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

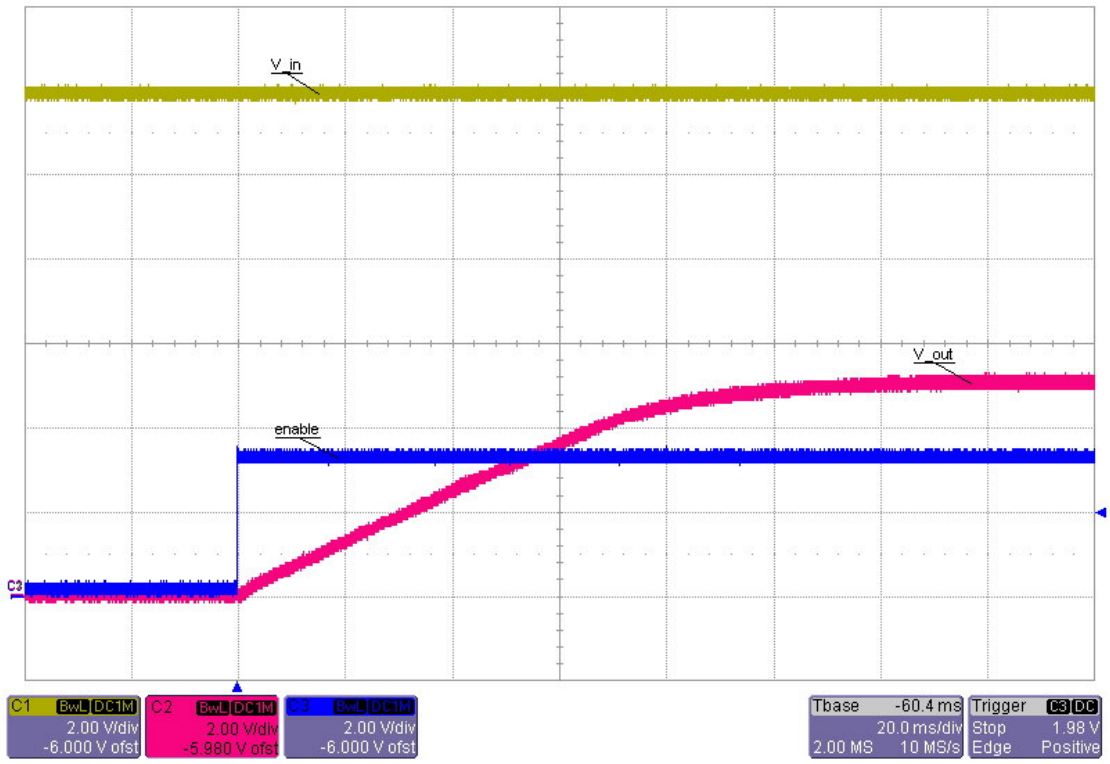

Figure 1

2 Shutdown

The shutdown waveform is shown in Figure 2. The input voltage is set at 12V with a 2.5A 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

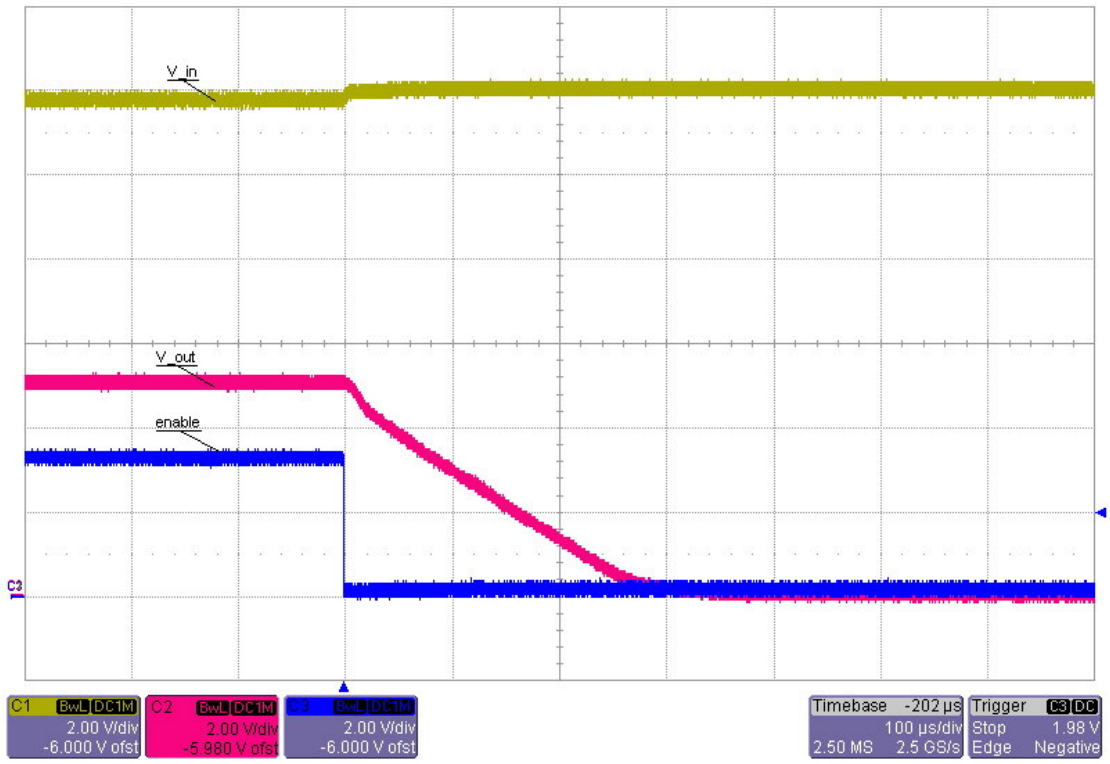

Figure 2

3 Efficiency

The efficiency is shown in Figure 3.

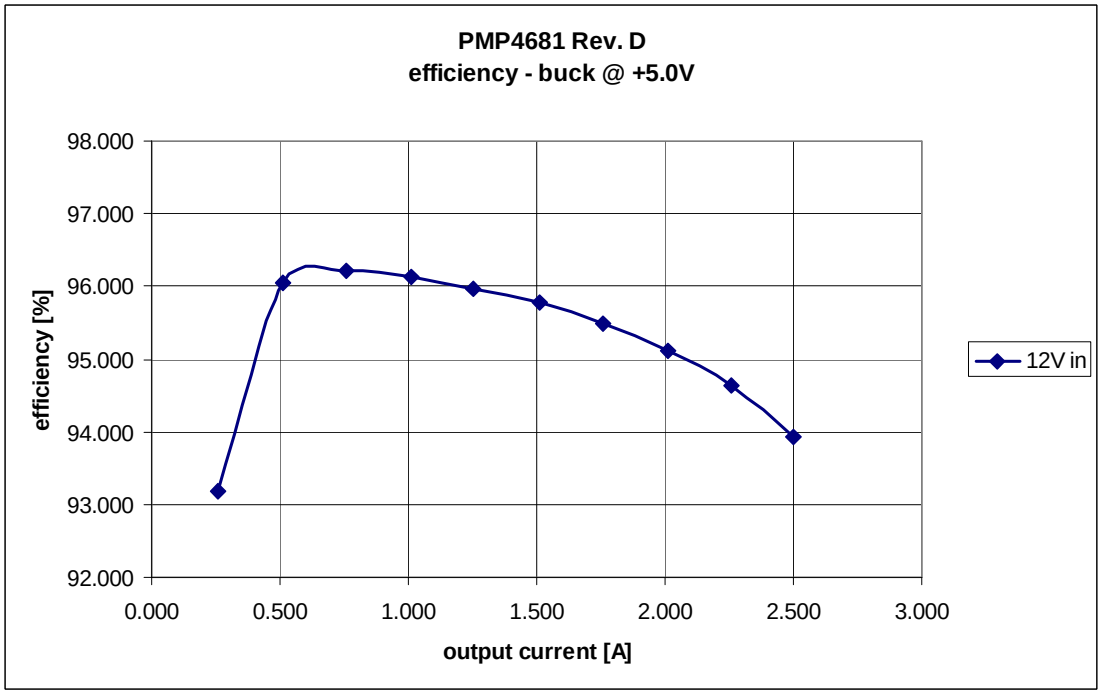

Figure 3

4 Load regulation

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

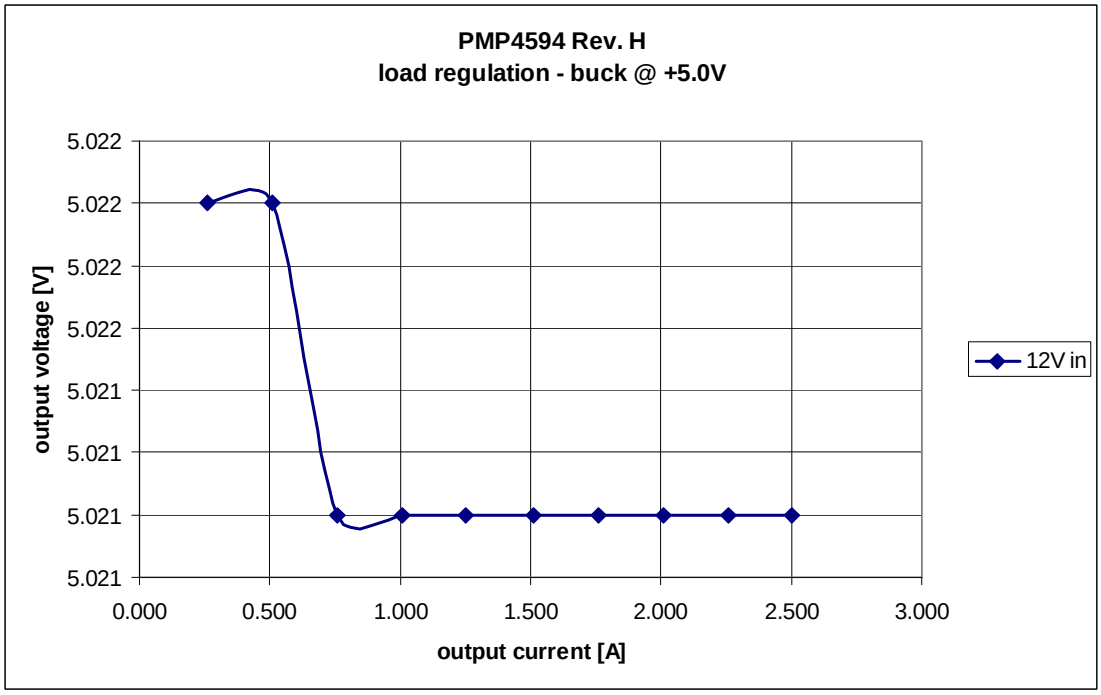

Figure 4

5 Output ripple voltage

The output ripple voltage at 2.5A load and 12.0V input voltage is shown in Figure 5.

Channel C2: **output voltage**, 28mV peak-peak
20mV/div, 2us/div, AC coupled

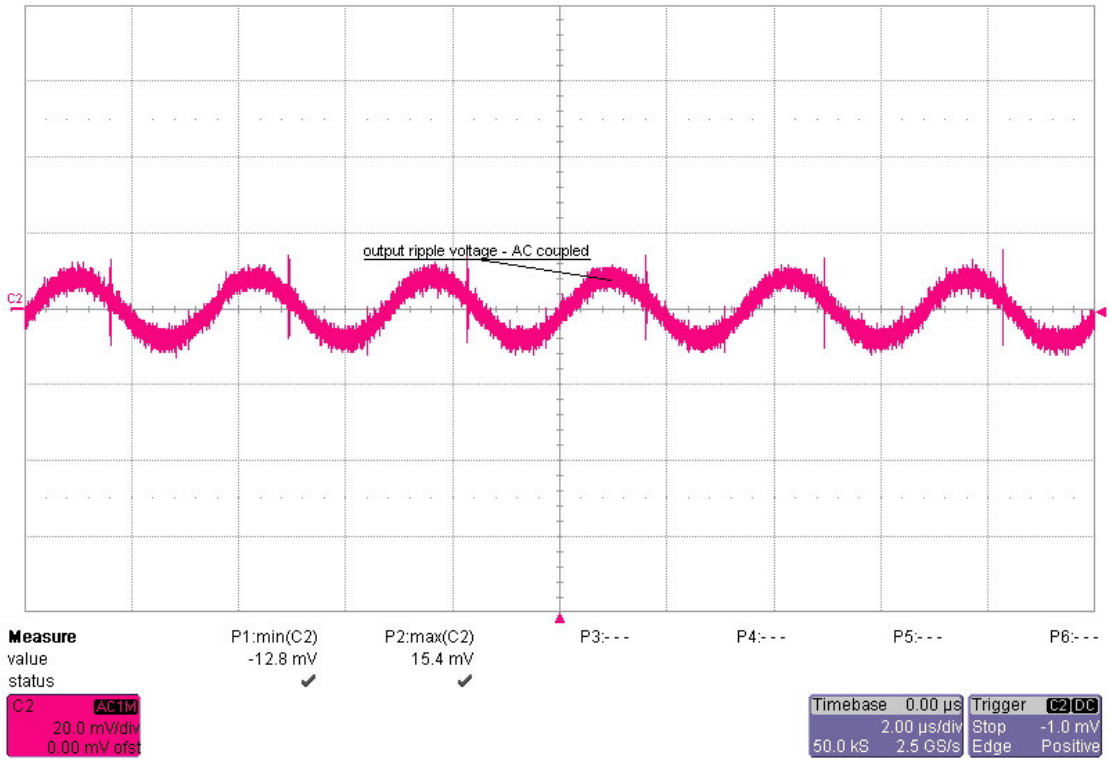

Figure 5

6 Transient response

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

Channel C2: **output voltage**, -98mV undershoot, 94mV overshoot
100mV/div, 1ms/div, AC coupled

Channel C1: **load current**, load step 1.7A to 2.5A
1A/div, 1ms/div

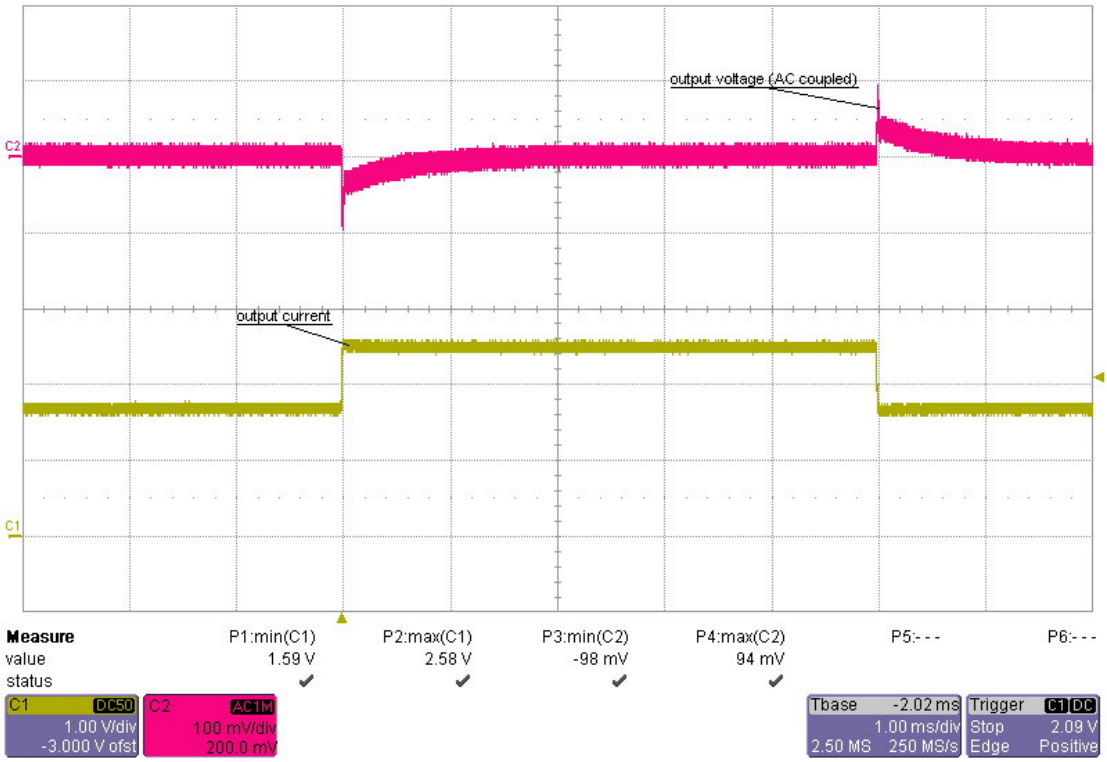

Figure 6

7 Frequency response

Figure 7 shows the loop response of the +5.0V output with 12.0V input and a 2.5A load.

60 deg phase margin @ crossover frequency 20.8 kHz

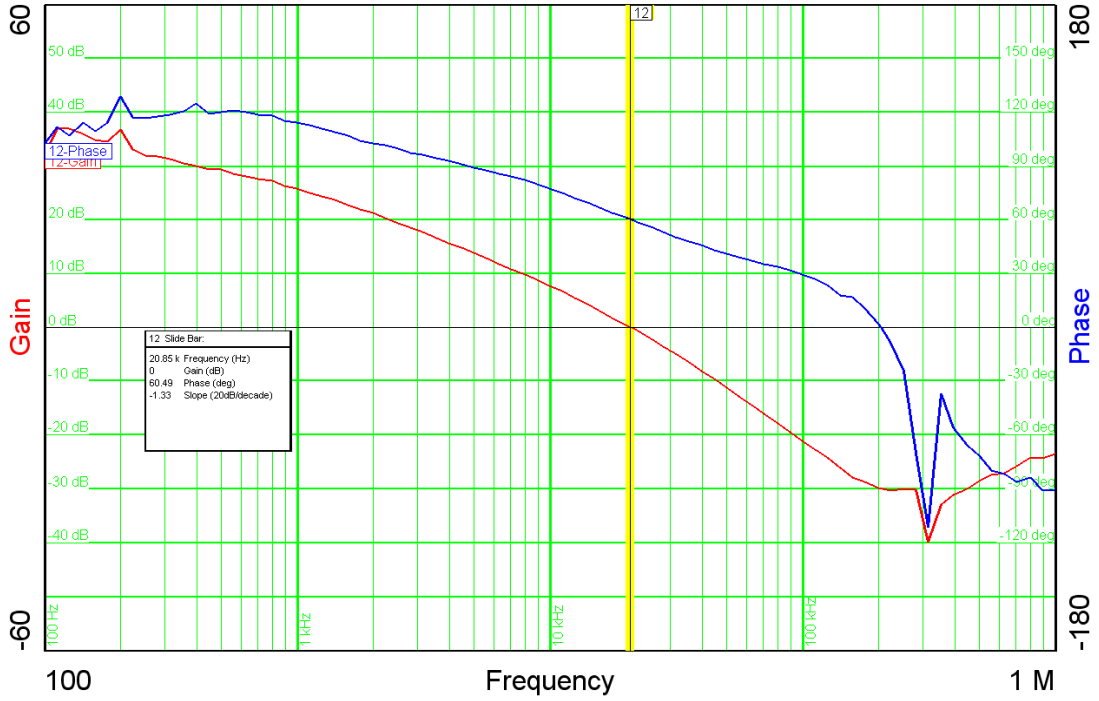

Figure 7

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 2.5A load.

Channel C2: **drain-source voltage**, -1.2V minimum voltage, 12.7V maximum voltage
2V/div, 2us/div

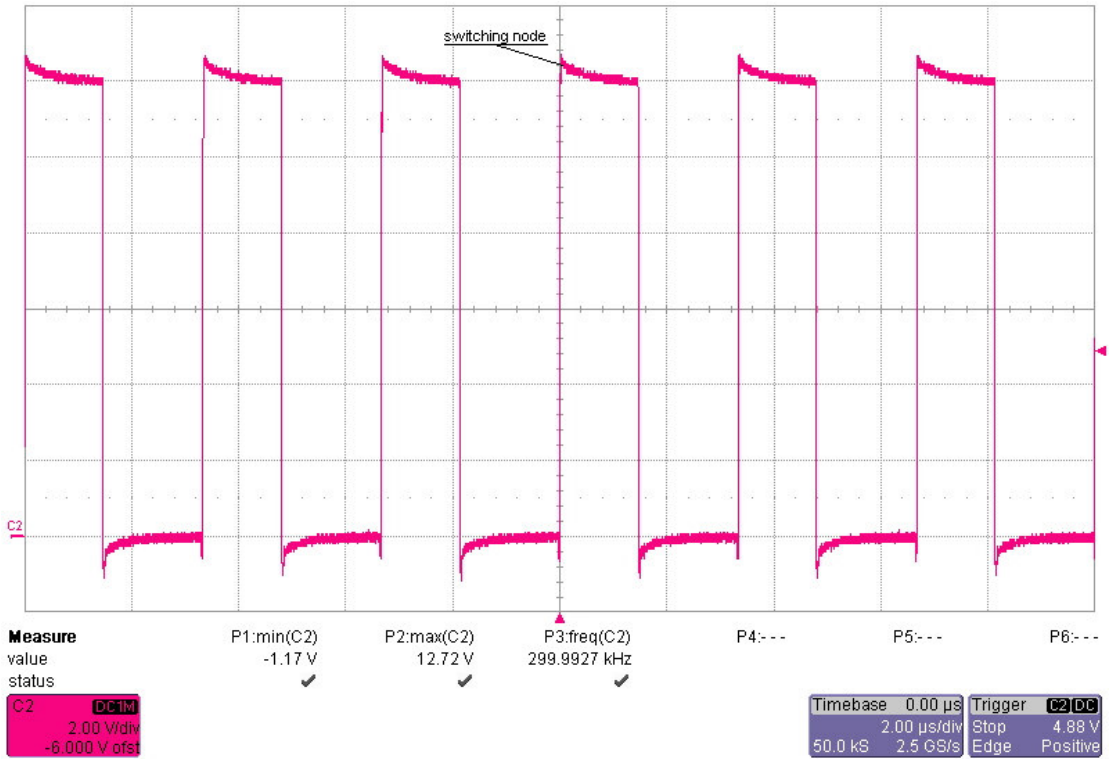

Figure 8

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.

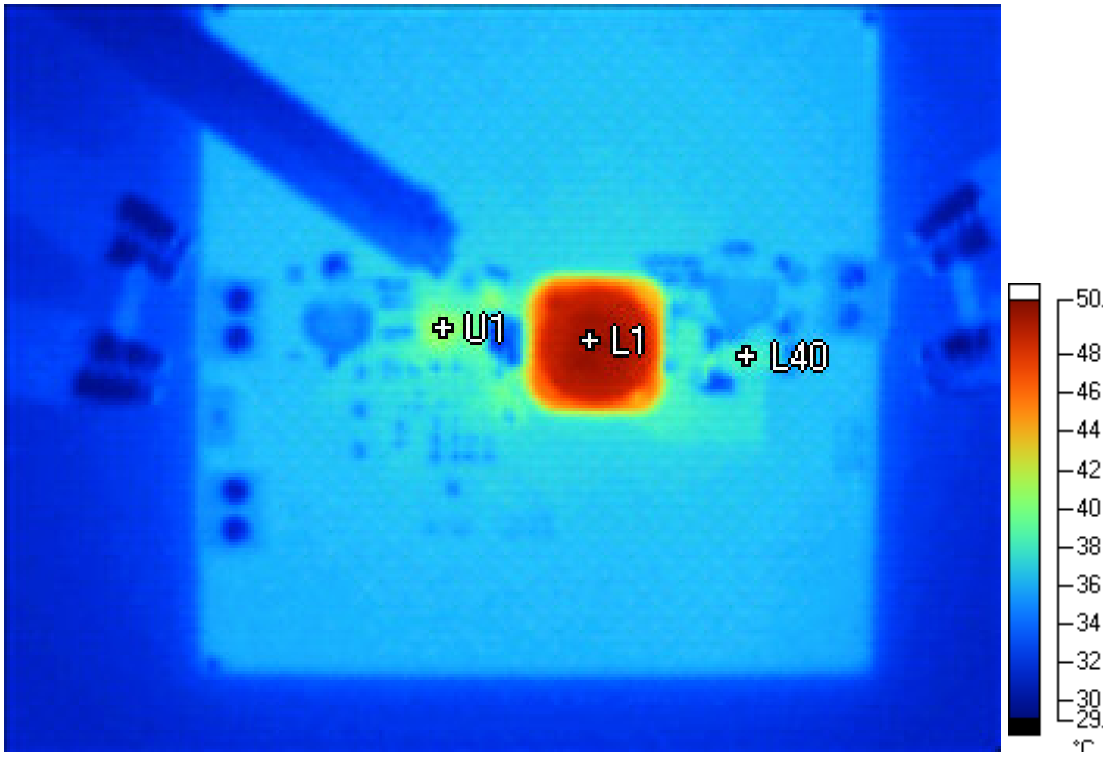

Figure 9

device	max. temperature	measured temp. @ 25 °C
U1 – TPS54620	150 °C	40.6 °C
L1 – inductor 33uH	85 °C	50.4 °C
L40 – inductor 22nH	125 °C	38.2 °C

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