QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 1507A
HIGH EFFICIENCY 20MA MONOLITHIC SYNCHRONOUS BUCK REGULATOR

LTC3632EDD

DESCRIPTION

Demonstration circuit 1507A is a high efficiency step-down DC/DC converter featuring LTC3632EDD with internal high side and synchronous power switches that draws only 12µA quiescent current. It has a wide 4.5V to 50V input range and internal over voltage monitor capable of protecting the part through 60V surges. The jumper selectable output is up to 5V. LTC3632EDD can supply up to 20mA load current with a programmable peak current limit that provides a simple method for optimizing efficiency in lower current applications. With no compensation required, LTC3632EDD is easily configured with minimal components.

Design files for this circuit are available. Call the LTC Factory.

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Table 1. Performance Summary (T_A = 25°C)

PARAMETER	CONDITION	VALUE
Input Voltage Range V_{IN}		4.5V to 50V
Output Voltage V_{OUT}	I_{OUT}=1mA to 20mA, V_{IN}=10V	V_{OUT} ± 2.7% (LTC3632 Output adjustable version)
Maximum Output Current		20mA
DC Supply Current	Active Mode, V_{IN}=10V, I_O=0A	125µA
Nominal Switching Frequency	Inductance=1000µH, V_{IN}=30V	60kHz

QUICK START PROCEDURE

The DC1507A is easy to set up to evaluate the performance of the LTC3632EDD. For a proper measurement equipment configuration, set up the circuit according to the diagram in Figure 2.

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 V_{IN} or V_{OUT} and GND terminals. See the Measurement Equipment Set-up diagram in Figure 1 for proper scope probe technique. To reduce the output voltage ripple further additional capacitor of 100µF can be added in parallel.

Please follow the procedure outlined below for proper operation.

1. Connect the input power supply to the V_{IN} and GND terminals. Connect the load between the V_{OUT} and GND terminals. Refer to Figure 2 for the proper measurement equipment setup.

2. Before proceeding to operation, insert jumper shunt XJP1 into the OFF position and insert jumper shunt into JP2 for voltages of 1.8V, 3.3V or 5V respectively. Set the load output current to 20mA.

3. Apply 6V at V_{IN}. Measure V_{OUT}; it should read 0V. If desired, one can measure the shutdown supply current at this point. The supply current will be about 5 µA in shutdown. Set the load output current back to 0mA.

4. Turn on V_{OUT} by changing shunt XJP1 from the OFF position to the ON position. The output voltage should measure according to the voltage set by the shunt jumper in JP2.

5. Set the load output current to 1mA. Vary the input voltage from 6V to 50V and V_{OUT} should be within a tolerance of ± 2.7%.

6. Set the input voltage to 10V. Vary the V_{OUT} load current from 1mA to 20mA, and the output voltage should be within a tolerance of ± 2.7%.

Warning - If the power for the demo board is carried in long leads, the input voltage at the part could “ring”, which could affect the operation of the circuit or even exceed the maximum voltage rating of the IC. To eliminate the ringing, insert an electrolytic capacitor (for instance, Panasonic part # EEU-FC2A680L, 68µF/100V) on the pads between the input power and return terminals on the bottom of the demo board. The (greater) ESR of the electrolytic will dampen the (possible) ringing voltage due to the use of long input leads. On a normal, typical PCB, with short traces, the capacitor is not needed.

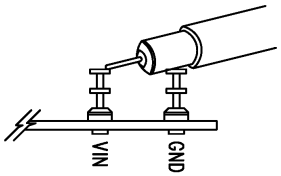


Figure 1. Measuring Input or Output Ripple

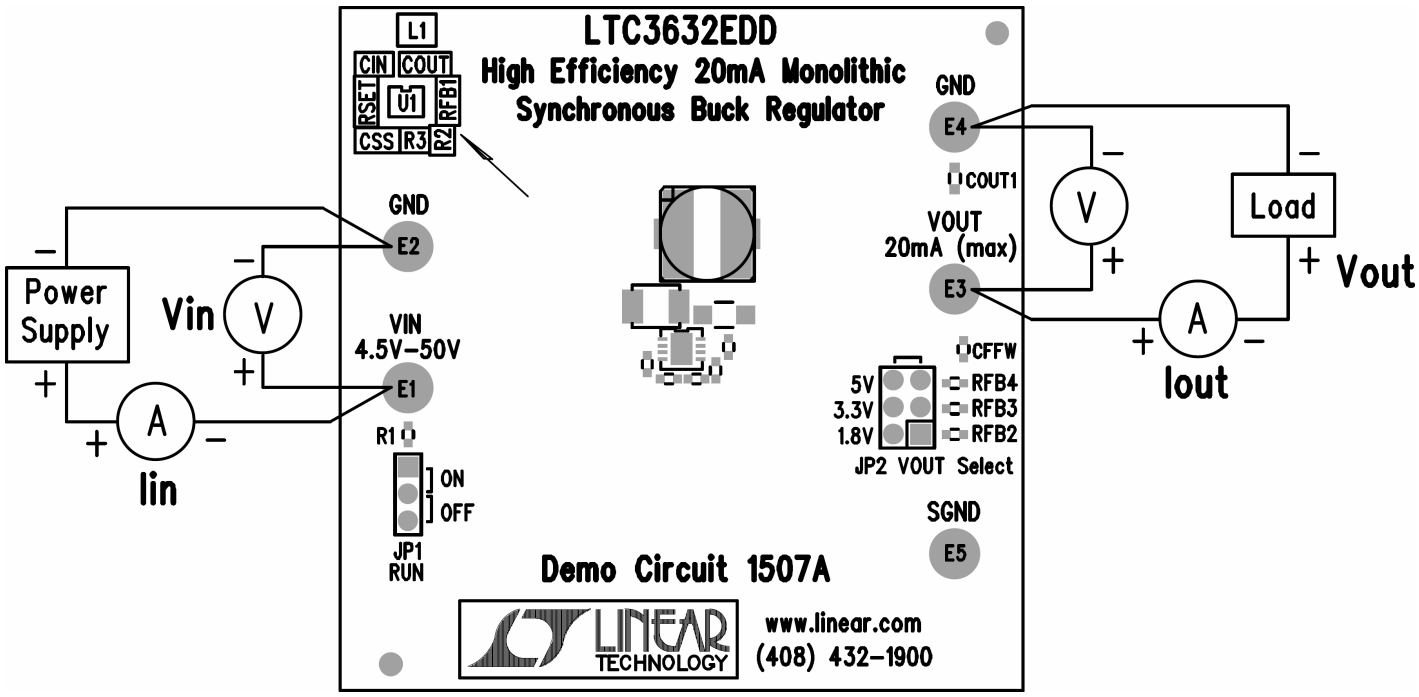
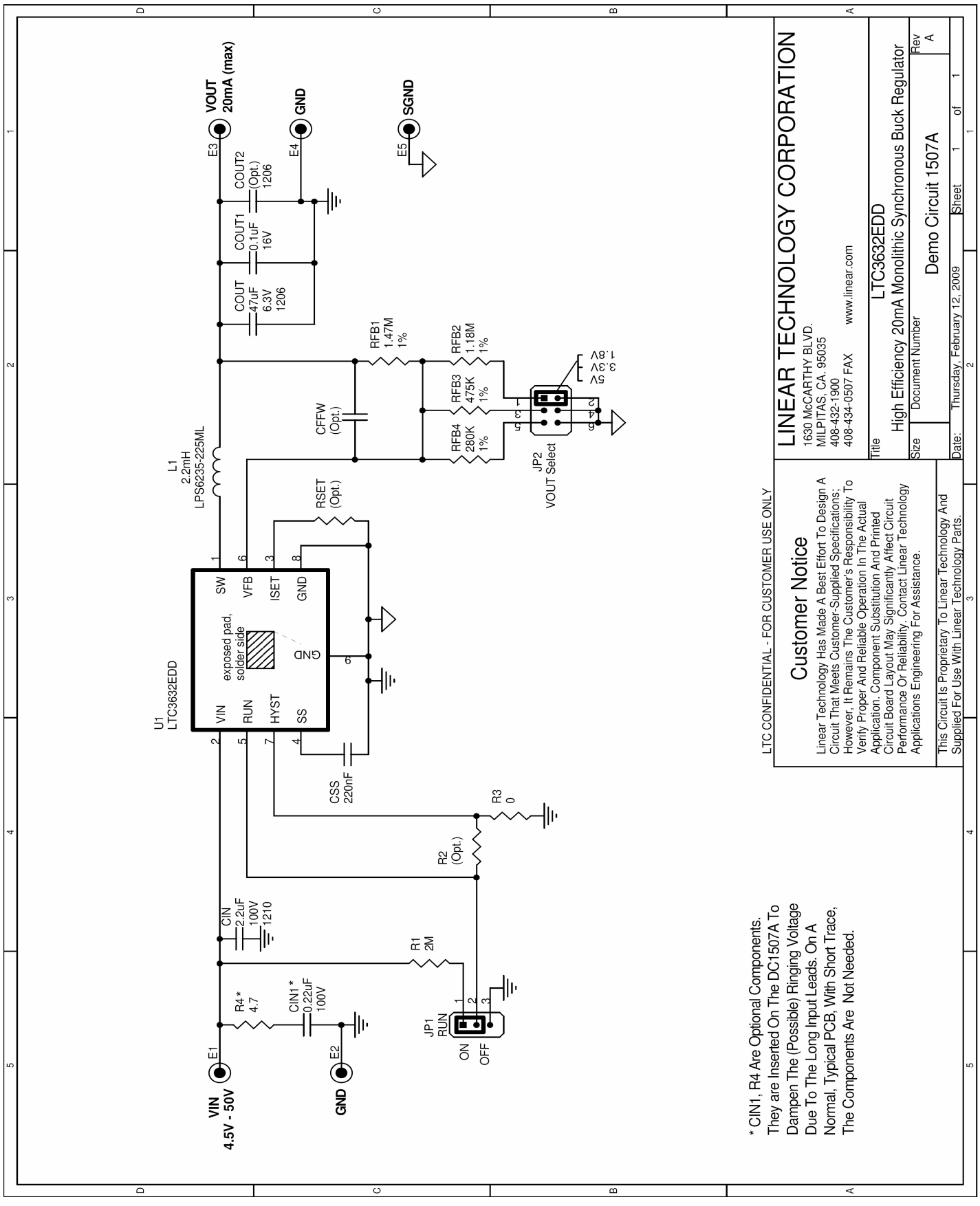


Figure 2. Proper Equipment Measurement setup


VOUT
20mA (max)
E3
E4
GND
E5
SGND
COUT2
(Opt.)
1206
COUT1
0.1uF
16V
COUT
47uF
6.3V
1206
RFB1
1.47M
1%
RFB2
1.18M
1%
RFB3
475K
1%
RFB4
280K
1%
CFFW
(Opt.)
JP2
VOUT Select
5V
3.3V
1.8V
L1
2.2mH
LPS6235-225ML
RSET
(Opt.)
U1
LTC3632EDD
SW
VFB
ISET
GND
exposed pad,
solder side
GND
VIN
RUN
HYST
SS
CSS
220nF
R3
0
R2
(Opt.)
CIN
2.2uF
100V
1210
R1
2M
JP1
RUN
ON
OFF
R4 *
4.7
CIN1 *
0.22uF
100V
E1
E2
VIN
4.5V - 50V
GND
* CIN1, R4 Are Optional Components.
They are Inserted On The DC1507A To
Dampen The (Possible) Ringing Voltage
Due To The Long Input Leads. On A
Normal, Typical PCB, With Short Trace,
The Components Are Not Needed.
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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 Applications Engineering For Assistance.
This Circuit Is Proprietary To Linear Technology And Supplied For Use With Linear Technology Parts.
LINEAR TECHNOLOGY CORPORATION
1630 McCARTHY BLVD.
MILPITAS, CA. 95035
408-432-1900
408-434-0507 FAX
www.linear.com
Title
LTC3632EDD
High Efficiency 20mA Monolithic Synchronous Buck Regulator
Size
Document Number
Demo Circuit 1507A
Rev
A
Date:
Thursday, February 12, 2009
Sheet
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