DESCRIPTION

Demonstration circuit 649 is a Telecom isolated DC/DC converter featuring the LTC®3803 constant frequency current mode flyback controller. The DC649 converts an isolated 36V to 72V input and provides 2A of output current at 5V. The 200kHz constant frequency operation is maintained down to very light load to reduce low frequency noise generated over a wide range of load current. The converter provides high output voltage accuracy (typically ±2%) over wide load range with no minimum load requirement.

The DC649 also provides non-isolated design by removing opto coupler and LT®1431 circuit. The demonstration circuit can be easily modified to generate different output voltages up to 15V. The output current is limited by total output power to 10W. Higher output voltages and currents can be achieved by changing the MOSFET, transformer and output capacitors. Please consult LTC factory for details.

The DC649 has a small circuit footprint. It is a high performance and cost effective solution for Telecom, Automotive and Power over Ethernet applications.

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

LTC and LT are registered trademarks of Linear Technology Corporation.

QUICK START PROCEDURE

Demonstration circuit 649 is easy to set up to evaluate the performance of the LTC3803. For proper measurement equipment setup refer to Figure 1 and follow the procedure below:

NOTE: When measuring the input or output voltage ripple, care must be taken to minimize the length of the oscilloscope probe ground lead. Measure the input or output voltage ripple by connecting the probe tip directly across the V_{IN} or V_{OUT} and GND terminals as shown in Figure 2.

1. With power off, connect the input power supply to +Vin and -Vin.
2. Turn the input power source on and slowly increase the input voltage. Be careful not to exceed 72V.

   NOTE: Make sure that the input voltage V_{IN} does not exceed 72V. If higher operating voltage is required, power components with higher voltage ratings should be used.
3. Check for proper output voltage. Vout=5V.

   If there is no output, temporarily disconnect the load to make sure that the load is not set too high.
4. To shut the converter down, pull the shut down pin below 0.28V.

   NOTE: Do not apply voltage to $\overline{SHDN}$ Pin.
5. Once the proper output voltage is established, adjust the load within 2A range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.

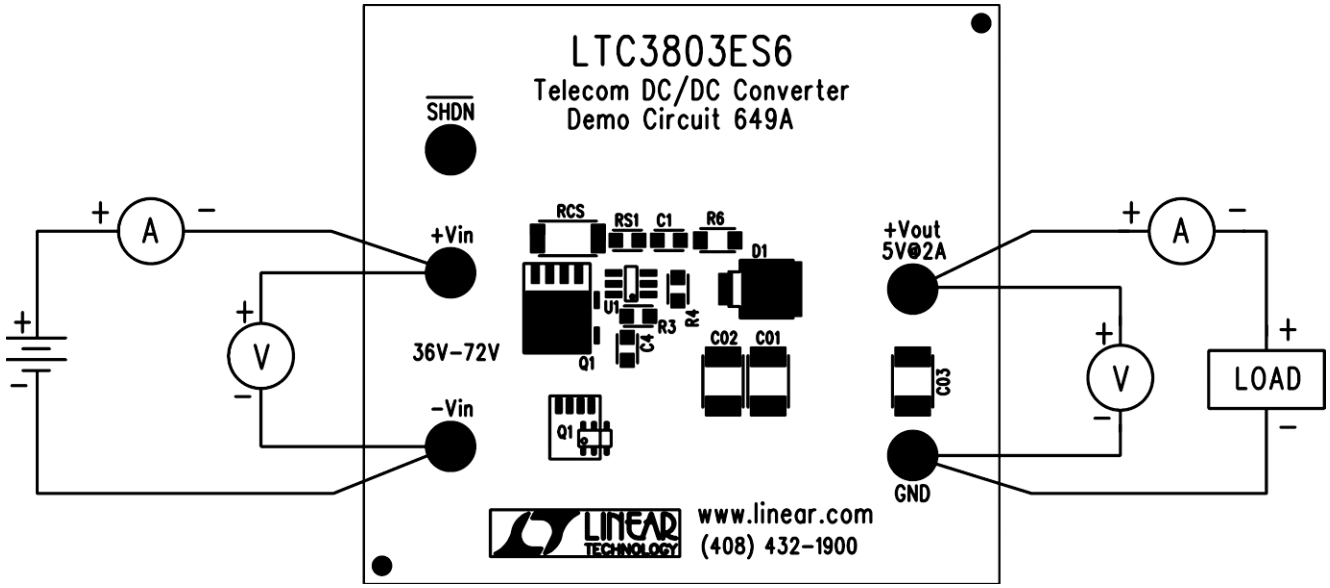


Figure 1. Proper Measurement Equipment Setup

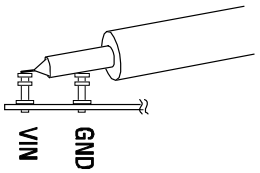
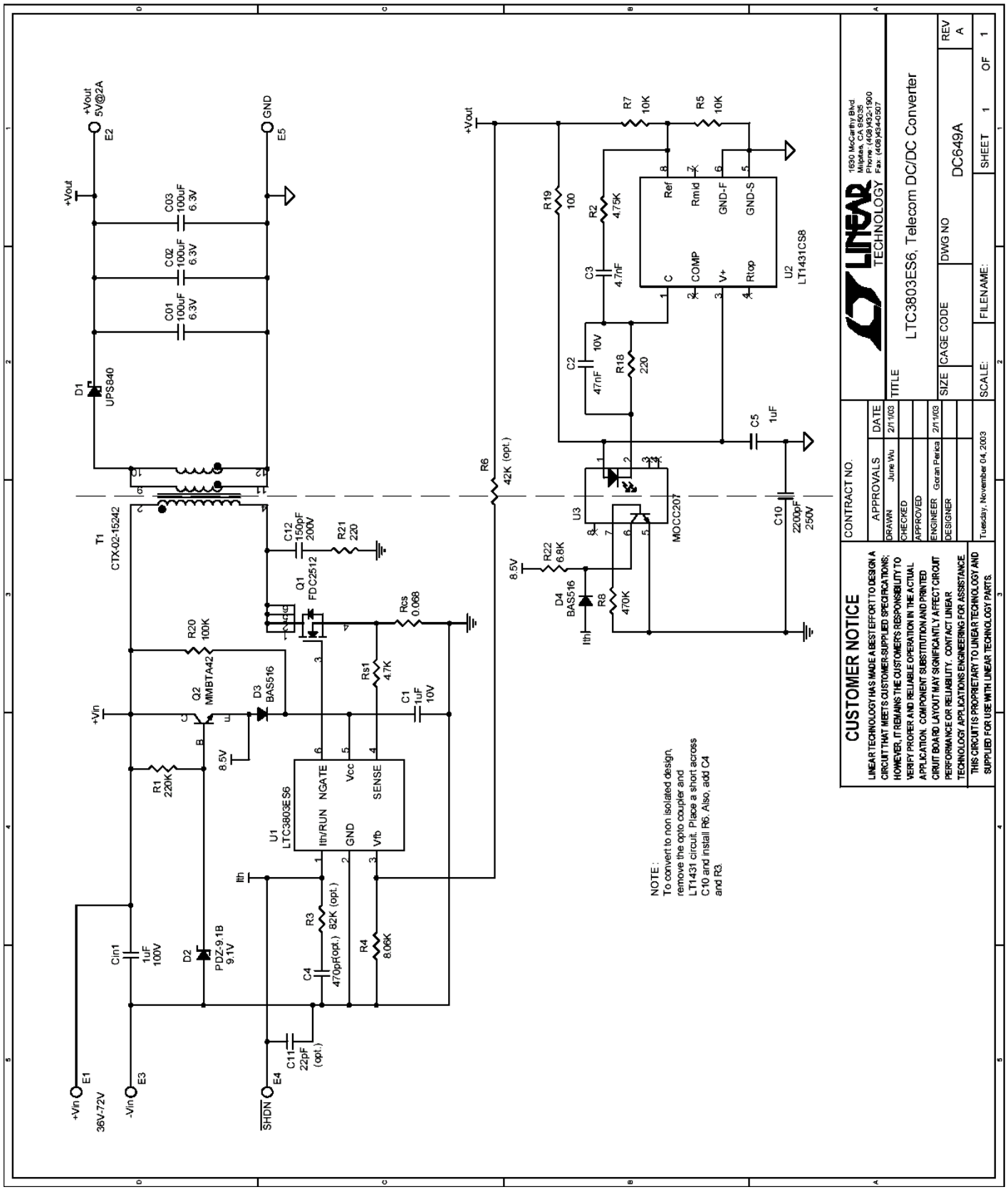


Figure 2. Measuring Input or Output Ripple


+Vout
5V@2A
E2
GND
E5
T1
CTX-02-15242
D1
UPS840
C01 100uF 6.3V
C02 100uF 6.3V
C03 100uF 6.3V
C12 150pF 200V
R21 220
Q1 FDC2512
Rcs 0.068
R20 100K
Q2 MMBTA42
D3 BAS516
Rs1 4.7K
C1 1uF 10V
+Vin
R1 220K
8.5V
U1 LTC3803ES6
Ith/RUN
NGATE
Vcc
GND
SENSE
Vfb
Ith
Cin1 1uF 100V
D2 PDZ-9.1B 9.1V
R3 82K (opt.)
C4 470pF(opt.)
R4 8.06K
C11 22pF (opt.)
+Vin E1
36V-72V
-Vin E3
SHDN E4
R6 42K (opt.)
R19 100
R2 4.75K
C3 4.7nF
C2 47nF 10V
R18 220
R7 10K
R5 10K
U2 LT1431CS8
C
COMP
V+
Rtop
Ref
Rmid
GND-F
GND-S
C5 1uF
C10 2200pF 250V
U3
MOCC207
R22 6.8K
D4 BAS516
R8 470K
NOTE:
To convert to non isolated design, remove the opto coupler and LT1431 circuit. Place a short across C10 and install R6. Also, add C4 and R3.
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 CIRUIT BOARD LAYOUT MAY SIGNIFICANTLY AFFECT CIRCUIT PERFORMANCE OR RELIABILITY. CONTACT LINEAR TECHNOLOGY APPLICATIONS ENGINEERING FOR ASSISTANCE.
THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS.
CONTRACT NO.
APPROVALS
DRAWN June Wu 2/1/03
CHECKED
APPROVED
ENGINEER Goran Perica 2/1/03
DESIGNER
DATE
TITLE
LTC3803ES6, Telecom DC/DC Converter
SIZE CAGE CODE DWG NO DC649A REV A
SCALE: FILENAME: SHEET 1 OF 1
Tuesday, November 04, 2003
LINEAR TECHNOLOGY
1630 McCarthy Blvd.
Milpitas, CA 95035
Phone: (408)432-1900
Fax: (408)434-0507