

DESCRIPTION

Demonstration circuit 759 is an isolated input to high current output converter featuring the LT[®]1952 switching controller. The DC759 converts isolated 36V to 75V input to 5V output and provides over 20A of output current. The converter operates at 300kHz with high efficiency of 92%. The DC759 can be easily modified to generate output voltages in the range from 1.23V to 28V. The output currents are limited by total output power of up to 140W.

Demonstration circuit 759 can generate output currents as high as 30A with some modifications. The output voltage can also be changed to any value between 1.23V and 28V by changing the MOSFETs, power transformer, output inductor and output capacitors. Please consult LTC factory for details.

The DC759 circuit features soft-start which prevents output voltage overshoot on startup or when recovering from overload condition.

The DC759 has a precise over-current protection circuit that allows for continuous operation under short circuit conditions. The low power dissipation under short circuit conditions insures high reliability even during short circuits.

The LT1952 can be synchronized to an external clock of up to 400kHz. Please refer to the LT1952 data sheet for design details and applications information.

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

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Table 1. Performance Summary

PARAMETER	CONDITION	VALUE
Minimum Input Voltage		36V
Maximum Input Voltage		75V
V _{OUT}	V _{IN} = 36V to 72V, I _{OUT} = 0A to 20A	5V ±3%
Typical Output Ripple V _{OUT}	V _{IN} = 36V to 72V, I _{OUT} = 0A to 20A	50mV _{P-P}
Nominal Switching Frequency		300kHz

QUICK START PROCEDURE

Demonstration circuit 759 is easy to set up to evaluate the performance of the LT1952. 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. With power off, connect the input power supply to +Vin and -Vin. Make sure that the input power supply has sufficient current rating at minimum input voltage for the required output load.
2. Turn on the power at the input.
NOTE: Make sure that the input voltage does not exceed 75V.
3. Check for the proper output voltage.
Vout = 5V.

QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 759

48VIN TO 5VOUT, 20A ISOLATED TELECOM DC/DC CONVERTER

If there is no output, temporarily disconnect the load to make sure that the load is not set too high.

4. Once the proper output voltage is established, adjust the load within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.
5. The DC759 is equipped with an output capacitor CSYS (470uF) that approximates typical system rail capacitance. If system board already has capacitance of similar value, CSYS can be removed.

CHANGING THE OUTPUT VOLTAGE

1. To set the output voltage lower than 5V, change the bottom voltage divider resistor connected to LTC1698 Vfb pin (R31). For example, to get 3.3V output, change R31 resistor value to 22.6k.
2. To get higher than 5V output voltages a transformer with higher turns ratio will be required. Also, an output MOSFET with higher voltage ratings may be required. Please contact LTC factory for details.

OUTPUT CAPACITORS

The DC759 is equipped with an output capacitor CSYS (470uF) that approximates typical system rail capacitance

USING MOSFET BUFFERS

The optional MOSFET buffer Q7 can improve the efficiency if a MOSFET with high Qg is used. By default, the MOSFET buffer is disabled. To test the performance with the buffer, perform the following steps.

1. Turn the power off.
2. Change the base-emitter resistor R33 to 10ohm.
3. Turn the power on.
4. Measure the efficiency.

QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 759

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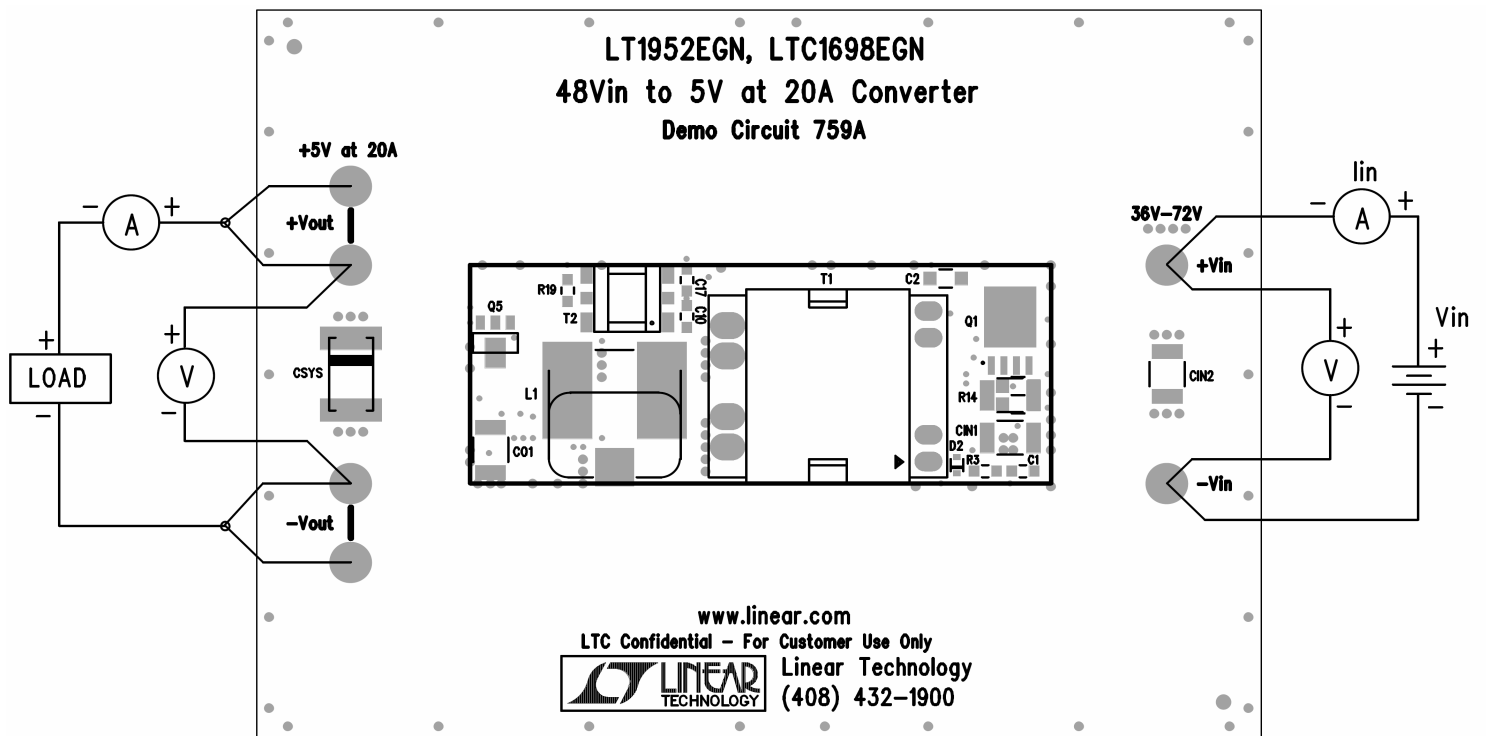


Figure 1. Proper Measurement Equipment Setup

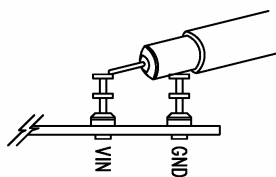
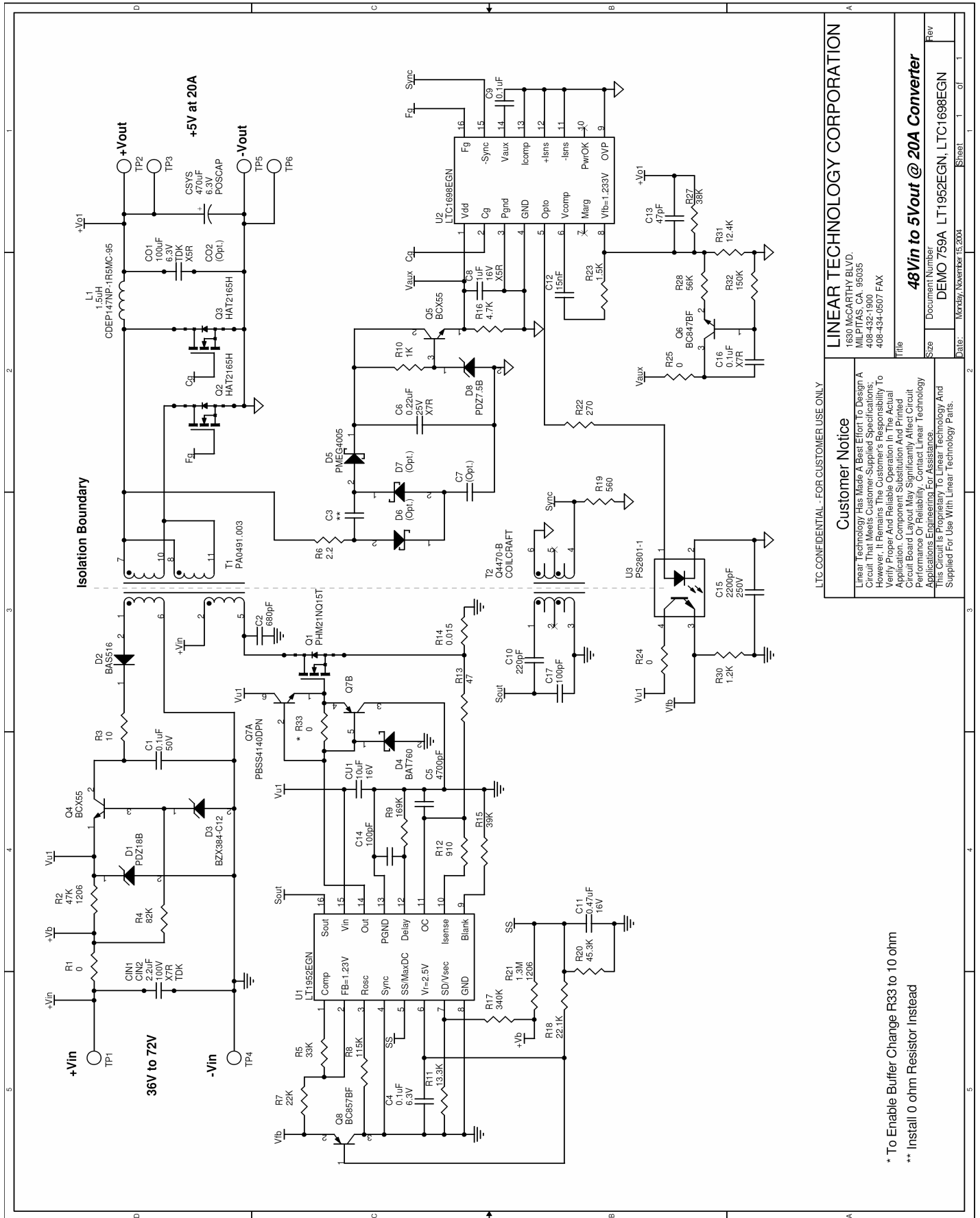


Figure 2. Scope Probe Placement for Measuring Input or Output Ripple

QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 759

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Customer Notice

Linear Technology Has Made A Best Effort To Design A Circuit That Meets Customer-Supplied Specifications. However, It Remains The Customer's 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 Technology For Details On Reliability Testing. This Circuit Is Property Of Linear Technology And Supplied For Use With Linear Technology Parts.

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Title: **48Vin to 5Vout @ 20A Converter**
 Size: DEMO 759A LT1952EGN, LTC1698EGN
 Date: Monday, November 15, 2004

* To Enable Buffer Change R33 to 10 ohm
 ** Install 0 ohm Resistor Instead