MIC4801 Evaluation Board

High Efficiency 600mA Single Channel Linear WLED Driver with Ultra Fast PWM™ Control

General Description

The MIC4801 is a high efficiency, single channel, White LED (WLED) driver. This constant current linear device is designed to drive a single high power WLED up to 600mA and features a low dropout of 130mV at 400mA (typical). Brightness is controlled through an Ultra Fast PWM™ interface which can operate from 1% to 100% duty cycle.

The MIC4801 is available in an 8-pin SOIC leaded package with a junction temperature range of -40°C to +125°C

Requirements

The MIC4801 evaluation board requires a power supply that is capable of delivering at least 1A while providing an input voltage between 3.0V and 5.5V.

Precautions

The MIC4801 evaluation board is designed for an input voltage no greater than 6V. This evaluation board does not have reverse polarity protection; hence, applying a negative voltage to the V_{IN} terminal may damage the device.

Getting Started

1. **Connect an external supply to V_{IN}.** Apply the desired input voltage across V_{IN} and ground terminals, J2 and J3, respectively, paying careful attention to polarity and supply voltage ($3.0V \leq V_{IN} \leq 5.5V$). 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. V_{BAT} is connected to V_{IN} through a 0Ω resistor, R1.

2. Enable/Disable the MIC4801

To enable the device, apply a DC voltage of 1.2V or greater to the EN pin. This allows for full brightness of the WLED (100% duty cycle). The EN pin can also be used for dimming by connecting a PWM signal and varying its duty cycle (please refer to the Ultra Fast PWM™ Dimming Interface Section in datasheet). Pulling EN low for more than 40ms forces the MIC4801 into a low I_Q sleep mode. Do not leave the EN pin floating as this may cause an indeterminate output state. A pull up resistor of 10kΩ is placed from EN (JP1) to V_{IN} to ensure that the WLED is ON when an input signal is applied.

3. Setting LED current with R_{SET} resistor.

The average LED current may be calculated using the equation below:

$$R_{SET}(k\Omega) = \frac{4920 \cdot D}{I_{LED}(mA)} + 0.140$$

$$I_{LED}(mA) = \frac{4920 \cdot D}{\left(R_{SET}(k\Omega) - 0.140\right)}$$

D is the duty cycle of the LED current during PWM dimming; D=1 when device is fully ON. The stock evaluation board uses an R_{SET} value of 12.1kΩ which corresponds to I_{LED} of 411mA.

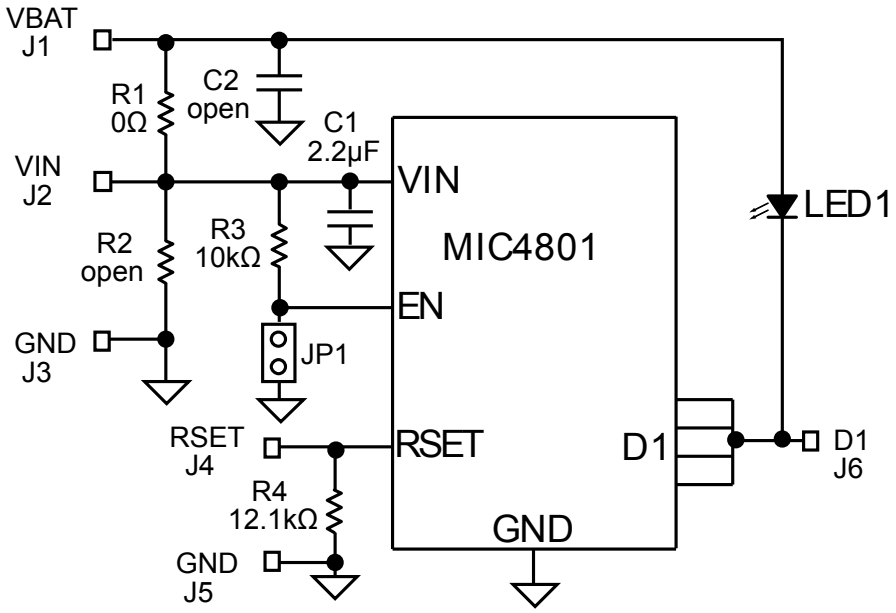
4. Measuring WLED current.

To measure WLED current, simply insert an ammeter in series with the WLED(s). Keep in mind that a series ammeter will add a small voltage drop, so the voltage at the WLED terminal, D1, should be used when making dropout measurements with a series ammeter.

Ordering Information

Part Number	Description
MIC4801YM EV	Evaluation board with the Single Channel MIC4801 device

MIC4801 Evaluation Board Schematic



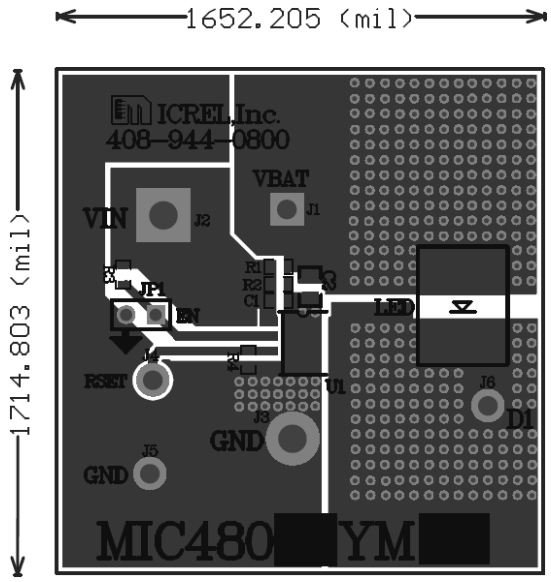
Bill of Materials

Item	Part Number	Manufacturer	Description	Qty.
C1	C1608X5R0J225K	TDK[1]	Ceramic Capacitor, 2.2µF, 6.3V, X5R, Size 0603	1
	06036D225KAT2A	AVX[2]		
	GRM188R60J225KE19D	Murata[3]		
	VJ0603G225KXYAT	Vishay[4]		
	CL10B225KQ8NNNC	Samsung[5]		
C2			Open	1
R1	CRCW06030000FKEA	Vishay	Resistor, 0Ω, 1%, 1/16W, Size 0603	1
R2			open	
R3	CRCW060310K0FKEA	Vishay	Resistor, 10kΩ, 1%, 1/16W, Size 0603	1
R4	CRCW060312K1FKEA	Vishay	Resistor, 12.1kΩ, 1%, 1/16W, Size 0603	1
LED1	W42180	Seoul Semiconductor[6]	3.8W High Power WLED	1
U1	**MIC4801YM**	**Micrel, Inc.[7]**	**600mA Single Channel Ultra Fast PWM™ Linear WLED Driver**	**1**

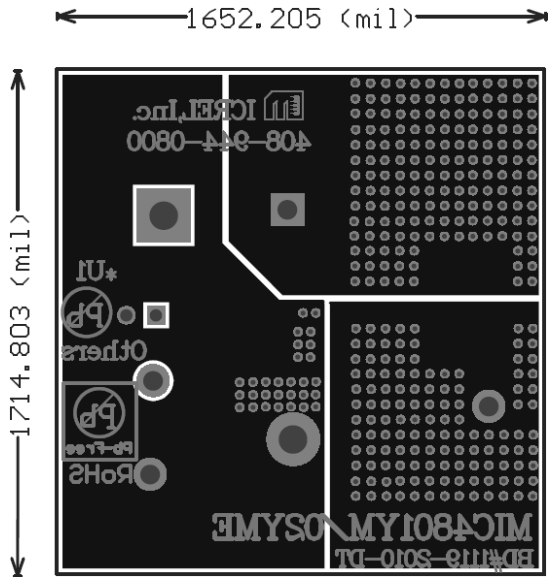
Notes:

1. TDK: www.tdk.com
2. AVX: www.avx.com
3. Murata: www.murata.com
4. Vishay: www.vishay.com
5. Samsung: www.samsung.com
6. Seoul Semiconductor: www.seoulsemicon.com
7. **Micrel, Inc.:** www.micrel.com

PCB Layout Recommendations



Top Layer



Bottom Layer

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