



**PMP9035 TPS40140 (x2) Project
6/12/13**

The tests performed were as follows:

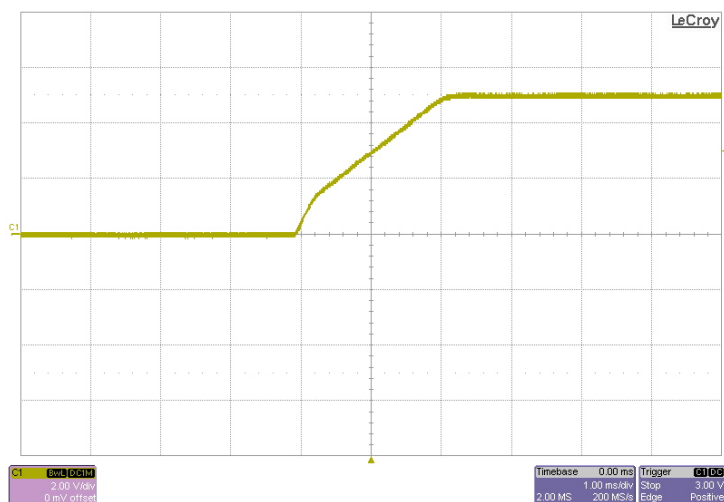
A. TPS40140

1. Turn-On (No Load)
2. Turn-Off (1A, EN shorted to GND)
3. Switch Node (Full Load and No Load)
4. Output Voltage Ripple (Full Load and No Load)
5. Transient Response (80% Load Step)
6. Efficiency
7. Load Regulation
8. Loop Response
9. Board Photo
10. Thermal Images

1 Turn On – (TPS40140 (x2) – 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.

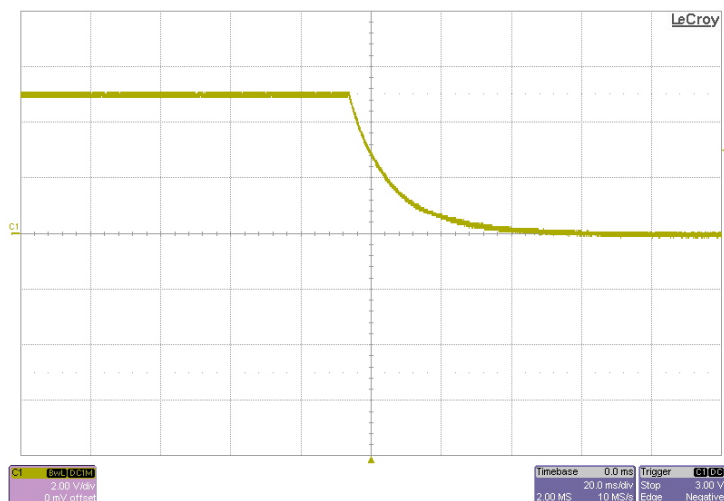
Channel 1 – Yellow : Output Voltage – (1V/Division)



2 Turn Off – (TPS40140 (x2) – 5V @ 1A)

The photo below shows the shutdown waveform. The input voltage is 12V, the output is loaded with 1A. The time-base is set to 20ms/Division.

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



3 Switch Node – (TPS40140 (X2) – 5V @ 55A)

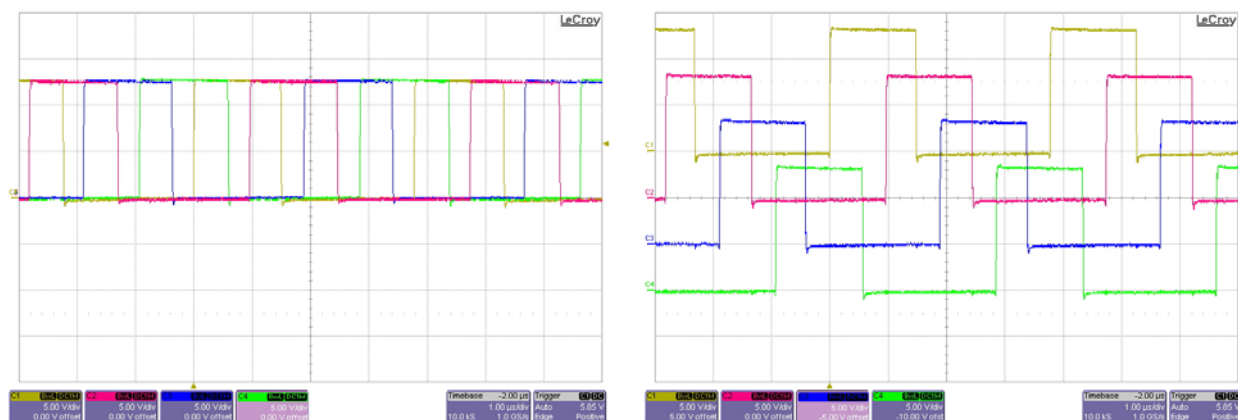
The pictures below show the switching waveforms for the converter. The input voltage is 12V. Each of the phases is shifted by 90degrees.

Channel 1 – Yellow : IC#1 Switch Node #1 – (5V/Division)

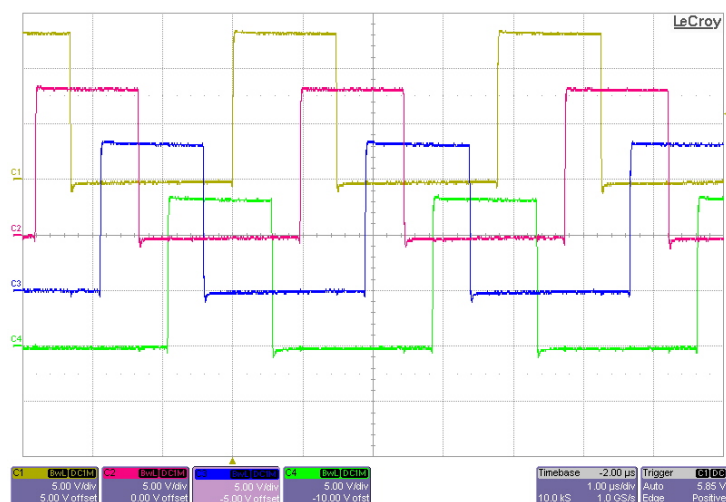
Channel 2 – Pink : IC#2 Switch Node #1 – (5V/Division)

Channel 3 – Blue : IC#1 Switch Node #2 – (5V/Division)

Channel 4 – Green : IC#2 Switch Node #2 – (5V/Division)



No Load on the Output



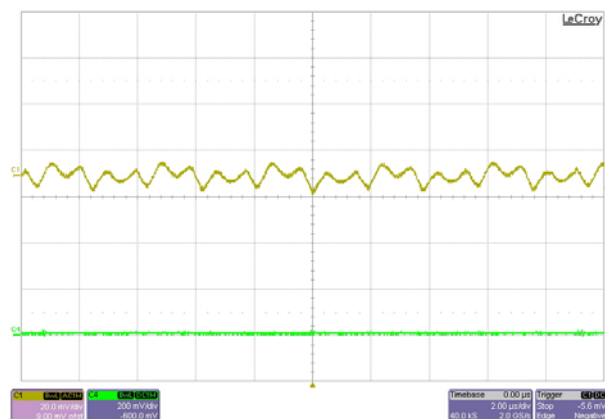
55A Load on the Output

4 Output Voltage Ripple – (TPS40140 (X2) – 5V @ 55A)

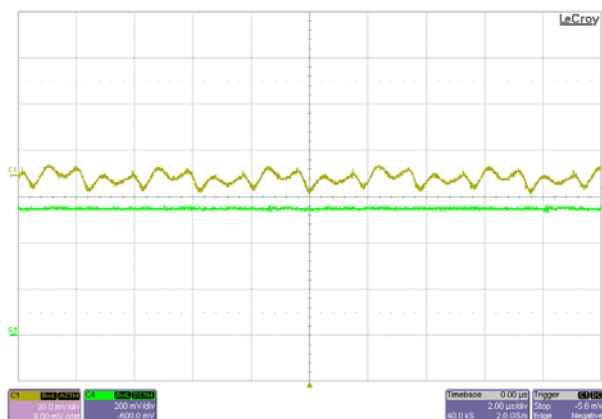
The output voltage ripple of the converter is shown in the figures below. The input voltage is 12V.

Channel 1 – Yellow : Output Voltage (20mV/Division; AC Coupled)

Channel 4 – Green : Output Current (20A/Division)



No Load



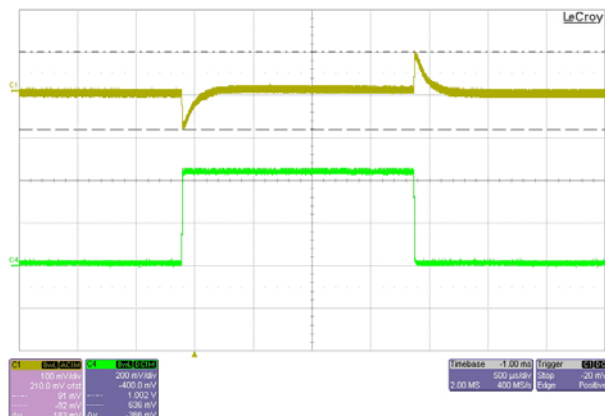
55A Load

5 Transient Response – (TPS40140 (X2) – 5V @ 55A)

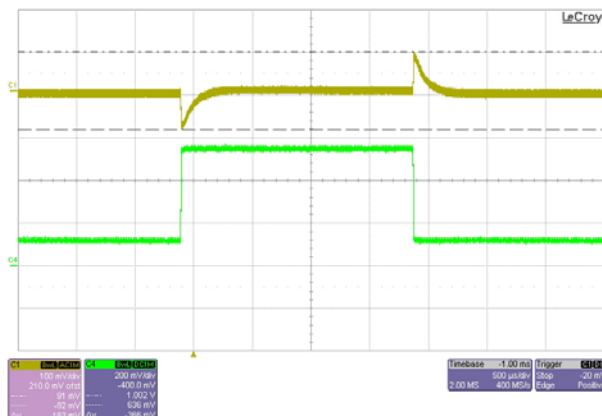
The transient response of the converter is shown in the figures below. The input voltage is 12V.

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

Channel 4 – Green : Output Current – (2A/Division)



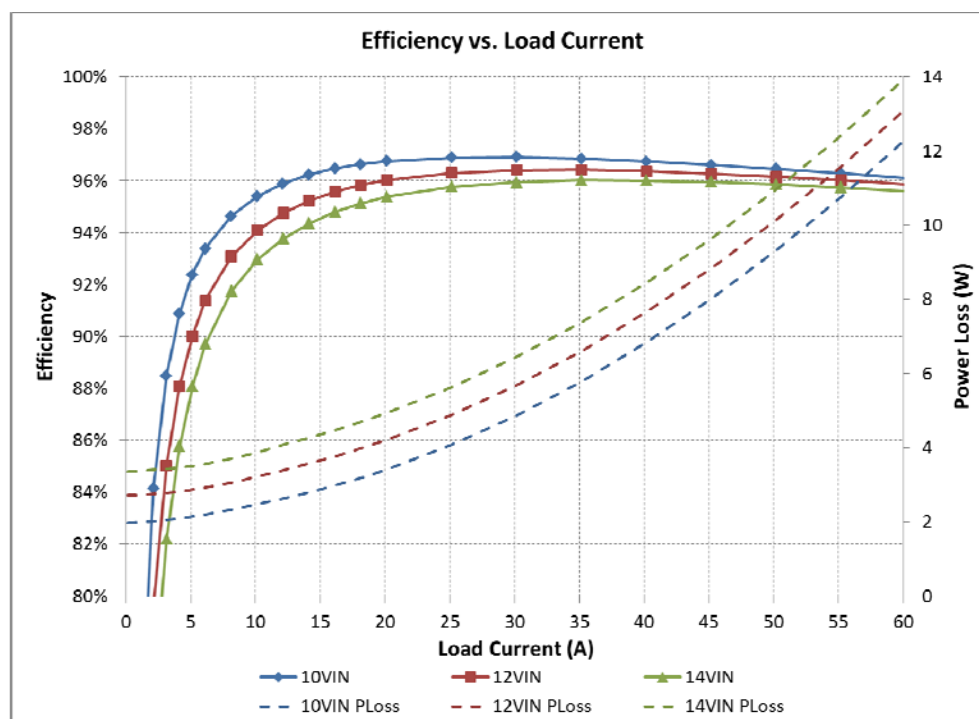
0% to 80% Load Step (0-44A)



20% to 100% Load Step (11A to 55A)

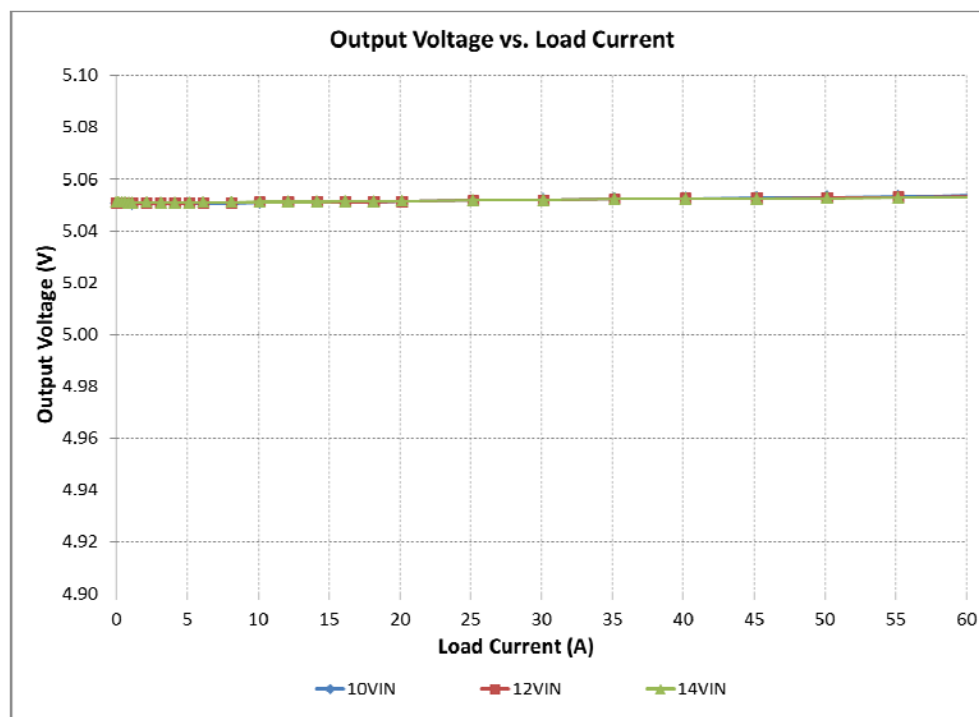
6 Efficiency – (TPS40140 (x2) – 5V @ 55A)

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



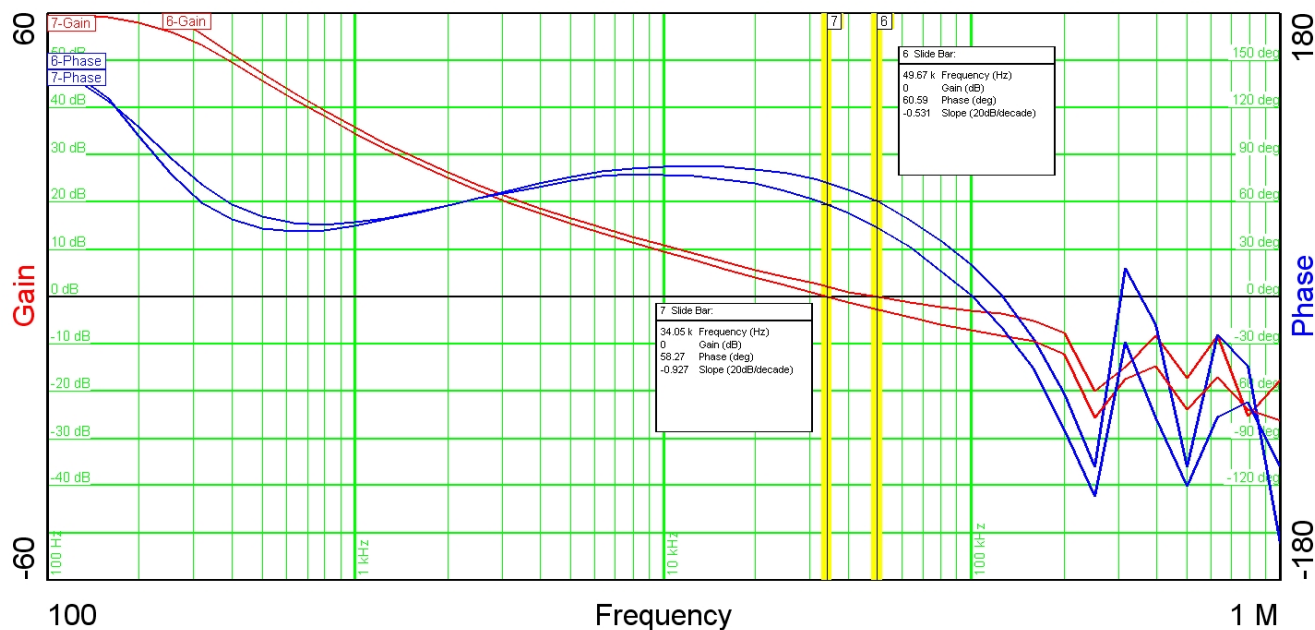
7 Load Regulation – (TPS40140 (X2) – 5V @ 55A)

The load regulation is shown in the figure below.



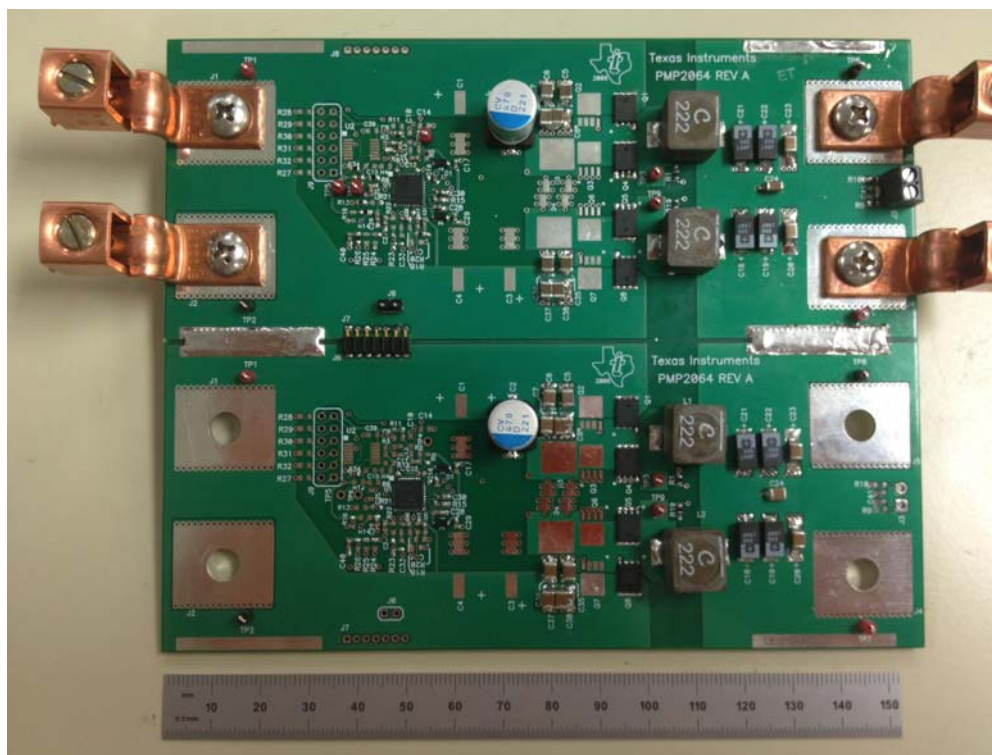
8 Loop Response

The load regulation is shown in the figure below. Plots below are shown for no load and 55A load.



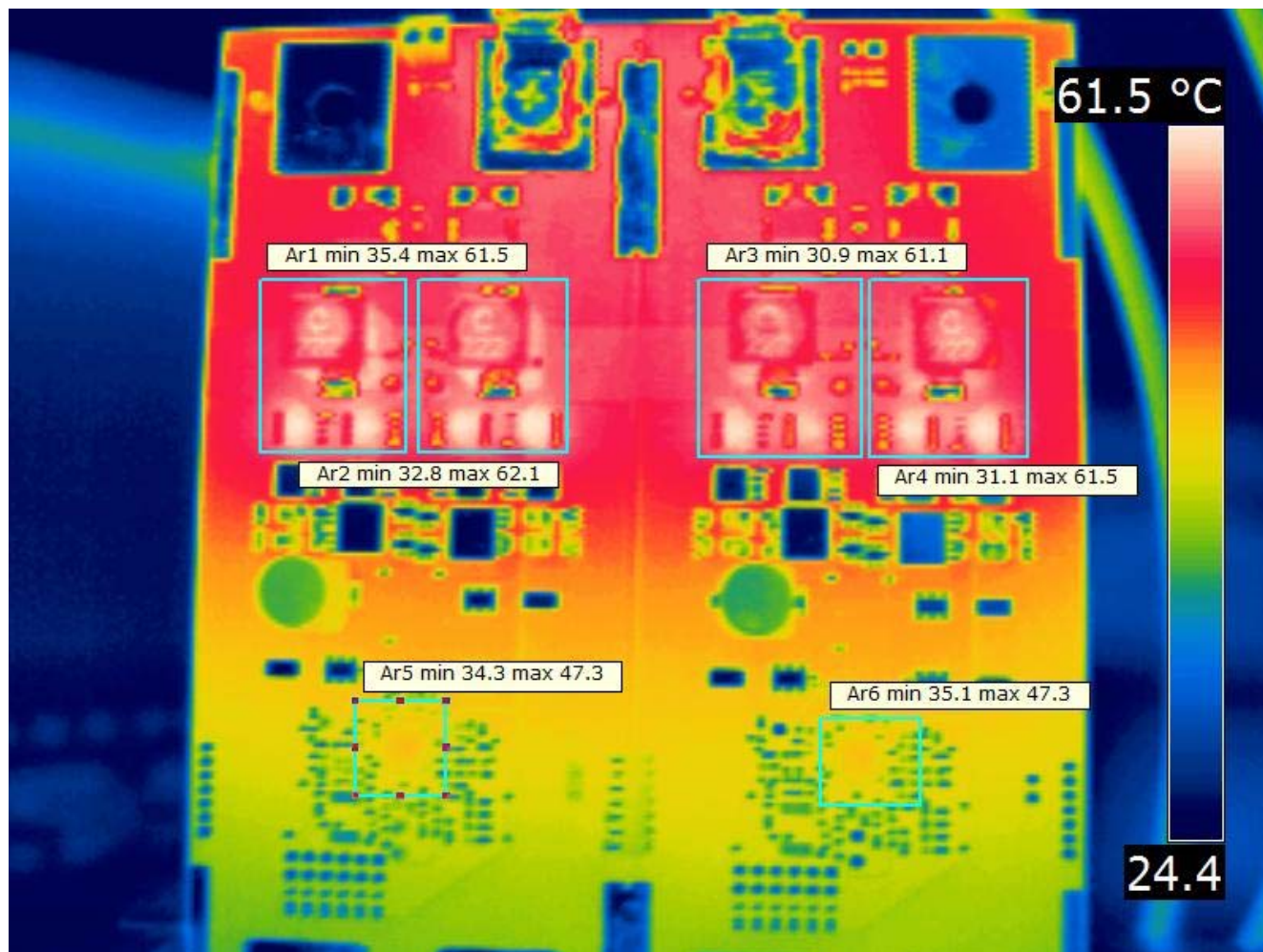
9 Board Photo

The photo below shows the 2 x PMP2064 boards that are used to create the 4 phase power supply.

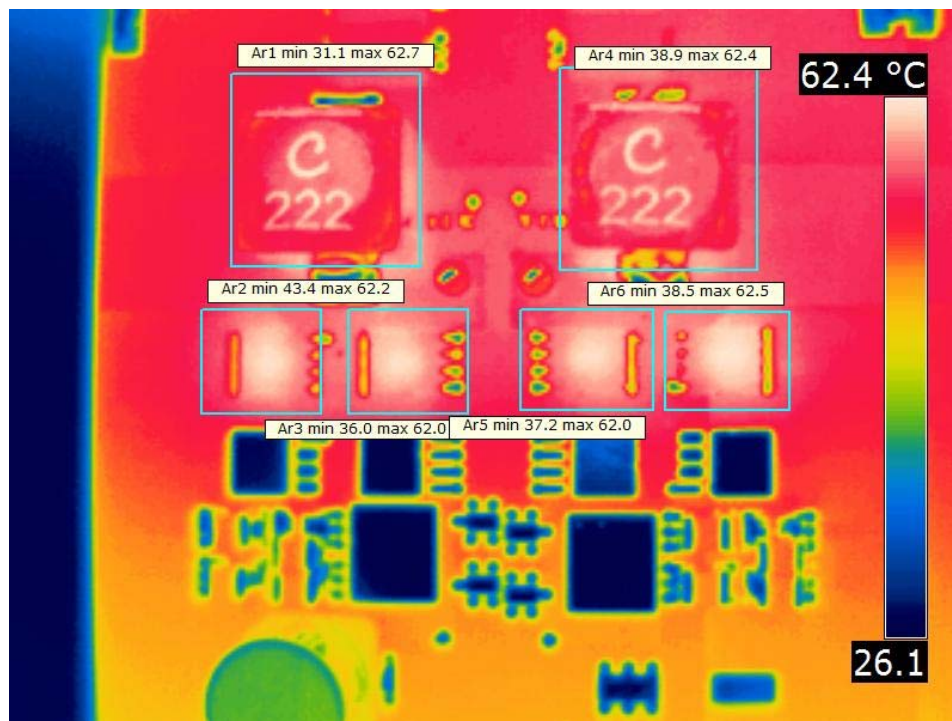


10 Thermal Images

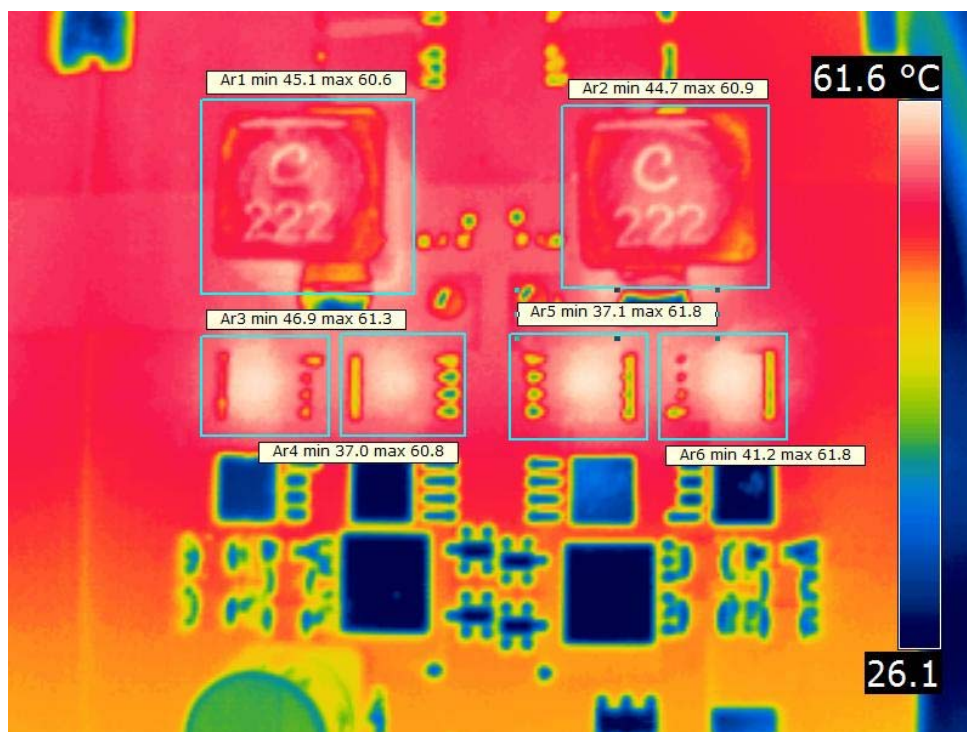
The images below show the thermal performance of the design. It is important to note that thermal performance is directly proportional to power loss and board size. Different sized and shaped boards will perform differently. The input voltage is 12V, the output current is 55A and no airflow was used. The board ran for ~15min before the images were taken.



4 Phase Supply at 55A Output



Zoom In of Left Power Stages at 55A



Zoom In of Right Power Stages at 55A

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