LTC3553EPD: Micropower USB Power Manager with Li-Ion Charger, Buck DC/DC, and LDO Regulator

DESCRIPTION

Demonstration Circuit DC1550A is a Micropower USB Power Manager with Li-Ion Charger, Buck DC/DC, and LDO Regulator featuring the LTC®3553.

PERFORMANCE SUMMARY Specifications are at T_A = 25°C

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
VBUS	Bus Input Voltage Range		4.35		6	V
V(BAT)	Battery Float Voltage	Constant Voltage Mode	4.15		4.23	V
I(BAT)	Battery Charge Current	Constant Current Mode, R_{PROG} = 1.87k	420		500	mA
VLDO	LDO Output Voltage	I(VLDO) ≤ 200mA	3.25		3.35	V
VBUCK	Buck Regulator Output Voltage	I(VBUCK) ≤ 200mA	1.15		1.25	V

QUICK START PROCEDURE

Refer to Figure 1 for the proper measurement equipment setup and jumper settings and follow the procedure below.

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 VBUS or VOUT(x) and GND terminals. See Figure 2 for proper scope probe technique.

1. Set PS1 = 0V, PS2 = 3.6V. Press "ON" button for > 0.5s. Observe I(BAT) (AM2), VBUCK (VM5) and VLDO (VM6).
   The LTC3553 is in STBY which reduces the battery current to less than 15µA, even with both regulators running. In STBY the maximum current from regulators is reduced to as low as 10mA

2. Set STBY (JP6) to "OFF", PS1 to 5V. Observe I(VBUS) (AM1), I(BAT) (AM2) and VPROG (VM2).

The LTC3553 is now operating in normal mode drawing more current from the battery. However the regulators are now capable of delivering over 200mA each. Also, since VBUS is now available, the battery charger is operating, but charge current is limited by the input current limit to 100mA.

3. Set HPWR (JP2) to "500mA". Observe I(VBUS) (AM1), I(BAT) (AM2) and VPROG (VM2).
   The input current limit is now 500mA, so the battery charger is delivering ~420mA to the battery.

4. Set LD2 to 200mA, LD3 to 200mA. Observe VBUCK (VM5), VLDO (VM6) and I(BAT) (AM2).
   Each regulator is supplying 200mA, and since the efficiency is ~90%, drawing ~225mA. So, the battery charger is only delivering approximately 50mA. This is because the input current limit is 500mA – 225mA – 225mA = 50mA.

5. Set LD2 to 0A, LD3 to 0A. Press "OFF" button.
   Observe VBUCK (VM5) and VLDO (VM6).
   The regulators are now off and therefore supply-
   ing 0 current. The battery charger is once again
   supplying ~ 420mA to the battery.
6. Reset the Jumpers to their default position.
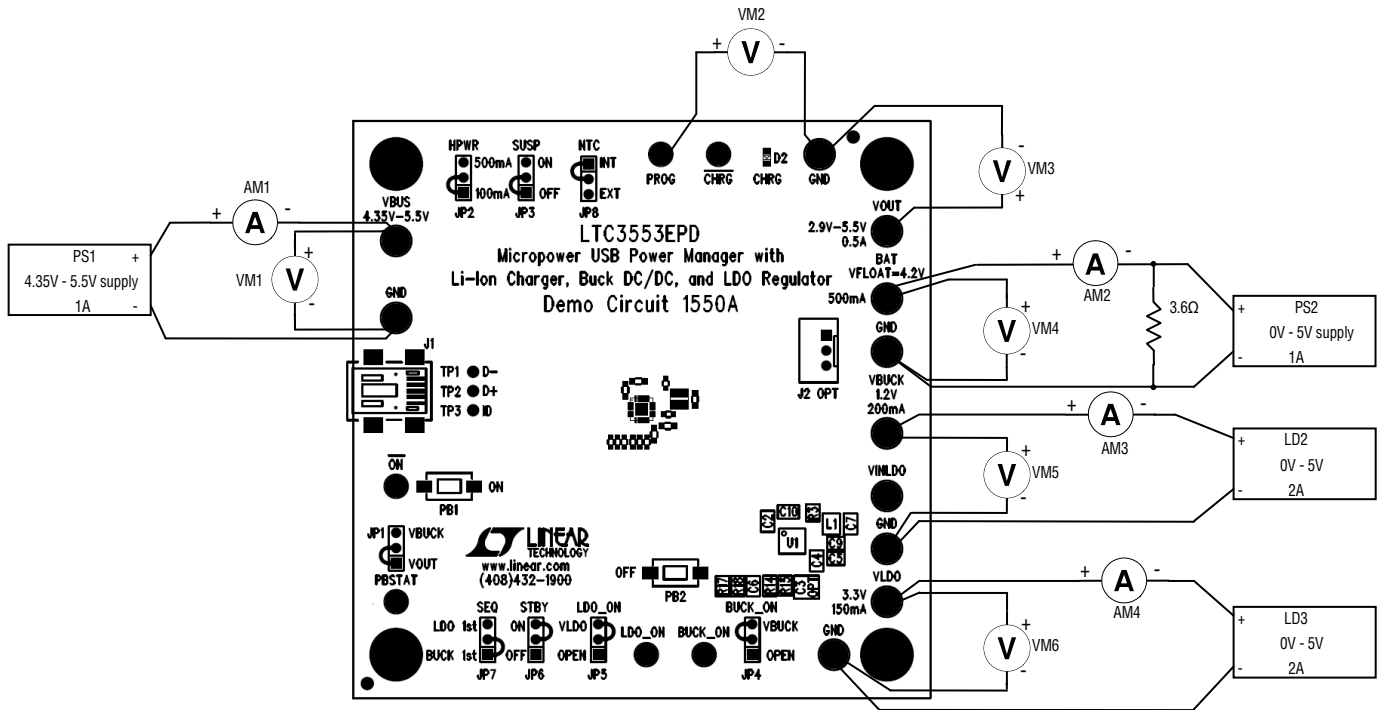
Note: All connections from equipment should be Kelvin connected directly to the board pins which they are connected on this diagram and any input or output leads should be twisted pair.

Figure 1. Proper Measurement Equipment Setup for DC1550A
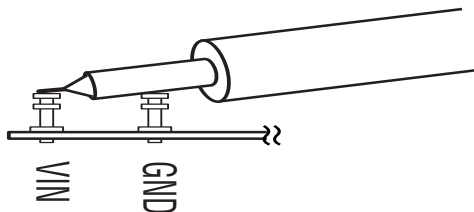
Figure 2. Measuring Input or Output Ripple
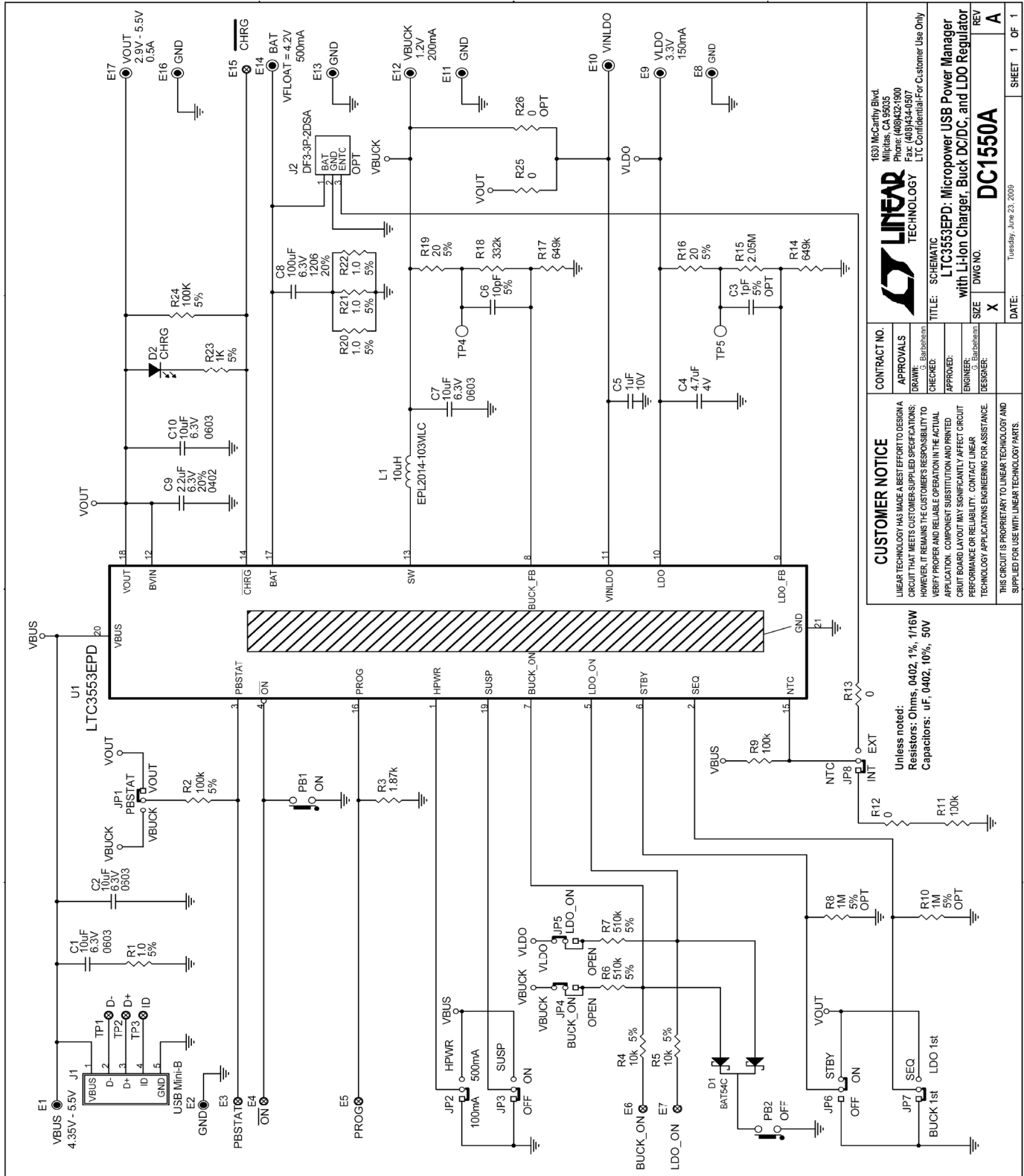
Figure 3. Circuit Schematic