# LVTTL-to-Differential LVPECL and Differential LVPECL-to-LVTTL Translator

## SY89328L Evaluation Board

## General Description

The SY89328L evaluation board is designed for convenient setup and quick evaluation of the SY89328L. The boards are optimized to interface directly to a 50Ω oscilloscope.

The default evaluation board I/O configuration is AC-coupled.

Data Sheets and Support documentation can be found on Micrel's website at www.micrel.com.

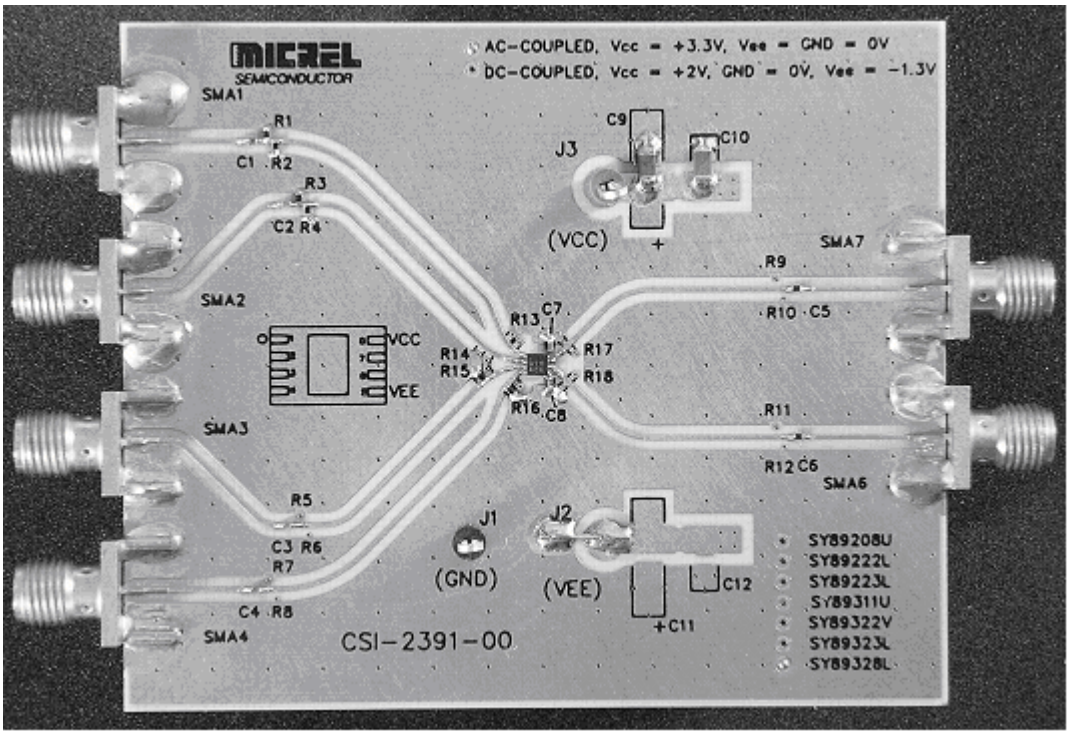
## Features

- SY89328L
- Single +3.3V power supply
- AC-coupled configuration for ease-of-use
- I/O interface includes on-board termination
- Fully assembled and tested

## Related Documentation

- SY89328L, 3.3V LVTTL -to-DIFFERENTIAL LVPECL and Differential LVPECL-to-LVTTL TRANSLATOR Data Sheet

## Evaluation Board





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## Evaluation Board Description

The default configuration for the board is the AC-coupled configuration.

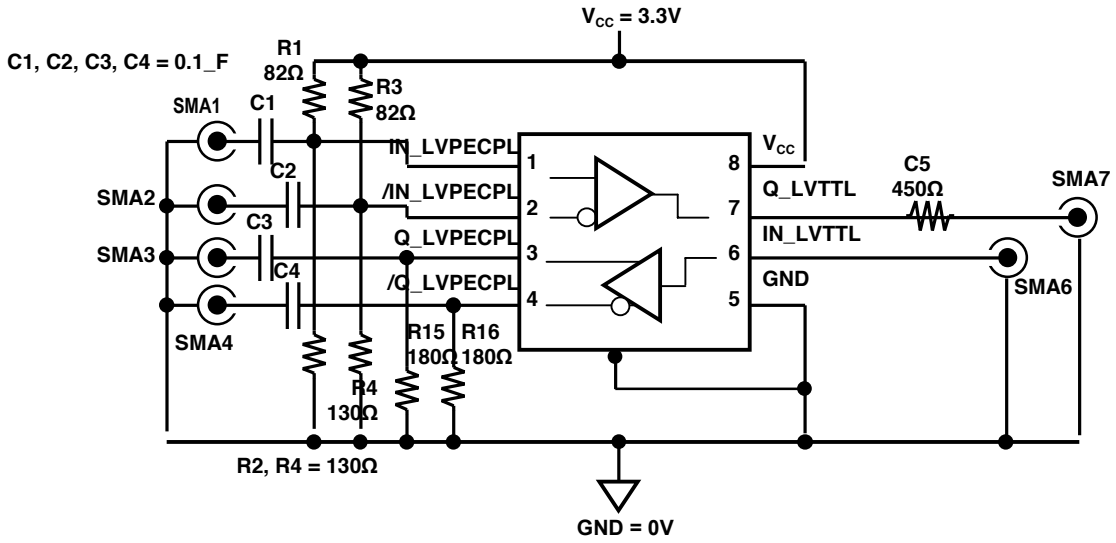
**AC-Coupled Evaluation Board**

The AC-coupled configuration is suited to most customer applications and is preferred by the majority of users because of its ease-of-use. It requires only a single power supply of either 3.3V ±10% and offers the most flexibility in interfacing to a variety of signal sources.

The DC-bias levels and AC-coupling capacitors are supplied on-board for each input, making it unnecessary to vary the offset voltage or change any components on the board as the power supply voltage varies. The user needs only to supply a minimum input voltage swing and the bias voltage will automatically adjust the input to the correct level as the power supply voltage varies.

The 450Ω series resistor in location C5 is to limit the output current when connected to a scope with a 50Ω termination to ground. This 450Ω resistor along with the 50Ω scope termination forms a 1:10 voltage divider that attenuates the voltage that will be seen by the scope. This 450Ω resistor is necessary only on the evaluation board and not in a system. For normal system use, the output would be connected directly to the next input.

## Evaluation Board




**SY89328L AC-Coupled Evaluation Board**

| AC-Coupled Evaluation Board Power Supply Connections | | | | |
|---|---|---|---|---|
| **Power Supply** | **$V_{CC}$** | **GND** | **$V_{EE}$** | **I/O** |
| 3.3 Volt System | +3.3V | 0V | 0V | AC-Coupled Input/AC-Coupled Output |

**Table 1: SY89328L AC-Coupled Configuration**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## AC-Coupled Evaluation Board Setup

### Setting up the AC-Coupled Evaluation Board

The following steps describe the procedure for setting up the evaluation board:

1. Set the voltage setting for a DC supply to 3.3V and turn off the supply.
2. Connect the GND terminal to the negative side of a DC power supply. This is the 0V ground potential.
3. Connect the $V_{CC}$ terminal to the positive side of a DC power supply
4. Turn on the power supply and verify that the power supply current is <100mA.
5. Turn off the power supply.
6. Using a differential signal source set the amplitude of each side of the differential pair to be 800mV (1600mV measured differentially). Set the offset to be a positive value, the value of this offset is not critical, as the AC-coupled inputs will be automatically biased to the correct offset. Turn off or disable the outputs of the signal source.
7. Using equal length 50Ω impedance coaxial cables, connect the signal source to the inputs on the evaluation board (SMA1 and SMA2).
8. Using a 50Ω impedance coaxial cable, connect the output of the evaluation board (SMA7) to the oscilloscope or other measurement device that has an internal 50W termination.
9. Using a single-ended signal source set the $V_{OL}$ = 0.4V and $V_{OH}$ = 2.4V. Turn off or disable the outputs of the signal source.
10. Using a 50Ω impedance coaxial cable, connect the signal source to the inputs on the evaluation board (SMA7).
11. Using equal length 50Ω impedance coaxial cables, connect the outputs of the evaluation board to the inputs on the evaluation board (SMA3 and SMA4) to the oscilloscope or other measurement device that has an internal 50Ω termination.
12. Turn on the power and verify the current is <100mA.
13. Enable the signal source and monitor the outputs.

## Bill of Materials

| Item | Part Number | Manufacturer | Description | Qty. |
|---|---|---|---|---|
| C1, C2, C3, C4 | VJ0402Y104KXXAT | Vishay[1] | 0.1μF, 25V, 10% Ceramic Capacitor, Size 0402, X7R Dielectric | 4 |
| C5 | CRCw04024500F | Vishay[1] | Replace capacitor with 450Ω, 1/16W, 5% Thick-film Resistor, Size 0402 | |
| C6 | CRCW04020R00F | Vishay[1] | Replace capacitor with 0Ω, 1/16W, 5% Thick-film Resistor, Size 0402 | 1 |
| C8 | 293D685X0010 | Vishay[1] | 6.8μF, 20V, Tantalum Electrolytic Capacitor, Size C | 1 |
| C9 | VJ1206Y103JXJAT | Vishay[1] | 0.01μF, 25V, 10% Ceramic Capacitor, Size 0805 | 1 |
| R1, R3 | CRCW0402820F | Vishay[1] | 82Ω, 1/16W, 5% Thick-film Resistor, Size 0402 | 2 |
| R2, R4 | CRCW04021300F | Vishay[1] | 130Ω, 1/16W, 5% Thick-film Resistor, Size 0402 | 2 |
| R15, R16 | CRCW04021800F | Vishay[1] | 180Ω, 1/16W, 5% Thick-film Resistor, Size 0402 | 2 |
| J1 | 111-0703-001 | Johnson Components[2] | Black Banana Jack | 1 |
| J3 | 111-0702-001 | Johnson Components[2] | Red Banana Jack | 1 |
| SMA1, SMA2, SMA3, SMA4, SMA6, SMA7 | 142-0701-851 | Johnson Components[2] | Jack Assembly End Launch SMA | 6 |
| U1 | **SY89328L** | **Micrel[3]** | LVTTL-to-Differential LVPECL and Differential LVPECL-to-LVTTL Translator | 1 |

**Notes**:

1. Vishay: www.vishay.com
2. Johnson Components: www.johnsoncomponents.com
3. Micrel: www.micrel.com


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## Evaluation Board Layout

### PC Board Layout

The evaluation boards are constructed with Rogers 4003 material and are coplanar in design and fabricated to minimize noise, achieve high bandwidth and minimize crosstalk.

| Layer | SY89328L |
|---|---|
| L1 | GND and Signal |
| L2 | Impedance GND |
| L3 | $V_{CC}$ and $V_{EE}$ |
| L4 | GND and Signal |

**Table 2: Layer Stack**


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## Micrel Cross Reference

To find an equivalent Micrel part, go to Micrel's website at: **http://www.micrel.com** and following the steps below.

1. Click on Dynamic Cross Reference
2. Enter competitor's part number in the Dynamic Cross Reference field
3. To download a PDF version of this information, click on the Cross Reference PDF tab

## HBW Support

Hotline: 408-955-1690

Email Support: **HBWHelp@micrel.com**

## Application Hints and Notes

For application notes on high speed termination on PECL and LVPECL products, clock synthesizer products, SONET jitter measurement, and other High Bandwidth product go to Micrel's website at http://www.micrel.com/. Once in Micrel's website, follow the steps below:

1. Click on "Product Info".
2. In the Applications Information Box, choose "Application Hints and Application Notes."

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