Precision Low Skew, 1-to-4 LVCMOS/LVTTL-to-LVDS Fanout Buffer

SY89645L Evaluation Board

General Description

The SY89645L evaluation board is designed for convenient setup and quick evaluation of the SY89645L fanout buffer. The board is optimized to interface directly to a 50Ω oscilloscope.

For quick and convenient evaluation of this part, the board is AC-coupled. For applications that require a DC-coupled configuration, step-by-step instructions for modifying the board are included.

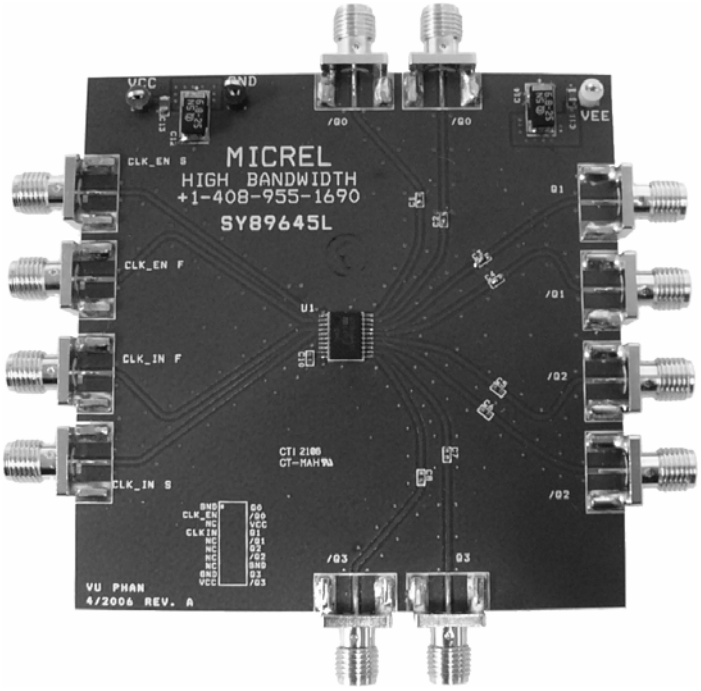
Features

- +3.3V power supply for the SY89645L
- AC-coupled configuration
- I/O interface includes on-board termination
- Fully assembled and tested
- Can be reconfigured for DC-coupled operation

Related Documentation

- SY89645L Precision Low Skew, 1-to-4 LVCMOS/LVTTL-to-LVDS Fanout Buffer Datasheet

Evaluation Board



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Evaluation Board Description

The default configuration for the SY89645L board is AC-coupled. The choice between AC- and DC-coupled configurations offers the user flexibility for specific applications.

AC-Coupled Evaluation Board

The SY89645L default configuration is set up for AC-coupled operation. In the AC-coupled configuration, the output voltage offset is automatically adjusted to interface directly with a 50Ω (to GND) scope.

For quick evaluation of the SY89645L, connect V_{CC} to 3.3V and V_{EE} and GND to 0V.

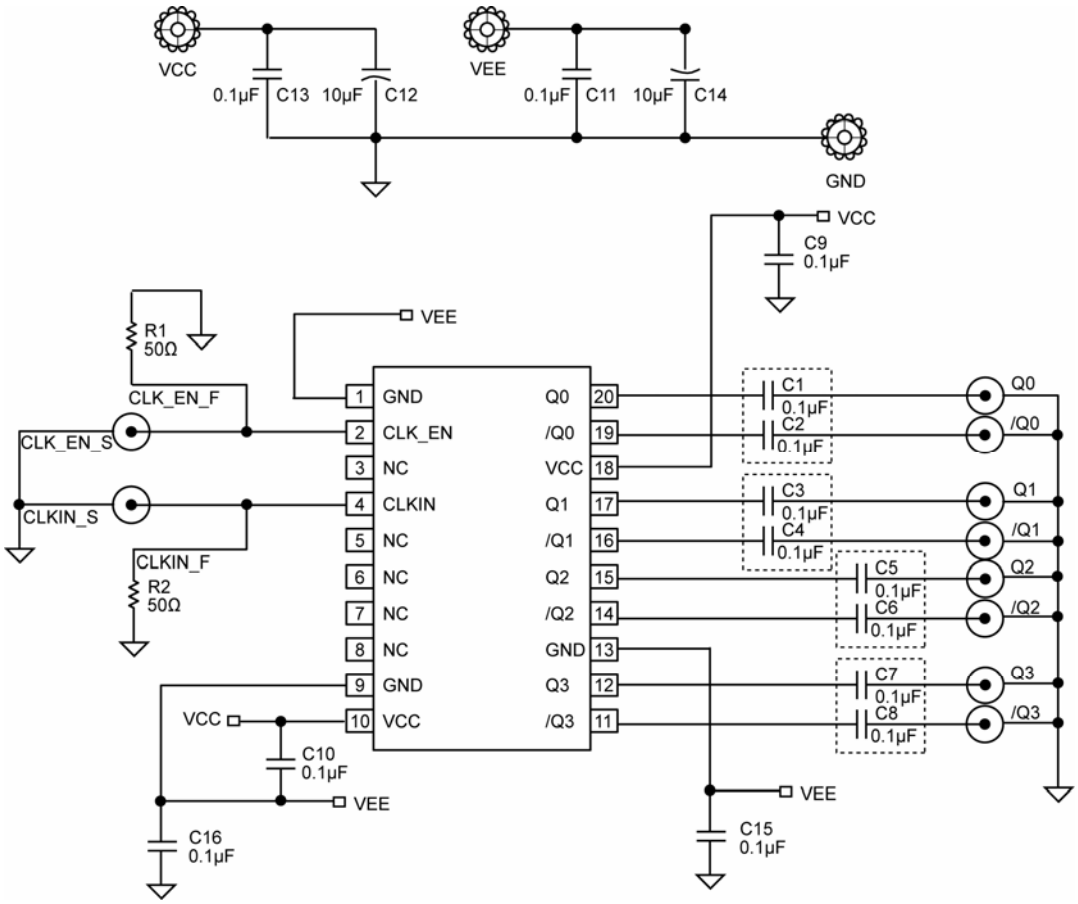
DC-Coupled Evaluation Board

The SY89645L evaluation board can be reconfigured for DC-coupled operation. This can be accomplished by modifying the board to use two power supplies into a "split-supply configuration." In order to correctly interface LVDS to a 50Ω (to ground) scope, V_{CC} must be V_{OCM} above the GND level. Therefore, a 3.3V supply will be split into +1.2V and -2.1V to ensure proper V_{CC} to V_{EE} voltage difference.

Output Disable

The SY89645L provides a disable output function. When CLK_EN is pulled HIGH, the output buffer is disabled. Output Q switches to a LOW state and /Q output switches to a HIGH state.

Evaluation Board



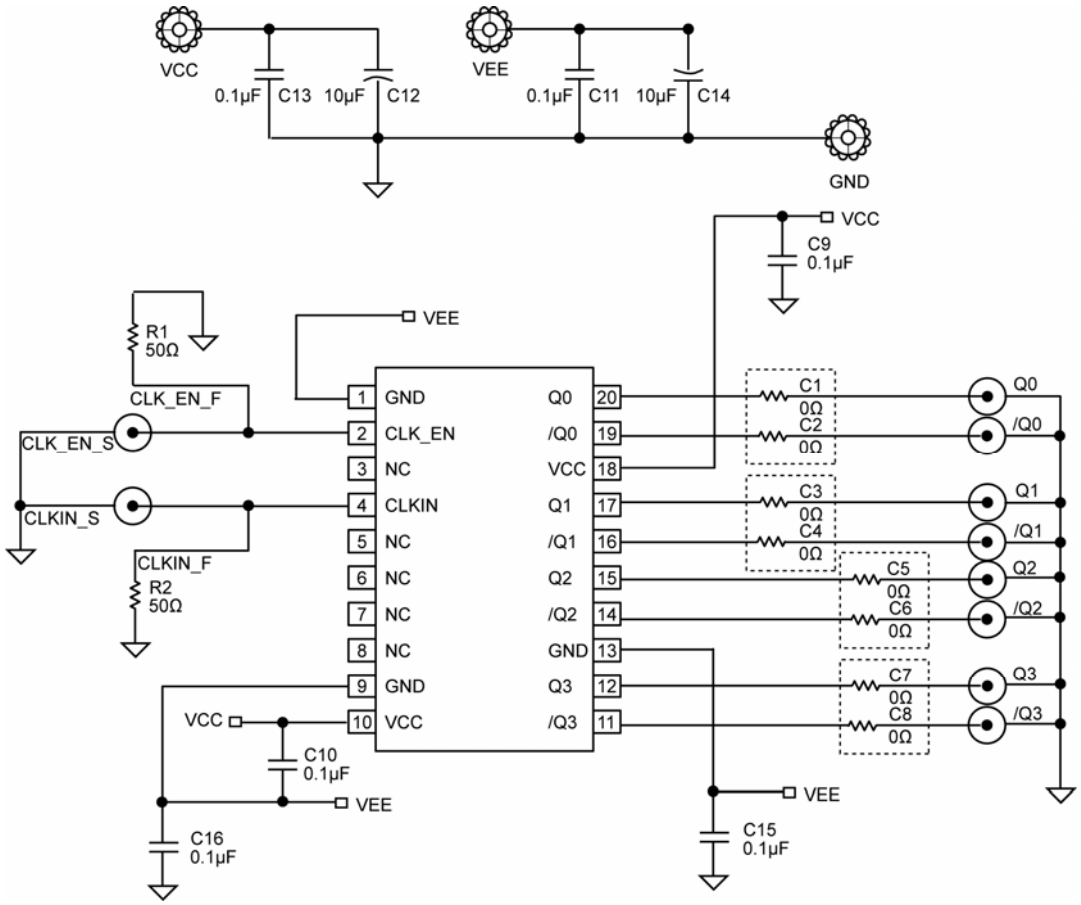
Note: R1 and R2 terminate trace at SMA pad.

SY89645L AC-Coupled Evaluation Board

I/O	Power Supply	V_{CC}	GND	V_{EE}
DC-Coupled Input/AC-Coupled Output	3.3V	3.3V	0V	0V

Table 1. Quick Start SY89645L AC-Coupled Evaluation Board Power Supply Connections.

Evaluation Board



Note: R1 and R2 terminate trace at SMA pad.

SY89645L DC-Coupled Evaluation Board

I/O	Power Supply	V_{CC}	GND	V_{EE}
DC-Coupled Input/DC-Coupled Output	3.3V	+1.2V	0V	-2.1V

Table 2. SY89645L DC-Coupled Evaluation Board Power Supply Connections.

AC-Coupled Evaluation Board Setup

Setting up the SY89645L AC-coupled Evaluation Board

The following steps describe the quick start procedure for setting up the AC-Coupled evaluation board.

1. Set the voltage setting for a DC supply to be 3.3V and turn off the supply.
2. Connect the GND and V_{EE} 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 the power supply current is < 300mA.
5. Turn off the power supply.
6. Using a TTL signal source, set the amplitude to 2V. Set the offset to be $V_{CC}/2$ volts. Turn off or disable the outputs of the signal source.
7. Using a 50Ω impedance coaxial cable, connect the signal source to the input on the evaluation board (CLKIN_S).
8. Using equal length 50Ω impedance coaxial cables, connect the outputs of the evaluation board to the oscilloscope or other measurement device that has an internal 50Ω termination. Any of these 8 outputs that are not connected to a scope or other instrument should be terminated with a 50Ω-to-ground at the SMA on the board.
9. Turn on the power supply and verify the current is <400mA.
10. Enable the signal source and monitor the outputs.

Modifying DC-Coupled Boards for DC-Coupled Operation

Reconfiguring a AC-Coupled Board into an DC-Coupled Board

The following procedure details the steps for converting a DC-coupled board to an AC-coupled board.

1. Replace capacitors C1-C8 with 0Ω resistors.

Setting up the DC-coupled Evaluation Board

The following steps describe the procedure for setting up the DC-Coupled evaluation board.

1. Set the voltage for DC supply number 1 to be 1.20V and connect it to V_{CC}.
2. Set the voltage for DC supply number 2 to be –2.1V and connect it to V_{EE}.
3. Turn off the power supplies and connect the GND terminal on the board, to the negative side of a DC power supply 1 and the positive side of DC power supply 2
4. Turn on the power supply and verify that the power supply current is < 300mA.
5. Turn off the power supply.
6. Disable the outputs of the differential signal source and set the V_{OH} = 2.65V and the V_{OL} = 0.65V.
7. Using a 50Ω impedance coaxial cable, connect the output of the signal source to the input of the evaluation board (CLKIN_S)
8. Using equal length 50Ω impedance coaxial cables, connect the outputs of the evaluation board to the oscilloscope or other measurement device that has an internal 50Ω termination. Any of these 8 outputs that are not connected to a scope or other instrument should be terminated with a 50Ω termination-to-ground at the SMA on the board.
9. Turn on the power and verify the current is <400mA.
10. Enable the signal source and monitor the outputs.

Evaluation Board Layout

PC Board Layout

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

L1	GND and Signal
L2	GND
L3	VCC
L4	VEE
L5	Signal
L6	GND and Signal

Table 2. Layer Stack

Bill of Materials

Item	Part Number	Manufacturer	Description	Qty.
C1-C11, C13, C15-C16	VJ0402Y100KXXA	Vishay[1]	0.1µF, 25V, 10% Ceramic Capacitor, Size 0402, X7R Dielectric	14
C12, C14	293D106X0010B2T	Vishay[1]	10µF, 10V, Tantalum Electrolytic Capacitor, Size B	2
R1-R2	CRCW0402549R9F	Vishay[1]	50Ω, 1/10W, 5% Thick-film Resistor, Size 0402	2
CLKIN_S, CLK_EN_S, Q0-Q3 /Q0-/Q3	142-0701-851	Johnson-Components[2]	Jack Assembly End Launch SMA	10
VCC	5005K-ND	Digi-Key[3]	Color Coded PCB Test Point - Red	1
GND	5006K-ND	Digi-Key[3]	Color Coded PCB Test Point - Black	1
VEE	5009K-ND	Digi-Key[3]	Color Coded PCB Test Point - Yellow	1
U1	**SY89645L**	**Micrel, Inc.[4]**	**Precision Low Skew, 1-to-4 LVCMOS/LVTTL-to-LVDS Fanout Buffer**	**1**

Additional Components for AC-Coupled Boards

Item	Part Number	Manufacturer	Description	Qty.
C1-C8	CRCW04020R00F	Vishay[1]	0Ω, 1/16W, Resistor SMD, Size 0402	8

Notes:

1. Vishay: www.vishay.com
2. Johnson Components: www.johnsoncomponents.com
3. Digi-Key: www.digikey.com
4. **Micrel, Inc.: www.micrel.com**

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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