PMP10902 REVB Test Results

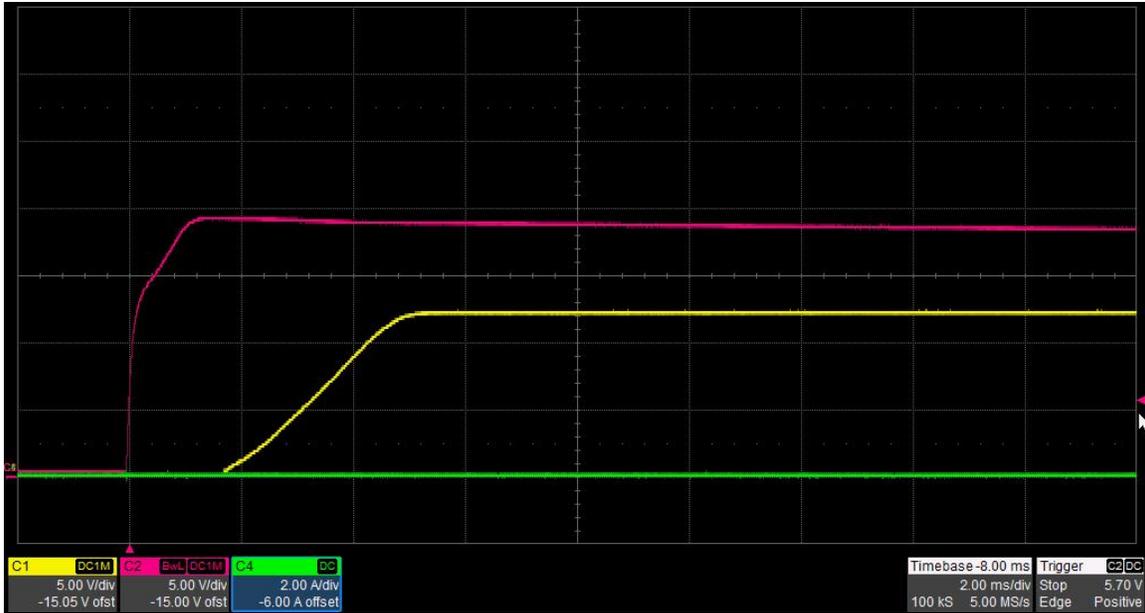**TEXAS INSTRUMENTS**

1   Startup

The photo below shows the output voltage startup waveform after the application of 18V in with the 12V output loaded to 0A.   (5V/DIV, 2A/DIV, 2mS/DIV)
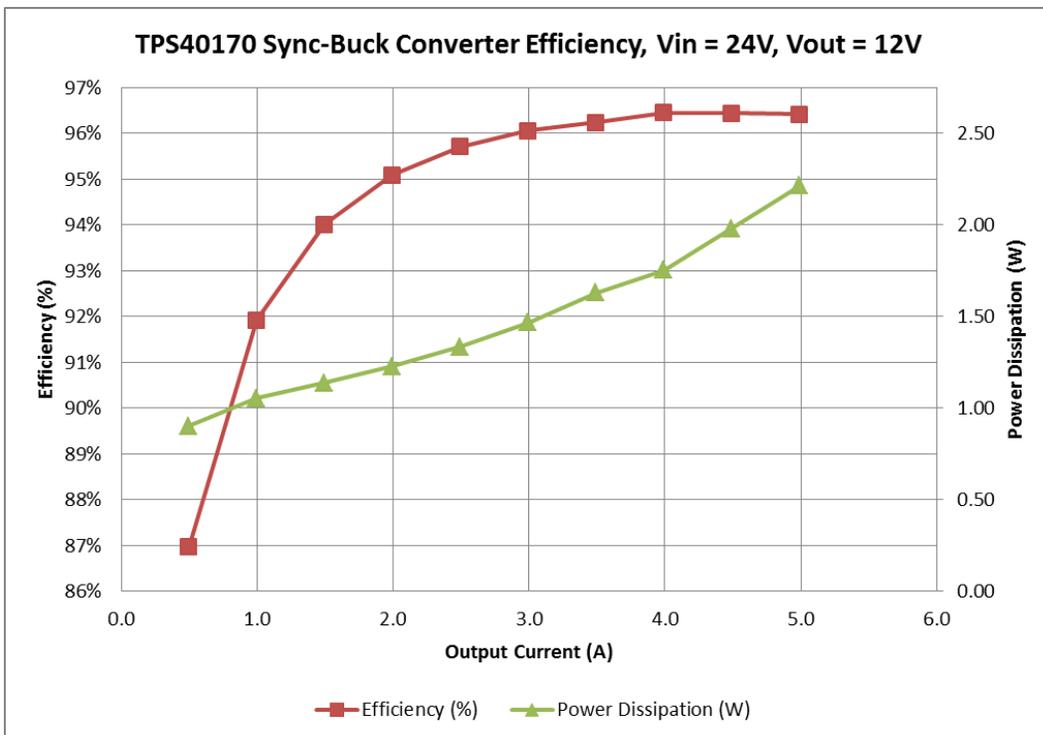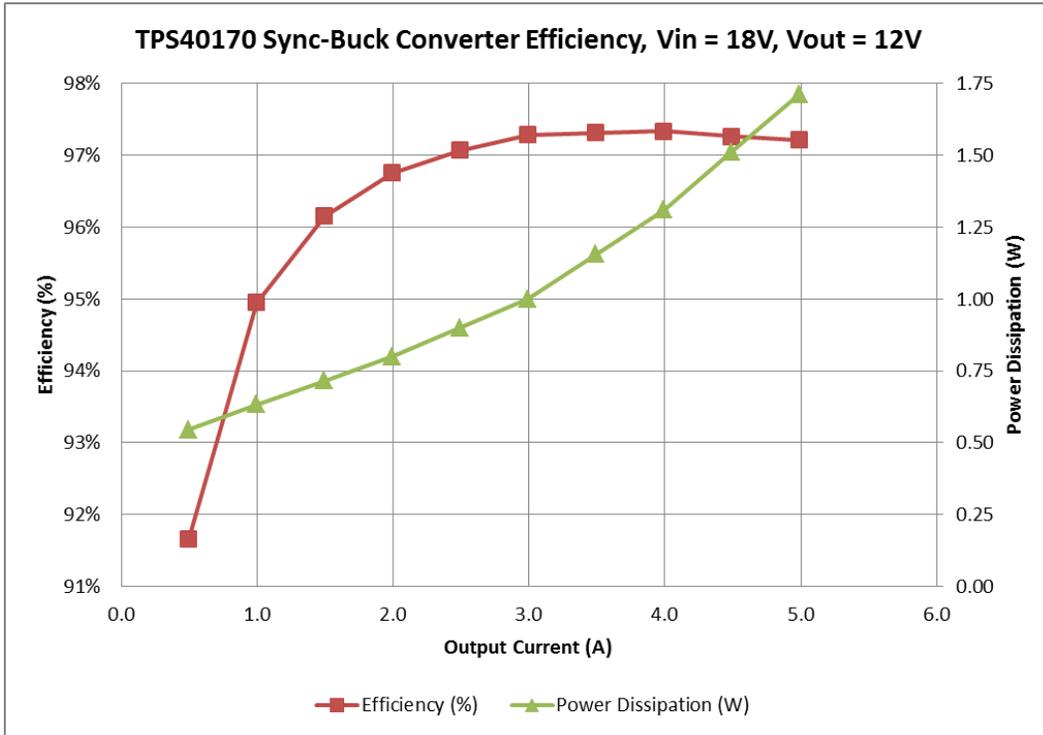

The photo below shows the output voltage startup waveform after the application of 18V in with the 12V output loaded to 4.5A (constant resistance active load).   (5V/DIV, 2A/DIV, 2mS/DIV)


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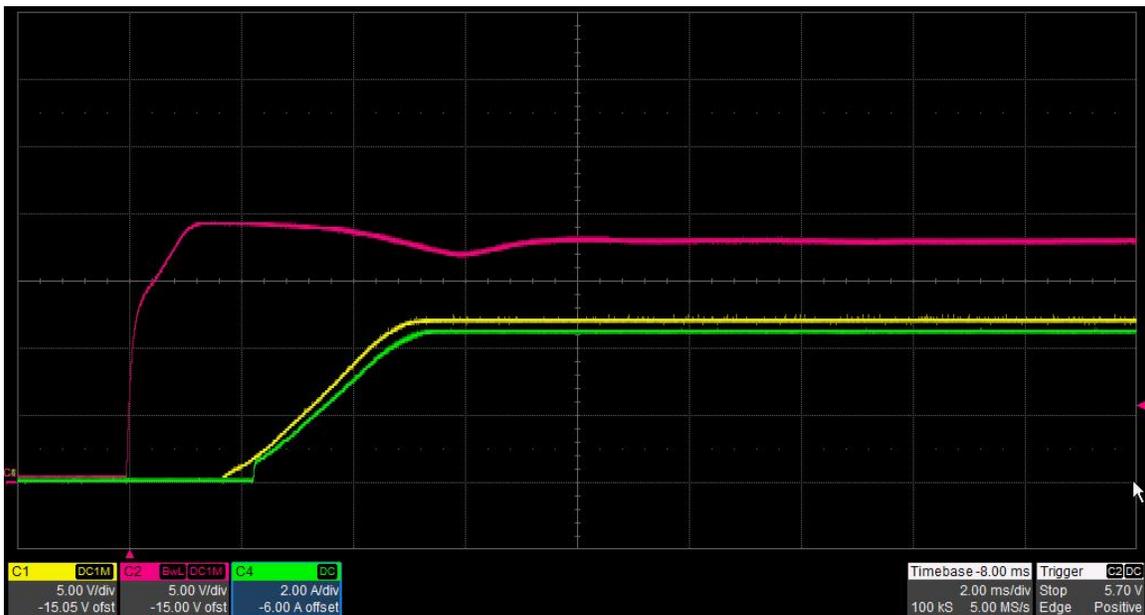
2 Efficiency

The TPS40170 12V converter efficiency is shown in the figure below.

TPS40170 Sync-Buck Converter Efficiency, Vin = 18V, Vout = 12V

TPS40170 Sync-Buck Converter Efficiency, Vin = 24V, Vout = 12V

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3 Output Ripple Voltage

The output ripple voltage is shown in the figure below. The image was taken with the 12V output loaded to 4.5A and the input voltage set to 24V.   (20mV/DIV, 2uS/DIV)
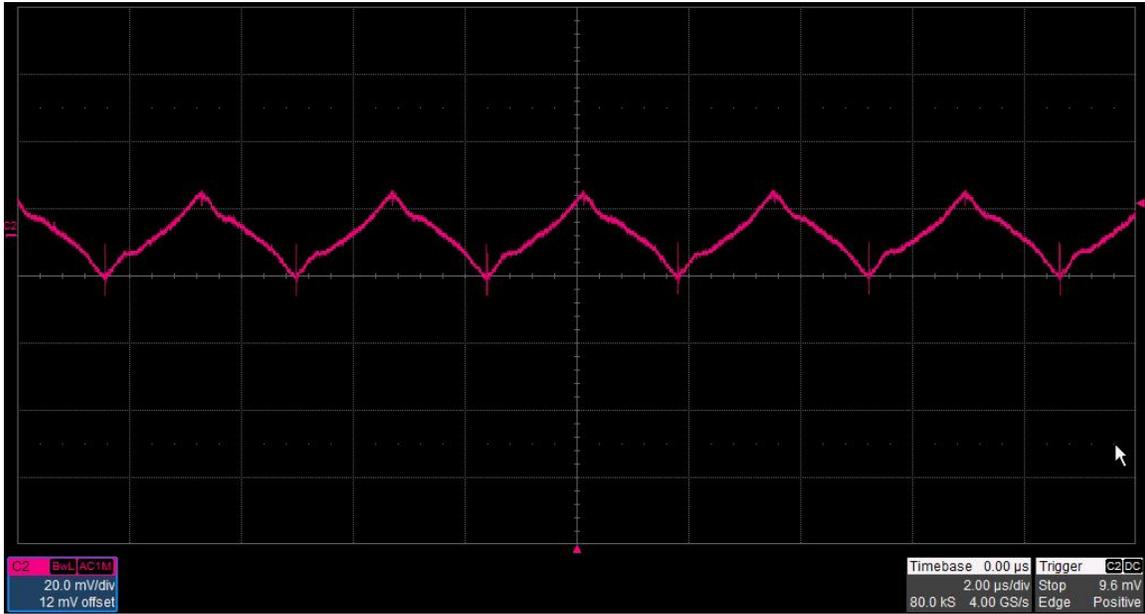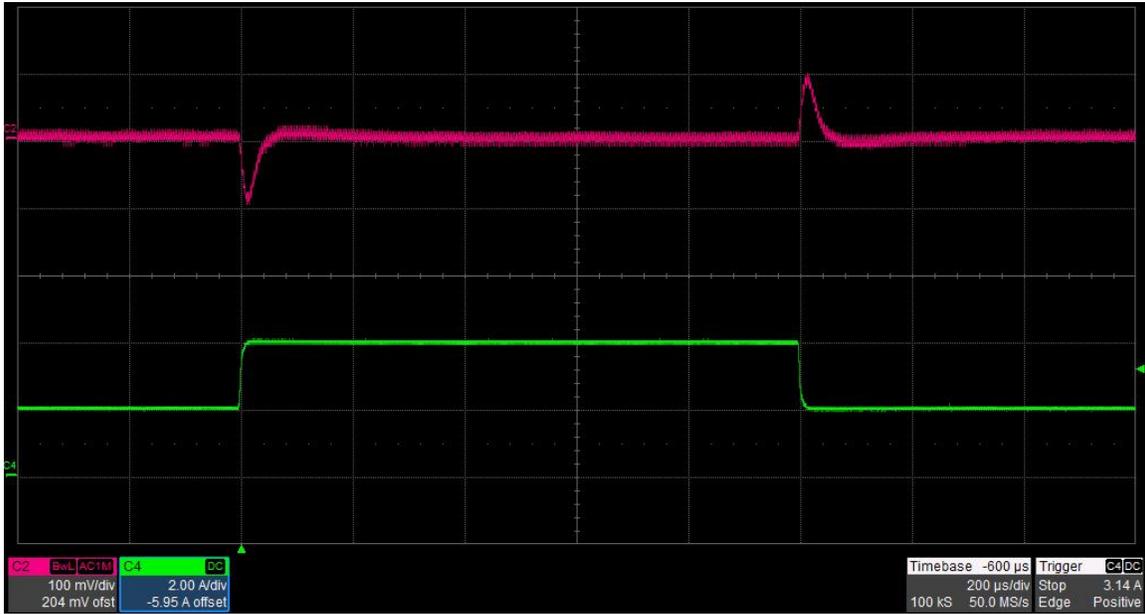

The output ripple voltage is shown in the figure below. The image was taken with the 12V output loaded to 4.5A and the input voltage set to 14V.   (20mV/DIV, 2uS/DIV)


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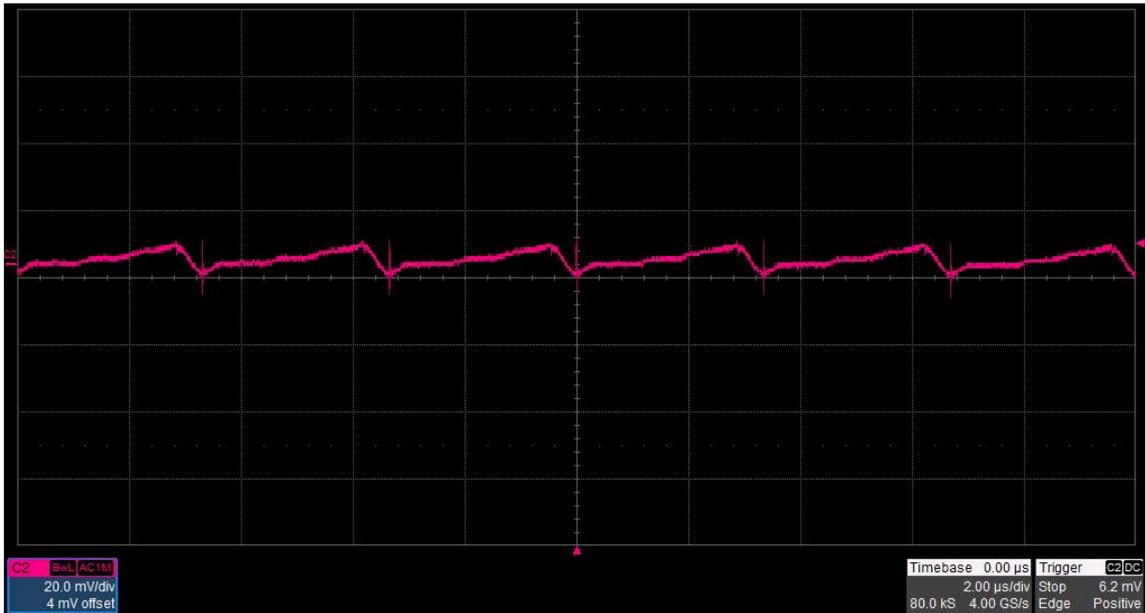
4 Load Transients

The photo below shows the output voltage (ac coupled) when the load current is stepped between 2A and 4A. Vin = 18V.   (100mV/DIV, 2A/DIV, 200uS/DIV)
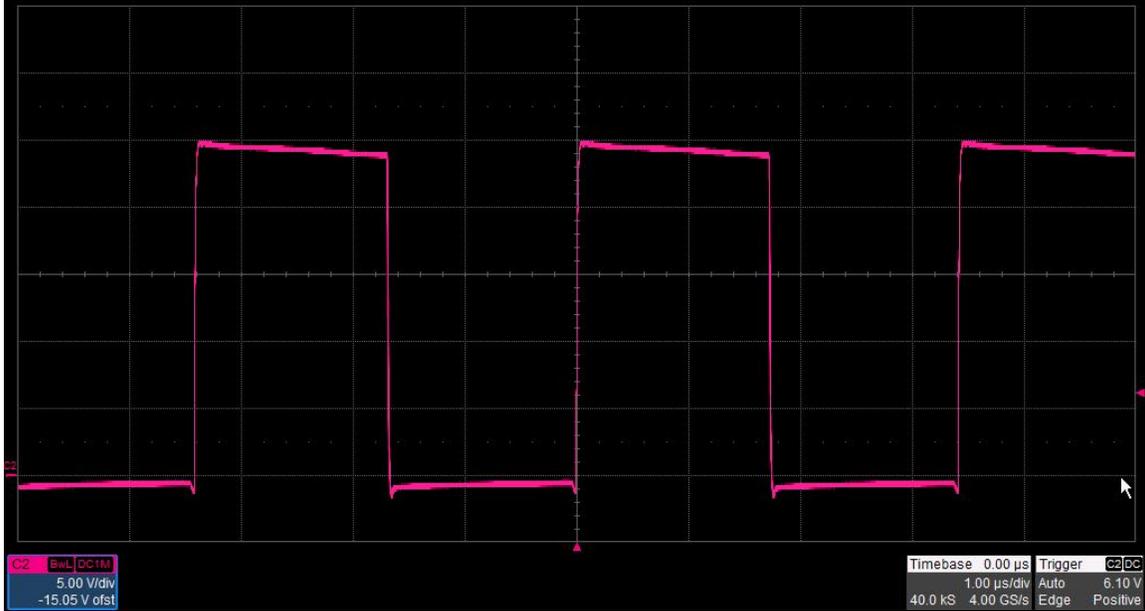

The photo below shows the output voltage (ac coupled) when the load current is stepped between 1A and 4.5A. Vin = 18V.   (100mV/DIV, 2A/DIV, 200uS/DIV)

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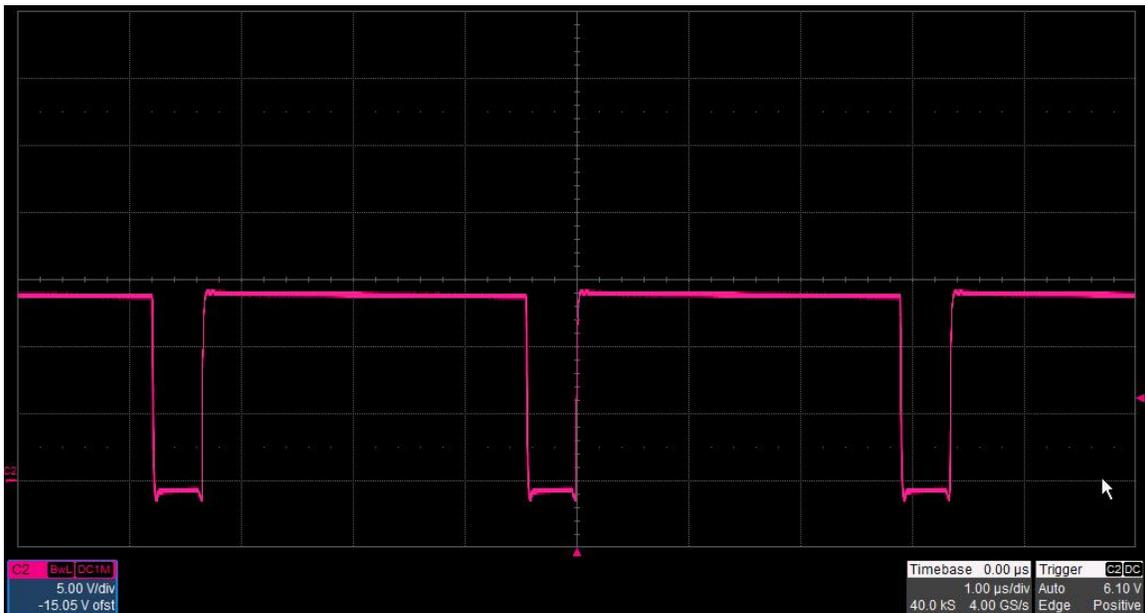
TEXAS
INSTRUMENTS
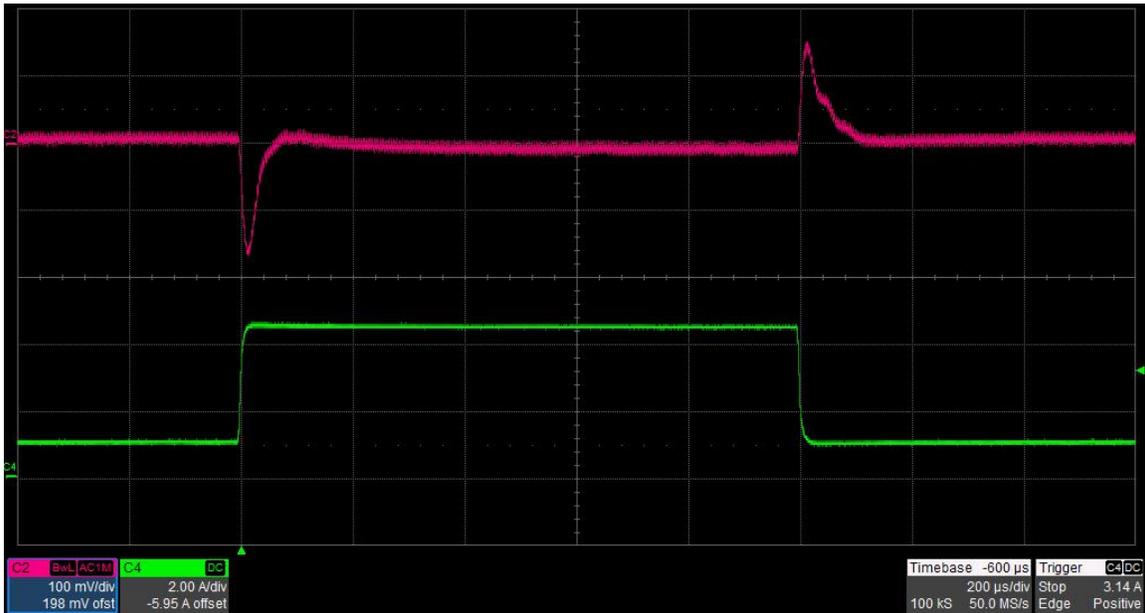
5 Switch Node Waveforms

The photo below shows the switch node voltage (TP4). The input voltage is 24V and the 12V output is loaded to 4.5A.   (5V/DIV, 1uS/DIV)

The photo below shows the switch node voltage (TP4). The input voltage is 14V and the 12V output is loaded to 4.5A.   (5V/DIV, 1uS/DIV)
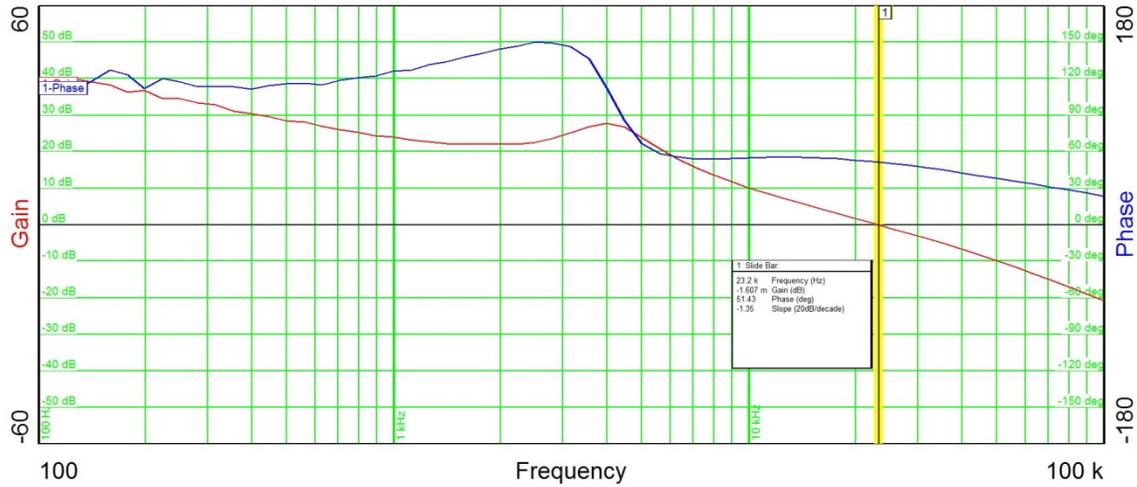

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TEXAS INSTRUMENTS

6 Control Loop Gain / Stability

The plot below shows the boost converter's loop gain and phase margin when the 12V output is loaded to 4.5A.

Vin = 24V   Band Width = 23.2KHz   Phase Margin = 51 degrees

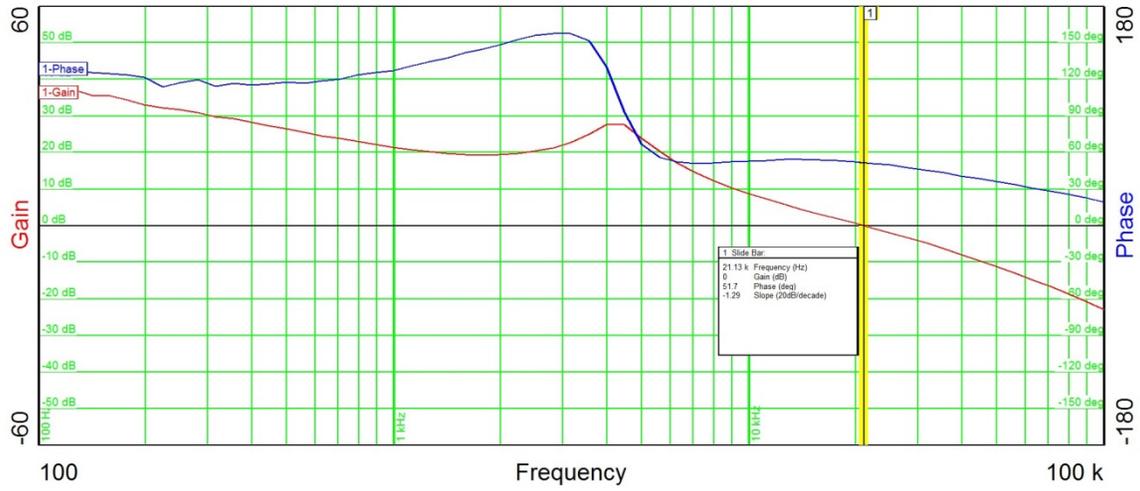
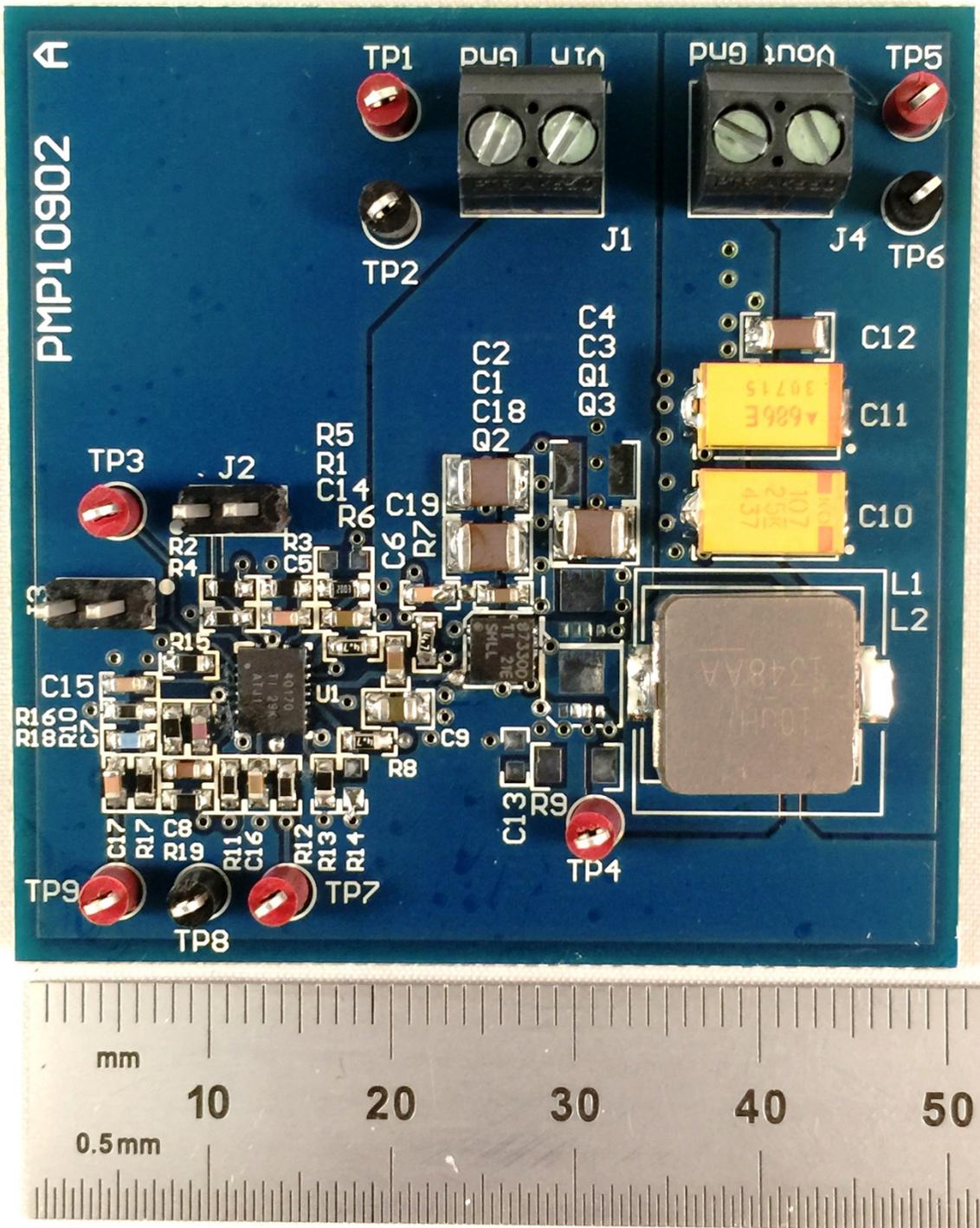Vin = 18V   Band Width = 18.8KHz   Phase Margin = 55 degrees
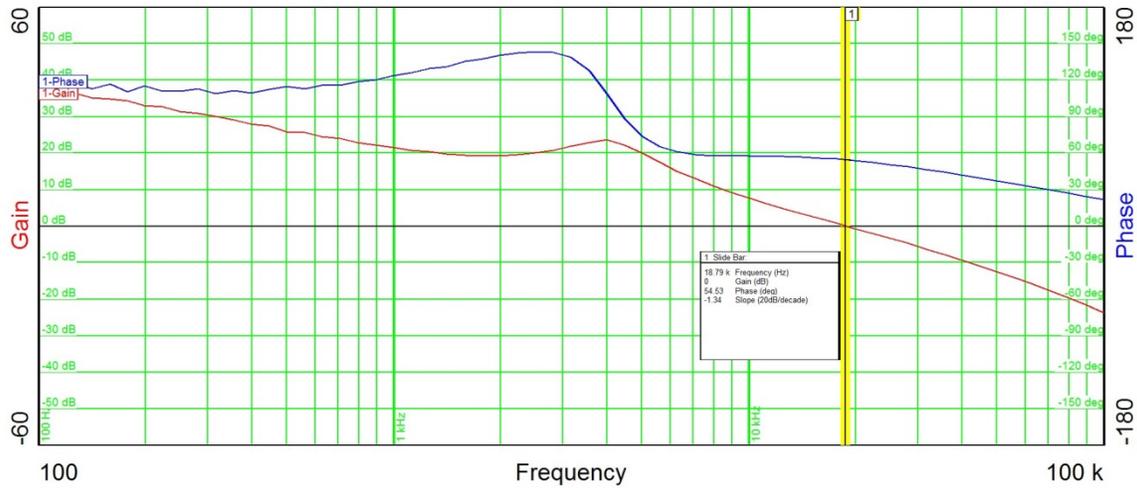
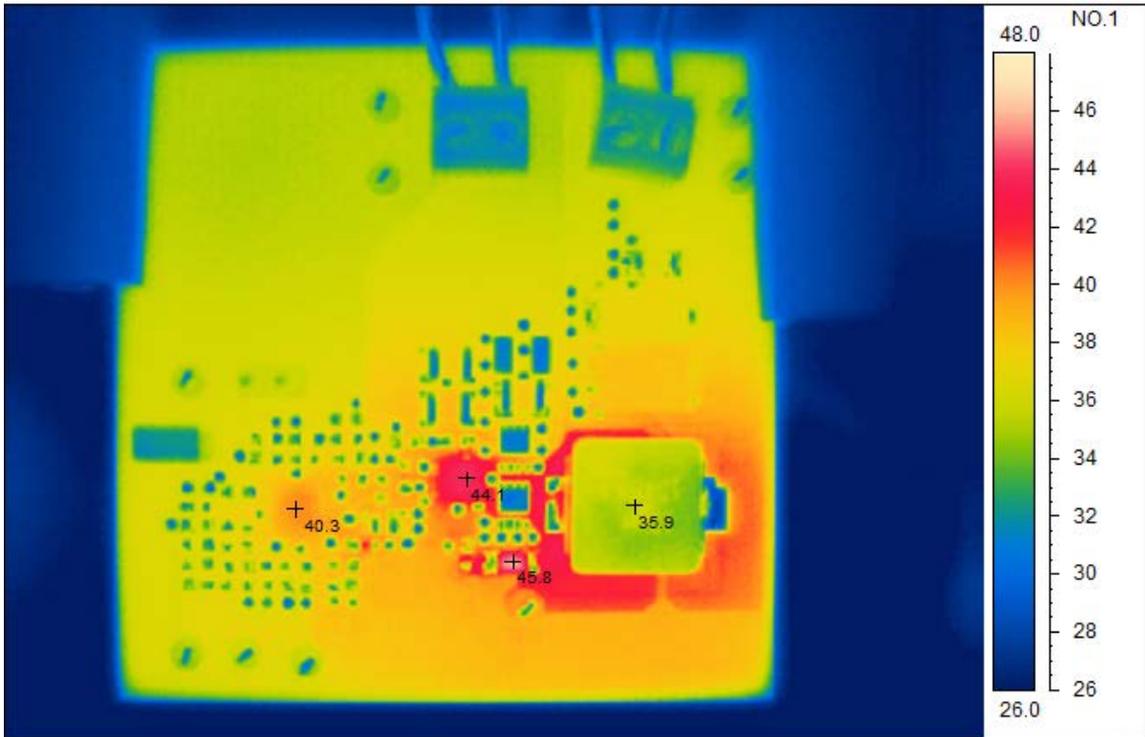Vin = 14V   Band Width = 21.1KHz   Phase Margin = 52 degrees

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7 Photo

The photo below shows the PMP10902 REVB assy.

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8 Thermal Image

The thermal image below shows sustained operation while at an 18V input / 4.5A output, with no airflow.

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