MIC2295 MLF® Evaluation Board

1.2MHz PWM Step-Up Converter

General Description

The Micrel MIC2295 is a small 1.2MHz constant frequency PWM DC/DC step-up switching regulator. The MIC2295 is available in either a thin SOT-23 or a 2mm x 2mm MLF® package. High power densities, in a very small size, are achieved using its internal 34V/1.2A switch.

Requirements

The MIC2295 evaluation board requires an input power source that is able to deliver greater than 1.2A at 2.5V.

Precautions

The evaluation board does not have reverse polarity protection. Applying a negative voltage to the VIN terminal may damage the device.

The MIC2295 evaluation board is tailored for a Li-ion range input supply voltage. The MIC2295 evaluation board should not exceed 6.3V on the input unless the standard input capacitor is replaced with a higher rated input capacitor.

Getting Started

1. **Connect an external supply to V_{IN}**. Apply desired input voltage to the V_{IN} (J1) and ground (J2 and J5) terminals of the evaluation board, paying careful attention to polarity and supply voltage ($2.5V \le V_{IN} \le 6.3V$). An ammeter may be placed between the input supply and the V_{IN} terminal to the evaluation board. Ensure that the supply voltage is monitored at the V_{IN} terminal. The ammeter and/or power lead resistance can reduce the voltage supplied to the input. A 10uF input capacitor is used on the evaluation board to help compensate for long cables used in most lab settings.

2. **Connect the load to the V_{OUT} (J4) and ground terminals**. The load can be either passive (resistor) or active (electronic load). An ammeter can be placed between the load and the V_{OUT} terminal. The default output voltage is set to 12V. This can be adjusted by changing the feedback resistors.

3. **Enabling the MIC2295**. Apply a 1.5V or greater voltage to the enable (J3) terminal.

Ordering Information

Part Number	Description
MIC2295YML EV	1.2MHz PWM Step-Up Converter

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Output Voltage

The output voltage on the MIC2295 evaluation board is adjustable. The output voltage is controlled by the feedback resistors (R1 and R2) and can be calculated as follows:

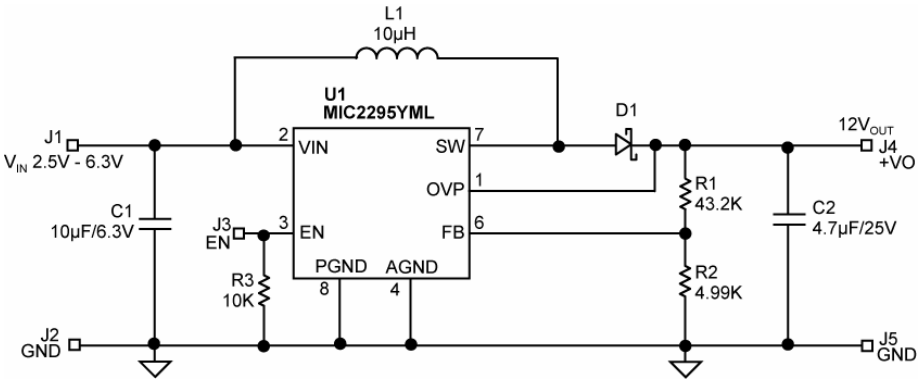
$$V_{OUT} = 1.24V \left(\frac{R1}{R2} + 1\right)$$

The evaluation board is initially adjusted to 12V, but can easily be modified by removing R1 and replacing it with the value that yields the desired output voltage. (**Caution**: Do not power up the MIC2295 SOT-23 version with R1 removed. The SOT-23 version does not have over-voltage protection thus the output voltage will steadily increase until the device self-destructs).

$$R1 = 4.99k\Omega \left(\frac{V_{OUT}}{1.24V} - 1\right)$$

Ensure the output voltage selected does not exceed the 25V rating of the output capacitor. When output voltages greater than 25V are desired, the output capacitor should be replaced with one rated greater than the maximum output voltage. The following chart defines the minimum output capacitor value recommended for different output voltages.

Output Voltage	Recommended Output Capacitor
<6V	22uF
<16V	10uF
<34V	4.7uF



MIC2295 Schematic

Bill of Materials

Item	Part Number	Manufacturer	Description	Qty.
C1	08056D106MAT	AVX[1]	10µF 6.3V 0805 X5R Ceramic Capacitor	1
	C1608X5R0J106K	TDK[2]	10µF 6.3V 0603 X5R Ceramic Capacitor	1
	GRM21BR61A106KE19L	Murata[3]	10µF 6.3V 0805 X5R Ceramic Capacitor	1
C2	1206YD475MAT	AVX[1]	4.7µF 25V 1206 X5R Ceramic Capacitor	1
	C3216X5R1C475K	TDK[2]		1
	GRM31CR61C475KA12L	Murata[3]		1
D1	MBRX140	MCC[4]	1A 40V Schottky Diode	1
	1N5819HW	Diodes Inc[6]		1
L1	LQH43CN100K03	Murata[3]	10µH 650mA Inductor	1
	VLF4012AT-100MR79	TDK[2]	10µH 800mA Inductor	1
R1	CRCW06034322FRT1	Vishay[6]	43.2kΩ 0603 Resistor	1
R2	CRCW06034991FRT1	Vishay[6]	4.99kΩ 0603 Resistor	1
R3	CRCW06031002FRT1	Vishay[6]	10kΩ 0603 Resistor	1
U1	**MIC2295YML**	**Micrel, Inc.**[7]	1.2MHz PWM Step-Up Converter	1

Notes:

1. AVX: www.avx.com.
2. TDK: www.tdk.com.
3. Murata: www.murata.com.
4. Micro Commercial Components (MCC): www.mccsemi.com.
5. Diodes Inc: www.diodes.com.
6. Vishay: www.vishay.com.
7. **Micrel, Inc**.: www.micrel.com.

Printed Circuit Board Layouts

2mm x 2mm MLF® (YML) Evaluation Board

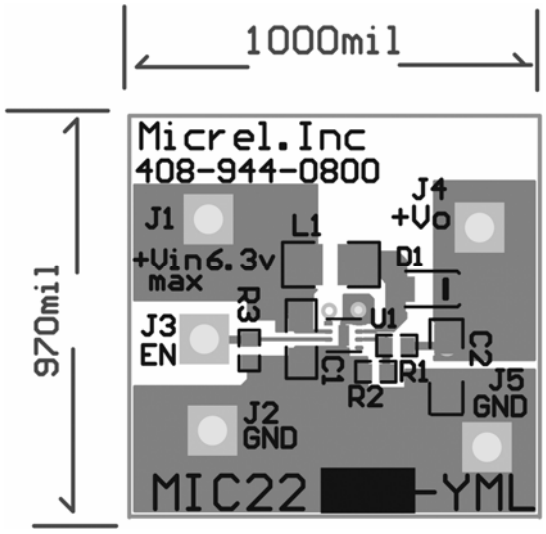


Figure 1a. Top Silkscreen

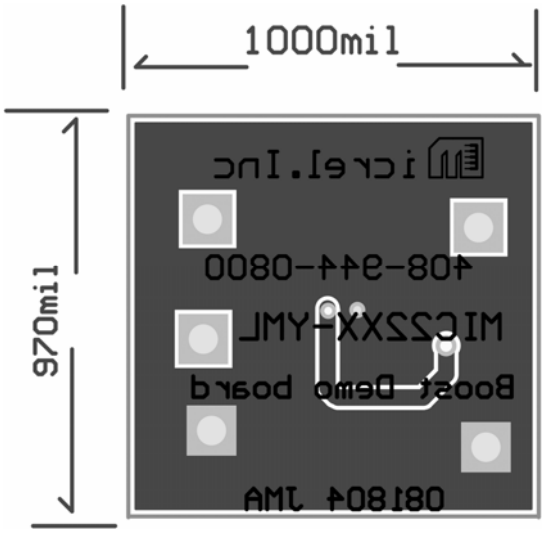


Figure 1b. Top Layer

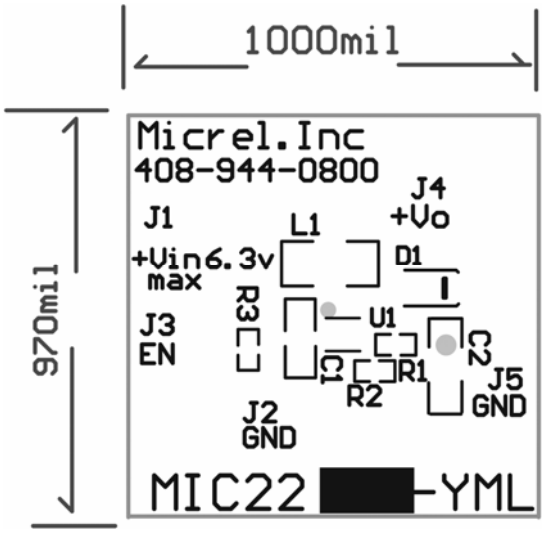


Figure 1c. Bottom Silkscreen

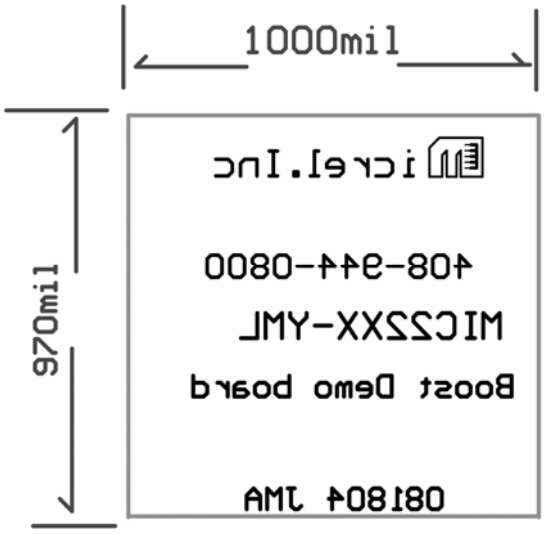


Figure 1d. Bottom Layer

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