ON Semiconductor®

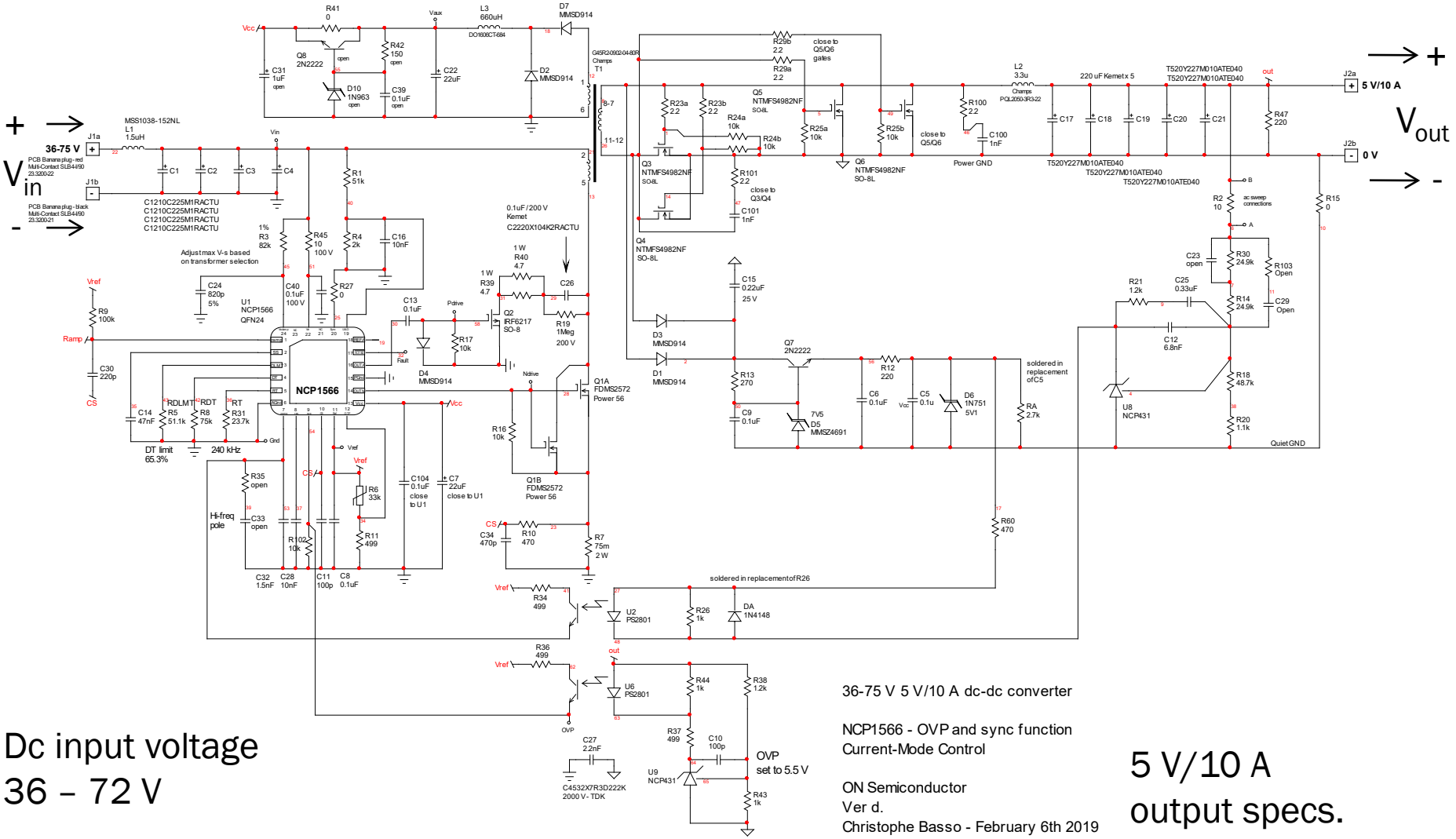
Test Procedure for the NCP1566 5-V/10-A Dc-Dc Converter

Christophe Basso

April 29th 2019

Rev. 1

Board Electrical Schematic



Dc input voltage
36 – 72 V

36-75 V 5 V/10 A dc-dc converter

NCP1566 - OVP and sync function
Current-Mode Control

ON Semiconductor
Ver d.
Christophe Basso - February 6th 2019

5 V/10 A
output specs.

Board Picture

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36 to 72 V

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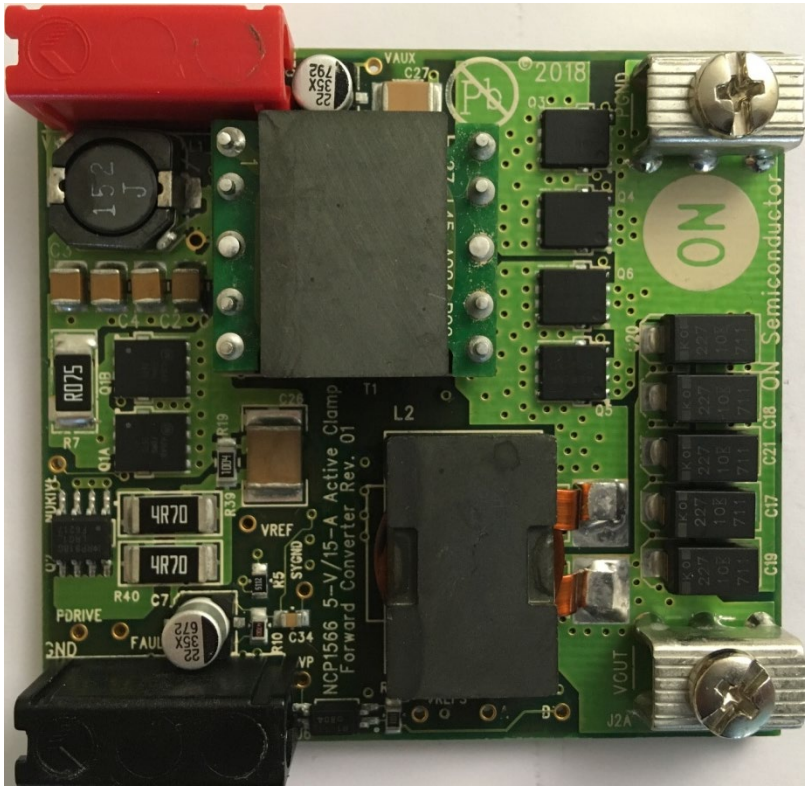


5 V
10 A

Input voltage is 48 V nominal.
Range is from 36 to 72 V.

Output voltage is 5 V nominal.
Output current is 10 A, max is 15 A

NCP1566FIVTEVB

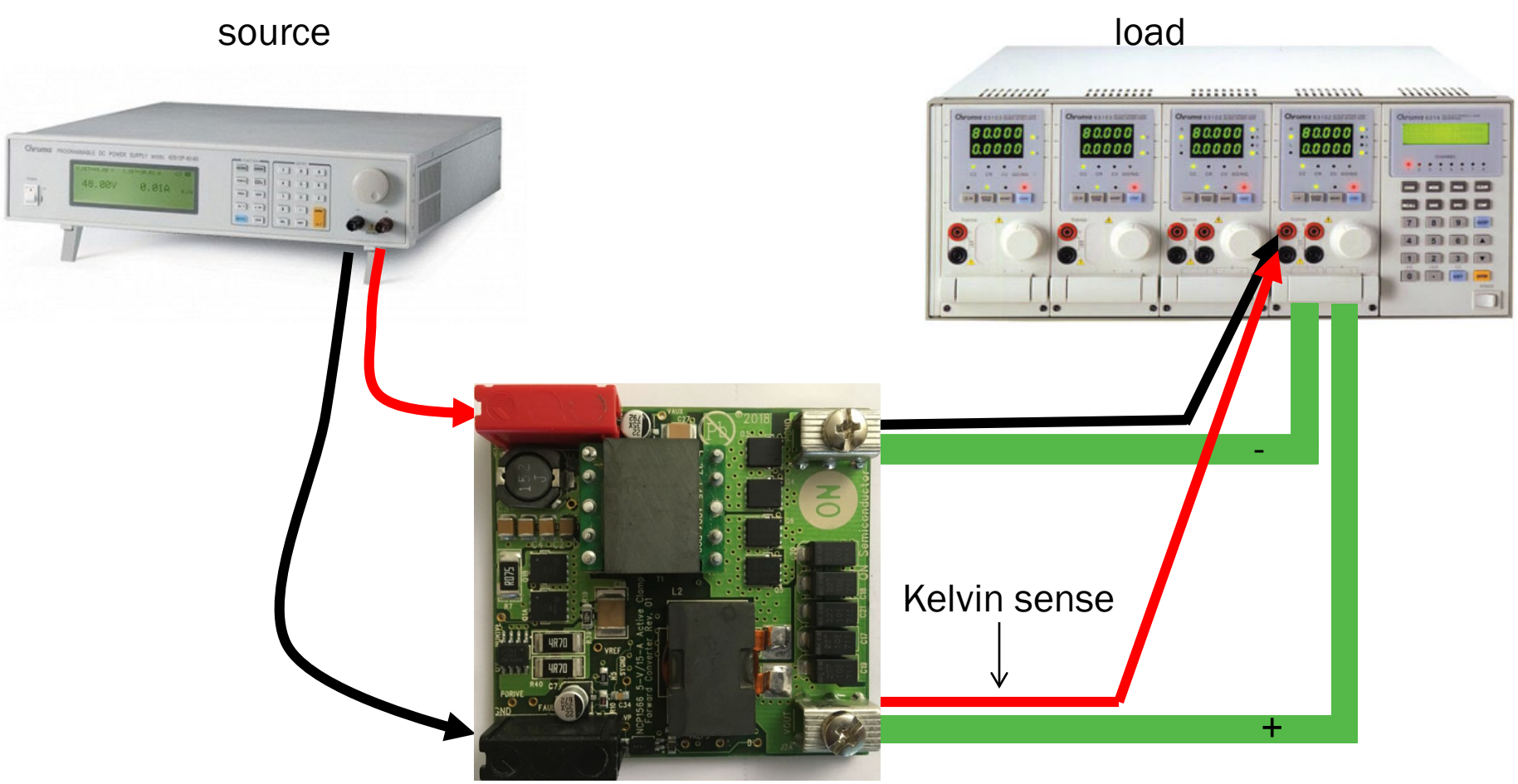
Needed Equipment

The needed equipments are the following:

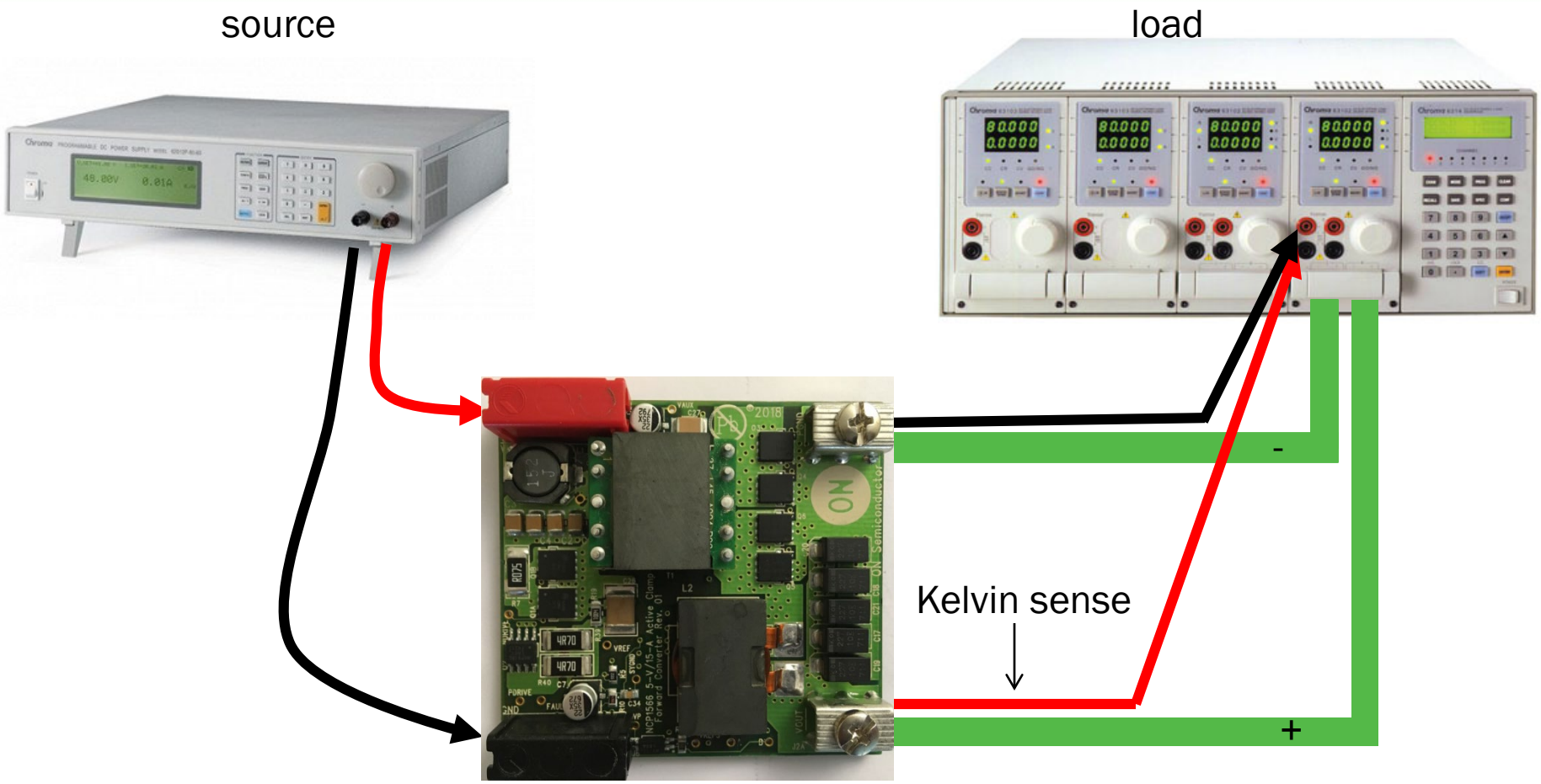
- ❑ a dc voltage source, delivering up to 60 V dc and up to 2 A
- ❑ a dc load absorbing up to 100 W, $V_{in,max}$ < 10 V, $I_{out,max}$ < 20 A
- ❑ either the above load can display dc V and dc A or separated V and A-meters are necessary
- ❑ An oscilloscope with single shot capability

➢ *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

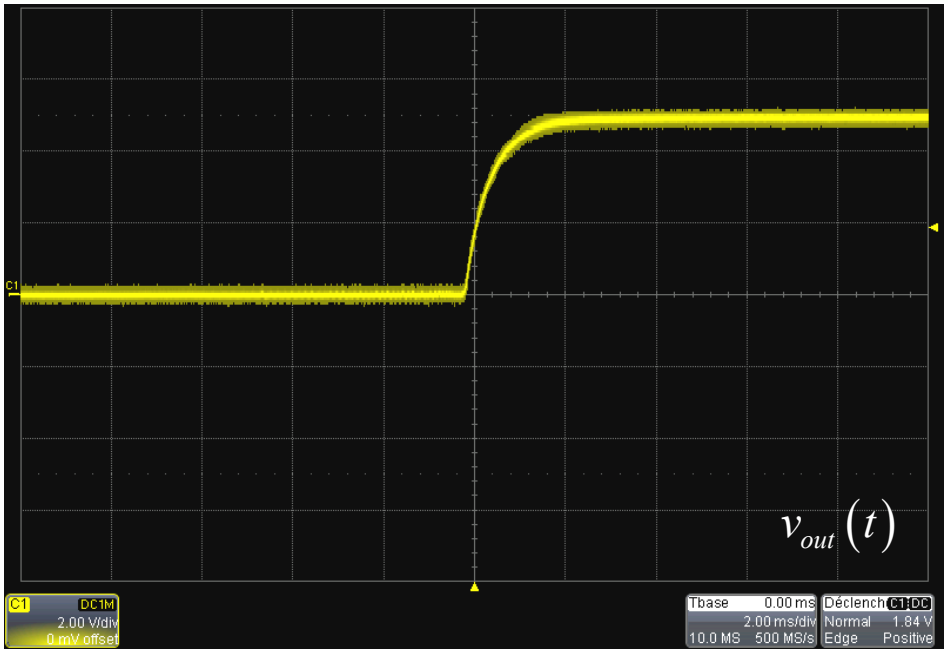


Test n°1

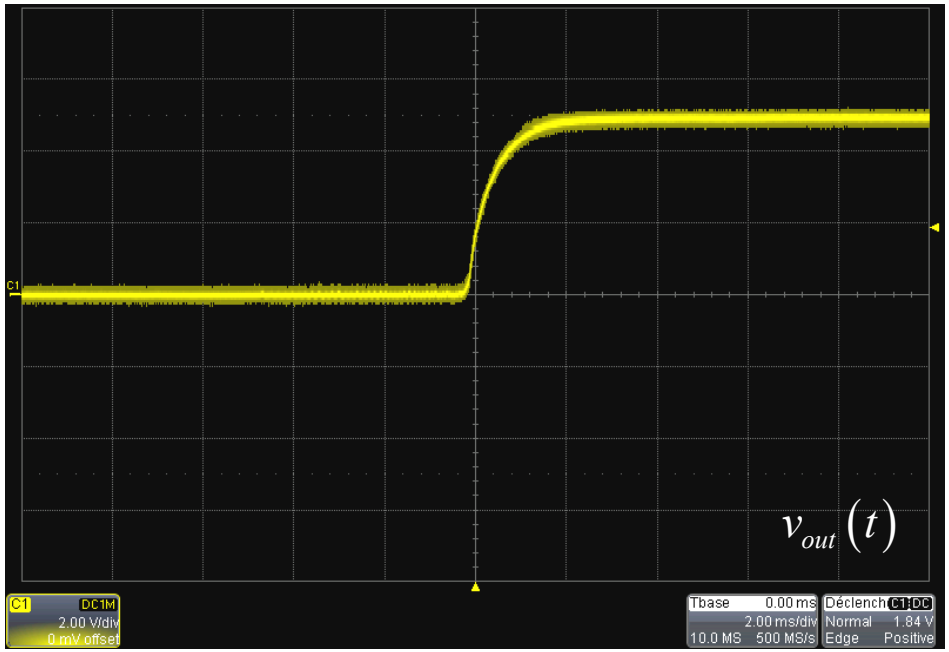


- Start the power supply V_{in} = 48 V while the load current is 10 A
- Monitor the output voltage on a scope
- Verify the voltage is monotonically rising

Test n°1



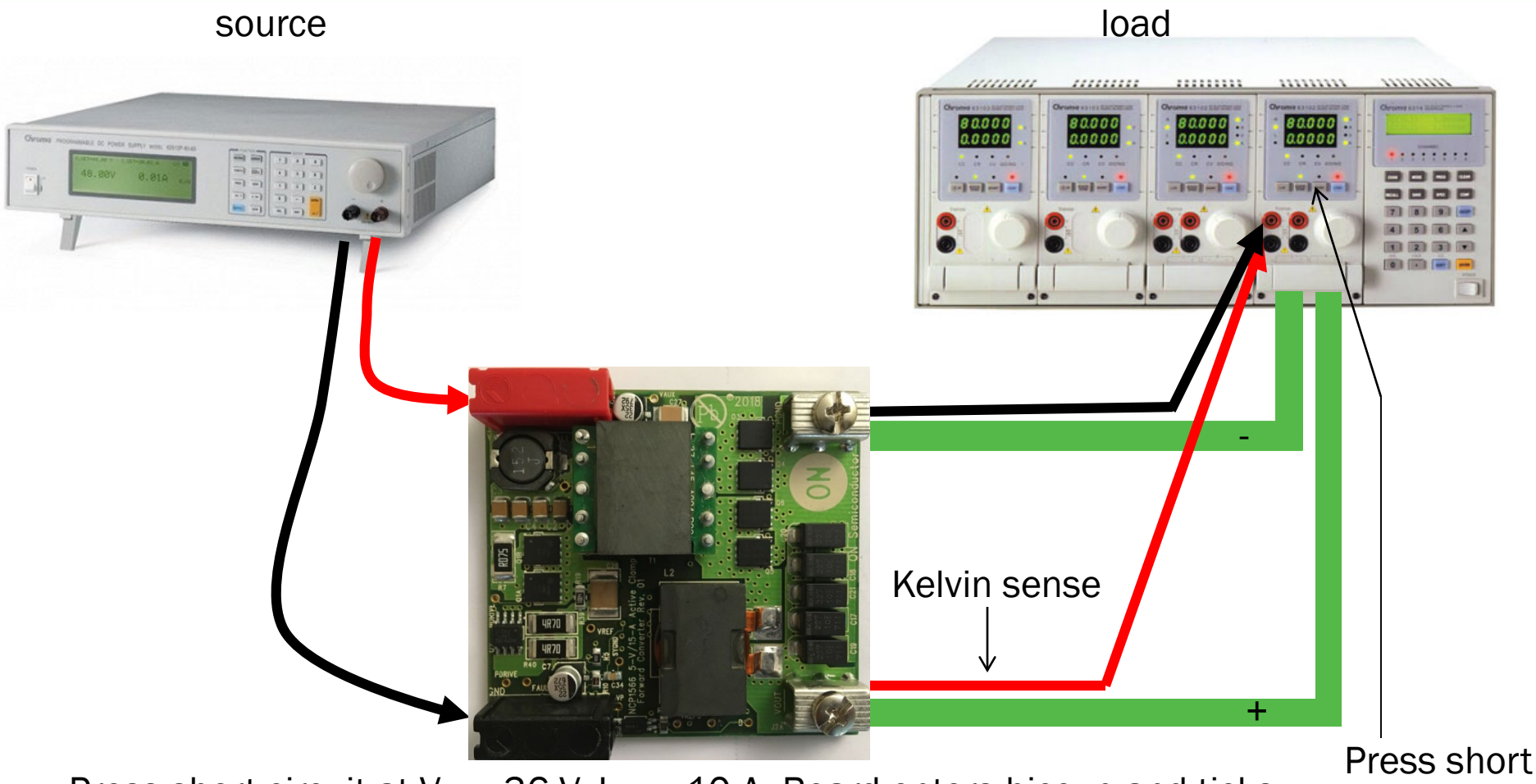
V_{in} = 0 to 48 V – I_{out} = 1 A



V_{in} = 0 to 48 V – I_{out} = 10 A

- It is important to verify the absence of negative slope
- Repeat the test for V_{in} = 36 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

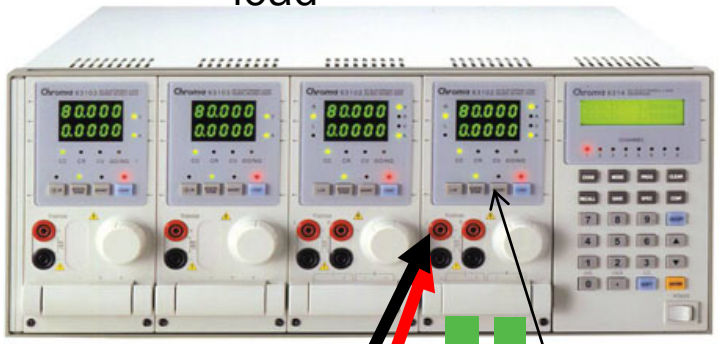


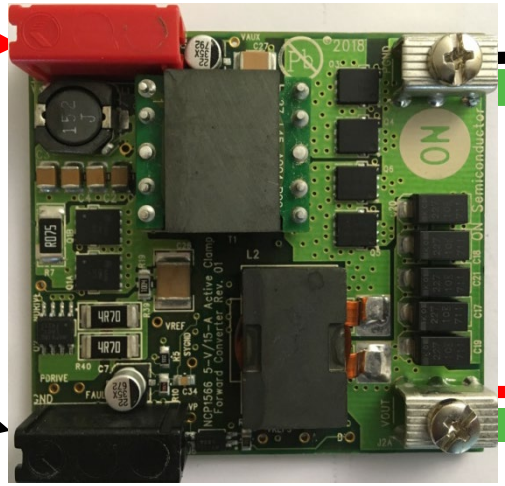
- Press short circuit at V_{in} = 36 V, I_{out} = 10 A. Board enters hiccup and ticks.
- Repeat test for V_{in} = 72 V
- Release short and make sure output resumes at 5 V

Test n°3

source

load





Kelvin sense

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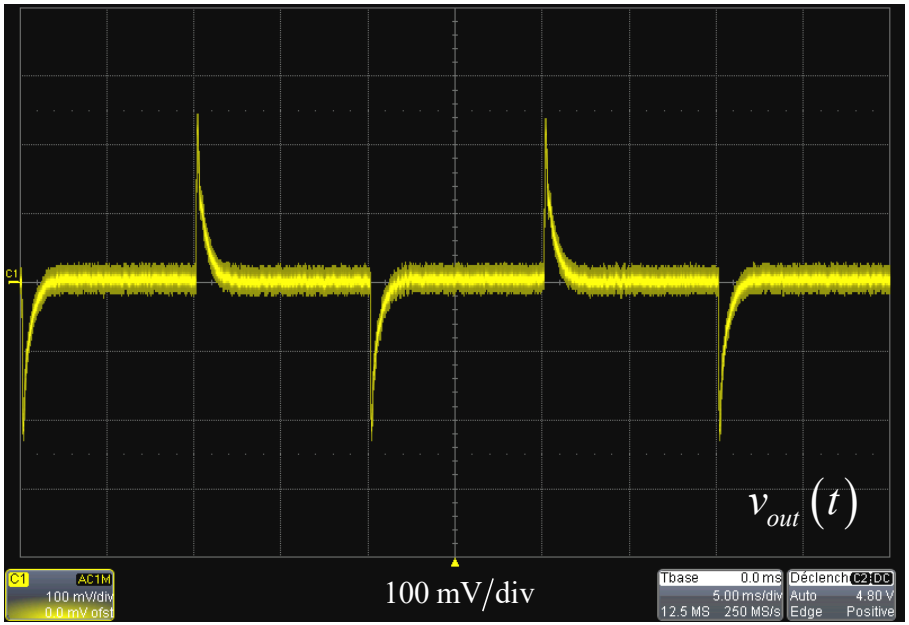
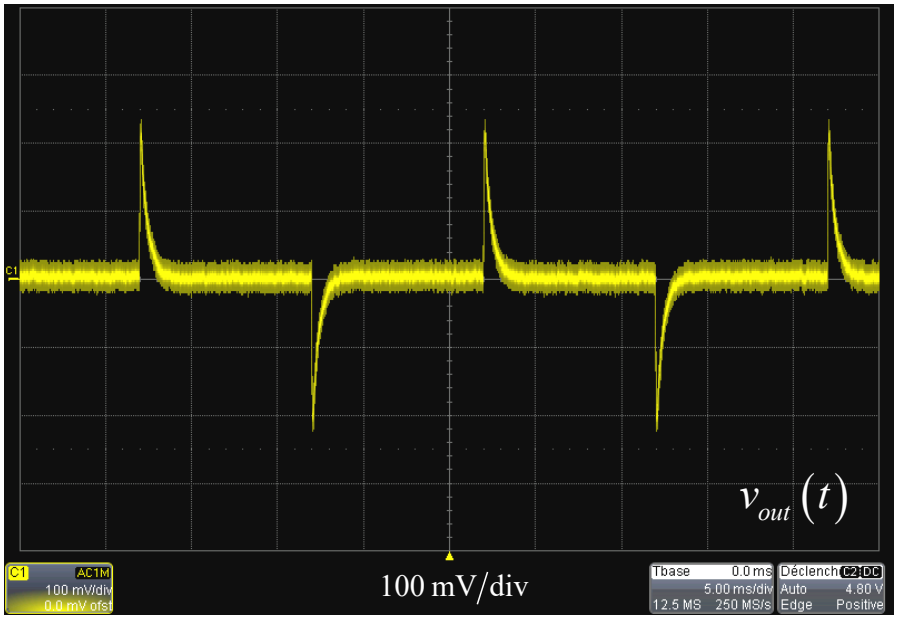
No pigtail!

- Program load to dynamic current mode
- I_{out} from 5 A to 10 A, slope 1 A/µs
- 10 ms interval, observe V_{out} on scope in ac, 100 mV/div

Test n°3



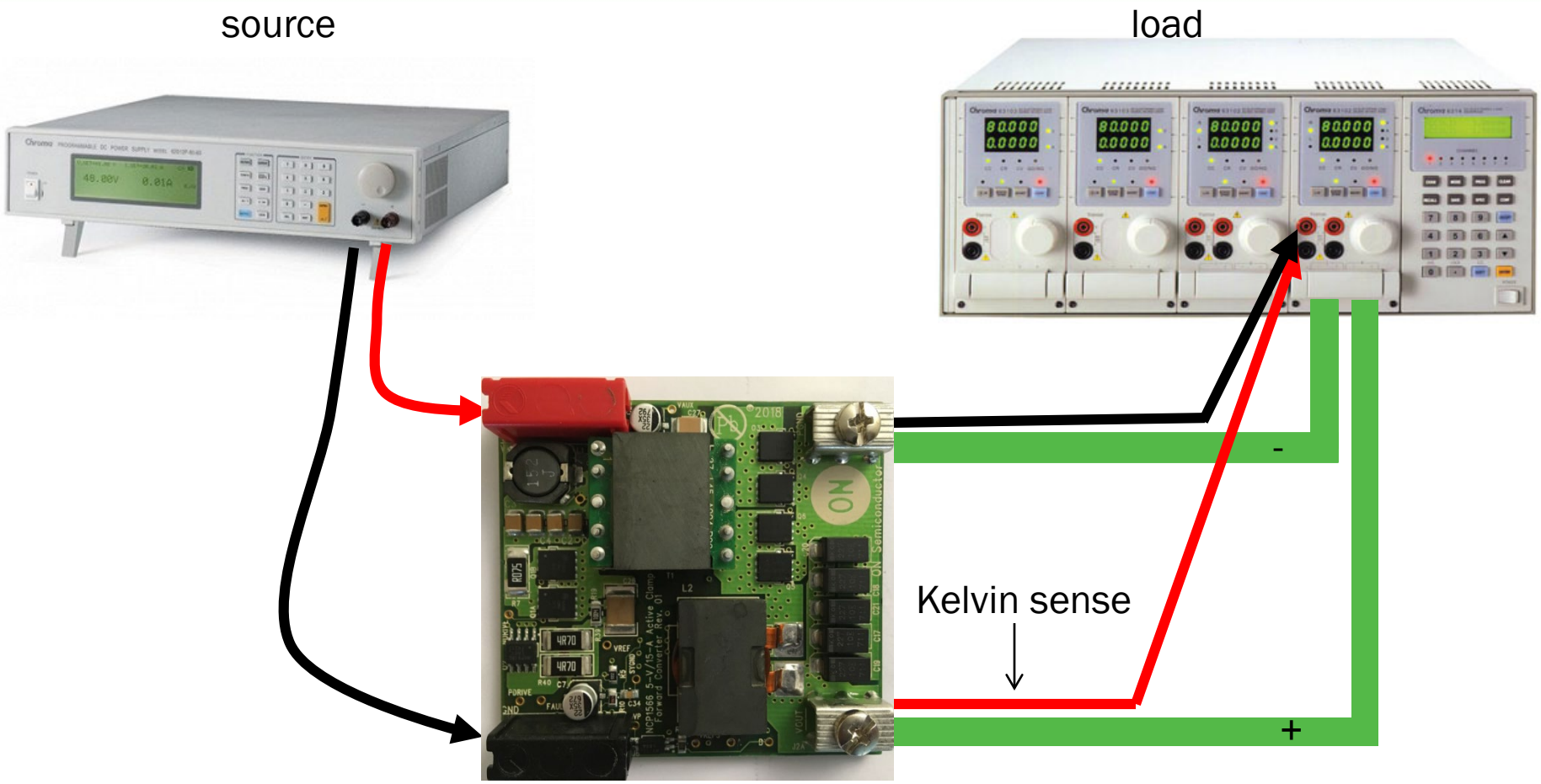
V_{in} = 36 V – 5 to 10 A – 1 A/µs



V_{in} = 48 V – 5 to 10 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 300 mV

Test n°4



- Leave the board for 5 mn at V_{in} = 36 V/10 A and room temperature.
- Check no thermal triping occurs.
- Board is declared sound.