![Texas Instruments logo]

ISO1044 Isolated CAN Transceiver Evaluation Module

This user's guide describes the evaluation module (EVM) for the family of ISO1044 isolated CAN transceivers. This EVM allows designers to evaluate device performance for fast development and analysis of isolated systems. The EVM supports evaluation of all ISO1044 devices in a 8-pin SOIC (D) 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 ISO1044 isolated CAN transceiver. The EVM includes test points for all main points where probing is necessary for evaluation such as GND, VCC, TXD, RXD, CANH, CANL. The EVM supports many options for CAN bus configuration. It is pre-configured with a *split* termination network with a common-mode capacitance and additional caps on the bus for protection. It also includes an option to populate a 120-Ω resistor which can be used with the EVM as a terminated line end (CAN is defined for 120-Ω impedance twisted pair cable). Pads are provided to add protection components like TVS diodes and common mode (CM) chokes. By default, bypass paths are used around those devices.Using these options, the customer is allowed installation of the desired components. This guide describes the EVM schematic, layout and typical laboratory setup. A typical input and output waveform is also presented.

2 Overview

The ISO1044 device is a galvanically-isolated controller area network (CAN) transceiver that meets the specifications of the ISO11898-2 (2016) standard. The ISO1044 device offers ±58-V DC bus fault protection and ±12-V common-mode voltage range. The device supports up to 5-Mbps data rate in CAN FD mode allowing much faster transfer of payload compared to classic CAN. This device uses a silicon dioxide (SiO2) insulation barrier with a withstand voltage of 3000 VRMS. Used in conjunction with isolated power supplies, the device prevents noise currents on a data bus or other circuits from entering the local ground and interfering with or damaging sensitive circuitry.

3 Pin Configuration of the ISO1044 CAN Transceiver

Figure 1 shows the ISO1044 pin configuration.

Not to scale
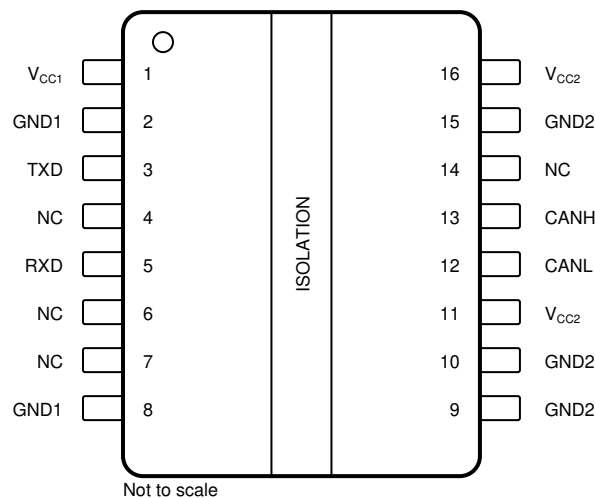
Figure 1. ISO1044 Pin Configuration

4   ISO1044 Board Block Diagram and Image

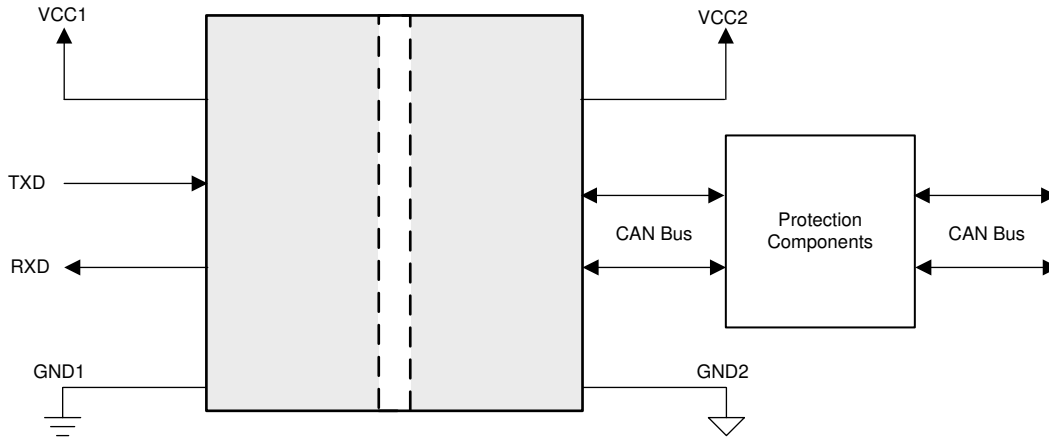Figure 2 shows the board configuration for evaluation of the ISO1044 isolated CAN transceiver.

Figure 2. ISO1044 Configuration

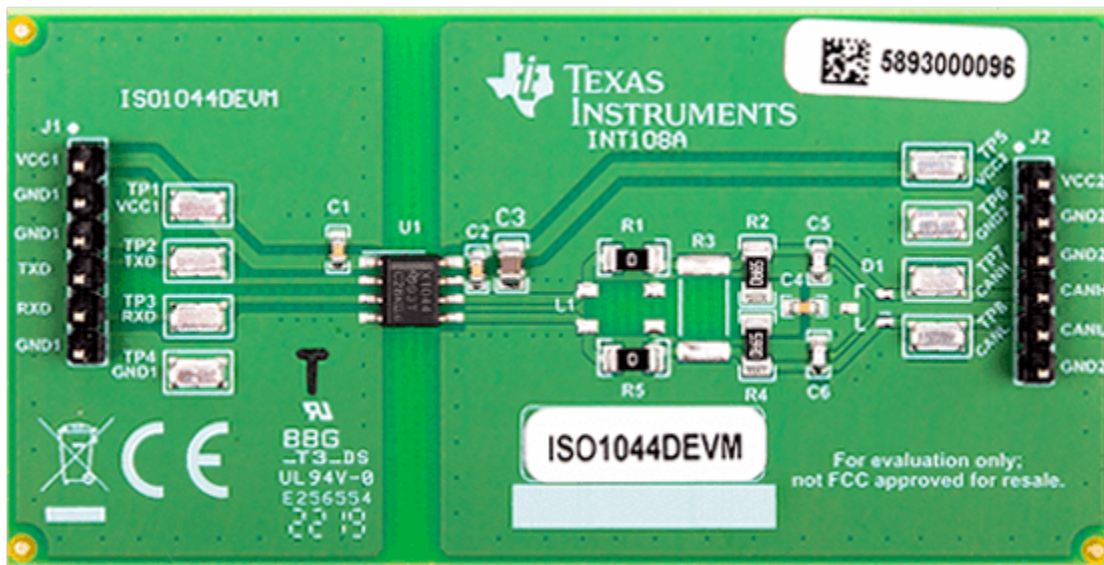Figure 3 shows the photograph of the EVM.

Figure 3. ISO1044 Photograph

5   EVM Schematics and Layout

Figure 4 shows the ISO1044 schematic and Figure 5 shows the printed-circuit board (PCB) layout.
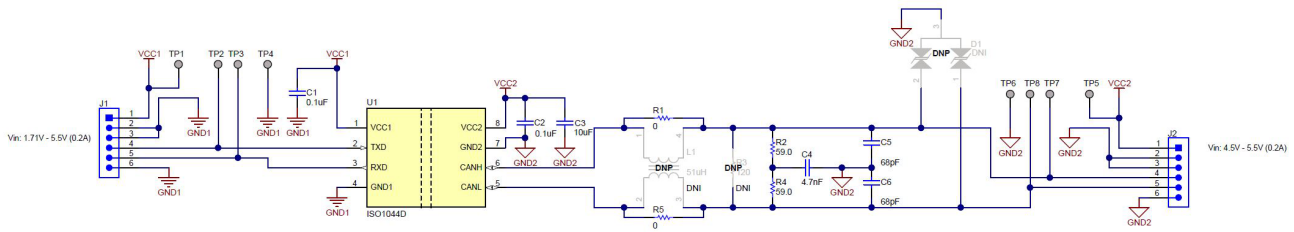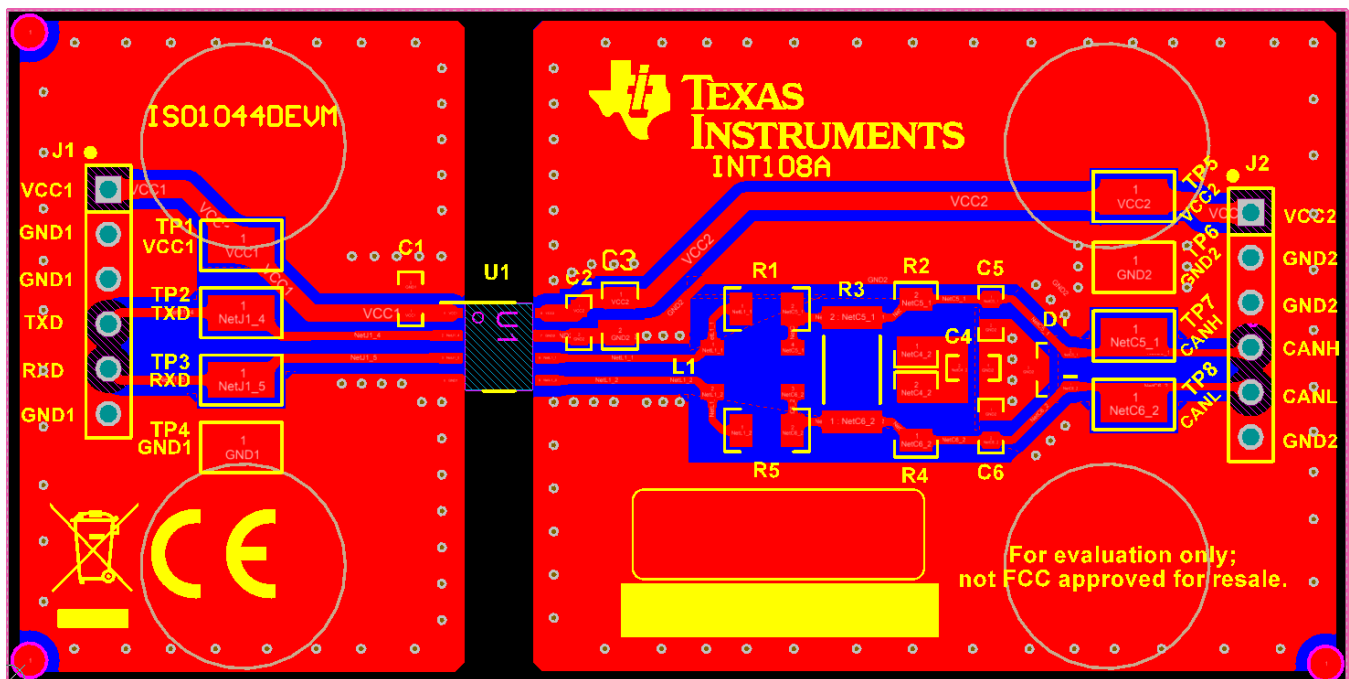

Figure 4. ISO1044 Schematic

**Figure 5. ISO1044 PCB Layout**

6 Bill of Materials

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

Table 1. Bill of Materials

Item	Designator	Description	Manufacturer	Part Number	Quantity
1	J1, J2	Header, 100 mil, 6x1, Tin, TH	Sullins Connector Solutions	PEC06SAAN	2
2	C3	CAP, CERM, 10 uF, 35 V, +/- 10%, X5R, 0805	MuRata	GRM21BR6YA106KE43L	3
4	C1, C2	CAP, CERM, 0.1 uF, 25 V, +/- 5%, X7R, 0603	AVX	06033C104JAT2A	3
5	C4	CAP, CERM, 4700 pF, 50 V, +/- 10%, X7R, 0603	MuRata	GRM188R71H472KA01D	1
6	C5, C6	CAP, CERM, 68 pF, 100 V, +/- 5%, C0G/NP0, 0603	MuRata	GRM1885C2A680JA01D	2
7	R1, R5	RES, 0, 5%, 0.25 W, 1206	Vishay-Dale	CRCW12060000Z0EA	0
8	R2, R4	RES, 59.0, 1%, 0.25 W, 1206	Vishay-Dale	CRCW120659R0FKEA	2
9	R3	RES, 120, 1%, 1 W, AEC-Q200 Grade 0, 2512	Vishay-Dale	CRCW2512120RFKEG	0
10	L1	Coupled inductor, 51 µH, 0.2 A, 1 ohm, AEC-Q200 Grade 0, SMD	TDK	ACT45B-510-2P-TL003	1
11	D1	Diode, TVS, Bi, 7 V, SOT-23	Bourns	CDSOT23-SM712	1
12	U1	ISO1044DW, DW0016B (SOIC-16)	Texas Instruments	ISO1044	1
13	TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8	Test Point, Miniature, SMT	Keystone	5019	10
14	H1, H2, H3, H4	Bumpon, Hemisphere, 0.44 X 0.20, Clear	3M	SJ-5303 (CLEAR)	4

7 EVM Setup and Operation

This section describes the setup and operation of the EVM for parameter performance evaluation. Figure 6 shows the configuration for operating the ISO1044 using two power supplies.
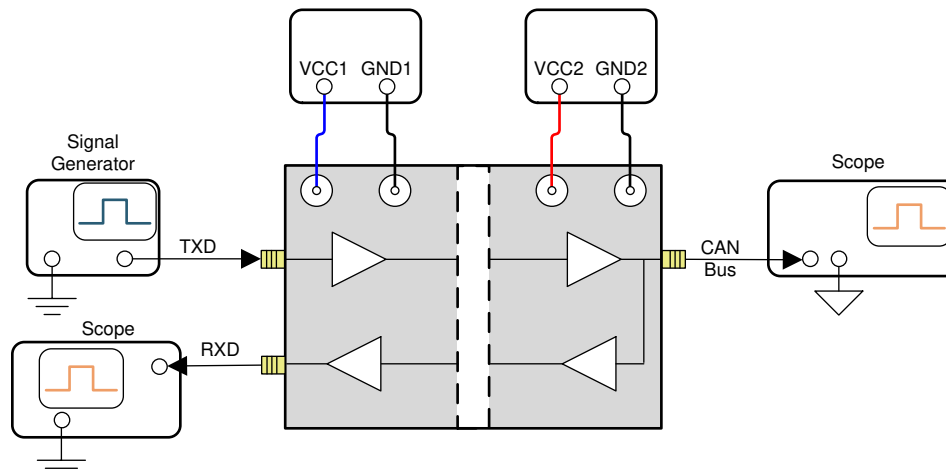
Figure 6. Basic EVM Operation

7.1 Protection Configurations

The EVM also has footprints for various protection schemes to enhance robustness for extreme system level EMC requirements. Figure 7 summarizes these options

Figure 7 shows typical input and output waveforms of the EVM for a 5-Mbps signal. TXD is shown as Channel 1, the CAN bus is shown as Channel 2, Channel 3 and RXD is shown as Channel 4.
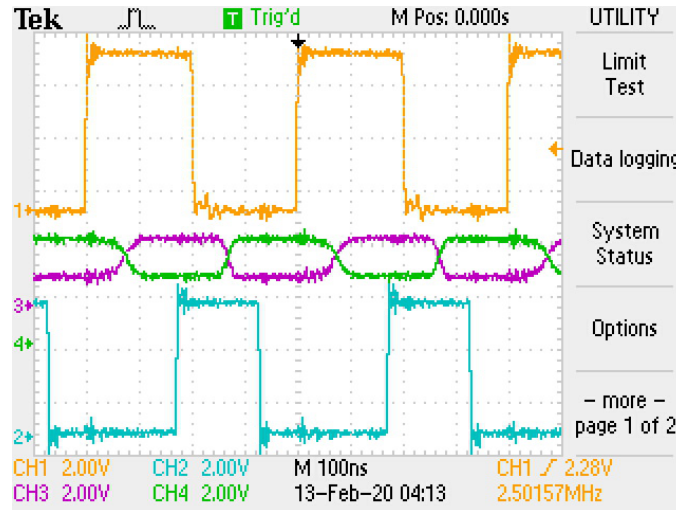

Figure 7. Typical Input and Output Waveforms

Configuration	Footprint Reference	Use Case	Population and Description
Series resistors or common mode choke	R1/R5 or L1	Direct CAN transceiver to bus connection	R1 and R5 populated with 0Ω
		Series resistance protection, CAN transceiver to bus connection	R1 and R14 populated with MELF resistor as necessary for harsh EMC environment
		CM choke (bus filter)	L1 populated with CM choke to filter noise as necessary for harsh EMC environment (Default Population)
Bus filtering caps and transient protection	C8/C9	Bus Filter	Filter noise as necessary for harsh EMC environment. Use filter caps in combination with L1 CM choke
	C8/C9 or D1	Transient and ESD protection	To add extra protection for system level transients and ESD protection. TVS diode population option via D1 footprint or varistor population through C2/C7 footprint.

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