SY88992L Evaluation Board

3.3V, 3.2Gbps VCSEL Driver

General Description

The SY88992L evaluation board is designed for fast evaluation of the SY88992L VCSEL driver.

A picture of the board loaded with SY88992L is shown below.

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

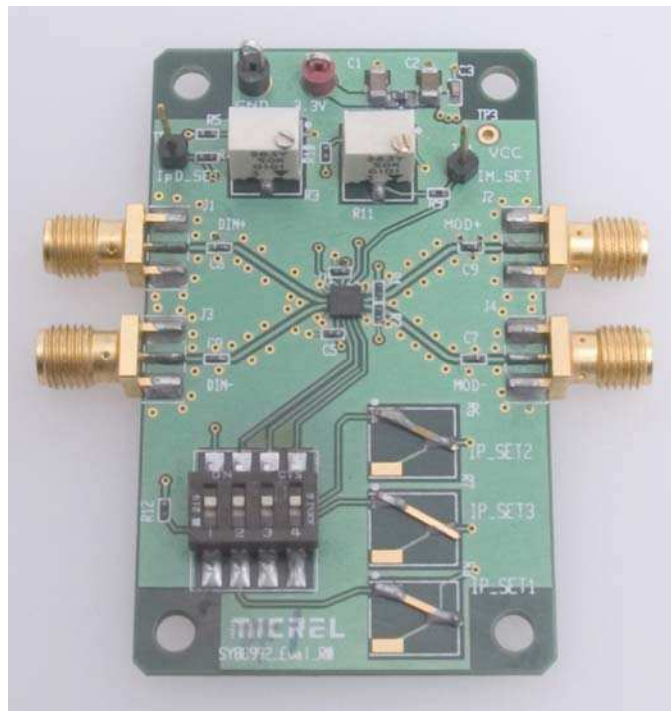## Features

- Single 3.3V supply voltage
- AC-coupled inputs
- AC-coupled outputs
- Peaking current programming
- Peaking current duration programming

Related Support Documentation

- SY88992L, 3.3V, 3.2Gbps VCSEL Driver data sheet
- SFP_992_R0 (small form-factor pluggable optical module)

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Evaluation Board

Evaluation Board Description and Setting

The evaluation board consists of a four-layer FR4 board. The inputs of the driver are AC-coupled and are accessible through SMA connectors.

Board Setting and Operation

1. Use connectors, J1 and J3, to connect a signal to the driver's inputs. The driver's outputs, J2 and J4, are to be connected to the scope.

2. Connect the power supply between TP1 (V_{CC} = 3.3V) and TP5 (GND).

3. Set position 1 of the DIP switch S1 to "ON" to enable the driver.

4. Adjust the modulation current with potentiometer R11. The modulation current can be measured using one of the following methods:

    a. Measure the output swing on the scope and divide it by the load (R1// 50Ω or R2 // 50Ω). The board comes with a 30Ω load (75Ω // 50Ω).

    b. Measure the IM_SET voltage by connecting a voltmeter between TP4 and GND, and use the modulation gain curve to deduce $I_{MOD.}$
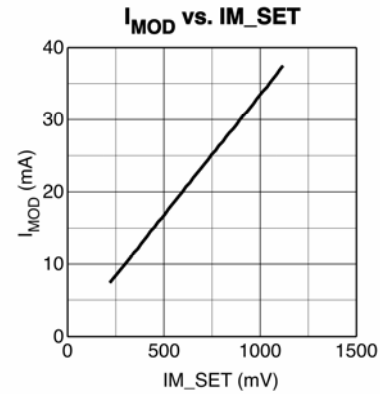

Figure 1. Modulation Gain vs. IM_SET

Once the modulation current is set, one can use the peaking option to improve the VCSEL edge response by varying the peaking amplitude and duration. Use R3 to adjust the peaking duration. Peaking amplitude is adjusted by setting different combinations of switch positions on the DIP switch S1, as shown in table 1 below:

IP/I_{MOD}	0 %	5 %	10 %	15 %	20 %	25 %	30 %	35 %
Position 2	off	on	off	on	off	on	off	on
Position 3	off	off	on	on	off	off	on	on
Position 4	off	off	off	off	on	on	on	on

**Table 1. Peaking/Modulation Current Ratio Setting**

OFF Modulation Current Measurement

Set position 1 of the DIP switch S1 to "OFF" to disable the driver and measure the current using the same methods as described in step 4 of the "Board Setting and Operation" section.

Electrical Eye Diagrams Change with Peaking and Duration

The following waveforms show how the output of the driver changes with peaking-to-modulation current ratio and peaking dur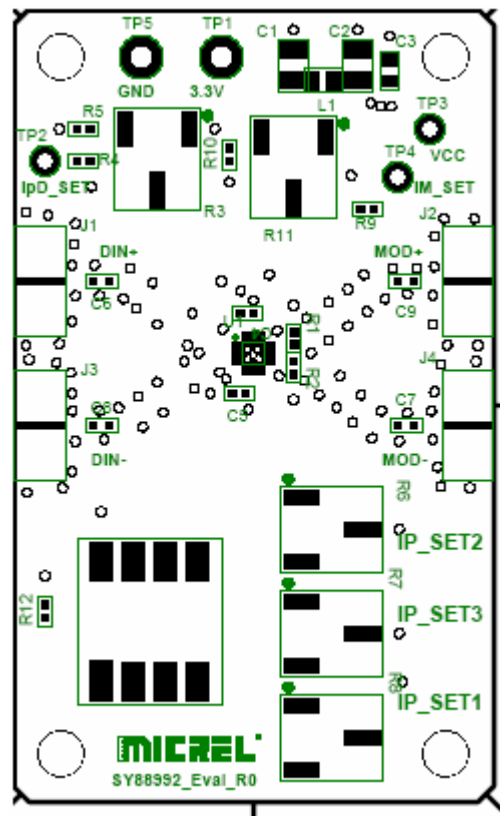ation. In real applications where the driver drives a VCSEL, the appropriate peaking-to-modulation current ratio and peaking duration are to be determined experimentally for each family of VCSELs. All waveforms are captured at 2.125Gbps, I_{MOD} = 15mA.
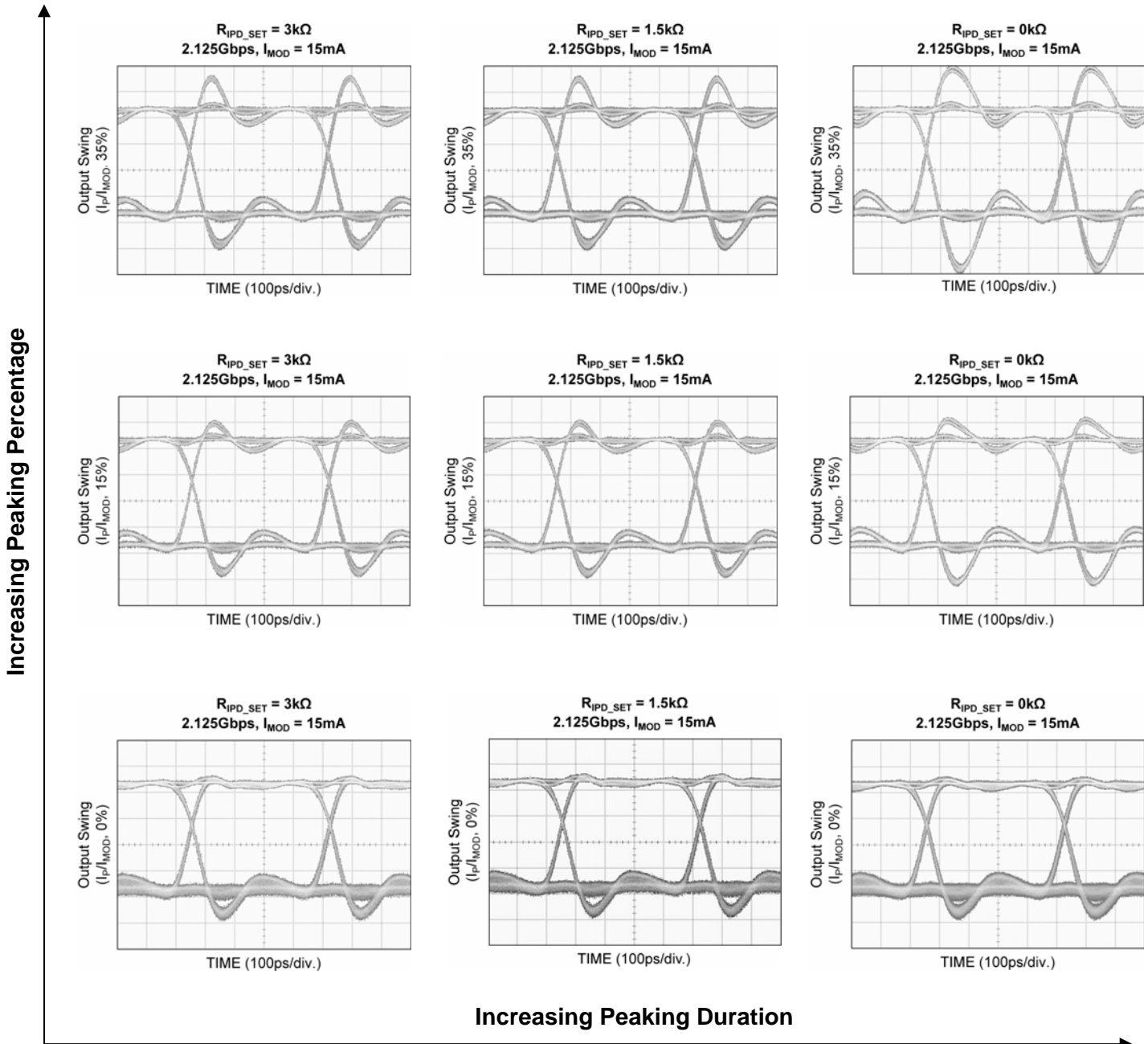
Evaluation Board Schematic
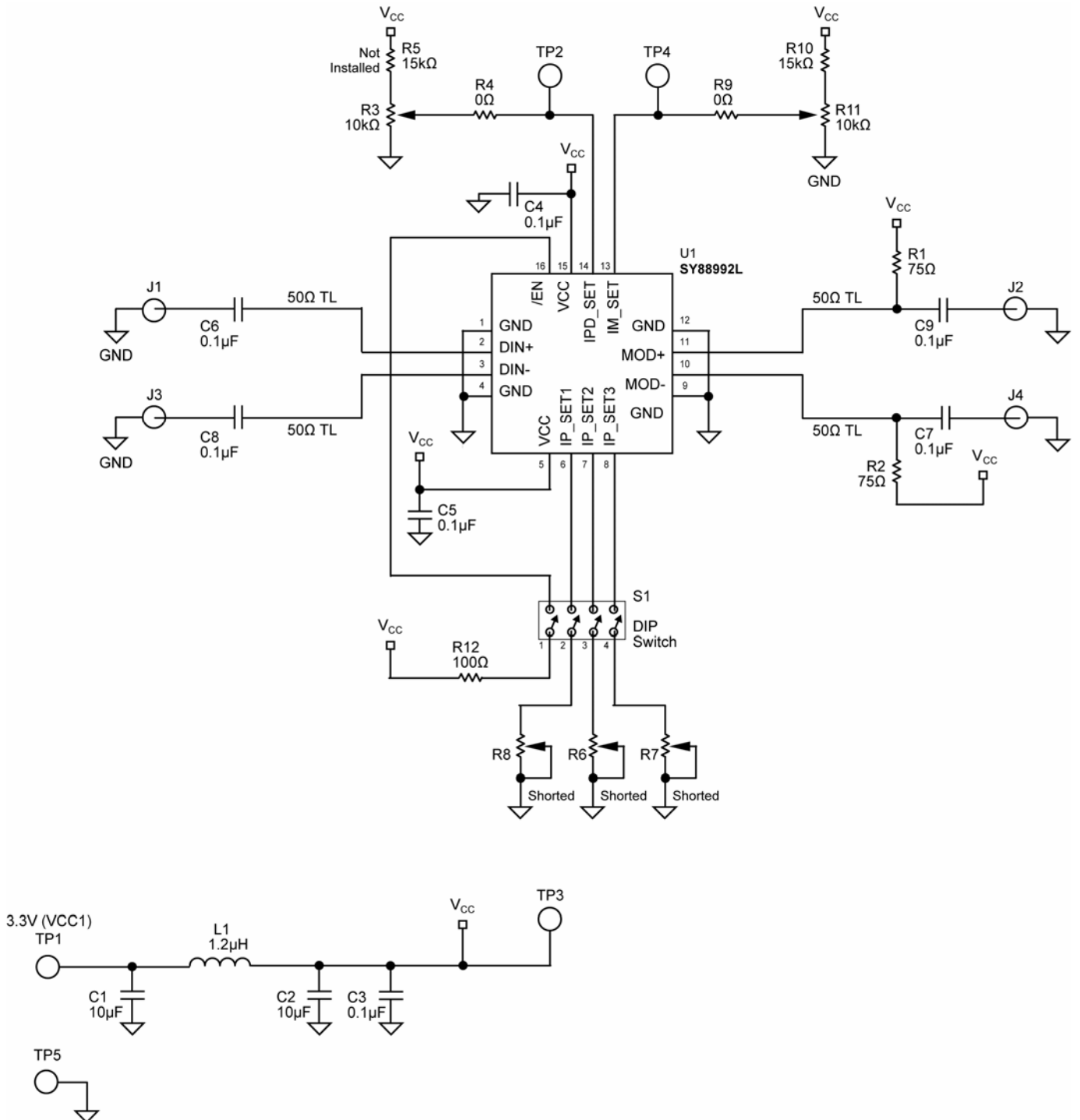
PCB Assembly

Bill of Materials

Item	Part Number	Manufacturer	Description	Qty.
C1, C2	ECSH0GY106R	Panasonic[1]	10μF, Y, Tantalium Solid Electrolytic Capacitor	2
C3	VJ0603Y104KXXA	Vishay[2]	0.1μF, Ceramic Capacitor, Size 0603	1
C4-C9	ECJ0EB1A104K	Panasonic[1]	0.1μF, Ceramic Capacitor, Size 0402	6
J1-J4	142-0711-821	Johnson Components[3]	SMA End Launch Receptacle Connector	4
L1	IMC 0805 RK 122 J 01	Vishay[2]	1.2μH Ferrite Bead Inductor	1
R1, R2	CRCW040275R0F	Vishay[2]	75Ω, 1% Resistor	2
R3, R11	3269	Bourns[5]	10kΩ Potentiometer	2
R4, R9	CRCW04020R00F	Vishay[2]	0Ω Resistor	2
R10	CRCW04021002F	Vishay[2]	15kΩ, 5% Resistor	1
R12	CRCW04021000F	Vishay[2]	100Ω, 1% Resistor	1
S1	90HBW04	Grayhill[7]	DIP Switch SMT, 4 Positions	1
TP1	5010	Keystone[6]	Color Coded PCB Test Point	1
TP2-4	TSW-1-1-07-G-S	Samtec[4]	Header, 1 Position	3
TP5	5011	Keystone[6]	Color Coded PCB Test Point	1
U1	**SY88992L**	**Micrel**[8]	Laser Driver	1

Notes:

1. Panasonic: www.panasonic.com.

2. Vishay: www.vishay.com.

3. Johnson Components: www.johnsoncomponents.com.

4. Samtec: www.samtec.com.

5. Bourns: www.bourns.com.

6. Keystone Electronics Corp.: www.keyelco.com.

7. Grayhill: www.grayhill.com.

8. **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, products 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."