PMP5609RevB Test Results

1 Startup

The startup waveform is shown in the Figure 1 (5V out) and Figure 2 (3.3V out). The input voltage was set to 6V, with full load at the outputs.

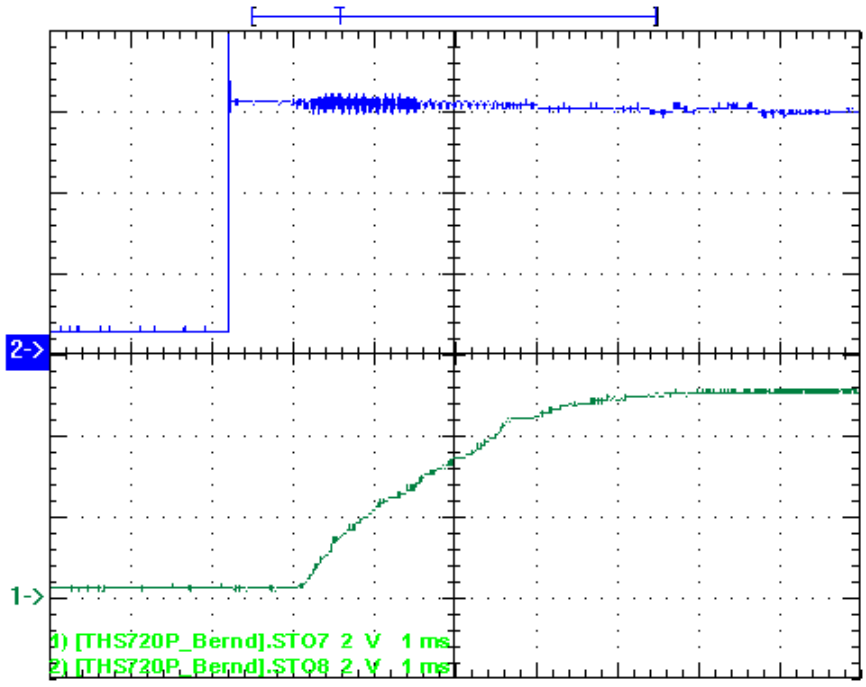


Figure 1

Ch2=> input voltage 2V/div

Ch1=> output voltage 5V 2V/div

1ms/div

20MHz bandwidth

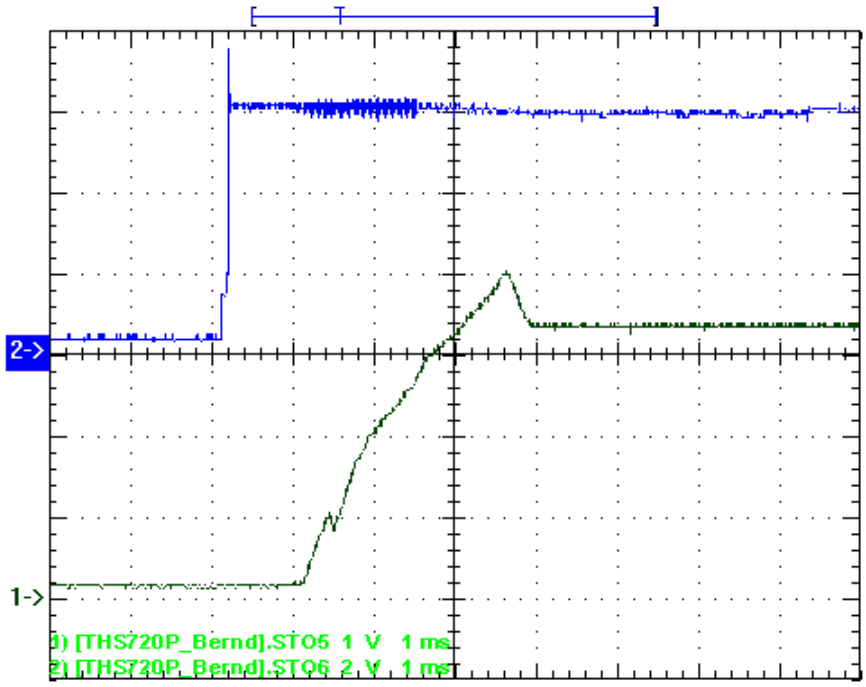


Figure 2

Ch2=> input voltage 2V/div

Ch1=> output voltage 3.3V 2V/div

1ms/div

20MHz bandwidth

PMP5609RevB Test Results

The startup waveform is shown in the Figure 3 (5V out) and Figure 4 (3.3V out). The input voltage was set to 21V, with full load at the outputs.

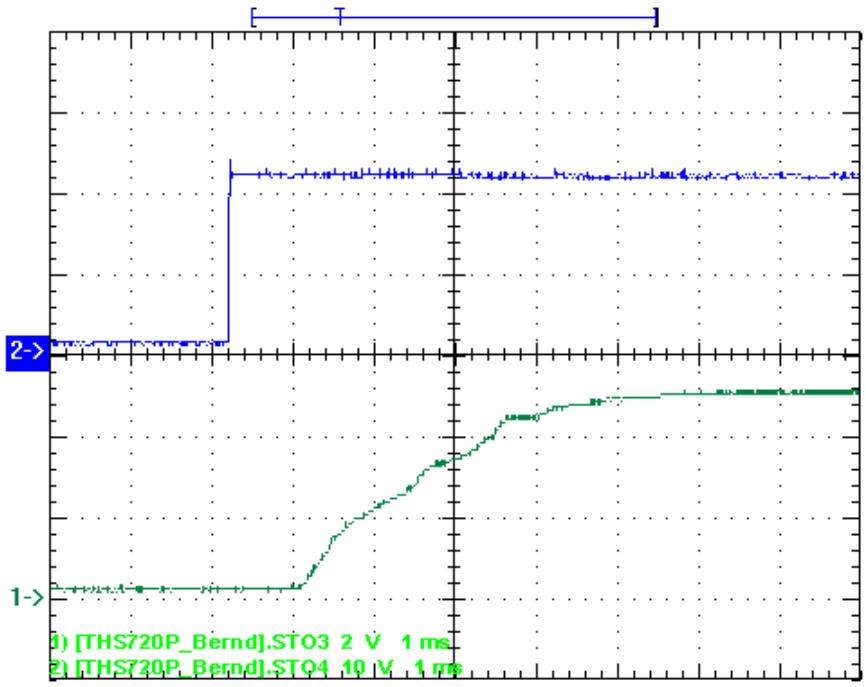


Figure 3

Ch2=> input voltage 10V/div

Ch1=> output voltage 5V 2V/div

1ms/div

20MHz bandwidth

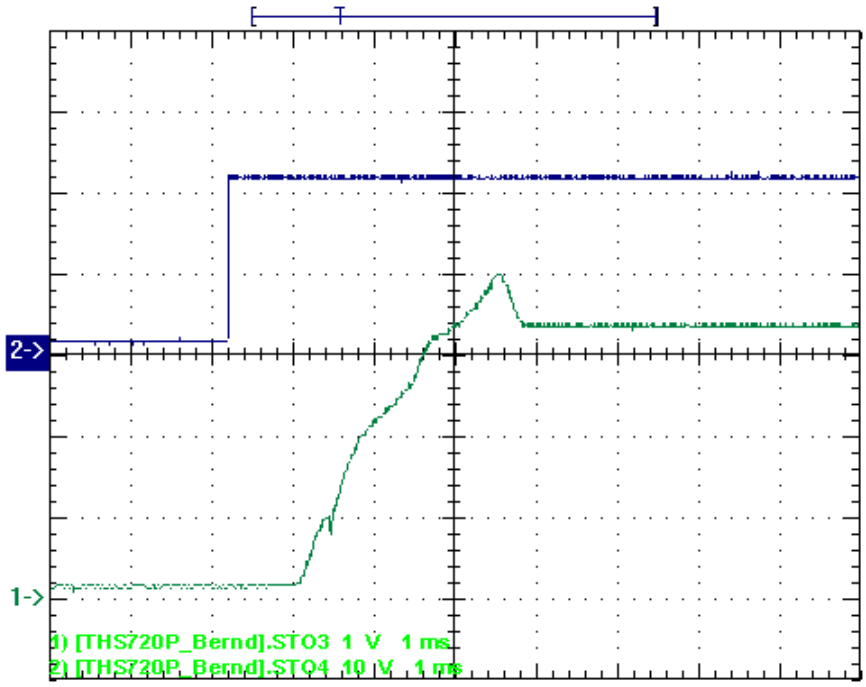


Figure 4

Ch2=> input voltage 10V/div

Ch1=> output voltage 3.3V 1V/div

1ms/div

20MHz bandwidth

PMP5609RevB Test Results

The startup waveform is shown in the Figure 5 (5V out) and Figure 6 (3.3V out). The input voltage was set to 36V, with full load at the outputs.

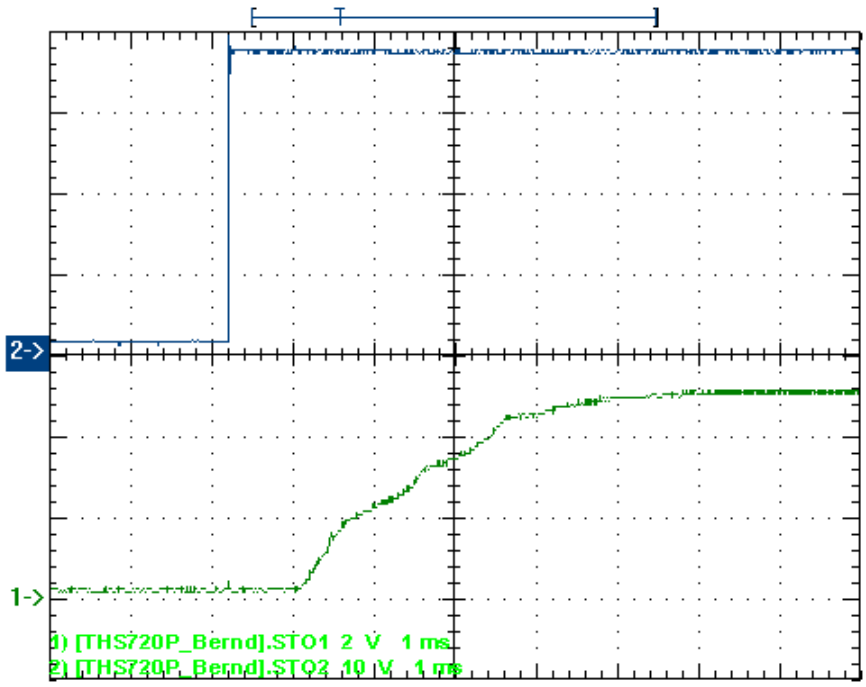


Figure 5

Ch2=> input voltage 10V/div

Ch1=> output voltage 2V/div

1ms/div

20MHz bandwidth

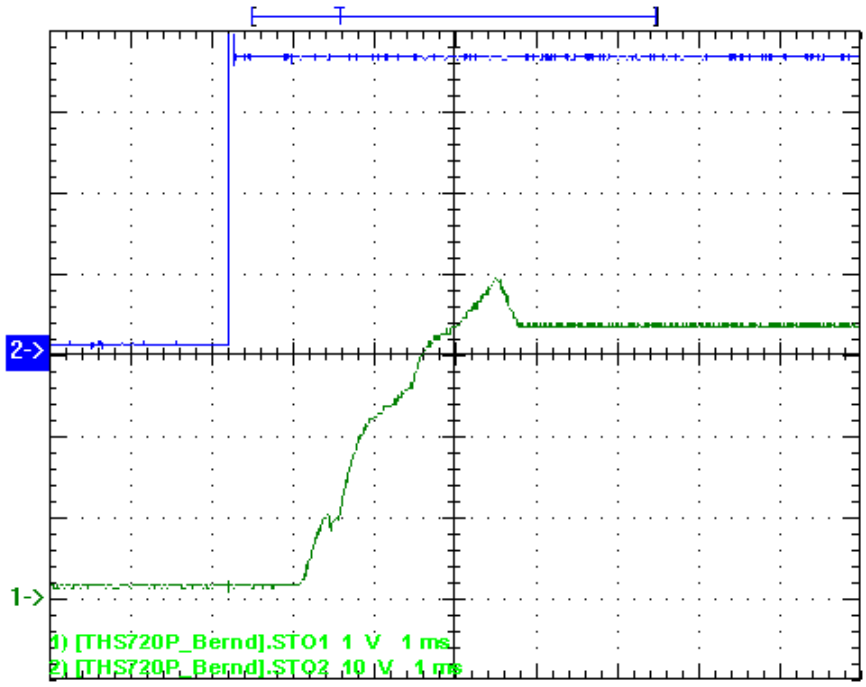


Figure 6

Ch2=> input voltage 10V/div

Ch1=> output voltage 1V/div

1ms/div

20MHz bandwidth

2 Shutdown

The shutdown waveform is shown in the Figure 7 (5V out) and Figure 8 (3.3V out). The input voltage was set to 6V, with full load at the outputs.

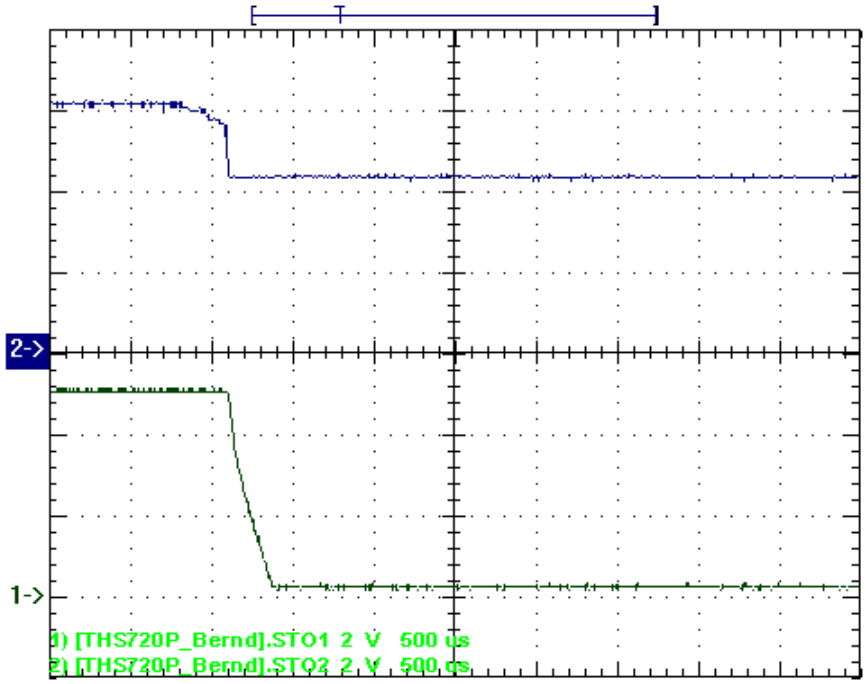


Figure 7

Ch2=> input voltage 2V/div

Ch1=> output voltage 5V 2V/div

500µs/div

20MHz bandwidth

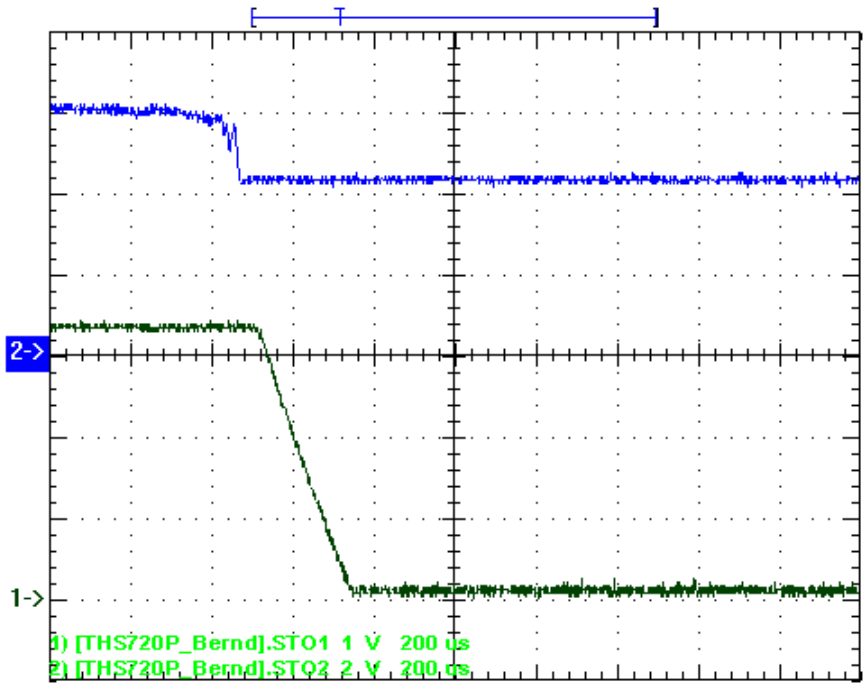


Figure 8

Ch2=> input voltage 2V/div

Ch1=> output voltage 3.3V 2V/div

200µs/div

20MHz bandwidth

The shutdown waveform is shown in the Figure 9 (5V out) and Figure 10 (3.3V out). The input voltage was set to 21V, with full load at the outputs.

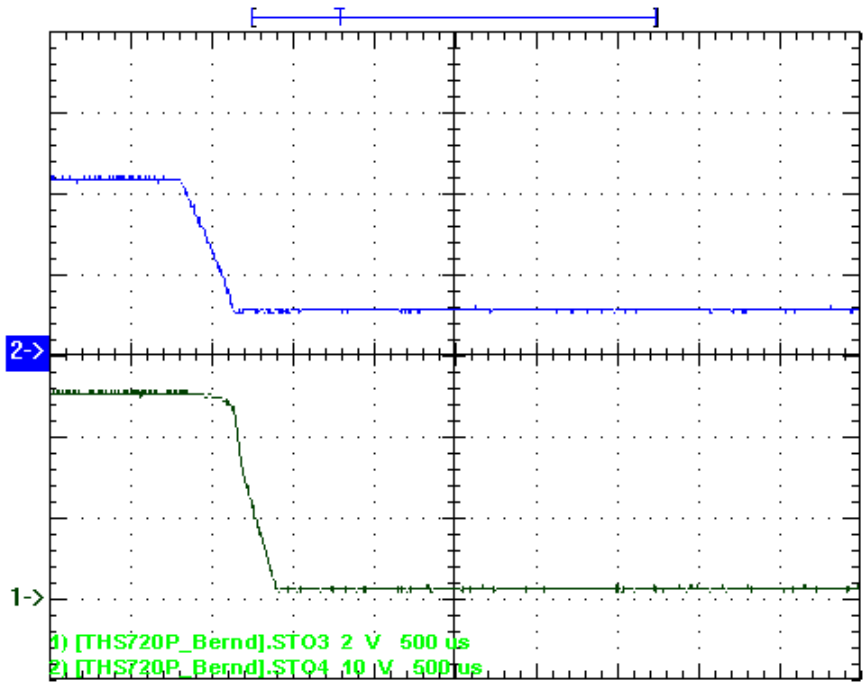


Figure 9

Ch2=> input voltage 10V/div

Ch1=> output voltage 5V 2V/div

500µs/div

20MHz bandwidth

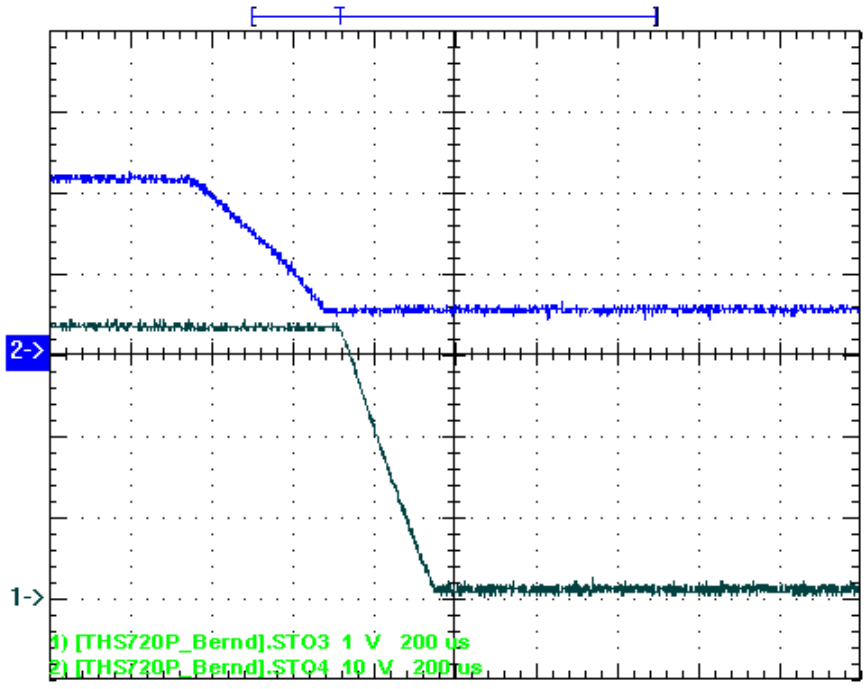


Figure 10

Ch2=> input voltage 10V/div

Ch1=> output voltage 3.3V 1V/div

200µs/div

20MHz bandwidth

The shutdown waveform is shown in the Figure 11 (5V out) and Figure 12 (3.3V out). The input voltage was set to 36V, with full load at the outputs.

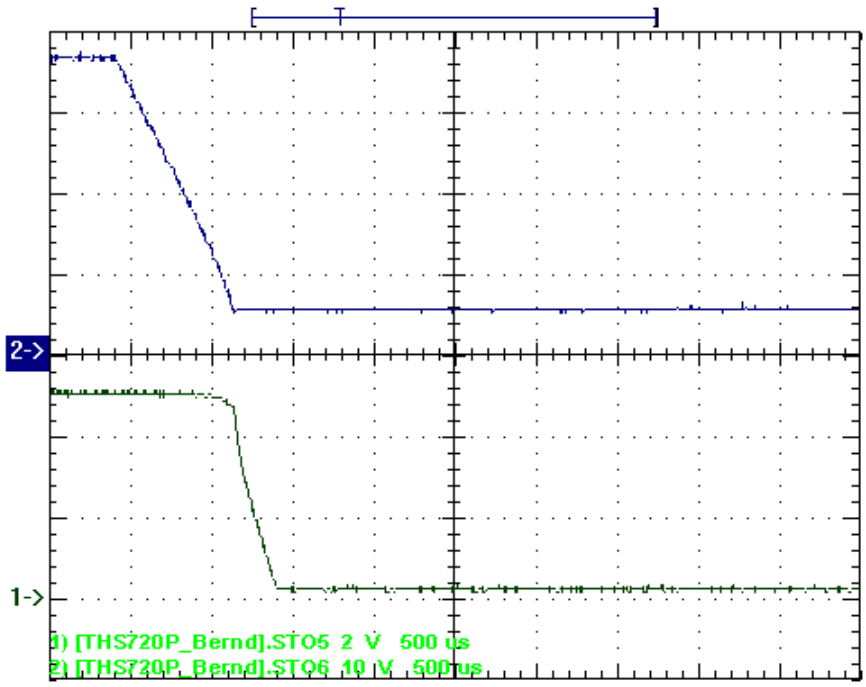


Figure 11

Ch2=> input voltage 10V/div

Ch1=> output voltage 2V/div

500µs/div

20MHz bandwidth

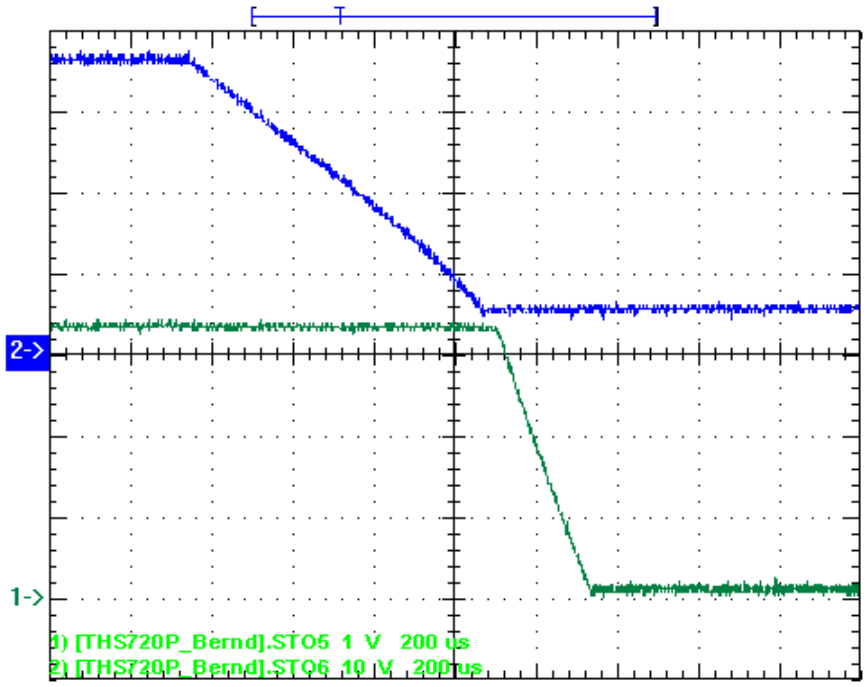


Figure 12

Ch2=> input voltage 10V/div

Ch1=> output voltage 1V/div

200µs/div

20MHz bandwidth

3 Efficiency

The efficiencies with different input voltages are shown in the Figure 13 below.

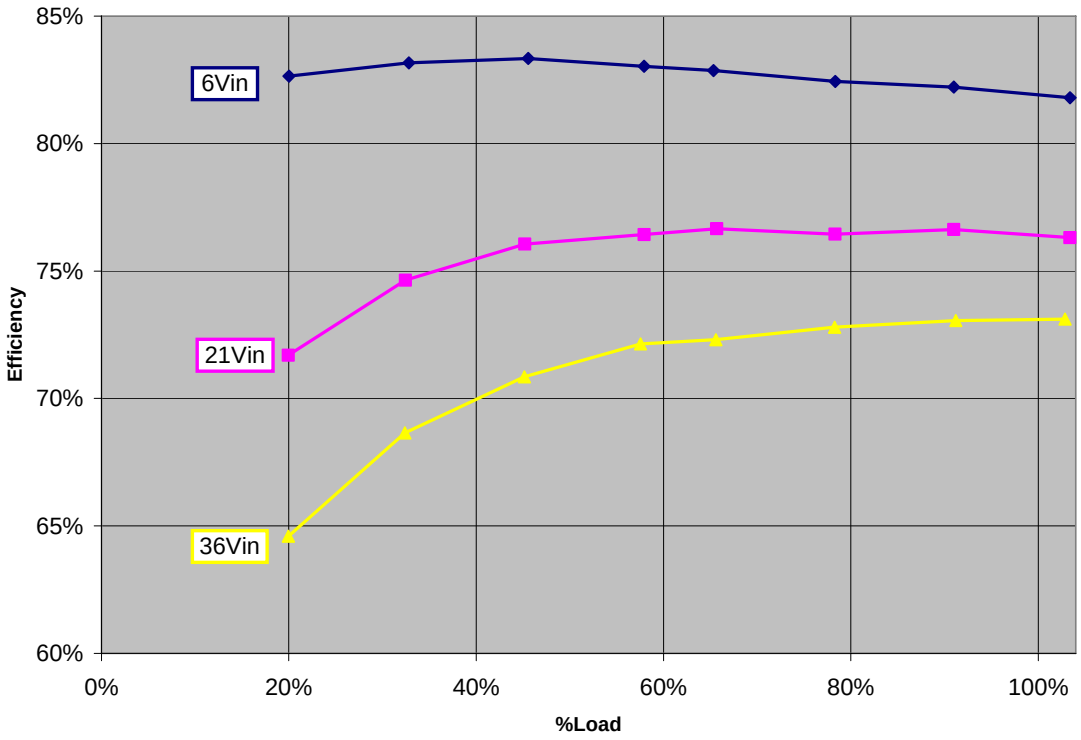


Figure 13

4 Load regulation

The load regulation for the 5V output at different input voltages are shown in Figure 14.

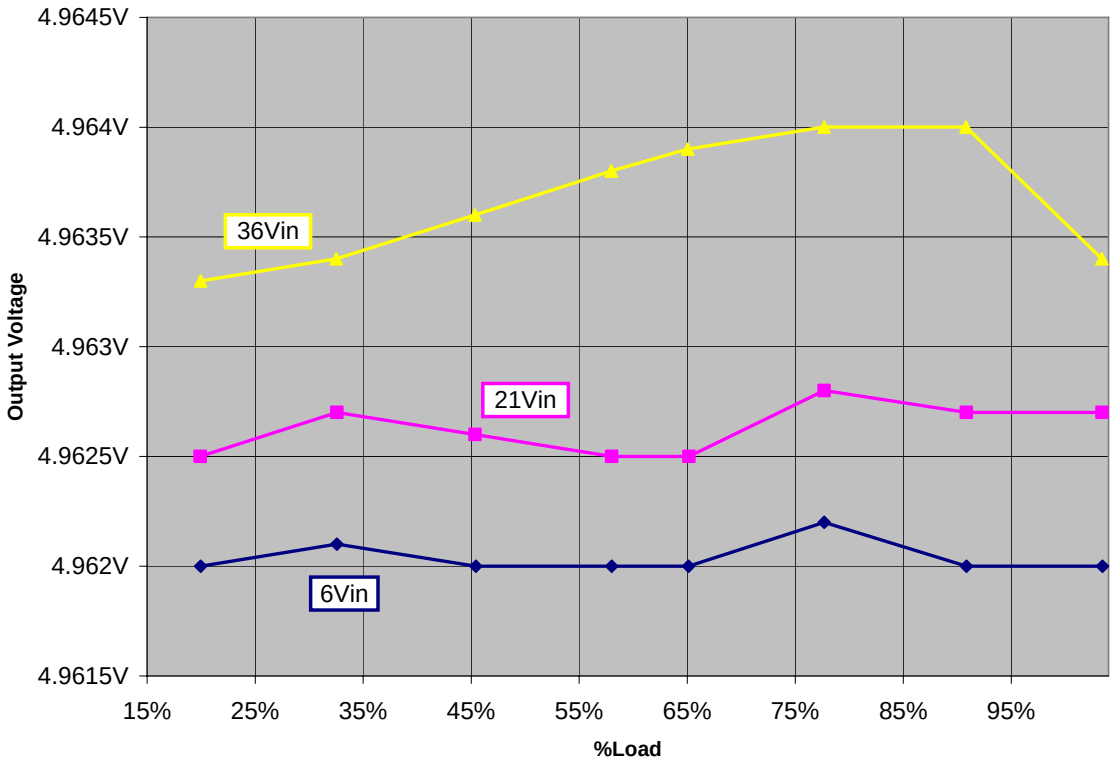


Figure 14

The load regulation for the 3.3V output at different input voltages are shown in Figure 15.

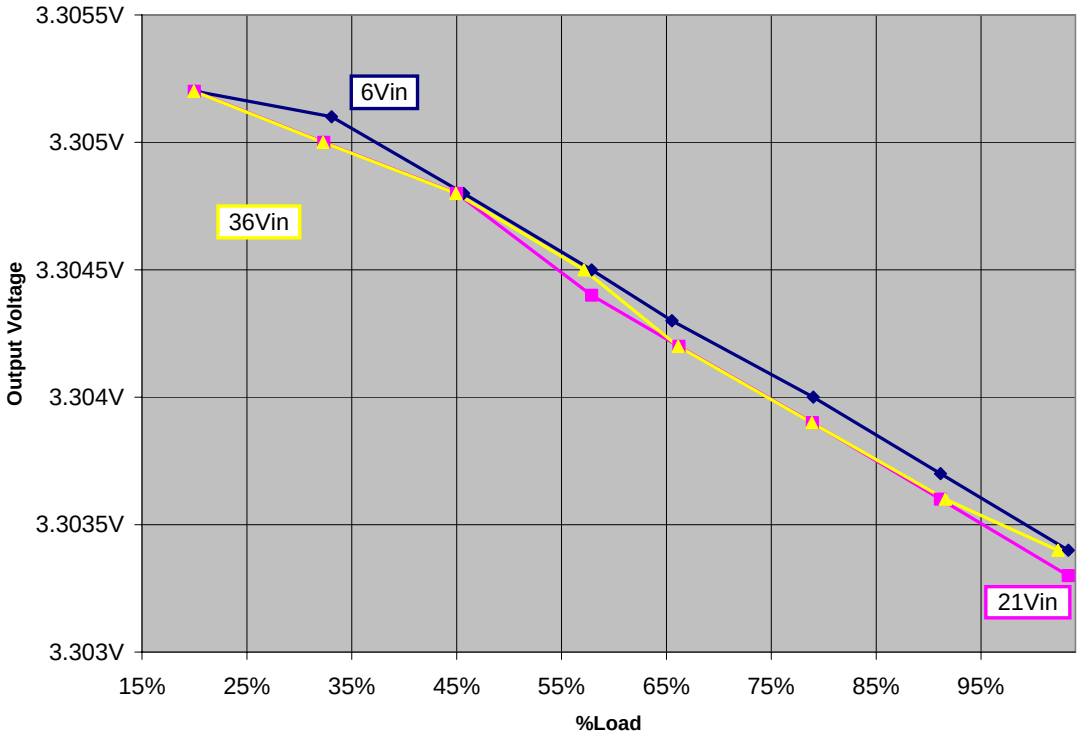


Figure 15

5 Line Regulation

The line regulation for the 5V output at full output current is shown in Figure 16

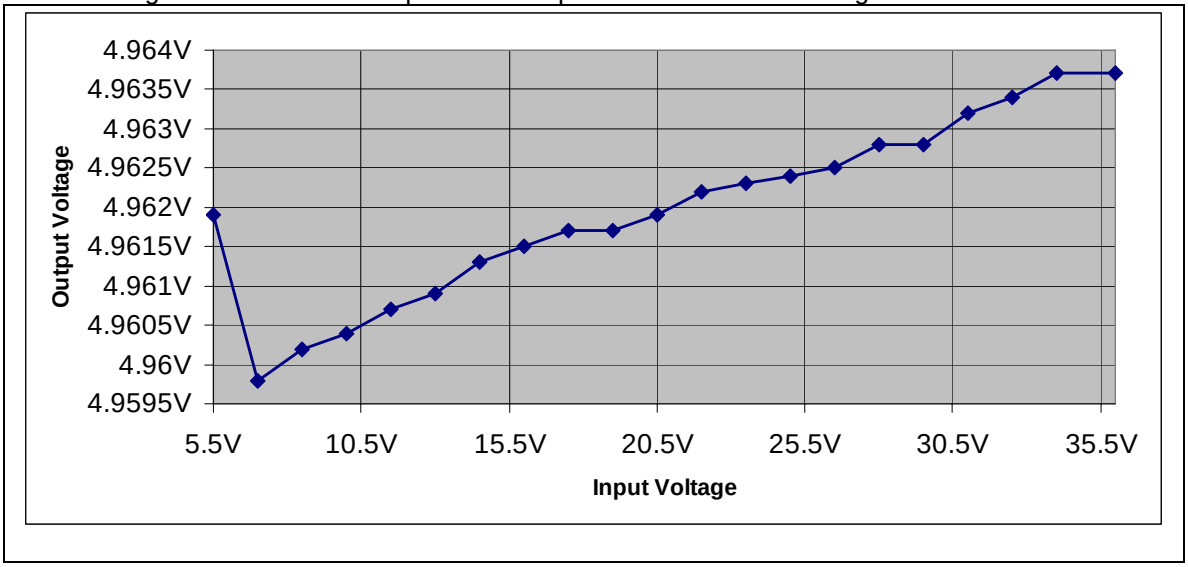


Figure 16

The line regulation for the 5V output at full output current is shown in Figure 17

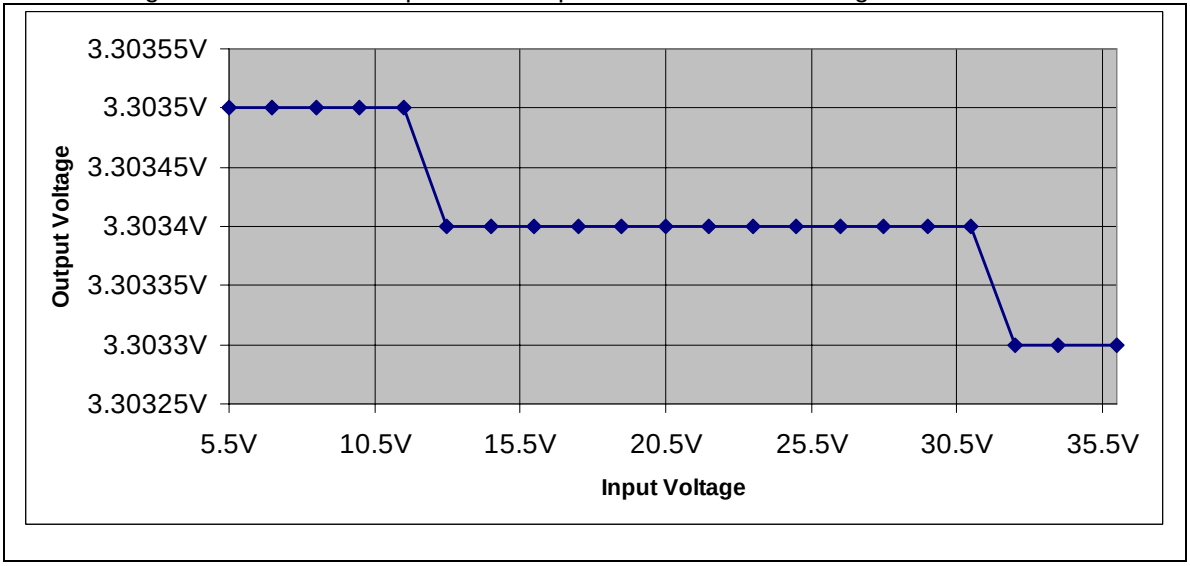


Figure 17

With the same measurement setup the efficiencies at 100% load are shown in Figure 18.

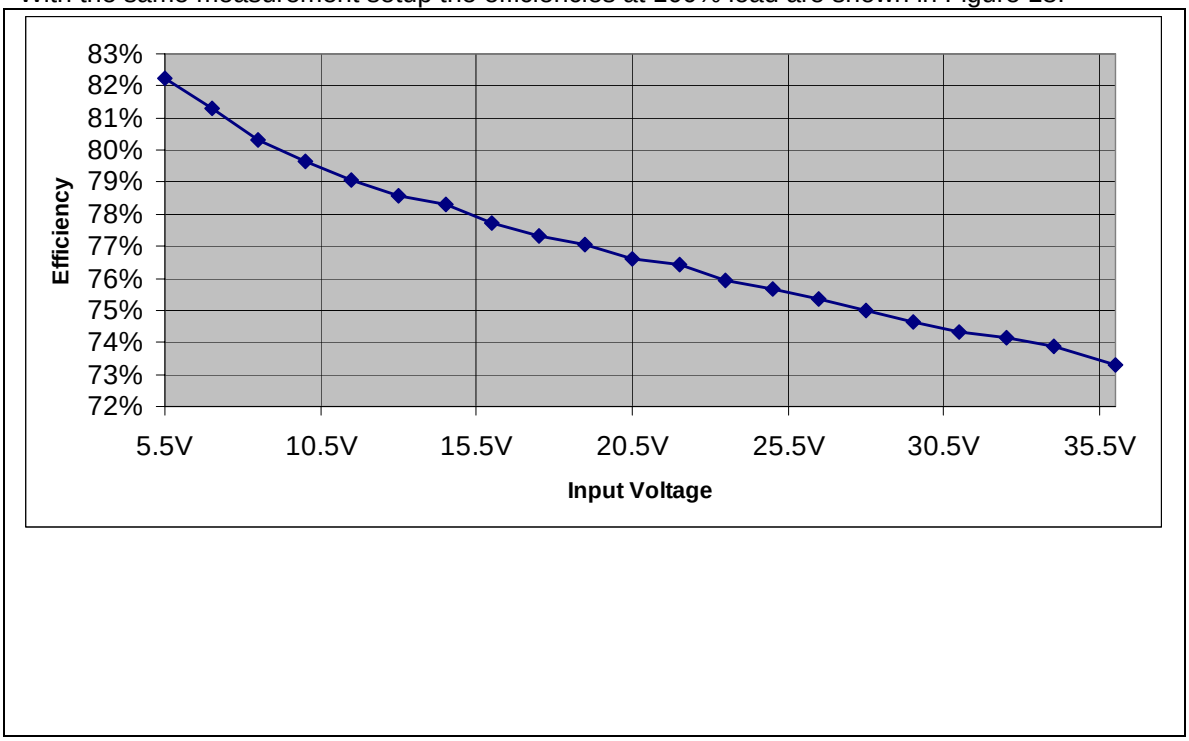
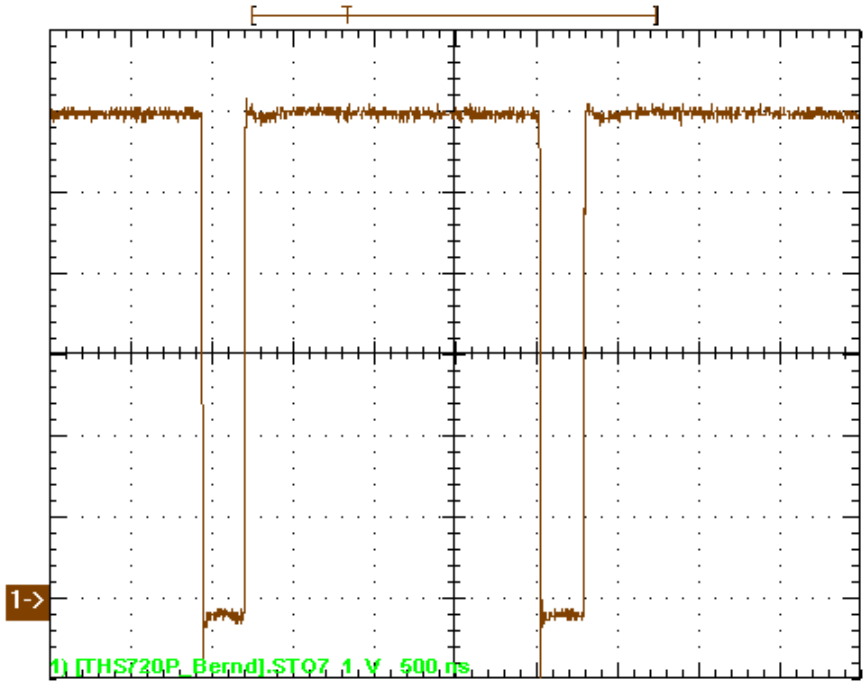


Figure 18

6 Switch Node Waveform

With full load results in the waveforms shown in Figure 19. 6V were applied to the input.

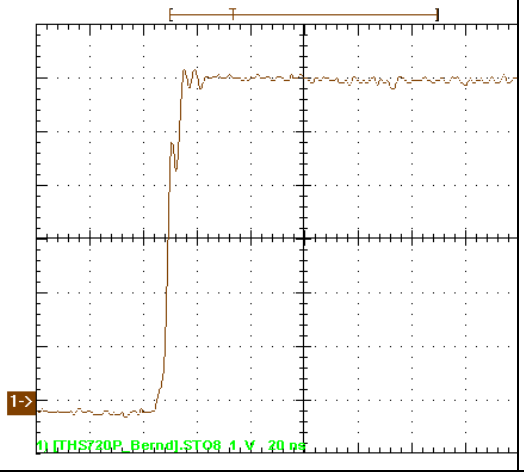


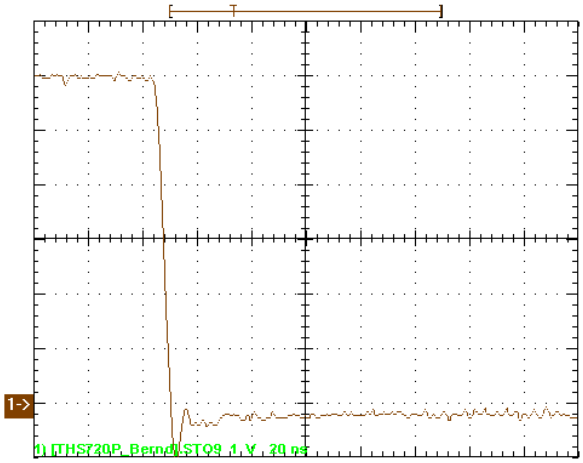
Ch1 => switchnode
1V/div

500ns/div

full bandwidth

Figure 19





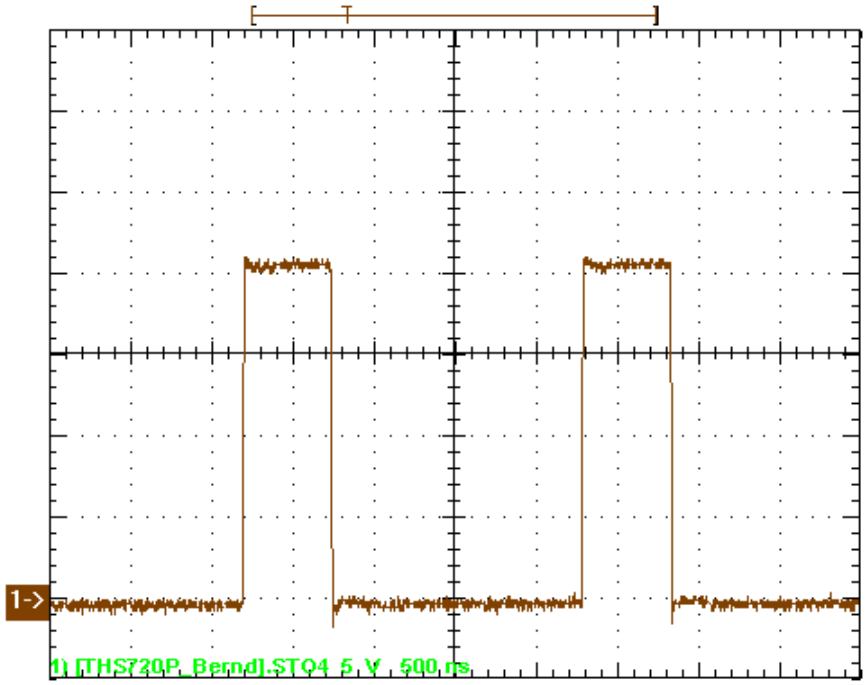
Ch1 => switchnode
1V/div

20ns/div

full bandwidth

Figure 20

With full load results in the waveforms shown in Figure 21. 21V were applied to the input.

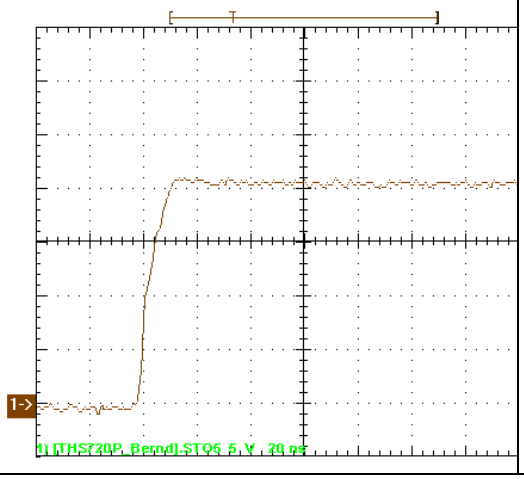


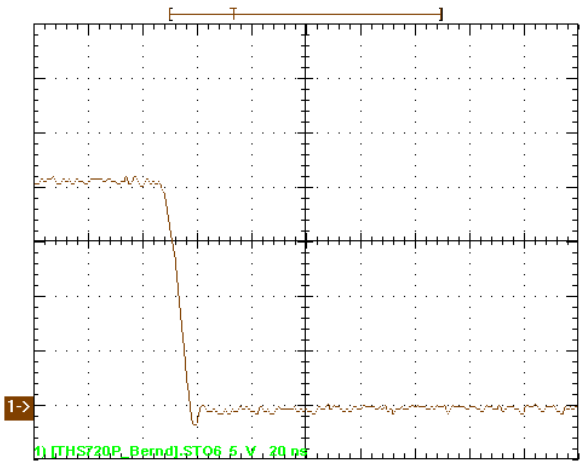
Ch1 => switchnode 5V/div

500ns/div

full bandwidth

Figure 21





Ch1 => switchnode 5V/div

20ns/div

full bandwidth

Figure 22

With full load results in the waveforms shown in Figure 19. 36V were applied to the input.

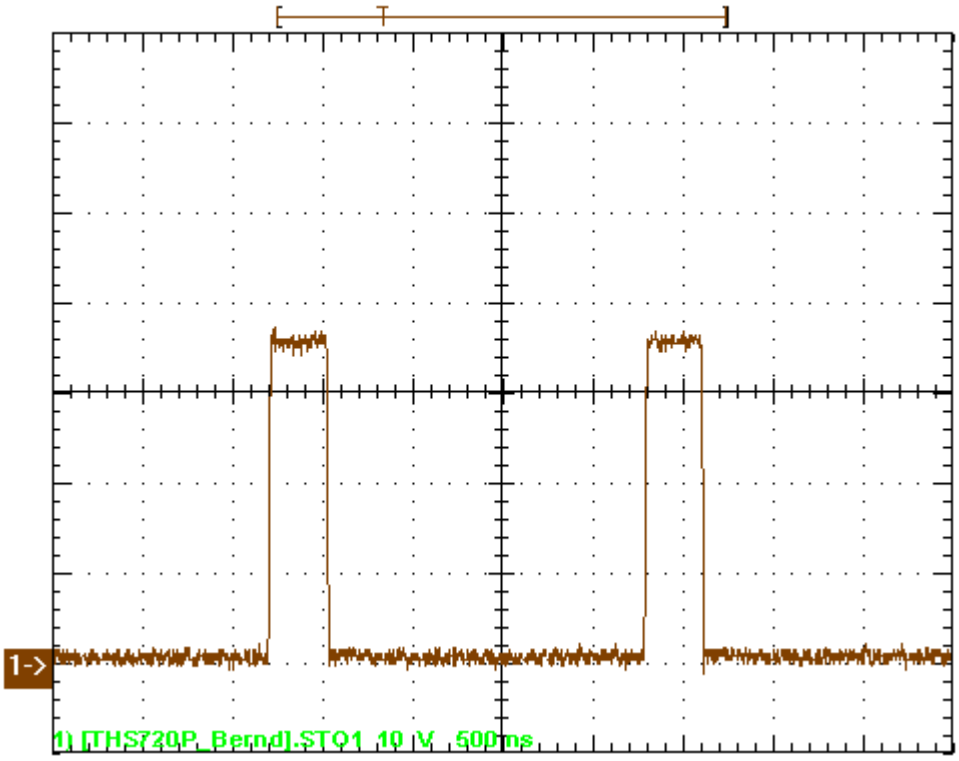
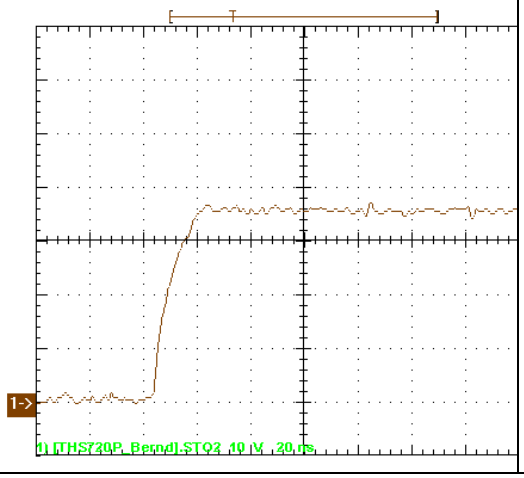


Figure 23

Ch1 => switchnode 10V/div

500ns/div

full bandwidth



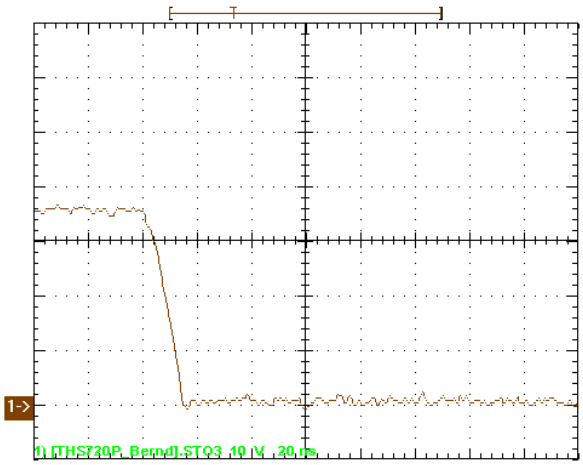


Figure 24

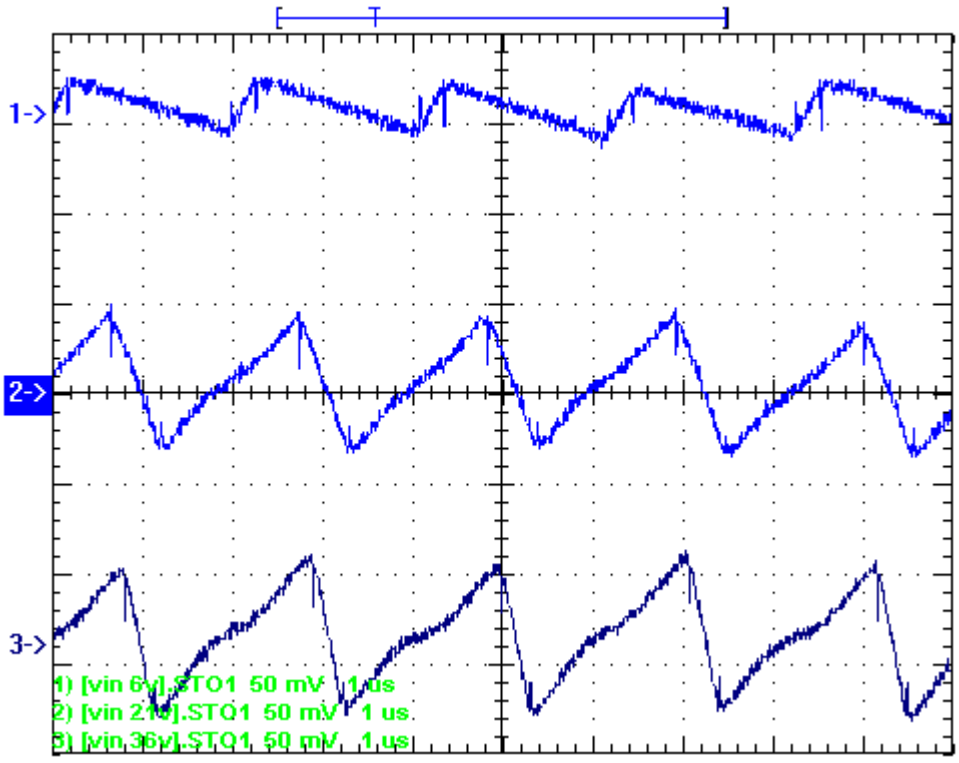
Ch1 => switchnode 10V/div

20ns/div

full bandwidth

7 Input Ripple

The input ripple voltage is displayed in Figure 25.Output at full load.



Ch1=> input voltage @ 6Vin 50mV/div

Ch1=> input voltage @ 21Vin 50mV/div

Ch1=> input voltage @ 36Vin 50mV/div

1µs/div
AC coupling
20MHz bandwidth

Figure 25

8 Output Ripple

With the resolution 50mV/div no ripple detectable

9 Control Loop Frequency Response

The control loop frequency response with full load and 6V input voltage is shown in Figure 26

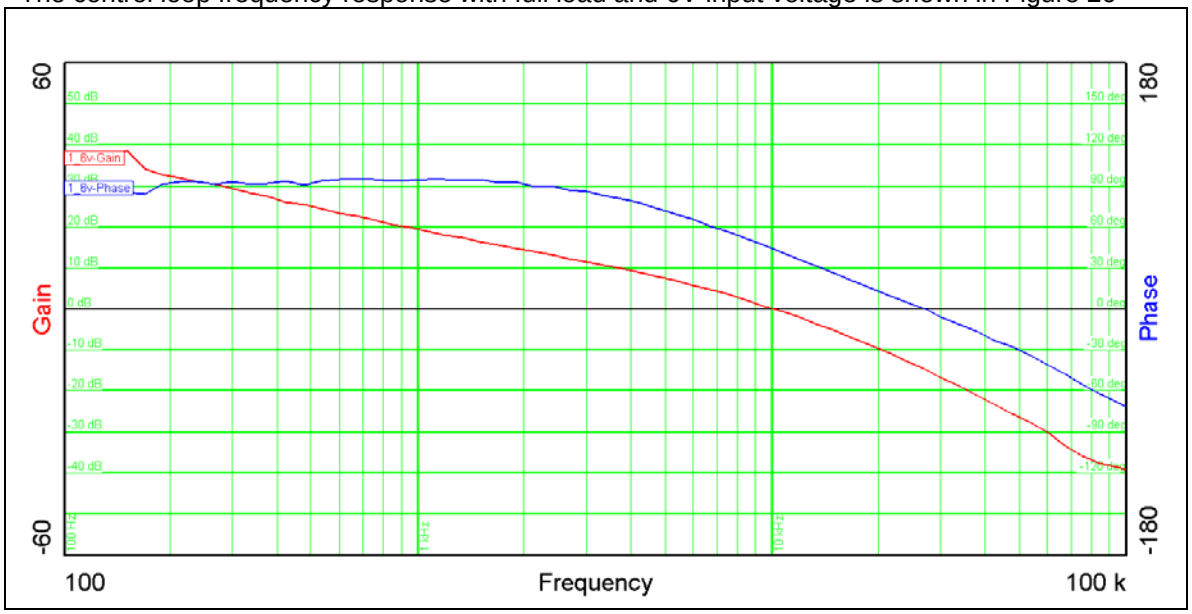


Figure 26

The control loop frequency response with full load and 21V input voltage is shown in Figure 27

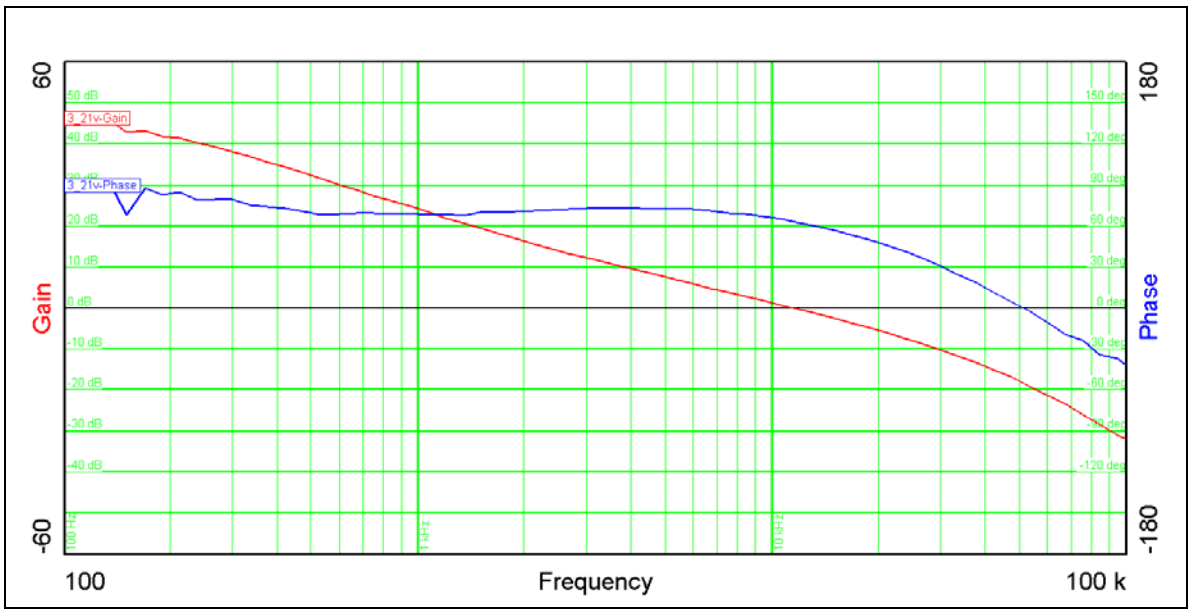


Figure 27

The control loop frequency response with full load and 36V input voltage is shown in Figure 28

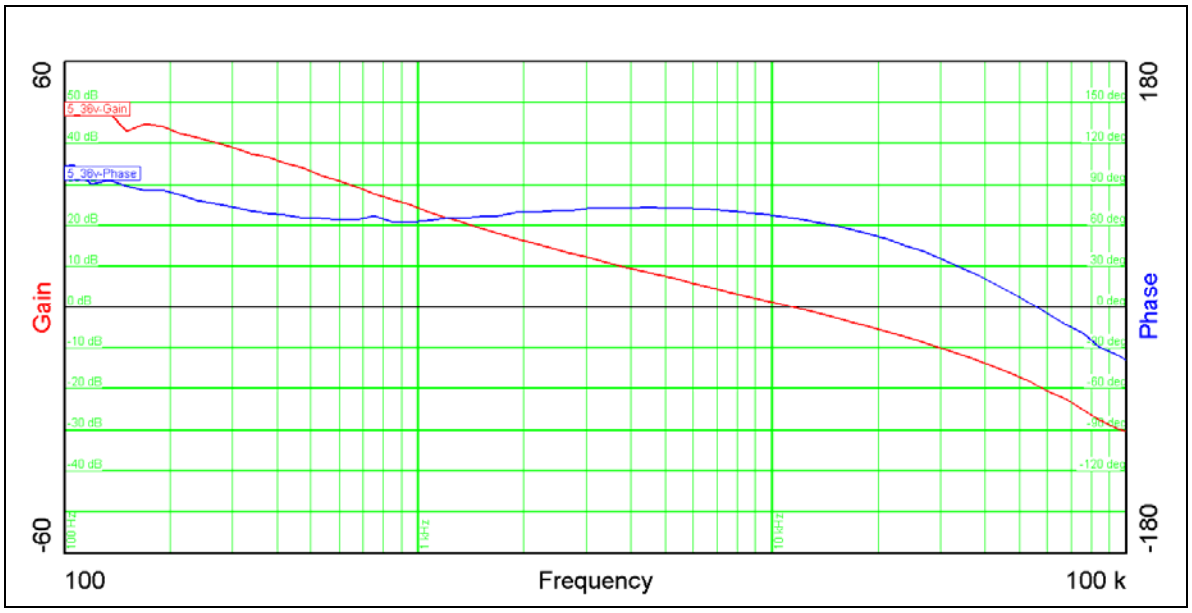


Figure 28

Table 1 summarizes the results.

Vin	6V	21V	36V
Bandwidth (kHz)	10.2	11.5	11.4
Phase margin	43.6°	63.4°	65.5°
slope (20dB/decade)	-1.46	-1.08	-1.06
gain margin (dB)	-14.8	-18.3	-19.1
slope (20dB/decade)	-2.04	-2	-2.25
freq (kHz)	26.9	51.3	55.8

Table 1

10 Load Transients

A output current change from 125mA to 250mA of the 5V output results in following Figure 29.The input voltage was set to 6V

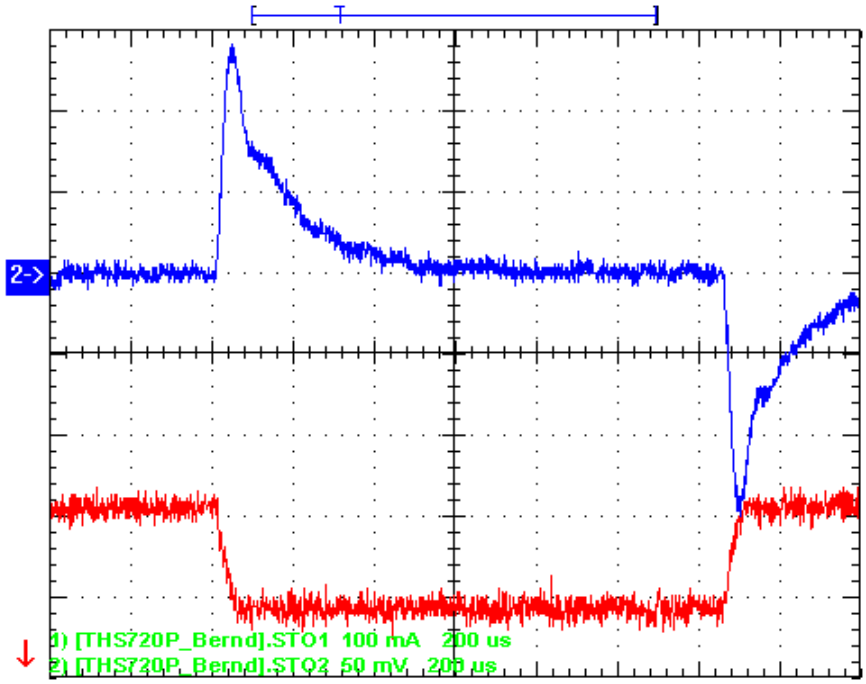


Figure 29

Ch2=> output voltage (5V)
AC coupled
50mV/div

Ch1=> output current (5V)
100mA/div

200µs/div

20MHz bandwidth

A output current change from 125mA to 250mA results in following Figure 30.The input voltage was set to 21V

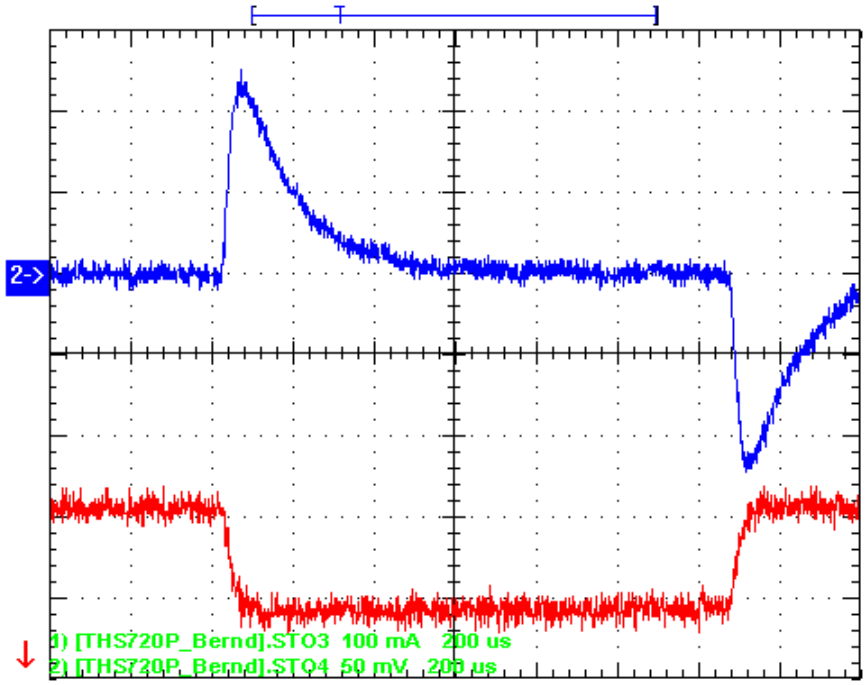


Figure 30

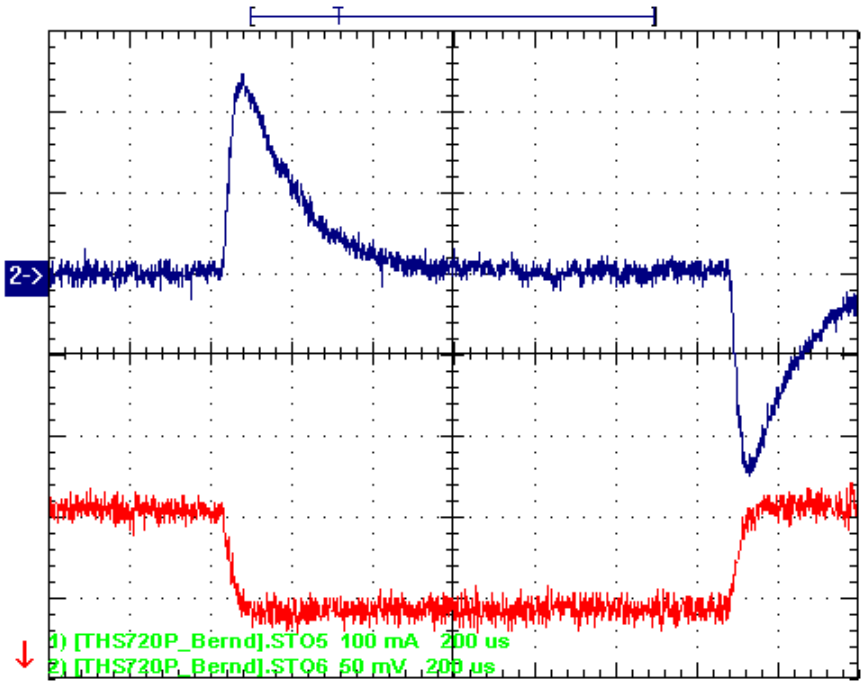
Ch2=> output voltage (5V)
AC coupled
50mV/div

Ch1=> output current 100mA (5V)

200µs/div

20MHz bandwidth

A output current change from 125mA to 250mA results in following Figure 31.The input voltage was set to 36V



Ch2=> output voltage
AC coupled
50mV/div

Ch1=> output current
100mA

200µs/div

20MHz bandwidth

Figure 31

A output current change from 0mA to 150mA of the 3.3V output results in following Figure 32.The input voltage was set to 6V

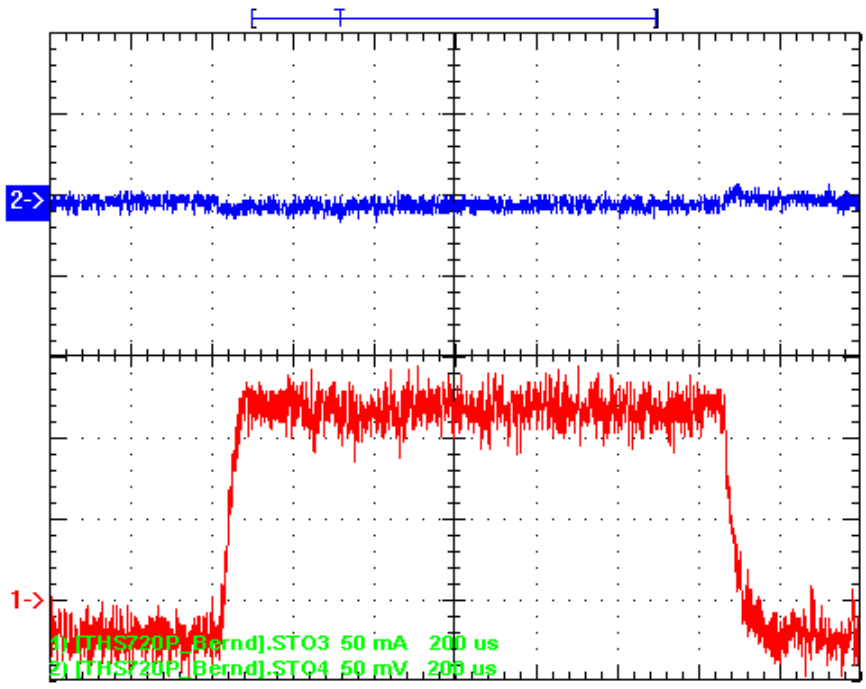


Figure 32

Ch2=> output voltage (3.3V)
AC coupled
50mV/div
full bandwidth

Ch1=> output current (3.3V)
50mA/div|
20MHz bandwidth

200µs/div

A output current change from 0mA to 150mA results in following Figure 33.The input voltage was set to 21V

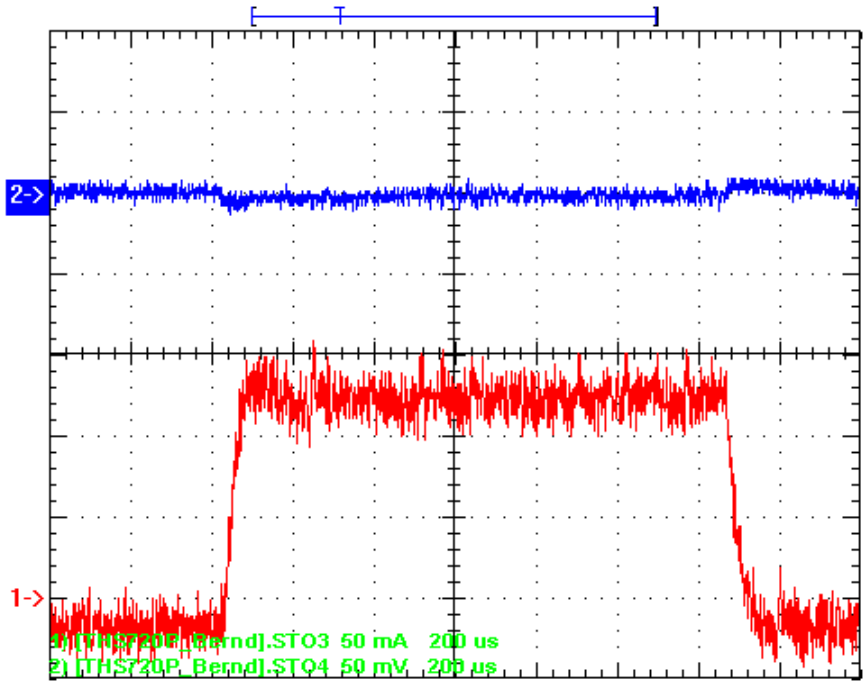


Figure 33

Ch2=> output voltage (3.3V)
AC coupled
50mV/div
full bandwidth

Ch1=> output current (3.3V)
50mA/div|
20MHz bandwidth

200µs/div

A output current change from 0mA to 250mA results in following Figure 34.The input voltage was set to 36V

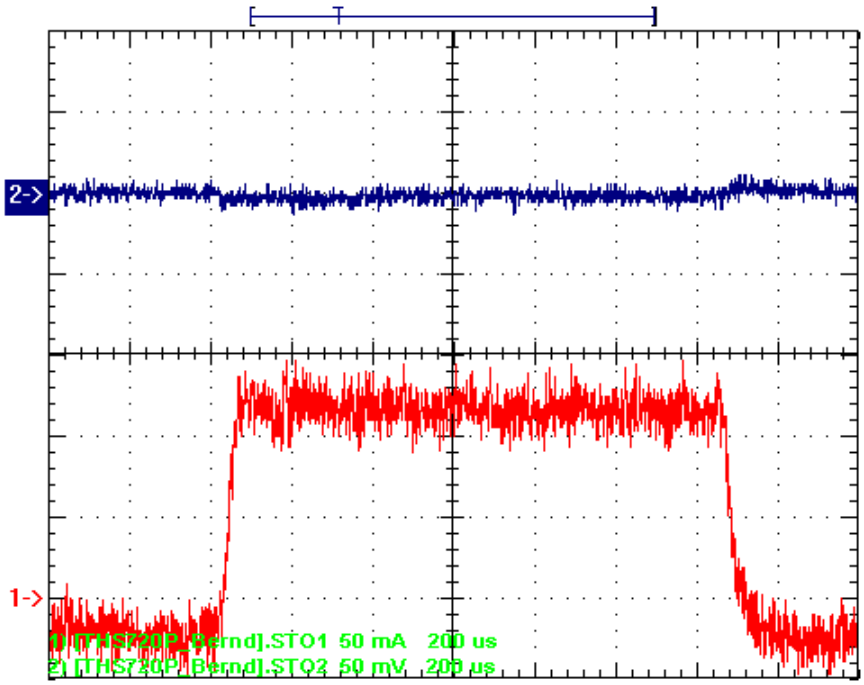


Figure 34

Ch1=> output voltage
AC coupled
50mV/div

Ch2=> output current
100mA
20MHz bandwidth

200µs/div

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