

Inverting buck-boost -15.0V

1 Startup

The startup waveform is shown in Figure 1. The input voltage is set at 24V, with no load on the output.

Channel C1: **input voltage**
5V/div, 500us/div

Channel C2: **output voltage**
5V/div, 500us/div

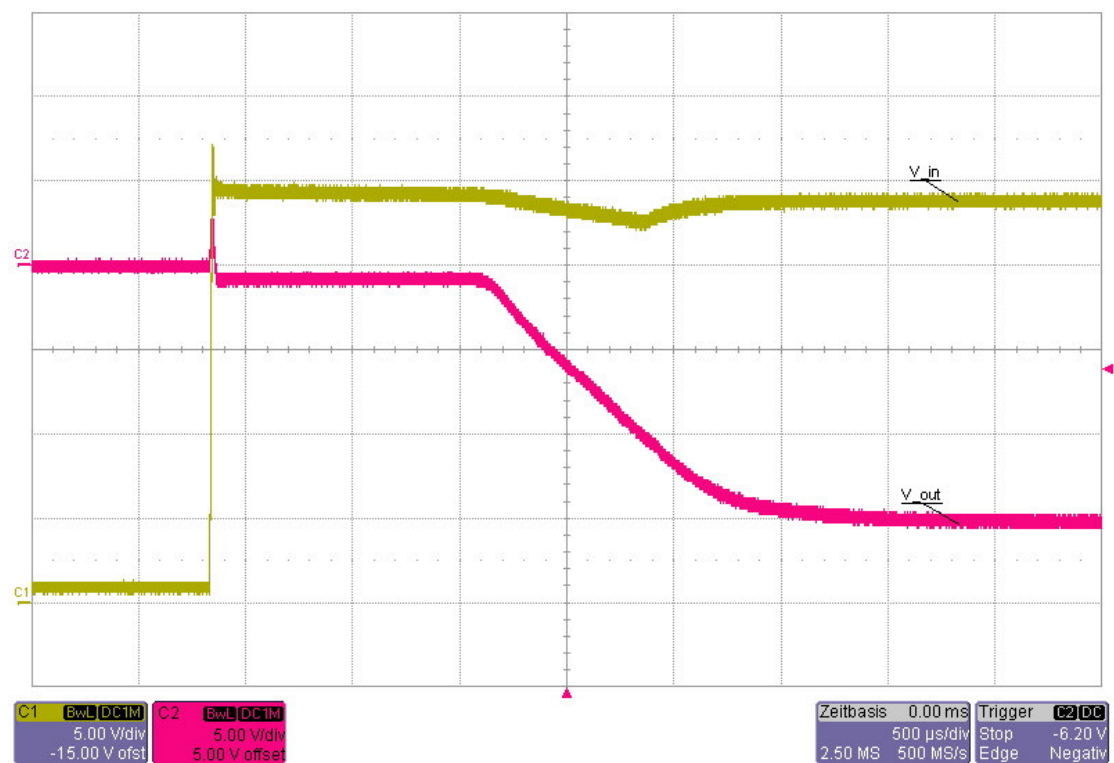


Figure 1

2 Shutdown

The shutdown waveform is shown in Figure 2. The input voltage is set at 24V with a 1.0A load on the output.

Channel C1: **input voltage**
5V/div, 50ms/div

Channel C2: **output voltage**
5V/div, 50ms/div

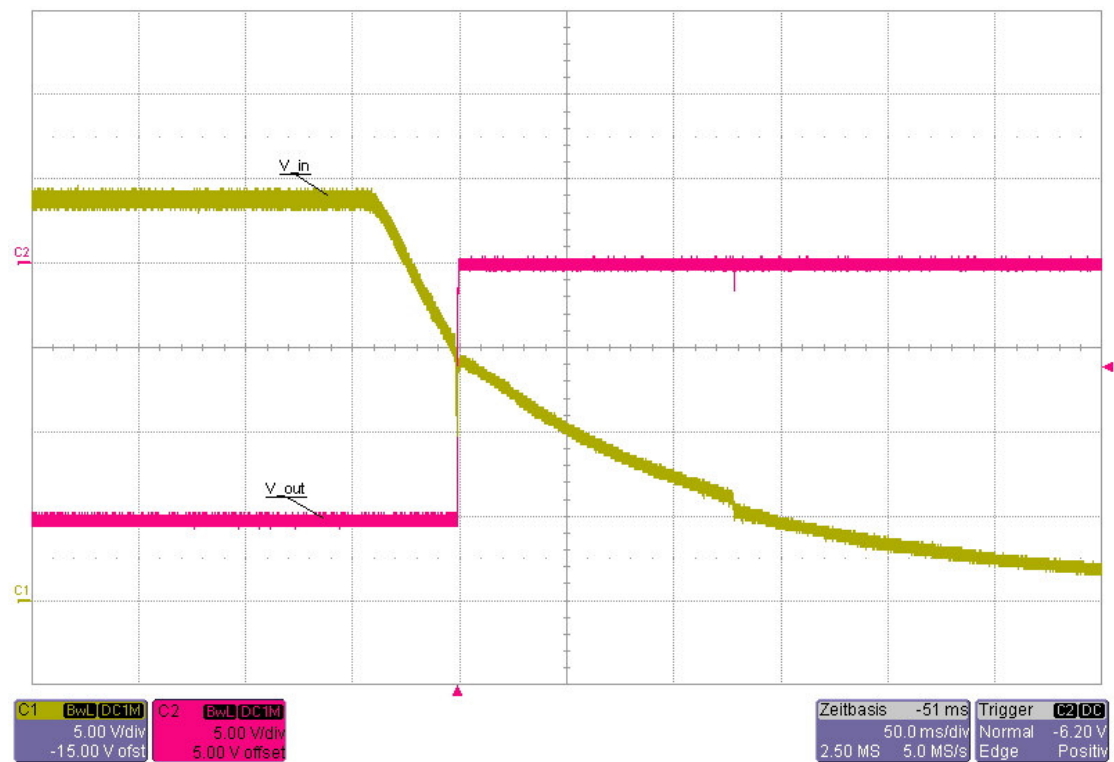


Figure 2

3 Efficiency

The efficiency is shown in Figure 3.

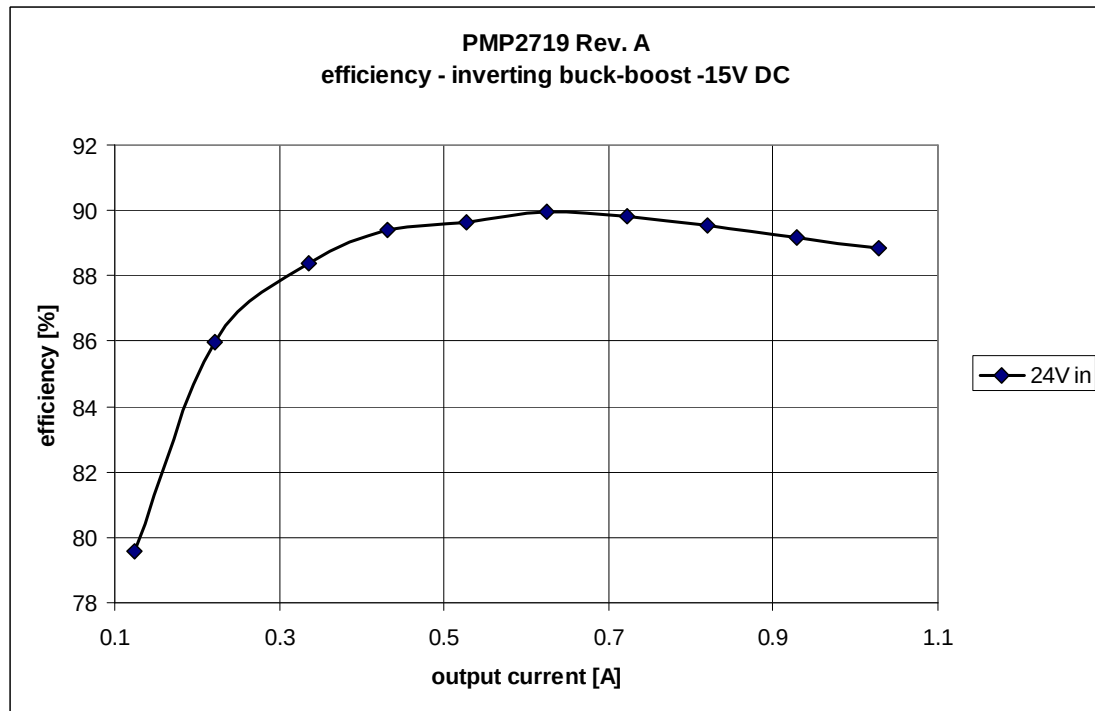


Figure 3

4 Load regulation

The load regulation of the -15V output is shown in Figure 4.

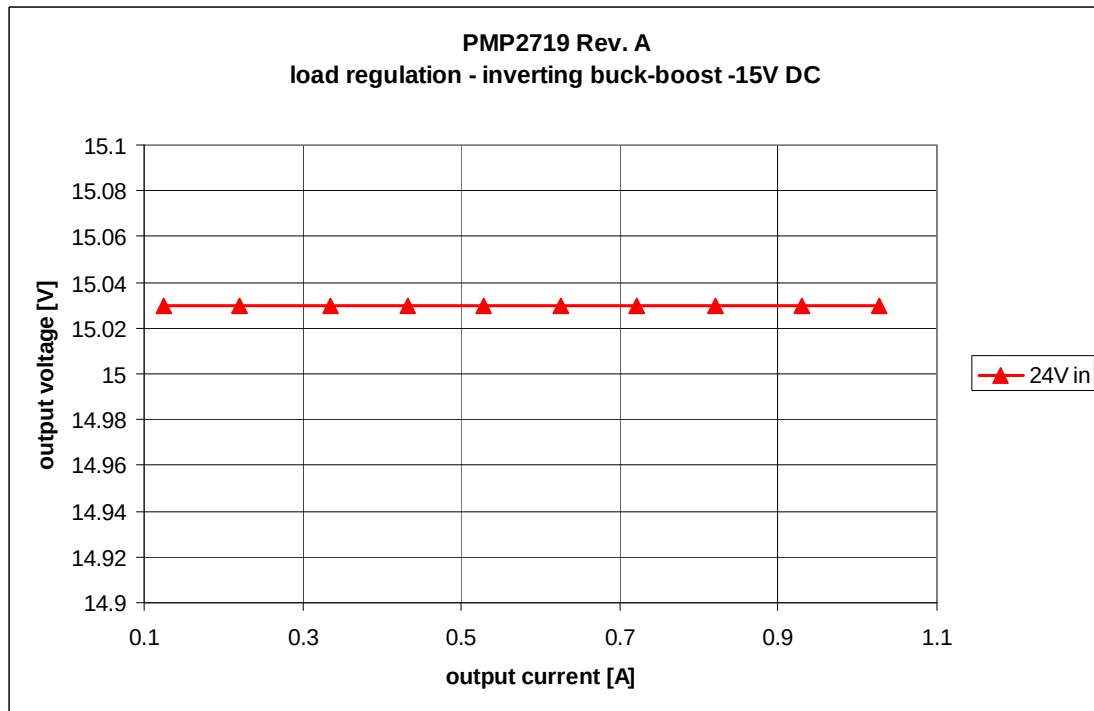


Figure 4

5 Output ripple voltage

The output ripple voltage at 1.0A load and 19V, 24V and 30V input voltage is shown in Figure 5.

Channel M1: **output voltage**, 26.0mV peak-peak
20mV/div, 5us/div, AC coupled

Channel M1: **output voltage**, 21.4mV peak-peak
20mV/div, 5us/div, AC coupled

Channel M3: **output voltage**, 21.2mV peak-peak
20mV/div, 5us/div, AC coupled

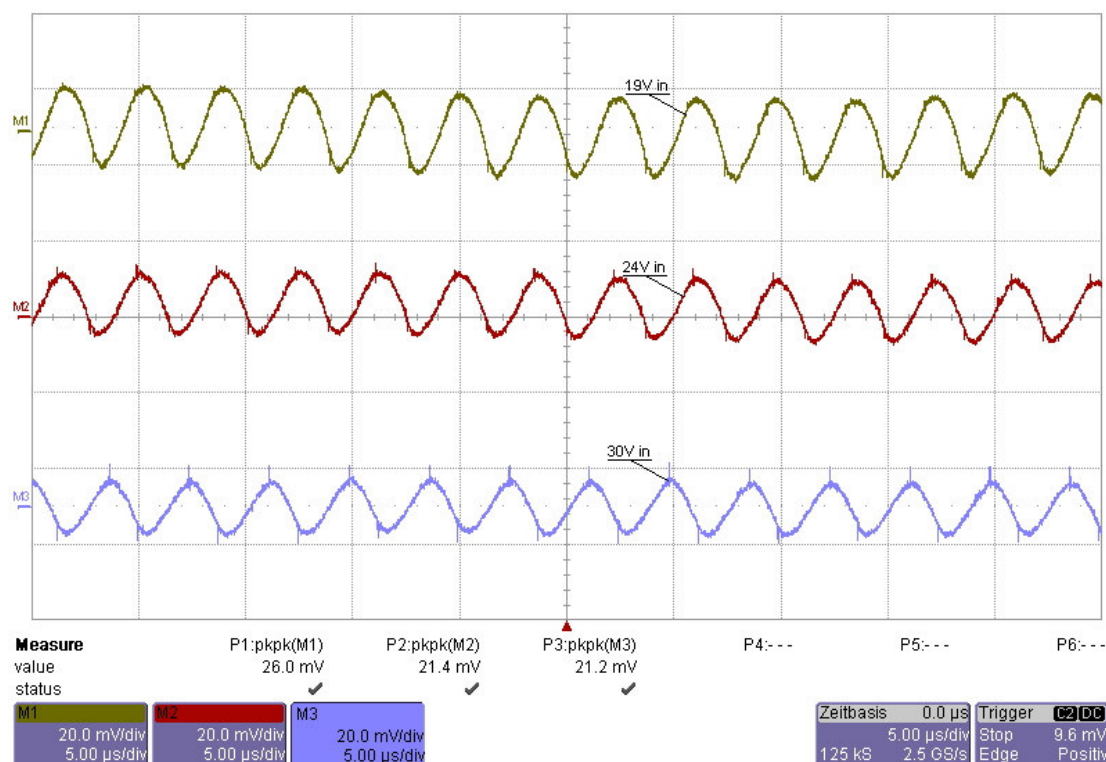


Figure 5

6 Load transients

The response to a load step and a load dump at an input voltage of 24V is shown in Figure 6 and Figure 7.

Channel C2: **output voltage**, -40mV undershoot, 728mV overshoot
500mV/div, 100us/div, AC coupled

Channel C1: **load current**, load step 0.5A to 1.0A
500mA/div, 100us/div

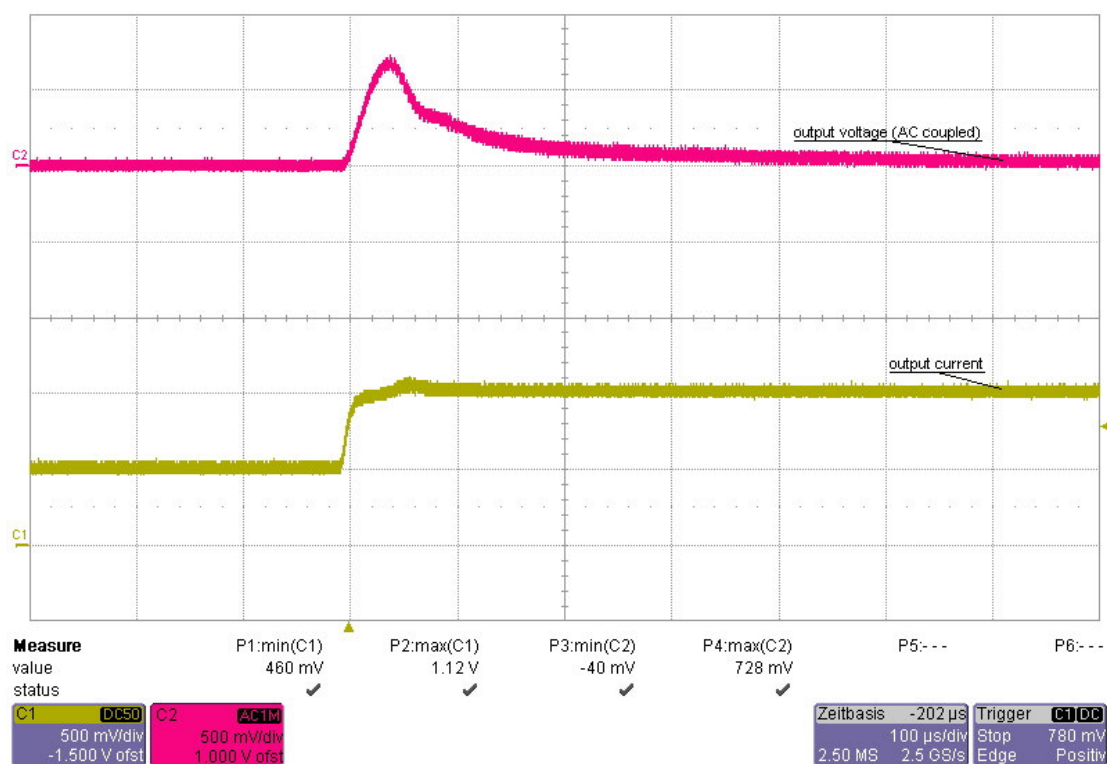


Figure 6

Channel C2: **output voltage**, 72mV overshoot, -680mV undershoot
500mV/div, 100us/div, AC coupled

Channel C1: **load current**, load dump 1.0A to 0.5A
500mA/div, 100us/div

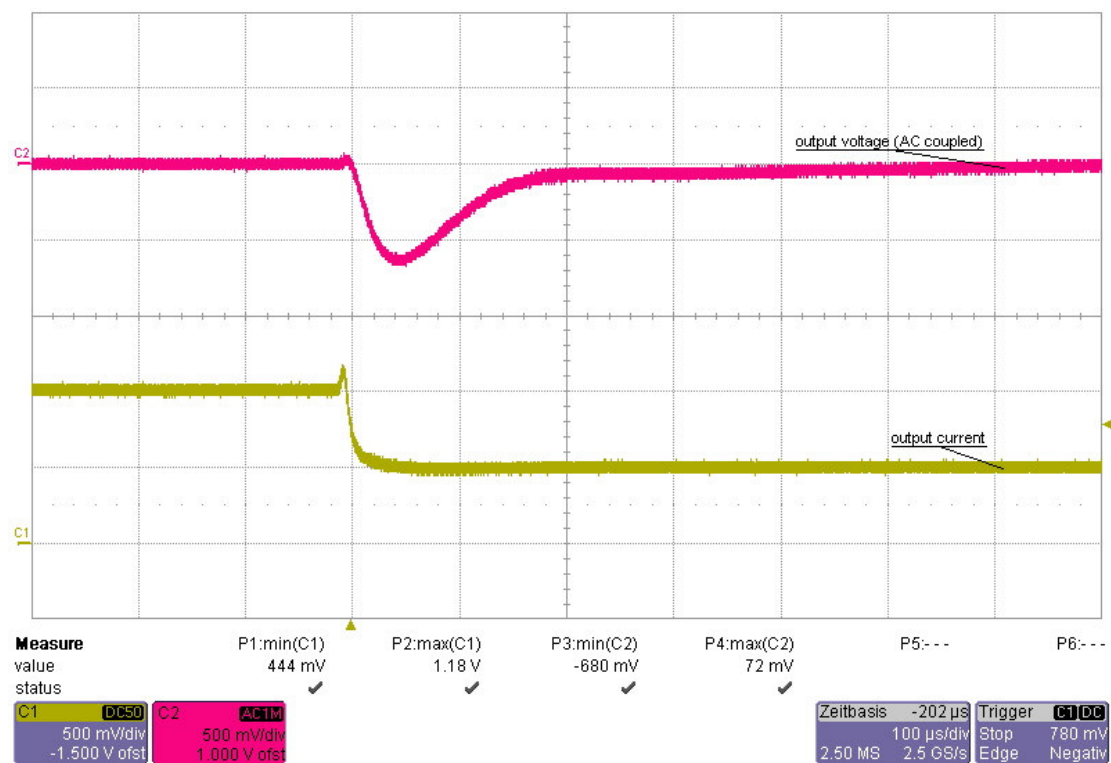


Figure 7

7 Frequency response

Figure 8 shows the loop response of the -15.0V output with 24V input and a 0.5A load.

56 deg phase margin @ crossover frequency 5.2kHz

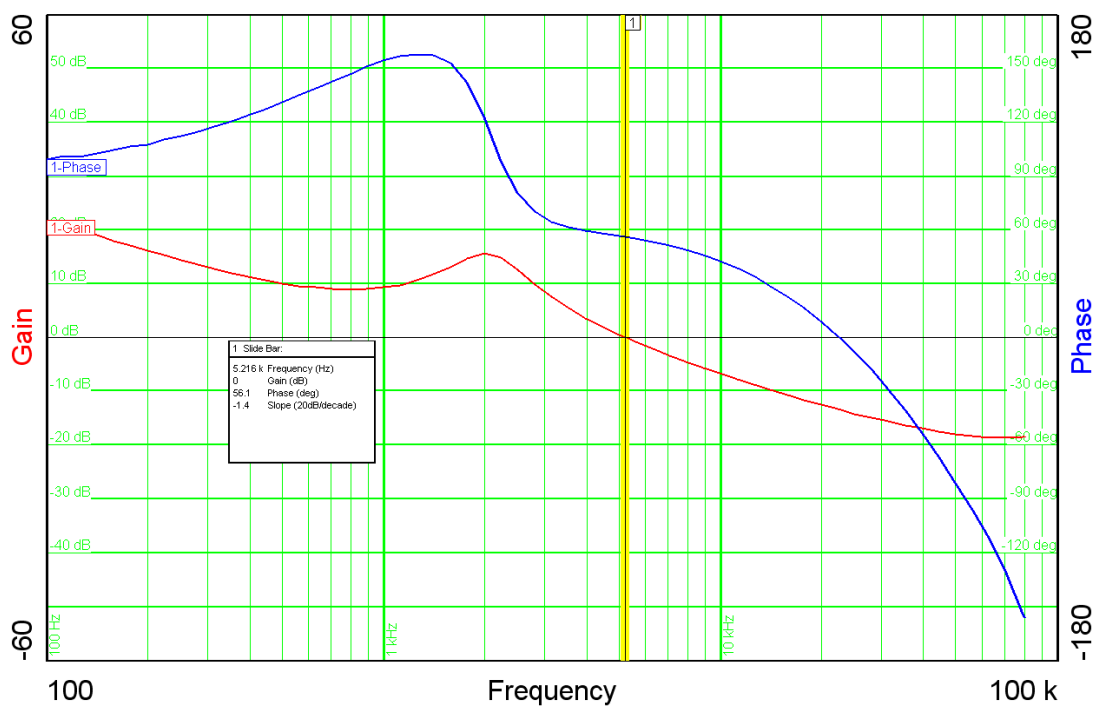


Figure 8

8 Miscellaneous waveforms

The voltage on the switch node is shown in Figure 9. The image was captured with a 30V input and a 1.0A load.

Channel C2: **switch node voltage**, -47.4V minimum voltage, 2.8V maximum voltage
10V/div, 2us/div

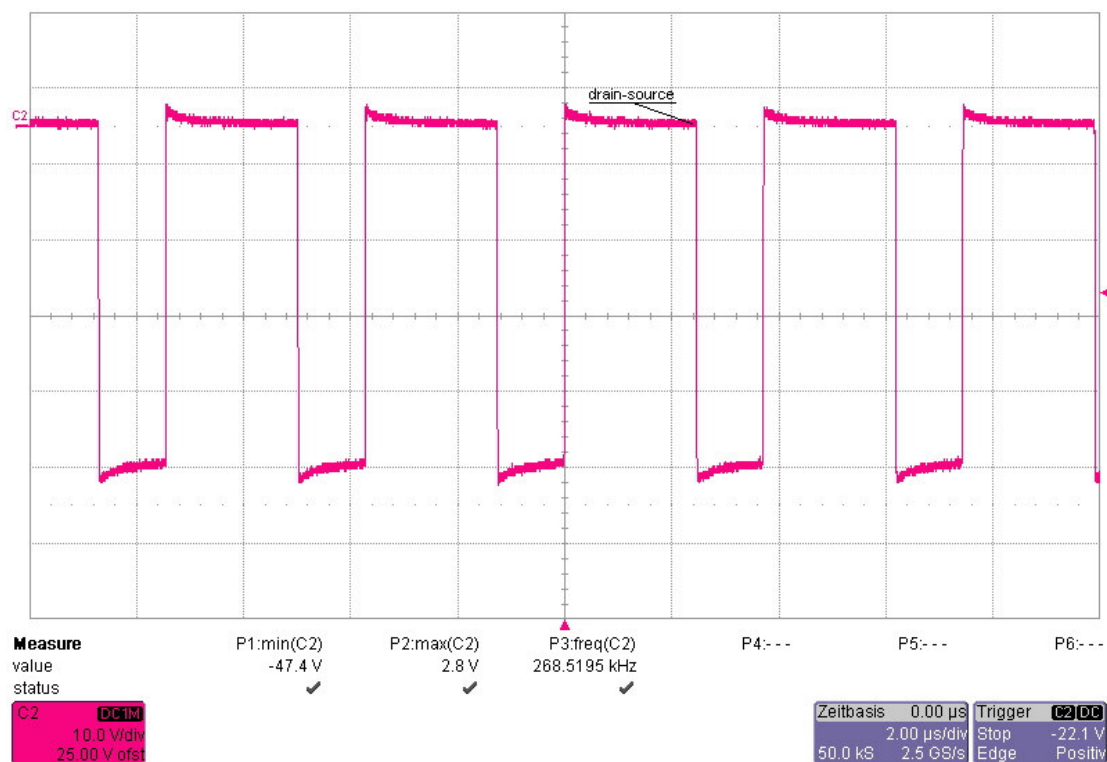


Figure 9

9 Thermal measurement

The thermal image (Figure 10) shows the circuit at an ambient temperature of 25 °C with an input voltage of 24V and a load of 1.0A.

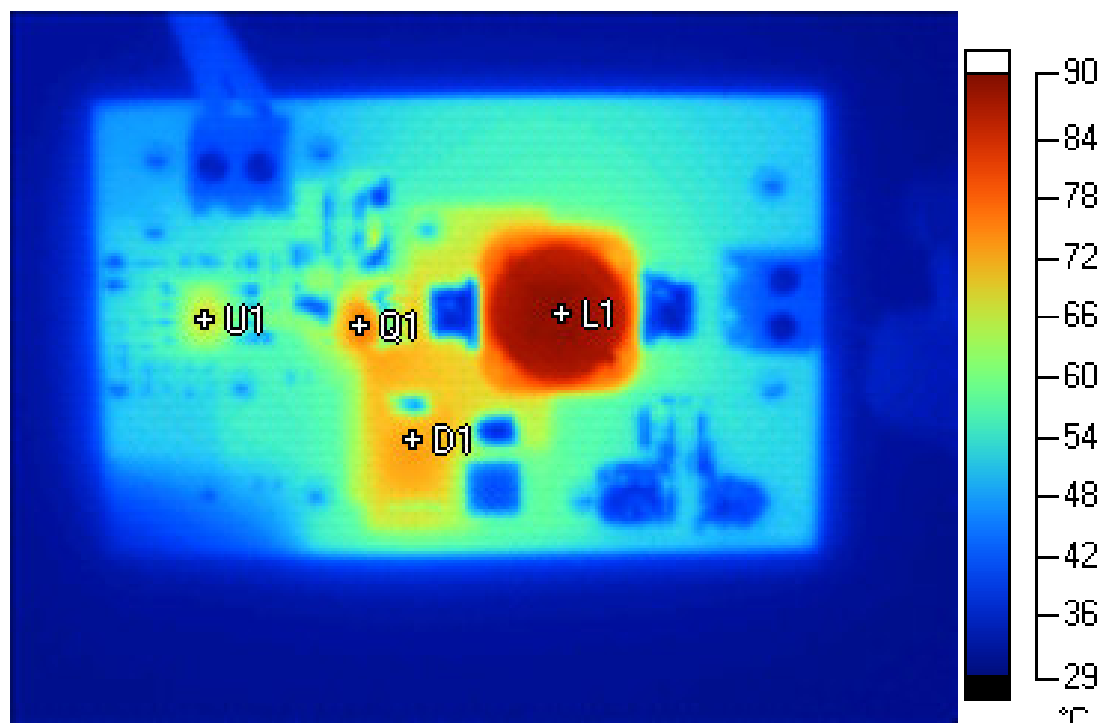


Figure 10

device	max. temperature	measured temp. @ 25 °C
U1	85.0	67.3
Q1	150.0	75.1
D1	150.0	72.1
L1	85.0	89.9

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