User's Guide
SLLU206–July 2014

ISO7310C Evaluation Module

This user's guide describes the ISO7310C Evaluation Module (EVM). This EVM helps designers evaluate device performance, supporting the fast development and analysis of isolated systems. The EVM supports evaluation of any of the TI single- or dual-channel digital isolators in an 8-pin SOIC package.

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1 Introduction

1.1 Overview

The ISO7310C digital isolator has a logic input and output buffer separated by a silicon oxide (SiO_2) insulation barrier. Used with isolated power supplies, this device blocks high voltage, 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.

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 a logic-high state.

CAUTION

Note that although these devices provide galvanic isolation of up to 3000 V_{RMS}, this EVM cannot be used for isolation voltage testing. It is designed for the evaluation of device operating parameters only and will be damaged if high voltage (> 5.5 V) is applied anywhere in the circuit.

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1.2 Functional Configuration of the ISO7310C

The EVM is configured for the pinout displayed in Figure 1. Additional I/Os on the EVM (J1, J4) are provided for evaluation of dual-channel isolators.

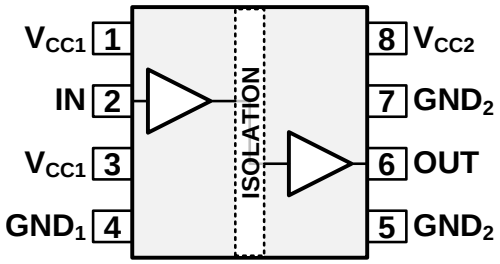


Figure 1. ISO7310C Pinout

The ISO7310C has TTL input thresholds and an input noise filter that prevents transient pulses from being passed to the output of the device, which restricts the maximum data rate to 25Mbps.

1.3 EVM Schematic

This multifunctional EVM is designed with signal paths shown in Figure 2 for the analysis of the ISO7310C, as well as other single- and dual-channel isolators.

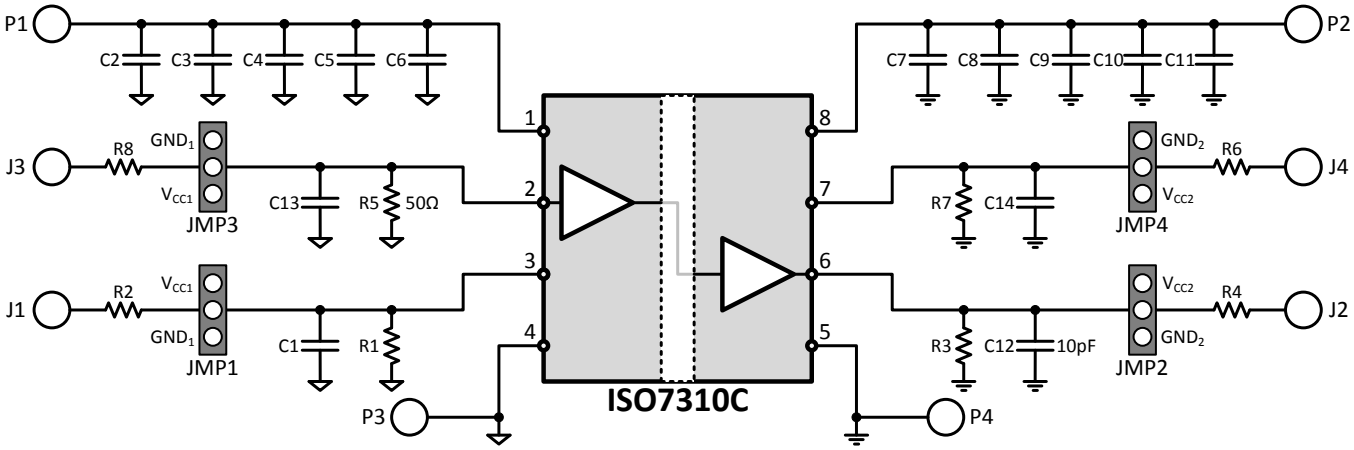


Figure 2. ISO7310C EVM Schematic

Table 1. EVM Connections

Connection	Label	Description
J1		SMA connector
J2		SMA connector to the output pin 6
J3		SMA connector to the input pin 2
J4		SMA connector
P1	V_{CC1}	Input power supply banana jack
P2	V_{CC2}	Output power supply banana jack
P3	GND1	Input power ground connection banana jack
P4	GND2	Output power ground connection banana jack
JMP1		3-pin jumper
JMP2		3-pin jumper
JMP3		3-pin jumper
JMP4		3-pin jumper

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1.4 EVM Configuration

For evaluation of the single-channel ISO7310C, the SMA connectors J3 and J2 serve as the input and output connections, respectively, as shown in Figure 3 and Figure 4. The input connection, J3, is terminated with a 50-Ω resistor, R5, located on the bottom of the EVM. The device output, pin 6, is populated with a 10-pF load, C12, located on the bottom of the EVM. Additional pads (R1, R3, R7, C1, C13, C14) are not populated, but are available for configuration of various input termination and output loading schemes of the I/O pins.

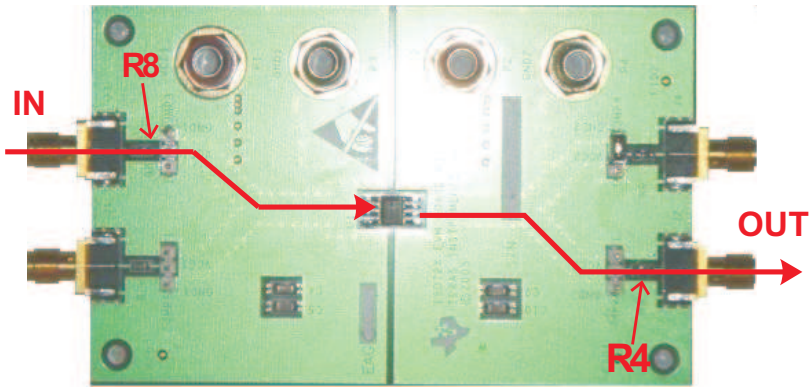


Figure 3. ISO7310C EVM, Top

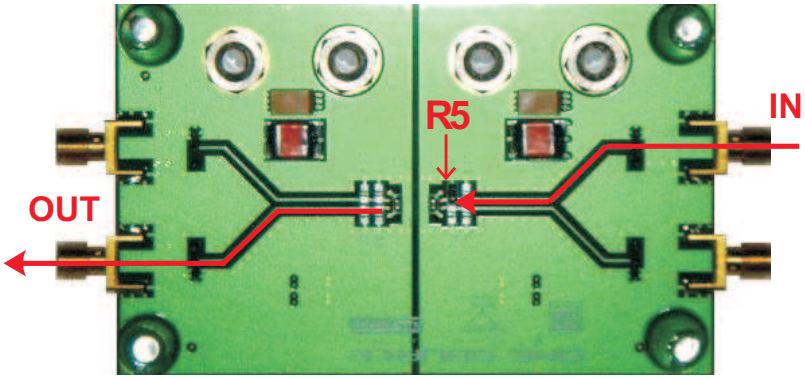


Figure 4. ISO7310C EVM, Bottom

2 EVM Setup and Operation

This section describes the setup and operation of the EVM for parameter performance evaluation. Figure 6 shows a typical waveform.

2.1 Overview

Figure 5 shows the configuration for operating the ISO7310C EVM using two power supplies.

CAUTION

Note that this EVM is for evaluating parametric performance only and not designed for isolation voltage testing. Any voltage applied above the 5.5-V maximum recommended operating voltage of the ISO7310C will damage the EVM.

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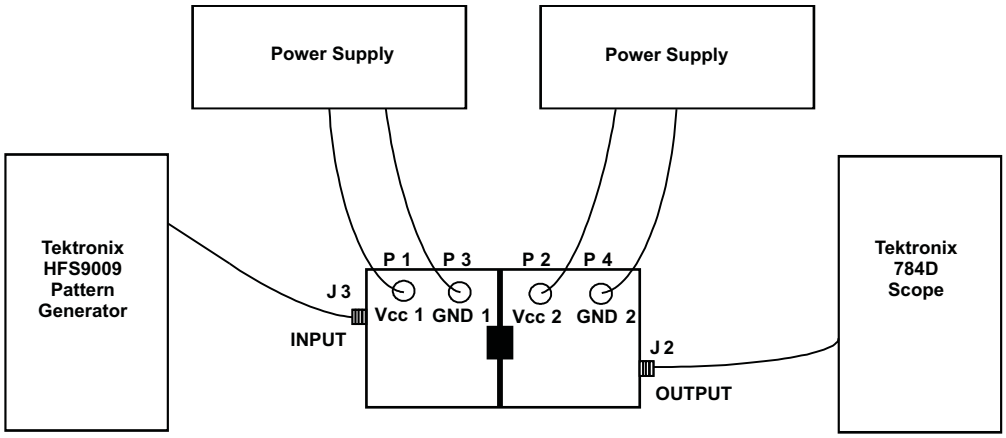


Figure 5. Basic EVM Operation

Figure 6 shows typical input and output waveforms of the ISO7310C for a 1-MHz clock. The input (J3) is shown as channel 1, and the output (J2) as channel 2.

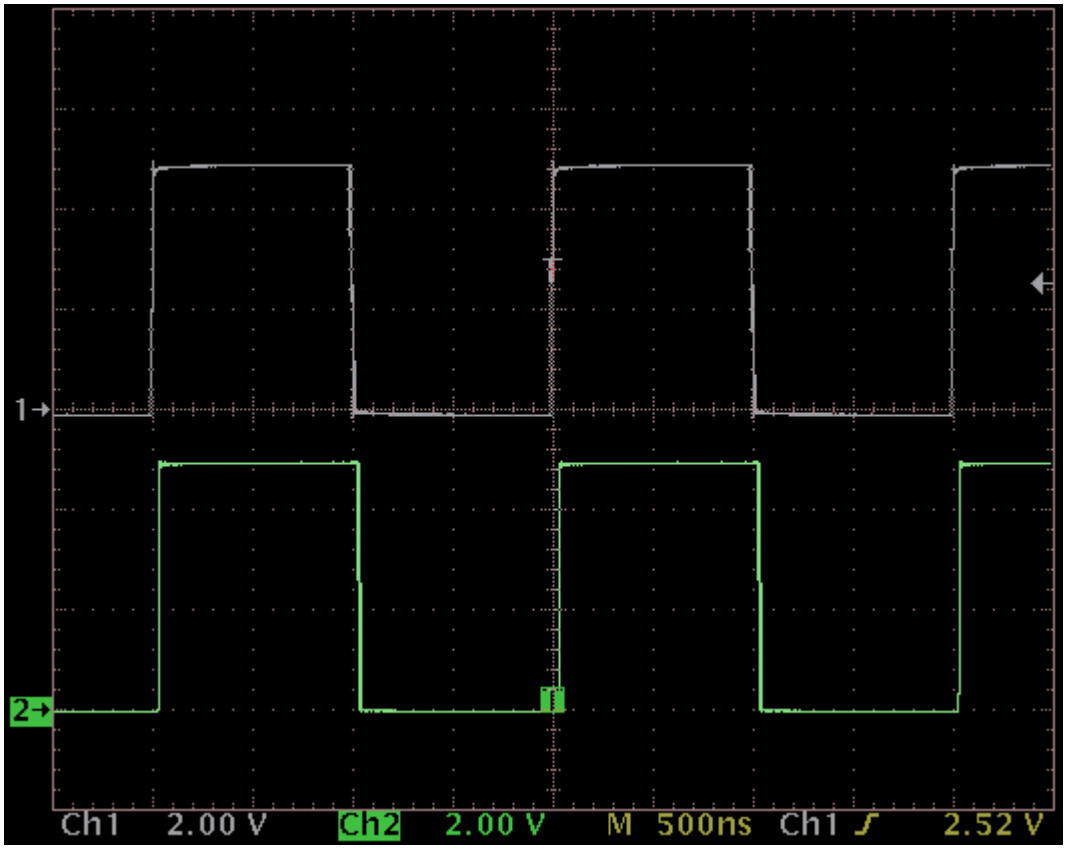


Figure 6. Typical Input and Output Waveforms

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3 Bill of Materials

Table 2 lists the BOM for this EVM.

Table 2. Bill of Materials

Item	Quantity	Reference	Value	PCB Footprint	Manufacturer	Part Number
1	3	C1, C13, C14	DNI	0805		
2	2	C2, C7	68 uF	7260	SPRAGUE	592D68X0010R2T
3	2	C3, C8	10 uF	7343	SPRAGUE	293D106X0035D2W
4	2	C4, C9	1 uF	1206	AVX	12063G105ZATRA
5	1	C5	0.1 uF	1206	AVX	12065C104JATMA
6	2	C6, C11	0.001 uF	0603	AVX	06033G102JATMA
7	1	C10	0.1 uF	1206	AVX	12065C104JATAMA
8	1	C12	10 pF	0805	PANASONIC	ECJ-1VC1H1000
9	4	JMP1, JMP2, JMP3, JMP4	3-Pin-Berg		AMP	4-103239-0X3
10	4	J1, J2, J3, J4	SMA		EF Johnson	142-0701-801
11	4	P1, P2, P3, P4	Banana Jack		ITT-POMONA	3267
12	3	R1, R3, R7	DNI	0805		
13	4	R2,R4,R6,R8	0 Ω	0805	DALE	CRCW08054530F
14	1	R5	49.9 Ω	0805	DALE	CRCW080549R9F
15	1	U1	ISO7310	SOIC8	Texas Instruments	ISO7310D

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- 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.
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