

## High Speed Evaluation Board for Half-Duplex M-LVDS Transceivers (ADN4690E, ADN4691E, ADN4694E, and ADN4696E)

### FEATURES

Easy evaluation of half-duplex M-LVDS transceivers:

[ADN4690E](#), [ADN4691E](#), [ADN4694E](#), and [ADN4696E](#)

Board layout optimized for high speed signaling

Matched track lengths on M-LVDS input/output differential pairs with controlled 50  $\Omega$  impedance tracks

SMB jack inputs/outputs for high-speed connections:

Logic signals RO,  $\overline{RE}$ , DE, and DI

M-LVDS bus signals A, B

Power/ground connections through screw terminal blocks

Jumper selectable enable/disable for  $\overline{RE}$  and DE

Test points for measuring all signals, multiple ground points to facilitate probing of multiple signals

50  $\Omega$  termination resistors across A and B to simulate double-terminated bus

### APPLICATIONS

Half-duplex M-LVDS part evaluation

### EVALUATION KIT CONTENTS

One each

[EVAL-ADN469xEHDEBZ](#)

[ADN4690EBRZ](#)

[ADN4691EBRZ](#)

[ADN4694EBRZ](#)

[ADN4696EBRZ](#)

### GENERAL DESCRIPTION

The EVAL-ADN469xEHDEBZ allows quick and easy evaluation of half-duplex M-LVDS transceivers ([ADN4690E](#), [ADN4691E](#), [ADN4694E](#), and [ADN4696E](#)). 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

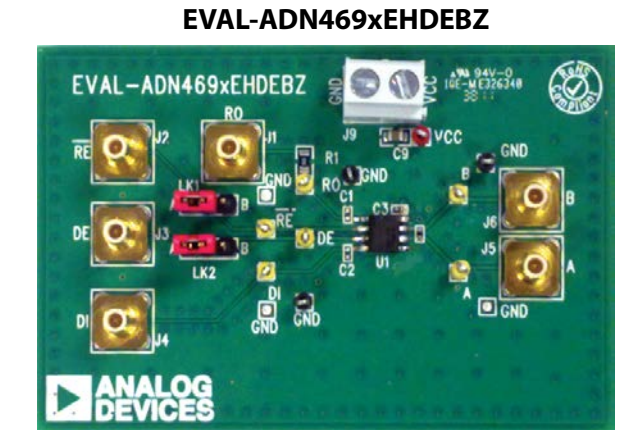


Figure 1.

connections for power and ground, with SMB jack connectors for high speed logic and M-LVDS bus signals.

The evaluation board has an 8-lead SOIC footprint for a half-duplex M-LVDS transceiver from the ADN469xE family (see Table 1).

Table 1. ADN469xE Selection Table

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

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**REVISION HISTORY**

4/12—Revision 0: Initial Version

# EVALUATION BOARD CONFIGURATION

## SETTING UP THE EVALUATION BOARD

The EVAL-ADN469xEHDEBZ allows the [ADN4690E/ADN4691E/ADN4694E/ADN4696E](#) 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  $\mu$ F decoupling capacitor, C1, is fitted at the connector between VCC and GND. The VCC pin of the ADN469xE is fitted with a decoupling capacitor of 100 nF.

An example evaluation of the [ADN4690E/ADN4691E/ADN4694E/ADN4696E](#) driver is shown in Figure 2. A signal generator is connected to DI with an input signal of 50 MHz ([ADN4690E/ADN4694E](#)) or 100 MHz ([ADN4691E/ADN4696E](#)), 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, A, and B.

Similarly, an evaluation of the [ADN4690E/ADN4691E/ADN4694E/ADN4696E](#) 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 the inverse of J5 input). 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-ADN469xEHDEBZ boards can be connected together in a point-to-point configuration as shown in Figure 4. In order to allow part evaluation with a load equivalent to a parallel-terminated bus, the boards have been fitted with 50  $\Omega$  termination resistors. For the point-to-point configuration in Figure 4, these should be replaced with resistors of 100  $\Omega$ .

A signal generator is connected onto one board's DI input. This board's A and B outputs are respectively connected to the second board's A and B inputs.

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-ADN469xEHDEBZ can be connected to an existing bus and a control board as shown in Figure 5 in order to test the performance in the application. In this case, both termination resistors should be removed, as well as the jumpers on LK1 and LK2. Control signals should be connected to RO, RE, DE, and DI.

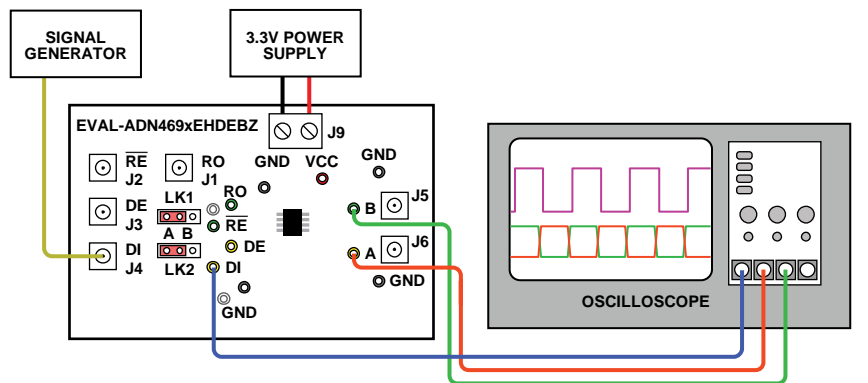


Figure 2. [ADN4690E/ADN4691E/ADN4694E/ADN4696E](#) Driver Evaluation with EVAL-ADN469xEHDEBZ

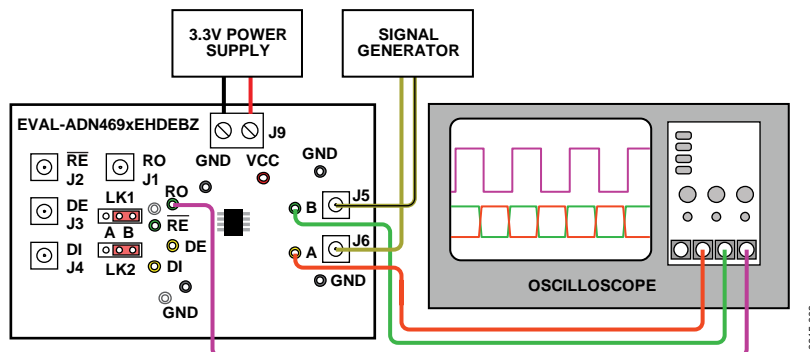
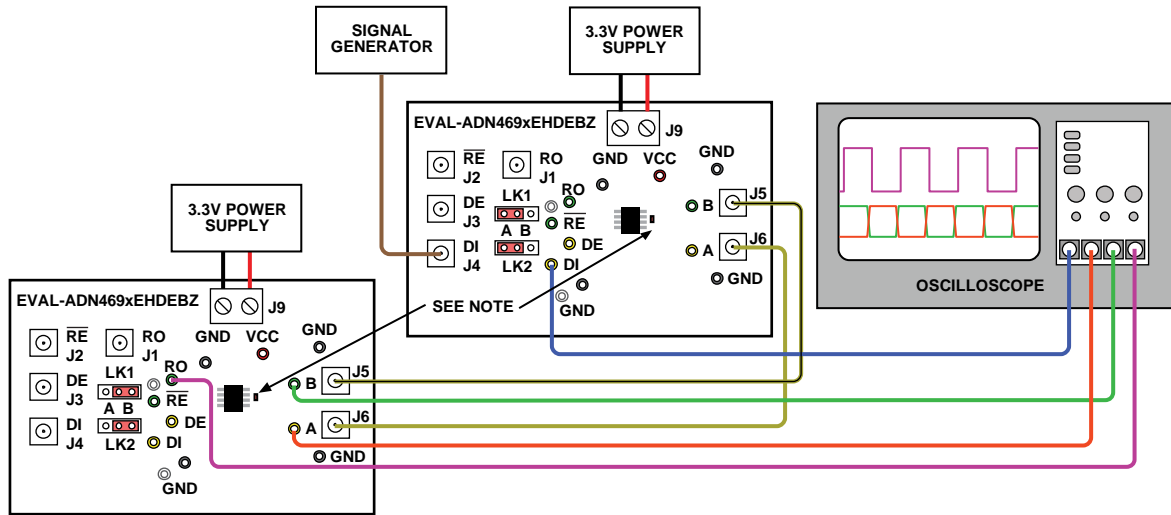


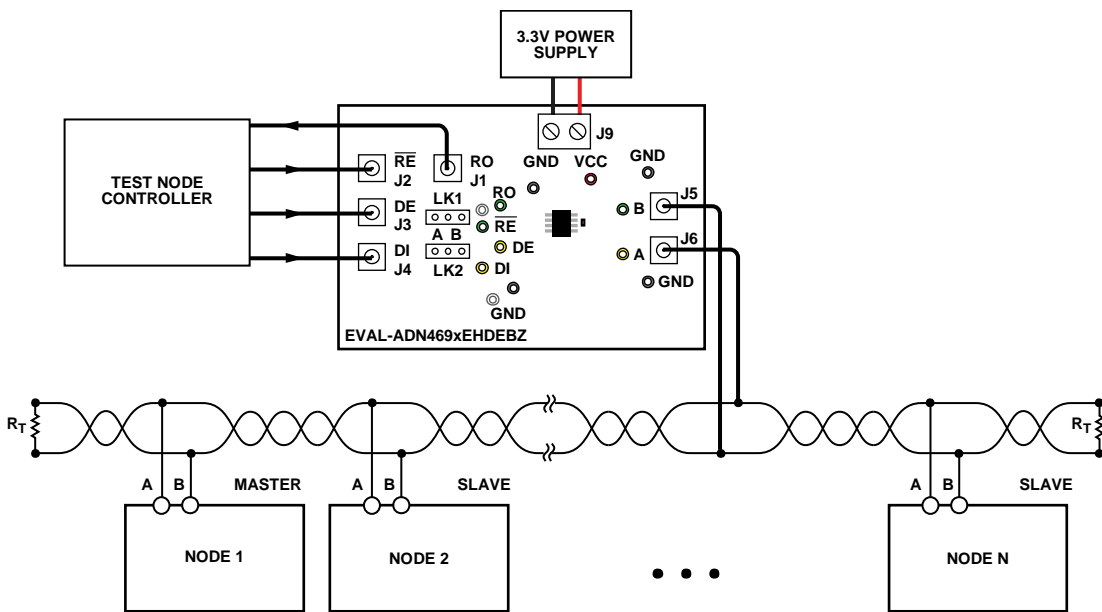
Figure 3. [ADN4690E/ADN4691E/ADN4694E/ADN4696E](#) Receiver Evaluation with EVAL-ADN469xEHDEBZ



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

Figure 4. EVAL-ADN469xEHDEBZ Two Board Point-to-Point Evaluation

10615-004



NOTES  
 1. REMOVE 50Ω TERMINATION RESISTOR 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-ADN469xEHDEBZ Application Evaluation Connected to Bus and Control Board

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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

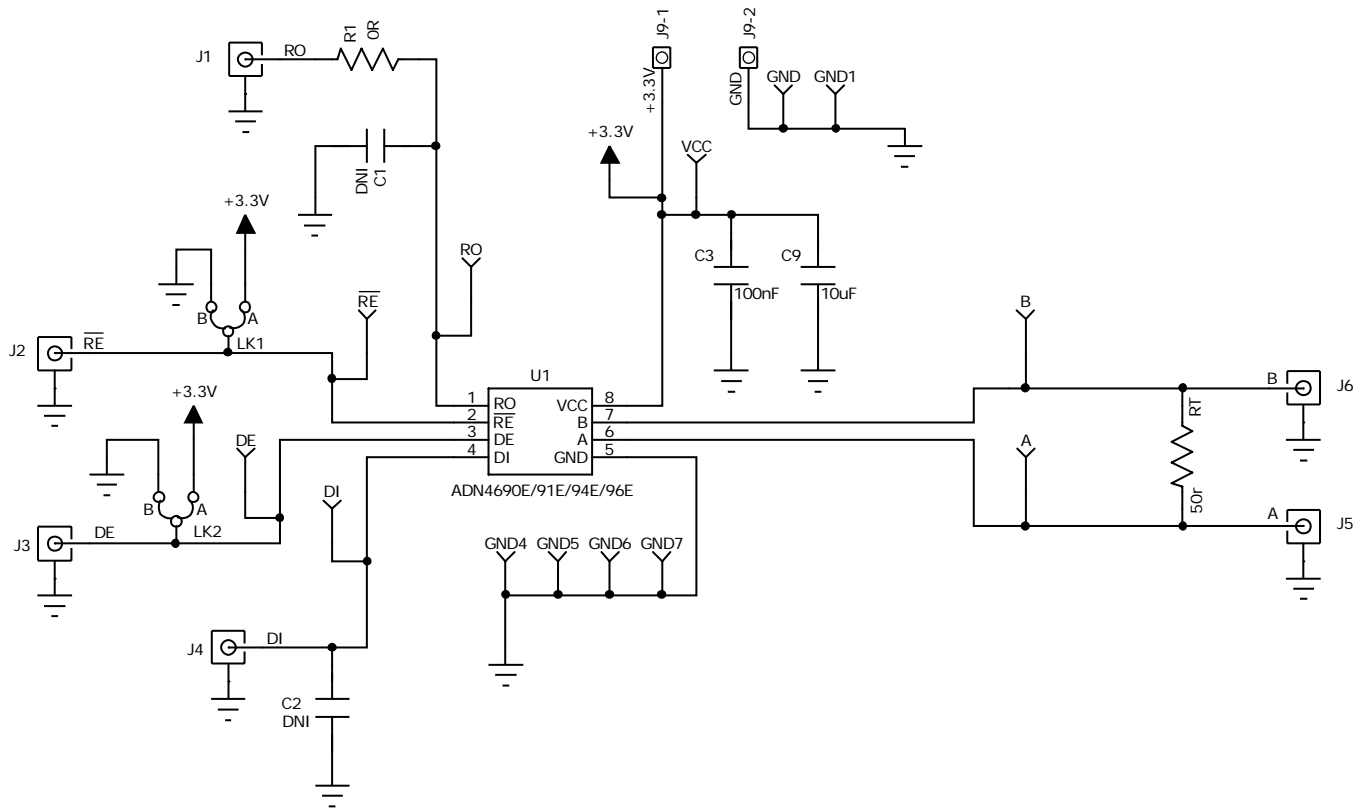


Figure 6. EVAL-ADN469xEHDEBZ Schematic

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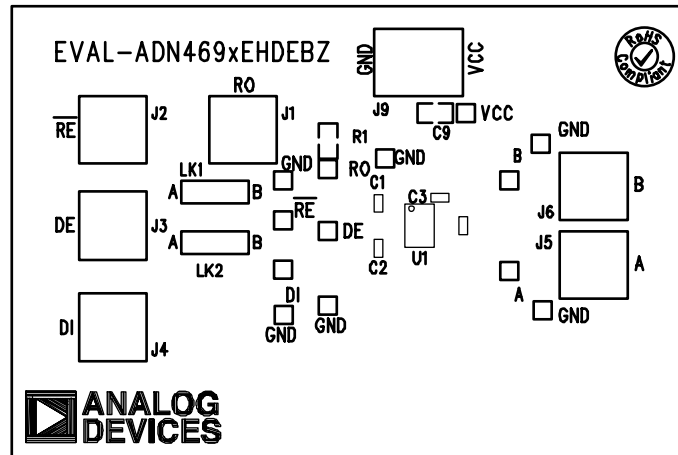


Figure 7. EVAL-ADN469xEHDEBZ Silkscreen

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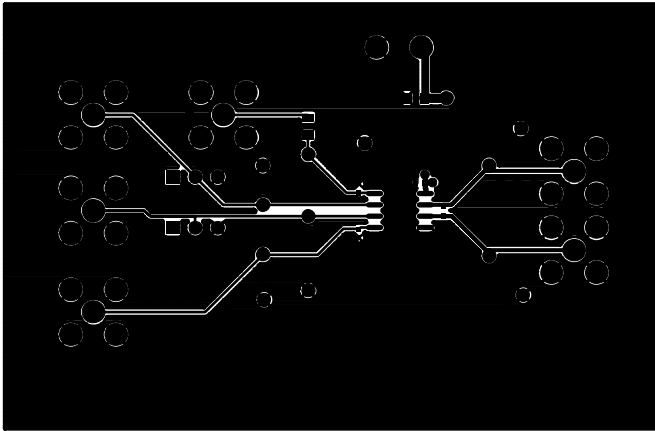


Figure 8. EVAL-ADN469xEHDEBZ Component Side

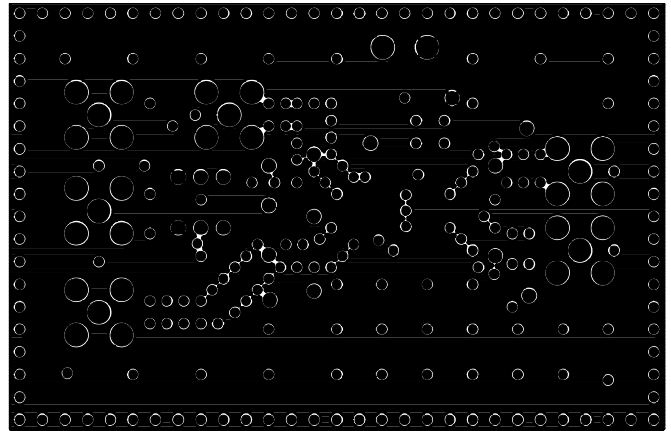


Figure 10. EVAL-ADN469xEHDEBZ Internal Layer 3

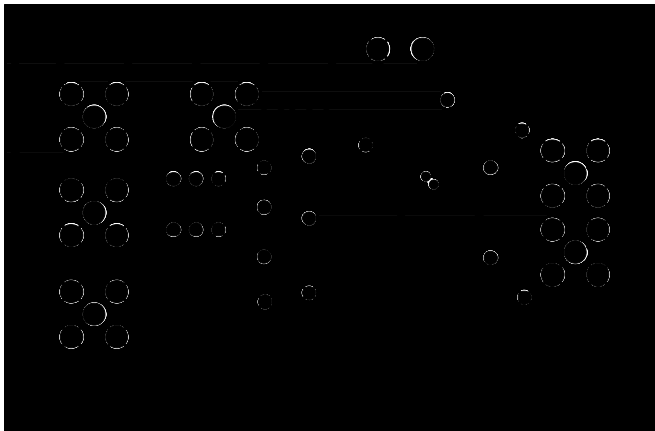


Figure 9. EVAL-ADN469xEHDEBZ Internal Layer 2

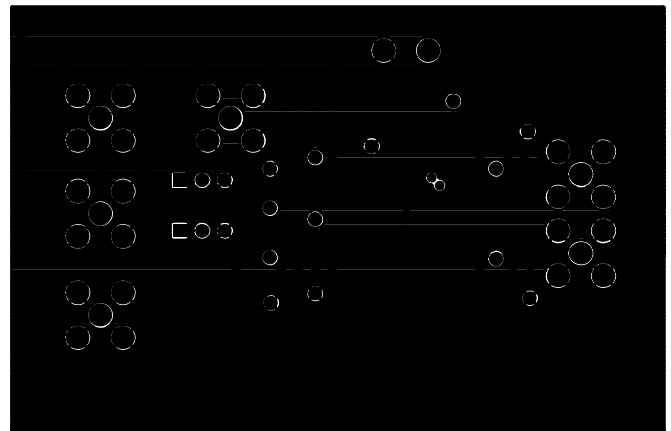


Figure 11. EVAL-ADN469xEHDEBZ Solder Side

**ORDERING INFORMATION****BILL OF MATERIALS**

Table 3.

Quantity	Reference Designator	Description	Supplier/Part Number
2	C1, C2	Not placed/optional	N/A
1	C3	Capacitor, 100 nF, 0805	Multicomp/MCCA000274
1	C9	Capacitor, 10 $\mu$ 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
6	GND (GND1 to GND7)	Test point, black (optional)	Vero Technologies/20-2137
6	J1 to J6	Connector, SMB jack	Multicomp/24-14-2-TGG
1	J9	Terminal block, 2 way	Lumberg/KRM 02
2	LK1, LK2	3-pin (1 $\times$ 3) 0.1" header and shorting block	Harwin/M20-9990346 & M7566-05
1	R1	Resistor, 0 $\Omega$ , 0805	Vishay Draloric/CRCW08050000Z0EA
1	RT	Resistor, 100 $\Omega$ , 0402	Vishay Draloric /CRCW0402100RFKEAHP
1	U1	8-lead SOIC (not placed)	Analog Devices/ADN4690E, ADN4691E, ADN4694E, or ADN4696E
1	VCC	Test point, red	Vero Technologies/20-313137

**RELATED LINKS**

Resource	Description
<a href="#">ADN4690E</a>	Product Page, 3.3 V, 100 Mbps, Half-Duplex, High Speed M-LVDS Transceiver with Type 1 Receiver
<a href="#">ADN4691E</a>	Product Page, 3.3 V, 200 Mbps, Half-Duplex, High Speed M-LVDS Transceiver with Type 1 Receiver
<a href="#">ADN4694E</a>	Product Page, 3.3 V, 100 Mbps, Half-Duplex, High Speed M-LVDS Transceiver with Type 2 Receiver
<a href="#">ADN4696E</a>	Product Page, 3.3 V, 200 Mbps, Half-Duplex, High Speed M-LVDS Transceiver with Type 2 Receiver

## 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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