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 *i*Coupler 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 *i*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 *i*Coupler® digital isolators. The EVAL-ADuM32XNEBZ evaluation board also grants the ability to examine multiple other 8-lead SOIC_N *i*Coupler 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.

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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 *i*Coupler digital isolator for U3 must be ordered and installed separately. The U3 footprint is compatible with single and dual channel *i*Coupler 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 *i*Coupler 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 µF 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 µF bypass capacitors for both DUT power-supply pins, located close to the *i*Coupler 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 *i*Coupler 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

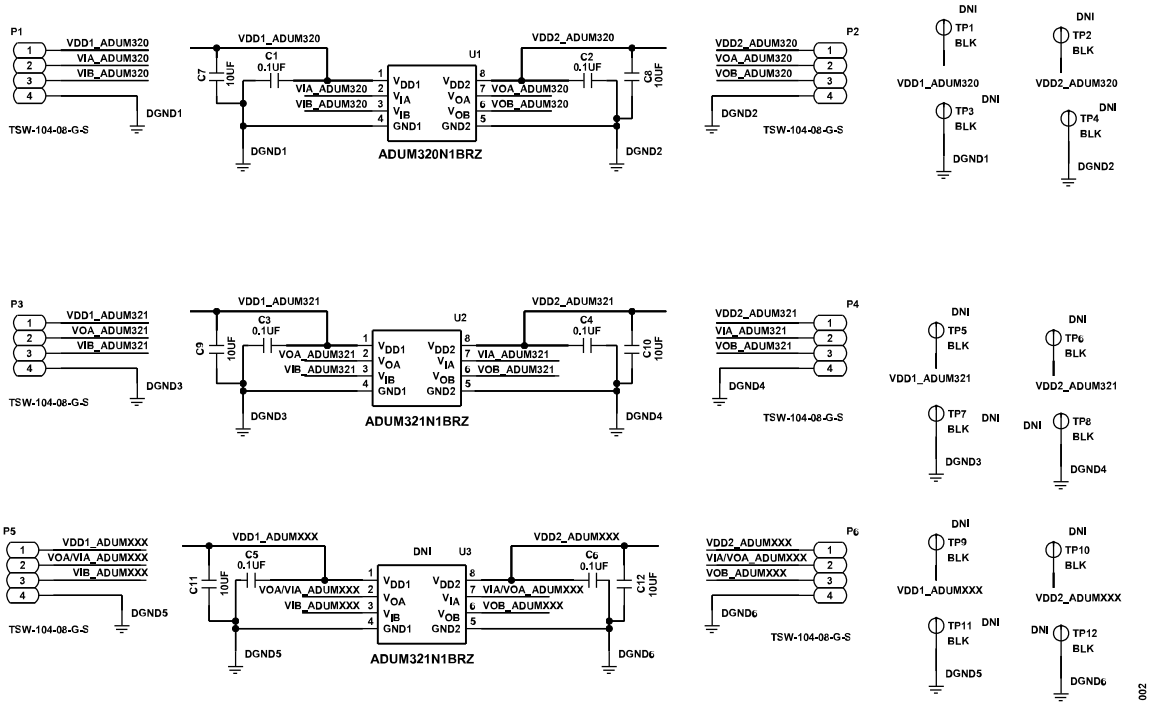

Figure 2. EVAL-ADuM32XNEBZ Evaluation Board Schematic

EVALUATION BOARD SCHEMATIC AND ARTWORK

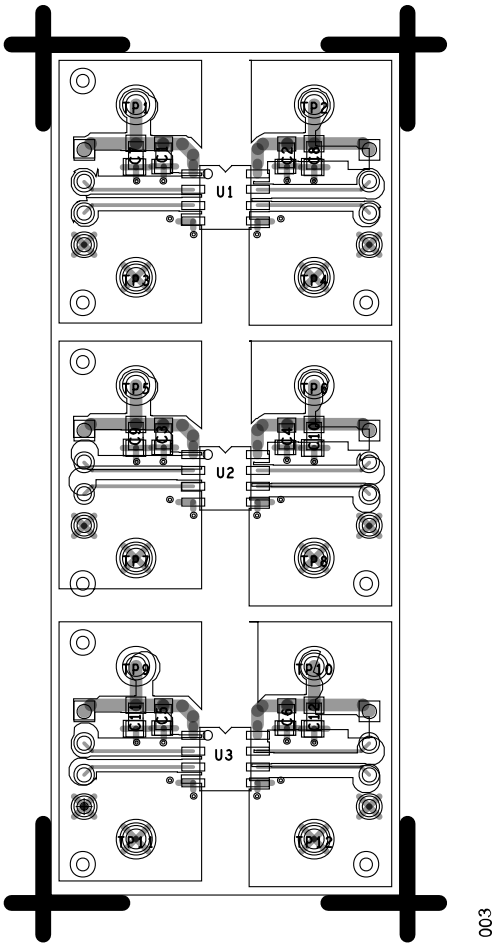

Figure 3. EVAL-ADuM32XNEBZ Evaluation Board Component Side, Layer 1

EVALUATION BOARD SCHEMATIC AND ARTWORK

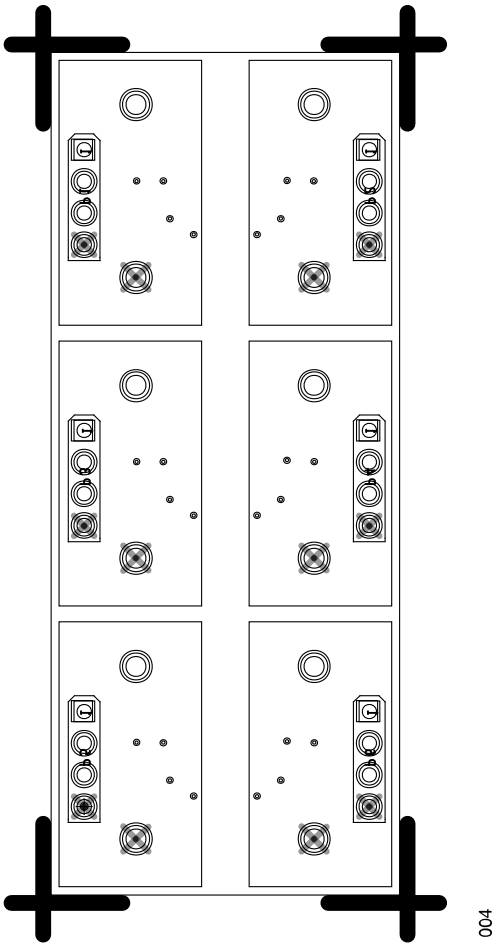

Figure 4. EVAL-ADuM32XNEBZ, Evaluation Board Layer 2

EVALUATION BOARD SCHEMATIC AND ARTWORK

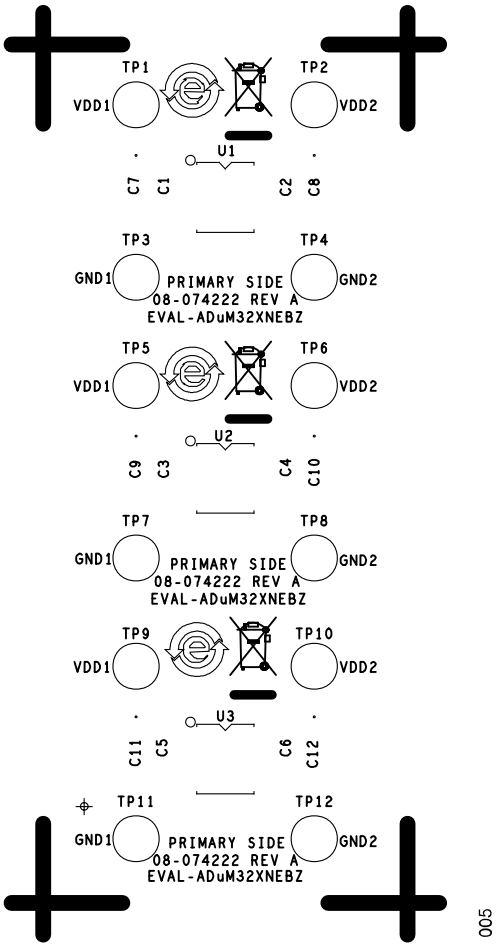

Figure 5. EVAL-ADuM32XNEBZ Evaluation Board Top Silkscreen

EVALUATION BOARD SCHEMATIC AND ARTWORK

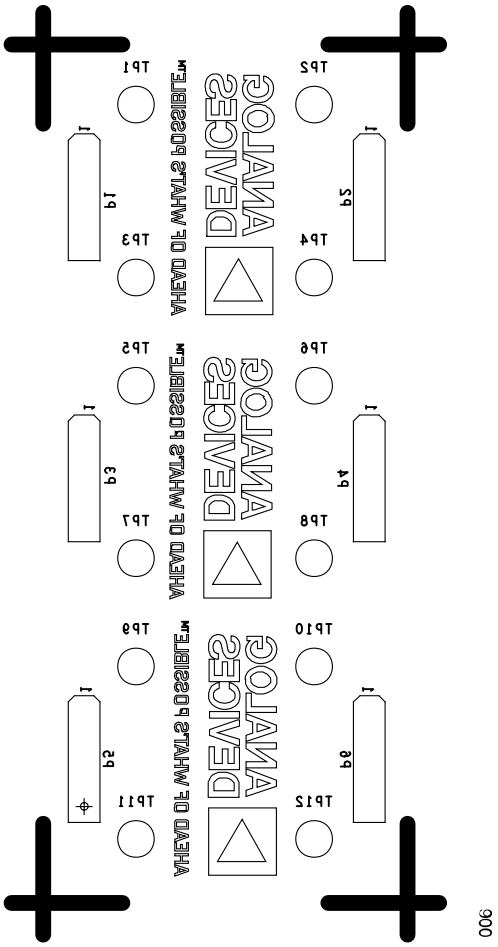

Figure 6. EVAL-ADuM32XNEBZ Evaluation Board Bottom Silkscreen

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.