

## Evaluation Board for the ADM3053 with Integrated DC-to-DC Converter

### FEATURES

Easy evaluation of the [ADM3053](#)

Signal and power isolated CAN transceiver

*isoPower* integrated isolated dc-to-dc converter

5 V operation on  $V_{CC}$

5 V or 3.3 V operation on  $V_{IO}$

High speed data rates up to 1 Mbps

Connect 110 or more nodes on the bus

### ADM3053 APPLICATIONS

Controller area networking (CAN) data buses

Industrial field networks

CANOpen applications

### EQUIPMENT NEEDED

EVAL-ADM3053EBZ

### GENERAL DESCRIPTION

The EVAL-ADM3053EBZ allows easy evaluation of the ADM3053 signal and power isolated CAN transceivers. The evaluation board allows all of the input and output functions to be exercised without the need for external components.

The device employs Analog Devices, Inc., *iCoupler*® technology to combine a 2-channel isolator, a CAN transceiver, and an Analog Devices, Inc., *isoPower*® dc-to-dc converter into a single SOIC surface-mount package. An on-chip oscillator outputs a pair of square waveforms that drive an internal transformer to provide isolated power. The device is powered by a single 5 V supply, realizing a fully isolated CAN solution.

The ADM3053 contains *isoPower* technology that uses high frequency switching elements to transfer power through the transformer. For layout guidelines, see the [AN-0971](#) Application Note.

### FUNCTIONAL BLOCK DIAGRAM

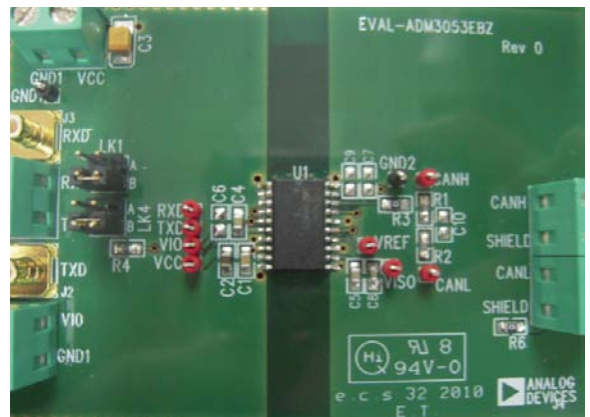


Figure 1.

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**REVISION HISTORY**

**7/11—Revision 0: Initial Version**

# EVALUATION BOARD HARDWARE

## SETTING UP THE EVALUATION BOARD

The EVAL-ADM3053EBZ allows the ADM3053 signal and power isolated CAN transceivers to be easily evaluated. The power supply is connected between a single 5 V supply on  $V_{DD1}$  and a 3.3 V or 5 V supply on  $V_{IO}$ . Note that the typical supply current from  $V_{DD1}$  ( $I_{CC1}$ ) is less than 30 mA when the part is in the recessive state, less than 200 mA when the part is in the dominant state, and less than 140 mA when actively switching states at 500 kbps.

$V_{CC}$  supplies power to the *isoPower* circuitry while  $V_{IO}$  supplies the *iCoupler* circuitry. Two decoupling capacitors of values 0.1  $\mu\text{F}$  and 10  $\mu\text{F}$  are fitted to both of these, C1 and C2 between  $V_{CC}$  and  $GND_1$  and C4 and C6 between  $V_{IO}$  and  $GND_1$ . On the bus side, it is required that  $V_{ISOIN}$  be connected to  $V_{ISOOUT}$ . A 10  $\mu\text{F}$  reservoir capacitor (C9) and a 0.1  $\mu\text{F}$  decoupling

capacitor (C7) are fitted between  $V_{ISOOUT}$  and  $GND_2$ . Two 0.1  $\mu\text{F}$  and 0.01  $\mu\text{F}$  decoupling capacitors (C5 and C8) are fitted between  $V_{ISOIN}$  and  $GND_2$ .

$R_S$  is the slope resistor input. This is connected through a resistor,  $R_S$ , to  $GND_2$  and is used to adjust the slope of the CANH and CANL signals as required.

An example operation of the EVAL-ADM3053EBZ is shown in Figure 2. Connect a clock generator on TXD, and set up a 500 kHz square wave clock with output swinging between 0 V and 5 V. Connect the scope probes to the test points, CANH and CANL. A plot of what can be seen on the oscilloscope for TXD, CANH, and CANL is shown in Figure 3; Channel 1 shows the TXD signal, and Channel 2 and Channel 3 show the CANH and CANL signals.

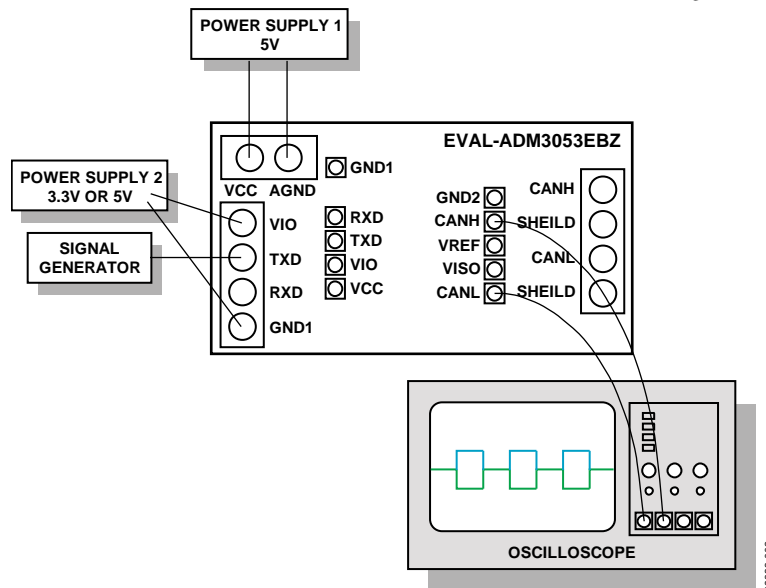


Figure 2. Basic Isolated CAN Transceiver Evaluation Board Operation

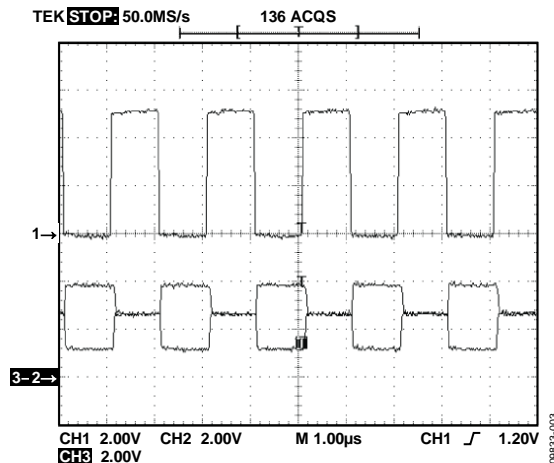


Figure 3. ADM3053 TXD, CANH, and CANL Signals



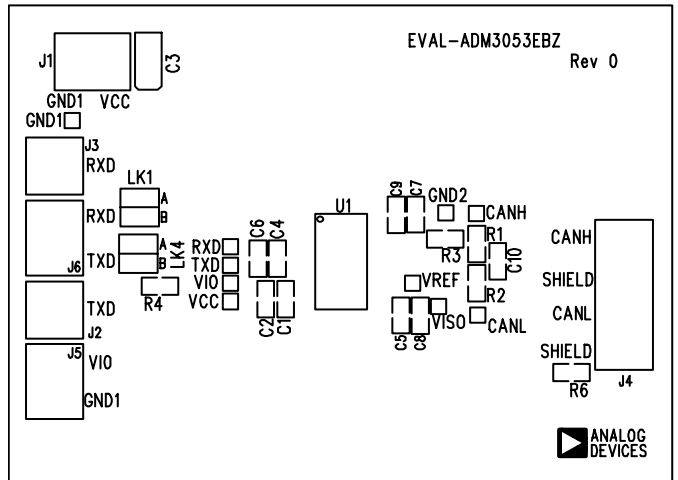


Figure 5. ADM3053 Evaluation Board Silkscreen

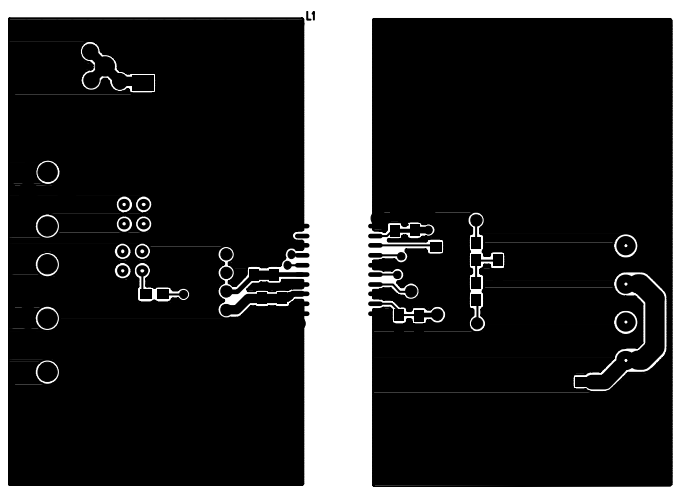


Figure 6. ADM3053 Evaluation Board Component Side

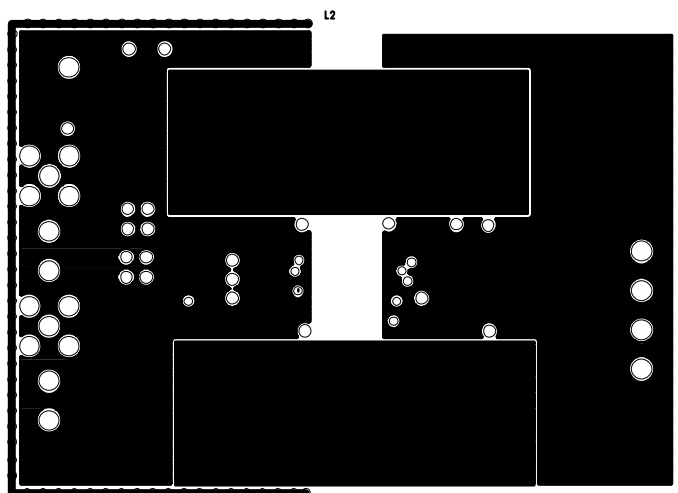
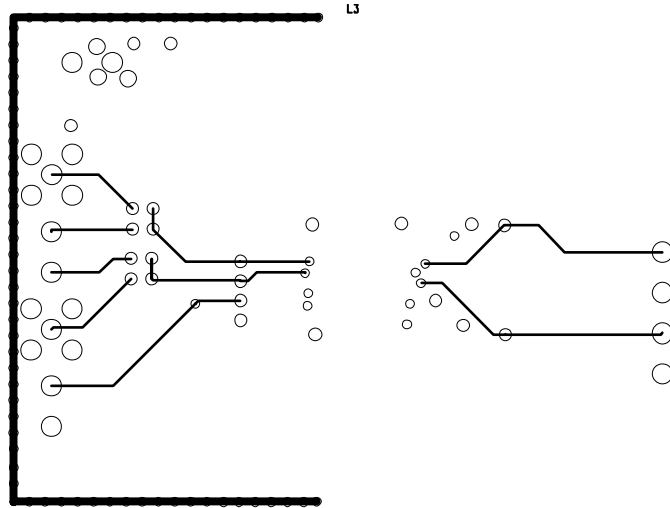
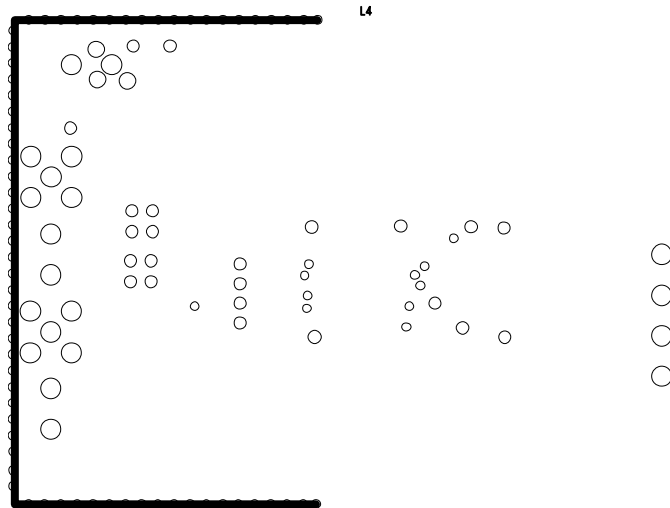


Figure 7. ADM3053 Evaluation Board Layer 2



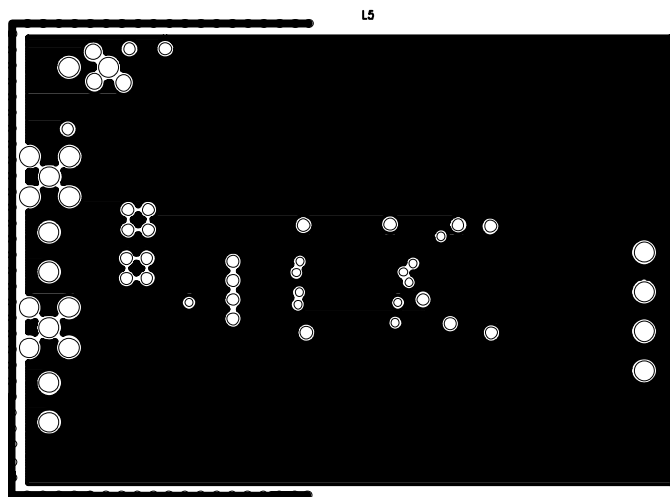
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Figure 8. ADM3053 Evaluation Board Layer 3



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Figure 9. ADM3053 Evaluation Board Layer 4



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Figure 10. ADM3053 Evaluation Board Layer 5

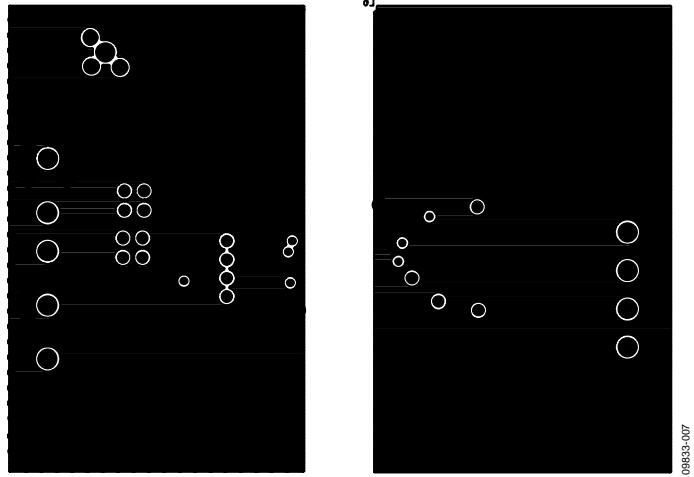


Figure 11. ADM3053 Evaluation Board Solder Side

## ORDERING INFORMATION

## BILL OF MATERIALS

Table 1.

Qty	Name	Description	Supplier	Part No.
3	C1, C6, C7	Capacitor, 100 nF, 805	Yageo (Phycomp)	CC0805KRX7R7BB104
2	C2, C8	Capacitor, 10 $\mu$ F, 805	AVX	08056C106KAT2A
1	C3	Capacitor, Taj-B, 22 $\mu$ F	AVX	TAJB226K016R
3	C4, C5, C9	Capacitor, 10 nF, 805	AVX	08053C103KAT2A
1	C10	Capacitor, 47 nF, 805	AVX	08055C473JAT2A
1	J1	2-pin terminal block (5 mm pitch)	Lumberg	KRE 02
2	J2, J3	PCB BNC jack (square)	Radiall	R114426000
1	J4	4-pin terminal block, CON\POWER4	Wieland Electric	25.161.0453.0
2	J5, J6	2-pin terminal block (5 mm pitch), CON\POWER2	Lumberg	KRE 02
1 <sup>1</sup>	LK1, LK2	Header, 2-row, 3 + 3-way	Harwin	M20-9970346
2	LK1, LK2	Jumper_2	Harwin	M7566-05
2	R1, R2	Resistor, 30 $\Omega$ , 805	Multicomp	MC 0.1W 0805 1% 30R
2	R3, R6	Resistor, 0 $\Omega$ , 805	Multicomp	MC 0.1W 0805 0R
1	R4	Resistor, 10 k $\Omega$ , 805	Multicomp	MC 0.1W 0805 1% 10K—RESISTOR, 0805 10K
6	RXD, TXD, VCC, VISO, CANH, CANL	Test point	Vero	20-313137
2	GND1, GND2	Test point	Vero	20-2137
1	U1	SO20WB	Analog Devices	ADM3053BRWZ

<sup>1</sup> Only one header required per board.

## RELATED LINKS

Resource	Description
<a href="#">ADM3053</a>	Product Page, Signal and Power isolated CAN Transceiver with Integrated Isolated DC-to-DC Converter
<a href="#">AN-0971</a>	Application note, Recommendations for Control of Radiated Emissions with <i>isoPower</i> ® Devices

**ESD Caution**

**ESD (electrostatic discharge) sensitive device.** Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

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