1 Startup

The startup waveform with input voltage VIN = 4.5 V is shown in Figure 1. The load is set to 1.5 A.

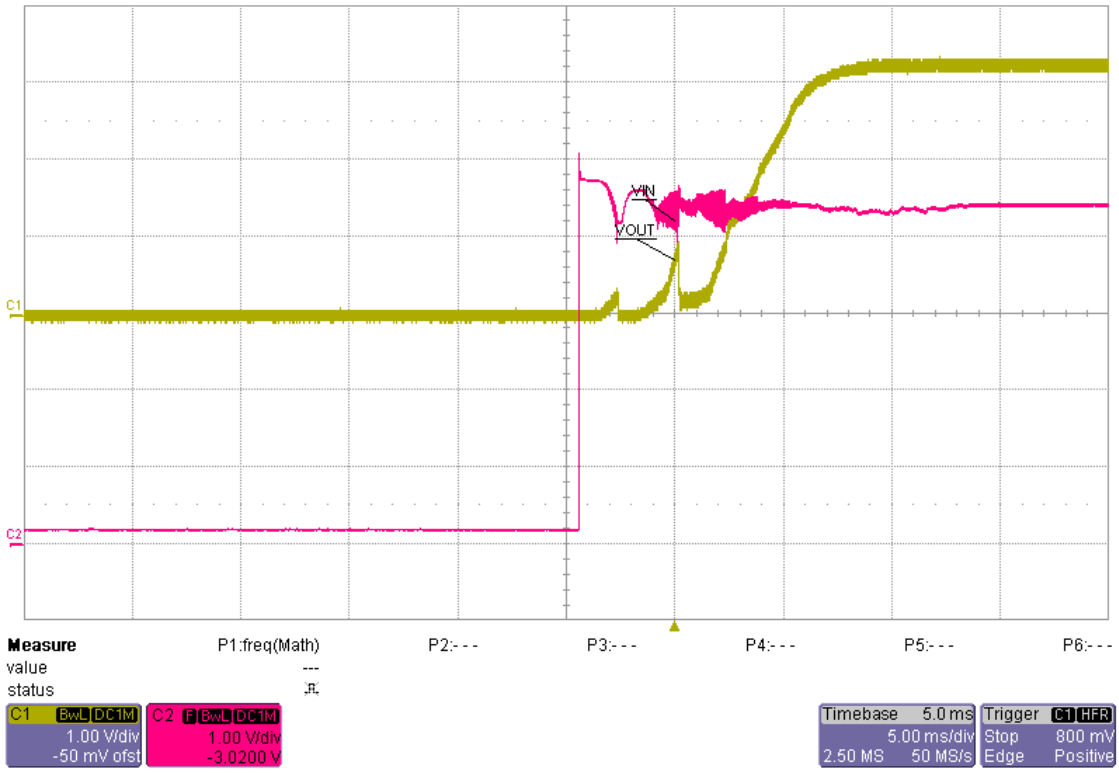

Figure 1

The startup waveform with input voltage VIN = 12 V is shown in Figure 2. The load is set to 1.5 A.

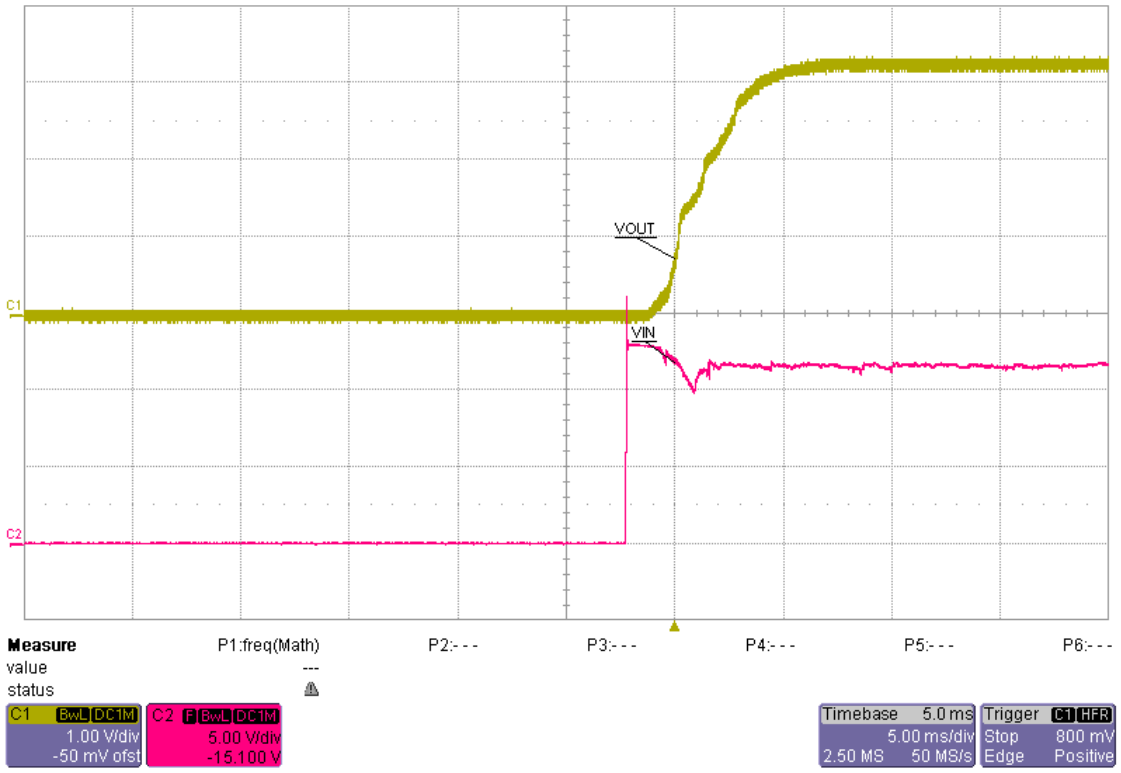

Figure 2

The startup waveform with input voltage VIN = 18 V is shown in Figure 3. The load is set to 1.5 A.

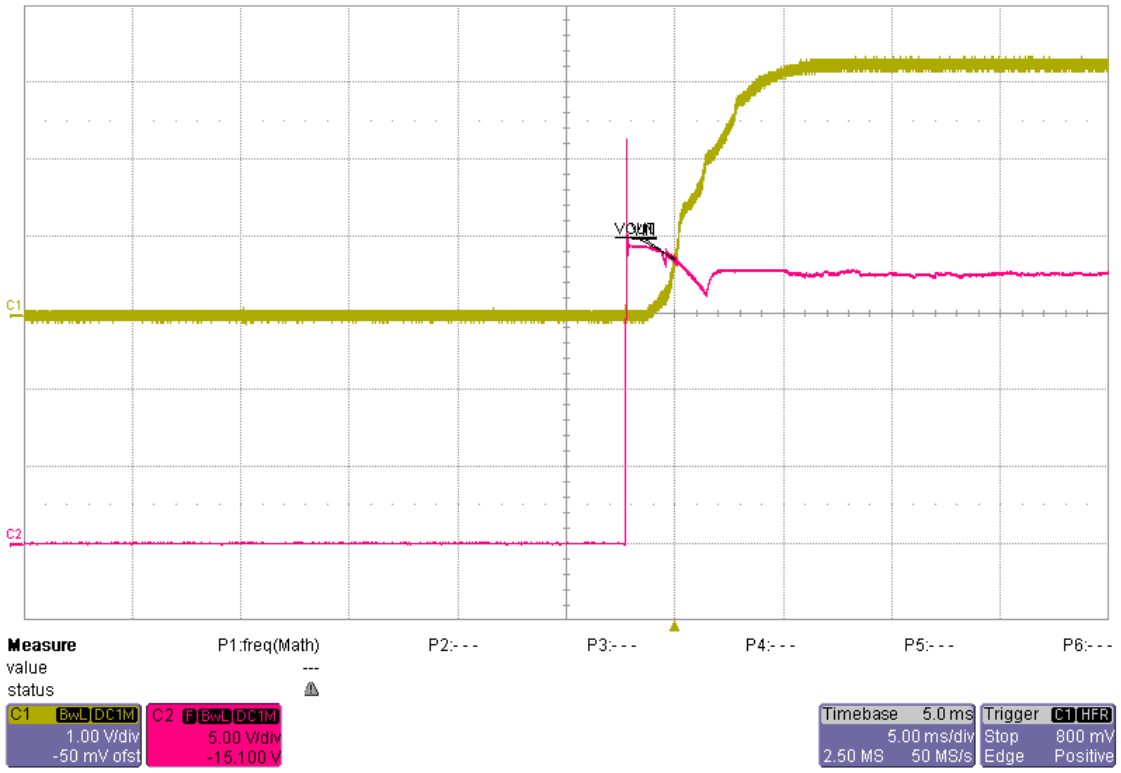

Figure 3: Channel 1: VOUT, Channel 2: VIN

2 Shutdown

The startup waveform with input voltage VIN = 4.5 V is shown in Figure 4. The load is set to 1.5 A.

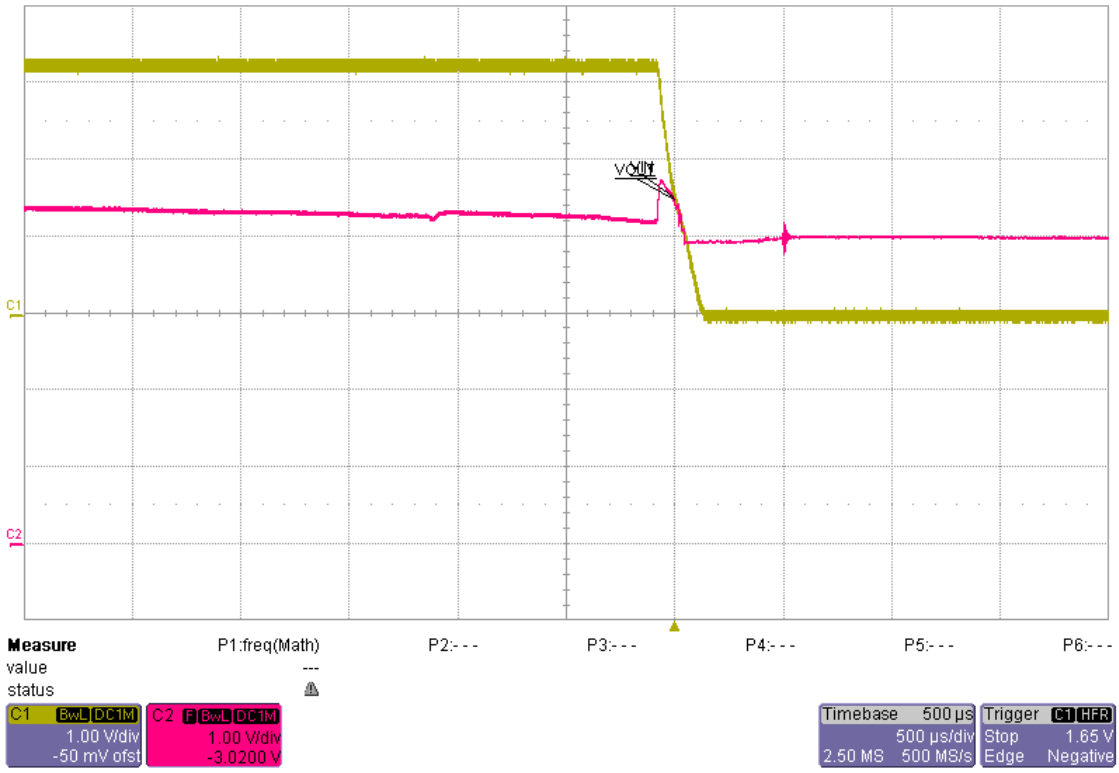

Figure 4: Channel 1: VOUT, Channel 2: VIN

The startup waveform with input voltage VIN = 12 V is shown in Figure 5. The load is set to 1.5 A.

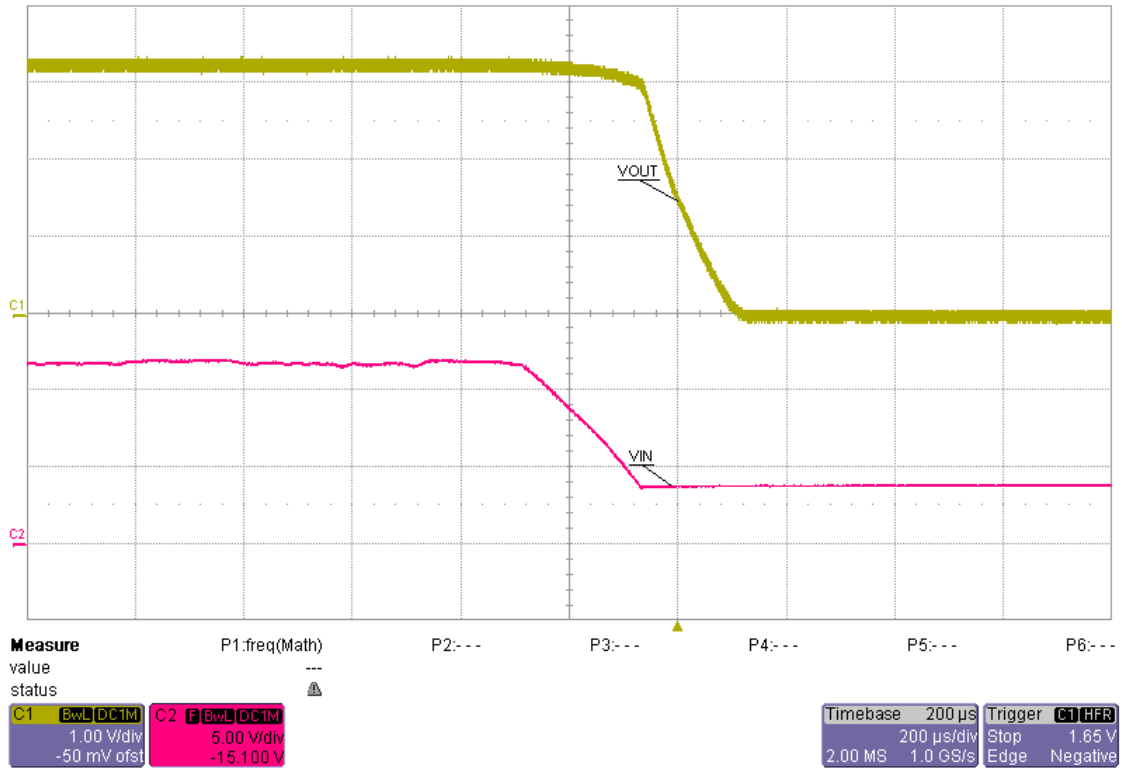

Figure 5

The startup waveform with input voltage VIN = 18 V is shown in Figure 6. The load is set to 1.5 A.

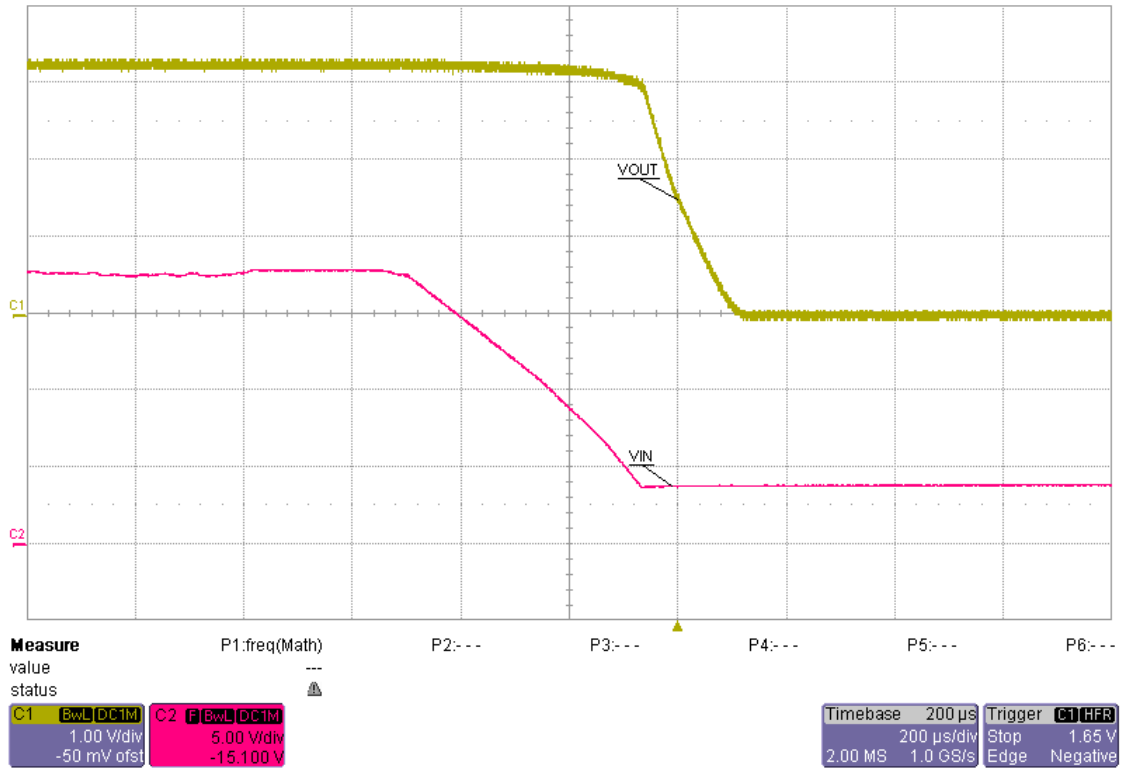

Figure 6

3 Efficiency

The converter efficiency for different input voltages is shown in Figure 7.

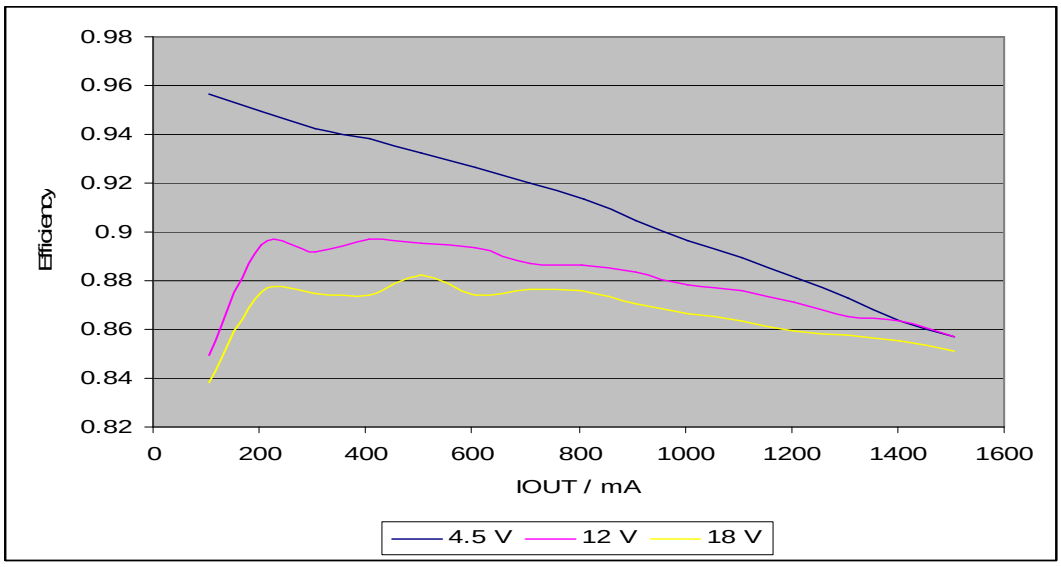

Figure 7

The voltage regulation curves are shown in Figure 8.

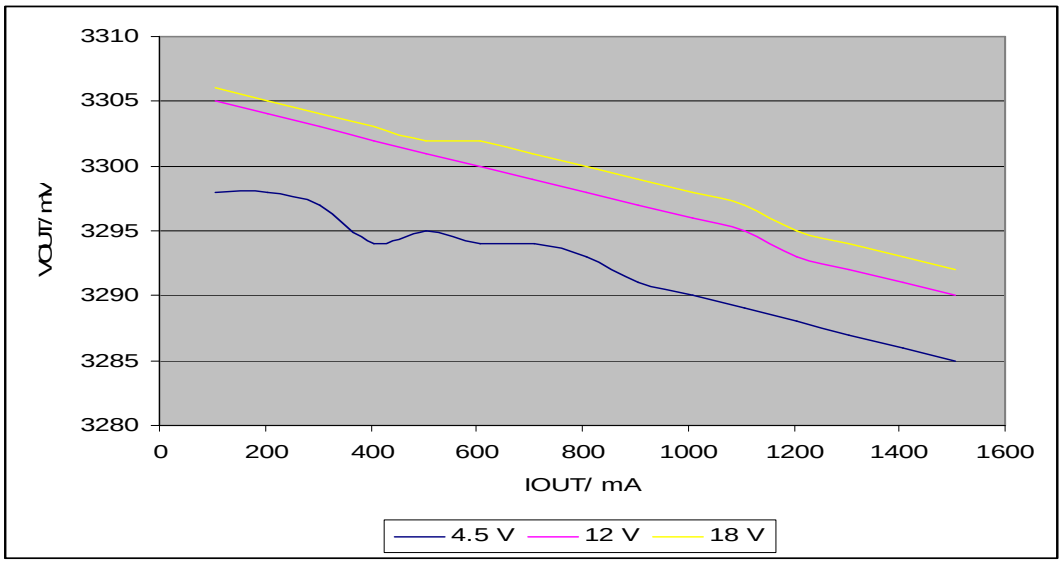

Figure 8

3 Output Voltage Ripple

The Output ripple voltages for VIN = 4.5 V, 12 V and 18 V are shown in Figure 9. The output is loaded with 1.5 A.

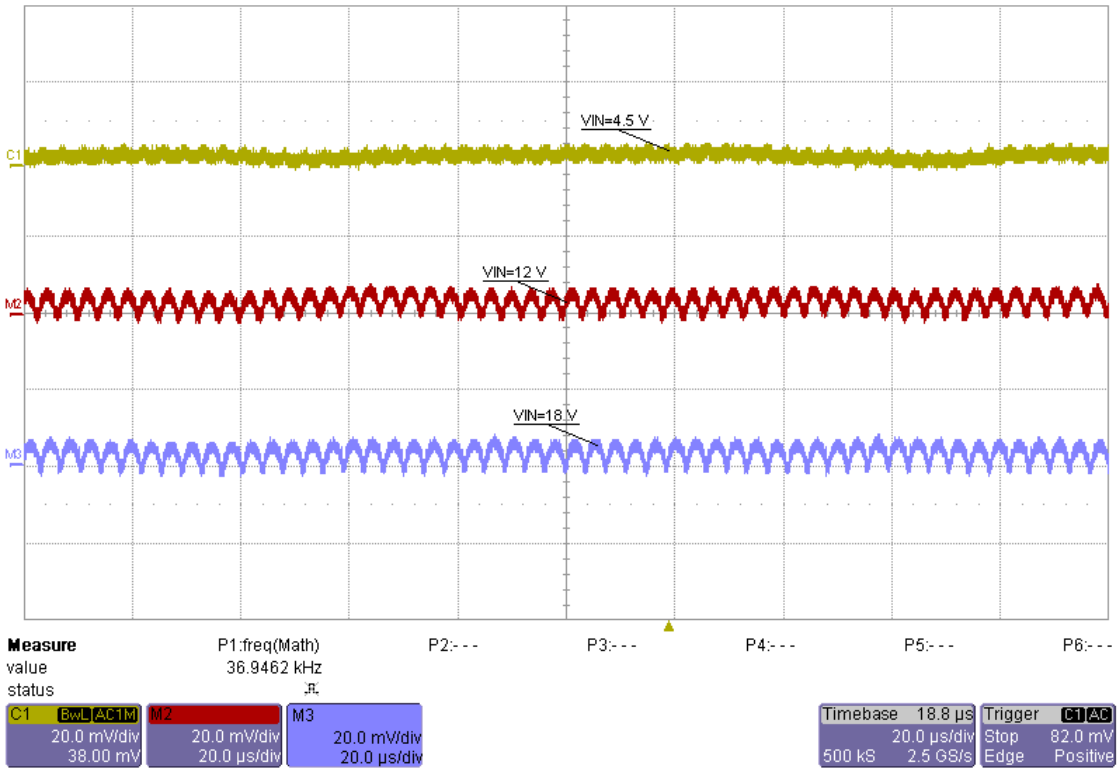

Figure 9

4 Load Transients

The response to a load step and dump is shown in Figure 10 for an input voltage of 18 V and a load step between 0.75 A and 1.5 A.

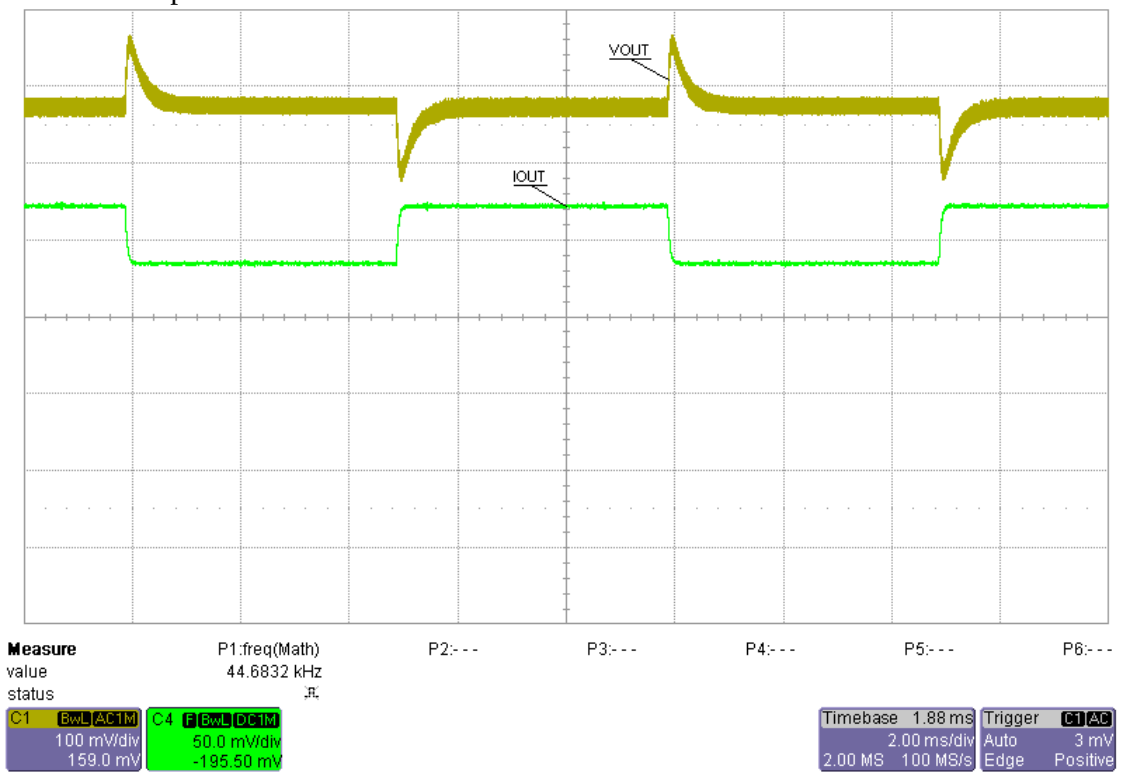

Figure 10

5 Switch Node Waveforms

The switch node waveforms for 4.5 V, 12 V and 18 V are shown in Figure 11 to Figure 13.

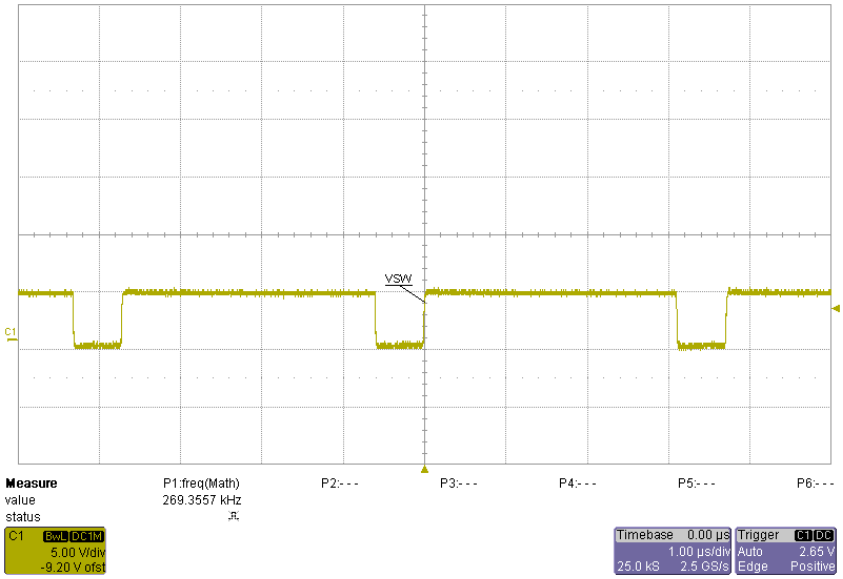

Figure 11

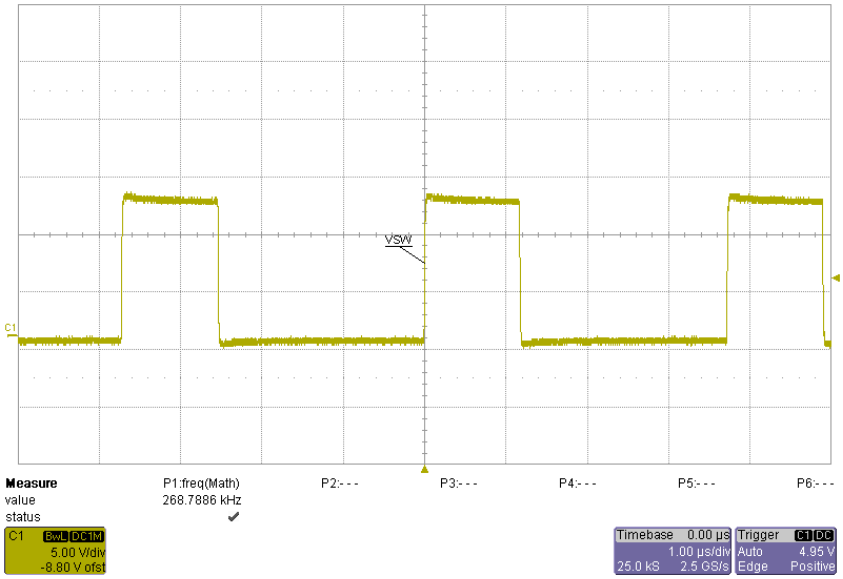

Figure 12

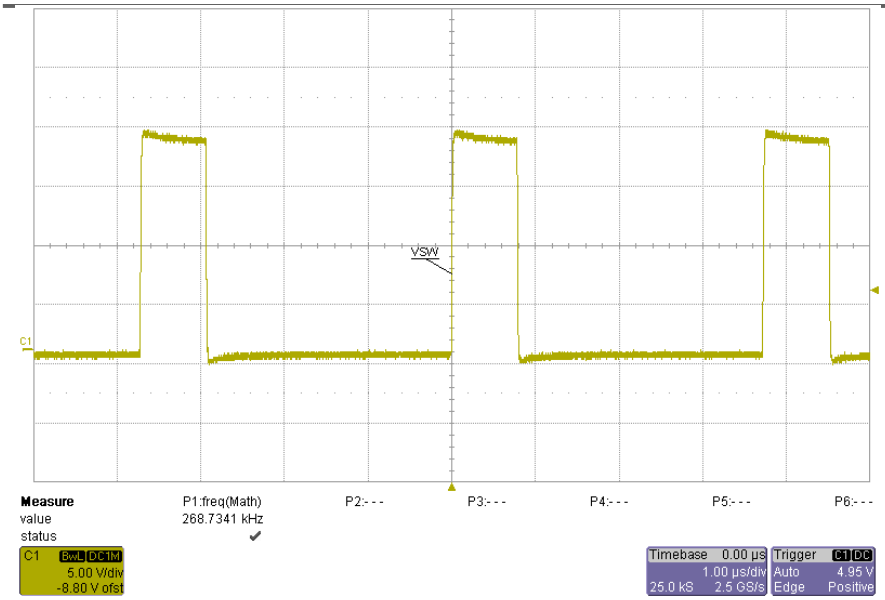
VSW
C1
Measure
value
status
P1:freq(Math)
268.7341 kHz
P2:- - -
P3:- - -
P4:- - -
P5:- - -
P6:- - -
C1 BwL DC1M
5.00 V/div
-8.80 V ofst
Timebase 0.00 µs
1.00 µs/div
25.0 kS 2.5 GS/s
Trigger C1 DC
Auto 4.95 V
Edge Positive

Figure 13

6 Control Loop Gain / Stability

Figure 14 shows the loop response of the converter with 12 V input voltage and 1.5 A load. At unity crossing at 12.29 kHz the phase margin is 66.82 deg and the slope -1.08(*20 dB/ decade). The gain margin at 0 deg phase is 18 dB.

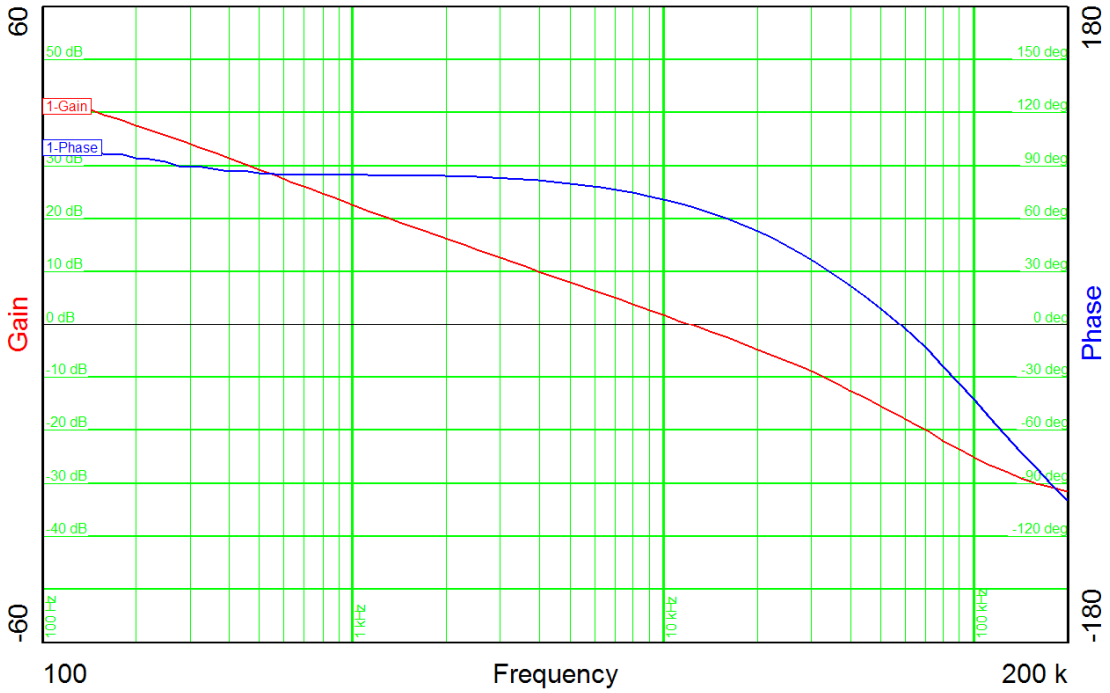

Figure 14

7 Thermal image

Figure 15 shows the thermal image of the board after more than half of an hour running at VIN = 4.5 V, IOUT = 1.5 A with the ambient at room temperature.

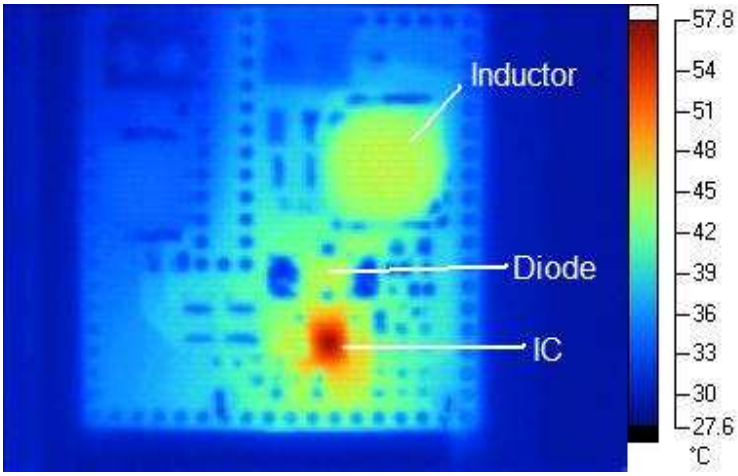

Figure 15

Figure 16 shows the thermal image of the board with VIN = 18 V, IOUT = 1.5 A at room ambient after running more than half an hour. The comparison corresponds to the efficiency measurements of part 3

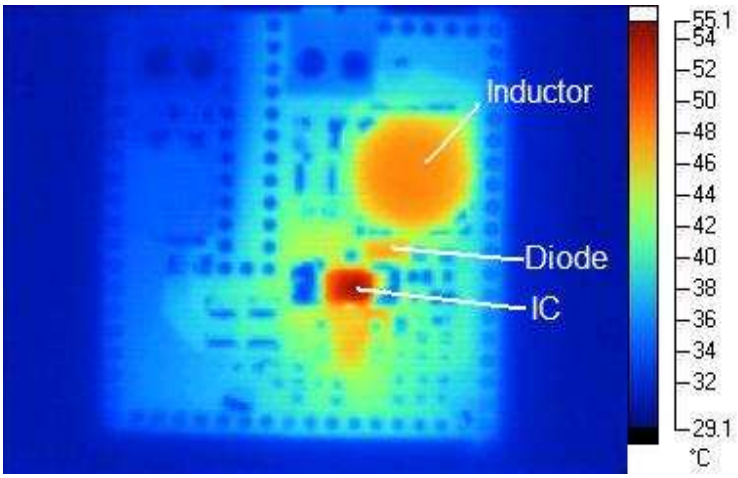

Figure 16

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