TPS51220RHB Test Results Rev. A

TPS51220A
05/14/08

The following test report is for the TPS51220RHB reference board that includes measurements for the following output voltage rails:

A. PP5V_S3_REG
B. PP3V3_S5_REG

The tests performed on the PP5V_S3_REG & PP3V3_S5_REG output voltage rails were as follows:

1. Turn-On (No load)
2. Turn-Off (No load)
3. Output Voltage Ripple (Measured at no load and full load)
4. Transient Response (10% to 90% load step)
5. Switch Node (No load and full load for 5.4Vin and 8.4Vin)
6. Switch Node (Rising and Falling at full load for 5.4Vin and 8.4Vin)
7. Loop Response (No load and full load for 5.4Vin and 8.4Vin)
8. Efficiency (5 to 50mA, 100mA to 1A and 1A to Full load for 6Vin and 8.4Vin)
9. Load Regulation (Measured from no load to full load for 5.4Vin and 8.4Vin)

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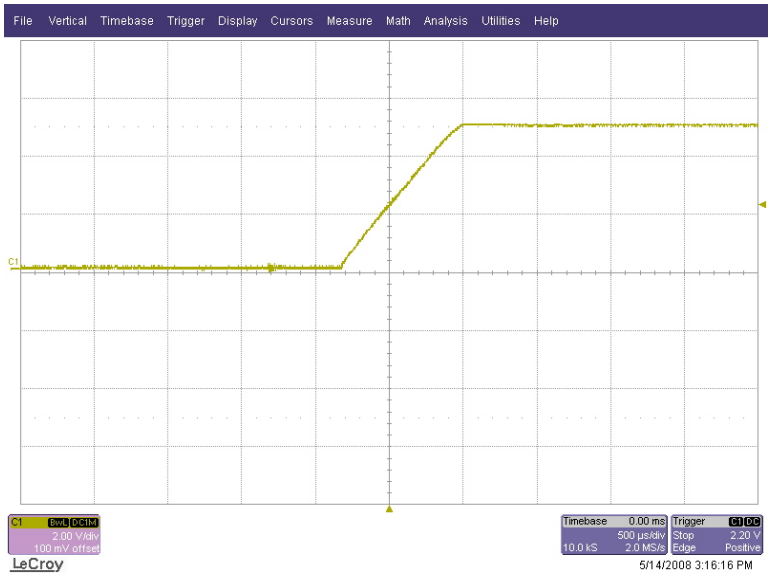
1 Startup - (TPS51220RHB – PP5V_S3_REG Rail)

The photo below shows the startup waveform. The input voltage is 8.4V, the output is not loaded. The time-base is set to 500us/Division.

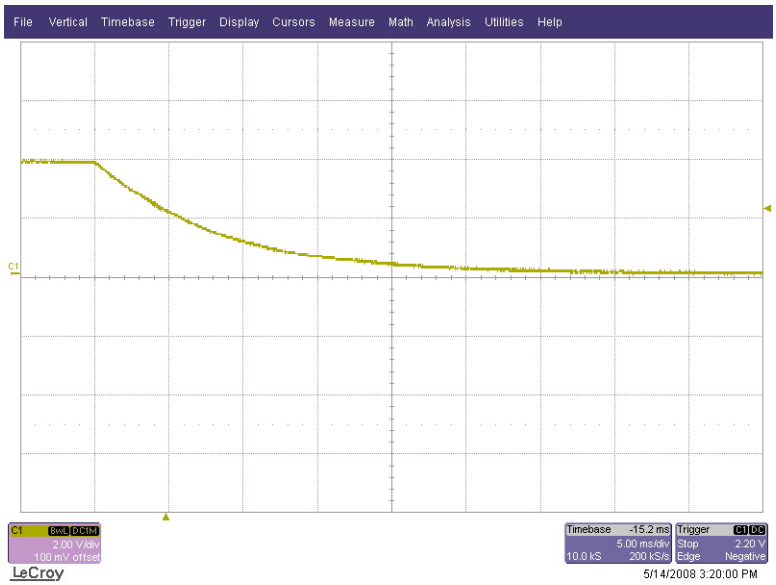
Channel 1: PP5V_S3_REG Output – Yellow (1V/Division)



2 Shutdown - (TPS51220RHB – PP5V_S3_REG Rail)

The photo below shows the shutdown waveform. The input voltage is 8.4V. The time-base is set to 2ms/Division. The output is not loaded.

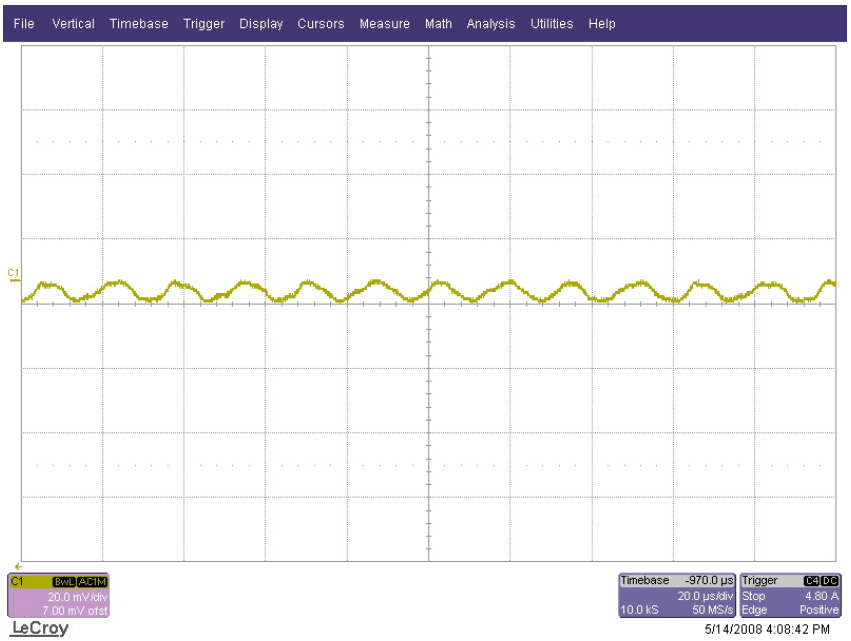
Channel 1: PP5V_S3_REG – Yellow (1V/Division)



3 Output Ripple Voltage - (PP5V_S3_REG Rail)

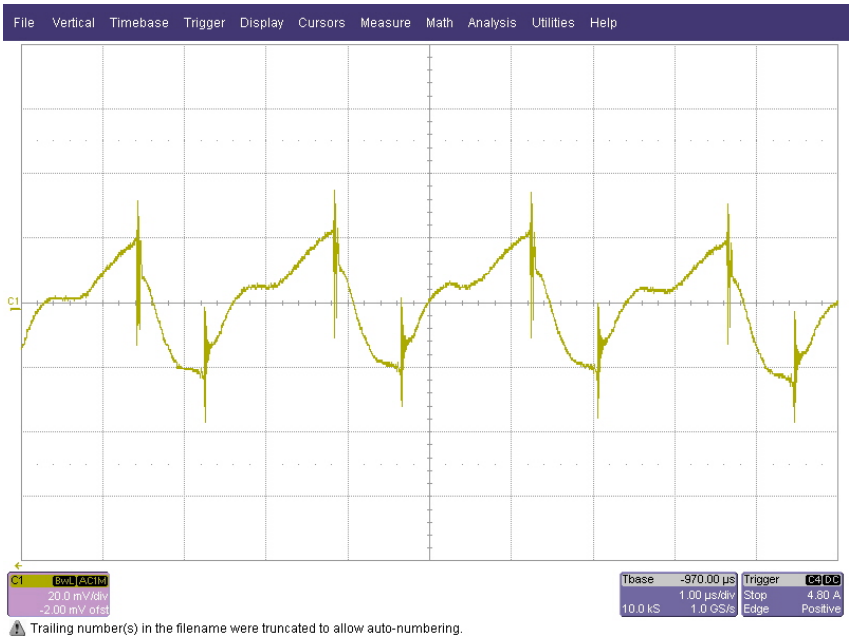
The output voltage ripple is shown in the figures below. The input is 8.4V.

Channel 1: PP5V_S3_REG – Yellow (20mV/Division; AC Coupled)



No Load

Channel 1: PP5V_S3_REG – Yellow (20mV/Division; AC Coupled)

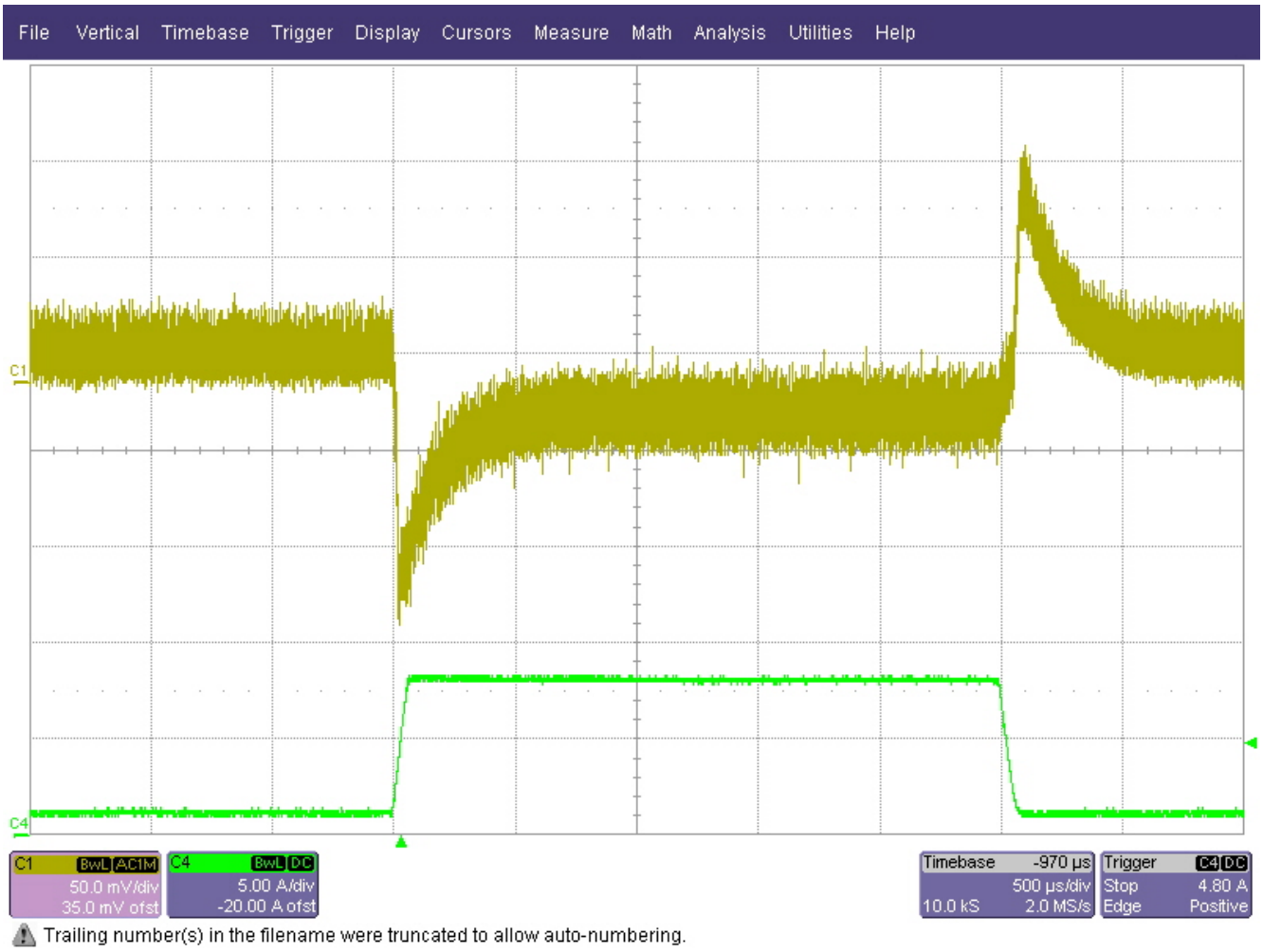


Full Load – 9A

4 Transient Response - (PP5V_S3_REG Rail)

The transient response of the converter is shown in the figure below. The output current is pulsed from 0.9A to 8.1A. The input voltage is 8.4V.

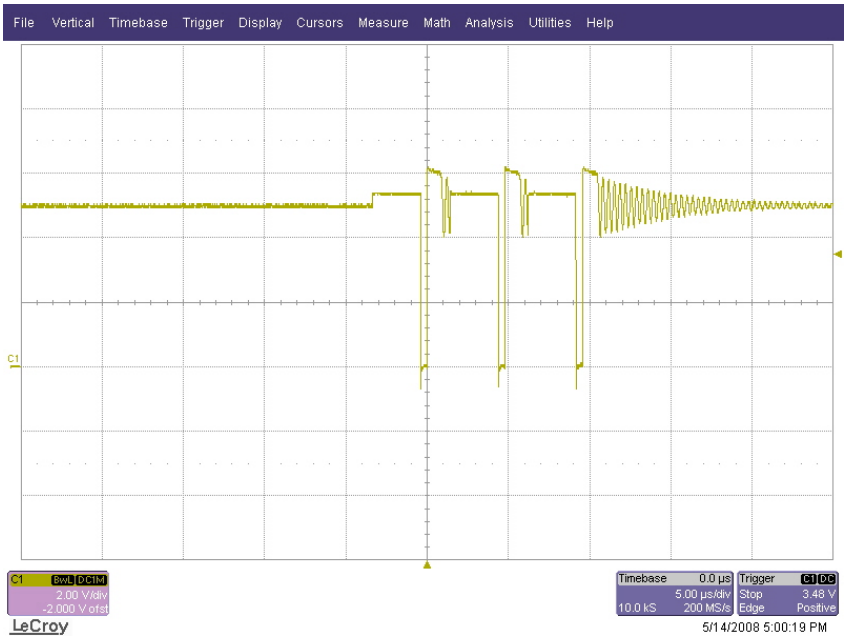
Channel 1: PP5V_S3_REG – Blue (50mV/Division; AC Coupled)
Channel 4: Output Current – Green (5A/Division)



5 Switching Waveforms - (PP5V_S3_REG Rail)

The waveform below shows the switch node.

Channel 1: Switch Node – Pink (2V/Division)



5.4Vin, No Load, 20MHz Band Limited

5.4Vin, 9A Load, 20MHz Band Limited

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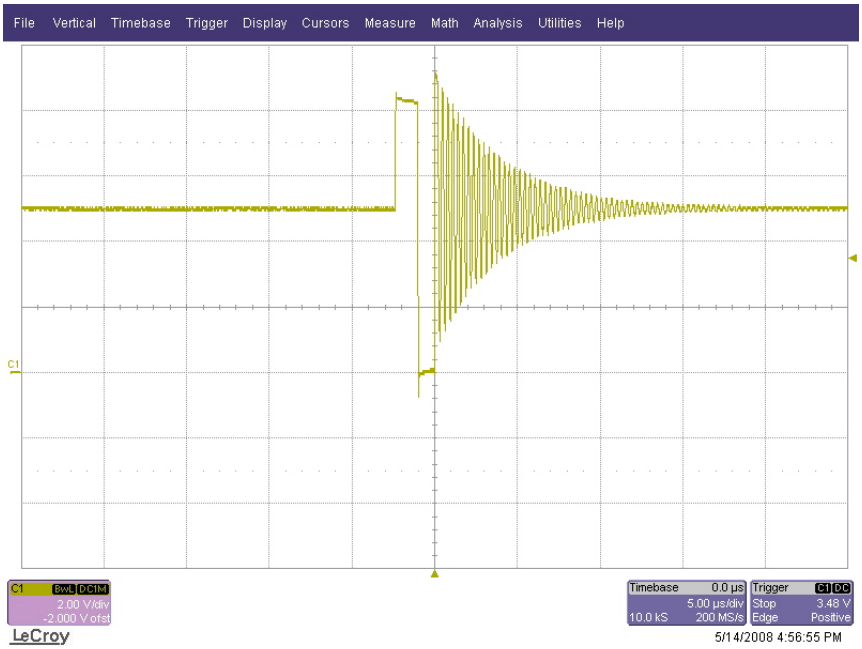

8.4Vin, No Load, 20MHz Band Limited

8.4Vin, 9A Load, 20MHz Band Limited

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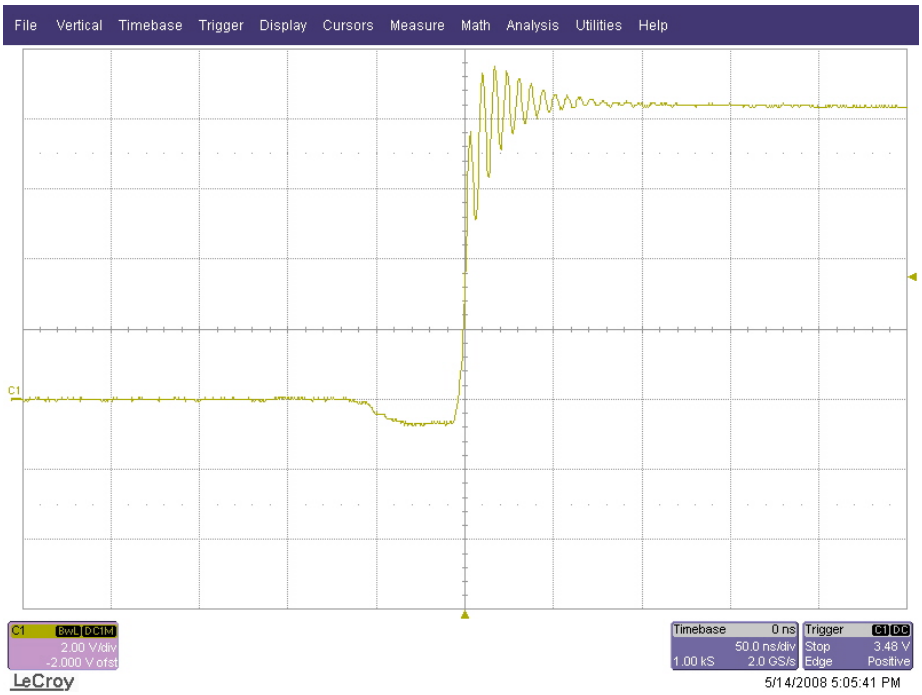
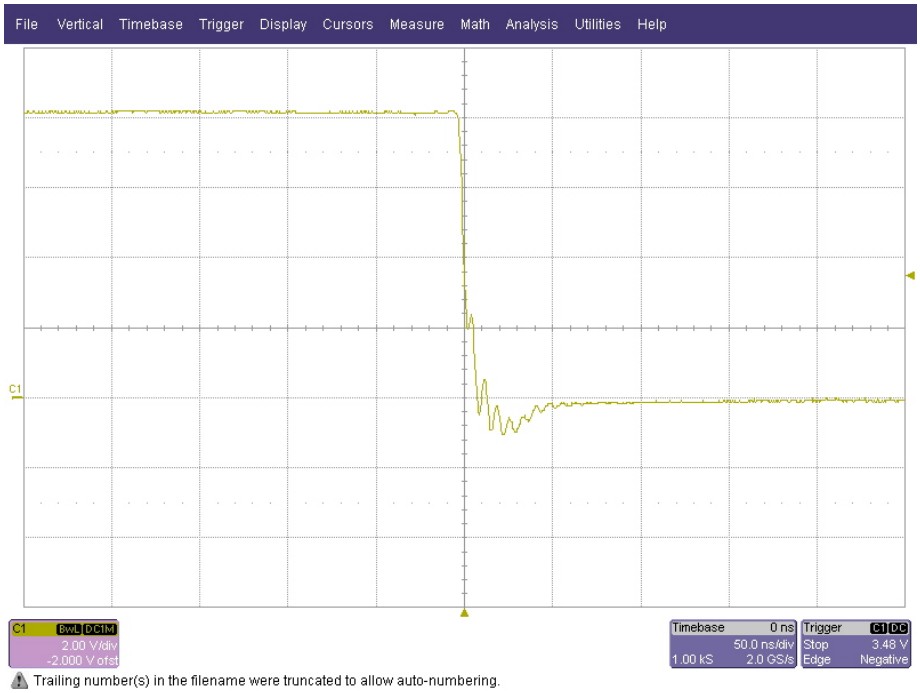


8.4Vin, 9A Load, Full Band, Rising Edge



8.4Vin, 9A Load, Full Band, Falling Edge

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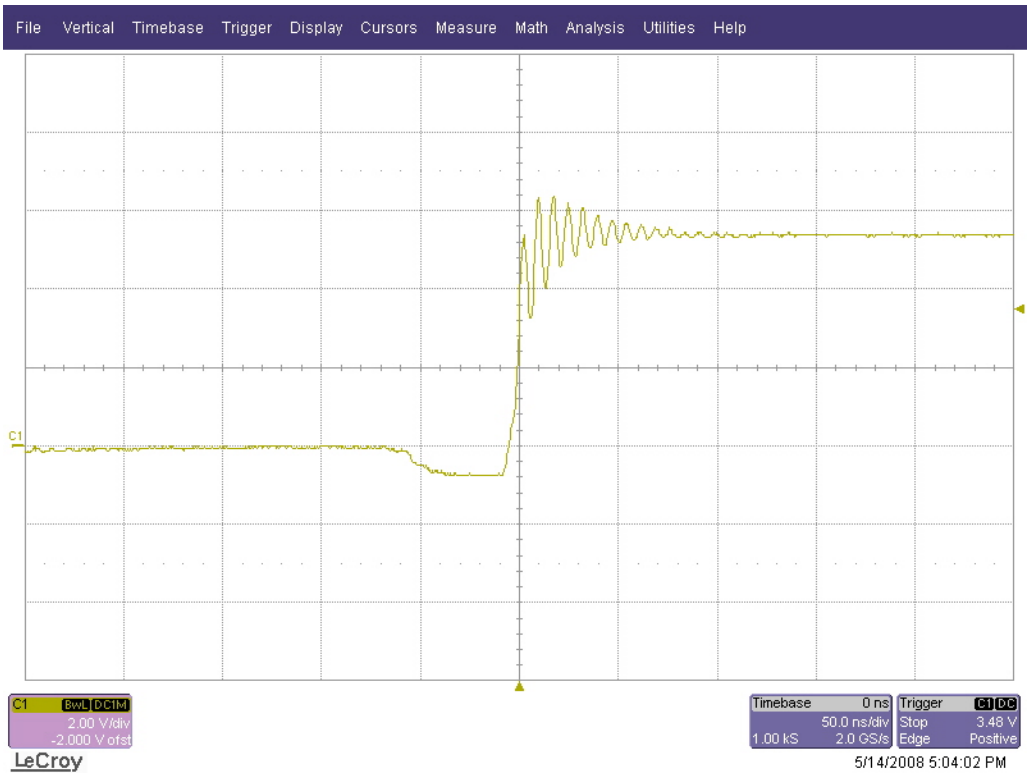
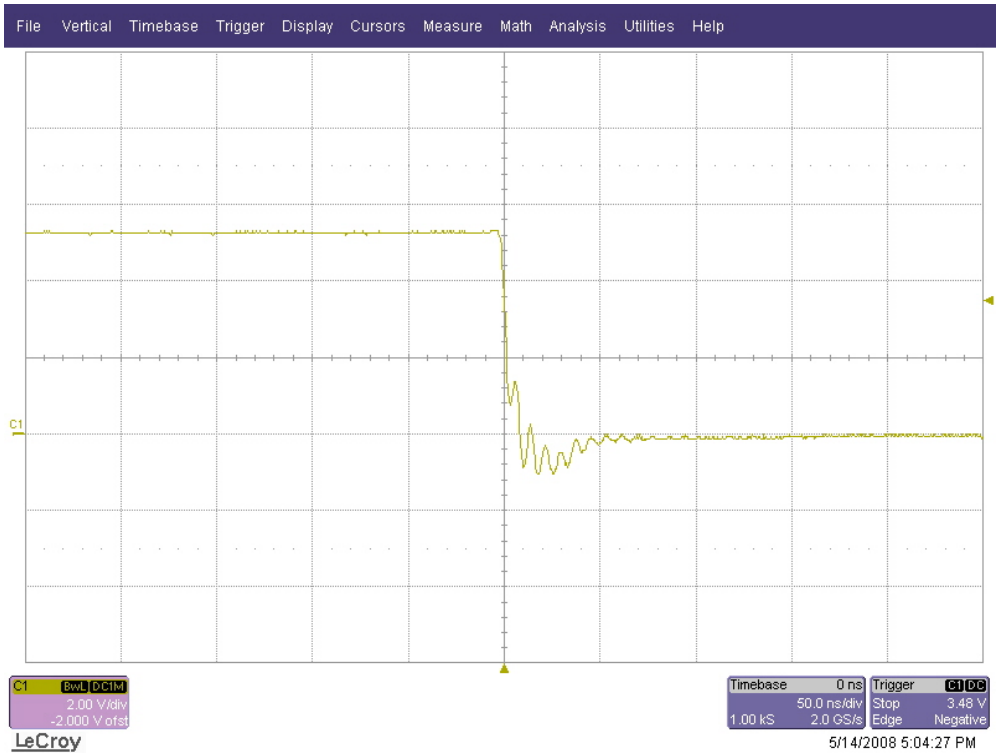


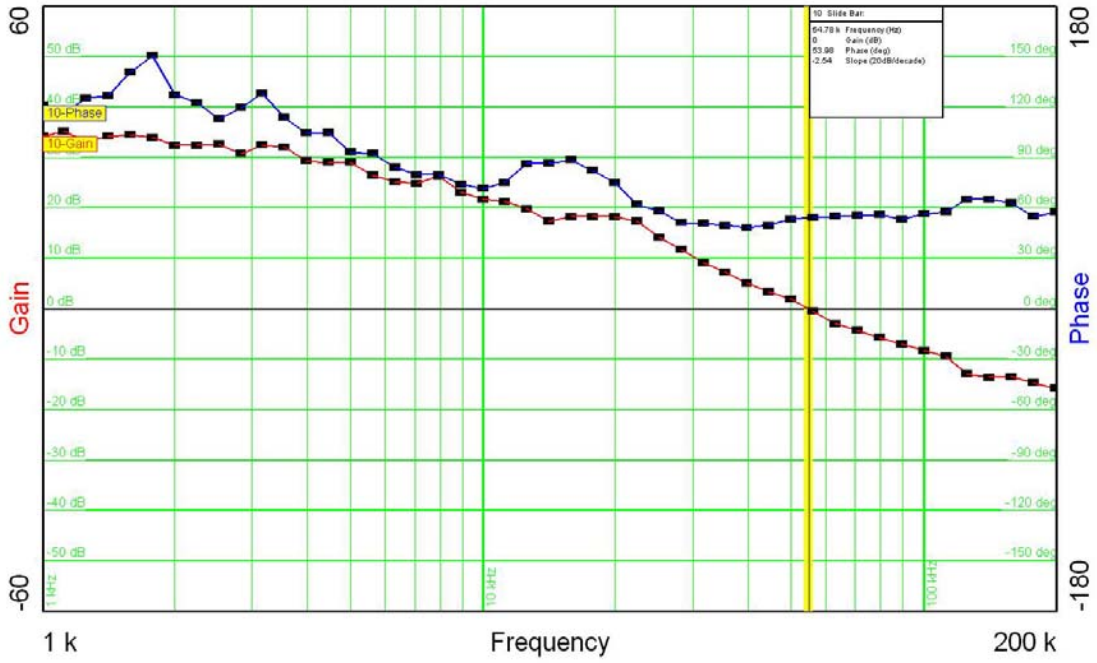
5.4Vin, 9A Load, Full Band, Rising Edge



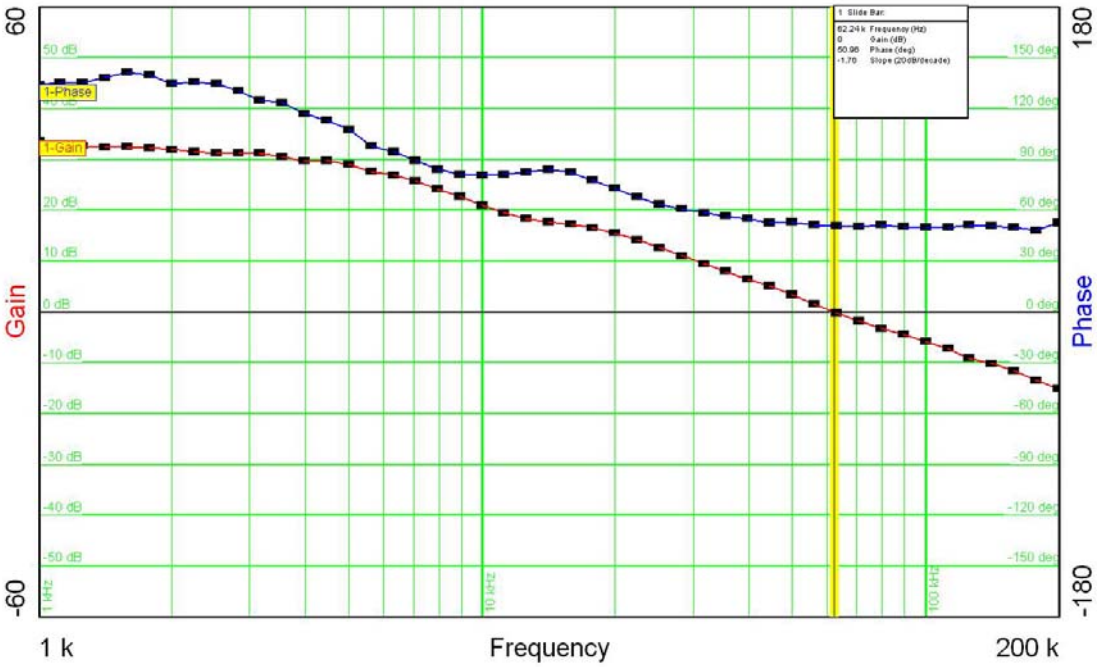
5.4Vin, 9A Load, Full Band, Falling Edge

6 Loop Response - (PP5V_S3_REG Rail)

The frequency response of the converter is shown in the figures below.



6Vin, Full Load

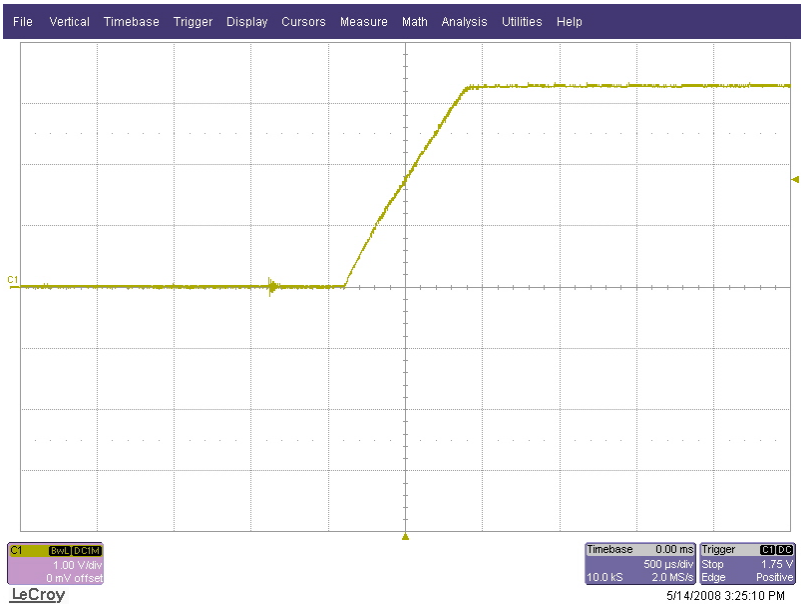


8.4Vin, Full Load

7 Startup - (TPS51220RHB – PP3V3_S5_REG Rail)

The photo below shows the startup waveform. The input voltage is 8.4V, the output is not loaded. The time-base is set to 500us/Division.

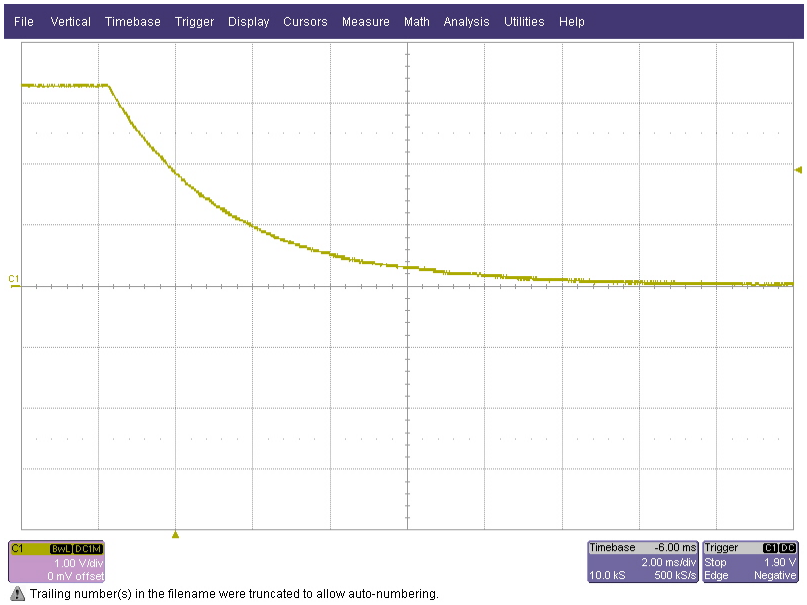
Channel 1: PP3V3_S5_REG Output – Yellow (1V/Division)



8 Shutdown - (TPS51220RHB – PP3V3_S5_REG Rail)

The photo below shows the shutdown waveform. The input voltage is 8.4V. The time-base is set to 2ms/Division. The output is not loaded.

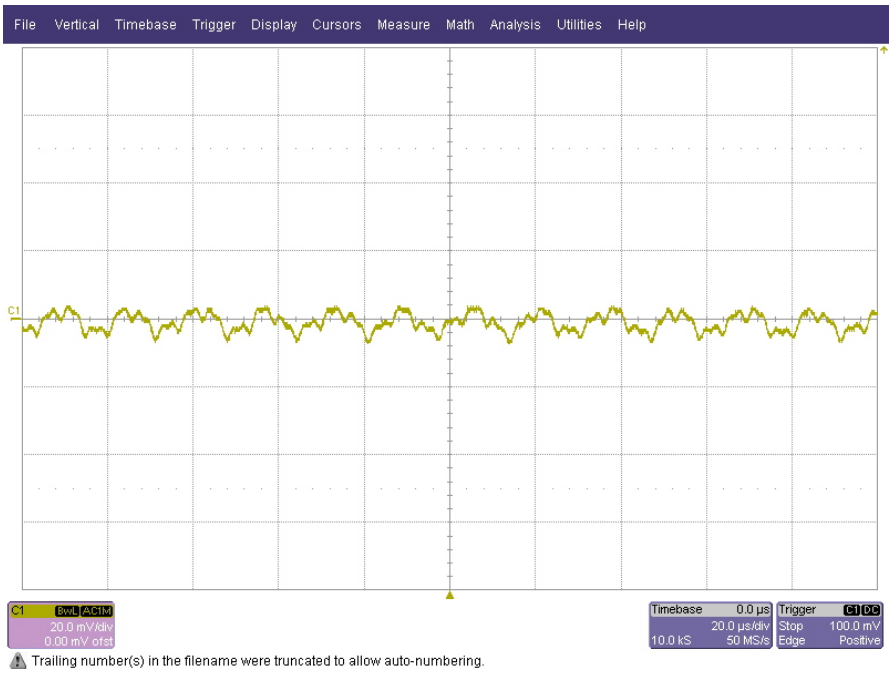
Channel 1: PP3V3_S5_REG – Yellow (1V/Division)



9 Output Ripple Voltage - (PP3V3_S5_REG Rail)

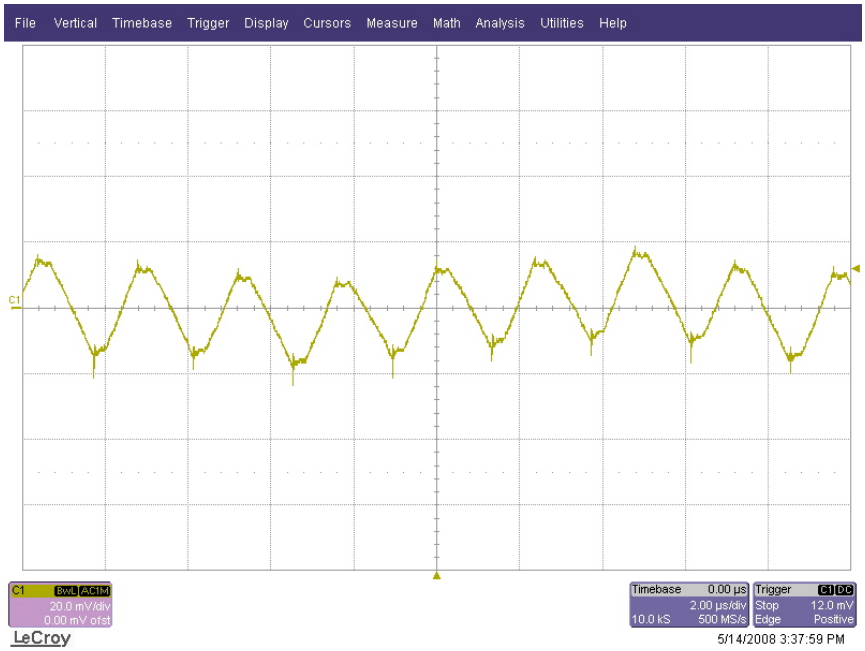
The output voltage ripple is shown in the figures below. The input is 8.4V.

Channel 1: PP3V3_S5_REG – Yellow (20mV/Division; AC Coupled)



No Load

Channel 1: PP3V3_S5_REG – Blue (20mV/Division; AC Coupled)

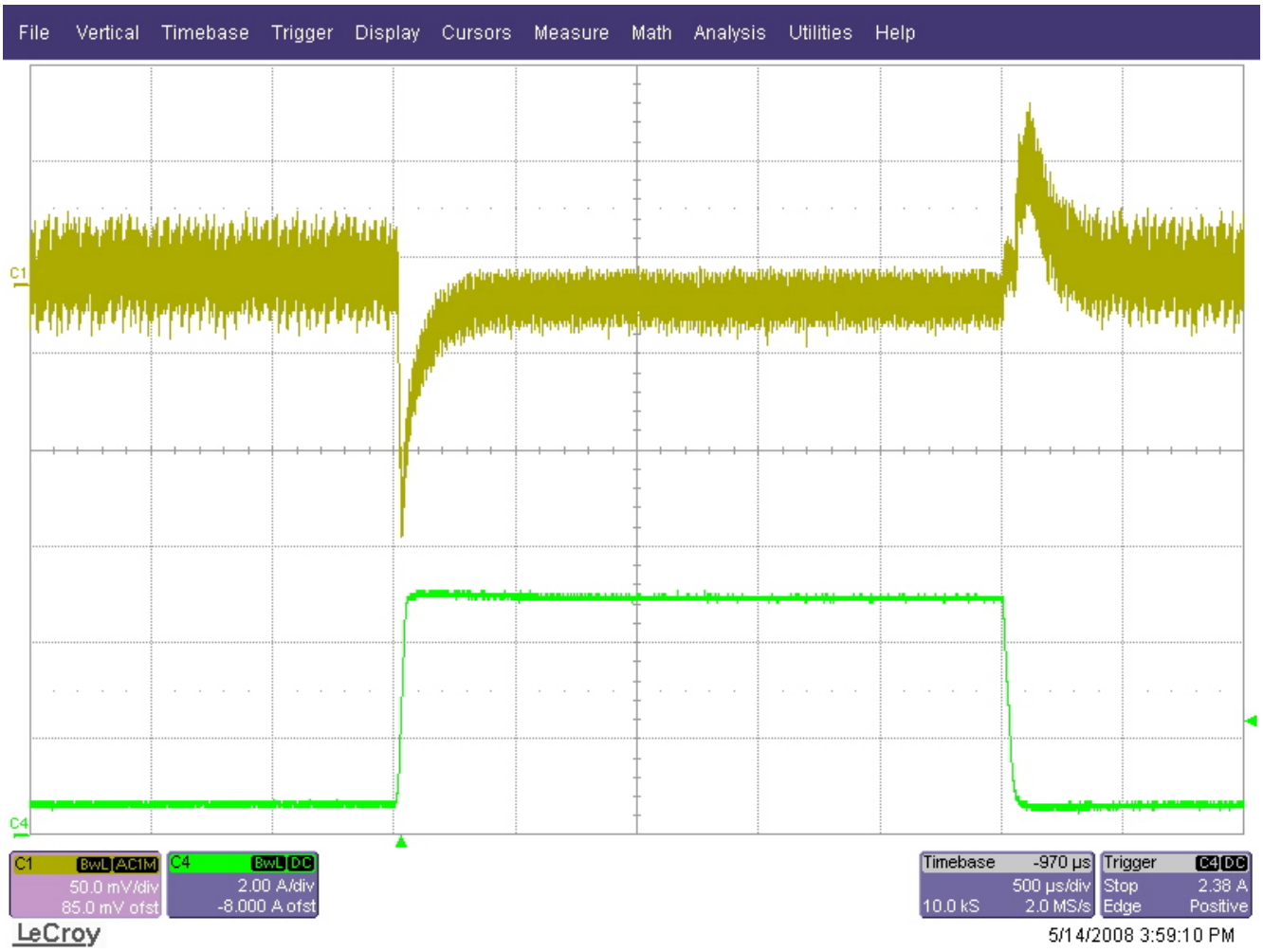


Full Load – 5.5A

10 Transient Response - (PP3V3_S5_REG Rail)

The transient response of the converter is shown in the figure below. The output current is pulsed from 0.55A to 4.95A. The input voltage is 8.4V.

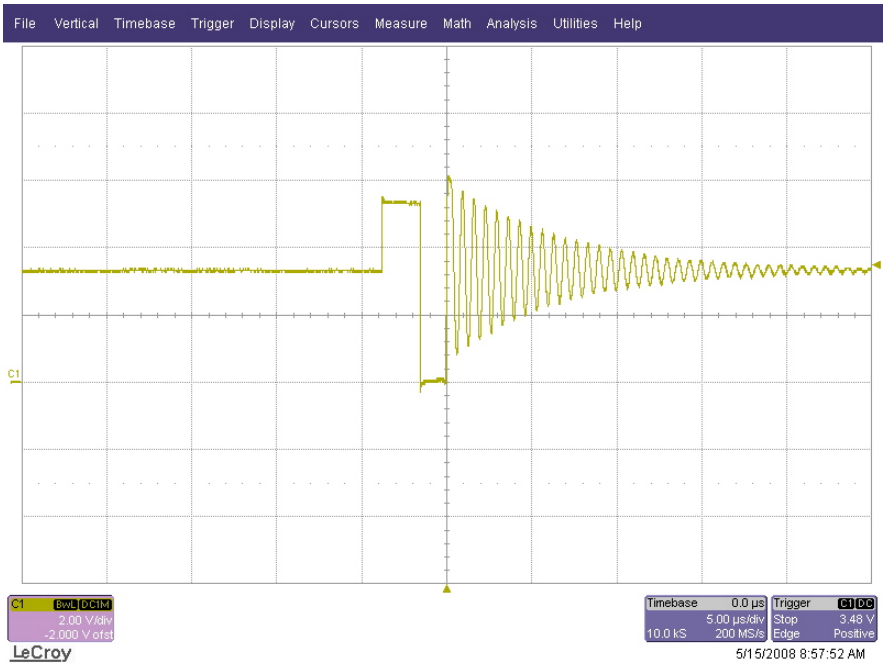
Channel 1: PP3V3_S5_REG – Blue (50mV/Division; AC Coupled)
Channel 4: Output Current – Green (2A/Division)



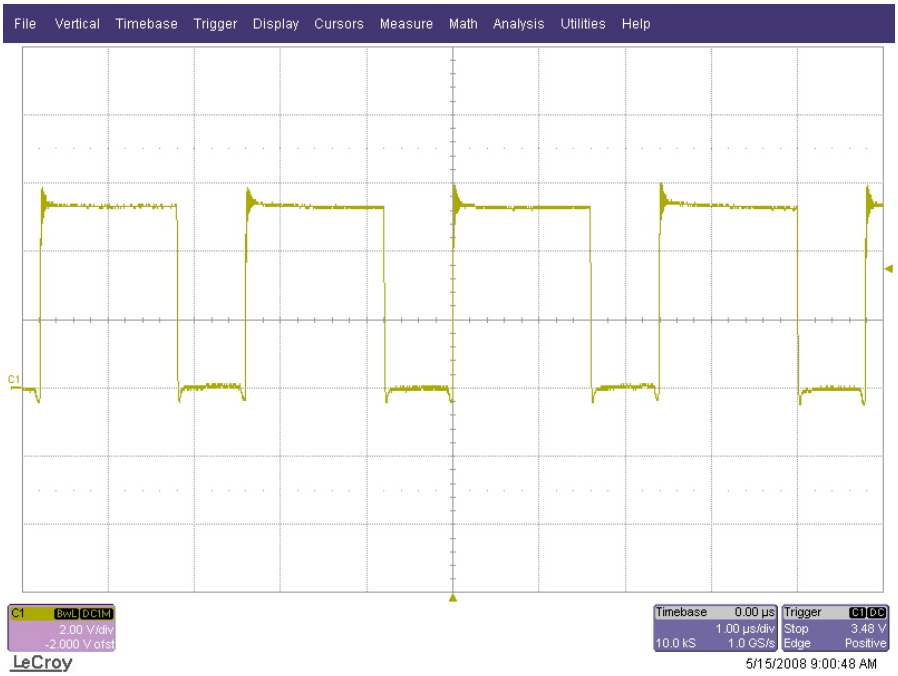
11 Switching Waveforms - (PP3V3_S5_REG Rail)

The waveform below shows the switch node.

Channel 1: Switch Node – Pink (2V/Division)



5.4Vin, No Load, 20MHz Band Limited



5.4Vin, 5.5A Load, 20MHz Band Limited

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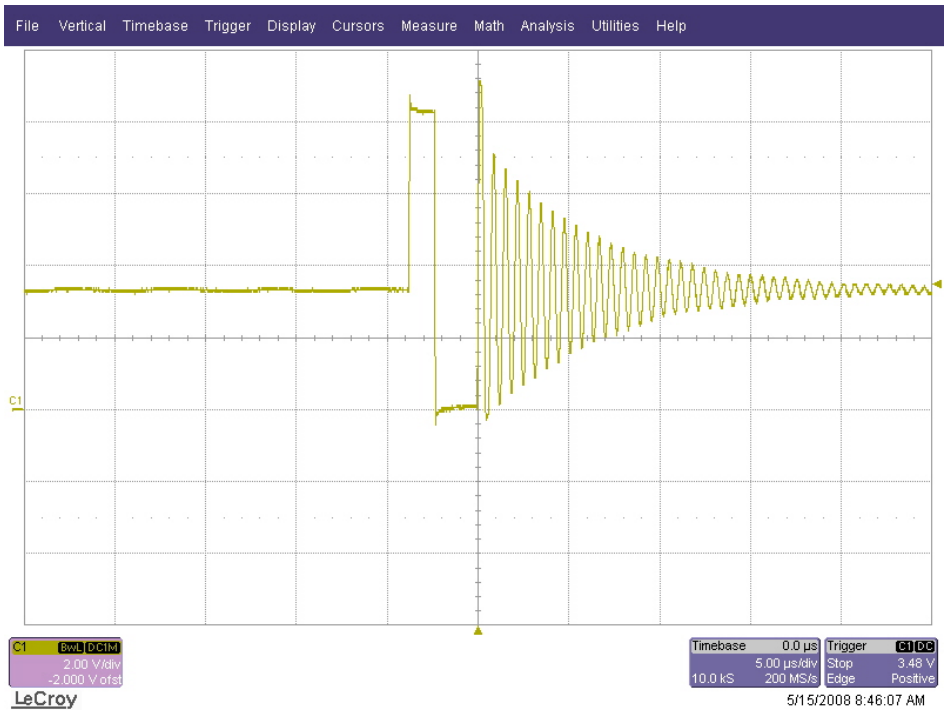
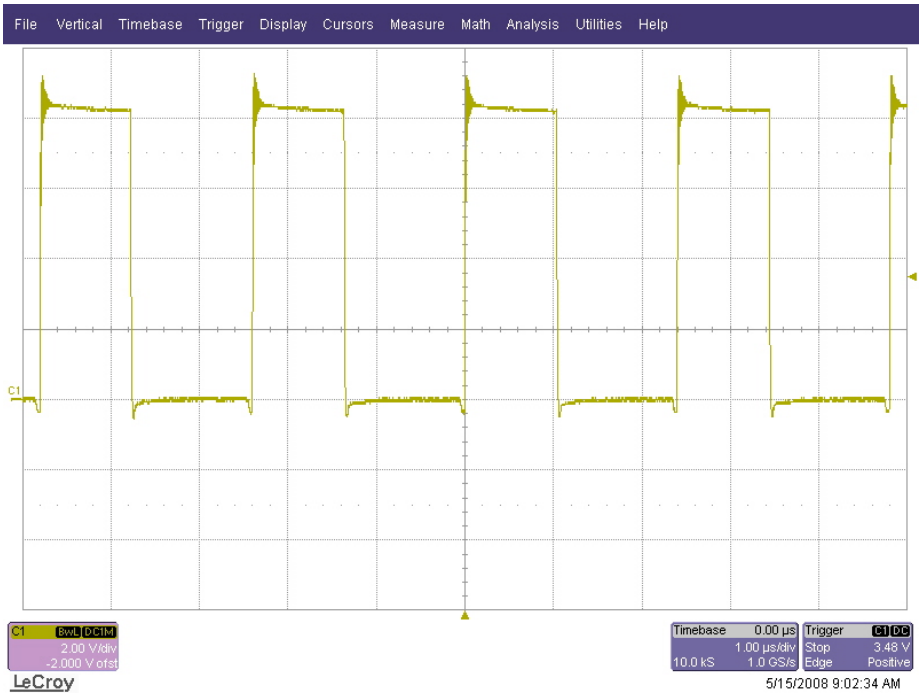


8.4Vin, No Load, 20MHz Band Limited



8.4Vin, 5.5A Load, 20MHz Band Limited

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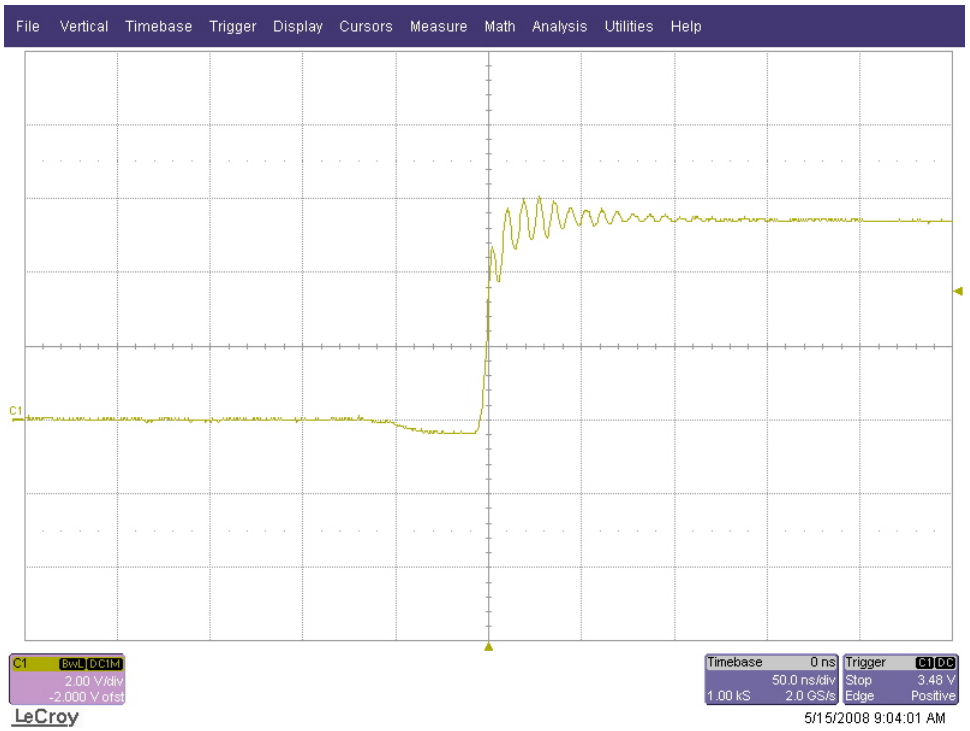
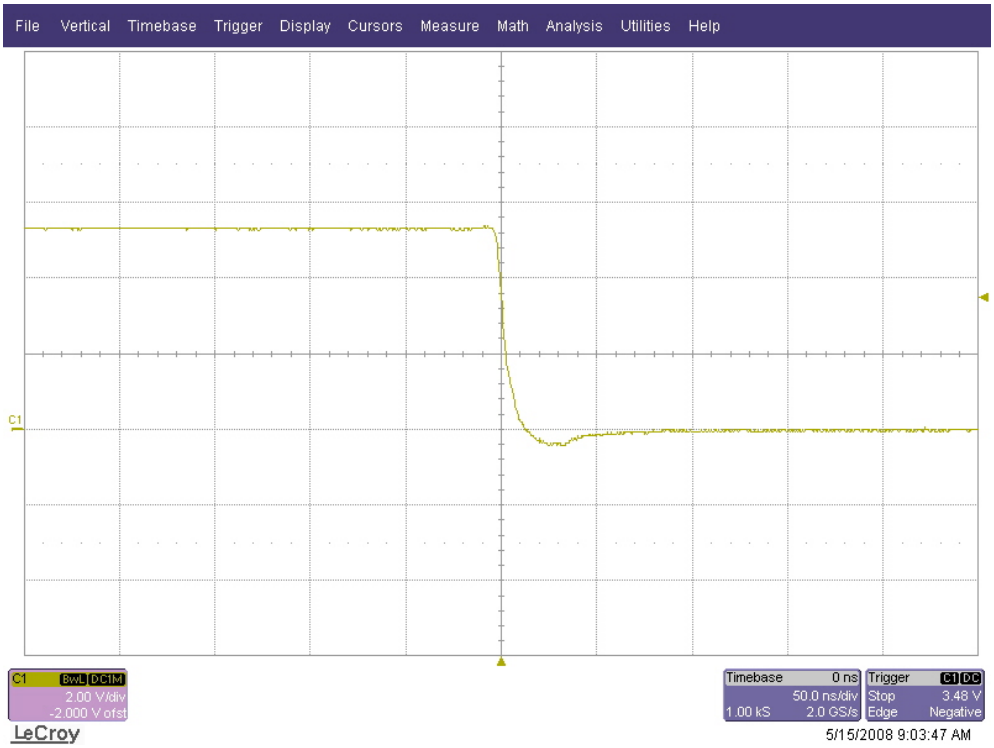


5.4Vin, 5.5A Load, Full Band, Rising Edge



5.4Vin, 5.5A Load, Full Band, Falling Edge

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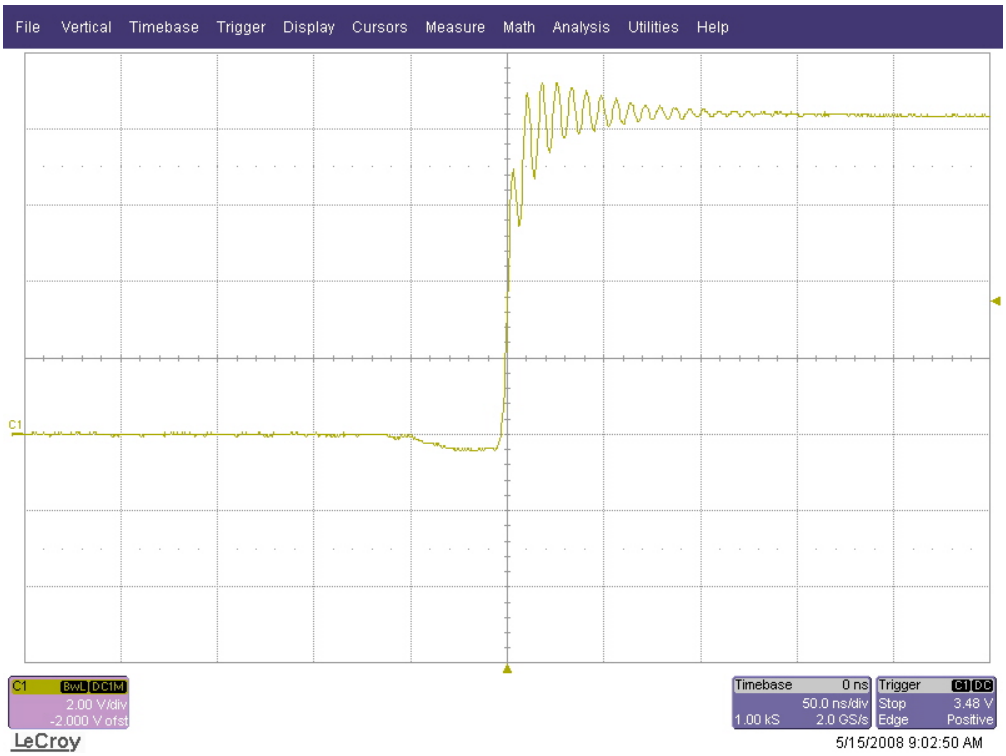
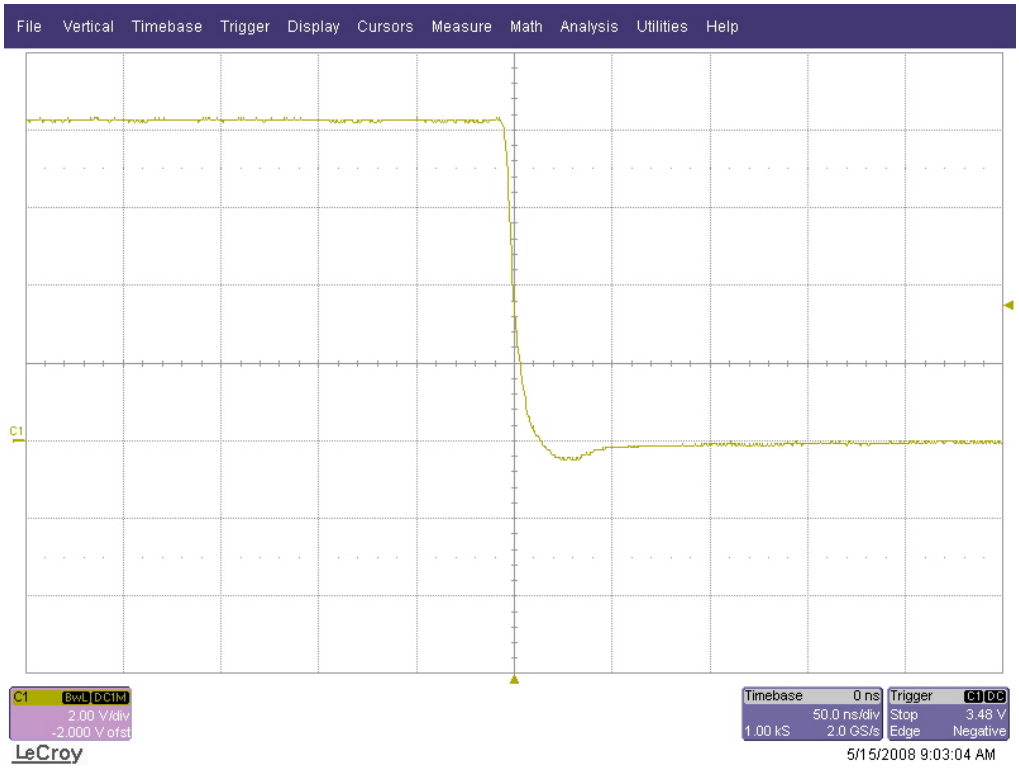


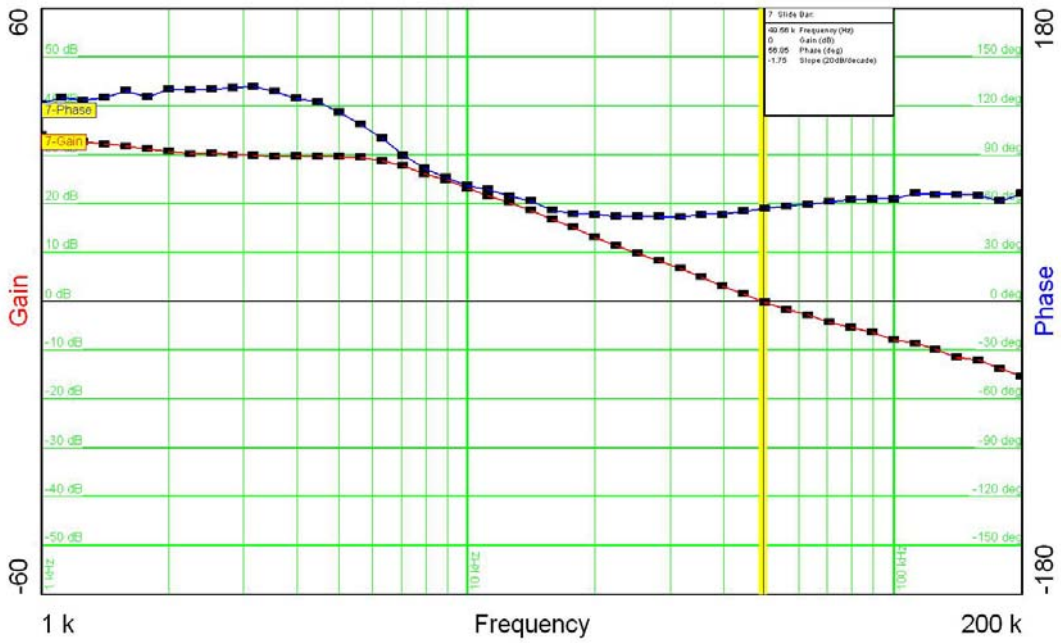
8.4Vin, 5.5A Load, Full Band, Rising Edge



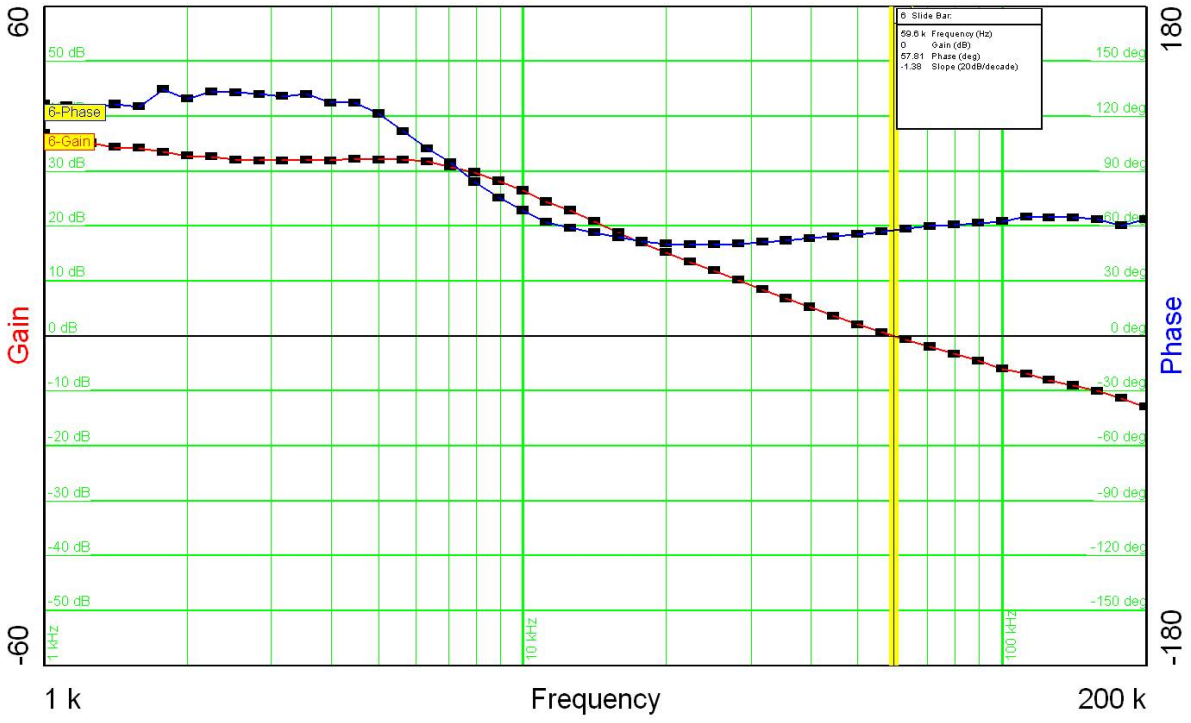
8.4Vin, 5.5A Load, Full Band, Falling Edge

12 Loop Response - (PP3V3_S5_REG Rail)

The frequency response of the converter is shown in the figures below.



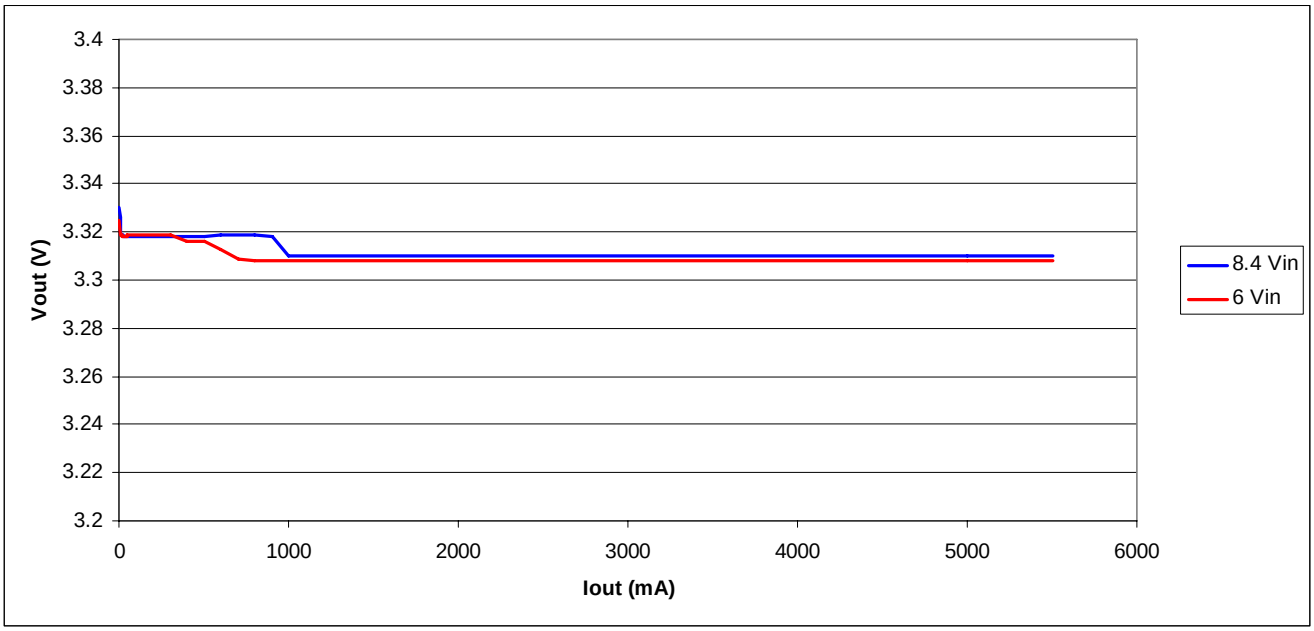
5.4Vin, 4.4A Load

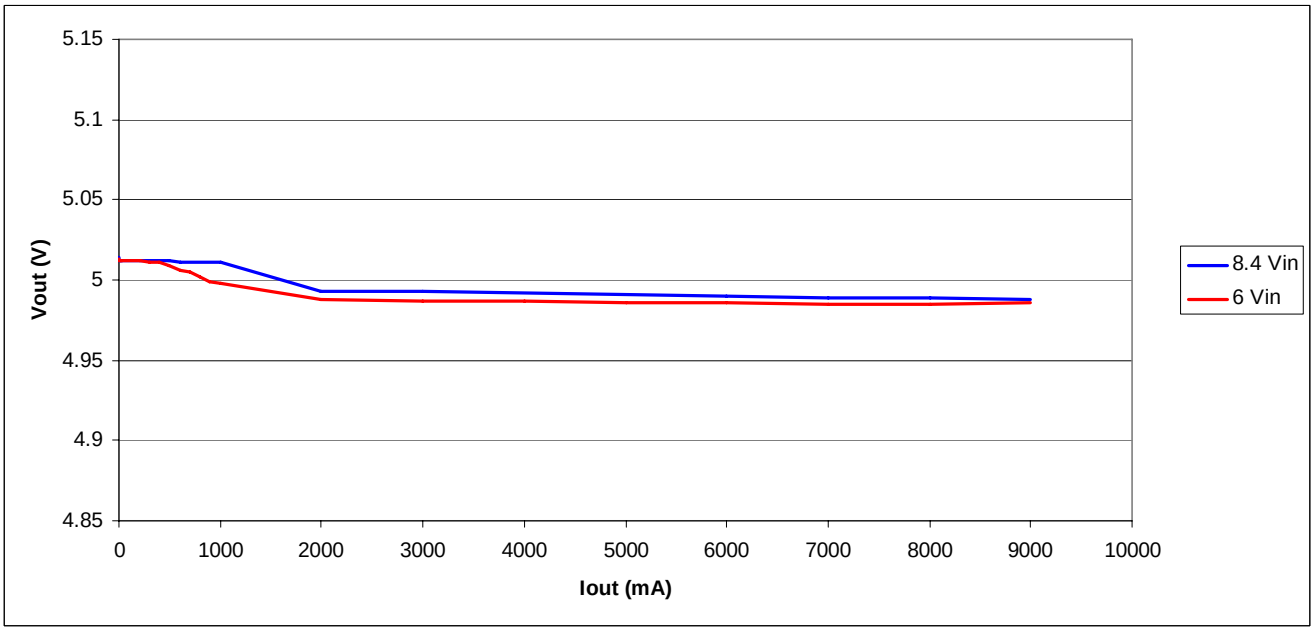


8.4Vin, 5.5A Load

13. Load Regulation

The load regulation is shown in the figures below.

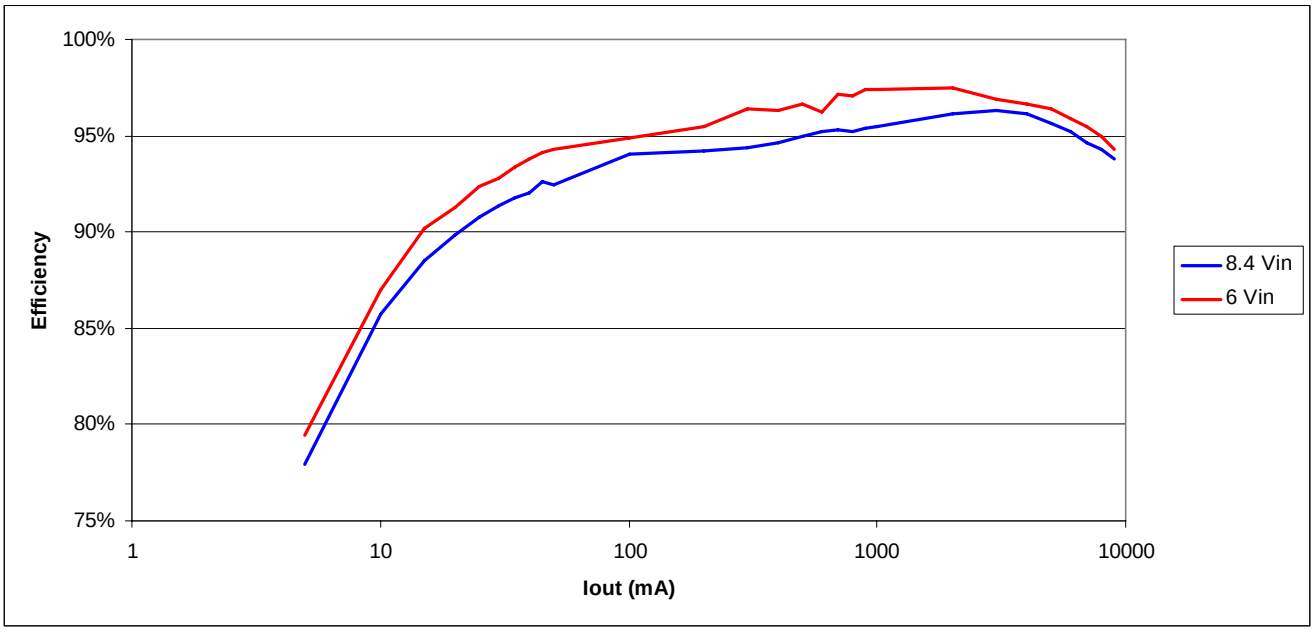




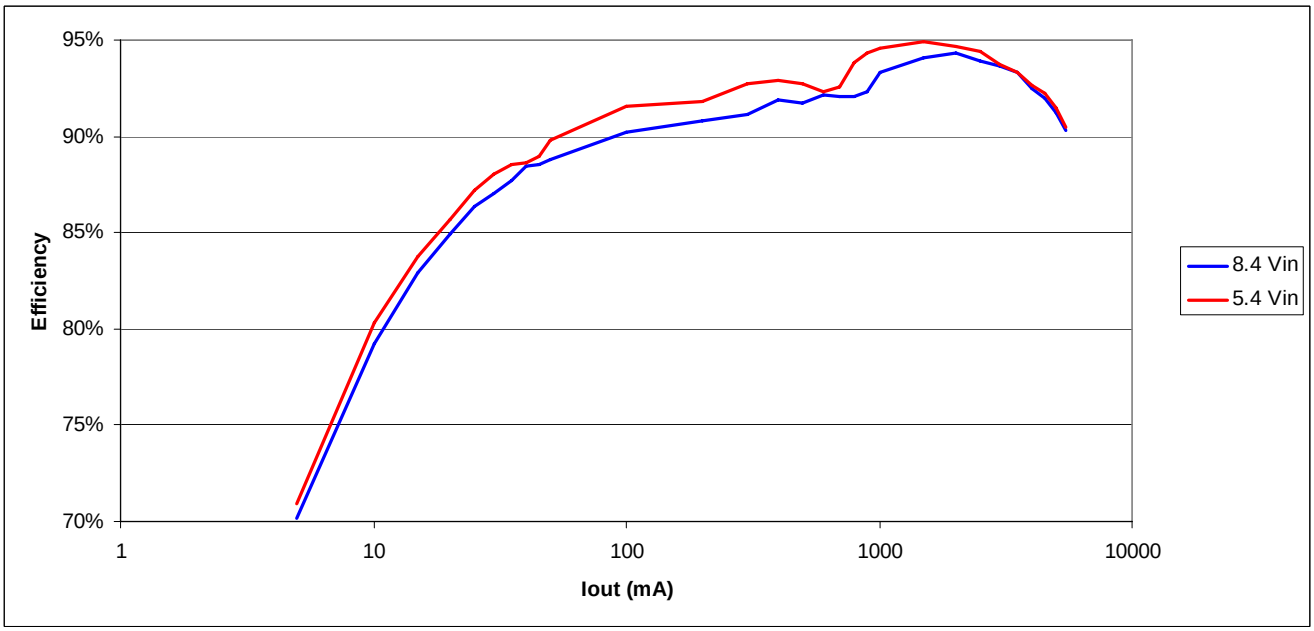
14 Efficiency

The efficiency of each output is measured below. The efficiency is measured from 5mA to 50mA, 100mA to 1A and from 1A to full load.

5 Vout



3.3 Vout



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