DEMO CIRCUIT 1433
QUICK START GUIDE

LT3070
5A, Low Noise, Programmable Output, 85mV Dropout Linear Regulator

DESCRIPTION

Demonstration circuit 1433 is an adjustable 5A linear regulator featuring LT3070. LT3070 is a low dropout voltage, UltraFast™ transient response linear regulator. The device supplies up to 5A of output current with a typical dropout voltage of 85mV. A 0.01µF reference bypass capacitor decreases output voltage noise to 25µV_{RMS}. The LT3070's high bandwidth permits the use of low ESR ceramic capacitors.

Output voltage is digitally selectable in 50mV increments over a 0.8V to 1.8V range. A margining function allows the user to tolerance system output voltage in increments of ±1%, ±3% or ±5%. To maintain proper performance and regulation, the BIAS supply voltage must be higher than the IN supply voltage. For a given V_{OUT}, the BIAS voltage must satisfy the following conditions:

$2.2 \le V_{BIAS} \le 3.6V$ and $V_{BIAS} \ge (1.25 \cdot V_{OUT}+1V)$.

For $V_{OUT} \le 0.95V$, the minimum bias voltage is limited to 2.2V.

The IC incorporates a unique tracking function to control buck regulator powering the LT3070's input. This tracking function drives the buck regulator to maintain the LT3070's input voltage to V_{OUT} + 300mV, minimizing power dissipation. It has internal protection includes UVLO, reverse-current protection, precision current limiting with power foldback and thermal shutdown.

The LT3070 regulator is available in a thermally enhanced 28-lead, 4mm×5mm QFN package.

The LT3070 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 1433.

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

LT, LTC and LT are registered trademarks of Linear Technology Corporation.
UltraFast is a trade mark of Linear Technology Corporation.
All other trademarks are the property of their respective owners.

Performance Summary (T_A = 25°C)

PARAMETER	CONDITION	VALUE
Minimum Input Voltage	V_{OUT}=1.2V, I_{OUT} = 5A	1.32V
Maximum Input Voltage		3V
Minimum Bias Voltage	V_{OUT}=1.2V	2.5V
Maximum Bias Voltage		3.6V
Output Voltage V_{OUT}	JP1=LOW, JP2=HIGH, JP3=HIGH JP4=LOW, JP6=FLOAT	1.2V ±1%
Maximum Output Current	V_{IN} -V_{out} < 0.5V	5A

QUICK START PROCEDURE

Demonstration circuit 1433 is easy to set up to evaluate the performance of the LT3070. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

1. Place JP5 on the ON position.
2. Use JP1, JP2, JP3, JP4 and JP6 to set the desired output voltage.
3. With power off, connect the input power supply to Vin and GND.
4. Connect the bias voltage to Vbias and GND.
5. Turn on the power at the input and the bias pin.

NOTE. Make sure that the input voltage does not exceed 3V and the bias voltage is within its limit.

6. Check for the proper output voltage.

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

7. Once the proper output voltage is established, adjust the load within the operating range and observe the output voltage regulation, efficiency and other parameters.

NOTE. Make sure that the power dissipation is limited below the thermal limit.

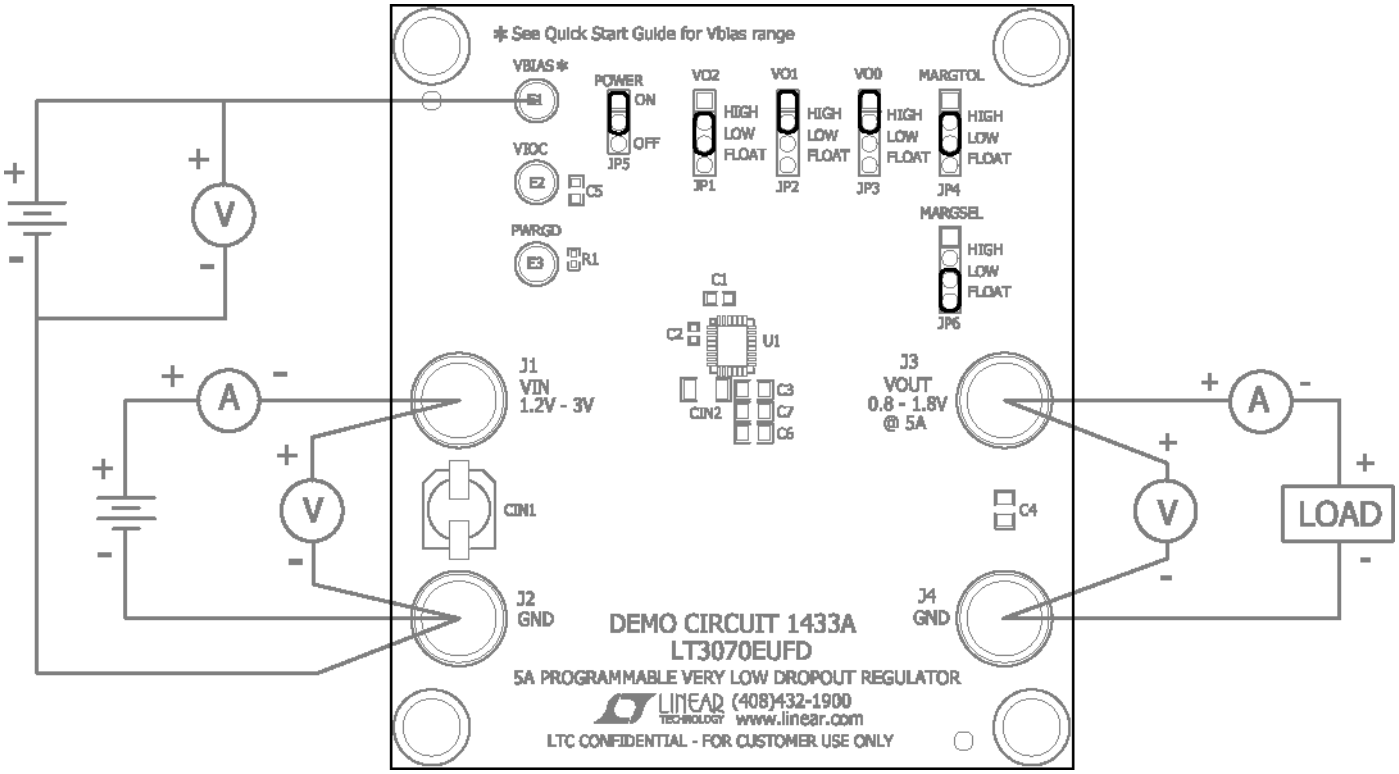
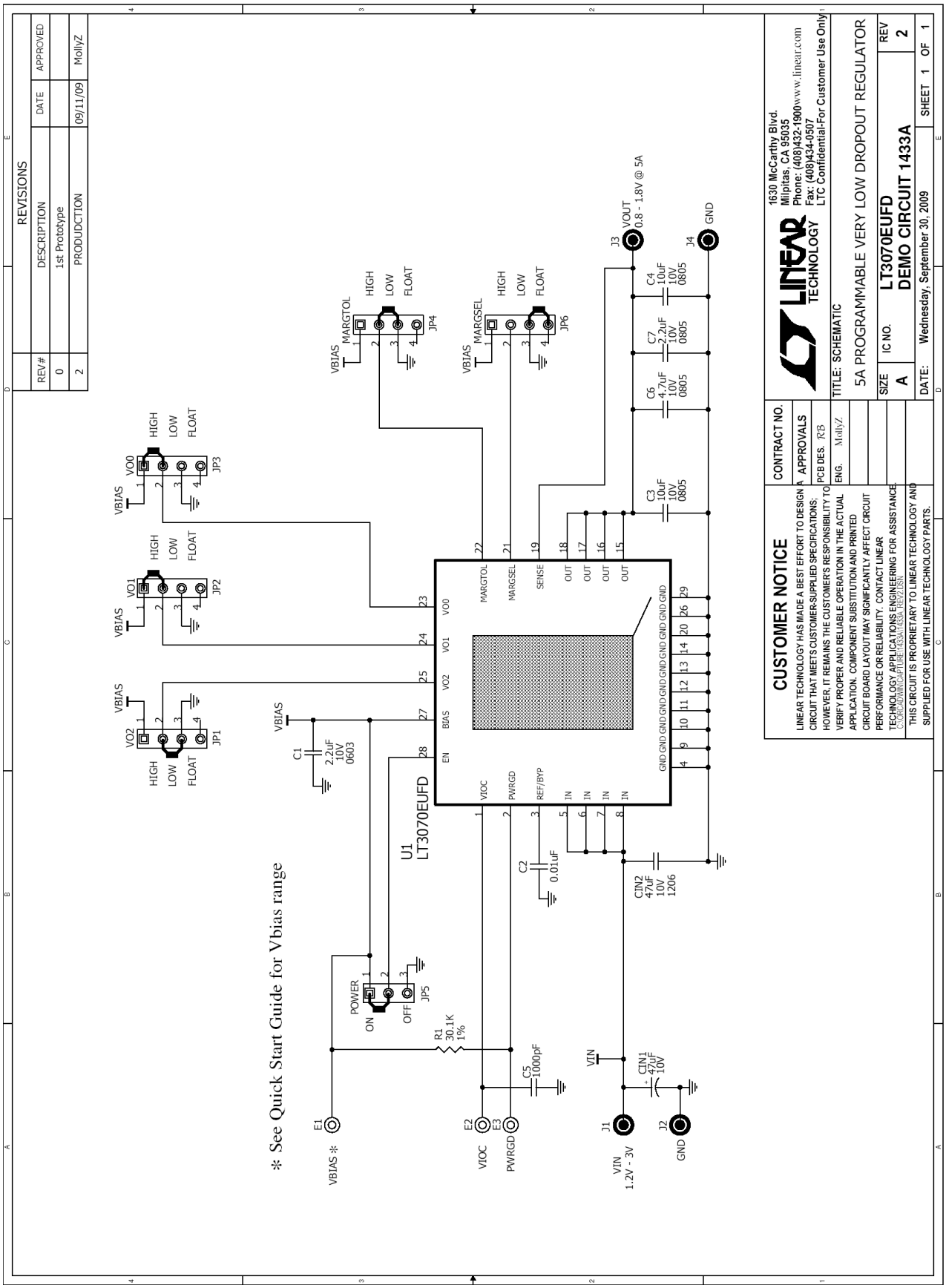


Figure 1. Proper Measurement Equipment Setup


REVISIONS
REV# DESCRIPTION DATE APPROVED
0 1st Prototype
2 PRODUCTION 09/11/09 MollyZ
U1
LT3070EUFD
VBIAS
VIOC
PWRGD
VIN
VOUT
0.8 - 1.8V @ 5A
GND
JP1
JP2
JP3
JP4
JP5
JP6
HIGH
LOW
FLOAT
POWER
ON
OFF
MARGTOL
MARGSEL
C1 2.2uF 10V 0603
C2 0.01uF
C3 10uF 10V 0805
C4 10uF 10V 0805
C5 1000pF
C6 4.7uF 10V 0805
C7 2.2uF 10V 0805
CIN1 47uF 10V
CIN2 47uF 10V 1206
R1 30.1K 1%
* See Quick Start Guide for Vbias range
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
C:\CRD\ADI\MC4\PTURE\1433A\1433A_REV2.DSN
THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS.
CONTRACT NO.
APPROVALS
PCB DES. RB
ENG. MollyZ
LINEAR TECHNOLOGY
1630 McCarthy Blvd.
Milpitas, CA 95035
Phone: (408)432-1900 www.linear.com
Fax: (408)434-0507
LTC Confidential-For Customer Use Only
TITLE: SCHEMATIC
5A PROGRAMMABLE VERY LOW DROPOUT REGULATOR
SIZE A
IC NO. LT3070EUFD
DEMO CIRCUIT 1433A
REV 2
DATE: Wednesday, September 30, 2009
SHEET 1 OF 1