# DEMO CIRCUIT 1166
# QUICK START GUIDE

## LT3590
## 48V Buck-Mode LED Driver

## DESCRIPTION

**WARNING!**

**Do not look directly at operating LED.**

This circuit produces light that can damage eyes.

Demonstration circuit 1166 is a 48V Buck-Mode LED Driver featuring the LT3590. The LT3590 is a fixed frequency buck mode converter specifically designed to drive up to 10 LEDs in series from a 48V DC source. Series connection of the LEDs provides identical LED currents of up to 50mA, resulting in uniform brightness and eliminating the need for ballast resistors. A fixed frequency current mode architecture results in stable operation over a wide range of input voltage and load condition. The high switching frequency allows using tiny components for the circuit.

The LT3590 datasheet gives complete descriptions 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 1166.

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



## PERFORMANCE SUMMARY **Specifications are at TA = 25°C**

| SYMBOL | PARAMETER | CONDITIONS | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|---|
| $V_{IN}$ | Input Supply Range | | 4.5 | | 55 | V |
| $D_{MAX}$ | Maximum Duty Cycle | | 90 | | | % |
| $I_{QSHDN}$ | Quiescent Current in Shutdown | $V_{IN}$ = 48V | | 15 | 20 | µA |
| $F_{SW}$ | Switching Frequency | | 650 | 850 | 1050 | KHz |
| $V_{REG}$ | VREG Pin Voltage | 1mA load on VREG pin | 3.1 | 3.3 | 3.5 | V |
| Eff | Efficiency | $V_{IN}$ = 48V; $V_{LED}$ = 30V; $I_{LED}$ = 50mA | | 90 | | % |

## QUICK START PROCEDURE

Demonstration circuit 1166 is easy to set up to evaluate the performance of the LT3590. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

**1.** Place jumpers in the following positions:

**JP1** ON

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

**3.** With power off, connect LEDs to LED+ and LED-.

**4.** Turn on the power at the input.

**NOTE.** Make sure that the input voltage does not exceed 55V.

**5.** Check for the proper output voltage and current.

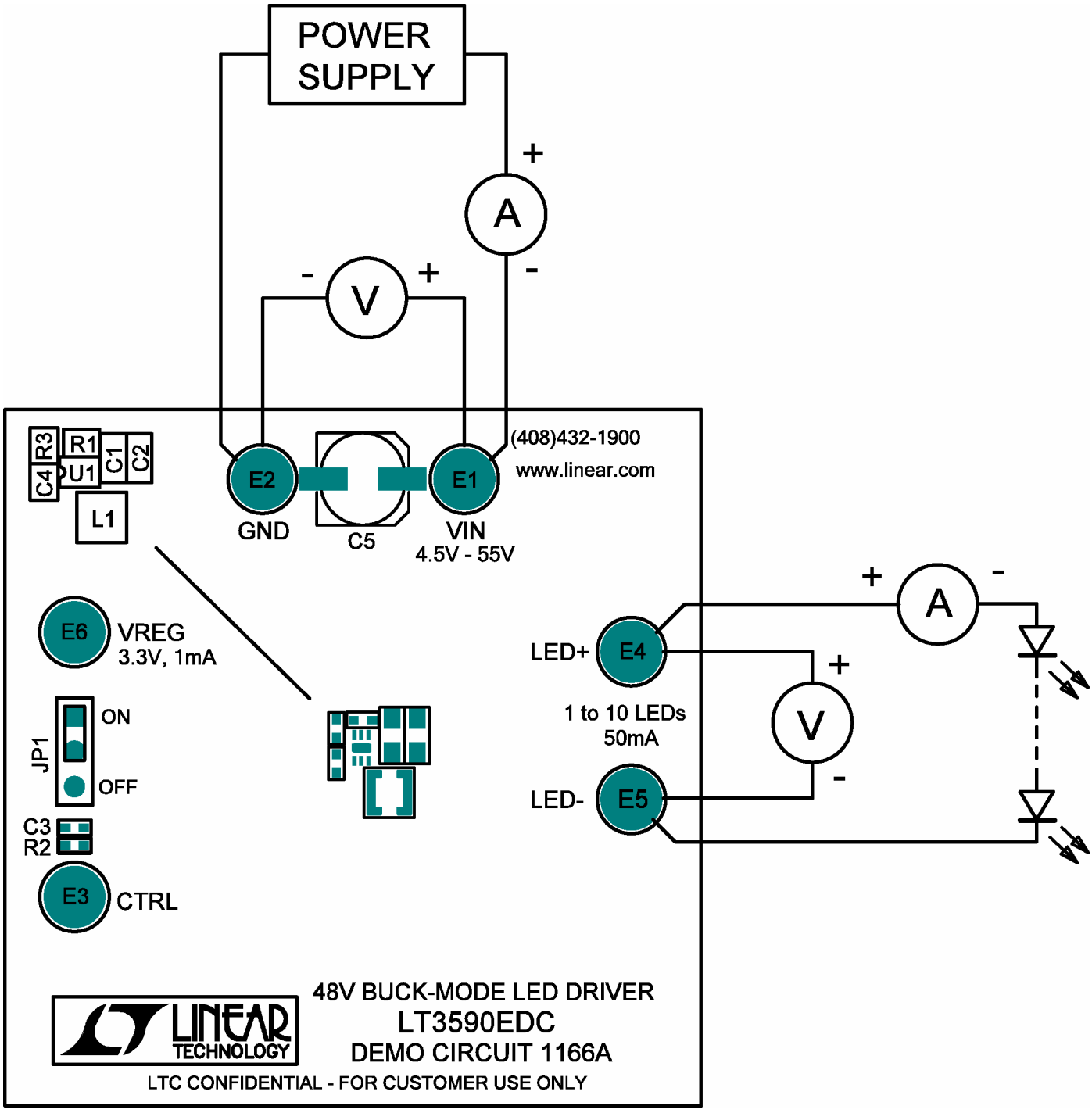
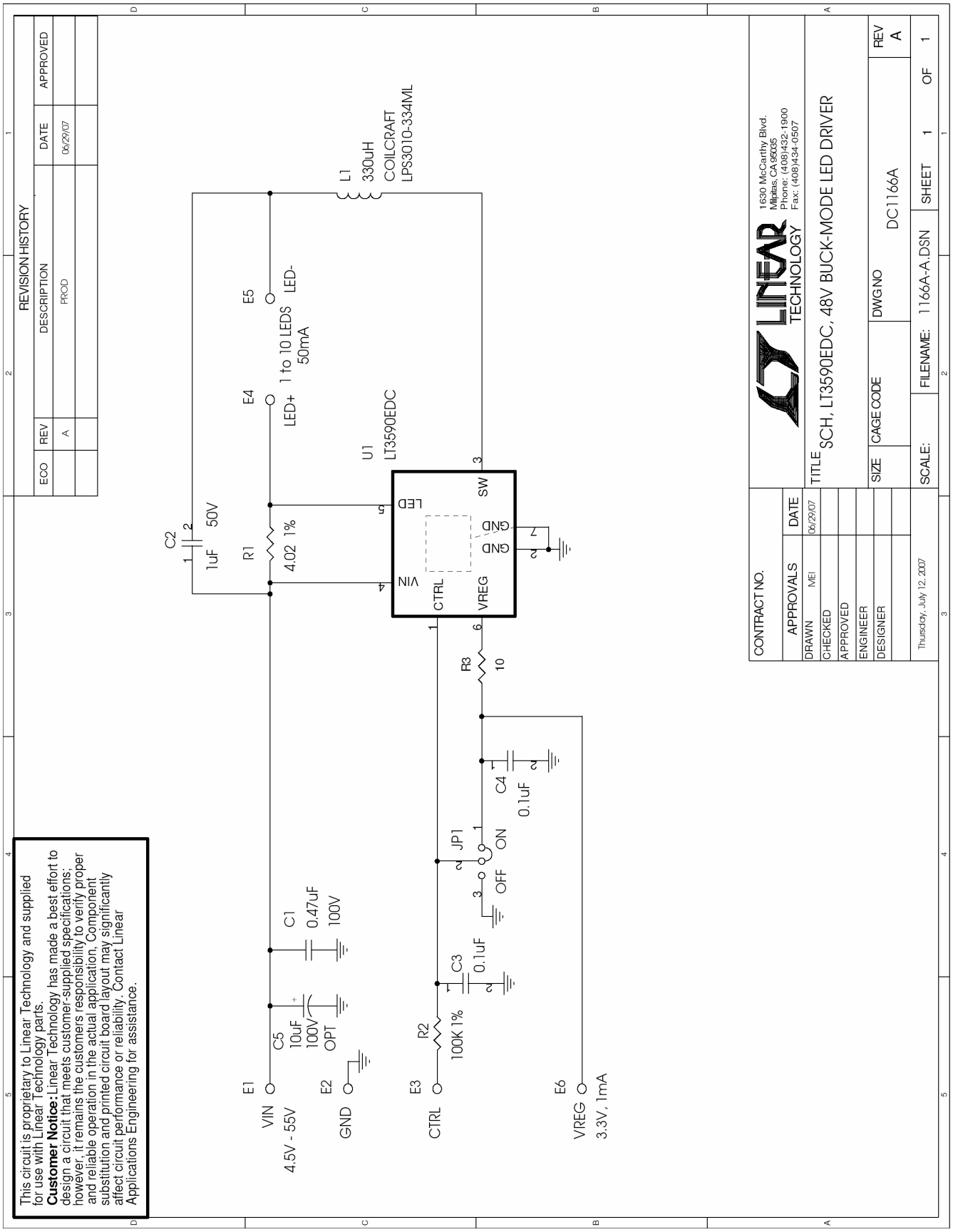



**Figure 1. Proper Measurement Equipment Setup**


REVISION HISTORY
ECO
REV
DESCRIPTION
DATE
APPROVED
A
PROD
06/29/07
This circuit is proprietary to Linear Technology and supplied for use with Linear Technology parts.
Customer Notice: Linear Technology has made a best effort to design a circuit that meets customer-supplied specifications; however, it remains the customers responsibility to verify proper and reliable operation in the actual application. Component substitution and printed circuit board layout may significantly affect circuit performance or reliability. Contact Linear Applications Engineering for assistance.
VIN
4.5V - 55V
GND
CTRL
VREG
3.3V, 1mA
LED+
1 to 10 LEDS
50mA
LED-
C1
0.47uF
100V
C2
1uF
50V
C3
0.1uF
C4
0.1uF
C5
10uF
100V
OPT
R1
4.02 1%
R2
100K 1%
R3
10
JP1
ON
OFF
U1
LT3590EDC
VIN
CTRL
VREG
LED
SW
GND
L1
330uH
COILCRAFT
LPS3010-334ML
CONTRACT NO.
APPROVALS
DATE
DRAWN
MEI
06/29/07
CHECKED
APPROVED
ENGINEER
DESIGNER
LINEAR TECHNOLOGY
1630 McCarthy Blvd.
Milpitas, CA 95035
Phone: (408)432-1900
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TITLE
SCH, LT3590EDC, 48V BUCK-MODE LED DRIVER
SIZE
CAGE CODE
DWG NO
DC1166A
REV
A
SCALE:
FILENAME: 1166A-A.DSN
SHEET 1 OF 1
Thursday, July 12, 2007