DUREL CORPORATION
AN AFFILIATE OF 3M AND ROGERS CORPORATION

D355A Basic Design Guidelines

Application Note

INTRODUCTION

The Durel® D355 chip inverter is part of a family of switch-mode IC drivers intended to reduce EL system cost, improve EL system performance, and simplify design. This powerful IC and two components make a complete lamp driving circuit ideal for watches, pagers, personal digital assistants (PDAs), and other applications using liquid crystal displays (LCDs).

A typical D355 circuit is represented in Figure 1. This application guideline is furnished to help you optimize your EL driver circuit design. It provides typical system outputs, such as lamp luminance and supply current draw, for various circuit configurations. Durel also provides a Designer's Kit which includes a printed circuit board to aid you in developing an EL lamp driver configuration that meets your requirements.

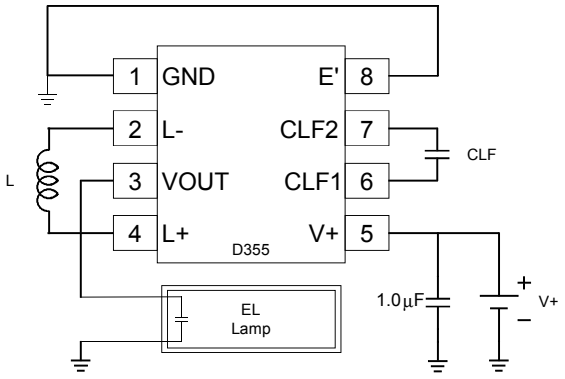

Figure 1: Typical D355A Circuit Design

I. Lamp Frequency

Selecting the appropriate value of capacitor for the low frequency oscillator (CLF) will set the output frequency of the D355 inverter. Figure 2 graphically represents the effect of the CLF capacitor value on the oscillator frequency at V+ = 3.0V.

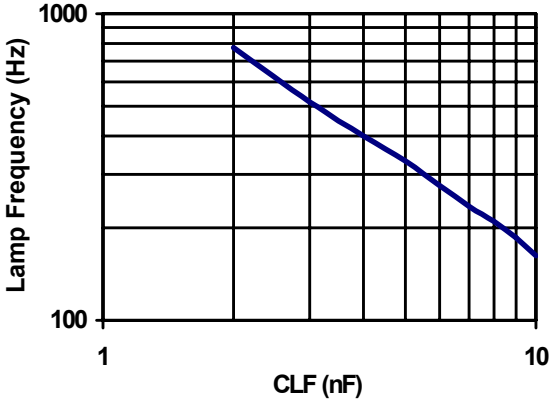

Figure 2: Typical Lamp Frequency vs. CLF Capacitor

II. Lamp Output

The effect of lamp frequency on the lamp luminance for a constant V+ and single value of inductor (L) is demonstrated in Figure 3. The output luminance of various sizes of Durel 3 Blue-green EL lamps was measured at V+ = 3.0V using a Sumida CLS62152 (1.5mH) inductor. It is important to test different values of CLF to find the lamp frequency that will yield the maximum lamp brightness for your application.

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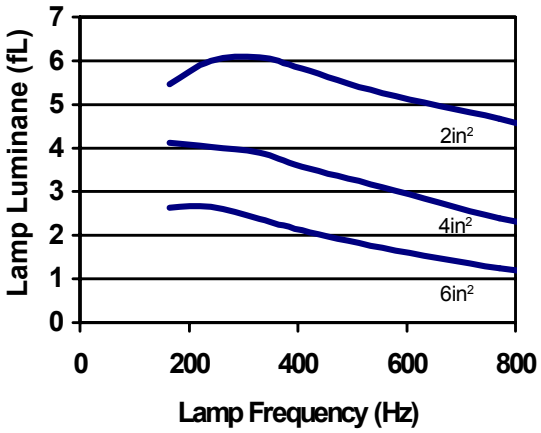

Figure 3: Typical Lamp Luminance vs Lamp Frequency

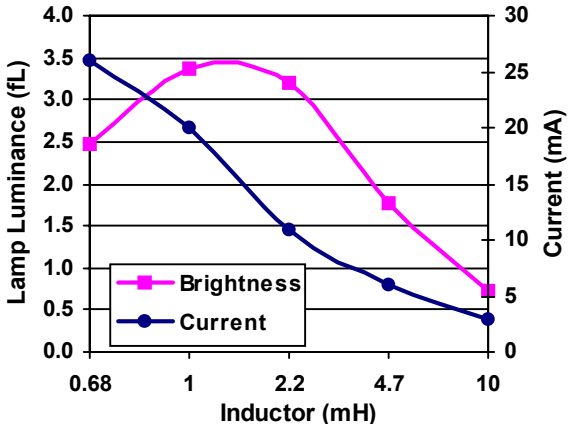

Figure 4: V+=1.5V, Lamp=1in²

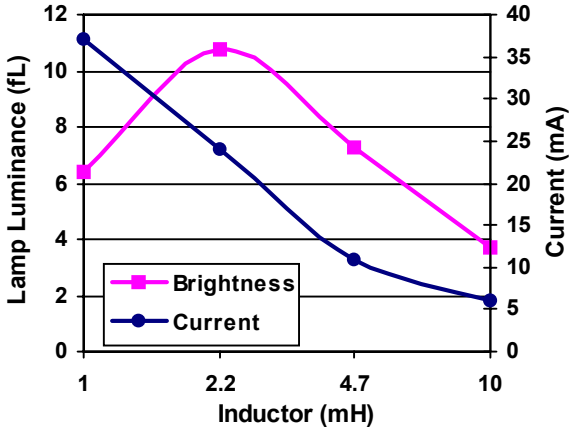

Figure 5: V+=3.0V, Lamp=1in²

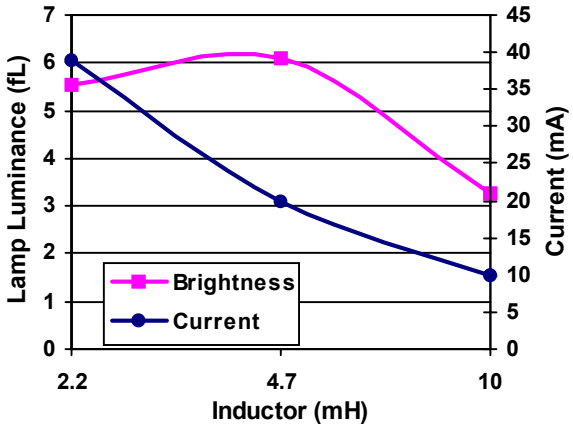

Figure 6: V+=5.0V, Lamp=4in²

III. Inductor Selection

The inductor (L) greatly affects the output and current draw of the driver. A careful designer will balance current draw considerations with output performance in choosing an inductor. Figures 4, 5, and 6 show typical brightness and current draw of a D355 circuit with several different inductor values, lamp sizes, and supply voltages. Please note that the DC resistance (DCR) of inductors with the same inductance value may vary with manufacturer and inductor type. Thus, inductors made by a different manufacturer may yield different outputs, but the trend of the different curves are similar. Lamp luminance is also a function of lamp size. In each example, a larger lamp will have less luminance with approximately the same current draw.

In this exercise, different values of Coilcraft surface mount inductors (Type DT1608C) were used in the design to light a Durel 3 Blue-green EL lamp.

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