PMP9145/6 TPS53513/5 Project
9/17/13

The tests performed were as follows:

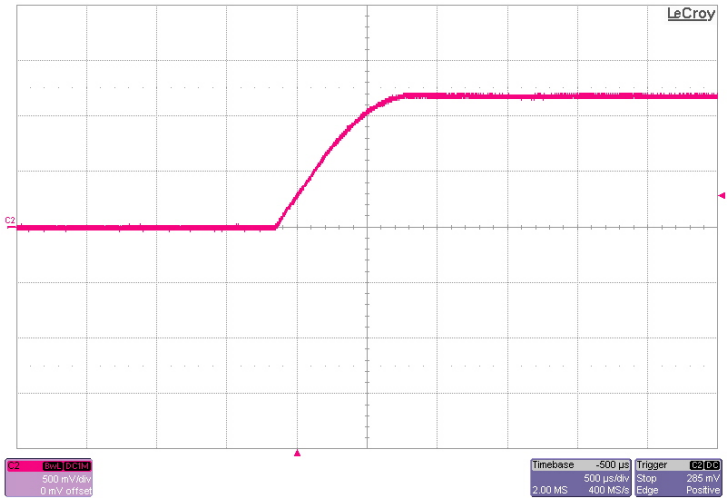
A. TPS53513/5
   1. Turn-On (No Load)
   2. Switch Node and Output Ripple (Full Load and No Load)
   3. Switch Node Jitter (Full Load and No Load)
   4. Switch Node Ringing (Full Load and No Load)
   5. Transient Response (100% and 50% Load Step)
   6. Efficiency
   7. Load Regulation
   8. Board Photo
   9. Thermal Images

PMP9145/6 Test Results Rev. A

1 Turn On – (TPS53513/5 – 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 500us/Division.

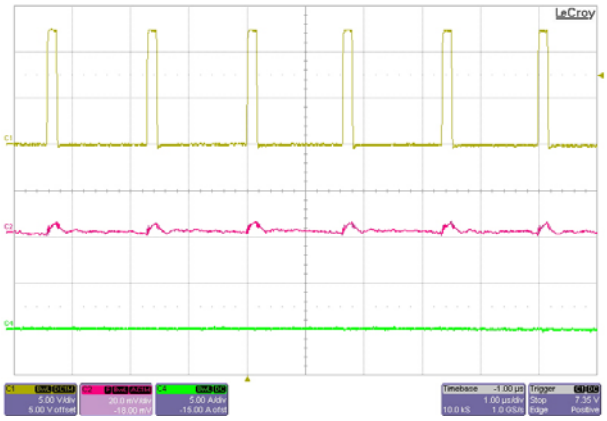
Channel 2 – Pink : Output Voltage – (500mV/Division)



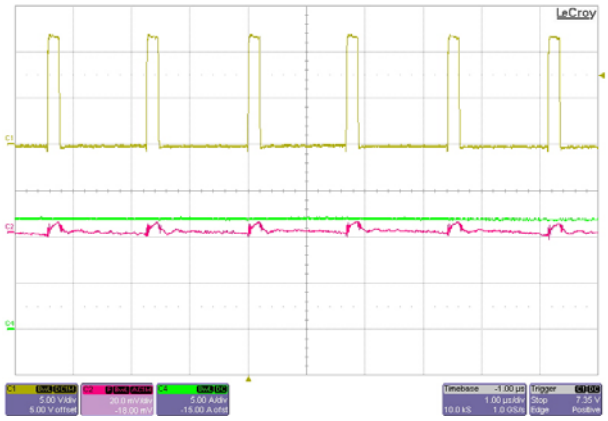
2 Switch Node and Output Ripple – (TPS53513/5 – 1.2V @ 12A)

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

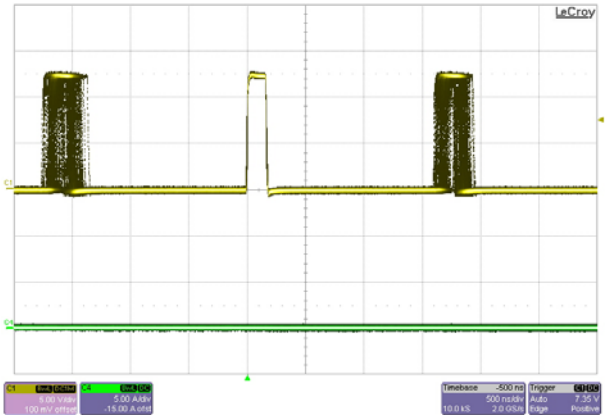


12A Load

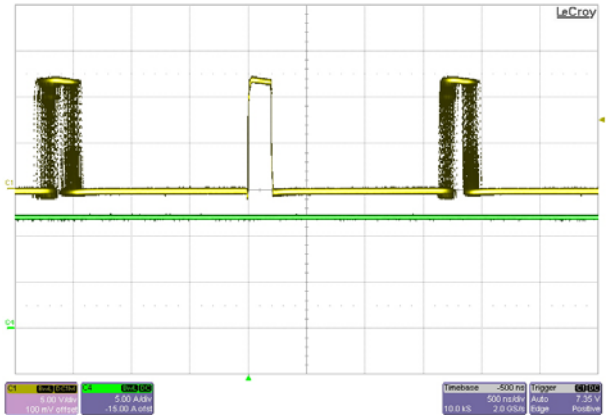
3 Swtich Node Jitter – (TPS53513/5 – 1.2V @ 12A)

The pictures below show the switch node jitter. The input is 12V.

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



No Load

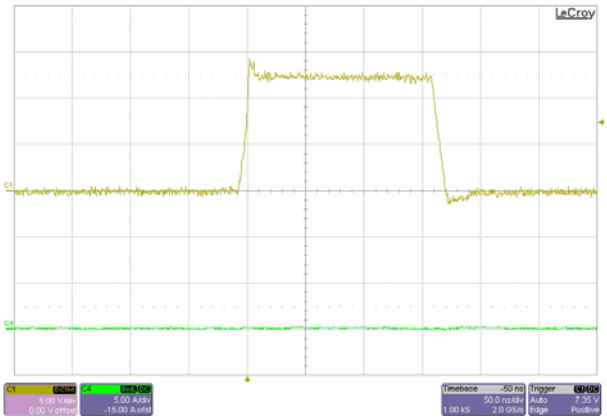


12A Load

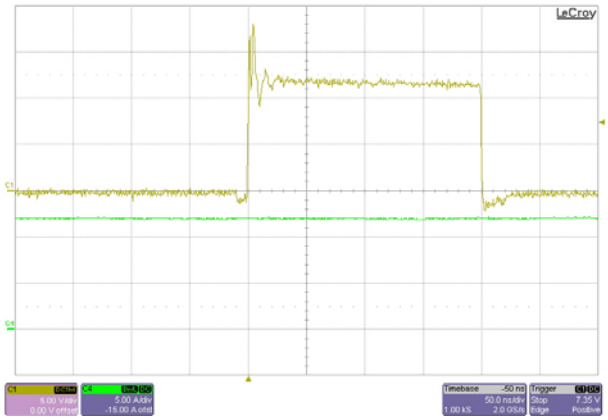
4 Switch Node Ringing – (TPS53513/5 – 1.2V @ 12A)

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



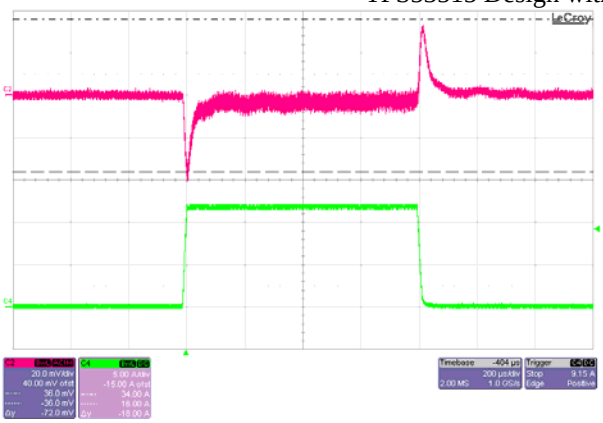
12A Load

5 Transient Response – (TPS53513/5 – 1.2V @ 12A)

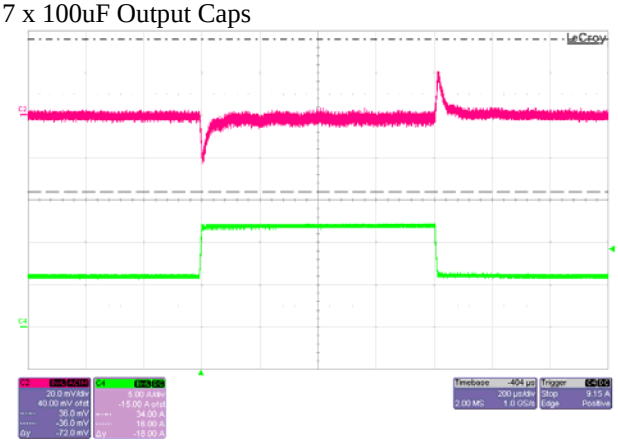
The transient response of the converter is shown in the figures below. The input voltage is 12V. All transients below meet the requirement of +/-3% of the output voltage.

Channel 2 – Pink : Output Voltage : (20mV/Division; AC Coupled)
Channel 4 – Green : Output Current – (5A/Division)

TPS53515 Design with 7 x 100uF Output Caps

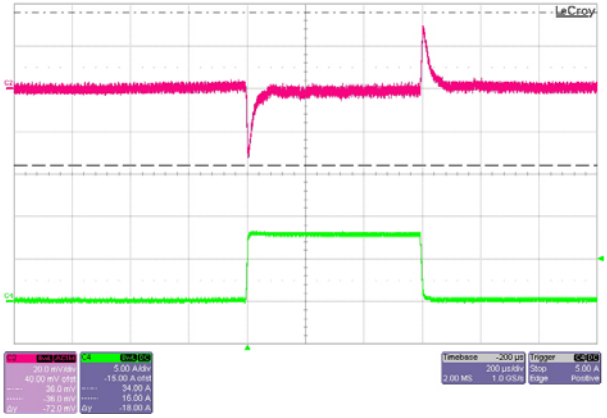


100% Load Step

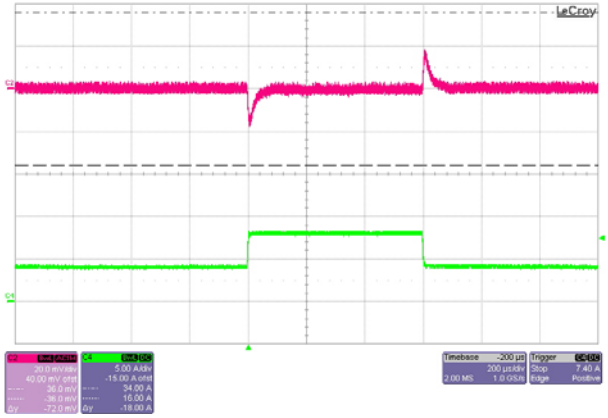


50% Load Step

TPS53513 Design with 3 x 100uF Output Caps



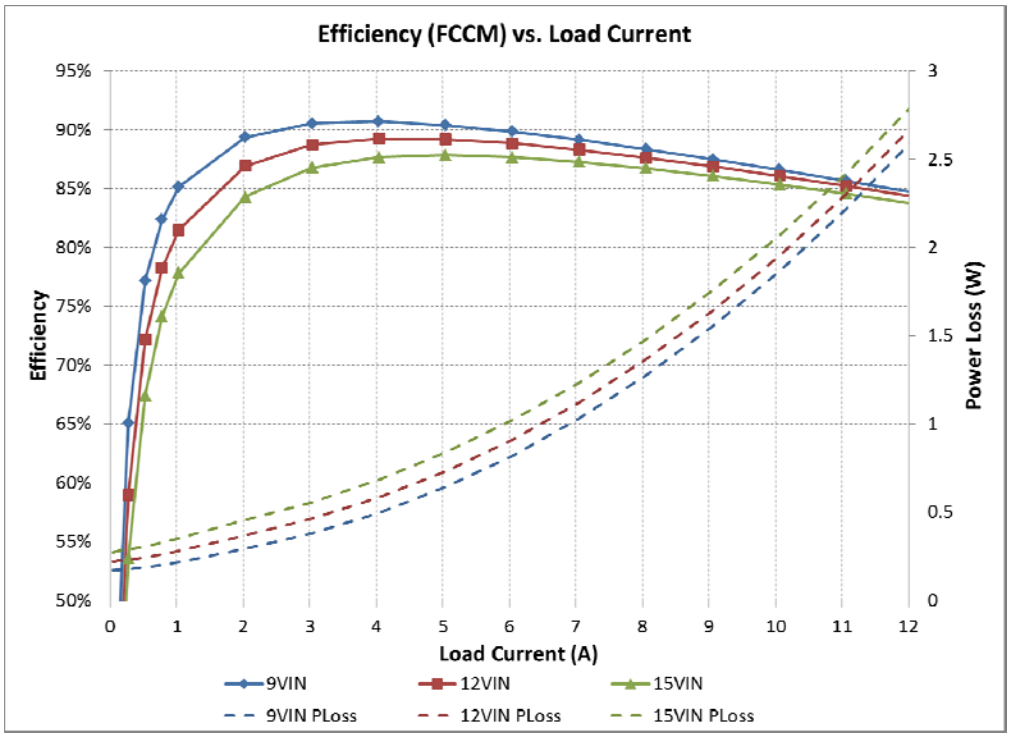
100% Load Step

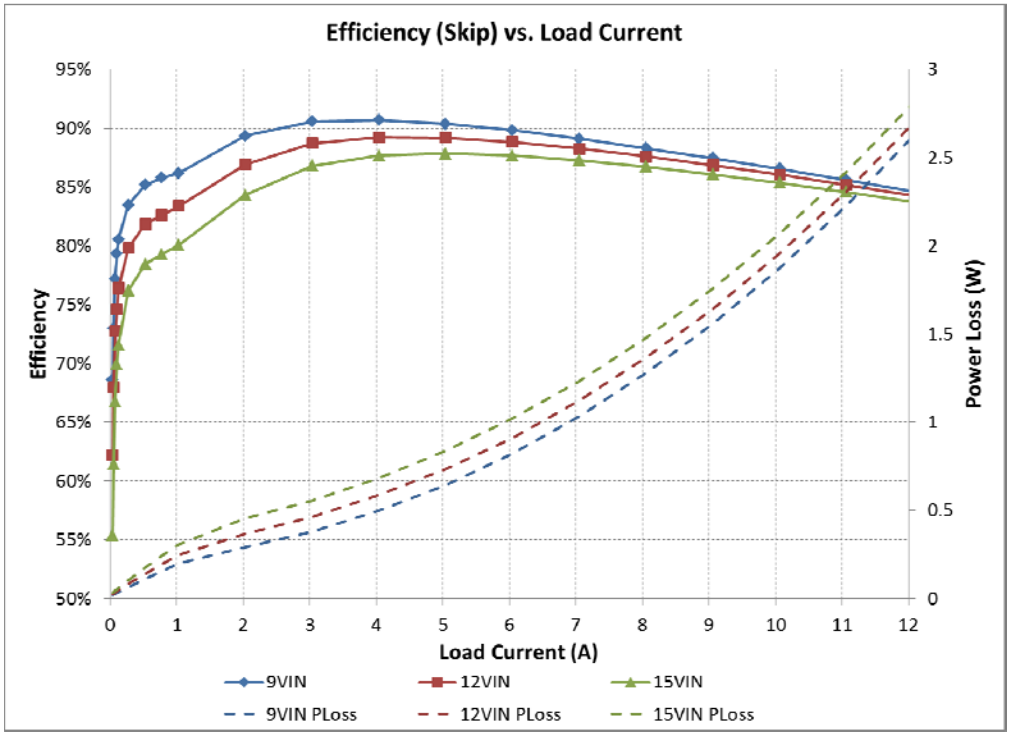


50% Load Step

6 Efficiency – (TPS53513/5 – 1.2V @ 12A)

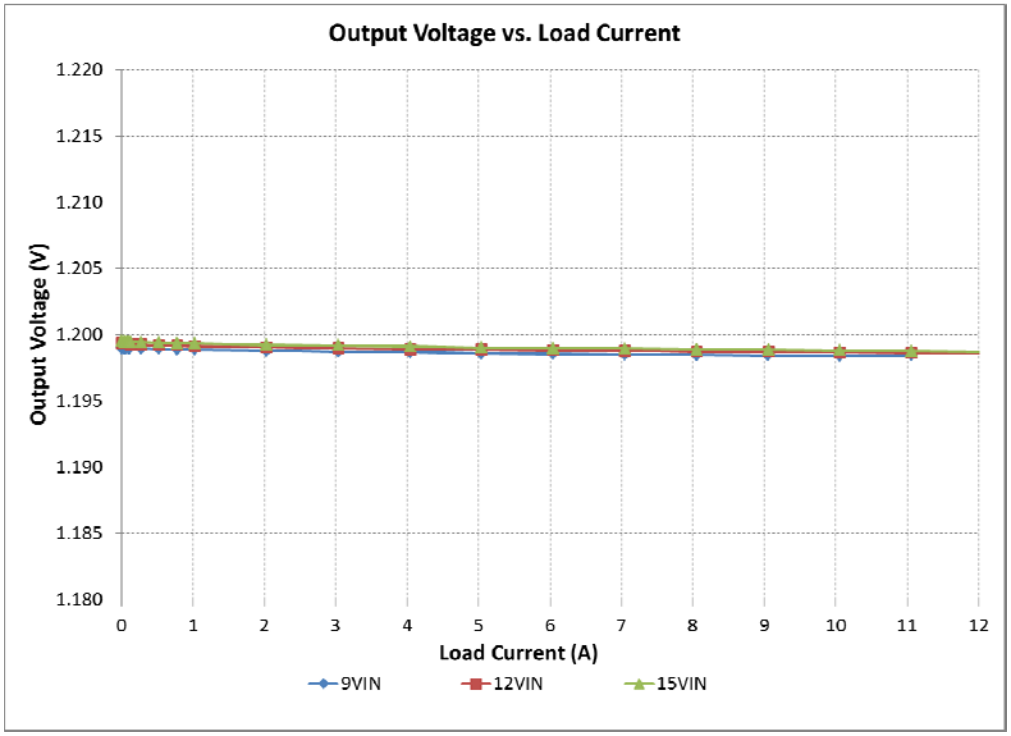
The efficiency and power loss of the converter is shown in the picture below.





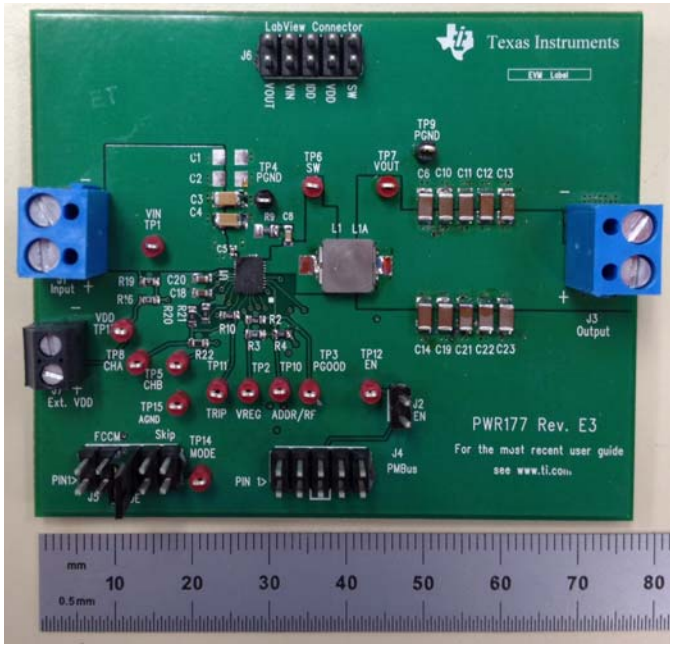
7 Load Regulation – (TPS53513/5 – 1.2V @ 12A)

The load regulation is shown in the figure below.



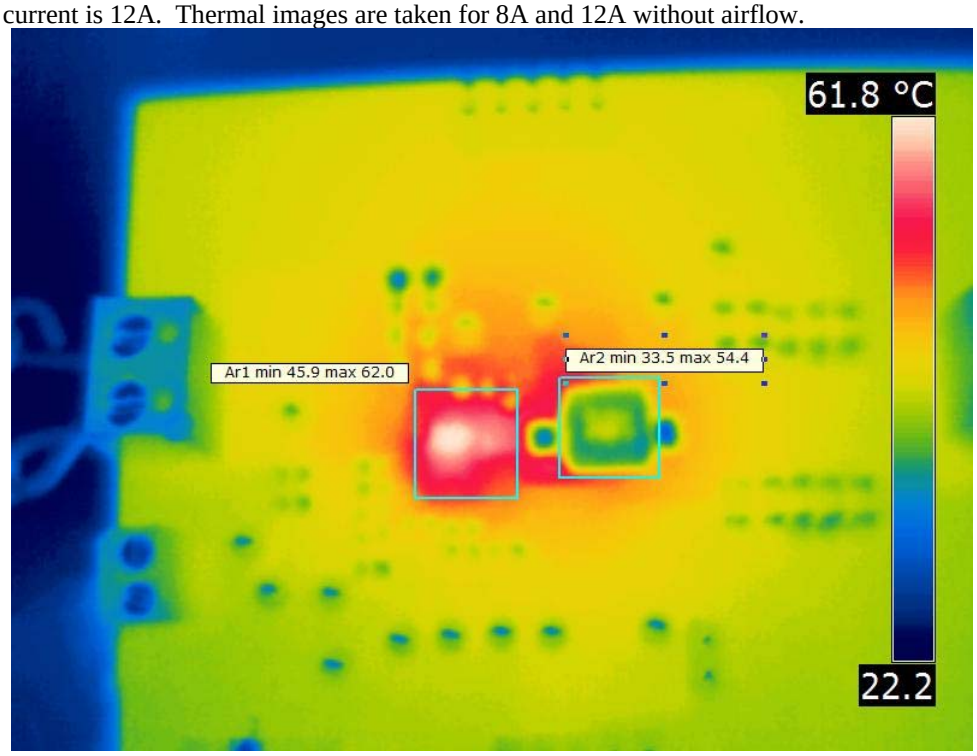
8 Board Photo

The photo below shows the PMP9145 board that is used

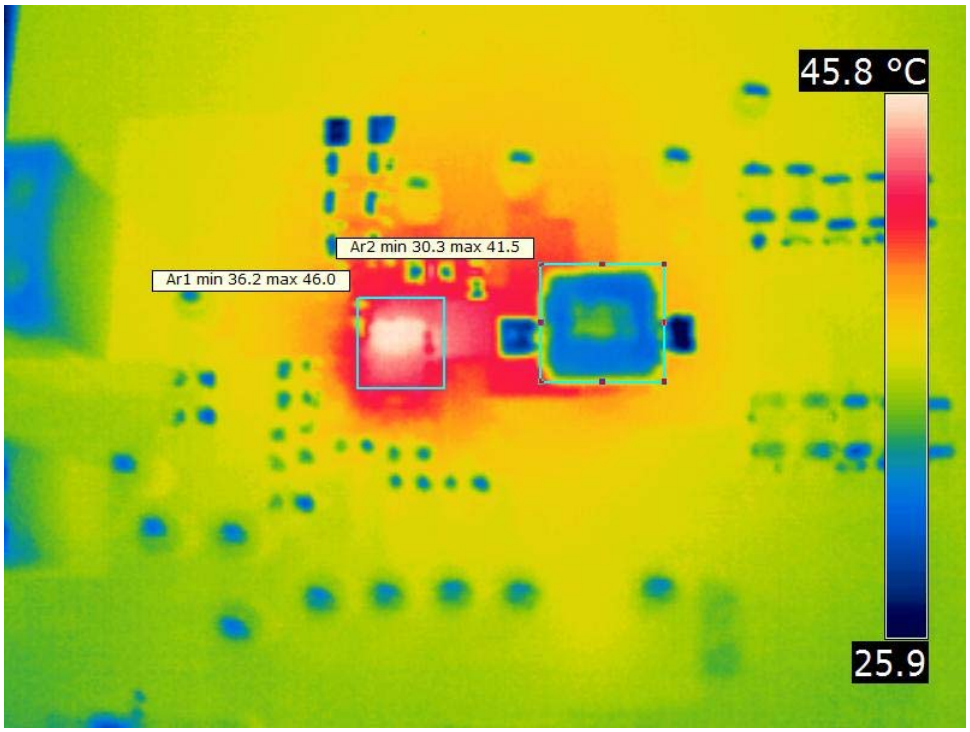


9 Thermal Images

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 12A. Thermal images are taken for 8A and 12A without airflow.



TPS53515 - 12A Output



TPS53513 - 8A Output

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