

1 Startup

The startup waveform is shown in Figure 1. The input voltage is set at 12V, with no load on the output.

- Channel C1: **input voltage**
2V/div, 20ms/div
- Channel C2: **output voltage**
2V/div, 20ms/div
- Channel C3: **enable signal**
2V/div, 20ms/div

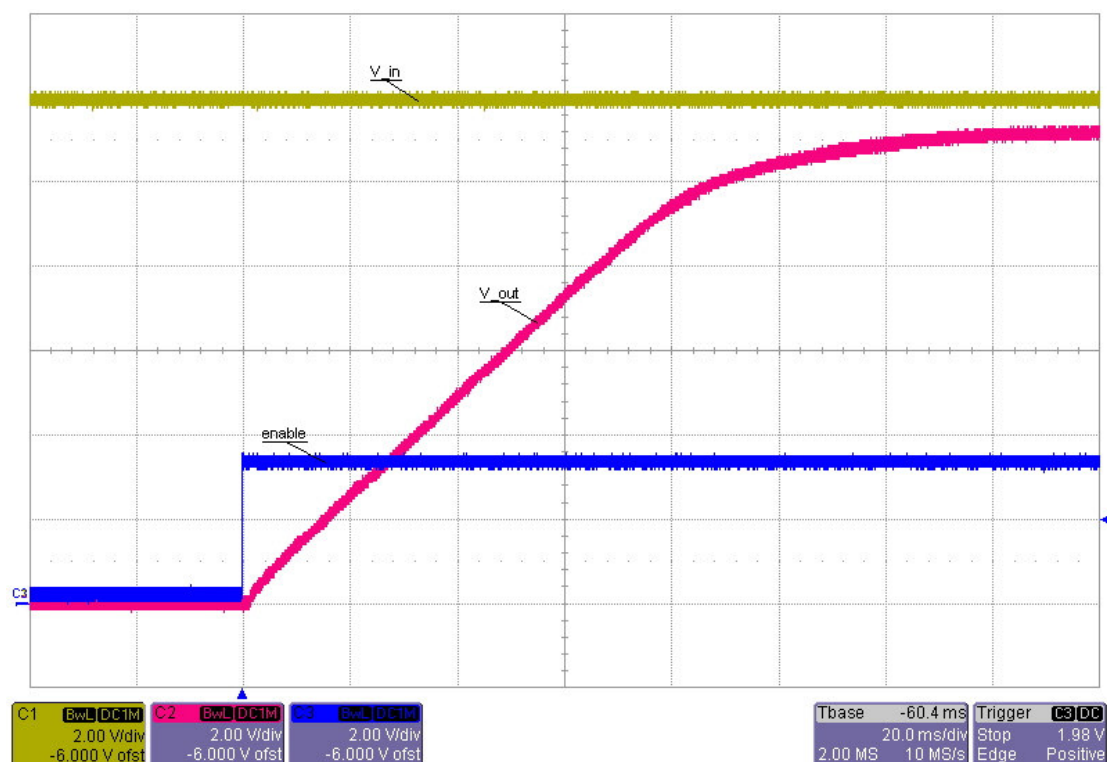


Figure 1

2 Shutdown

The shutdown waveform is shown in Figure 2. The input voltage is set at 12V with a 3.0A load on the output.

- Channel C1: **input voltage**
2V/div, 100us/div
- Channel C2: **output voltage**
2V/div, 100us/div
- Channel C3: **enable signal**
2V/div, 100us/div

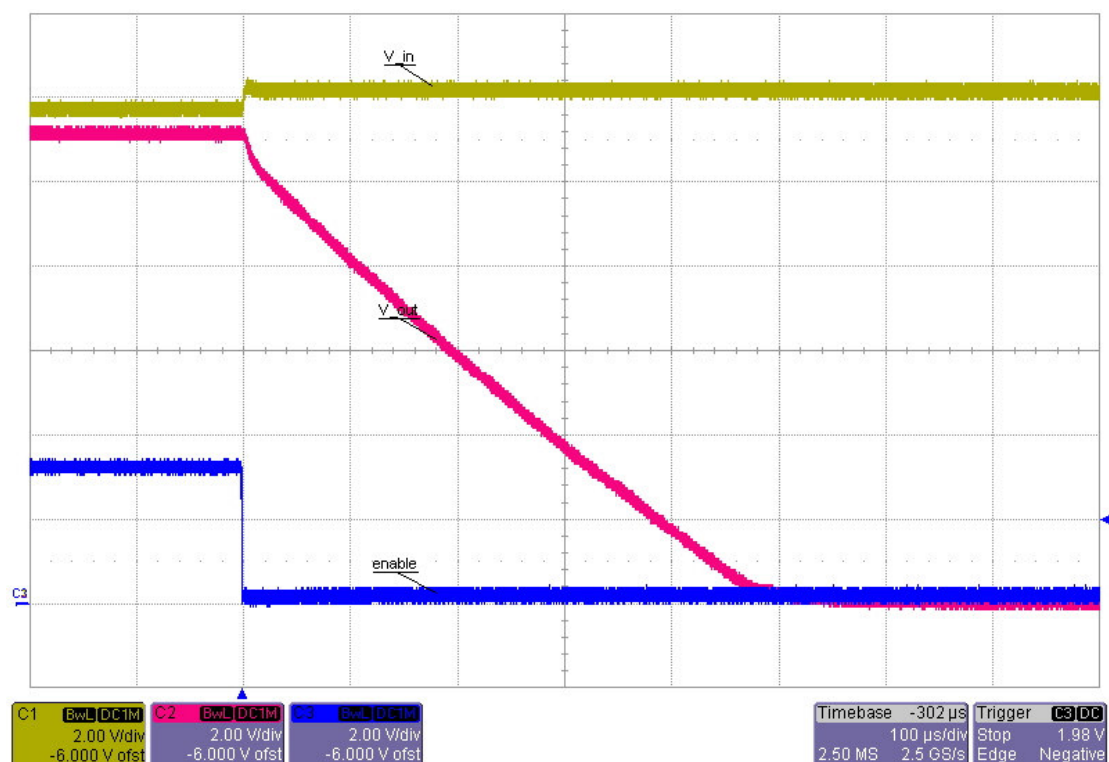


Figure 2

3 Efficiency

The efficiency is shown in Figure 3.

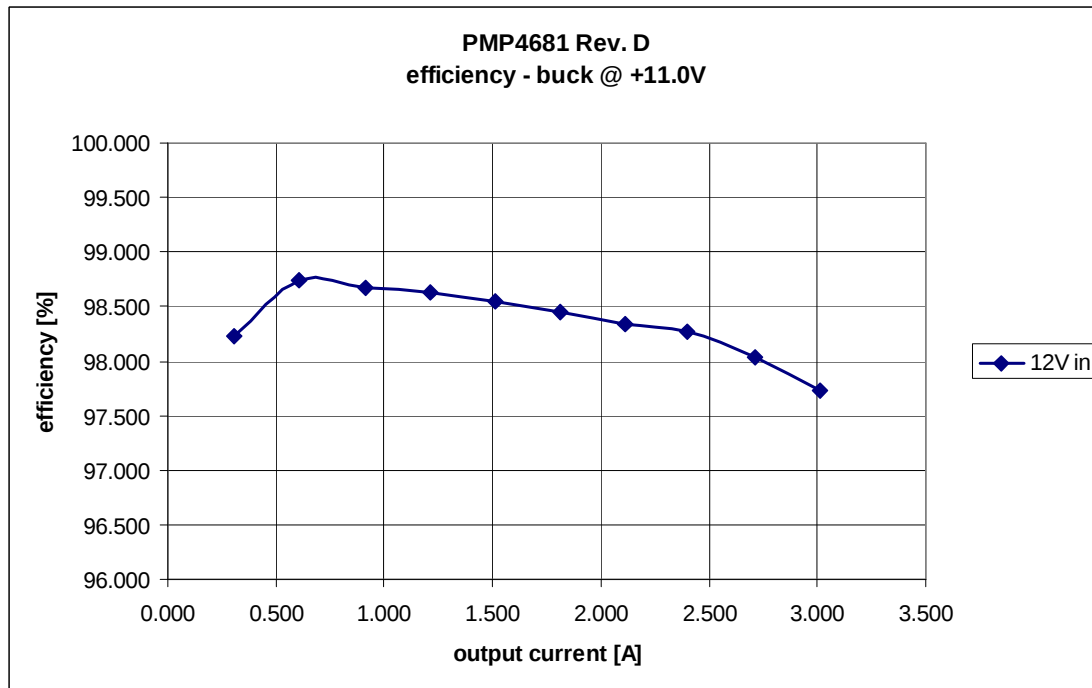


Figure 3

4 Load regulation

The load regulation of the 5V output is shown in Figure 4.

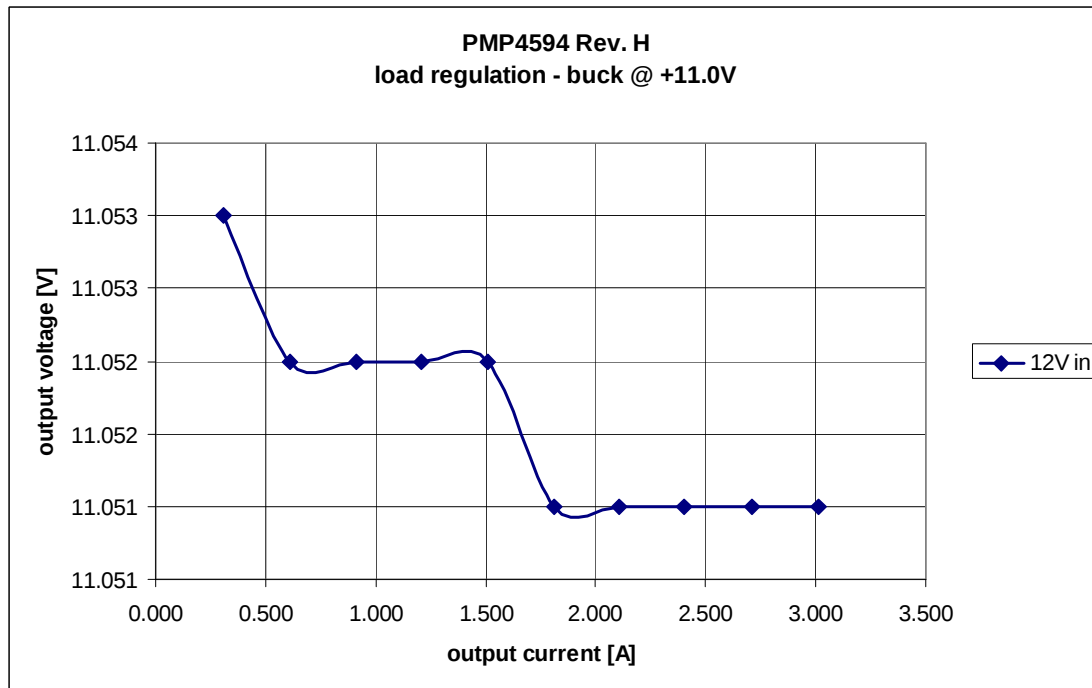


Figure 4

5 Output ripple voltage

The output ripple voltage at 3.0A load and 12.0V input voltage is shown in Figure 5.

Channel C2: **output voltage**, 25mV peak-peak
20mV/div, 5 μ s/div, AC coupled

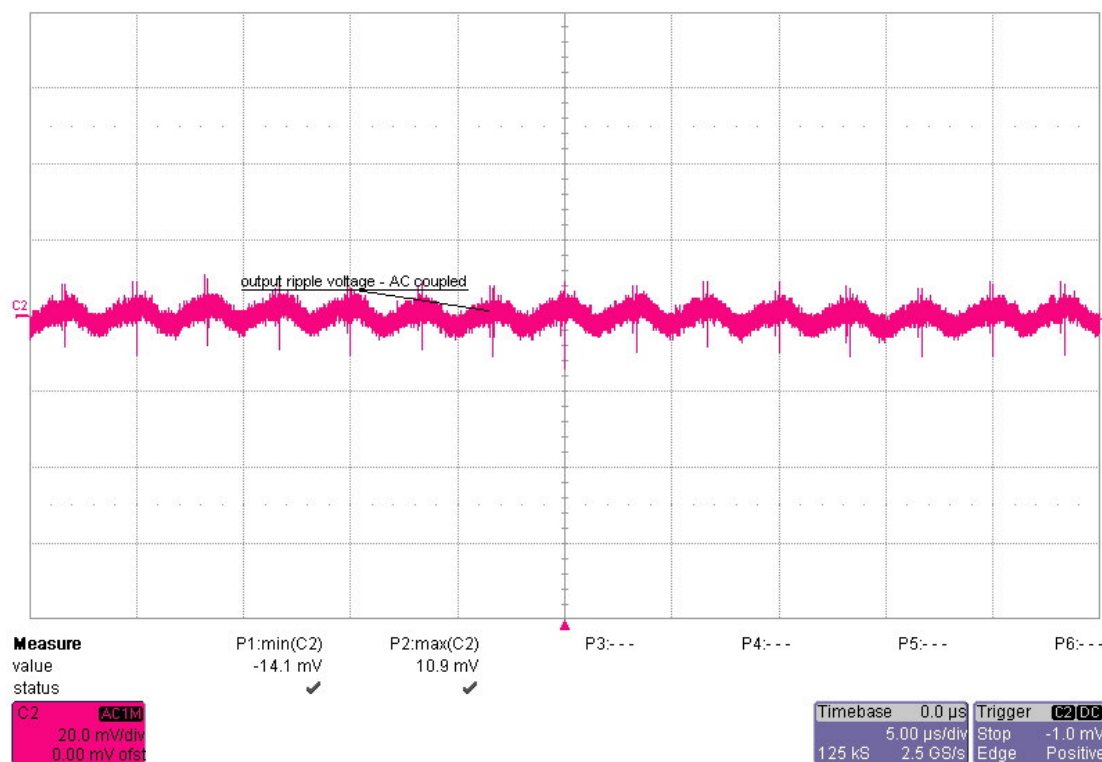


Figure 5

6 Transient response

The transient response at an input voltage of 12.0V is shown in Figure 6.

Channel C2: **output voltage**, -136mV undershoot, 136mV overshoot
100mV/div, 1ms/div, AC coupled

Channel C1: **load current**, load step 2.1A to 3.0A and vice versa
1A/div, 1ms/div

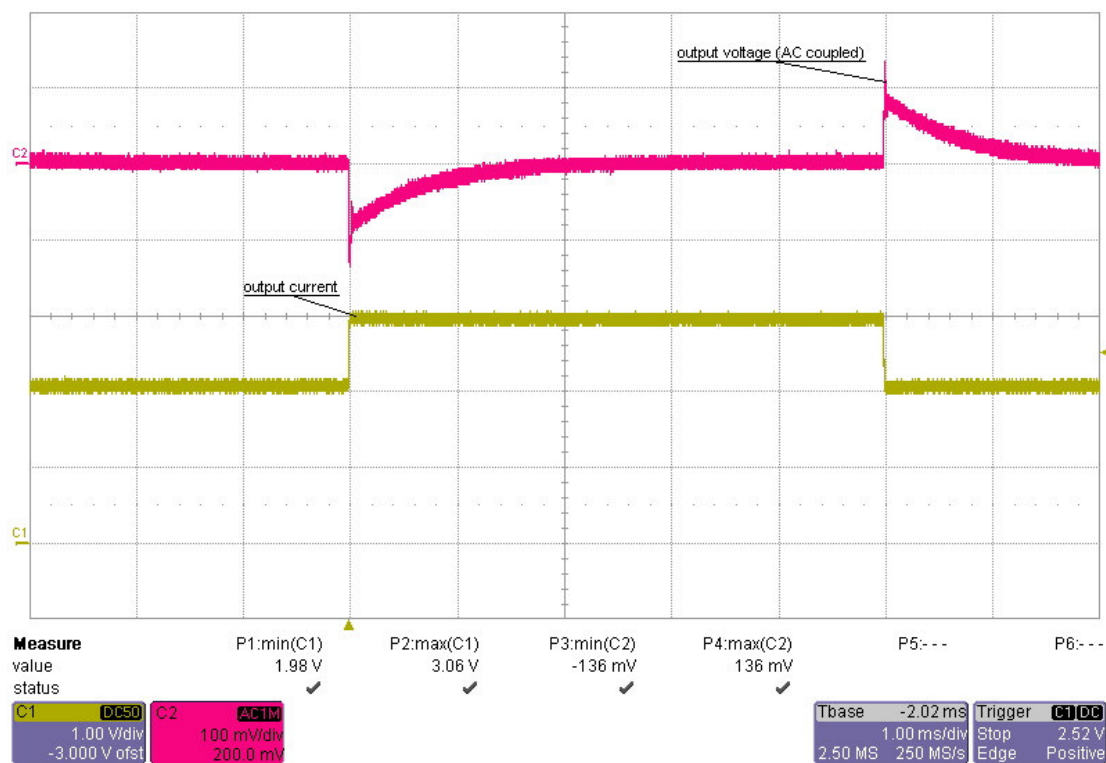


Figure 6

7 Frequency response

Figure 7 shows the loop response of the +11.0V output with 12.0V input and a 3.0A load.

61 deg phase margin @ crossover frequency 21.3 kHz

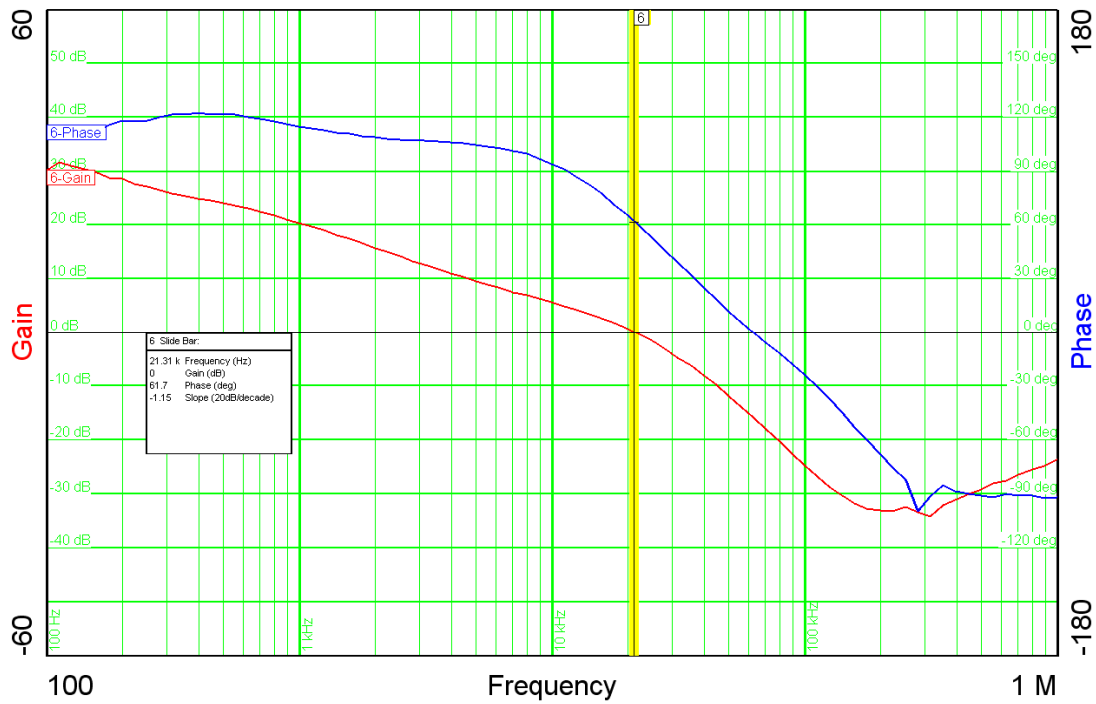


Figure 7

8 Miscellaneous waveforms

The drain-source voltage on the switching node is shown in Figure 8. The image was captured with a 12V input and a 3.0A load.

Channel C2: **drain-source voltage**, -1.3V minimum voltage, 12.4V maximum voltage
2V/div, 2 μ s/div

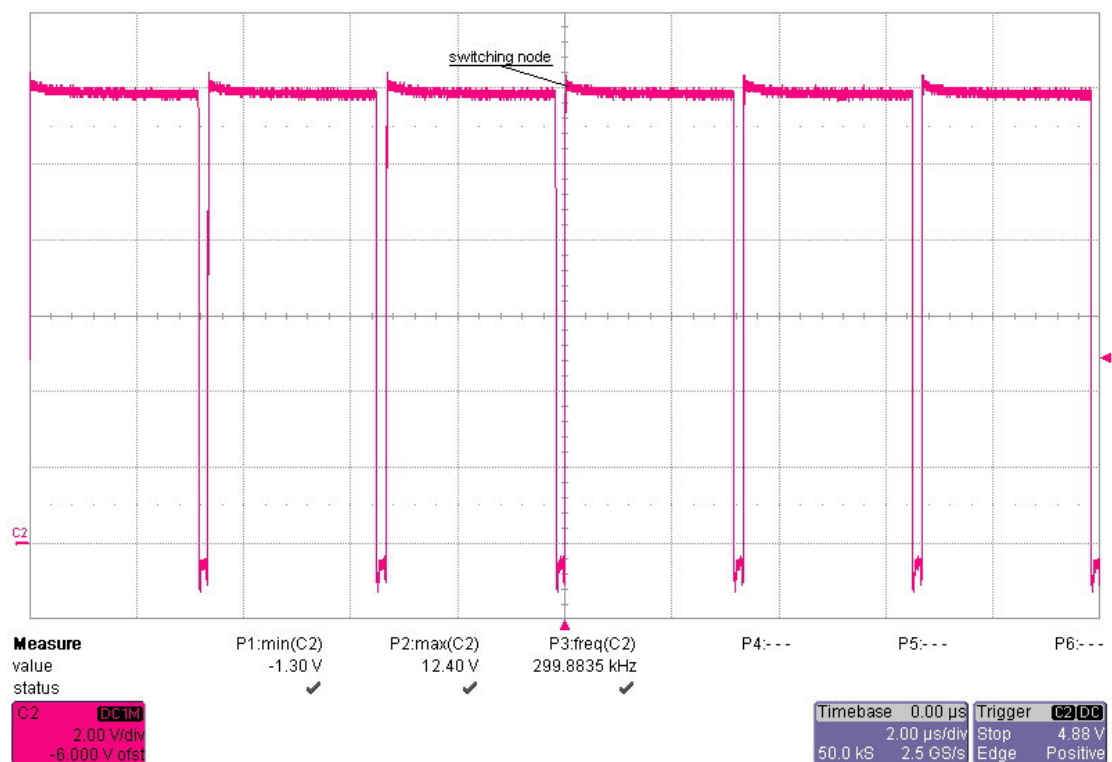


Figure 8

9 Thermal measurement

The thermal image (Figure 9) shows the circuit at an ambient temperature of 25 °C with an input voltage of 12V and a load of 2.5A.

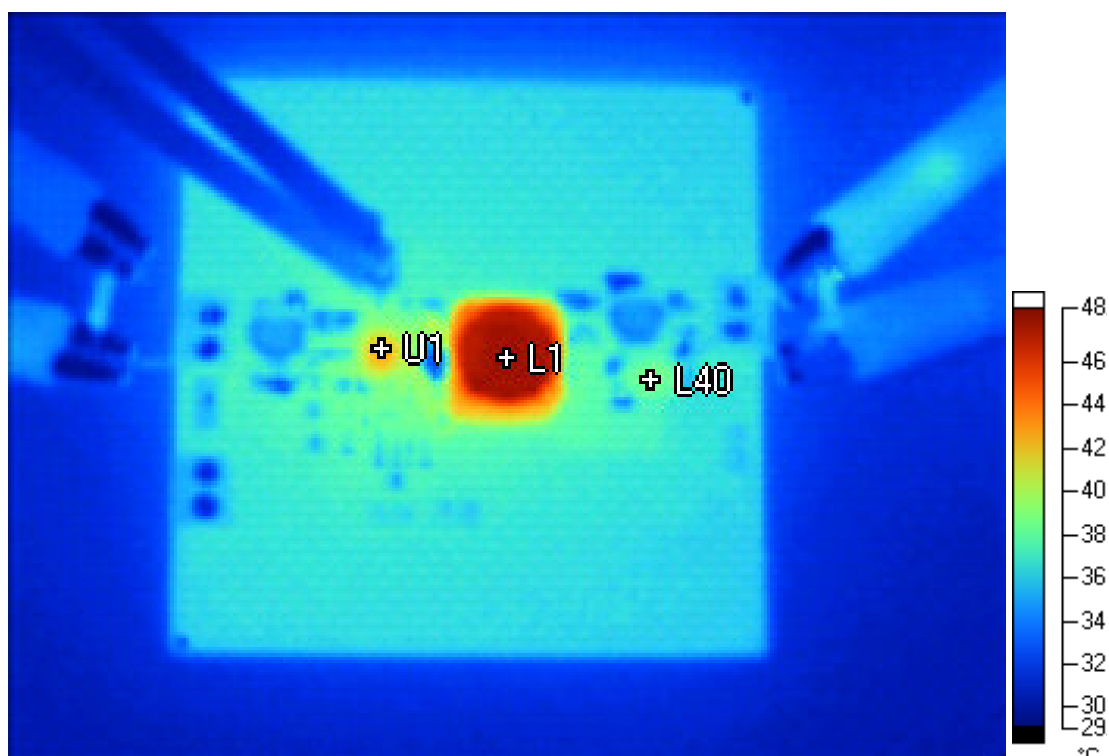


Figure 9

device	max. temperature	measured temp. @ 25 °C
U1 – TPS54620	150 °C	42.1 °C
L1 – inductor 18uH	85 °C	48.2 °C
L40 – inductor 22nH	125 °C	38.7 °C

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