



# Dual Differential LVPECL-to-LVTTL Translator

SY89223/323L Evaluation Board

## General Description

The SY89223L and SY89323L evaluation boards are designed for convenient setup and quick evaluation of these devices. 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 web site at [www.micrel.com](http://www.micrel.com).

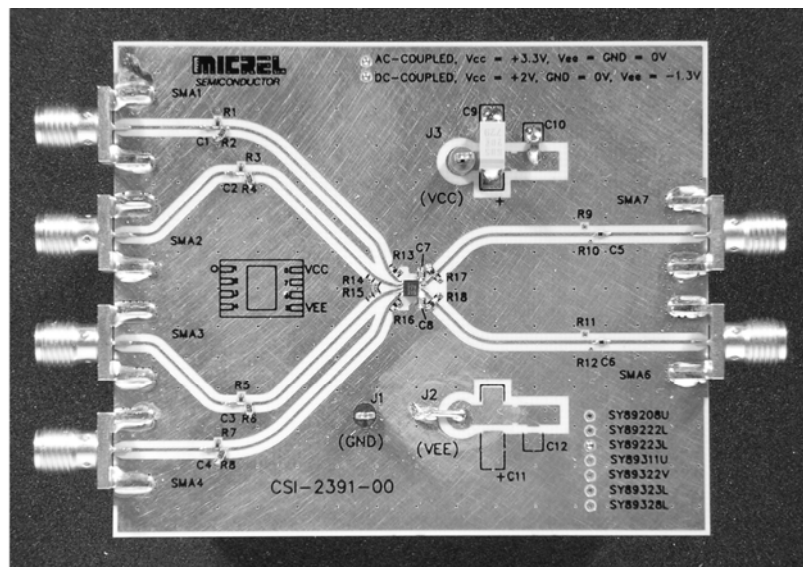
## Features

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

## Related Documentation

- SY89223L, 3.3V Dual Differential LVPECL-to-LVTTL Translator Data Sheet
- SY89323L, 3.3V Dual Differential LVPECL-to-LVTTL Translator Data Sheet

## Evaluation Board



## Evaluation Board Description

The SY89223L and SY89323L share a common evaluation board. The individual evaluation boards are labeled to identify the specific device.

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

### AC-Coupled Evaluation Board

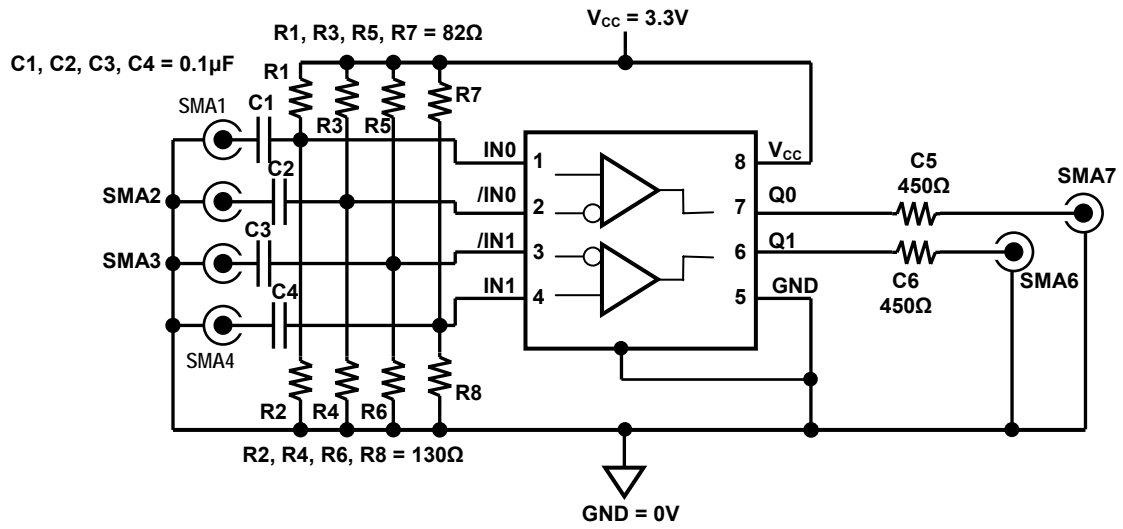
The AC-coupled configuration is suited to most customer applications and is preferred by the majority of users because of its ease-of-use. It requires only a single power and offers the most flexibility in interfacing to a variety of signal sources.

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 450 $\Omega$  series resistors in locations C5 and C6 are to limit the output current when connected to a scope with a 50 $\Omega$  termination to ground. This 450 $\Omega$  resistor along with the 50 $\Omega$  scope termination forms a 1:10 voltage divider that attenuates the voltage that will be seen by the scope. This 450 $\Omega$  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



### SY89223/323L AC-Coupled Evaluation Board

AC-Coupled Evaluation Board Power Supply Connections				
Power Supply	V <sub>CC</sub>	GND	V <sub>EE</sub>	I/O
3.3 Volt System	+3.3V	0V	0V	AC-Coupled Input/AC-Coupled Output

Table 1. SY89223/323L AC-Coupled Configuration

## 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<sub>CC</sub> 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 for each differential input pair, connect the signal source to the inputs on the evaluation board (SMA1, SMA2, SMA3 and SMA4).

8. Using 50Ω impedance coaxial cables, connect the outputs of the evaluation board (SMA6 and SMA7) to the oscilloscope or other measurement device that has an internal 50Ω termination.
9. Turn on the power and verify the current is <100mA.
10. Enable the signal source and monitor the outputs.

### Evaluation Board Layout

Layer	SY89223/323L
L1	GND and Signal
L2	Impedance GND
L3	V <sub>CC</sub> and V <sub>EE</sub>
L4	GND and Signal

**Table 2. Layer Stack**

### 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.

## Bill of Materials

Item	Part Number	Manufacturer	Description	Qty.
C1, C2, C3, C4	VJ0402Y104KXXAT	Vishay <sup>(1)</sup>	0.1 $\mu$ F, 25V, 10% Ceramic Capacitor, Size 0402, X7R Dielectric	4
C5, C6	CRCW04024500F	Vishay <sup>(1)</sup>	Replace capacitor with resistors: 450 $\Omega$ , 1/16W, 5% Thick-film Resistor, Size 0402	2
C7, C8	VJ0402Y103KXXAT	Vishay <sup>(1)</sup>	0.01 $\mu$ F, 25V, 10% Ceramic Capacitor, Size 0402, X7R Dielectric	2
C9	293D685X0025B2T	Vishay <sup>(1)</sup>	6.8 $\mu$ F, 20V, Tantalum Electrolytic Capacitor, Size C	1
C10	VJ1206Y103JXJAT	Vishay <sup>(1)</sup>	0.01 $\mu$ F, 25V, 10% Ceramic Capacitor, Size 1206	1
R1, R3, R5, R7	CRCW040282R5F	Vishay <sup>(1)</sup>	82.5 $\Omega$ , 1/16W, 5% Thick-film Resistor, Size 0402	4
R2, R4, R6, R8	CRCW04021300F	Vishay <sup>(1)</sup>	130 $\Omega$ , 1/16W, 5% Thick-film Resistor, Size 0402	4
J1	111-0703-001	Johnson Components <sup>(2)</sup>	Black Banana Jack	1
J3	111-0702-001	Johnson Components <sup>(2)</sup>	Red Banana Jack	1
SMA1, SMA2, SMA3, SMA4, SMA6, SMA7	142-0701-851	Johnson Components <sup>(2)</sup>	Jack Assembly End Launch SMA	6
U1	<b>SY89223/323L</b>	<b>Micrel, Inc.</b> <sup>(3)</sup>	Dual Differential LVPECL-LVTTL Translator	1

### Notes:

1. Vishay: [www.vishay.com](http://www.vishay.com)
2. Johnson Components: [www.johnsoncomponents.com](http://www.johnsoncomponents.com)
3. Micrel: [www.micrel.com](http://www.micrel.com)

## HBW Support

Hotline: 408-955-1690

Email Support: [HBWHelp@micrel.com](mailto: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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