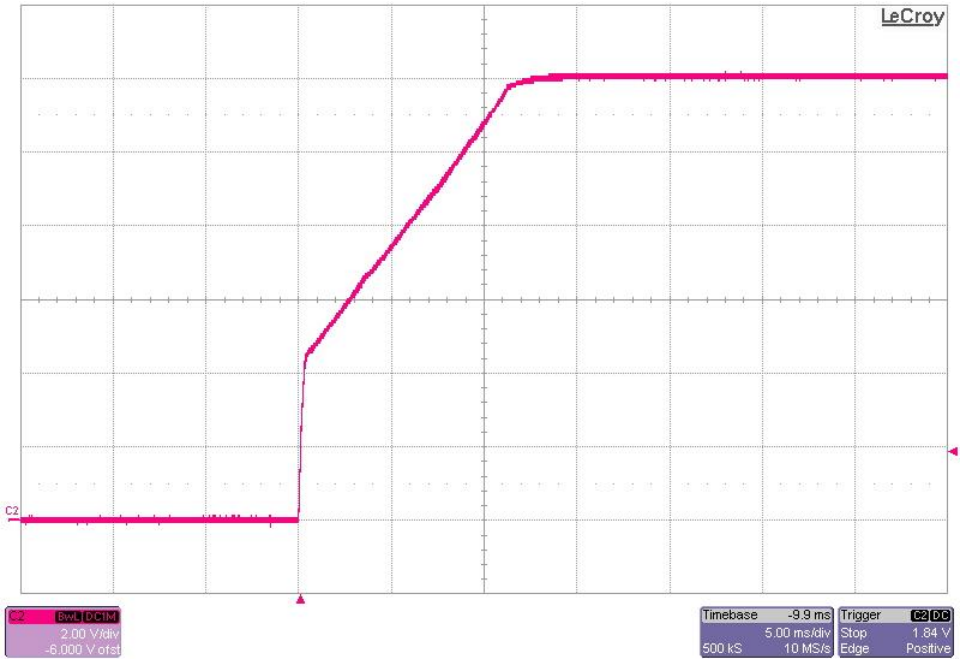
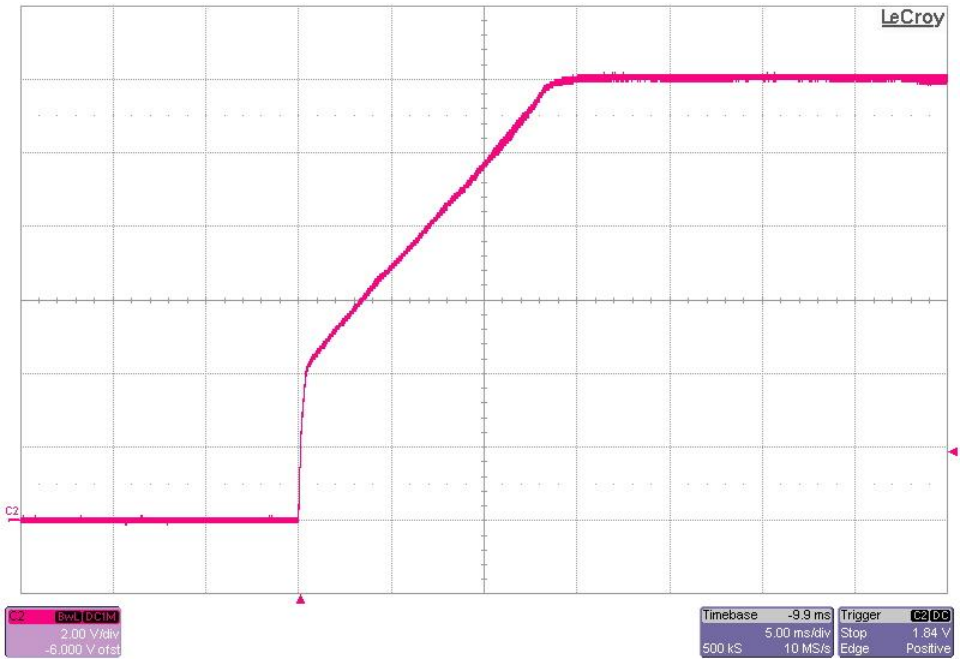
# 1 Startup

The photo below shows the output voltage startup waveform after the application of 48V in. The 12V output was loaded to 0A and operating at 1MHz. (2V/DIV, 5mS/DIV)

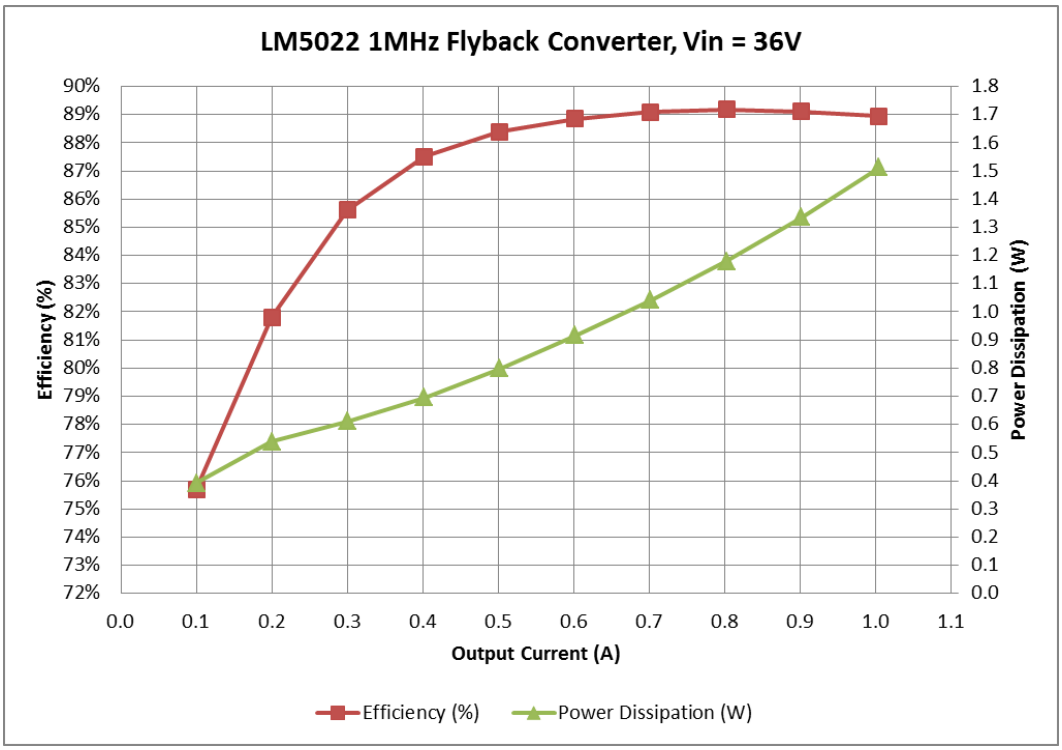


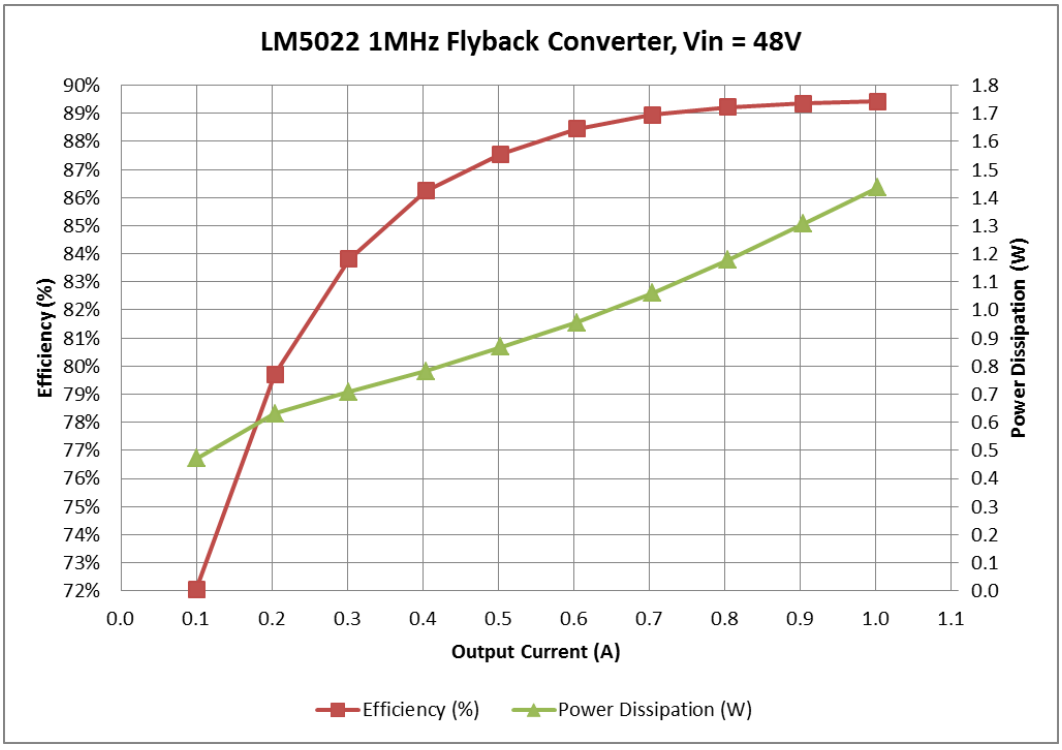

The photo below shows the output voltage startup waveform after the application of 48V in. The 12V output was loaded to 1A and operating at 1MHz. (2V/DIV, 5mS/DIV)

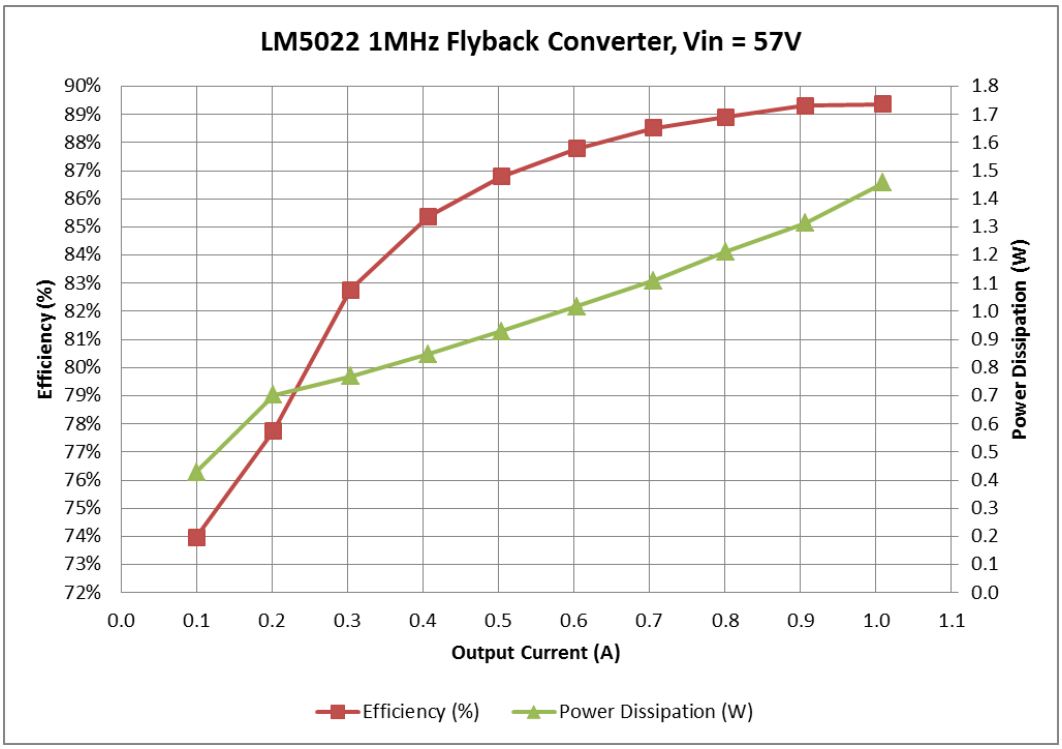


## 2 Efficiency

The flyback converter's efficiency and power losses are shown below when operating at 1MHz.

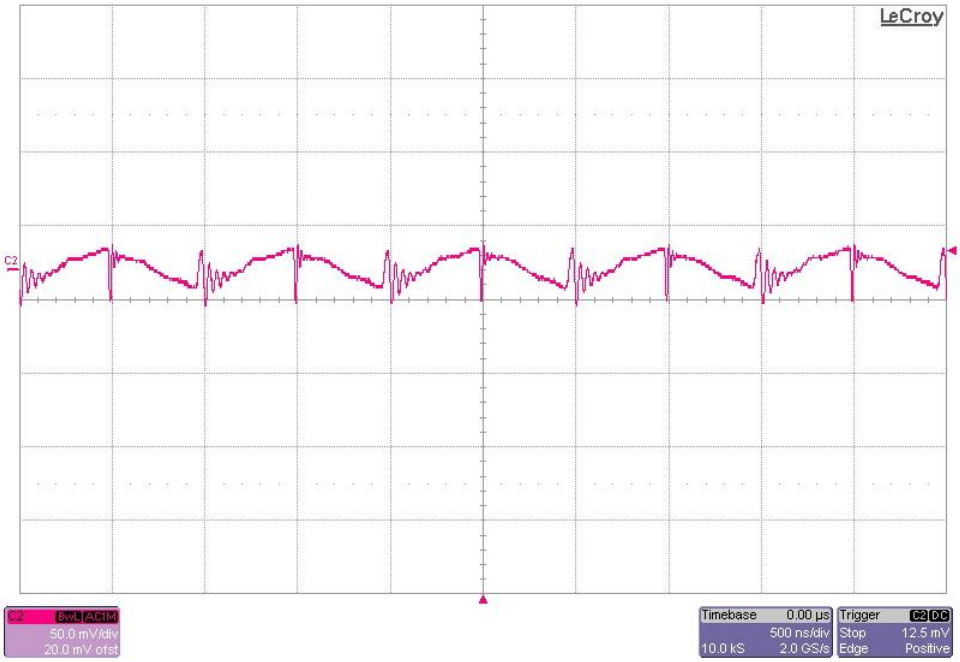


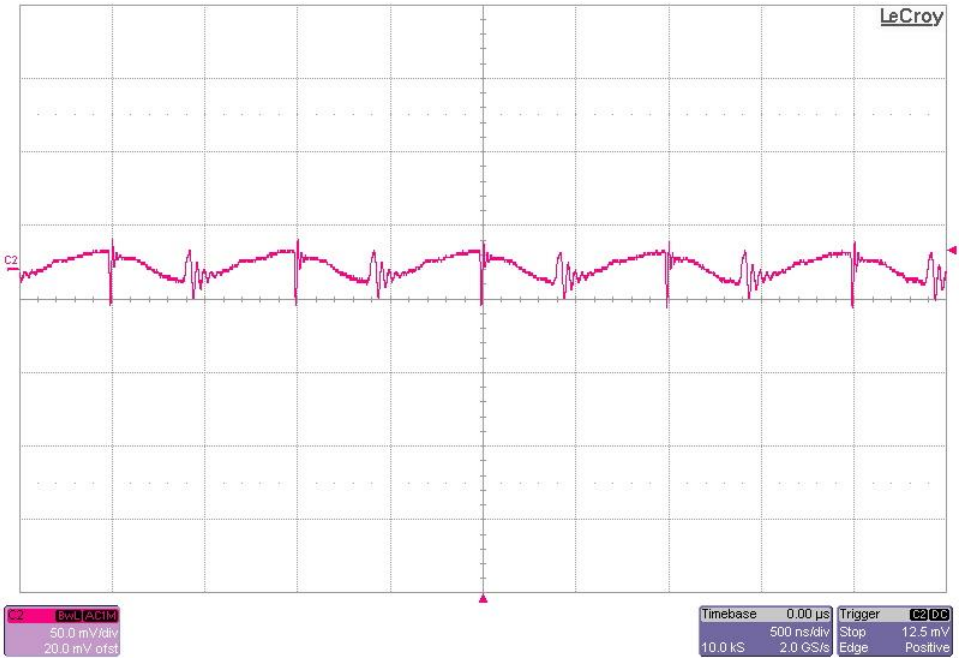

LM5022 1MHz Flyback Converter, Vin = 57V
Efficiency (%)
Power Dissipation (W)
Output Current (A)
90%
89%
88%
87%
86%
85%
84%
83%
82%
81%
80%
79%
78%
77%
76%
75%
74%
73%
72%
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
Efficiency (%)
Power Dissipation (W)

# 3 Output Ripple Voltage

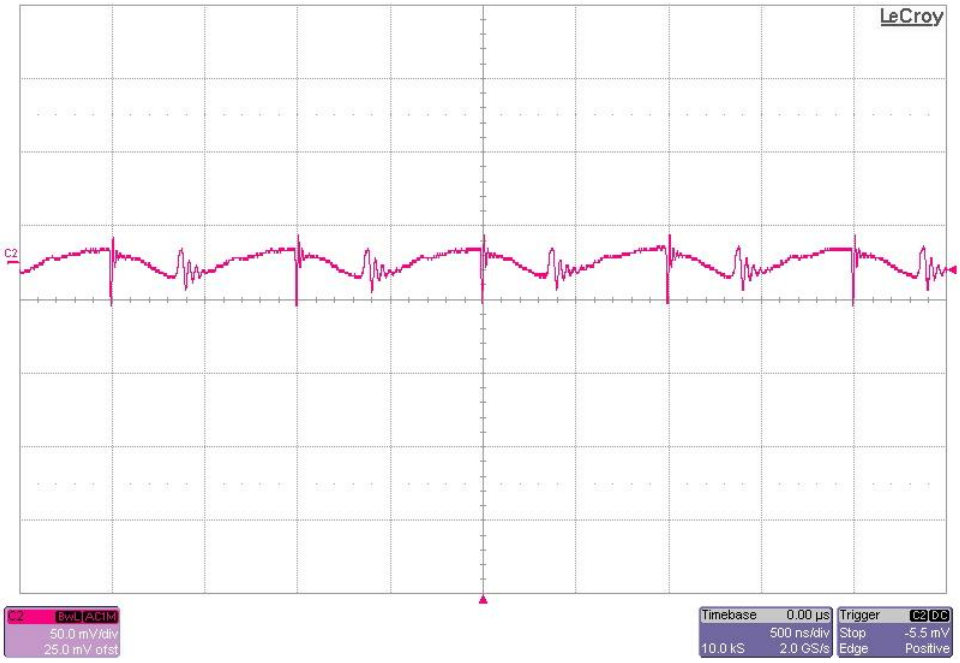
The 12V output ripple voltage (AC coupled) is shown in the figure below. The image was taken with the output loaded to 1A and operating at 1MHz. The input voltage is set to 36V. (50mV/DIV, 500nS/DIV)




The 12V output ripple voltage (AC coupled) is shown in the figure below. The image was taken with the output loaded to 1A and operating at 1MHz. The input voltage is set to 48V. (50mV/DIV, 500nS/DIV)

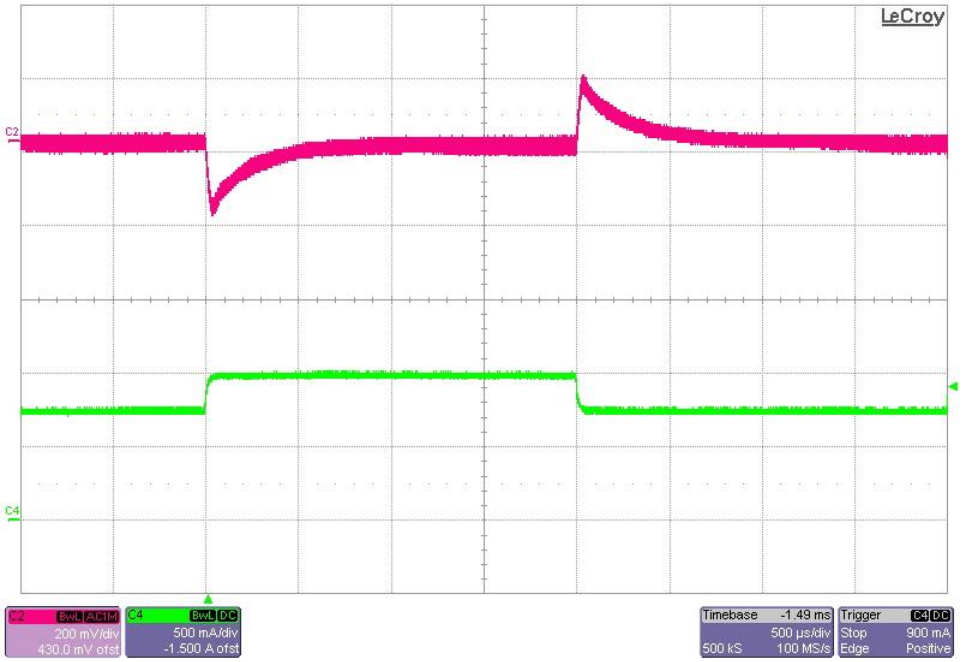


The 12V output ripple voltage (AC coupled) is shown in the figure below. The image was taken with the output loaded to 1A and operating at 1MHz. The input voltage is set to 57V. (50mV/DIV, 500nS/DIV)

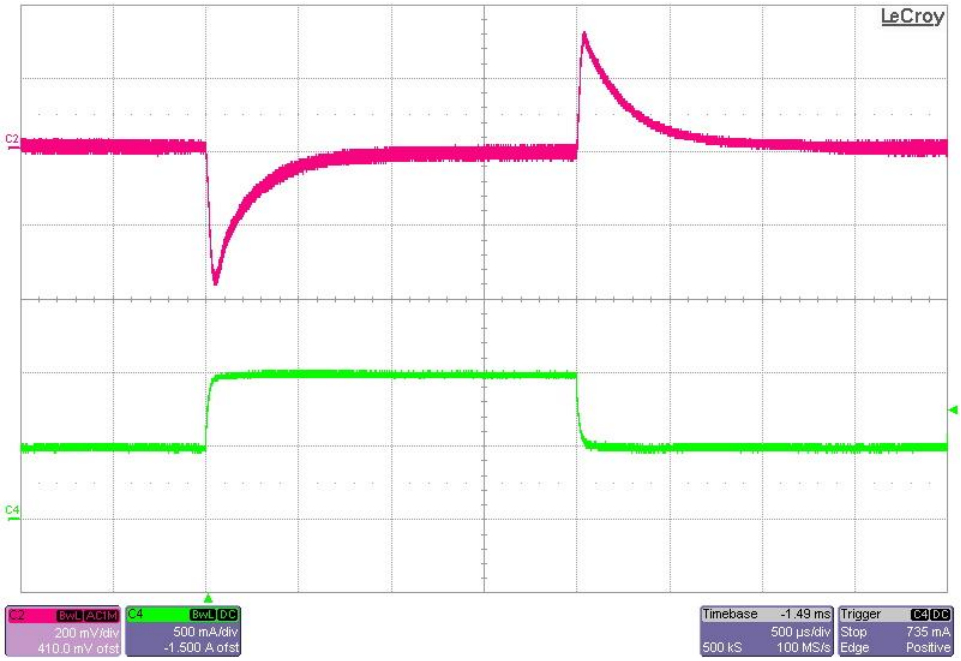


# 4 Load Transients

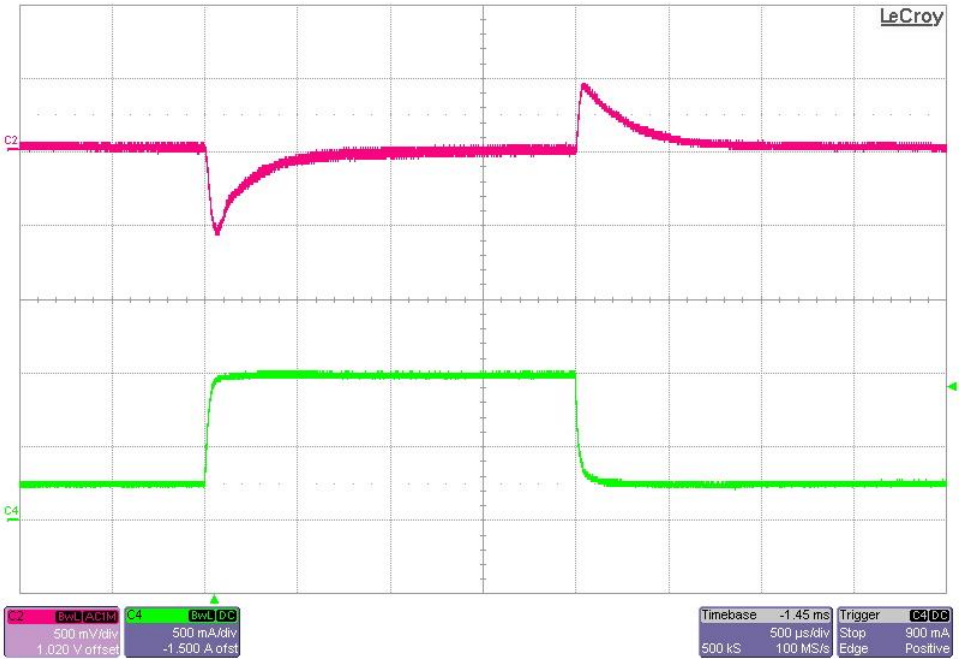
The photo below shows the 12V output voltage (ac coupled) when the load current is stepped between 0.75A and 1A. Vin = 48V and 1MHz. (200mV/DIV, 500mA/DIV, 500uS/DIV)



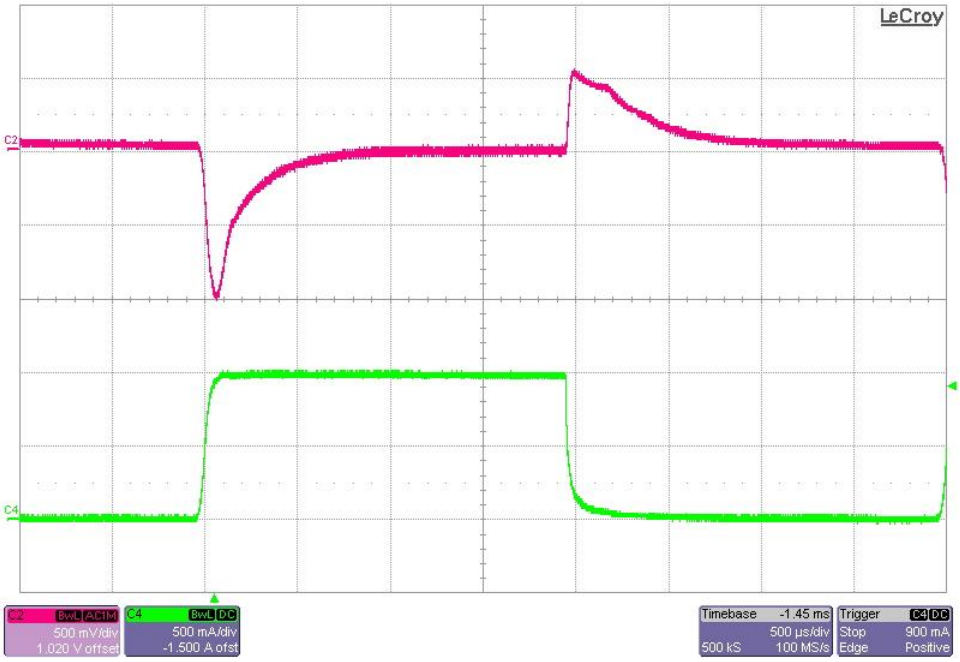

The photo below shows the 12V output voltage (ac coupled) when the load current is stepped between 0.5A and 1A. Vin = 48V and 1MHz. (200mV/DIV, 500mA/DIV, 500uS/DIV)



The photo below shows the 12V output voltage (ac coupled) when the load current is stepped between 0.25A and 1A. Vin = 48V and 1MHz. (500mV/DIV, 500mA/DIV, 500uS/DIV)

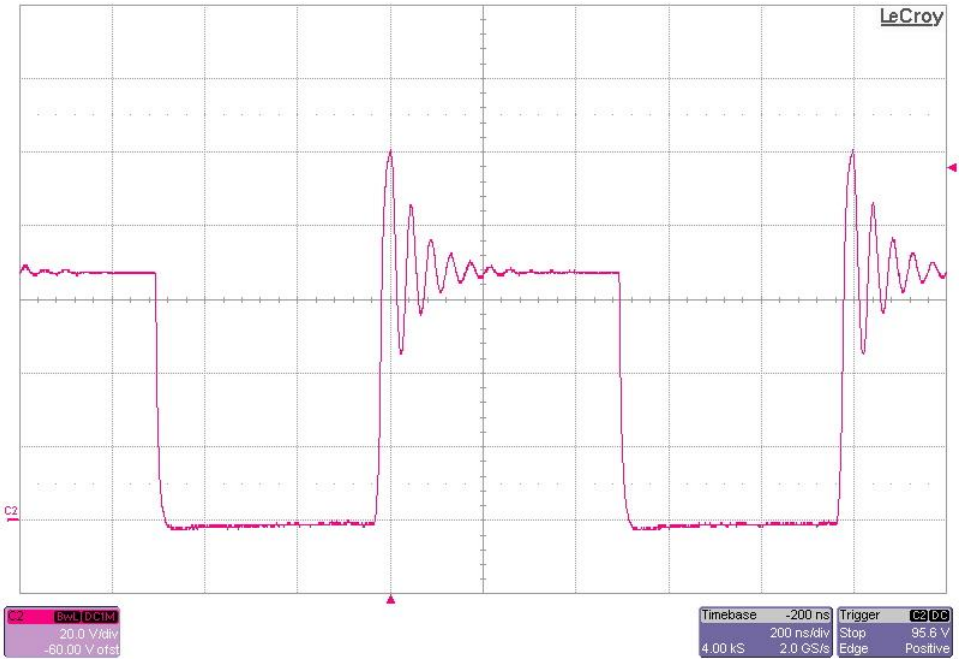



The photo below shows the 12V output voltage (ac coupled) when the load current is stepped between 0A and 1A. Vin = 48V and 1MHz. (500mV/DIV, 500mA/DIV, 500uS/DIV)

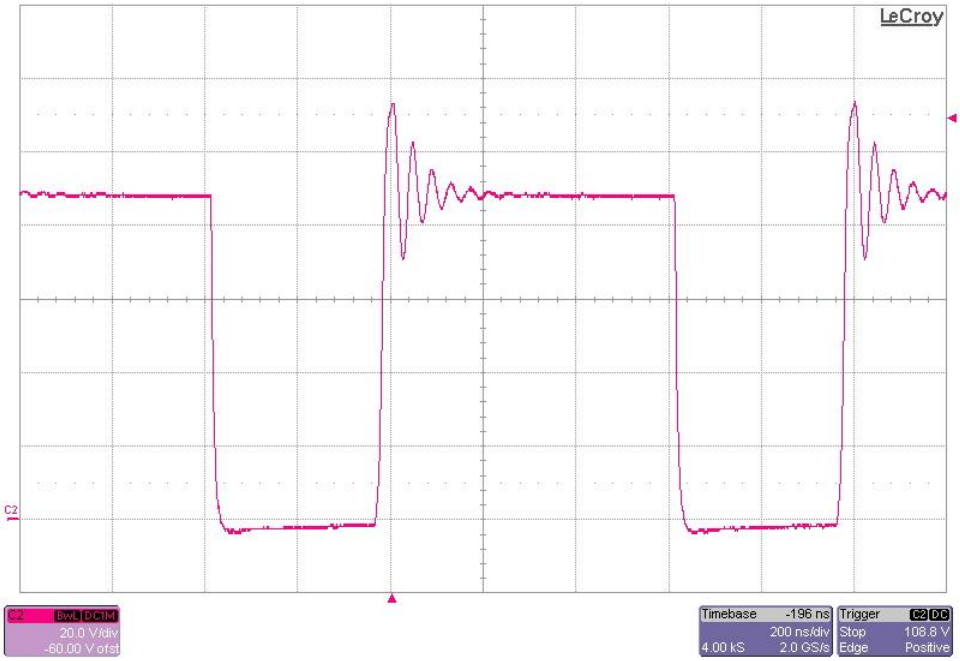


## 5 Switch Node Waveforms

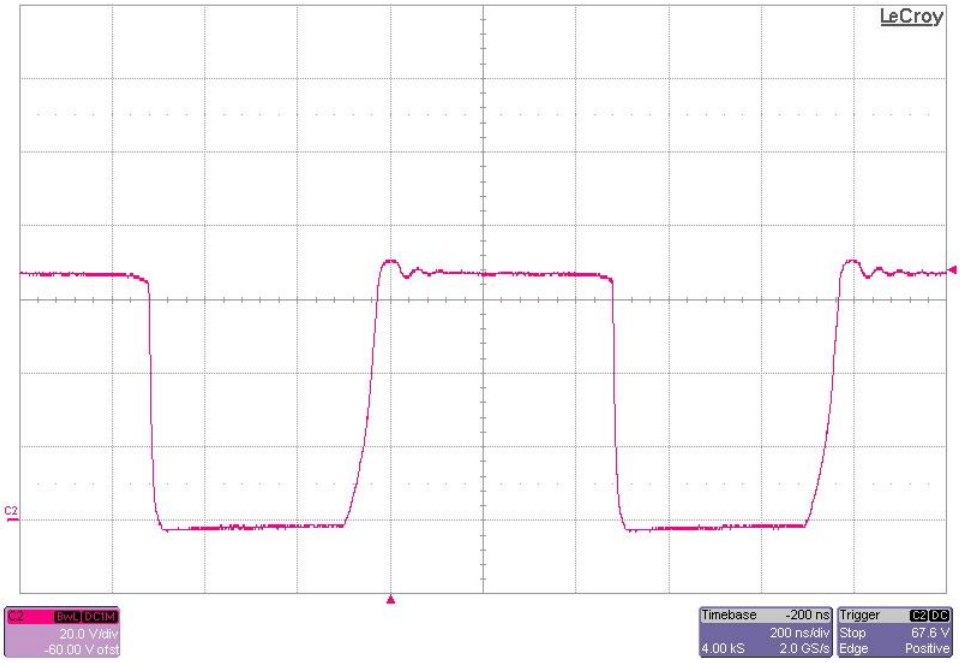
The photo below shows the FET switching voltage (TP5) for an input voltage of 36V and a 1A load. (20V/DIV, 200nS/DIV)



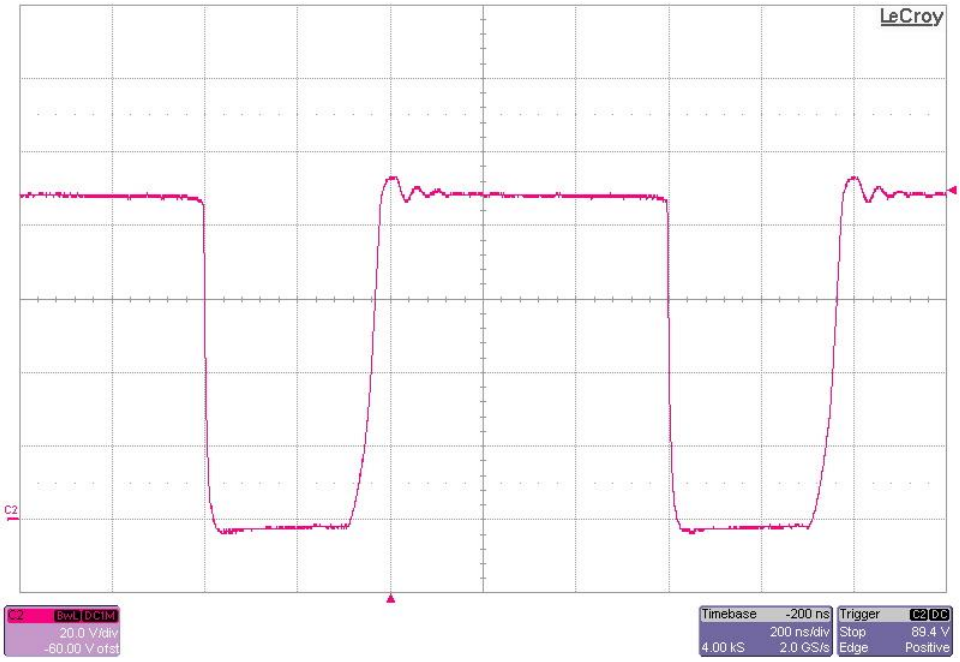

The photo below shows the FET switching voltage (TP5) for an input voltage of 57V and a 1A load. (20V/DIV, 200nS/DIV)



The photo below shows the FET switching voltage (TP5) for an input voltage of 36V and a 0.09A load. The converter has just transitioned to DCM at this load. (20V/DIV, 200nS/DIV)

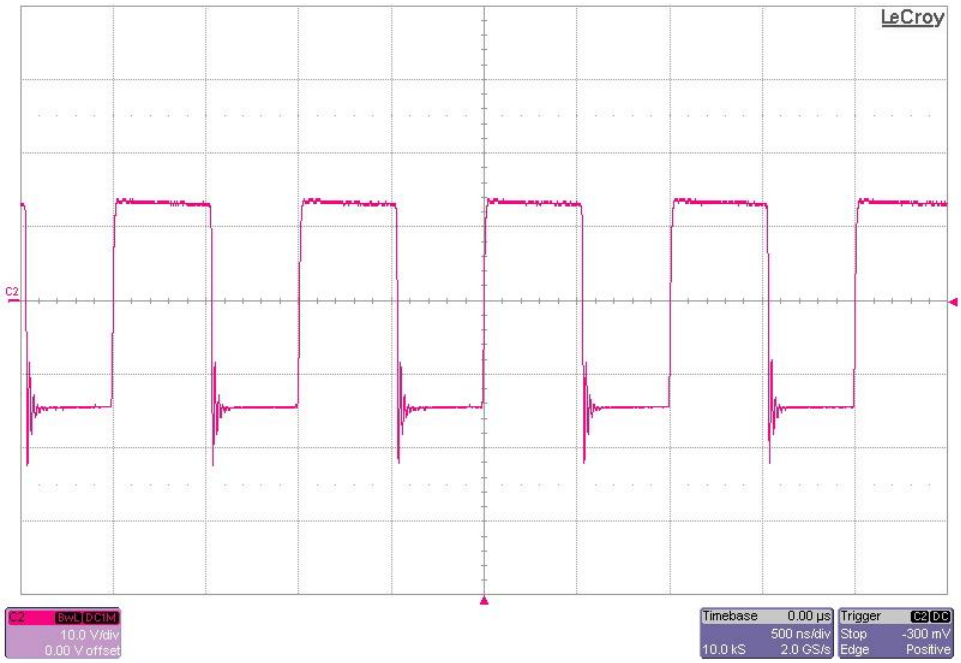



The photo below shows the FET switching voltage (TP5) for an input voltage of 57V and a 0.14A load. The converter has just transitioned to DCM at this load. (20V/DIV, 200nS/DIV)

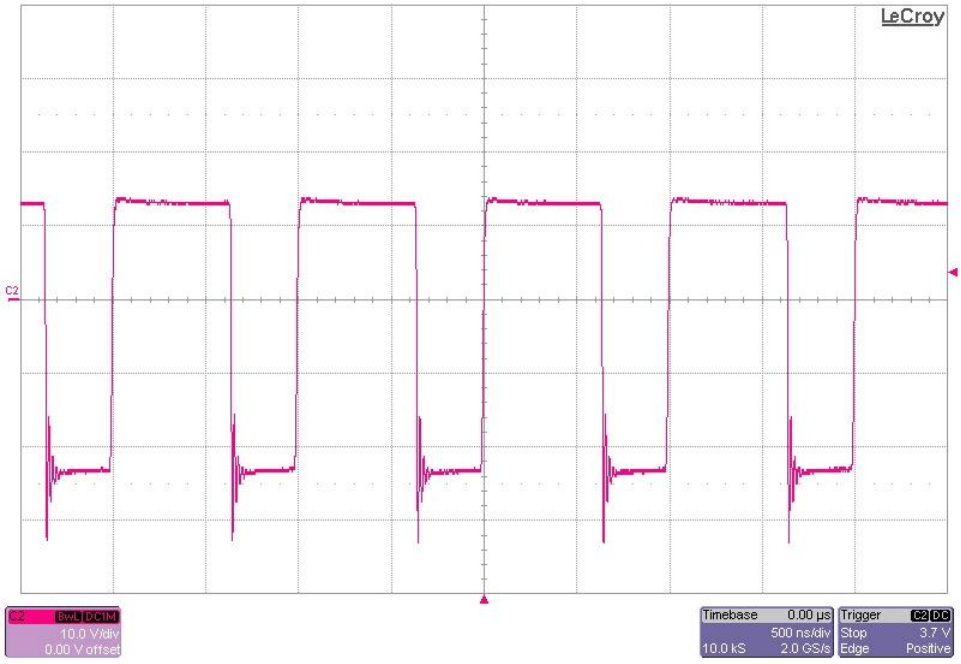


# 6 Output Rectifier Waveforms

The photo below shows the 12V transformer secondary voltage. The input voltage was set to 36V with a 1A load. (10V/DIV, 500nS/DIV)



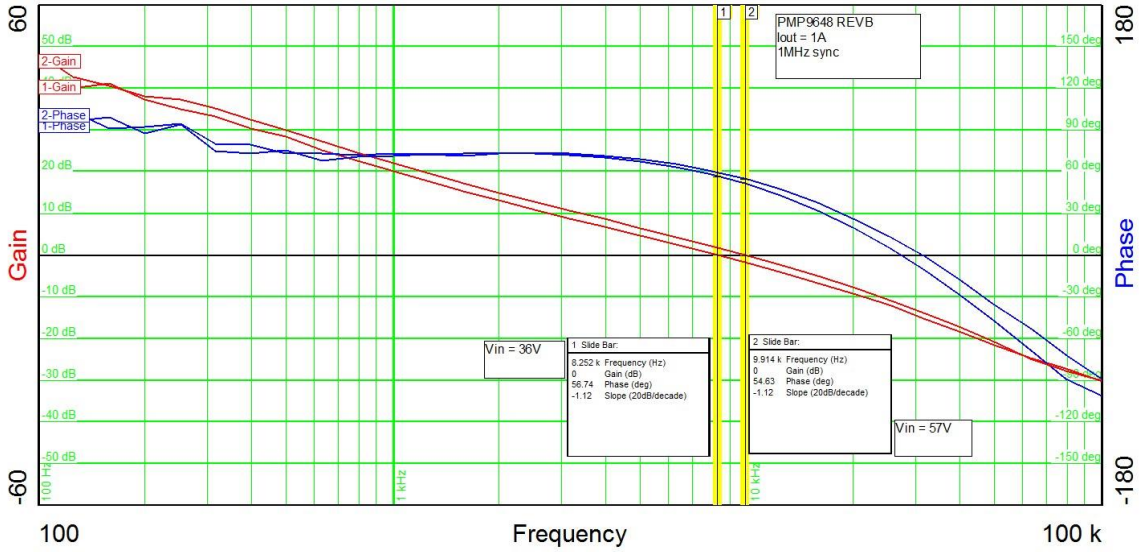

The photo below shows the 12V transformer secondary voltage. The input voltage was set to 57V with a 1A load. (10V/DIV, 500nS/DIV)



# 7 Loop Gain

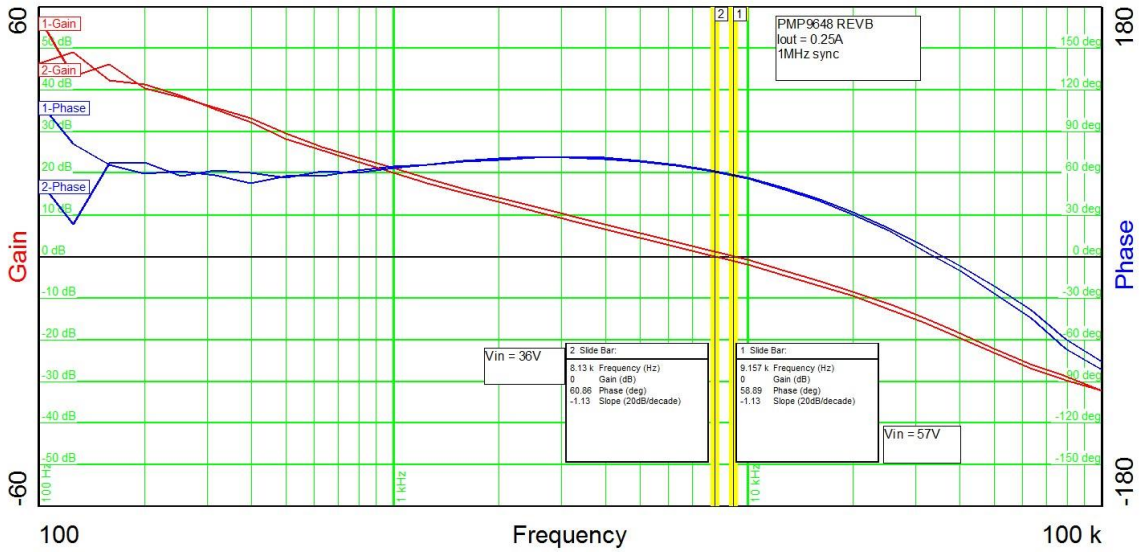
The plot below shows the loop gain with the input voltage set to 36V and 57V for an output load of 1A.

| | | |
|---|---|---|
| Loop Gain (Vin = 57V) | BW: 9.91KHz | PM: 55 degrees |
| Loop Gain (Vin = 36V) | BW: 8.25KHz | PM: 57 degrees |



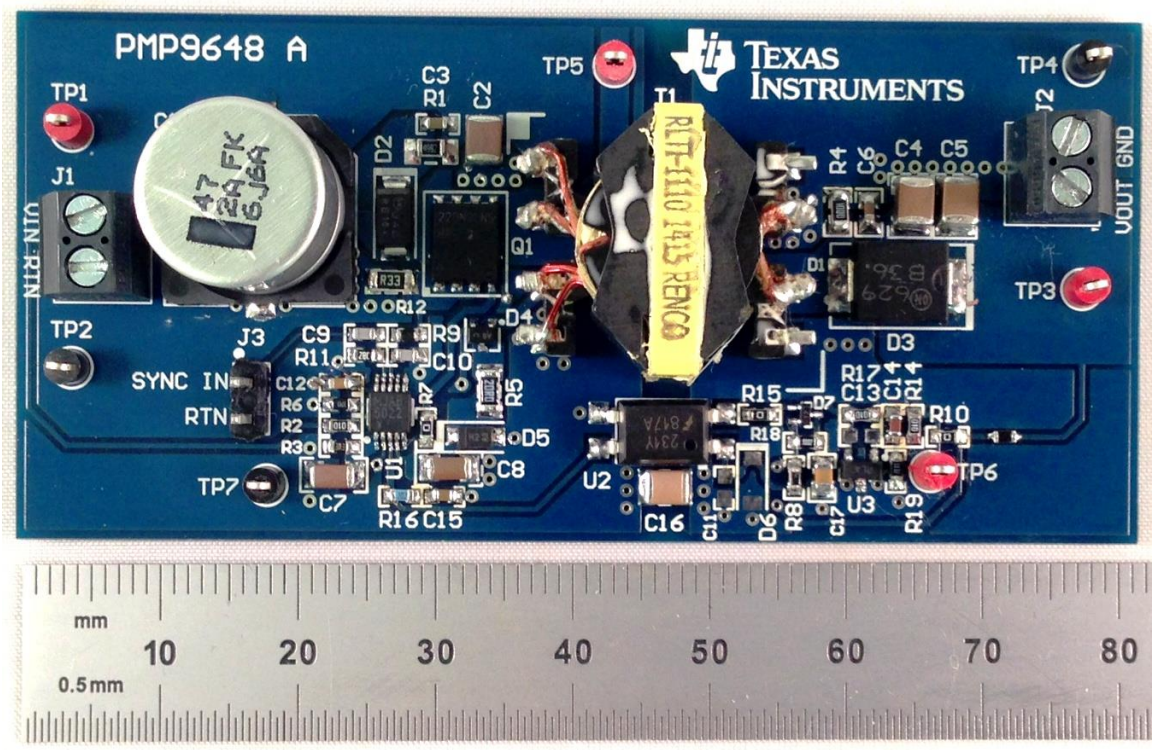

The plot below shows the loop gain with the input voltage set to 36V and 57V for an output load of 0.25A.

| | | |
|---|---|---|
| Loop Gain (Vin = 57V) | BW: 9.16KHz | PM: 59 degrees |
| Loop Gain (Vin = 36V) | BW: 8.13KHz | PM: 61 degrees |



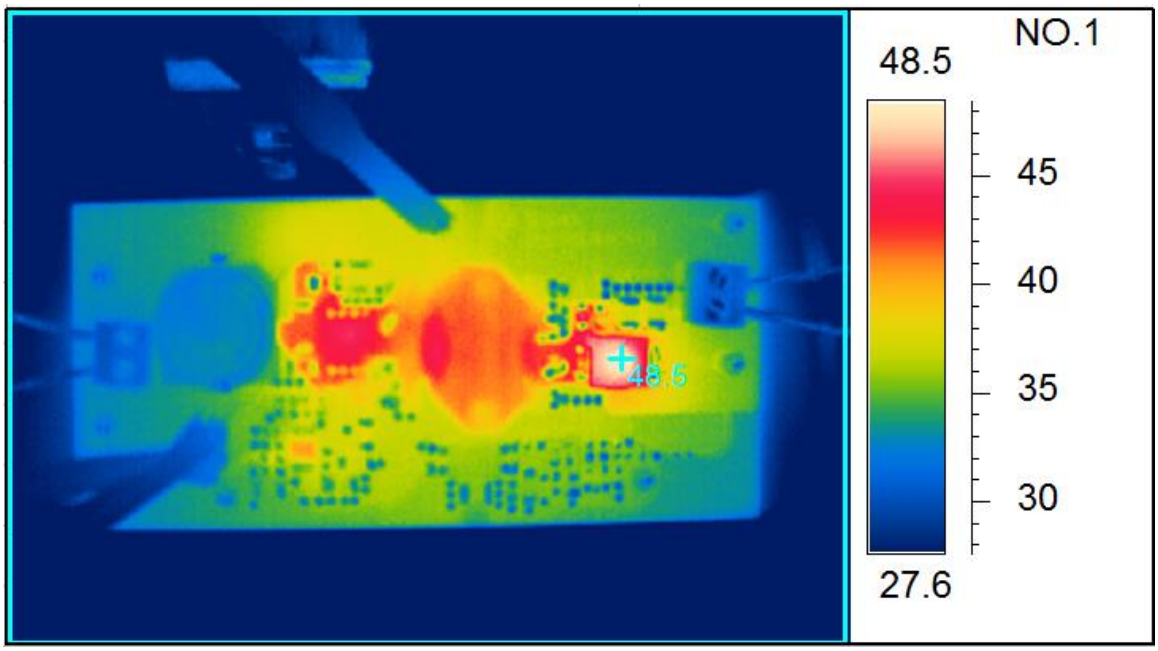
## 8 Photo

The photo below shows the PMP9595 REVB assy built on the REVA PCB.




## 9 Thermal Image

A thermal image is shown below operating at 48V input and 12V@1A output (room temp, no airflow).



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