PMP9008 TPS544C20 Project
9/11/13

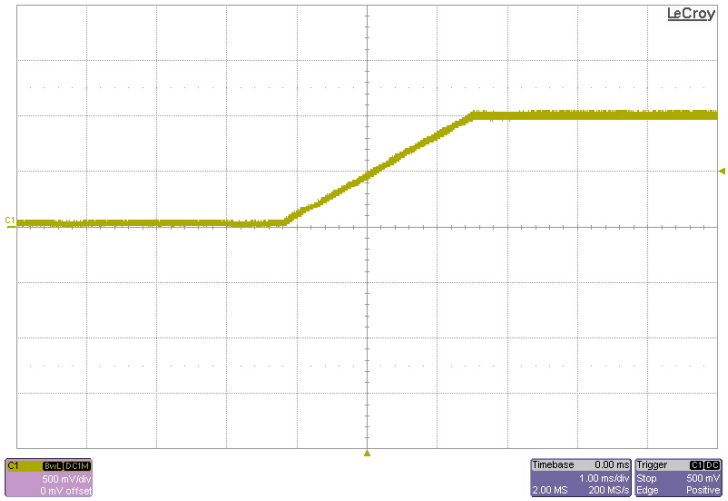
The tests performed were as follows:

A. TPS544C20
   1. Turn-On (No Load)
   2. Switch Node (Full Load and No Load)
   3. Switch Node Ringing (Full Load and No Load)
   4. Output Voltage Ripple (Full Load and No Load)
   5. Transient Response (67% Load Step)
   6. Efficiency
   7. Load Regulation
   8. Board Photo
   9. Thermal Images

1 Turn On – (TPS544C20 – No Load)

The photo below shows the startup waveform. The input voltage is 12V, the output is not loaded. The time-base is set to 1ms/Division.

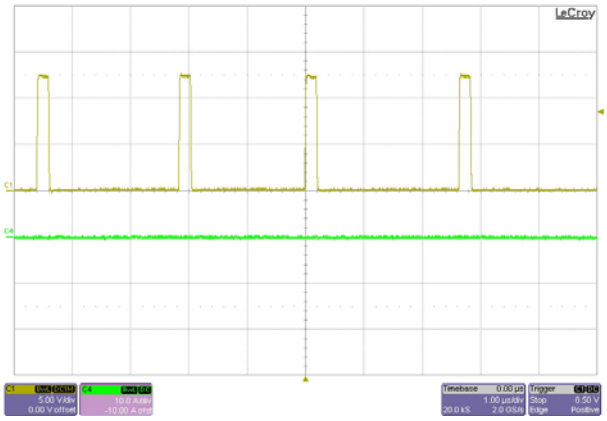
Channel 1 – Yellow : Output Voltage – (1V/Division)



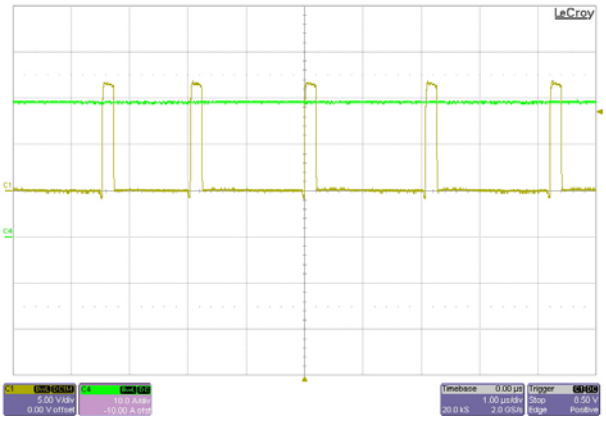
2 Switch Node – (TPS544C20 – 1V @ 30A)

The pictures below show the switching waveform for the converter. The input voltage is 12V.

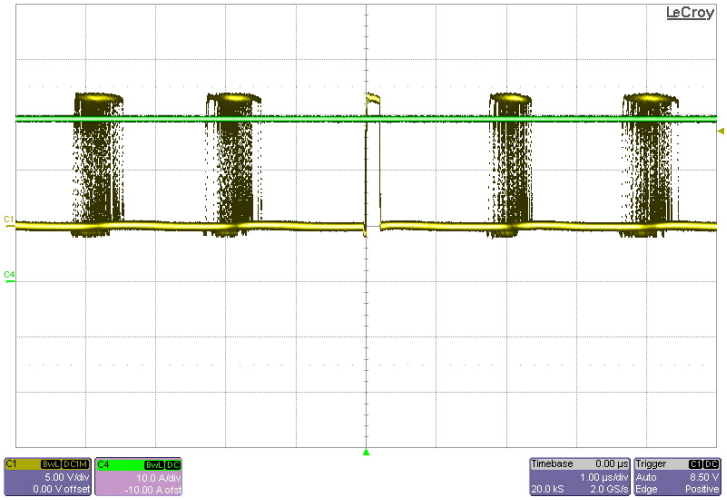
Channel 1 – Yellow : Switch Node – (5V/Division)
Channel 4 – Green : Output Current – (10A/Division)



No Load



30A Load

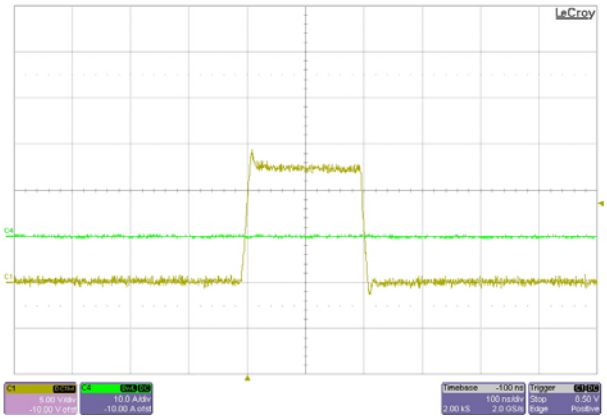


Switch Node with persistence to show the jitter

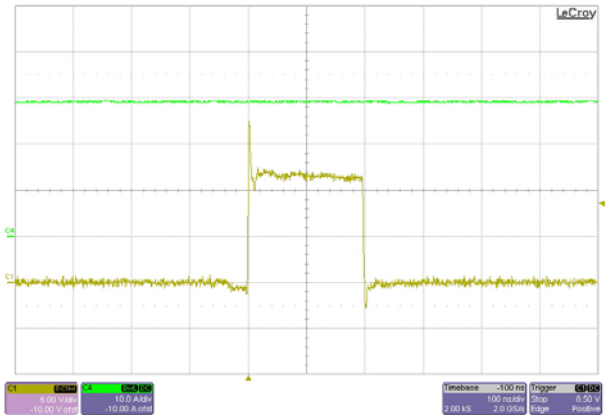
3 Switch Node Ringing – (TPS544C20 – 1V @ 30A)

The pictures below show the switch node ringing waveform for the converter. The input voltage is 12V.

Channel 1 – Yellow : Switch Node – (5V/Division)
Channel 4 – Green : Output Current – (10A/Division)



No Load

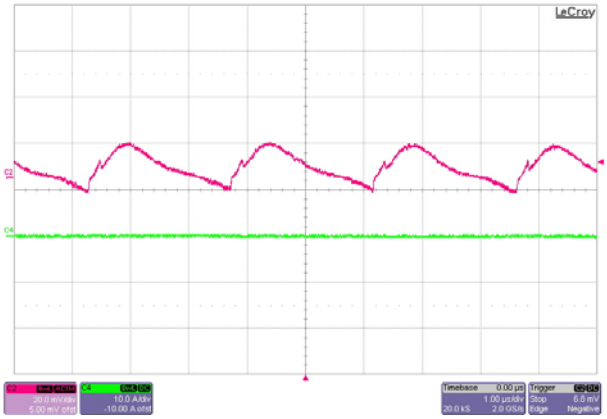


30A Load

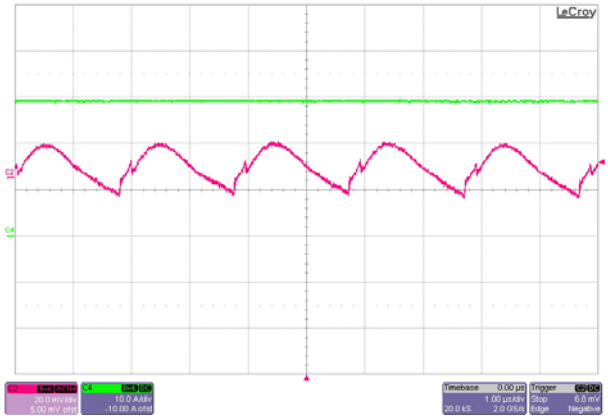
4 Output Voltage Ripple – (TPS544C20 – 1V @ 30A)

The output voltage ripple of the converter is shown in the figures below. The input voltage is 12V.

Channel 2 – Pink : Output Voltage (20mV/Division; AC Coupled)
Channel 4 – Green : Output Current (20A/Division)



No Load

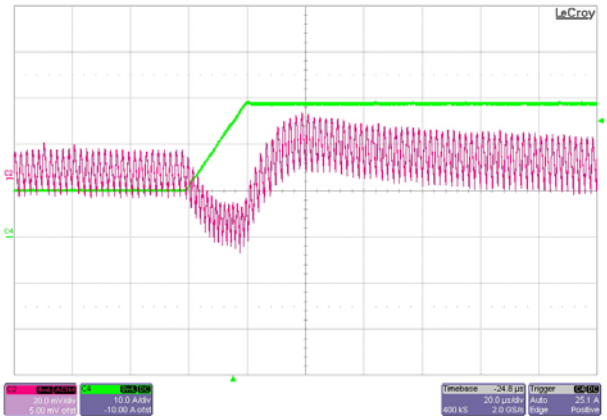


30A Load

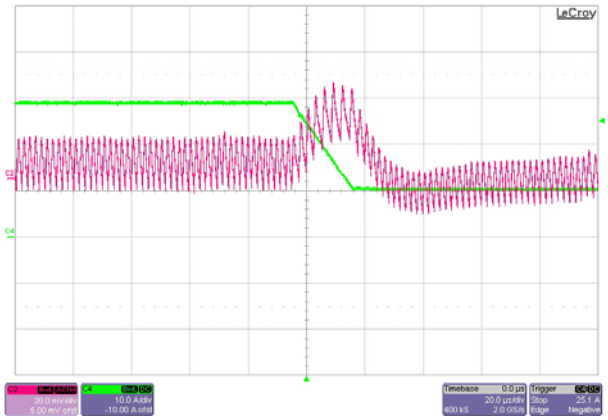
5 Transient Response – (TPS544C20 – 1V @ 30A)

The transient response of the converter is shown in the figures below. The input voltage is 12V.

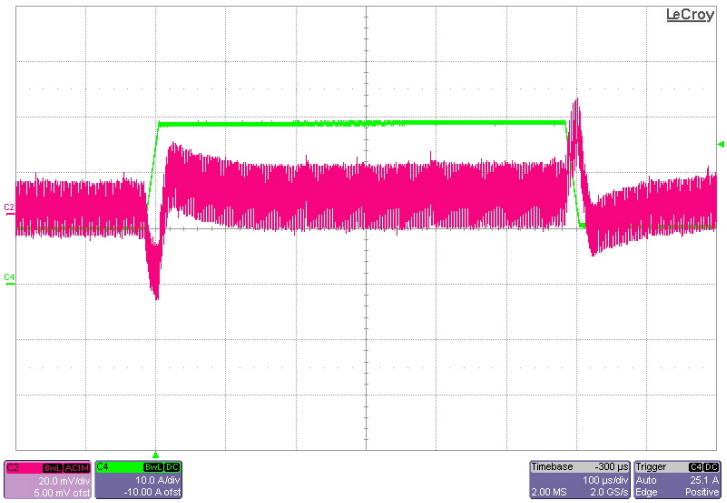
Channel 2 – Pink : Output Voltage : (20mV/Division; AC Coupled)
Channel 4 – Green : Output Current – (2A/Division)



10A to 30A Load Step

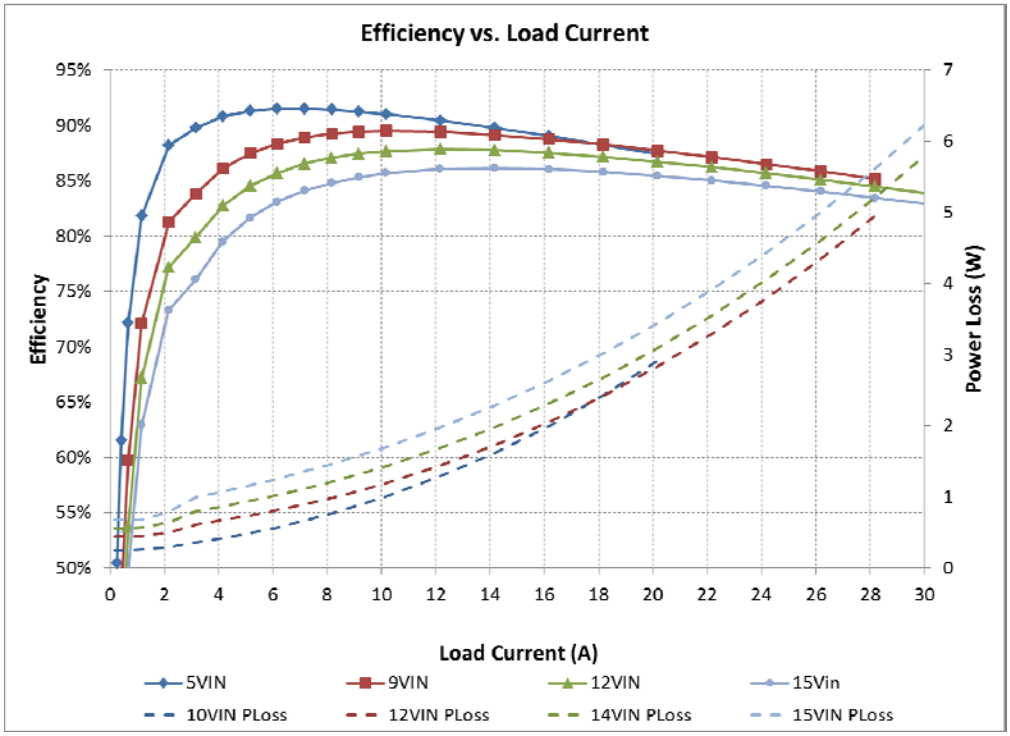


30A to 10A Load Step



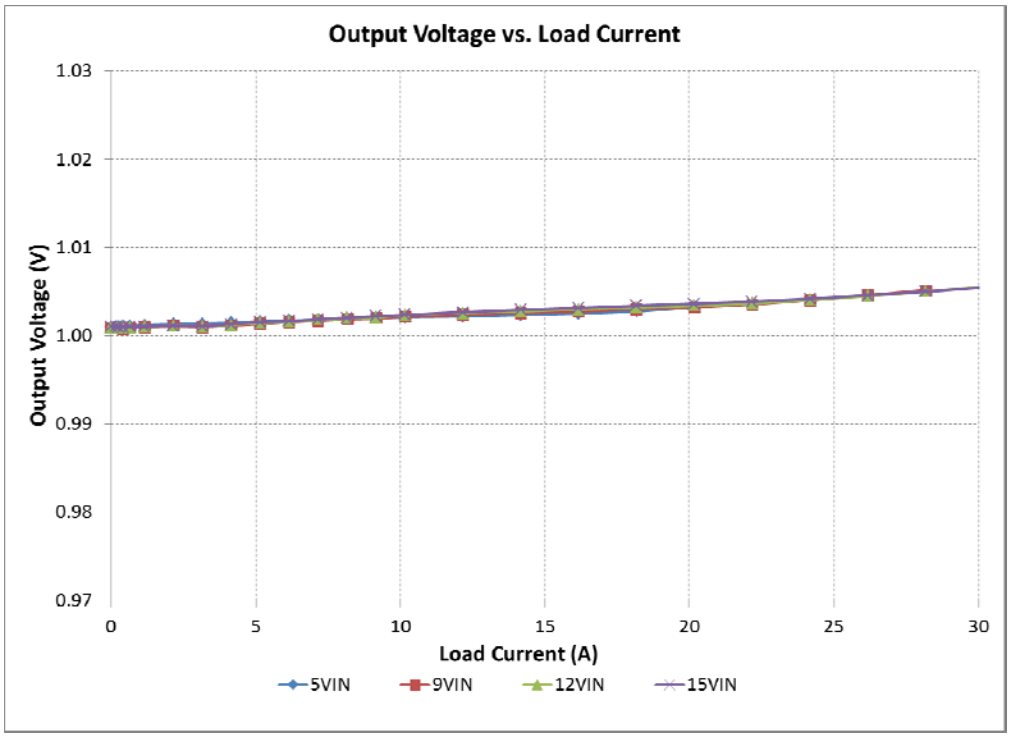
6 Efficiency – (TPS544C20 – 1V @ 30A)

The efficiency and power loss of the converter is shown in the picture below.



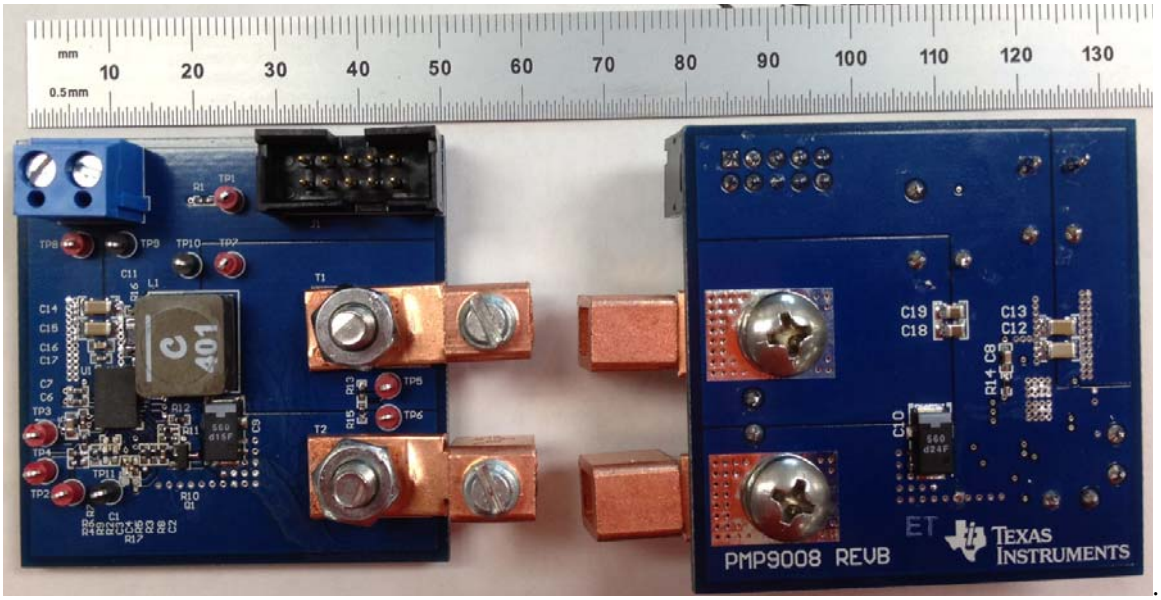
7 Load Regulation – (TPS544C20 – 1V @ 30A)

The load regulation is shown in the figure below.



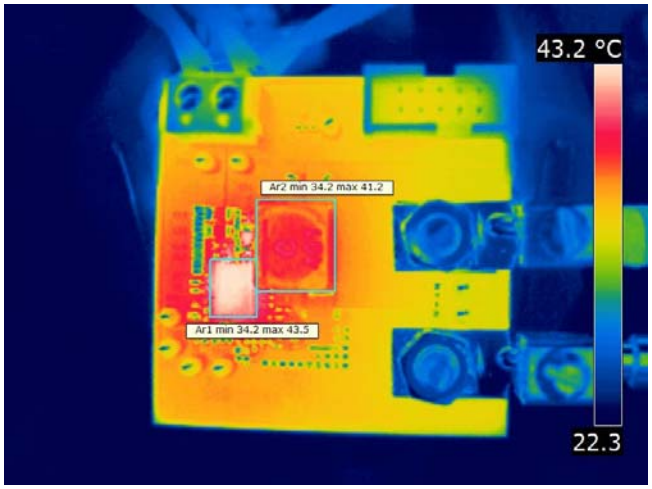
8 Board Photo

The photo below shows the PMP9008 board that is used

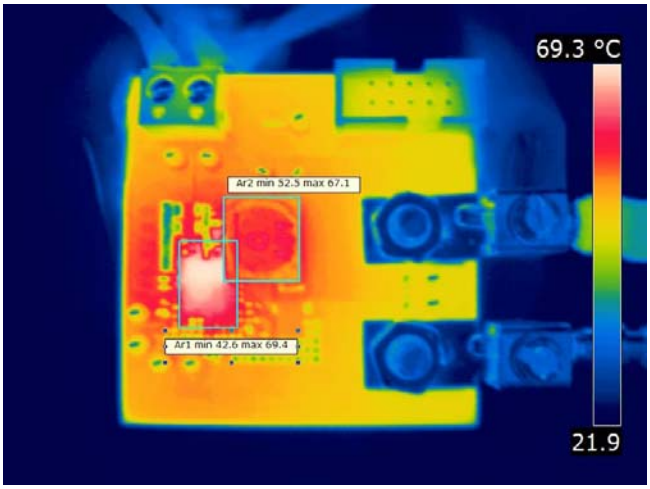


9 Thermal Images

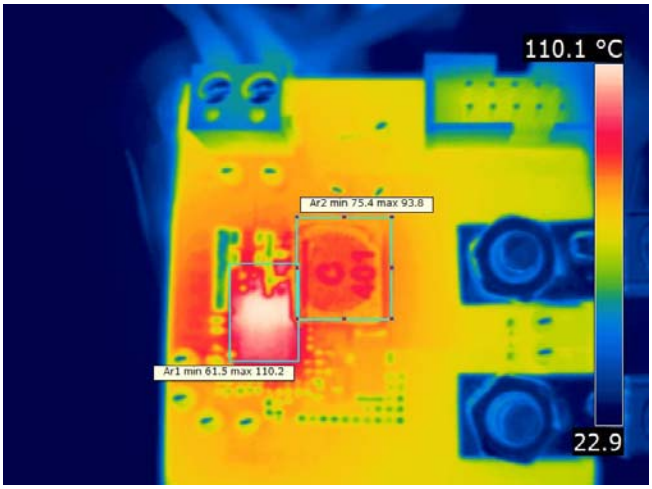
The images below show the thermal performance of the design. It is important to note that thermal performance is directly proportional to power loss and board size. Different sized and shaped boards will perform differently. The input voltage is 12V, the output current is 30A. Thermal images are taken for 10A, 20A, 30A with airflow and 30A without airflow.



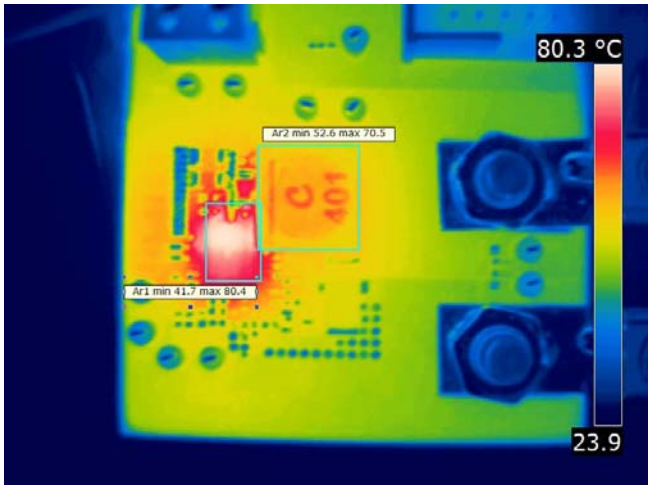
10A Load



20A Load



30A Load No Air Flow



30A load with Air Flow

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