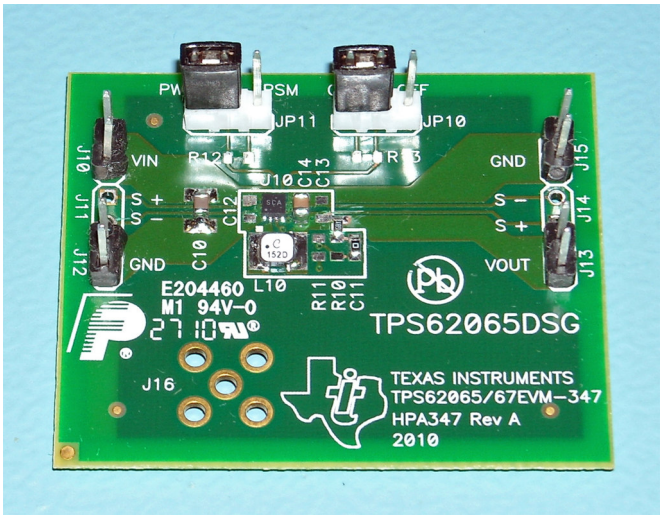
Synchronous Buck with TLV620612 – 1.2V @ 900mA

- Input 3.2 ..3.4V DC
- Output 1.2V @ 900mA
- Controller TLV620612-Q1
- Free-Running switching frequency of 3.0 MHz
- Modified TPS62065 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 1.2V output.

Channel C1: **3.3V Input voltage**
1V/div, 5ms/div

Channel C2: **1.2V Output voltage**
500mV/div, 5ms/div

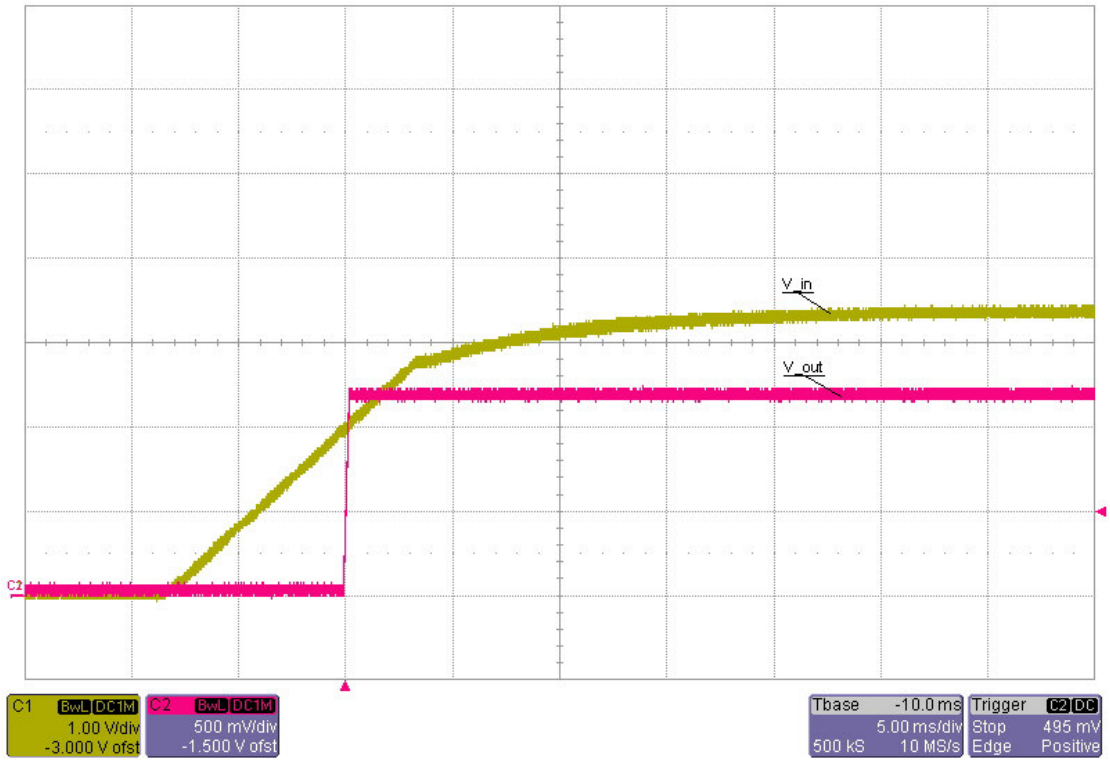


Figure 1

2 Shutdown

The shutdown waveform is shown in Figure 2. The input voltage is set at 3.3V with a 900mA load on the 1.2V output.

Channel C1: **3.3V Input voltage**
1V/div, 100us/div

Channel C2: **1.2V Output voltage**
500mV/div, 100us/div

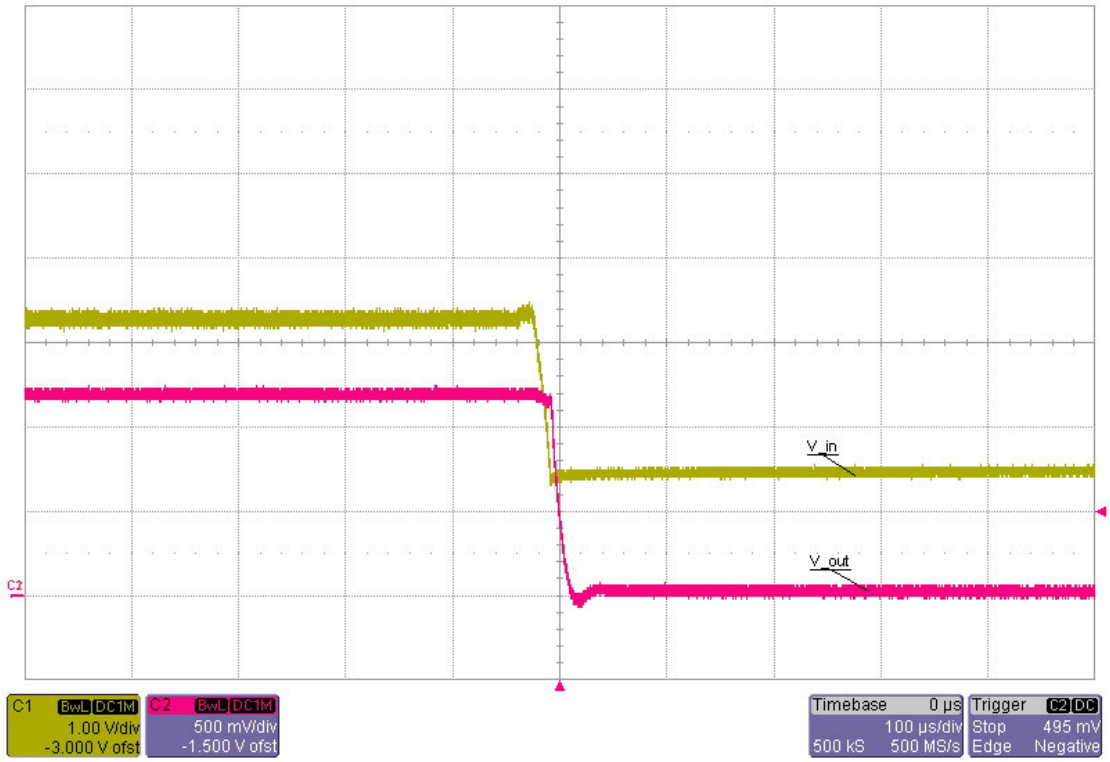


Figure 2

3 Efficiency

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

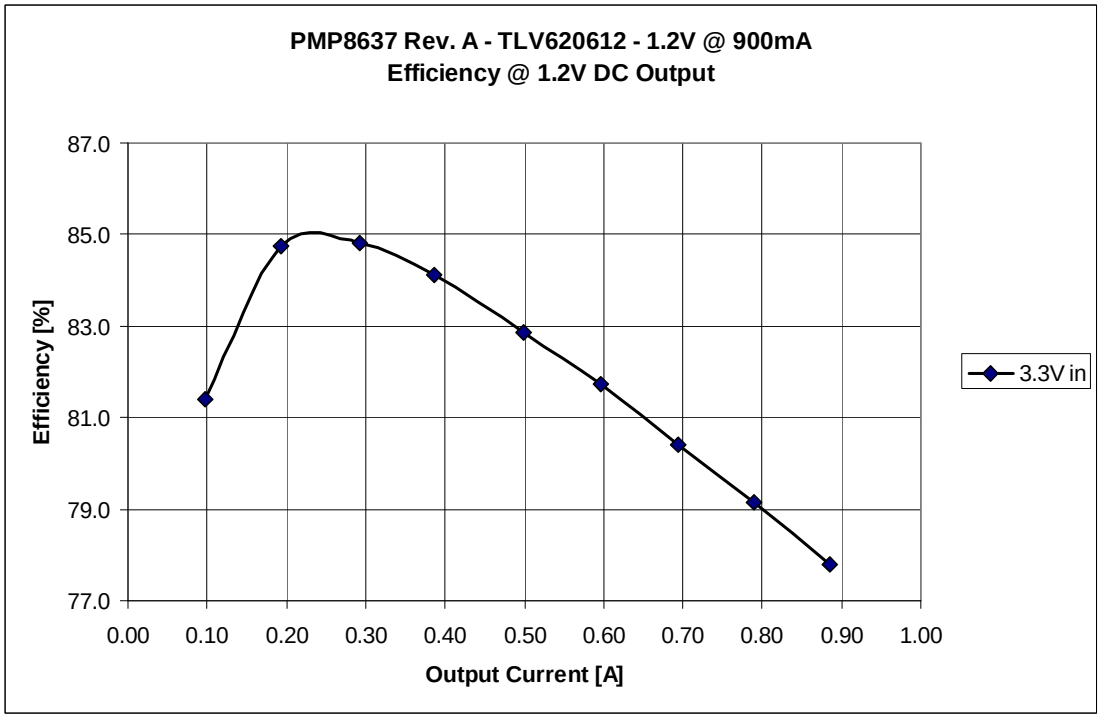


Figure 3

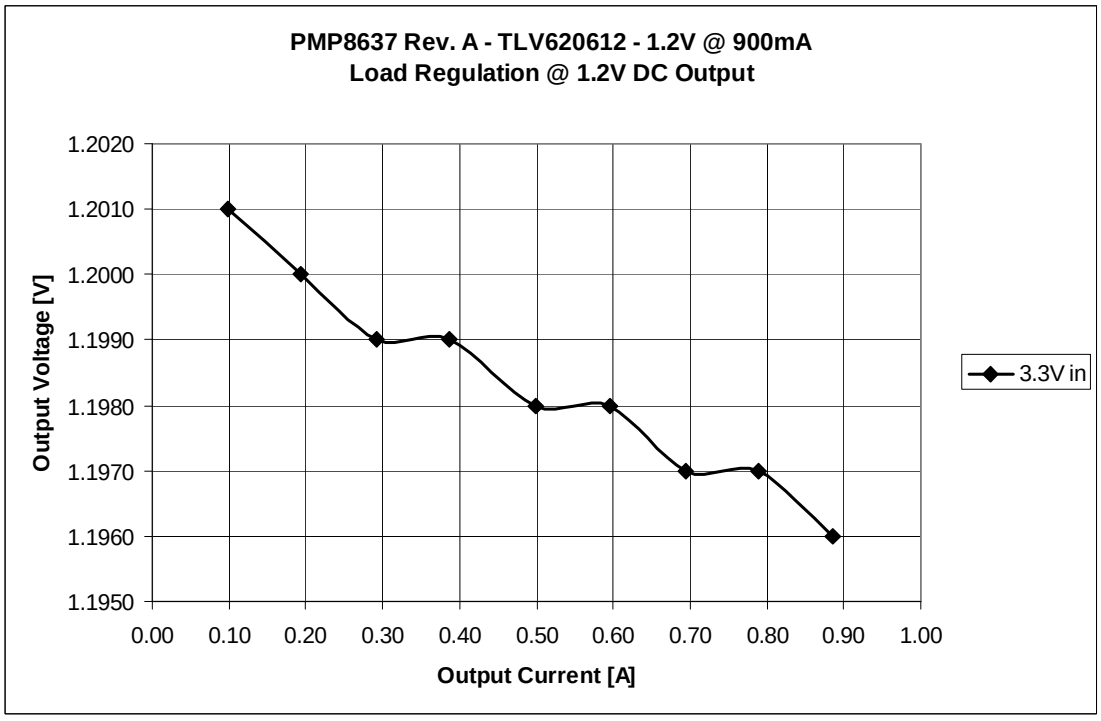


Figure 4

4 Load step

The response to a load step and a load dump for the 1.2V output at an input voltage of 3.3V is shown in Figure 5.

Channel C2: **Output voltage**, -5mV undershoot (-0.4%), 5mV overshoot (+0.4%)
20mV/div, 1ms/div, AC coupled

Channel C1: **Load current**, load step 450mA to 900mA and vice versa
500mA/div, 1ms/div

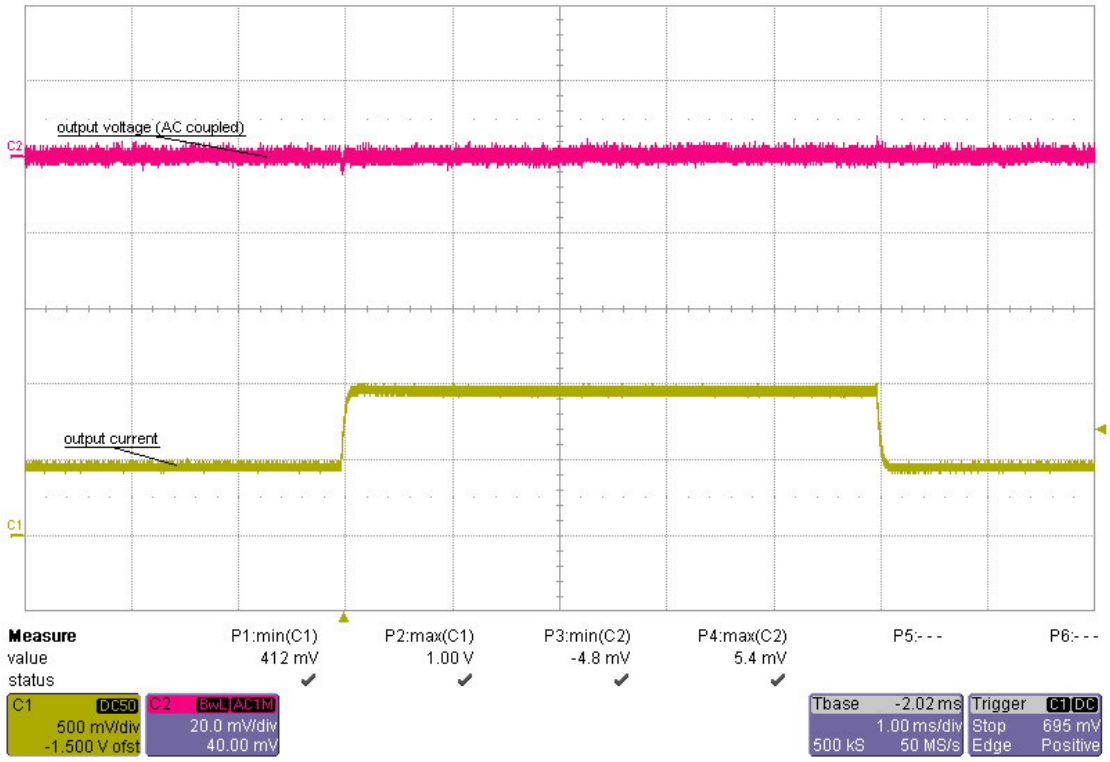


Figure 5

5 Frequency response

Figure 6 shows the loop response at 3.3V input voltage and a load of 600mA.

3.3V input

- 50 deg phase margin @ crossover frequency 160 kHz
- -19 db gain margin

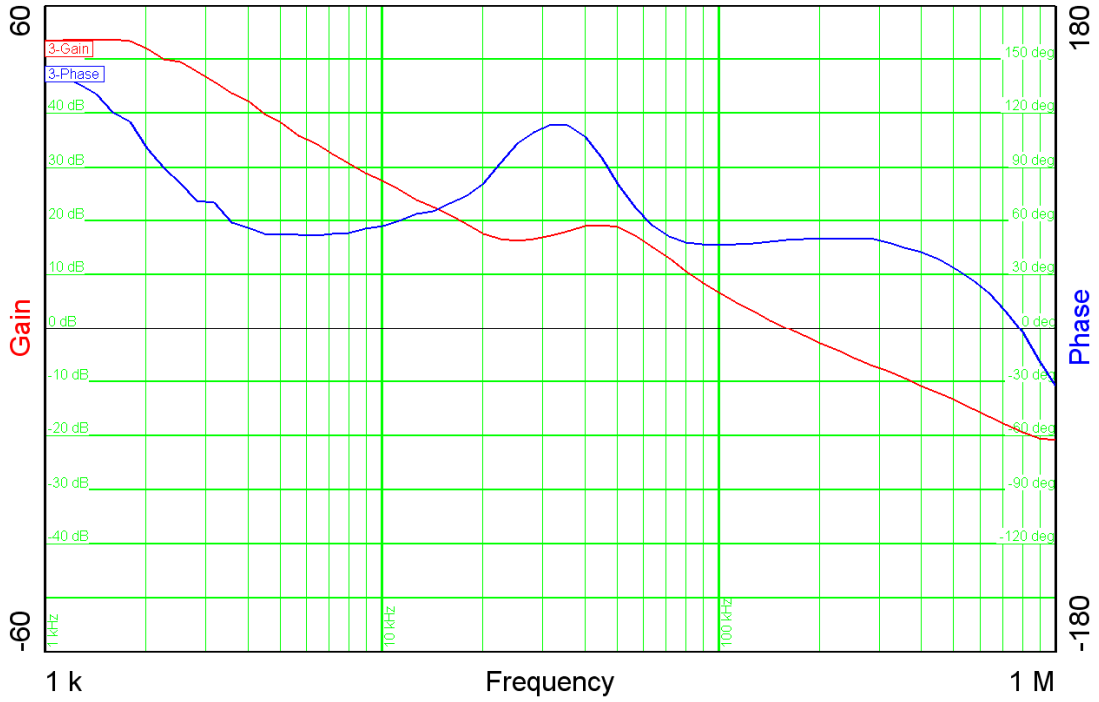


Figure 6

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 900mA load.

Channel C2: **Drain-source voltage**, -1.1V minimum voltage, 3.4V maximum voltage
1V/div, 200ns/div

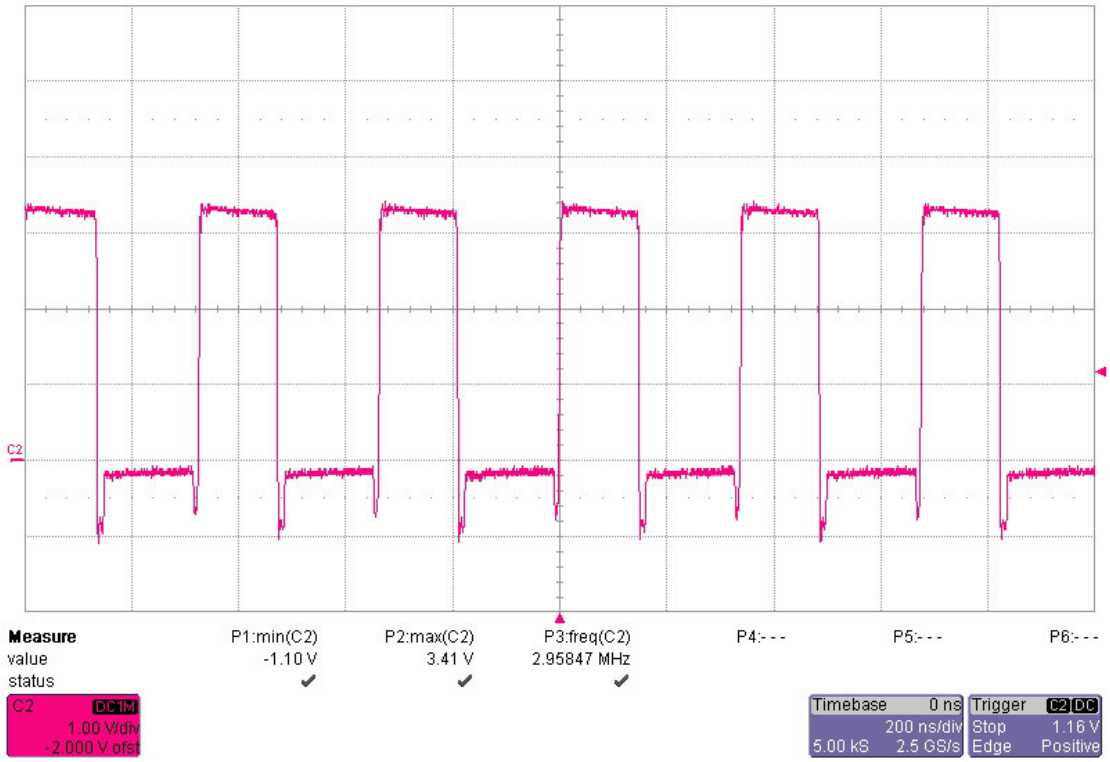


Figure 7

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 900mA.

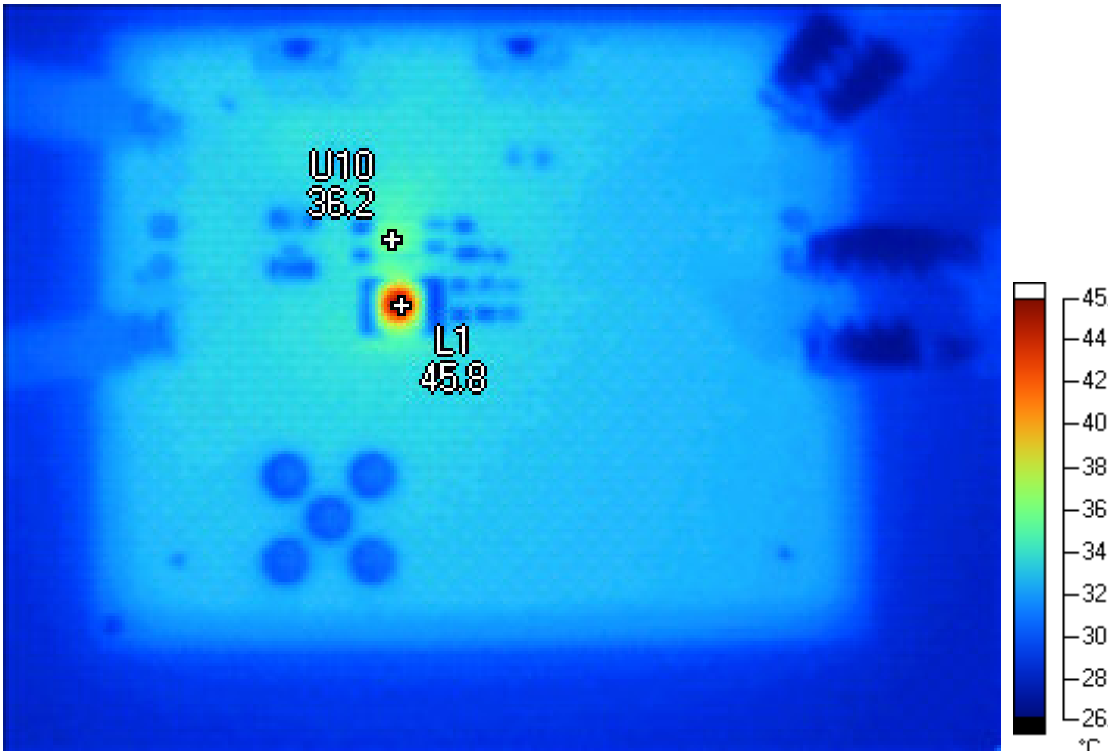


Figure 8

Markers

Label	Temperature	Emissivity	Background
L1	45.8 °C	0.95	21.0 °C
U1	36.2 °C	0.95	21.0 °C

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