User's Guide
SNVA068B–May 2004–Revised April 2013

AN-1290 LM3595 Evaluation Board

The LM3595 is a four-output parallel white LED driver capable of delivering 25mA per output when driven with a fixed input voltage. The input voltage range is 3V to 5.5V and the desired output current is set through the use of one external resistor. The LM3595 has functionality for both PWM and analog brightness control. For PWM control, a PWM signal must be applied to the EN pin. A 50% duty cycle will yield 50% of the set output current. Care must be take to make sure that the minimum on-time (T_{ON} = 50µs) is not exceeded. The following equations will ensure that minimum on-time is not violated:

$$D \times (1/f) > T_{ON} \quad (1)$$

$$f_{MAX} = D_{MIN} \div T_{ON} \quad (2)$$

For analog brightness control, the BR-ON pin must be driven high and a voltage from 0V to 3V on the BRGT pin will control the output current. The output current under normal operation is set using the following equation:

$$\text{Eq. 1 for BR-ON = 0V: } R_{SET} = 100 \bullet (1.22V / I_{OUT}) \quad (3)$$

When analog brightness control is used, the output current is set using the following equation:

$$\text{Eq. 2 for BR-ON = } V_{IN}\text{: } R_{SET} = 100 \bullet ((1.22V / I_{OUTx\ (MAX)}) \bullet (V_{BRGT\ (MAX)} / 3V) \quad (4)$$

Present on the LM3595 evaluation board is a cathode connect jumper. Removing this jumper allow the output currents to be drawn through the corresponding output headers instead of through the diodes present on the board. Replacing the jumpers returns the board to normal operation.

The LM3595 comes in TI's LLP-10 package. For more information, please refer to the *LM3595 Parallel White-LED Driver* (SNVS241) data sheet

Table 1. Bill of Materials

Designator	Description	Manufacturer	Model Number
U1	LM3595 Parallel White LED Driver	Texas instruments	LM3595
D1-4	White LEDs	Osram	LWM67C
C_{IN}	Input Capacitor (1µF ceramic capacitor)	TDK	C1608X5R1A105K

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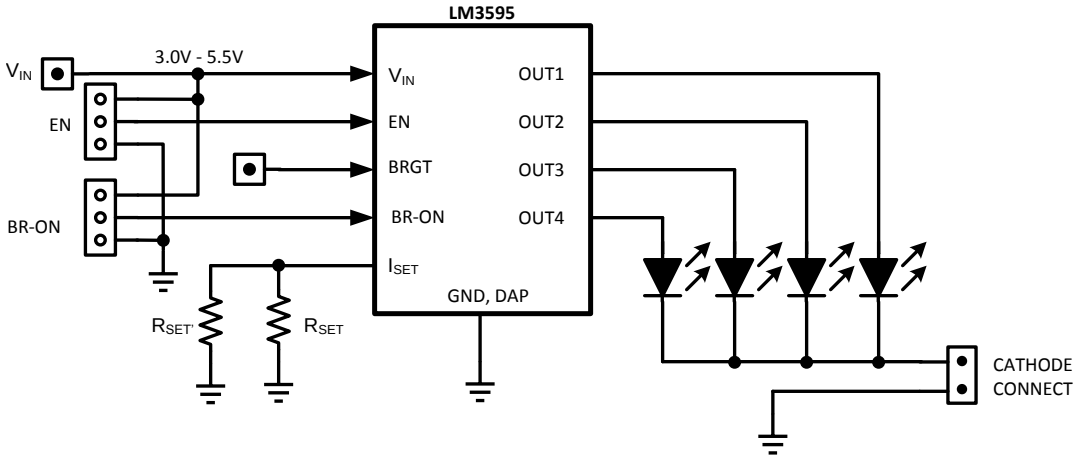

Figure 1. LM3595 Application Board Diagram

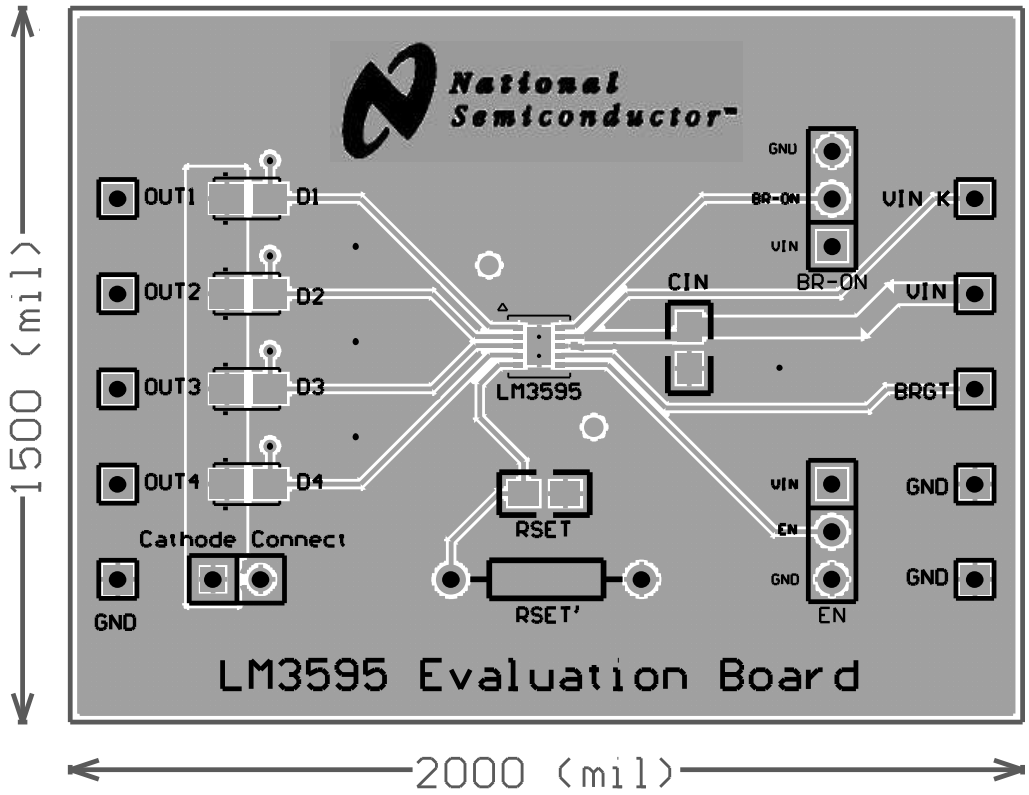

Figure 2. Typical Layout, Top Side

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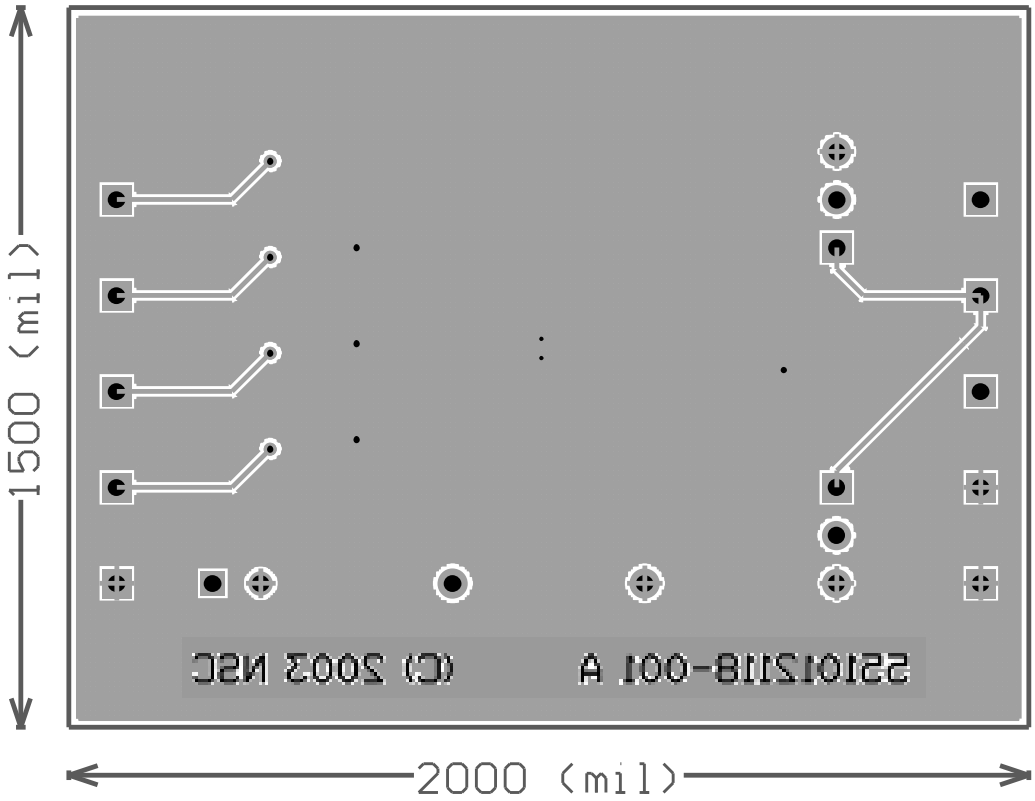

Figure 3. Typical Layout, Bottom Side Unmirrored

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