2.5/3.3V, 3.2Gbps LVDS Multiplexer with Internal Termination

SY89542/3/4/5/6/7 Evaluation Board

General Description

The SY8954x family multiplexers evaluation board is designed for convenient setup and quick evaluation of the SY89542x family. The boards are optimized to interface directly to a 50Ω oscilloscope.

The default evaluation board I/O configuration is AC-coupled inputs and outputs. For applications that require a DC-coupled configuration, instructions for modifying the board are included.

All data sheets and support documentation can be found on Micrel's web site at: www.micrel.com.

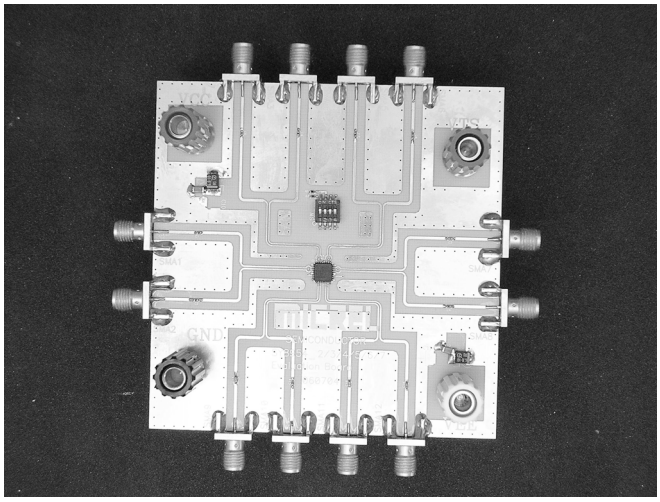
Features

- SY89542/3/4/5/6/7U LVDS multiplexer with internal termination
- Single +2.5V or +3.3V power supply
- AC-coupled input and output configuration for ease of use
- Evaluation board re-configurable for DC-coupled output
- Fully assembled and tested

Related Documentation

- SY89542U, 2.5V, 3.2Gbps Dual Differential 2:1 Multiplexer with Internal Termination Data Sheet
- SY89543L, 3.3V, 3.2Gbps Dual Differential 2:1 Multiplexer with Internal Termination Data Sheet
- SY89544U, 2.5V, 3.2Gbps Differential 4:1 LVDS Multiplexer with Internal Termination Data Sheet
- SY89545L, 3.3V, 3.2Gbps Differential 4:1 LVDS Multiplexer with Internal Termination Data Sheet
- SY89546U, 2.5V, 3.2Gbps Differential 4:1 LVDS Multiplexer with 1:2 Fanout and Internal Termination Data Sheet
- SY89547L, 2.5V, 3.2Gbps Differential 2:1 LVDS Multiplexer with 1:2 Fanout Internal Termination Data Sheet

Evaluation Board



hbwhelp@micrel.com or (408) 955-1690

Evaluation Board Description

AC-Coupled Evaluation Board

The SY8954x is packaged in a 32-pin MLF™ with an exposed pad (EPAD) attached to a metal pad on the component side of the board for improved heat dissipation. The SY8954x evaluation board is designed to operate with a single 2.5V ±5% or 3.3V ±10% power supply and is configured in AC-coupled mode.

The high-speed input channels are brought out to SMA connectors through matched length AC-coupled differential strip-line traces. The DC-operating point is se by the VT pins, which are brought out to a banana jack. The outputs are brought out to SMA connectors through matched length AC-coupled differential strip-line traces, which allow the board to interface directly with 50Ω-to-ground lab equipment. The LVTTL/LVCMOS control input SEL pins are controlled by a dipswitch, which is used to select the channel inputs.

The evaluation board's default mode is AC-coupled but can be reconfigured in DC-coupled mode by modifying the board. Since the board can be reconfigured in DC-coupled mode, the board offers the user flexibility in selecting the mode that is right for the application.

DC-Coupled Evaluation Board

100Ω System

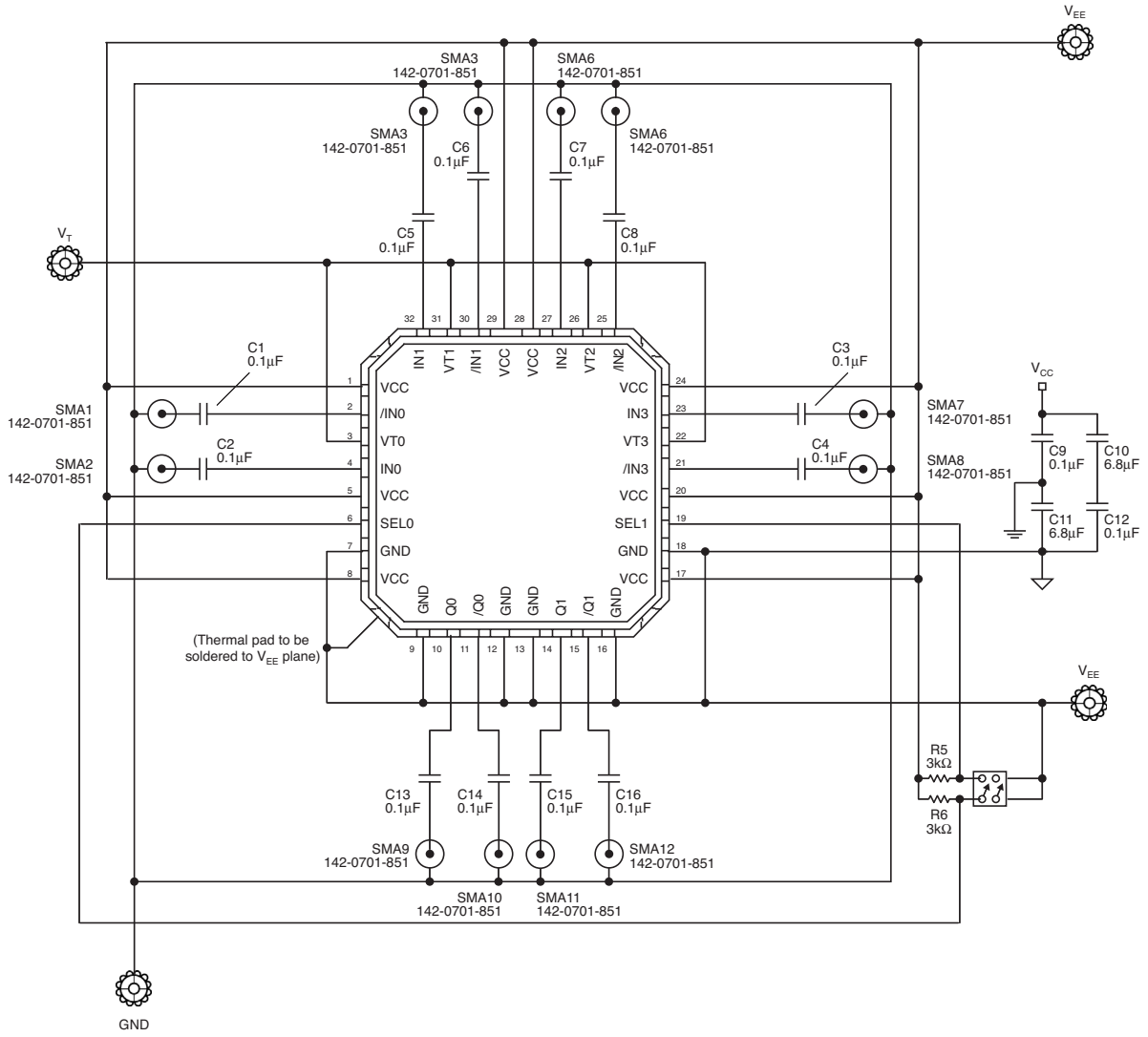
For applications that are not suited for AC-coupled mode such as data or clock that are turned off for extended periods of time, the board can be configured for DC-coupled mode. DC-coupled mode requires the user to remove capacitors C13–C16 and replace with 0Ω resistors (see the SY89542x evaluation board schematic and Table 1).

Once the board is configured for DC-coupled mode, the output requires 100Ω termination resistors across the outputs and requires only a single power supply.

50Ω System

The SY8954x family evaluation board can also interface to 50Ω to ground lab equipment in DC-coupled mode by removing capacitors C13–C16 and replacing the components with 0Ω resistors. Once the board is configured in DC-coupled mode, interfacing the board to a 50Ω environment involves using split supplies. Split-supply is an easy method to interface to a 50Ω-to-ground scope. Therefore, a 3.3V supply will be split into +1.2V ad –2.1V, and 2.5V supply will be split into +1.2V and –1.3V.

Evaluation Board



SY8954x Evaluation Board

I/O	System	Power Supply	V_{CC}	GND	V_{EE}	V_T	C13–C16
AC-Coupled Input/AC-Coupled Output[1,2]	50Ω	2.5V/3.3V	2.5V/3.3V	0V	0V	$V_T = V_{CC}–1.3V$	0.1µF
AC-Coupled Input/AC-Coupled Output[3]	50Ω 100Ω	2.5V	1.2V 2.5V	0V 0V	–1.3V 0V	$V_T = V_{CC}–1.3V$ $V_T = V_{CC}–1.3V$	0Ω 0Ω
AC-Coupled Input/DC-Coupled Output[3]	50Ω 100Ω	3.3V	1.2V 3.3V	0V 0V	–2.1V 0V	$V_T = V_{CC}–1.3V$ $V_T = V_{CC}–1.3V$	0Ω 0Ω

Table 1. SY8954x Configuration

Notes:

1. Default configuration.
2. AC-coupling capacitors C13–C16 were added for ease of use in interfacing the evaluation board to a 50Ω to ground lab equipment.
3. Remove capacitors at C13–C16 and replace with 0Ω, 0402 resistors.
4. **SY89544/5: pins 14 and 15 are no connects.**

hbwhelp@micrel.com or (408) 955-1690

AC-Coupled Evaluation Board Setup

Setting up the SY8954x AC-Coupled Evaluation Board

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

1. Set VCC to 2.5V or 3.3V, and GND and VEE to 0V, and turn off the supply.
2. Set the VT banana jack to VCC–1.3V.
3. Set the dipswitch to select the desired input channel, see Table 2 below.
4. Using a differential signal source set the amplitude to 400mV (single-ended) or 800mV (differential). Set the offset to a positive value, the value of the offset is not critical, since the AC-coupled inputs will automatically bias to the VT voltage.
5. Turn off or disable the outputs of the signal source.
6. Using equal length 50Ω impedance coaxial cables, connect the single source to the inputs on the evaluation board.
7. Using equal length 50Ω impedance coaxial cables, connect the outputs of the evaluation board to an oscilloscope or other lab equipment with internal 50Ω termination.
8. Enable the signal source and monitor the outputs.

IN0	IN1	SEL	Q	/Q
0	X	0	0	1
1	X	0	1	X
X	0	1	0	1
X	1	1	1	0

Table 2. Truth Table

Evaluation Board Layout

PC Board Layout

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

L1	GND and Signal
L2	GND
L3	VCC
L4	GND

Table 3. Layer Stack

Bill of Materials

Item	Part Number	Manufacturer	Description	Qty.
C1–C9, C12–C16[1]	VJ0402Y104KXXAT	Vishay[2]	0.1μF, 25V, 10% Ceramic Capacitor, Size 0402, X7R, Dielectric	14
C10, C11	CRCW0402000Z	Vishay[2]	6.8μF, 20V, 10% Tantalum Electrolytic Capacitor, Size B	2
R5, R6	CRCW04023001F	Vishay[2]	3kΩ, 1/16W, 1% Thick-film, 0402 Resistors	8
J1	111-0703-001	Johnson Components[3]	GND, Black Banana Jack	1
J2	111-0703-001	Johnson Components[3]	VCC, Red Banana Jack	1
J3	111-0703-001	Johnson Components[3]	VEE, White Banana Jack	1
J4	111-0703-001	Digi-Key[4]	VT, Green Banana Jack	1
SMA–SMA10	142-0701-851	Johnson Components[3]		10
U1	**SY89854U**	**Micrel[5]**	1:4 Low Power, LVPECL Fanout Buffer	1

Notes:

1. SY89544/5 pins 14 and 15 are No connects.
2. Vishay: www.vishay.com
3. Johnson Components: www.johnsoncomponents.com
4. Digi-key; www.digikey.com.
5. Micrel, Inc.: www.micrel.com.

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 Semiconductors 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."

MICREL, INC. 2180 FORTUNE DRIVE SAN JOSE, CA 95131 USA
TEL +1 (408) 944-0800 FAX +1 (408) 474-1000 WEB http:/www.micrel.com