DESCRIPTION

Demonstration circuit DC1158A is a high efficiency monolithic synchronous buck regulator using a constant frequency, current mode architecture featuring LTC3564. Its high switching frequency of 2.25MHz allows the use of small surface mount inductors and capacitors. Supply current during operation is only 20uA dropping to below 1uA in shutdown. The 2.5V to 5.5V input voltage range makes the LTC3564 ideally suited for single Li-Ion battery-powered or 3.3V to 5V input voltage applications. 100% duty cycle provides low dropout operation, extending battery life in portable systems. Automatic Burst Mode® operation increases efficiency at light loads, further extending battery runtime. **Gerber files for this circuit are available. Call the LTC Factory.**

Table 1. Performance Summary (T_A = 25ºC)

PARAMETER	CONDITION	VALUE
Input Voltage		2.5V to 5.5V
Output Voltage V_{OUT}	I_{OUT}=0A to 1.25A	V_{OUT} ± 0.5%
Maximum Output Current		1.25A
DC Supply Current	V_{FB} = 0.5V or V_{OUT} = 90%, I_{OUT} = 0A	300µA
Nominal Switching Frequency	V_{FB} = 0.6V or V_{OUT} = 100%	2.25MHz

QUICK START PROCEDURE

The DC1158A is easy to set up to evaluate the performance of the LTC3564. 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 Setup diagram in Figure 1 for proper scope probe technique.

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 XJP2, XJP3 or XJP4 for voltages of 1.2V, 1.5V or 1.8V respectively. Set the load output current to less than 1.25A. An optional output voltage can be set by populating resistor RFB6, removing RFB5 and moving the shunt jumper to JP5.

3. Apply 5V 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 1 µA in shutdown.

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 XJP2, XJP3 or XJP4.

5. Vary the input voltage between 2.5V and 5.5V and the output voltage should be within +/- 0.4% tolerance.

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 a small tantalum capacitor (for instance, AVX part # TAJW686M010) on the pads between the input power and return terminals on the bottom of the demo board. The (greater) ESR of the tantalum 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.

6. Vary the V_{OUT} load current from 0 to 1.25A, and the output voltage should be within a tolerance of +/- 0.5%.

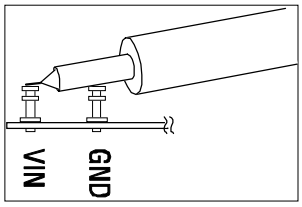


Figure 1. Measuring Input or Output Ripple

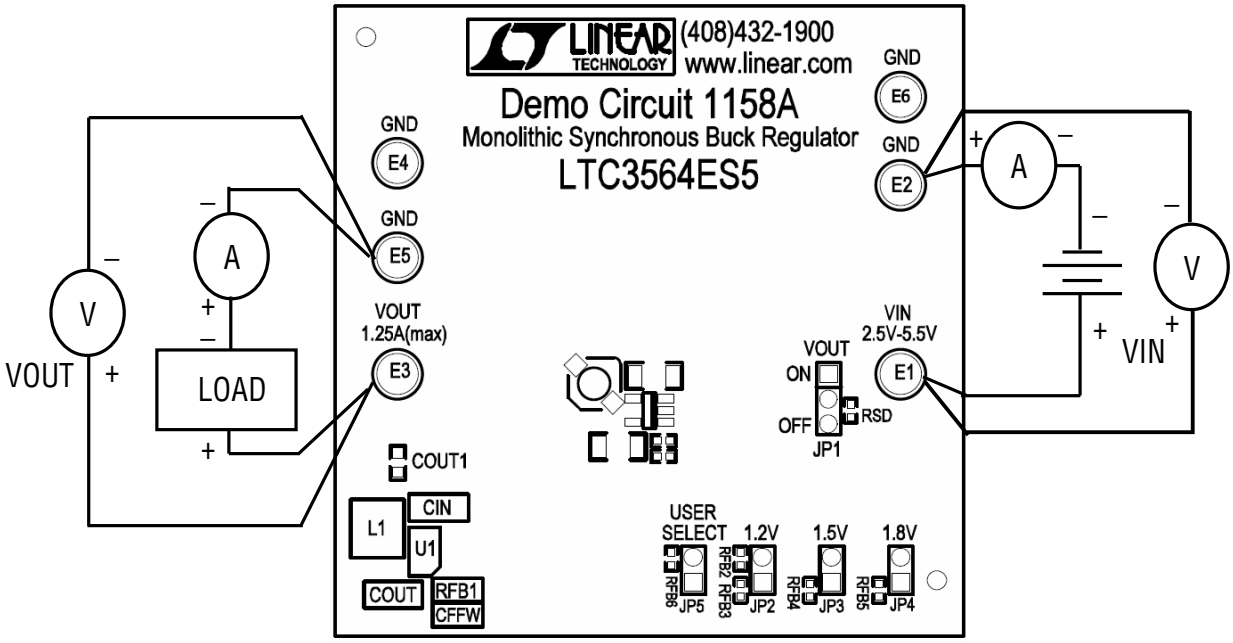
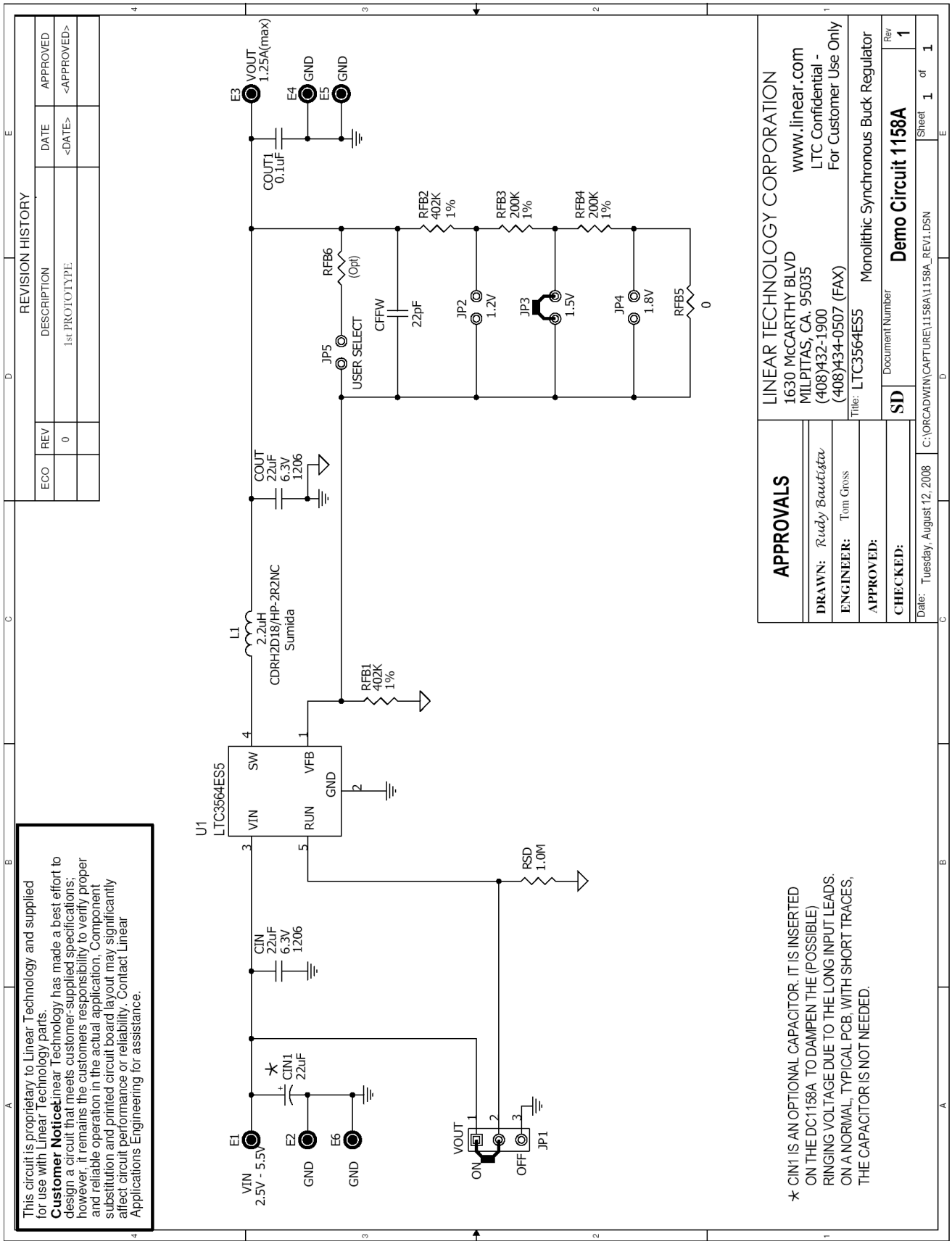


Figure 2. Equipment setup to test LTC3564


REVISION HISTORY
ECO
REV
DESCRIPTION
DATE
APPROVED
0
1st PROTOTYPE
<DATE>
<APPROVED>
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.
U1
LTC3564ES5
VIN
SW
VFB
RUN
GND
L1
2.2uH
CDRH2D18/HP-2R2NC
Sumida
COUT
22uF
6.3V
1206
CIN
22uF
6.3V
1206
CIN1
22uF
RFB1
402K
1%
RFB2
402K
1%
RFB3
200K
1%
RFB4
200K
1%
RFB5
0
RFB6
(Opt)
RSD
1.0M
CFFW
22pF
COUT1
0.1uF
E1
VIN
2.5V - 5.5V
E2
GND
E6
GND
E3
VOUT
1.25A(max)
E4
GND
E5
GND
JP1
VOUT
ON
OFF
JP2
1.2V
JP3
1.5V
JP4
1.8V
JP5
USER SELECT
* CIN1 IS AN OPTIONAL CAPACITOR. IT IS INSERTED ON THE DC1158A TO DAMPEN THE (POSSIBLE) RINGING VOLTAGE DUE TO THE LONG INPUT LEADS. ON A NORMAL, TYPICAL PCB, WITH SHORT TRACES, THE CAPACITOR IS NOT NEEDED.
APPROVALS
DRAWN: Rudy Bautista
ENGINEER: Tom Gross
APPROVED:
CHECKED:
LINEAR TECHNOLOGY CORPORATION
1630 McCARTHY BLVD
MILPITAS, CA. 95035
(408)432-1900
(408)434-0507 (FAX)
www.linear.com
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Title: LTC3564ES5 Monolithic Synchronous Buck Regulator
SD
Document Number
Demo Circuit 1158A
Rev
1
Date: Tuesday, August 12, 2008
C:\ORCADWIN\CAPTURE\1158A\1158A_REV1.DSN
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