

High Speed Evaluation Board for Full Duplex M-LVDS Transceivers ([ADN4692E](#), [ADN4693E](#), [ADN4695E](#), and [ADN4697E](#))

FEATURES

- Easy evaluation of full-duplex M-LVDS transceivers [ADN4692E](#), [ADN4693E](#), [ADN4695E](#), and [ADN4697E](#)
- Board layout optimized for high speed signaling
- Matched track lengths on M-LVDS input/output differential pairs, with controlled 50 Ω impedance tracks
- SMB jack inputs/outputs for high speed connections
- Logic signals: RO, $\overline{\text{RE}}$, DE, and DI
- M-LVDS bus signals: A, B, Y, and Z
- Power/ground connections through screw terminal blocks
- Jumper selectable enable/disable for $\overline{\text{RE}}$ and DE
- Test points for measuring all signals and multiple ground points to facilitate probing of multiple signals
- 50 Ω termination resistors across A and B, and Y and Z, to simulate double-terminated bus

APPLICATIONS

Full-duplex M-LVDS part evaluation

EVALUATION KIT CONTENTS

- 1 EVAL-ADN469xEFDEBZ
- 1 [ADN4692EBRZ](#)
- 1 [ADN4693EBRZ](#)
- 1 [ADN4695EBRZ](#)
- 1 [ADN4697EBRZ](#)

EVAL-ADN469xEFDEBZ

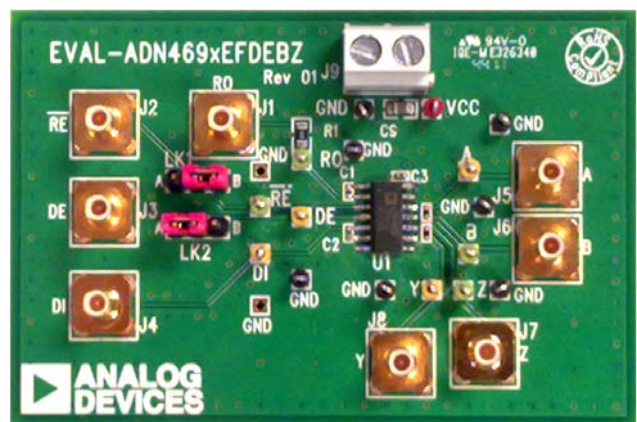


Figure 1.

GENERAL DESCRIPTION

The EVAL-ADN469xEFDEBZ allows quick and easy evaluation of full-duplex M-LVDS transceivers ([ADN4692E](#), [ADN4693E](#), [ADN4695E](#), and [ADN4697E](#)). The evaluation board allows all of the input and output functions to be exercised without the need for external components. Screw terminal blocks provide convenient connections for power and ground, with SMB jack connectors for high speed logic and M-LVDS bus signals.

The evaluation board has a 14-lead SOIC footprint for a full-duplex M-LVDS transceiver from the ADN469xE family (see Table 1).

Table 1. ADN469xE Selection Table

Part No.	Receiver Type	Data Rate	Package	Half-Duplex/Full-Duplex	Evaluation Board
ADN4690E	Type 1	100 Mbps	8-lead SOIC	Half	EVAL-ADN469xEHDEBZ
ADN4691E	Type 1	200 Mbps	8-lead SOIC	Half	EVAL-ADN469xEHDEBZ
ADN4692E	Type 1	100 Mbps	14-lead SOIC	Full	EVAL-ADN469xEFDEBZ
ADN4693E	Type 1	200 Mbps	14-lead SOIC	Full	EVAL-ADN469xEFDEBZ
ADN4694E	Type 2	100 Mbps	8-lead SOIC	Half	EVAL-ADN469xEHDEBZ
ADN4695E	Type 2	100 Mbps	14-lead SOIC	Full	EVAL-ADN469xEFDEBZ
ADN4696E	Type 2	200 Mbps	8-lead SOIC	Half	EVAL-ADN469xEHDEBZ
ADN4697E	Type 2	200 Mbps	14-lead SOIC	Full	EVAL-ADN469xEFDEBZ

TABLE OF CONTENTS

Features	1	Setting Up the Evaluation Board.....	3
Applications.....	1	Evaluation with Applications.....	3
Evaluation Kit Contents.....	1	Evaluation Board Schematic and Layout	5
EVAL-ADN469xEFDEBZ	1	Ordering Information.....	8
General Description	1	Bill of Materials.....	8
Revision History	2	Related Links.....	8
Evaluation Board Configuration	3		

REVISION HISTORY

3/12—Revision 0: Initial Version

EVALUATION BOARD CONFIGURATION

SETTING UP THE EVALUATION BOARD

The EVAL-ADN469xEFDEBZ allows the full-duplex parts in the ADN469xE family to be quickly and easily evaluated. The evaluation board allows all of the input and output functions to be exercised without the need for external components. Jumper configurations are shown in Table 2.

The board is powered by connecting a 3.3 V power supply to the screw terminals for VCC and GND. Supply current is typically 16 mA with both driver and receiver enabled or 1 mA with both disabled. A 10 μ F decoupling capacitor, C1, is fitted at the connector between VCC and GND. The V_{CC} pin of the ADN469xE is fitted with a decoupling capacitor of 100 nF.

An example evaluation of the [ADN4692E/ADN4693E/ADN4695E/ADN4697E](#) driver is shown in Figure 2. A signal generator is connected to DI with an input signal of 50 MHz ([ADN4692E/ADN4695E](#)) or 100 MHz ([ADN4693E/ADN4697E](#)), with a 50% duty cycle and swing of between 0 V and 3.3 V. Jumpers LK1 and LK2 are connected in Position A to disable the receiver and enable the driver. Oscilloscope probes are connected to DI, Y, and Z.

Similarly, an evaluation of the [ADN4692E/ADN4693E/ADN4695E/ADN4697E](#) receiver is shown in Figure 3. A signal generator capable of applying a differential input signal is connected to J5 and J6, with the input swing between 1 V and

1.2 V (J6 input is the inverse of J5). Jumpers LK1 and LK2 are connected in Position B to enable the receiver and disable the driver. Oscilloscope probes are attached to RO, A, and B.

EVALUATION WITH APPLICATIONS

Two EVAL-ADN469xEFDEBZ boards can connect together in a point-to-point configuration, as shown in Figure 4. To allow part evaluation with a load equivalent to a parallel-terminated bus, the boards have been fitted with 50 Ω termination resistors. For the point-to-point configuration in Figure 4, replace these resistors with 100 Ω resistors.

A signal generator is connected onto the DI input of one board. The Y and Z outputs of this board are connected to the A and B inputs of the second board, respectively.

Connecting probes to DI on the first board, and A, B, and RO on the second, the propagation of the input signal across the bus and to the receiver output of the second board can be observed and evaluated.

Alternatively, the EVAL-ADN469xEFDEBZ can connect to an existing bus and a control board, as shown in Figure 5, to test the performance in the application. In this case, remove both termination resistors, as well as the jumpers on LK1 and LK2. Connect control signals to RO, RE, DE, and DI.

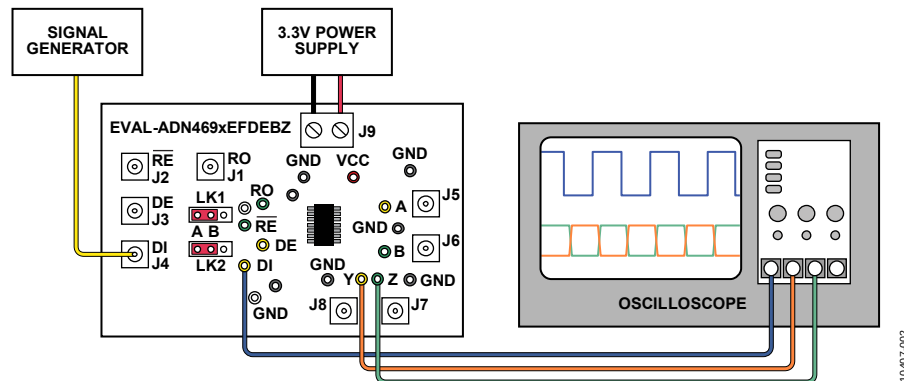


Figure 2. [ADN4692E/ADN4693E/ADN4695E/ADN4697E](#) Driver Evaluation with EVAL-ADN469xEFDEBZ

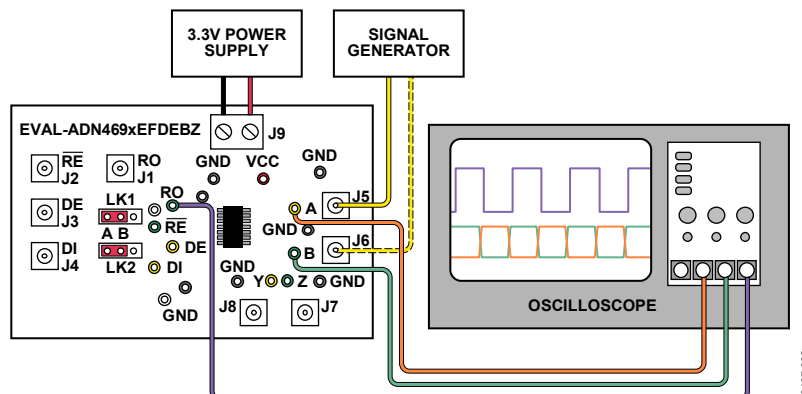
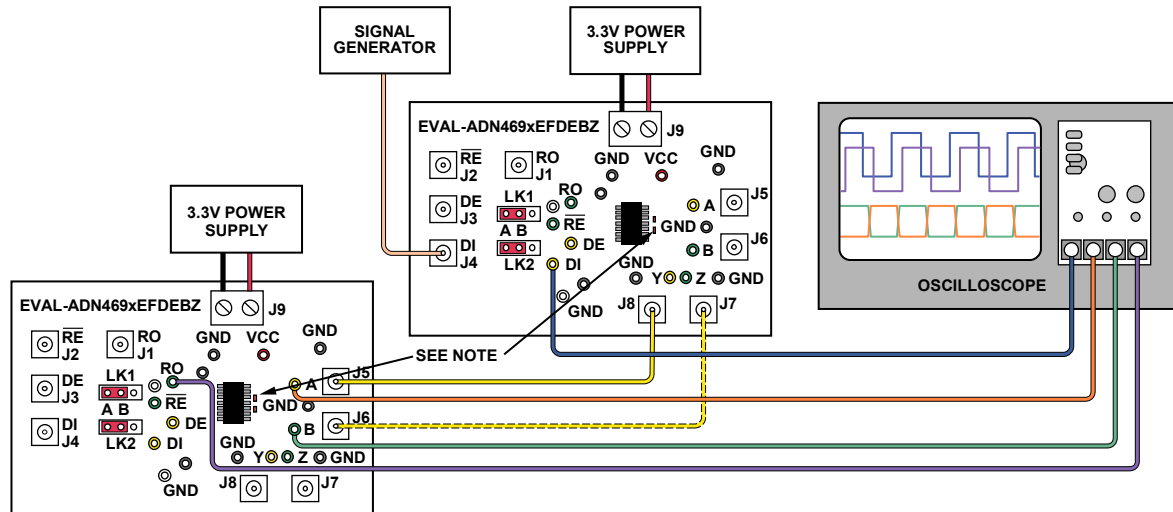


Figure 3. [ADN4692E/ADN4693E/ADN4695E/ADN4697E](#) Receiver Evaluation with EVAL-ADN469xEFDEBZ

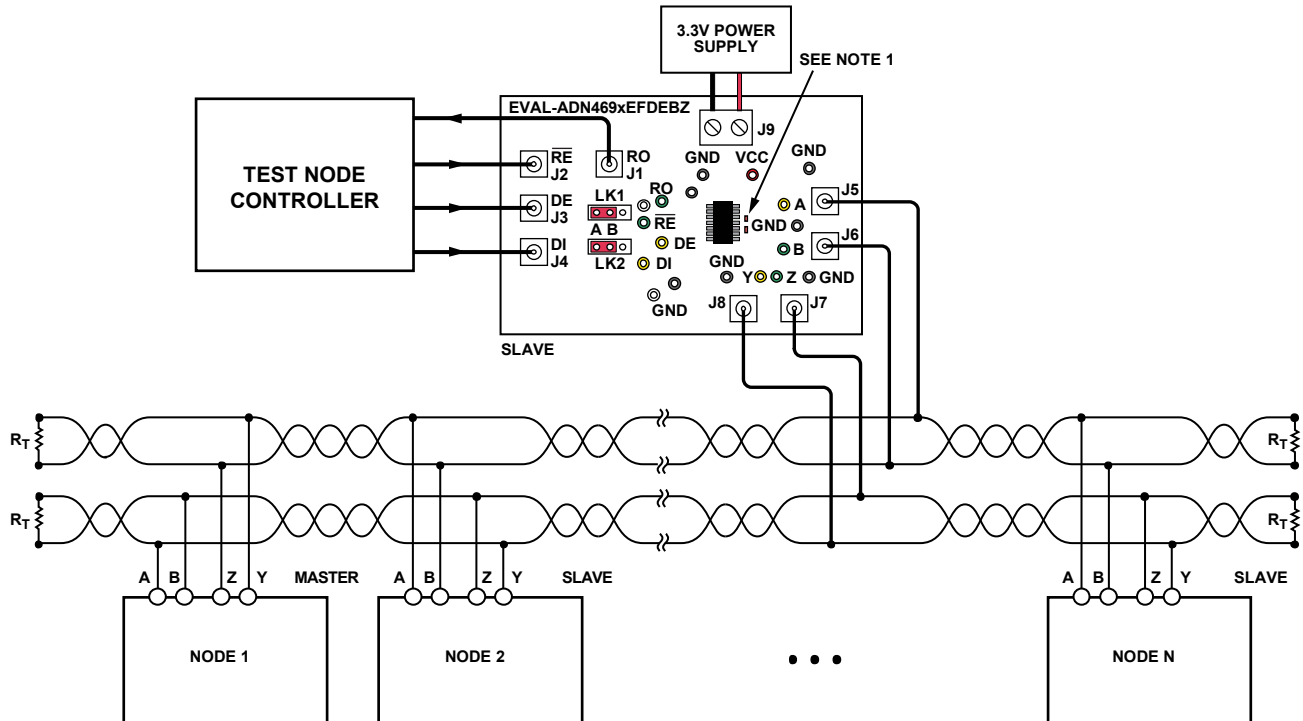


NOTES

1. REPLACE 50Ω RESISTORS WITH 100Ω WHEN EVALUATING TWO BOARDS CONNECTED TOGETHER.

Figure 4. EVAL-ADN469xEFDEBZ Two Board Point-to-Point Evaluation

10407-004



NOTES

1. REMOVE 50Ω TERMINATION RESISTORS FROM EVALUATION BOARD.
2. MAXIMUM NUMBER OF NODES: 32.
3. R_T IS EQUAL TO THE CHARACTERISTIC IMPEDANCE OF THE CABLE USED.

Figure 5. EVAL-ADN469xEFDEBZ Application Evaluation Connected to Bus and Control Board

10407-005

Table 2. Jumper Configuration

Link	Connection	Description
LK1	A	Connects $\overline{RE}$ to VCC (disables receiver output). Disconnect J2 input.
	B	Connects $\overline{RE}$ to GND (enables receiver output). Disconnect J2 input.
	None	Allows $\overline{RE}$ input on J2.
LK2	A	Connects DE to VCC (enables driver outputs). Disconnect J3 input.
	B	Connects DE to GND (disables driver outputs). Disconnect J3 input.
	None	Allows DE input on J3.

EVALUATION BOARD SCHEMATIC AND LAYOUT

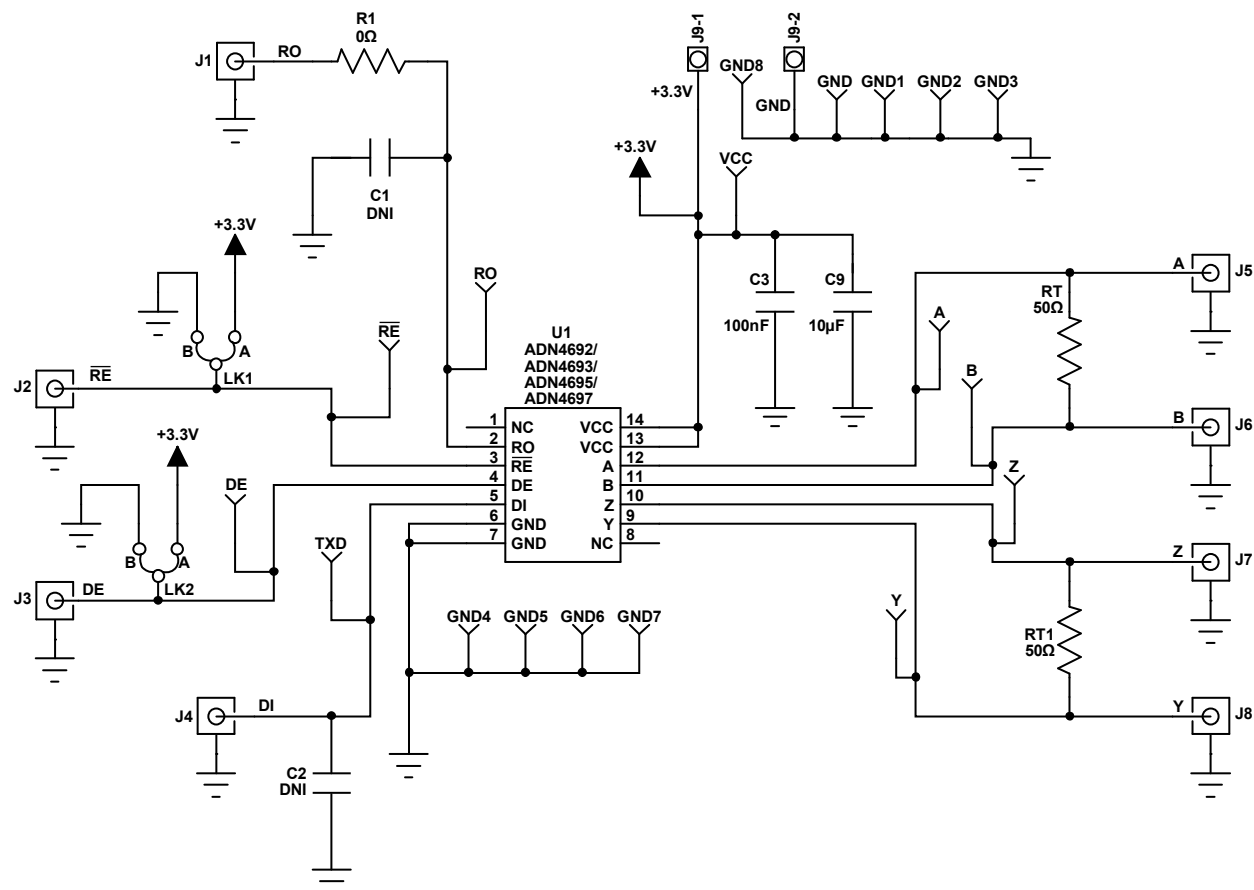


Figure 6. EVAL-ADN469xEFDEBZ Schematic

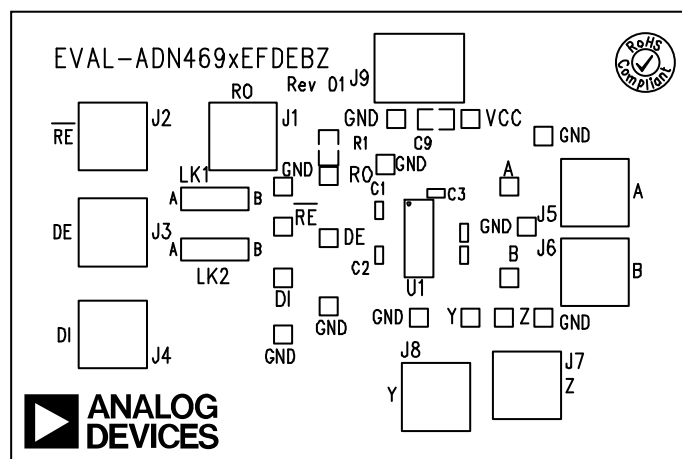


Figure 7. EVAL-ADN469xEFDEBZ Silkscreen

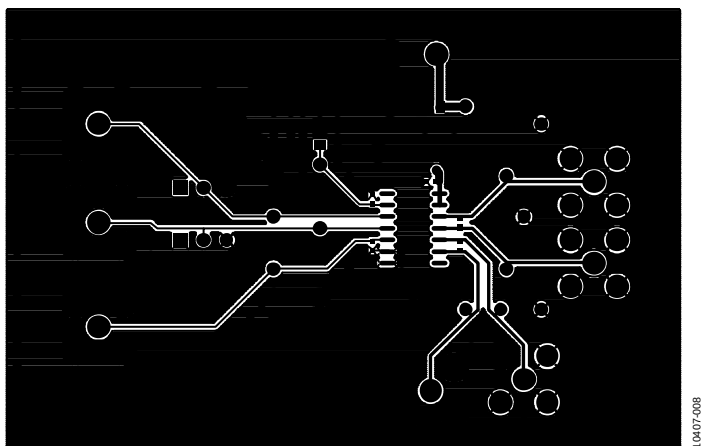


Figure 8. EVAL-ADN469xEFDEBZ Component Side

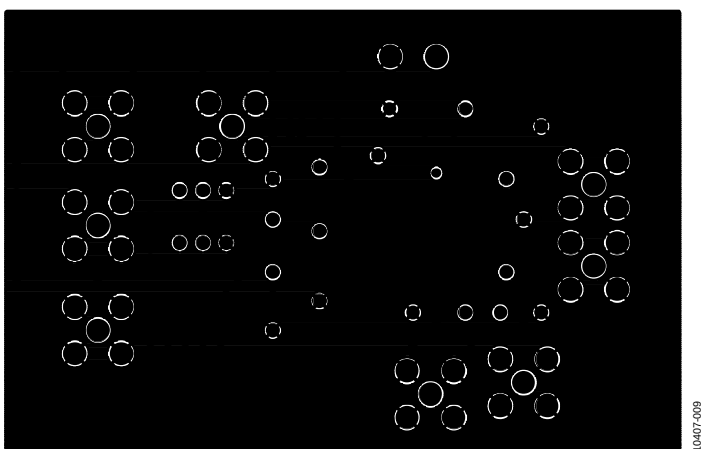


Figure 9. EVAL-ADN469xEFDEBZ Internal Layer 2

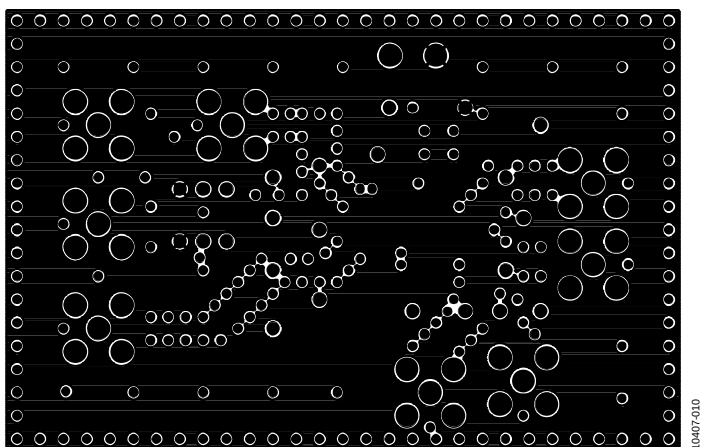


Figure 10. EVAL-ADN469xEFDEBZ Internal Layer 3

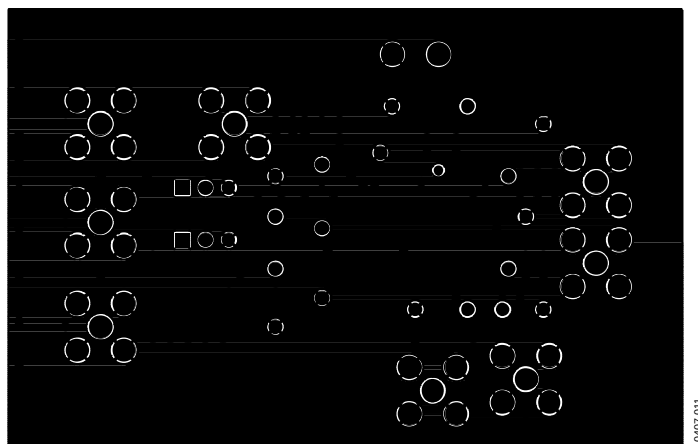


Figure 11. EVAL-ADN469xEFDEBZ Solder Side

ORDERING INFORMATION

BILL OF MATERIALS

Table 3.

Quantity	Reference Designator	Description	Supplier/Part Number
2	C1, C2	Not placed/optional	Not applicable
1	C3	Capacitor, 100 nF, 0805	Multicomp/MCCA000274
1	C9	Capacitor, 10 μ F, 0805	AVX/0805ZD106KAT2A
4	A, DE, TXD, Y	Test point, yellow	Vero Technologies/20-313140
4	B, RE, RO, Z	Test point, green	Vero Technologies/20-313138
9	GND (GND1 to GND8)	Test point, black (optional)	Vero Technologies/20-2137
8	J1 to J8	Connector, SMB jack	Multicomp/24-14-2-TGG
1	J9	2-way terminal block	Lumberg/KRM 02
2	LK1, LK2	3-pin (1 $\times$ 3) 0.1" header and shorting block	Harwin/M20-9990346 and Harwin/M7566-05
1	R1	Resistor, 0 Ω , 0805	Vishay Draloric/CRCW08050000Z0EA
2	RT1, RT	Resistor, 100 Ω , 0402	Vishay Draloric/CRCW0402100RFKEAHP
1	U1	16-lead SOIC (not placed)	Analog Devices/ ADN4692E , ADN4693E , ADN4695E , or ADN4697E
1	VCC	Test point, red	Vero Technologies/20-313137

RELATED LINKS

Resource	Description
ADN4692E	Product Page, 3.3 V, 100 Mbps, Full-Duplex, High Speed M-LVDS Transceiver with Type 1 Receiver
ADN4693E	Product Page, 3.3 V, 200 Mbps, Full-Duplex, High Speed M-LVDS Transceiver with Type 1 Receiver
ADN4695E	Product Page, 3.3 V, 100 Mbps, Full-Duplex, High Speed M-LVDS Transceiver with Type 2 Receiver
ADN4697E	Product Page, 3.3 V, 200 Mbps, Full-Duplex, High Speed M-LVDS Transceiver with Type 2 Receiver



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.

Legal Terms and Conditions

By using the evaluation board discussed herein (together with any tools, components documentation or support materials, the "Evaluation Board"), you are agreeing to be bound by the terms and conditions set forth below ("Agreement") unless you have purchased the Evaluation Board, in which case the Analog Devices Standard Terms and Conditions of Sale shall govern. Do not use the Evaluation Board until you have read and agreed to the Agreement. Your use of the Evaluation Board shall signify your acceptance of the Agreement. This Agreement is made by and between you ("Customer") and Analog Devices, Inc. ("ADI"), with its principal place of business at One Technology Way, Norwood, MA 02062, USA. Subject to the terms and conditions of the Agreement, ADI hereby grants to Customer a free, limited, personal, temporary, non-exclusive, non-sublicensable, non-transferable license to use the Evaluation Board FOR EVALUATION PURPOSES ONLY. Customer understands and agrees that the Evaluation Board is provided for the sole and exclusive purpose referenced above, and agrees not to use the Evaluation Board for any other purpose. Furthermore, the license granted is expressly made subject to the following additional limitations: Customer shall not (i) rent, lease, display, sell, transfer, assign, sublicense, or distribute the Evaluation Board; and (ii) permit any Third Party to access the Evaluation Board. As used herein, the term "Third Party" includes any entity other than ADI, Customer, their employees, affiliates and in-house consultants. The Evaluation Board is NOT sold to Customer; all rights not expressly granted herein, including ownership of the Evaluation Board, are reserved by ADI. CONFIDENTIALITY. This Agreement and the Evaluation Board shall all be considered the confidential and proprietary information of ADI. Customer may not disclose or transfer any portion of the Evaluation Board to any other party for any reason. Upon discontinuation of use of the Evaluation Board or termination of this Agreement, Customer agrees to promptly return the Evaluation Board to ADI. ADDITIONAL RESTRICTIONS. Customer may not disassemble, decompile or reverse engineer chips on the Evaluation Board. Customer shall inform ADI of any occurred damages or any modifications or alterations it makes to the Evaluation Board, including but not limited to soldering or any other activity that affects the material content of the Evaluation Board. Modifications to the Evaluation Board must comply with applicable law, including but not limited to the RoHS Directive. TERMINATION. ADI may terminate this Agreement at any time upon giving written notice to Customer. Customer agrees to return to ADI the Evaluation Board at that time. LIMITATION OF LIABILITY. THE EVALUATION BOARD PROVIDED HEREUNDER IS PROVIDED "AS IS" AND ADI MAKES NO WARRANTIES OR REPRESENTATIONS OF ANY KIND WITH RESPECT TO IT. ADI SPECIFICALLY DISCLAIMS ANY REPRESENTATIONS, ENDORSEMENTS, GUARANTEES, OR WARRANTIES, EXPRESS OR IMPLIED, RELATED TO THE EVALUATION BOARD INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTY OF MERCHANTABILITY, TITLE, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS. IN NO EVENT WILL ADI AND ITS LICENSORS BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES RESULTING FROM CUSTOMER'S POSSESSION OR USE OF THE EVALUATION BOARD, INCLUDING BUT NOT LIMITED TO LOST PROFITS, DELAY COSTS, LABOR COSTS OR LOSS OF GOODWILL. ADI'S TOTAL LIABILITY FROM ANY AND ALL CAUSES SHALL BE LIMITED TO THE AMOUNT OF ONE HUNDRED US DOLLARS (\$100.00). EXPORT. Customer agrees that it will not directly or indirectly export the Evaluation Board to another country, and that it will comply with all applicable United States federal laws and regulations relating to exports. GOVERNING LAW. This Agreement shall be governed by and construed in accordance with the substantive laws of the Commonwealth of Massachusetts (excluding conflict of law rules). Any legal action regarding this Agreement will be heard in the state or federal courts having jurisdiction in Suffolk County, Massachusetts, and Customer hereby submits to the personal jurisdiction and venue of such courts. The United Nations Convention on Contracts for the International Sale of Goods shall not apply to this Agreement and is expressly disclaimed.