MIC94310 Evaluation Board

200mA LDO with Ripple Blocker™ Technology

General Description

The MIC94310 is a 200mA Low Dropout (LDO) regulator that provides high power supply ripple rejection (PSRR). This is important for applications where switching noise cannot be tolerated by sensitive downstream circuits such as in RF applications. The MIC94310 maintains high power supply ripple rejection (PSRR) with input voltage operating near the output voltage level to improve overall system efficiency.

The MIC94310 operates from an input voltage of 1.8V to 3.6V.

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

Requirements

The MIC94310 evaluation board requires an input power supply that is capable of delivering greater than 400mA at a voltage range of 1.8V to 3.6V. The output load can be either active or passive.

Precautions

The MIC94310 evaluation board does not have reverse polarity protection. Applying a negative voltage to the V_{IN} terminal may damage the device.

Getting Started

- **Connect an External Supply to V_{IN}**. Apply the desired input voltage to the V_{IN} and ground terminal of the evaluation board, paying careful attention to polarity and supply voltage ($1.8V \le V_{IN} \le 3.6V$).
- **Enable/Disable the MIC94310**. The evaluation board is supplied with 100kΩ pull-up resistor to V_{IN} for default on state. To disable the output, simply jumper the EN terminal to ground.
- **Connect the Load**. Connect the load to the V_{OUT} terminal and the ground terminal. The load can be either a passive (resistor) or active (electronic load). Be sure to monitor the output voltage at the V_{OUT} terminal.

Ordering Information

Part Number	Description
MIC94310-GYCS EV	200mA LDO Ripple Blocker™ CSP Package Evaluation Board V_{OUT}=1.8V
MIC94310-GYMT EV	200mA LDO Ripple Blocker™ Thin MLF® Package Evaluation Board V_{OUT}=1.8V

Micrel Inc. • 2180 Fortune Drive • San Jose, CA 95131 • USA • tel +1 (408) 944-0800 • fax + 1 (408) 474-1000 • http://www.micrel.com

Power Supply Ripple Rejection (PSRR) Measurements

Figure 1 illustrates the frequency response of the MIC94310.

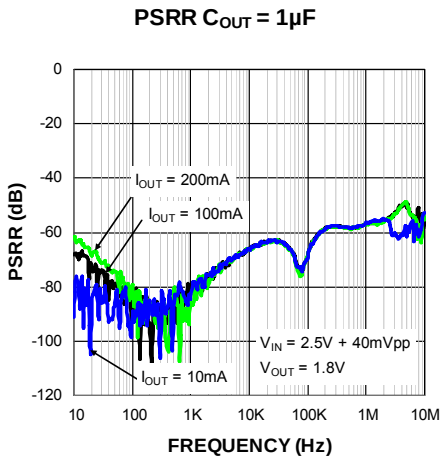


Figure 1. MIC94310 Ripple Blocker™ Frequency Response

For high-frequency measurements (above 1MHz), careful attention must be made to the test set-up configuration as it is easy to introduce noise into the grounds which will give inaccurate measurements as shown in Figure 2.

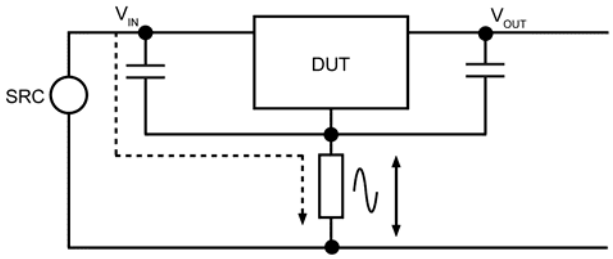


Figure 2. High-Frequency Noise on Measurement System

The inductance of test probes connected to the evaluation board at higher frequencies becomes a factor which can create a differential between the device under test and test measurement system grounds. Adding a low-value resistor (2Ω) in series with the input capacitor to ground and utilizing a test measurement system capable of making differential measurements will help to reduce these effects.

PSRR measurements may be made using either dedicated PSRR test equipment or with a PSRR interface board and a network analyzer. The network analyzer can sweep the AC frequency and perform a comparison measurement of the amplitude on the input and output. With this method, the network analyzer is configured for an A/R measurement. The difficulty arises when trying to impose the network analyzer's AC signal with the DC input voltage to the MIC94310. The circuit shown in Figure 3 accomplishes this by using the MIC911 as a summing amplifier. The summing amplifier adds the V_{SUPPLY} (DC voltage) and the network analyzers AC signal. As the network analyzers source is 50Ω impedance it may be neglected, the DC voltage seen at the non-inverting side is half of the V_{SUPPLY} voltage. The output is gained up by 2 with the 1kΩ resistor divider to the non-inverting side. This sums the AC and DC voltages with an overall gain of 1.

$$V_{OUT} = \left(\frac{1k\Omega}{1k\Omega + 1k\Omega} V_{SUPPLY} + \frac{1k\Omega}{1k\Omega + 1k\Omega} V_{NETWORKANALYZER} \right) \left(1 + \frac{1k\Omega}{1k\Omega} \right)$$

$$V_{OUT} = \left(\frac{1}{2} V_{SUPPLY} + \frac{1}{2} V_{NETWORKANALYZER} \right) \left(2 \right)$$

$$V_{OUT} = V_{SUPPLY} + V_{NETWORKANALYZER}$$

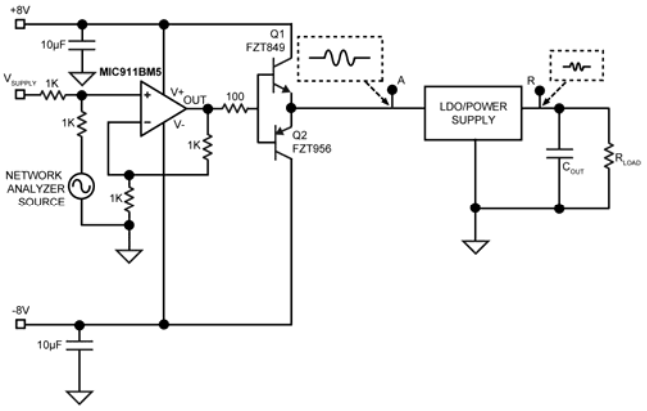
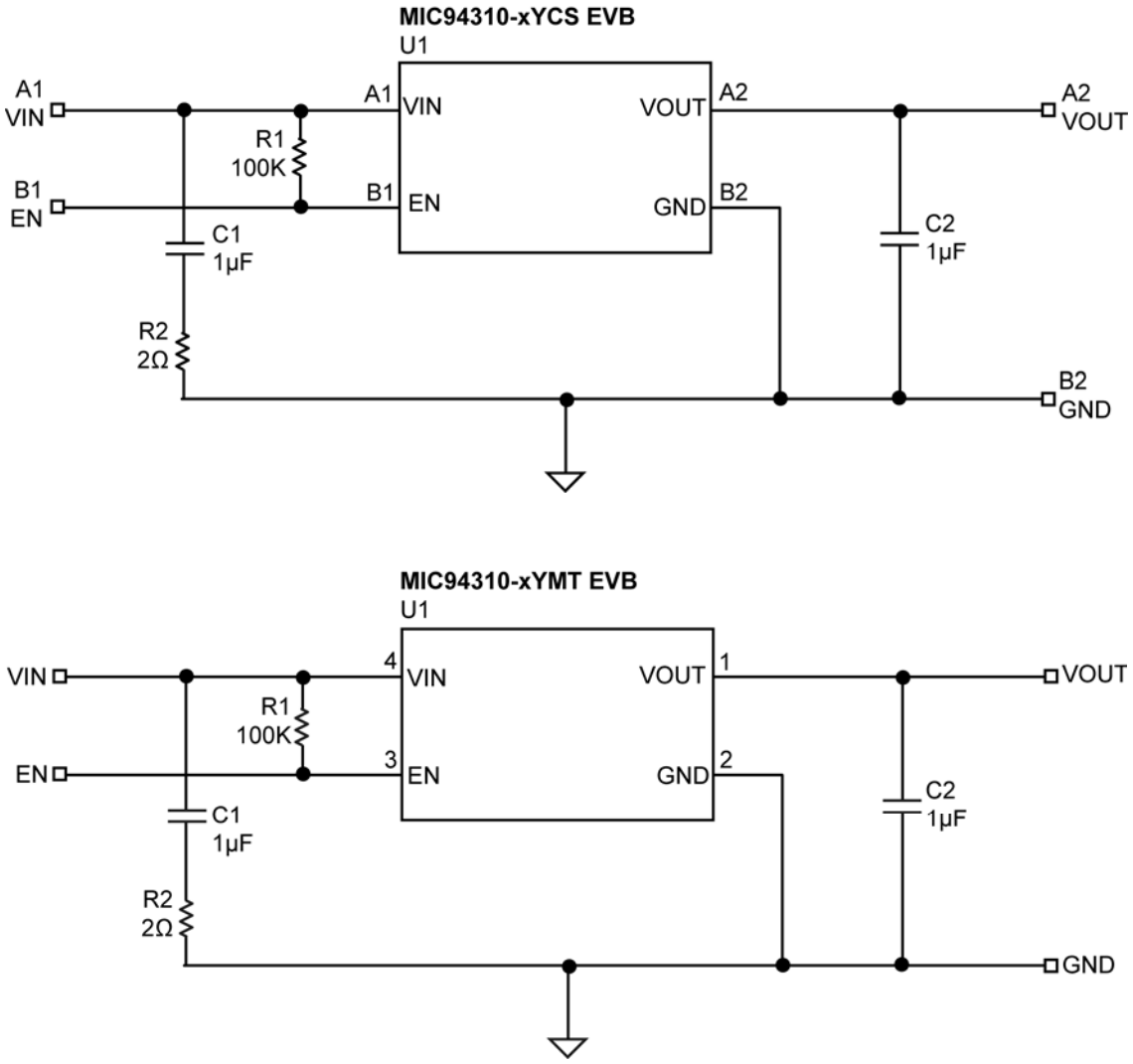


Figure 3. Network Analyzer Set-Up

Evaluation Board Schematics



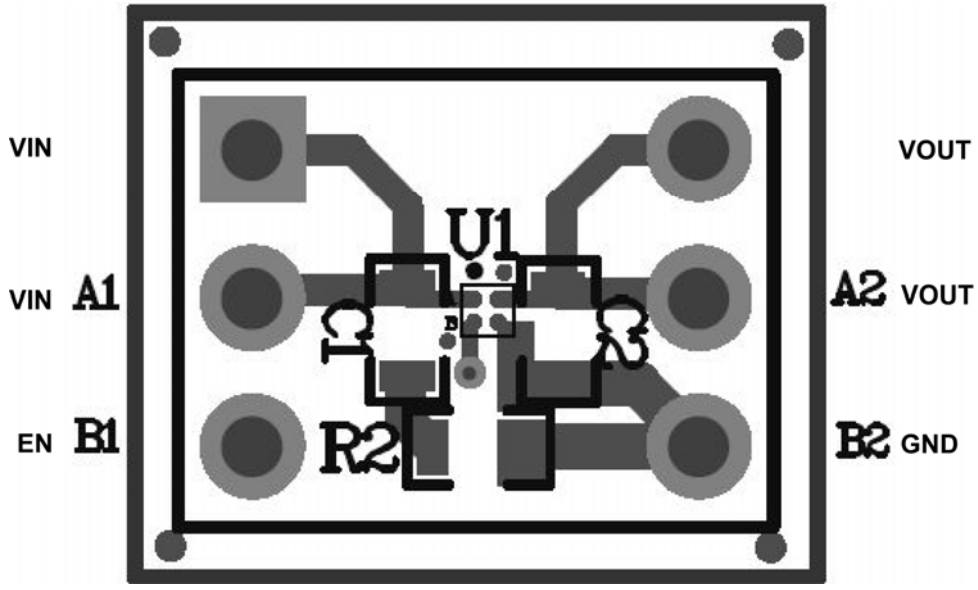
Bill of Materials

Item	Part Number	Manufacturer	Description	Qty.
C1, C2	CL10B105KA8NNNC	Samsung[1]	1µF, 25V, X7R, Size 0603, ceramic capacitor	2
R1	CRCW0402100KFKEA	Vishay[2]	100KΩ, 1%, 1/16W, Size 0402 resistor	1
R2	CRCW04022R00FKED	Vishay[2]	2Ω, 1%, 1/16W, Size 0402 resistor	1
U1	**MIC94310-xYCS**	**Micrel, Inc.[3]**	**200mA LDO with Ripple Blocker™ technology**	**1**
	MIC94310-xYMT			

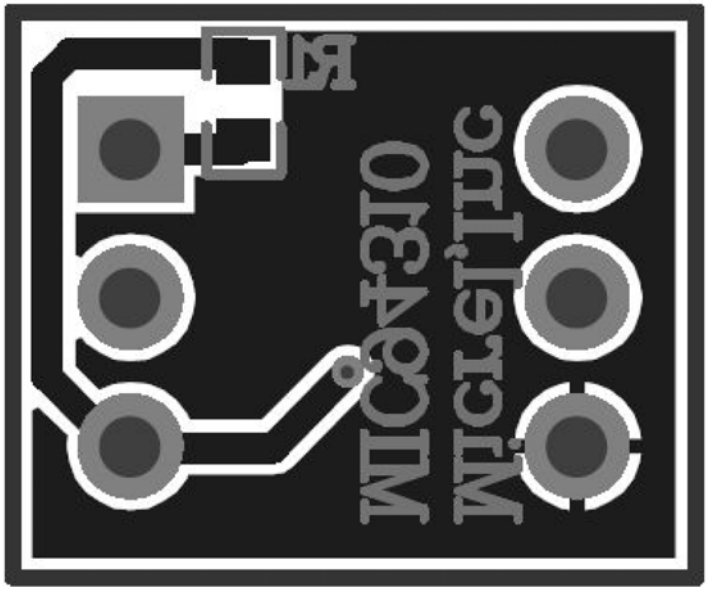
Notes:

1. Samsung: http://www.semlcr.com.
2. Vishay: www.vishay.com.
3. **Micrel, Inc**:: www.micrel.com.

PCB Layout Recommendations (CS Package)

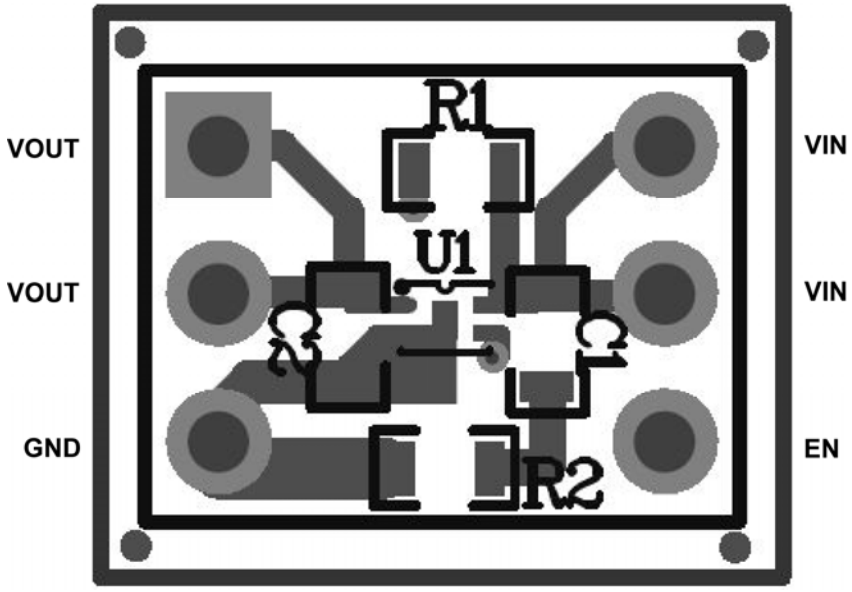


Top Layer

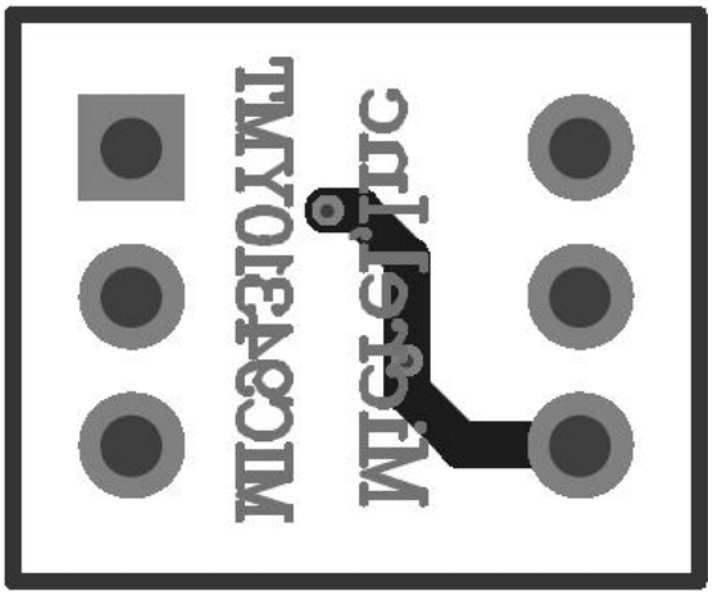


Bottom Layer

PCB Layout Recommendations (MT Package)



Top Layer



Bottom Layer

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