

Evaluation Board User Guide for the **ADA4522-2** 55 V, EMI Enhanced, Zero Drift, Ultralow Noise, Rail-to-Rail Output Operational Amplifier

FEATURES

- Full featured evaluation board for the [ADA4522-2](#)
- Enables efficient prototyping
- User defined circuit configuration
- Edge mounted SMA connector provisions

EVALUATION KIT CONTENTS

EVAL-ADA4522-2ARMZ

EQUIPMENT NEEDED

- Dual output power supply
- Signal generator
- Oscilloscope
- 3 banana jack to grabber cables
- 2 SMA to BNC male cables

DOCUMENT NEEDED

[ADA4522-1/ADA4522-2/ADA4522-4](#) data sheet

GENERAL DESCRIPTION

The EVAL-ADA4522-2ARMZ allows the evaluation of the [ADA4522-2](#), 8-lead, dual-channel, mini small outline package (MSOP) operational amplifier (op amp). Both channels of the [ADA4522-2](#) in this evaluation board are configured in a noninverting amplifier with a gain of 101. The output has a low-pass filter with a cutoff frequency of approximately 117 kHz that minimizes the artifacts introduced by the 800 kHz chopping frequency of the [ADA4522-2](#).

The flexible design of the evaluation board allows the user to create a multitude of configurations such as inverting and noninverting amplifier, difference amplifier, and second-order Sallen-Key filters. In addition, a combination of test points and edge mounted Subminiature Version A (SMA) connectors are used for the inputs and outputs for ease of use.

The evaluation board mainly consists of 0805 sized resistors and capacitors to ensure easy installation by the user, besides the bypass capacitors, C1 and C4. The 10 μ F bypass capacitors (C1 and C4) have a package size of 2220 to accommodate a higher voltage rating because the [ADA4522-2](#) has a maximum supply of 55 V.

For full details on the [ADA4522-2](#), see the [ADA4522-1/ADA4522-2/ADA4522-4](#) data sheet, which must be consulted in conjunction with this user guide when using the EVAL-ADA4522-2ARMZ.

EVALUATION BOARD PHOTOGRAPHS

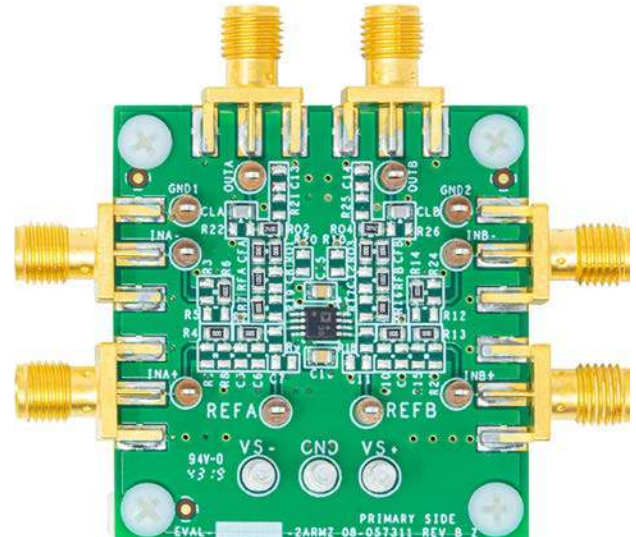


Figure 1. EVAL-ADA4522-2ARMZ, Primary Side



Figure 2. EVAL-ADA4522-2ARMZ, Secondary Side

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REVISION HISTORY

2/2020—Revision 0: Initial Version

EVALUATION BOARD QUICK START PROCEDURE

OVERVIEW

The following sections outline the basic prepopulated configuration of the EVAL-ADA4522-2ARMZ required to test the basic functionality of the ADA4522-2. Both channels of the ADA4522-2 are set up with the same configuration, but for this section, only Channel A is discussed.

POWER SUPPLY CONSIDERATION

The terminal turrets labeled VS+, VS-, and GND are used to power up the EVAL-ADA4522-2ARMZ. Make sure to always connect the proper polarity to the evaluation board. A Zener diode is installed to protect the evaluation board in case of power supply reversal. Proper supply levels must be strictly followed, with a range of 5 V to 55 V for single-supply operation and ± 27.5 V for dual-supply operation. The evaluation board also comes with a preinstalled decoupling capacitor with a value of 10 μ F and 0.1 μ F.

INITIAL BOARD CONFIGURATION

The following steps test the basic functionality of the preinstalled circuit (noninverting amplifier, with a gain of 101) of the EVAL-ADA4522-2ARMZ:

1. Before connecting anything to the evaluation board, first ensure that the power supply and signal generator are powered down.
2. Use the three banana jack to grabber cables to connect the terminal turrets labeled VS-, GND, and VS+ to the negative, ground, and positive supply, respectively.
3. Using an SMA to Bayonet Neill-Concelman (BNC) male cable, connect the output of the signal generator to the SMA on the evaluation board labeled INA+.
4. Using another SMA to BNC male cable, connect the SMA output of the channel labeled OUTA to the oscilloscope.
5. For testing Channel B, repeat Step 3 and Step 4 and utilize the SMA labeled INB+ and OUTB.

USING THE EVALUATION BOARD FOR TESTING

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

1. Set the power levels to +15 V for the positive supply rail, and -15 V for the negative supply rail.
2. Select a sine wave output for the signal generator. The frequency is 1 kHz with a magnitude of 40 mV p-p. The offset is at 0 V. Use a high-Z configuration for the output of the signal generator.
3. Set the input or the termination of the oscilloscope at 1 M Ω . The parameters on the oscilloscope that must be measured or observed are frequency and peak-to-peak voltage.
4. After setting up all the equipment, turn on the power supply first. Ensure that the current consumption is between 1 mA and 3 mA and must not exceed 5 mA.
5. After turning on the supply and verifying the voltage and current levels, turn on the signal generator. Ensure that the signal generator is displaying the correct output.
6. The oscilloscope displays the output waveform. Because the evaluation board is configured in a noninverting amplifier with a gain of 101, the output is a sine wave with a frequency of 1 kHz and a peak-to-peak voltage of approximately 4.04 V.

EVALUATION BOARD SCHEMATICS AND ARTWORK

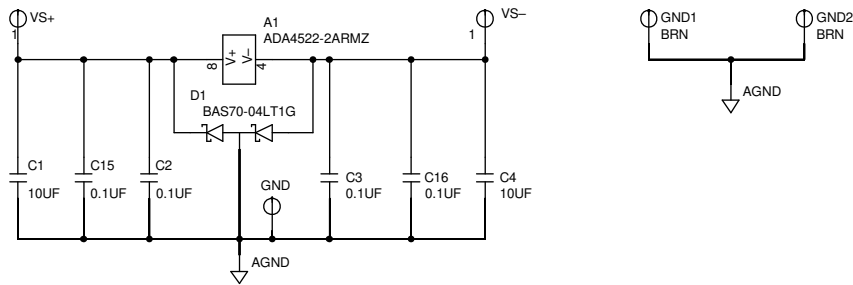


Figure 3. EVAL-ADA4522-2ARMZ Schematic, Power Supply Pins

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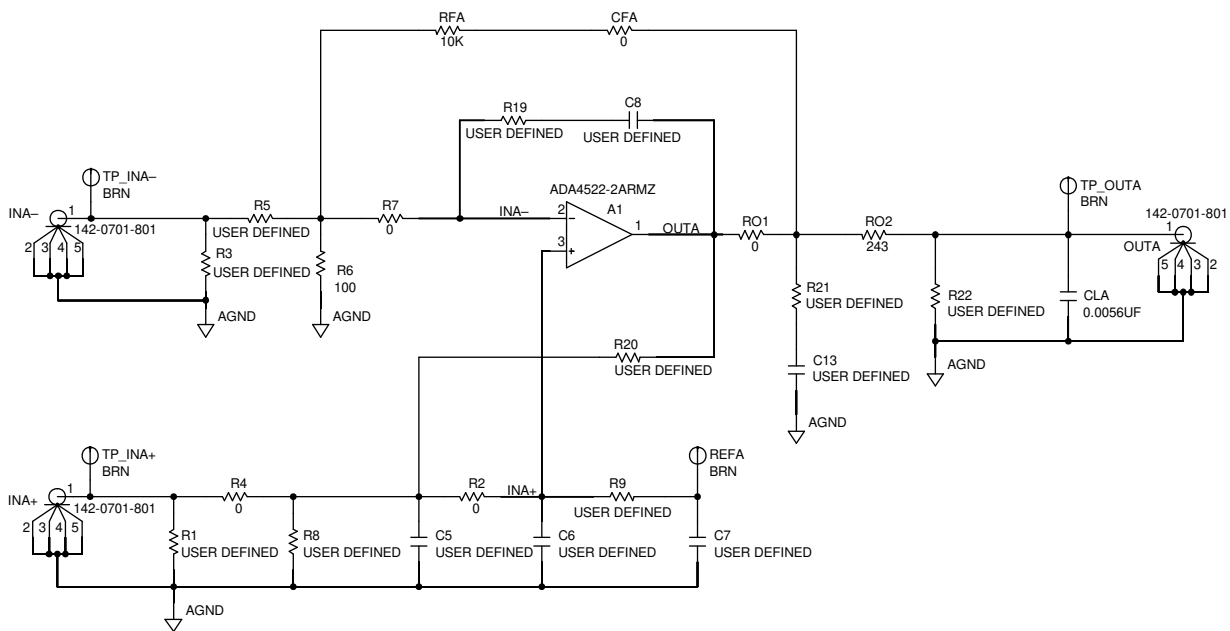


Figure 4. EVAL-ADA4522-2ARMZ Channel A Schematic

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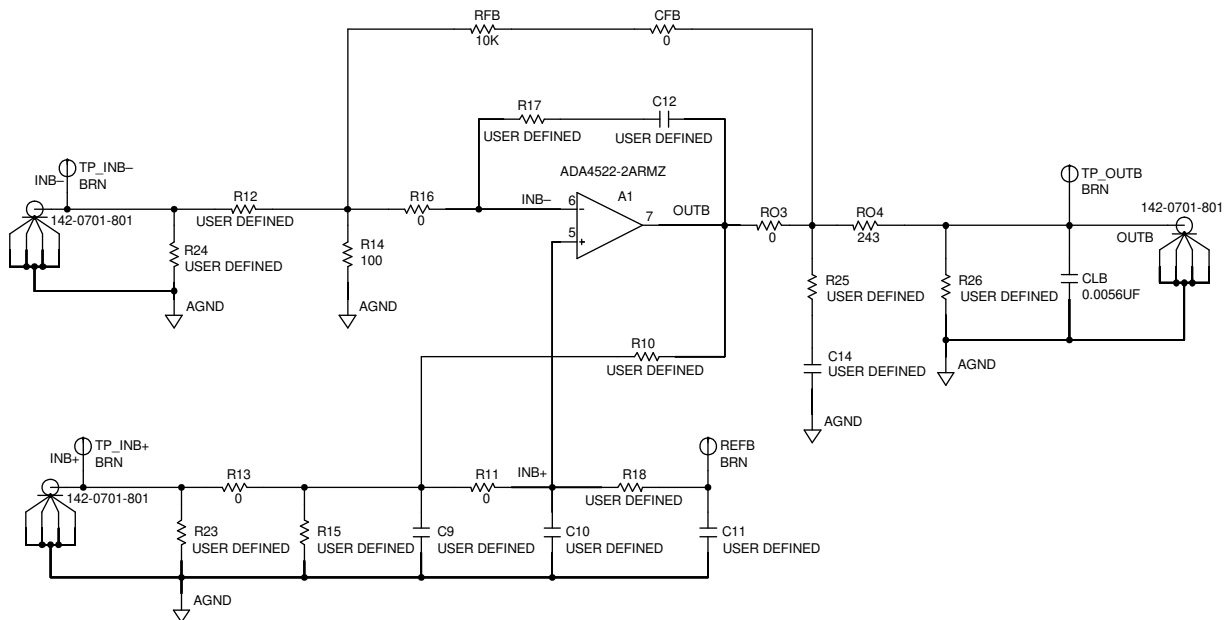
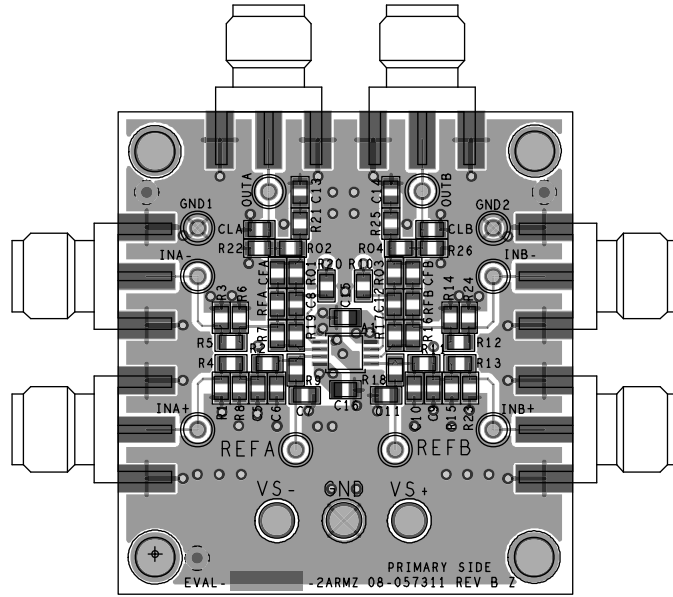


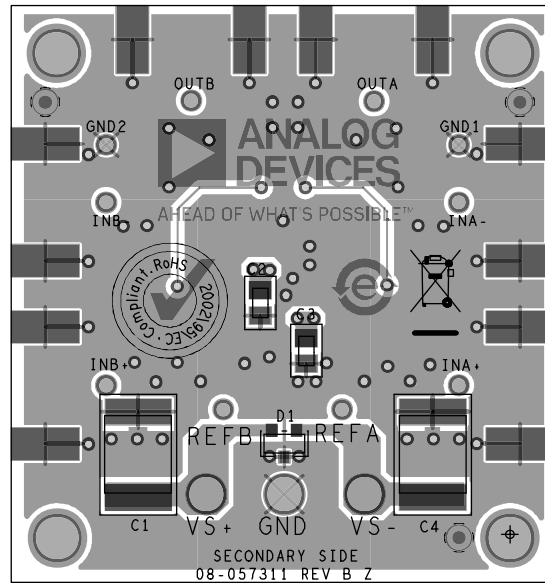
Figure 5. EVAL-ADA4522-2ARMZ Channel B Schematic

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23126-006

Figure 6. EVAL-ADA4522-2ARMZ Layout, Primary Side



23126-007

Figure 7. EVAL-ADA4522-2ARMZ Layout, Secondary Side

ORDERING INFORMATION

BILL OF MATERIALS

Table 1. Bill of Materials

Qty	Reference Designator	Description	Supplier	Part Number
1	A1	Zero drift, rail-to-rail output op amp, ADA4522-2	Analog Devices, Inc.	ADA4522-2ARMZ
2	C1, C4	Capacitors, X7R, 10 μ F, 2220	AVX Corporation	22201C106MAT2A
4	C2, C3, C15, C16	Capacitors, X7R, 0.1 μ F, 0805	AVX Corporation	08051C104JAT2A
2	CLA, CLB	Capacitors, COG, 0.0056 μ F, 0805	Murata	GRM2195C1H562JA01D
10	C5 to C14	Capacitors, user defined, 0805	Not applicable	Not applicable
10	CFA, CFB, R2, R4, R7, R11, R13, R16, RO1, RO3	Resistors, thick film, 0 Ω , 0805	Panasonic	ERJ-6GEY0R00V
2	R6, R14	Resistors, thick film, 100 Ω , 0805	Panasonic	ERJ-6ENF1000V
2	RFA, RFB	Resistors, thick film, 10 k Ω , 0805	Panasonic	ERJ-6ENF1002V
2	RO2, RO4	Resistors, thick film, 243 Ω , 0805	Panasonic	ERJ-6ENF2430V
18	R1, R3, R5, R8 to R10, R12, R15, R17 to R26	Resistors, user defined, 0805	Not applicable	Not applicable
1	D1	Schottky diode, SOT23-M3	ON Semiconductor	BAS70-04LT1G
3	GND, VS+, VS-	Terminal turrets	Mill-Max	2501-2-00-80-00-00-07-0
10	GND1, GND2, REFA, REFB, TP_INA+, TP_INA-, TP_INB+, TP_INB-, TP_OUTA, TP_OUTB	Test points, brown	Keystone Electronics	5115
6	INA+, INA-, INB+, INB-, OUTA, OUTB	SMA end launch connectors	Cinch Connectivity Solutions	142-0701-801

**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.