



# MIC4812 Evaluation Board

## High Current 6 Channel Linear WLED Driver with DAM™ and Ultra Fast PWM™ Control

### General Description

The MIC4812 is a high efficiency linear White LED (WLED) driver; it is designed to drive up to six high current WLEDs while maintaining constant current in each channel. The MIC4812 features Dynamic Average Matching™ (DAM™) which is specifically designed to provide optimum matching across all WLEDs. These high accuracy ( $\pm 1\%$  typical) current regulated WLED channels ensure uniform display illumination under all conditions. A typical dropout of 190mV at 100mA is expected.

The MIC4812 is available in a 10-pin Epad MSOP package with a junction temperature range of  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ .

Datasheets and support documentation can be found on Micrel's web site at: [www.micrel.com](http://www.micrel.com)

### Requirements

The MIC4812 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 MIC4812 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, J1 and J2, respectively, paying careful attention to polarity and supply voltage ( $3.0\text{V} \leq V_{IN} \leq 5.5\text{V}$ ). 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.

### 2. Enable/Disable the MIC4812

To enable the device, apply a DC voltage of 1.2V or greater to the EN pin (J3). This allows for full brightness of the WLEDs (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 20ms forces the MIC4812 into a low  $I_Q$  sleep mode. Do not leave the EN pin floating as this may cause an indeterminate output state. A pull down resistor of 200k $\Omega$  is placed from EN to GND to ensure that the WLEDs are OFF when an enable signal is not applied.

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

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

$$R_{SET} (k\Omega) = \frac{820 \cdot D}{I_{LED} (mA)} + 0.139$$

$$I_{LED} (mA) = \frac{820 \cdot D}{(R_{SET} (k\Omega) - 0.139)}$$

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 8.25k $\Omega$  which corresponds to  $I_{LED}$  of 10mA.

### 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(s), D1-D6, should be used when making dropout measurements with a series ammeter.

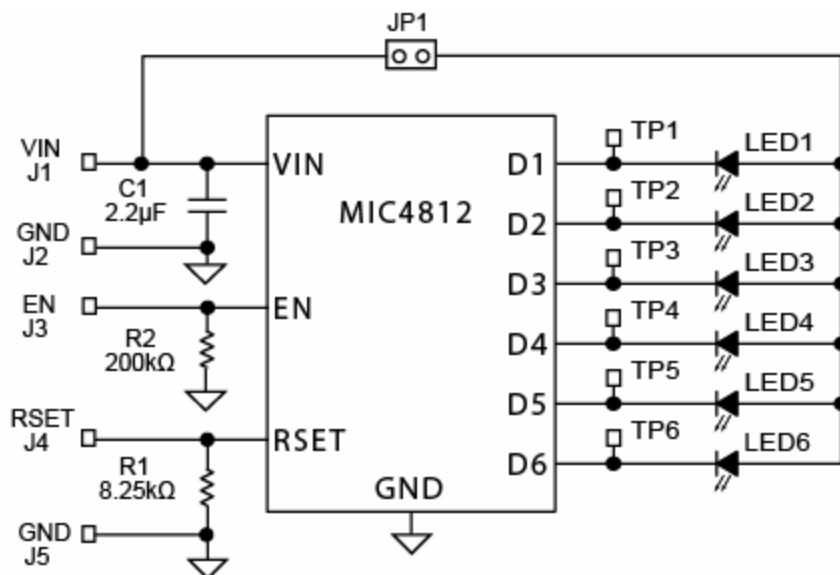
### Ordering Information

| Part Number    | Description                                   |
|----------------|---|
| MIC4812YMME EV | Evaluation board with Six Channel WLED Driver |

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

## MIC4812 Evaluation Board Schematic



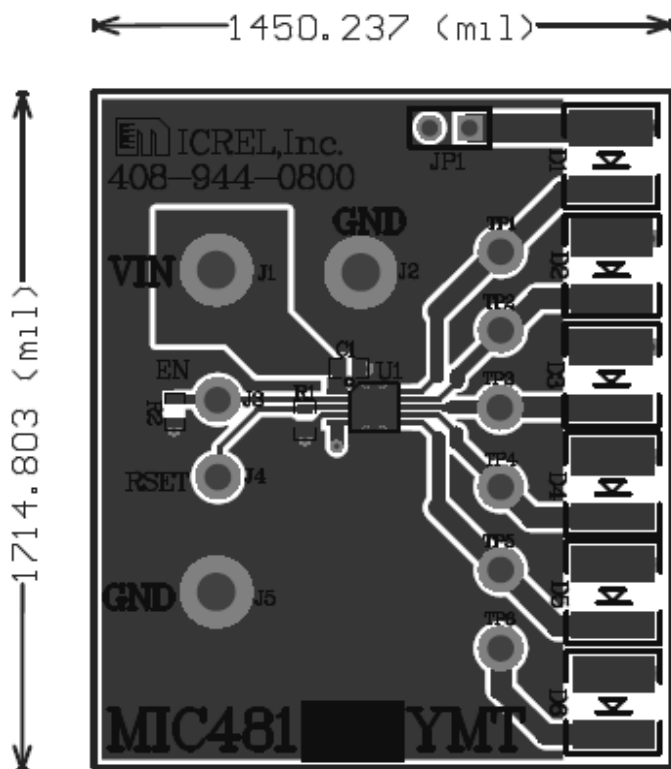
### Bill of Materials

| Item      | Part Number        | Manufacturer                         | Description   | Qty |
|-----------|--------------------|--------------------------------------|---|-----|
| C1        | C1608X5R0J225K     | TDK <sup>(1)</sup>                   | Ceramic Capacitor, 2.2µF, 6.3V, X5R, Size 0603                                  | 1   |
|           | 06036D225KAT2A     | AVX <sup>(2)</sup>                   |   |     |
|           | GRM188R60J225KE19D | Murata <sup>(3)</sup>                |   |     |
|           | VJ0603G225KXYAT    | Vishay <sup>(4)</sup>                |   |     |
| LED1–LED6 | OVS5WBCR4          | OPTEK Technology, Inc <sup>(5)</sup> | WLED  | 6   |
| R1        | CRCW06038K25F5EA   | Vishay <sup>(4)</sup>                | Resistor, 8.25k, 1%, 1/16W, Size 0603   | 1   |
| R2        | CRCW06032003FKEA   | Vishay <sup>(4)</sup>                | Resistor, 200k, 1%, 1/16W, Size 0603  | 1   |
| U1        | MIC4812YMME        | Micrel, Inc. <sup>(6)</sup>          | High Current 6 Channel Linear WLED Driver with DAM™ and Ultra Fast PWM™ Control | 1   |

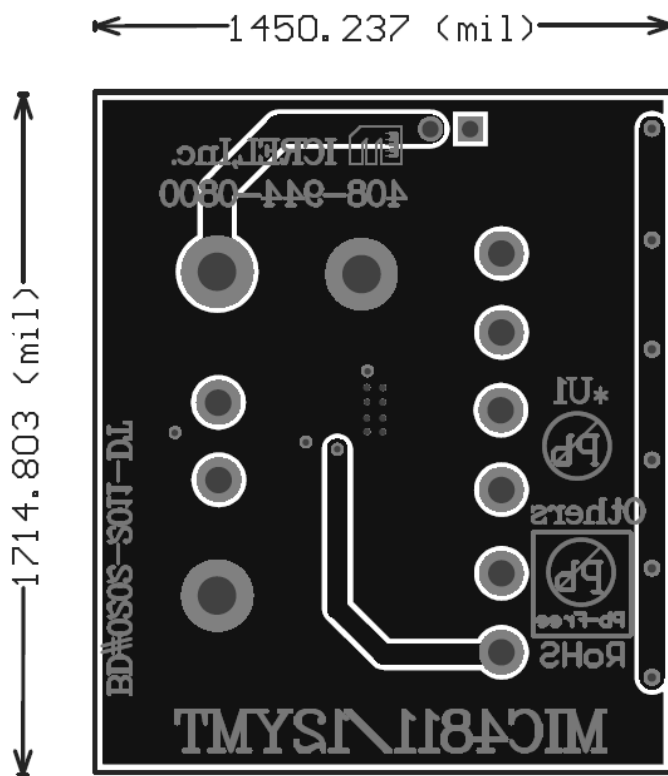
**Notes:**

1. TDK: [www.tdk.com](http://www.tdk.com)
2. AVX: [www.avx.com](http://www.avx.com)
3. Murata: [www.murata.com](http://www.murata.com)
4. Vishay: [www.vishay.com](http://www.vishay.com)
5. OPTEK: [www.optekinc.com](http://www.optekinc.com)
6. Micrel, Inc.: [www.micrel.com](http://www.micrel.com)

### PCB Layout Recommendations

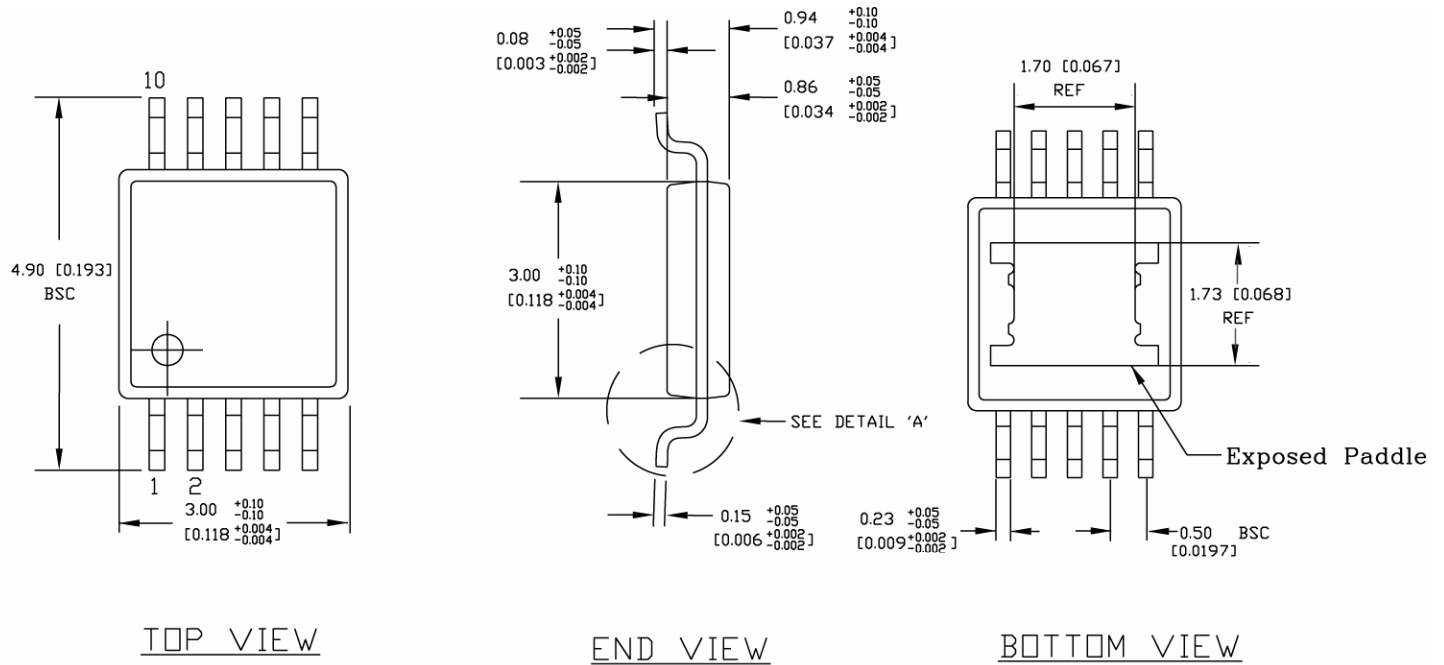


Top Layer



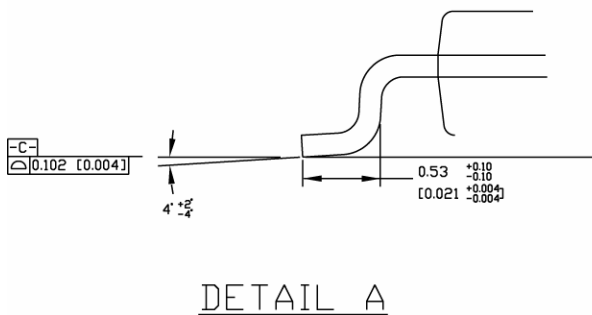
Bottom Layer

## Package Information



**NOTES:**

1. DIMENSIONS ARE IN MM [INCHES].
2. CONTROLLING DIMENSION: MM
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.20 [0.008] PER SIDE.



**10-Pin EPAD MSOP (MME)**

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

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