

## 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

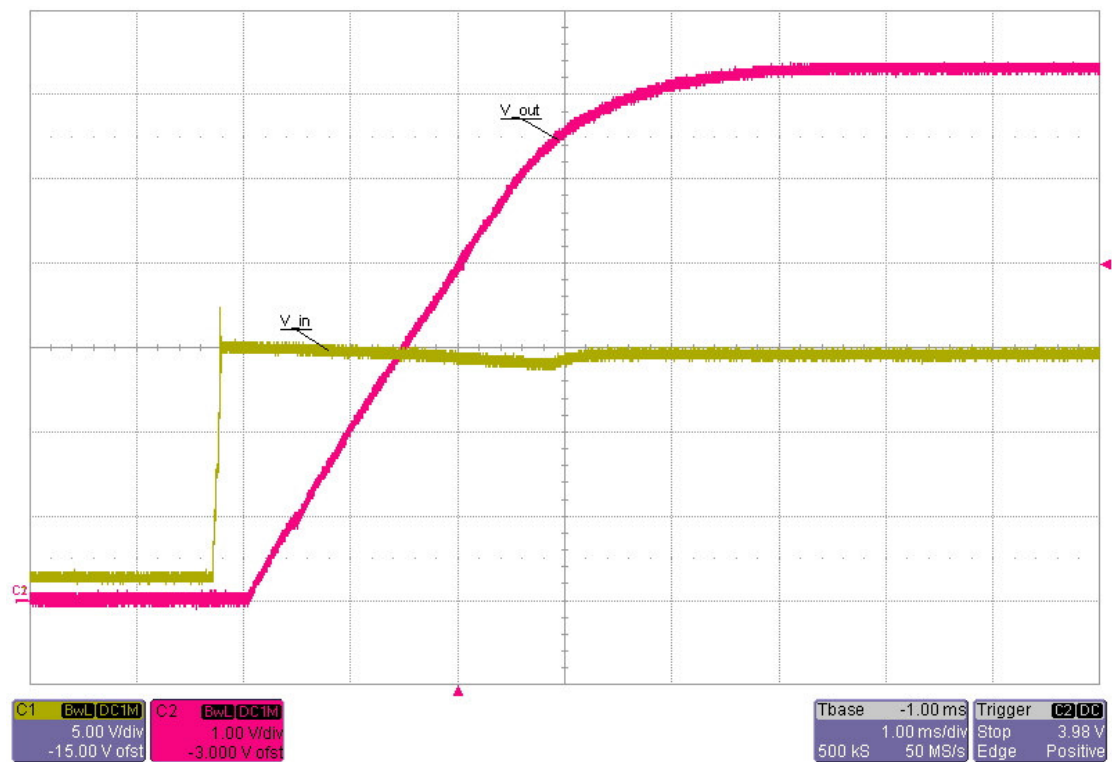


Figure 1

## 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

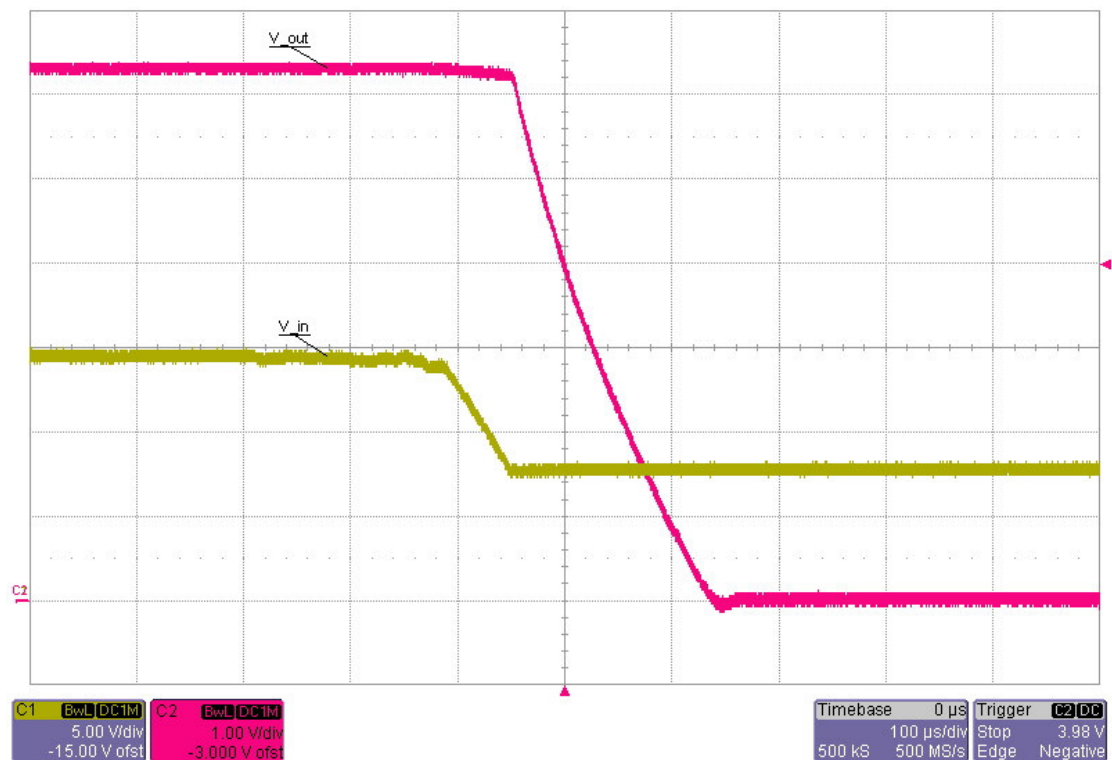
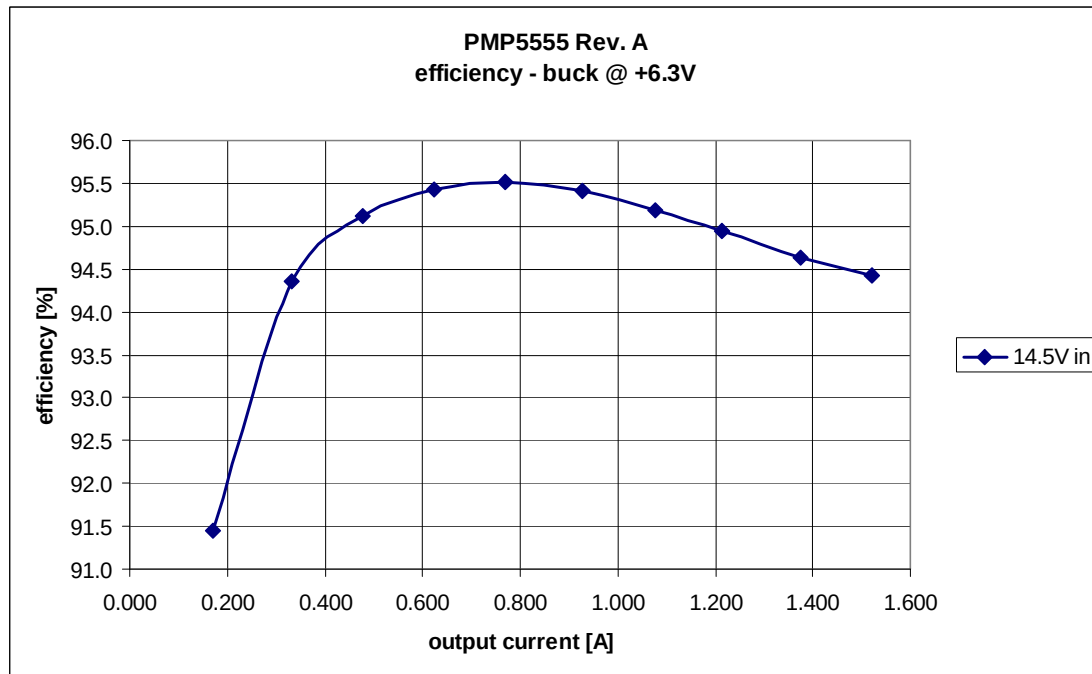


Figure 2

## 1. Efficiency

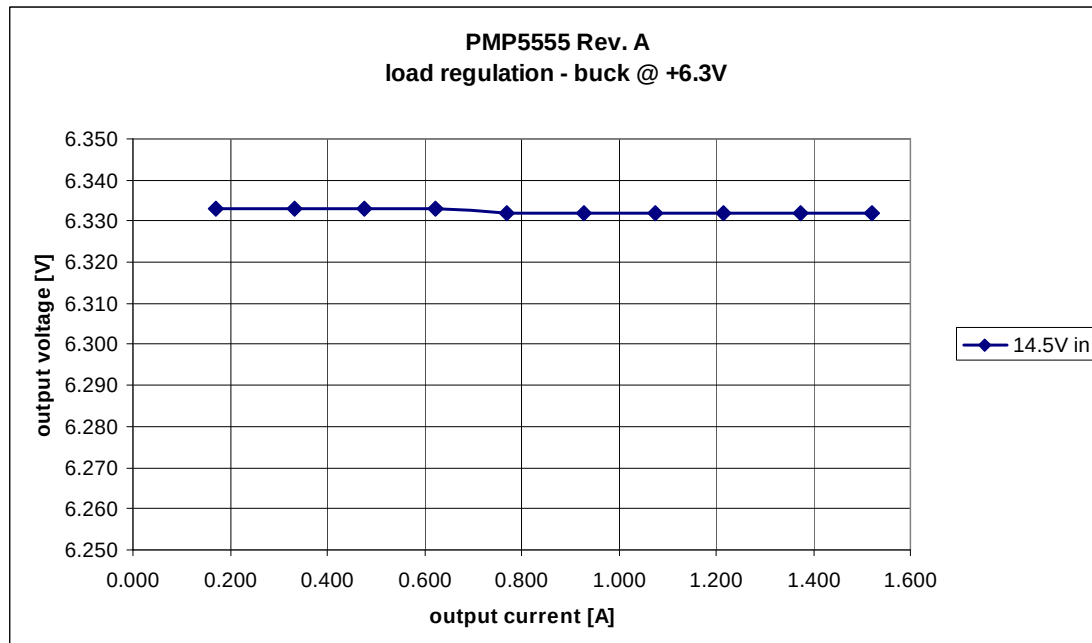
The efficiency is shown in Figure 3.



**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

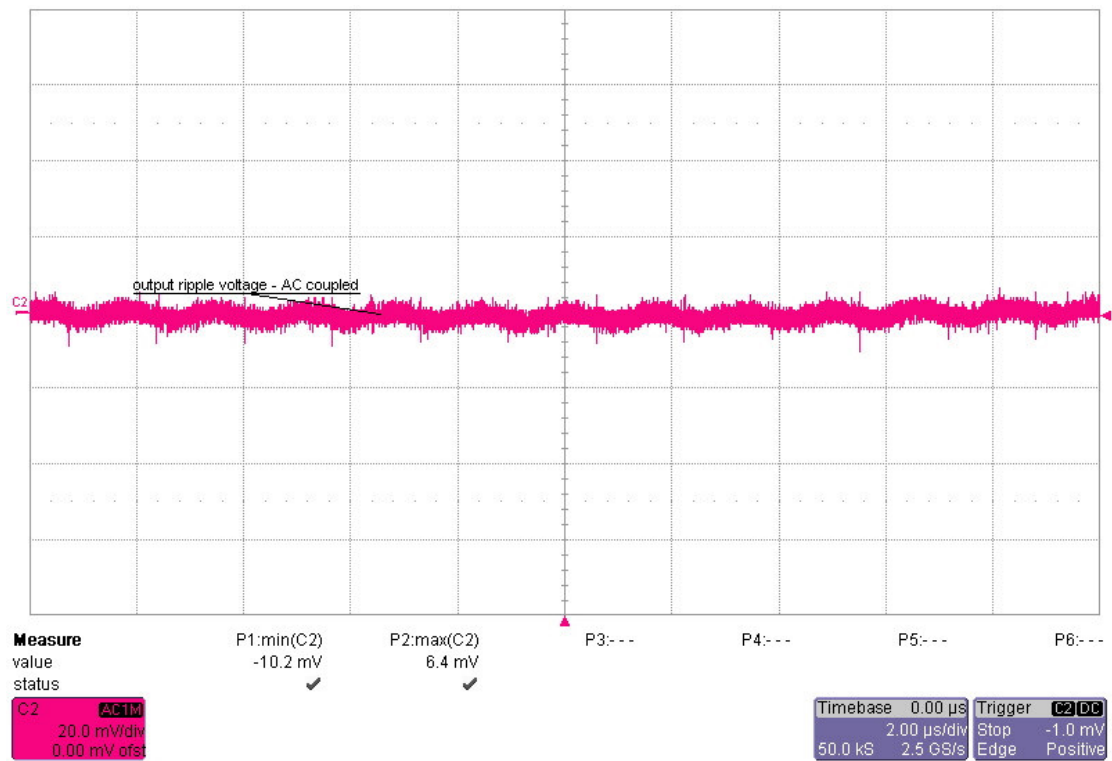


Figure 5

## 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**, -42mV 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

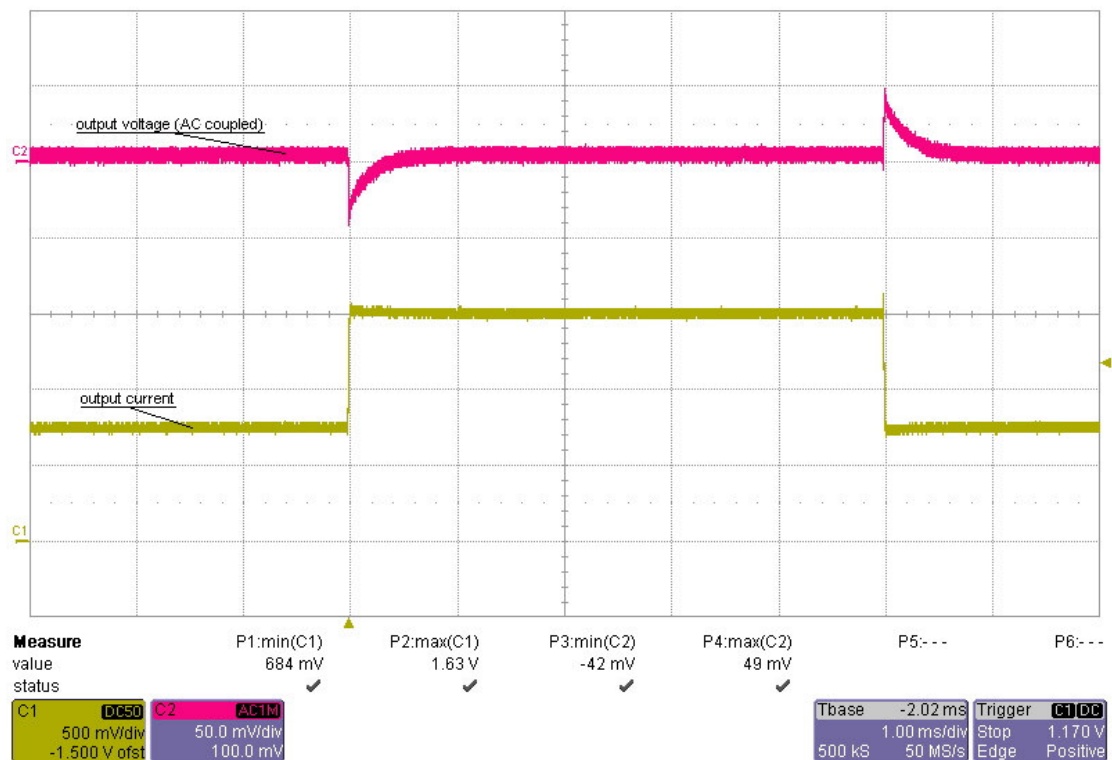
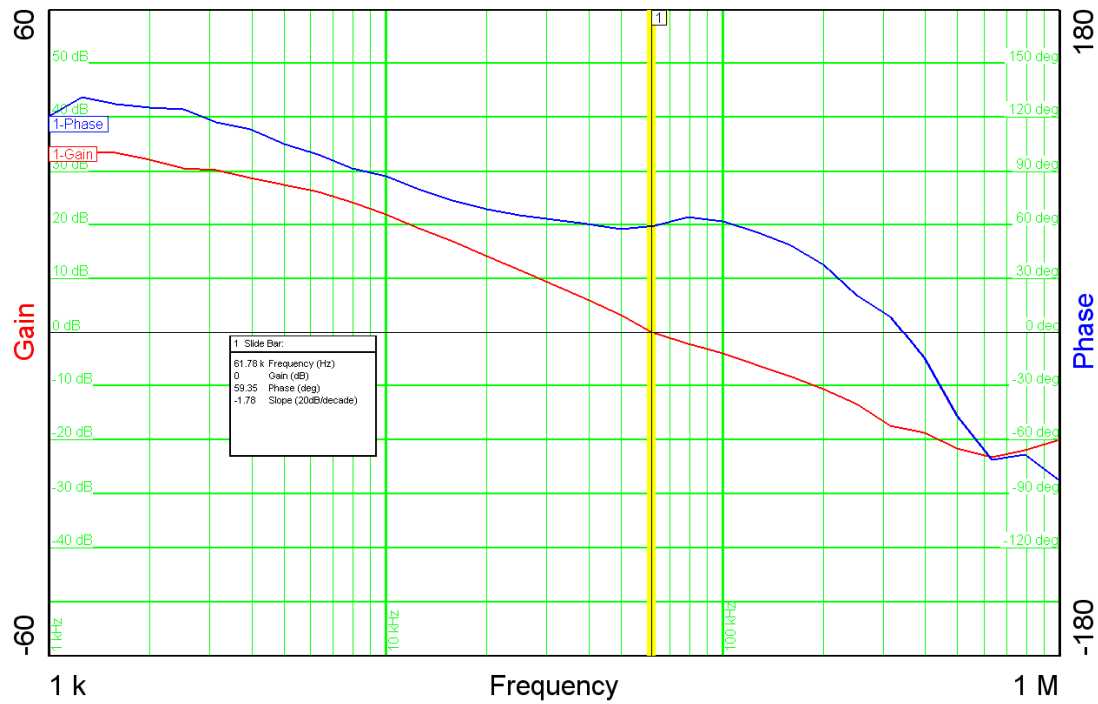


Figure 6

## 6 Frequency response

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

59 deg phase margin @ crossover frequency 61.8 kHz

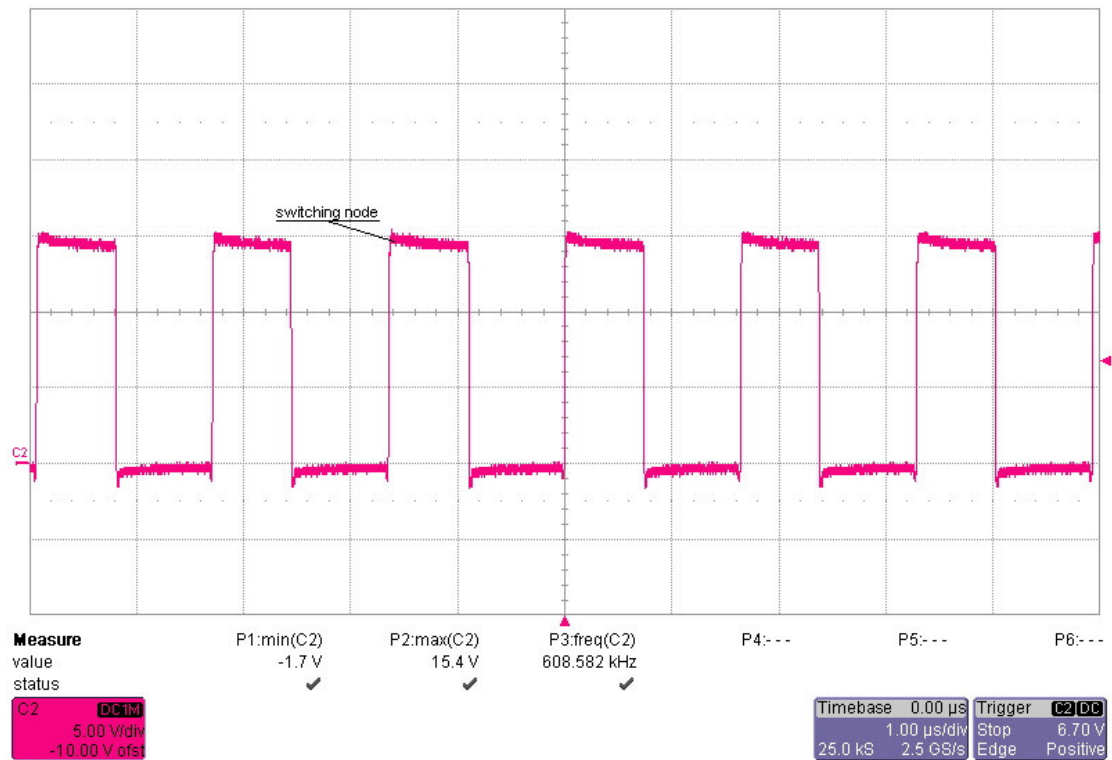


**Figure 7**

## 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**, -1.7V minimum voltage, 15.4V maximum voltage  
5V/div, 1us/div

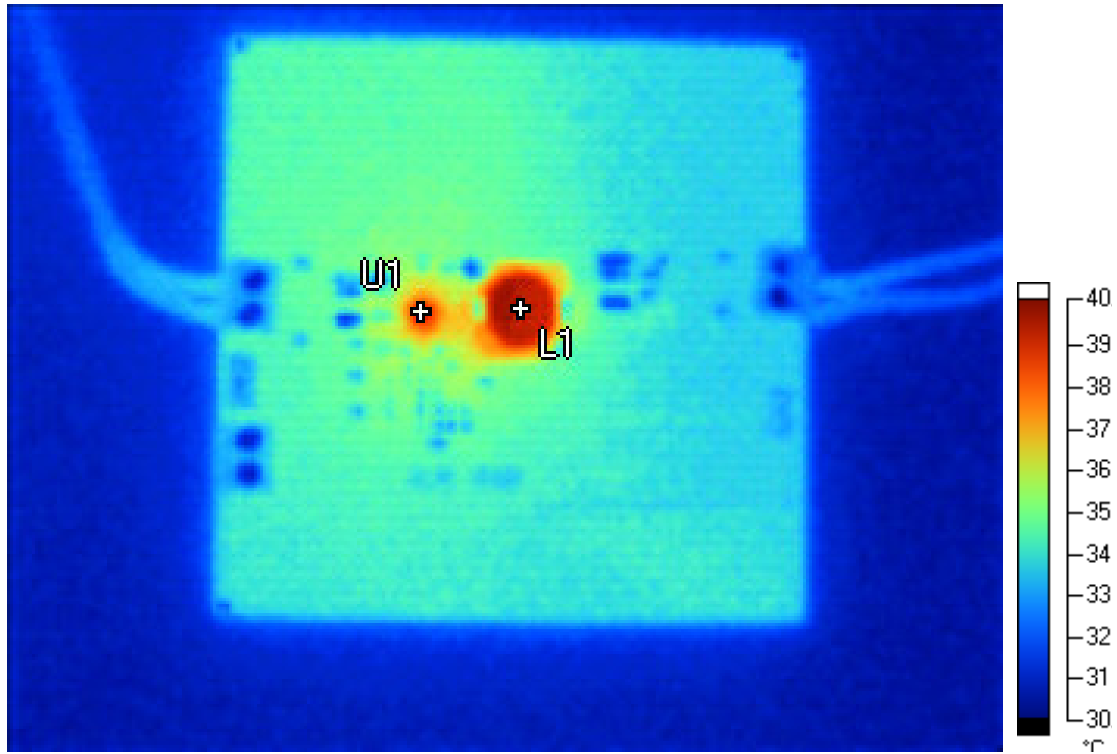


**Figure 8**



## 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.<br>@ 21 °C |
|---------------|------------------|---------------------------|
| U1 – TPS54521 | 150 °C           | 39.4 °C                   |
| L1 – 22uH     | 150 °C           | 39.5 °C                   |

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