ISO73xx Triple/Quad Digital Isolator Evaluation Module

This user's guide describes the ISO73xx Triple/Quad 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 TI triple- or quad-channel digital isolators in a 16DW 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 5.5 V recommended operating range.

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1 Introduction

This user's guide describes EVM operation with respect to the ISO73xx triple- and quad-channel digital isolators. However, the EVM may be reconfigured for evaluation of any of TI's triple- or quad-channel digital isolators in a 16DW package.

This guide also describes the available channel configurations within the ISO73xx family, the EVM schematic, and typical laboratory setup. Typical input and output waveforms are also presented.

1.1 Overview

The ISO73xx digital isolators have logic input and output buffers separated by a silicon oxide (SiO2) insulation barrier. Used with isolated power supplies, these devices block high voltages, isolate grounds, and prevent noise currents on a data bus or other circuits from entering the local ground and interfering with, or damaging sensitive circuitry.

A binary input signal is conditioned, translated to a balanced signal, and then differentiated by the capacitive isolation barrier. Across the isolation barrier, a differential comparator receives the logic transition information, then sets or resets a flip-flop and the output circuit accordingly. A periodic update pulse is sent across the barrier to ensure the proper dc level of the output. If this dc-refresh pulse is not received for a period of time, the input is assumed to be unpowered or not functional, and the fail-safe circuit drives the output to the specified failsafe state.

1.2 Functional Configurations of the ISO73xx Triple- and Quad-Channel Digital Isolators

Figure 1 illustrates the ISO733x triple-channel digital isolator pin configurations.

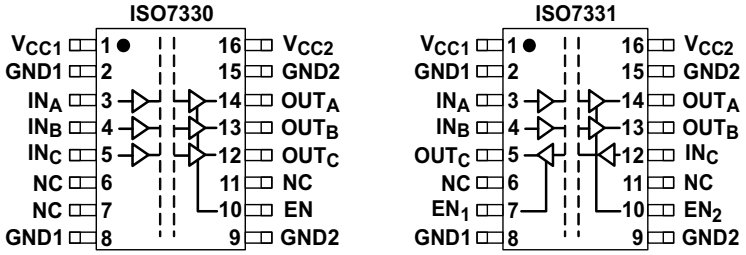

Figure 1. ISO733x Triple-Channel Digital Isolator Pin Configurations

Figure 2 shows the ISO734x quad-channel digital isolator pin configurations.

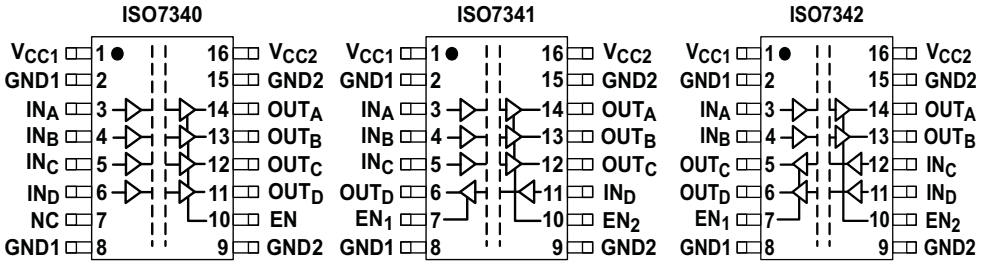

Figure 2. ISO734x Quad-Channel Digital Isolator Pin Configurations

1.3 EVM Schematics

Separate orderable EVMs are available for each triple- and quad-channel device in the ISO73xx family of digital isolators. The EVMs differ only in the placement of 50-Ω termination resistors at the input, and 10-pF capacitive loads at the output of each channel.

Figure 3 through Figure 7 show the supported ISO73xxx EVM schematics.

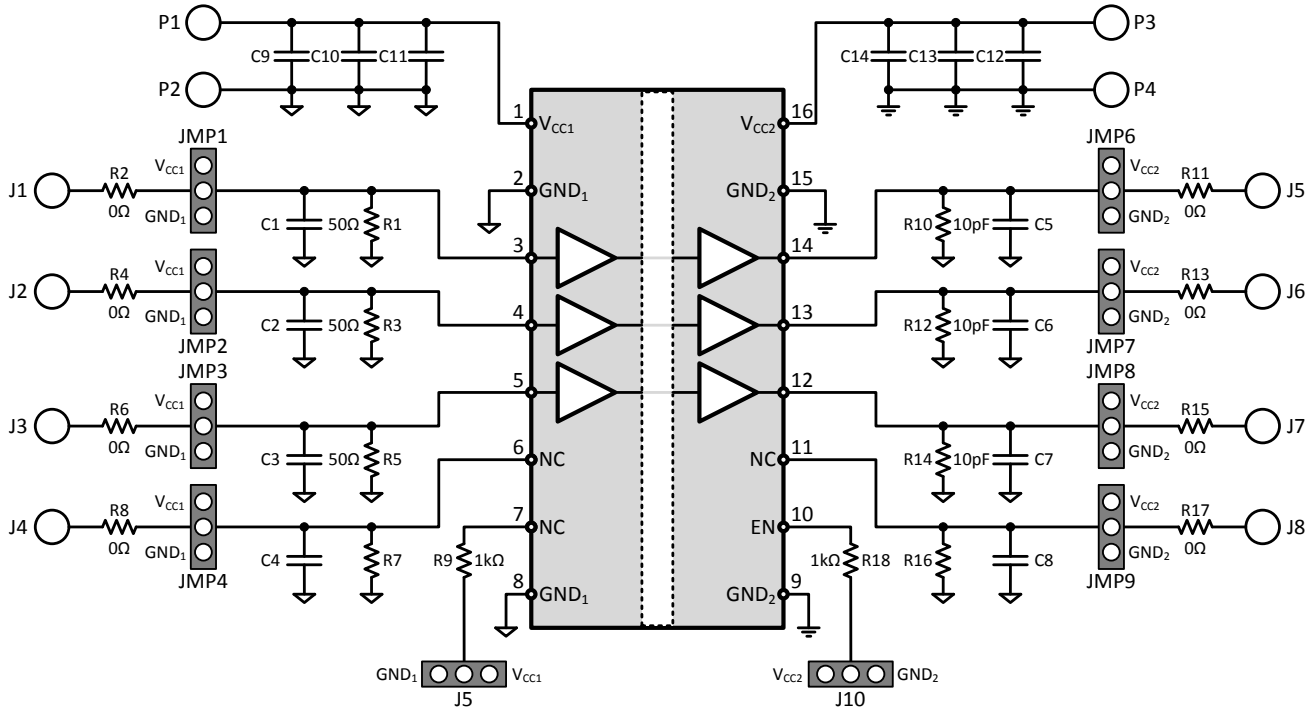

Figure 3. ISO7330x EVM Schematic

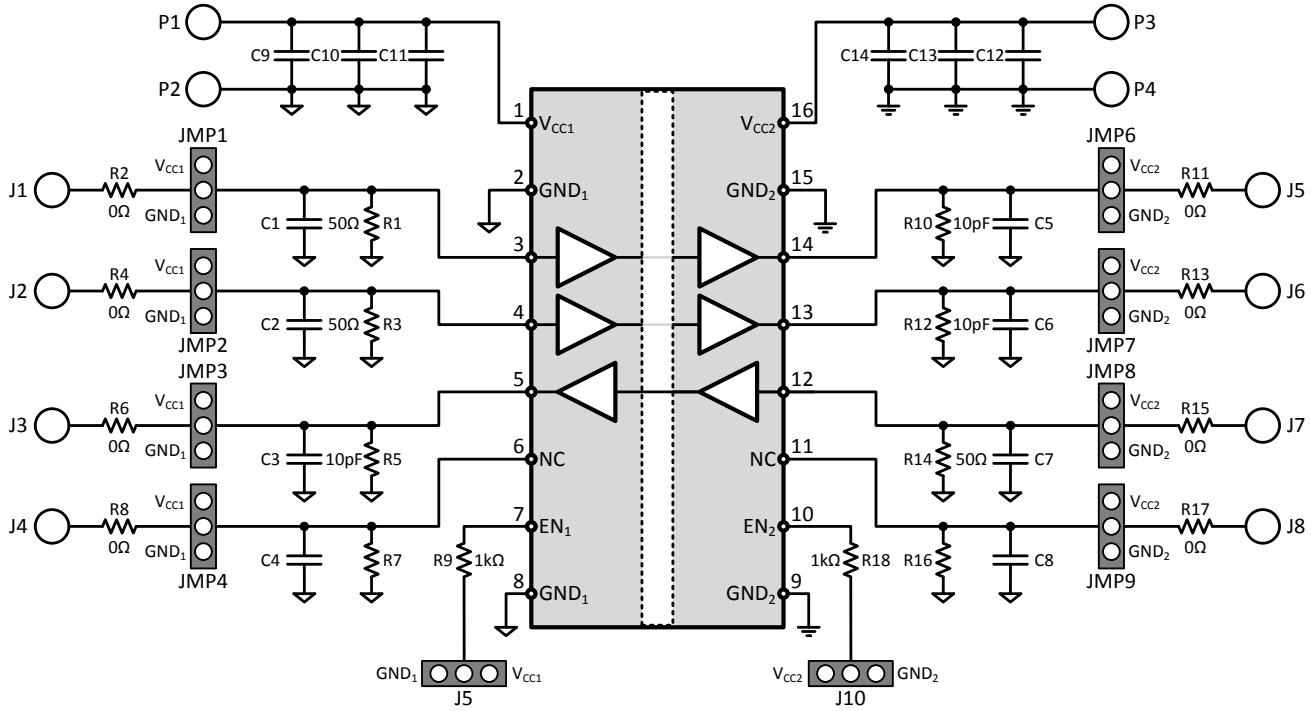

Figure 4. ISO7331x EVM Schematic

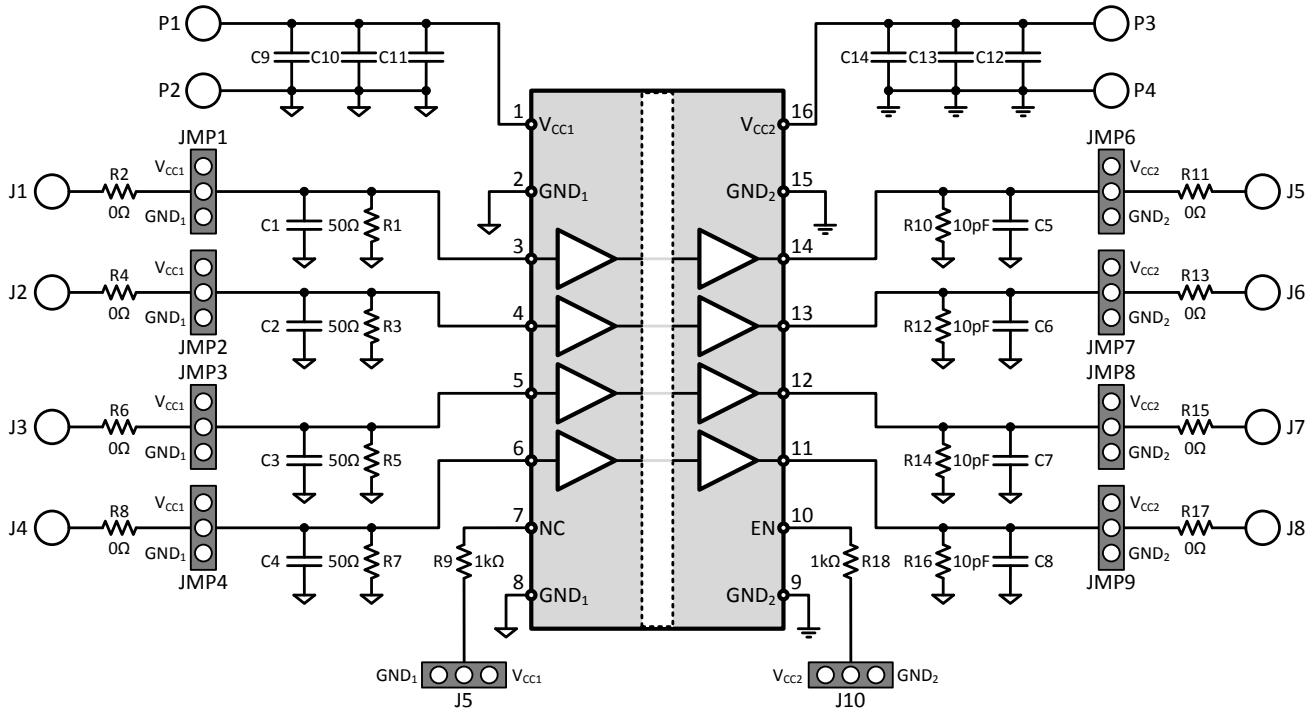

Figure 5. ISO7340x EVM Schematic

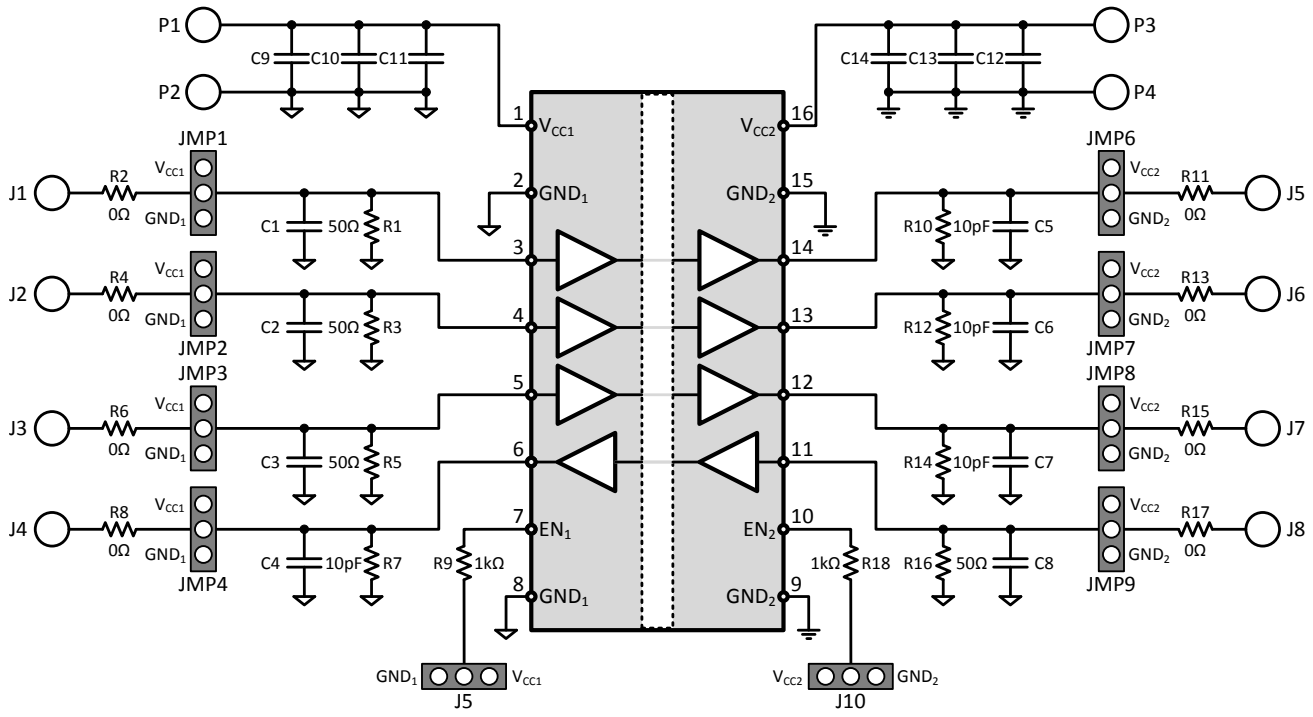

Figure 6. ISO7341x EVM Schematic

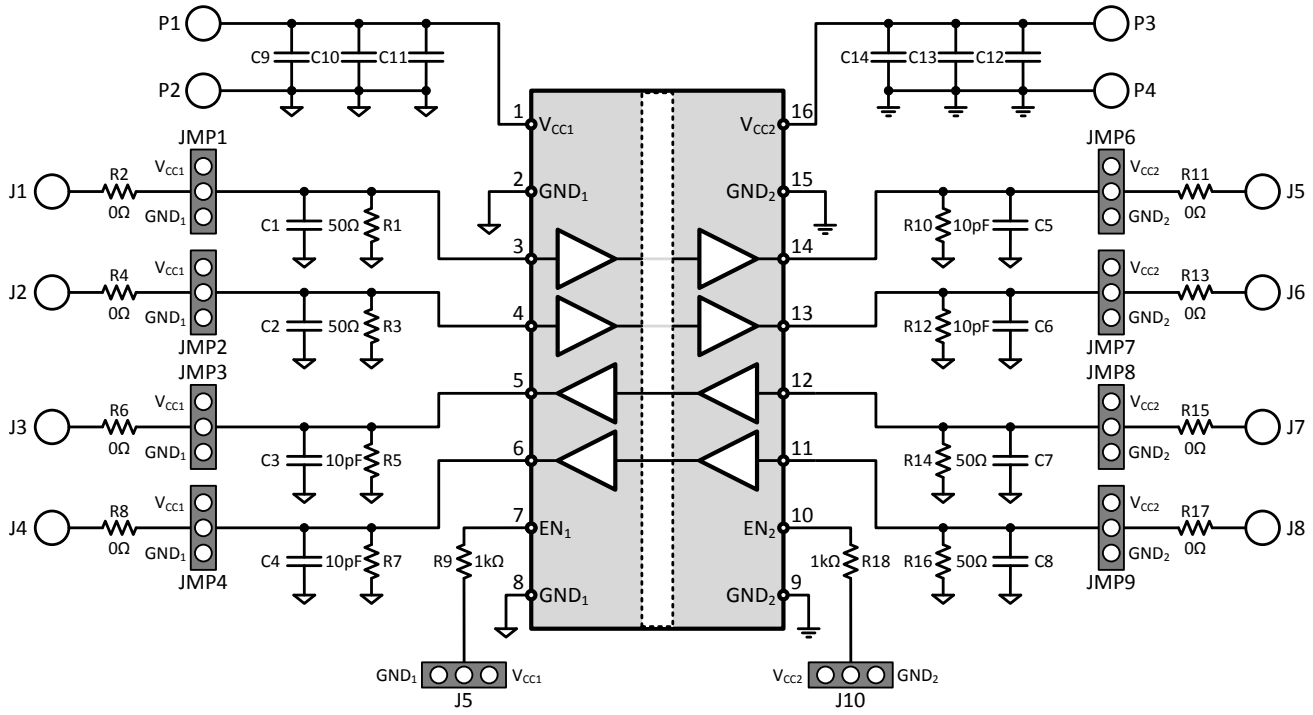

Figure 7. ISO7342x EVM Schematic

2 EVM Setup and Operation

This section describes the setup and operation of the EVM for parameter performance evaluation.

2.1 Overview

Figure 8 shows the configuration for operating the ISO73xx Triple/Quad Digital Isolator EVM using two power supplies.

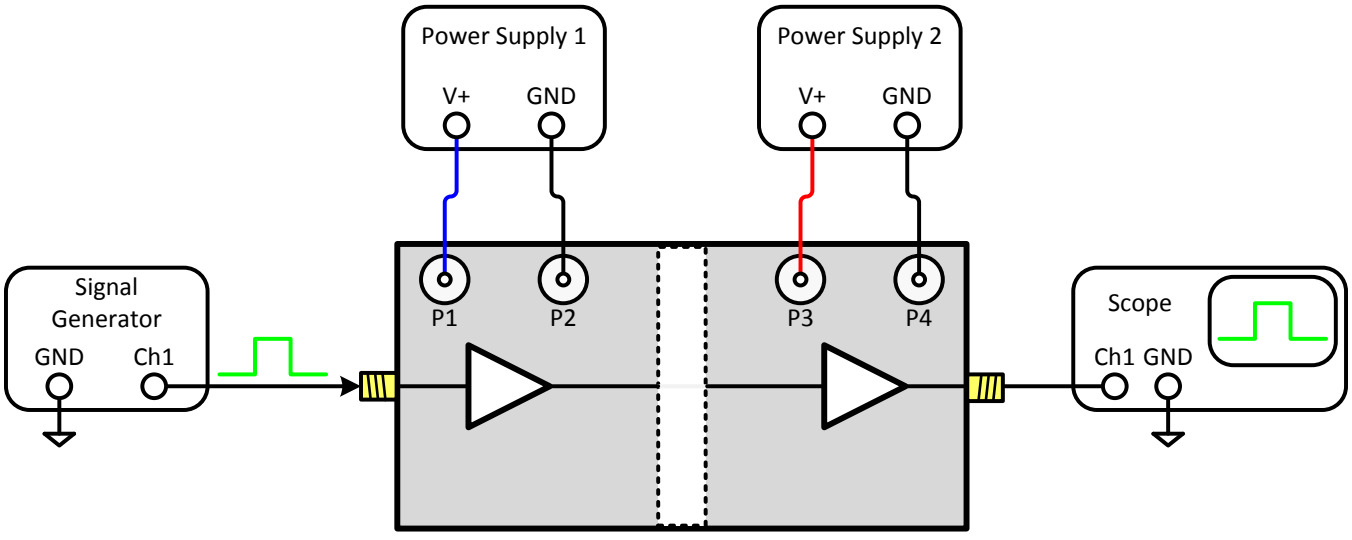

Figure 8. Basic EVM Operation

Figure 9 shows typical input and output waveforms of the EVM for a 1-MHz clock. The input is shown as channel 1, and the output is shown as channel 2.

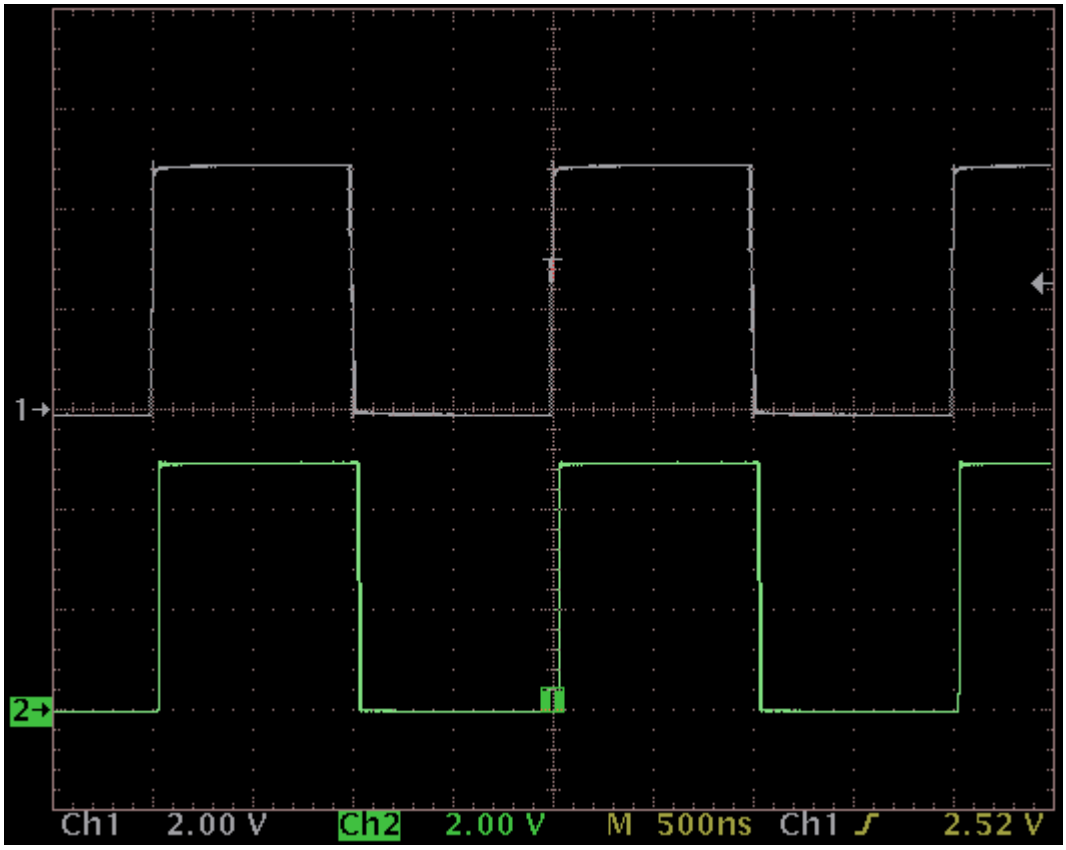

Figure 9. Typical Input and Output Waveforms

3 Bill of Materials

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

Table 1. Bill of Materials

Item	Quantity	Part Reference	Value	Footprint
1	8	C1, C2, C3, C4, C5, C6, C7, C8	10 pF/DNI	0805
2	2	C9, C12	10 uF	0805
3	2	C10, C13	1 uF	0805
4	2	C11, C14	0.1 uF	0805
5	8	J1, J2, J3, J4, J5, J6, J7, J8	SMA	
6	8	JMP1, JMP2, JMP3, JMP4, JMP6, JMP7, JMP8, JMP9	4-Pin Berg	
7	2	JMP5, JMP10	3-Pin Berg	
8	4	P1, P2, P3, P4	Banana	
9	8	R1, R3, R5, R7, R10, R12, R14, R16	49.9 Ω/DNI	0603
10	8	R2, R4, R6, R8, R11, R13, R15, R17	0 Ω	0805
11	2	R9, R18	1 kΩ	0805
12	1	U1	ISO73xx	16DW

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      3.1.1 *Notice applicable to EVMs not FCC-Approved:*

      This kit is designed to allow product developers to evaluate electronic components, circuitry, or software associated with the kit to determine whether to incorporate such items in a finished product and software developers to write software applications for use with the end product. This kit is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the condition that this product not cause harmful interference to licensed radio stations and that this product accept harmful interference. Unless the assembled kit is designed to operate under part 15, part 18 or part 95 of this chapter, the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under part 5 of this chapter.

      3.1.2 *For EVMs annotated as FCC – FEDERAL COMMUNICATIONS COMMISSION Part 15 Compliant:*

      CAUTION

      This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

      Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

      FCC Interference Statement for Class A EVM devices

      NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Interference Statement for Class B EVM devices

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- *Reorient or relocate the receiving antenna.*
- *Increase the separation between the equipment and receiver.*
- *Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
- *Consult the dealer or an experienced radio/TV technician for help.*

3.2 *Canada*

3.2.1 *For EVMs issued with an Industry Canada Certificate of Conformance to RSS-210*

Concerning EVMs Including Radio Transmitters:

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Concernant les EVMs avec appareils radio:

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Concerning EVMs Including Detachable Antennas:

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Concernant les EVMs avec antennes détachables

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur

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http://www.tij.co.jp/lsds/ti_ja/general/eStore/notice_01.page

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1. Use EVMs in a shielded room or any other test facility as defined in the notification #173 issued by Ministry of Internal Affairs and Communications on March 28, 2006, based on Sub-section 1.1 of Article 6 of the Ministry's Rule for Enforcement of Radio Law of Japan,
2. Use EVMs only after User obtains the license of Test Radio Station as provided in Radio Law of Japan with respect to EVMs, or
3. Use of EVMs only after User obtains the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to EVMs. Also, do not transfer EVMs, unless User gives the same notice above to the transferee. Please note that if User does not follow the instructions above, User will be subject to penalties of Radio Law of Japan.

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4.2 User must read and apply the user guide and other available documentation provided by TI regarding the EVM prior to handling or using the EVM, including without limitation any warning or restriction notices. The notices contain important safety information related to, for example, temperatures and voltages.

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