ON Semiconductor®

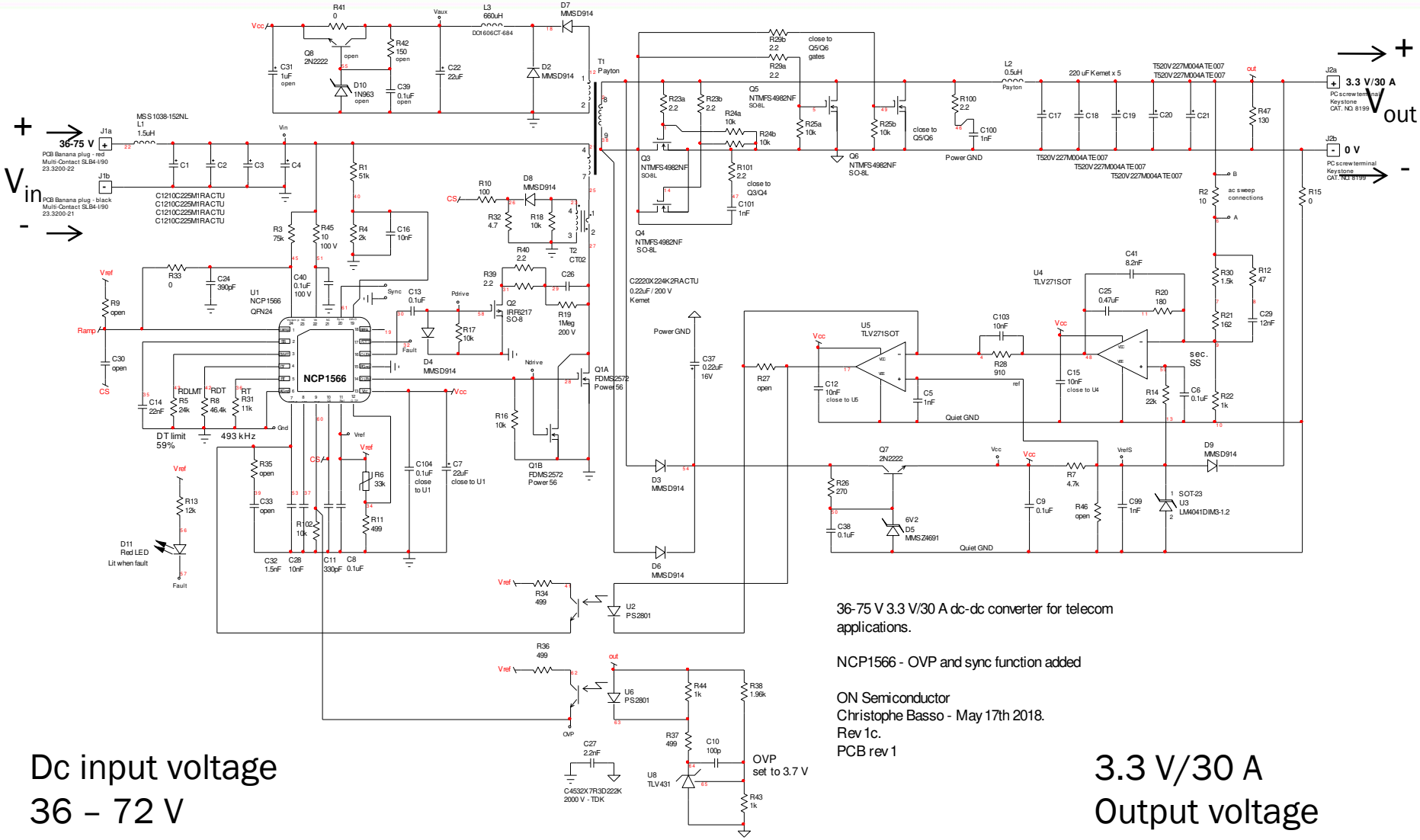
Test Procedure for the NCP1566 3.3-V/30-A Dc-Dc Converter

Christophe Basso

October 30th 2017

Rev. 2

Board Electrical Schematic



36-75 V 3.3 V/30 A dc-dc converter for telecom applications.

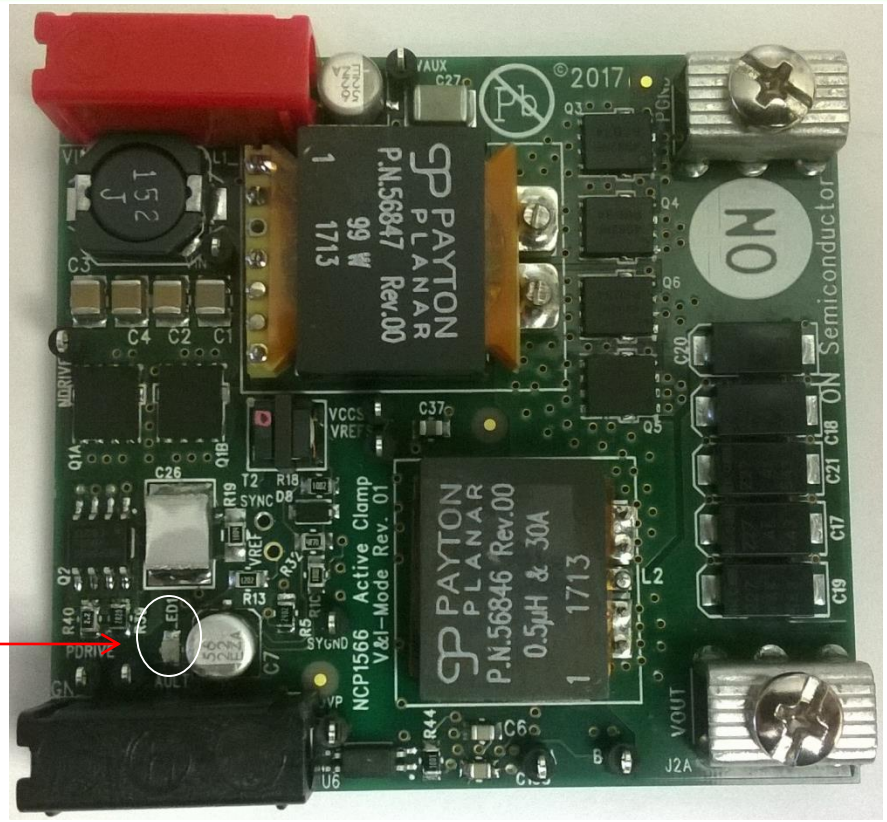
NCP1566 - OVP and sync function added

ON Semiconductor
Christophe Basso - May 17th 2018.
Rev 1c.
PCB rev 1

Dc input voltage
36 – 72 V

3.3 V/30 A
Output voltage

Board Picture



Input voltage from 36 V to 72 V dc. Nominal input is 48 V

Output voltage is 3.3 V nominal current is 30 A

NCP1566TELECGEVB

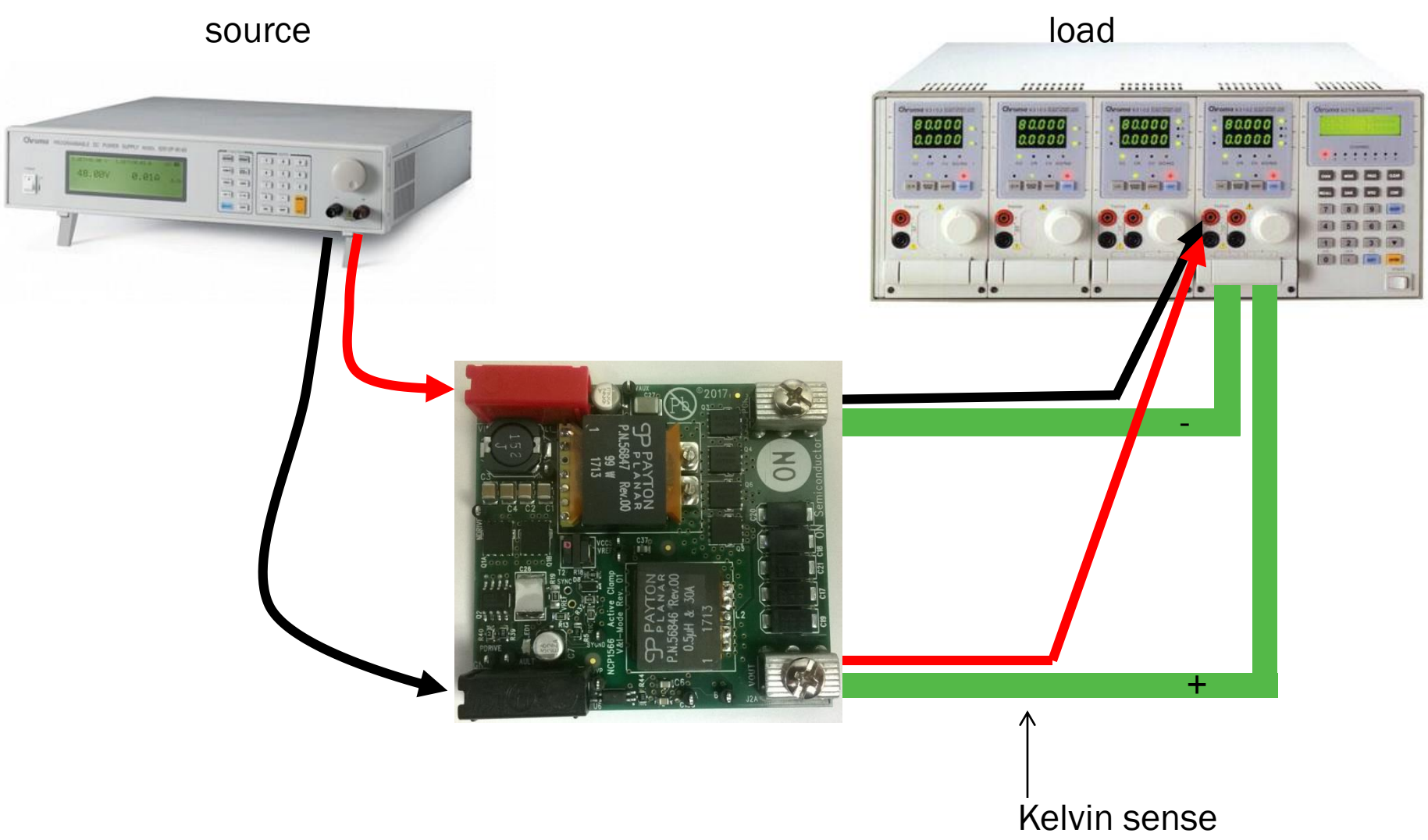
Needed Equipment

The needed equipments are the following:

- ❑ a dc voltage source, delivering up to 80 V dc and up to 5 A
- ❑ a dc load absorbing up to 100 W, $V_{in,max}$ < 20 V, $I_{out,max}$ < 40 A
- ❑ either the above load can display dc V and dc A or separated V and A-meters are necessary
- ❑ An oscilloscope with single shot capability

➢ *Kelvin sensing is necessary to connect the load to the board. If no precautions are taken, it is likely that the voltage drop at the load cables ends induces a reading error*

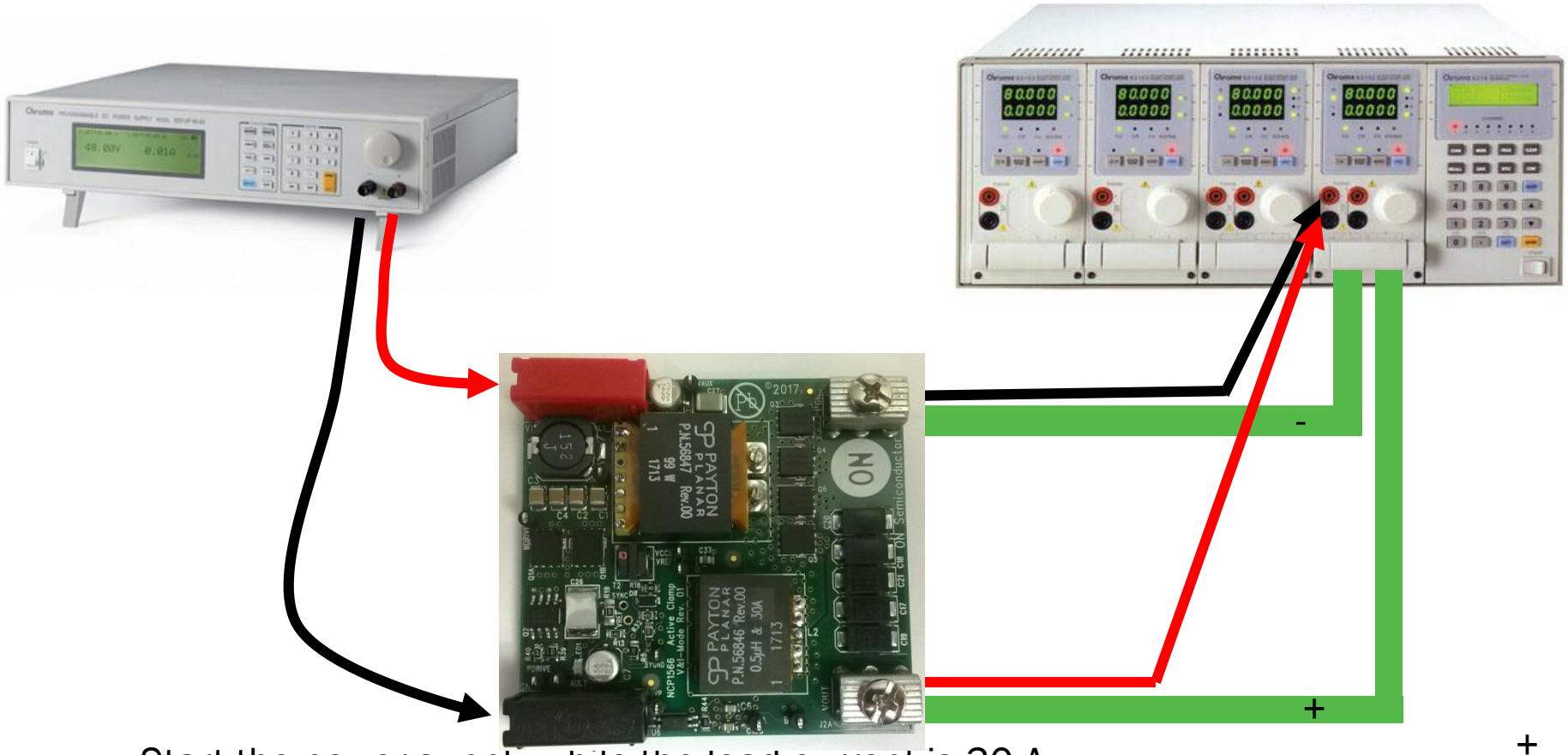
Basic Test Setup



Test n°1

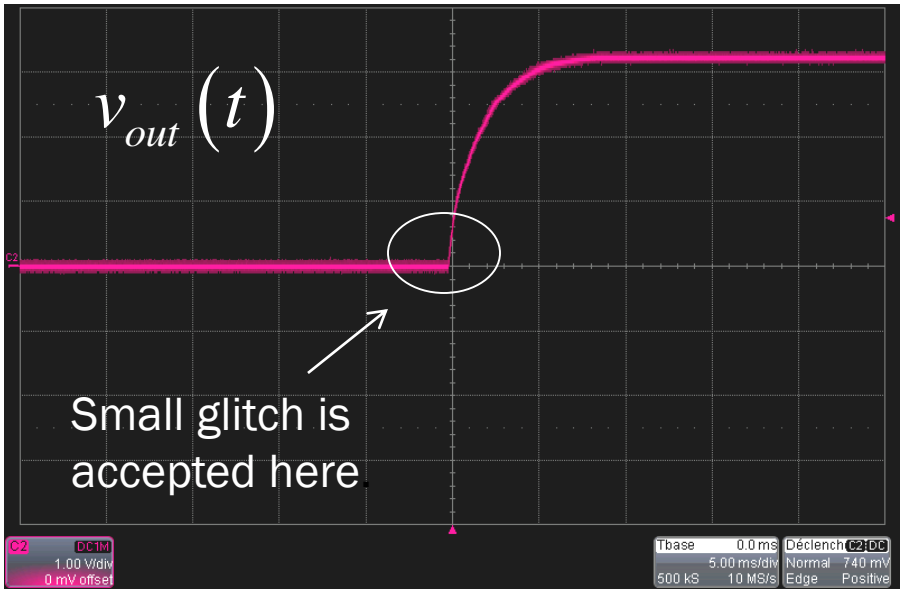
source

load

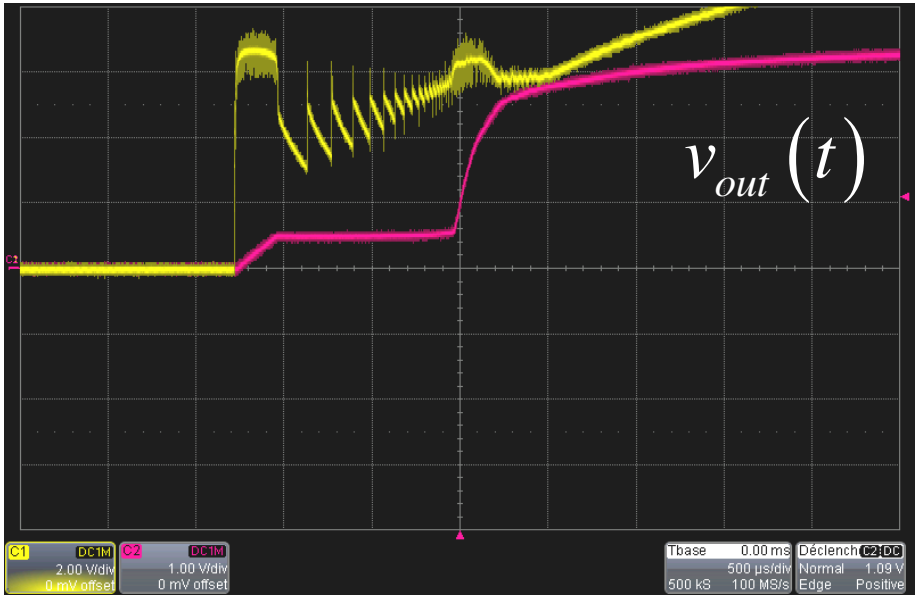


- Start the power supply while the load current is 30 A
- Monitor the output voltage on a scope
- Verify the voltage is monotonically rising

Test n°1



Ok



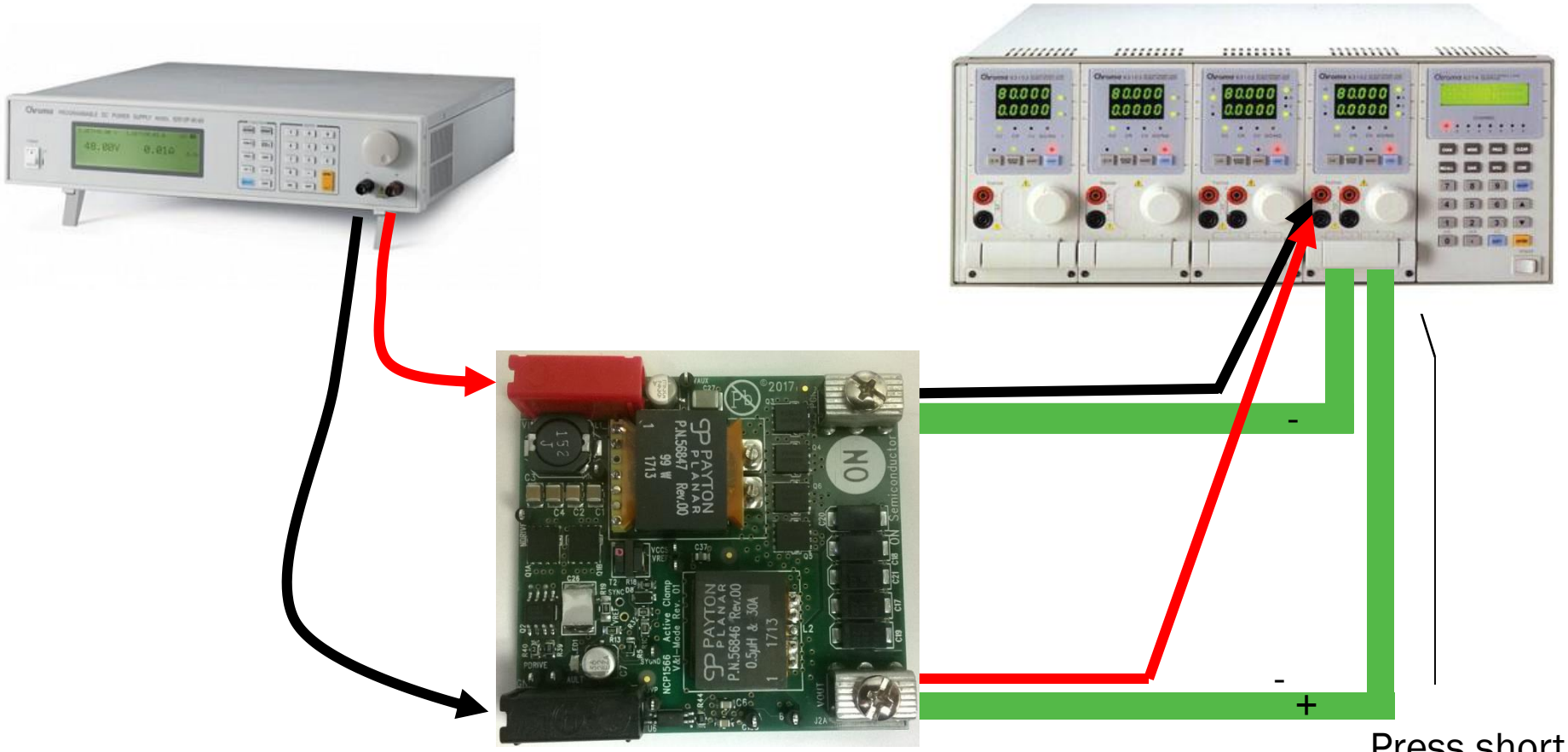
Bad

- It is important to verify the absence of double slope
- Repeat the test for V_{in} = 48 V and 72 V
- Change load to 0 A, repeat tests. Wait 10 s between re-starts
- A small glitch at the begining of the rising edge is acceptable

Test n°2

source

load



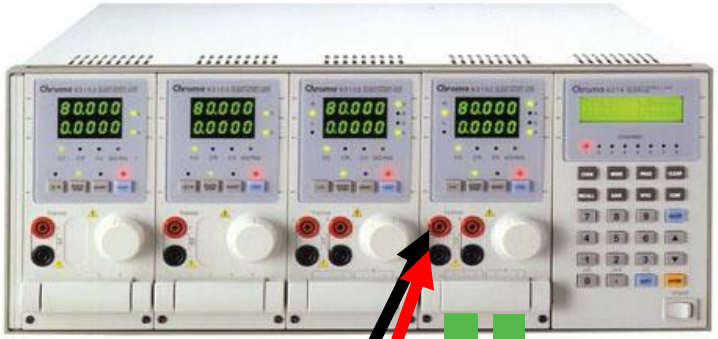
Press short

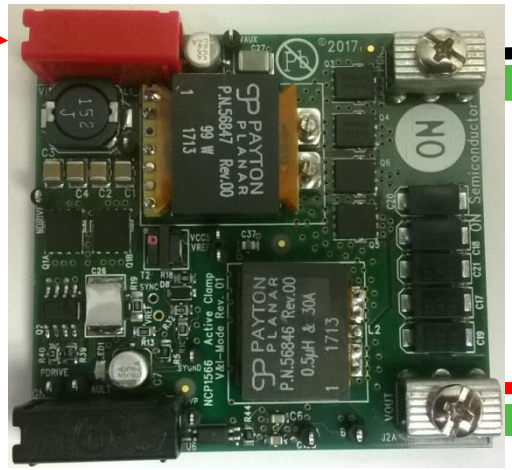
- Press short circuit at V_{in} = 36 V, I_{out} = 30 A. Led is lit, board ticks.
- Repeat test for V_{in} = 72 V
- Release short and make sure output resumes at 3.3 V

Test n°3

source

load

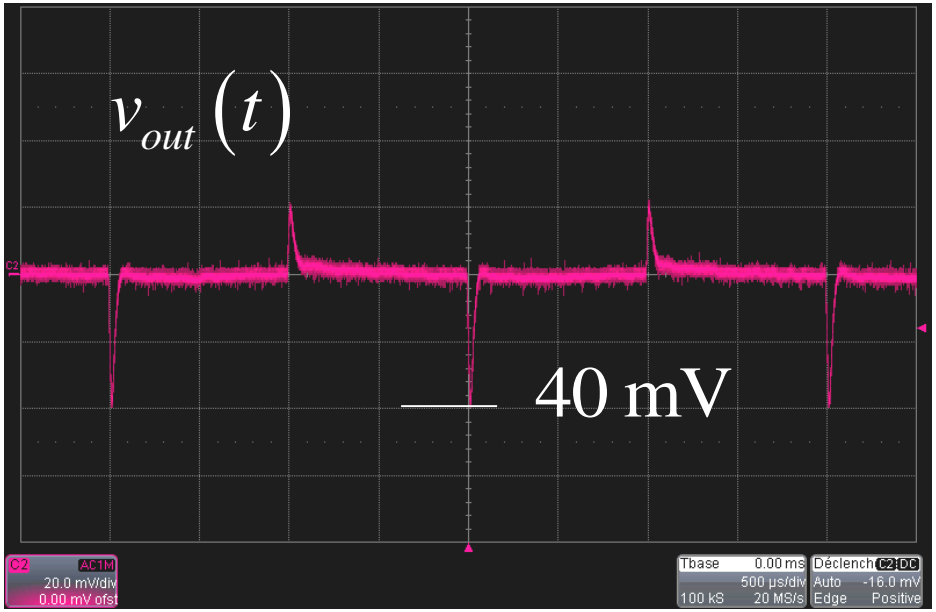


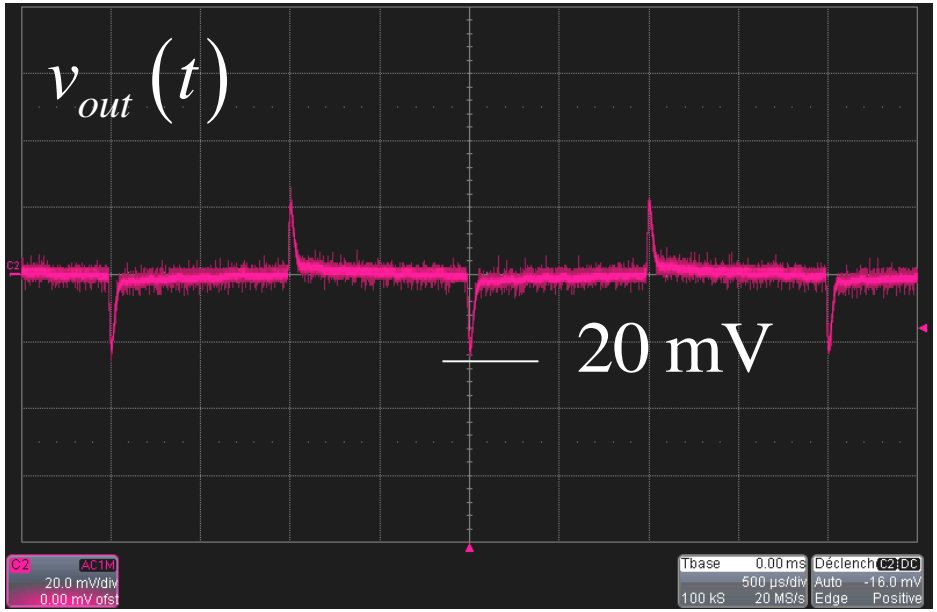


No pigtail!

- Program load to dynamic current mode
- I_{out} from 20 A to 15 A, slope 1 A/µs
- 1 ms interval, observe V_{out} on scope in ac, 20 mV/div

Test n°3





V_{in} = 36 V I_{out} = 15 to 20 A, 1 A/µs

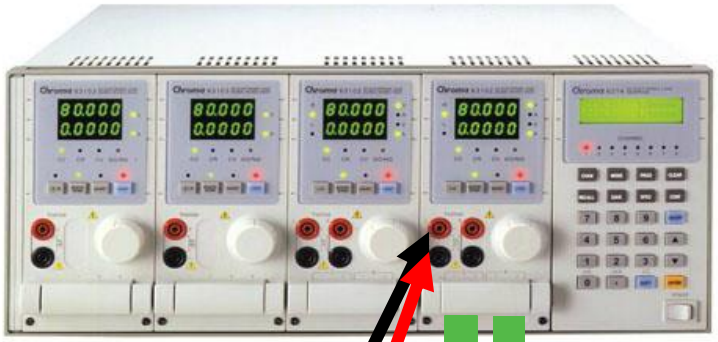
V_{in} = 48 V I_{out} = 15 to 20 A, 1 A/µs

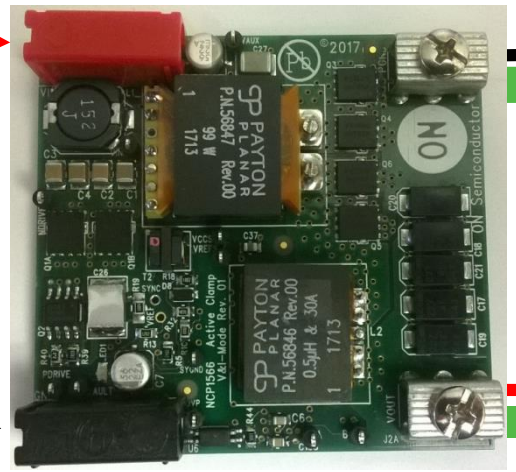
- Run the test from V_{in} = 36 V (worst case) to V_{in} = 72 V.
- Spec is to have an under/over shoot less than 60 mV

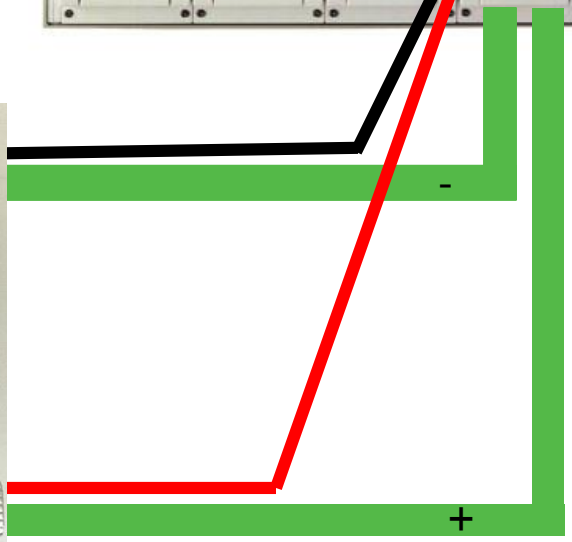
Test n°4

source

load

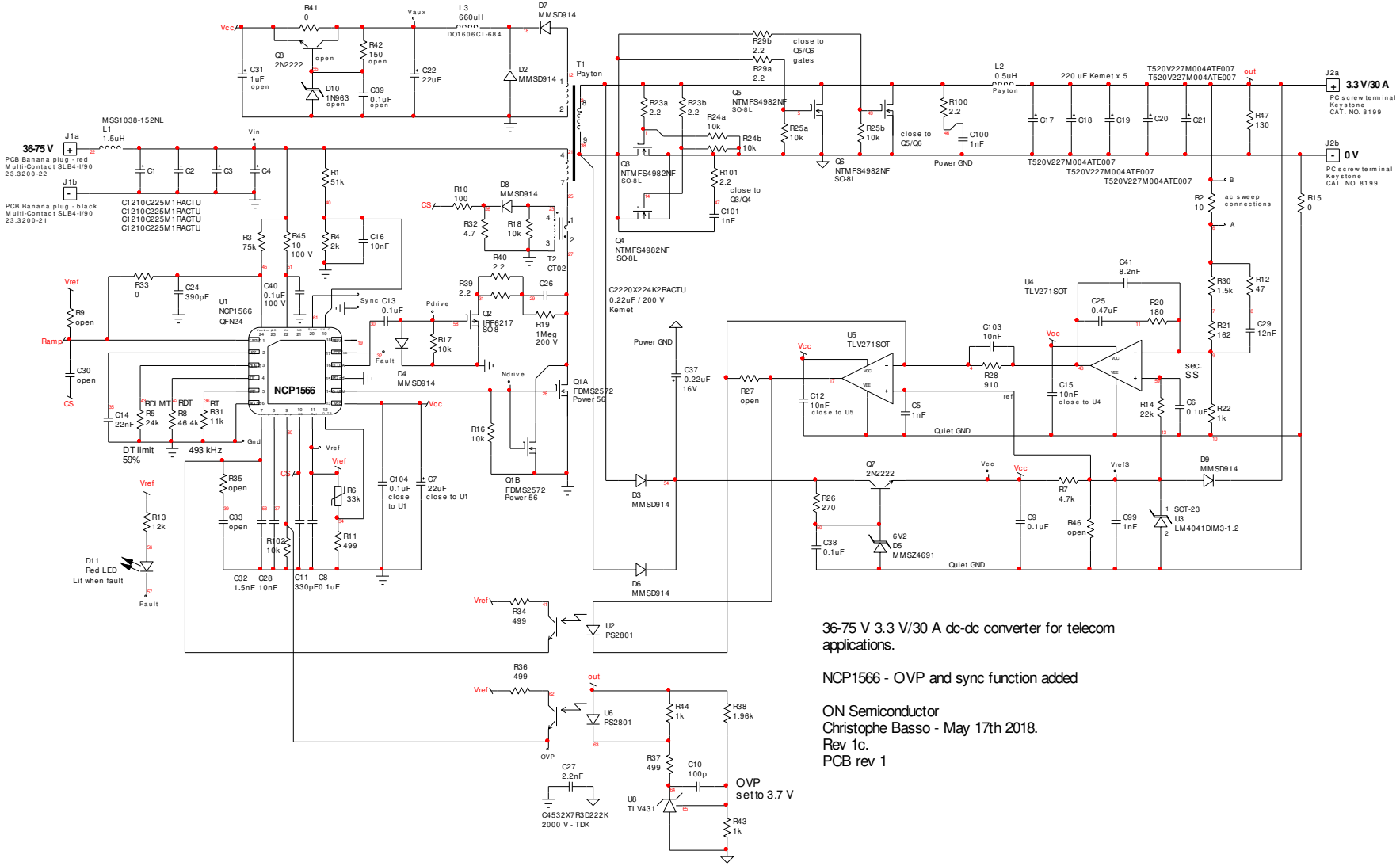






- Leave the board for 5 mn at V_{in} = 36 V/30 A.
- Check no thermal triping occurs.
- Board is declared sound.

Demonstration Board Schematic



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