PMP30009RevB Test Results

1 Startup 2

2 Shutdown 3

3 Efficiency 4

4 Load Regulation 4

5 Output Ripple Voltage 5

6 Input Ripple Voltage 6

7 Loop Compensation & Transient Response 7

8 Transient Response 9

9 Miscellaneous Waveforms 10

9.1 Switch to GND 10

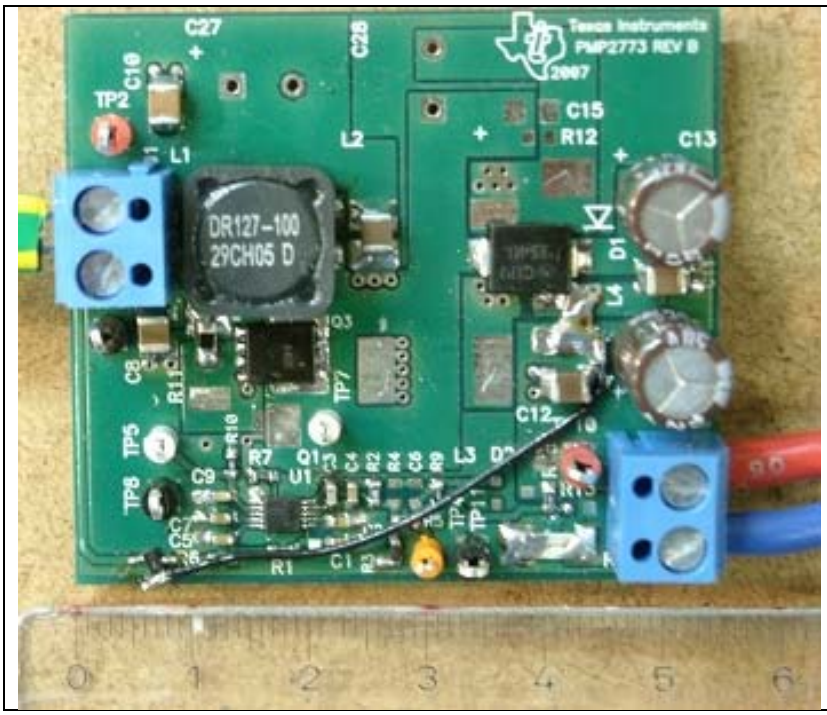
9.2 Gate to GND 12

10 Thermal Image 14

Topology: Boost
Device: TPS40210

Due to availability (lab stock)
FET BSC032N04LS ,inductor DR127-100-R and electrolytics EKZE500ELL101MHB5D were used

Unless otherwise mentioned, the measurements were done with 1.7A output current



1 Startup

The startup waveform at 6V input voltageis shown in the Figure 1.

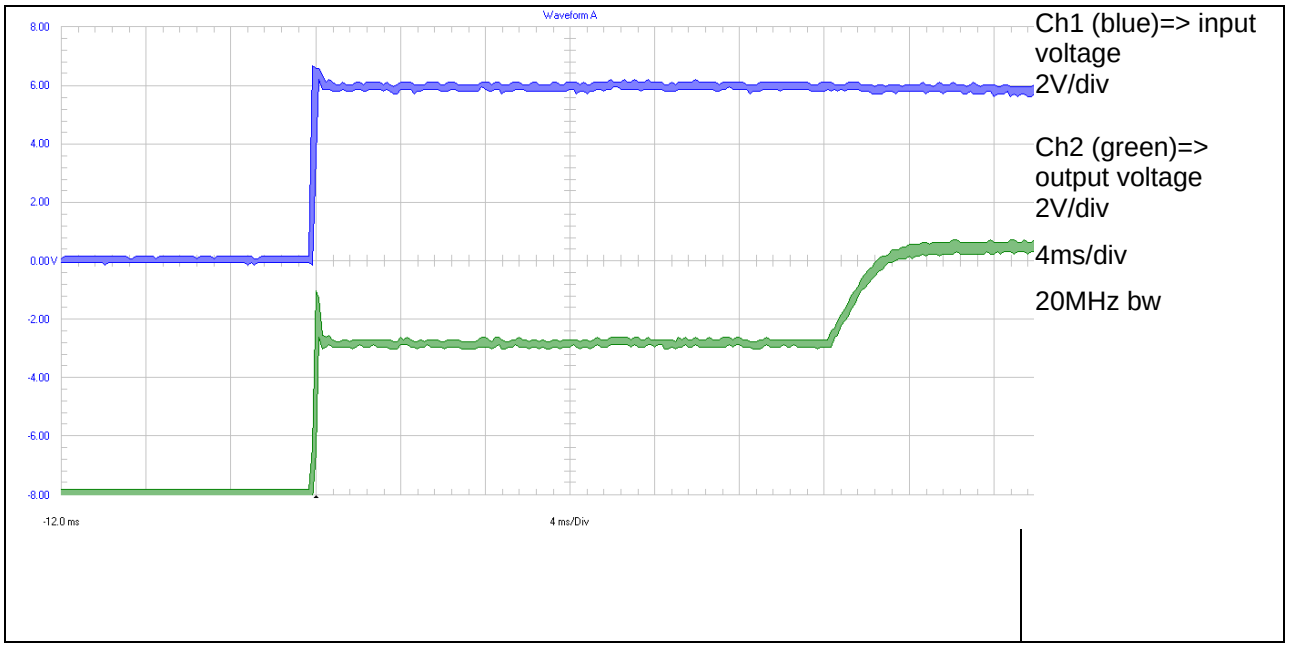
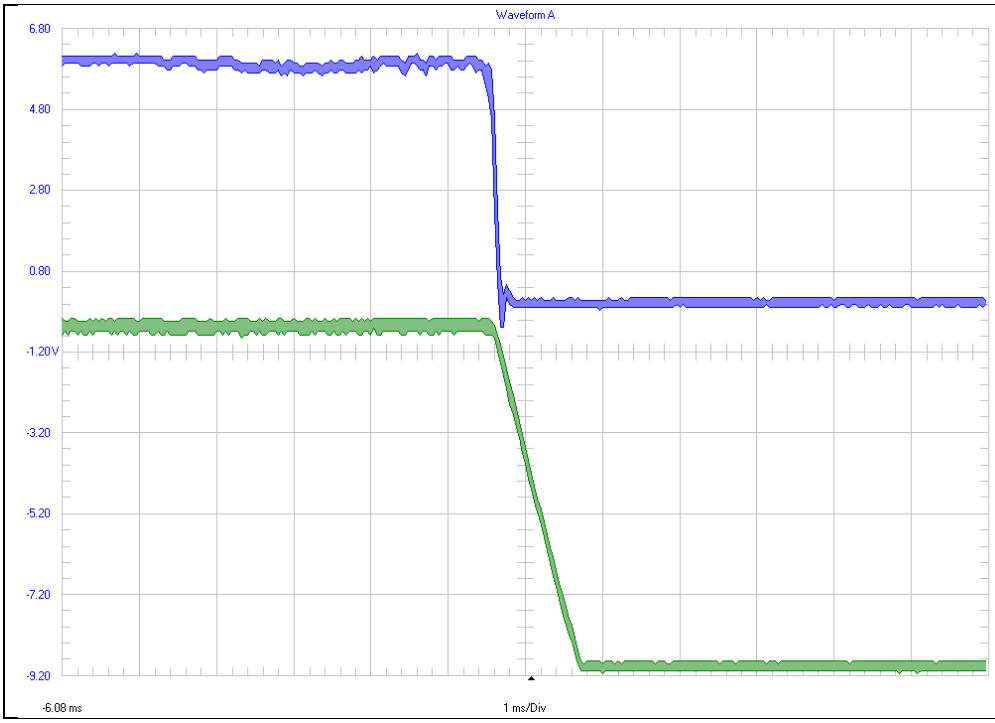


Figure 1

2 Shutdown

The shutdown waveform with 6V input voltage is shown in the Figure 2..
The power supply was disconnected.



Ch1=> input voltage
2V/div

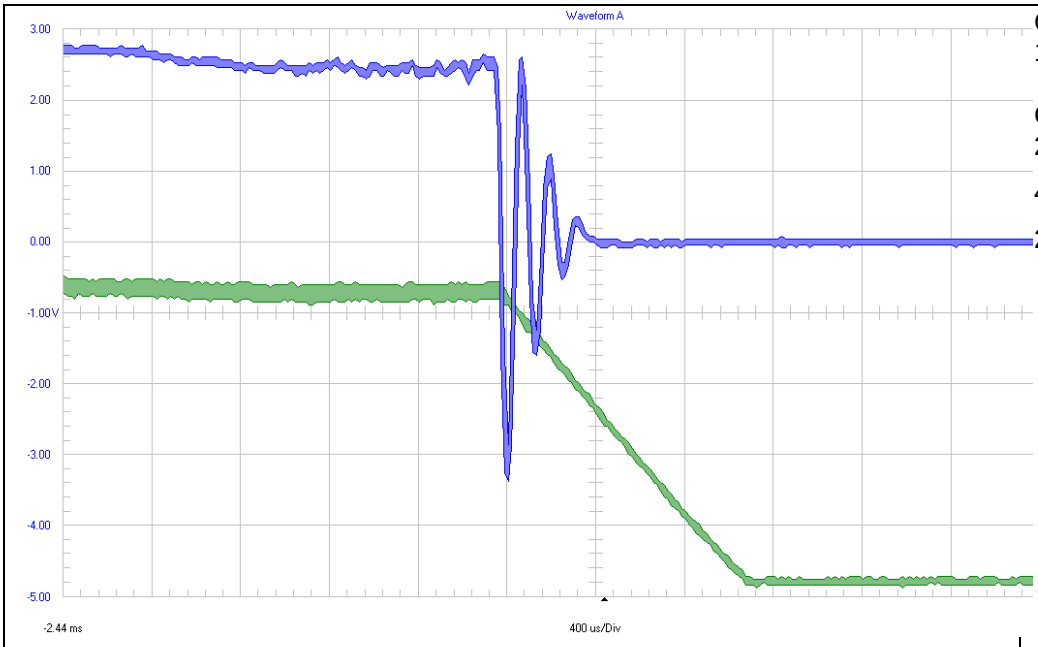
Ch2=> output voltage
2V/div

1ms/div

20MHz bw

Figure 2

The shutdown waveform with 2.7V input voltage is shown in the Figure 3.
The power supply was disconnected (manually, therefore the disturbance in the input voltage waveform)



Ch1=> input voltage
1V/div

Ch2=> output voltage
2V/div

400µs/div

20MHz bw

Figure 3

3 Efficiency

The efficiency curves are shown in the Figure 4 below.

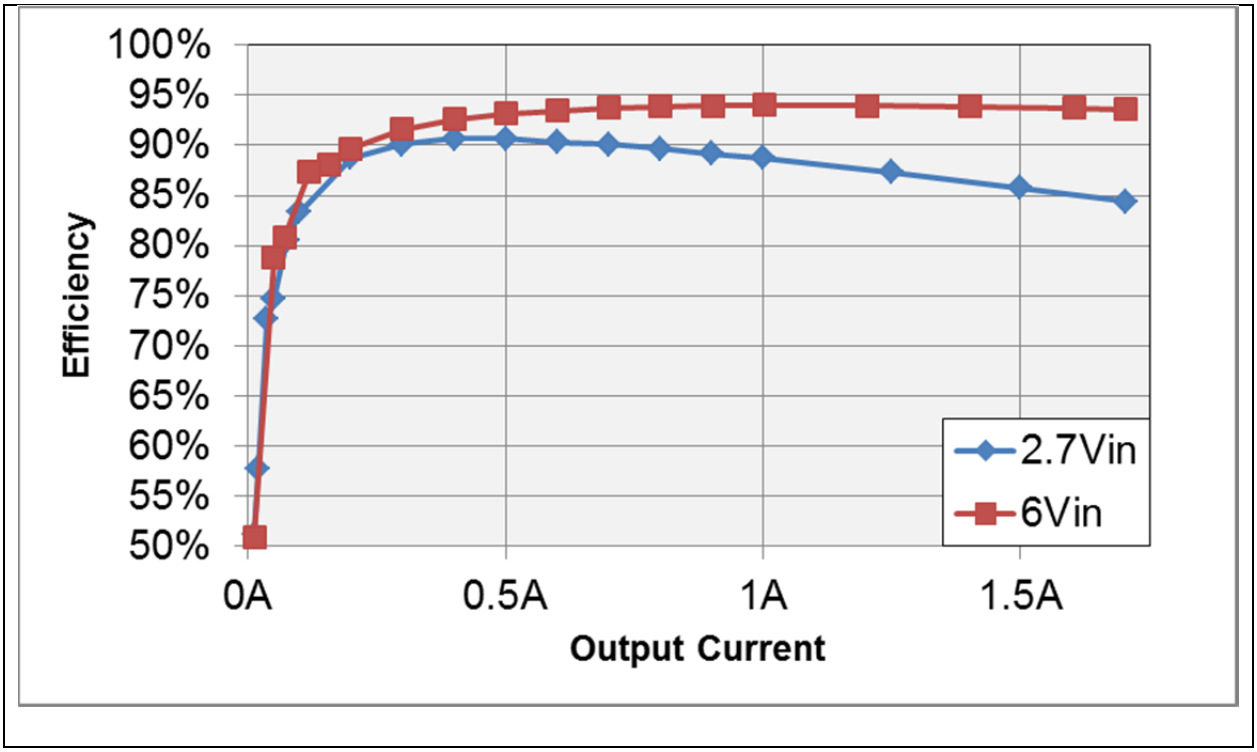


Figure 4

4 Load Regulation

The load regulation of the output is shown in the Figure 5 below.

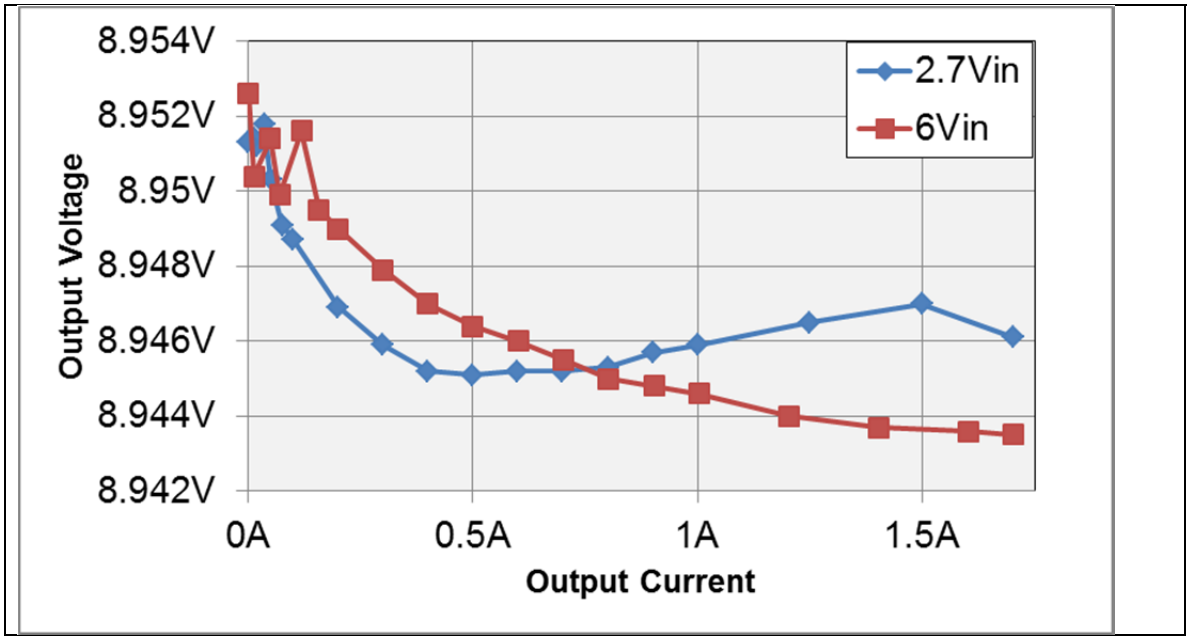


Figure 5

5 Output Ripple Voltage

The output ripple voltage is shown in Figure 6. The input voltage was 6V

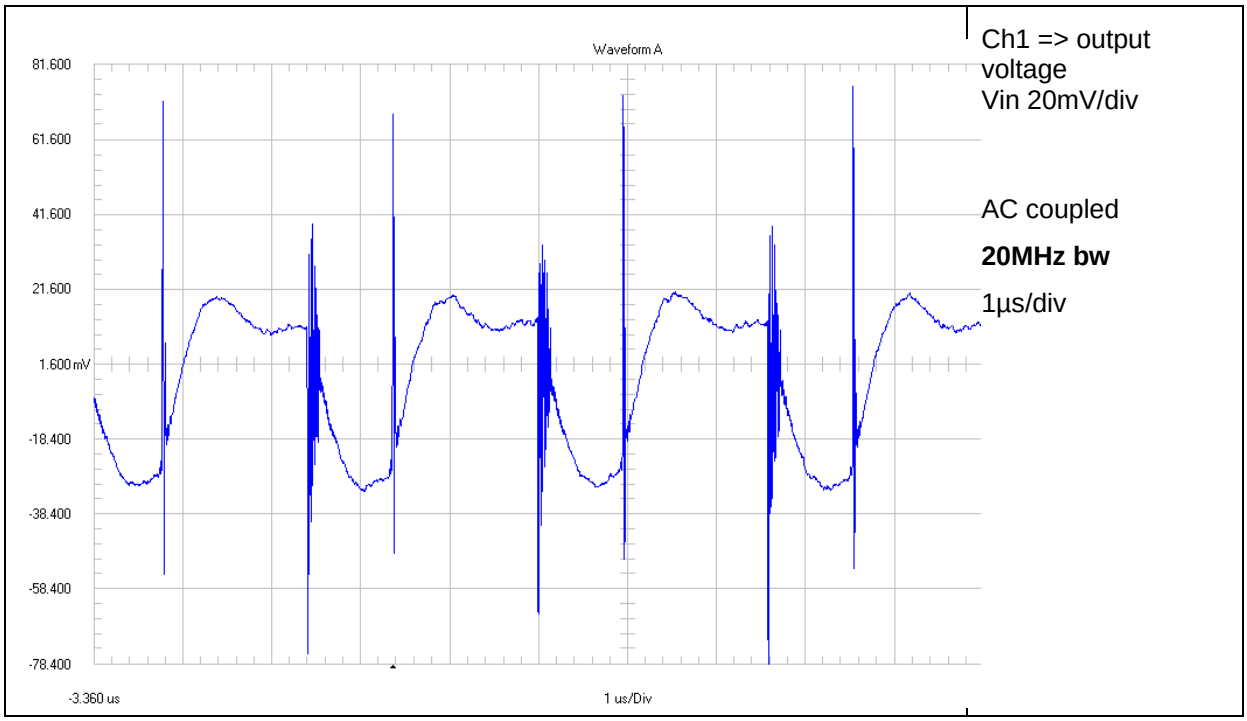


Figure 6

The output ripple voltage is shown in Figure 7. The input voltage was 2.7V

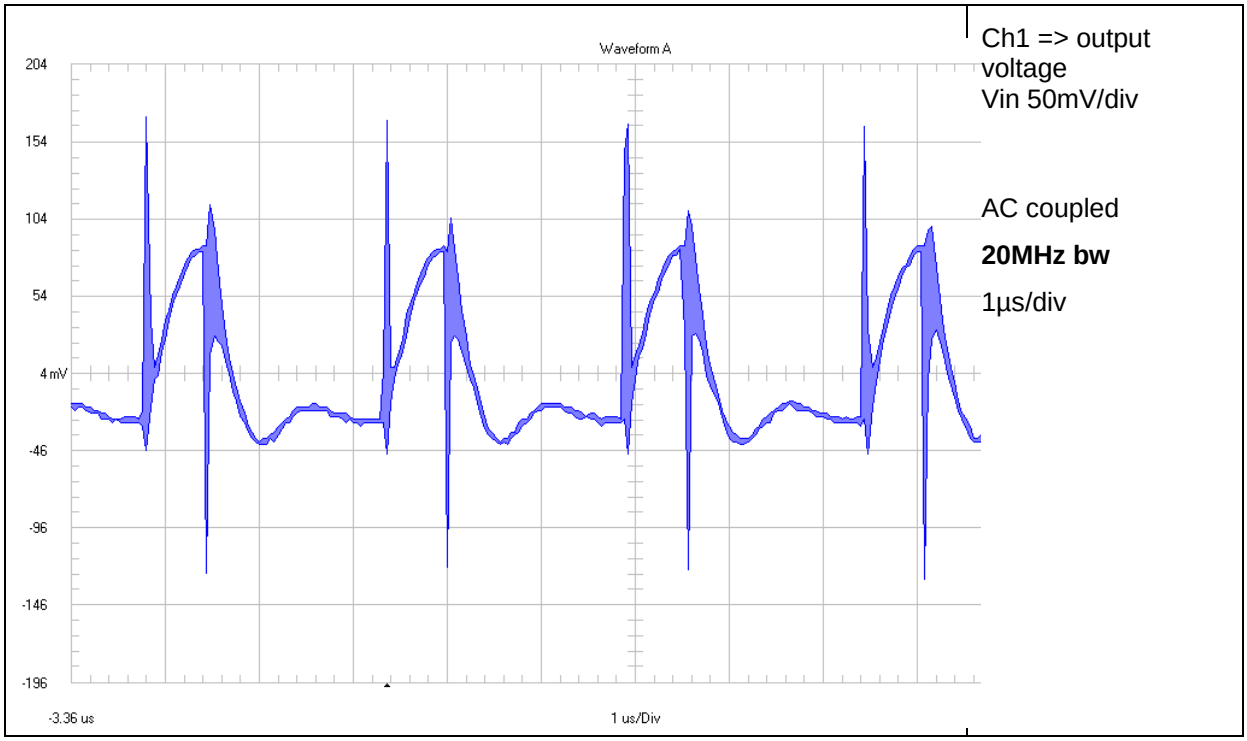


Figure 7

6 Input Ripple Voltage

The input ripple voltage is shown in Figure 8. The input voltage were set to 6V and 2.7V.

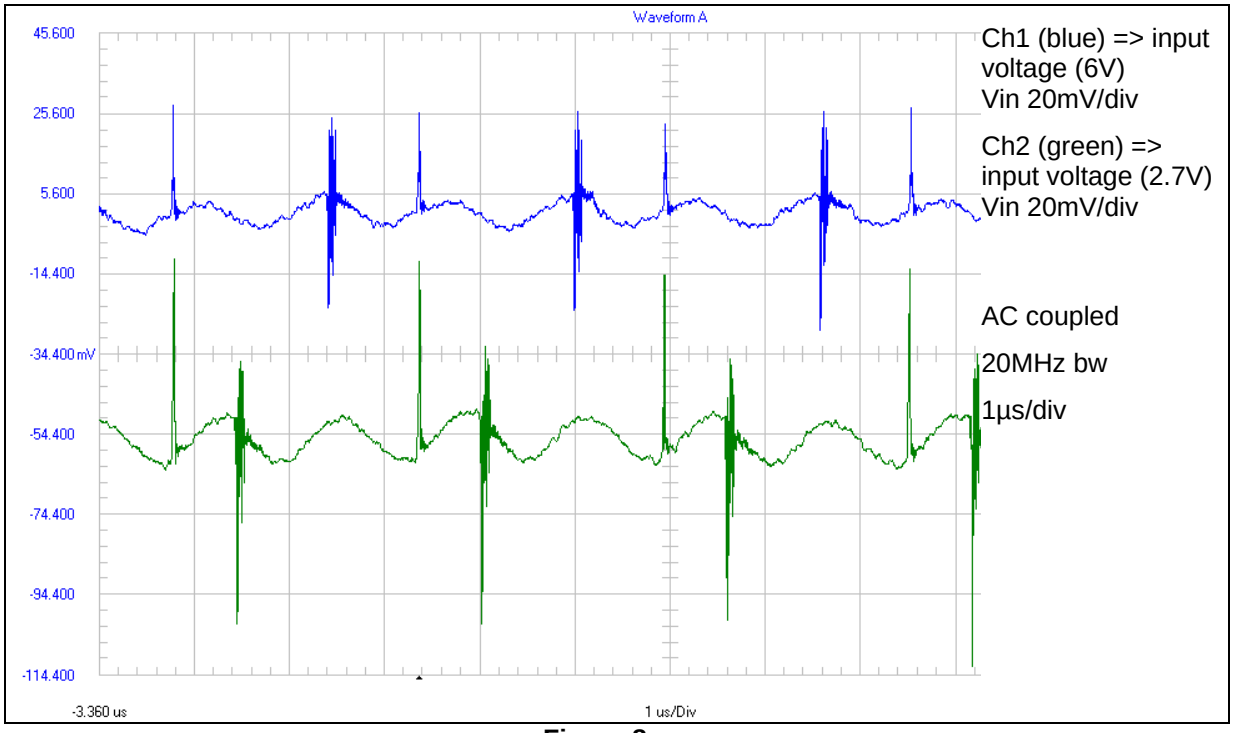
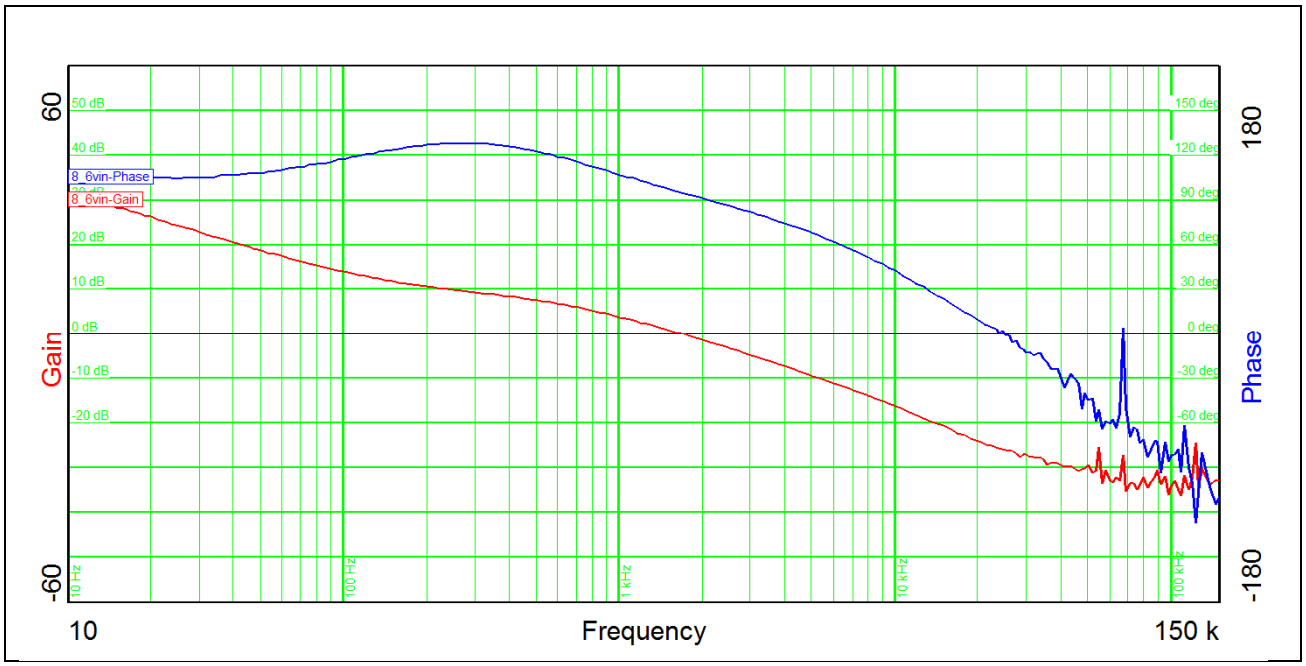


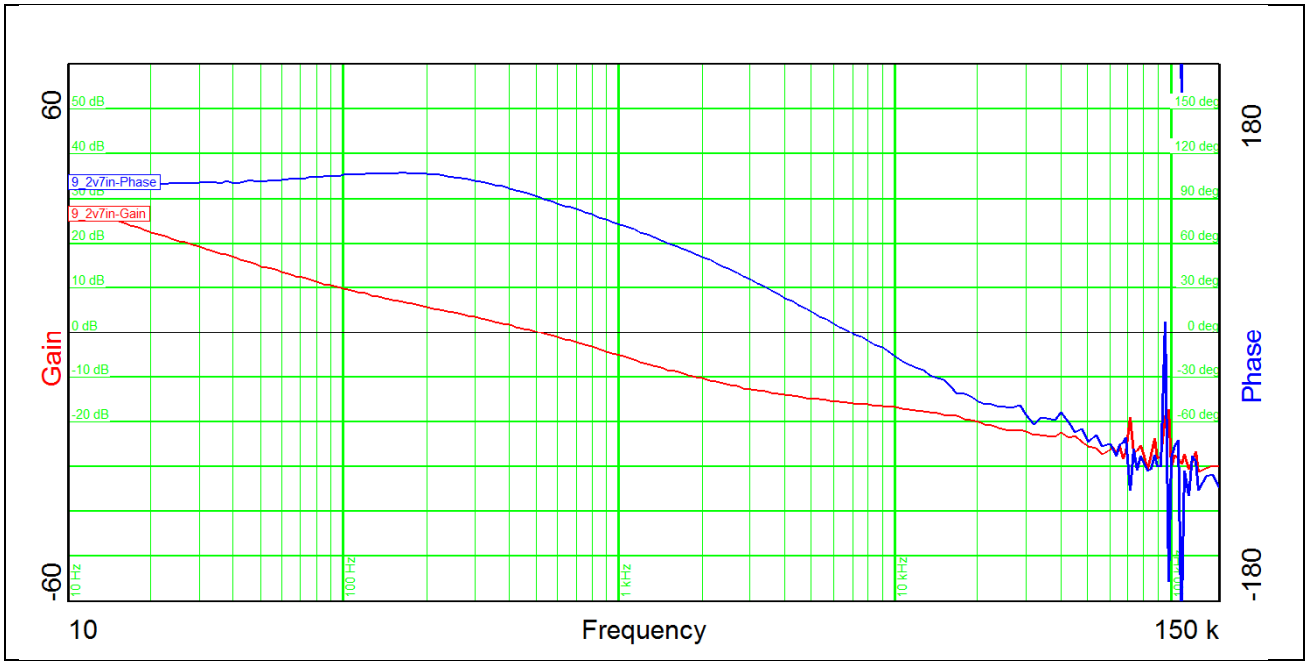
Figure 8

7 Loop Compensation & Transient Response

Measured at Vin 6V.Table 1 sumarizes the results.



Measured at Vin 2.7V



Vin	6V	2.7V
Bandwidth (kHz)	1.69	0.52
Phase margin	95	90.7°
slope (20dB/decade)	-0.99	-0.83
gain margin (dB)	-25	-15.8
freq (kHz)	26	6.97

Table 1

8 Transient Response

The Figure 9 shows the response to load transients. The load is switching from 0.85A to 1.7A. The input voltage was set to **6V**

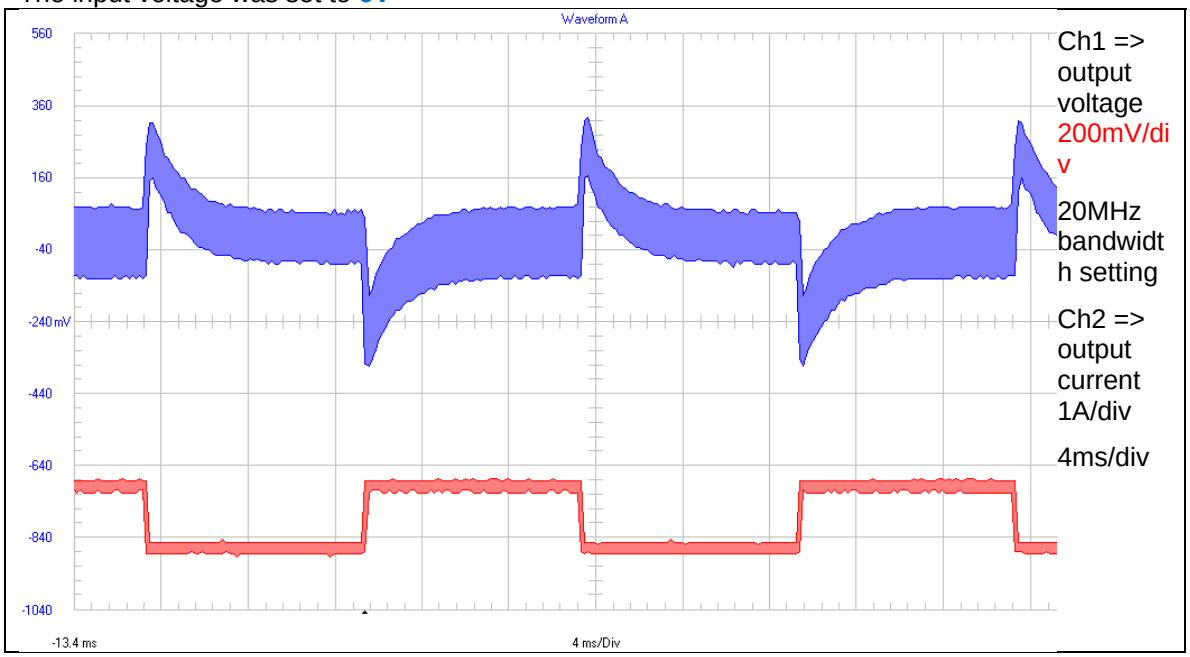


Figure 9

The Figure 10 shows the response to load transients. The load is switching from 0.85A to 1.7A. The input voltage was set to 2.7V.

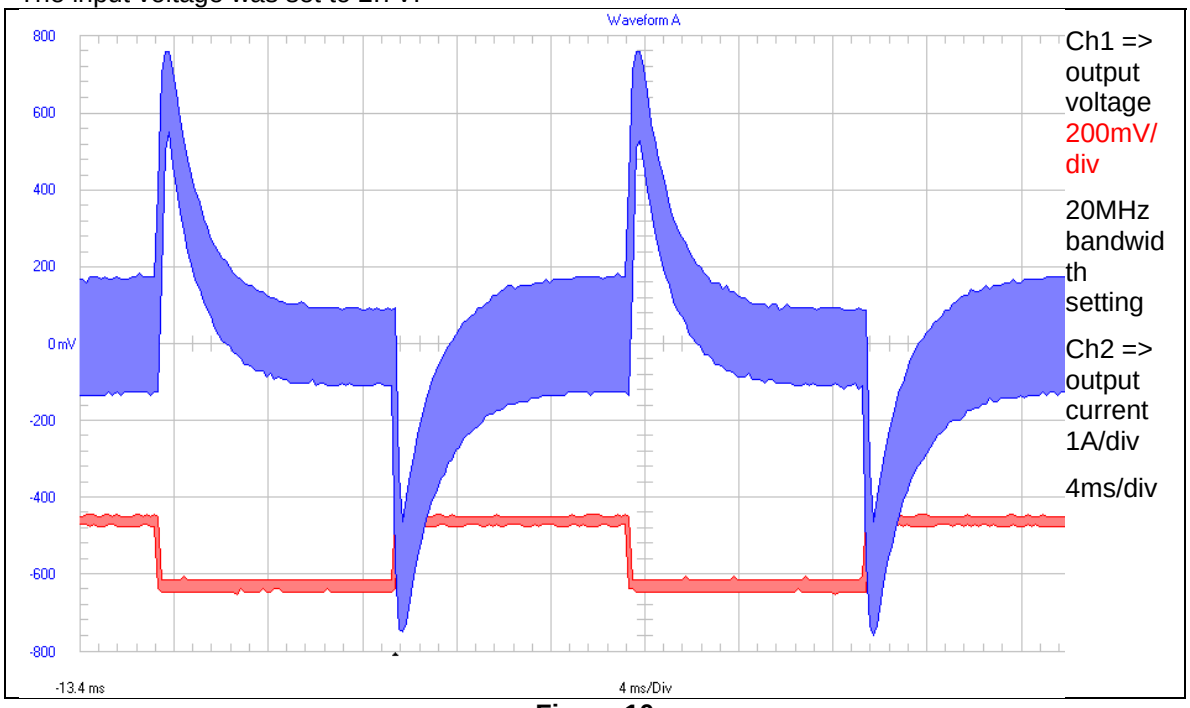


Figure 10

9 Miscellaneous Waveforms

9.1 Switch to GND

The waveform of the voltage on switchnode is shown in Figure 11. Input voltage was set to 6V

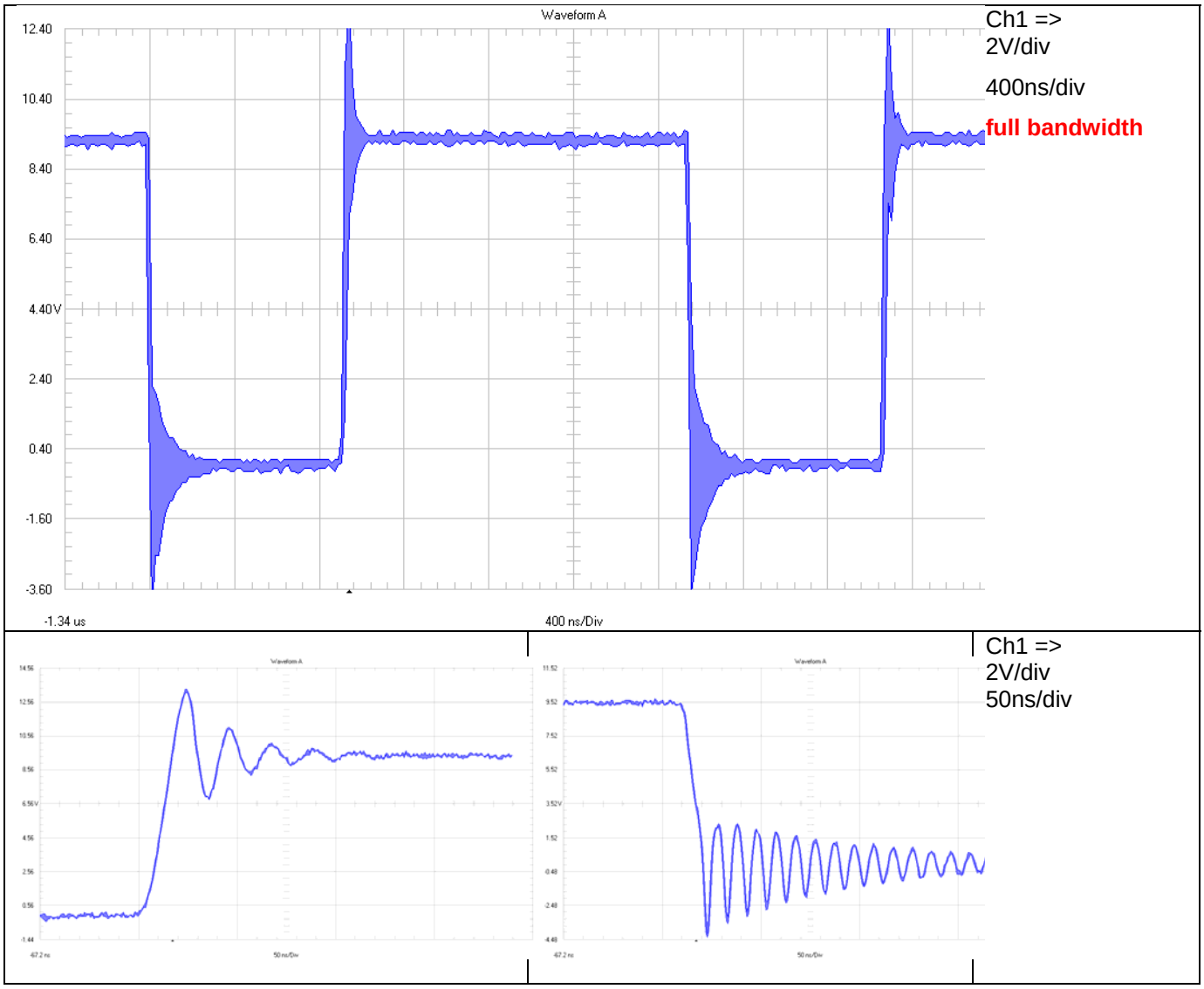


Figure 11

The waveform of the voltage on switchnode is shown in Figure 11. Input voltage was set to 2.7V

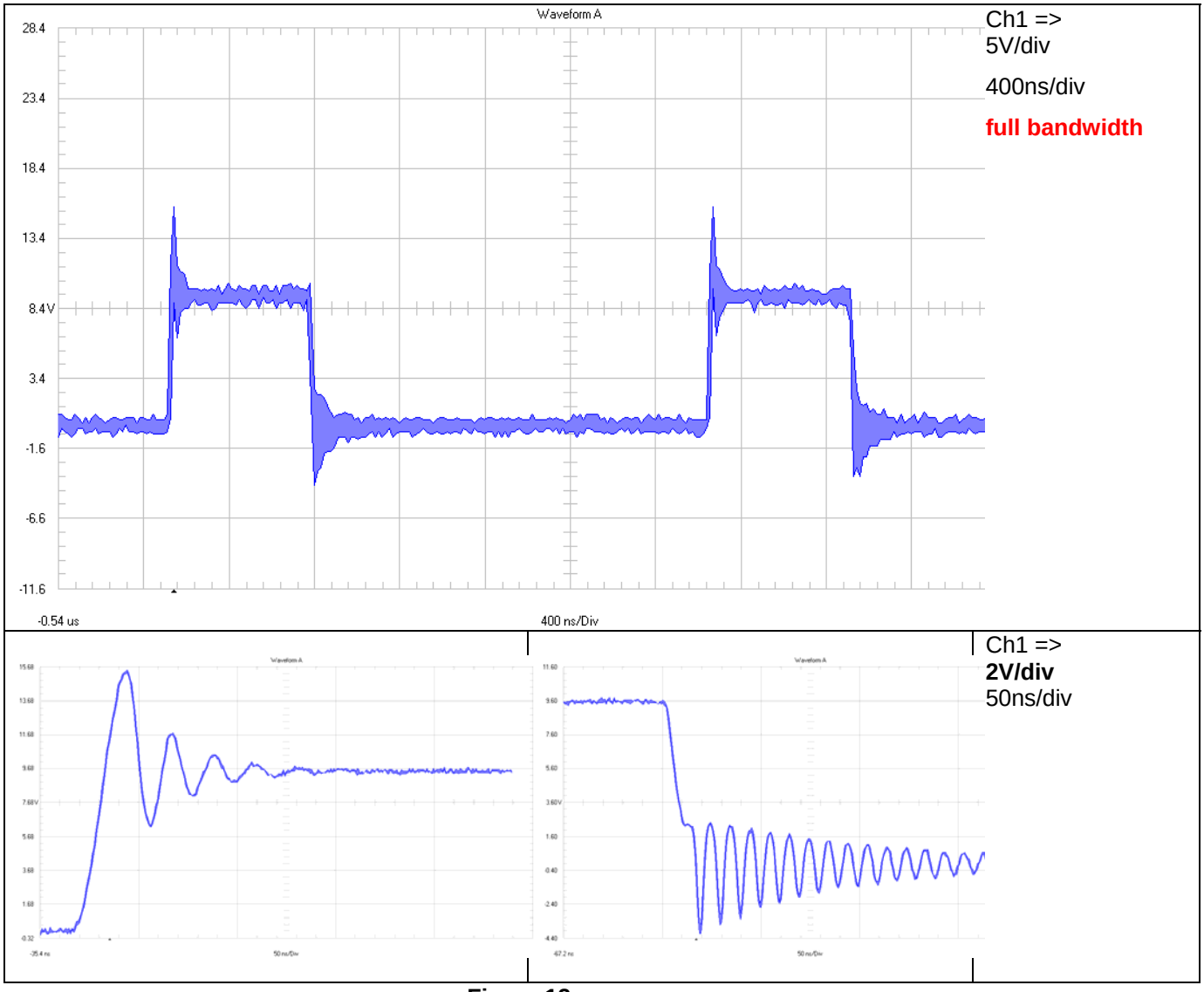


Figure 12

9.2 Gate to GND

The waveform of the voltage on MOSFET gate to GND is shown in Figure 13. Input voltage was set to 6V

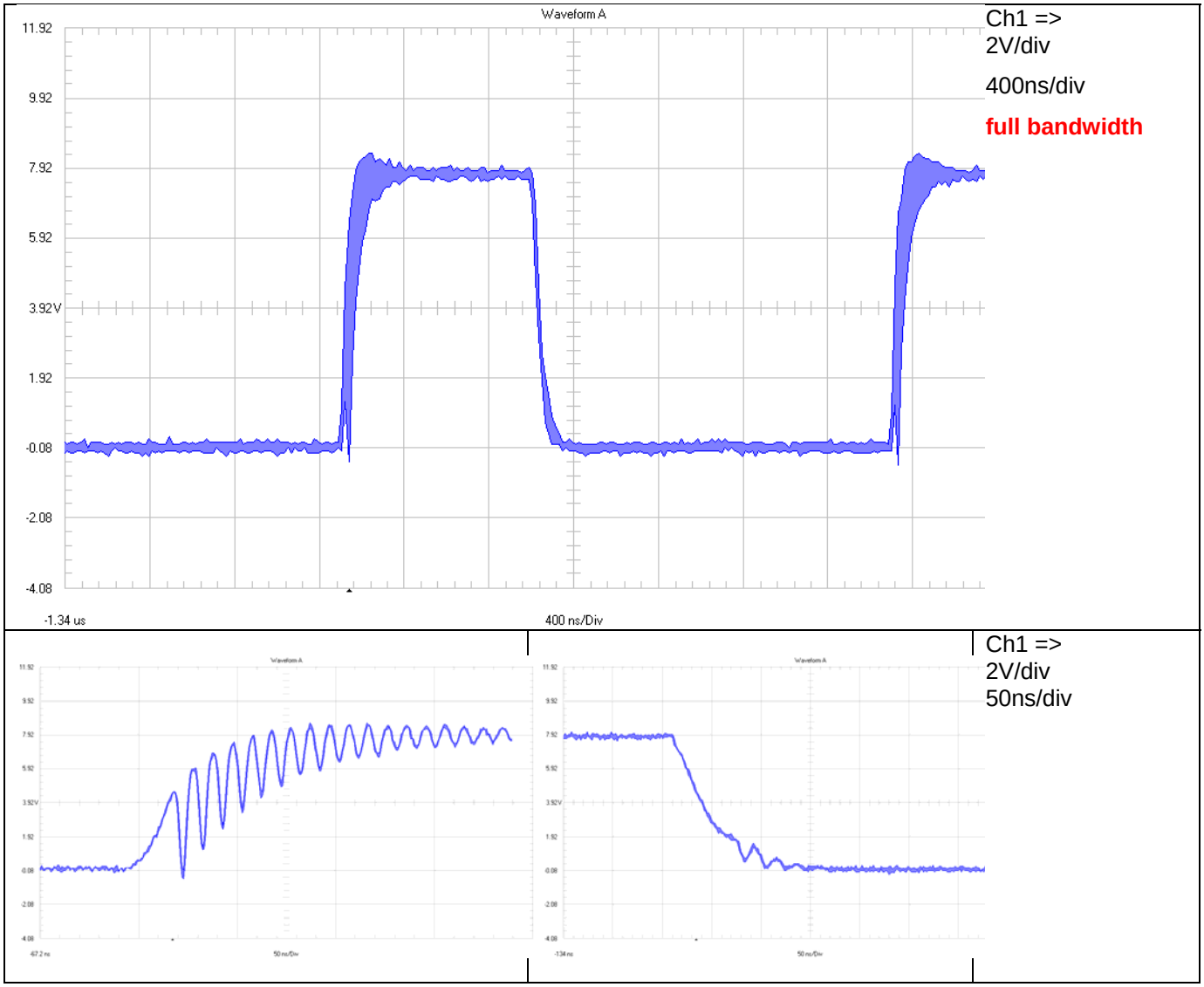


Figure 13

The waveform of the voltage on gate to GND is shown in Figure 14. Input voltage was set to 2.7V

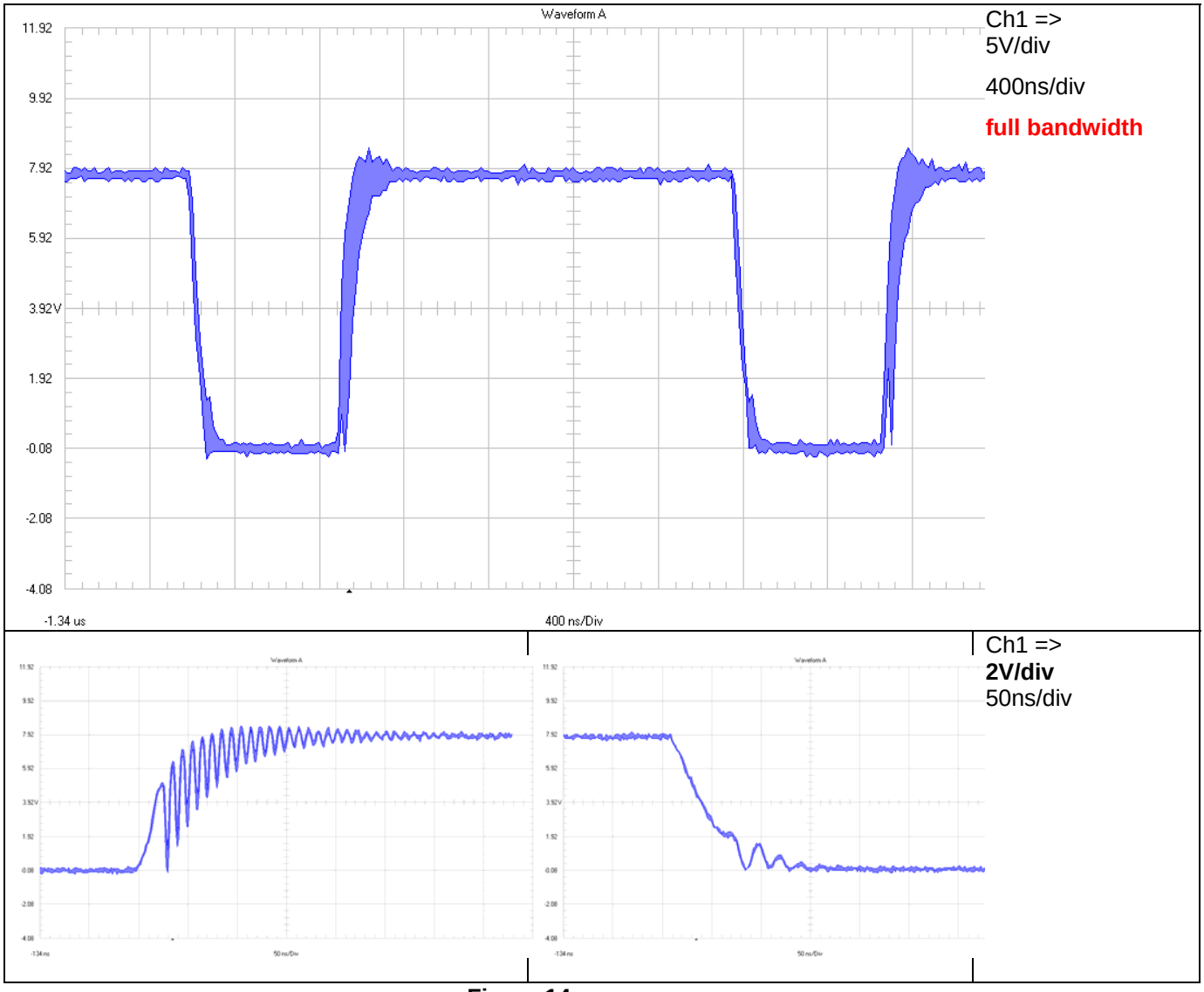


Figure 14

10 Thermal Image

Figure 15 shows the thermal image at 2.7V input voltage and 1.7 output current for >30 minutes;

Input current 6.6AmpsDC:

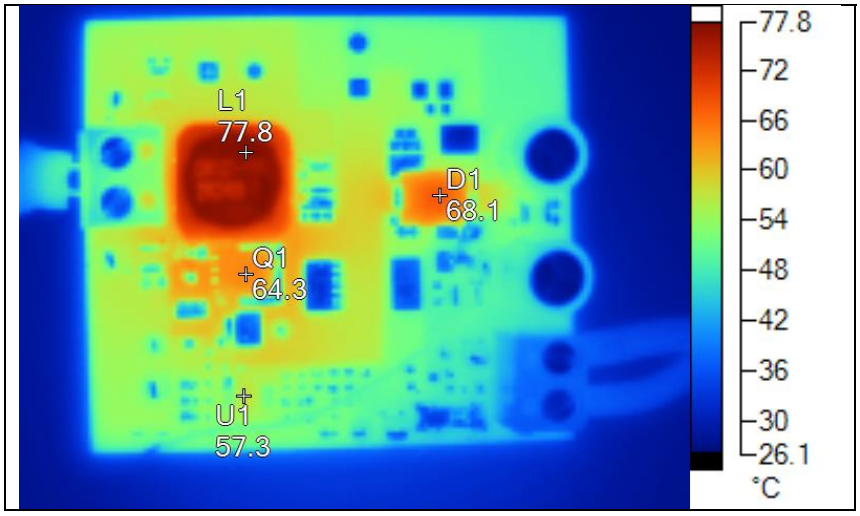


Figure 15

Main Image Markers

Name	Temperature
L1	77.8°C
D1	68.1°C
Q1	64.3°C
U1	57.3°C

Boost function has been verified down to 2.0V input voltage, here current consumption 10.0Amps DC (!)

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