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

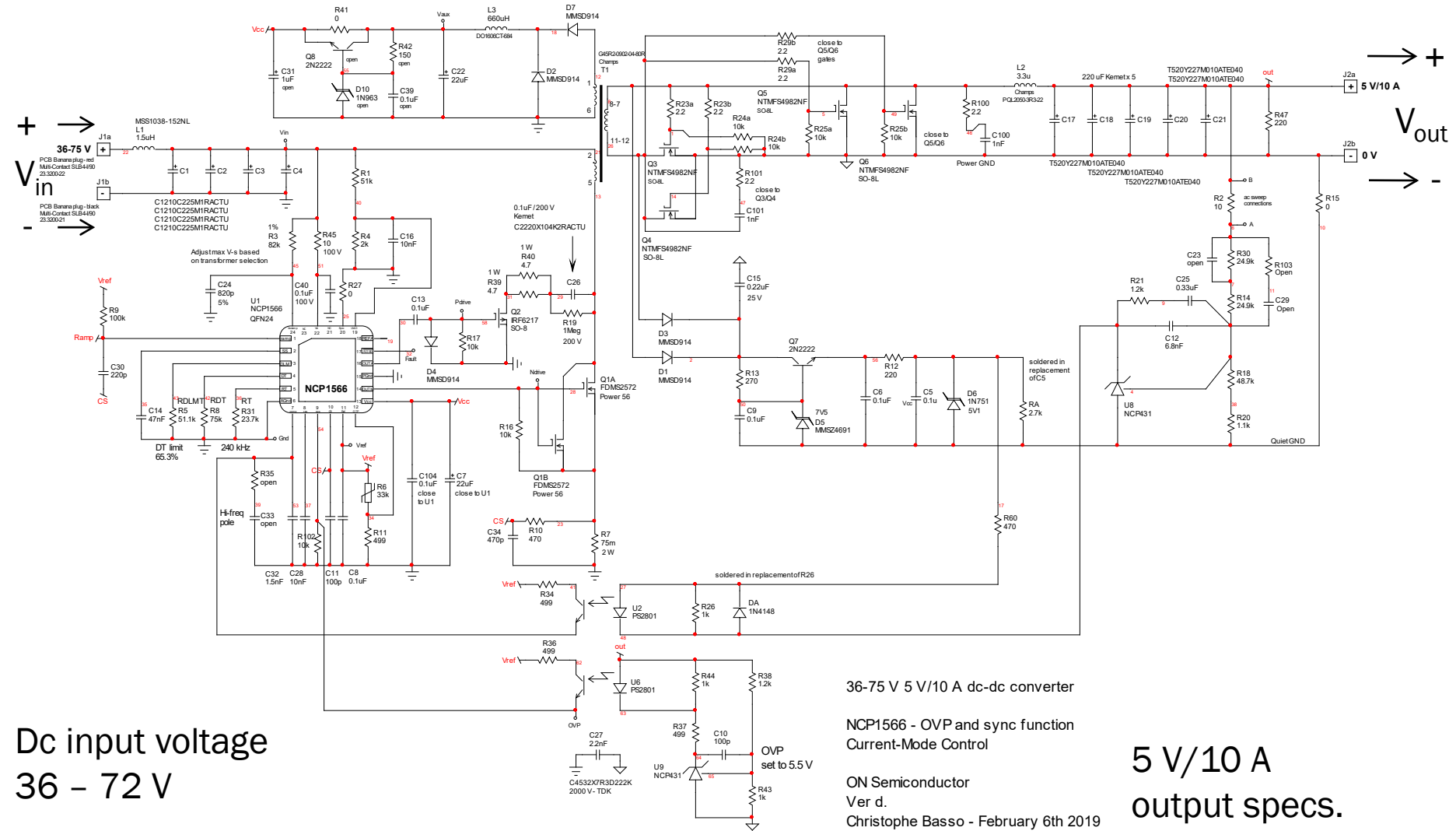
Christophe Basso

April 29th 2019

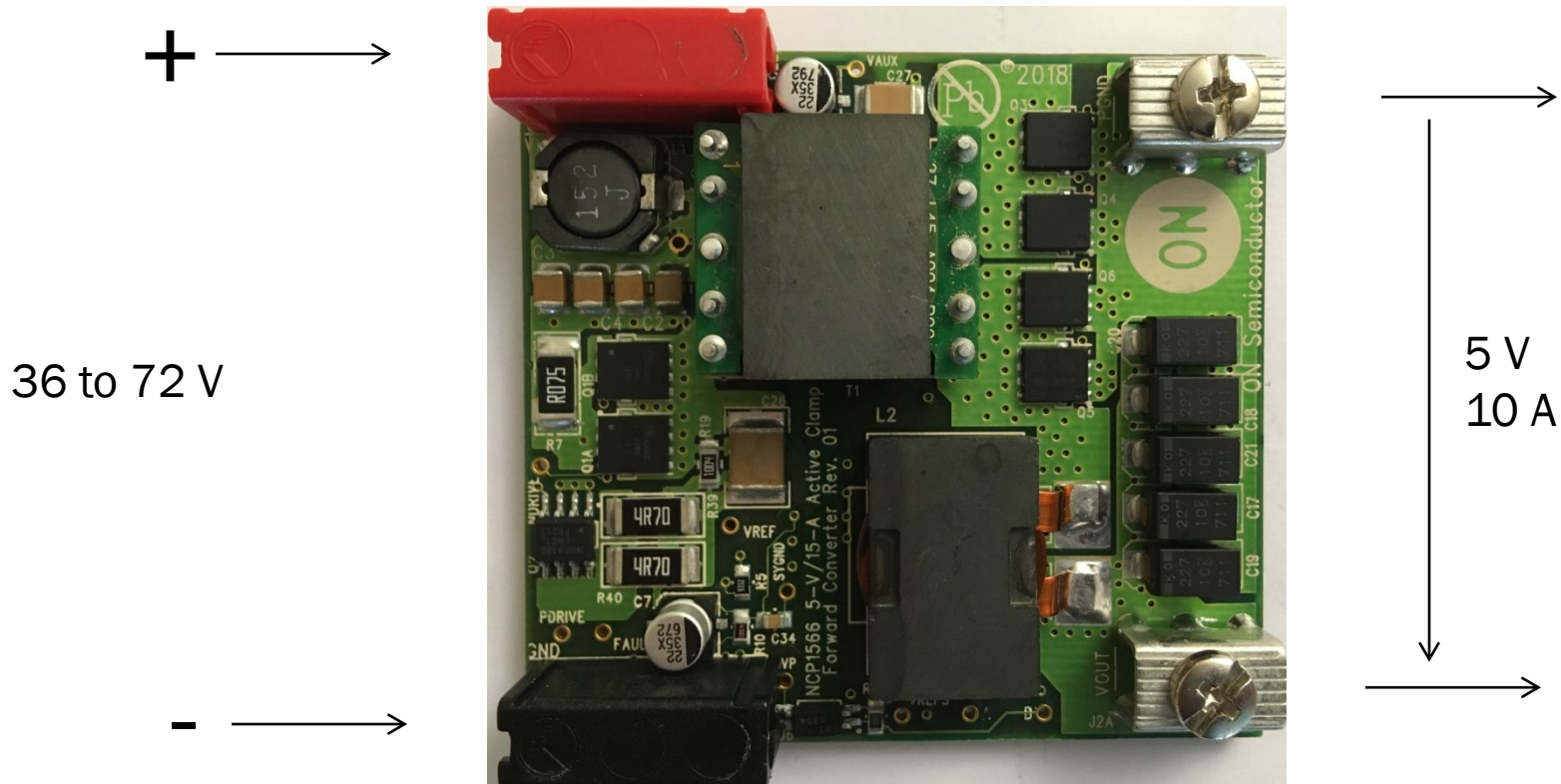
Rev. 1



Board Electrical Schematic



Board Picture



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:

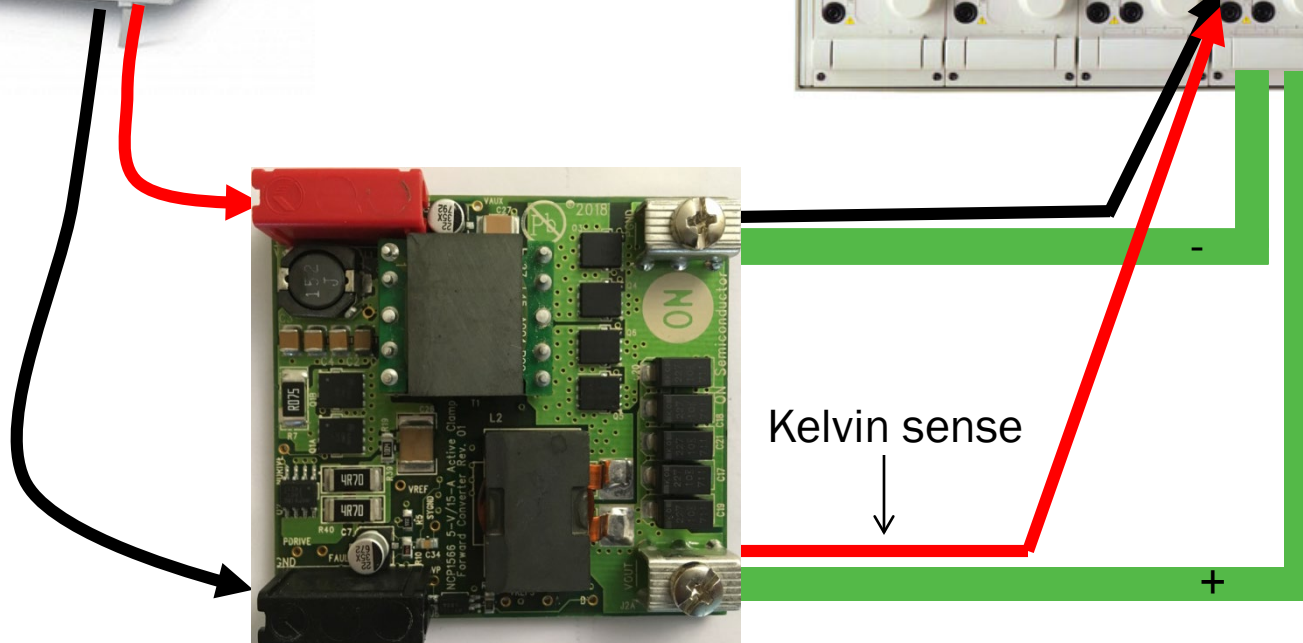
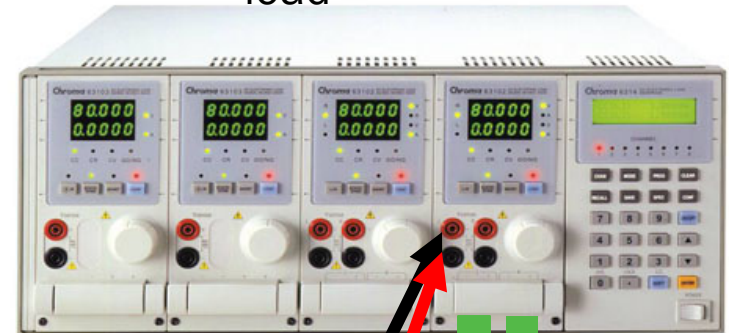
- ❑ a dc voltage source, delivering up to 60 V dc and up to 2 A
 - ❑ a dc load absorbing up to 100 W, $V_{in,max} < 10\text{ V}$, $I_{out,max} < 20\text{ A}$
 - ❑ either the above load can display dc V and dc A or separated V and A-meters are necessary
 - ❑ An oscilloscope with single shot capability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

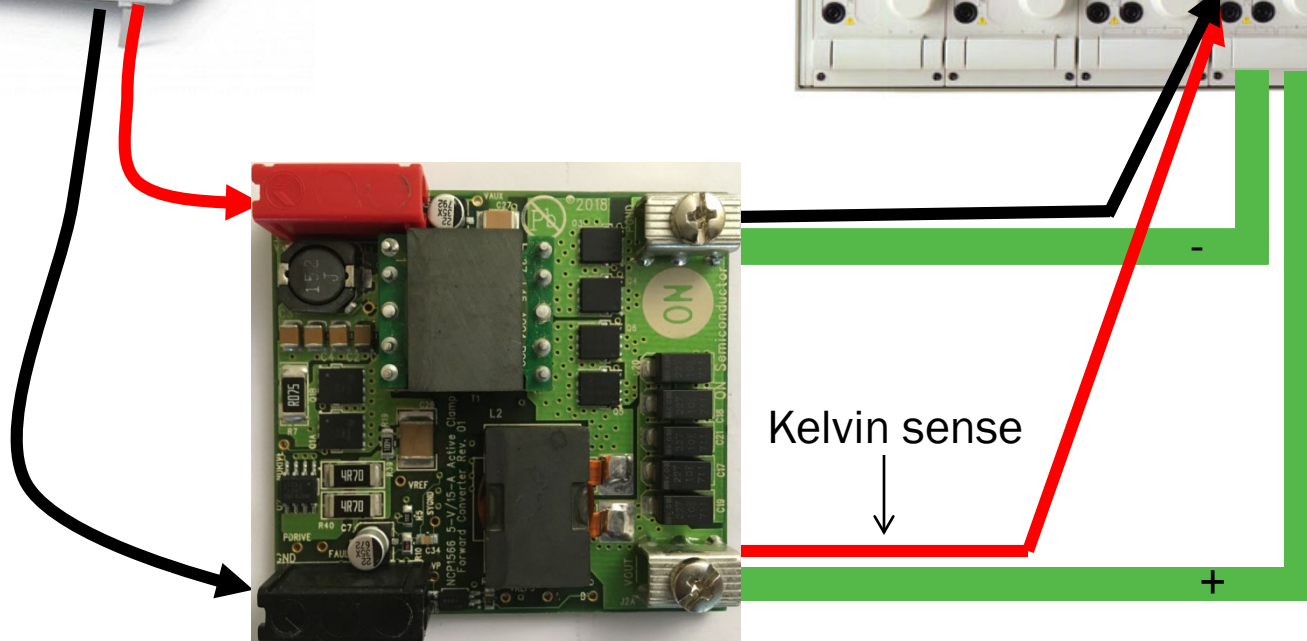
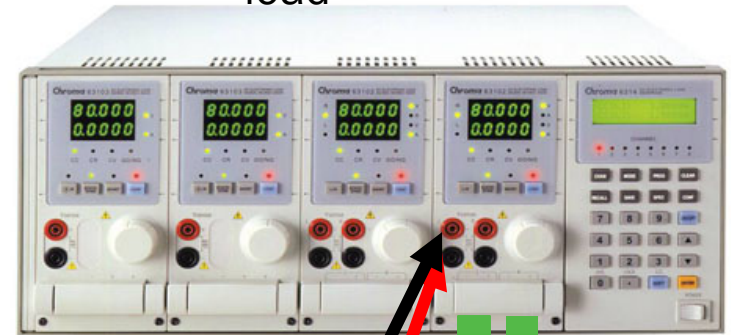


Test n°1

source

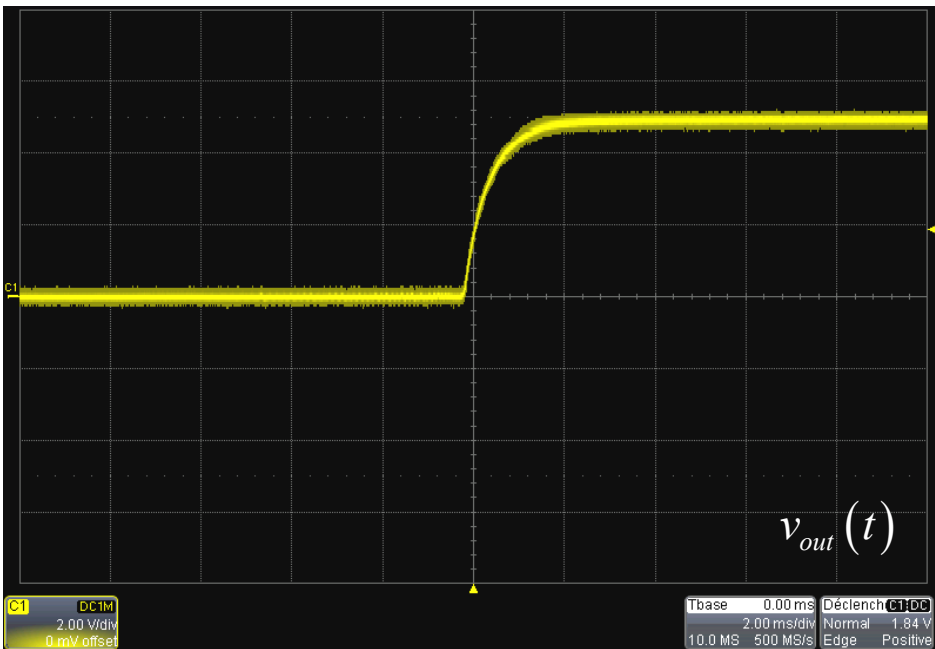


load

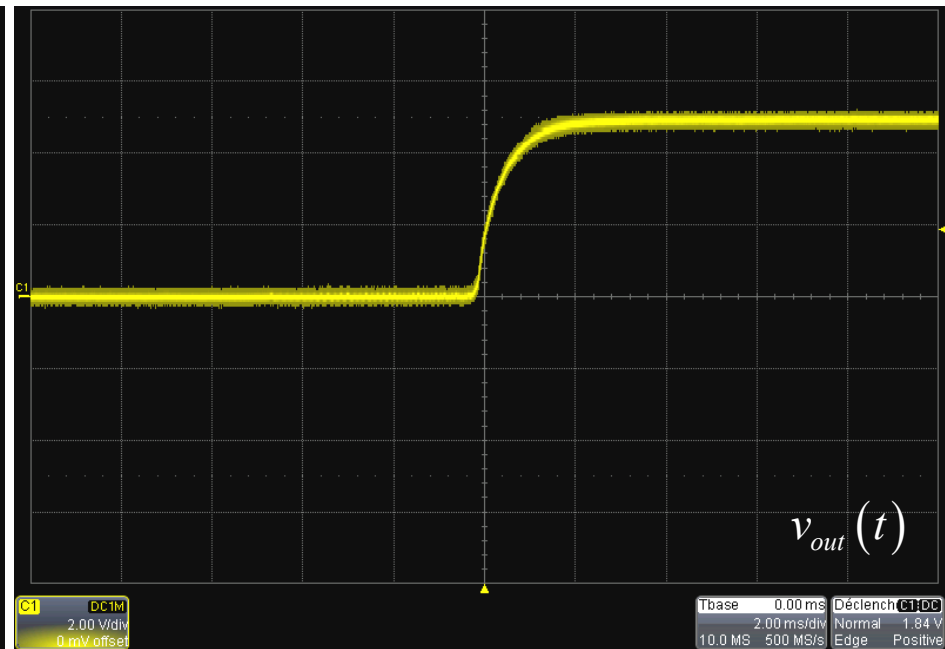


- Start the power supply $V_{in} = 48\text{ V}$ while the load current is 10 A
- Monitor the output voltage on a scope
- Verify the voltage is monotonically rising

Test n°1



$V_{in} = 0 \text{ to } 48 \text{ V} - I_{out} = 1 \text{ A}$



$V_{in} = 0 \text{ to } 48 \text{ V} - I_{out} = 10 \text{ A}$

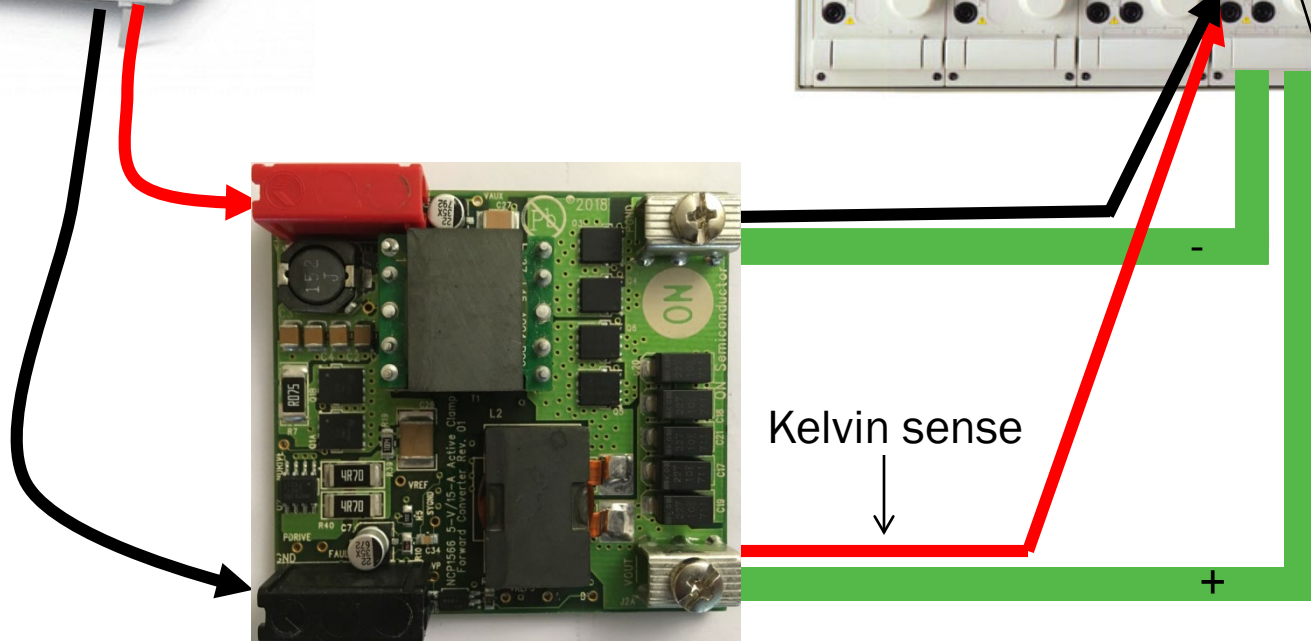
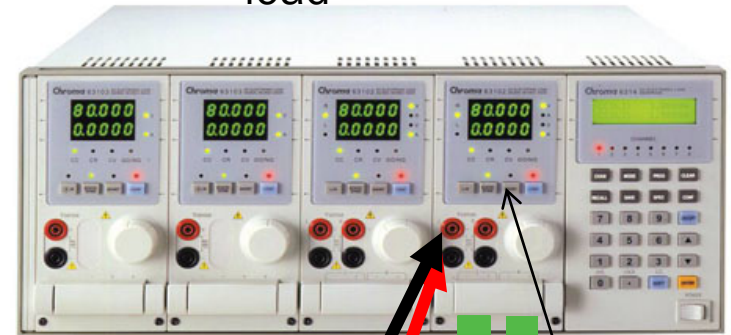
- It is important to verify the absence of negative slope
- Repeat the test for $V_{in} = 36 \text{ V}$ and 72 V
- Change load to 0 A , repeat tests. Wait 10 s between re-starts
- A small glitch at the beginning of the rising edge is acceptable

Test n°2

source



load



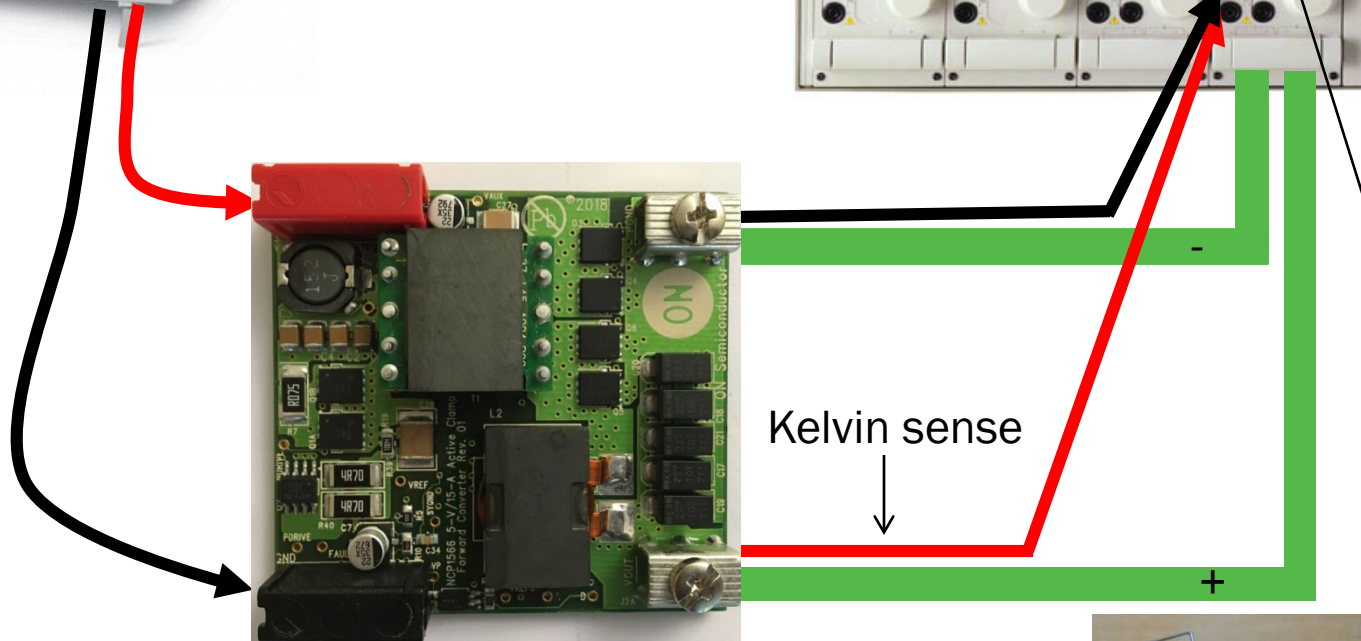
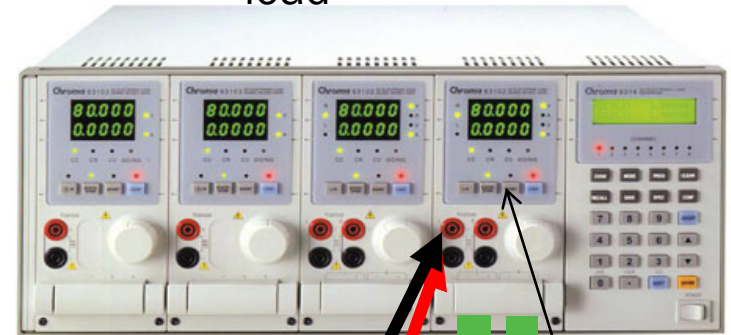
- Press short circuit at $V_{in} = 36\text{ V}$, $I_{out} = 10\text{ A}$. Board enters hiccup and ticks.
- Repeat test for $V_{in} = 72\text{ V}$
- Release short and make sure output resumes at 5 V

Test n°3

source



load

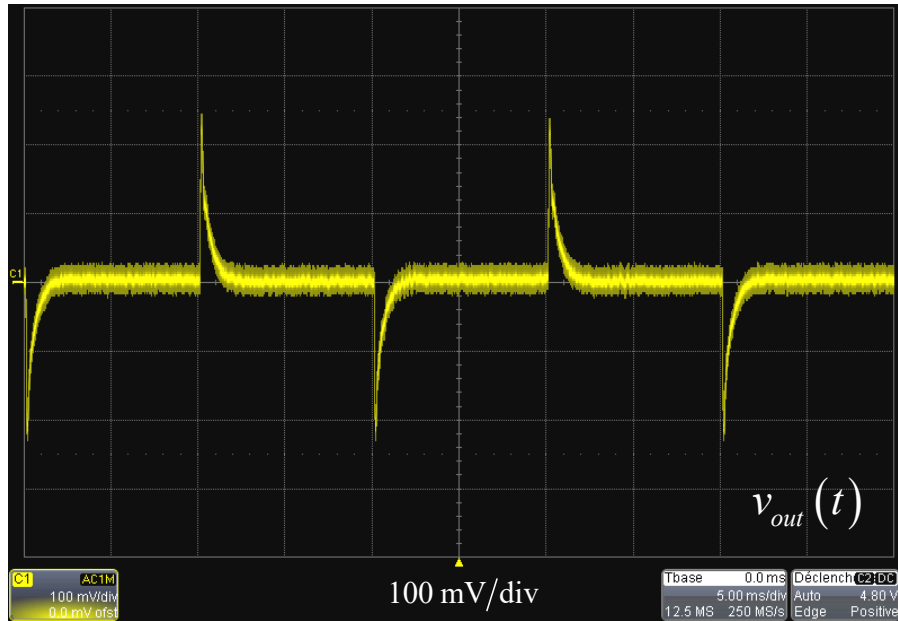


- Program load to dynamic current mode
- I_{out} from 5 A to 10 A, slope 1 A/ μ s
- 10 ms interval, observe V_{out} on scope in ac, 100 mV/div

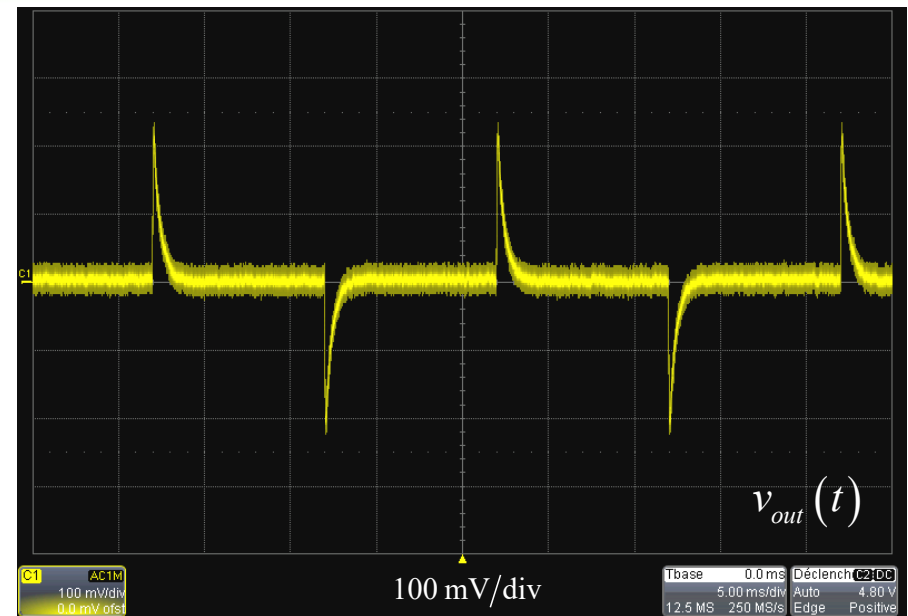


No pigtail!

Test n°3



$$V_{in} = 36\text{ V} - 5\text{ to }10\text{ A} - 1\text{ A}/\mu\text{s}$$



$$V_{in} = 48\text{ V} - 5\text{ to }10\text{ A} - 1\text{ A}/\mu\text{s}$$

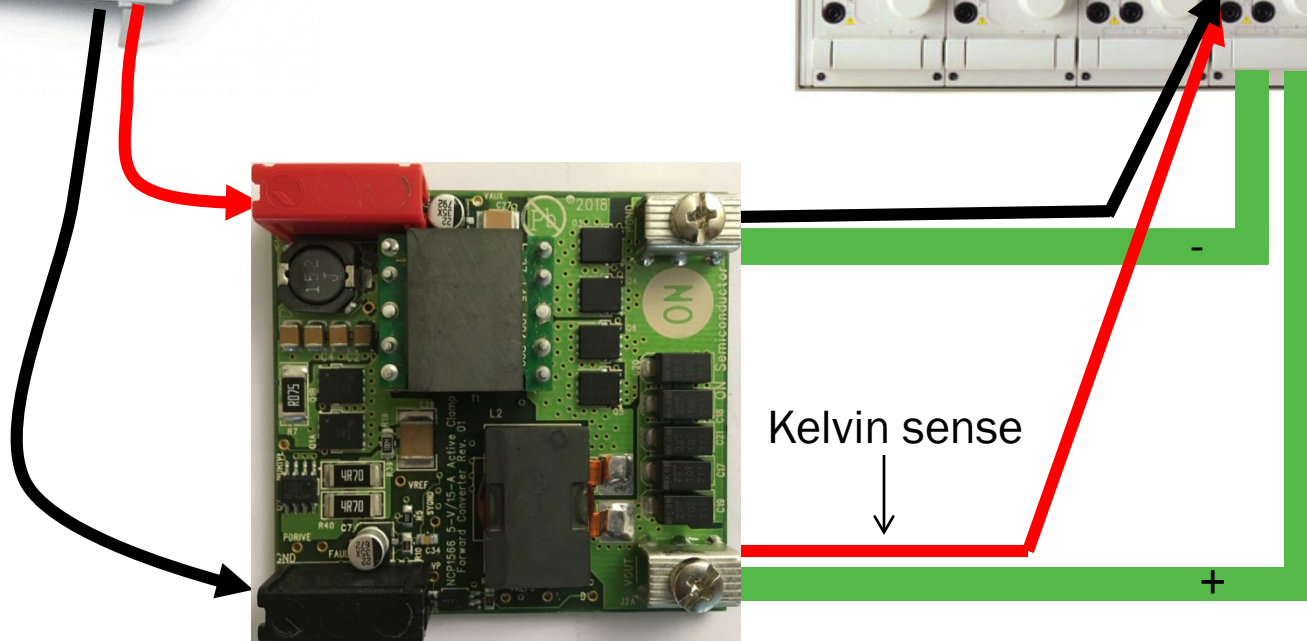
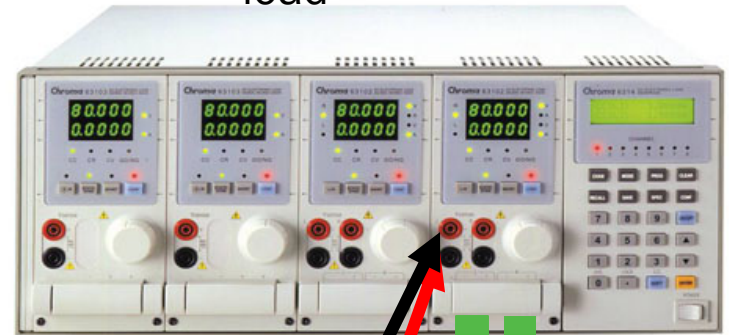
- Run the test from $V_{in} = 36\text{ V}$ (worst case) to $V_{in} = 72\text{ V}$.
- Spec is to have an under/over shoot less than 300 mV

Test n° 4

source



load



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

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