

# Digital Isolator Evaluation Board User's Manual

## EVBUM2758/D

### Description

The P9002EVB evaluation board is a convenient platform for designers to evaluate, characterize and verify the performance of ON Semiconductor's digital isolator devices. The setup includes a 16-pin digital isolator sample in SOIC W package, mounted across two isolated power and ground systems. All pins are individually accessible through connection headers and test points.

This evaluation board is available in two options: P90022EVB with mounted bi-directional dual-channel digital isolator NCID9211; and P90024EVB with mounted bi-directional quad-channel digital isolator NCID9411. The board can be reconfigured also to evaluate other ON Semiconductor's digital isolators with 2 to 4 channels in SOIC16 W package.

P9002EVB is intended as a tool for quick validation of the datasheet parameters of digital isolators. Refer to this manual for the board contents and setup. Refer to the device datasheet for the operating conditions and details of the electrical and switching characteristics.

### Features

- Convenient Connection Headers for External Power Supplies and Test Points for Measurement Probes
- Two Isolated Systems in Compact Board Layout
- Allows Bi-directional Digital Communication
- Selectable Jumper for Output Enable Function (Primary and Secondary side)



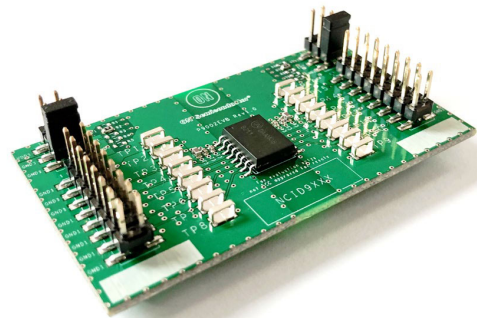
**CAUTION:** This evaluation board is not intended for HIGH VOLTAGE tests. Do not use this board to verify Insulation Ratings and Isolation Characteristics.



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## EVAL BOARD USER'S MANUAL



**Figure 1. P9002EVB Evaluation Board**

## Digital Isolators

Digital isolators allow digital signals to communicate between isolated systems without conducting ground loops or hazardous voltages. The input digital data is modulated with a high-frequency carrier signal and transmitted across a capacitive isolation barrier. The barrier signal is detected at the receiver side and demodulated to generate the output digital data. The barrier utilizes ON Semiconductor's patented galvanic off-chip capacitor isolation technology. With thick insulation distance of >0.5 mm, digital isolators

offers reliable high voltage insulation that meets UL and VDE safety standards.

P9002EVB supports evaluation of digital isolators with 2 to 4 communication channels with output Enable. They are available in dual-channel NCID9211; triple-channel NCID9301 and NCID9311; and quad-channel NCID9401 and NCID9411. They are housed in 16-pin wide body small outline package. The pinouts and channel configurations are shown in Figure 2.

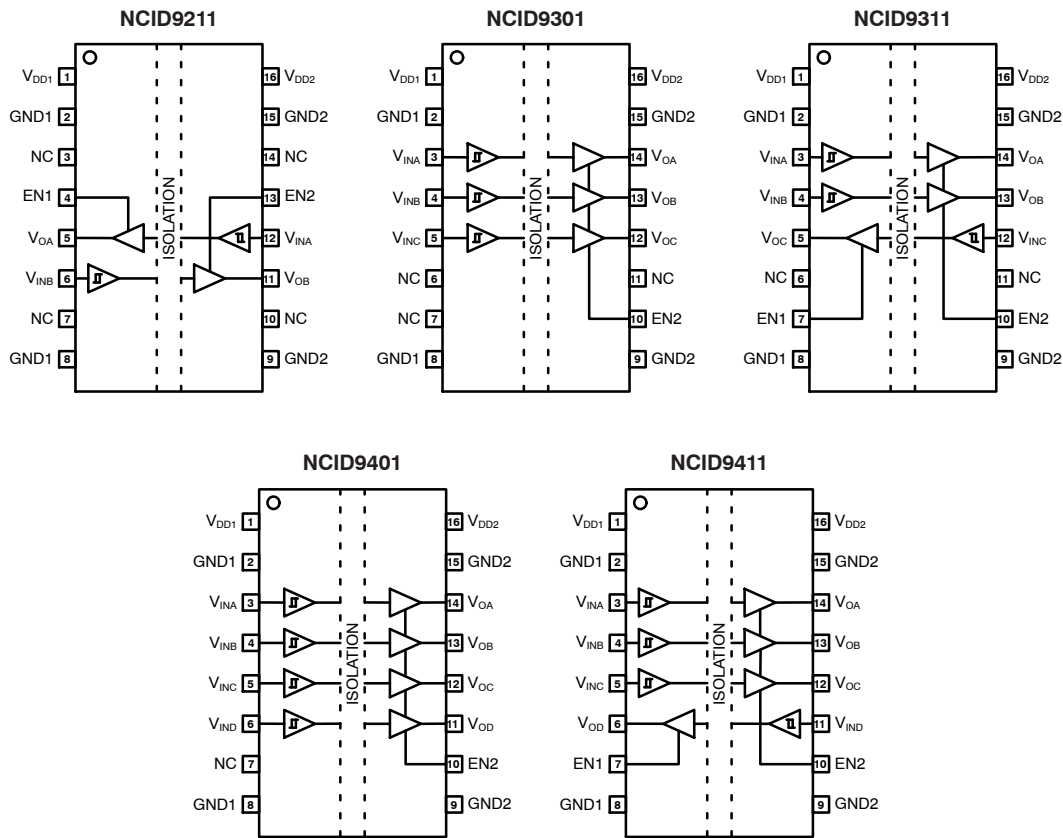


Figure 2. Channel and Pin Configuration

## Evaluation Board Setup and Operation

The P9002EVB evaluation board enables users to make a quick and accurate assessment of digital isolator data transmission between two isolated systems. The top and bottom board photos in Figure 3 show the separation between the isolated system grounds GND1 and GND2.

The basic setup shown in Figure 4 requires two isolated power supply sources. Refer to the board schematic in Figure 7 for the allocated connection headers; J1 (2-1) or J3 (1-3) for VDD1 power supply; J2 (1-2) or J4 (2-4) for VDD2 power supply. Represent the input digital data VINX using signal or logic data generator. Monitor the output digital data VOX using oscilloscope or logic analyzer. Figure 5 shows VINX and VOX sample waveforms.

Output Enable pins can be left open or connected to separate voltage or signal sources. For added convenience, the Enable pins can also be tied to the power or ground pins using jumpers J3 (4-2/6) for EN1 and J4 (3-1/5) for EN2, as shown in Figure 6. Recommended operating voltage for the power supplies, input, output and enable signals ranges from 2.5 V to 5.5 V.

Connection headers and test points are allocated for all the 16 pins of the device package to enable the user to evaluate any of the digital isolator channels. Two or more channels in opposite direction can be monitored simultaneously to demonstrate bi-directional communication.

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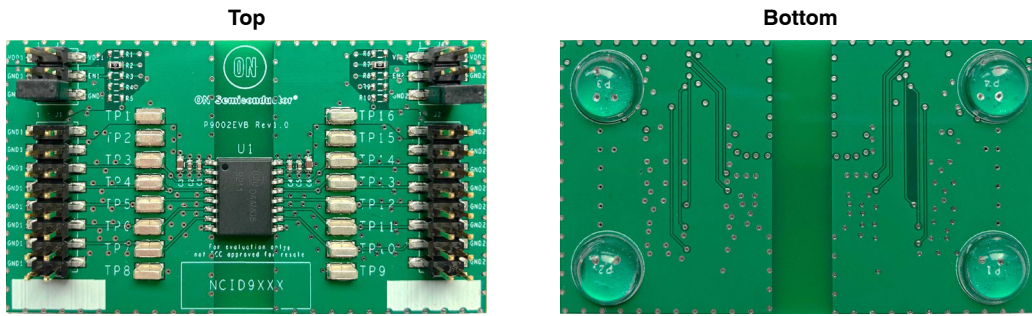


Figure 3. P9002EVB Digital Isolator Evaluation Board

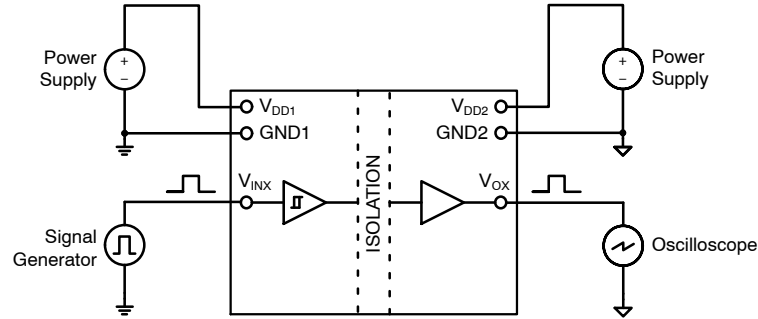


Figure 4. Evaluation Board Basic Setup

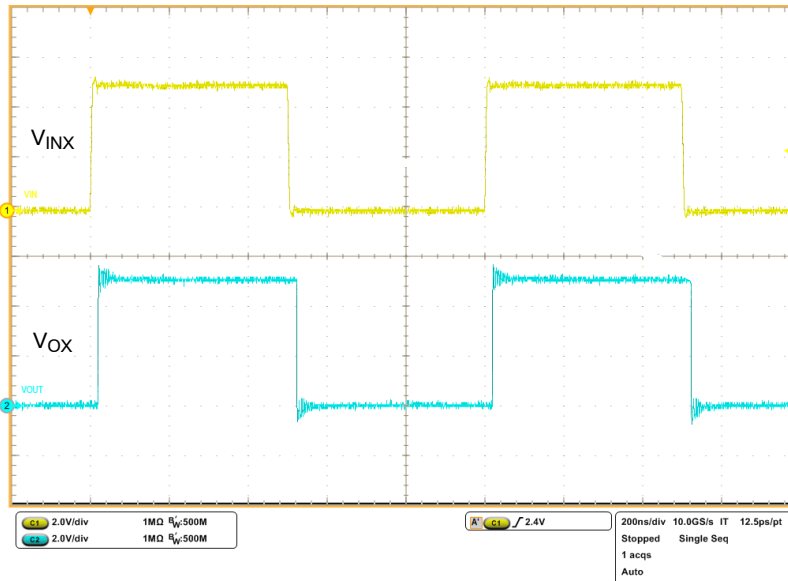


Figure 5. Sample Input and Output Waveforms of NCID9211 Digital Isolator

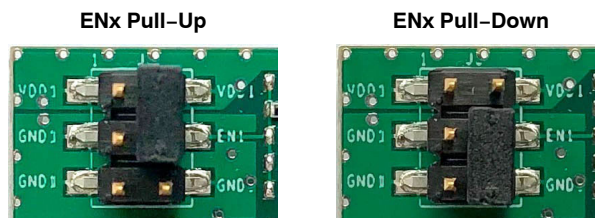


Figure 6. Enable Pin Selection

## Schematic

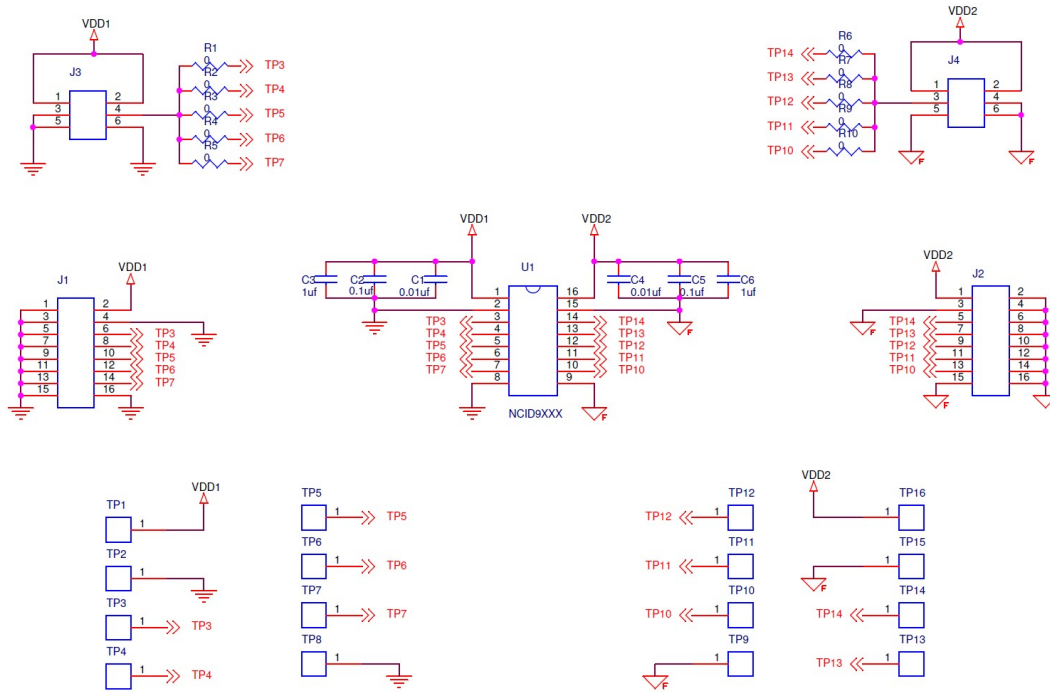


Figure 7. P9002EVB Schematic

## Layout

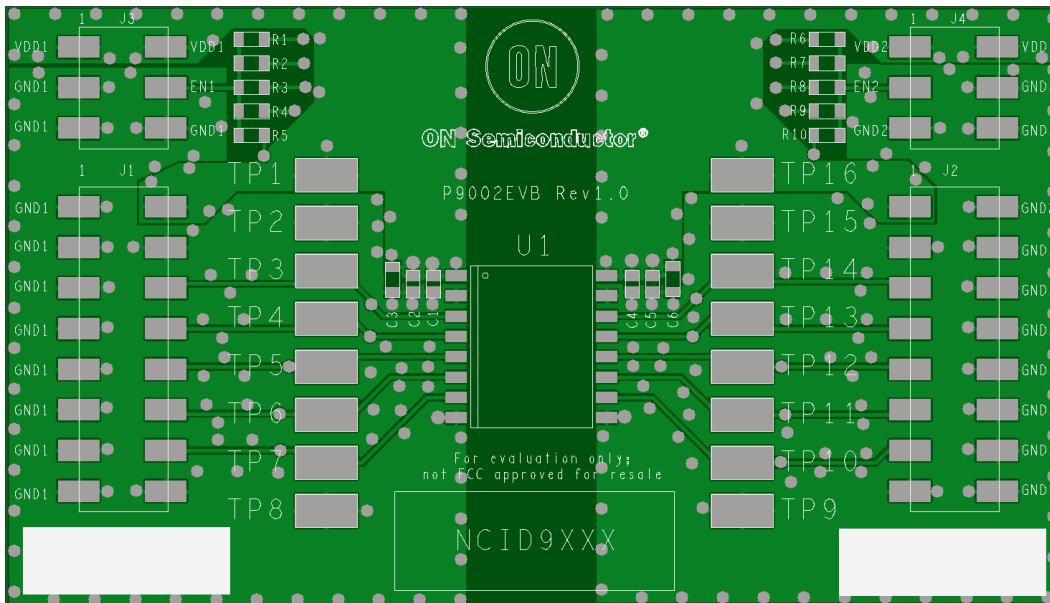


Figure 8. P9002EVB Layout

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## Bill of Materials

Table 1. BILL OF MATERIALS

Item	Qty	Board Part Number	Description	Manufacturer Part Number	Manufacturer
1	1	U1 (Note 1)	Digital Isolator SOIC16 W	(P90022EVB) NCID9211 (P90024EVB) NCID9411	ON Semiconductor
2	16	TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15, TP16	PC Test Point Miniature	5019	Keystone
3	2	C1, C4	Cap Cer 10000 pF 25 V X8R 0402	CGA2B2X8R1E103K050BA	TDK
4	2	C2, C5	Cap Cer 0.1 $\mu$ F 25 V X8L 0402	GCM155L81E104KE02D	Murata
5	2	C3, C6	Cap Cer 1 $\mu$ F 16 V X8L 0603	C1608X8L1C105K080AC	TDK
6	2	J1, J2	Conn Header SMD 16POS 2.54 mm	95278-101A16LF	Amphenol
7	2	J3, J4	Conn Header SMD 6POS 2.54 mm	95278-801A06LF	Amphenol
8	2	J3, J4	Conn Jumper Shorting Gold	SSC02SYAN	Sullins
9	2	(P920022EVB) R2, R7 (P920024EVB) R5, R10	Res SMD 0 $\Omega$ Jumper 1/10 W 0603	ERJ-3GEY0R00V	Panasonic
10	4	P1, P2, P3, P4	Round Self-Adhesive Rubber Bumper Stops D9.5 mm	BS-12	BS

1. U1 can be replaced with NCID9301, NCID9311 or NCID9401 in P90024EVB configuration.

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