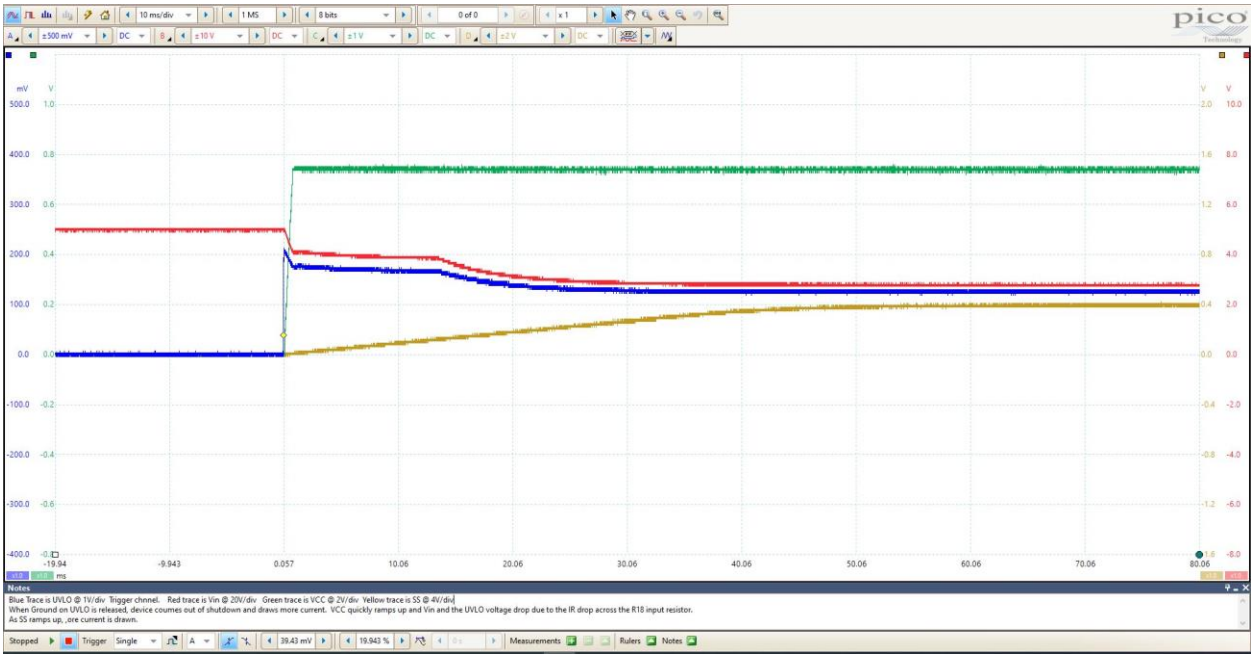
Scope plots of LM5121 Design

This plot shows the startup sequence. The scope is triggered on the Blue trace. This is the UVLO voltage as the IC. The sequence is started by first applying the input voltage from an external power supply set to 50V. This is done while the VLO voltage is held at Ground. Then the Ground is removed and the UVLO voltage is allowed to quickly ramp up to Vin scaled by the 20K/499K voltage divider. The RED trace is the input voltage as seen across the input capacitors. The input voltage drops when the UVLO threshold is crossed because the IC draws more current and the MOSFETs are not being turned on, so the input current still goes through the input resistor and diode (D4 and R18). The Green trace is VCC. That voltage comes up as the UVLO threshold is crossed. The Yellow trace is the SS signal. That starts to ramp up also.

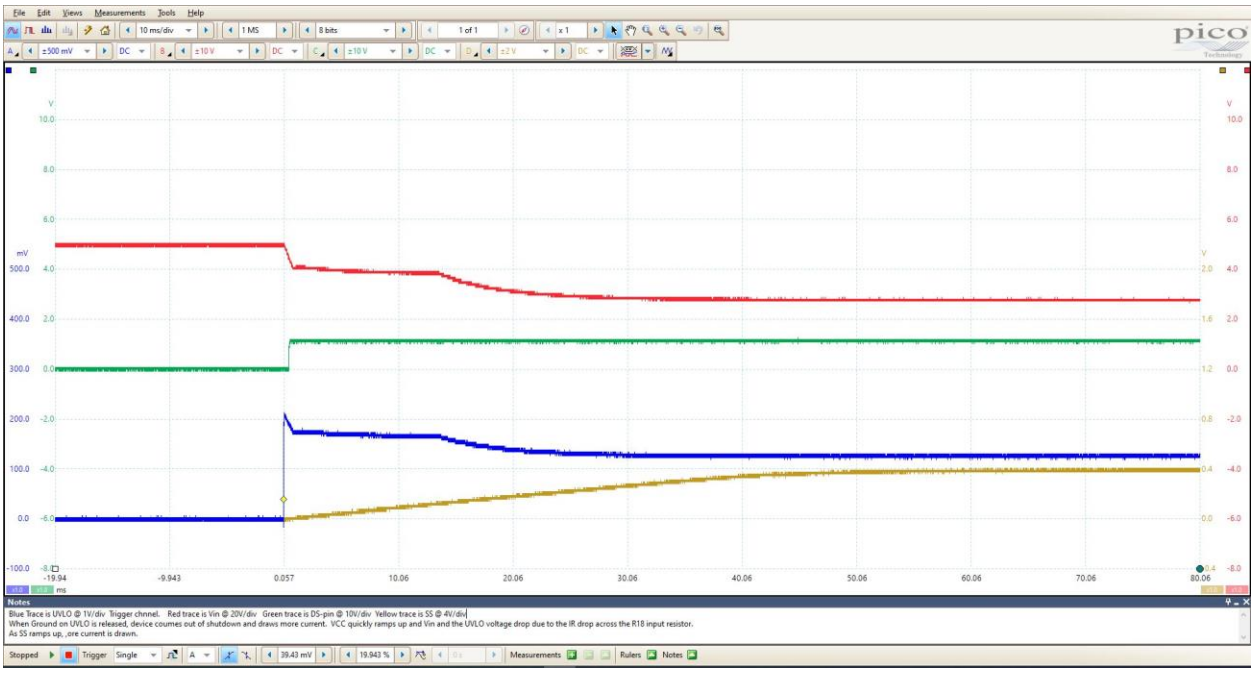


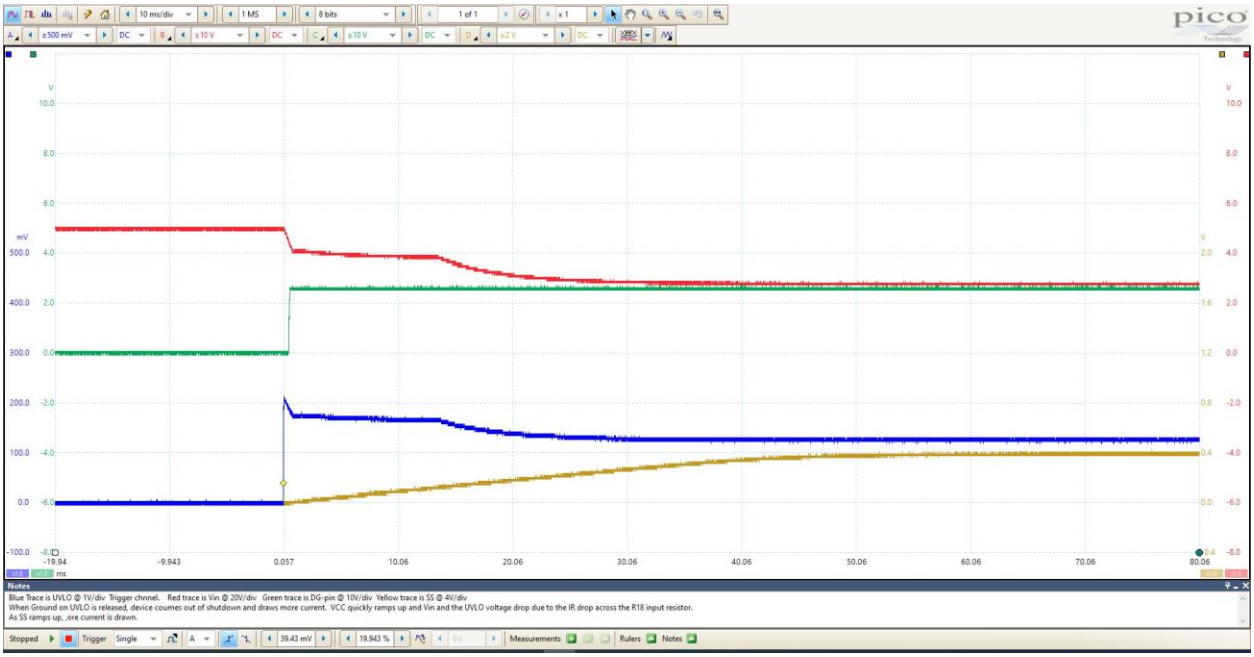
Blue = 1V/div Red = 20V/div Green = 2V/div Yellow = 4V/div

The next plot replaces the VCC trace with the DG pin on the IC. The Red trace (Vin) and the Green trace (DG-pin) are on the same scale. This clearly shows that the charge pump does not push the DG voltage above the Vin voltage.

The third plot replaces the DG pin with the DS pin for the Green trace.

The last plot has the LO FET drive signal on the Green trace. This shows that the switching operation starts at a point that appears to align with the VCC coming up.


File Edit Views Measurements Tools Help
pico
Notes
Blue Trace is UVLO @ 1V/div Trigger chnnel. Red trace is Vin @ 20V/div Green trace is DS-pin @ 10V/div Yellow trace is SS @ 4V/div
When Ground on UVLO is released, device coumes out of shutdown and draws more current. VCC quickly ramps up and Vin and the UVLO voltage drop due to the IR drop across the R18 input resistor.
As SS ramps up, ,ore current is drawn.
Stopped Trigger Single Measurements Rulers Notes


pico
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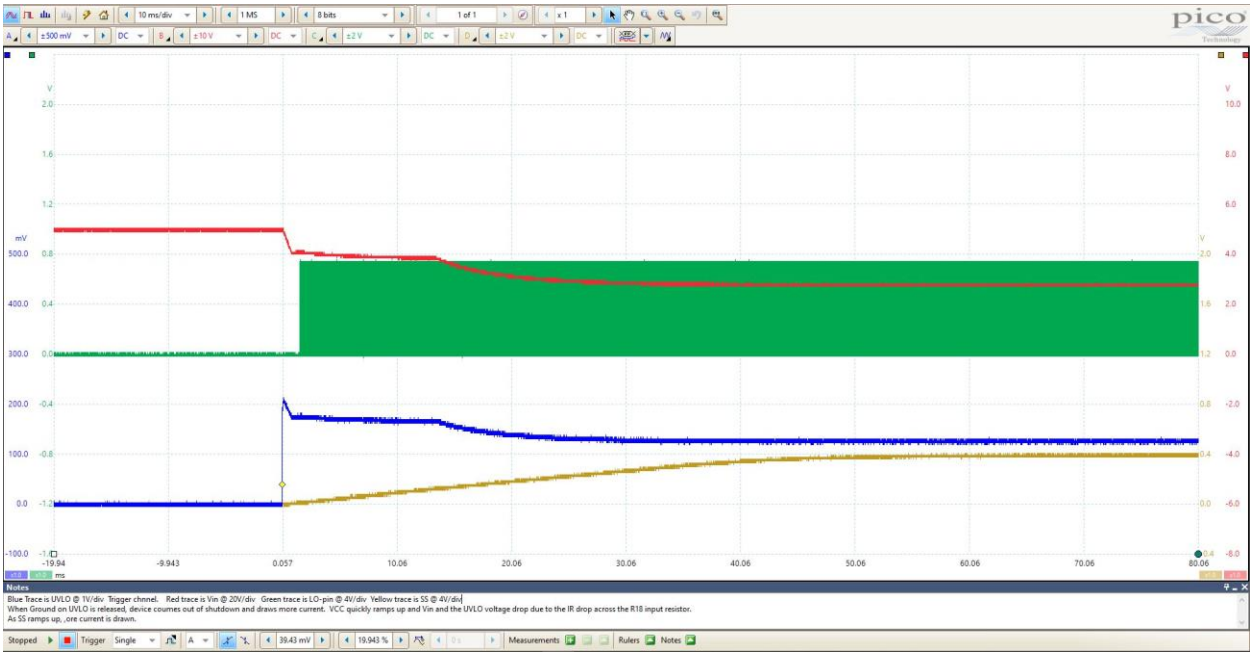
10 ms/div
1 MS
8 bits
1 of 1
x 1
±500 mV
±10 V
±2 V
±2 V
DC
pico
V
mV
2.0
1.6
1.2
0.8
0.4
0.0
-0.4
-0.8
-1.2
500.0
400.0
300.0
200.0
100.0
0.0
-100.0
10.0
8.0
6.0
4.0
2.0
0.0
-2.0
-4.0
-6.0
-8.0
-19.94
-9.943
0.057
10.06
20.06
30.06
40.06
50.06
60.06
70.06
80.06
ms
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Stopped
Trigger
Single
A
39.43 mV
19.943 %
Measurements
Rulers
Notes