TEXAS INSTRUMENTS INCORPORATED

PMP10896 Rev B.

Power Design Services Test Report

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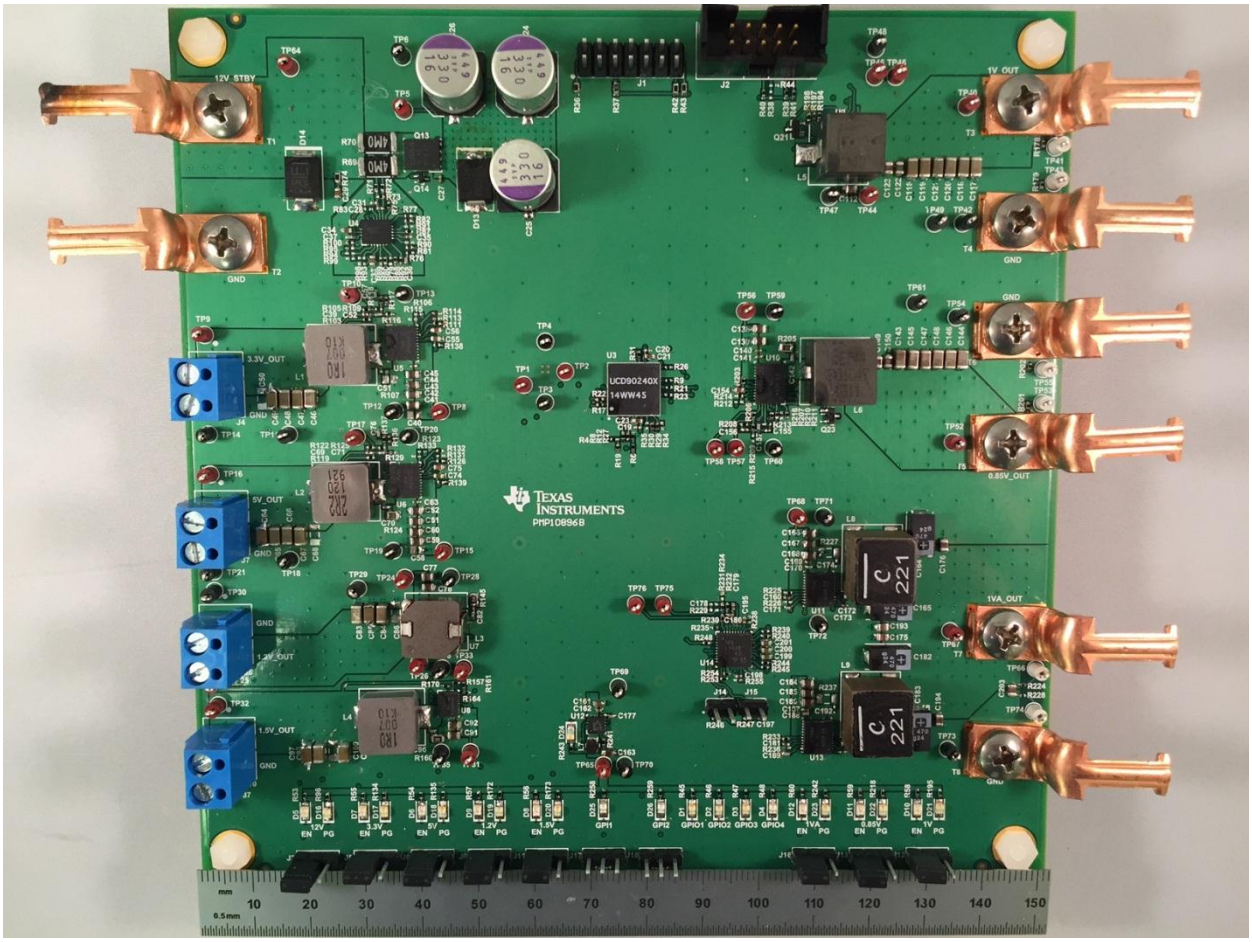
PMP10896 Rev B is a power evaluation module consisting of eight power supplies, an input hot-swap and a 24-channel sequencer and supervisor. The board is intended to showcase TI's PMBus power solutions in addition to analog point-of-load converters. The test report documents the various power supply waveforms.

PMP10896 Rev B Test Results

Table of Contents

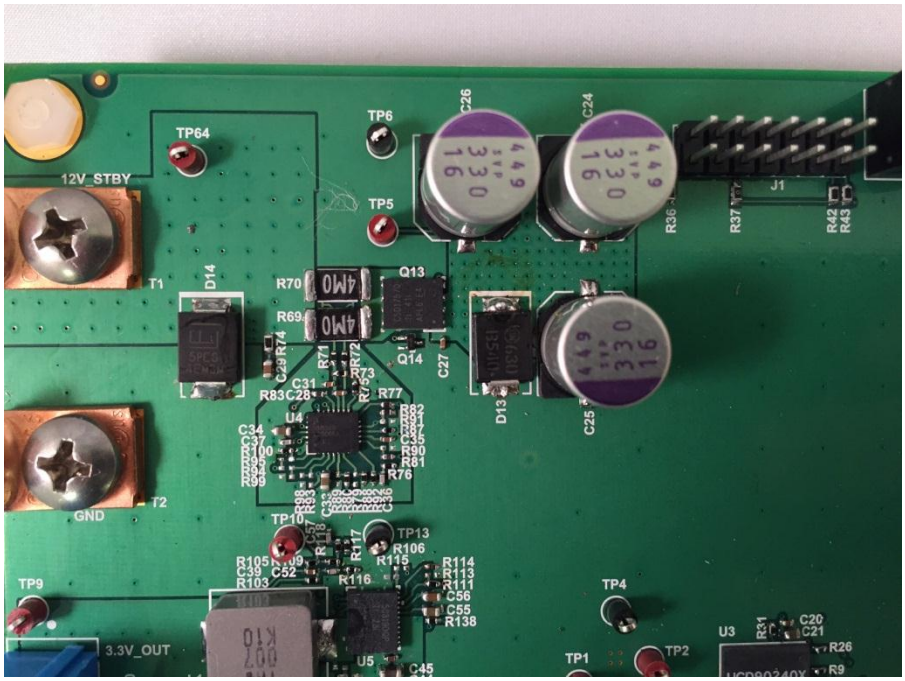
1 PMP10896 REVB

1.1 Board Photo



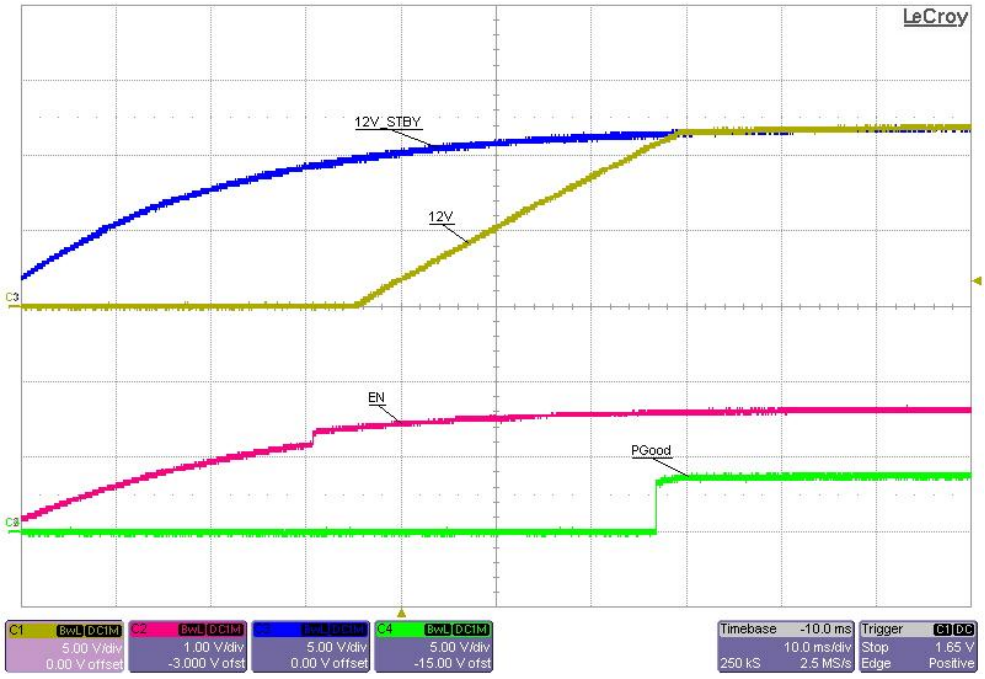
2 LM25066A 12V at 27.6A Hot Swap

2.1 Board Photo



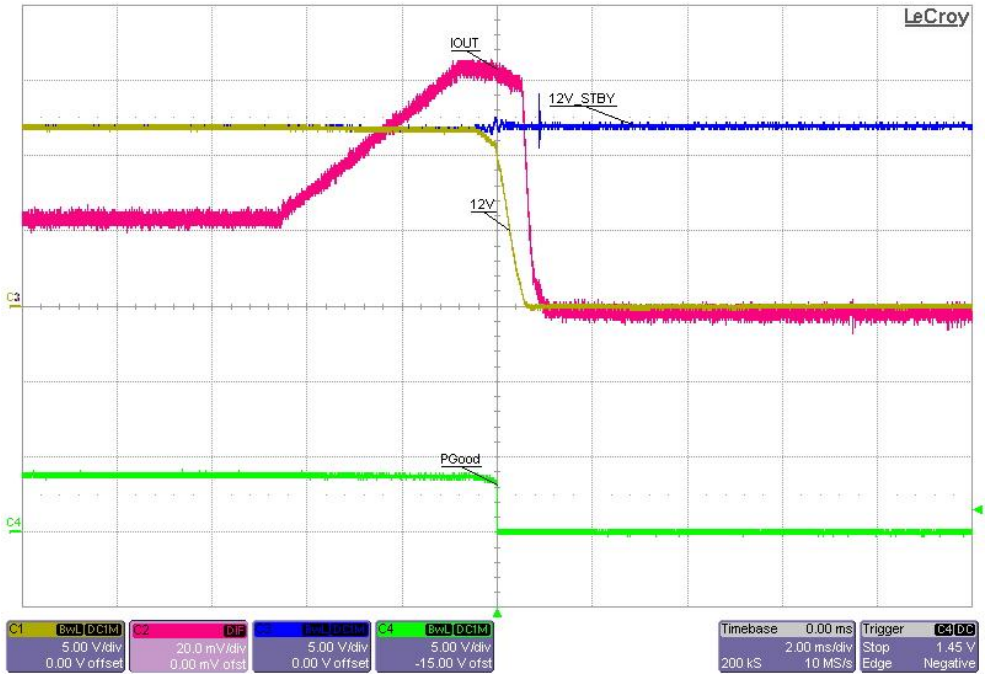
2.2 Startup

The hot-swap startup into no load is shown below.



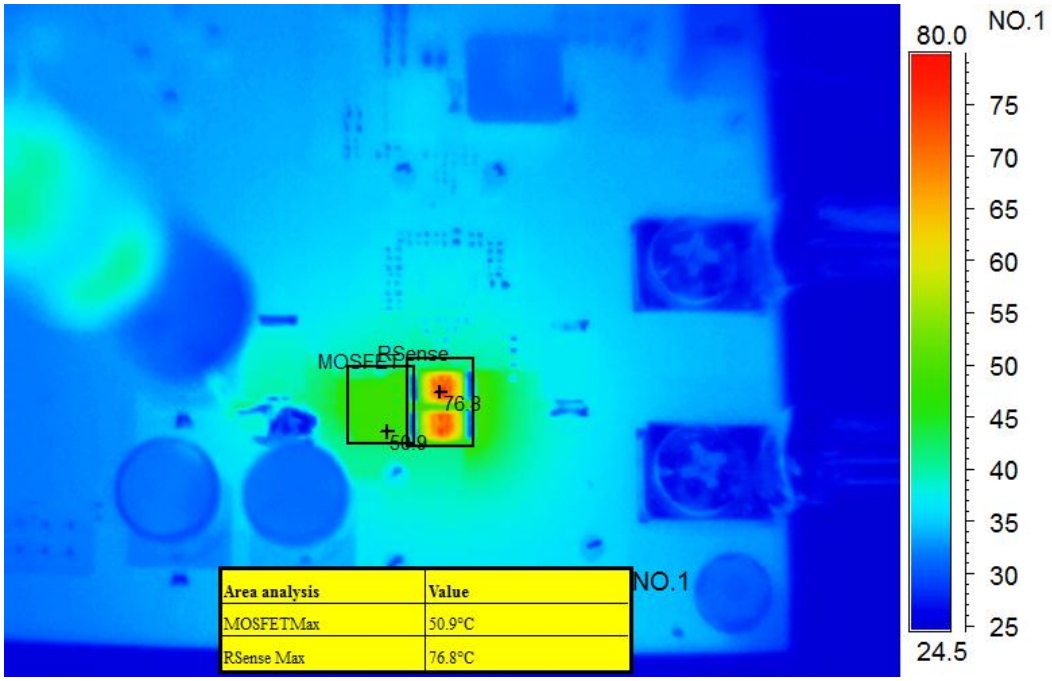
2.3 Overcurrent Protection

The overcurrent protection is shown below. R_Isense is 2mΩ. Steady-state OCP is 27.6A.



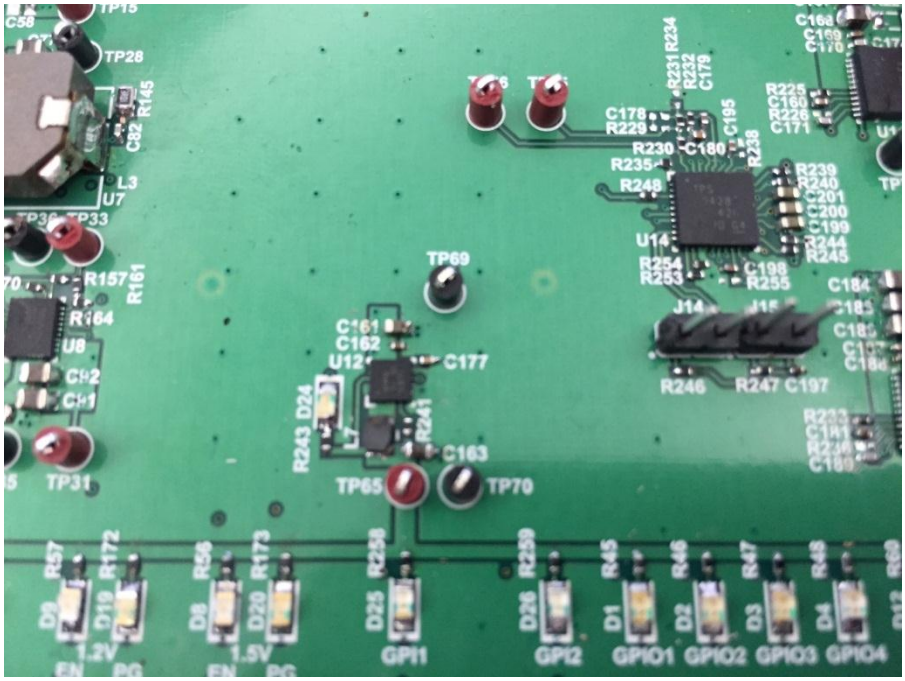
2.4 Thermal

The hot-swap thermal image at 25A is shown below.



3 TPS62153 5V_STBY at 1A

3.1 Board Photo



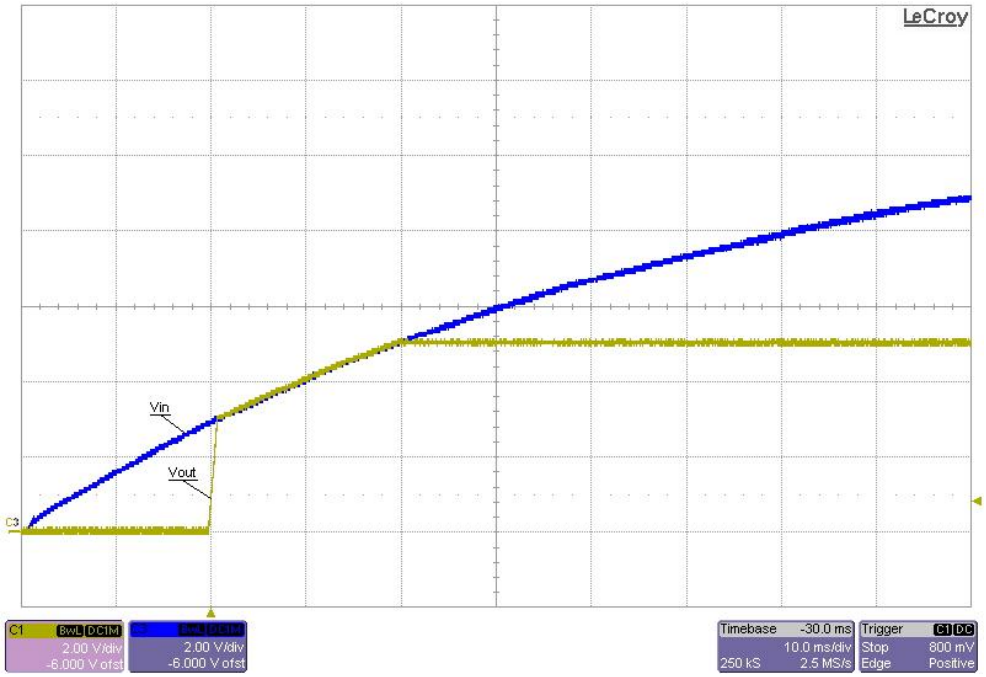
3.2 Load Regulation

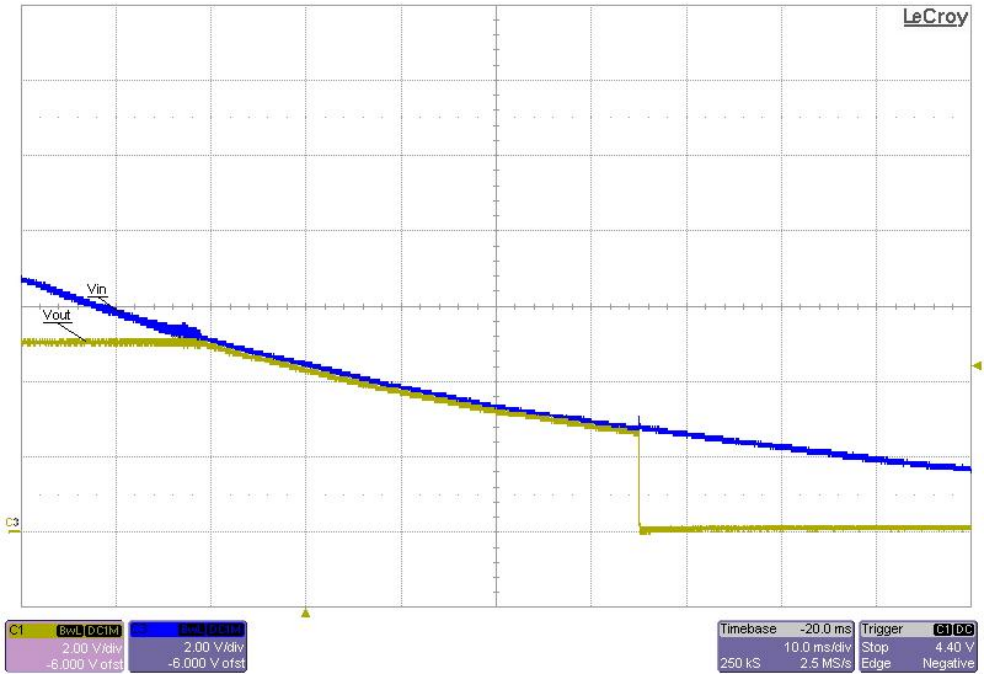
The output regulation for load currents listed in Amps is below.

5V_STBY Load Regulation		
Measured at TP65 and TP70		
0	5.02	V
0.25	5.02	V
0.5	5.02	V

3.3 Startup and Shutdown

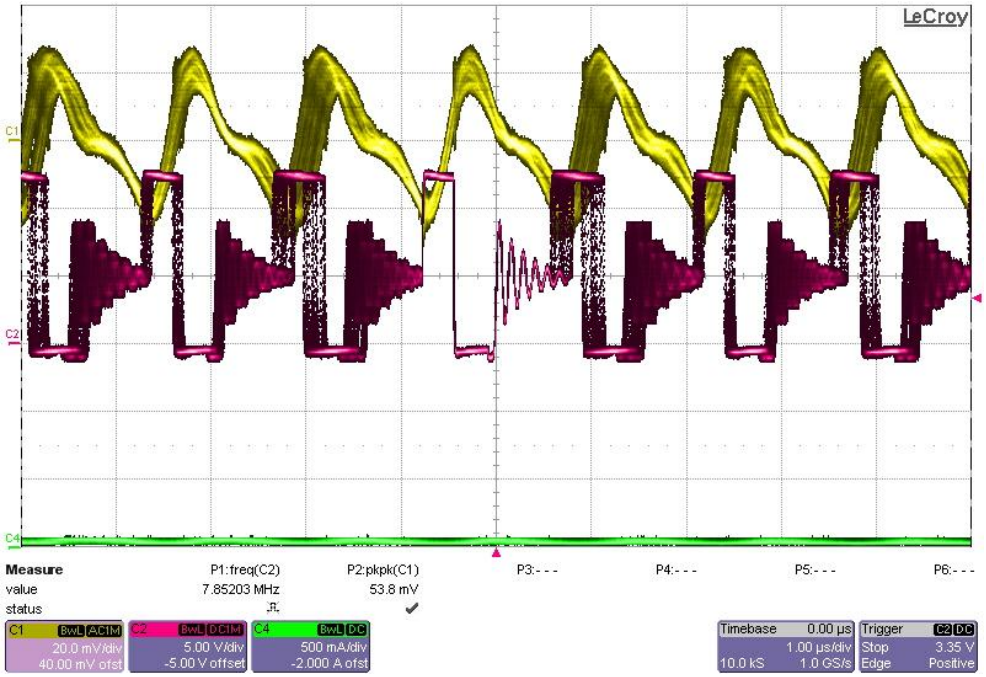
The startup at 0A and shutdown at 500mA are shown below.

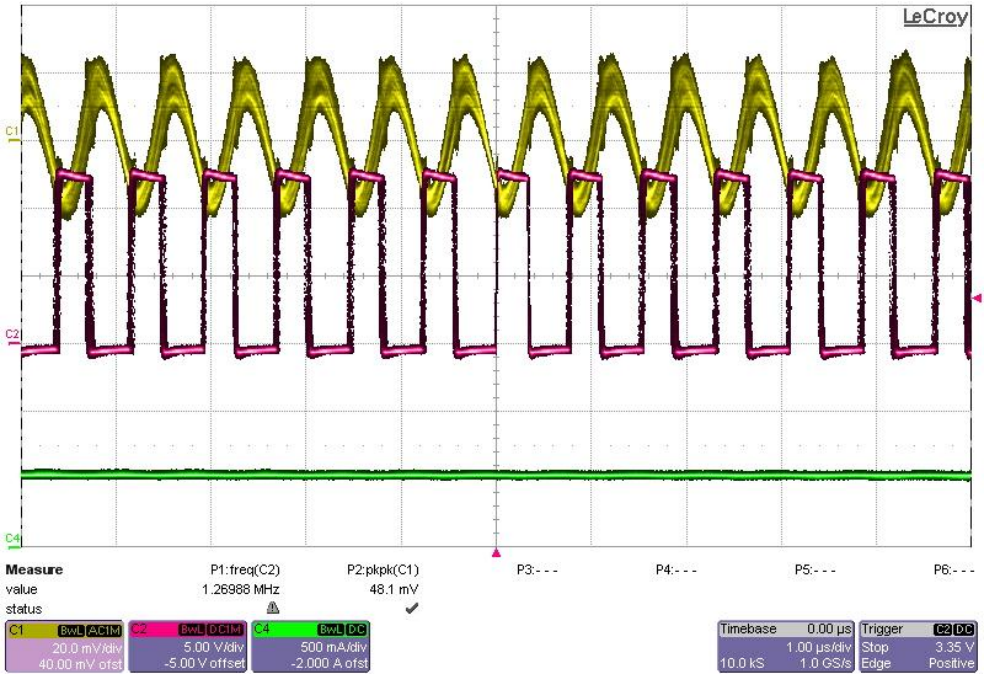




3.4 Output Ripple

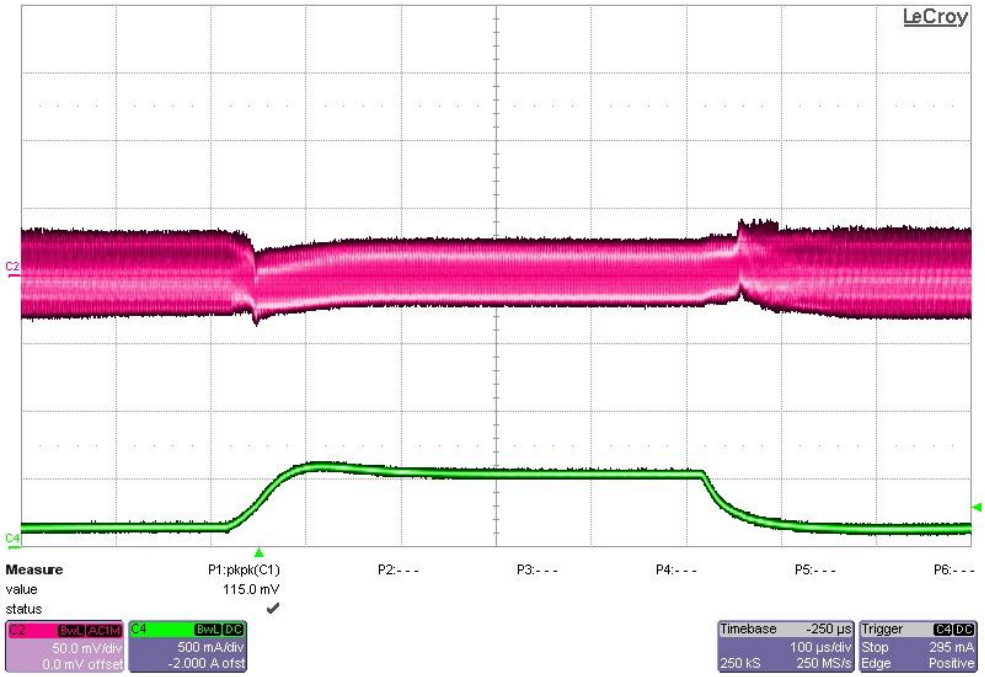
The 5V_STBY output ripple at 0A and 500mA are shown in persistence below.





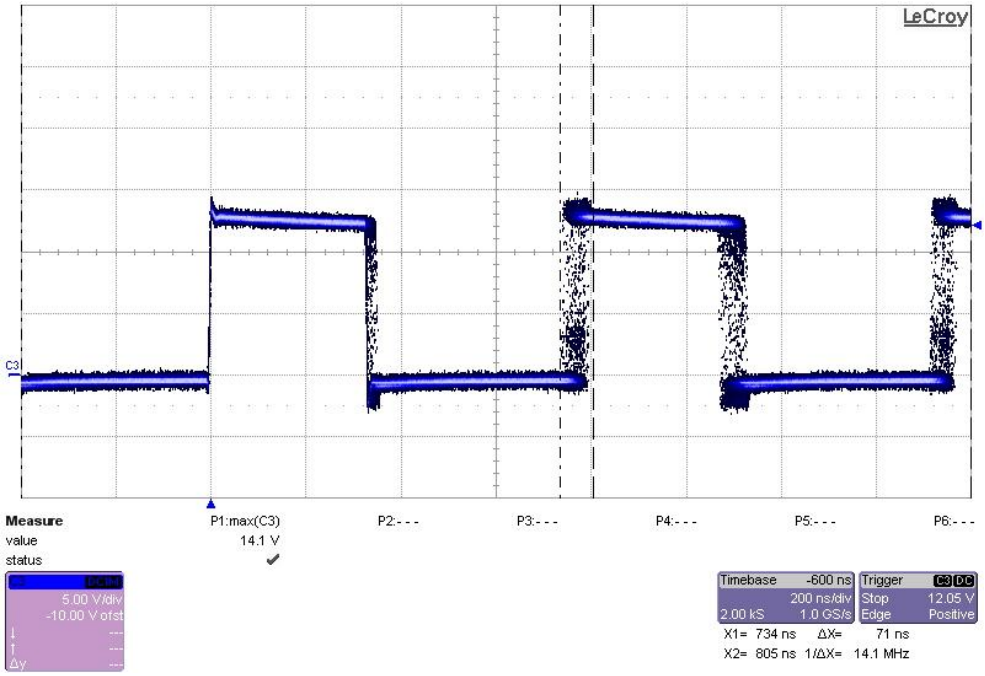
3.5 Transient Response

The transient response due to a 100mA to 500mA load step is shown in persistence below.



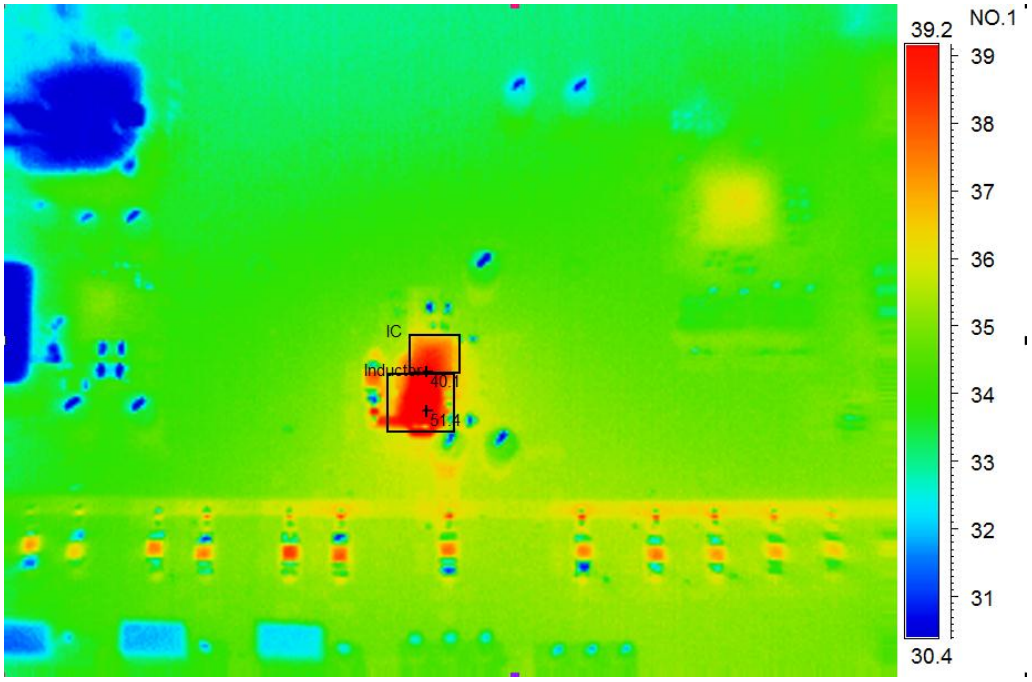
3.6 Frequency Jitter

The switch node frequency jitter is shown in persistence at 500mA load current. Fsw = 1.25MHz.



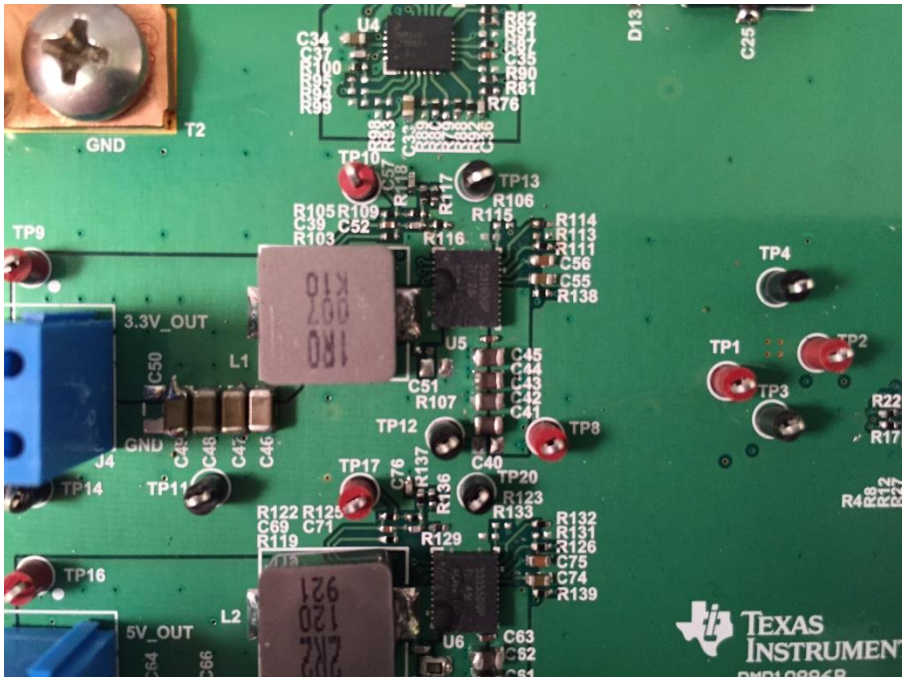
3.7 Thermal Image

The thermal image for 5V_STBY at 500mA load current is shown below.



4 TPS53319 3.3V at 14A

4.1 Board Photo



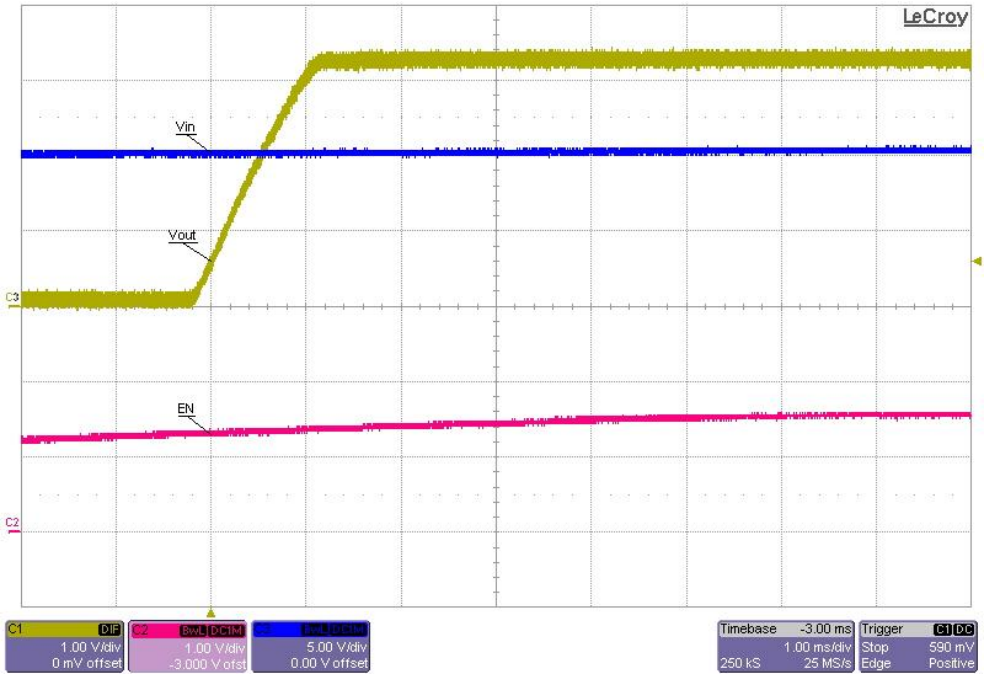
4.2 Load Regulation

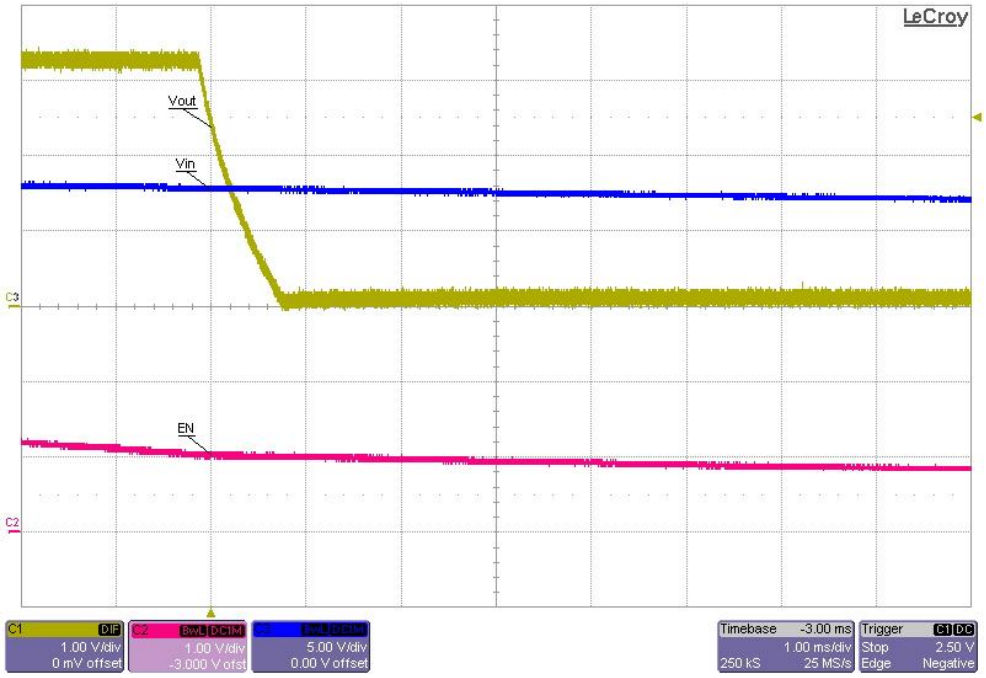
The 3.3V output regulation for load currents listed in Amps is below.

3.3V Load Regulation		
Measured at TP9 and TP14		
0	3.296	V
5	3.287	V
14	3.282	V

4.3 Startup and Shutdown

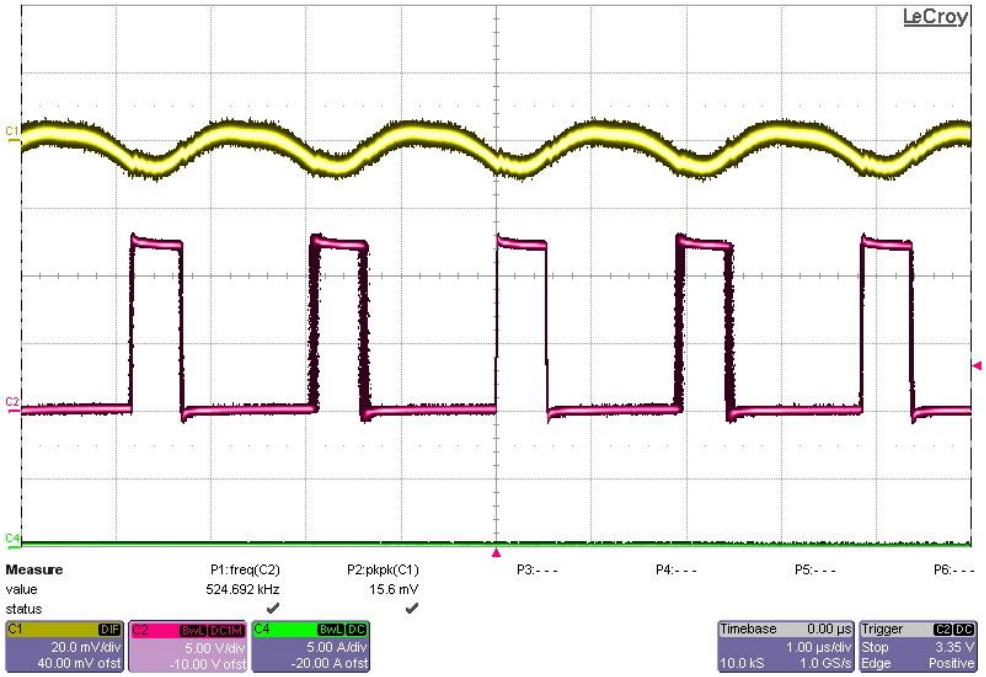
The startup at 0A and shutdown at 1A are shown below.

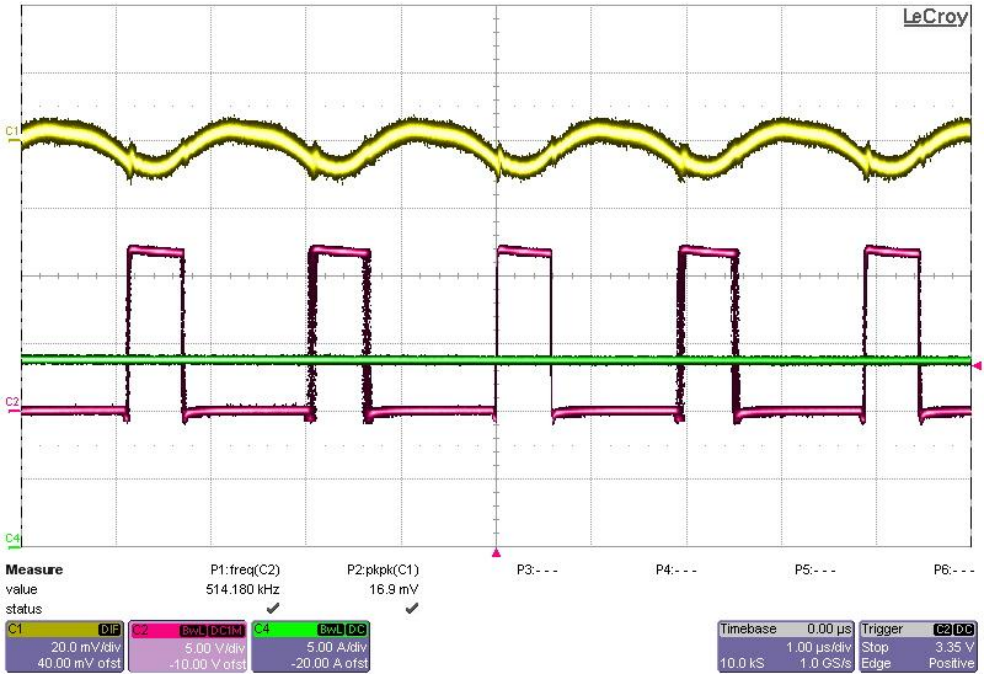




4.4 Output Ripple

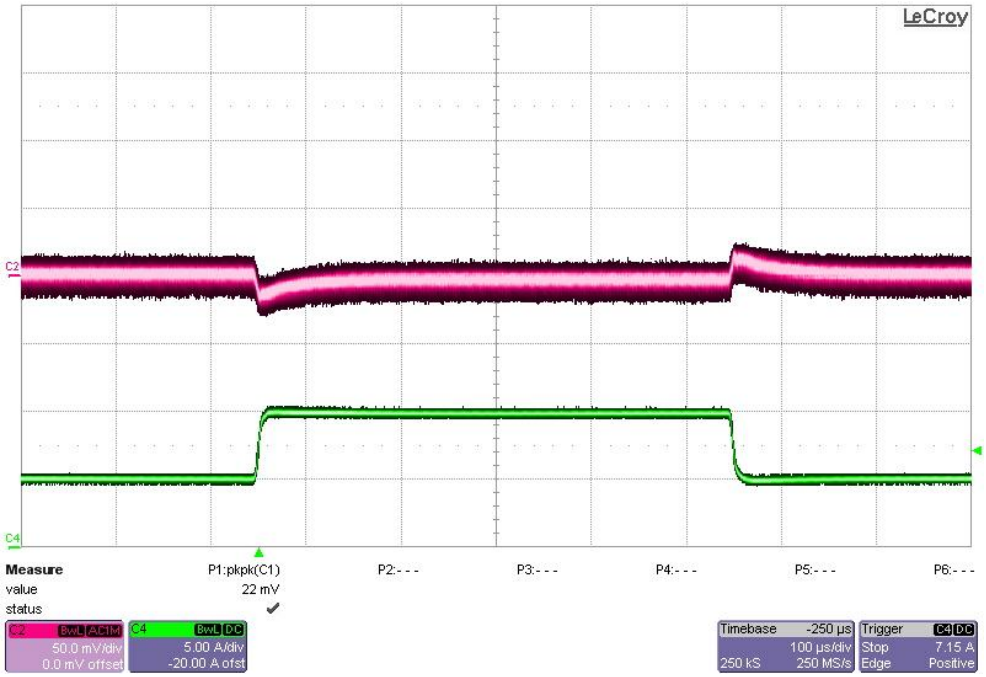
The 3.3V output ripple at 0A and 14A are shown in persistence below.





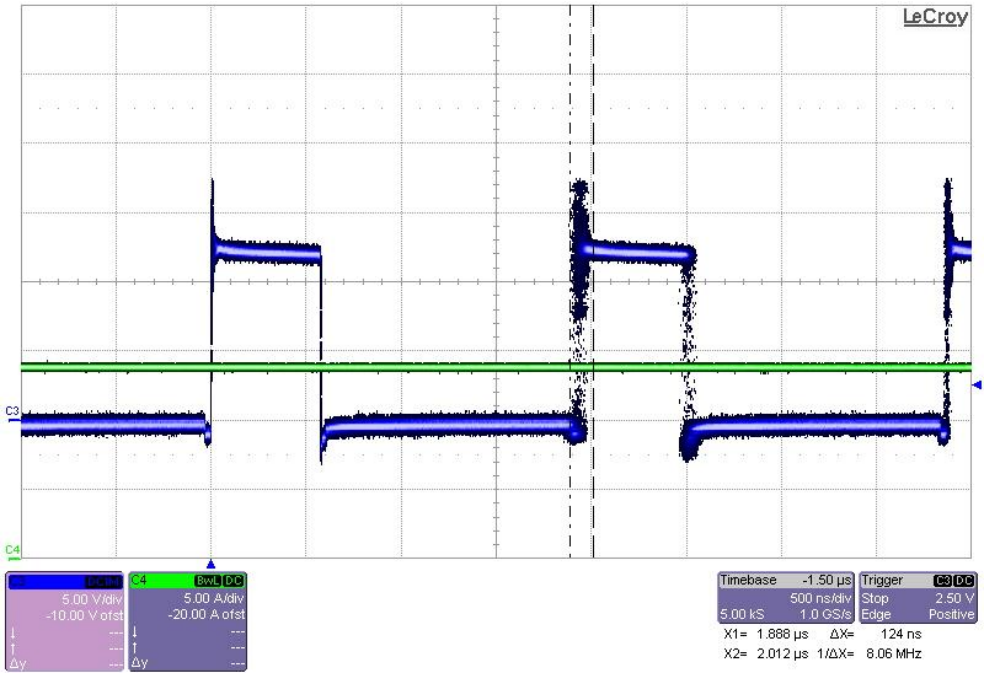
4.5 Transient Response

The transient response due to a 5A to 10A load step is shown in persistence below.



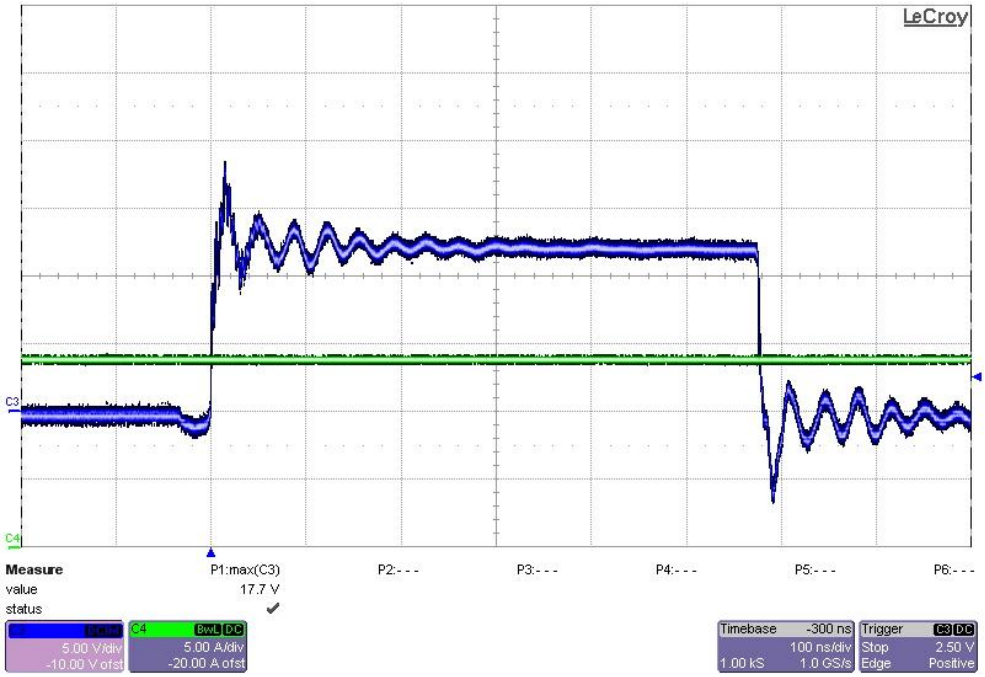
4.6 Frequency Jitter

The switch node frequency jitter is shown in persistence at 14A below. Fsw = 500kHz.



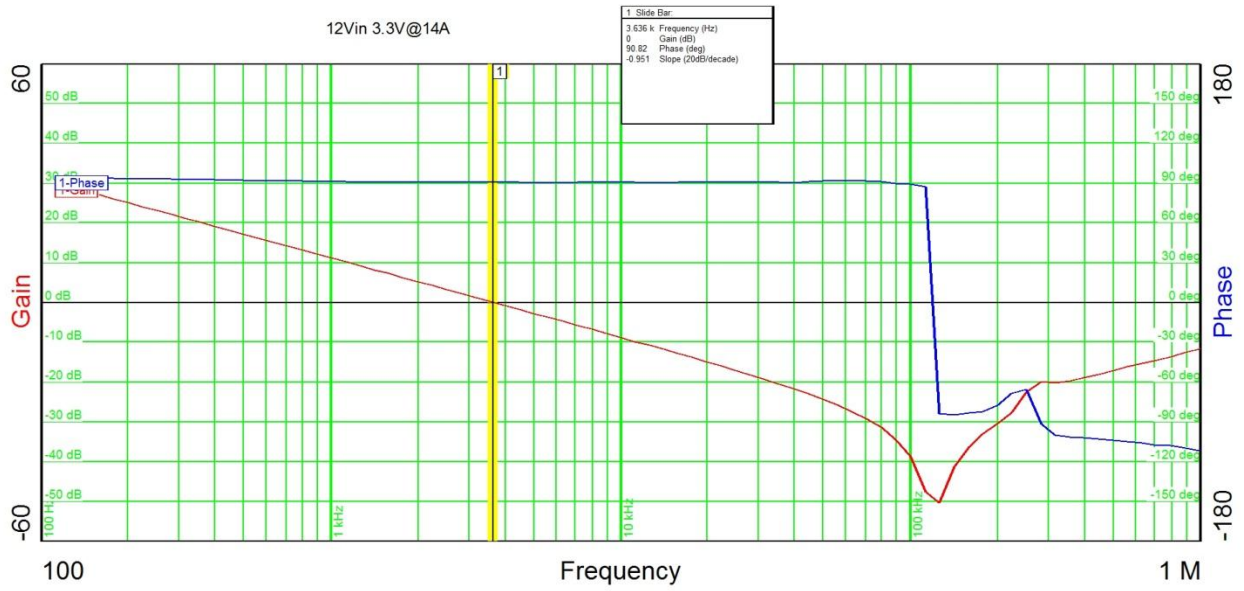
4.7 Switch Node Peak

The maximum switch node voltage is shown in persistence below at 14A.



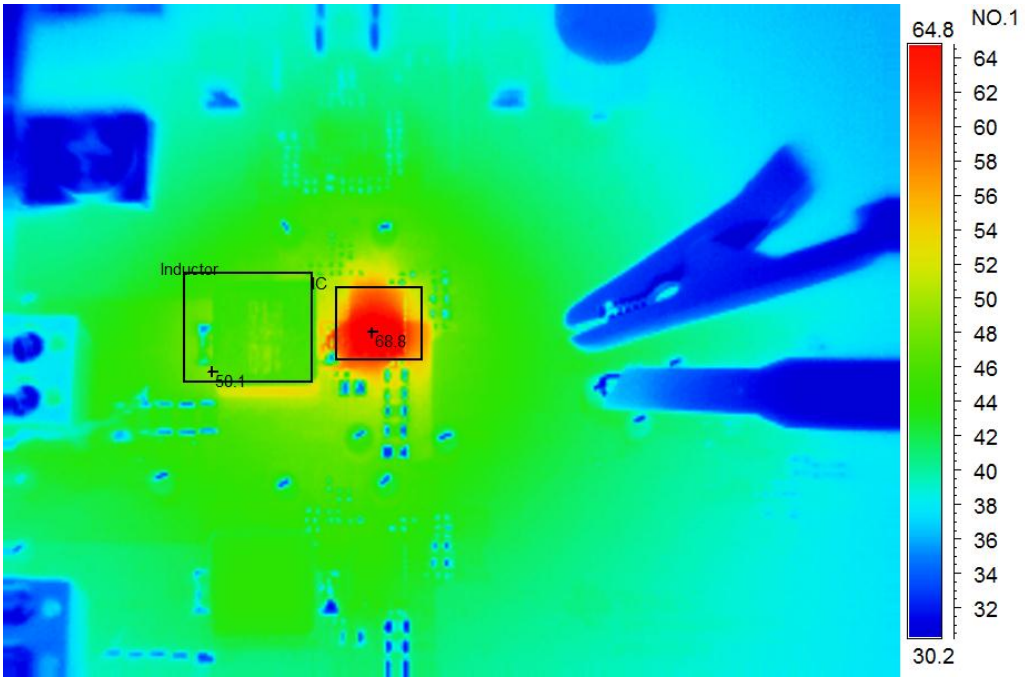
4.8 Loop Response

The loop response of the power supply at 14A load current is shown below.



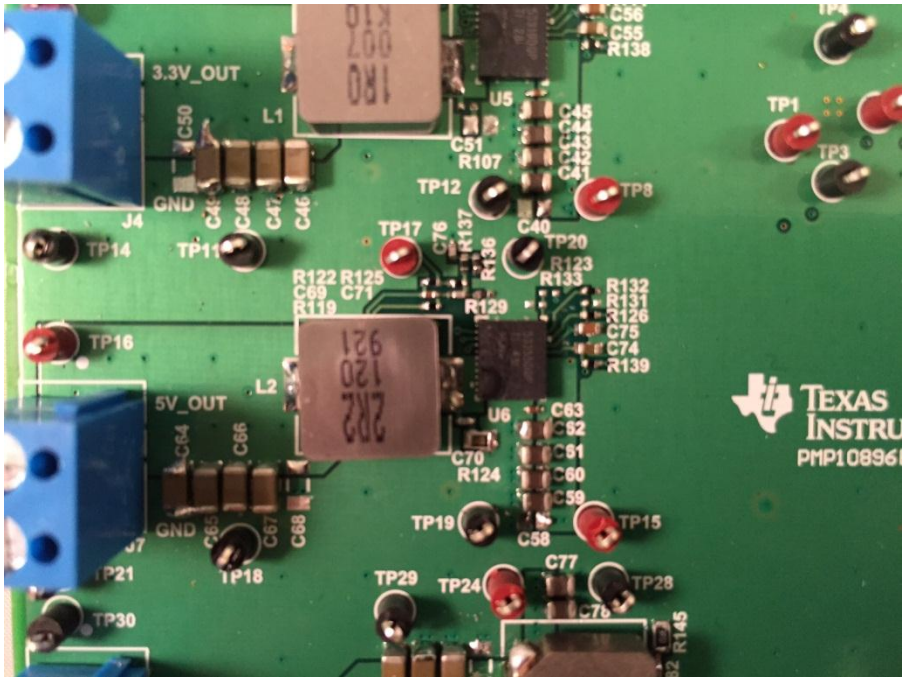
4.9 Thermal Image

The thermal image of the power supply operating with 14A load current is shown below.



5 TPS53355 5V at 10A

5.1 Board Photo



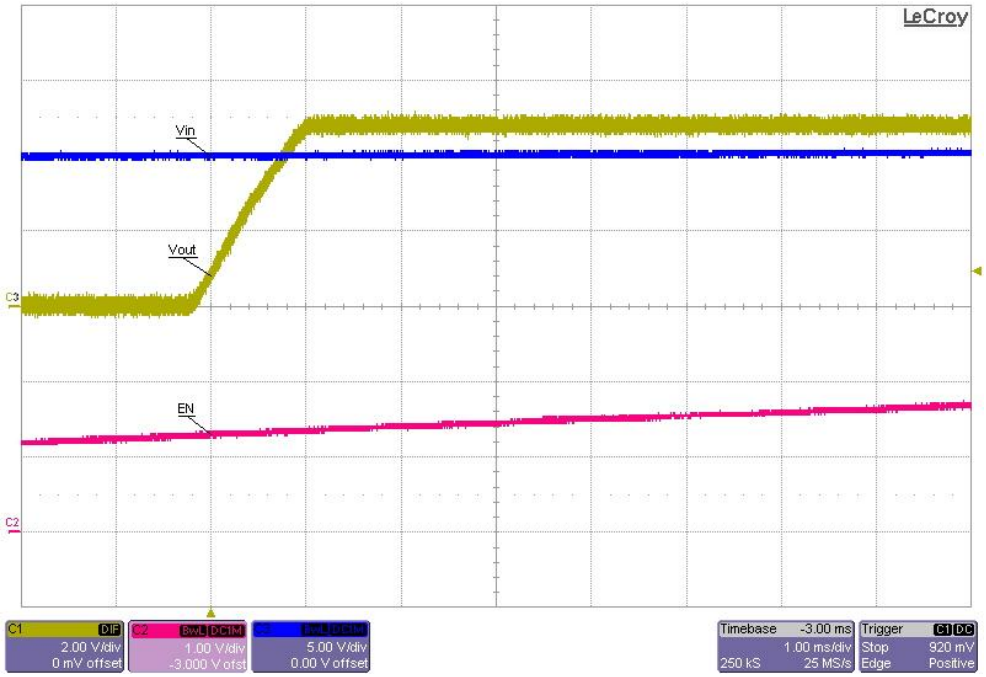
5.2 Load Regulation

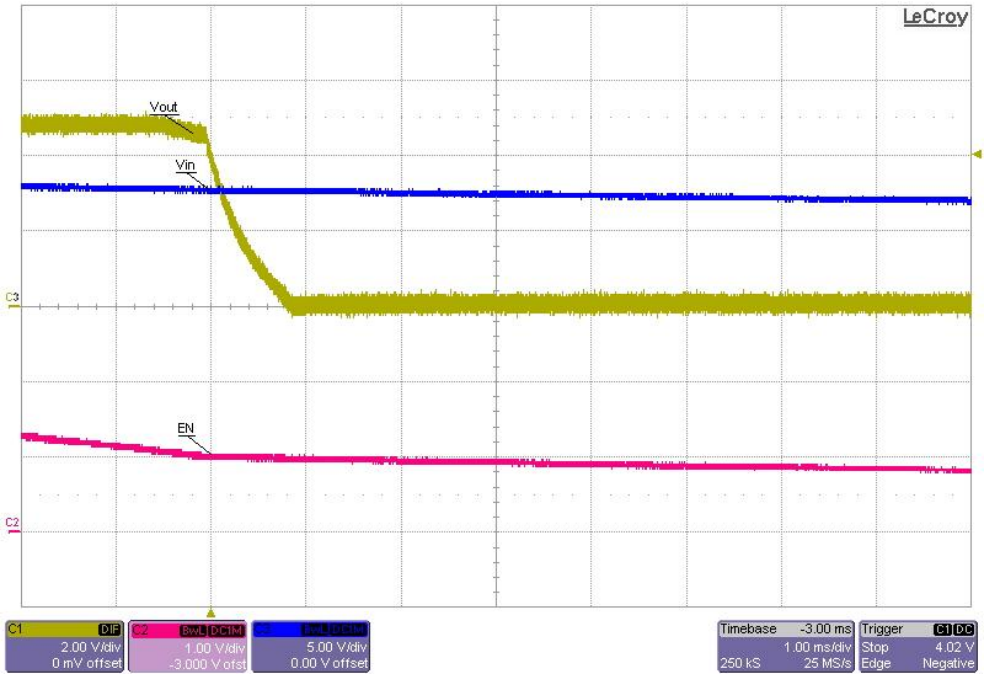
The 5V output regulation for load currents listed in Amps is below.

5V Load Regulation		
Measured at TP16 and TP21		
0	5.09	V
5	5.07	V
10	5.07	V

5.3 Startup and Shutdown

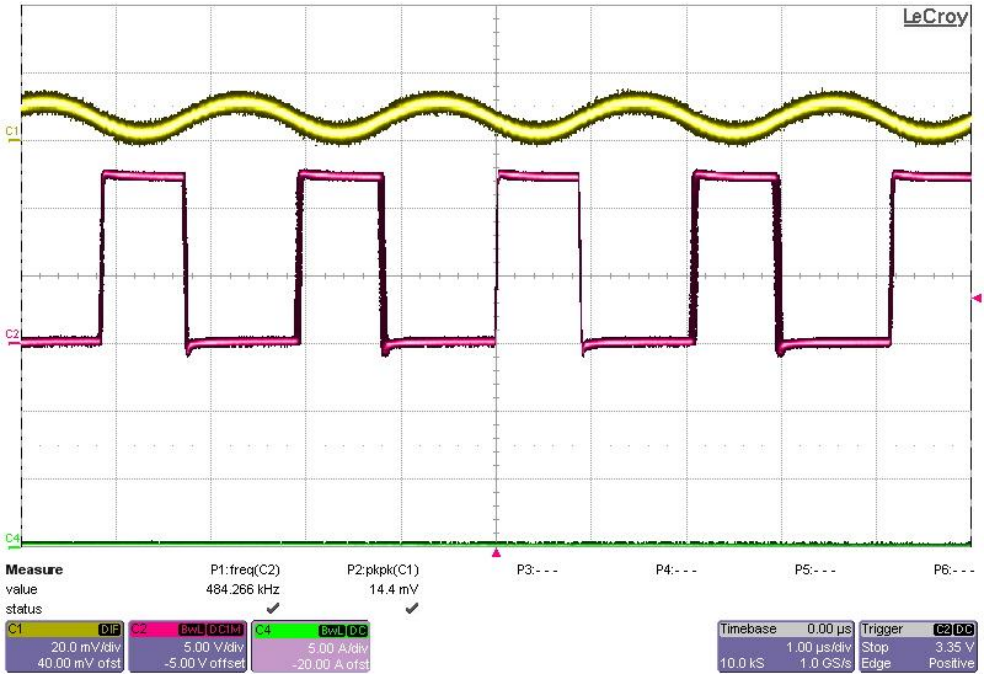
The startup at 0A and shutdown at 1A are shown below.

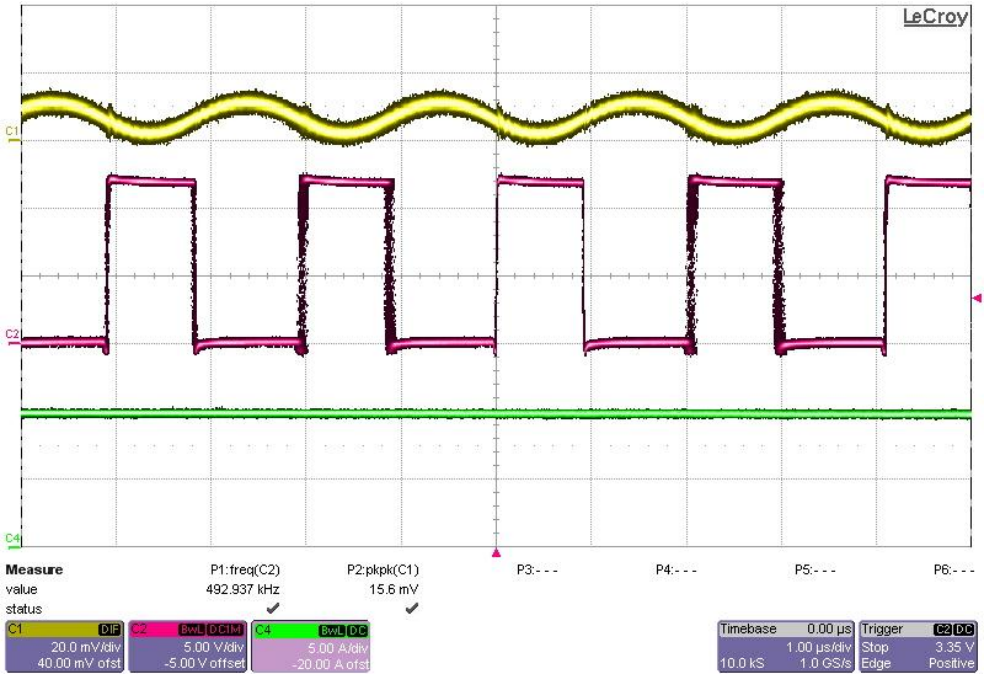




5.4 Output Ripple

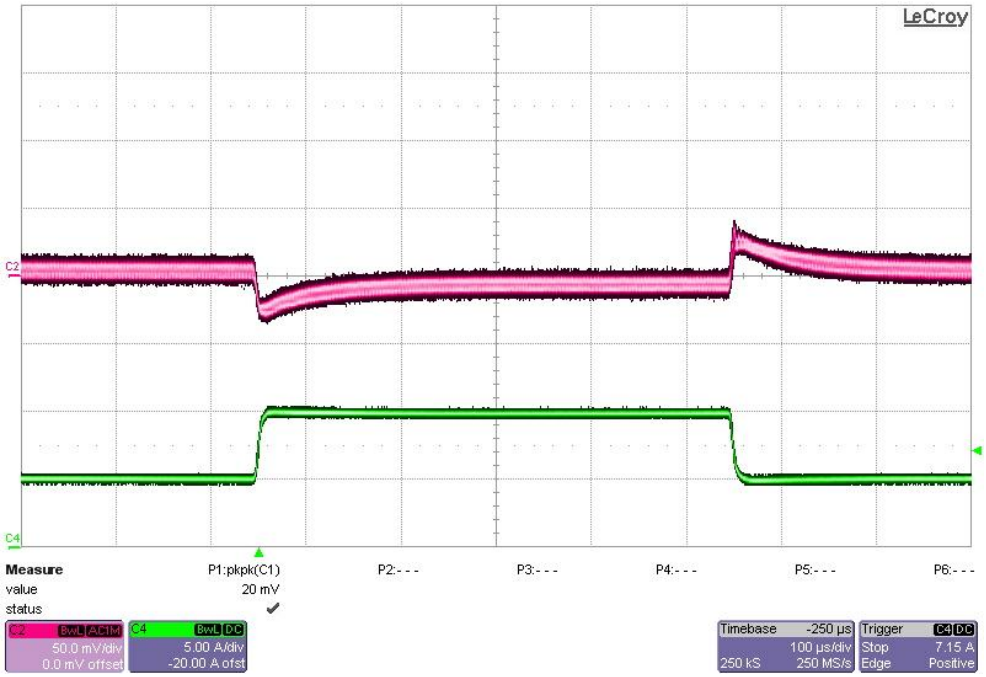
The 5V output ripple at 0A and 10A are shown in persistence below.





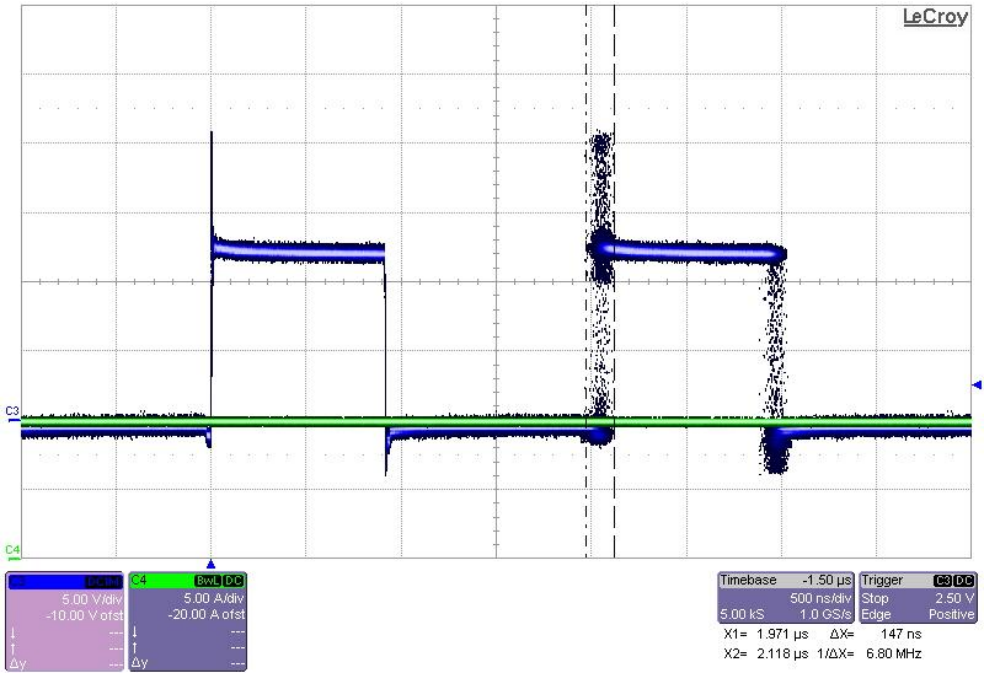
5.5 Load Transient

The transient response due to a 5A to 10A load step is shown in persistence below.



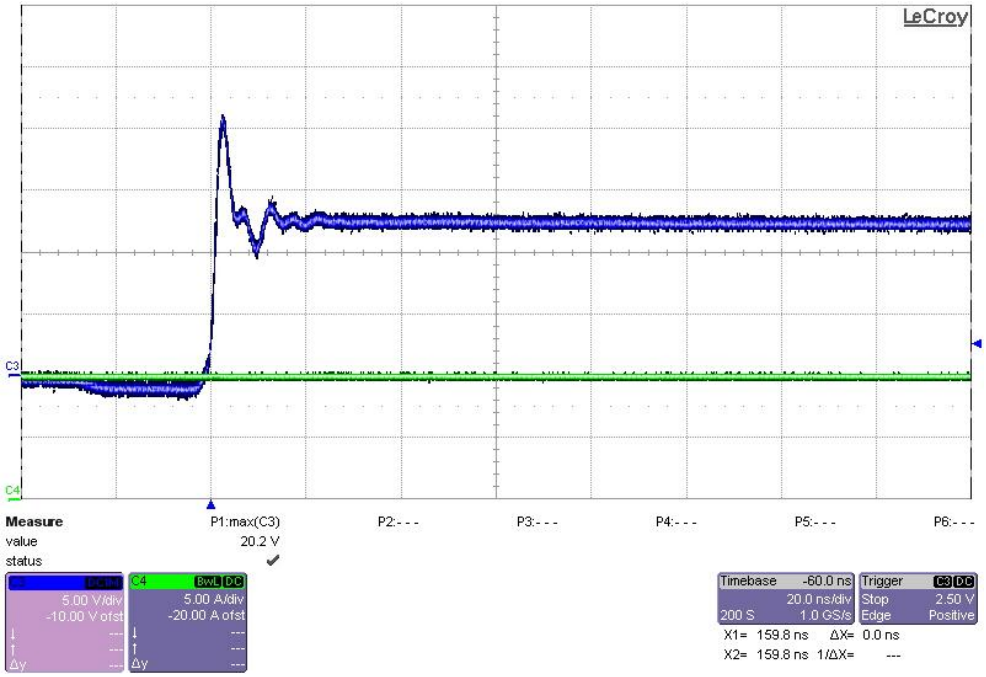
5.6 Frequency Jitter

The switch node frequency jitter is shown in persistence at 10A below. Fsw = 500kHz.



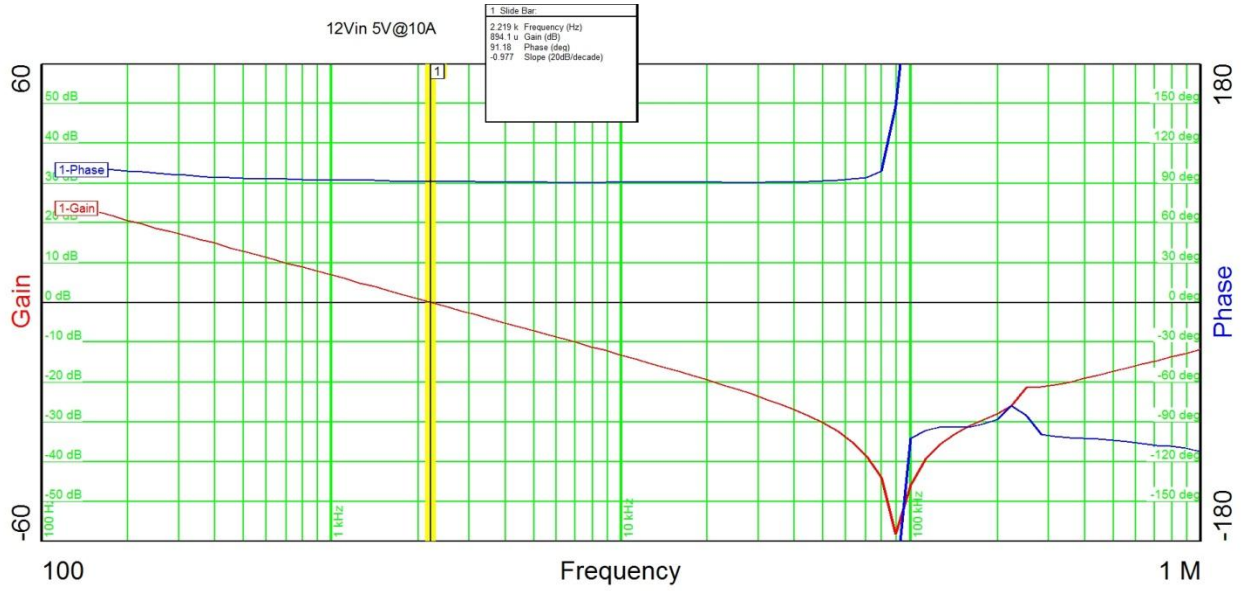
5.7 Switch Node Peak

The maximum switch node voltage is shown in persistence below at 10A.



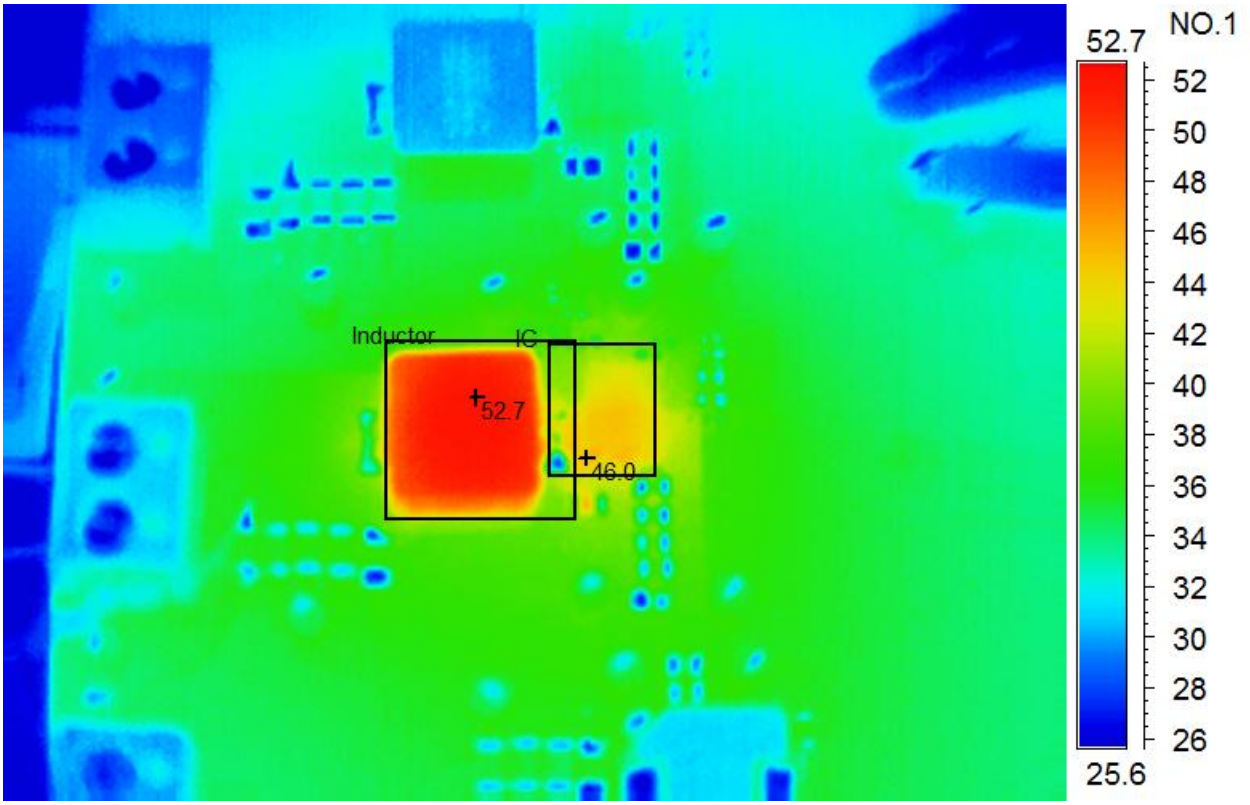
5.8 Loop Response

The loop response of the power supply at 10A load current is shown below.



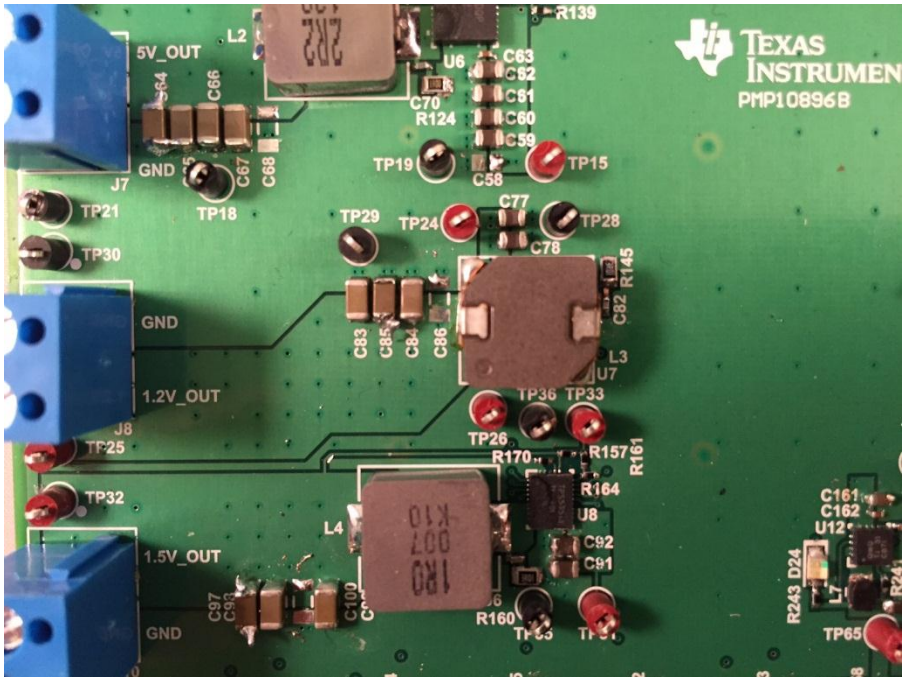
5.9 Thermal Image

The thermal image of the power supply operating with 10A load current is shown below.



6 TPS53515 1.2V at 12A

6.1 Board Photo



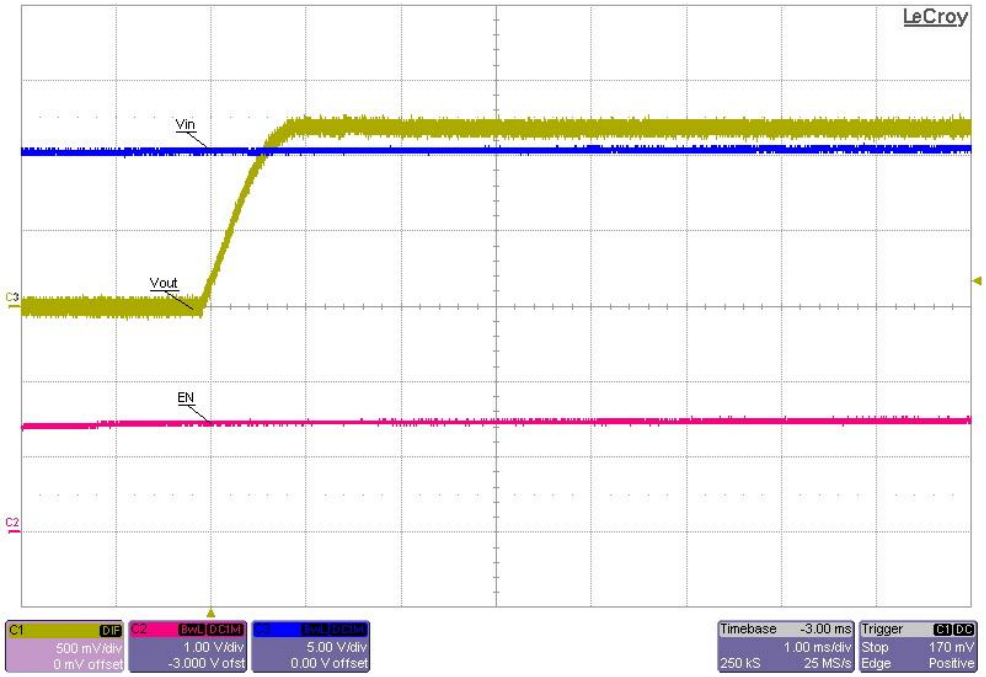
6.2 Load Regulation

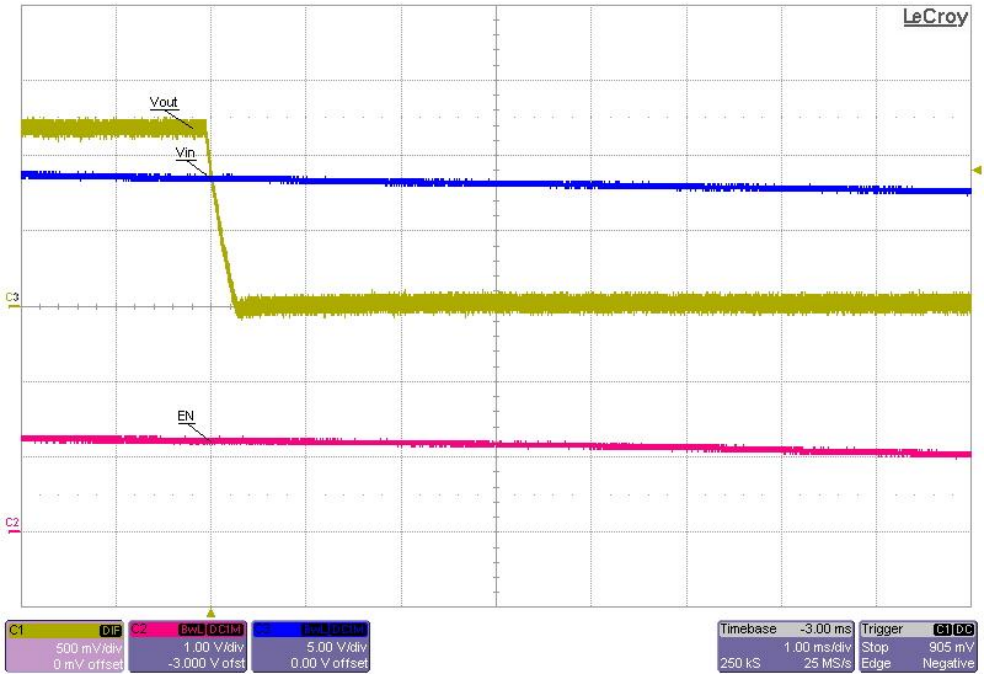
The 1.2V output regulation for load currents listed in Amps is below.

1.2V Load Regulation		
Measured at TP25 and TP30		
0	1.198	V
6	1.193	V
12	1.187	V

6.3 Startup and Shutdown

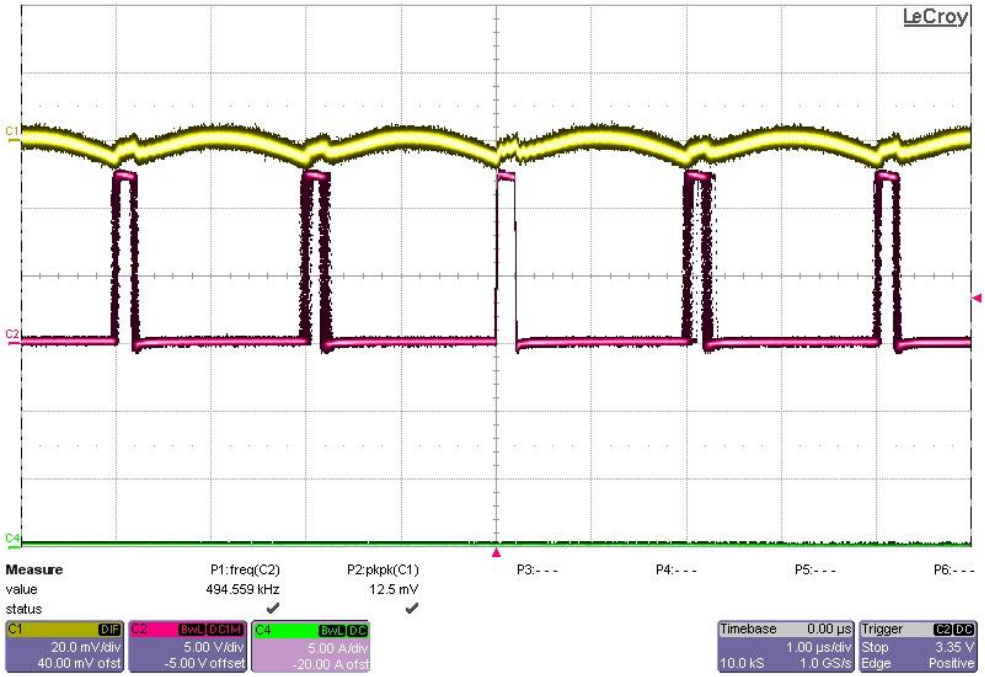
The startup at 0A and shutdown at 1A are shown below.

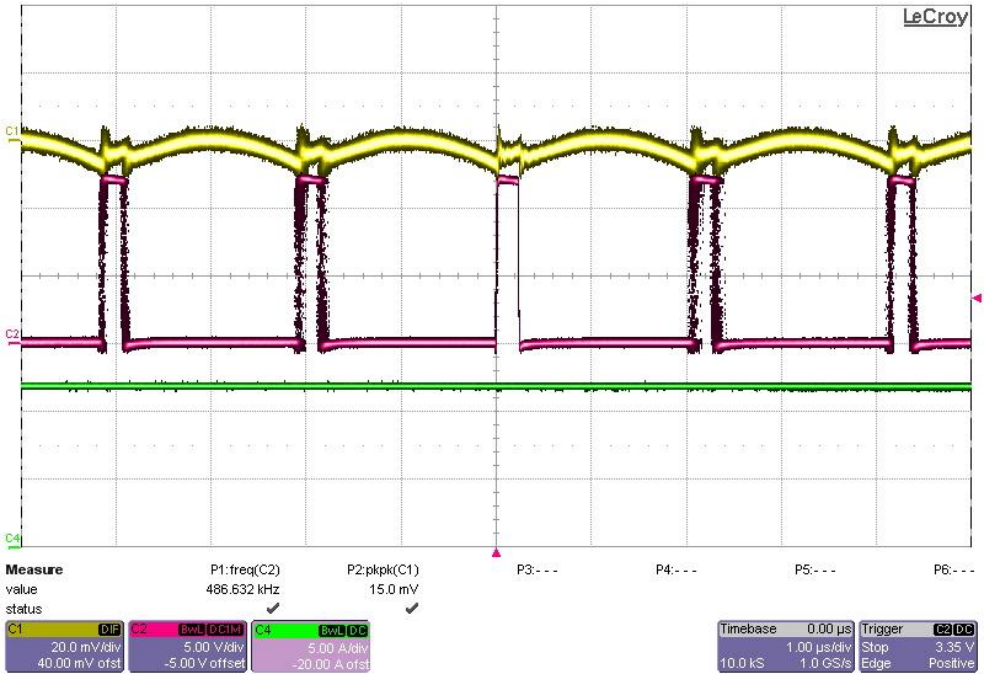




6.4 Output Ripple

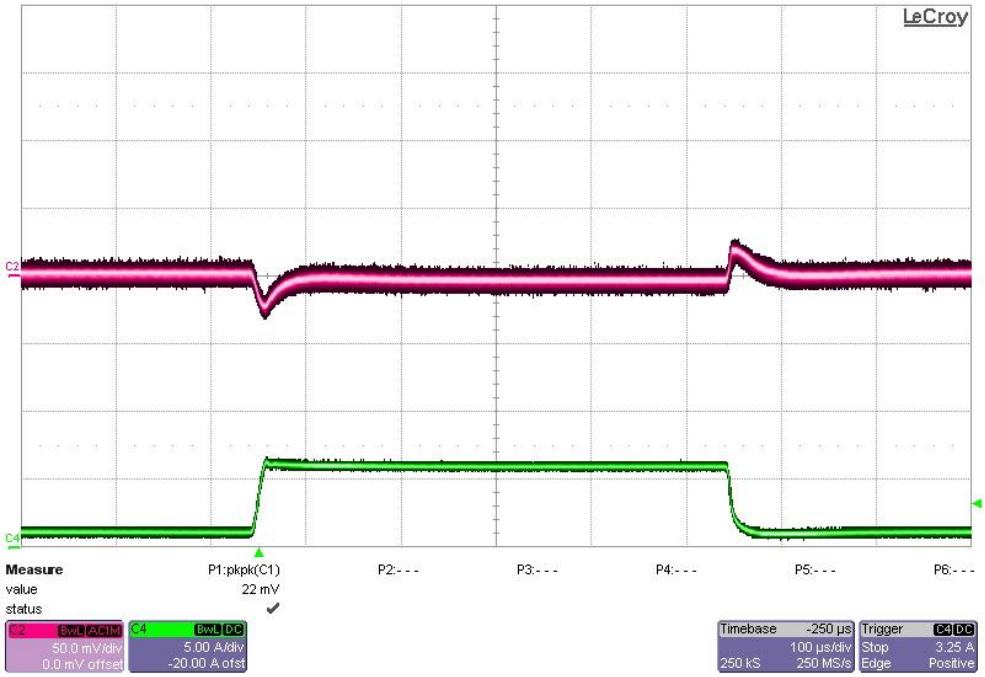
The 1.2V output ripple at 0A and 12A are shown in persistence below.





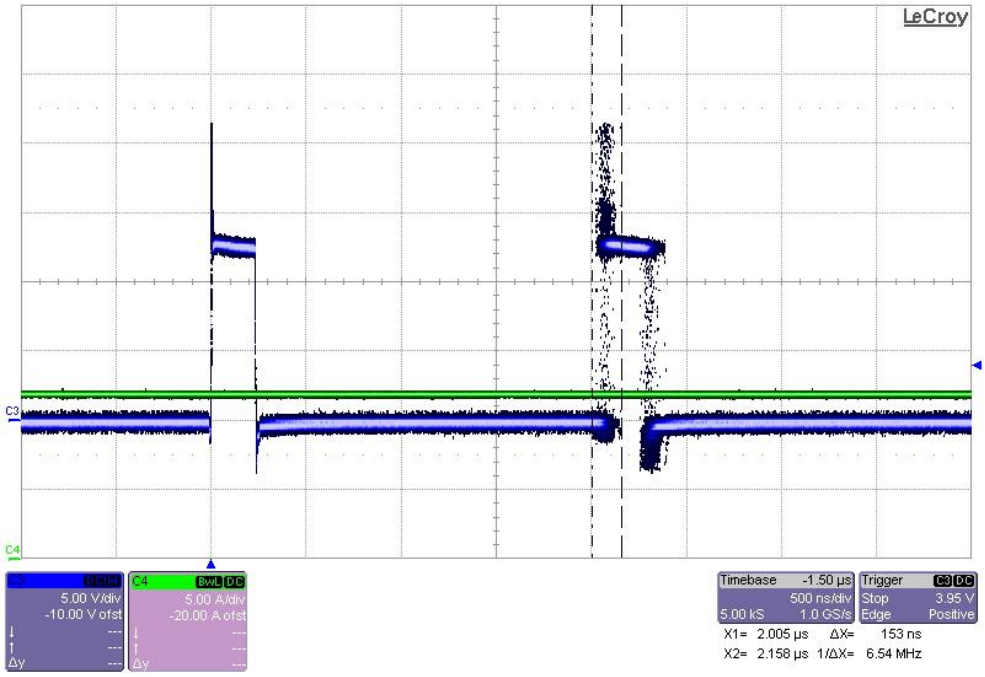
6.5 Load Transient

The transient response due to a 1A to 6A load step is shown in persistence below.



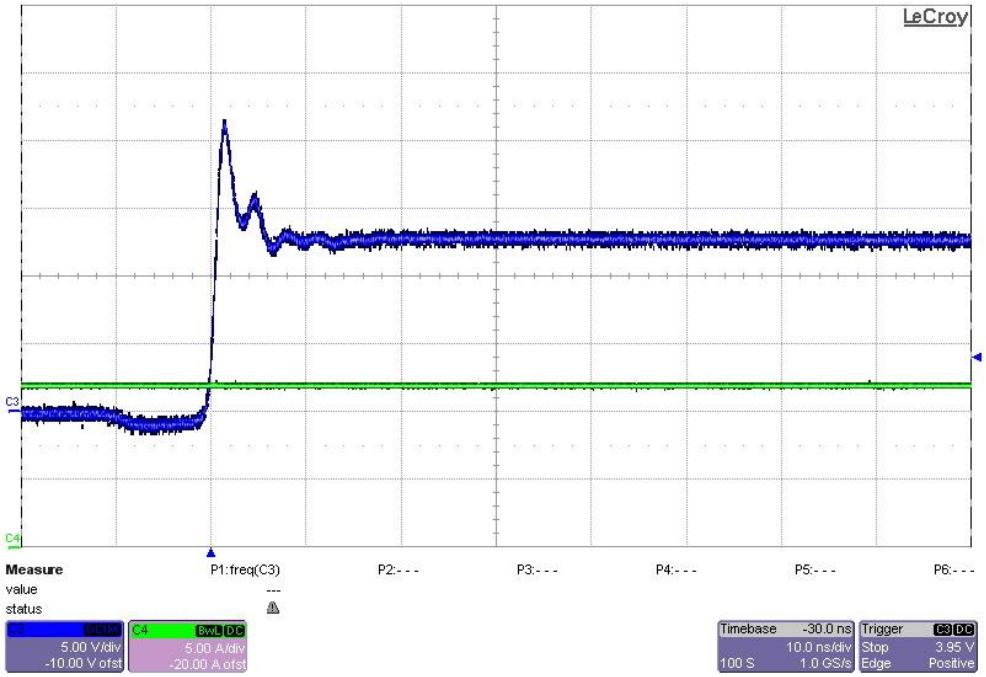
6.6 Frequency Jitter

The switch node frequency jitter is shown in persistence at 12A below. Fsw = 500kHz.



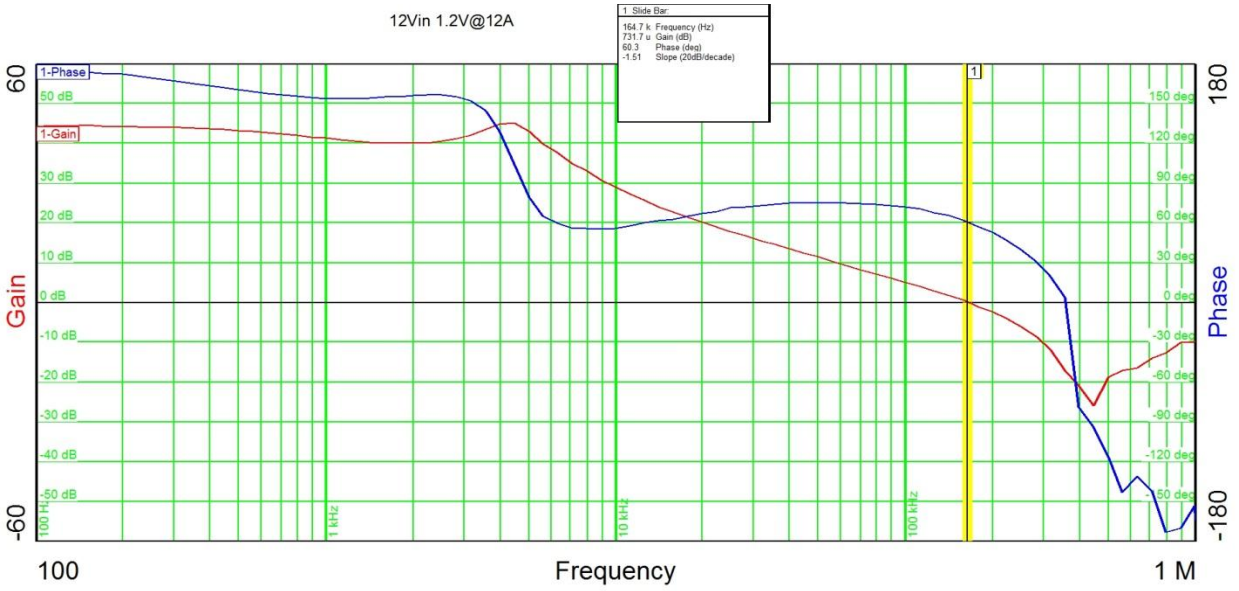
6.7 Switch Node Peak

The maximum switch node voltage is shown in persistence below at 12A.



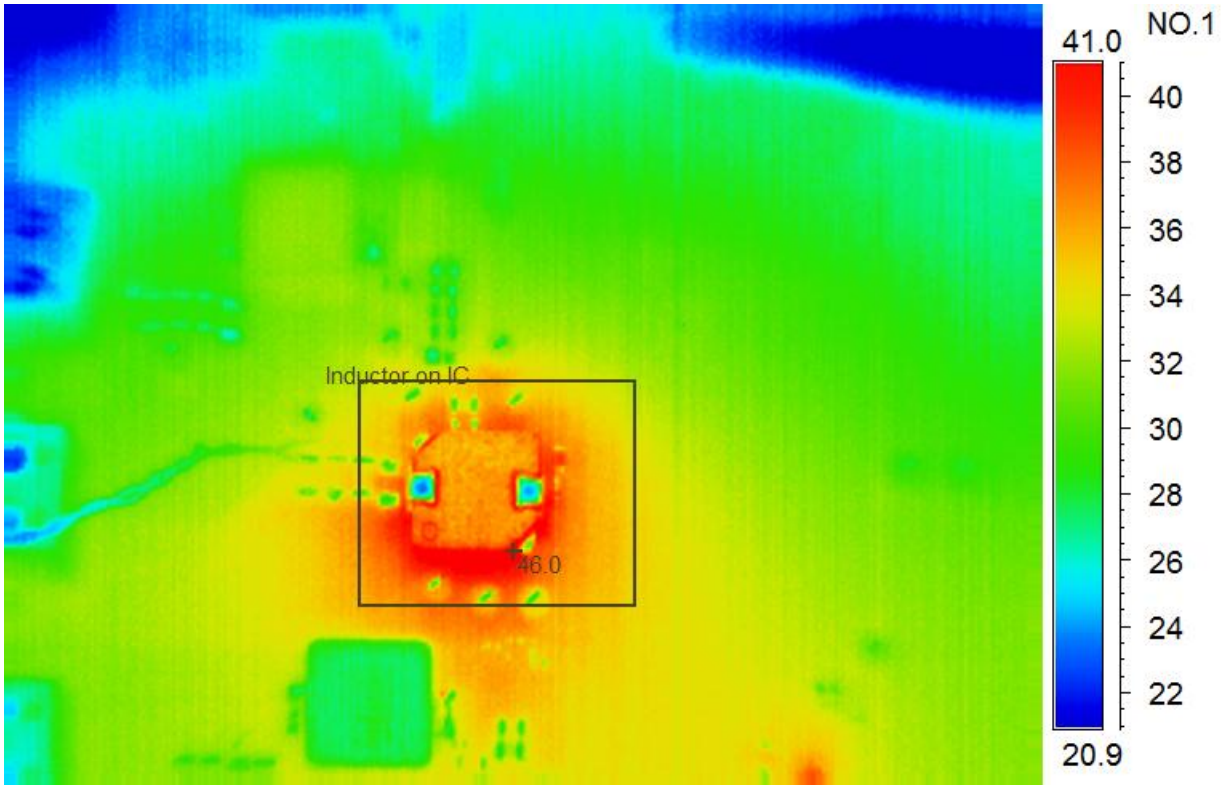
6.8 Loop Response

The loop response of the power supply at 12A load current is shown below.



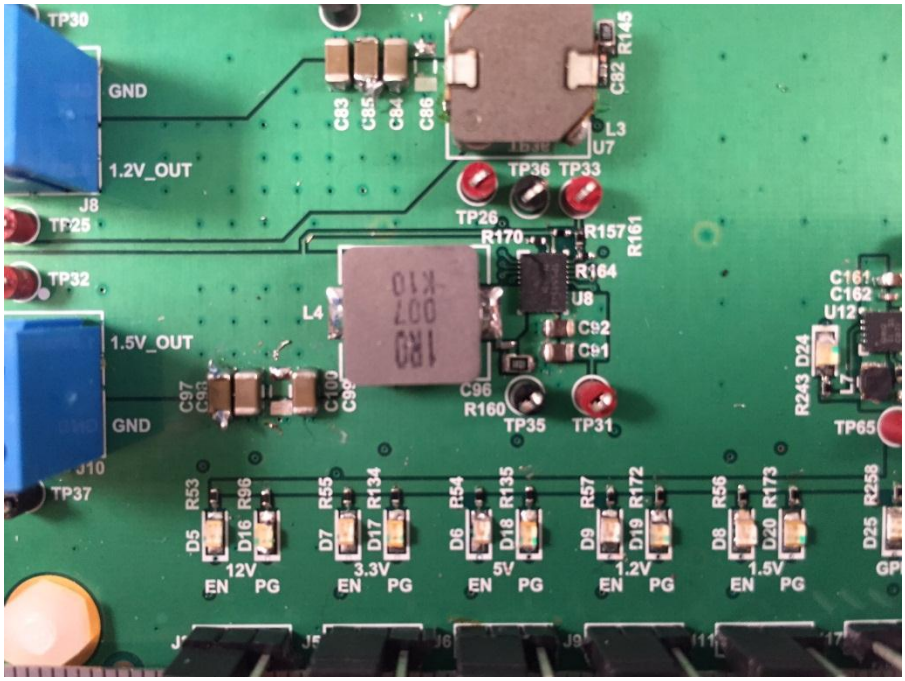
6.9 Thermal Image

The thermal image of the power supply operating with 12A load current is shown below.



7 TPS53513 1.5V at 8A

7.1 Board Photo



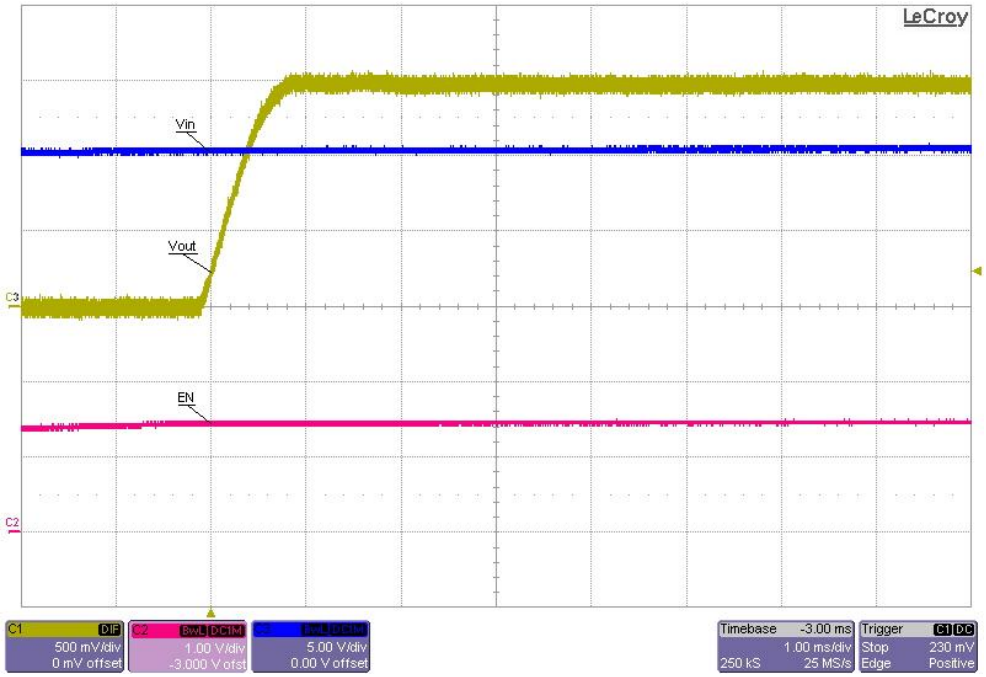
7.2 Load Regulation

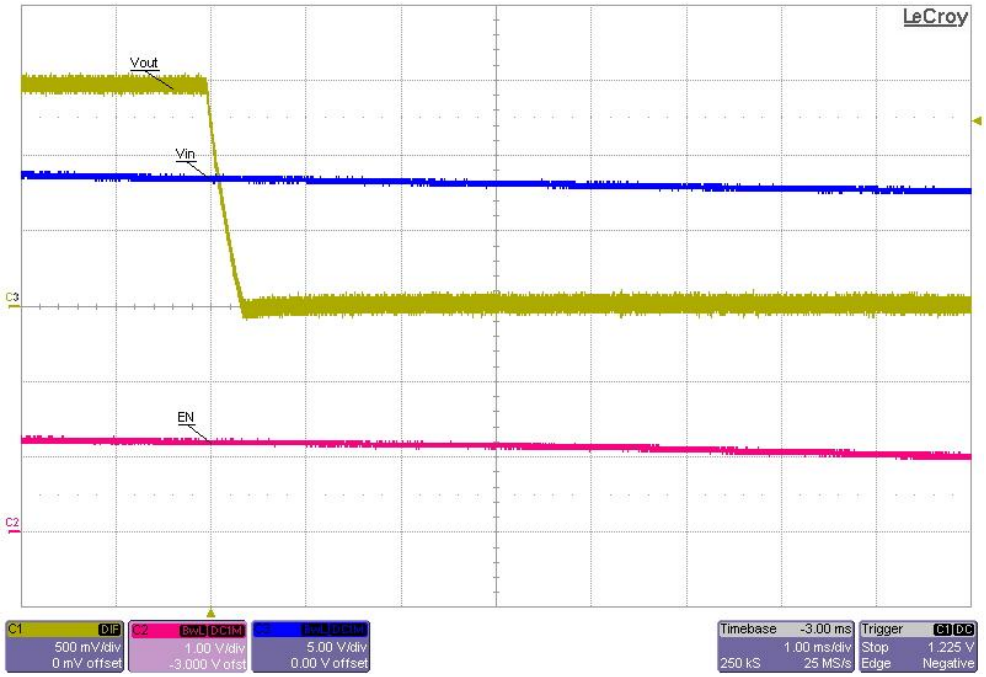
The 1.5V output regulation for load currents listed in Amps is below.

1.5V Load Regulation		
Measured at TP32 and TP37		
0	1.499	V
4	1.495	V
8	1.492	V

7.3 Startup and Shutdown

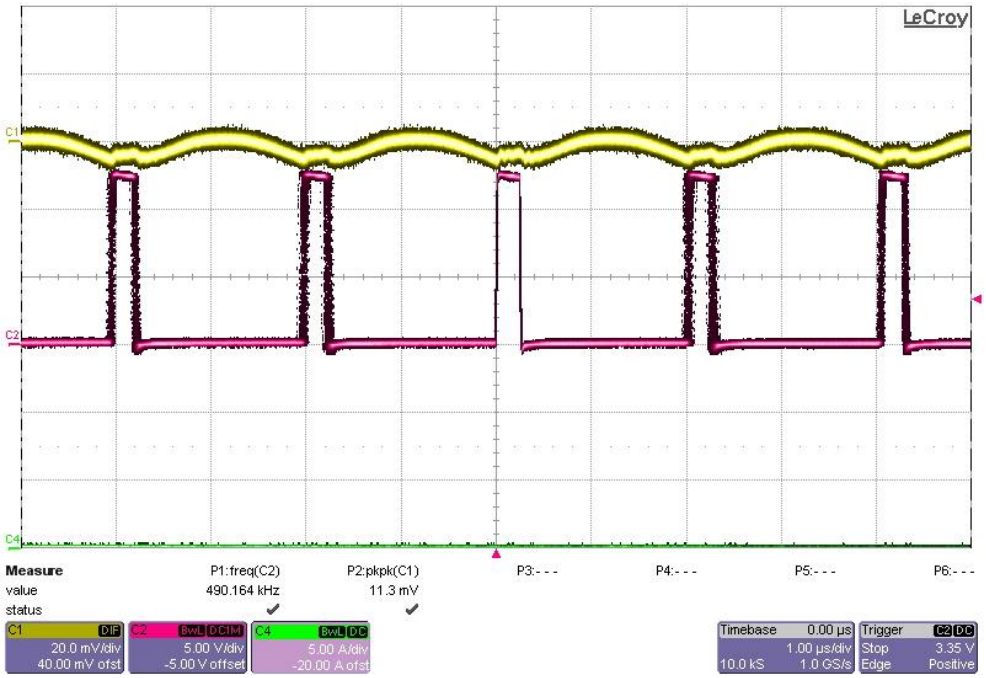
The startup at 0A and shutdown at 1A are shown below.

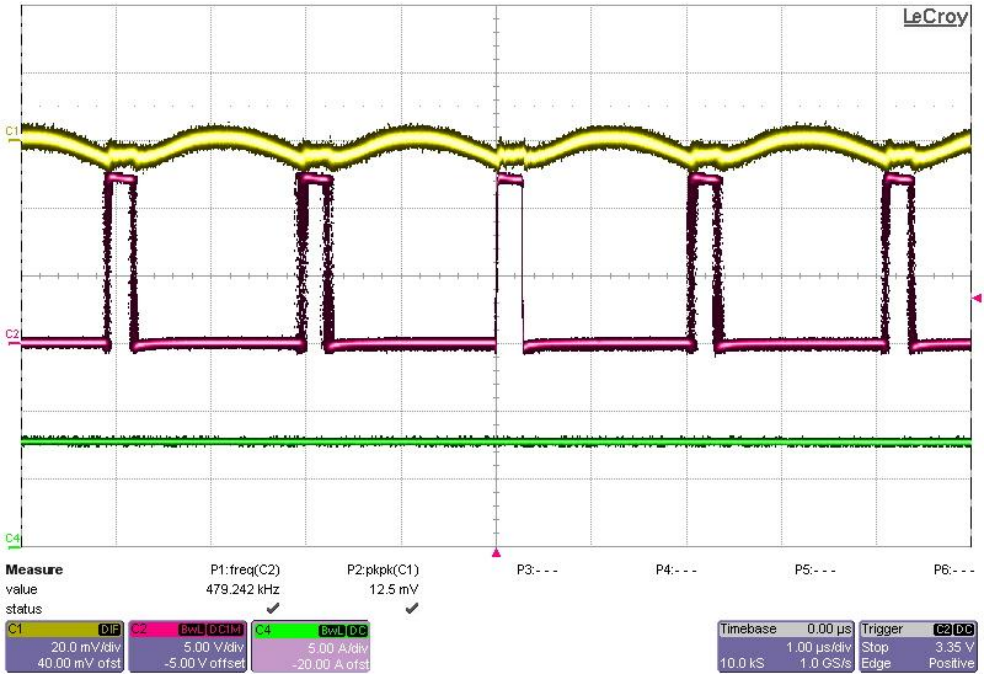




7.4 Output Ripple

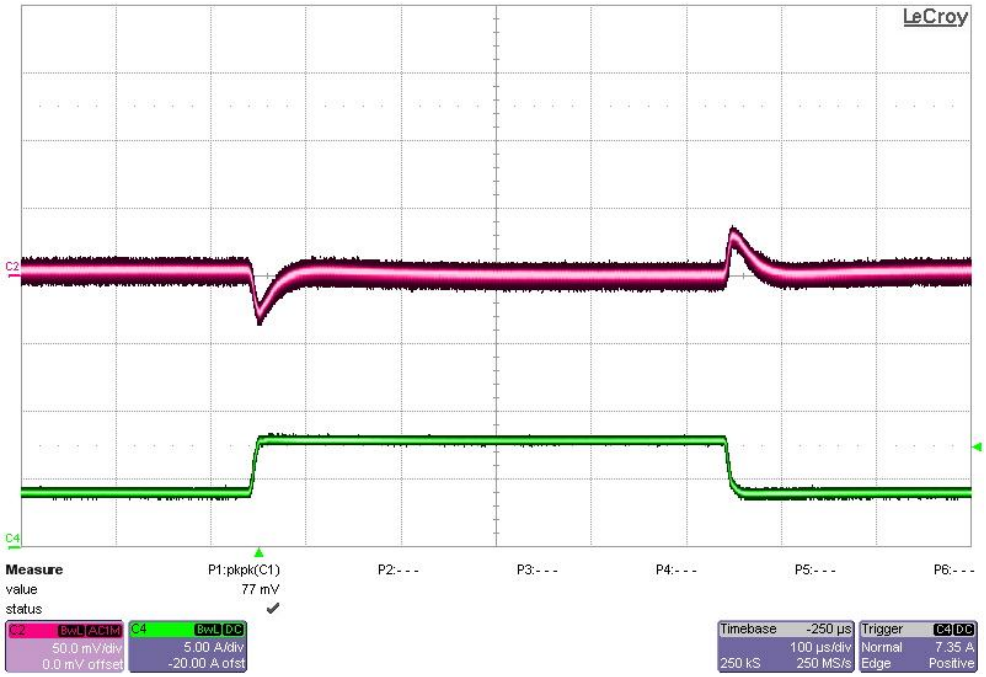
The 1.5V output ripple at 0A and 8A are shown in persistence below.





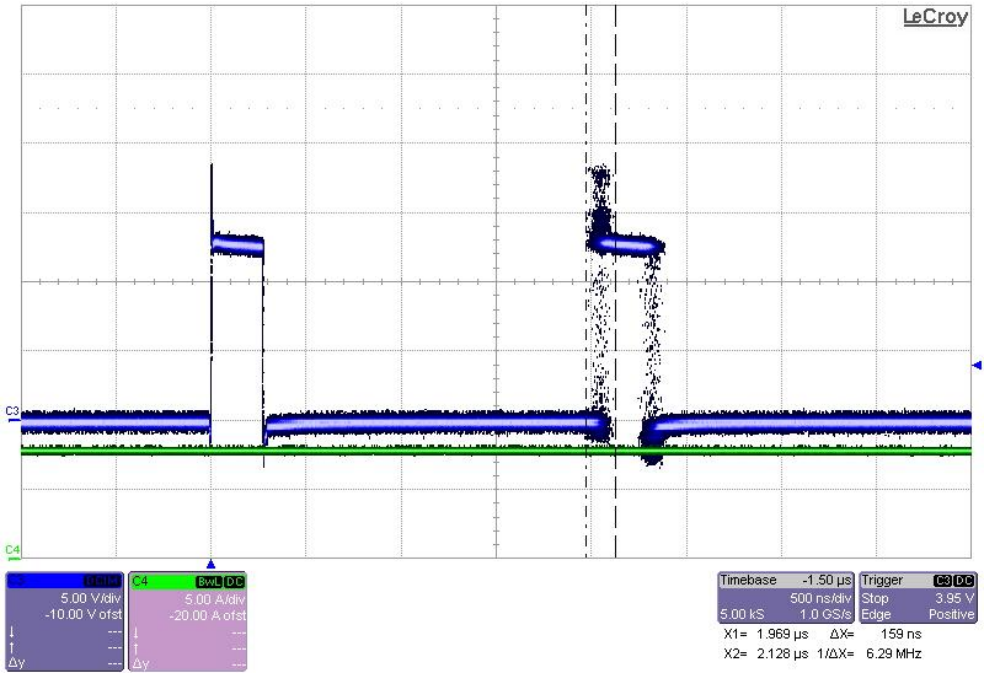
7.5 Load Transient

The transient response due to a 4A to 8A load step is shown in persistence below.



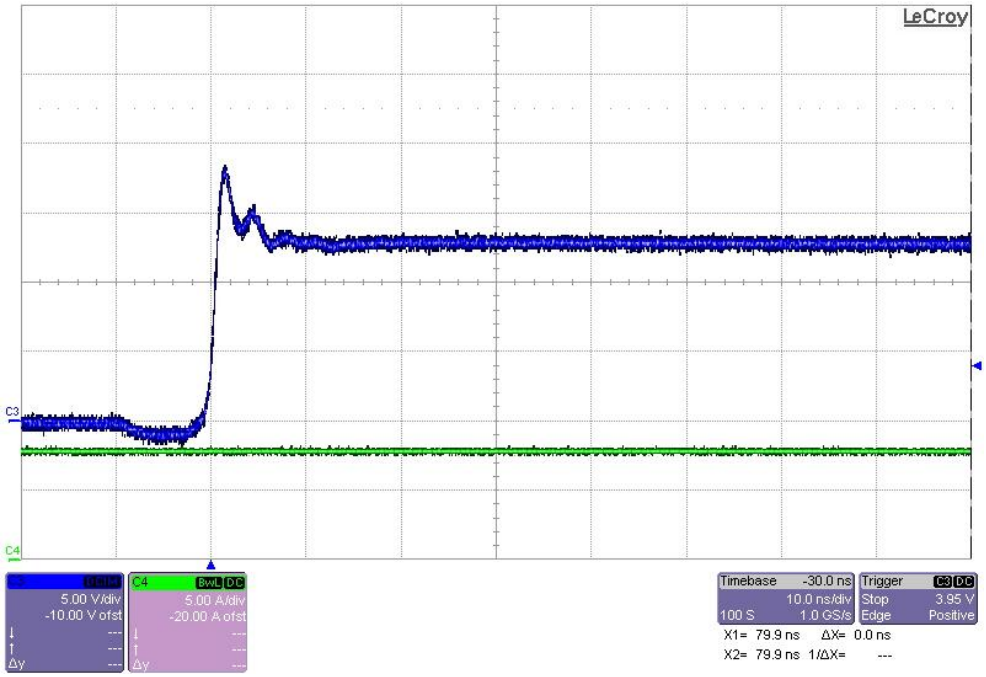
7.6 Frequency Jitter

The switch node frequency jitter is shown in persistence at 8A below. Fsw = 500kHz.



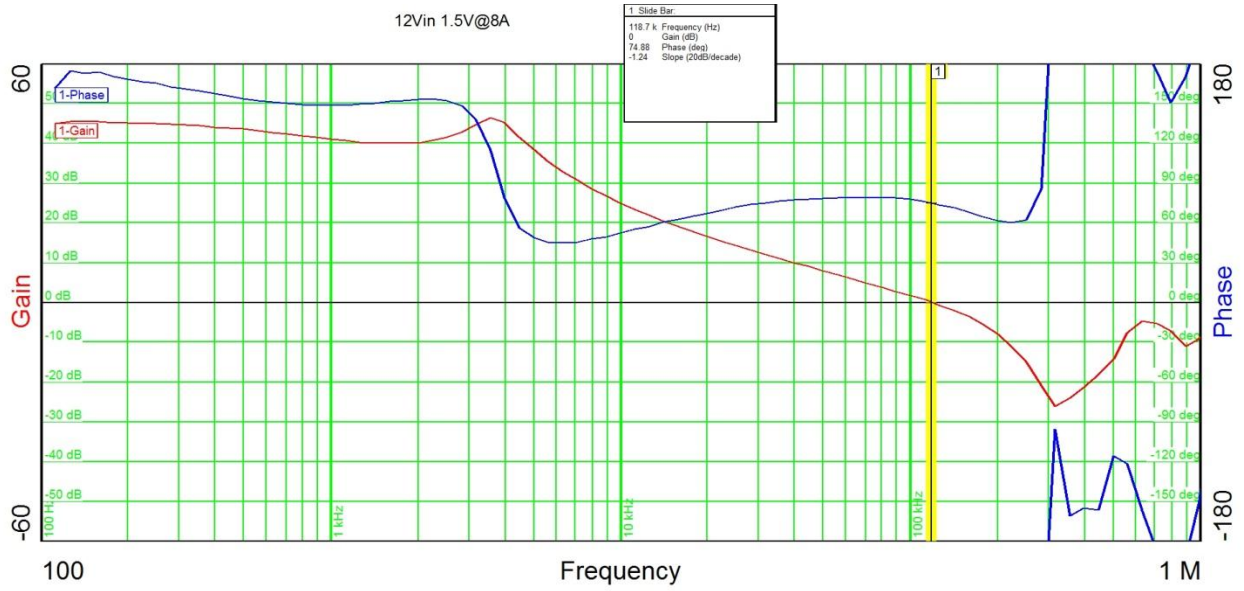
7.7 Switch Node Peak

The maximum switch node voltage is shown in persistence below at 8A.



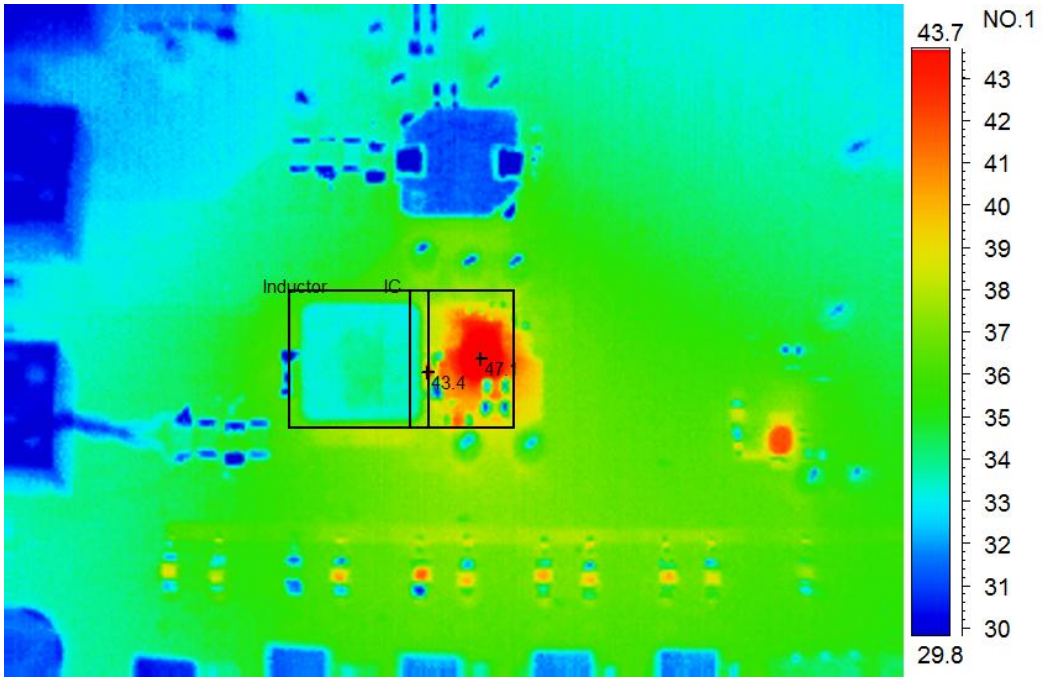
7.8 Loop Response

The loop response of the power supply at 8A load current is shown below.



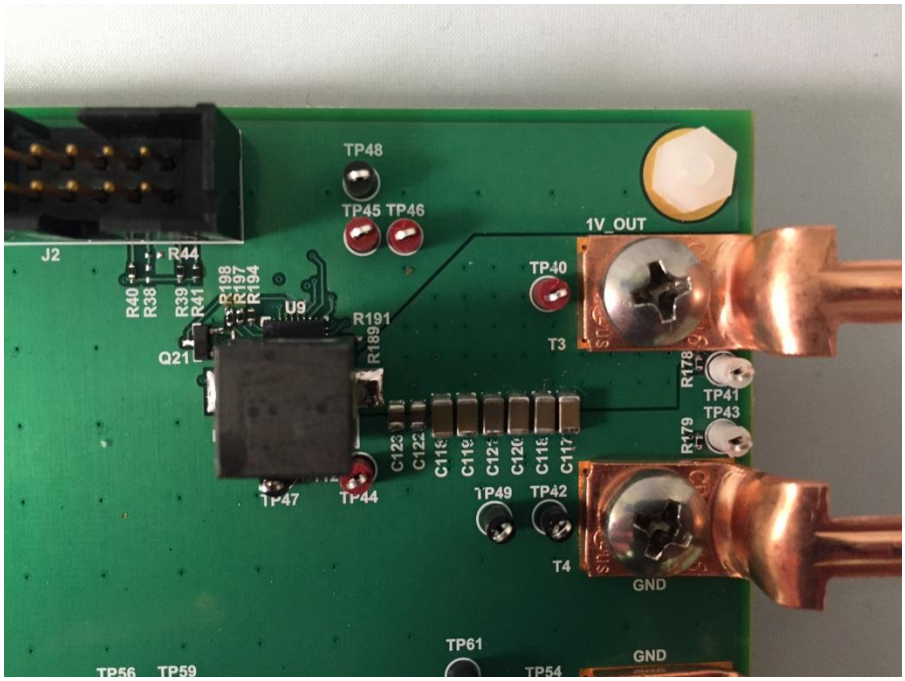
7.9 Thermal Image

The thermal image of the power supply operating with 8A load current is shown below.



8 TPS544C25 1V at 30A

8.1 Board Photo



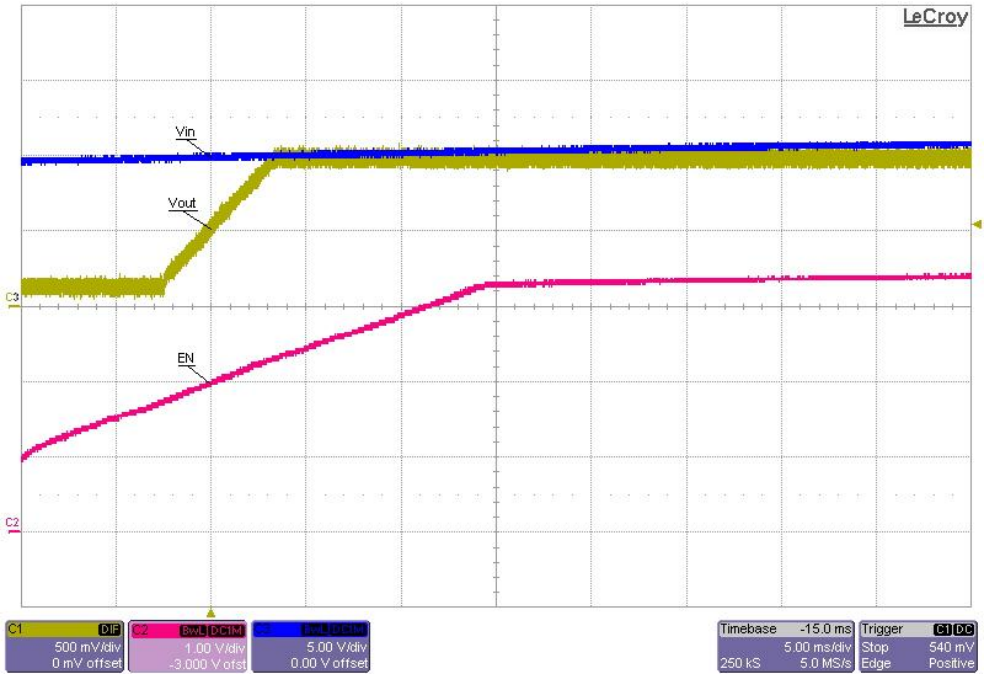
8.2 Load Regulation

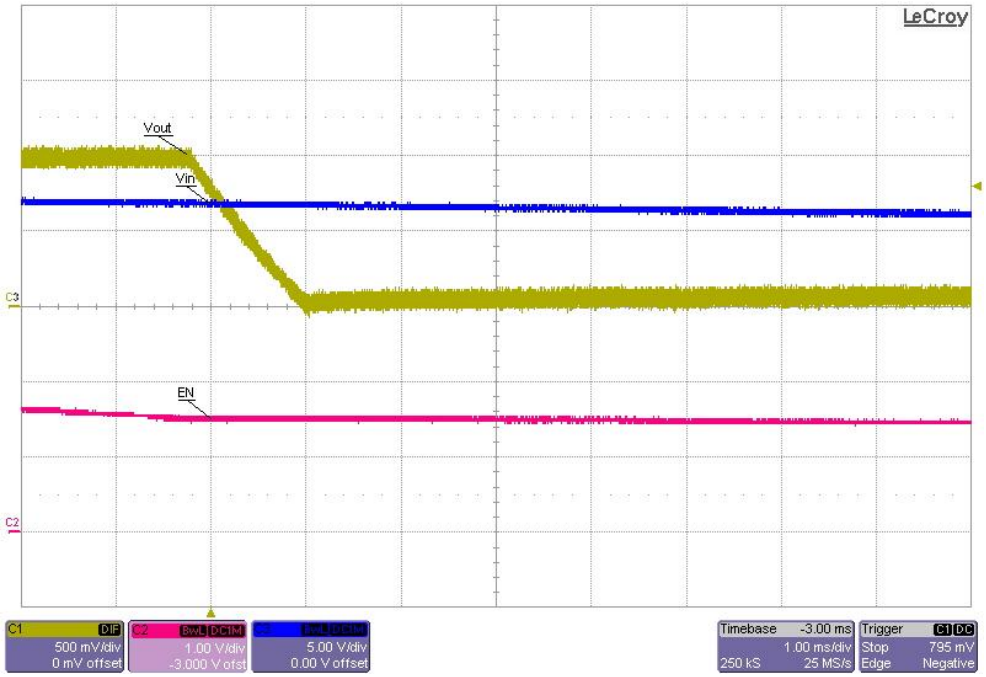
The 1V output regulation for load currents listed in Amps is below.

1V Load Regulation		
Measured at TP41 and TP43		
0	1	V
15	0.999	V
20	0.999	V

8.3 Startup and Shutdown

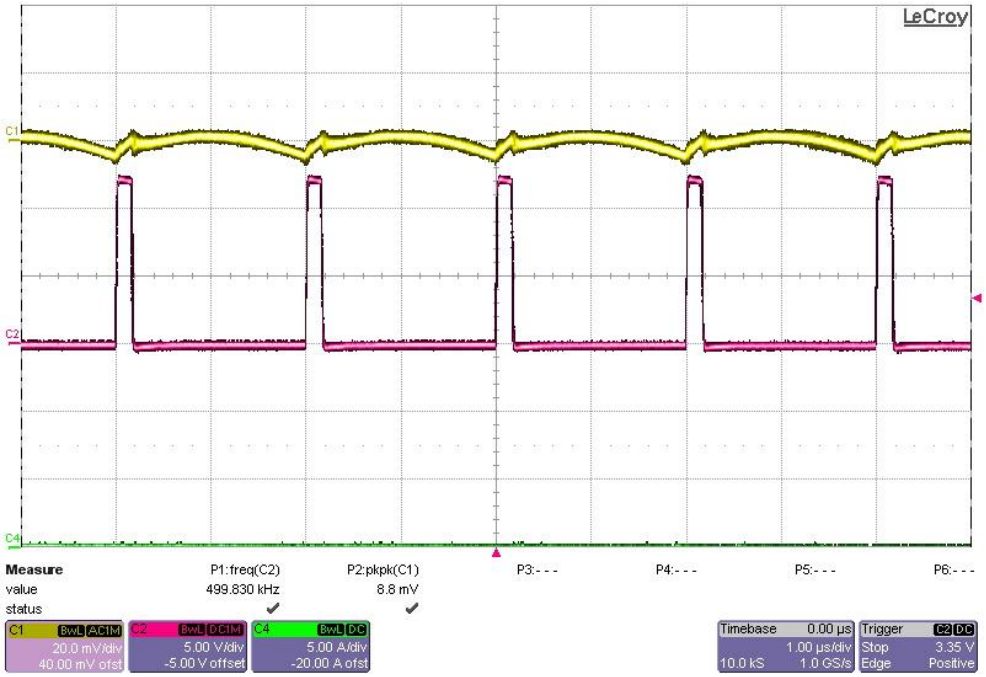
The startup at 0A and shutdown at 1A are shown below.

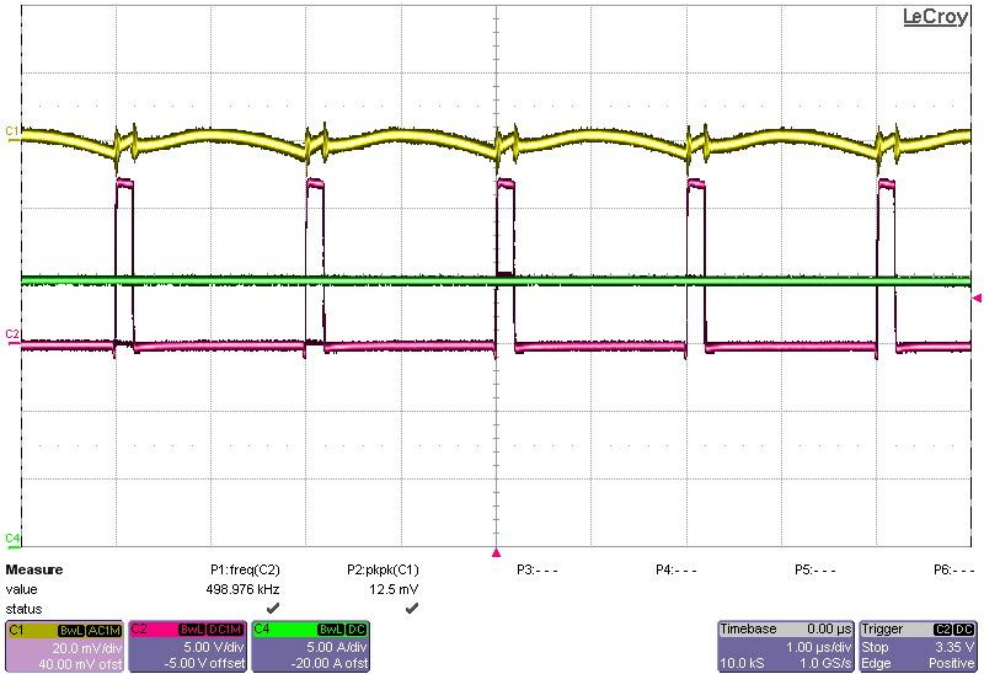




8.4 Output Ripple

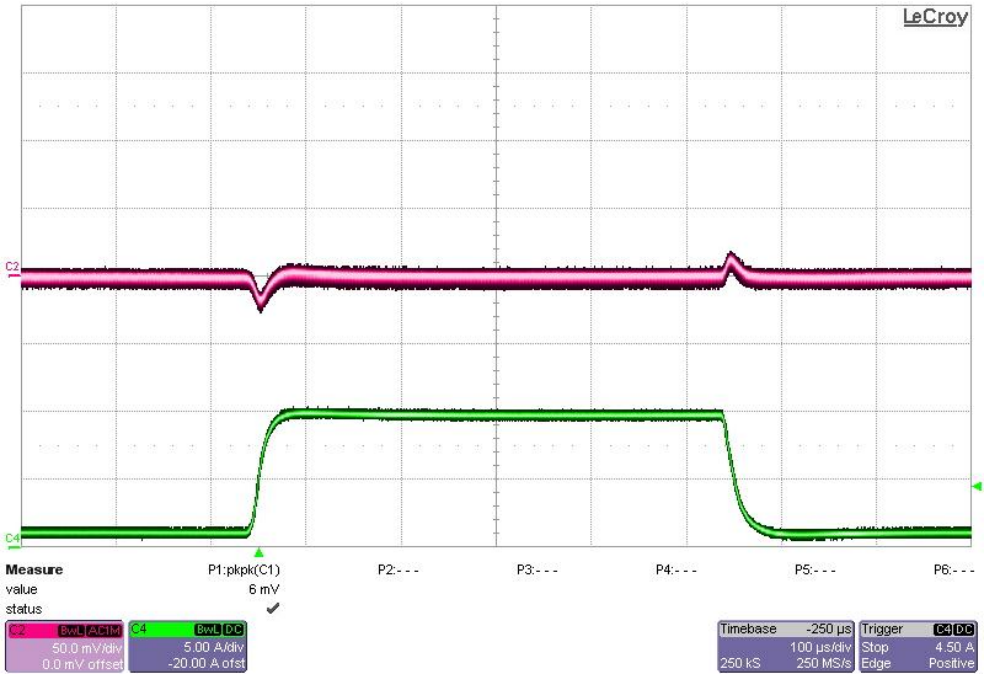
The 1V output ripple at 0A and 20A are shown in persistence below.





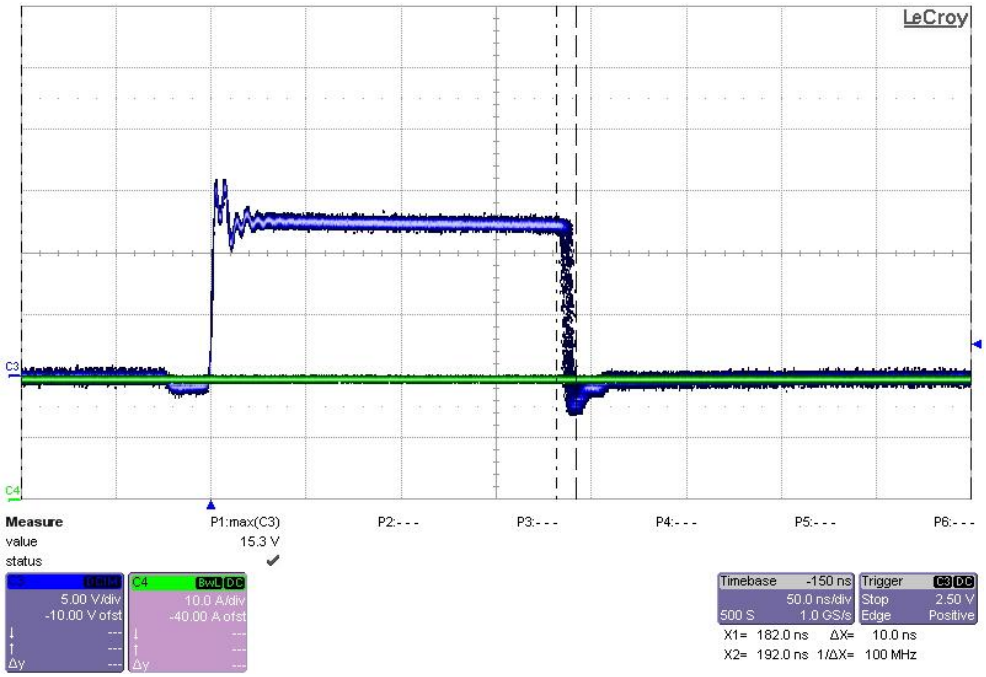
8.5 Load Transient

The transient response due to a 1A to 10A load step is shown in persistence below.



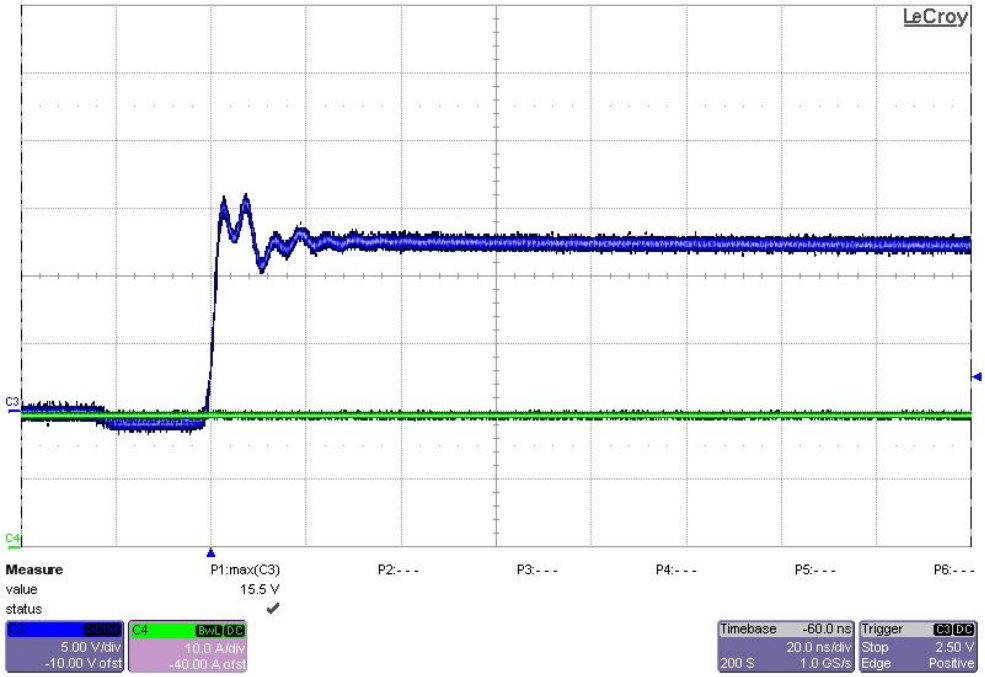
8.6 On Time Jitter

The switch node on-time jitter is shown in persistence at 20A below. Fsw = 500kHz.



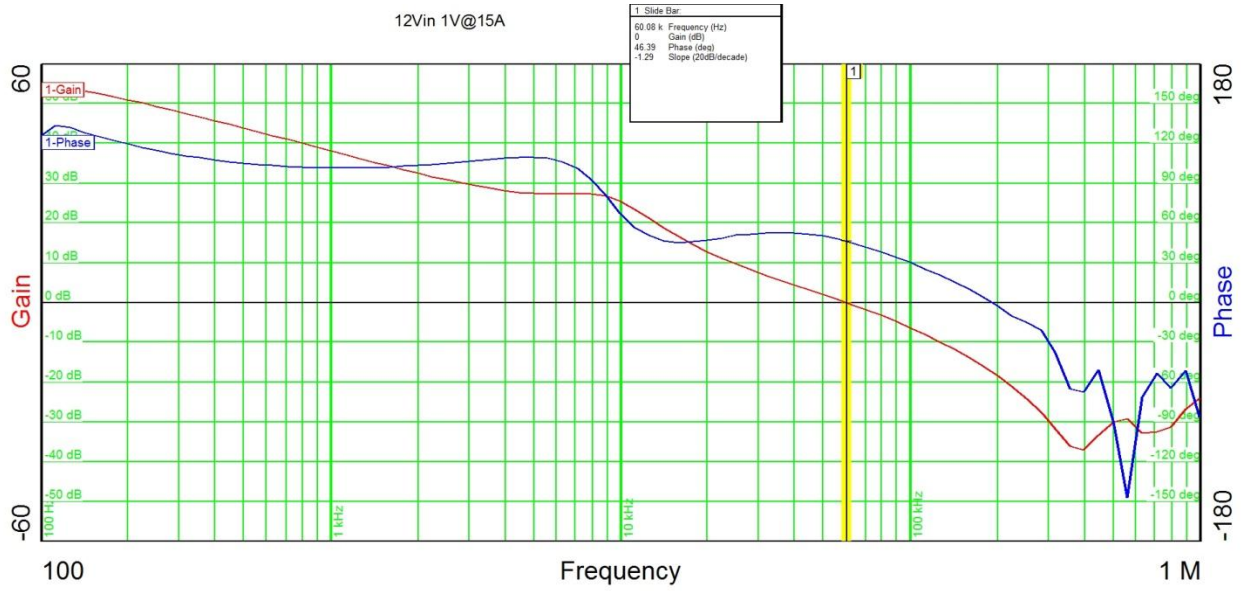
8.7 Switch Node Peak

The maximum switch node voltage is shown in persistence below at 20A.



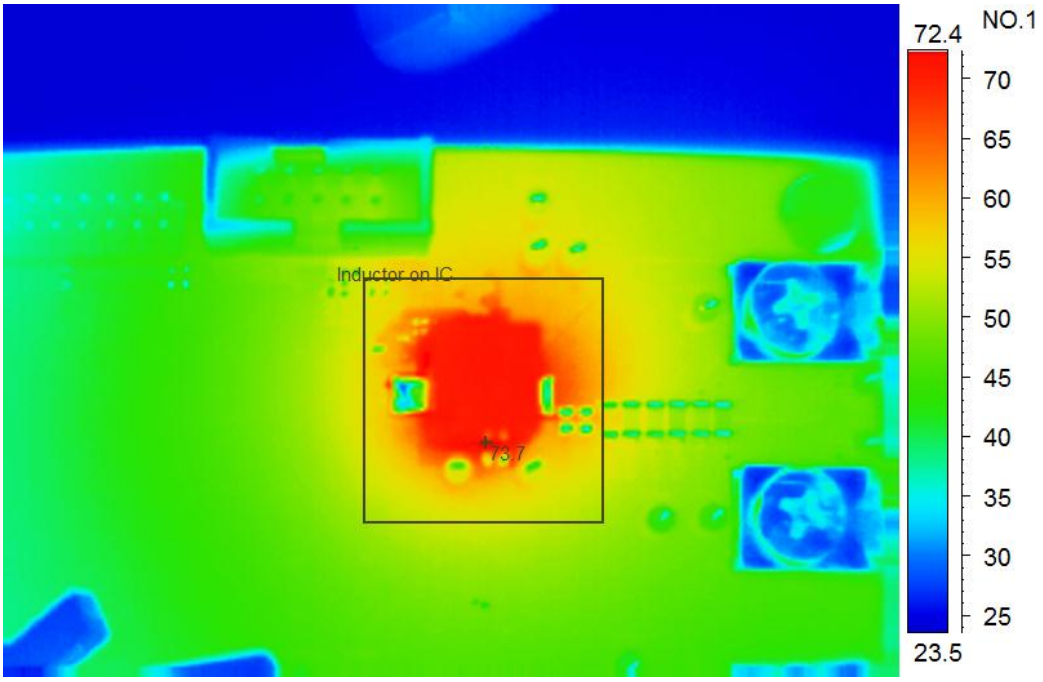
8.8 Loop Response

The loop response of the power supply at 15A load current is shown below.



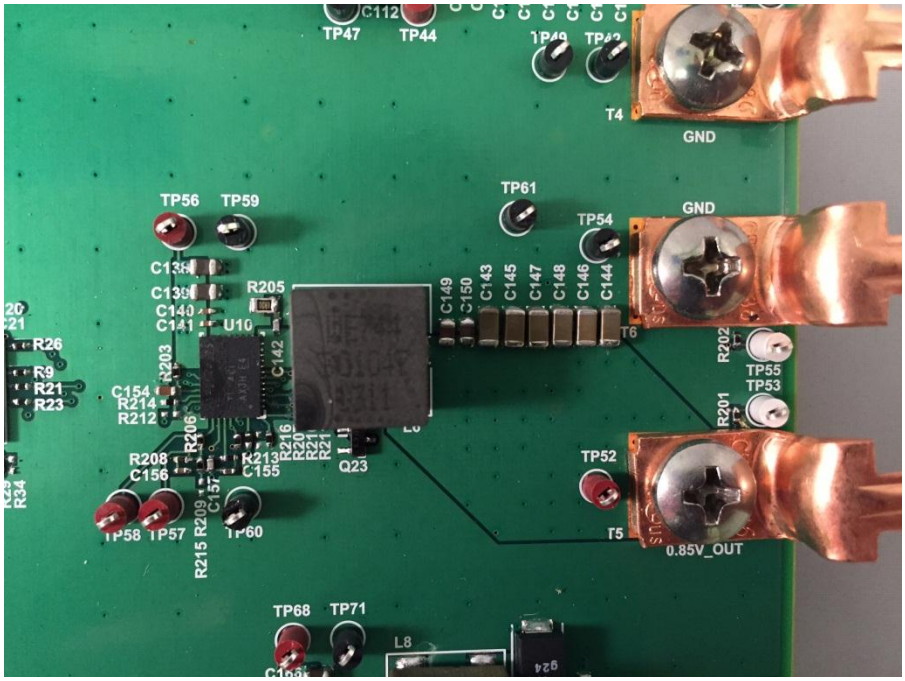
8.9 Thermal Image

The thermal image of the power supply operating with 30A load current is shown below.



9 TPS544C25 0.85V at 30A

9.1 Board Photo



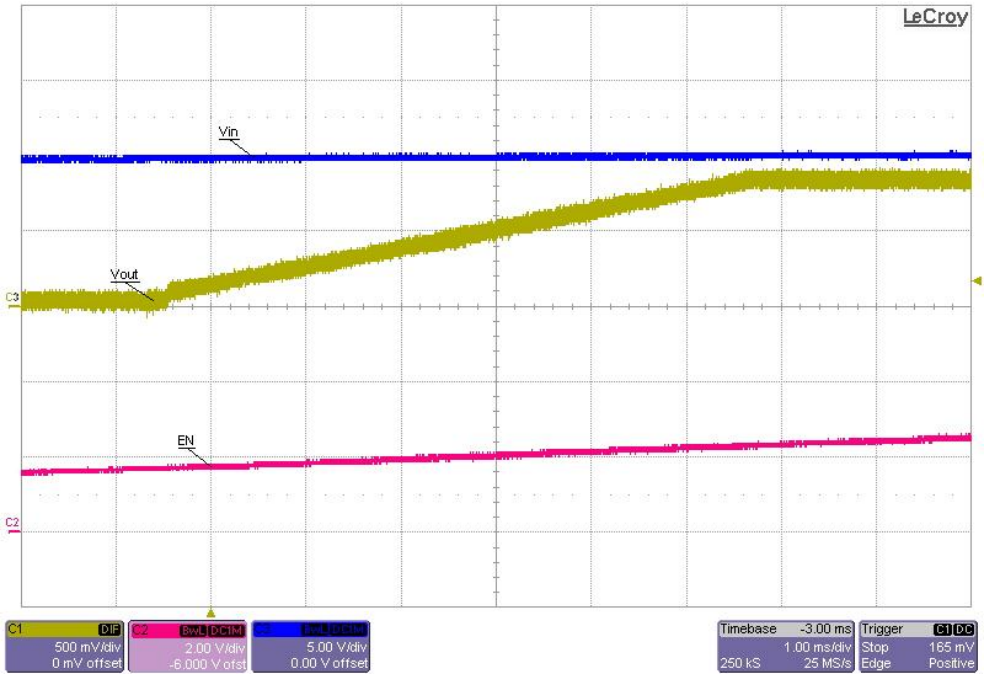
9.2 Load Regulation

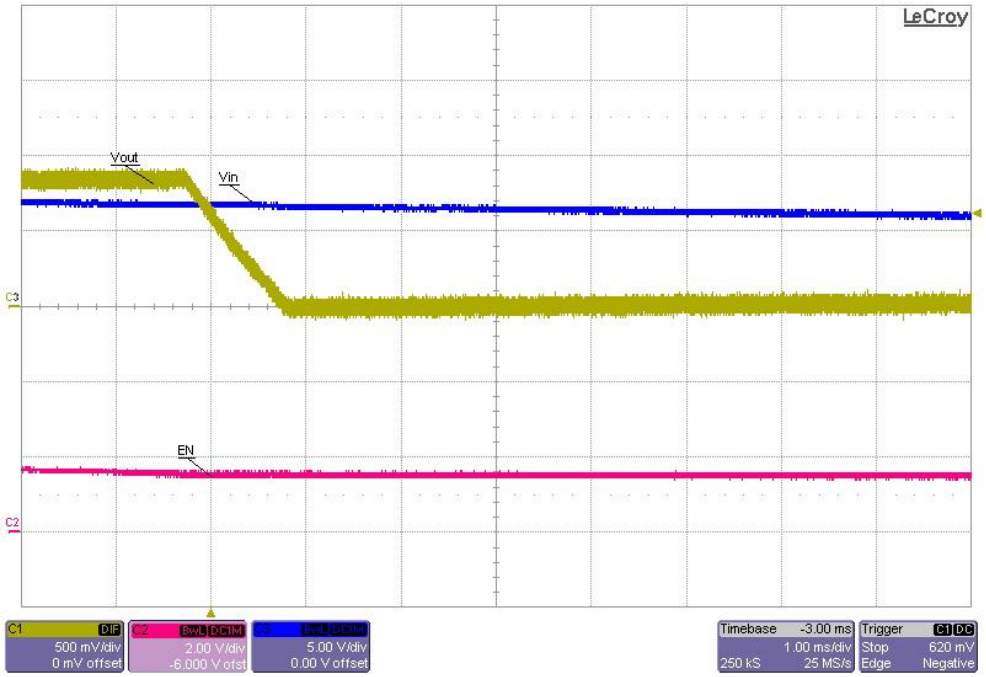
The 0.85V output regulation for load currents listed in Amps is below.

0.85V Load Regulation		
Measured at TP53 and TP55		
0	0.849	V
15	0.848	V
30	0.848	V

9.3 Startup and Shutdown

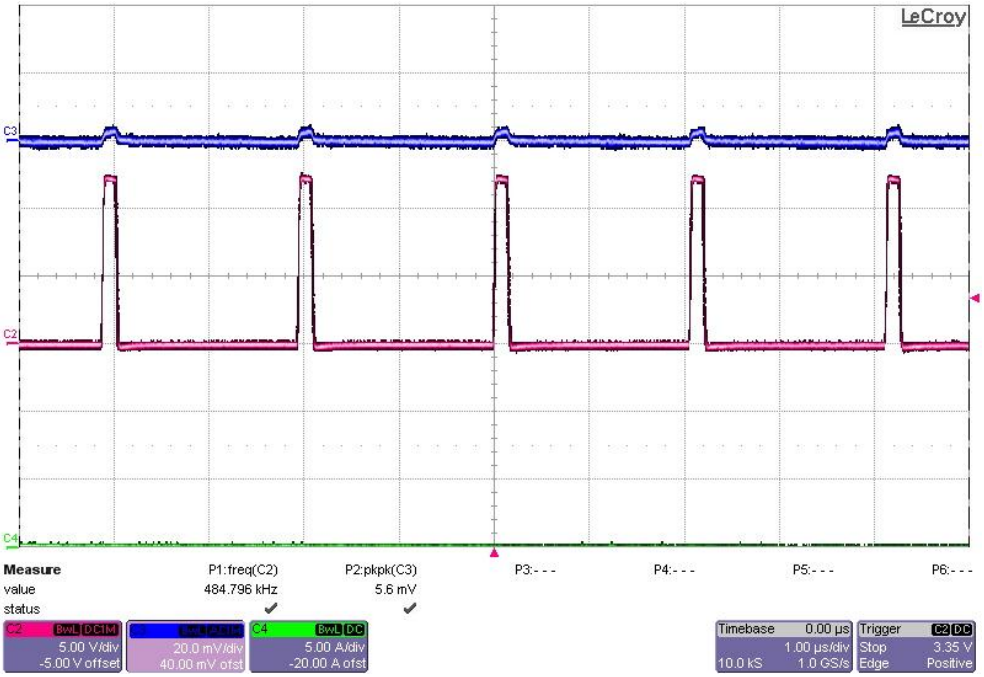
The startup at 0A and shutdown at 1A are shown below.

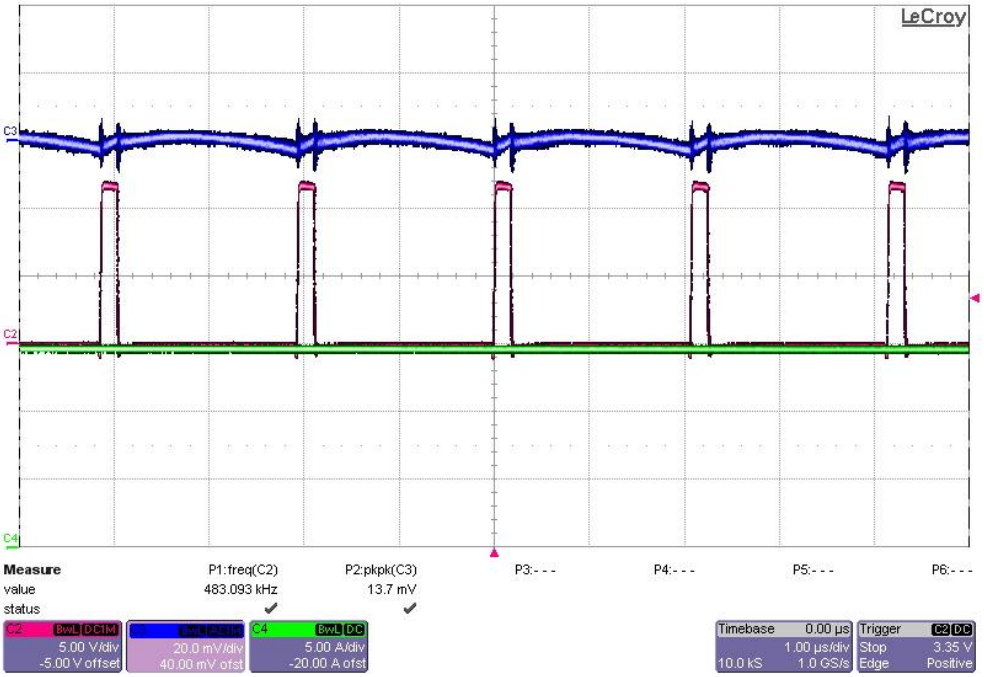




9.4 Output Ripple

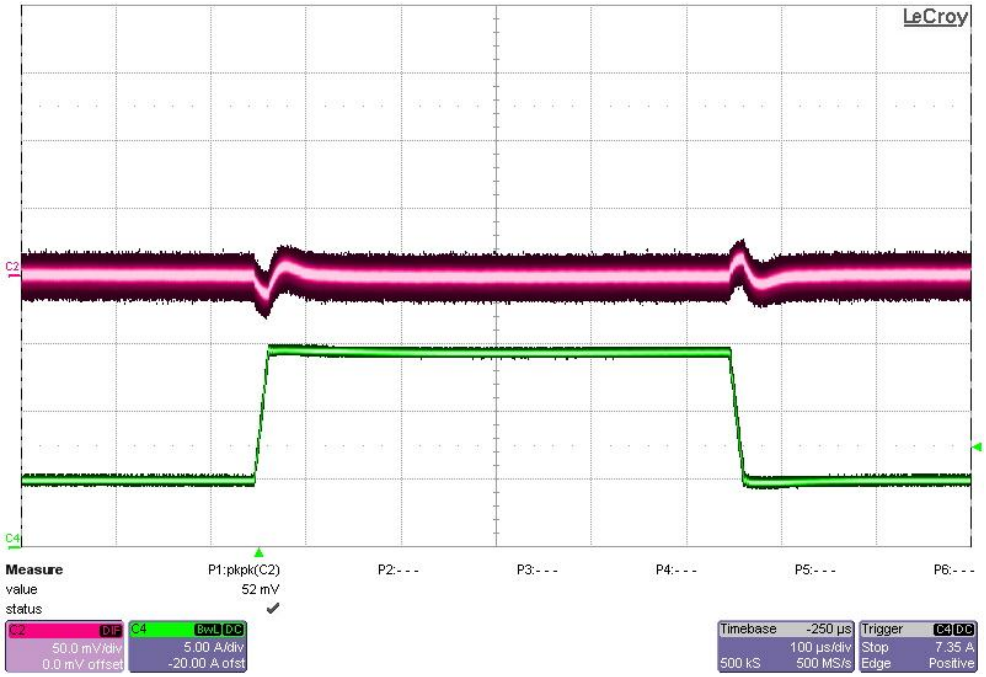
The 0.85V output ripple at 0A and 30A are shown in persistence below.





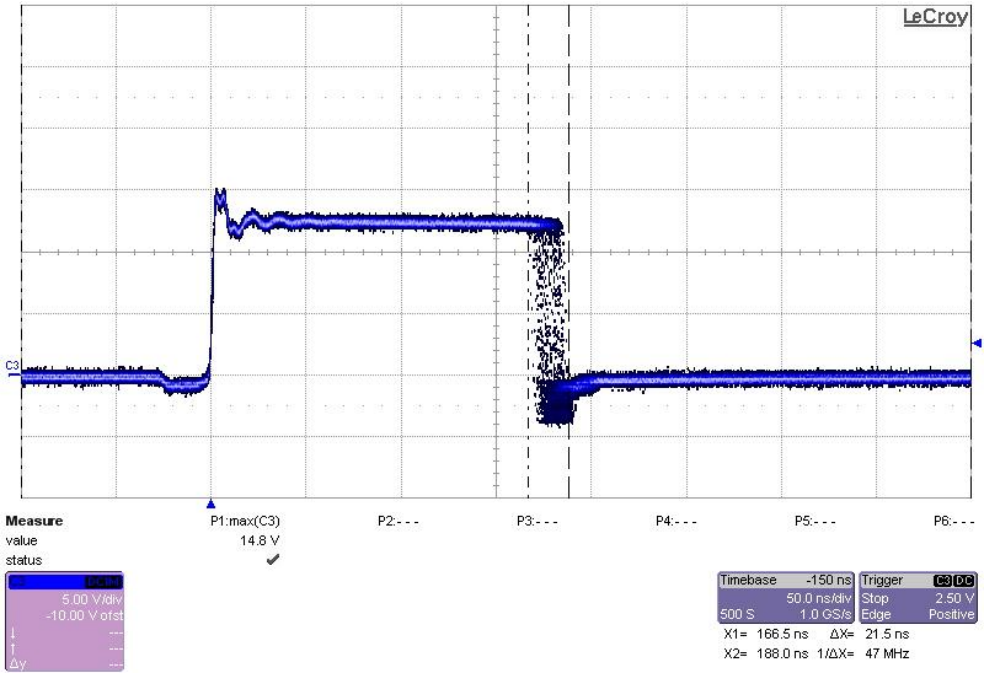
9.5 Load Transient

The transient response due to a 1A to 10A load step is shown in persistence below.



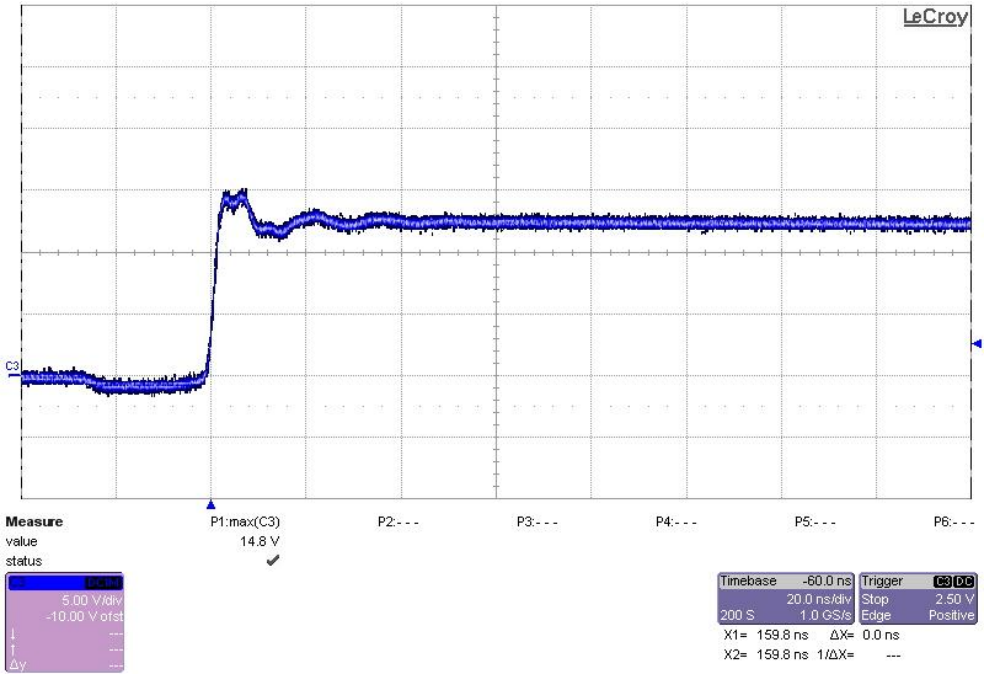
9.6 On Time Jitter

The switch node on-time jitter is shown in persistence at 30A below. Fsw = 500kHz.



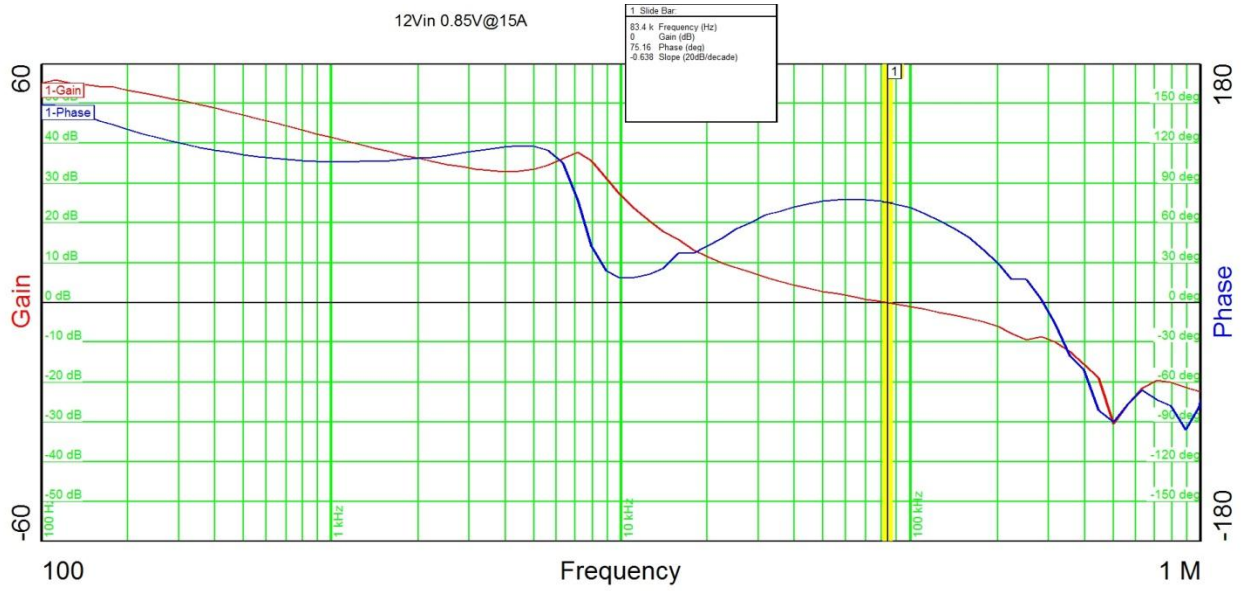
9.7 Switch Node Peak

The maximum switch node voltage is shown in persistence below at 30A.



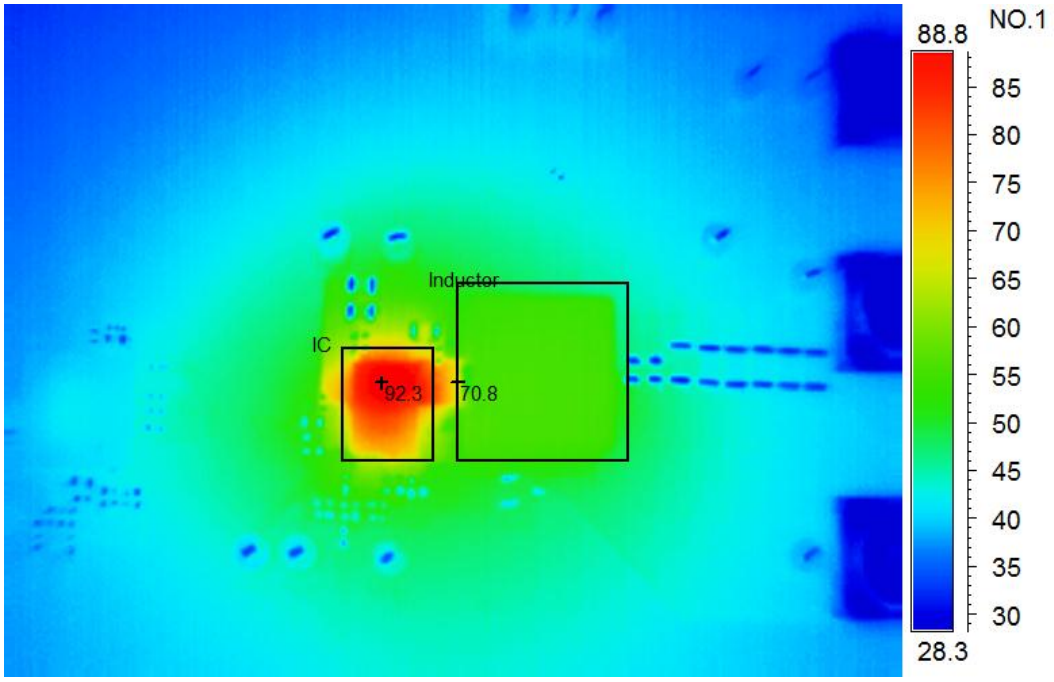
9.8 Loop Response

The loop response of the power supply at 15A load current is shown below.



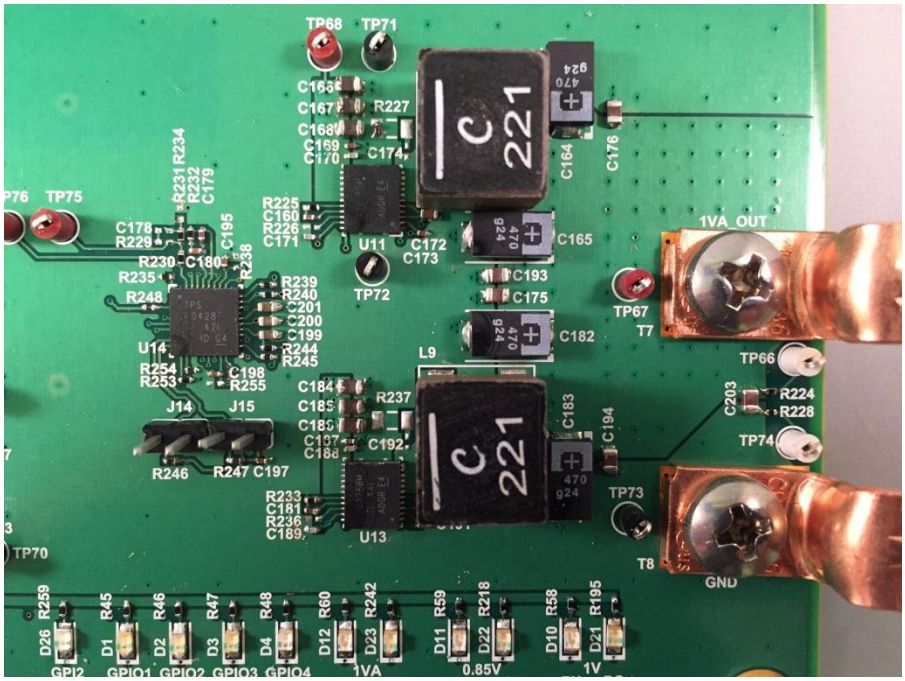
9.9 Thermal Image

The thermal image of the power supply operating with 30A load current is shown below.



10 TPS40428 1V at 60A

10.1 Board Photo



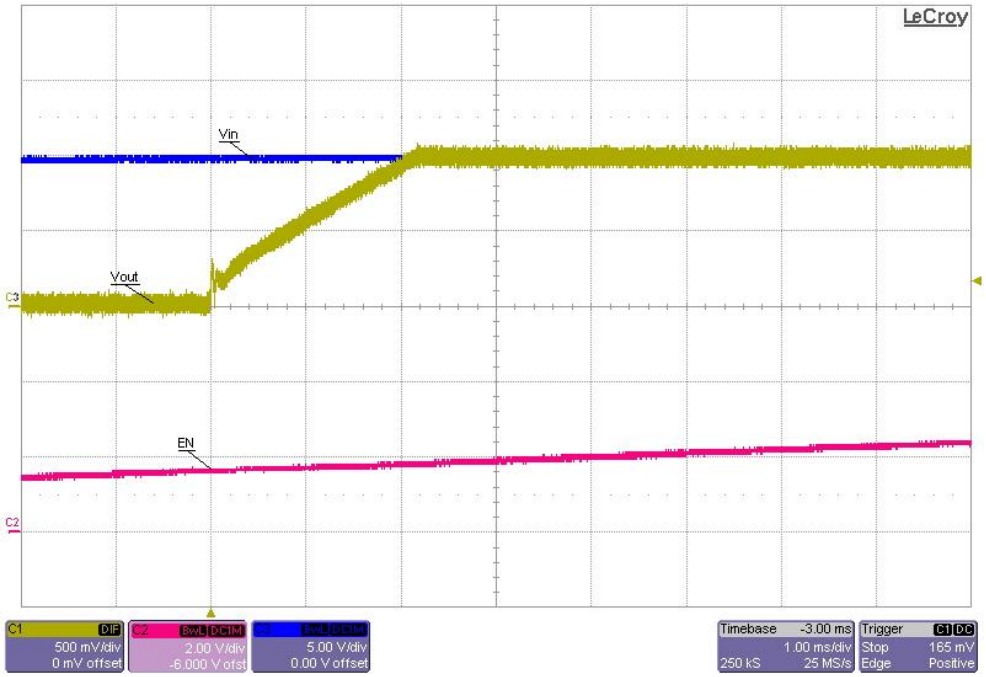
10.2 Load Regulation

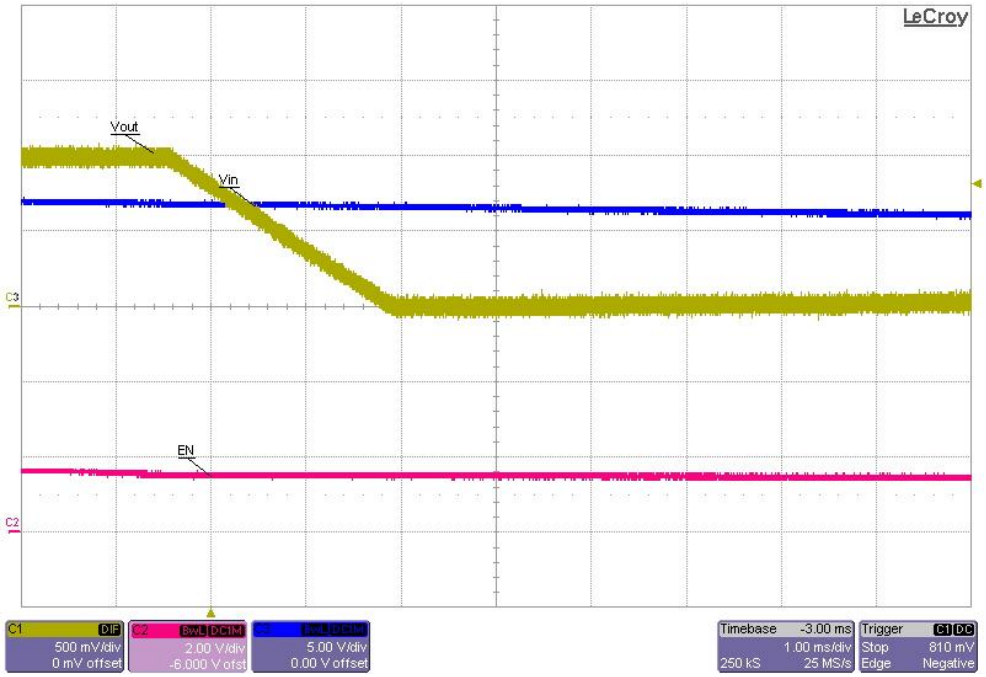
The 1V output regulation for load currents listed in Amps is below.

1VA Load Regulation		
Measured at TP66 and TP74		
0	1.003	V
15	1.003	V
30	1.003	V
45	1.003	V
60	1.004	V

10.3 Startup and Shutdown

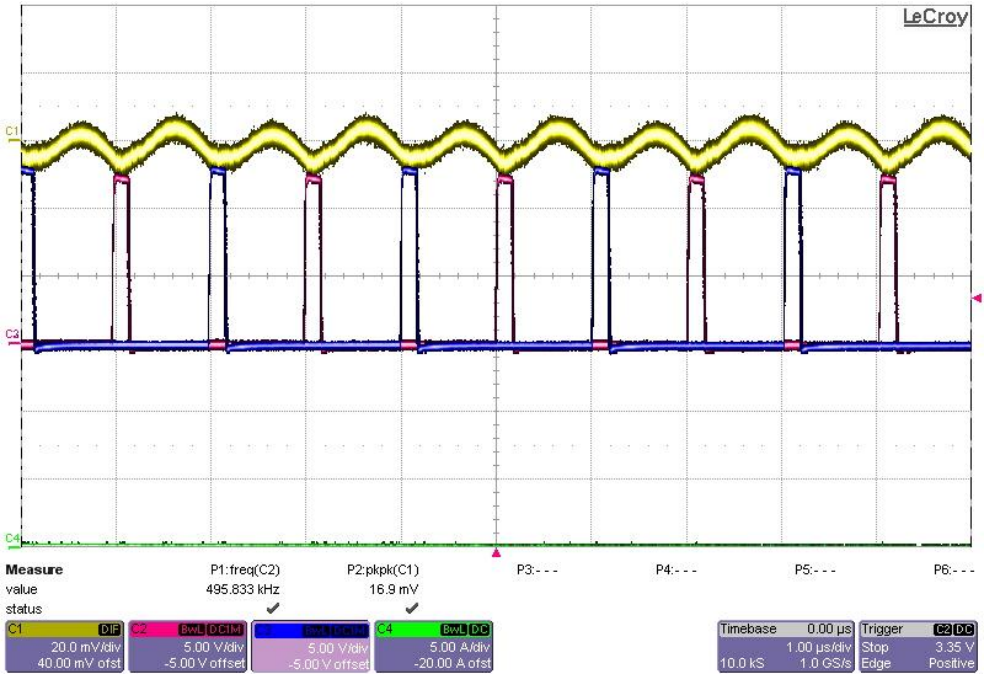
The startup at 0A and shutdown at 1A are shown below.

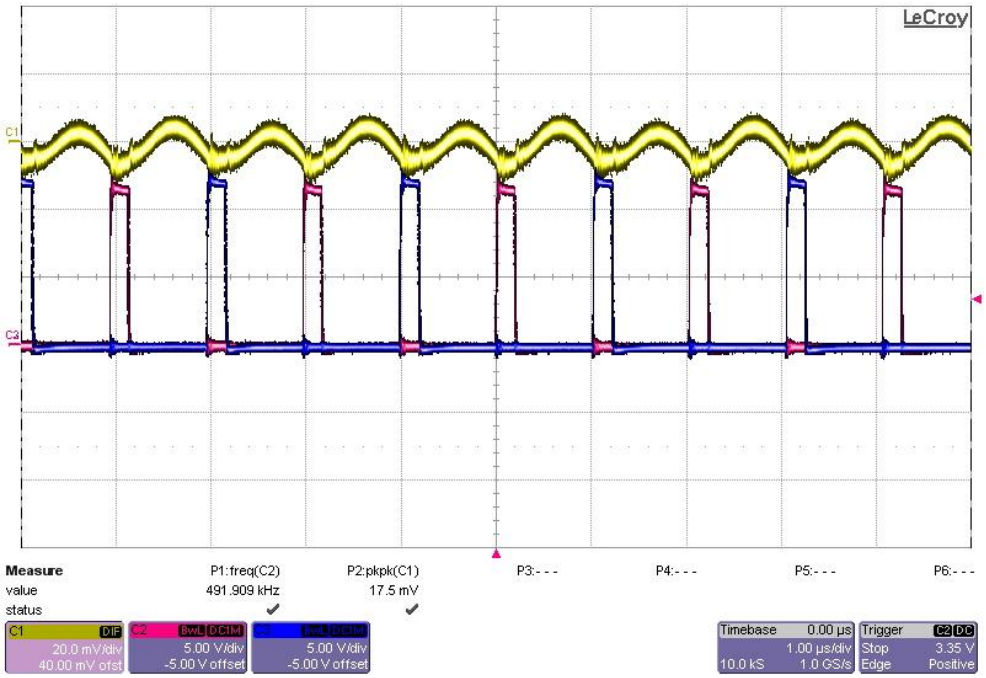




10.4 Output Ripple

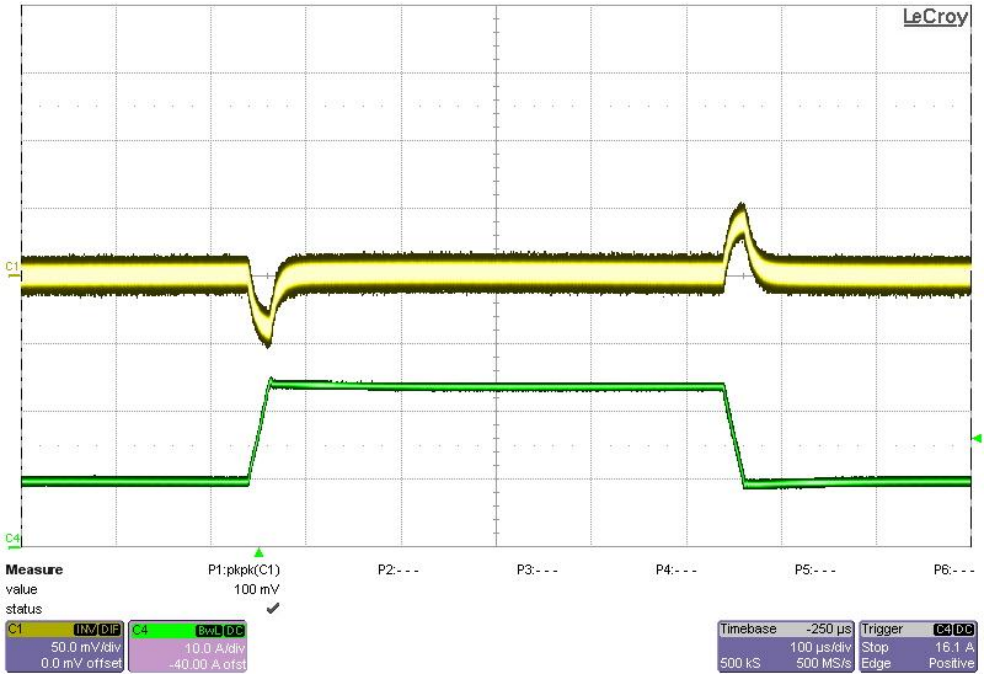
The 1V output ripple at 0A and 60A are shown in persistence below. Two phase switching at 500kHz per phase.





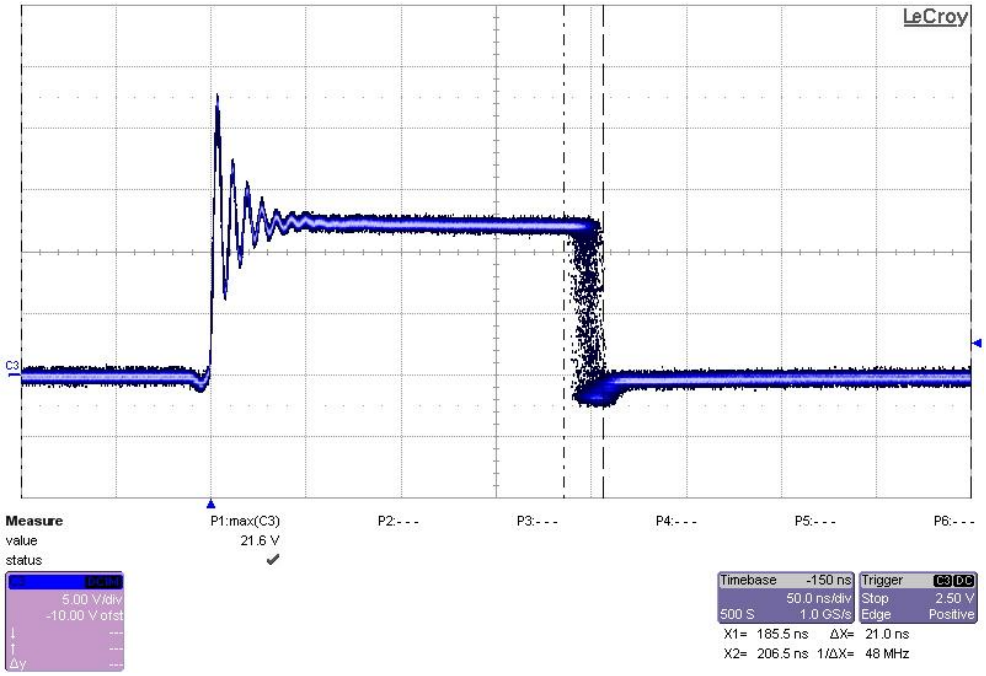
10.5 Load Transient

The transient response due to a 30A to 45A load step is shown in persistence below.



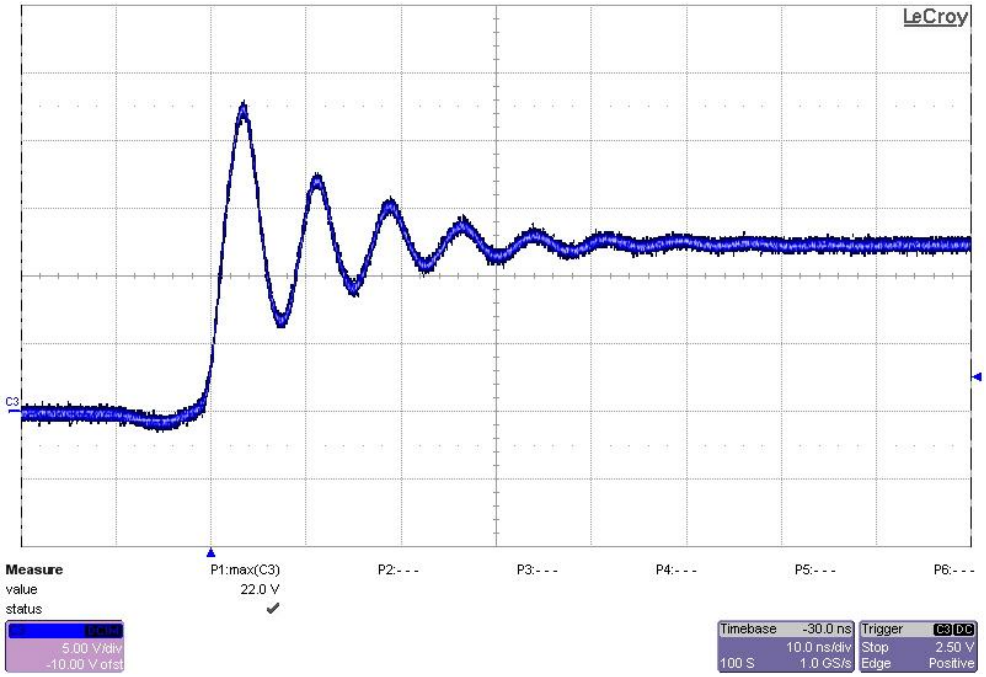
10.6 On-Time Jitter

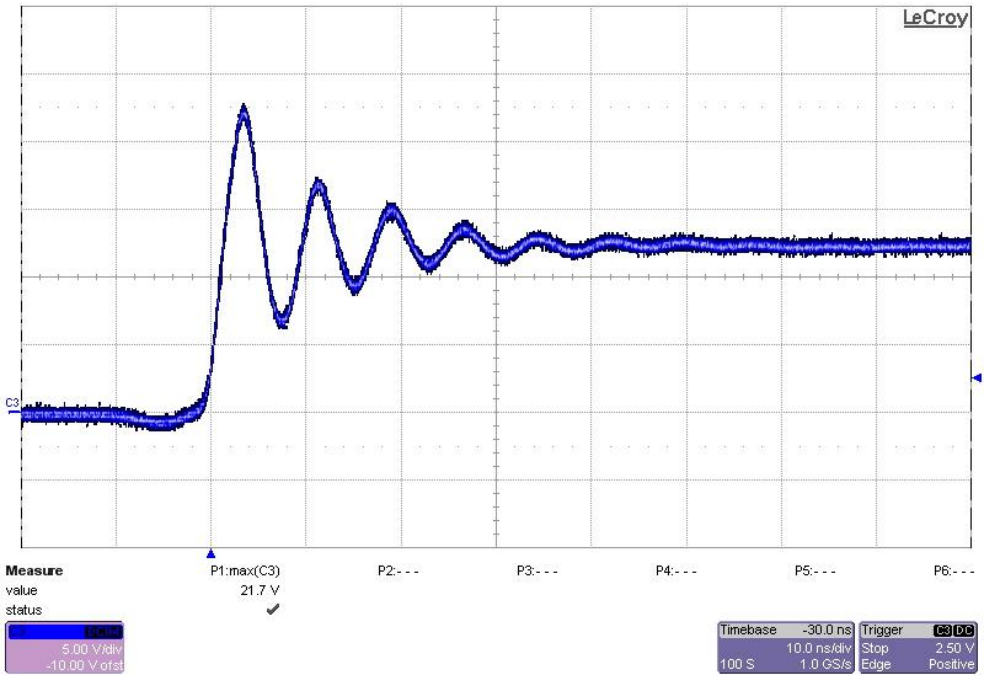
The switch node on-time jitter is shown in persistence at 60A below. Fsw = 500kHz/phase.



10.7 Switch Node Peak

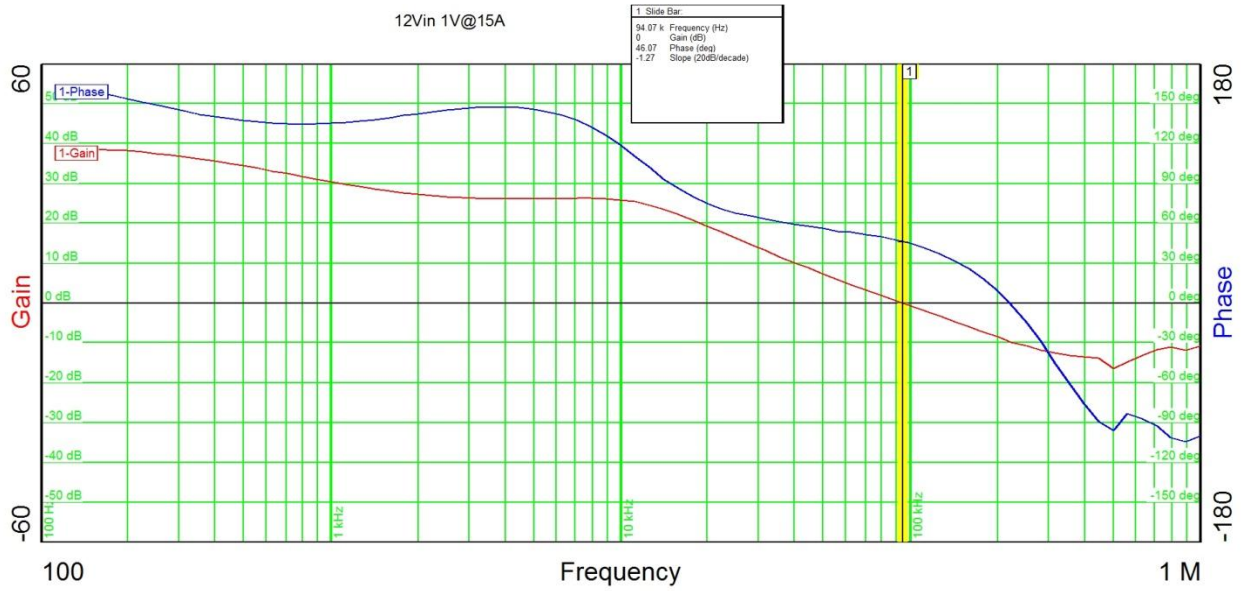
The maximum switch node voltages for U11 and U13 are shown in persistence below at 60A load current.





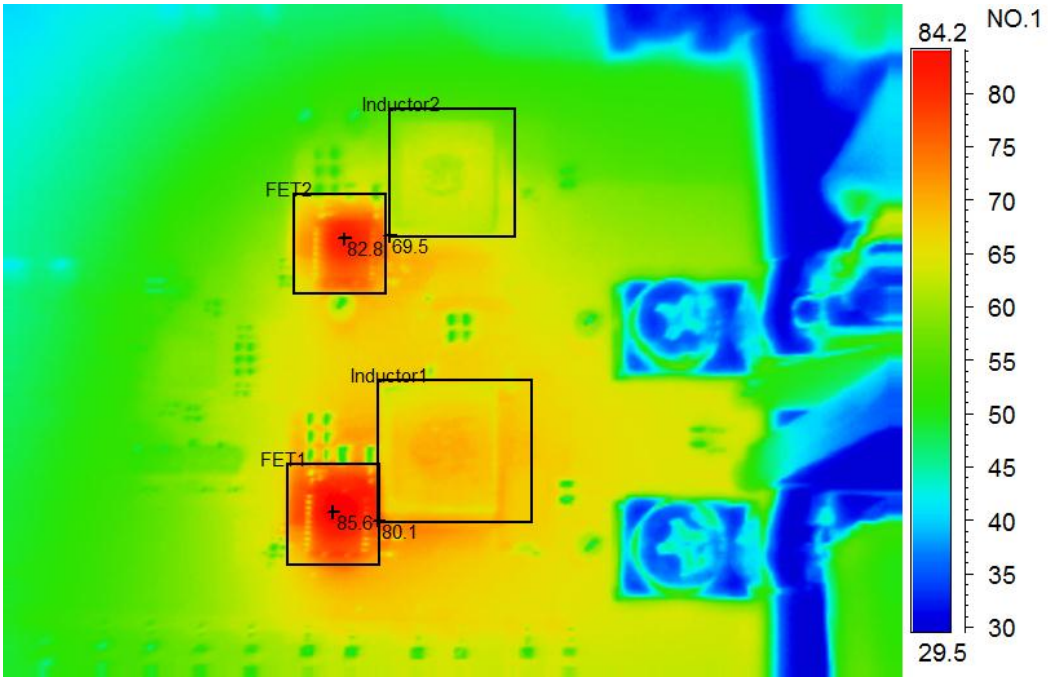
10.8 Loop Response

The loop response of the power supply at 15A load current is shown below.



10.9 Thermal Image

The thermal image of the power supply operating with 60A load current is shown below.



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