

## High Voltage Synchronous Buck Controller with Programmable Frequency and Sync

### DESCRIPTION

Demonstration Circuit 1073 is a 100kHz-500kHz programmable frequency, high voltage, current-mode DC/DC step-down converter featuring the LT3845. The operating frequency can be synchronized up to 600kHz. The demo board is designed for 12V @ 6.25A (75W) output from a 20V to 55V input. A soft-start feature controls the output voltage slew rate at start-up, reducing current surges and voltage overshoots. The modes of operation (Burst Mode, Discontinuous Current Mode and Continuous Current Mode) are jumper selectable. Both Burst Mode and Discontinuous Current Mode increase the efficiency at light loads. Continuous Current Mode will maintain a constant switching frequency regardless of the load current.

An Optional Boost Bias circuit is provided on the bottom side of the board for back-driving the LT3845 internal regulator from the output voltage. Customers may want to use this optional circuit with modified applications that have relatively high input voltages and low (~ 3.3V)

output voltages. In such applications, the optional circuit can increase the overall efficiency by reducing the power loss in the LT3845. The demonstration board has also been laid out with the option of doubling the switching MOSFETs to facilitate higher output current. This board is suitable for a wide range of industrial control systems and particularly suitable for 12V/42V automotive applications and 48V Telecom power supplies.

The LT3845 datasheet gives a complete description of the part, operation and application information. The datasheet must be read in conjunction with this quick start guide for demo circuit 1073.

**Note:** It is best to ground the SYNC pin if the SYNC function is not being used.

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

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Performance Summary (  $T_A = 25^{\circ}\text{C}$  )

| PARAMETER FOR STEP-DOWN CONVERTER | CONDITION | VALUE      |
|-----------------------------------|-----------|------------|
| Minimum input voltage             |           | 20V        |
| Maximum input voltage             |           | 55V        |
| Output voltage $V_{OUT}$          |           | 12V +/- 4% |
| Maximum output current            |           | 6.25A      |
| Typical switching frequency       |           | 300kHz     |

## QUICK START PROCEDURE

Demonstration circuit 1073 is easy to set up to evaluate the performance of the LT3845. 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.

1. Place JP1 on the RUN position:
2. With power off, connect the input power supply to Vin and GND.

3. Turn on the power at the input.

NOTE. Make sure that the input voltage does not exceed 60V.

4. Check for the proper output voltages. .
5. Once the proper output voltages are established, adjust the loads within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.

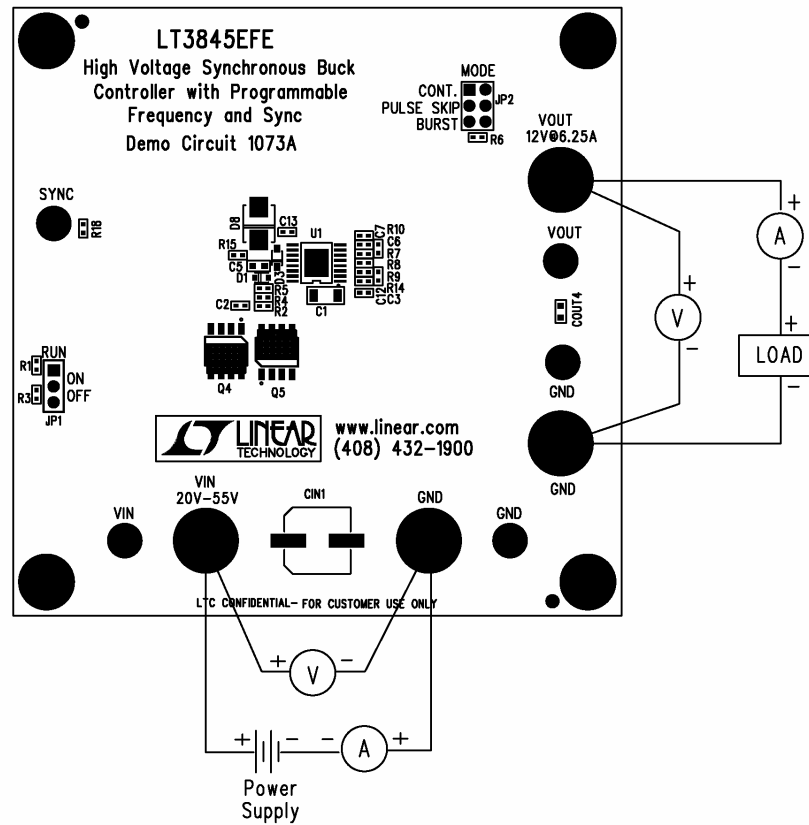


Figure 1. Proper Measurement Equipment Setup

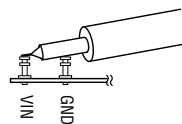
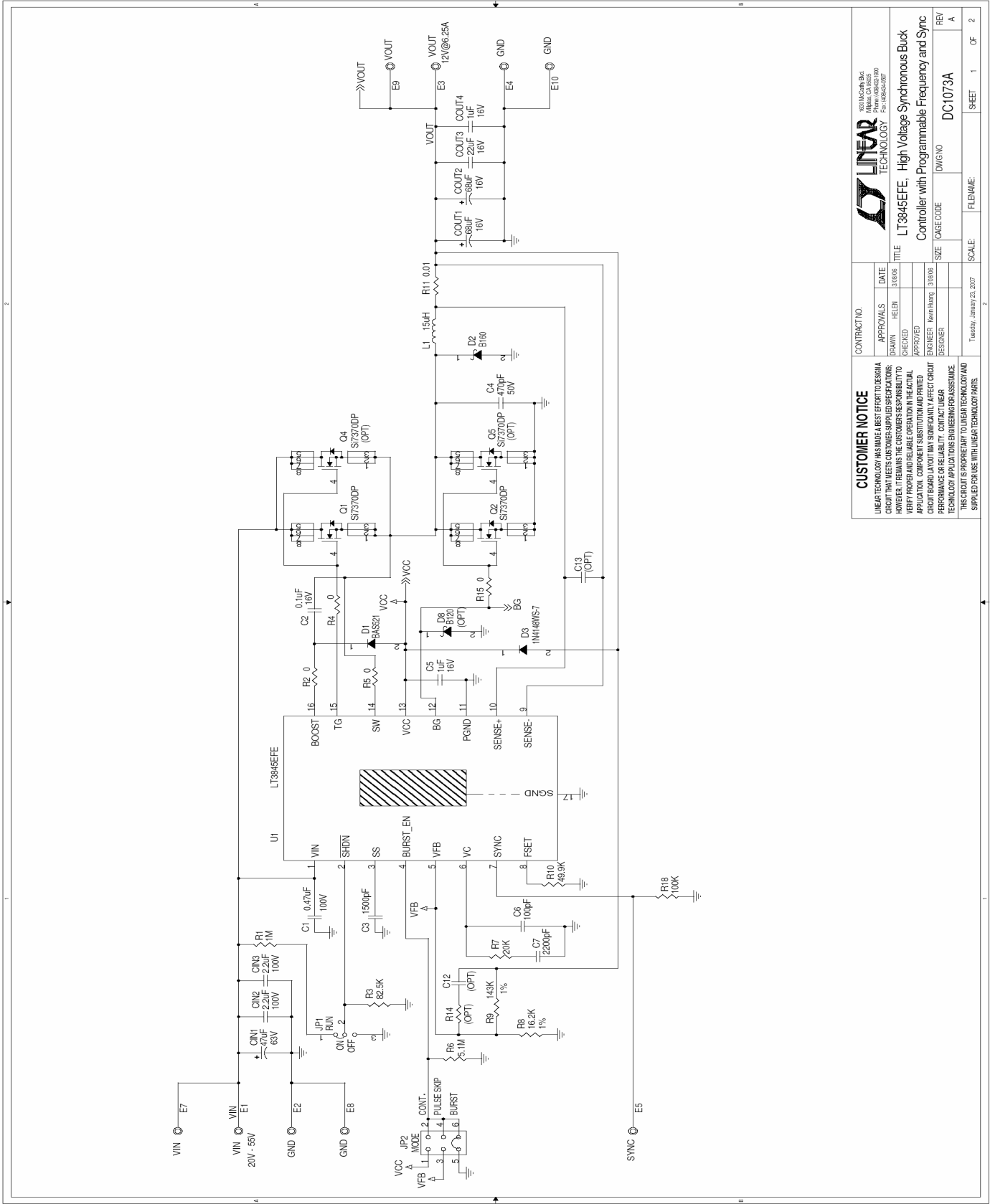
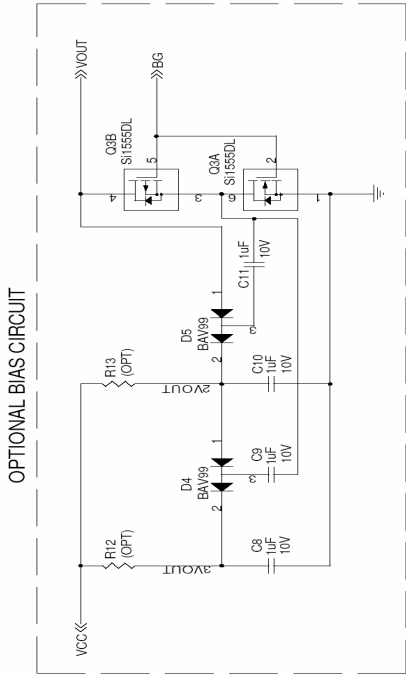


Figure 2. Measuring Input or Output Ripple





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| CHECKED      |             |         |  |
| APPROVED     |             |         |  |
| ENGINEER     | Kevin Huang | 3/18/06 |  |
| DESIGNER     |             |         |  |

| TITLE     |                                                                               | SCALE  |         |
|-----------|-------------------------------------------------------------------------------|--------|---------|
| LT3845EFE | High Voltage Synchronous Buck Controller with Programmable Frequency and Sync |        |         |
| SIZE      | DWG CODE                                                                      | DWG NO | DC1073A |

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