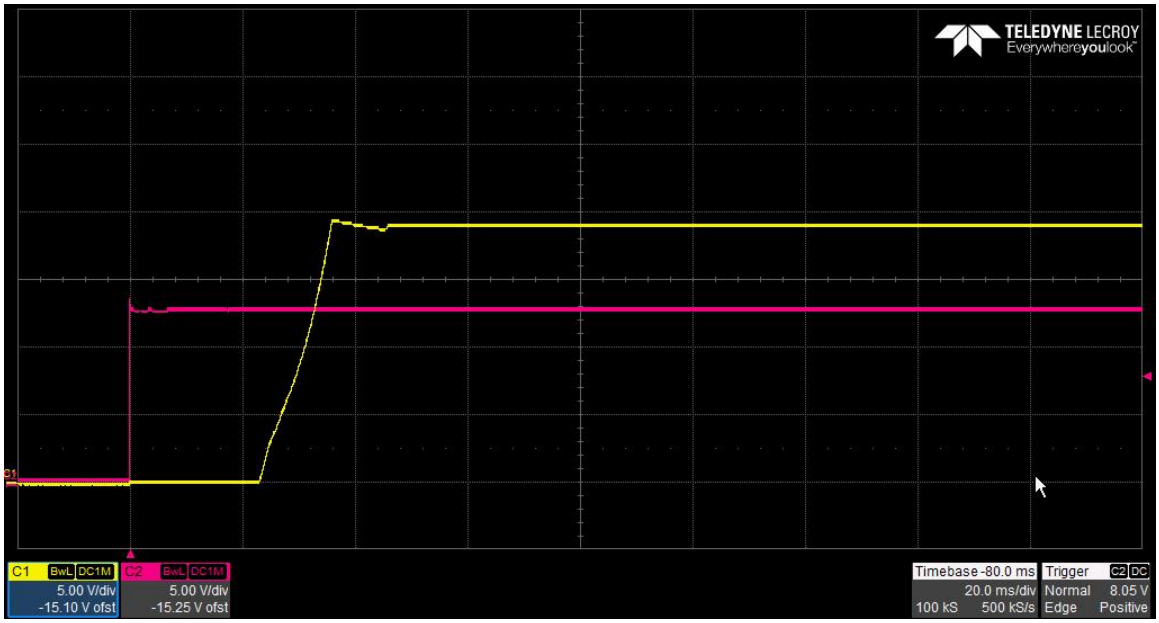
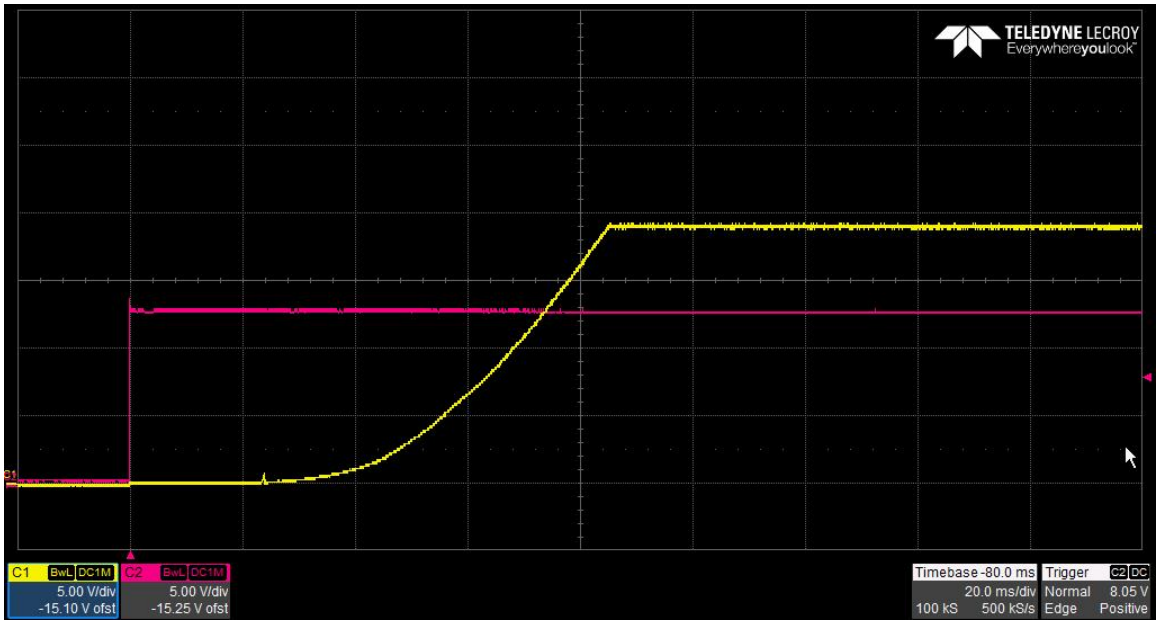
1 Startup

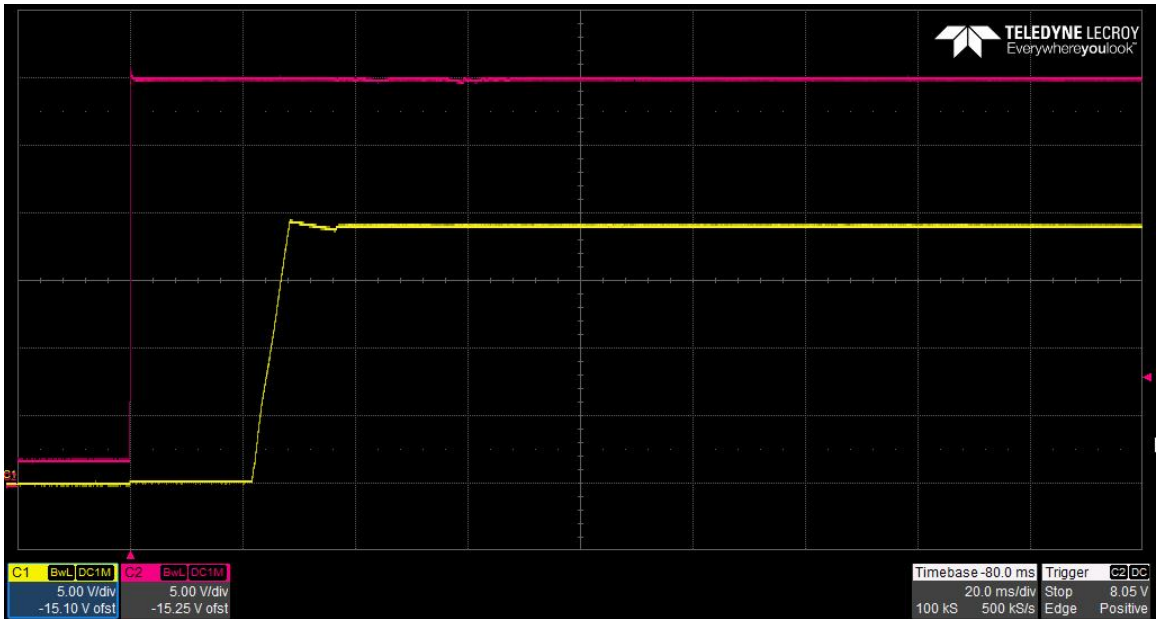
The photo below shows the 18.9V output voltage startup waveform (YELLOW) after the application of 13V in (RED) with the output loaded to 0A. (5V/DIV, 20mS/DIV)



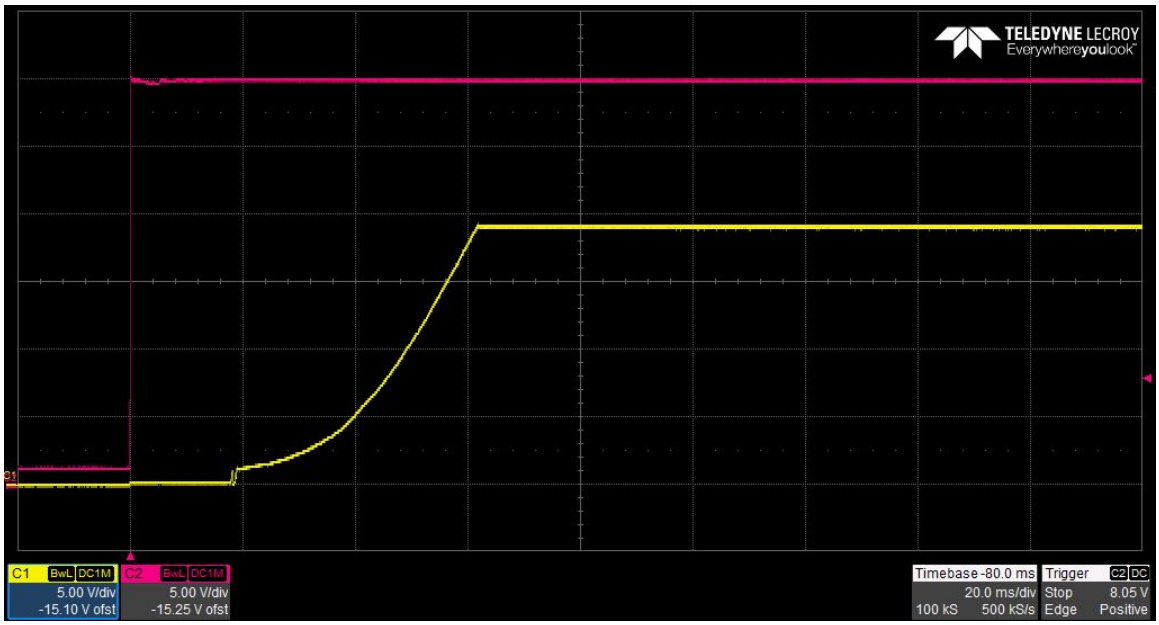
The photo below shows the 18.9V output voltage startup waveform (YELLOW) after the application of 13V in (RED) with the output loaded to 0.6A. (5V/DIV, 20mS/DIV)



The photo below shows the 18.9V output voltage startup waveform (YELLOW) after the application of 30V in (RED) with the output loaded to 0A. (5V/DIV, 20mS/DIV)

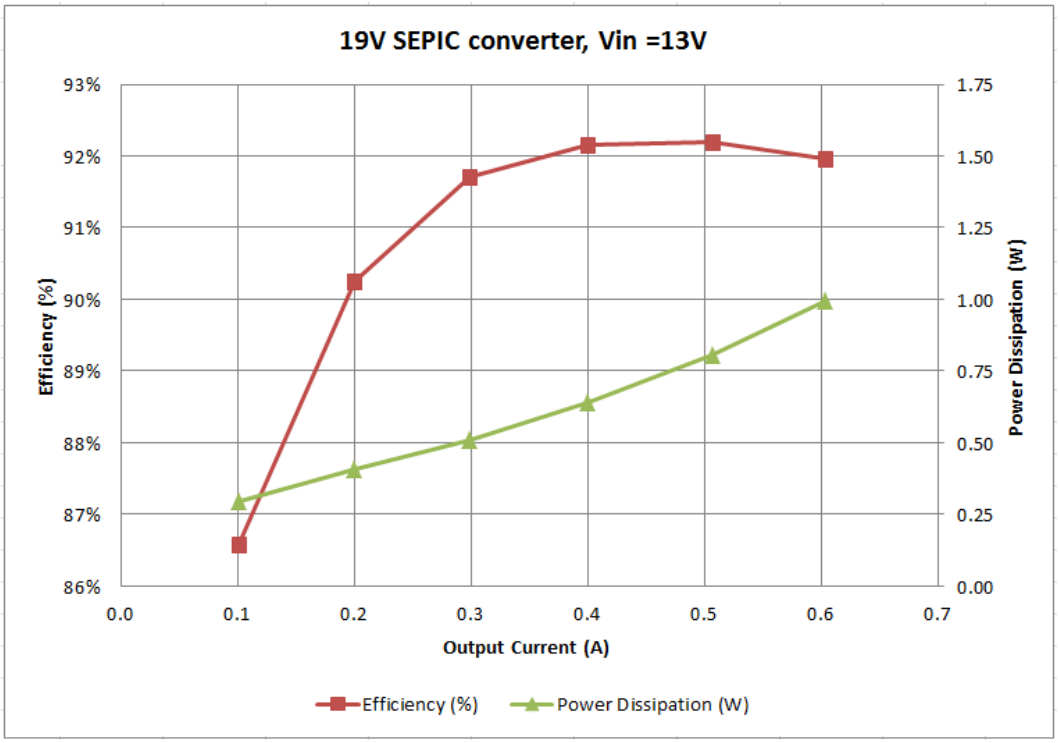


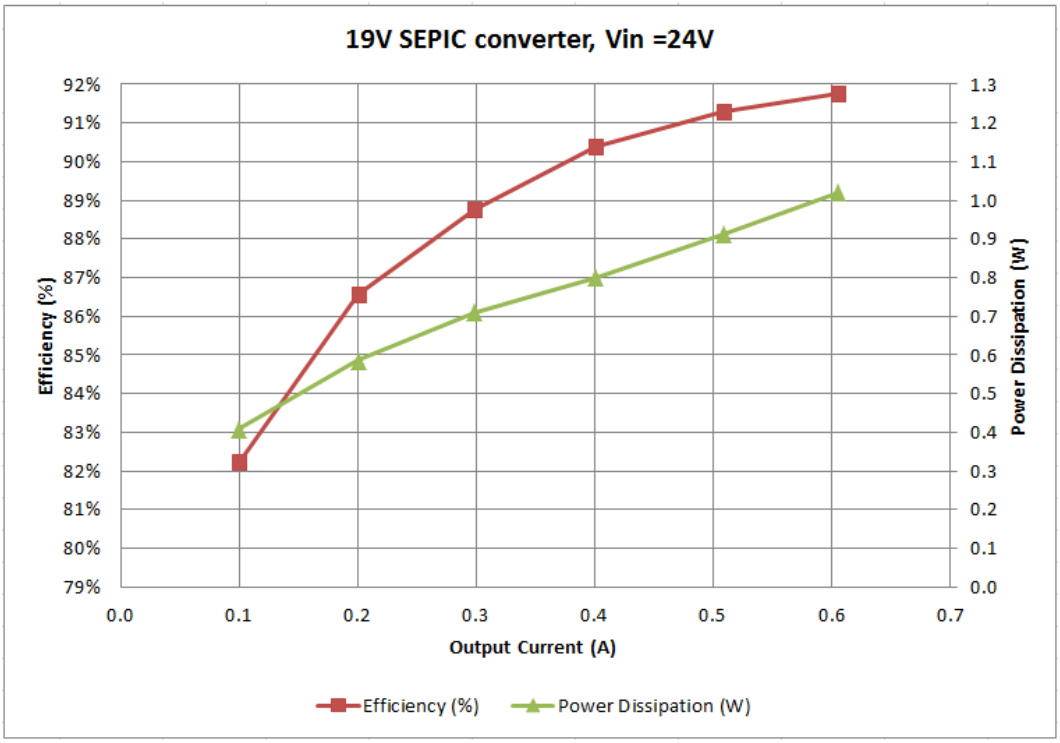
The photo below shows the 18.9V output voltage startup waveform (YELLOW) after the application of 30V in (RED) with the output loaded to 0.6A. (5V/DIV, 20mS/DIV)

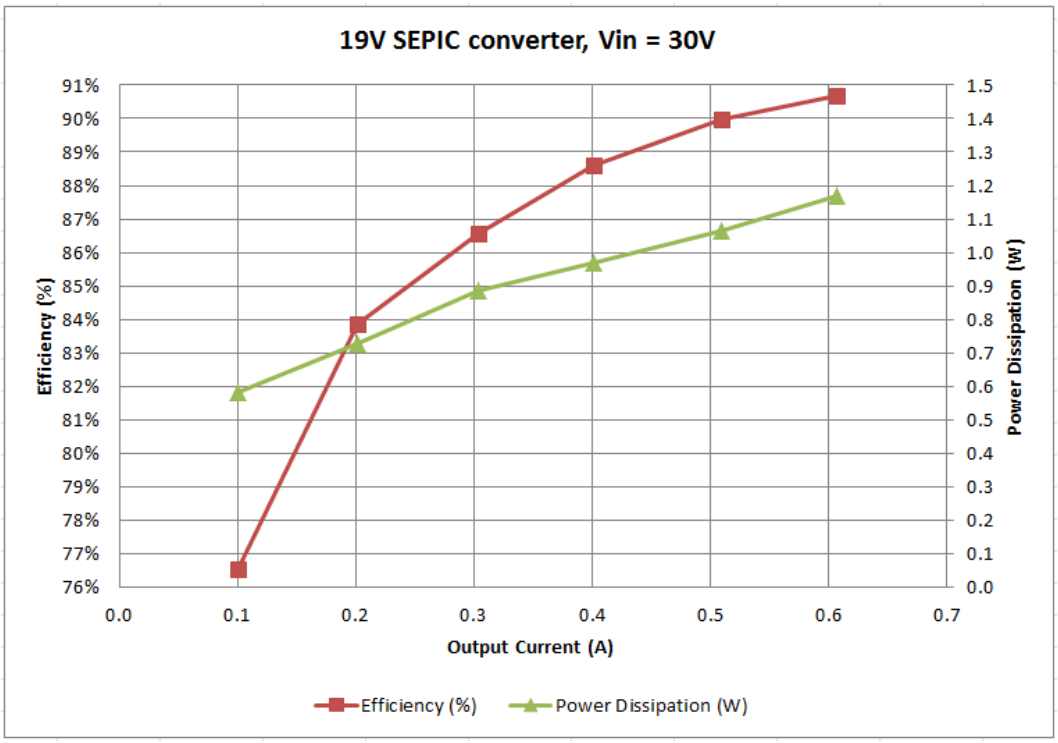


2 Efficiency

The converter efficiency is shown in the figure below.

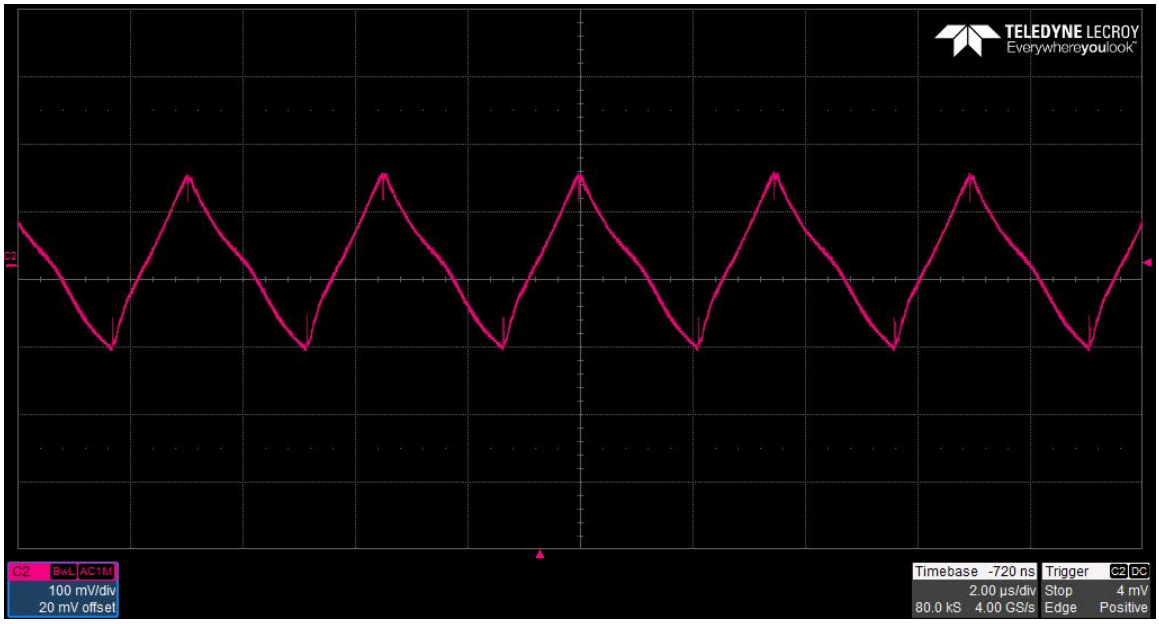




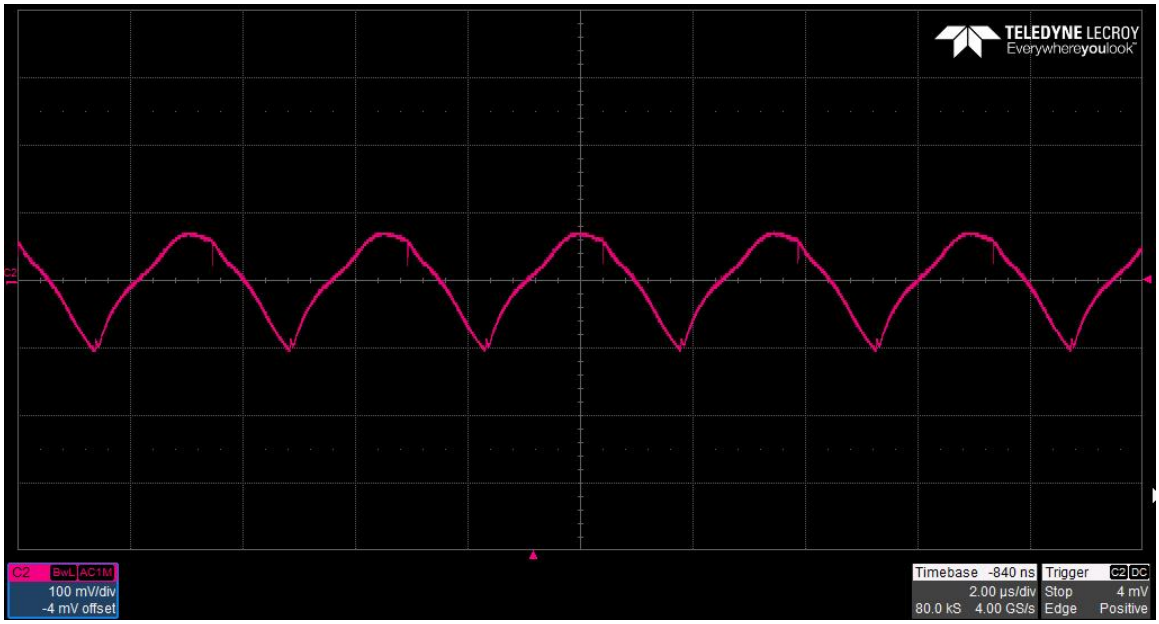

19V SEPIC converter, Vin = 30V
Efficiency (%)
91%
90%
89%
88%
87%
86%
85%
84%
83%
82%
81%
80%
79%
78%
77%
76%
Power Dissipation (W)
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
Output Current (A)
Efficiency (%)
Power Dissipation (W)

3 Output Ripple Voltage

The 18.9V output ripple voltage (ac coupled) is shown in the figure below. The image was taken with the output loaded to 0.6A. The input voltage is set to 13V. (100mV/DIV, 2uS/DIV)

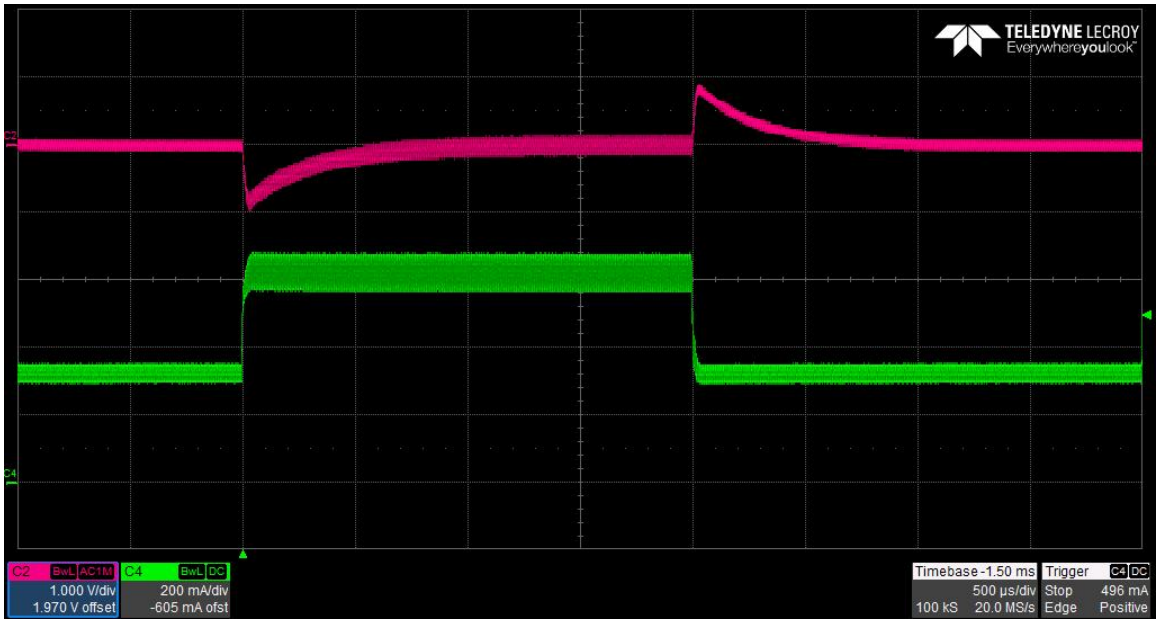


The 18.9V output ripple voltage (ac coupled) is shown in the figure below. The image was taken with the output loaded to 0.6A. The input voltage is set to 30V. (100mV/DIV, 2uS/DIV)

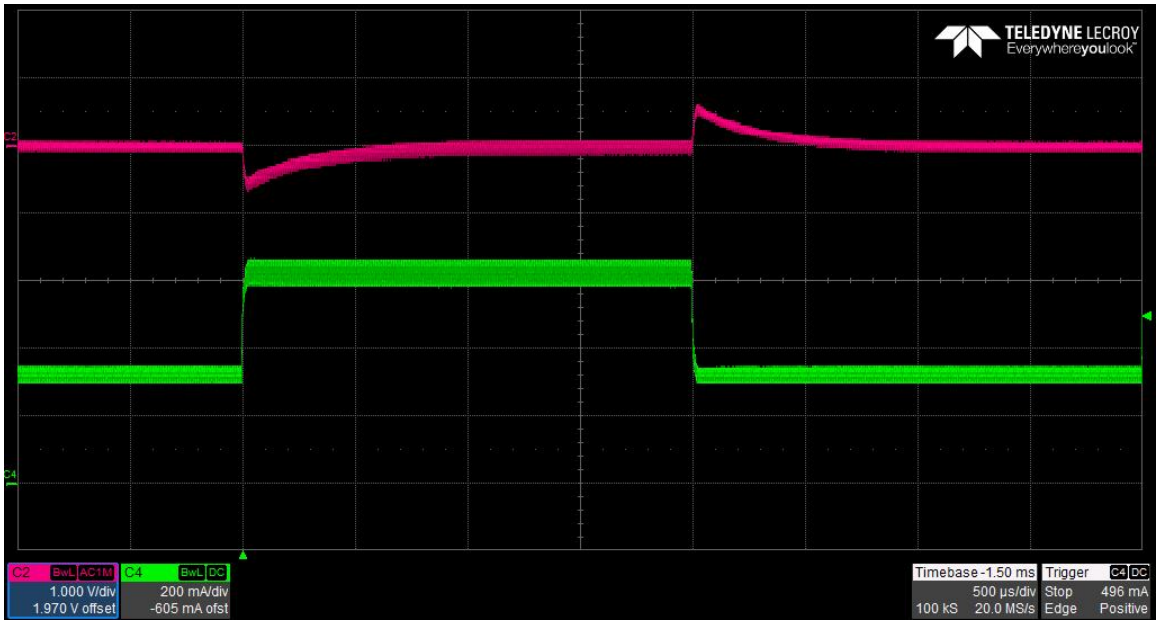


4 Load Transients

The photo below shows the output voltage (ac coupled) when the load current is stepped between 0.3A and 0.6A. Vin = 13V. (1V/DIV, 200mA/DIV, 500uS/DIV)

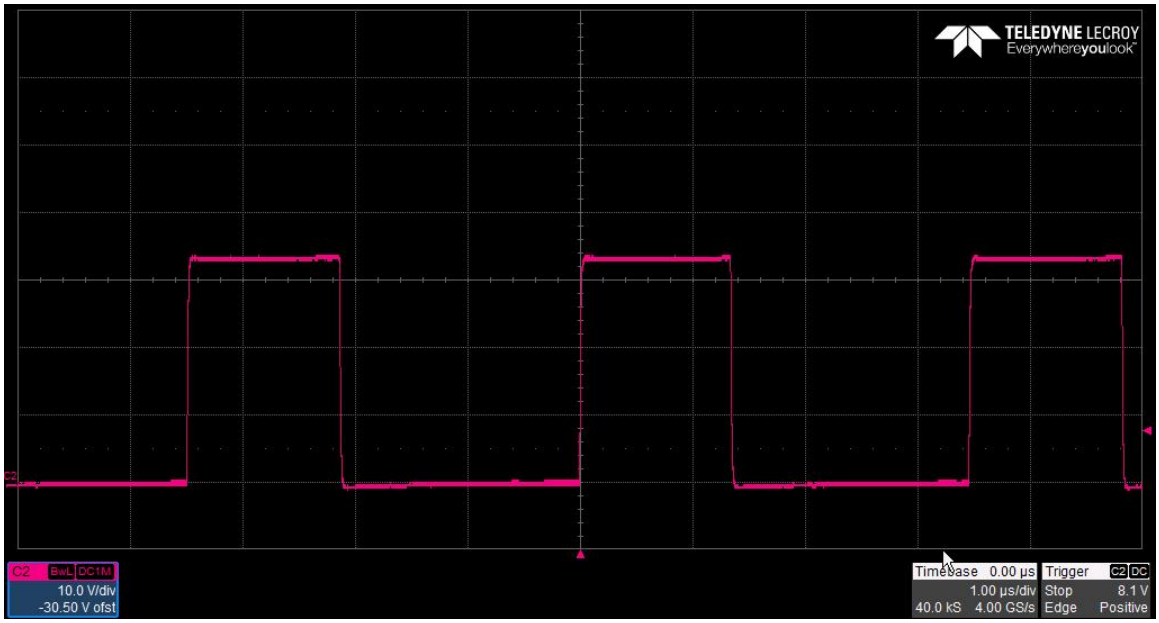


The photo below shows the output voltage (ac coupled) when the load current is stepped between 0.3A and 0.6A. Vin = 30V. (1V/DIV, 200mA/DIV, 500uS/DIV)

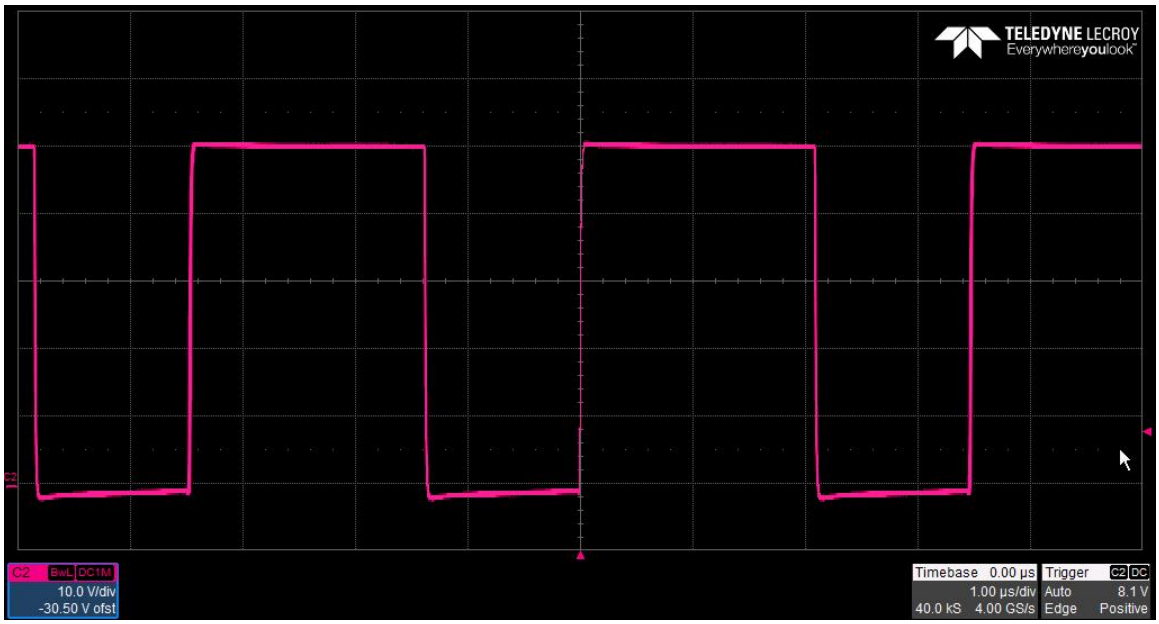


5 Switch Node Waveforms

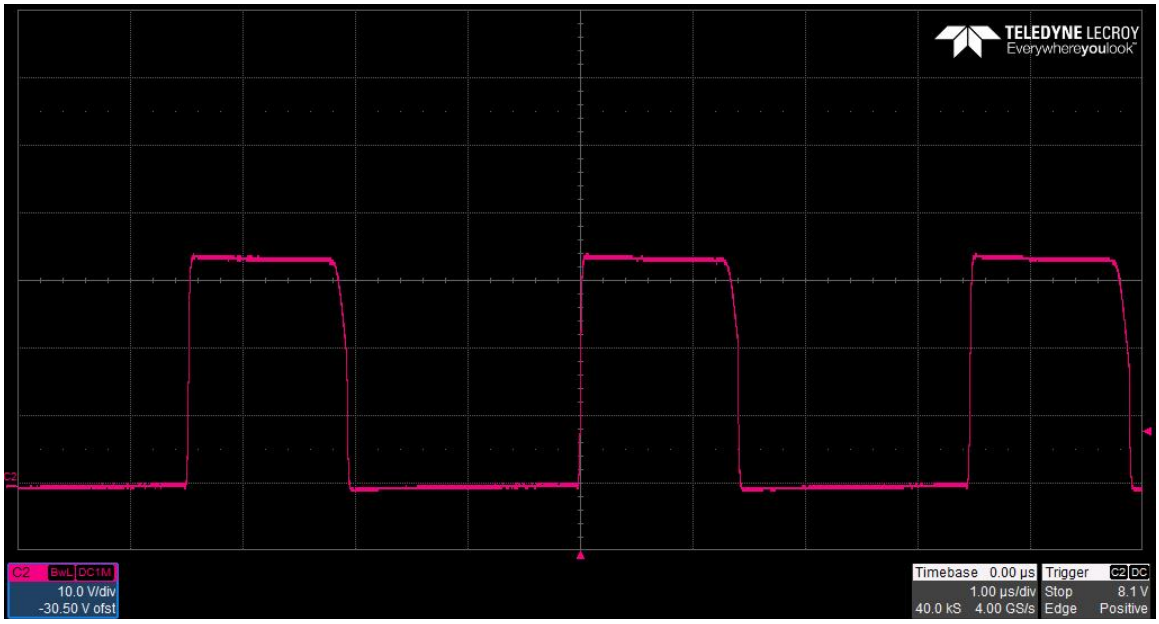
The photo below shows the SEPIC switch node voltage. The input voltage is 13V and the output is 18.9V @ 0.6A. (10V/DIV, 1uS/DIV)



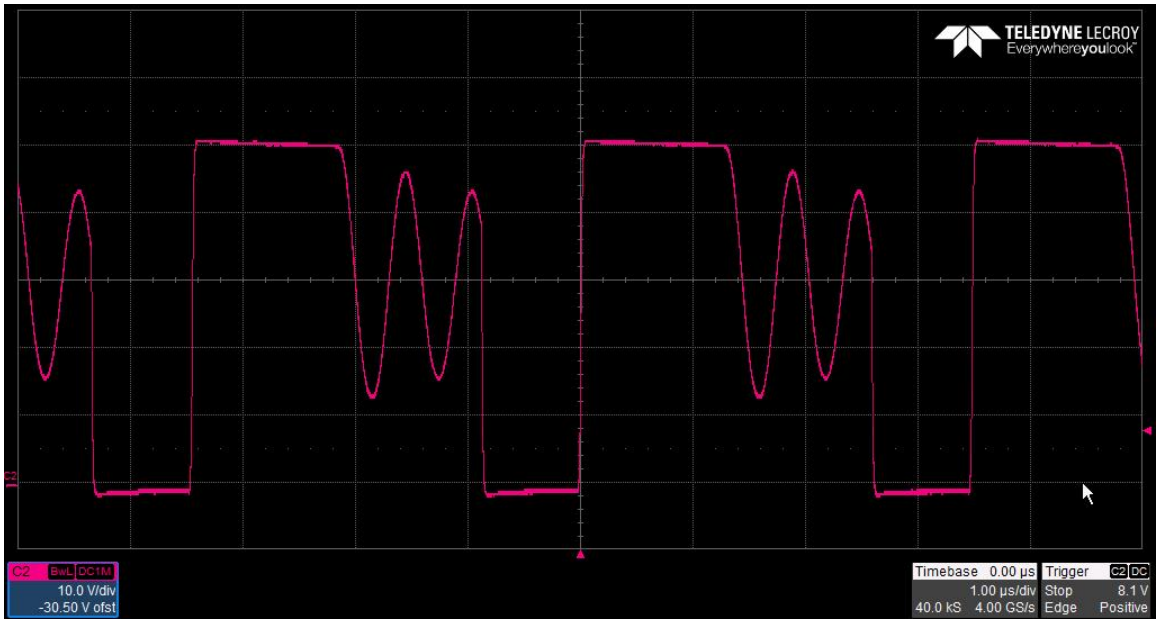
The photo below shows the SEPIC switch node voltage. The input voltage is 30V and the output is 18.9V @ 0.6A. (10V/DIV, 1uS/DIV)



The photo below shows the SEPIC switch node voltage. The input voltage is 13V and the output is 18.9V @ 0.1A. The converter is operating in discontinuous mode. (10V/DIV, 1uS/DIV)



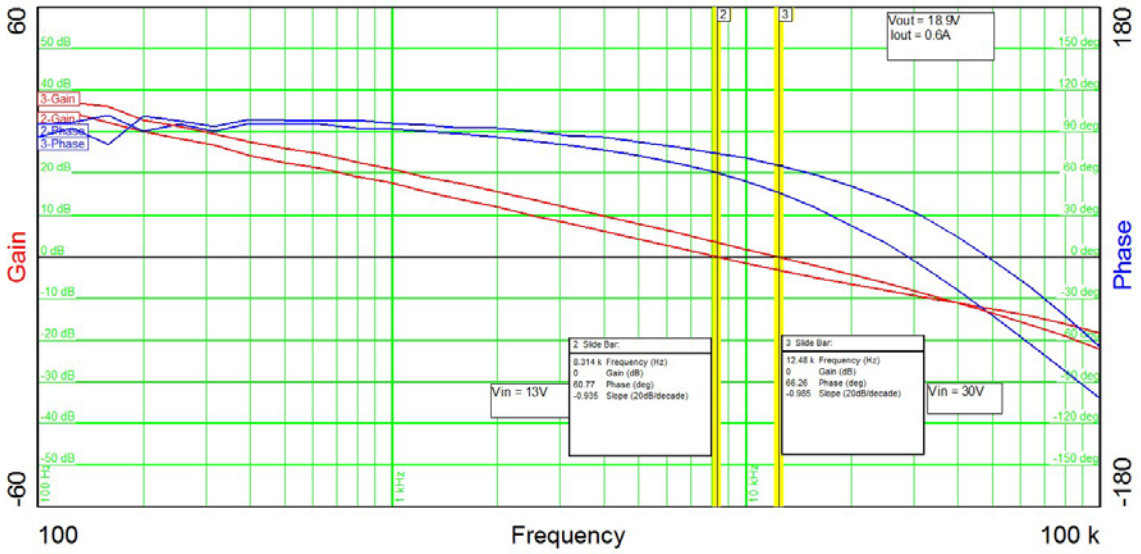
The photo below shows the SEPIC switch node voltage. The input voltage is 30V and the output is 18.9V @ 0.1A. The converter is operating in discontinuous mode. (10V/DIV, 1uS/DIV)



6 Control Loop Gain / Stability

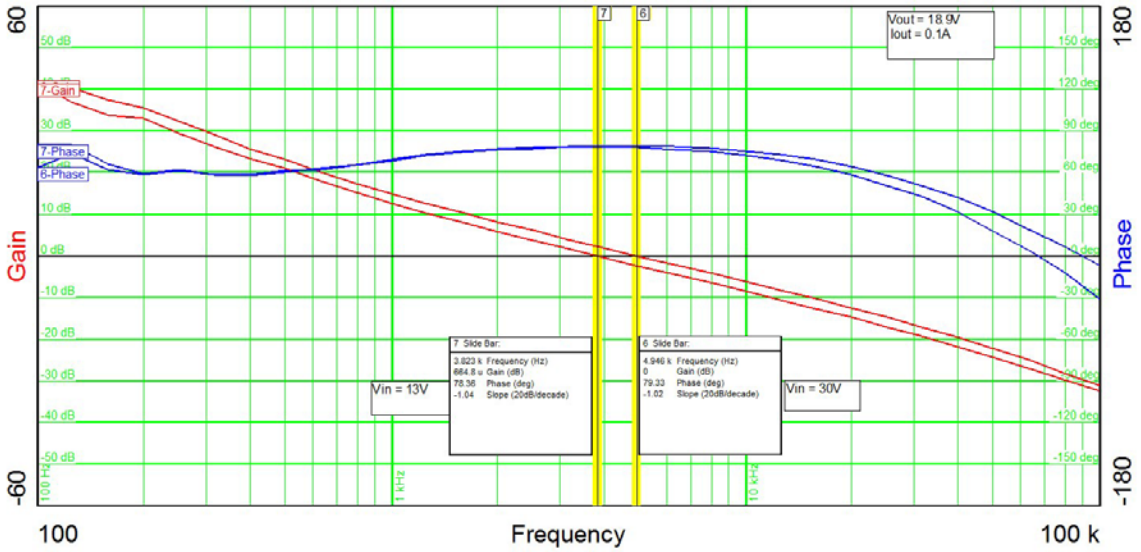
The plot below shows the 18.9V loop gain and phase margin with the output loaded to 0.6A.

Band Width = 12.5KHz,	Phase Margin = 66 degrees	(Vin = 30V)
Band Width = 8.31KHz	Phase Margin = 61 degrees	(Vin = 13V)



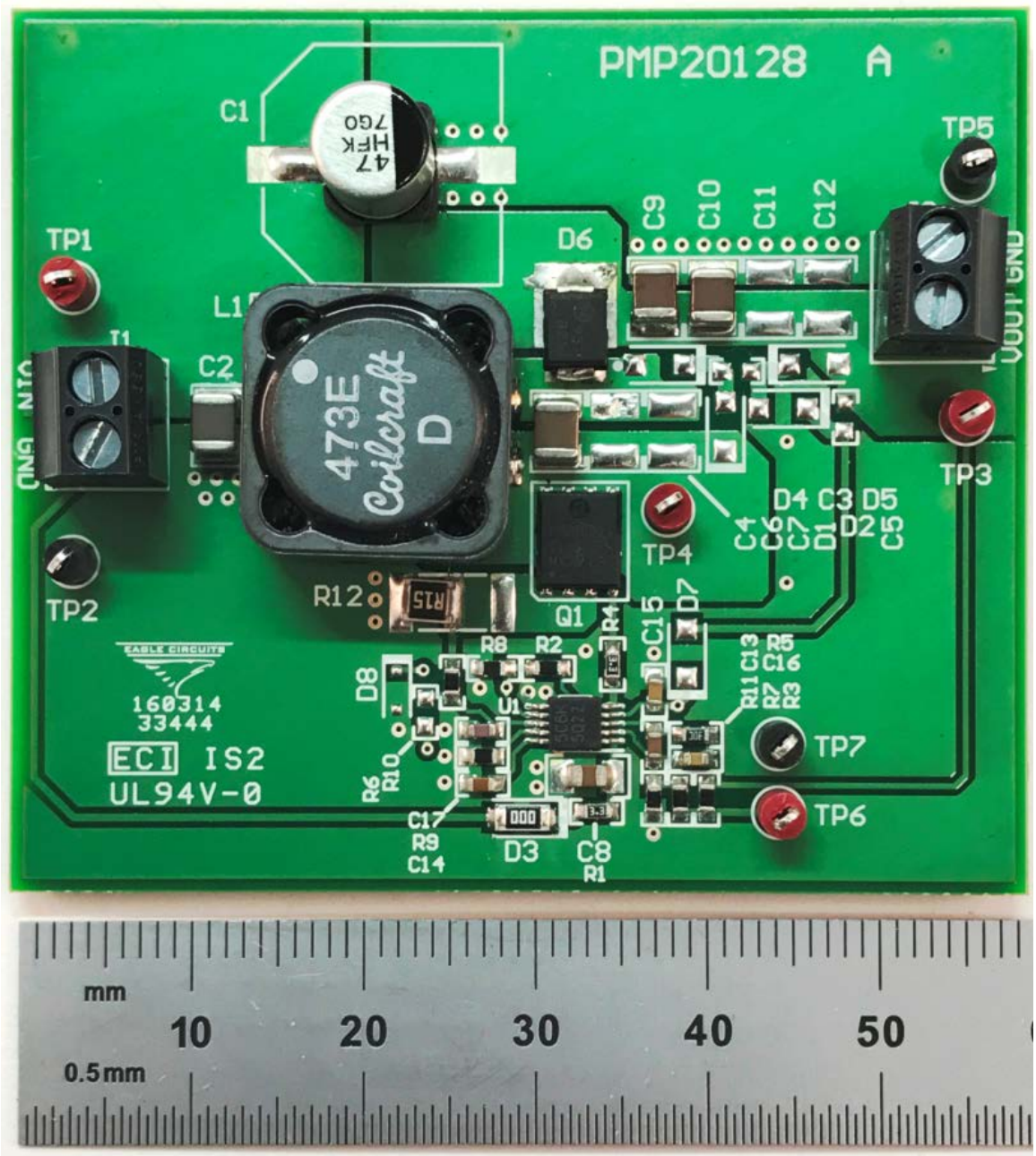
The plot below shows the 18.9V loop gain and phase margin with the output loaded to 0.1A.

Band Width = 4.95KHz,	Phase Margin = 79 degrees	(Vin = 30V)
Band Width = 3.82KHz	Phase Margin = 78 degrees	(Vin = 13V)



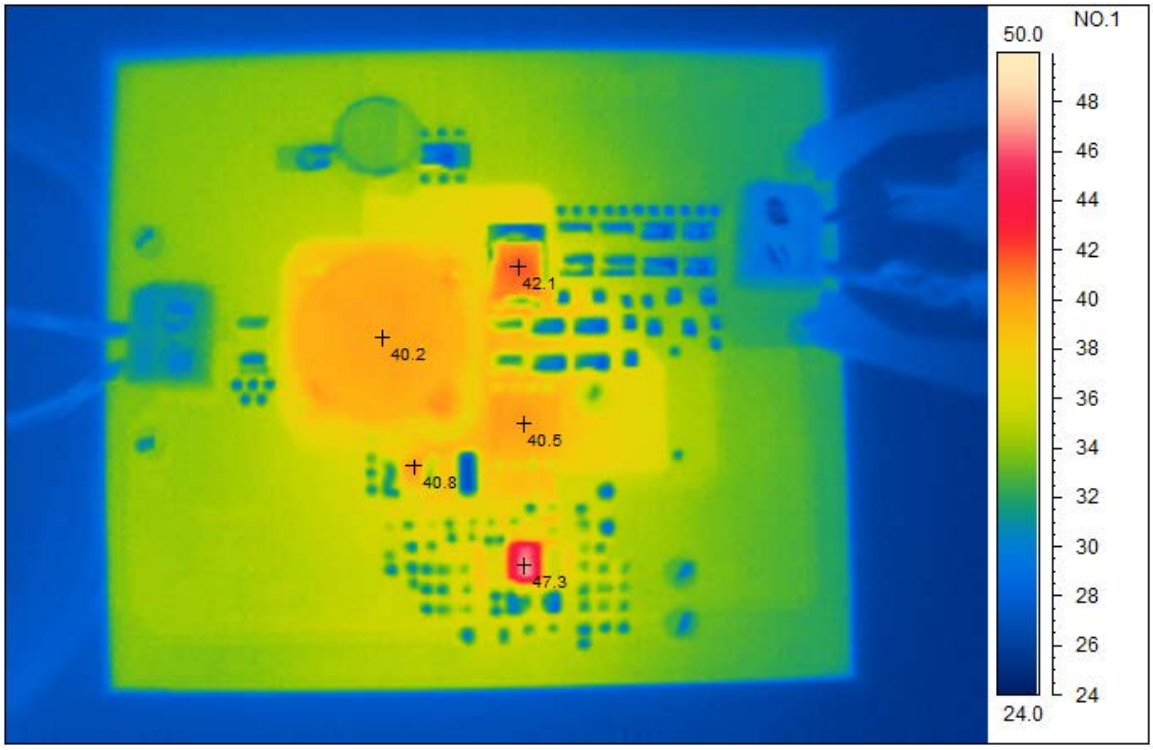
7 Photo

The photo below shows the PMP20197 REVC assembly built on the PMP20128 REVA PCB with modifications.



8 Thermal Image

A thermal image is shown below with the SEPIC converter operating at 24V input and an 18.9V @ 0.6A output, with no airflow.



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