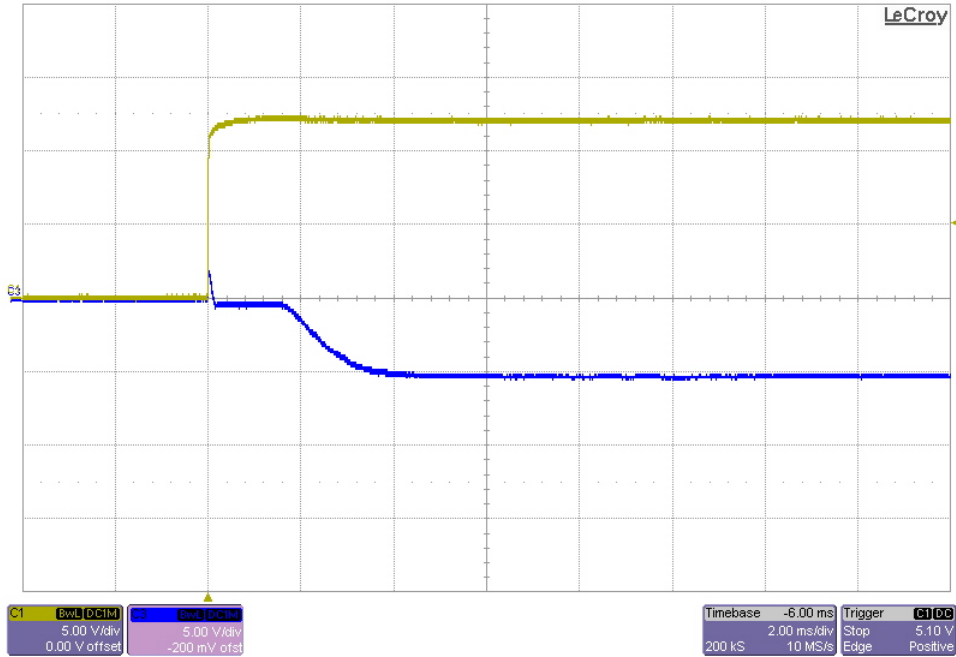
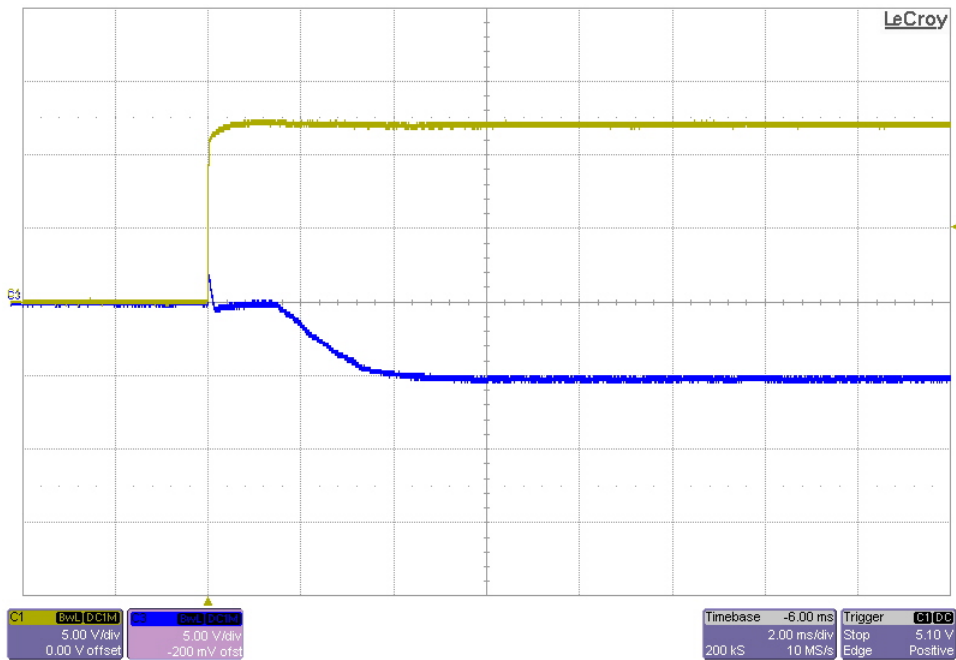


## 1 Startup

The photo below shows the output voltage startup waveform after the application of 12V in. The -5.2V output was loaded to 0A. (5V/DIV, 2mS/DIV)

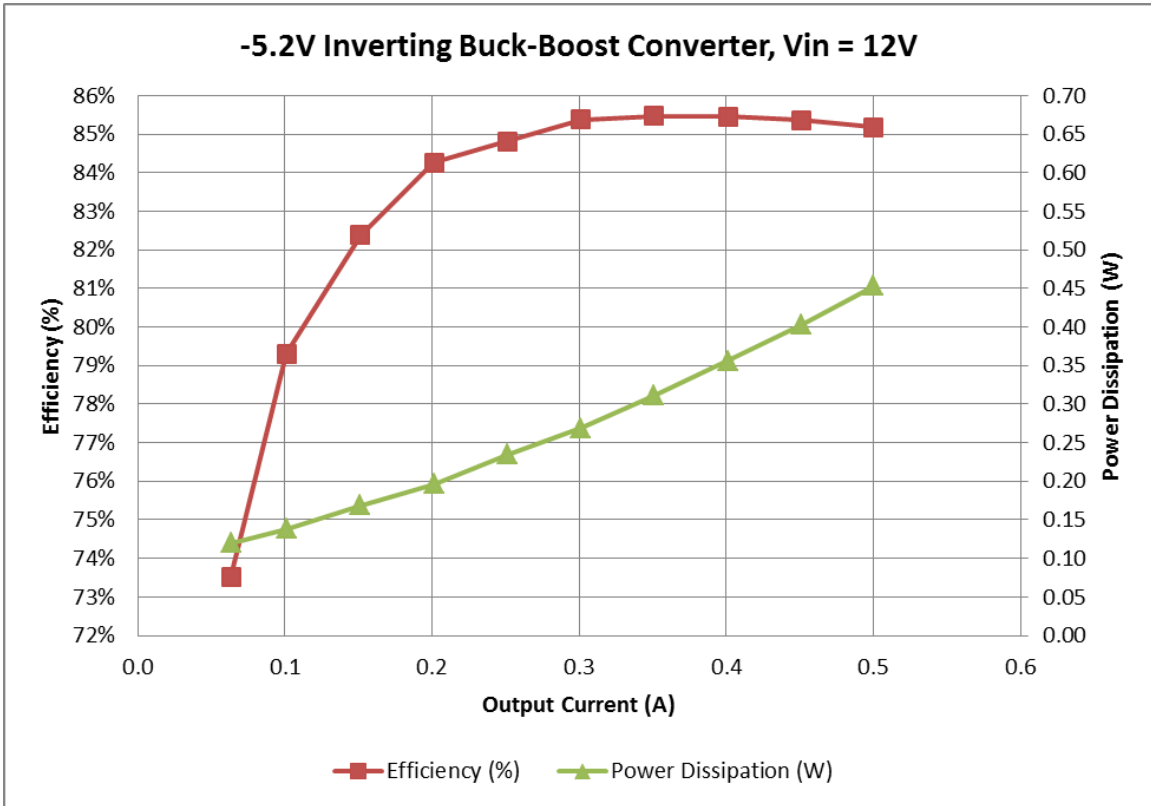


The photo below shows the output voltage startup waveform after the application of 12V in. The -5.2V output was loaded to 0.5A. (5V/DIV, 2mS/DIV)



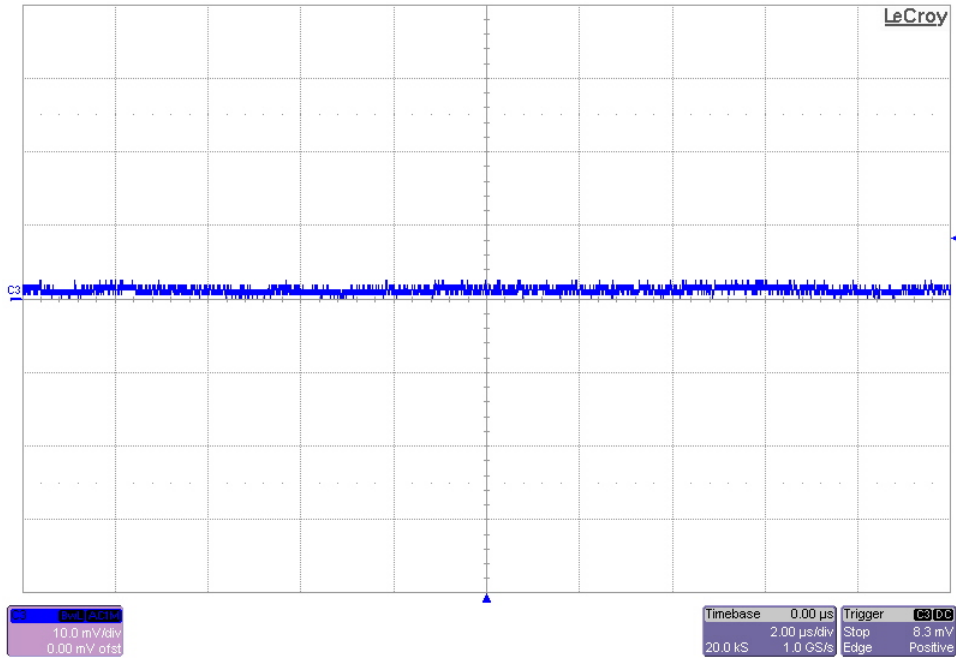
## 2 Efficiency

The TPS54231 inverting buck-boost converter efficiency is shown below.

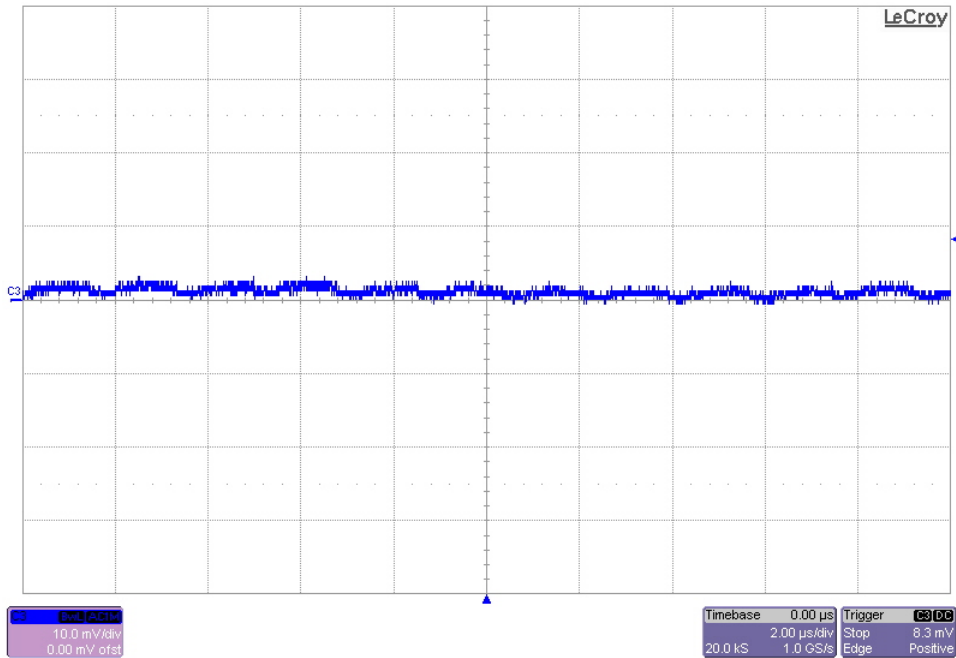


## 3 Output Ripple Voltage

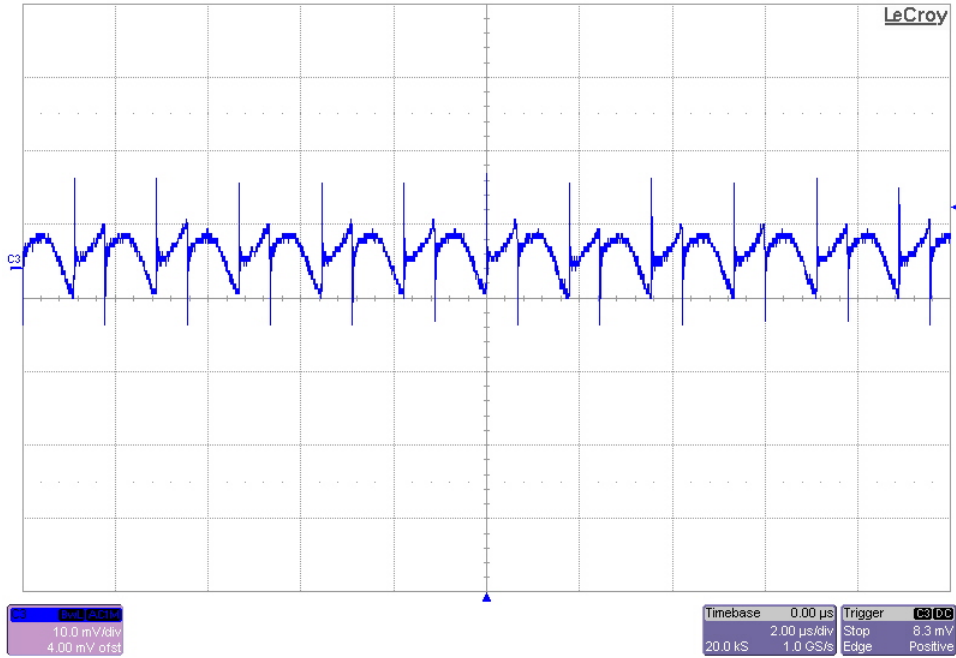
The -5.2V output ripple voltage (AC coupled) is shown in the figure below. The image was taken with the output loaded to 0.5A. The input voltage is set to 10V. (10mV/DIV, 2uS/DIV)



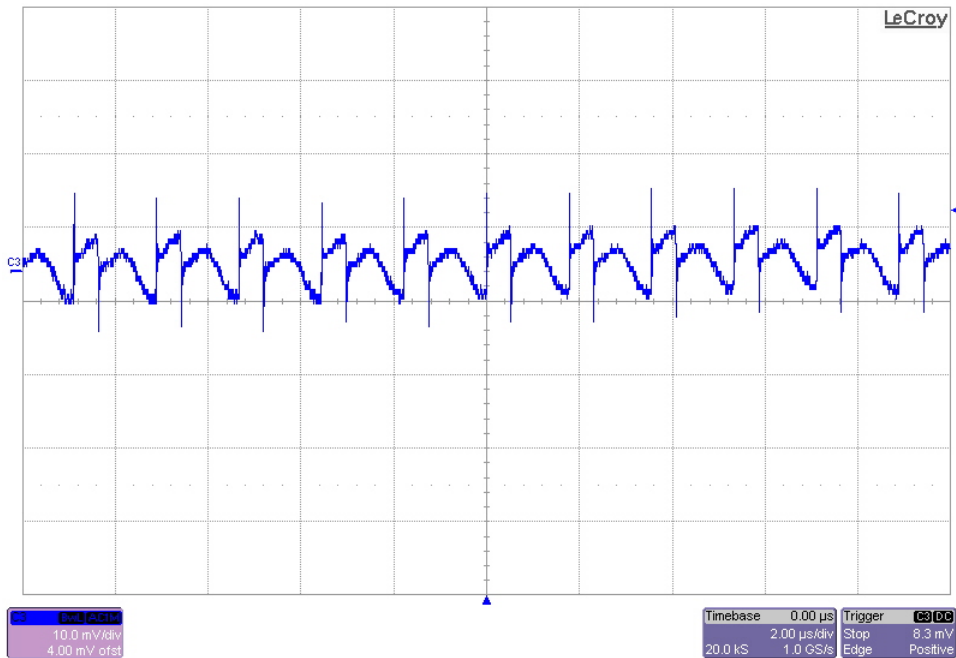
The -5.2V output ripple voltage (AC coupled) is shown in the figure below. The image was taken with the output loaded to 0.5A. The input voltage is set to 14V. (10mV/DIV, 2uS/DIV)



The -5.2V output ripple voltage (AC coupled) is shown in the figure below. The image was taken **before** the output LC filter (across C2) with the output loaded to 0.5A. The input voltage is set to 10V. (10mV/DIV, 2uS/DIV)

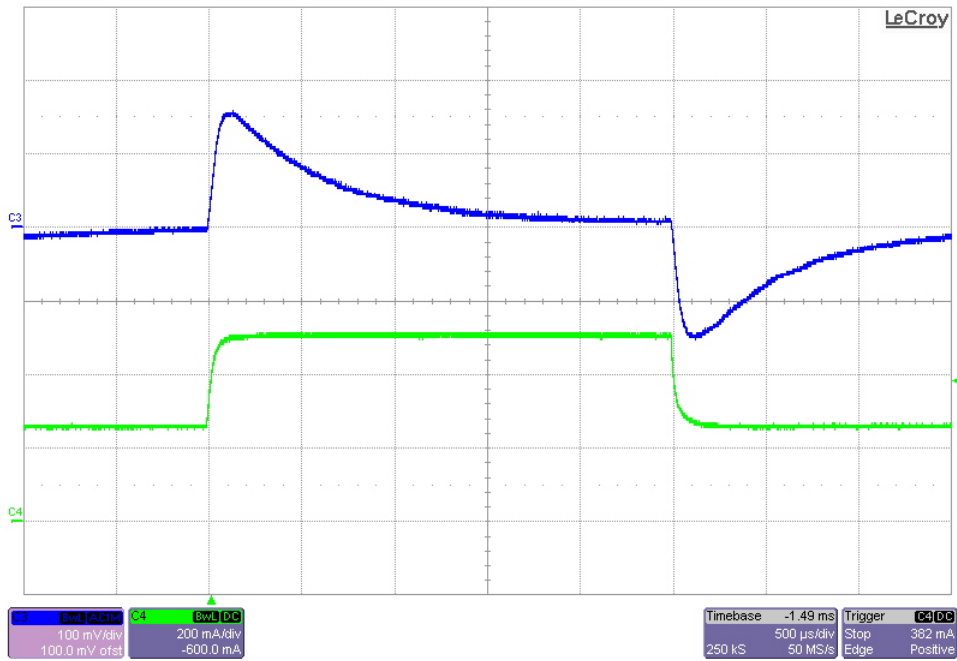


The -5.2V output ripple voltage (AC coupled) is shown in the figure below. The image was taken **before** the output LC filter (across C2) with the output loaded to 0.5A. The input voltage is set to 14V. (10mV/DIV, 2uS/DIV)

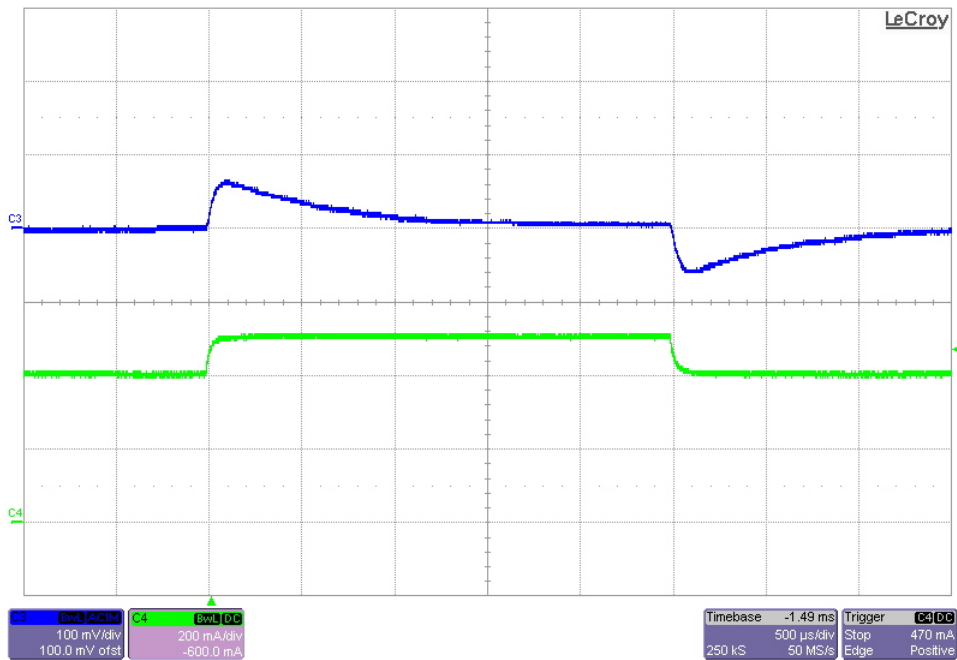


## 4 Load Transients

The photo below shows the output voltage (ac coupled) when the load current is stepped between 0.25A and 0.5A.  $V_{in} = 12V$ .  
(100mV/DIV, 200mA/DIV, 500uS/DIV)

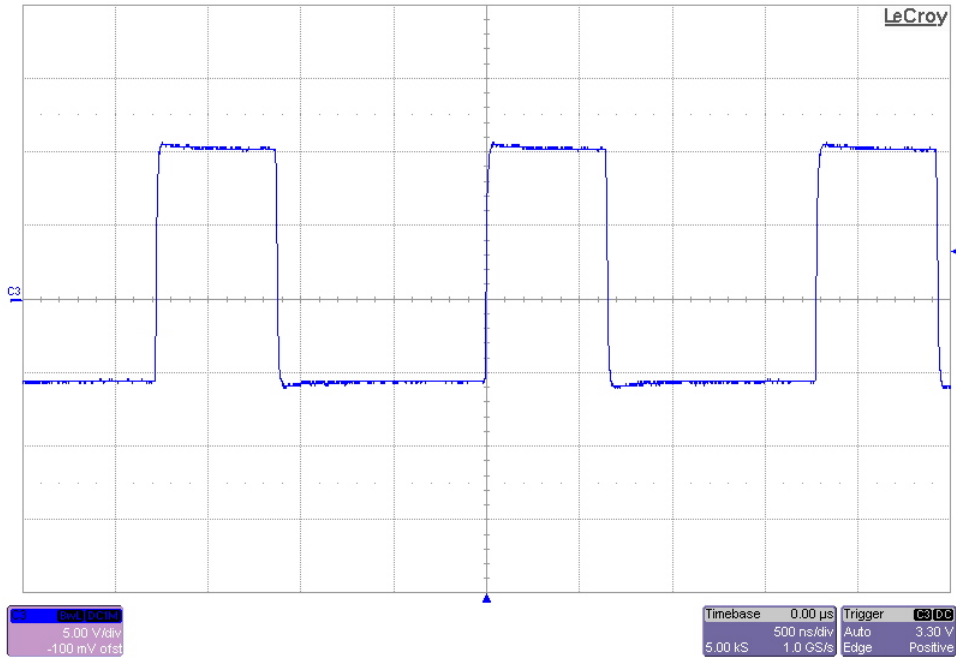


The photo below shows the output voltage (ac coupled) when the load current is stepped between 0.4A and 0.5A.  $V_{in} = 12V$ .  
(100mV/DIV, 200mA/DIV, 500uS/DIV)

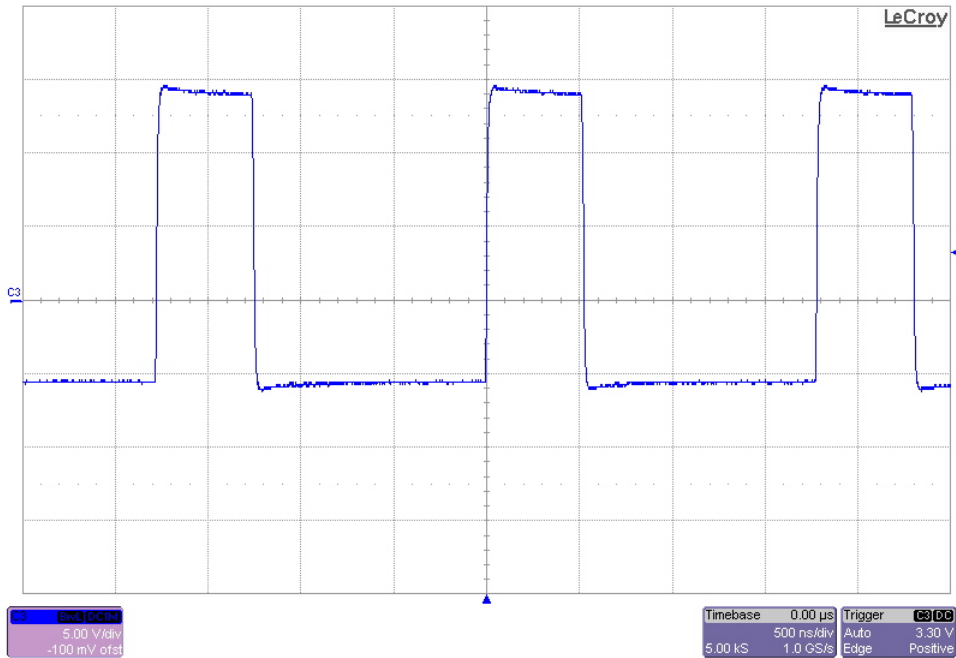


## 5 Switch Node Waveforms

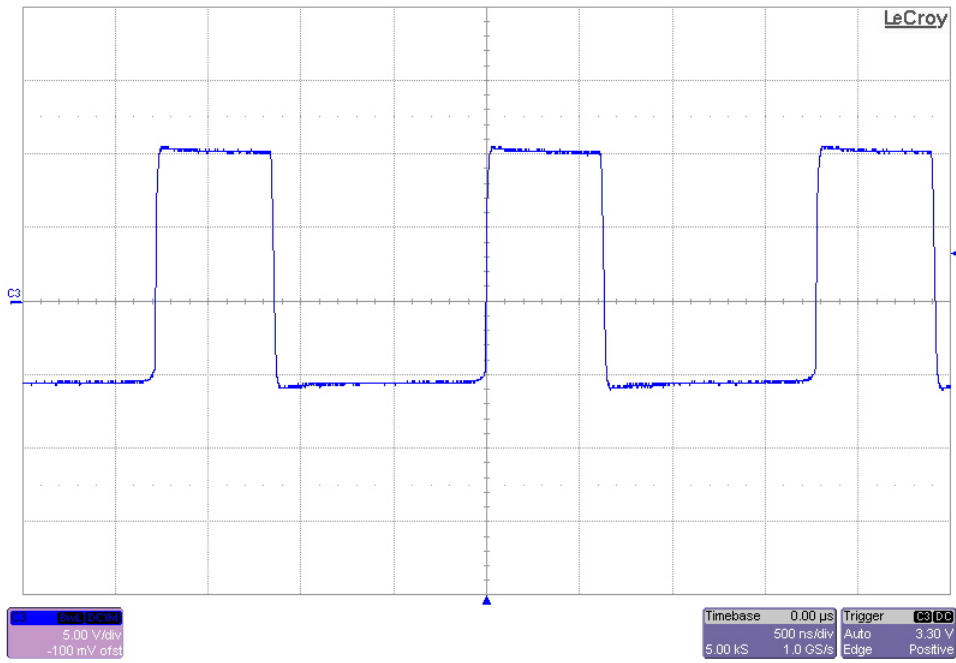
The photo below shows the switching node voltage. The input voltage is 10V and the -5.2V output is loaded to 0.5A. (10V/DIV, 2uS/DIV)



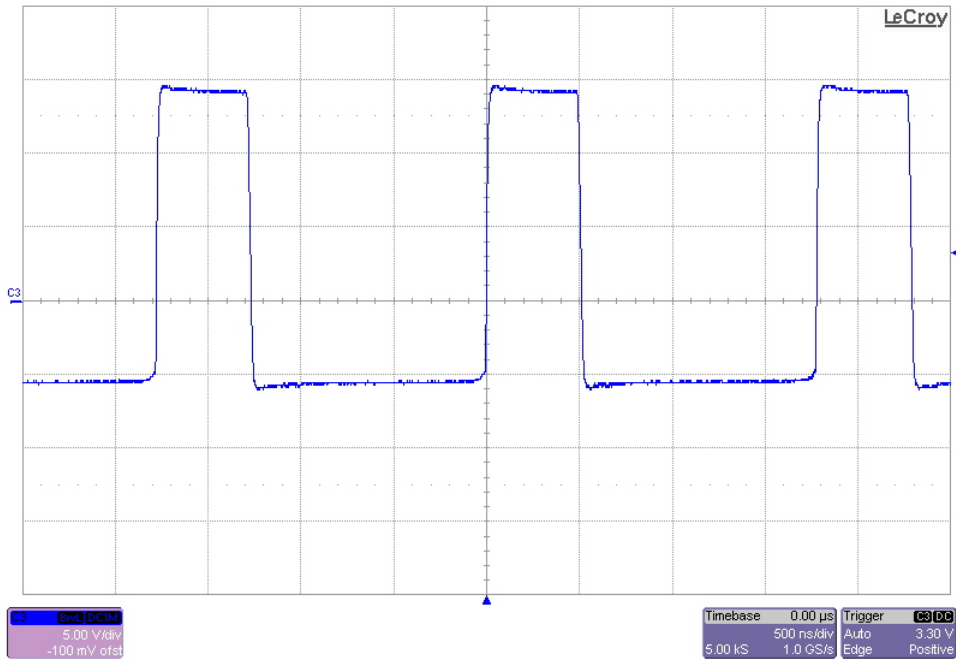
The photo below shows the switching node voltage. The input voltage is 14V and the -5.2V output is loaded to 0.5A. (10V/DIV, 2uS/DIV)



The photo below shows the switching node voltage. The input voltage is 10V and the -5.2V output is loaded to 0.050A. The converter has just starting DCM operation. (10V/DIV, 2uS/DIV)



The photo below shows the switching node voltage. The input voltage is 14V and the -5.2V output is loaded to 0.065A. The converter has just starting DCM operation. (10V/DIV, 2uS/DIV)



## 6 Loop Gain

The plot below shows the loop gain with the input voltage set to 10V and 14V and the output to 0.5A.

Loop Gain ( $V_{in} = 14V$ )

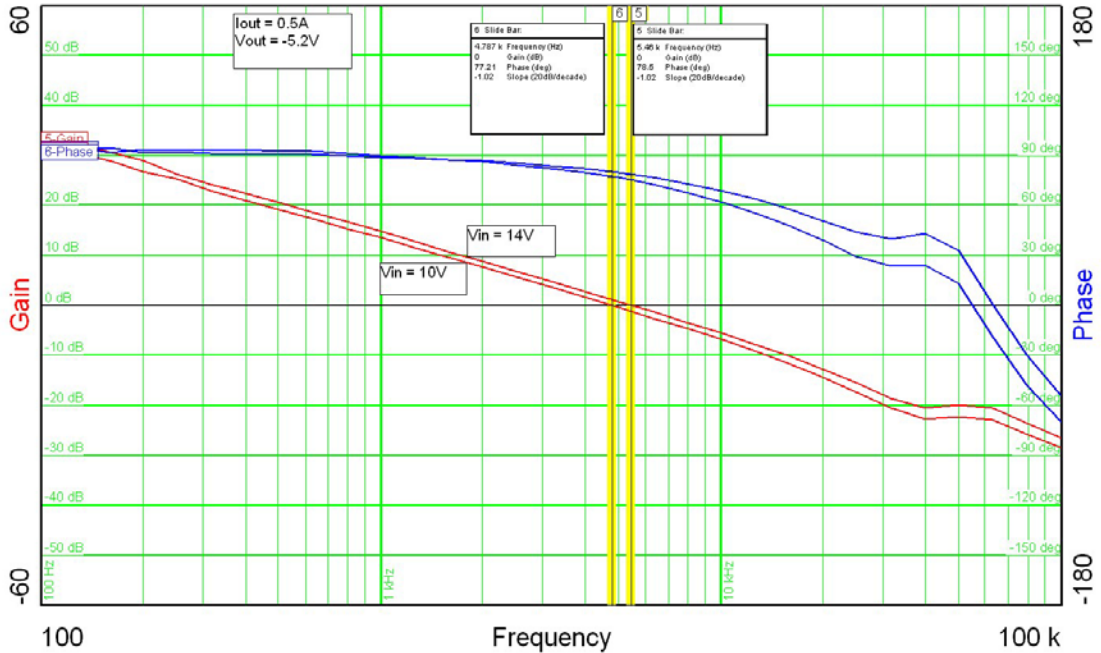
BW: 5.46KHz

PM: 79 degrees

Loop Gain ( $V_{in} = 10V$ )

BW: 4.79KHz

PM: 77 degrees



The plot below shows the loop gain with the input voltage set to 10V and 14V and the output to 0.1A.

Loop Gain ( $V_{in} = 14V$ )

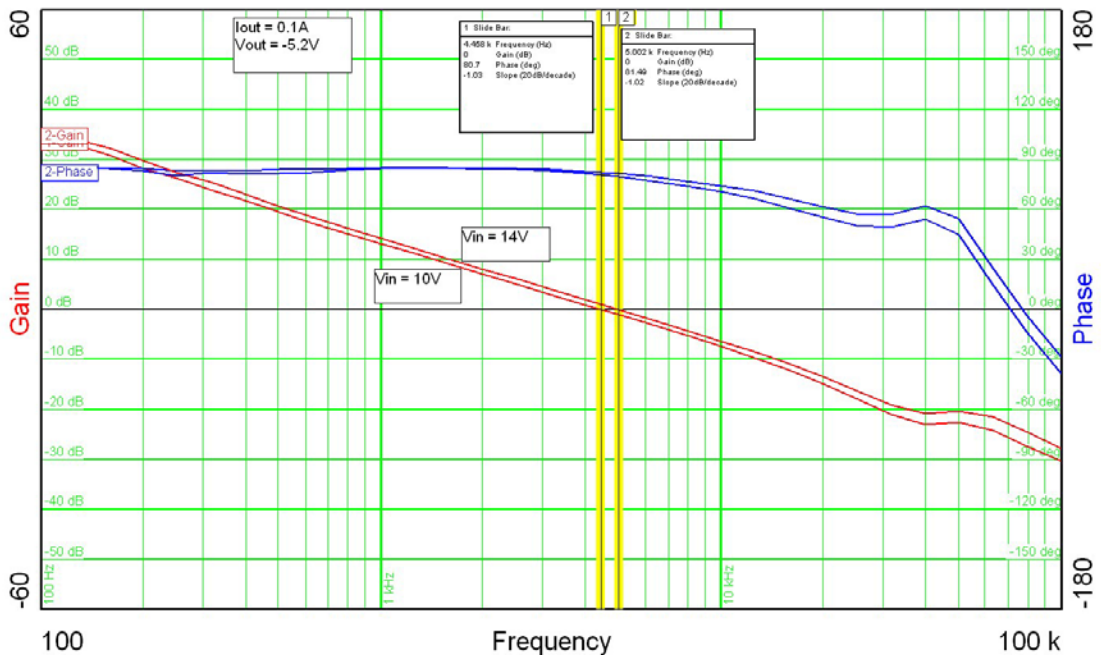
BW: 5.00KHz

PM: 81 degrees

Loop Gain ( $V_{in} = 10V$ )

BW: 4.46KHz

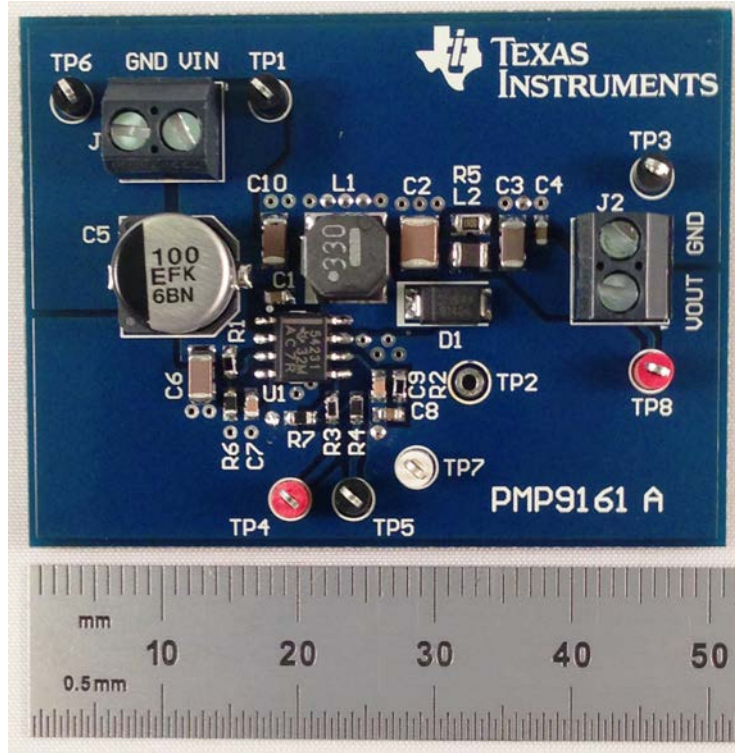
PM: 81 degrees





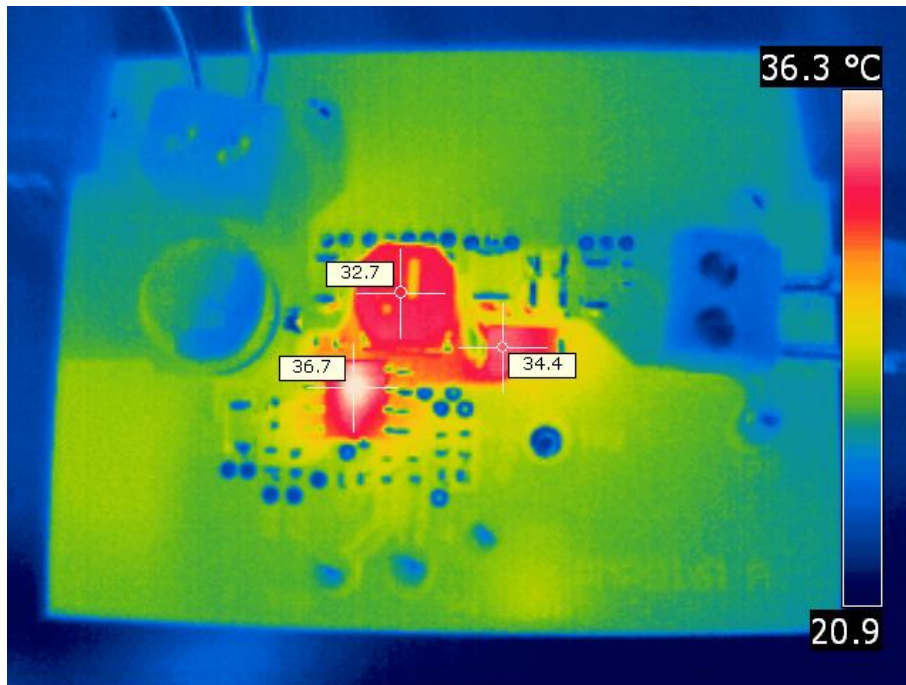
## 7 Photo

The photo below shows the PMP9161 REVB assy.



## 8 Thermal Image

A thermal image is shown below operating at 12V input and -5.2V@0.5A (room temp and no airflow).



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