User's Guide
SLAU797A–June 2017–Revised June 2019

ISO70xx Low-Power Digital Isolator Evaluation Module

This user's guide describes the ISO7041 Low-Power Isolator Digital Isolator Evaluation Module (EVM). This EVM allows designers to evaluate device performance for fast development and analysis of isolated systems. The EVM supports evaluation of any of the quad-channel Low-Power digital isolators in a 16-pin SSOP (DBQ) package.

CAUTION

This evaluation module is made available for isolator parameter performance evaluation only and is not intended for isolation voltage testing. To prevent damage to the EVM, any voltage applied as a supply or digital input/output must be maintained within the 0 V to 3.63 V recommended operating range.

Contents

List of Figures

List of Tables

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1 Introduction

This user's guide describes EVM operation with respect to the ISO7041 Low-Power digital isolator. However, the EVM may be reconfigured for evaluation of any of TI's quad-channel digital isolators in a 16-pin SSOP (DBQ) package. This guide also describes the EVM schematic, and typical laboratory setup. A typical input and output waveform is also presented.

2 Overview

The ISO7041 is TI's new low-power digital isolator device capable of a galvanic isolation rating of up to 4000 V_{PK}. This device is certified to meet reinforced isolation requirements by VDE and CSA. This isolator provides high electromagnetic immunity and low emissions at low power consumption, while isolating CMOS or LVCMOS digital I/Os. The ISO7041 digital isolator has logic input and output buffers separated by a silicon oxide (SiO2) insulation barrier. Used with isolated power supplies, this device blocks high voltages, isolates grounds, and prevents noise currents on a data bus or other circuits from entering the local ground and interfering with, or damaging sensitive circuitry. Additionally, the ISO7041 operates on very low power. ISO7041DBQEVM is designed to allow users to evaluate the ISO7041. The 2-channel ISO7021 performance can also be evaluated using the ISO7041 installed on the ISO7041DBQEVM. The ISO7721DEVM can be used to install the ISO7021 for further 2-channel evaluation.

3 Pin Configuration of the ISO7041 Low-Power Digital Isolator

Figure 1 shows the ISO7041 low-power quad-channel digital isolator pin configuration.

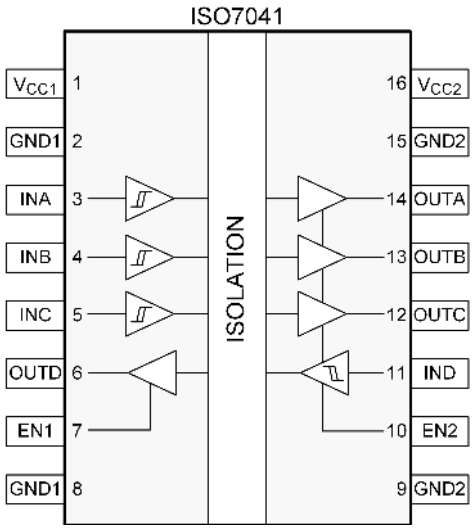

Figure 1. ISO7041 Low-Power Digital Isolator Pin Configurations

4 ISO7041DBQ EVM Board Block Diagram and Image

Figure 2 shows the board configuration for evaluation of the ISO7041 quad-channel digital isolator.

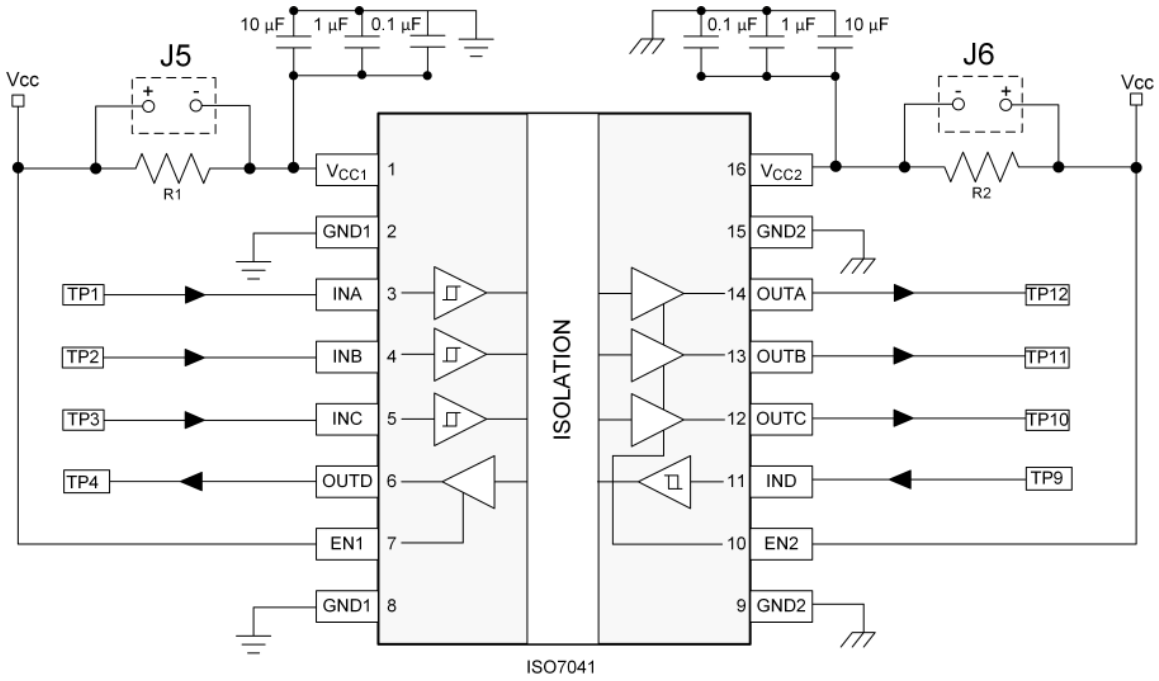

Figure 2. ISO7041DBQ EVM Configuration

Figure 3 shows the photograph of the EVM.

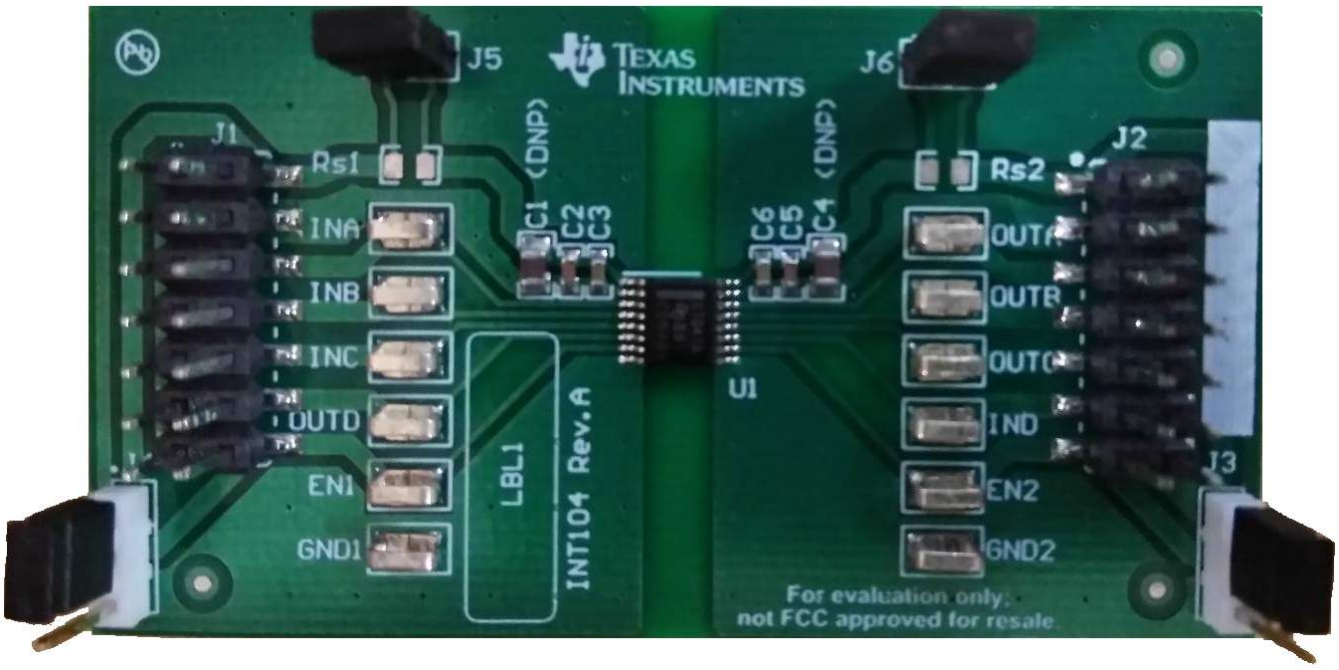

Figure 3. ISO7041DBQ EVM Photograph

5 EVM Setup and Operation

This section describes the setup and operation of the EVM for parameter performance evaluation. Figure 4 shows the configuration for operating the ISO70xx triple and quad digital isolator EVM using two power supplies and two voltmeter. Rs1 and Rs2 allow the user to easily measure the low current consumed by the ISO7041 without the need for specialized equipment. Current consumed by a particular side of the ISO7041 can simply be calculated by measuring the voltage drop across the respective Rs resistor and dividing that value by it's resistance. Rs1 and Rs2 will need to be populated with a resistance that allows the user to accurately measure the voltage across them. This value will typically range between 400 and 600 ohms. Higher resistances can be used but Vsupply will have to be increased in order to compensate for the increased voltage drop over Rs1 and Rs2. Please be sure to use high accuracy resistors of 0.1% tolerance or better for the most accurate measurements and calculations.

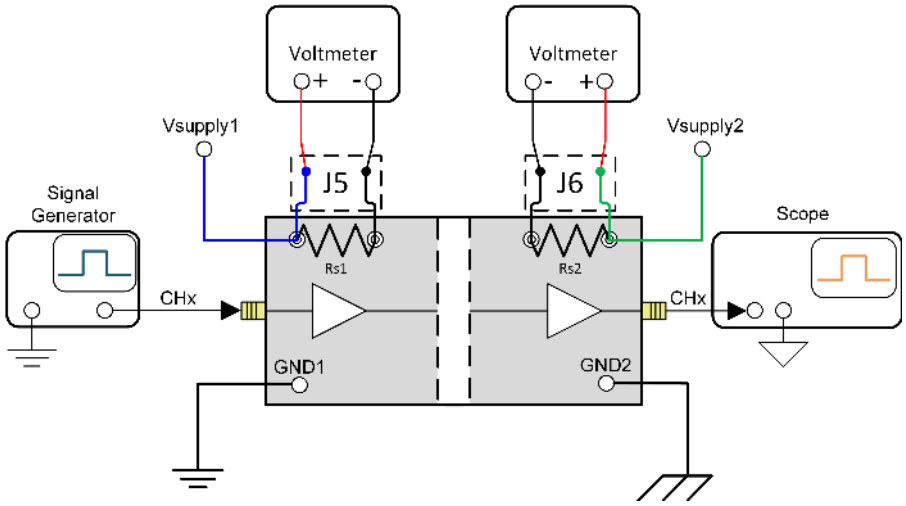

Figure 4. Basic EVM Operation

Figure 5 shows typical input and output waveforms of the EVM for a 1-MHz clock. The input is shown as channel 3, and the output is shown as channel 4.

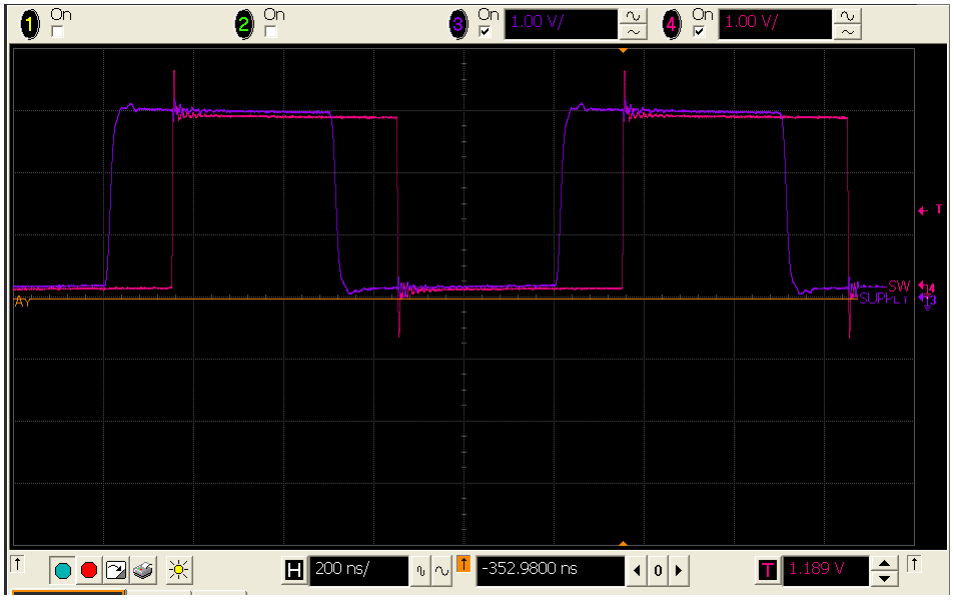

Figure 5. Typical Input and Output Waveforms

6 Bill of Materials

Table 1 shows the bill of materials (BOM) for this EVM.

Table 1. Bill of Materials

Item	Designator	Description	Manufacturer	PartNumber	Quantity
1	J1, J2	Header, 2.54 mm, 7 x 2, Gold, SMT	Wurth	61001421121	2
2	C1, C4	CAP, CERM, 10 uF, 35 V, +/- 10%, X5R, 0805	MuRata	GRM21BR6YA106KE 43L	2
2	C2, C5	CAP, CERM, 1 µF, 50 V, ±10%, X5R, 0603	TDK	C1608X5R1E105K08 0AC	2
3	C3, C6	CAP, CERM, 0.1 µF, 25 V, ±5%, X7R, 0603	AVX	06033C104JAT2A	2
4	H1, H2, H3, H4	Bumpon, Hemisphere, 0.44 × 0.20, Clear	3M	SJ-5303 (CLEAR)	4
5	J5, J6	Header, 2.54 mm, 2 x 1, Gold, TH	Wurth Elektronik	61300211121	2
6	J3, J4	Header, 100 mil, 3 × 1, Gold, TH	Samtec	HTSW-103-07-G-S	2
7	TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, and TP12	Test Point, Miniature, SMT	Keystone	5019	12
8	U1	Ultra-Low Power Four-Channel Digital Isolator	Texas Instruments	ISO7041DBQ	1

7 EVM Schematics and Layout

The ISO7041DBQ EVM is designed to accommodate any of the ISO70xx Low-Power devices in a 16-pin SSOP. To evaluate any of the ISO70xx Low-Power devices in a 16-pin SSOP package, replace ISO7741DBQ with the device of interest on the ISO7041DBQ EVM PCB. No other component requires any modification. Figure 6 shows the ISO7041DBQEVM schematic and Figure 7 shows the printed-circuit board (PCB) layout.

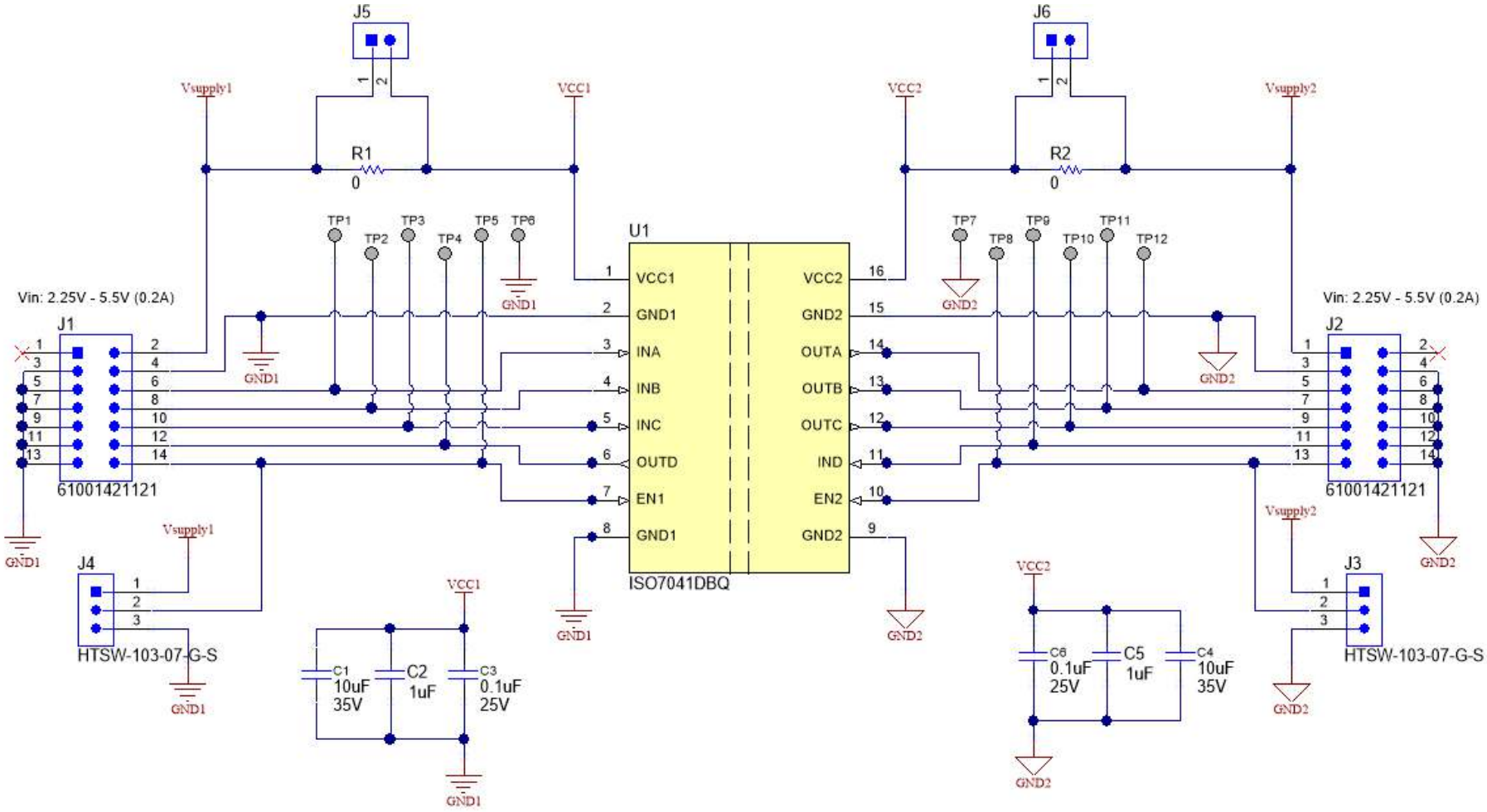

Figure 6. ISO7041DBQ EVM Schematic

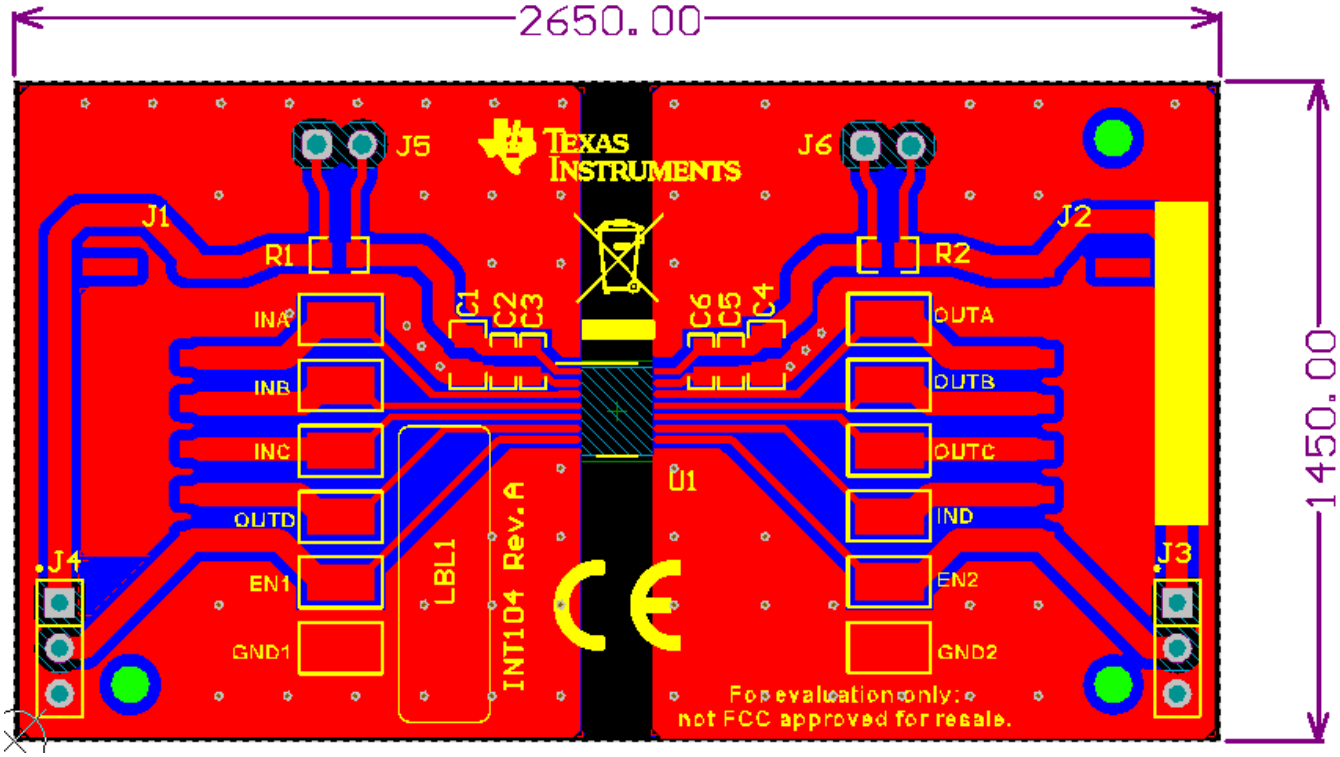

Figure 7. ISO7041DBQ PCB Layout

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Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265