


### Specifications

| Parameter     | Min | Typ | Max | Unit      |
|---------------|-----|-----|-----|-----------|
| Input Voltage |     |     |     |           |
| AC            | -   | -   | 265 | $V_{rms}$ |
| DC            | 15  | -   | 375 | $V_{DC}$  |
| Load Current  | -   | -   | 350 | mA        |
| Efficiency    | -   | 90  | -   | %         |



**WARNING!**

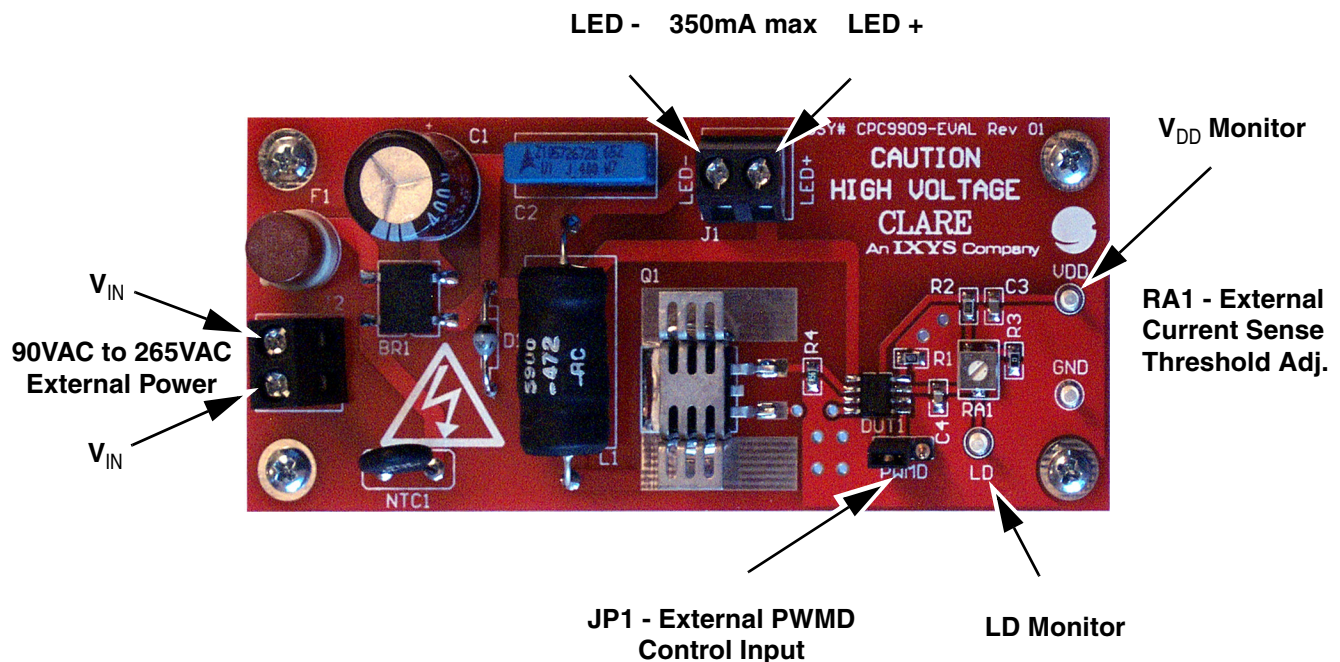
This demonstration board must be powered through an isolation transformer before connecting any external AC instrumentation

### Introduction

IXYS IC Division's CPC9909 Evaluation Board contains all the necessary circuitry to demonstrate all the features of CPC9909 High Brightness (HB), Off-Line LED driver. The CPC9909 IC architecture includes pulse frequency modulation (PFM) with a constant peak-current control scheme. This regulation scheme is inherently stable, allowing the driver to operate above 50% duty cycle without open-loop instability or sub-harmonic oscillations. This greatly increases the number of LEDs in series that can be driven by the CPC9909 and by this Evaluation Board.

Linear LED dimming can be achieved either by adjusting the on-board potentiometer, RA1, or by adjusting the voltage at the LD pin. In addition, PWM dimming can be achieved with a user-applied TTL-level, low frequency, pulse-width-modulated square wave signal between JP1-1 (GND) and JP1-2 (connected to the PWMD pin of the CPC9909).

Figure 1. CPC9909 Evaluation Board, Top View



|   |          |
|---|----------|
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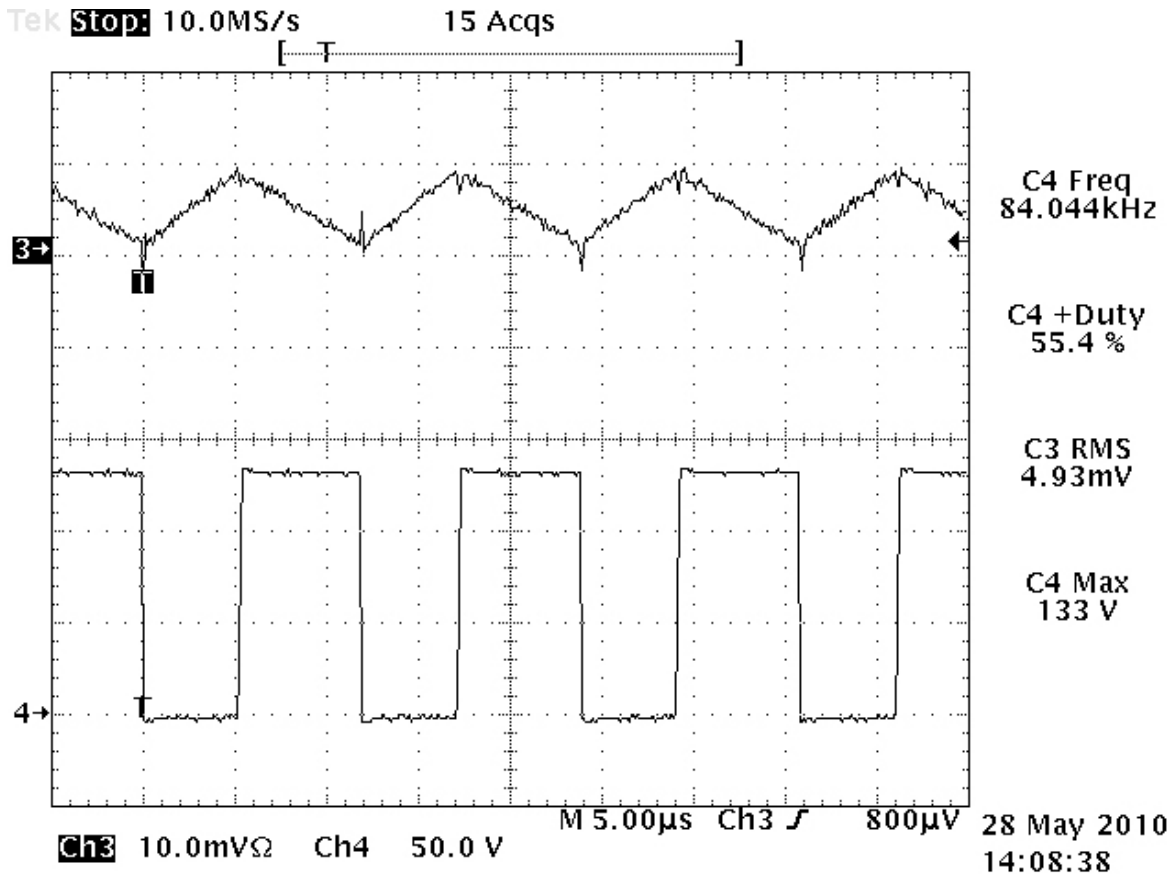


**1.3 CPC9909 Evaluation Board Bill of Materials**

| Designator | Qty. | Description                                     | Part Number                               |
|------------|------|---|---|
| BR1        | 1    | IC, Rectifier Bridge, 400V, 1.5A                | DF04S                                     |
| C1         | 1    | Capacitor, Polarized, 0.5 WD, 22 $\mu$ F, 400V  | EXXG401ELL22CMK20S                        |
| C2         | 1    | Capacitor, Axial, 0.6 x 0.35, 0.1 $\mu$ F, 400V | B32652A4104J                              |
| C3         | 1    | Capacitor, 2.2 $\mu$ F, 16V                     | GRM21BR61C225KA88L                        |
| C4         | 1    | Capacitor, 0.1 $\mu$ F, 25V                     | GRM216F51E104ZA01D                        |
| D1         | 1    | BYV26B, 1A, 400V                                | BYV26B-TR                                 |
| DUT1       | 1    | IXYS IC Division CPC9909                        | CPC9909                                   |
| F1         | 1    | Fuse Holder, Thru-Hole, PC Mount                | 5600000100                                |
| F2         | 1    | Fuse, 2A, 250V                                  | 37312000410                               |
| J1         | 1    | 2-Position Terminal Block                       | 39544-3002                                |
| J2         | 1    | 2-Position Terminal Block                       | 39544-3002                                |
| JP1        | 1    | 3-Position Jumper                               | 800-10-064-10-001000 w/shunt<br>929950-00 |
| JP2        | 1    | Wire Jumper, 0.3                                | (Included)                                |
| L1         | 1    | Inductor, Axial, 4.7mH, 0.4A                    | 5900-472-RC                               |
| NTC1       | 1    | Thermistor, Inrush Current Limiter              | CL-130                                    |
| Q1         | 1    | IXYS FET, With Aavid Thermalloy Heat Sink       | IXTA8N50P w/heatsink 573100D00000         |
| R1         | 1    | Resistor, Surface Mount, 402k                   | RC0805FR-07402KL                          |
| R2         | 1    | Resistor, Surface Mount, 51k                    | RC0805FR-0751K1L                          |
| R3         | 1    | Resistor, Surface Mount, 0 Ohms                 | RC0805JR-070RL                            |
| R4         | 1    | Resistor, Surface Mount, 0.56                   | RL1220S-R56-F                             |
| RA1        | 1    | Variable Resistor, 5k                           | 3314G-1-502E                              |
| TP2        | 1    | Test Point                                      | 10-138-2-01                               |
| TP3        | 1    | Test Point                                      | 10-138-2-01                               |
| TP4        | 1    | Test Point                                      | 10-138-2-01                               |

## 2. Performance

### 2.1 Typical Output Waveforms



Input Voltage = 110VAC  
 CH3: LED Current, 10mVΩ = 100mA/div  
 CH4: MOSFET drain voltage, 50V/div  
 Frequency = 84kHz, positive duty cycle = 55.4%

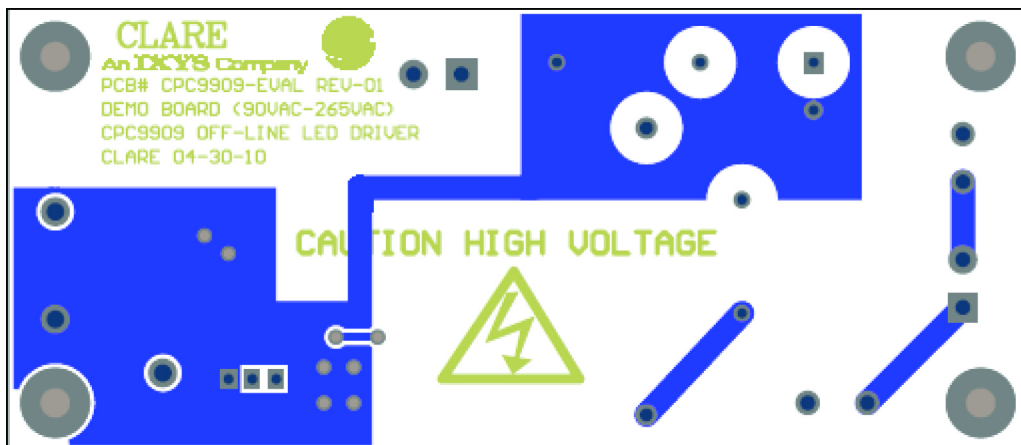
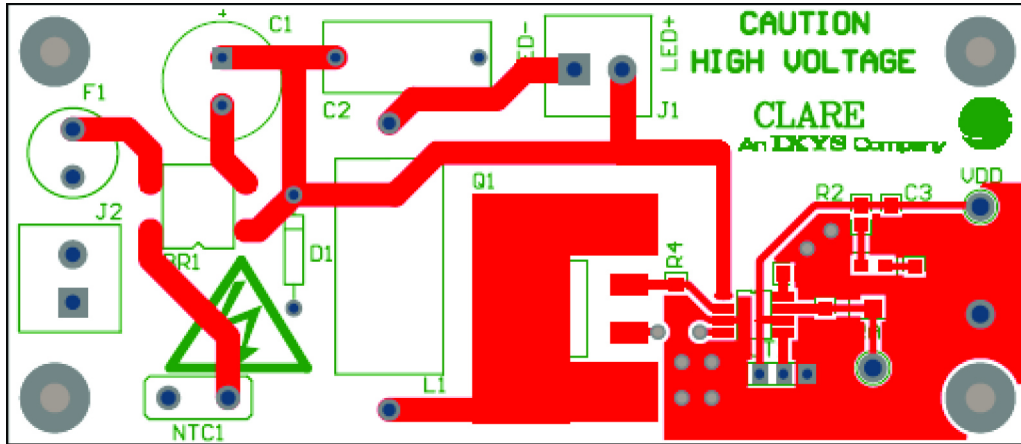
## 3. PC Board Layout Considerations

Proper PCB layout should include a short, thick trace from pin 4 of the CPC9909 internal gate driver to the gate of the external power MOSFET.

In addition, the current sense resistor, connected to pin 2, and the one-shot programming resistor, connected to pin 8, should be placed as close as possible to pin 2 and pin 8 respectively to minimize any noise coupling to the CS and RT pins.

Please note that in some cases, during turn-off transitions of the external power MOSFET, high current spikes from the external inductor can develop. In this case, the design may require placing a high voltage capacitor, 100nF or higher, between the LED+ and LED- terminals to filter these current spikes.

## 4. PC Board Layout



For additional information please visit [www.ixysic.com](http://www.ixysic.com)

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