

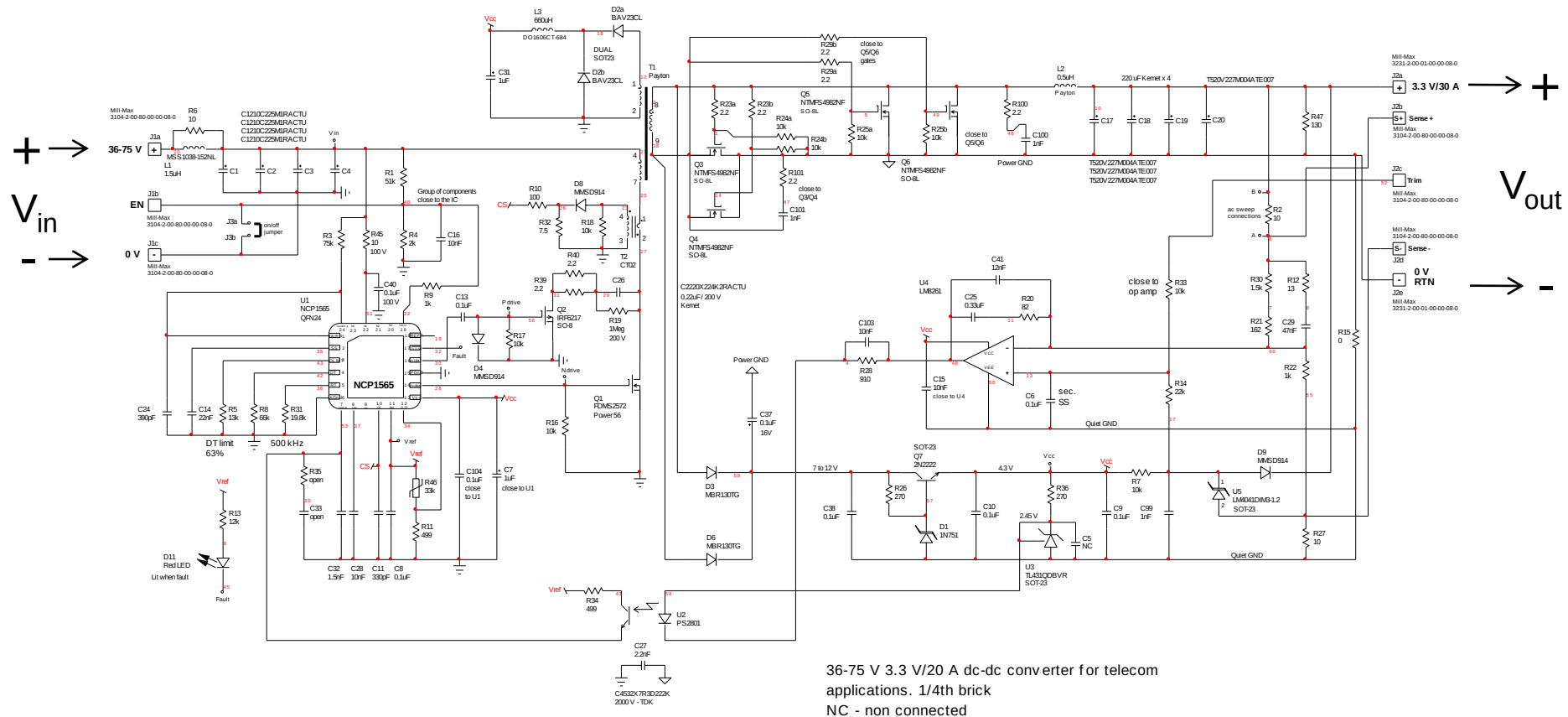


ON Semiconductor®

Test Procedure for the NCP1565 3.3-V/20-A Dc-dc Converter



Board Electrical Schematic

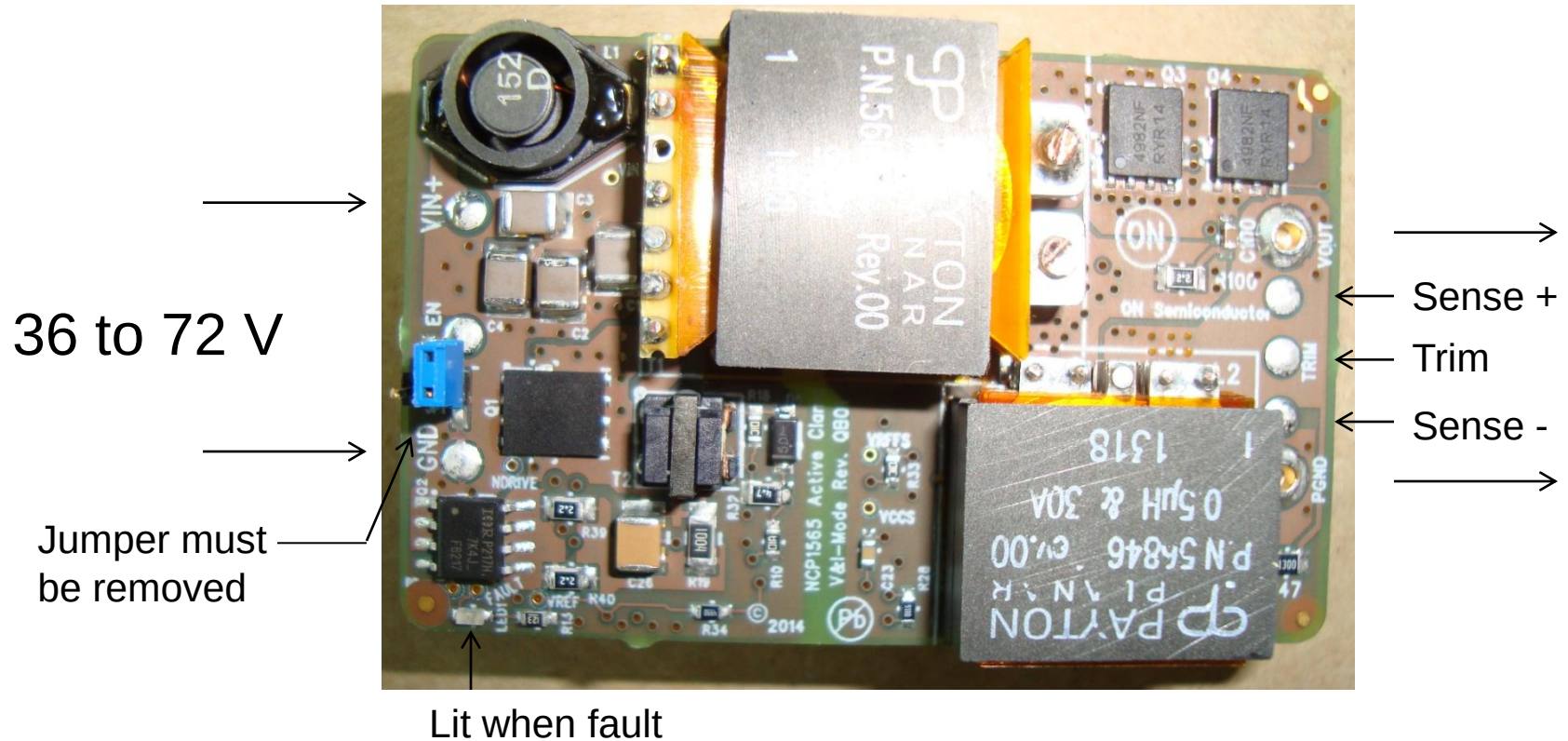


Dc input voltage
36 – 72 V

ON Semiconductor
Christophe Basso - February 17th 2014.
Rev 1c.
PCB rev 1

3.3 V/20 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 20 A

Needed Equipment

The needed equipments are the following:

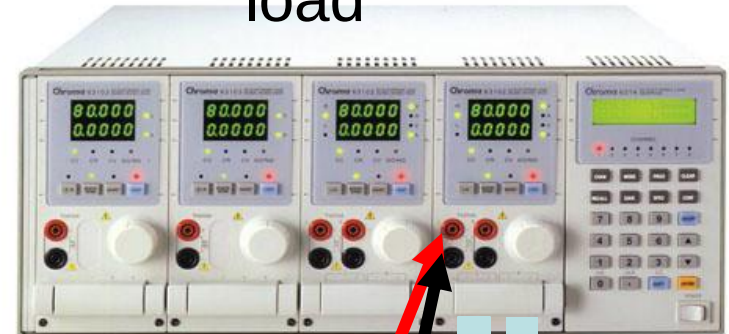
- ❑ a dc voltage source, delivering up to 80 V dc and up to 3 A
 - ❑ a dc load absorbing up to 100 W, $V_{in,max} < 20\text{ V}$, $I_{out,max} < 40\text{ A}$
 - ❑ either the above load can display dc V and dc A or separated V and A-meters are necessary
 - ❑ An oscilloscope with single shot capability
- *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

source



load

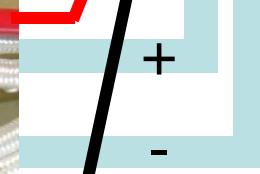


Jumper is removed



Socket in which the dc-dc is firmly plugged

Kelvin sense

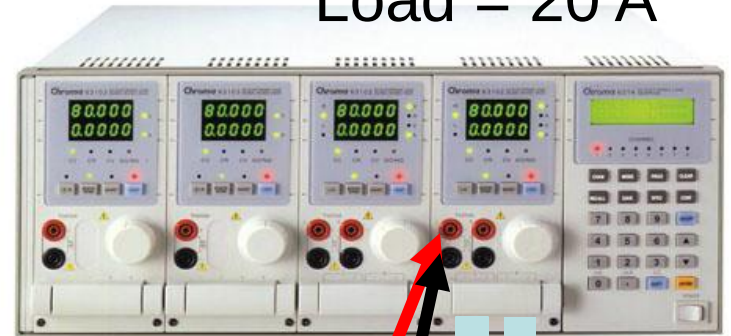
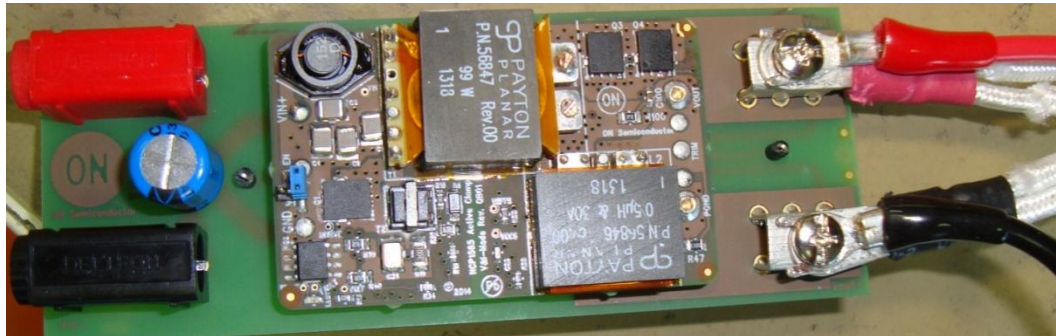


Test n°1

Source = 36 V

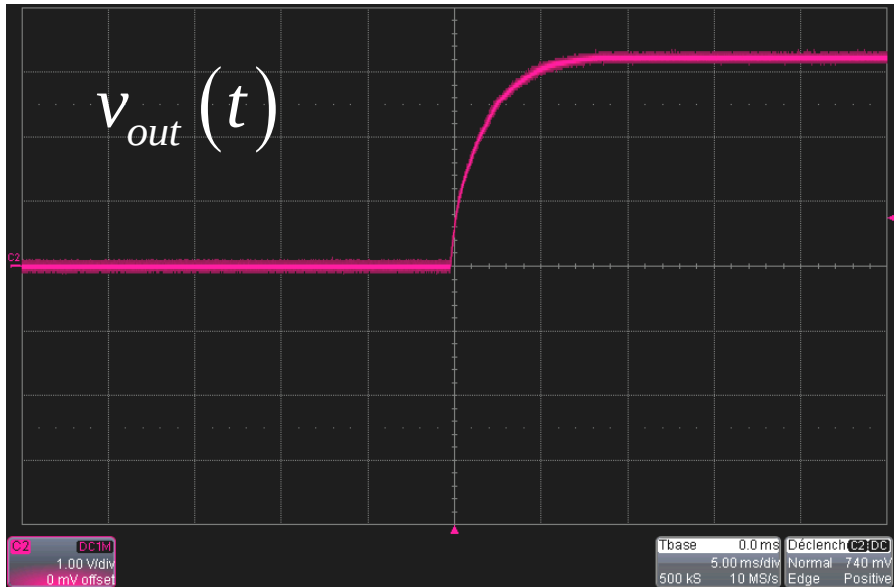


Load = 20 A

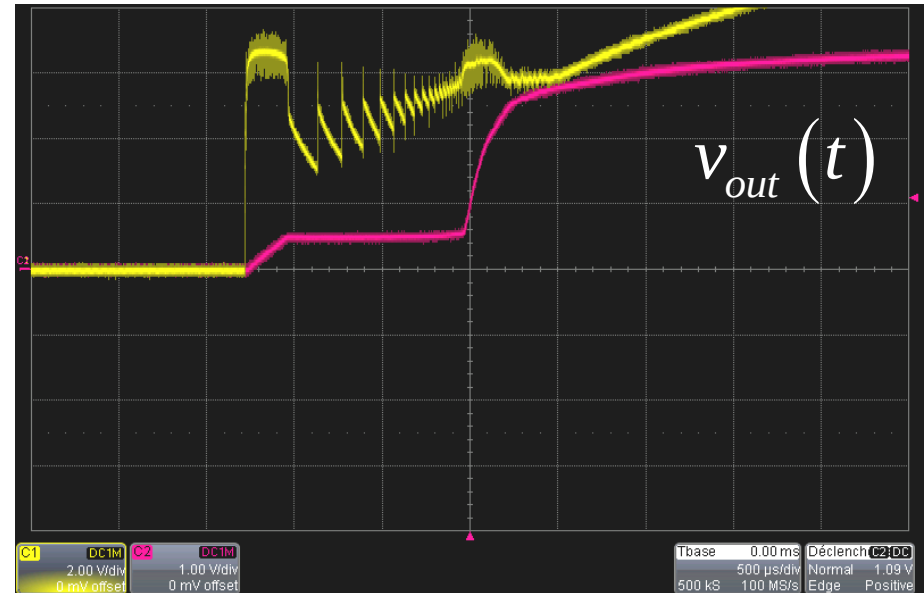


- Start the power supply while the load current is 20 A
- Monitor the output voltage on a scope
- Verify the voltage is monotonically rising

Test n°1



Ok



Bad

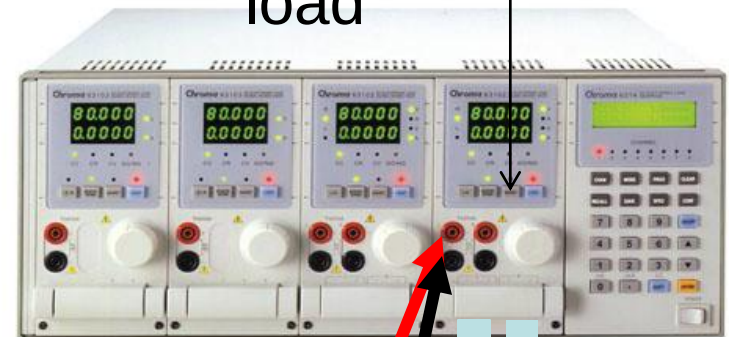
- It is important to verify the absence of double slope
- Repeat the test for $V_{in} = 48\text{ V}$ and 72 V
- Change load to 0 A , repeat tests. Wait 10 s between re-starts.

Test n°2

source

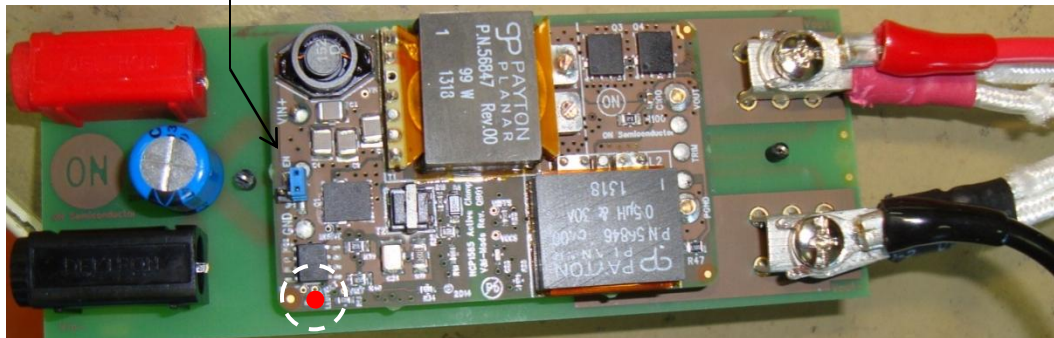


load



Press
short

Jumper is removed



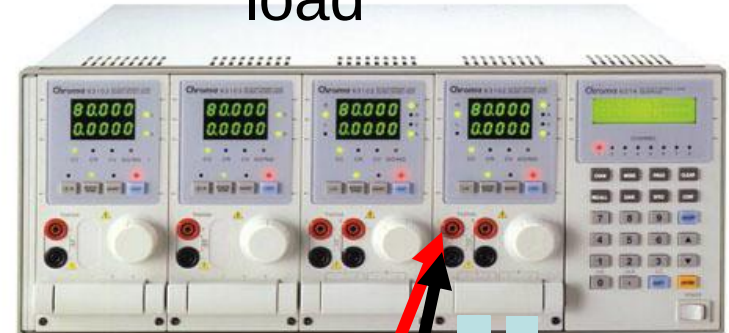
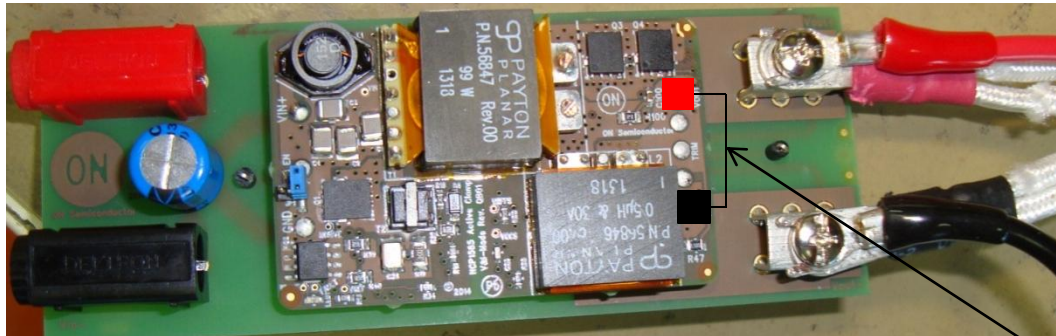
- Press short circuit at $V_{in} = 36\text{ V}$. Led blinks, board ticks.
- Repeat test for $V_{in} = 48\text{ V}$ and 72 V
- Release short and make sure output resumes at 3.3 V .

Test n°3

source



load



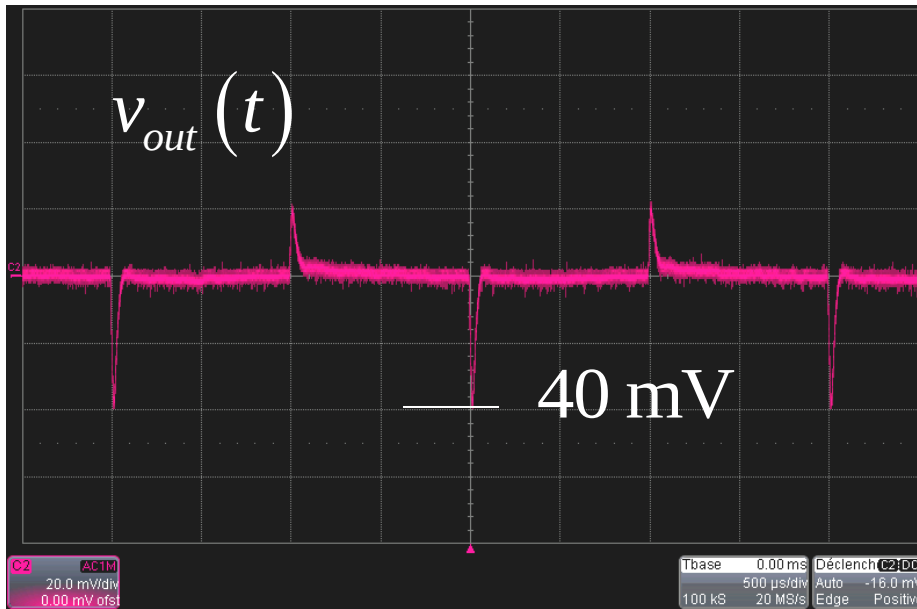
Probe here



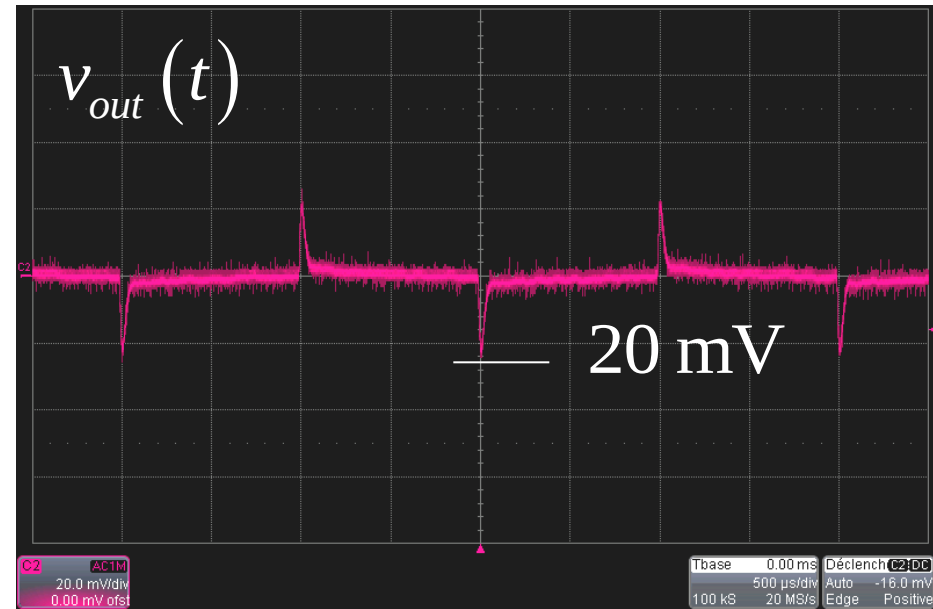
No pigtail!

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

Test n°3



$V_{in} = 36 \text{ V}$ $I_{out} = 15 \text{ to } 20 \text{ A}, 1 \text{ A}/\mu\text{s}$



$V_{in} = 48 \text{ V}$ $I_{out} = 15 \text{ to } 20 \text{ A}, 1 \text{ A}/\mu\text{s}$

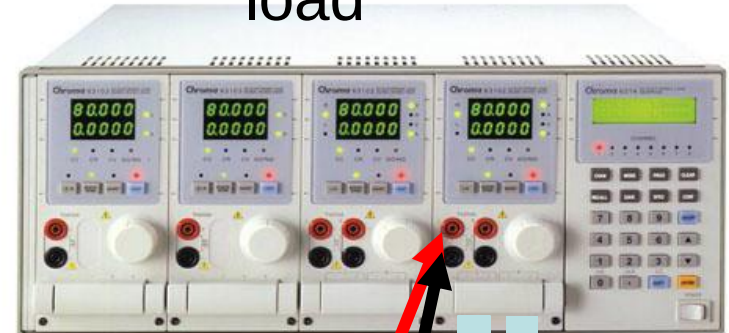
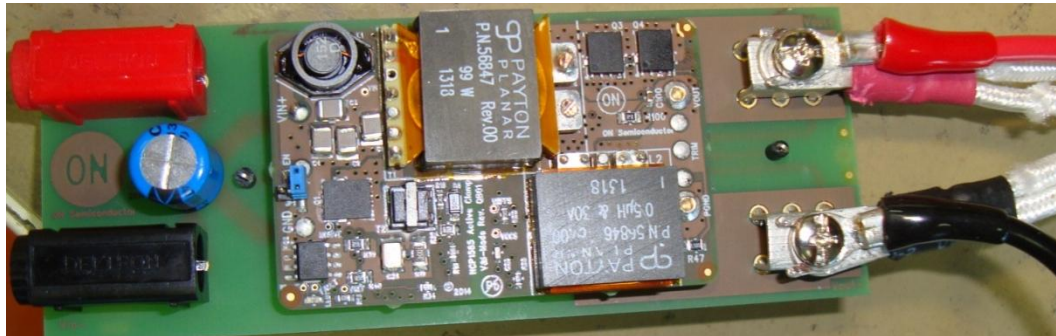
- Run the test from $V_{in} = 36 \text{ V}$ (worst case) to $V_{in} = 72 \text{ V}$.
- Spec is to have an under/over shoot less than 60 mV

Test n°4

source



load



- Leave the board for 5 mn at $V_{in} = 36\text{ V}/20\text{ A}$.
- Check no thermal disjonction occurs.
- Board is declared sound.