tied to GND. Finally, apply an input signal at INB+ and monitor the output at OUTB.

### USING THE EVALUATION BOARD FOR TESTING

When the procedure in the Initial Board Configuration section is complete, implement the following settings and verify the expected output:

1. Set the power supply to +15 V for the positive supply and −15 V for the negative supply, and then turn on the power supply.
2. Configure the signal generator to output a 1 kHz sine wave with 0 V offset and 1 V p-p, and enable the generator.
3. Set the oscilloscope scaling to 200 mV/2 ms per division. If using a 10× probe instead of a BNC to SMA cable to monitor OUTA, set the oscilloscope input impedance to 1 MΩ, and the oscilloscope probe setting attenuation factor to 10×. Ensure that a 1 kHz, 1 V p-p sine wave centered at 0 V appears on the oscilloscope.
4. To evaluate the device shutdown performance, move the P1 jumper into Position 3 (labeled DISABLE) to tie SHDN1 to VS+. There is no output at the OUTA SMA pad or bulk test point. To reenable the device, move the P1 jumper back into Position 1 (labeled ENABLE).
5. Repeat Step 1 to Step 4 with the P2 jumper on the EVAL-ADA4099-2EBZ to enable and disable Channel B on the SHDN2 pin. Apply an input signal at INB+ and monitor the output at OUTB.

## EVALUATION BOARD SCHEMATICS AND ARTWORK

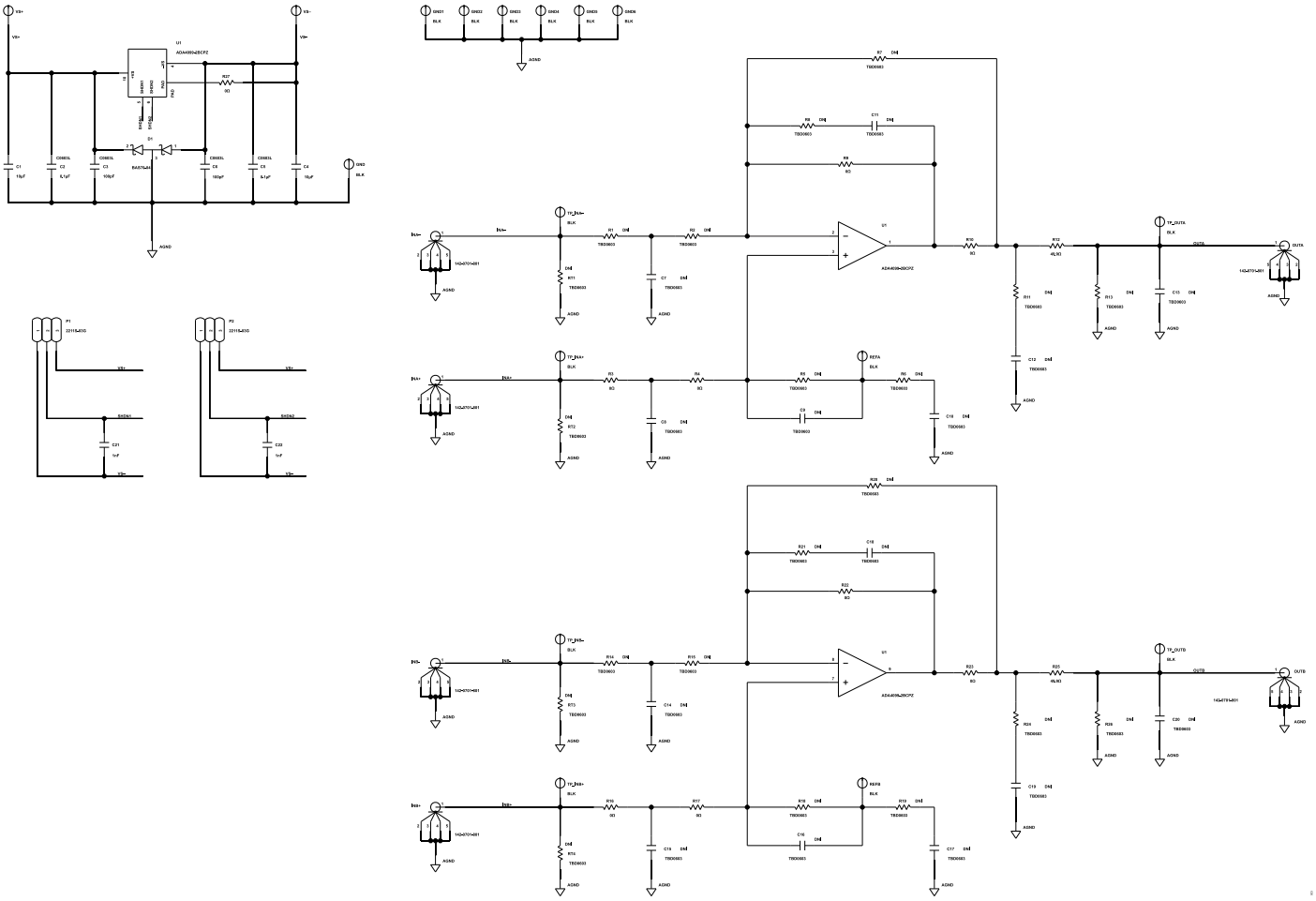


*Figure 3. EVAL-ADA4099-2EBZ Schematic*

## EVALUATION BOARD SCHEMATICS AND ARTWORK

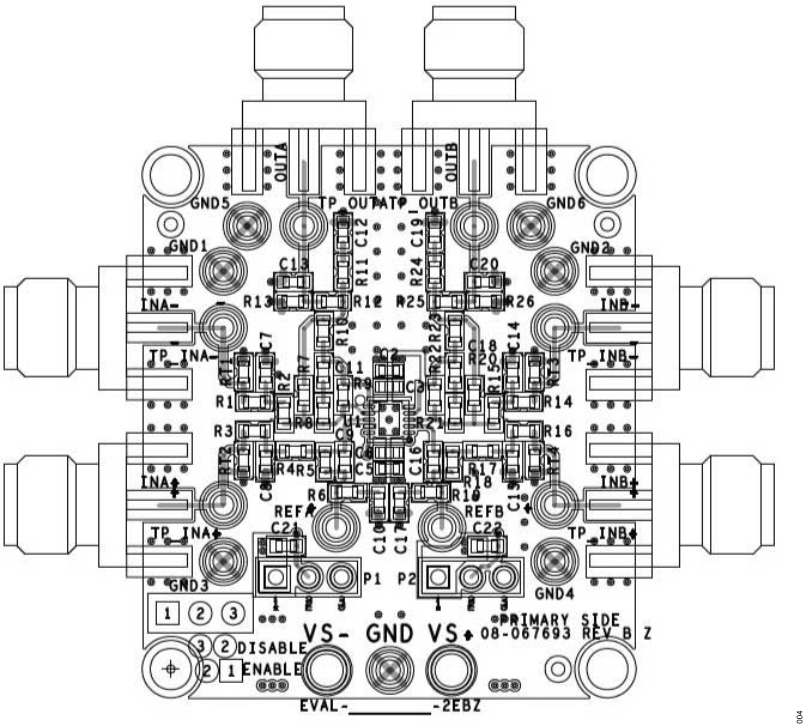



*Figure 4. EVAL-ADA4099-2EBZ Layout Pattern, Primary Side*

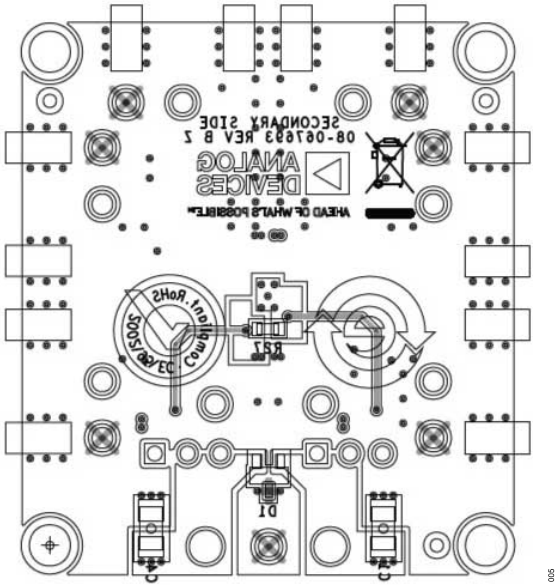



*Figure 5. EVAL-ADA4099-2EBZ Layout Pattern, Secondary Side*

## ORDERING INFORMATION

## BILL OF MATERIALS

*Table 1.*

| Qty | Reference Designator | Description | Supplier | Part Number |
|---|---|---|---|---|
| 1 | U1 | 50 V, 8 MHz, 1.5 mA robust Over-The-Top precision op amp | Analog Devices, Inc. | ADA4099-2BCPZ |
| 2 | C1, C4 | Ceramic capacitors, X5R, 1206, 10 µF | TDK | C3216X5R1H106K160AB |
| 2 | C2, C5 | Ceramic capacitors, X7R, 0603, 0.1 µF | Yageo | CC0603KRX7R9BB104 |
| 2 | C21, C22 | Ceramic capacitor, X7R, 0603, 1 nF | AVX Corporation | 06031C102KAT2A |
| 2 | C3, C6 | Ceramic capacitor, X7R, 0603, 100 pF | Kemet | C0603C101K5RAC |
| 14 | C7 to C20 | Capacitors, 0603, do not install (DNI), user defined | Not applicable | Not applicable |
| 1 | D1 | Diode Schottky barrier | Nexperia USA | BAS70-04,215 |
| 3 | GND, VS+, VS− | Printed circuit board (PCB) connector, terminal turrets | Mill-Max | 2501-2-00-80-00-00-07-0 |
| 15 | TP_INA+, TP_INA−, REFA, TP_OUTA, TP_INB+, TP_INB−, REFA, REFB, TP_OUTB, GND1 to GND6 | PCB connector, bulk test points | Components | TP-104-01-00 |
| 6 | INA+, INA−, OUTA, INB+, INB−, OUTB | Coax SMA end launch | Cinch | 142-0701-801 |
| 2 | P1, P2 | PCB connector, 3-position, male header | Multicomp (SPC) | 2211S-03G |
| 2 | R12, R25 | Resistor, 49.9 Ω | Vishay | TNPW060349R9BEEA |
| 20 | R1, R2, R5 to R8, R11, R13 to R15, R18 to R21, R24, R26, RT1 to RT4 | Resistors, 0603, DNI, user defined | Not applicable | Not applicable |
| 9 | R3, R4, R9, R10, R, 16, R17, R22, R23, R27 | Resistors, 0 Ω | Panasonic | ERJ-3GEY0R00V |