PMP5691RevB Test Results

Topology:	inverting BuckBoost
Input:	4.5V to 5.5V
Output:	-5@100mA
IC:	TPS54040

1 Startup

The startup waveform is shown in the Figure 1. The input voltage was set to 5V, with 100mA load at the output.

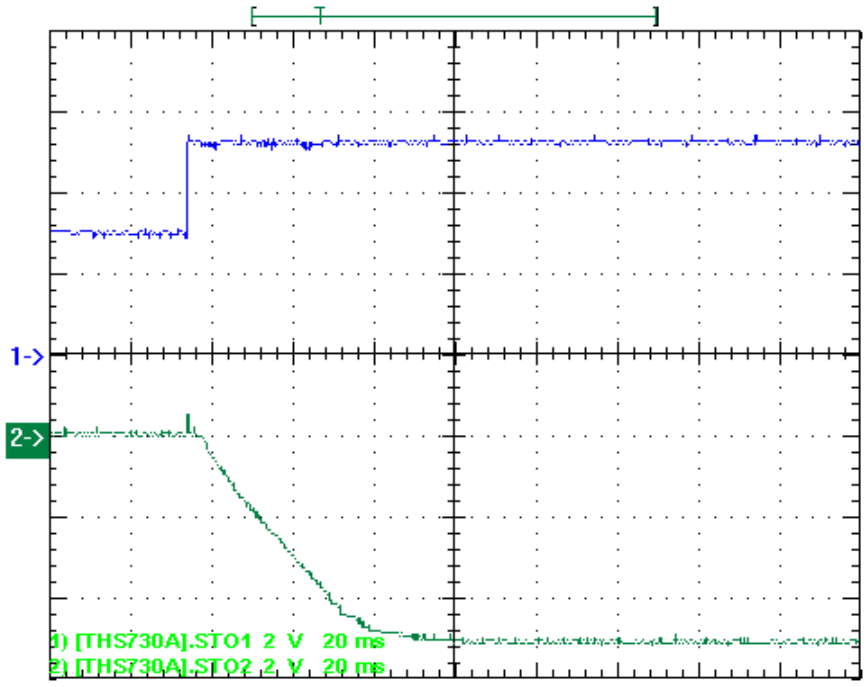


Figure 1

Ch1=> input voltage 2V/div

Ch2=> output voltage 2V/div

20ms/div

20MHz bandwidth

Figure 2 shows the waveform with the same setup as in Figure 1 only with another time base.

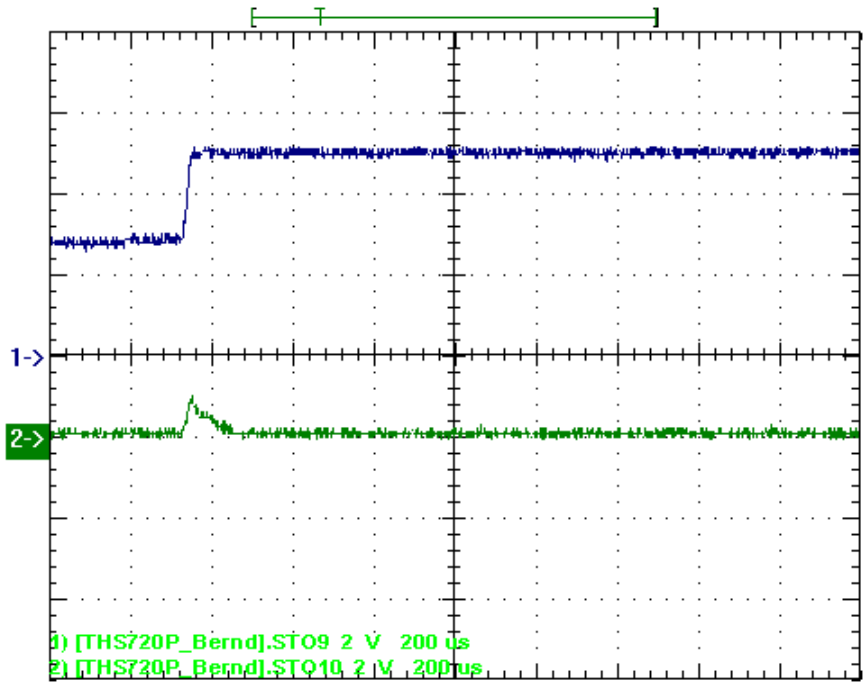


Figure 2

Ch1=> input voltage 2V/div

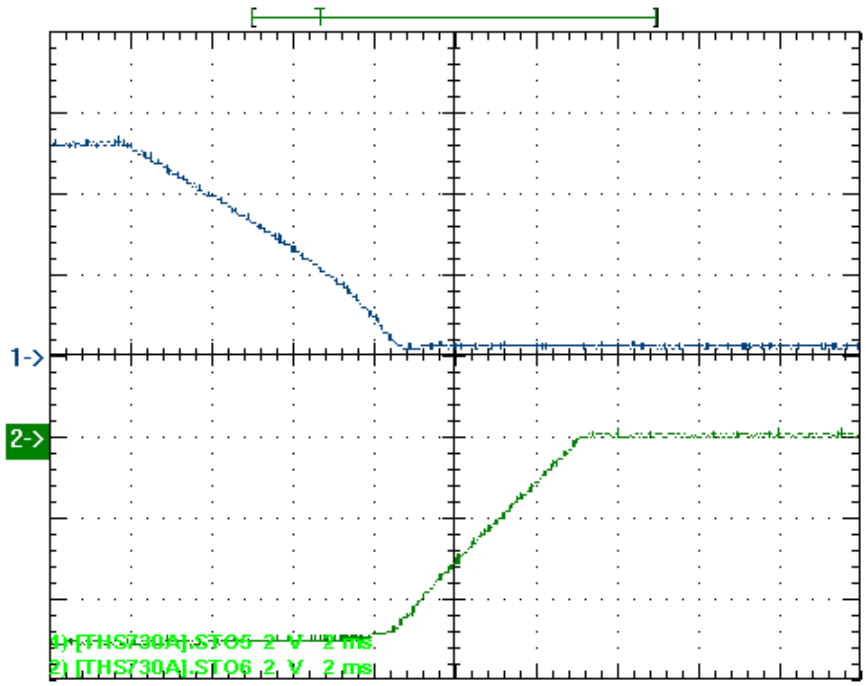
Ch2=> output voltage 2V/div

200µs/div

20MHz bandwidth

2 Shutdown

The shutdown waveform is shown in the Figure 3 at 5V input voltage. With 100mA load applied at the output.



Ch1=> input voltage 2V/div

Ch2=> output voltage 2V/div

2ms/div

20MHz bandwidth

Figure 3

3 Efficiency

The efficiencies at 5V input voltage are shown in the Figure 4 below.

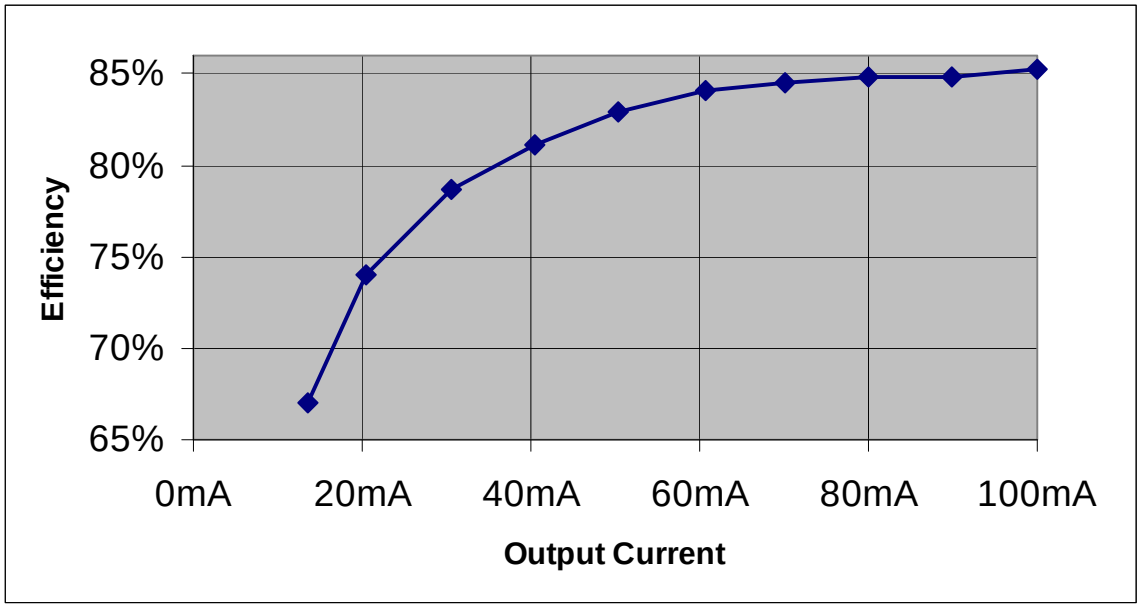


Figure 4

4 Load regulation

The load regulation at 5V input voltage is shown in Figure 5.

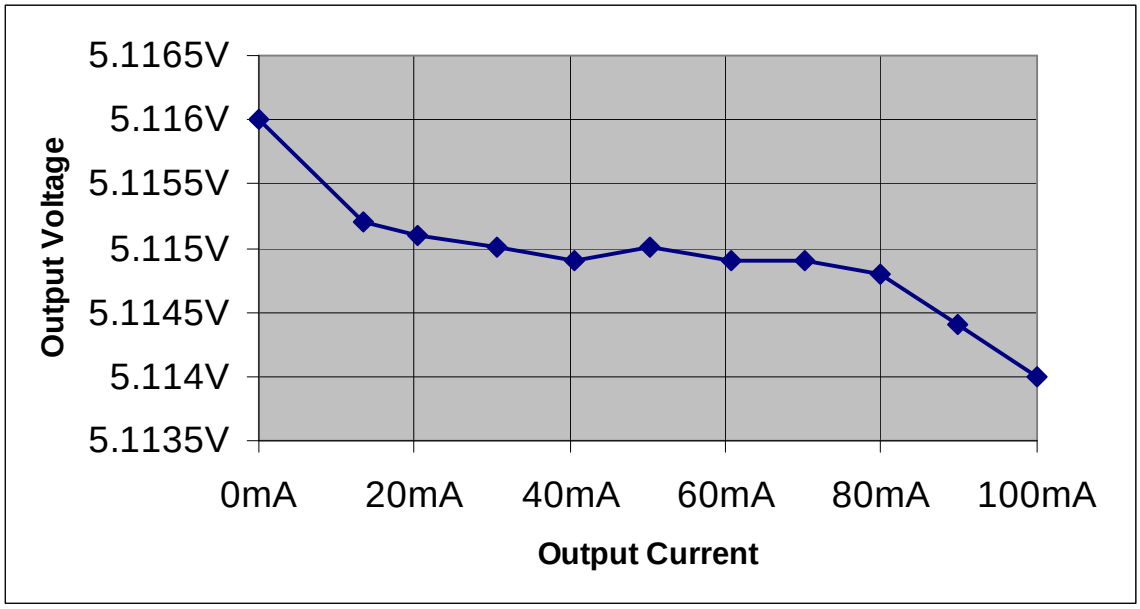
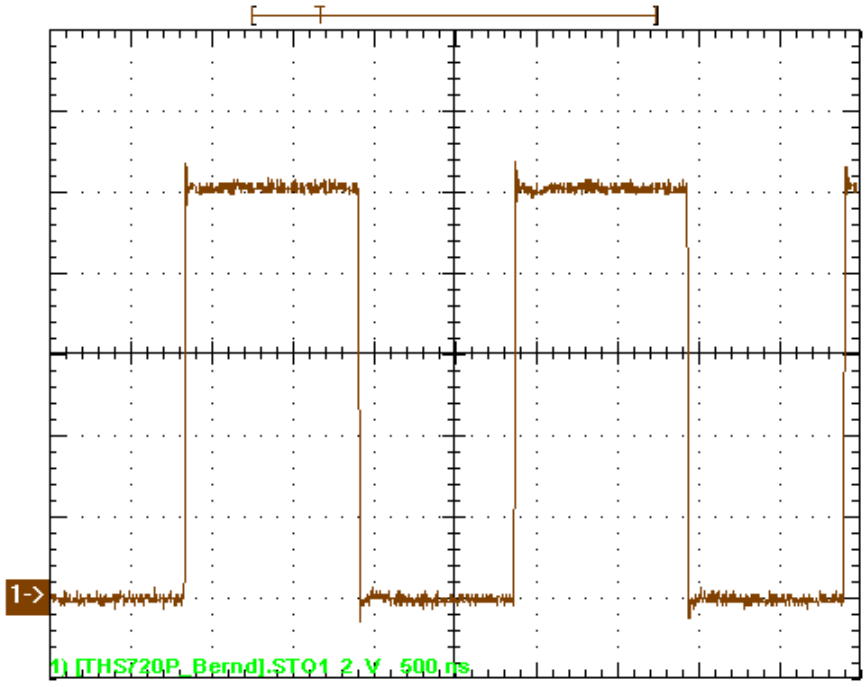


Figure 5

5 Switch Node Waveform

With 100mA load results in the waveforms shown in Figure 6. 5V were applied to the input.

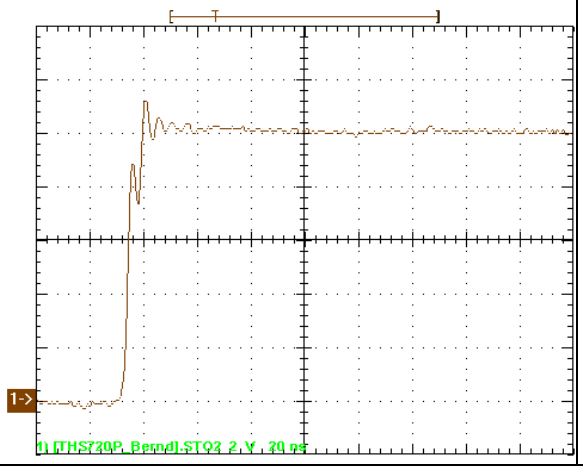


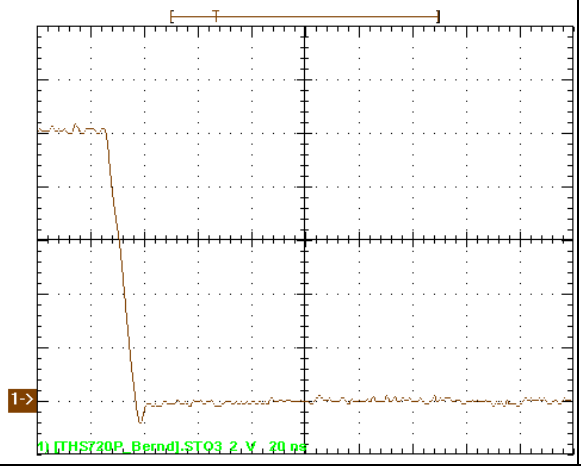
Ch1 => switchnode
2V/div

500ns/div

full bandwidth

Figure 6





Ch1 => switchnode
2V/div

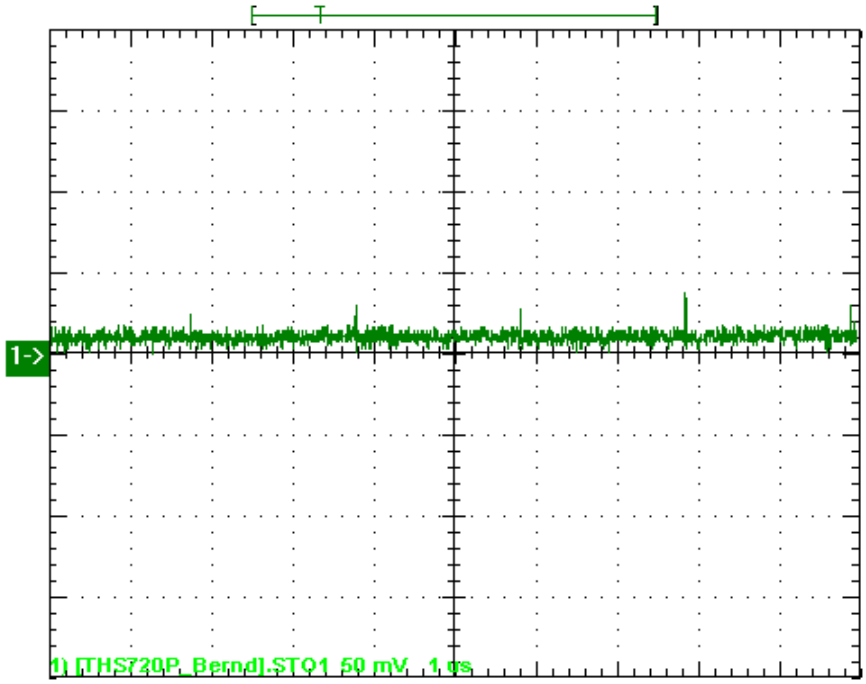
20ns/div

full bandwidth

Figure 7

6 Ripple Voltages

The output ripple voltage is displayed in Figure 8. The input voltage was set to 5V with output current 100mA.



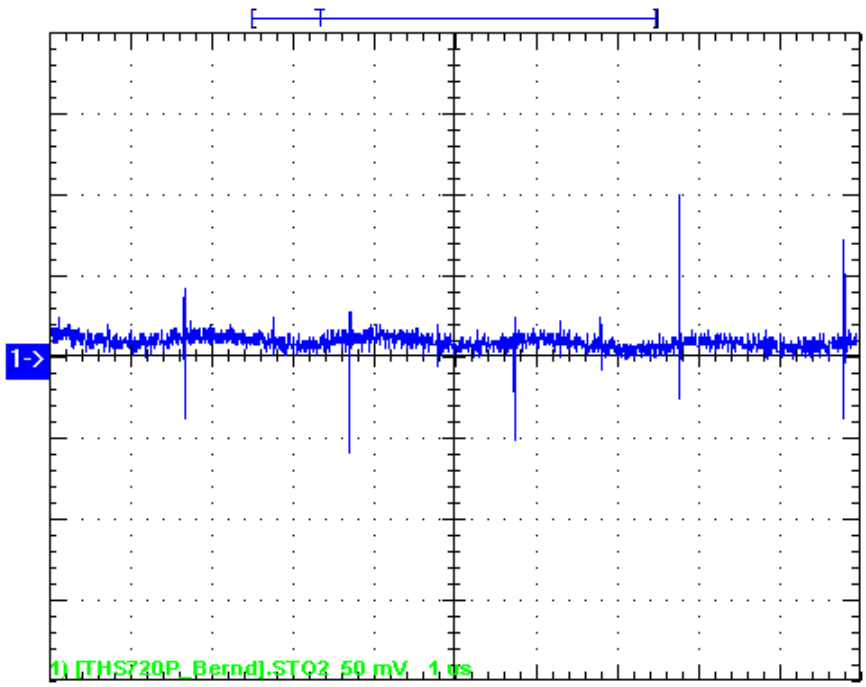
Ch1=> output voltage
50mV/div

1µs/div
AC coupling

full bandwidth

Figure 8

The input ripple voltage is displayed in Figure 9. The input voltage was set to 5V with output current 100mA.



Ch=> input voltage
50mV/div

1µs/div
AC coupling

full bandwidth

Figure 9

7 Load Transients

A output current change from 50mA to 100mA (50Hz) results in following Figure 10.The input voltage was set to 5V

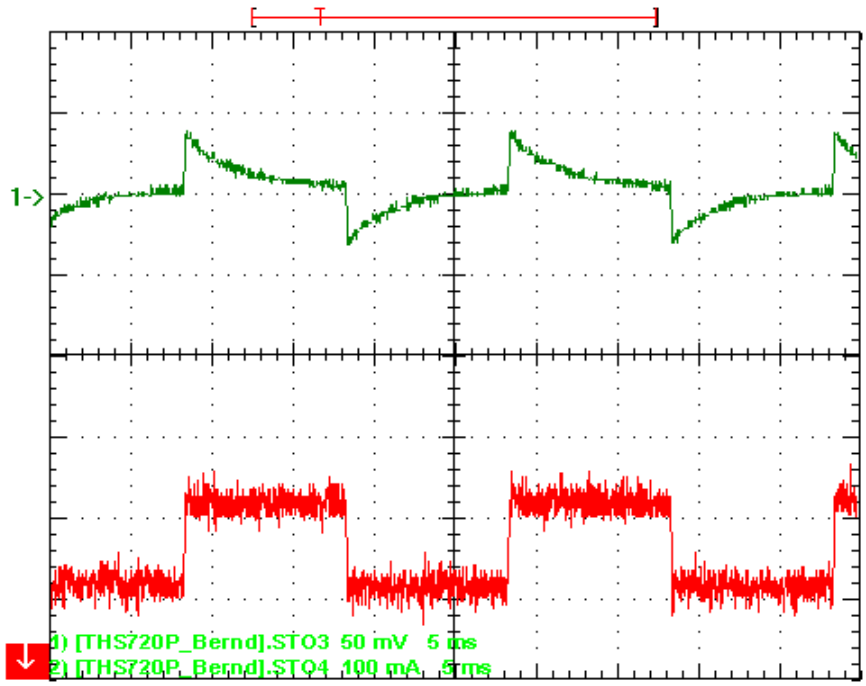


Figure 10

Ch1=> output voltage
AC coupled
50mV/div

Ch2=> output current
100mA/div

5ms/div

20MHz bandwidth

8 Control Loop Frequency Response

The control loop frequency response with 100mA load and 5V input voltage is shown in Figure 11

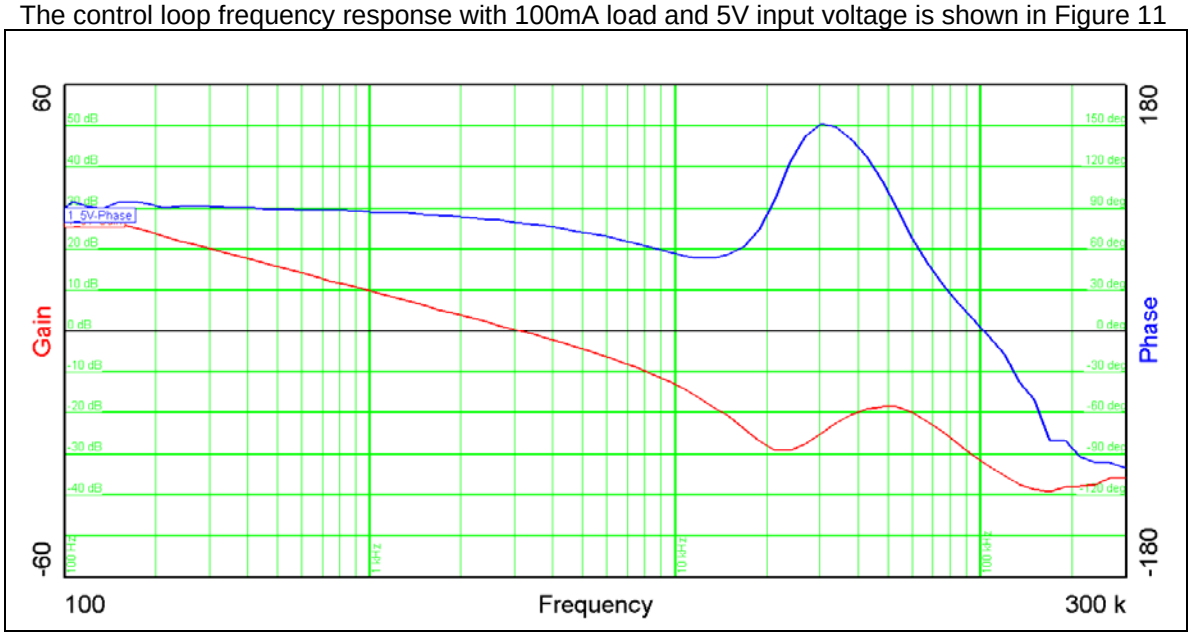


Figure 11

Table 1 summarizes the results.

Vin	5V
Bandwidth (kHz)	3.1
Phase margin	79°
slope (20dB/decade)	-1
gain margin (dB)	-32
slope (20dB/decade)	-2.7
freq (kHz)	103

Table 1

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