QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 1368A

ADJUSTABLE LDO LINEAR REGULATORS IN PARALLEL

LT3080EDD-1

DESCRIPTION

Demonstration circuit 1368A shows adjustable linear regulators in parallel using LT3080-1. Architected as a precision current source and voltage follower, it allows this new regulator to be used in many applications requiring high current, adjustability to zero output, and no heat sink. Also the device brings out the collector of the pass transistor to allow low dropout operation when used with multiple supplies.

A key feature of the LT3080-1 is the capability to supply a wide output voltage range. By using a reference current through a single resistor, the output voltage can be programmed to any level between zero and 36V. The DC1368A has a reduced input voltage 25V due to input capacitor voltage rating. LT3080-1 incorporates an internal ballast resistor to allow direct paralleling of devices without the need for PC board resistors or sensor resistors. By direct paralleling of four LT3080-1 regulators, the DC1368A is capable of delivering up to 4.4A output current. It can be used as a high current linear regulator, post regulator for switching supply, variable voltage supply or low output voltage power supply.

Internal protection circuitry includes current limiting and thermal limiting.

LT3080-1 regulator is offered in 8-lead MSOP (with an Exposed Pad for better thermal characteristics) and a 3mm × 3mm DFN.

The LT3080-1 datasheet gives a complete description of the part, operation and application information. The datasheet should be read in conjunction with this quick start guide for working on or modifying the demo circuit 1368A.

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

Table 1. Performance Summary ($T_A = 25^oC$)

PARAMETER	CONDITION	VALUE
Minimum Vin Voltage	Vout=1.2V	1.7V
Maximum Vin Voltage		25V
Minimum Vcontrol Voltage	Vout=1.2V	2.8V
Maximum Vcontrol Voltage		25V
Output Voltage	Iout=4.4A	1.17V ±3%
Minimum Output Current		4mA
Maximum Output Current	Vin-Vout<2.5V	4.4A

QUICK START PROCEDURE

The DC1368A is easy to set up to evaluate the performance of the LT3080-1. Refer to Figure 1. for proper measurement equipment setup and following the procedures below:

1. Apply 1.7V across Vin (to Gnd), and 2.8V across Vcontrol. Draw 4.4A of load current. The measured Vout should be 1.17V ± 3% (1.13V to 1.21V).
2. Vary Vin from 1.7V to 25V, Vcontrol from 2.8V to 25V and the load current from 4mA to 4.4A. Vout should measure 1.19V ± 5% (1.13V to 1.25V).

Note: Make sure the power dissipation is limited below the thermal limit.

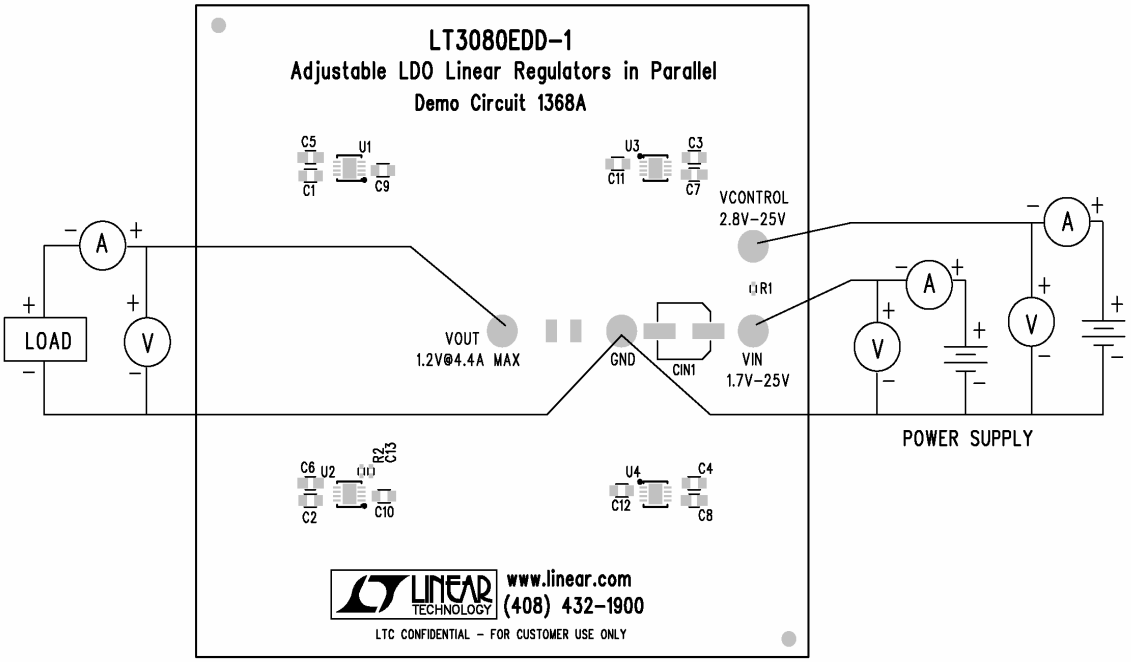


Figure 1. Proper Measurement Equipment Setup

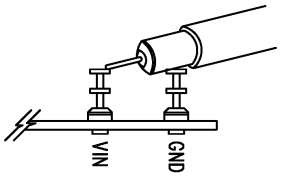


Figure 2. Measuring Input or Output Ripple

INPUT VOLTAGE RANGE

The guaranteed Vin dropout voltage is 0.5V at 4.4A, the guaranteed Vcontrol dropout voltage is 1.6V at 4.4A. The maximum Vin and maximum Vcontrol is reduced to 25V due to the input capacitor voltage rating.

DUAL SUPPLY OR SINGLE SUPPLY

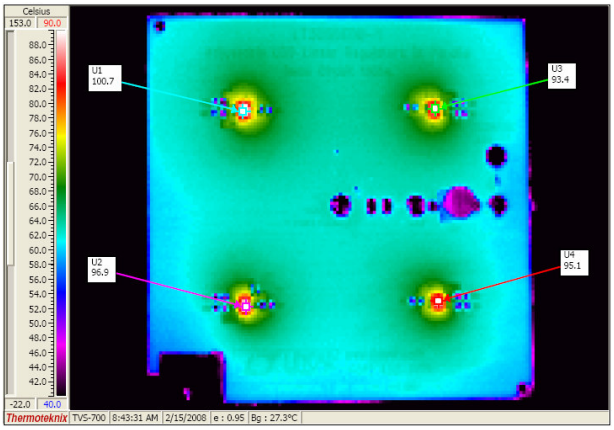
Use two separate supplies for Vin and Vcontrol, a low dropout voltage can be achieved on the Vin pin and the power dissipation is minimized. Alternatively, Tying the Vcontrol to Vin through a zero ohm jump resistor R1 on board, a single supply is sufficient to drive the demo circuit 1368A. **AVOID USING A LONG WIRE TO TIE VCONTROL AND VIN**.

OUTPUT CURRENT

The output current will decrease at high input-to-output differential. The actual current output is further limited by the thermal shutdown function, which is related to the board thermal dissipation.

THERMAL IMAGE

An example thermal image shows the temperature distribution on board. The test is done in still air at room temperature with average 2.0W power dissipation in each LT3080-1.



BYPASS CAPACITOR

Since the SET pin is a high impedance node, unwanted signals may couple into the SET pin and cause erratic behavior. This will be most noticeable when operating with minimum output capacitors at full load current. The easiest way to remedy this is to bypass the SET pin with a small amount of capacitance from SET to ground, 10pF to 20pF is sufficient. A 0.01uF bypass capacitor is used on the demo board to provide a low-noise output. Please refer to datasheet for details.