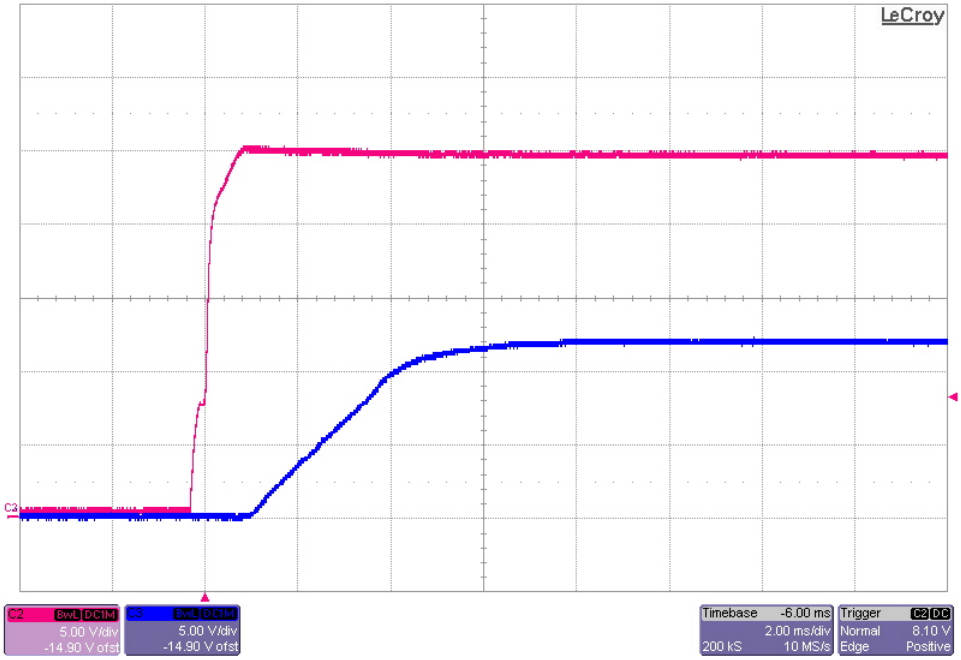
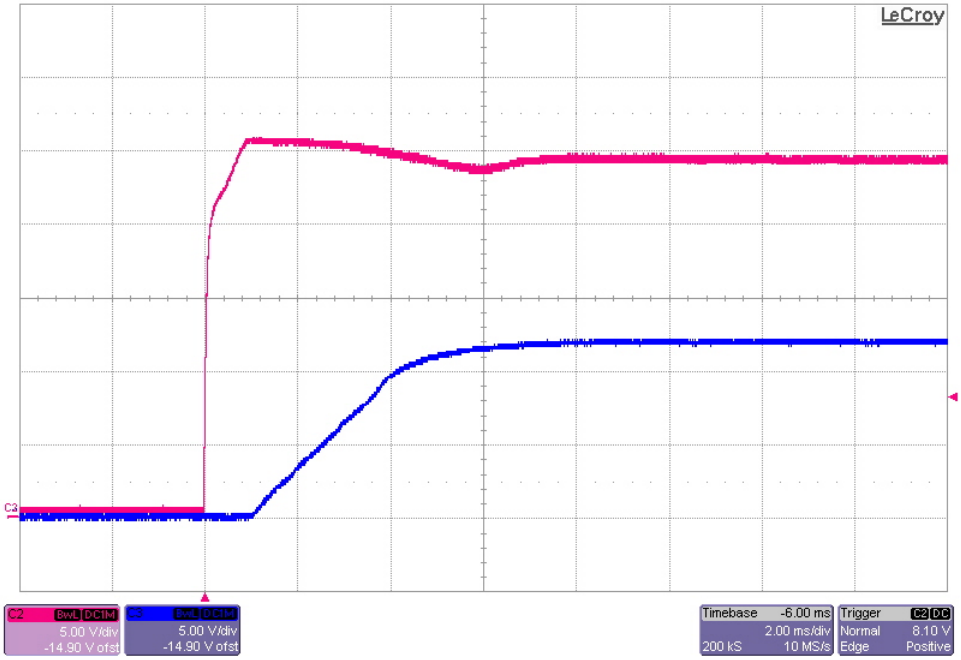
1 Startup

The photo below shows the output voltage startup waveform after the application of 24V in with the 12V output loaded to 0A. (5V/DIV, 2mS/DIV)

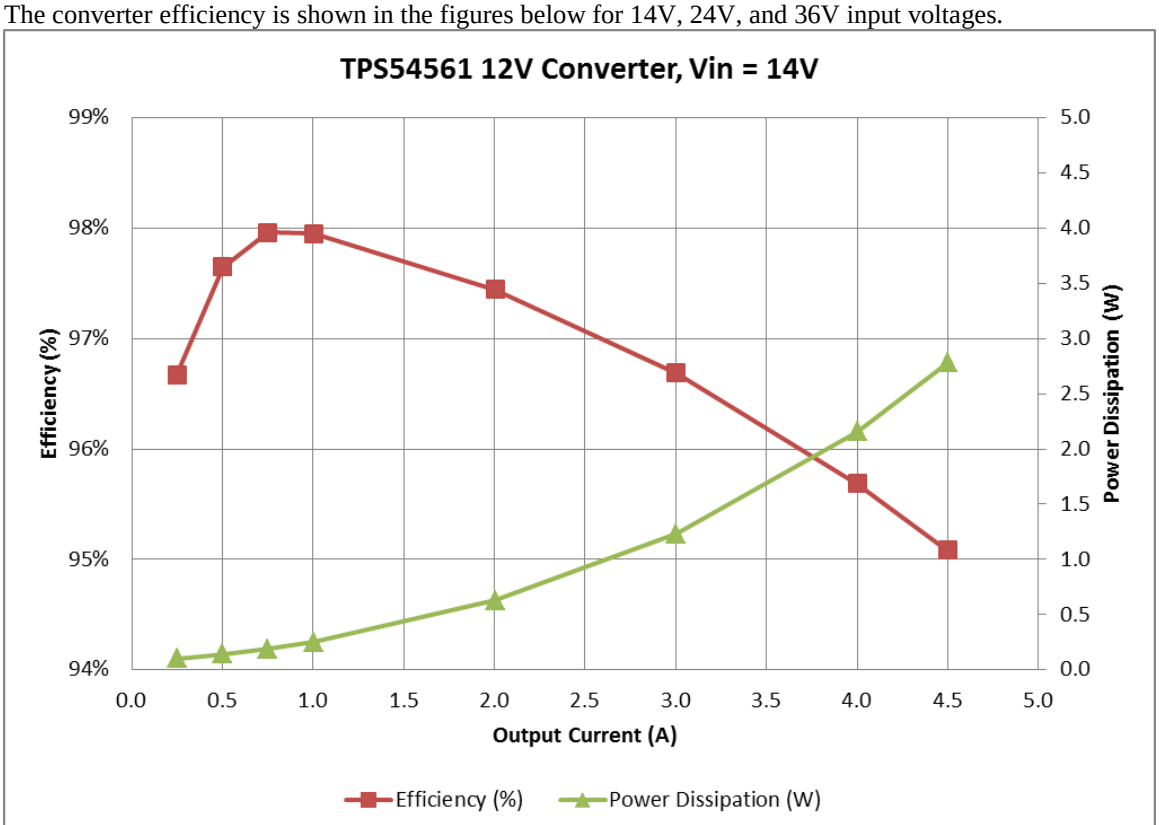


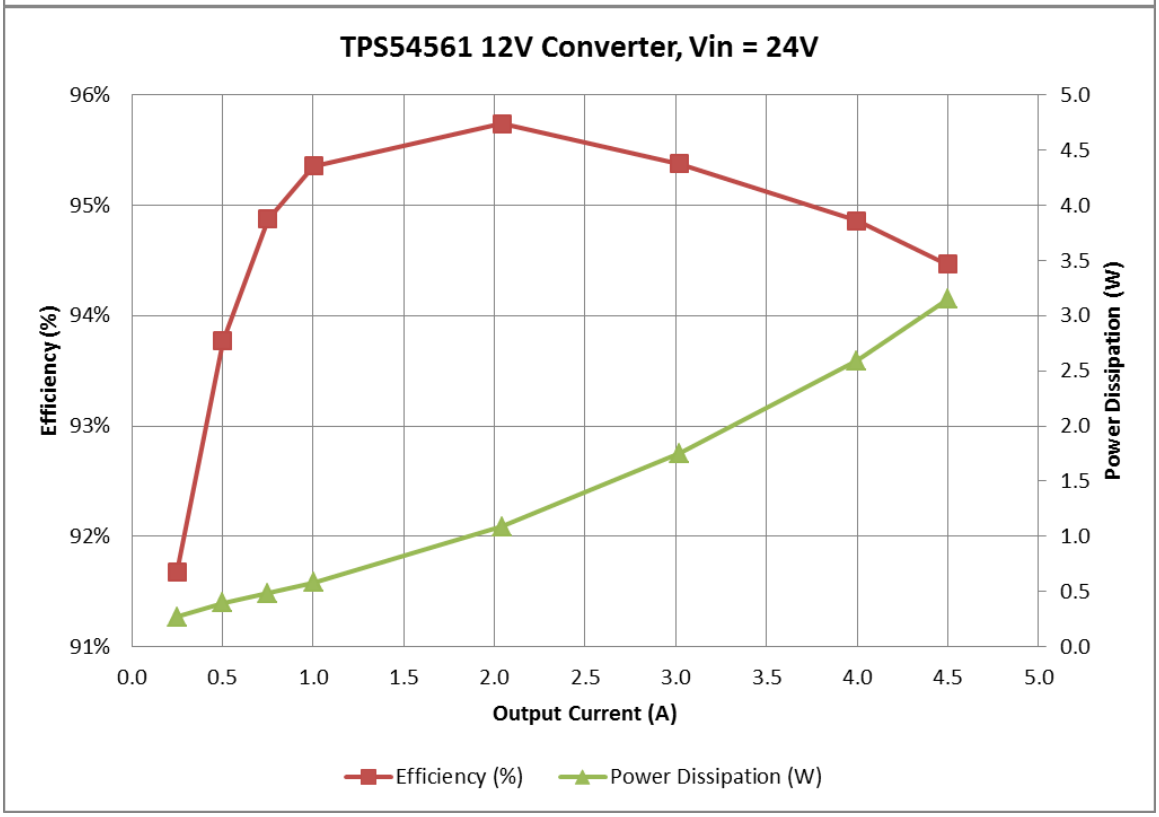
The photo below shows the output voltage startup waveform after the application of 24V in with the 12V output loaded to 4.2A. (5V/DIV, 2mS/DIV)

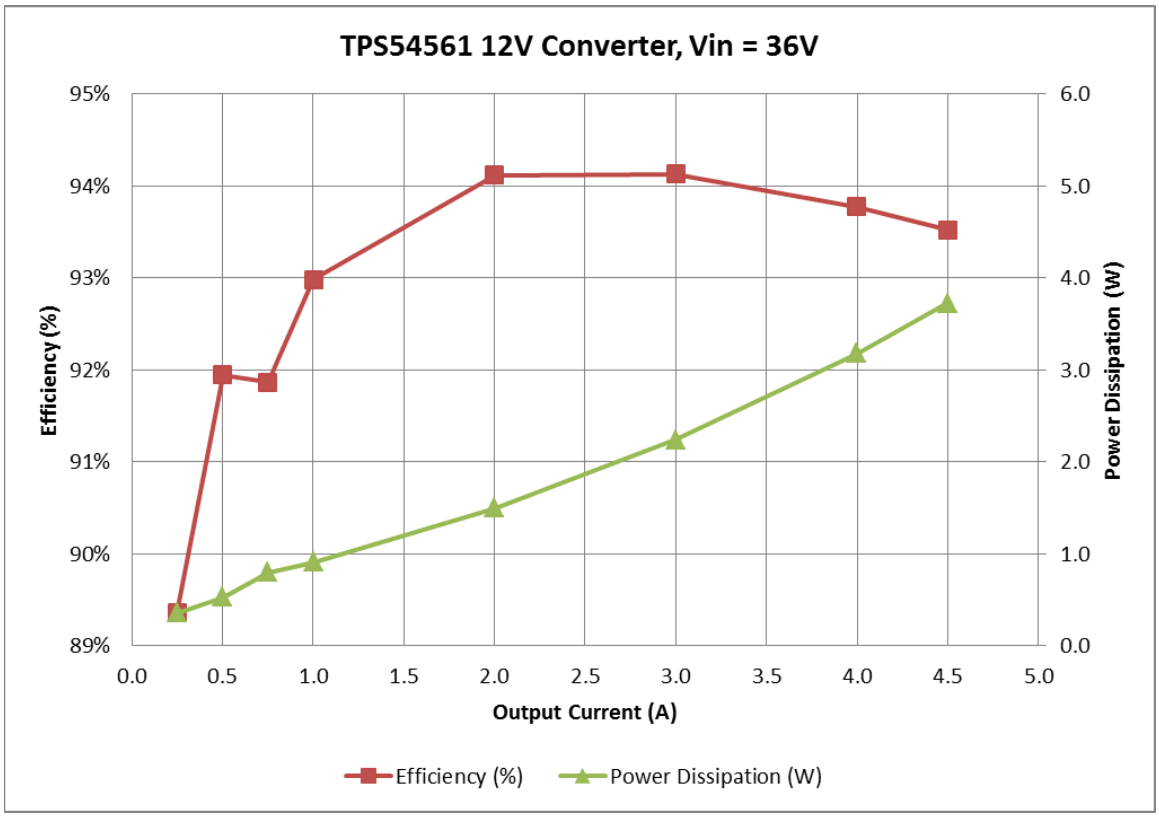


2 Efficiency

The converter efficiency is shown in the figures below for 14V, 24V, and 36V input voltages.

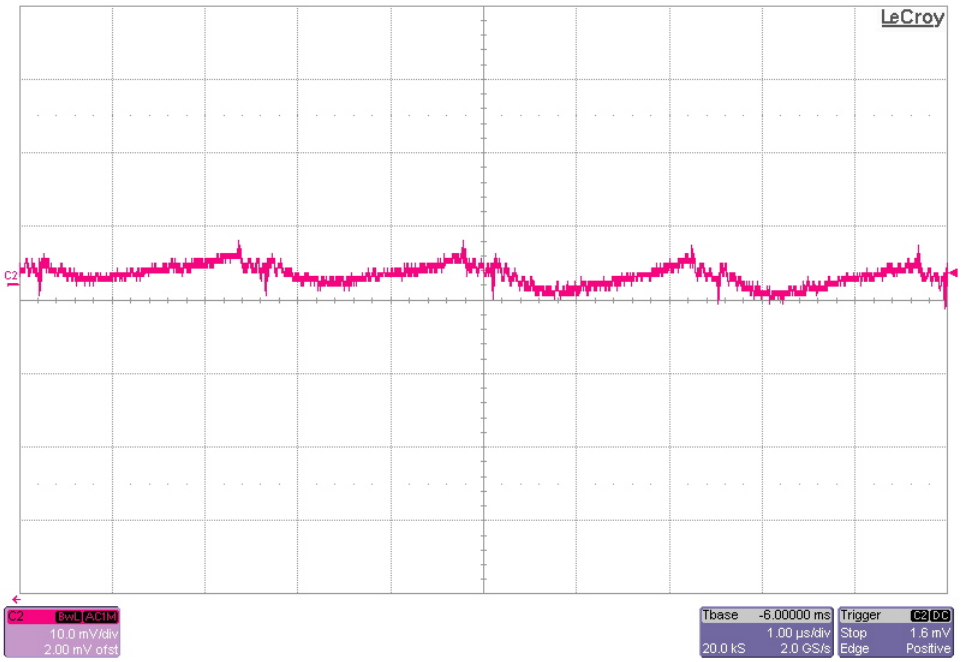




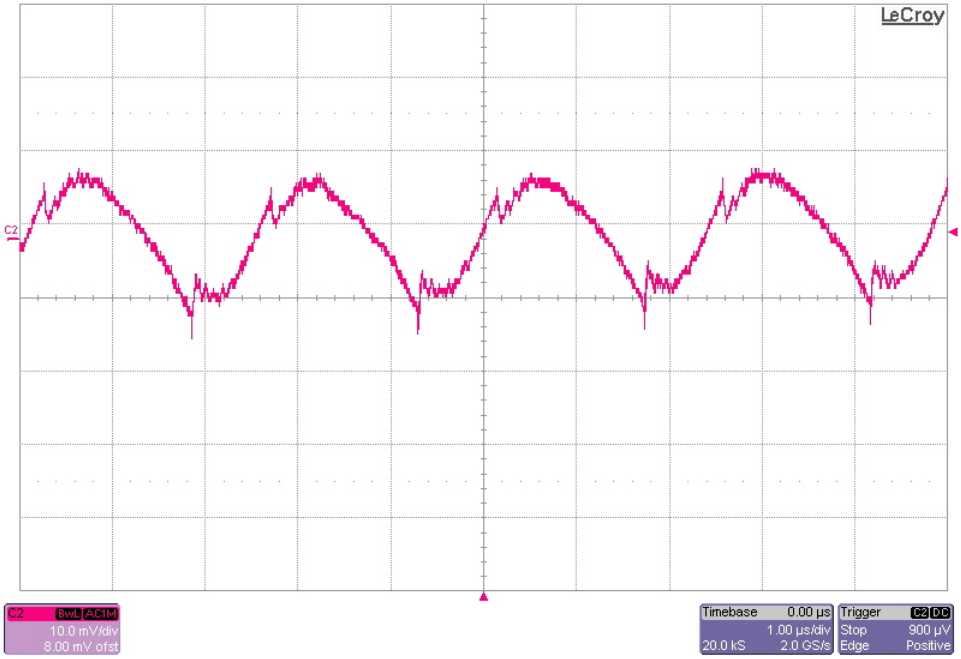

TPS54561 12V Converter, Vin = 36V
95%
94%
93%
92%
91%
90%
89%
Efficiency (%)
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Power Dissipation (W)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
Output Current (A)
Efficiency (%)
Power Dissipation (W)

3 Output Ripple Voltage

The output ripple voltage is shown in the figure below. The image was taken with the 12V output loaded to 4.2A and the input voltage set to 14V. (10mV/DIV, 1uS/DIV)

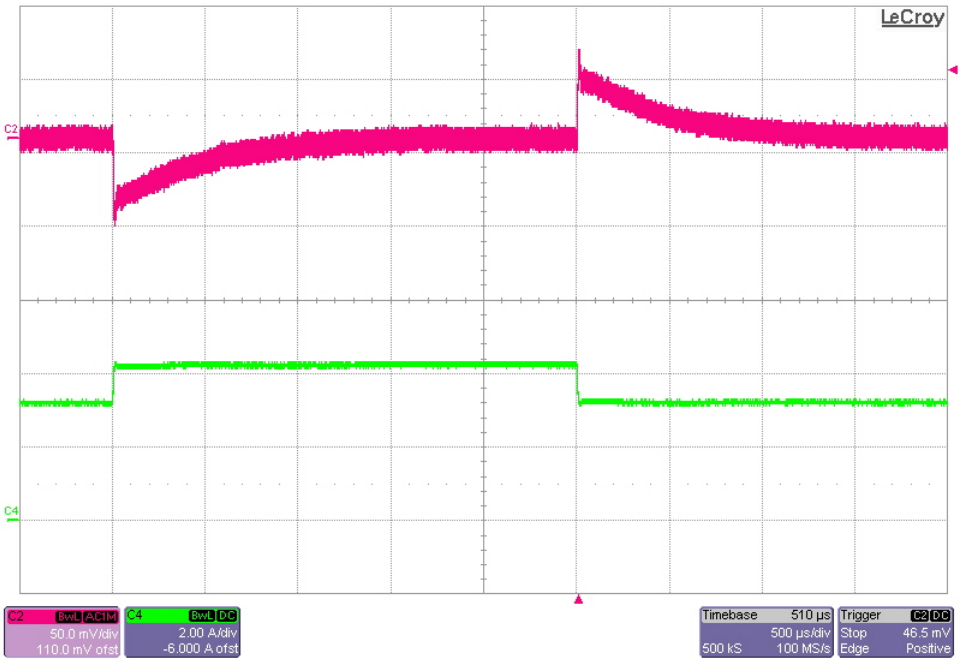


The output ripple voltage is shown in the figure below. The image was taken with the 12V output loaded to 4.2A and the input voltage set to 36V. (10mV/DIV, 1uS/DIV)

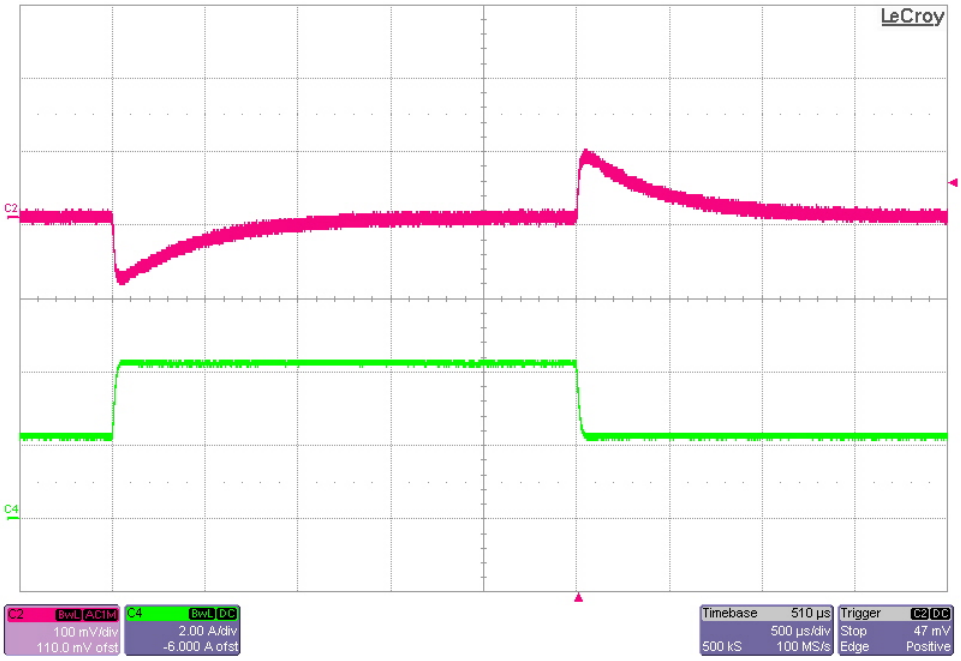


4 Load Transients

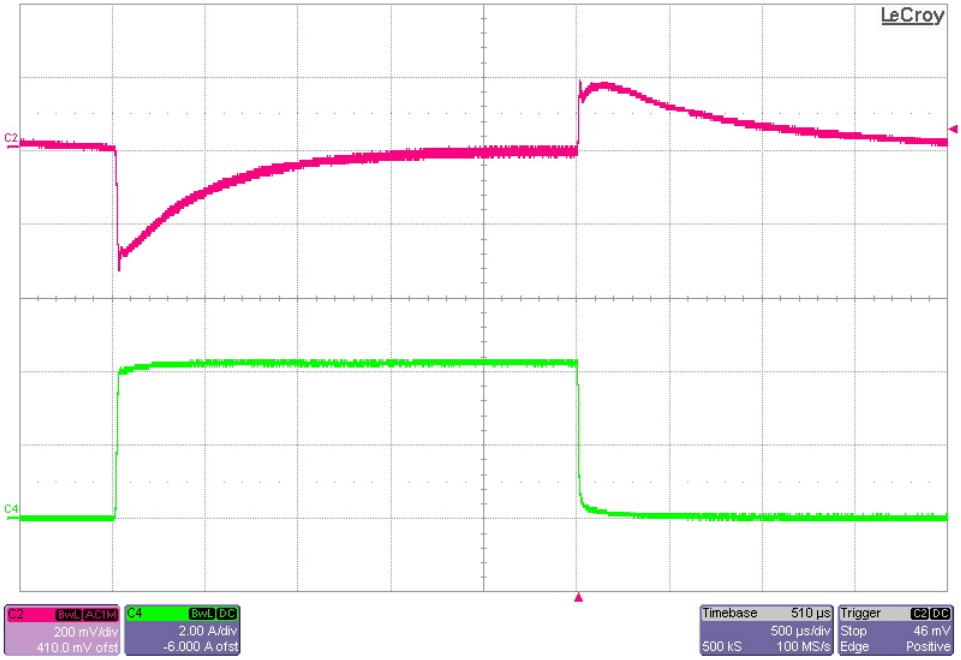
The photo below shows the 12V output voltage (ac coupled) when the load current is stepped between 3.2A and 4.2A. Vin = 24V. (50mV/DIV, 2A/DIV, 500uS/DIV)



The photo below shows the 12V output voltage (ac coupled) when the load current is stepped between 2.2A and 4.2A. Vin = 24V. (100mV/DIV, 2A/DIV, 500uS/DIV)

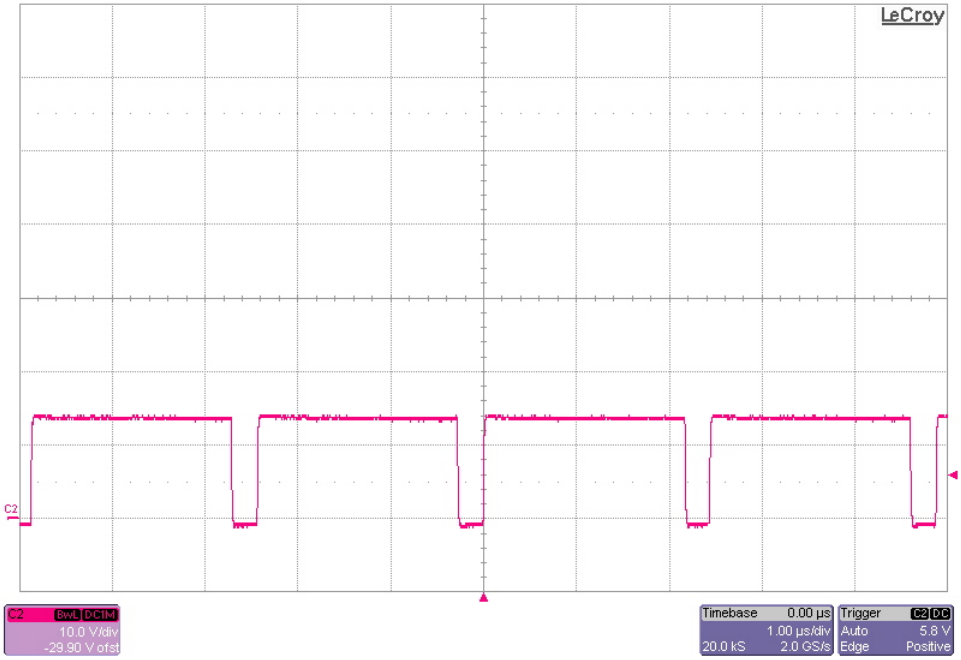


The photo below shows the 12V output voltage (ac coupled) when the load current is stepped between 0A and 4.2A. Vin = 24V. (200mV/DIV, 2A/DIV, 500uS/DIV)

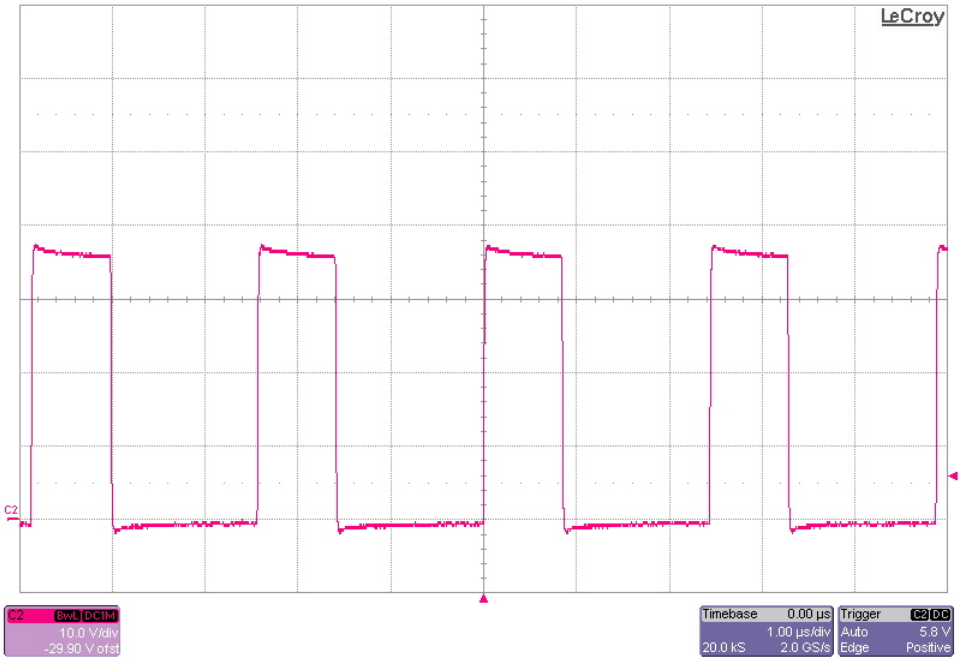


5 Switch Node Waveforms

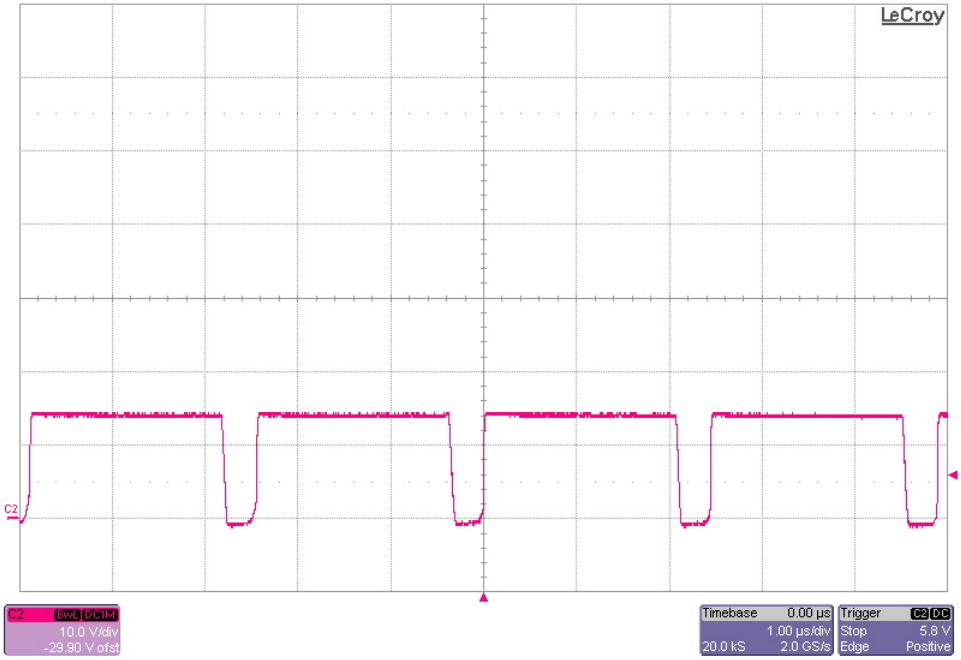
The photo below shows the switch node voltage. The input voltage is 14V and the 12V output is loaded to 4.2A. (10V/DIV, 1uS/DIV)



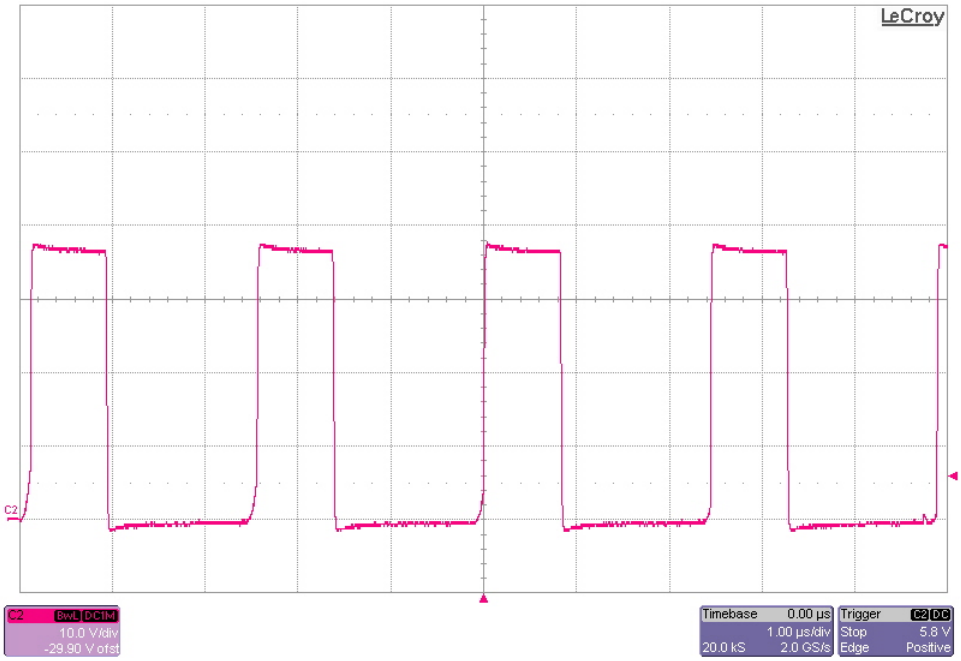
The photo below shows the switch node voltage. The input voltage is 36V and the 12V output is loaded to 4.2A. (10V/DIV, 1uS/DIV)



The photo below shows the switch node voltage. The input voltage is 14V and the 12V output is loaded to 0.09A. The converter has entered Discontinuous Conduction Mode. (10V/DIV, 1uS/DIV)



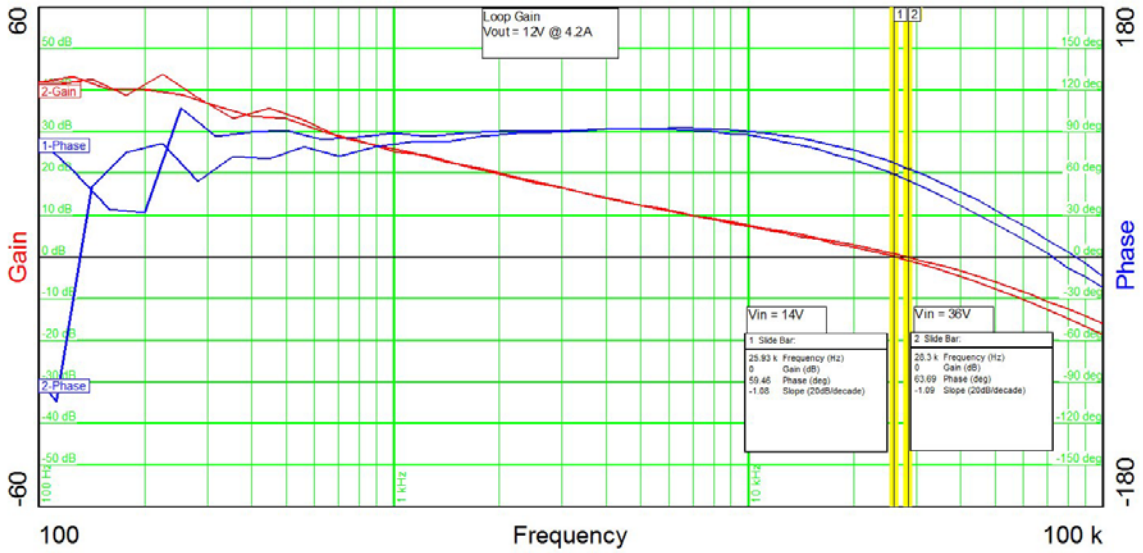
The photo below shows the switch node voltage. The input voltage is 36V and the 12V output is loaded to 0.55A. The converter has entered Discontinuous Conduction Mode. (10V/DIV, 1uS/DIV)



6 Control Loop Gain / Stability

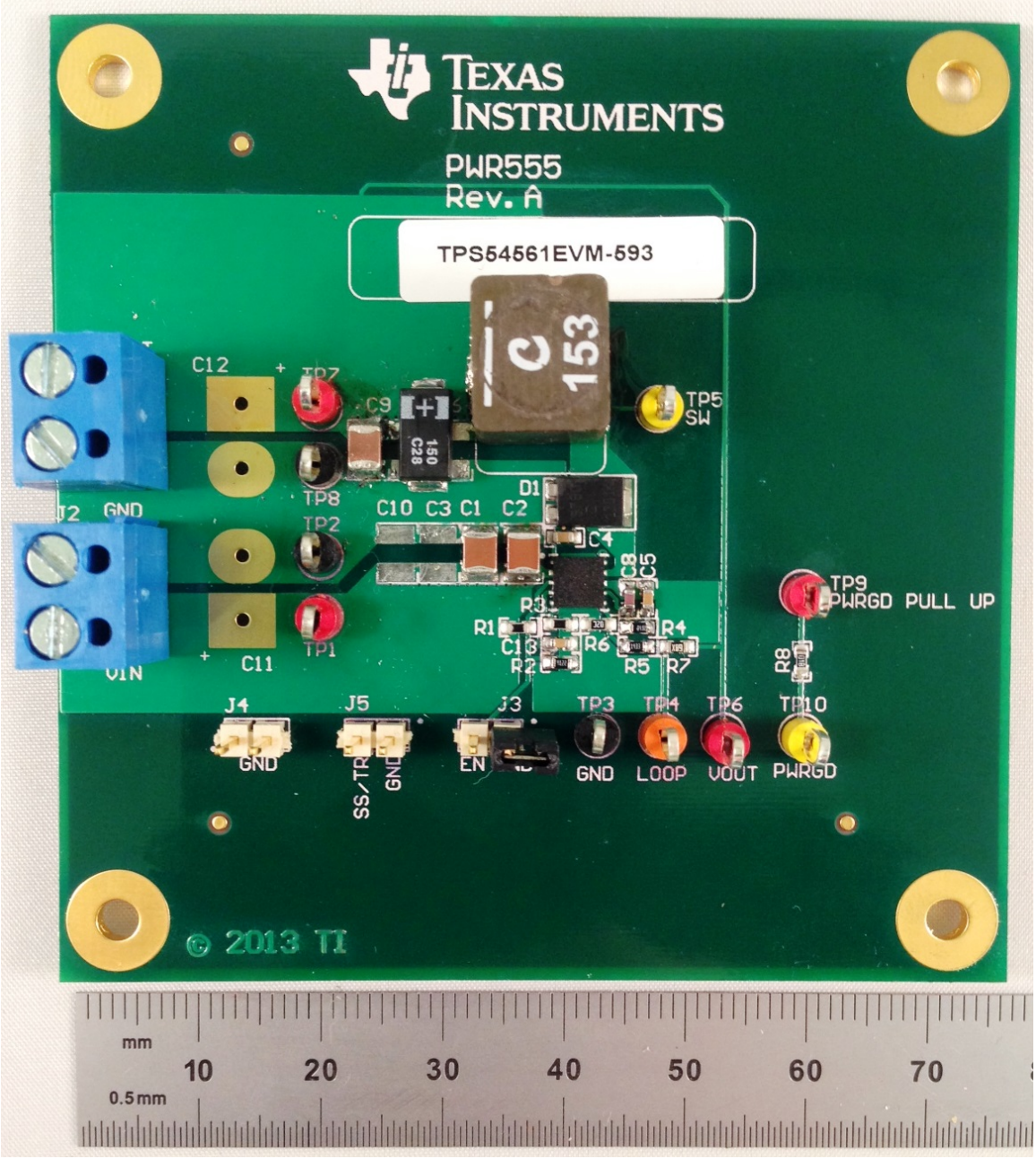
The plot below shows the converter's loop gain and phase margin when loaded to 12V @ 4.2A.

Vin = 14V	Band Width = 25.9KHz	Phase Margin = 59 degrees
Vin = 36V	Band Width = 28.3KHz	Phase Margin = 64 degrees



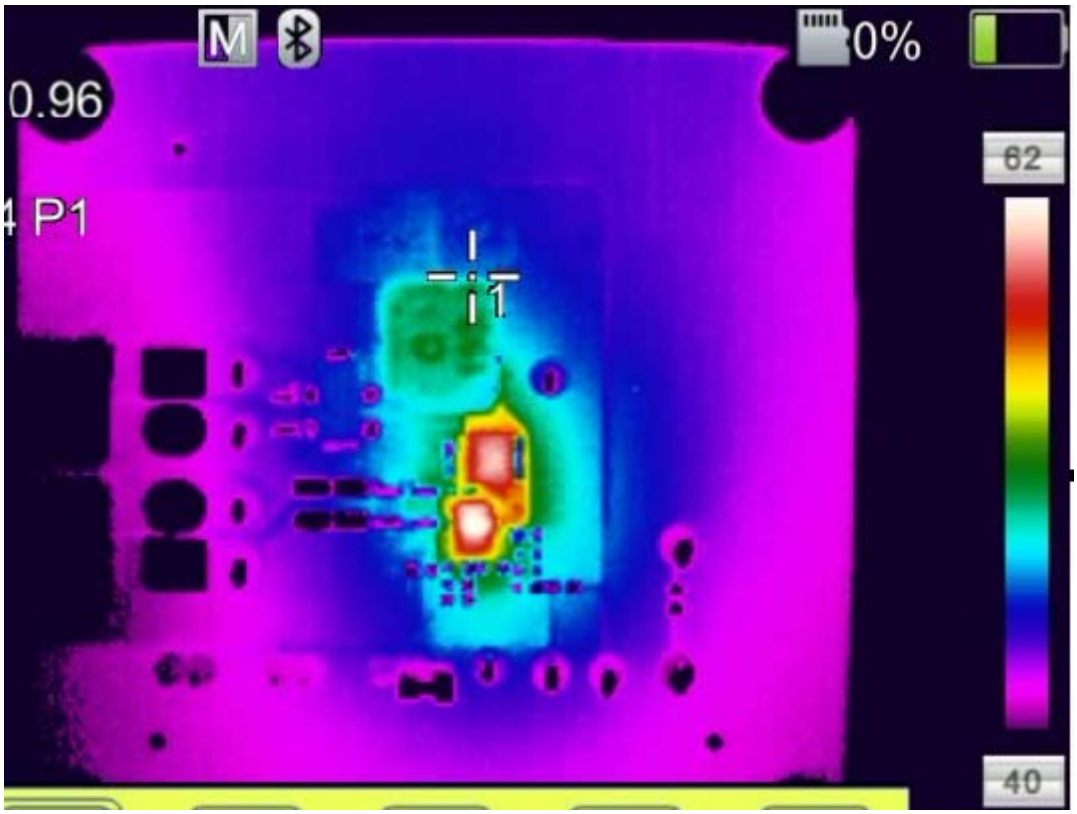
7 Photo

The photo below shows the PMP10357 REVB assy built on the TPS54561 EVM (PWR555).



8 Thermal Image

The thermal image below shows operation at 24V input and 12V@4.2A output, with no airflow.



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