

## Evaluating the Signal and Power Isolated CAN Transceiver with Integrated Isolated DC-to-DC Converter

### FEATURES

- Signal and power isolated CAN transceiver with *isoPower* integrated isolated dc-to-dc converter
- PCB layout optimized for low radiated emissions; passes EN55022 Class B (certification available)
- Standard 4-layer PCB solution for radiated emissions
- Screw terminal connectors for prototyping
  - Logic signals RXD and TXD
  - Power supply VCC and VIO
  - Bus signals CANH and CANL
  - PCB ground GND1 and GND2
- SMA connectors for TXD and RXD
- On-board LDO for 6 V to 9 V supply, providing 5 V on V<sub>CC</sub> pin
- 5 V or 3.3 V operation on VIO
- Test points for logic signals, power supplies, grounds, and bus signals
- On-board 30 Ω + 30 Ω termination resistors to simulate full bus load (60 Ω)

### EVALUATION KIT CONTENTS

evaluation board

### DOCUMENTS NEEDED

data sheet

### GENERAL DESCRIPTION

The *isoPower* signal and power isolated controller area network (CAN) transceivers. The evaluation board allows all of the input and output functions to be exercised without the need for external components.

The *isoPower* device employs Analog Devices, Inc., *iCoupler* technology to combine a 2-channel isolator, a CAN transceiver, and an Analog Devices *isoPower* dc-to-dc converter into a single small outline IC (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 *isoPower* contains *isoPower* technology that uses high frequency switching elements to transfer power through the transformer. For layout guidelines, see the

For full details, see the *isoPower* data sheet, which must be used in conjunction with this user guide when using the evaluation board.

### EVALUATION BOARD PHOTOGRAPH

Figure 1.

09833-001

**TABLE OF CONTENTS**

Features ..... 1  
 Evaluation Kit Contents..... 1  
 Documents Needed ..... 1  
 General Description ..... 1  
 EVAL-ADM3053EBZ Evaluation Board Photograph ..... 1  
 Revision History ..... 2  
 Evaluation Board Hardware..... 3  
     Setting Up the Evaluation Board ..... 3

Overlapping Stitching Capacitor.....4  
 PCB Layout Recommendations .....4  
 EN55022 Radiated Emissions Test Results .....4  
 Evaluation Board Schematics and Artwork.....6  
 Ordering Information.....9  
     Bill of Materials.....9  
 Related Links.....9

**REVISION HISTORY**

**7/2017—Rev. 0 to Rev. A**

Deleted ADM3053 Applications Section, Equipment Needed  
 Section, and Functional Block Diagram Section..... 1  
 Changes to Features Section and Figure 1..... 1  
 Added Evaluation Kit Contents Section, Documents Needed  
 Section, and Evaluation Board Photograph Section..... 1  
 Changes to Setting Up the Evaluation Board Section and  
 Figure 3 ..... 3  
 Added Table 1, Renumbered Sequentially ..... 3  
 Added Overlapping Stitching Capacitors Section, PCB Layout  
 Recommendations Section, EN55022 Radiated Emissions Test  
 Results Section, and Figure 4; Renumbered Sequentially ..... 4

Added Figure 5, Figure 6, and Table 2 .....5  
 Changes to Figure 7.....6  
 Deleted Figure 9 and Figure 10.....6  
 Changes to Figure 8 and Figure 10.....7  
 Added to Figure 9 .....7  
 Changes to Figure 11, Figure 12, and Figure 13 .....8  
 Changes to Table 3 and Related Links Section .....9

**7/2011—Revision 0: Initial Version**





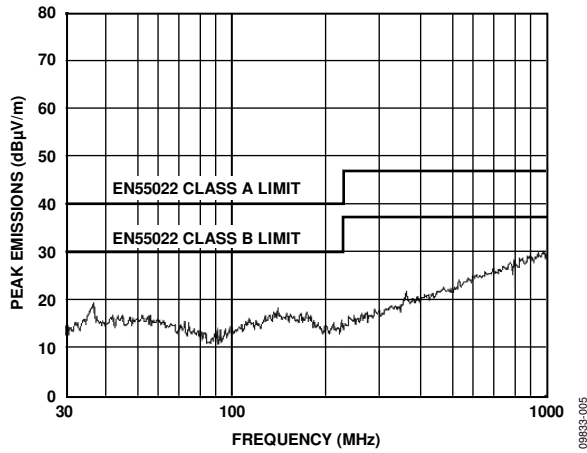


Figure 5. Horizontal Scan From 30 MHz to 1000 MHz

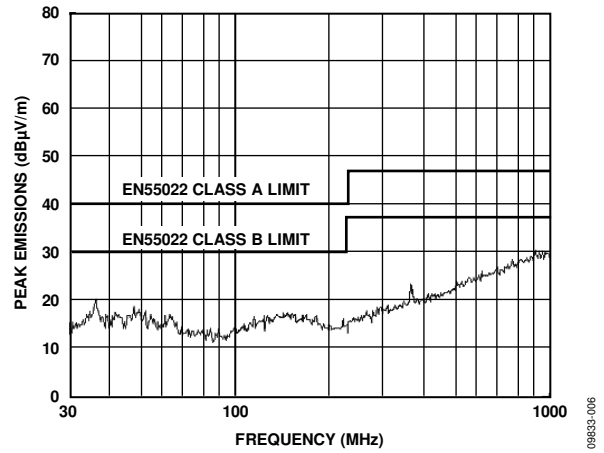


Figure 6. Vertical Scan from 30 MHz to 1000 GHz

Table 2. ADM3053 Test Results (Quasi-Peak Measurements)

Frequency (MHz)	QP Level dB ( $\mu\text{V}/\text{m}$ )	EN55022 Class B dB ( $\mu\text{V}/\text{m}$ )	Antenna Position	Antenna Height (m)	Pass/Fail
182.330	17.5	30	Horizontal	4.00	Pass
364.902	31.9	37	Horizontal	2.50	Pass
182.027	12.0	30	Vertical	1.00	Pass
364.058	22.1	37	Vertical	1.50	Pass

EVALUATION BOARD SCHEMATICS AND ARTWORK

09833-007

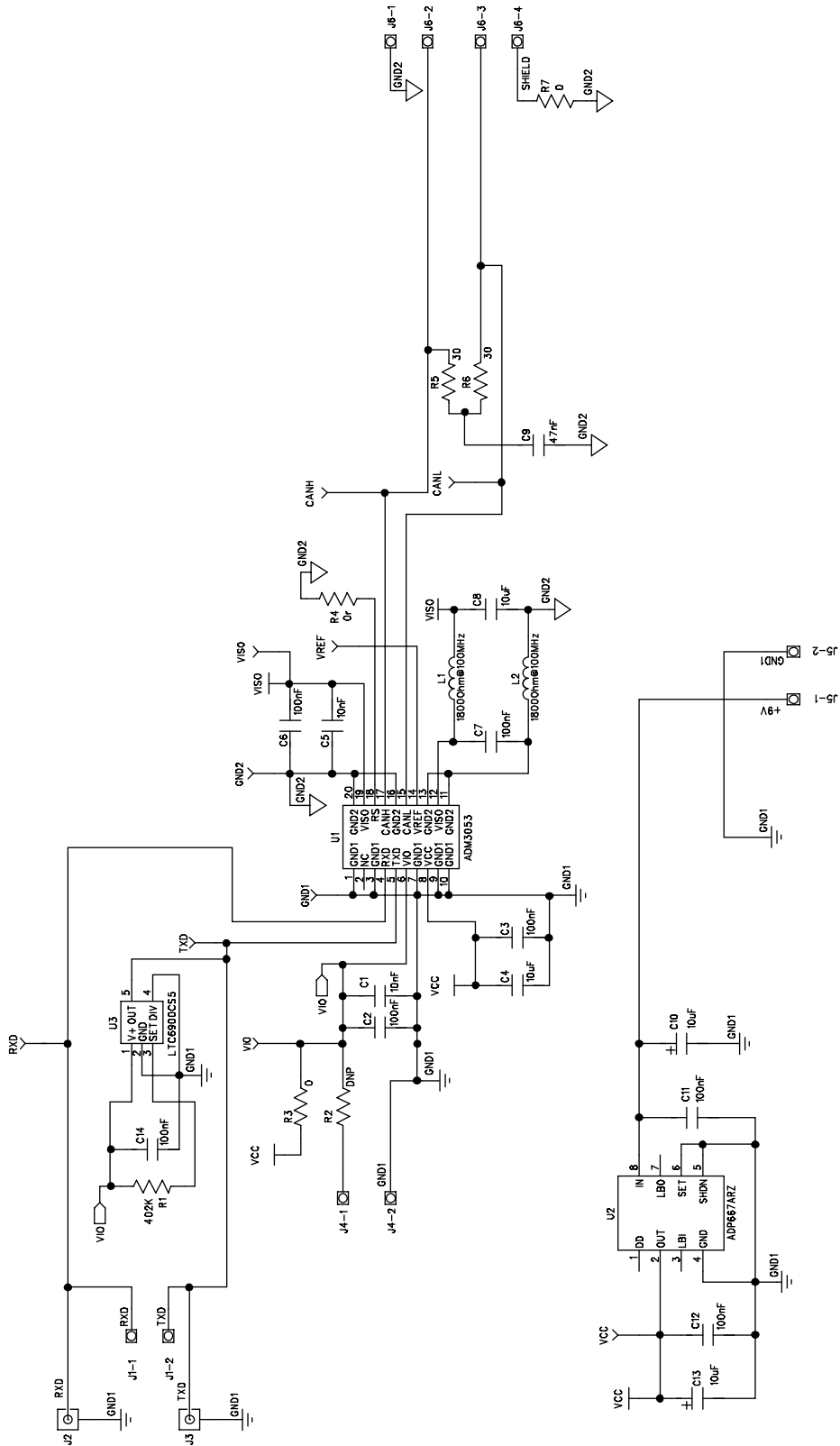


Figure 7. EVAL-ADM3053EBZ Evaluation Board Schematic

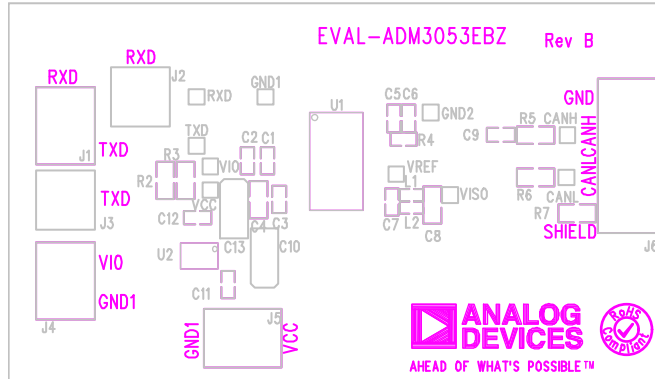


Figure 8. EVAL-ADM3053EBZ Evaluation Board Silkscreen (Top)

09833-008

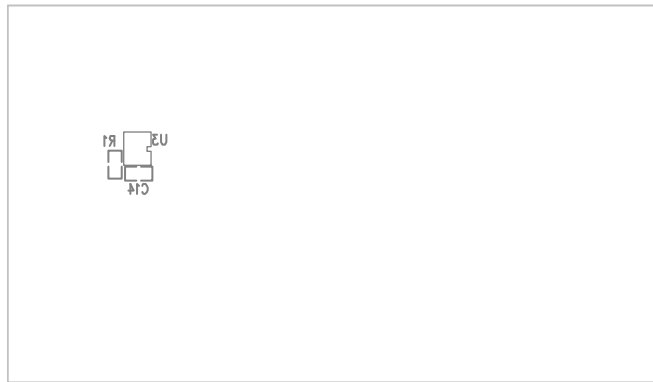


Figure 9. EVAL-ADM3053EBZ Evaluation Board Silkscreen (Bottom)

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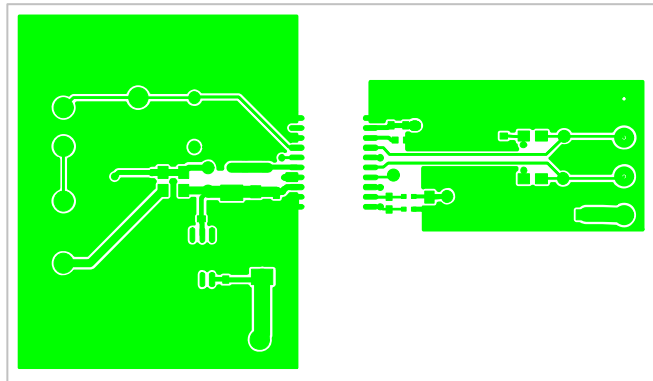
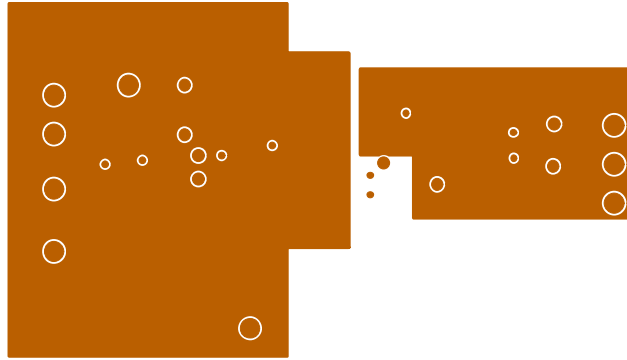


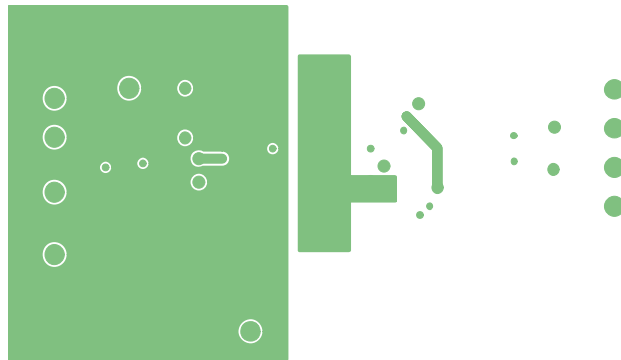
Figure 10. EVAL-ADM3053EBZ Evaluation Board Component Side

09833-010



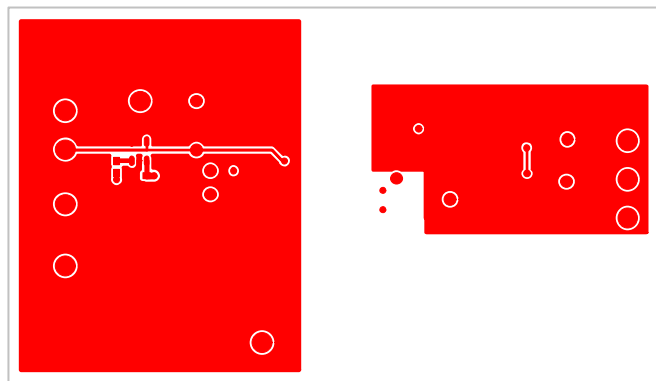
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Figure 11. EVAL-ADM3053EBZ Evaluation Board Layer 2



09833-012

Figure 12. EVAL-ADM3053EBZ Evaluation Board Layer 3



09833-013

Figure 13. EVAL-ADM3053EBZ Evaluation Board Solder Side



## ORDERING INFORMATION

### BILL OF MATERIALS

Table 3.

Quantity	Name	Description	Supplier	Part No.
2	C1, C5	Capacitor, X7R, 10 nF, 0603	Multicomp	MC0603B103K160CT
6	C2, C3, C6, C7, C11, C12	Capacitor, X7R, 100 nF, 0603	Multicomp	MC0603B104K160CT
2	C4, C8	Capacitor, X7R, 10 $\mu$ F, 0805	AVX	0805ZC106KAT2A
1	C9	Capacitor, X7R, 47 nF, 0603	Multicomp	MC0603B473K500CT
2	C10, C13	Capacitor, tantalum, 10 $\mu$ F, Case C	Kemet	B45196E3106K309
1	C14 (not placed)	Capacitor, X7R, 100 nF (optional)	Multicomp	MC0603B104K160CT
3	J1, J4, J5	2-pin terminal block	Lumberg	KRM 02
2	J2, J3	SMA, straight jack	TE Connectivity	5-1814832-1
1	J6	4-pin terminal block	Lumberg	KRM 04
2	L1, L2	Ferrite bead, 1.8 k $\Omega$ at 100 MHz	Murata	BLM15HD182SN1D
1	R1 (not placed)	Resistor, 402 k $\Omega$ , 0603 (optional)	Multicomp	MC0063W06031402K
1	R2, R7	Resistor, 0 $\Omega$ , 0805	Vishay Draloric	CRCW08050000ZSTA
1	R3 (not placed)	Resistor, 0 $\Omega$ , 0805 (optional)	Vishay Draloric	CRCW08050000ZSTA
1	R4	Resistor, 0 $\Omega$ , 0603	Multicomp	MC0063W06030R
2	R5, R6	Resistor, thick film, 30 $\Omega$ , 0.5 W, 0805	Panasonic	ERJP06F30R0V
5	CANH, CANL, RXD, TXD, VREF	Test point, yellow	Vero	20-313140
2	GND1, GND2	Test point, black	Vero	20-2137
3	VCC, VIO, VISO	Test point, red	Vero	20-313137
1	U1	<a href="#">ADM3053</a> isolated CAN transceiver with <i>isoPower</i> integrated dc-to-dc converter	Analog Devices	<a href="#">ADM3053BRWZ</a>
1	U2	5 V fixed, adjustable low dropout linear voltage regulator	Analog Devices	<a href="#">ADP667ARZ</a>
1	U3 (not placed)	Oscillator, 1 kHz to 20 MHz (optional)	Linear Technology	LTC6900CS5#TRMPBF

### RELATED LINKS

Resource	Description
<a href="#">ADM3053</a>	Signal and Power isolated CAN Transceiver with Integrated Isolated DC-to-DC Converter
<a href="#">AN-1349</a>	PCB Implementation Guidelines to Minimize Radiated Emissions on the <a href="#">ADM2582E/ADM2587E</a> RS-485/RS-422 Transceivers
<a href="#">AN-1123</a>	Controller Area Network (CAN) Implementation Guide
<a href="#">AN-0971</a>	Recommendations for Control of Radiated Emissions with <i>isoPower</i> Devices

## NOTES

**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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