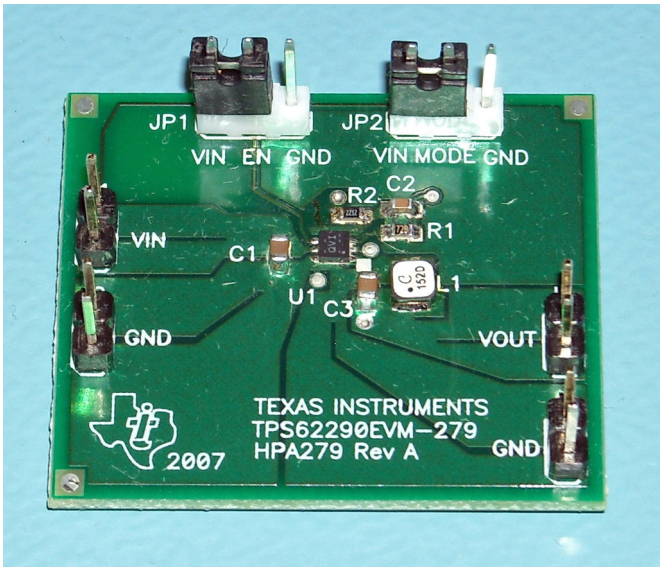
Synchronous Buck with TPS62290 – 0.75V @ 700mA

- Input 3.2 ..3.4V DC
- Output 0.75V @ 700mA
- Controller TPS62290-Q1
- Free-Running switching frequency of 2.25 MHz
- Modified TPS62290 Evaluation Board
- **All measurements were done in forced PWM mode!**



1 Startup

The startup waveform is shown in Figure 1. The input voltage is set at 3.3V, with no load on the 0.75V output.

Channel C1: **3.3V Input voltage**
500mV/div, 100us/div

Channel C2: **0.75V Output voltage**
200mV/div, 100us/div

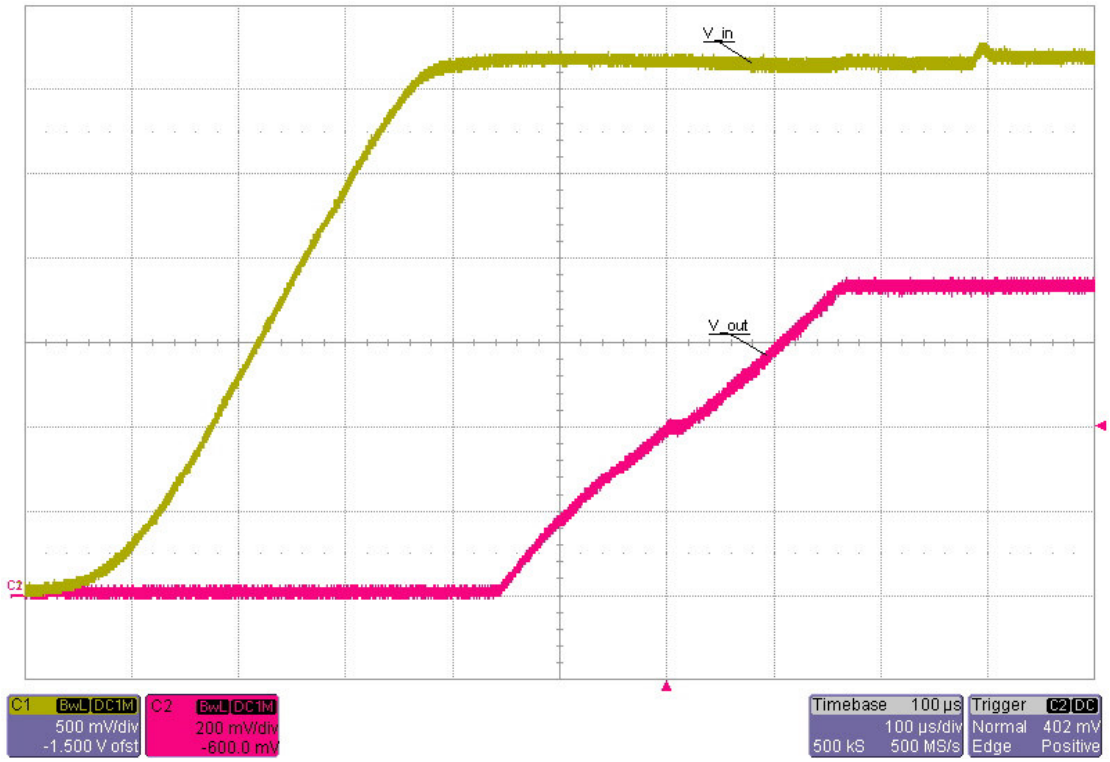


Figure 1

2 Shutdown

The shutdown waveform is shown in Figure 2. The input voltage is set at 3.3V with a 700mA load on the 0.75V output.

Channel C1: **3.3V Input voltage**
500mV/div, 20us/div

Channel C2: **0.75V Output voltage**
200mV/div, 20us/div

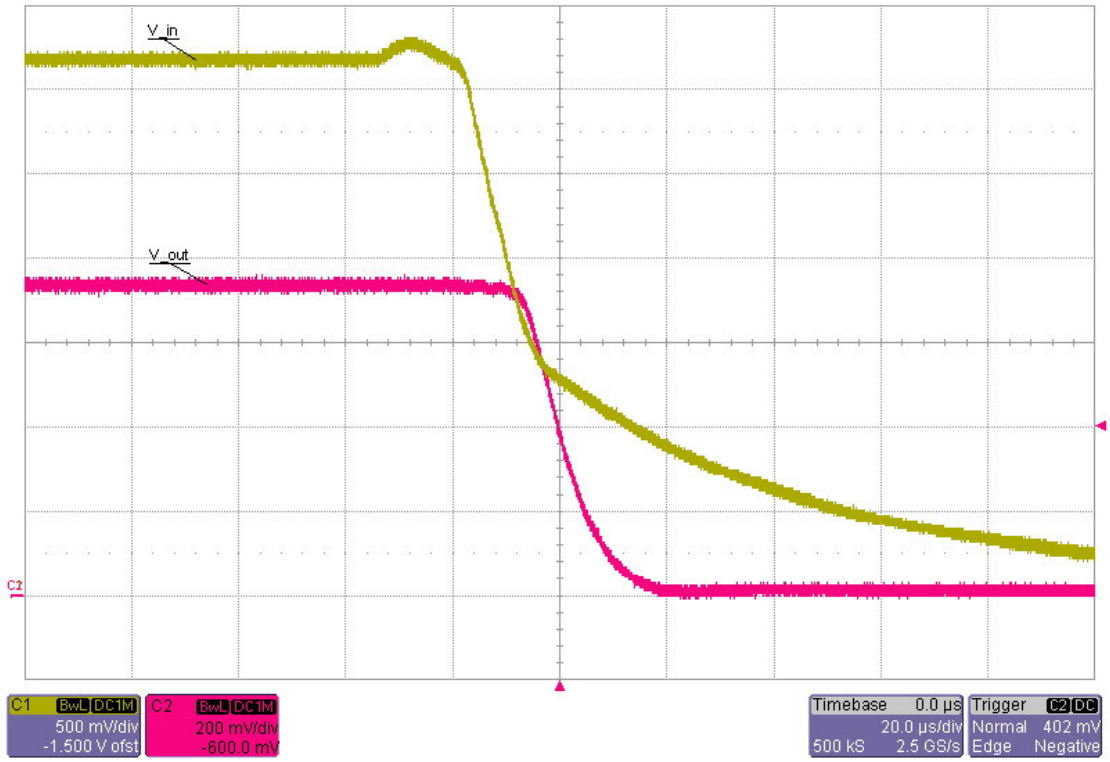


Figure 2

3 Efficiency

The efficiency and load regulation are shown in Figure 3 and Figure 4.

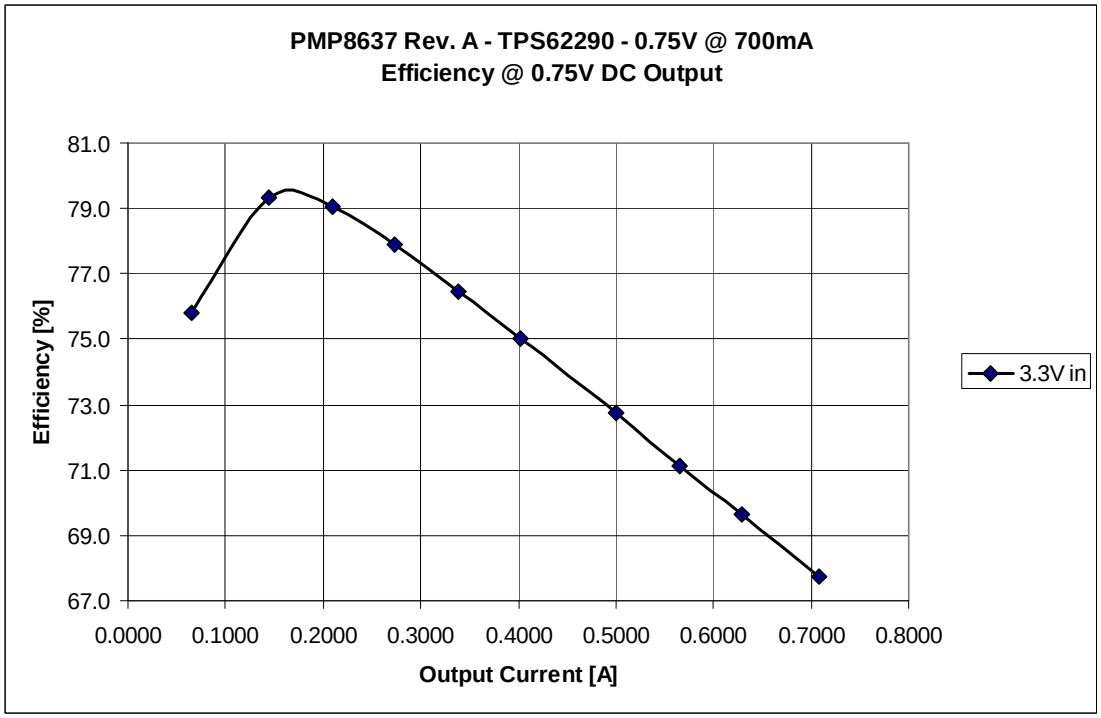


Figure 3

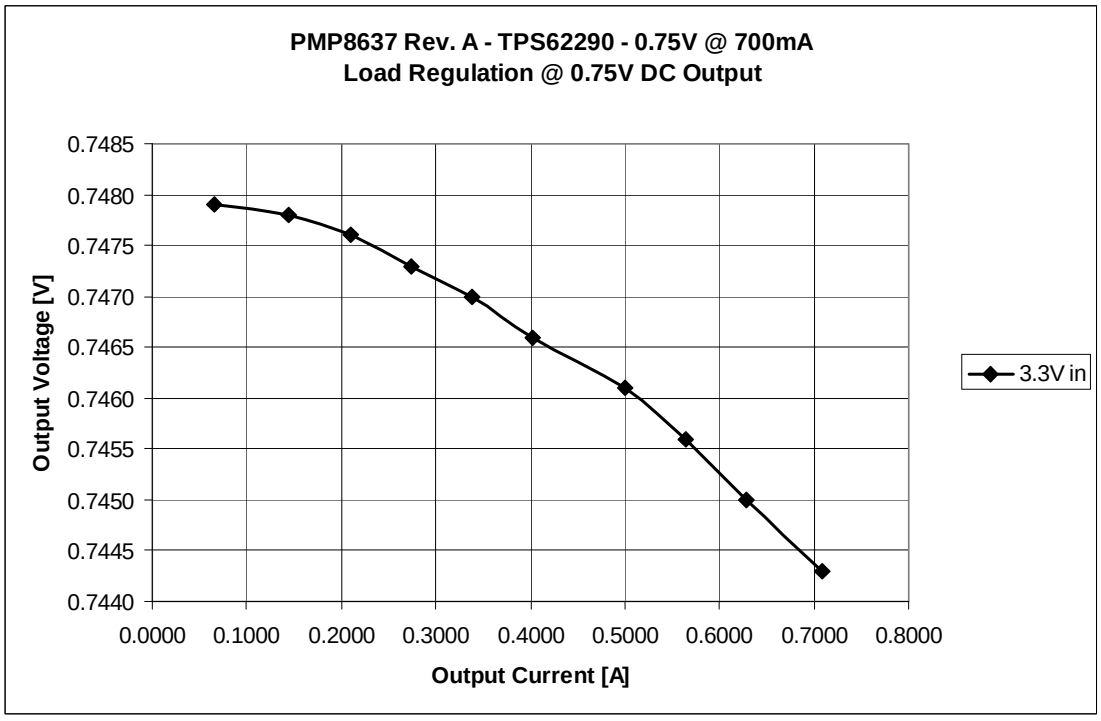


Figure 4

4 Load step

The response to a load step and a load dump for the 0.75V output at an input voltage of 3.3V is shown in Figure 5.

Channel C2: **Output voltage**, -4mV undershoot (-0.5%), 3mV overshoot (+0.4%)
20mV/div, 1ms/div, AC coupled

Channel C1: **Load current**, load step 350mA to 700mA and vice versa
500mA/div, 1ms/div

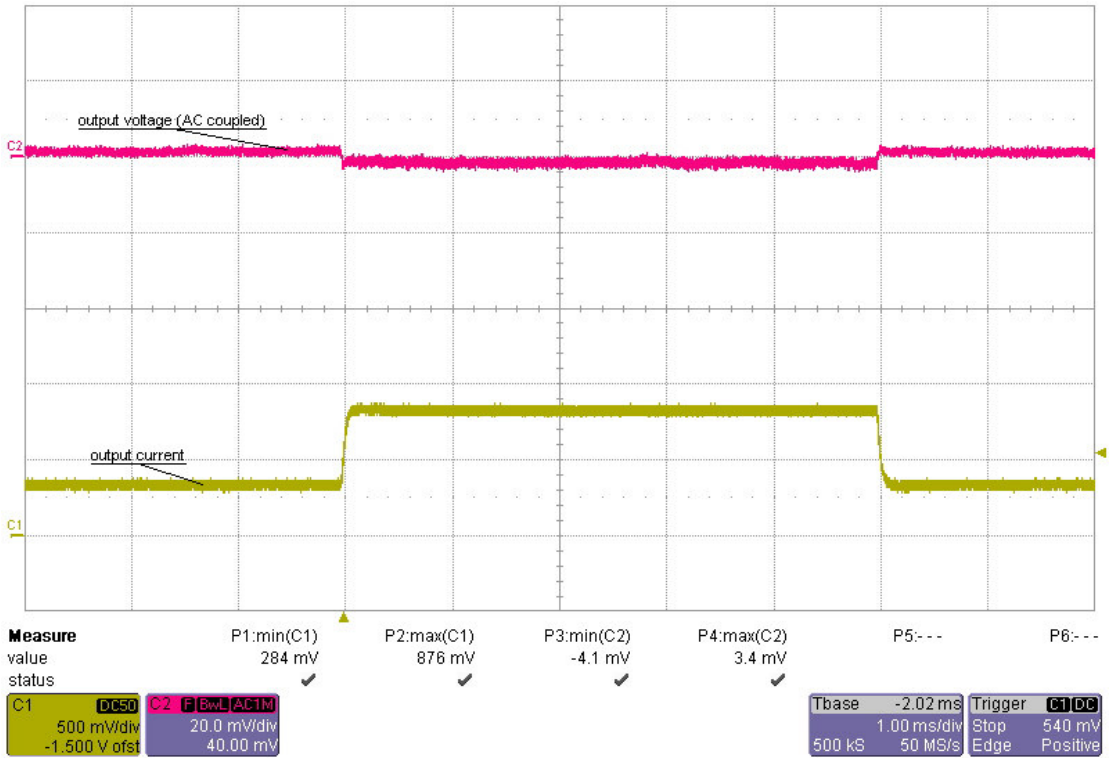


Figure 5

5 Frequency response

Figure 6 shows the loop response at 3.3V input voltage and a load of 700mA.

3.3V input

- 55 deg phase margin @ crossover frequency 194 kHz
- -21 db gain margin

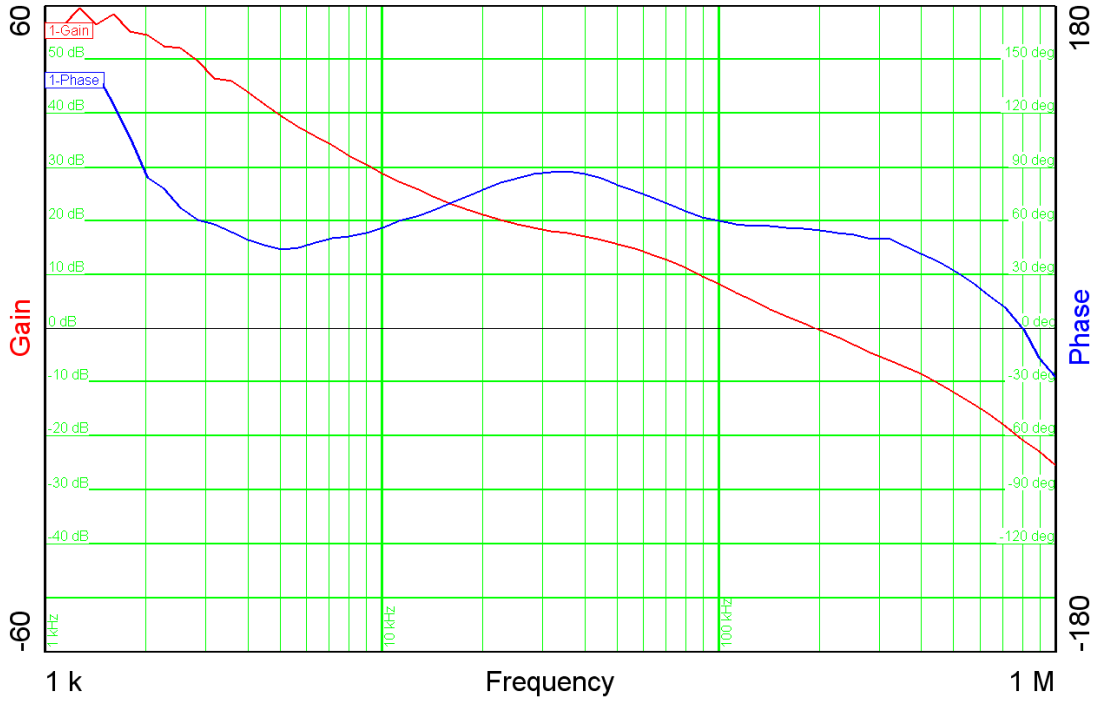


Figure 6

6 Switching Node

The drain-source voltage on the switching node is shown in Figure 7. The image was captured with 3.3V input and 700mA load.

Channel C2: **Drain-source voltage**, -848mV minimum voltage, 3.25V maximum voltage 1V/div, 200ns/div

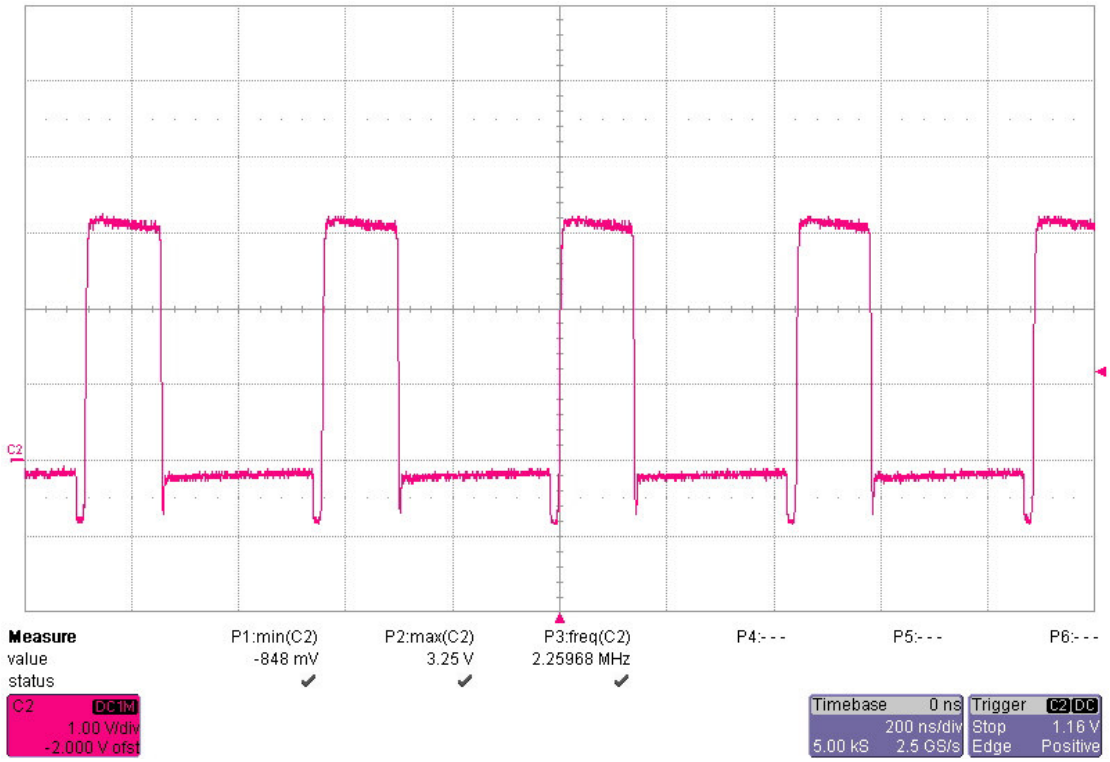


Figure 7

7 Thermal measurement

The thermal image (Figure 8) shows the circuit at an ambient temperature of 21 °C with an input voltage of 3.3V and a load of 700mA.

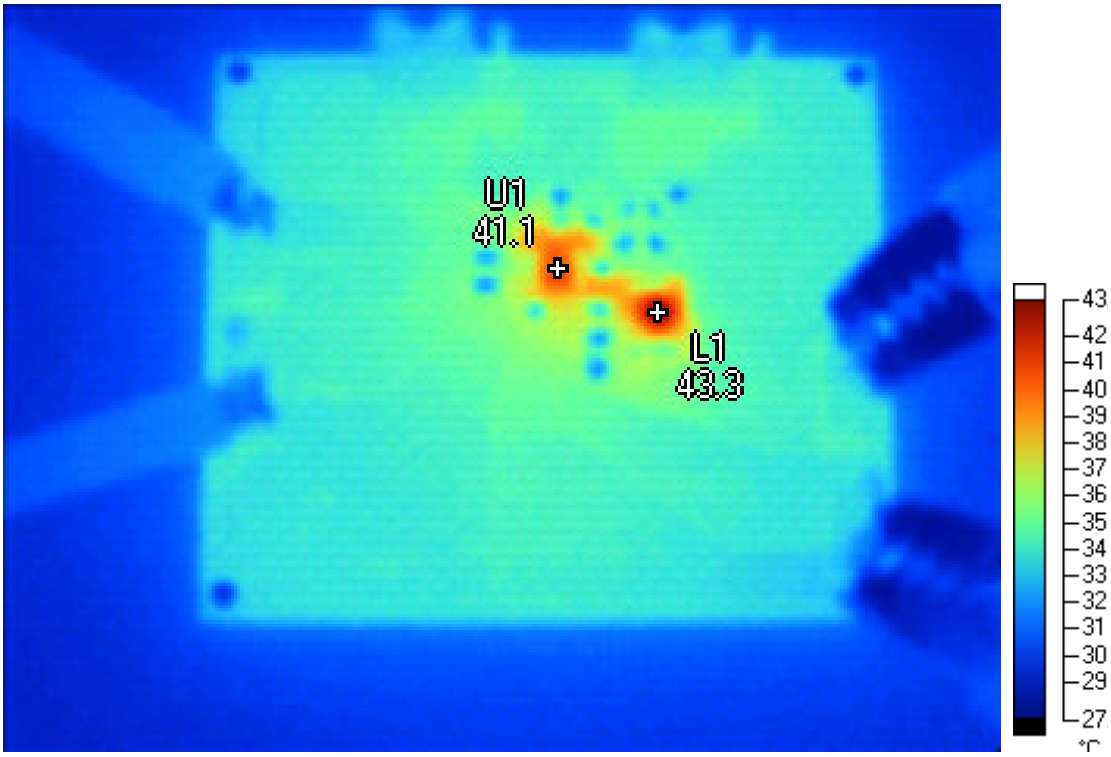


Figure 8

Markers

Label	Temperature	Emissivity	Background
L1	43.3 °C	0.95	21.0 °C
U1	41.1 °C	0.95	21.0 °C

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