1 Startup

The startup waveform is shown in Figure 1. The input voltage is set at 14.5V, with no load on the 6.3V output.

Channel C1: **input voltage**
5V/div, 1ms/div

Channel C2: **output voltage**
1V/div, 1ms/div

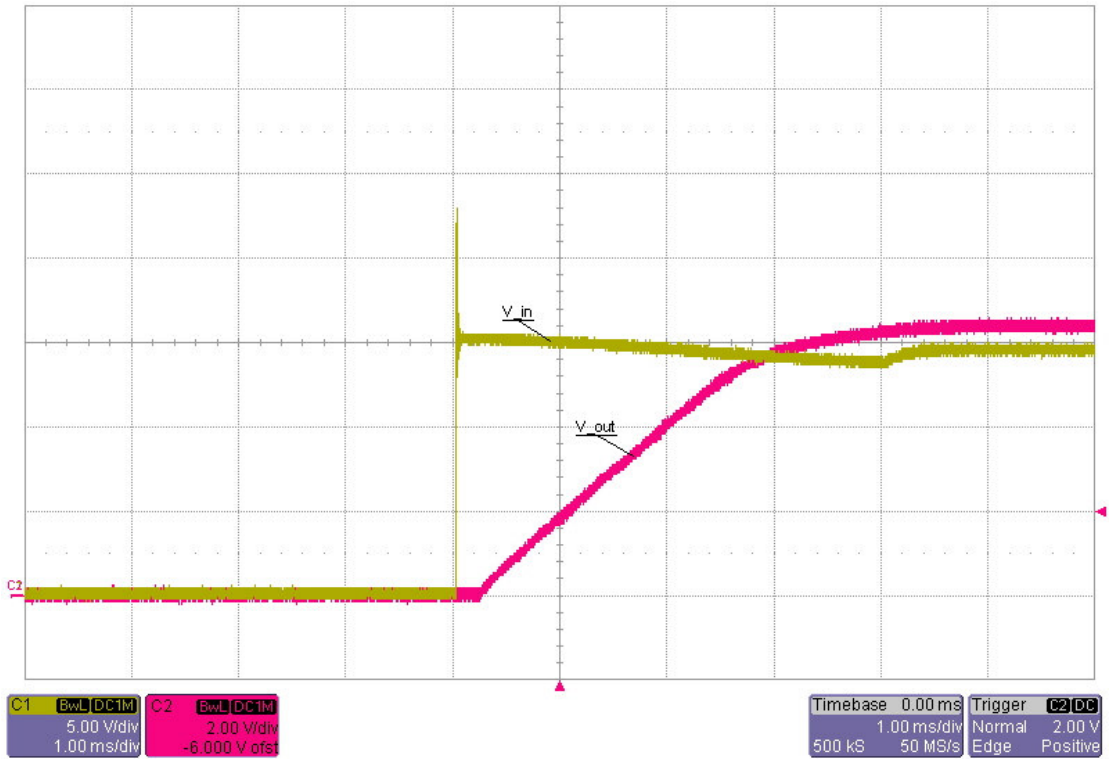

Figure 1

2 Shutdown

The shutdown waveform is shown in Figure 2. The input voltage is set at 14.5V with a 1.5A load on the 6.3V output.

Channel C1: **input voltage**
5V/div, 100us/div

Channel C2: **output voltage**
1V/div, 100us/div

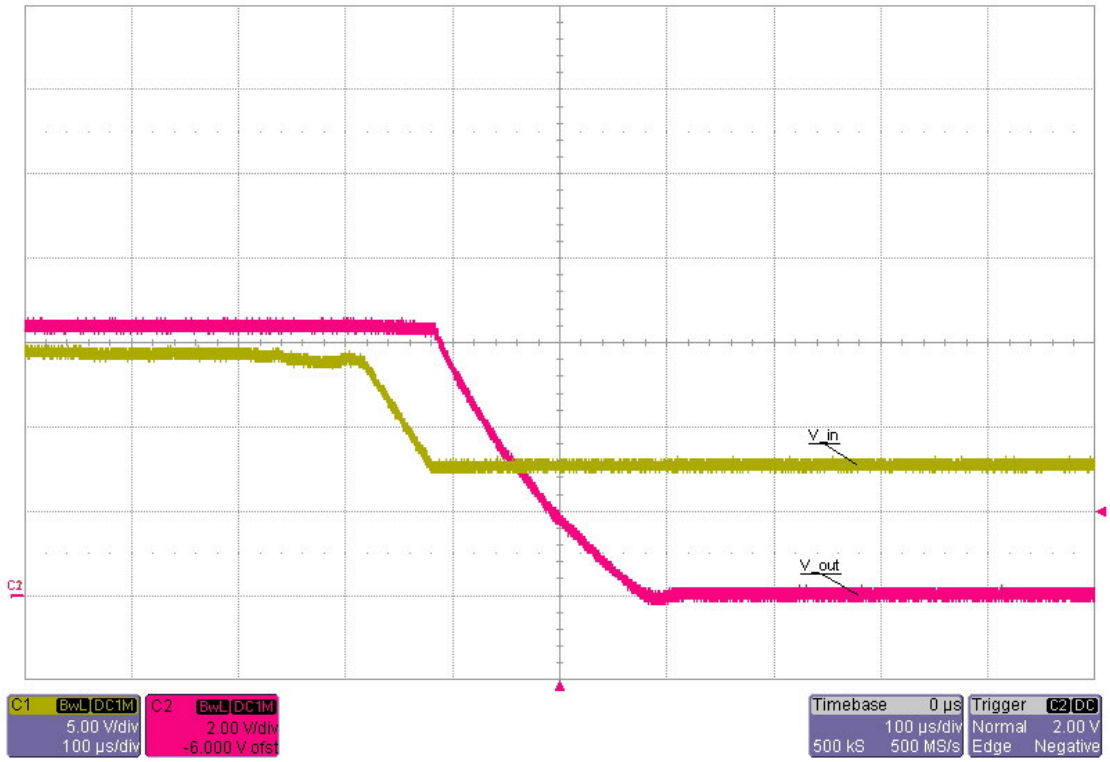

Figure 2

1. Efficiency

The efficiency is shown in Figure 3.

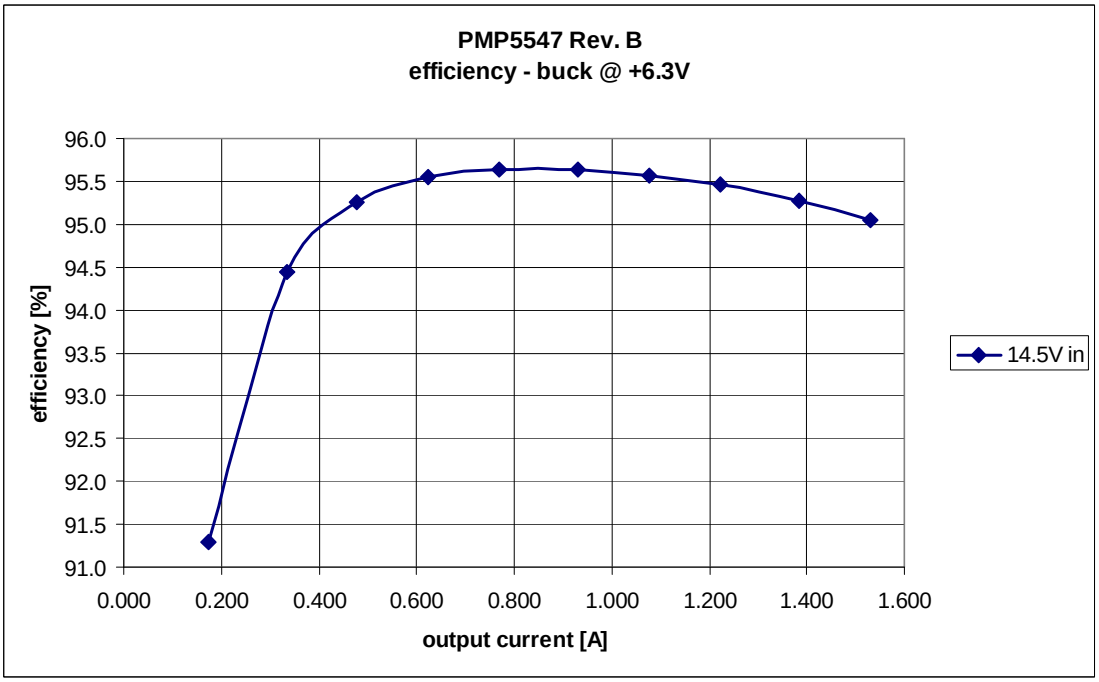

Figure 3

3 Load regulation

The load regulation of the 6.3V output is shown in Figure 4.

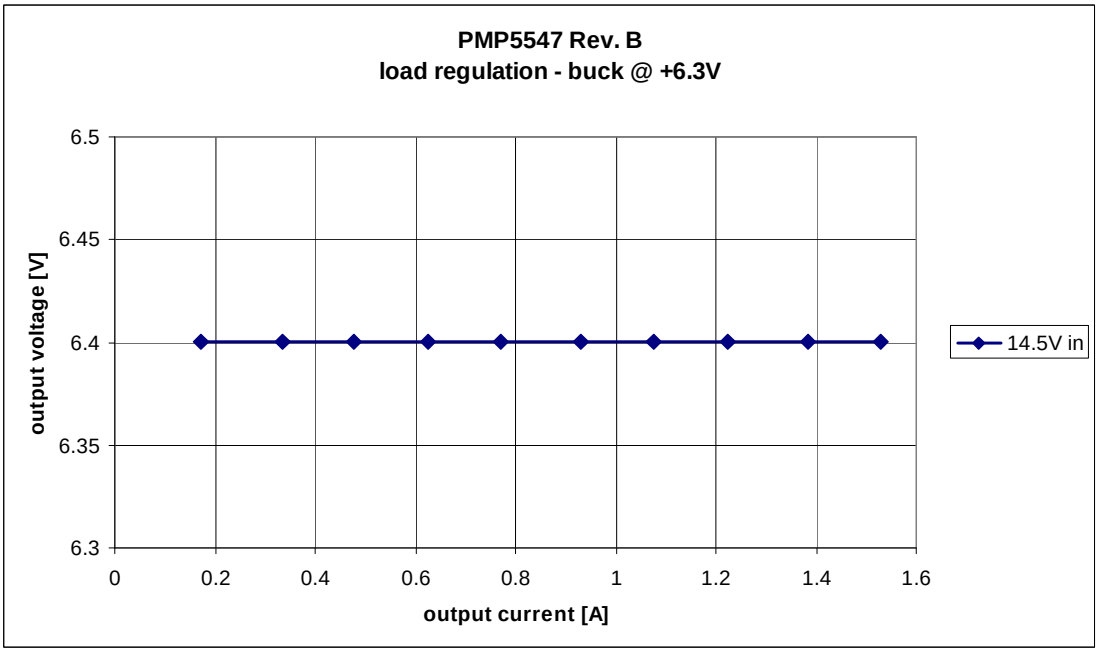

Figure 4

4 Output ripple voltage

The output ripple voltage at 1.5A load and 14.5V input voltage is shown in Figure 5.

Channel C2: **output voltage**, 4mV peak-peak
20mV/div, 2us/div, AC coupled

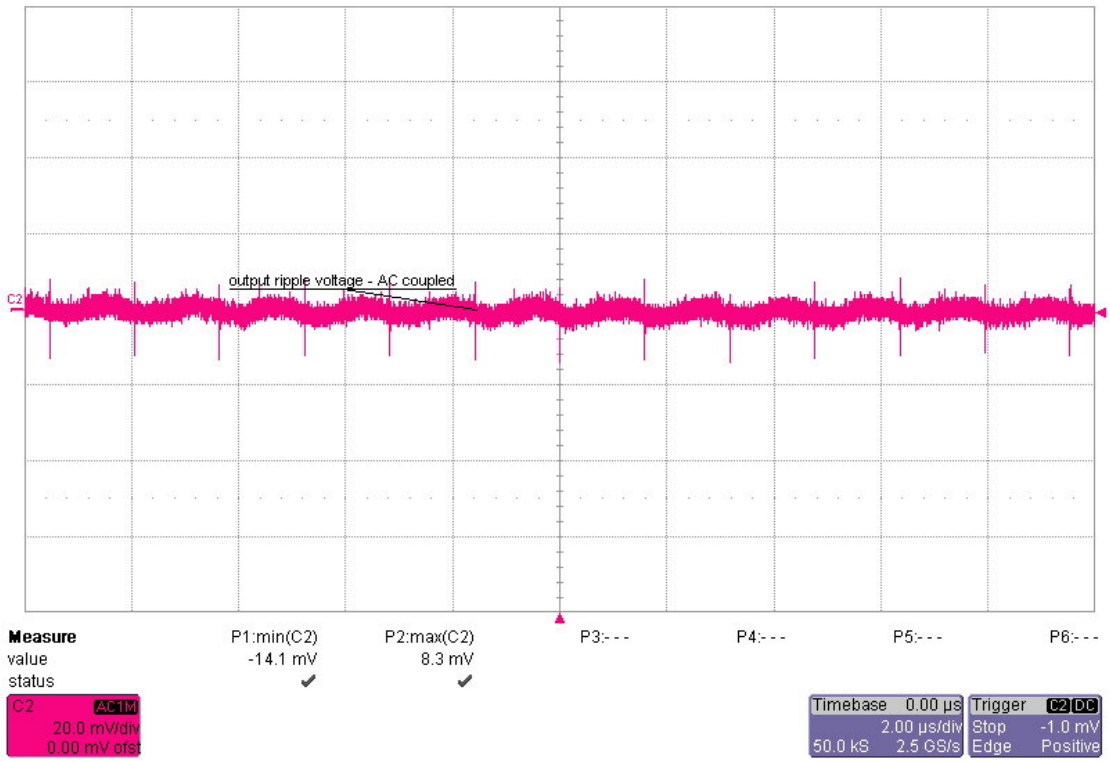

Figure 5

5 Load transients

The response to a load step and a load dump at an input voltage of 14.5V is shown in Figure 6.

Channel C2: **output voltage**, -50mV undershoot, 49mV overshoot
50mV/div, 1ms/div, AC coupled

Channel C1: **load current**, load step 0.75A to 1.5A and vice versa
500mA/div, 1ms/div

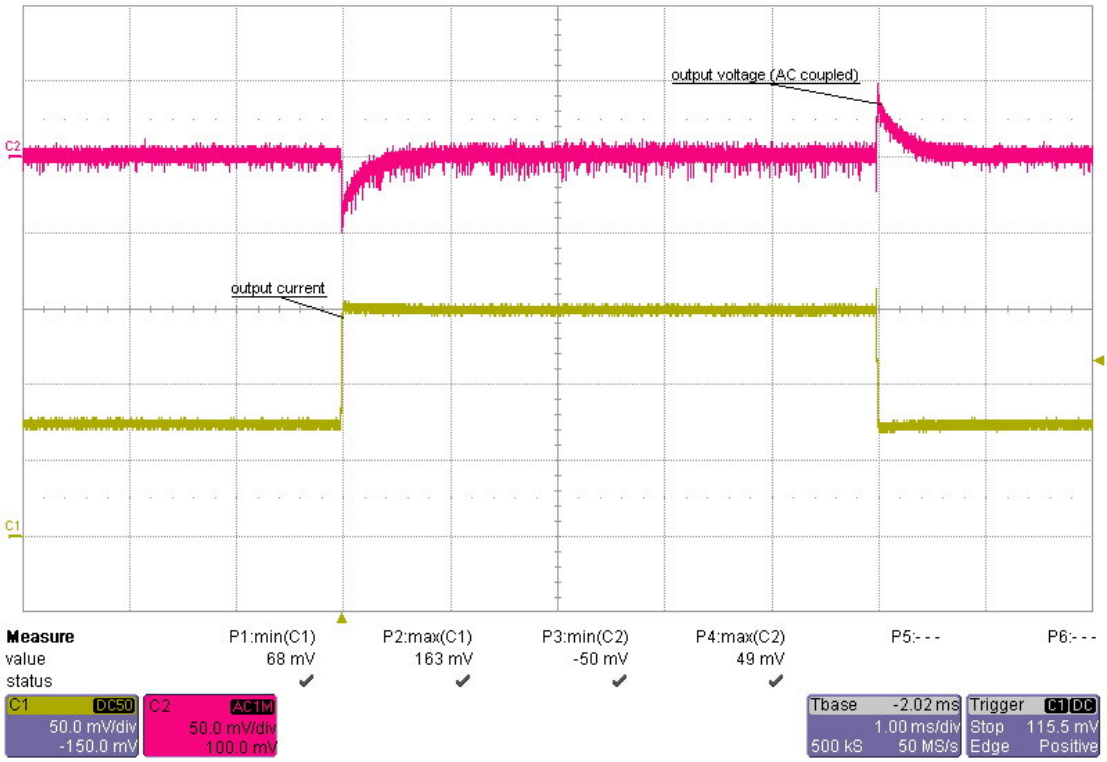

Figure 6

6 Frequency response

Figure 7 shows the loop response of the 6.3V output with 14.5V input and a 1.5A load.

64 deg phase margin @ crossover frequency 69.0 kHz

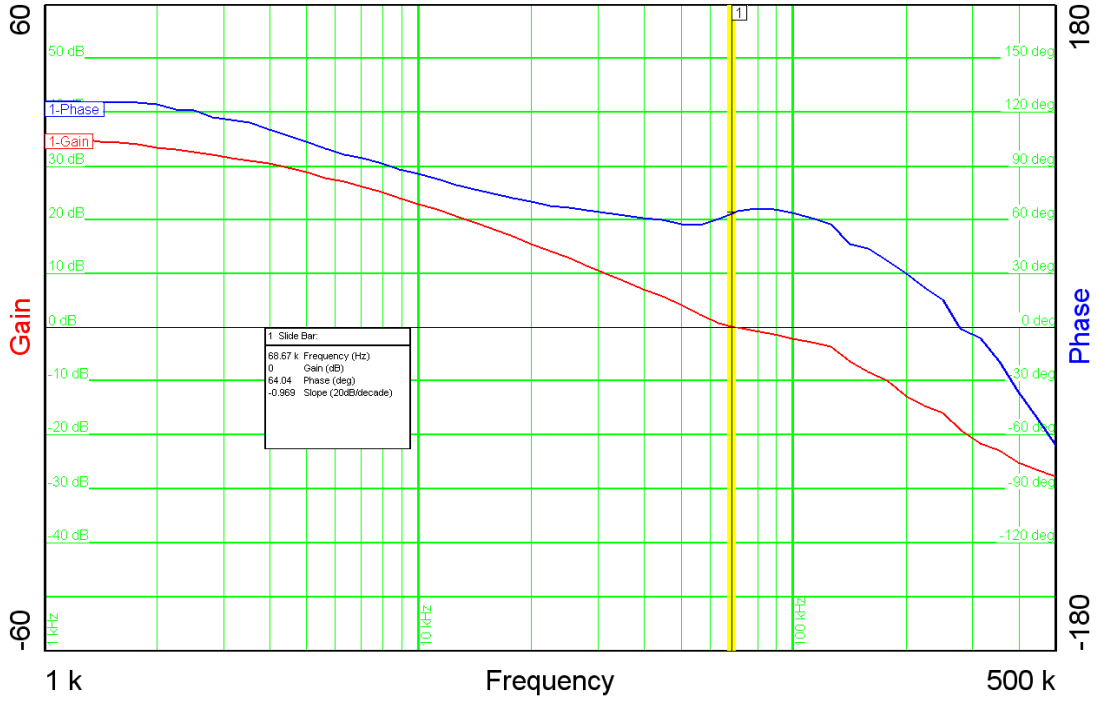

Figure 7

7 Miscellaneous waveforms

The drain-source voltage on the switching node is shown in Figure 8. The image was captured with a 14.5V input and a 1.5A load.

Channel C2: **drain-source voltage**, -1.6V minimum voltage, 15.2V maximum voltage
5V/div, 1us/div

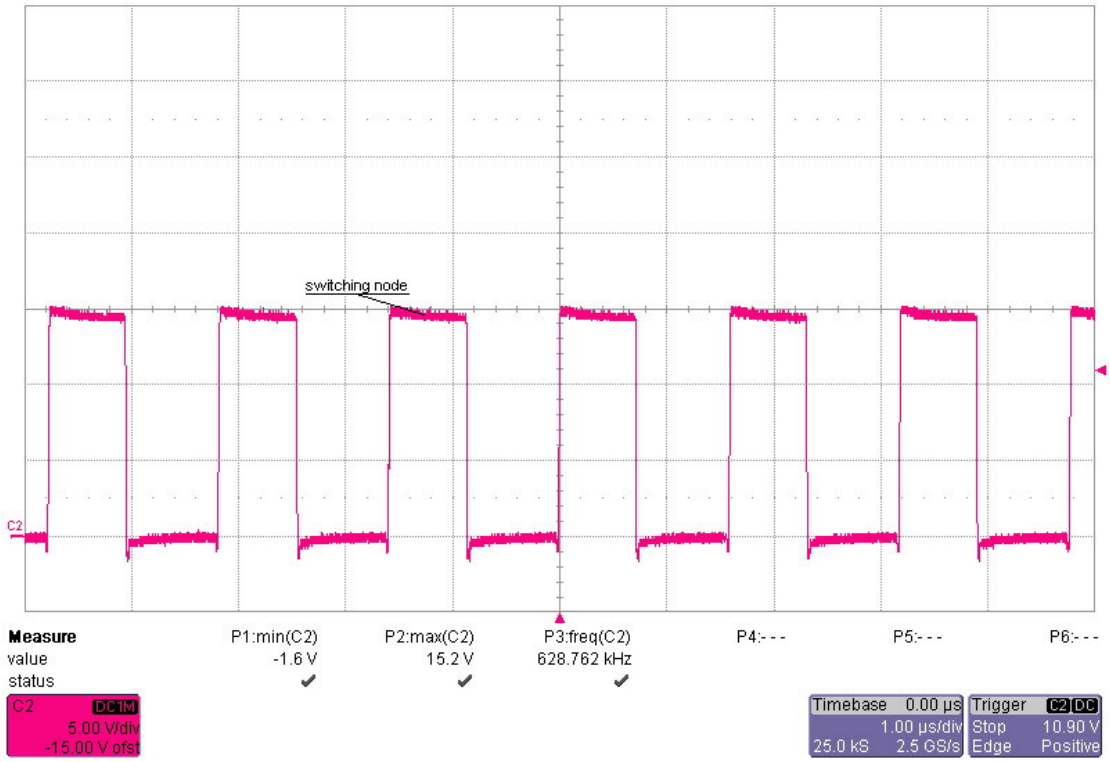

Figure 8

8 Thermal measurement

The thermal image (Figure 9) shows the circuit at an ambient temperature of 21 °C with an input voltage of 14.5V and a load of 1.5A.

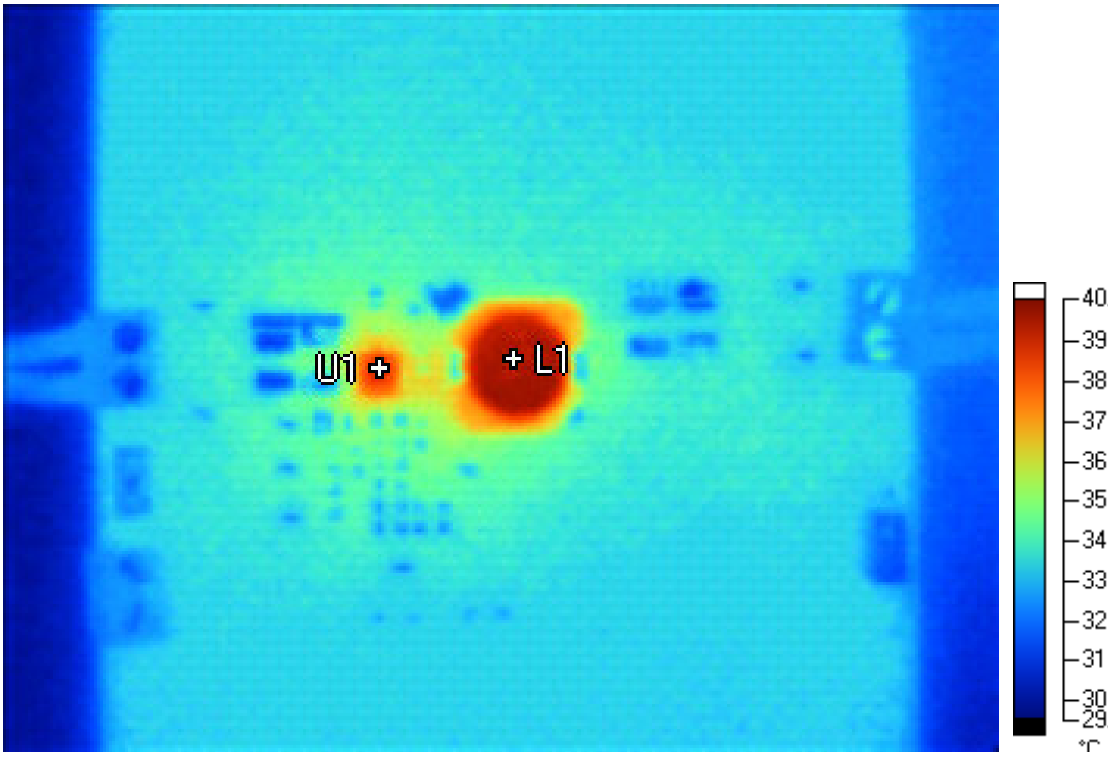

Figure 9

device	max. temperature	measured temp. @ 21 °C
U1 – TPS54320	150 °C	39.2 °C
L1 – 22uH	150 °C	39.5 °C

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