PMP11098 Rev. B
5/20/15

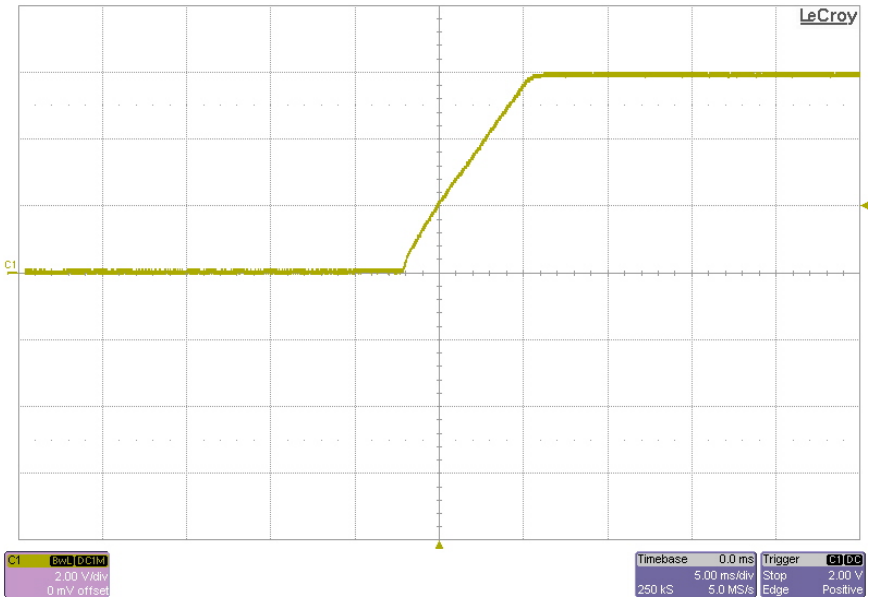
The tests performed were as follows:

1. Turn-On
2. Turn-Off
3. Switch Node
    i. No Load
    ii. Full Load 2.5A
4. Output Voltage Ripple
    i. No Load
    ii. Full Load 2.5 A
5. Transient Response (100mA to 2.5A Load Step)
6. Efficiency
7. Load Regulation
8. Bode and Phase
9. Board Photo
10. Thermal Images

1 Turn-On

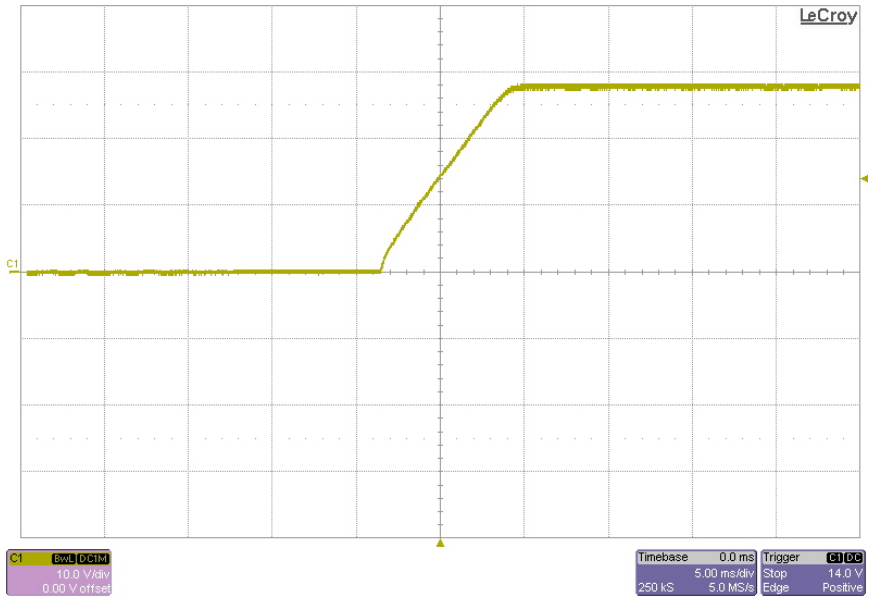
The photo below shows the startup waveform of the 6V output, with no load, and an input voltage of 48V.

Channel 1 – Yellow: Output Voltage – (2V/Div, 5ms/Div)



The photo below shows the startup waveform of the 28V output, with no load, and an input voltage of 48V.

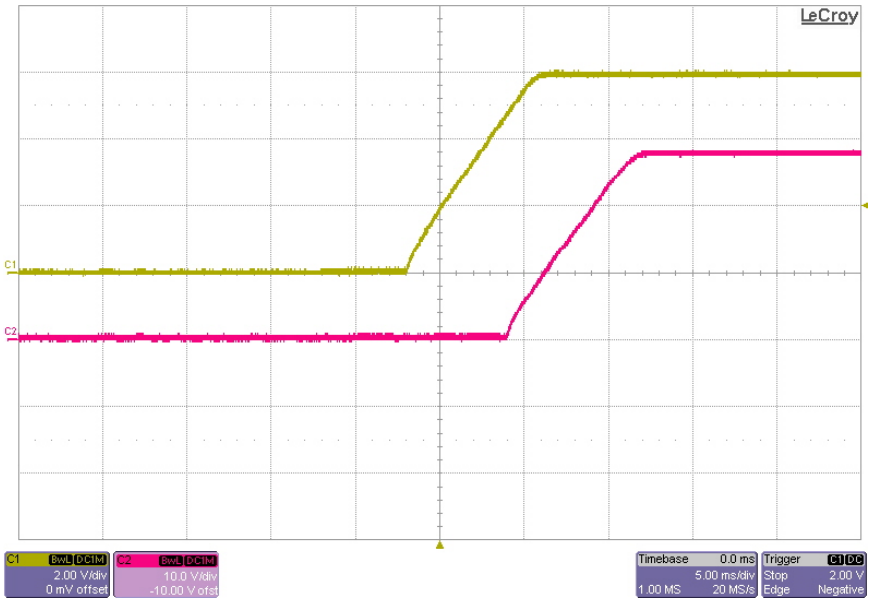
Channel 1 – Yellow: Output Voltage – (10V/Div, 5ms/Div)



PMP11098 Test Results Rev. B

The photo below shows the startup waveform of the 6V output (yellow), with no load, and the 28V output (Red), with no load. The input voltage is 48V.

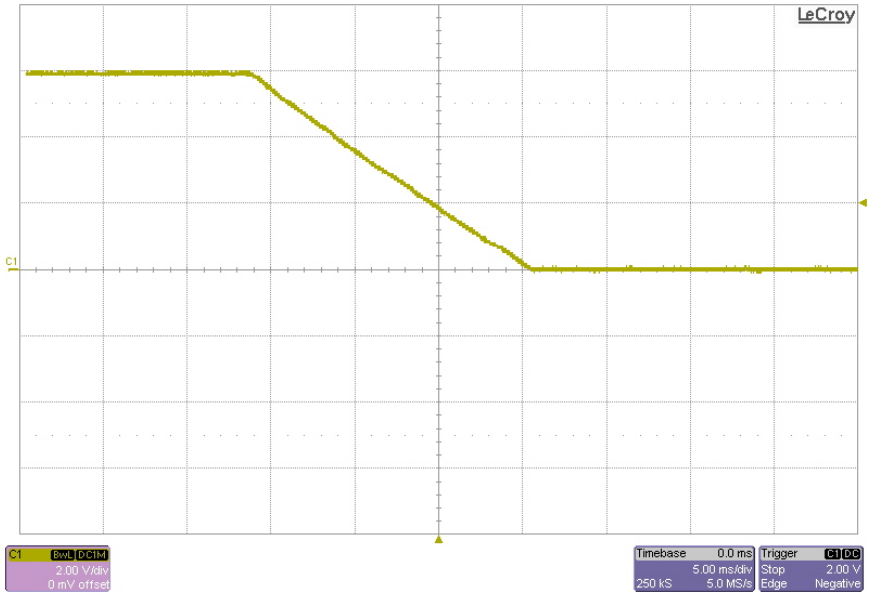
Channel 1 – Yellow: 6V Output Voltage – (2V/Div, 5ms/Div)
Channel 2 – Red: 28V Output Voltage – (10V/Div, 5ms/Div)



2 Turn-Off

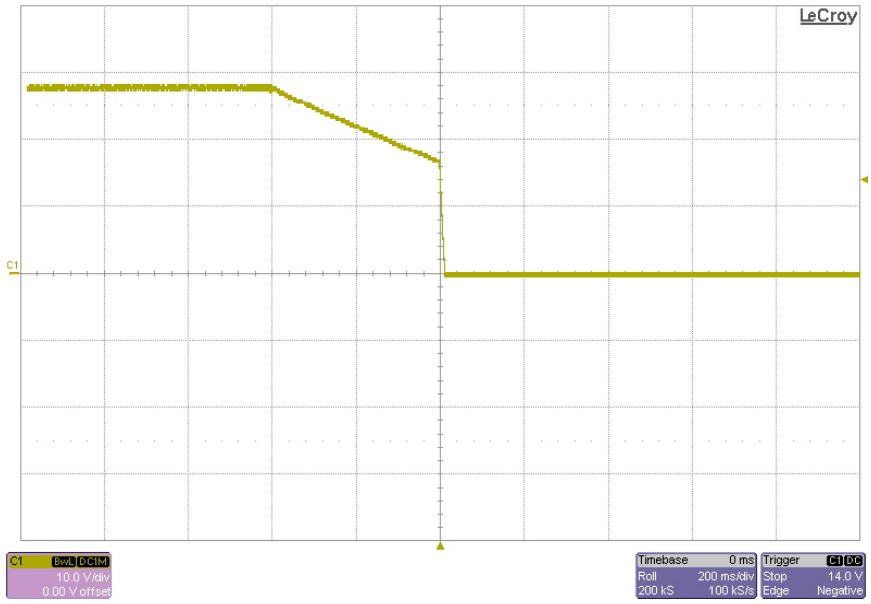
The photo below shows the turn off waveform of the 6V output, with a 100 mA load, and an input voltage of 48V

Channel 1 – Yellow: Output Voltage – (2V/Div, 5ms/Div)



The photo below shows the turn off waveform of the 28V output, with a 100mA load, and an input voltage of 48V.

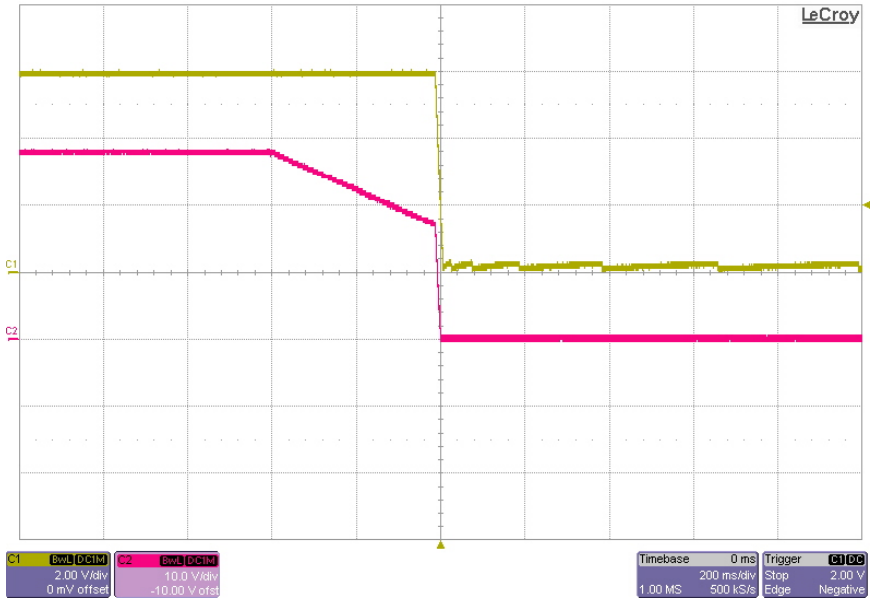
Channel 1 – Yellow: Output Voltage – (10V/Div, 200ms/Div)



PMP11098 Test Results Rev. B

The photo below shows the shutdown waveform of the 6V output (yellow), with a 100 mA load, and the 28V output (Red), with a 100 mA load. The input voltage is 48V.

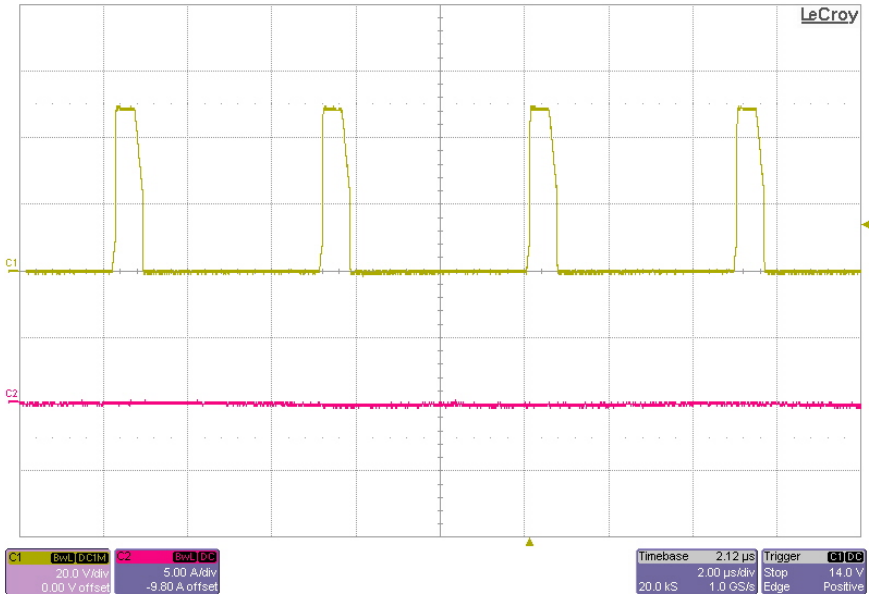
Channel 1 – Yellow: 6V Output Voltage – (2V/Div, 200ms/Div)
Channel 2 – Red: 28V Output Voltage – (10V/Div, 200ms/Div)



3 Switch Node

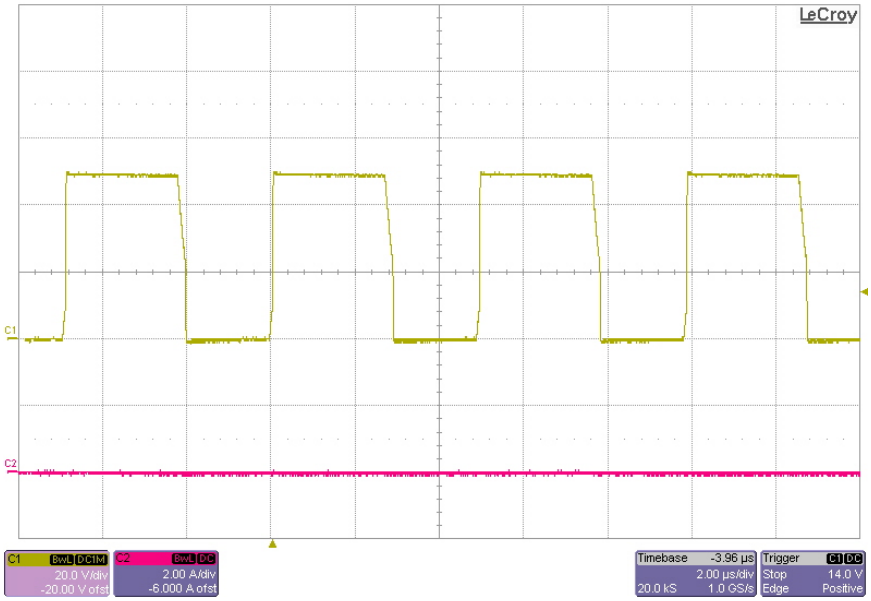
The picture below shows the switching waveform of the converter for the 6V output, with no load. The input voltage is 48V.

Channel 1 – Yellow: Switch Node – (20V/Div, 2us/Div)
Channel 2 – Red: Current – (5A/Div, 2us/Div)



The picture below shows the switching waveform of the converter for the 28V output, with no load. The input voltage is 48V.

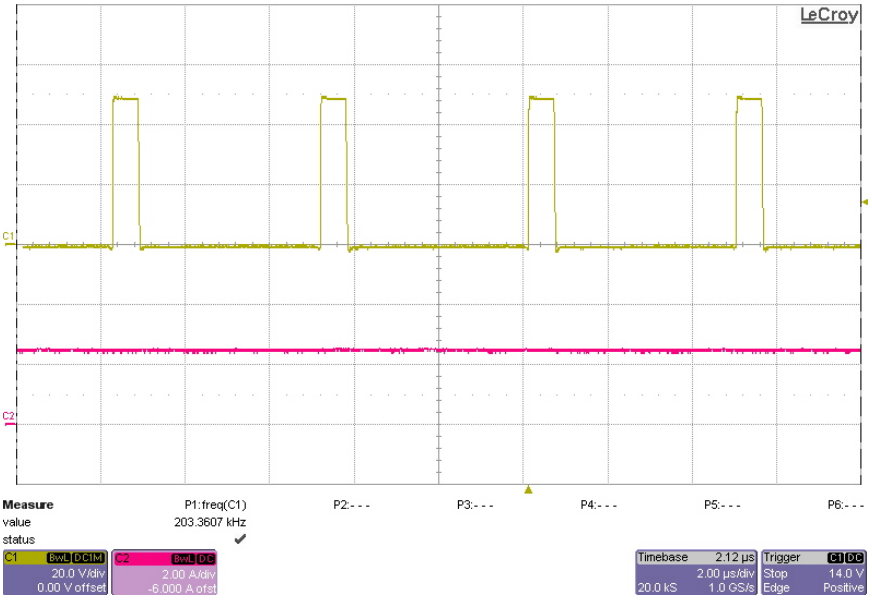
Channel 1 – Yellow: Switch Node – (20V/Div, 2us/Div)
Channel 2 – Red: Current – (2A/Div, 2us/Div)



PMP11098 Test Results Rev. B

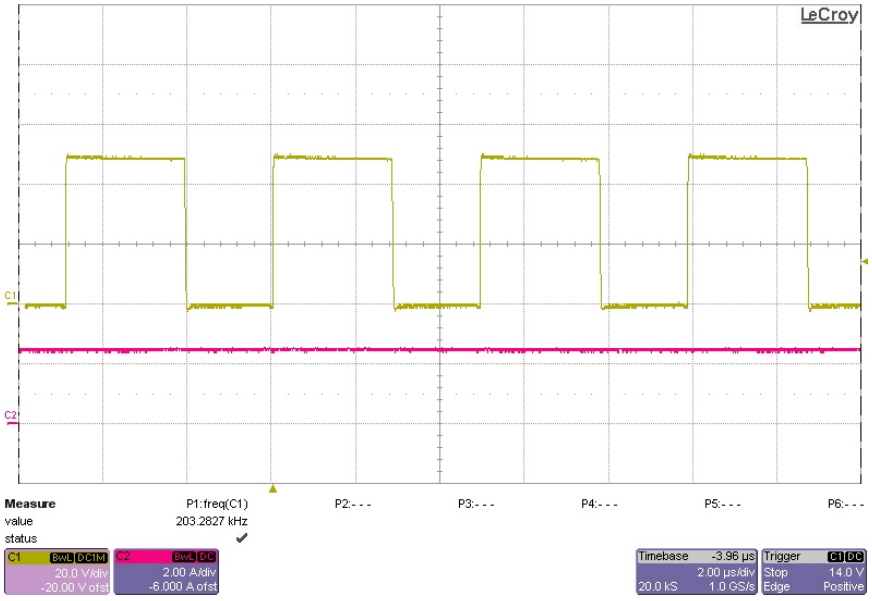
The picture below shows the switching waveform of the converter for the 6V output, with a full load of 2.5A. The input voltage is 48V and the frequency is shown to be 203 kHz.

Channel 1 – Yellow: Switch Node – (20V/Div, 2us/Div)
Channel 2 – Red: Current – (2A/Div, 2us/Div)



The picture below shows the switching waveform of the converter for the 28V output, with a full load of 2.5A. The input voltage is 48V and the frequency is shown to be 203 kHz.

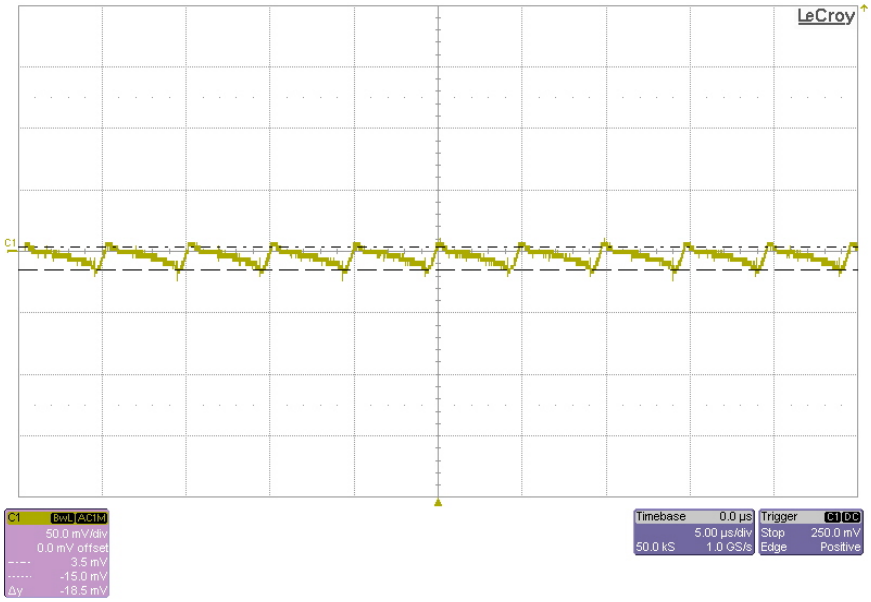
Channel 1 – Yellow: Switch Node – (20V/Div, 2us/Div)
Channel 2 – Red: Current – (2A/Div, 2us/Div)



4 Output Voltage Ripple

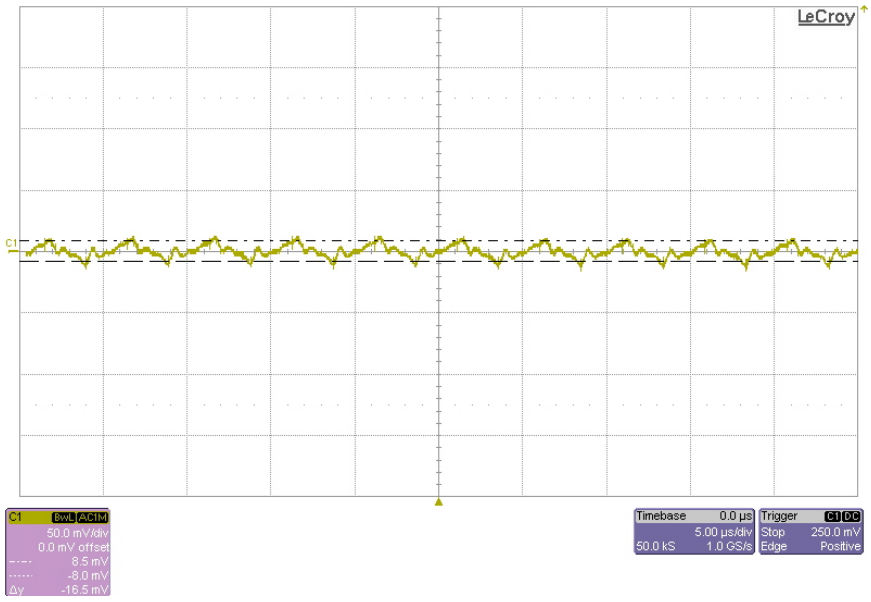
The picture below shows the output voltage ripple of the converter for the 6V output, with no load. The input voltage is 48V.

Channel 1 – Yellow: Output Voltage (50mV/Div, 5us/Div; AC Coupled)



The picture below shows the output voltage ripple of the converter for the 28V output, with no load. The input voltage is 48V.

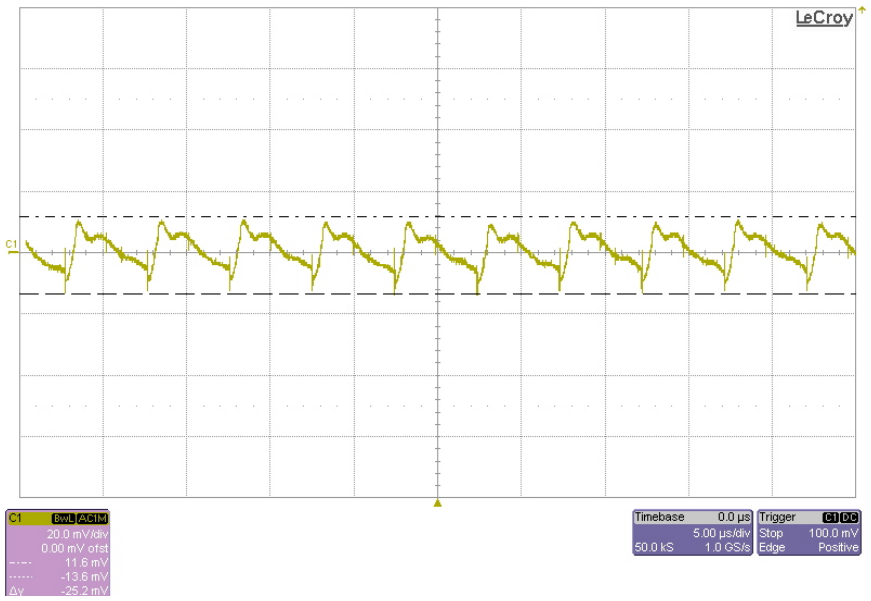
Channel 1 – Yellow: Output Voltage (50mV/Div, 5us/Div; AC Coupled)



PMP11098 Test Results Rev. B

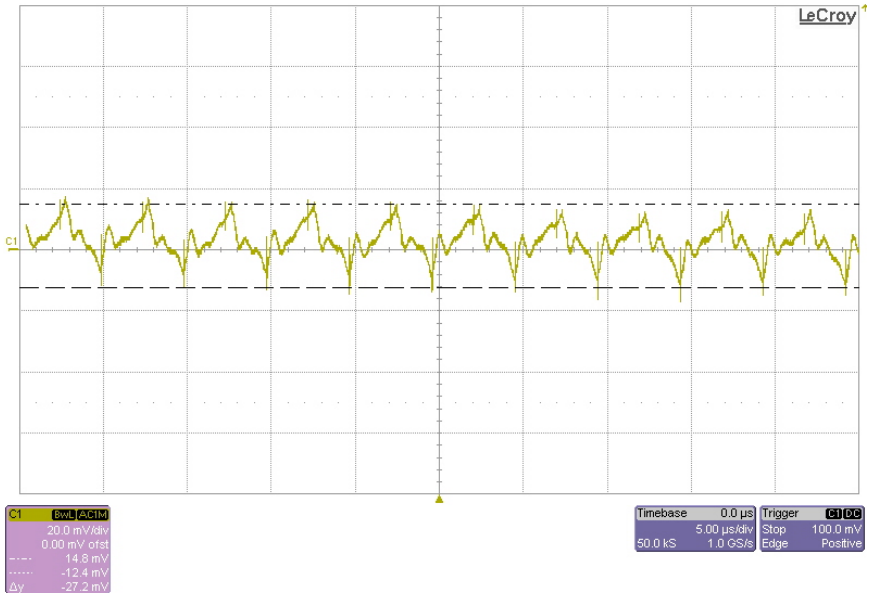
The picture below shows the output voltage ripple of the converter for the 6V output, with a full load of 2.5A. The input voltage is 48V.

Channel 1 – Yellow: Output Voltage (20mV/Div, 5us/Div; AC Coupled)



The picture below shows the output voltage ripple of the converter for the 28V output, with a full load of 2.5A. The input voltage is 48V.

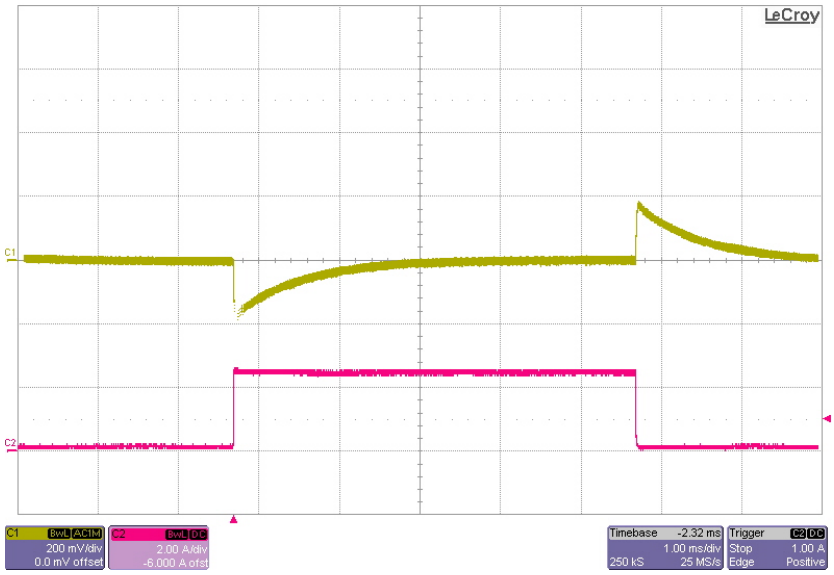
Channel 1 – Yellow: Output Voltage (20mV/Div, 5us/Div; AC Coupled)



5 Transient Response

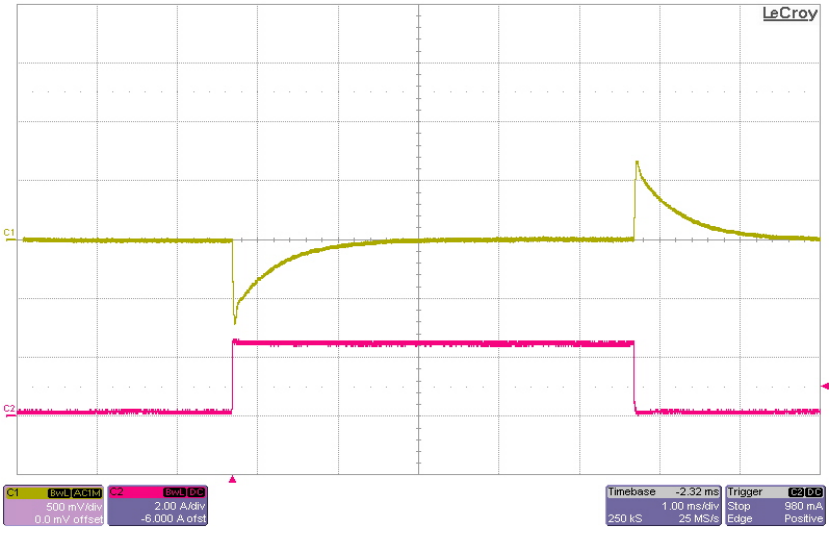
The transient response of the converter is shown in the figure below, for the 6V output, with a full load of 2.5A. The input voltage is 48V. The load is stepped from 100mA to 2.5A.

Channel 2 – Yellow: Output Voltage: (200mV/Div, 1ms/Div; AC Coupled)
Channel 4 – Red: Output Current – (2A/Div, 1ms/Div)



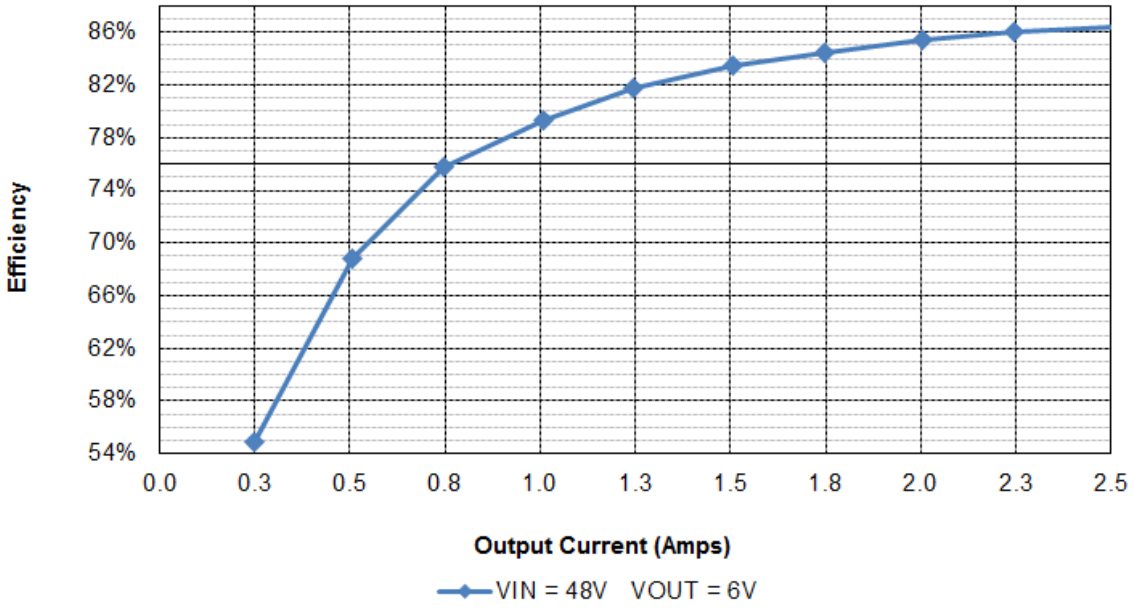
The transient response of the converter is shown in the figures below, for the 28V output, with a full load of 2.5A. The input voltage is 48V. The load is stepped from 100mA to 2.5A.

Channel 2 – Yellow: Output Voltage: (500mV/Div, 1ms/Div; AC Coupled)
Channel 4 – Red: Output Current – (2A/Div, 1ms/Div)

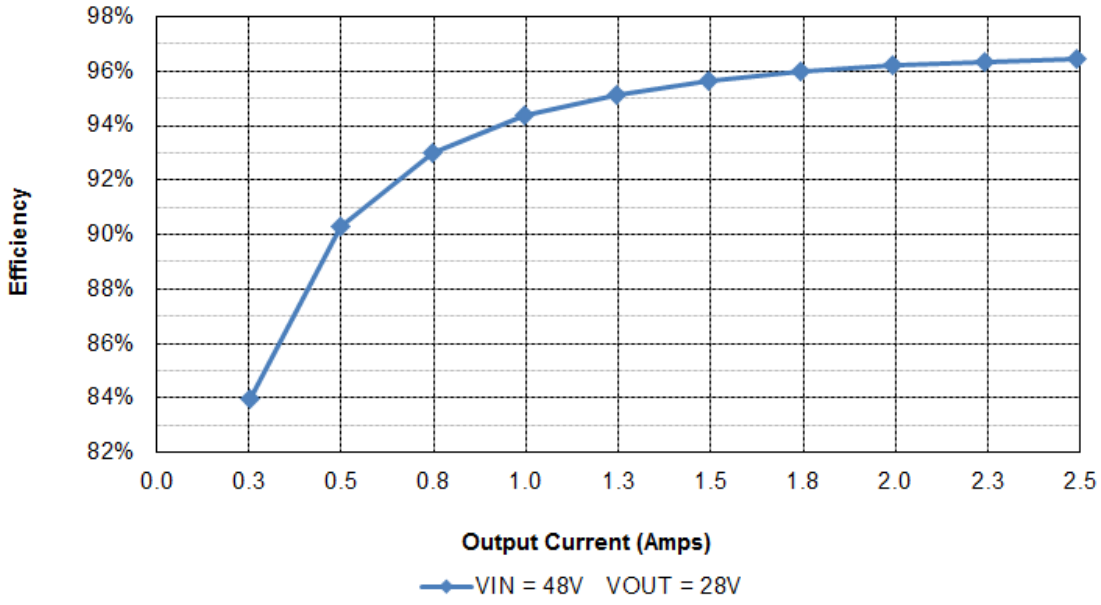


6 Efficiency

The curve below shows the efficiency measurement for the 6V output. The 28V output was disabled for this measurement.

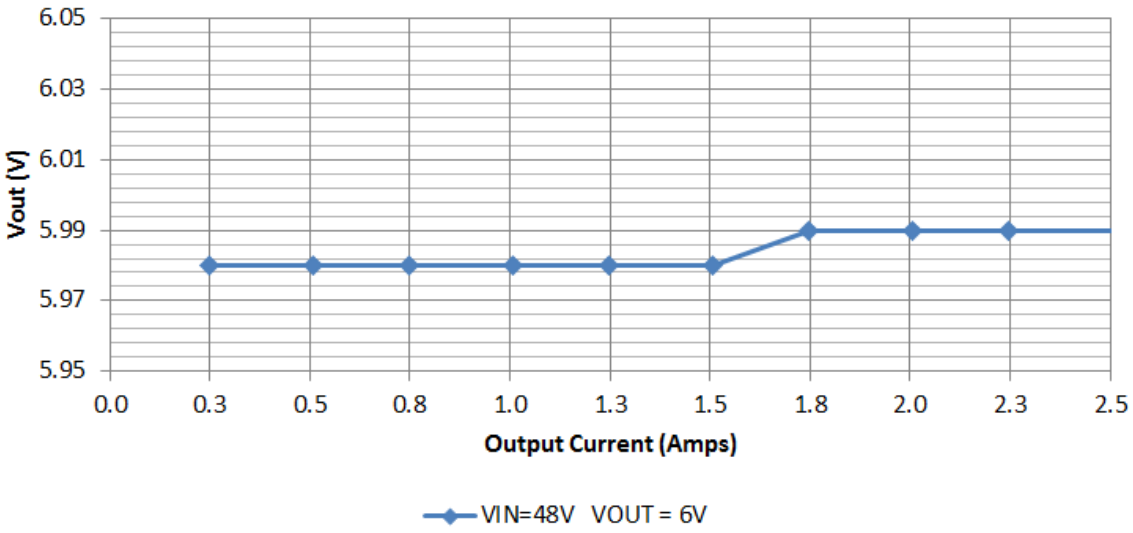


The curve below shows the efficiency measurement for the 28V output. The 6V output was disabled for this measurement.

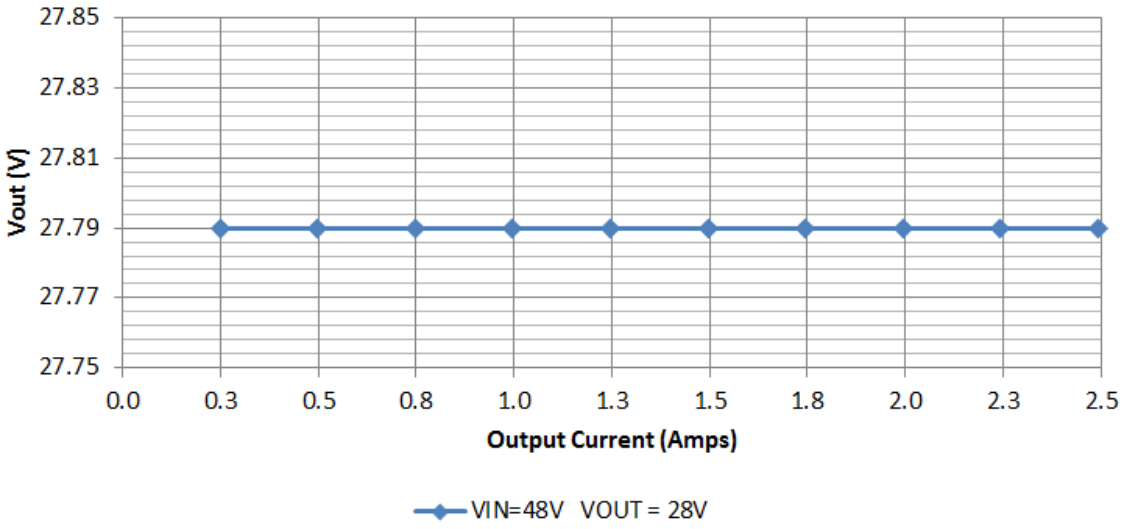


7 Load Regulation

The curve below shows the load regulation for the 6V output. The 28V output was disabled for this measurement.



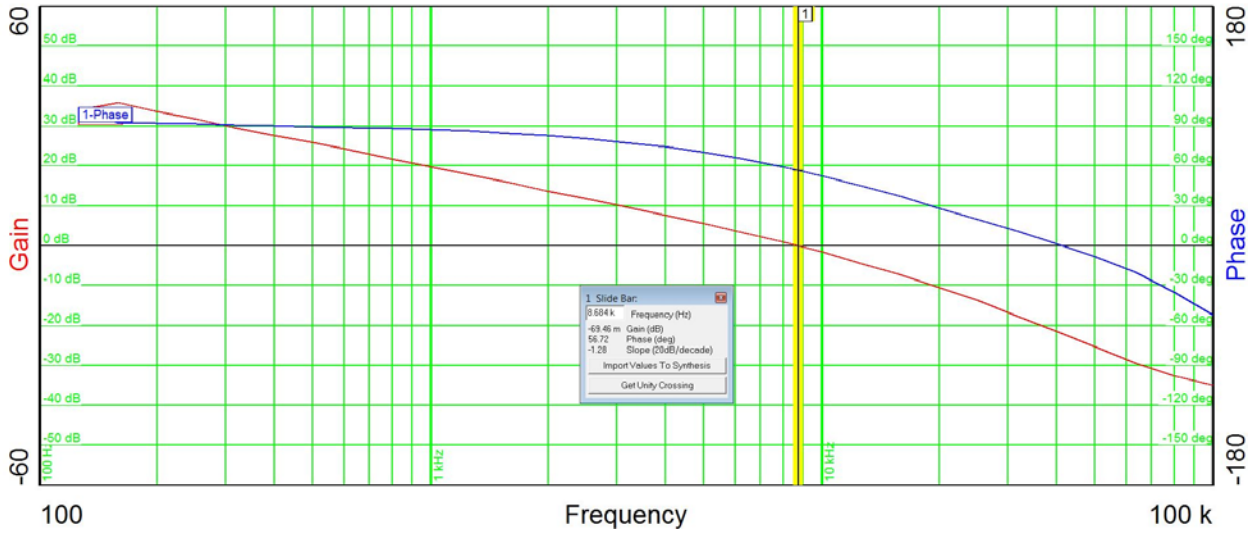
The curve below shows the load regulation for the 28V output. The 6V output was disabled for this measurement.



8 Bode and Phase

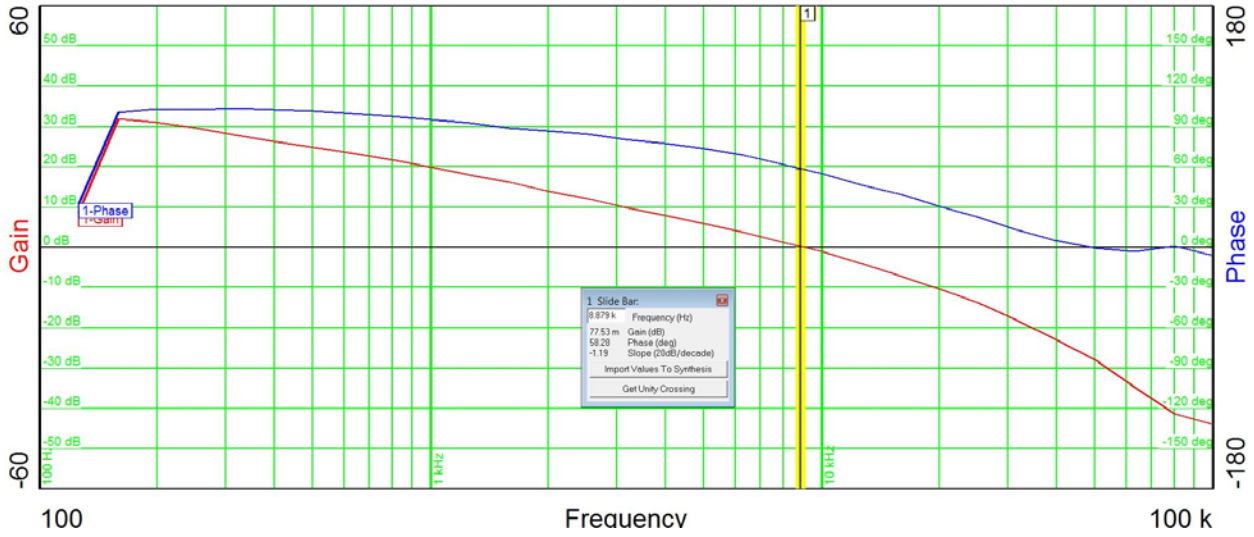
The frequency response below shows the 6V output with a full load of 2.5A.

Bandwidth: 8.68KHz Phase Margin: 57 degrees



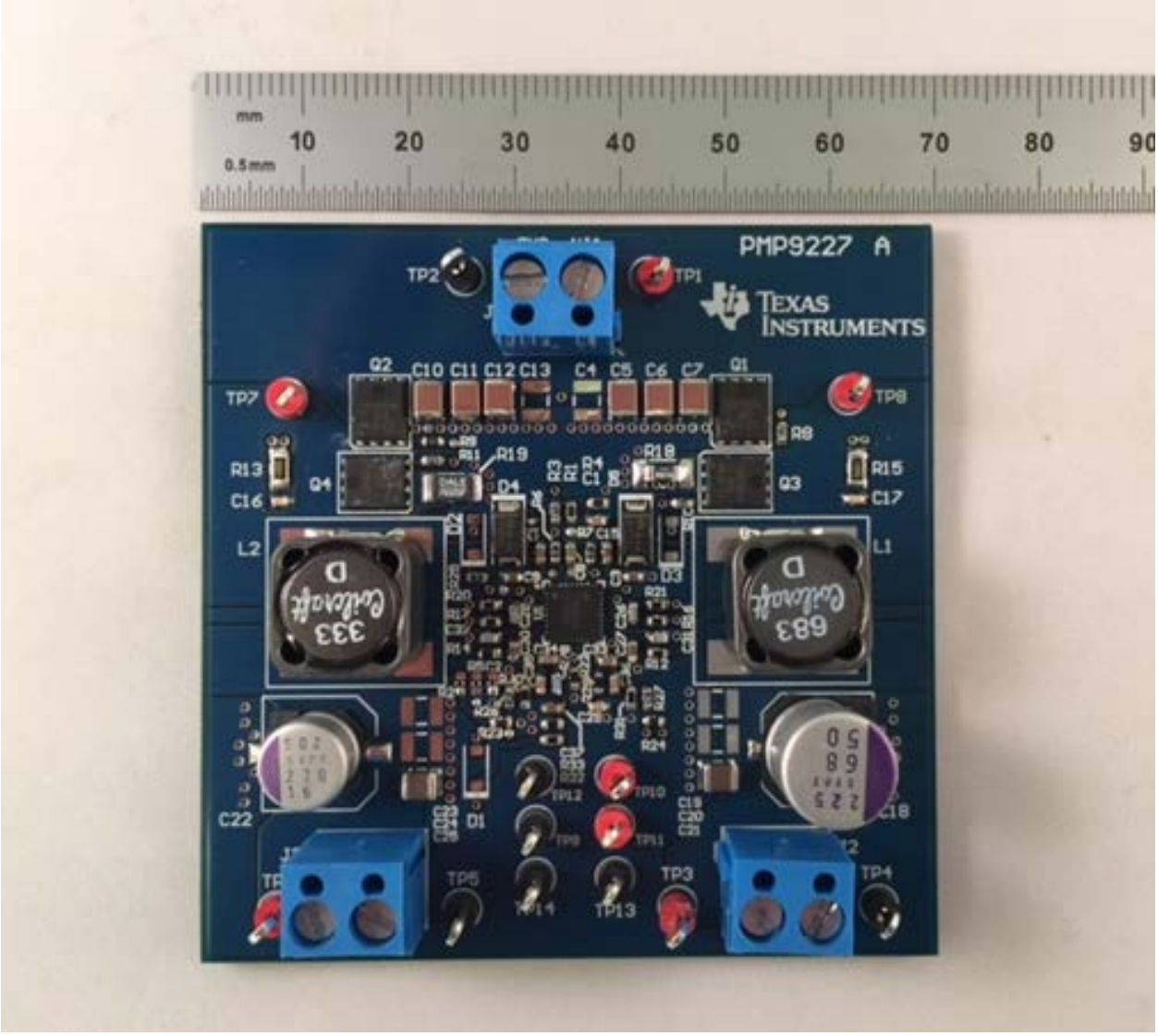
The frequency response below shows the 28V output with a full load of 2.5A.

Bandwidth: 8.88KHz Phase Margin: 58 degrees



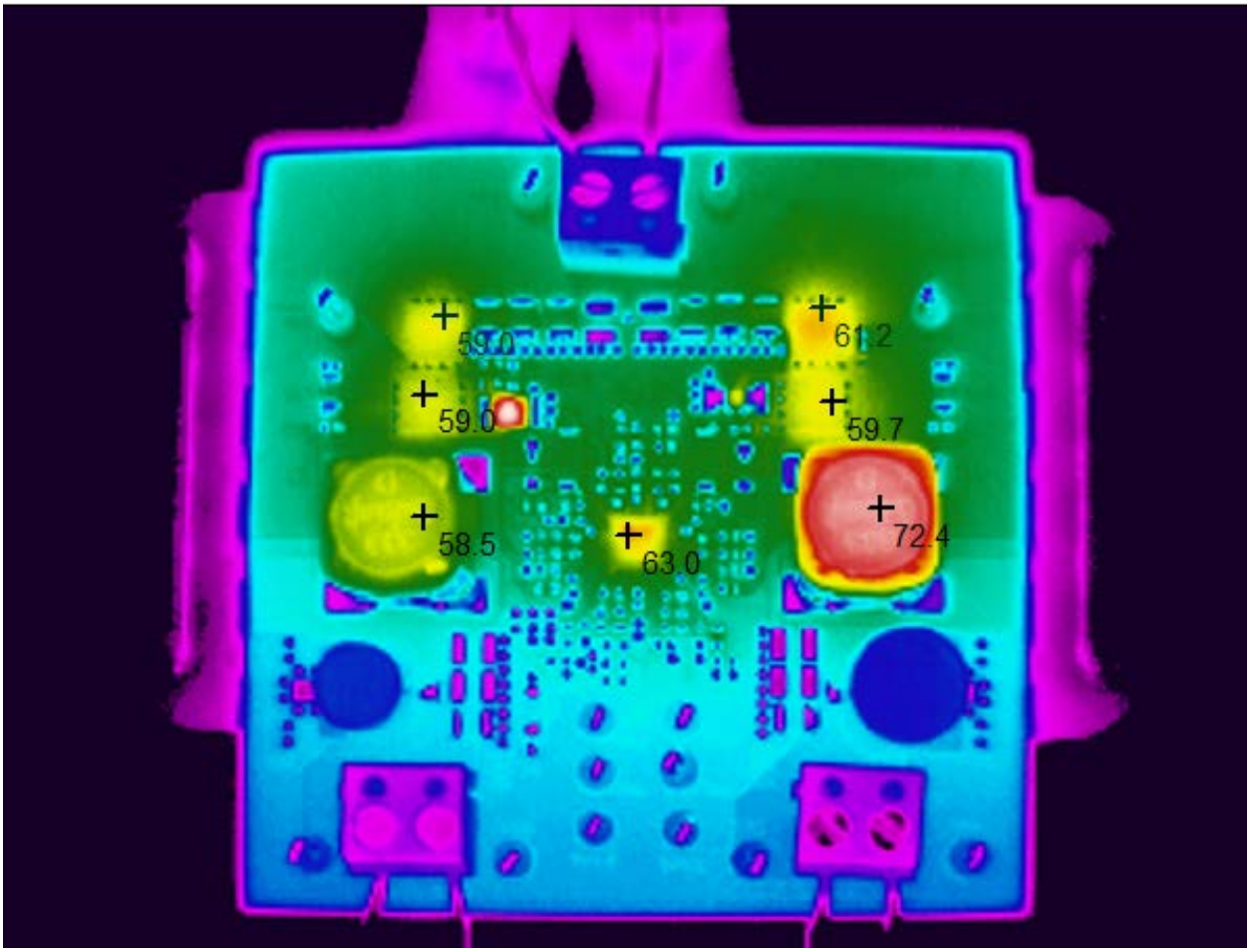
9 Board Photo

The photo below shows the PMP11098 Rev B assembly built on the PMP9227 Rev A PWB.



10 Thermal Images

The images below show the thermal performance of the design. It is important to note that thermal performance is directly proportional to power loss and board size. Different sized and shaped boards will perform differently. The input voltage is 48V, the 6V output is at a full load of 2.5A, and the 28V output is at a full load of 2.5A.



IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES “AS IS” AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, or other requirements. These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI’s products are provided subject to TI’s Terms of Sale (https:www.ti.com/legal/termsofsale.html) or other applicable terms available either on ti.com or provided in conjunction with such TI products. TI’s provision of these resources does not expand or otherwise alter TI’s applicable warranties or warranty disclaimers for TI products.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265