MIC59300 Evaluation Board

3.0A Low Voltage LDO Regulator

General Description

The demonstration board can be used to evaluate the MIC59300. The MIC59300, a 3.0A, ultra-high speed, low dropout linear regulator, utilizes a split supply input to regulate low output voltages. It is offered in fixed and adjustable outputs. The adjustable version allows the use of a resistor divider network to adjust the output voltage. An enable pin allows it to be placed in a zero-current off mode state. The evaluation board accommodates the adjustable version.

Requirements

The MIC59300 requires two power supplies. One to provide a minimum of 3.0A to the VIN and the other to provide Vbias current. Although typical Vbias current is 30mA, in dropout conditions Vbias currents can be very high. A 1A minimum power supply is recommended for Vbias. The Vbias should be able to deliver a minimum of 3v or 2.1V greater than Vout, whichever is greater. In cases where the Vin voltage satisfies the minimum Vbias voltage, one supply can be used.

Circuit Description

The MIC59300 ultra-high speed regulator is easy to use. It is extremely tolerable to a wide range and types of output capacitor. A minimum 1µF ceramic capacitor is recommended.

An input capacitor is required when the power supply is more than 4 inches away from the device. The evaluation board has a 1µF ceramic on the VIN pin.

For the adjustable version, the output can be selected by using the evaluation board jumper JP2. The available output options on the evaluation board are 1.0V, 1.2V, 1.5V and 1.8V. Also, a 0.5V output can be obtained by removing the jumper. Any of the four bottom feedback resistors can be substituted to obtain a different output voltage. The equation to set the output is as follows:

$$V_{OUT} = V_{REF}(\frac{R1}{R2} + 1)$$

Where VREF is 0.5V.

R1 on the evaluation board is set to 1KΩ. Due to the high bandwidth of the MIC59300, larger values of R1 and the parasitic capacitance of the feedback pin introduce an additional pole. For R1 values greater than 1KΩ, a small feed forward capacitor (C4) across R1 will be required to maintain stability. Since R1 on the evaluation board is set to 1KΩ, the formula for adjusting the output to the desired level is as follows:

$$R2 = \frac{R1 \times V_{REF}}{V_{OUT} - V_{REF}}$$

$$R2 = \frac{1k\Omega \times 0.5V}{V_{OUT} - 0.5V}$$

A jumper at JP1 can turn on or turn off the device. JP1-2 is connected to the EN pin of MIC59300. If the jumper is shorting EN pin and VBIAS, the device is turned on. If the jumper is shorting GND and VBIAS, the device is turned off. Connecting EN pin to an external power supply can also control the device on and off. Minimal turn-on threshold voltage of EN pin is 1.6V. Maximum turn-off threshold voltage of EN pin is 0.3V.

Getting Started

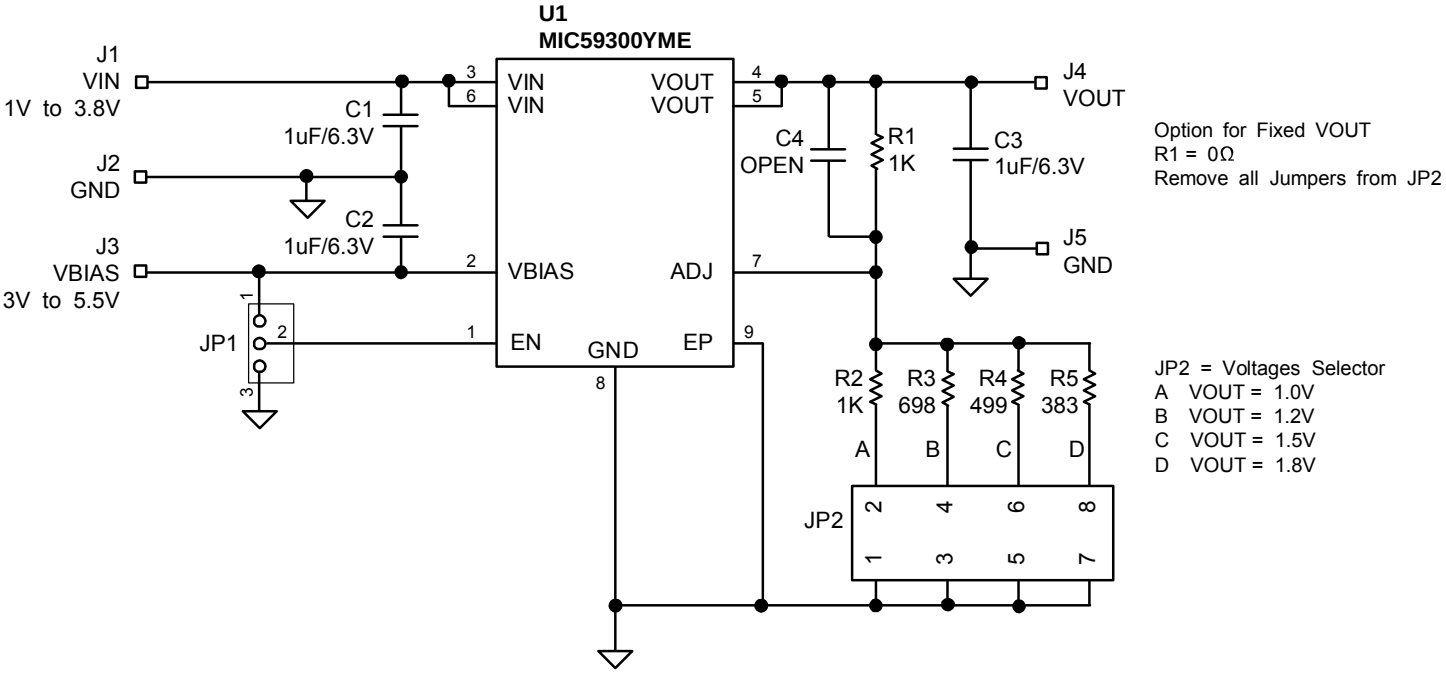
1. Connect external supplies to VIN terminal and VBIAS terminal. Apply desired input voltages to the VIN, VBIAS and ground terminals of the evaluation board, paying careful attention to polarity and supply voltage (1.0V<VIN<3.8V, 3.0V<VBIAS<5.5V). Ensure the supply voltages are monitored at the VIN and VBIAS terminals. Power lead resistances can reduce the voltages supplied to the inputs.

2. Connect the load to the VOUT and ground terminals. The load can be either passive (resistive) or active (as an electronic load). An ammeter can be placed between the load and the VOUT terminal. Ensure the output voltage is monitored at the VOUT terminal. The VOUT is set by the voltage selector. The output voltage can also be adjusted by changing the feedback resistors. See “Circuit Description”.

3. Enable the MIC59300. The output of the MIC59300 is turned on by shorting the enable pin to VBIAS or bringing the enable pin beyond the enable threshold. The output of the MIC59300 is turned off by shorting the enable pin to ground or bringing the enable pin below the enable threshold. See “Circuit Description”.

Ordering Information

Part Number	Description	Package
MIC59300YME	IC	8-Pin SOIC EPAD
MIC59300YME EV	Evaluation Board	8-Pin SOIC EPAD



Bill of Materials

Item	Part Number	Manufacturer	Description	Qty.
C1,C2	C1608X5R0J105K	TDK(1)	1uF Ceramic Capacitor X5R 0603 6.3V	3
C3	GRM188R60J105KA01D	Murata(2)		
	0603D105KAT2A	AVX(3)		
C4			Open	1
R1,R2	CRCW06031K00FKXX	Vishay(4)	1kΩ 1% 0603 Resistor	2
R3	CRCW0603698RFKXX	Vishay(4)	698Ω 1% 0603 Resistor	1
R4	CRCW0603499RFKXX	Vishay(4)	499Ω 1% 0603 Resistor	1
R5	CRCW0603383RFKXX	Vishay(4)	383Ω 1% 0603 Resistor	1
U1	**MIC59300YME**	**Micrel, Inc.(5)**	**Ultra High Speed 3.0A LDO**	**1**

Notes:

1. TDK: www.tdk.com
2. Murata Tel: www.murata.com
3. AVX Tel: www.avx.com
4. Vishay Tel: www.vishay.com
5. **Micrel, Inc.: www.micrel.com**

Printed Circuit Board Layouts

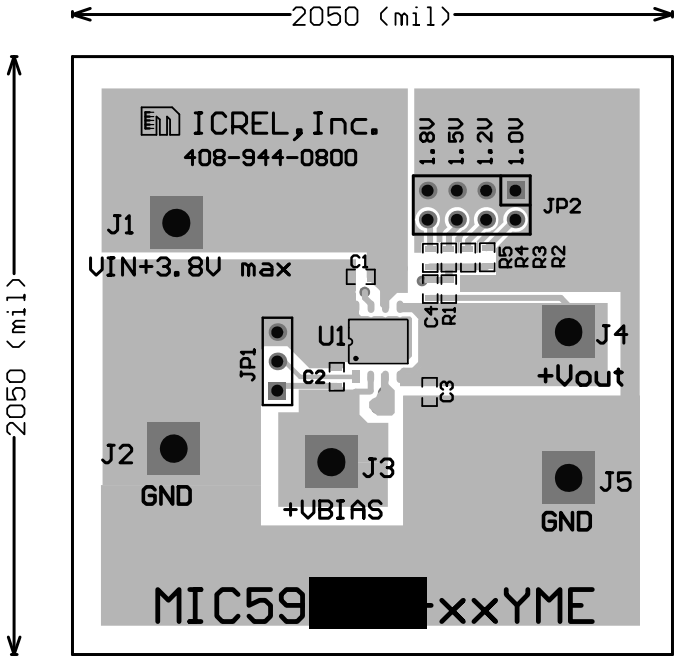


Figure 1a. Top Layer

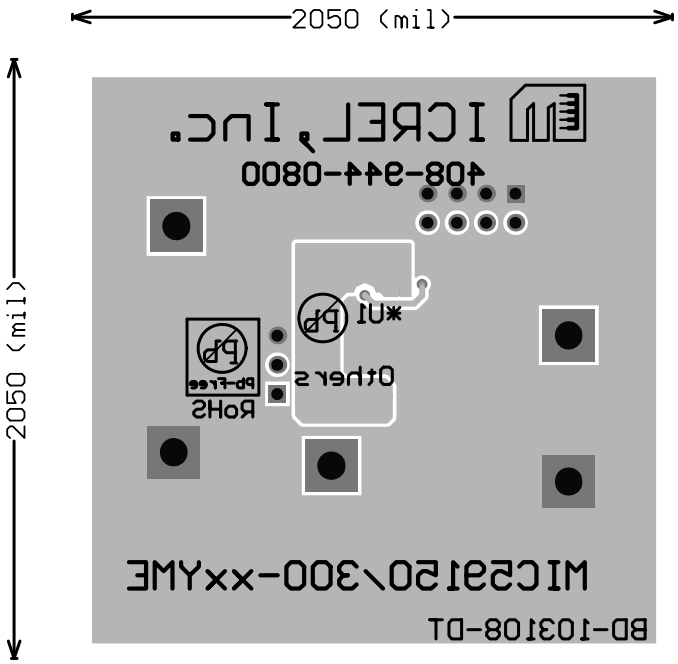


Figure 1b. Bottom Layer

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Revision History

Date	Edits by:	Revision Number