FABRIMEX

Technical Note
TN16081101

Spikes on 175063A

Created by Jürg Schneider, TN16081101_Spikes_on_175063A.docx

Version: A Release 0

Creation date: 11.August 16 15:59

Print date: 12.August 16 14:01

Versions and Releases:

Version A: None

1. Setup

1.1 Used devices

Scope: waveRunner 44Xi
Probes: 10x
BW limited to 20MHz

Galvanic separated probe: Sapphire SI-9001

2. galvanic separated probe: Sapphire SI-9101

2. Comparison of measuring methodes

2.1 GND connection of the probe

Figure 1, spring contact

Figure 2, wired GND connection

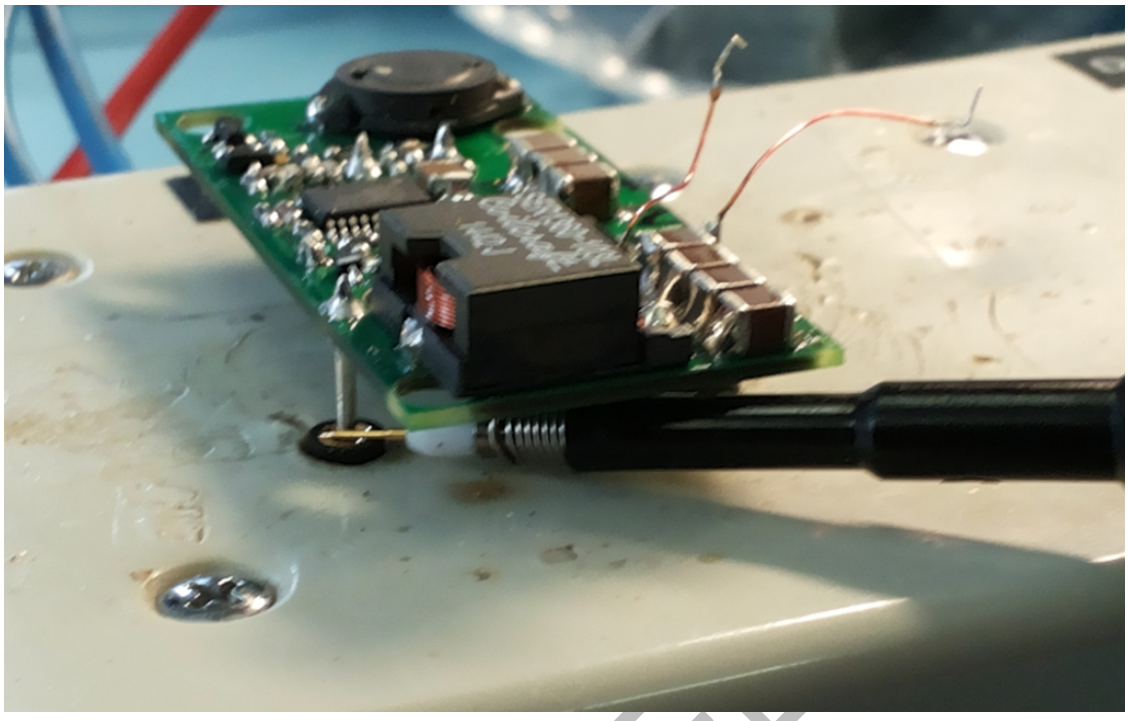

Figure 3, spring contact across the pins

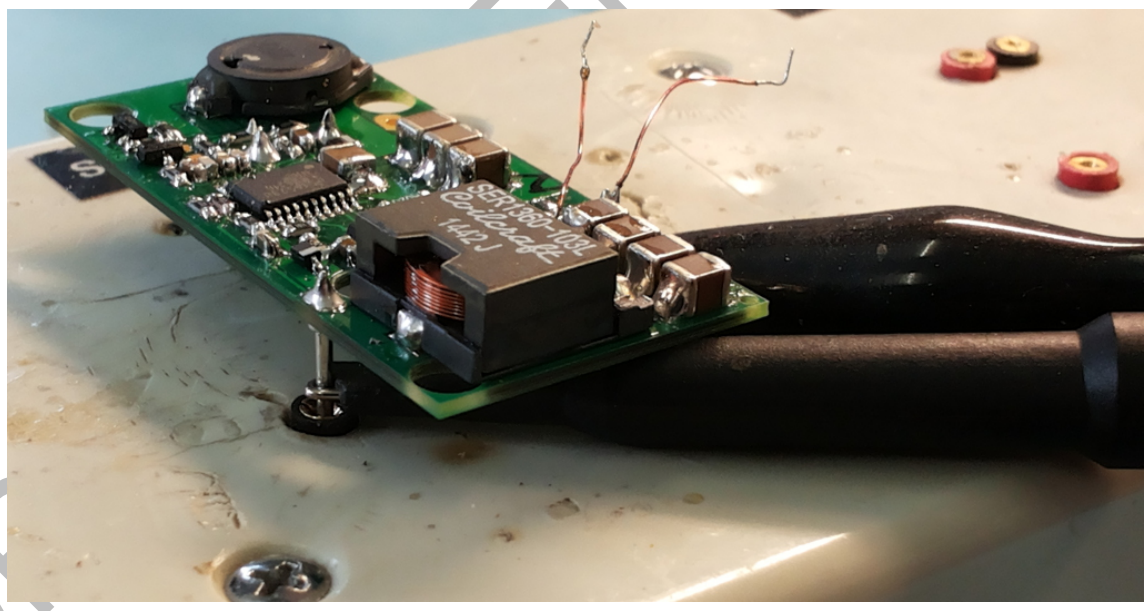

Figure 4, wired GND connection across the pins

Figure 5, HF spikes with spring contact across the pins

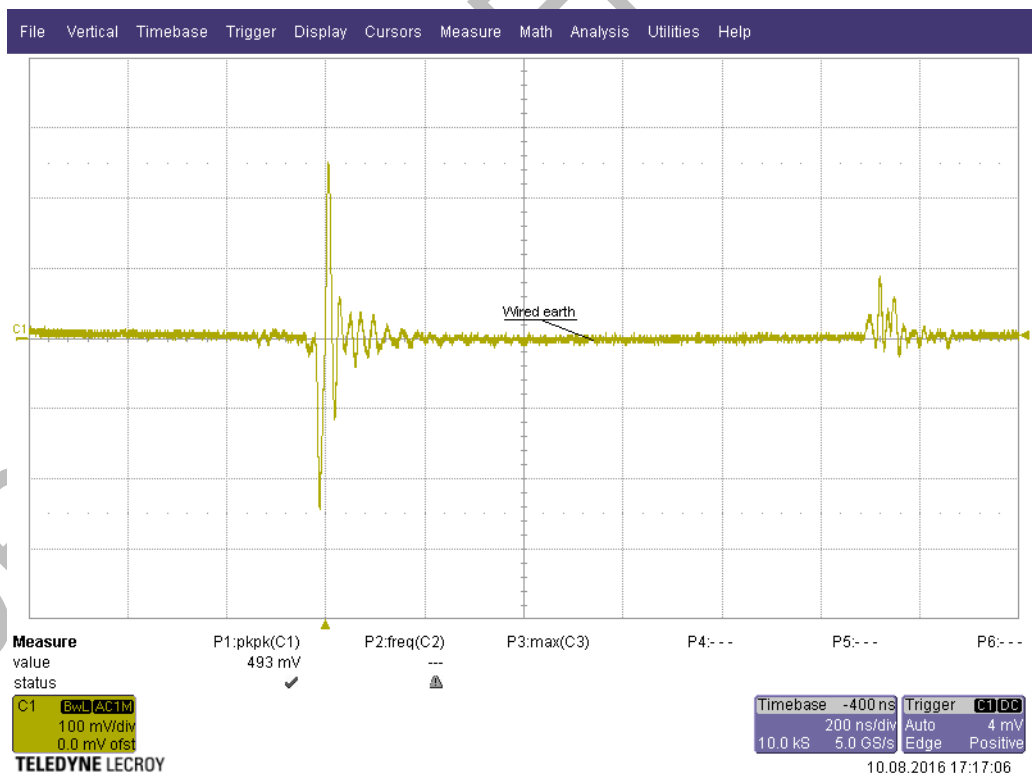

Figure 6, HF spikes with wired GND connection across the pins

2.1.1 Conclusion

With wired GND connection the values are little worse, but this is not the cause.

2.2 Normal probe vs. Sapphire SI-9001

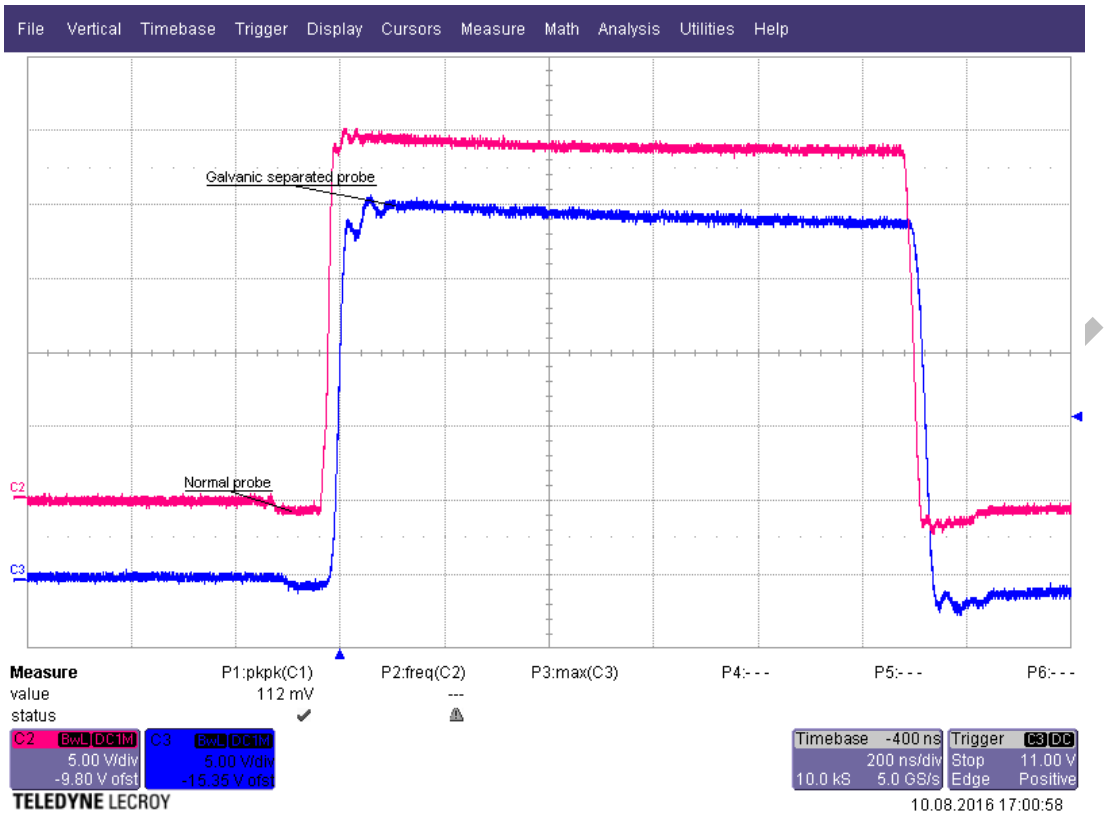

Figure 7, Sapphire SI-9001 in comparison

2.2.1 Conclusion

The differences seems marginal, the Sappire probe has a little delay.

Further measurments are made with the wired probe (HF spikes) and Sapphire probe (others).

3. Initial assembly

3.1 Spikes

Yello: The spikes on Uout.

Blue: The switching node.

Green: Inductor current.

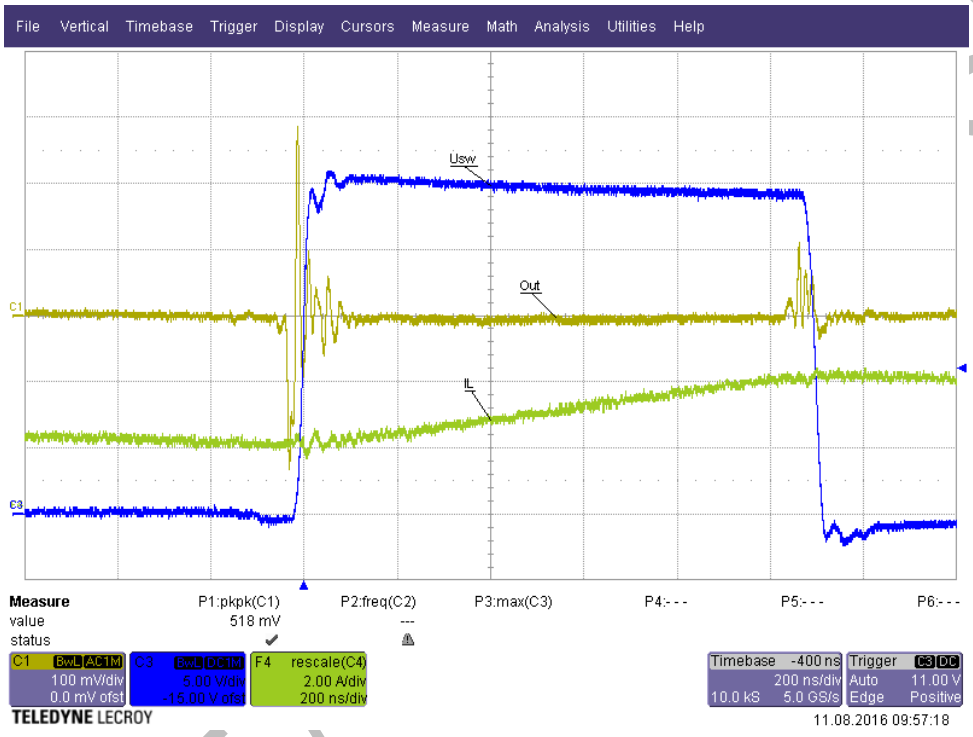

Figure 8, Spikes, Uin = 24V, Iout = 3A

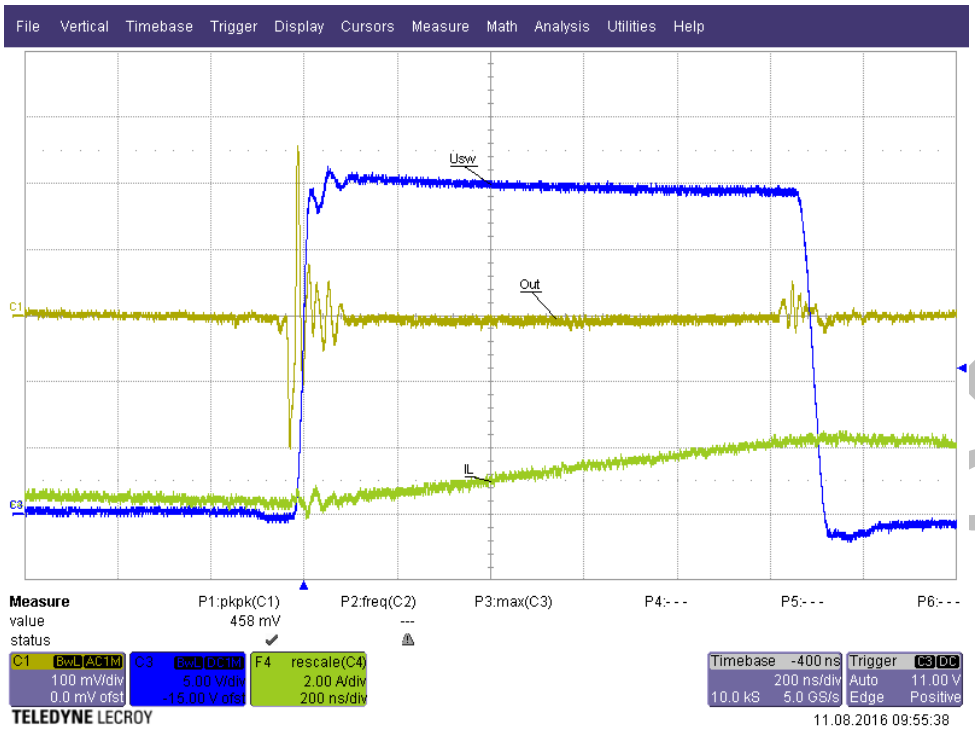

Figure 9, Spikes, Uin = 24V, Iout = 1.2A

The inductor becames empthy:

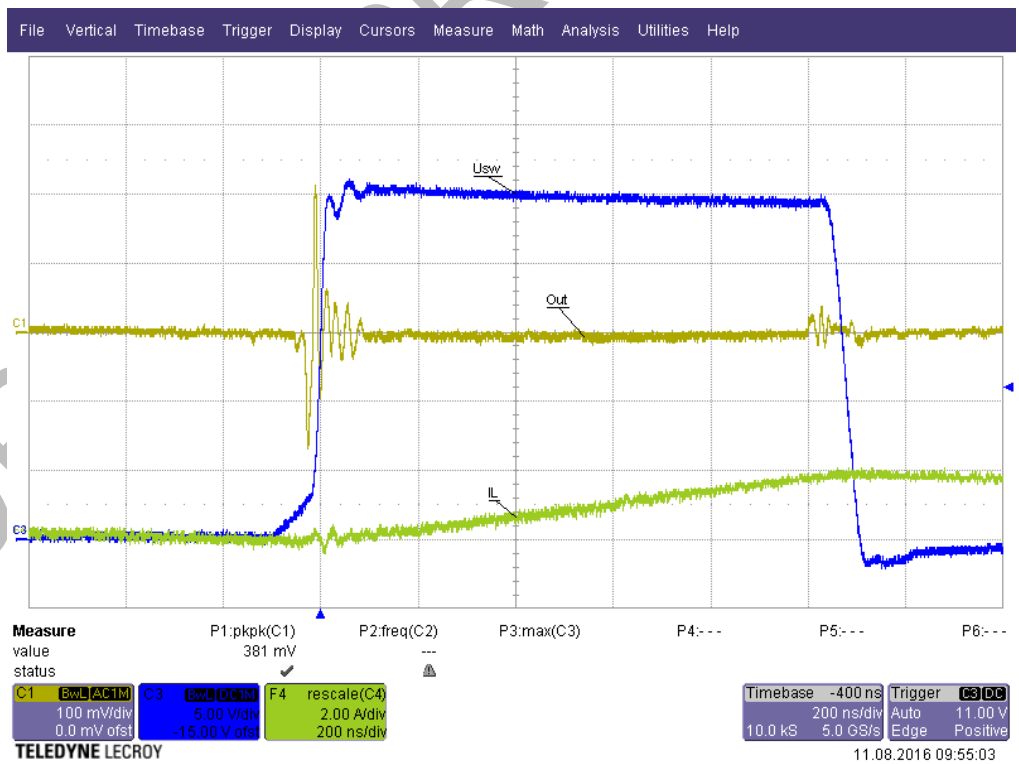

Figure 10, Spikes, Uin = 24V, Iout = 0.8A

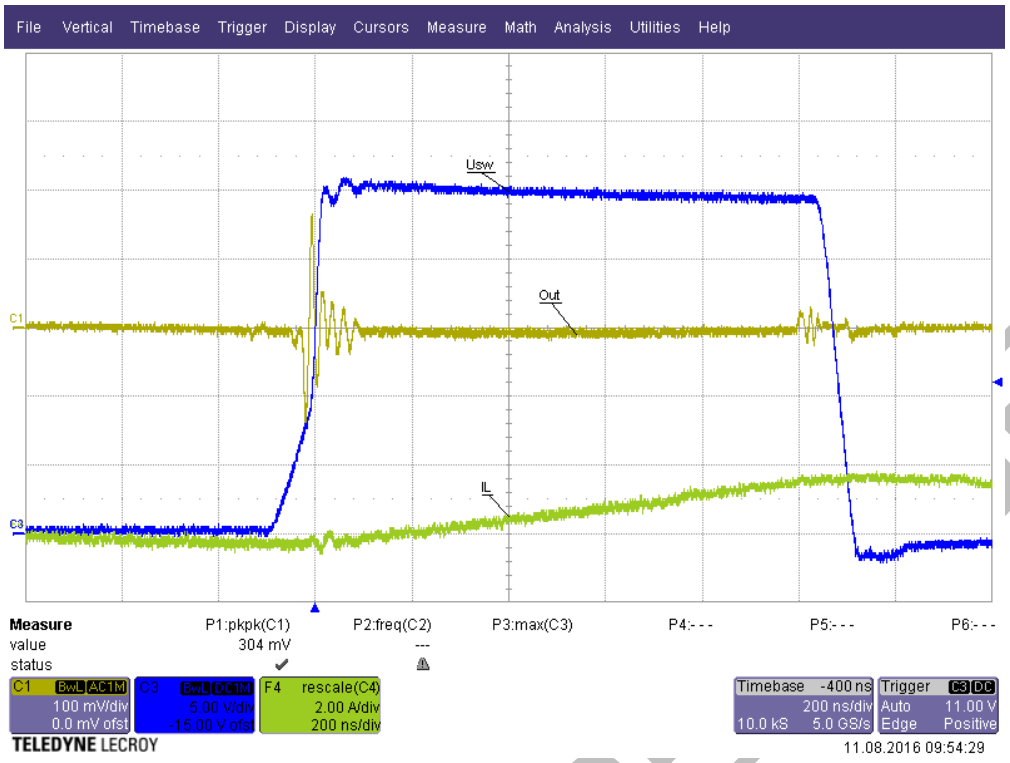

Figure 11, Spikes, Uin = 24V, Iout = 0.5A

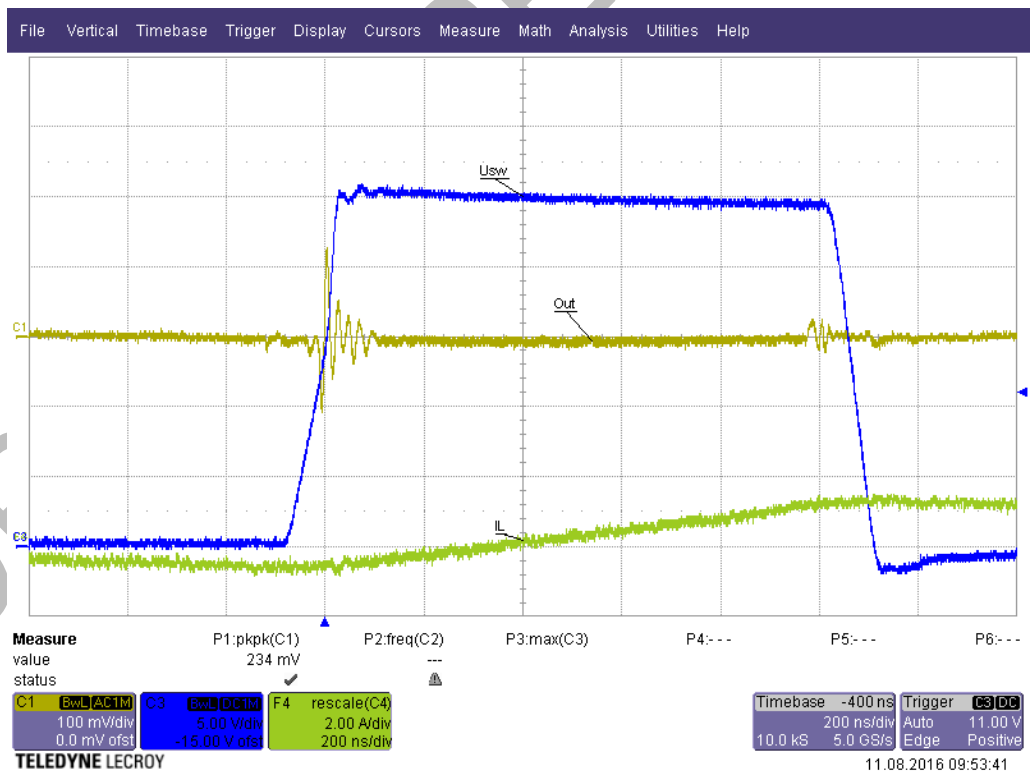

Figure 12, Spikes, Uin = 24V, Iout = 0.2A

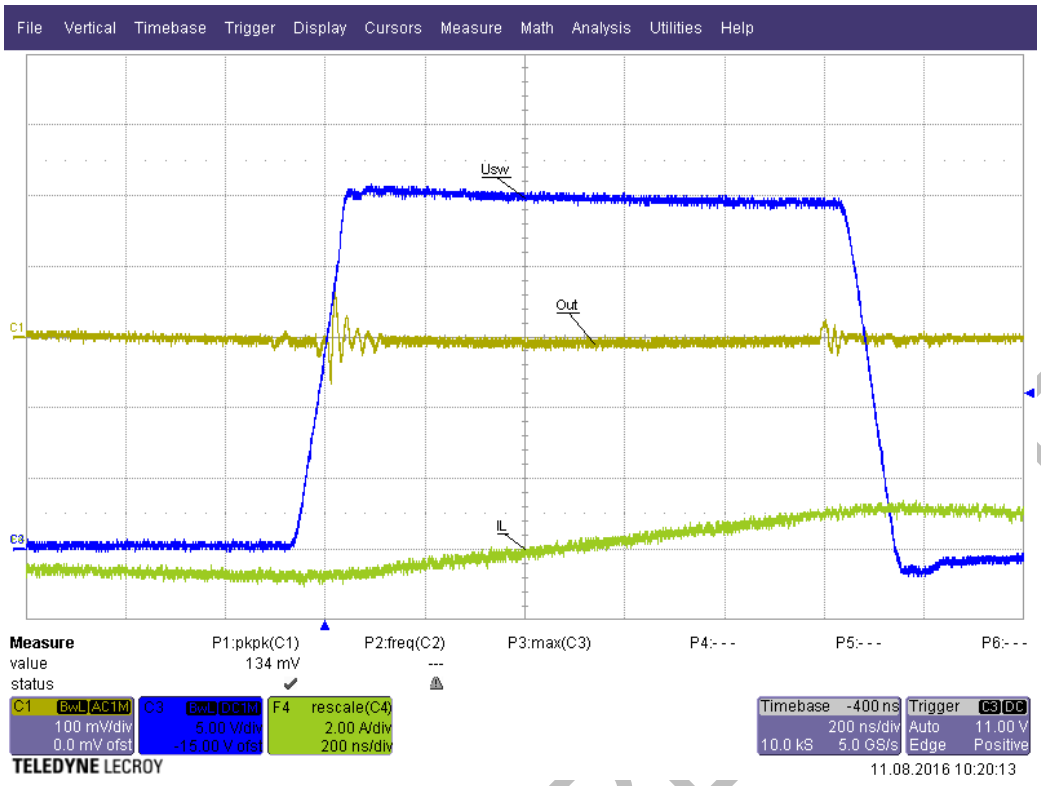

Figure 13, Spikes, Uin = 24V, Iout = 0A

In case of hard load jumps the controller switches to diode emulation:

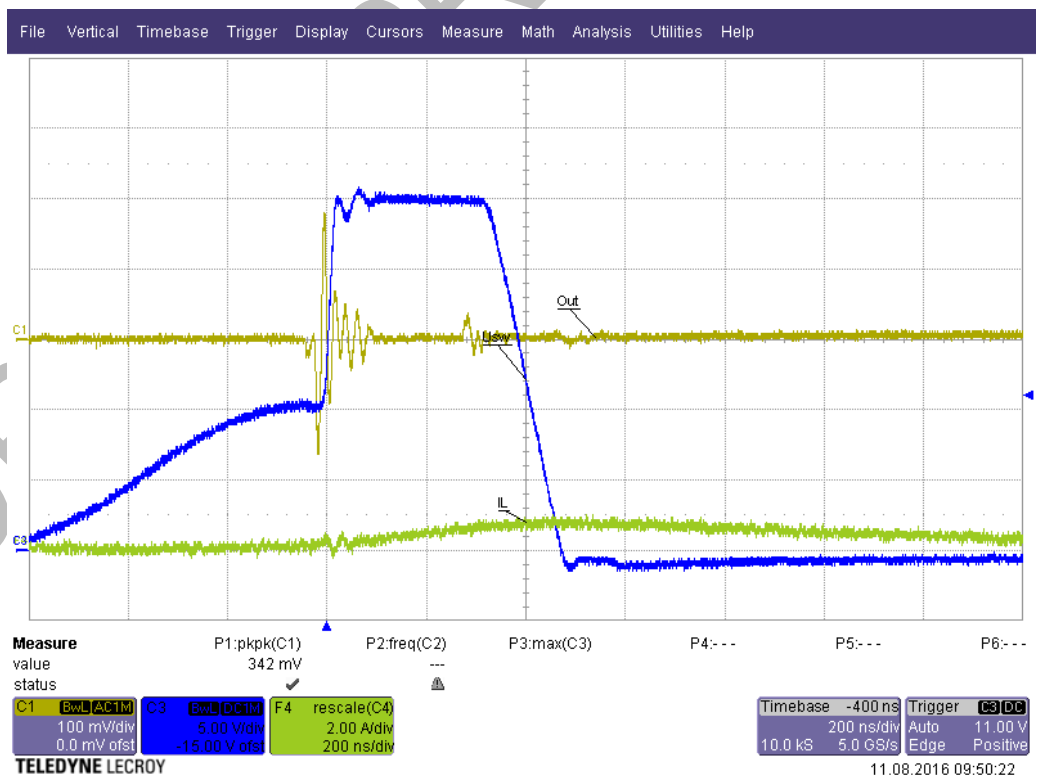

Figure 14, Spikes, Uin = 24V, Iout = 0.12A

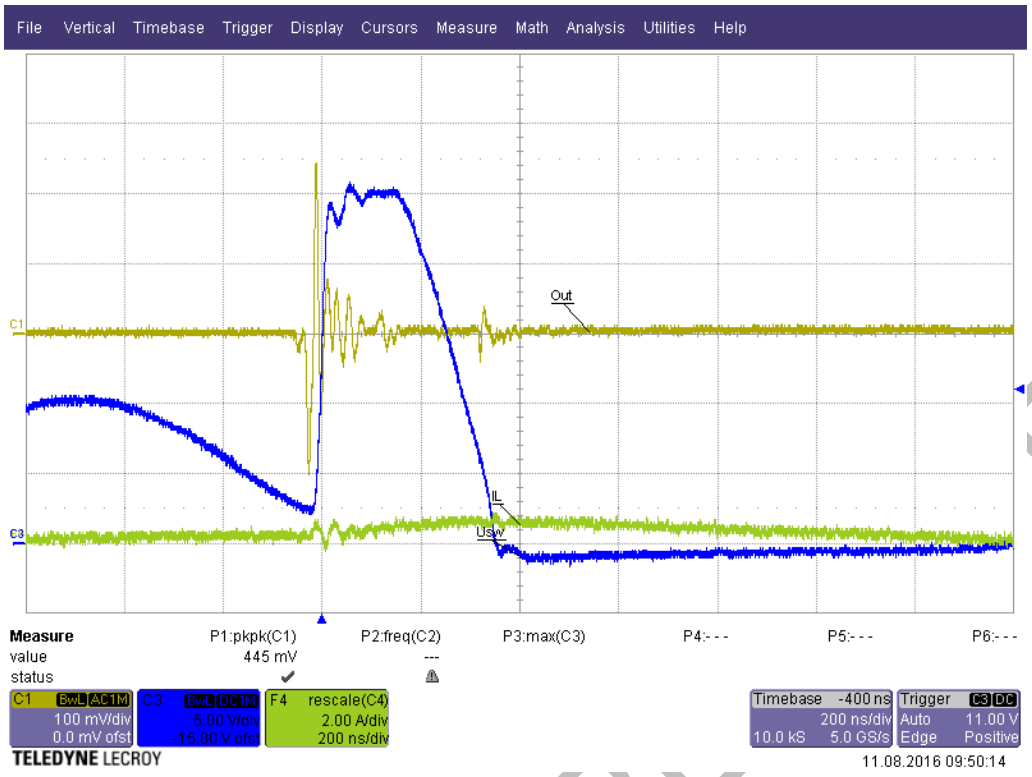

Figure 15, Spikes, Uin = 24V, Iout = 0.065A

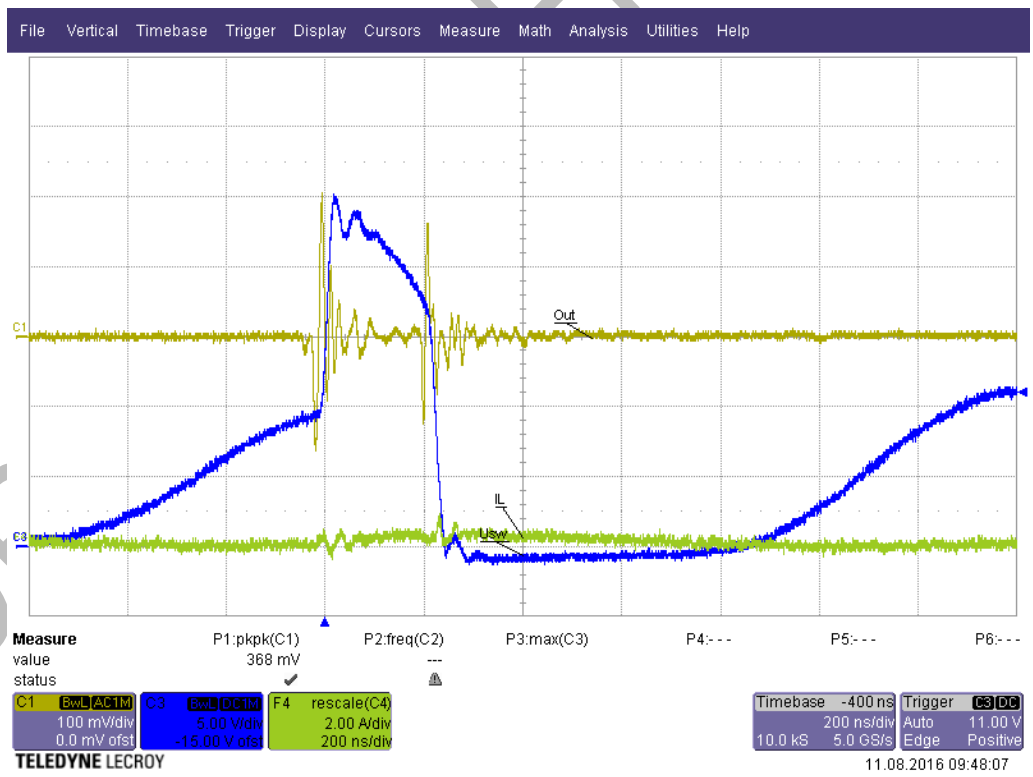

Figure 16, Spikes, Uin = 24V, Iout = 0A

4. With snubber 4R7 / 10nF

4.1 Spikes

With snubber the controller works at light loads always in diode emulation:

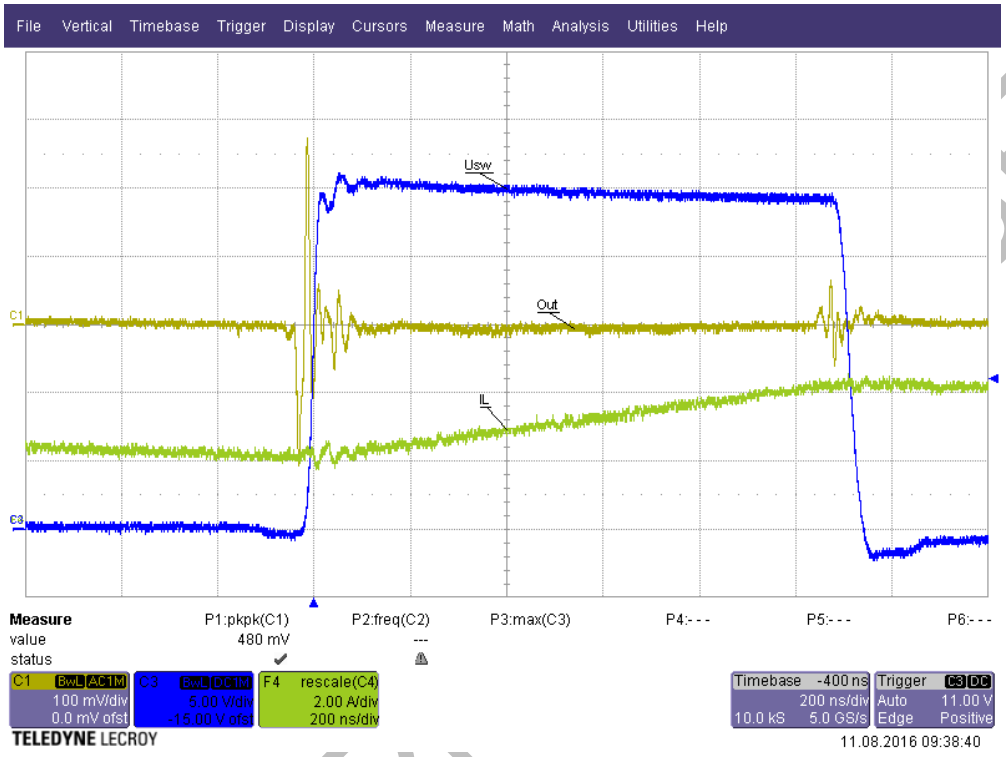

Figure 17, Spikes, Uin = 24V, Iout = 3A

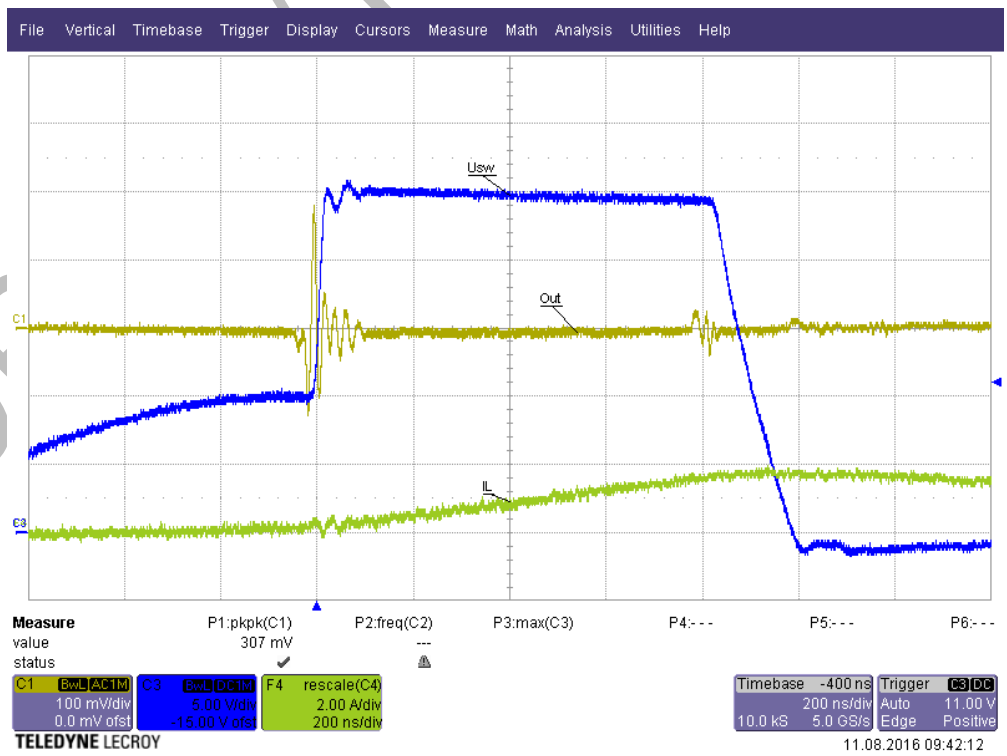

Figure 18, Spikes, Uin = 24V, Iout = 0.62A

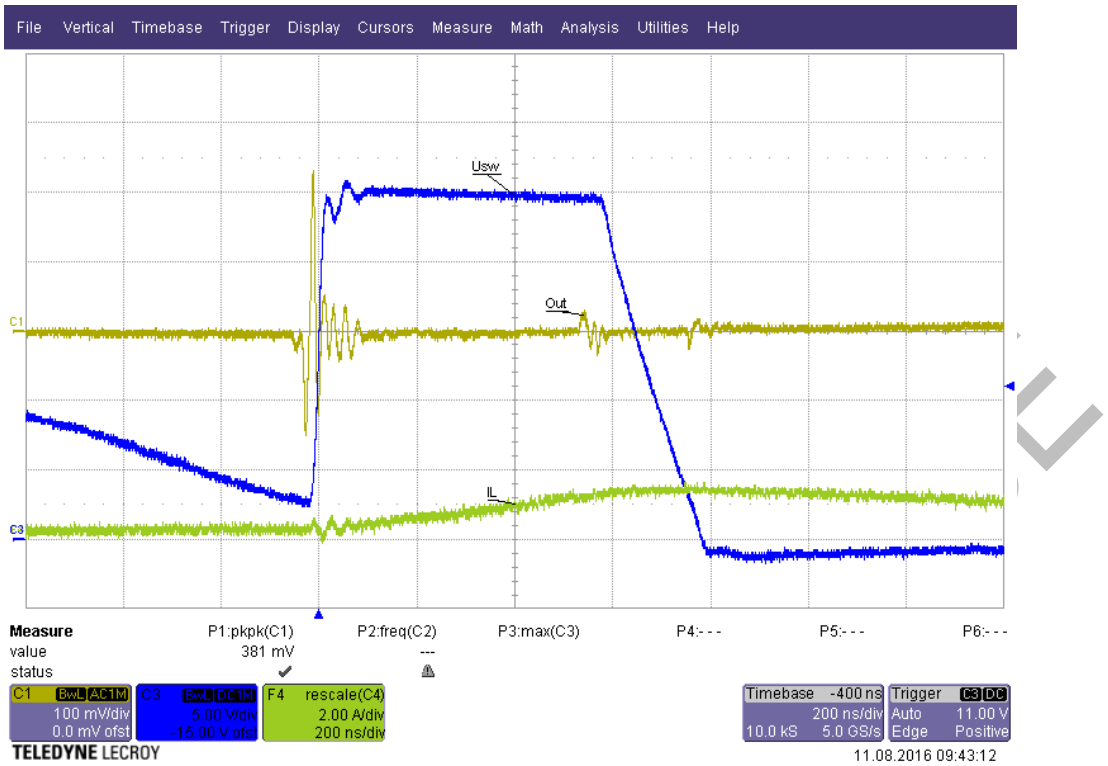

Figure 19, Spikes, Uin = 24V, Iout = 0.43A

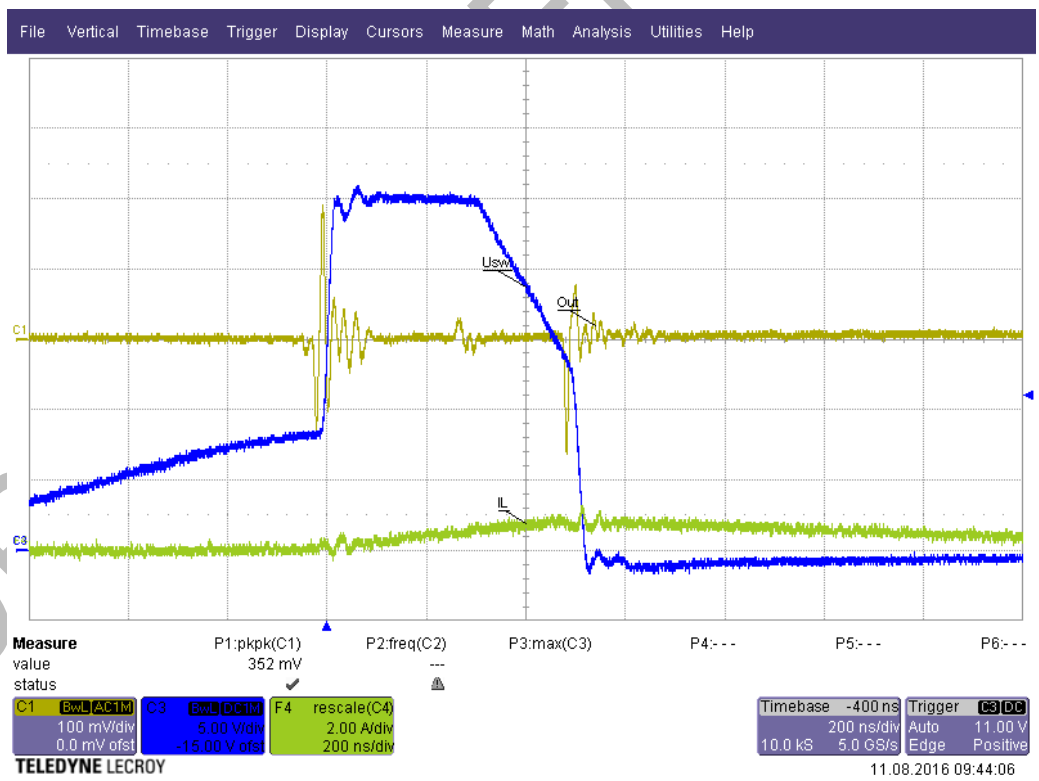

Figure 20, Spikes, Uin = 24V, Iout = 0.12A

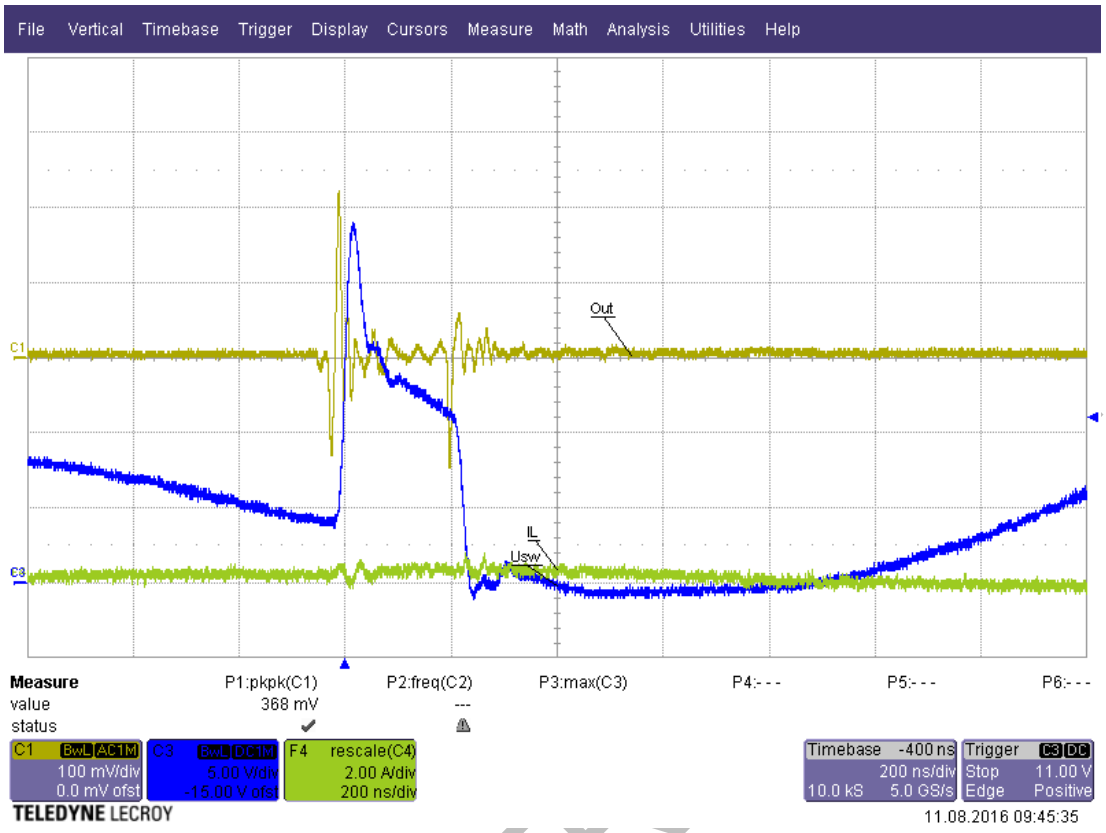

Figure 21, Spikes, Uin = 24V, Iout = 0A

The snubber doesn't solve the issue.

5. History

Issue	Date	Remarks
Draft.		