DEMO MANUAL DC1205A
LT3592: Step-Down 500mA LED Driver with 10:1 Dimming

DESCRIPTION

Demonstration circuit 1205A features the LT3592 36V step-down 500mA LED driver with 10:1 dimming. The demonstration circuit is designed to drive two red 500mA LEDs mounted on the PCB from a wide input voltage range. The high 2.2MHz switching frequency permits the use of a small inductor and ceramic capacitors to save space and cost. Current mode control provides fast transient response and cycle-by-cycle current limit for short-circuit protection. The LEDs have two brightness settings. With BRIGHT pulled high or left floating, the two red LEDs are driven with 500mA. With BRIGHT pulled to GND, the LED current drops to 50mA for 10:1 analog dimming.

The typical efficiency of the LT3592 DC1205A is 85% with 12V\(_{IN}\) and the two LEDs at 4.6V total with 500mA as shown in Figure 1. Although the board is stuffed with two red LEDs, different LED strings can be powered from the LT3592. The minimum input voltage to run the step-down converter at 2.2MHz with a given string of LEDs is shown in Figure 2.

The LT3592 data sheet gives a complete description of the part, operation and applications information. The data sheet must be read in conjunction with this Demo Manual for DC1205A. The LT3592 is assembled in a 10-lead plastic DFN (3mm × 2mm) DDB package with a thermally enhanced ground pad. Proper board layout is essential for maximum thermal performance. See the data sheet section Layout Hints.

Design files for this circuit board are available at http://www.linear.com/demo

Figure 1. Input Voltage vs Efficiency

Figure 2. Minimum Input Voltage vs LED Voltage

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QUICK START PROCEDURE

Demonstration circuit 1205A is easy to set up for evaluating the LT3592 36V step-down 500mA LED driver with 10:1 dimming. Follow the test procedure outlined below and see Figure 3.

1. Set up DC1205A as shown in Figure 3 with hand-held multimeters, and a bench supply (power turned off) with voltage greater than the LED string (approximately 3.5V to 5V) and less than 36V.

2. Turn on the bench power supply and observe a constant 500mA through the string of LEDs with BRIGHT terminal floating.

3. Tie BRIGHT terminal to GND terminal and observe the LED current dropping to 50mA as brightness also decreases.

4. Use the SHDN terminal to turn the LEDs on and off by respectively floating or grounding the terminal.

Figure 3. Proper Measurement Equipment Setup
# Parts List

## Required Circuit Components

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>REFERENCE</th>
<th>PART DESCRIPTION</th>
<th>MANUFACTURER/PART NUMBER</th>
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<tr>
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## Additional Demo Board Circuit Components

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## Hardware for Demo Board Only

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</table>
STEP-DOWN 500mA LED DRIVER WITH 10:1 DIMMING

**NOTE:** UNLESS OTHERWISE SPECIFIED

1. **ALL RESISTORS ARE IN OHMS, 0402.**
2. **ALL CAPACITORS ARE IN MICROFARADS, 0402.**
PCB LAYOUT AND FILM

Top Silkscreen

Layer 1—Top Layer

Layer 2—GND Plane 1

Layer 3—GND Plane 2
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PCB LAYOUT AND FILM

Layer 4—Bottom Layer

Top Solder Mask

Bottom Solder Mask

Top Solder Paste Mask
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FABRICATION DRAWING

NOTES: UNLESS OTHERWISE SPECIFIED

1. FAB PER IPC-A-600
2. MATERIAL: EPOXY FIBERGLASS, NEMA GRADE FR-4
   FINISHED THICKNESS TO BE 0.062" +/-.005""
   TOTAL OF 4 LAYERS WITH 2 OZ. CU ON THE
   OUTER LAYERS AND 1 OZ. CU ON THE INNER LAYERS.
   FLAMMABILITY RATING: 94 V-0 MINIMUM
3. SIZE: CUT TO DIMENSIONS AND TOLERANCES SHOWN.
   0.001" ARE PRIMARY DATUMS.
4. DRILLING: DRILL HOLES PER SCHEDULE PLATE THROUGH
   HOLES WITH COPPER, 0.001" THICK MIN.
   ALL HOLES SIZES ARE SPECIFIED AFTER PLATING.
   HOE LOCATION TOLERANCES ARE +/-0.003"
   IN RELATION TO CENTER
5. FINISH: SNIPE USING LPI BOTH SIDES, COLOR GREEN.
   GOLD INVERSION, USE LEAD FREE SOLDER FOR PROTOTYPE
   FOR SILKSCREEN USE WHITE NON-CO nductive INK.
6. DO NOT ALTER ARTWORK E.G. TO ADD LOGO OR DATE CODE.
   PAD SIZE CAN BE MODIFIED TO NEET END FINISH.
7. PCBs ARE TO BE RIMs COMPLIANT.
8. SCORING FOR PARCELED PCB.

SHOWN FROM COMPONENT SIDE
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This notice contains important safety information about temperatures and voltages. For further safety concerns, please contact a LTC application engineer.

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