

Evaluating the 5.7 kV RMS ADuM340E/ADuM341E/ADuM342E Quad Digital Isolators

FEATURES

- ▶ Simplified evaluation of the ADuM340E/ADuM341E/ADuM342E digital isolator family
- ▶ U4 not inserted to allow evaluation of other supported *iCoupler* digital isolator in 16-lead SOIC_W package
- ▶ Enable controls
- ▶ Small, easy configuration optimized for rapid evaluation on breadboards/prototype boards
- ▶ Test points can be fitted to measure all signals

EVALUATION KIT CONTENTS

- ▶ EVAL-ADuM34XEELBZ

SUPPORTED *i*COUPLER DEVICES

- ▶ ADuM340E/ADuM341E/ADuM342E

EQUIPMENT NEEDED

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

DOCUMENTS NEEDED

- ▶ ADuM340E/ADuM341E/ADuM342E data sheet

GENERAL DESCRIPTION

The EVAL-ADuM34XEELBZ evaluation board supports simplified, efficient evaluation of the 5.7 kV rms ADuM340E/ADuM341E/ADuM342E family of *iCoupler*® digital isolators. The EVAL-ADuM34XEELBZ board also grants the ability to examine multiple other 16-lead SOIC_W *iCoupler* digital isolators via the unpopulated U4, which provides the user a JEDEC standard 16-Lead SOIC_W pad layout and routing appropriate for the evaluation of supported devices.

The EVAL-ADuM34XEELBZ board features V shaped grooves between each component (U1 to U4) 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 U4 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.

EVALUATION BOARD PHOTOGRAPH



Figure 1. EVAL-ADuM34XEELBZ Photograph

Enable controls are provided via the pin headers, which can be configured via a digital input, or the user can refer to the schematic in Figure 2 and populate the pull-up resistors on the V_{E1}/V_{E2} pins. The pull-ups on the V_{Ex} pins are not inserted by default. The 100 k Ω value in the schematic may need to be changed depending on the application needs.

The EVAL-ADuM34XEELBZ 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 corresponding ADuM340E/ADuM341E/ADuM342E data sheet, which must be consulted in conjunction with this user guide when using the evaluation board.

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REVISION HISTORY**1/2023—Revision 0: Initial Version**

EVALUATION BOARD HARDWARE

PCB EVALUATION FUNCTIONS

The EVAL-ADuM34XEEBZ board comes with bypass capacitors, header pins, and [ADUM340E/ADUM341E/ADUM342E](#) (U1 to U3) installed. The PCB features multiple test points and footprints for pull-up resistors that are not fitted by default. The compatible *iCoupler* digital isolator for U4 must be ordered and installed separately. The U4 footprint is compatible with triple and quad channel *iCoupler* standard data isolator devices with on/off keying (OOK) architecture, such as the [ADuM130D/ADuM130E/ADuM131D/ADuM131E](#), [ADuM140D/ADuM140E/ADuM141D/ADuM141E/ADuM142D/ADuM142E](#), [ADuM230D/ADuM230E/ADuM231D/ADuM231E](#), and [ADuM240D/ADuM240E/ADuM241D/ADuM241E/ADuM242D/ADuM242E](#) in 16-lead SOIC_W packages.

The evaluation board features V shaped grooves between each component (U1 to U4) 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-ADuM34XEEBZ PCB supports both connections made directly to the 8-pin headers or connections made to a prototyping/bread board in which the EVAL-ADuM34XEEBZ is mounted. The 8-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 bread boards. 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 via the P1 to P8 8-pin headers to allow connections from the EVAL-ADuM34XEEBZ

to a signal generator. Each side of each *iCoupler* digital isolator has an 8-pin header that is used for power, ground, and data I/O connections.

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

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 ADuM340E/ADuM341E/ADuM342E 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 may 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. Refer to the schematic, [Figure 2](#), to see the appropriate power pins on the connectors.

EVALUATION BOARD SCHEMATICS AND ARTWORK

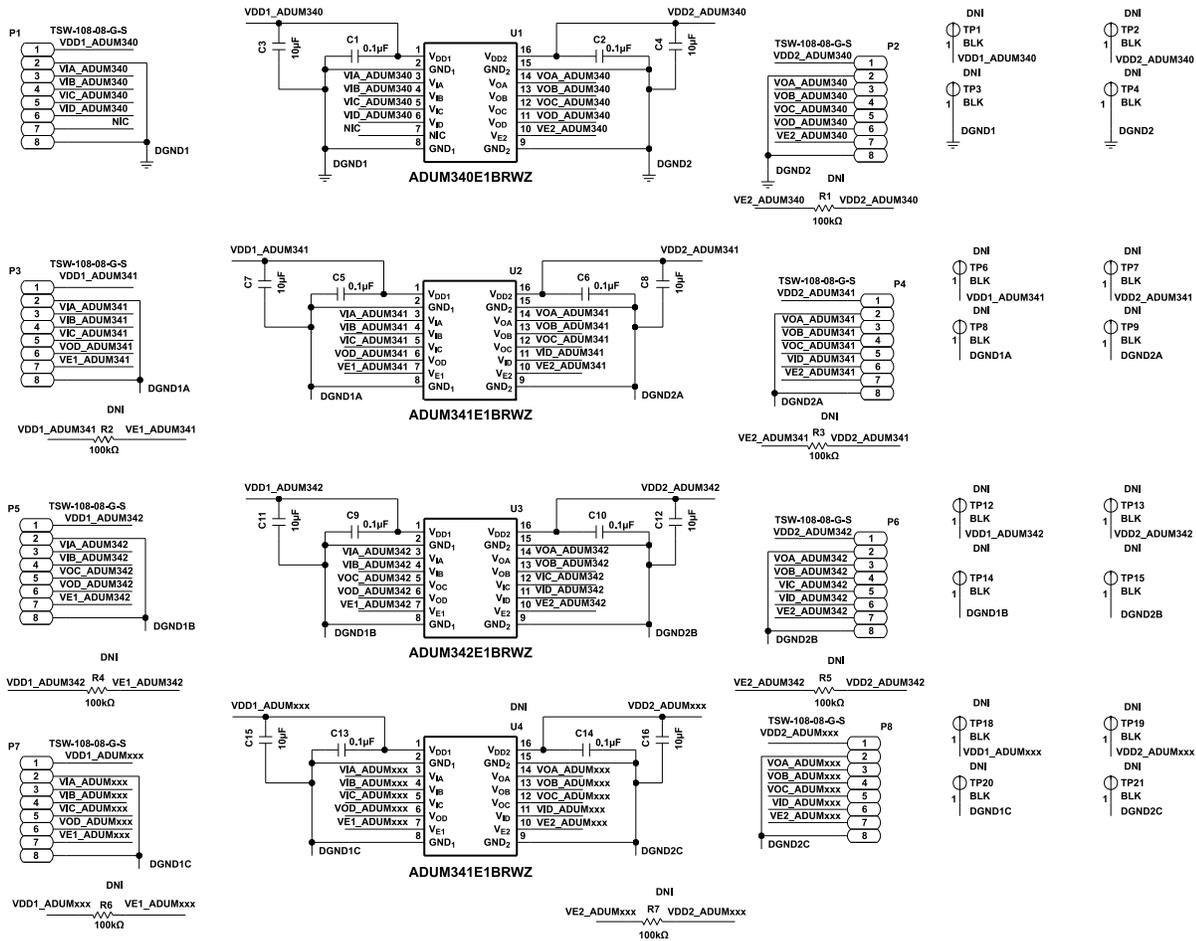


Figure 2. EVAL-ADuM34XEEBZ Schematic

EVALUATION BOARD SCHEMATICS AND ARTWORK

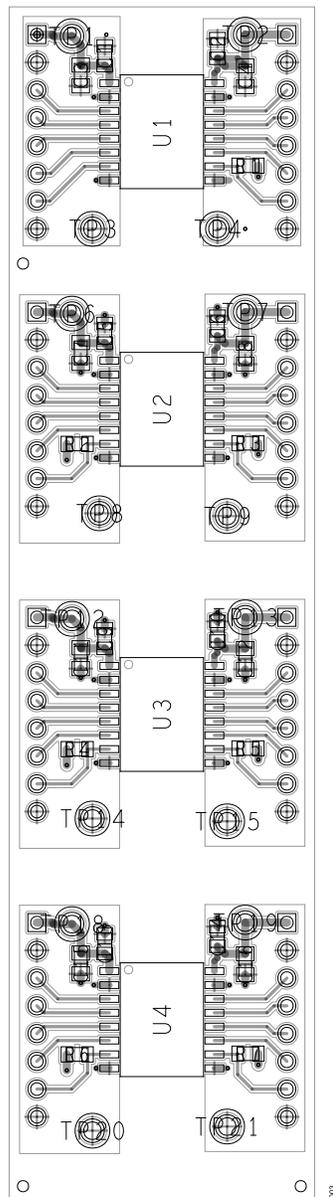


Figure 3. EVAL-ADuM34XEEBZ Component Side, Layer 1

EVALUATION BOARD SCHEMATICS AND ARTWORK

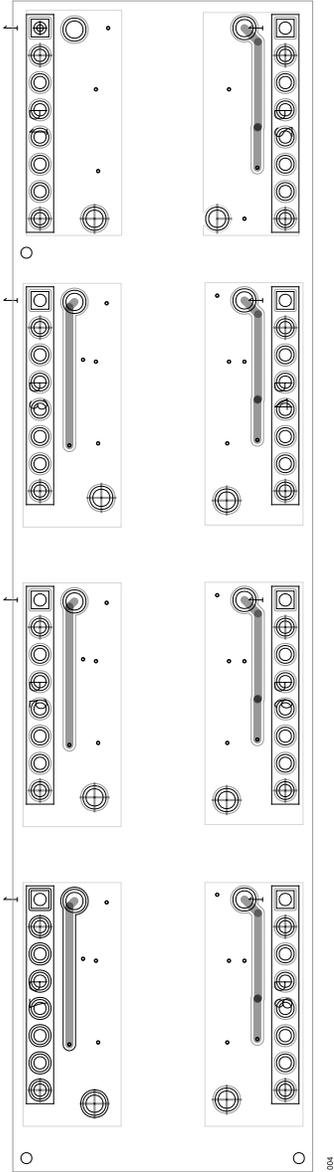


Figure 4. EVAL-ADuM34XEEBZ, Layer 2

EVALUATION BOARD SCHEMATICS AND ARTWORK

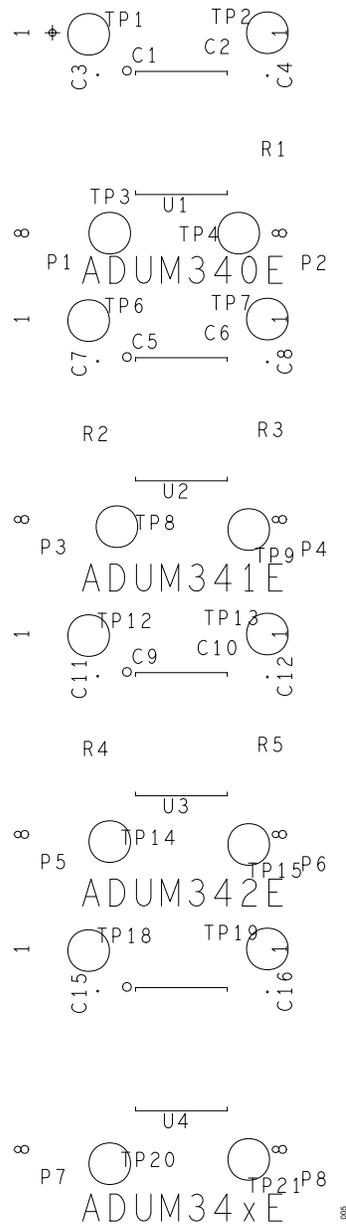


Figure 5. Top Silkscreen

EVALUATION BOARD SCHEMATICS AND ARTWORK

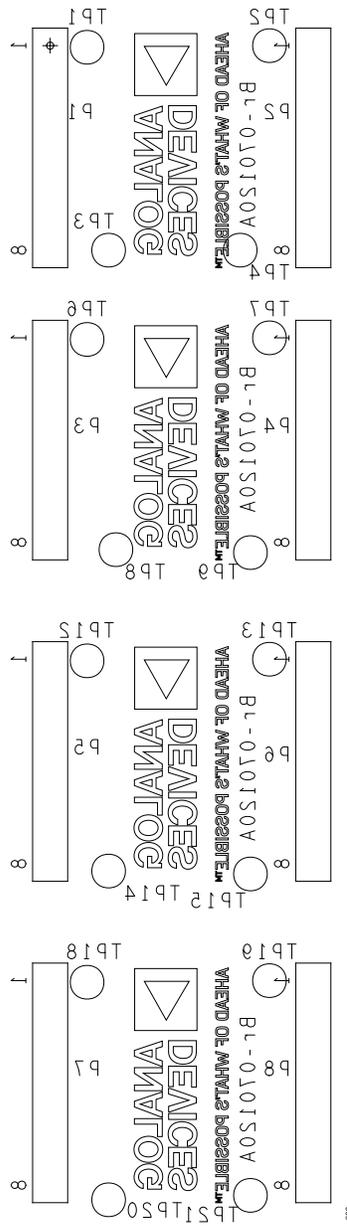


Figure 6. Bottom Silkscreen

ORDERING INFORMATION

BILL OF MATERIALS

Table 1. EVAL-ADuM34XEEDZ Bill of Materials

Qty.	Reference Designator	Description	Manufacturer	Part Number
0	TP1 to TP4, TP6 to TP9, TP12 to TP15, TP18 to TP21	Test points, black (not installed)	Keystone Electronics	5006
0	U4	5.7 kV rms quad digital isolator (not installed)	Analog Devices, Inc.	
0	R1 to R7	Resistor, surface-mount device (SMD), 100 kΩ, 1%, ½ W, 0805, AEC-Q200 (not installed)	Vishay	CRCW0805100KFKEAHP
1	U1	Quad channel digital isolator	Analog Devices	ADUM340E1BRWZ
1	U2	Quad channel digital isolator	Analog Devices	ADUM341E1BRWZ
1	U3	Quad channel digital isolator	Analog Devices	ADUM342E1BRWZ
8	C1, C2, C5, C6, C9, C10, C13, C14	Ceramic capacitor, 0.1 μF, 50 V, 5%, X7R, 0805	KEMET	C0805C104J5RACTU
8	C3, C4, C7, C8, C11, C12, C15, C16	Ceramic capacitor, 10 μF, 25 V, 10%, X5R, 0805	Murata	GRM21BR61E106KA73L
8	P1 to P8	8-pin headers, 0.1 inch spacing	Samtec	TSW-108-08-G-S

**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

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