

LT3591

LED Driver with Integrated Schottky in 3mmx2mm DFN

DESCRIPTION

Demonstration circuit 1124 is an LED Driver with Integrated Schottky in 3mmx2mm DFN featuring the LT3591. The LT3591 is a fixed frequency step-up current mode DC/DC converter to drive up to ten white LEDs in series. The high switching frequency allows using tiny components for the circuit. External components are minimized by integrating the schottky diode and the open circuit protection into the package. The high side current sensing feature of the LT3591 allows “one wire” current source, i.e. the low side of the LED string can return to ground anywhere. The input voltage range of the demo board is from 3V to 9V. This driver can provide 20mA for up to 10 LEDs. Different dimming controls can be

implemented on the demo board. Please refer to the quick start procedure.

The LT3591 datasheet gives complete description of the part, operation and application information. The datasheet must be read in conjunction with this quick start guide for working on or modifying the demo circuit 1124.

Design files for this circuit board are available. Call the LTC factory.

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PERFORMANCE SUMMARY

Specifications are at $T_A = 25^\circ\text{C}$

| SYMBOL | PARAMETER | CONDITIONS | MIN | TYP | MAX | UNITS |
|-------------|-------------------------------------|---|------|------|-----|---------------|
| V_{IN} | Input Supply Range ** | | 3 | | 9 | V |
| I_{OUT} | Output Current | $V_{IN} = 3\text{V}$, 10 LEDs | | | 20 | mA |
| η | Efficiency | $V_{IN} = 3.6\text{V}$, 10 LEDs | | 78.2 | | % |
| V_{OPEN} | CAP pin Over voltage Protection | LED Open | 40 | 42 | 44 | V |
| I_Q | Quiescent Current | $V_{IN} = 3\text{V}$, $V_{CTRL} = 3\text{V}$ | | | 5 | mA |
| I_{QSHDN} | Quiescent Current While in Shutdown | $V_{IN} = 3\text{V}$, $V_{CTRL} = 0\text{V}$ | | | 11 | μA |
| F_s | Switching Frequency | | 0.75 | 1 | 1.2 | MHz |

** The Input Supply Range of the demo circuit 1124 is limited by the input capacitors. The input voltage absolute maximum rating of the LT3591 is 12V.

QUICK START PROCEDURE

Demonstration circuit 1124 is easy to set up to evaluate the performance of the LT3591. Refer to Figure 1 for

proper measurement equipment setup and follow the procedure below:

NOTE. When measuring the input or output voltage ripple, care must be taken to avoid a long ground lead on the oscilloscope probe. Measure the input or output voltage ripple by touching the probe tip directly across the Vin or Vout and GND terminals. See Figure 2 for proper scope probe technique. Place jumper JP1 in the ON position.

1. With power off, connect the input power supply to VIN and GND.

2. Turn on the power at the input.

NOTE. Make sure that the input voltage does not exceed 9V.

3. Check for the proper voltage and current.

NOTE. If the LEDs do not light up, check the jumper setting and LED connection.

4. Once proper operation is established, adjust the input within the operating range and observe the parameters of interest.

5. To test the filtered PWM dimming or the direct DC dimming, apply the PWM or the DC signal to the CTRL terminal and observe the brightness of the LED output.

6. To test the direct PWM dimming, remove C4 and R3. Install Q1 and connect CTRL with PWM pin. Apply the PWM signal to the PWM pin and observe the brightness of the LED output.

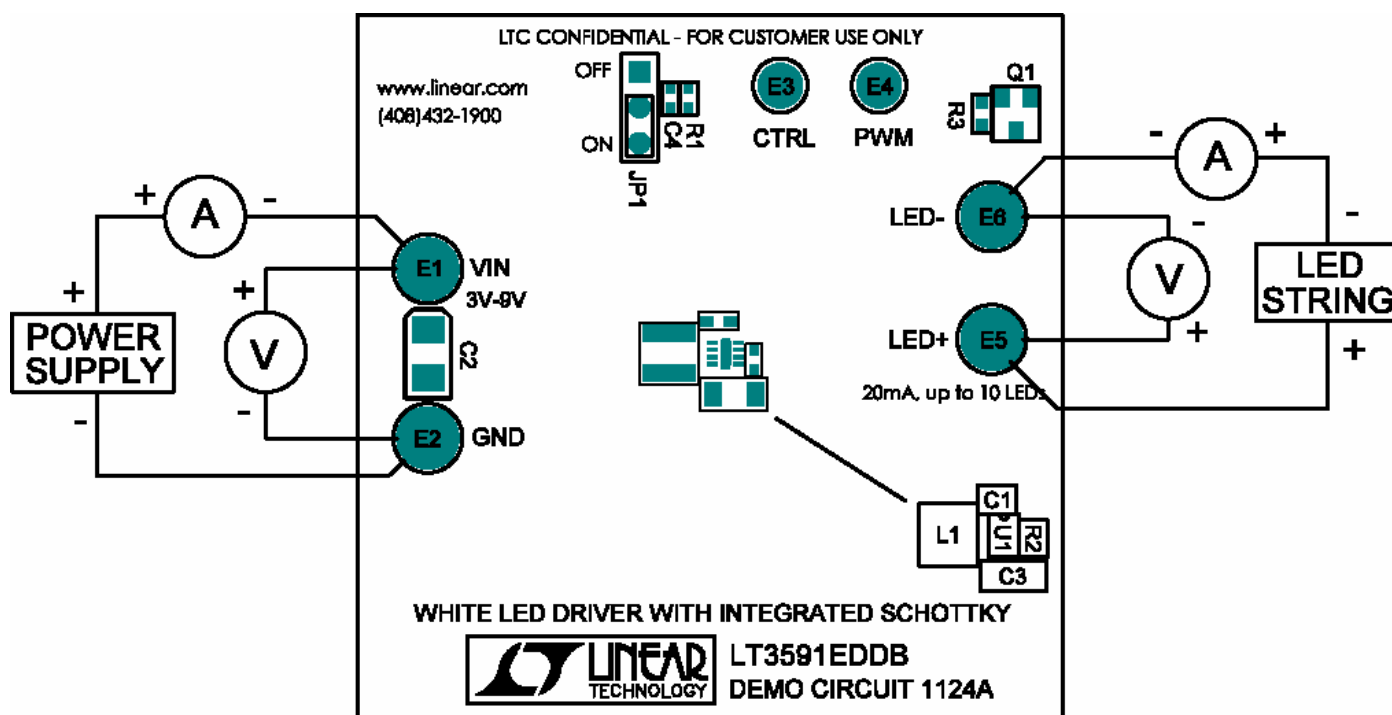


Figure 1.

Proper Measurement Equipment Setup

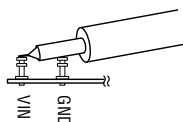


Figure 2. Measuring Input or Output Ripple

