

Evaluating the ADuM320N/ADuM321N, 5.7 kV RMS/3.0 kV RMS Dual Digital Isolators**FEATURES**

- ▶ Simplified evaluation of the [ADuM320N/ADuM321N](#) digital isolator family
- ▶ U3 not inserted to allow evaluation of other supported *iCoupler* digital isolator in 8-lead SOIC_N package
- ▶ Small, easy configuration optimized for rapid evaluation on breadboards/prototype boards
- ▶ Test points can be fitted to measure signals

EVALUATION KIT CONTENTS

- ▶ EVAL-ADuM32XNEBZ evaluation board

SUPPORTED /COUPLER DEVICES

- ▶ ADuM320N/ADuM321N

EQUIPMENT NEEDED

- ▶ Oscilloscope
- ▶ Signal generator
- ▶ 2.25 V to 5.5 V supply
- ▶ Breadboard/prototype board

DOCUMENTS NEEDED

- ▶ ADuM320N/ADuM321N data sheet

GENERAL DESCRIPTION

The EVAL-ADuM32XNEBZ evaluation board supports simplified, efficient evaluation of the 3 kV RMS ADuM320N/ADuM321N family of *iCoupler*® digital isolators. The EVAL-ADuM32XNEBZ evaluation board also grants the ability to examine multiple other 8-lead SOIC_N *iCoupler* digital isolators through the unpopulated U3, which provides the user a JEDEC standard 8-Lead SOIC_N pad layout and routing appropriate for the evaluation of supported devices.

The EVAL-ADuM32XNEBZ evaluation board features V shaped grooves between each component (U1 to U3) that allow the user to split the PCB into sections and examine a specific device of their choice on a breadboard or similar prototyping board for ease of use. If U3 is populated with a different supported device, refer to the appropriate device data sheet.

Power and the inputs/outputs can be connected either directly to the pin header connectors or onto a prototyping board.

The EVAL-ADuM32XNEBZ evaluation board follows printed circuit board (PCB) design practices, including a ground plane on each side of the isolation barrier. No other electromagnetic interference (EMI) or noise mitigation design features are included on this board.

Full specifications for the device under test (DUT) are available in the ADuM320N/ADuM321N data sheet available from Analog Devices, Inc., and must be consulted with this user guide when using the EVAL-ADuM32XNEBZ evaluation board.

TABLE OF CONTENTS

Features.....	1	PCB Evaluation Functions.....	4
Evaluation Kit Contents.....	1	Connectors.....	4
Supported iCoupler Devices.....	1	Data Input/Output Structures.....	4
Equipment Needed.....	1	Bypass on the PCB.....	4
Documents Needed.....	1	High Voltage Capability.....	4
General Description.....	1	Power Input.....	4
EVAL-ADuM32XNEBZ Evaluation Board		Evaluation Board Schematic and Artwork.....	5
Photograph.....	3	Ordering Information.....	10
Evaluation Board Hardware.....	4	Bill of Materials.....	10

REVISION HISTORY**7/2023—Revision 0: Initial Version**

EVAL-ADUM32XNEBZ EVALUATION BOARD PHOTOGRAPH

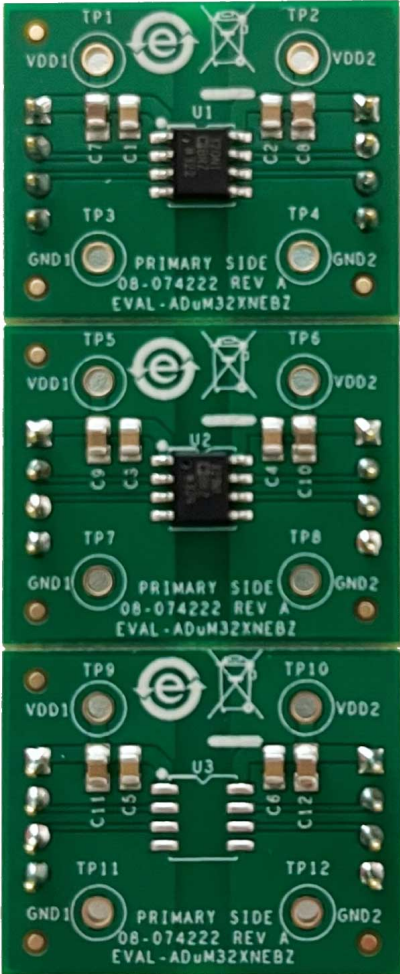


Figure 1. EVAL-ADuM32XNEBZ Evaluation Board Photograph

EVALUATION BOARD HARDWARE

PCB EVALUATION FUNCTIONS

The EVAL-ADuM32XNEBZ board comes with bypass capacitors, header pins, and ADuM320N/ADuM321N (U1 to U2) installed. The PCB features multiple test points that are not fitted by default. The compatible *iCoupler* digital isolator for U3 must be ordered and installed separately. The U3 footprint is compatible with single and dual channel *iCoupler* standard data isolator devices with on/off keying (OOK) architecture, such as the ADuM110N/ADuM120N/ADuM121N and older legacy architectures that are available in 8-lead SOIC_N packages.

The EVAL-ADuM32XNEBZ evaluation board features V shaped grooves between each component (U1 to U3) that allow the user to split the PCB into smaller sections and evaluate a device of their choice on a breadboard/prototype board.

CONNECTORS

The EVAL-ADuM32XNEBZ PCB supports both connections made directly to the 4-pin headers or connections made to a prototyping/breadboard in which the EVAL-ADuM32XNEBZ is mounted. The 4-pin header connectors for the evaluation board are located on the bottom of the PCB and are spaced appropriately to ensure compatibility with a range of standard 0.1 in. (2.54 mm) pitch spaced breadboards. The PCB can also be separated into smaller sections to evaluate a specific device and channel configuration as needed.

DATA INPUT/OUTPUT STRUCTURES

Digital input and output signals are connected through the P1 to P6 4-pin headers to allow connections from the EVAL-ADuM32XNEBZ to a signal generator. Each side of each *iCoupler* digital isolator has a 4-pin header that is used for power, ground, and data I/O connections.

To distinguish between the power and the data input/output for the corresponding device, see [Figure 2](#).

BYPASS ON THE PCB

Optional 10 μ F power-supply decoupling capacitors are installed by default on the power lines of the PCB. These capacitors can be removed if not required by the user application. The PCB also features optimal 0.1 μ F bypass capacitors for both DUT power-supply pins, located close to the *iCoupler* digital isolator.

HIGH VOLTAGE CAPABILITY

The purpose of this PCB is to allow the user rapid evaluation of the ADuM320N/ADuM321N family of digital isolators. Do not rely on the evaluation board for safety functions.

POWER INPUT

Each side of the *iCoupler* standard data isolator requires an off board power source. The power source must be independent if common-mode voltages are applied across the isolation barrier, or damage can occur to the power supply. Divided power and ground planes are present on the layers of the PCB on each side of the isolation barrier shown in [Figure 3](#) and [Figure 4](#). Power connects to V_{DD1} for Side 1 and to V_{DD2} for Side 2. To see the appropriate power pins on the connectors, see [Figure 2](#).

EVALUATION BOARD SCHEMATIC AND ARTWORK

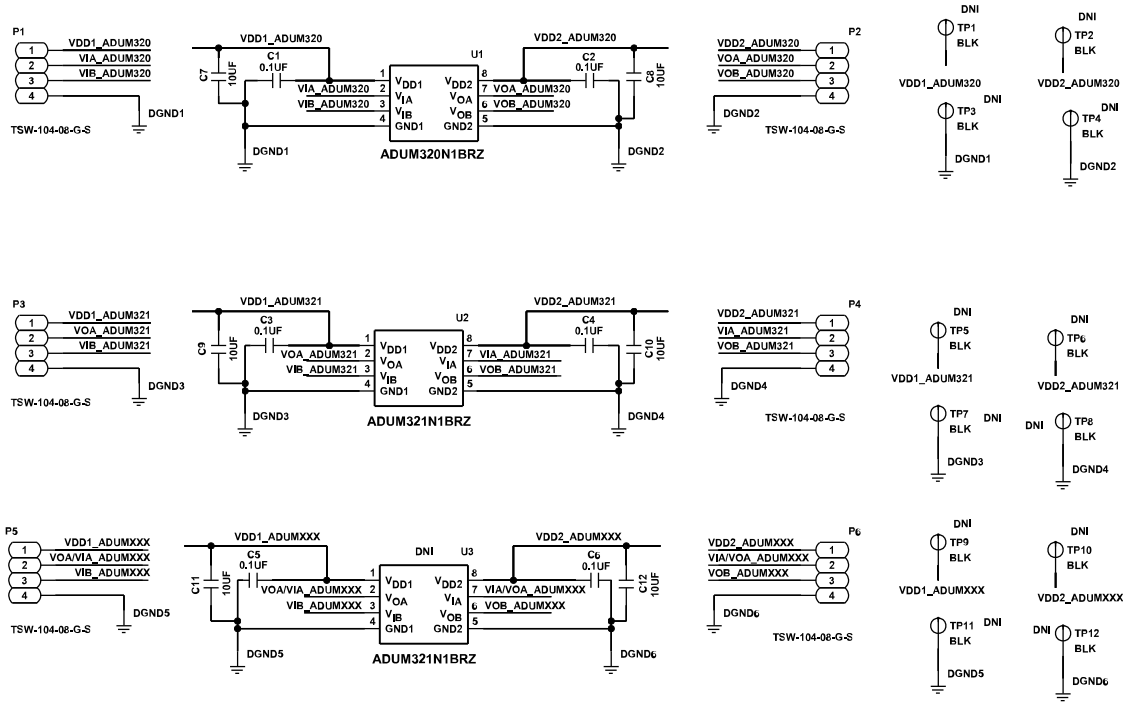


Figure 2. EVAL-ADuM32XNEBZ Evaluation Board Schematic

EVALUATION BOARD SCHEMATIC AND ARTWORK

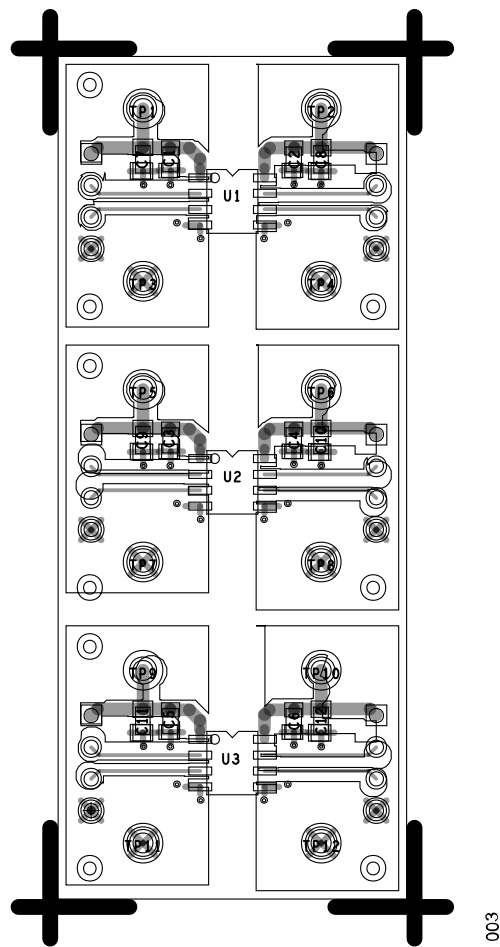


Figure 3. EVAL-ADuM32XNEBZ Evaluation Board Component Side, Layer 1

EVALUATION BOARD SCHEMATIC AND ARTWORK

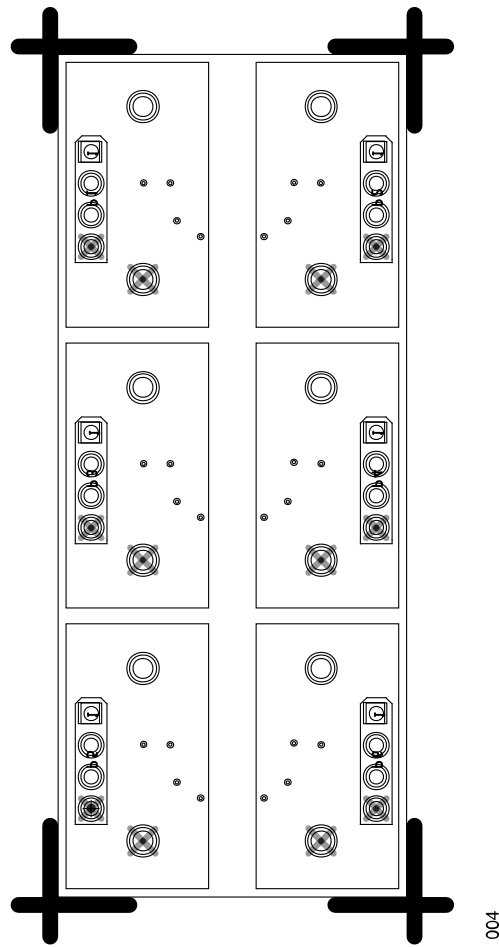


Figure 4. EVAL-ADuM32XNEBZ, Evaluation Board Layer 2

EVALUATION BOARD SCHEMATIC AND ARTWORK

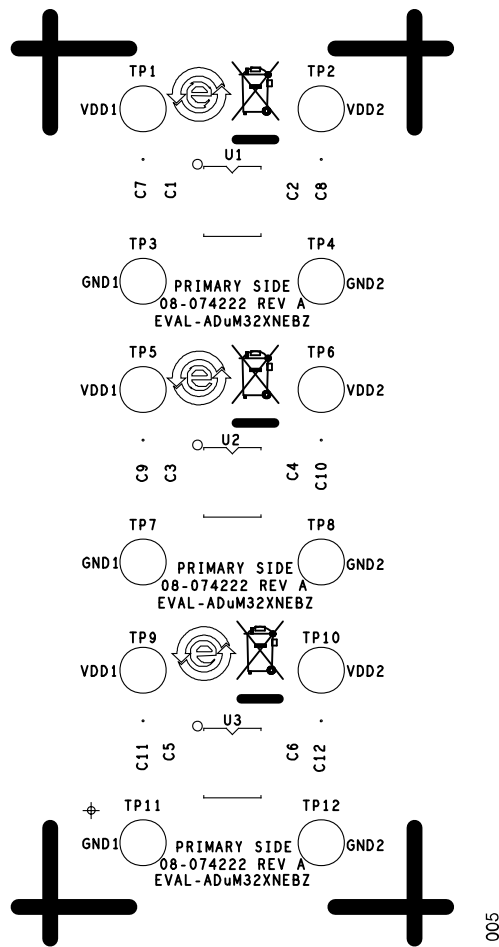


Figure 5. EVAL-ADuM32XNEBZ Evaluation Board Top Silkscreen

EVALUATION BOARD SCHEMATIC AND ARTWORK

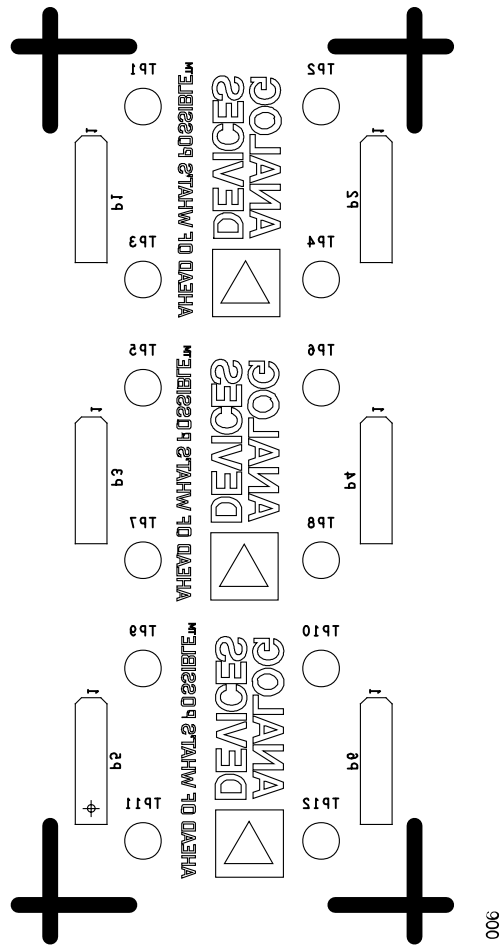


Figure 6. EVAL-ADuM32XNEBZ Evaluation Board Bottom Silkscreen

ORDERING INFORMATION

BILL OF MATERIALS

Table 1. EVAL-ADuM32XNEBZ Bill of Materials

Quantity	Reference Designator	Part Description	Manufacturer	Part Number ¹
0	TP1 to TP12	Test points, black (not installed)	Keystone Electronics	5006
0	U3	3.0 kV RMS dual digital isolator (not installed)	Analog Devices, Inc.	N/A
1	U1	Dual-channel digital isolator	Analog Devices, Inc.	ADUM320N1BRZ
1	U2	Dual-channel digital isolator	Analog Devices, Inc.	ADUM321N1BRZ
6	C1 to C6	Ceramic capacitors, 0.1 µF, 50 V, 5%, X7R, 0805	Kemet	C0805C104J5RACTU
6	C7 to C12	Ceramic capacitors, 10 µF, 25 V, 10%, X5R, 0805	Murata	GRM21BR61E106KA73L
6	P1 to P6	4-pin headers, 0.1 inch spacing	Samtec	TSW-104-08-G-S

¹ N/A = Not applicable.

**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 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.

