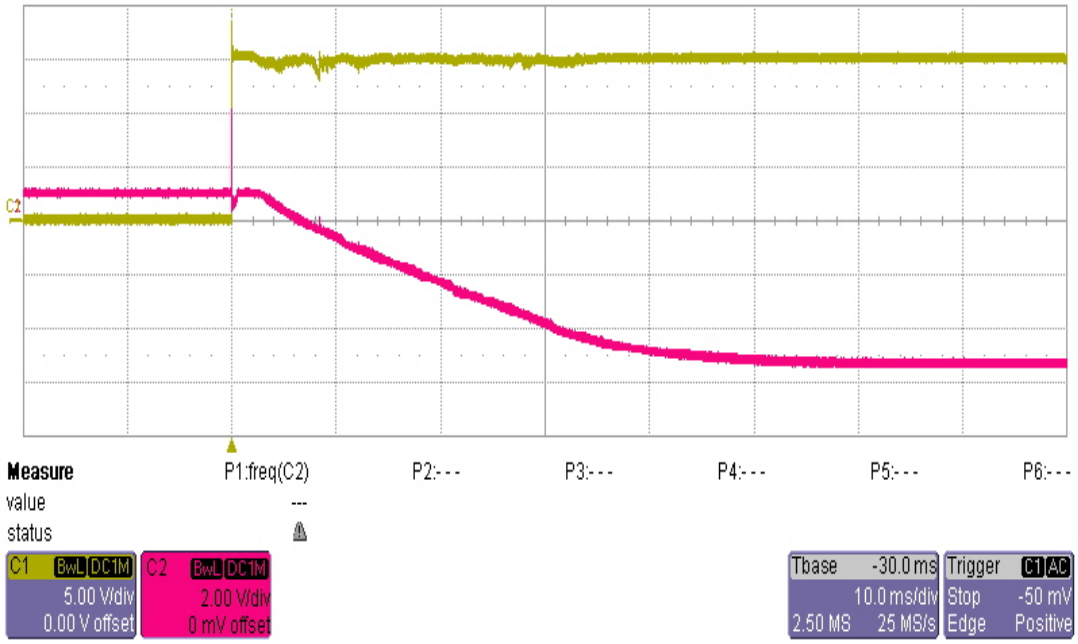
PMP4743RevB Test Results

1 Startup

The startup waveform is shown in the Figure 1. The input voltage was set at 15V, with 150mA load at the output.



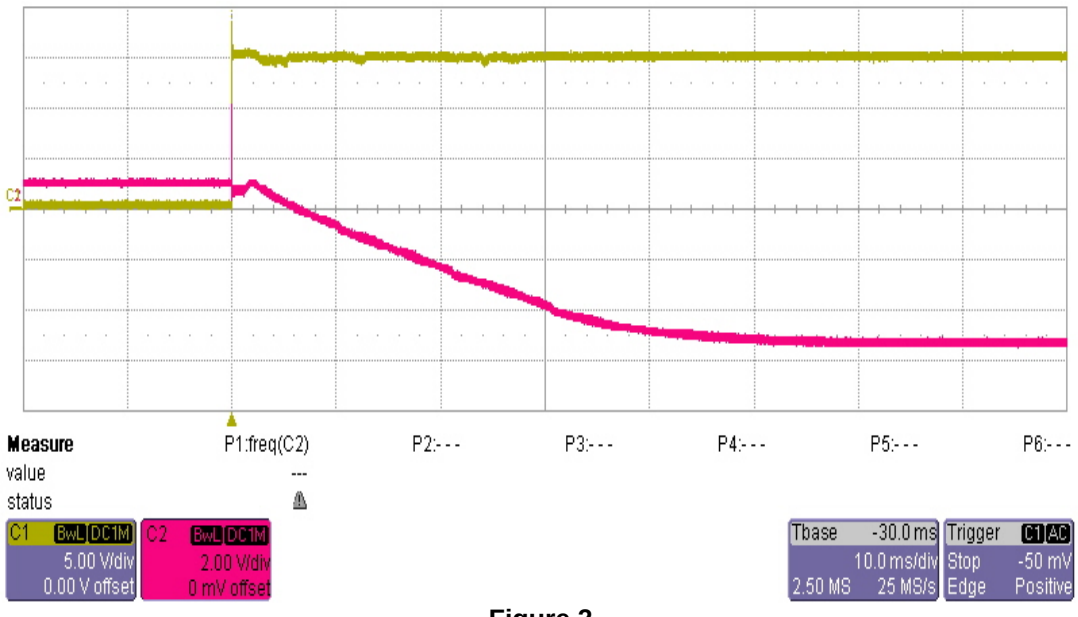
Ch1=> output voltage 5V/div

Ch2=> input voltage 2V/div

10.0ms/div

Figure 1

The startup waveform with 15V input voltage shown in the Figure 2; with 0A load at the output.



Ch1=> output voltage 5V/div

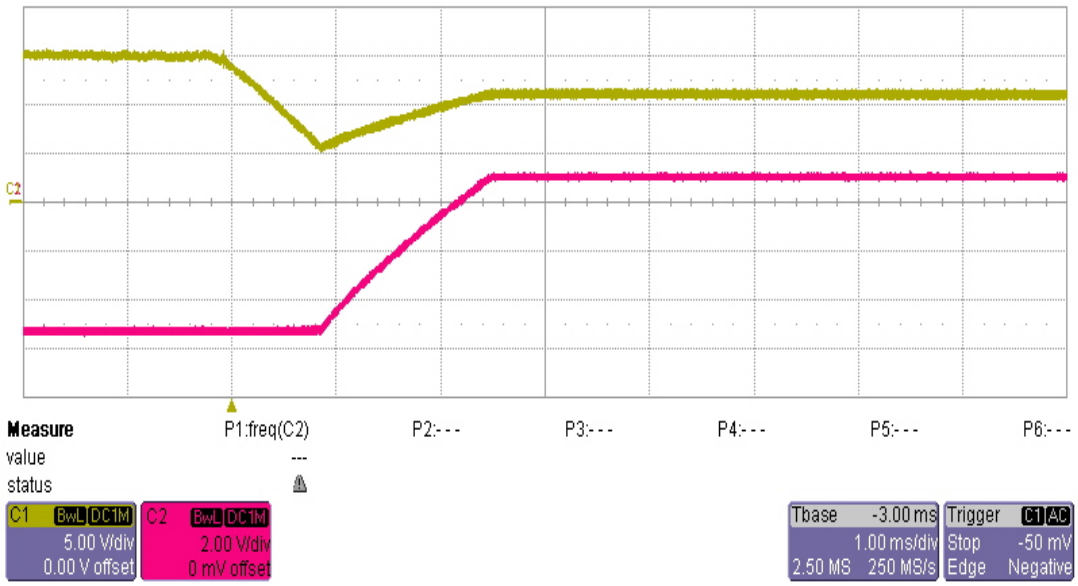
Ch2=> input voltage 2V/div

10.0ms/div

Figure 2

2 Shutdown

The shutdown waveform is shown in the
Figure 3 at 15V input voltage. With 150mA load applied at the output.



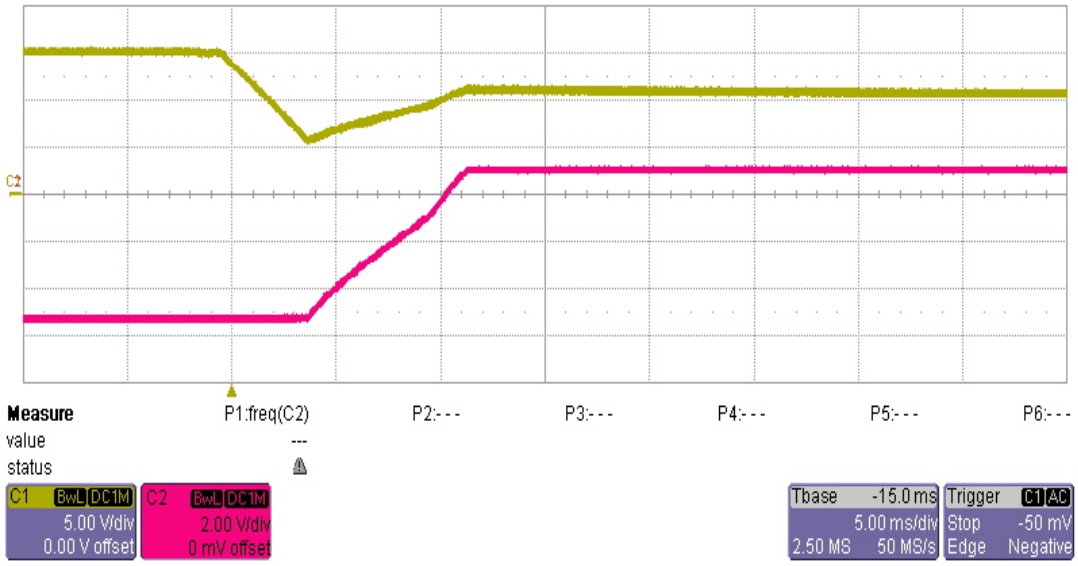
Ch1=> output voltage 5V/div

Ch2=> input voltage 2V/div

1.0ms/div

Figure 3

The shutdown waveform is shown in the
Figure 4 at 15V input voltage. With 0mA load applied at the output.



Ch1=> output voltage 5V/div

Ch2=> input voltage 2V/div

5.0ms/div

Figure 4

3 Efficiency

The efficiency is shown in the

Figure 5 below. The input voltage is at 15V.

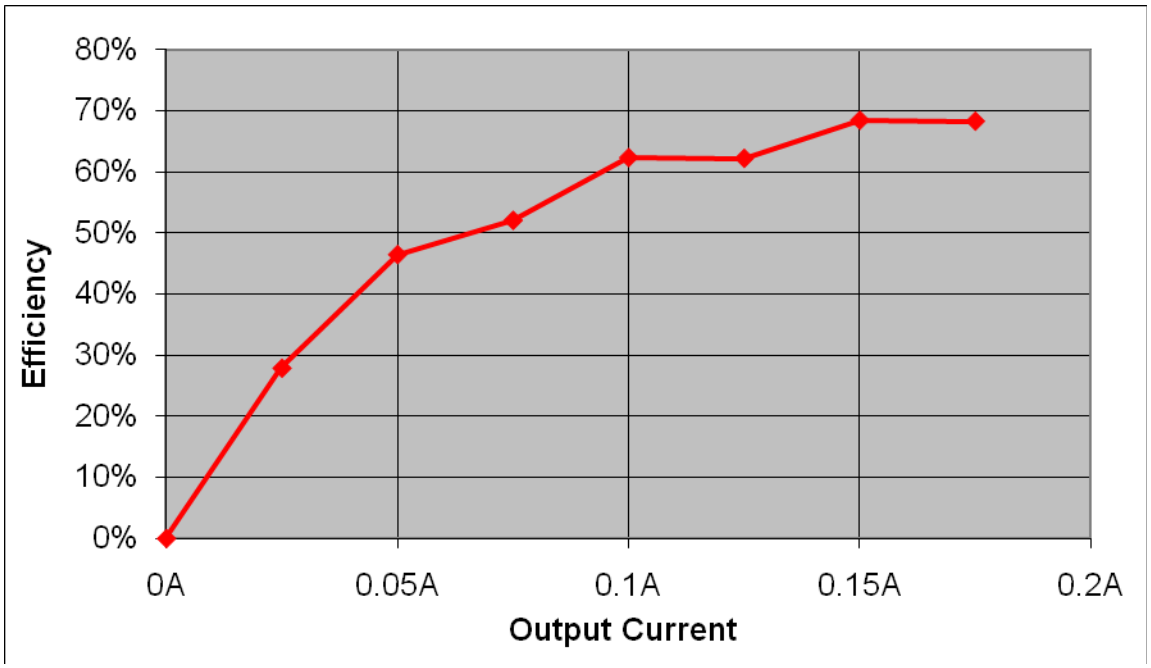


Figure 5

4 Load regulation

The load regulation for 15V input voltage is shown in

Figure 6.

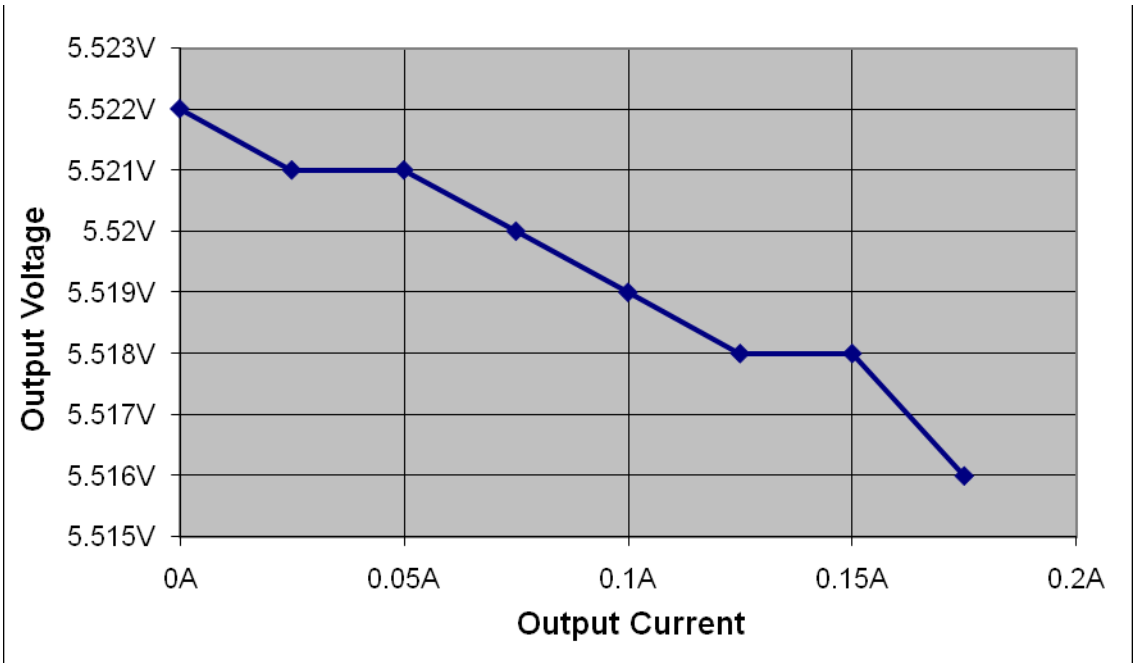


Figure 6

5 Control Loop Frequency Response

Figure 7 shows the loop response (outer loop). 150mA-load applied. The input voltage was set to 14V. This curve has been plotted with the optimized compensation loop of **RevB**.

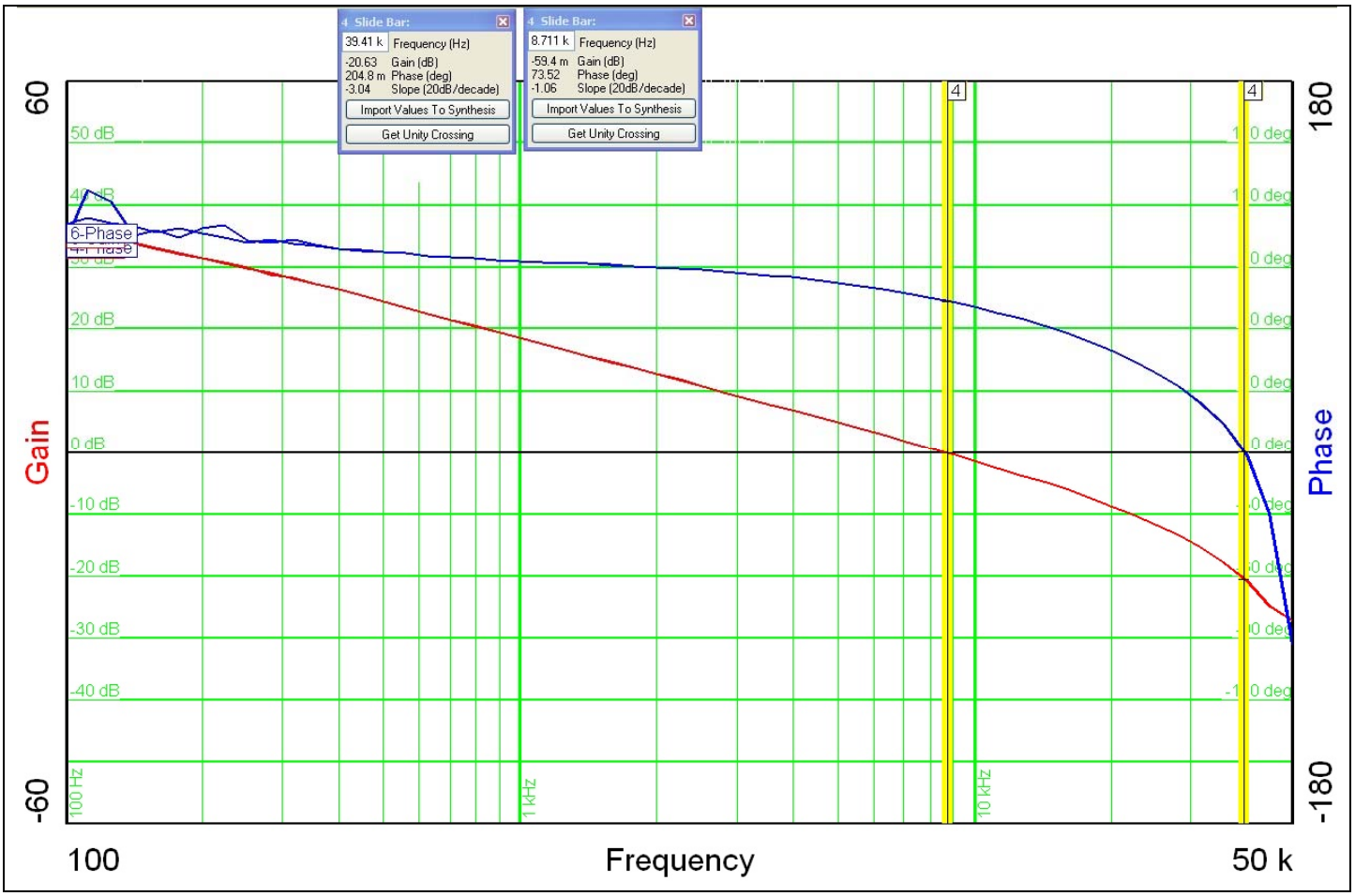


Figure 7

Table 1 summarizes the results from Figure 7

Vin	14V
Bandwidth (kHz)	8.71
Phase margin	73.52°
slope (20dB/decade)	-1.06
gain margin (dB)	-20.63
slope (20dB/decade)	-3.04
freq (kHz)	39.41

Table 1

Compensation components:	**R1**	126kΩ
	C9	2.2pF
	C10	22nF

Table 2

Figure 8 shows the loop response (outer loop). 150mA-load applied. The input voltage was set to 15V. This curve has been plotted with the PMP4743**RevA** compensation loop.

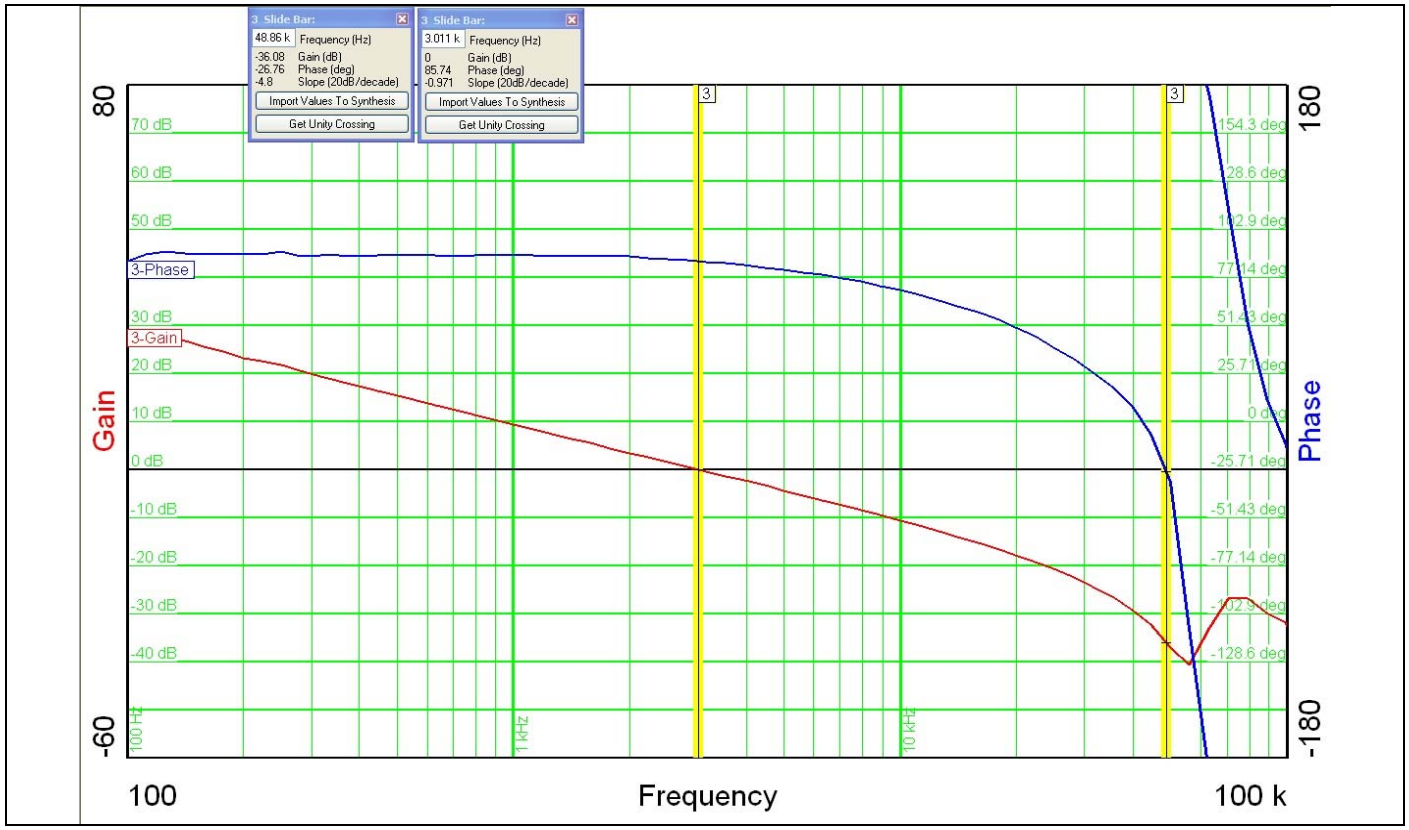


Figure 8

Table 3 summarizes the results from Figure 8

Vin	15V
Bandwidth (kHz)	3.01
Phase margin	85.74°
slope (20dB/decade)	-0.971
gain margin (dB)	-36.18
slope (20dB/decade)	-4.8
freq (kHz)	48.86

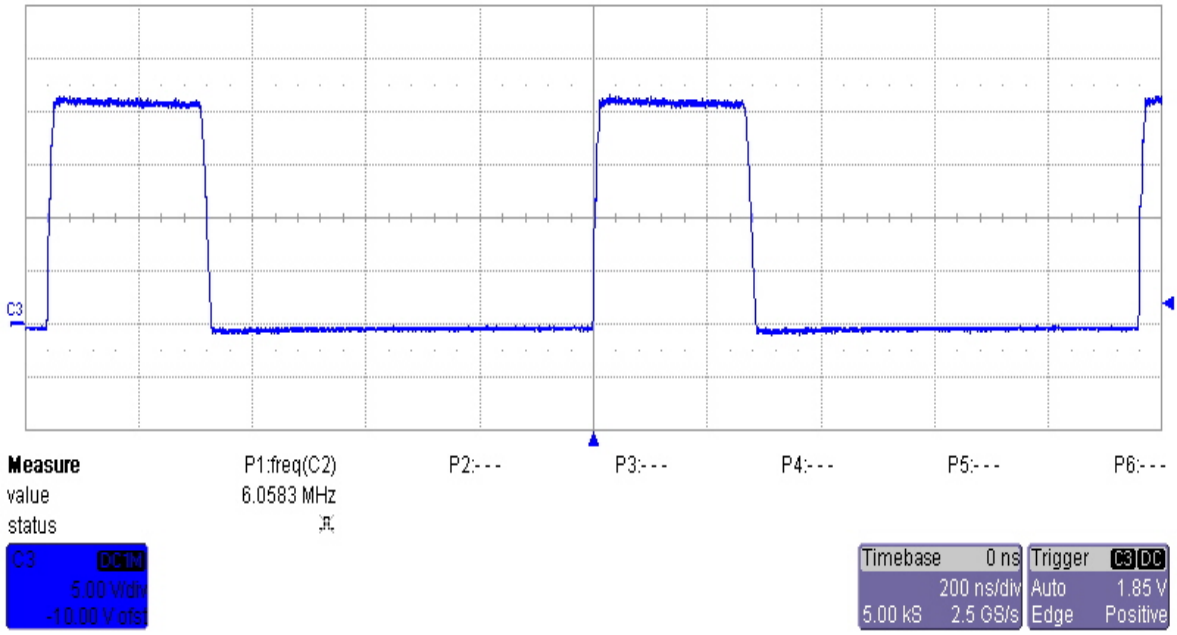
Table 3

Compensation components:	**R1**	42.2kΩ
	C9	33pF
	C10	33nF

Table 4

6 Switch Node Waveform

With 150mA load results in the waveforms shown in Figure 9, Figure 9 Figure 9. 15V were applied to the input.



Ch1 => switch node
5 V/div

200 ns/div

full bandwidth

Figure 9

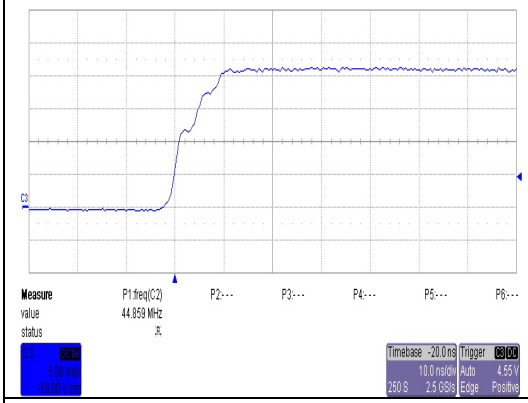


Figure 10

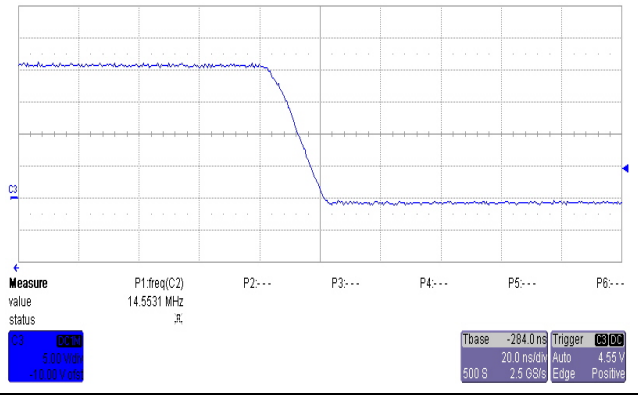


Figure 11

Ch1 => switch node
5V/div

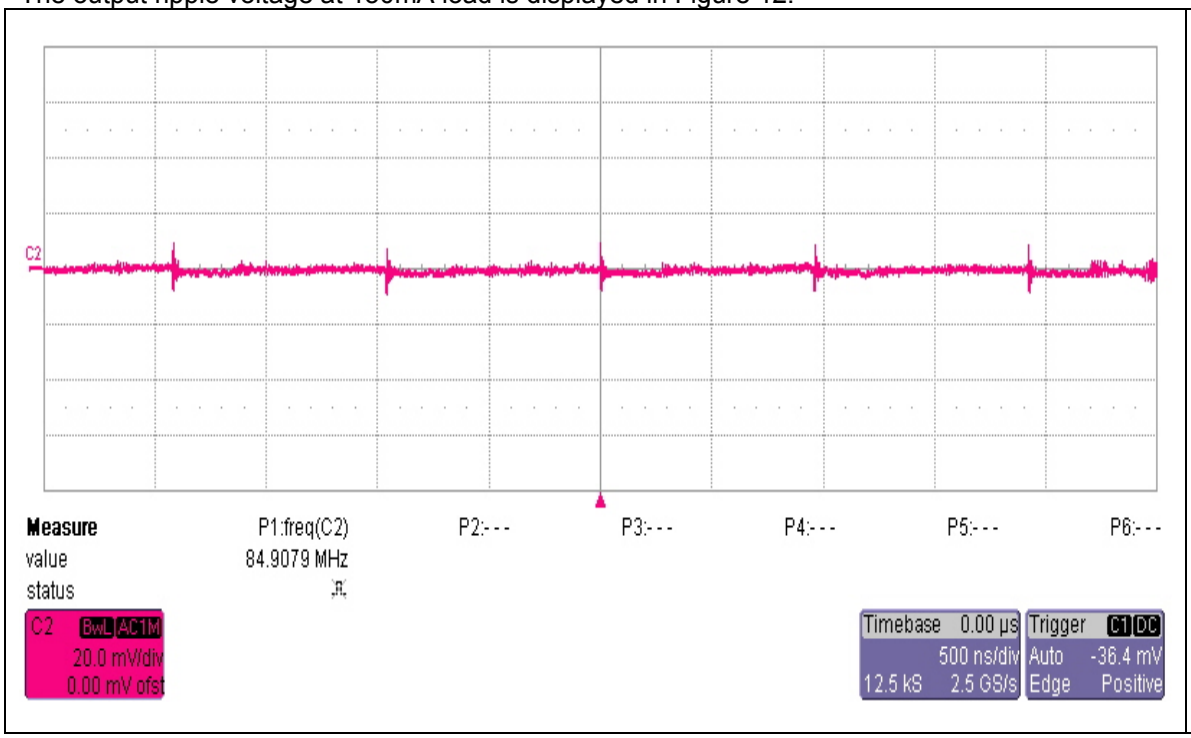
10ns/div

20ns/div

full bandwidth

7 Ripple Voltages

The output ripple voltage at 150mA load is displayed in Figure 12.



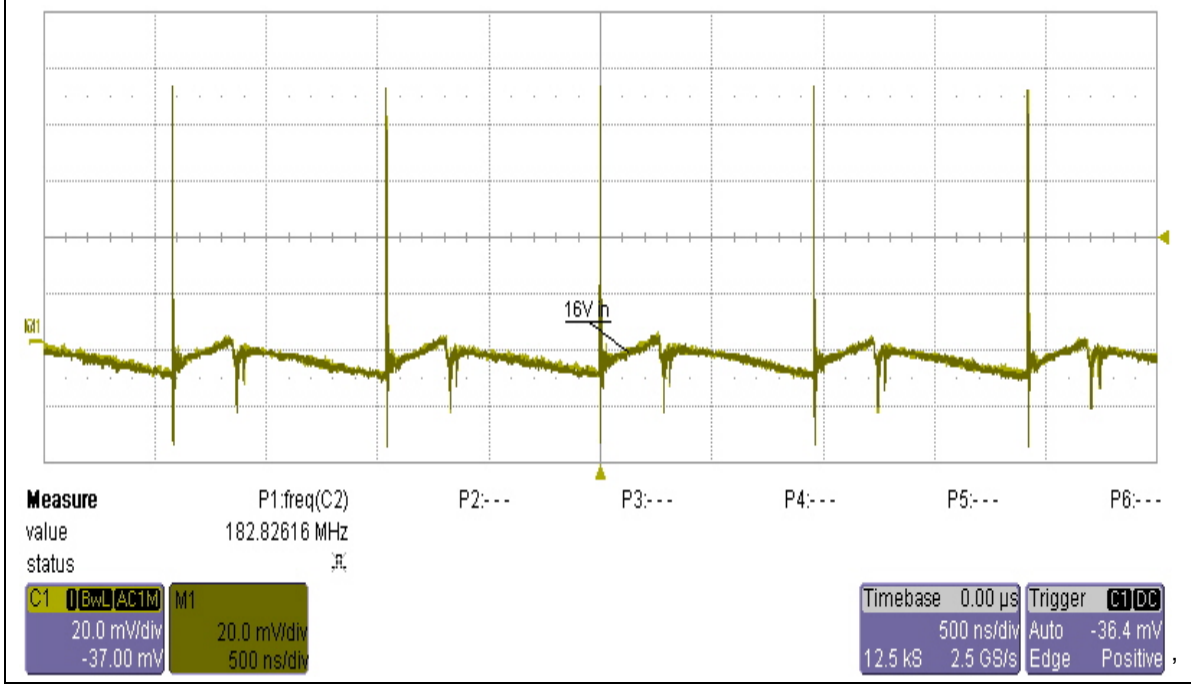
Ch1=> output voltage 20mV/div @ 15V Vin

500ns/div AC coupling

20MHz bandwidth

Figure 12

The input ripple voltage is displayed in Figure 13. The input voltage was set to 15V with output current 150mA.



CH1=> input voltage 20mV/div @ 15V Vin

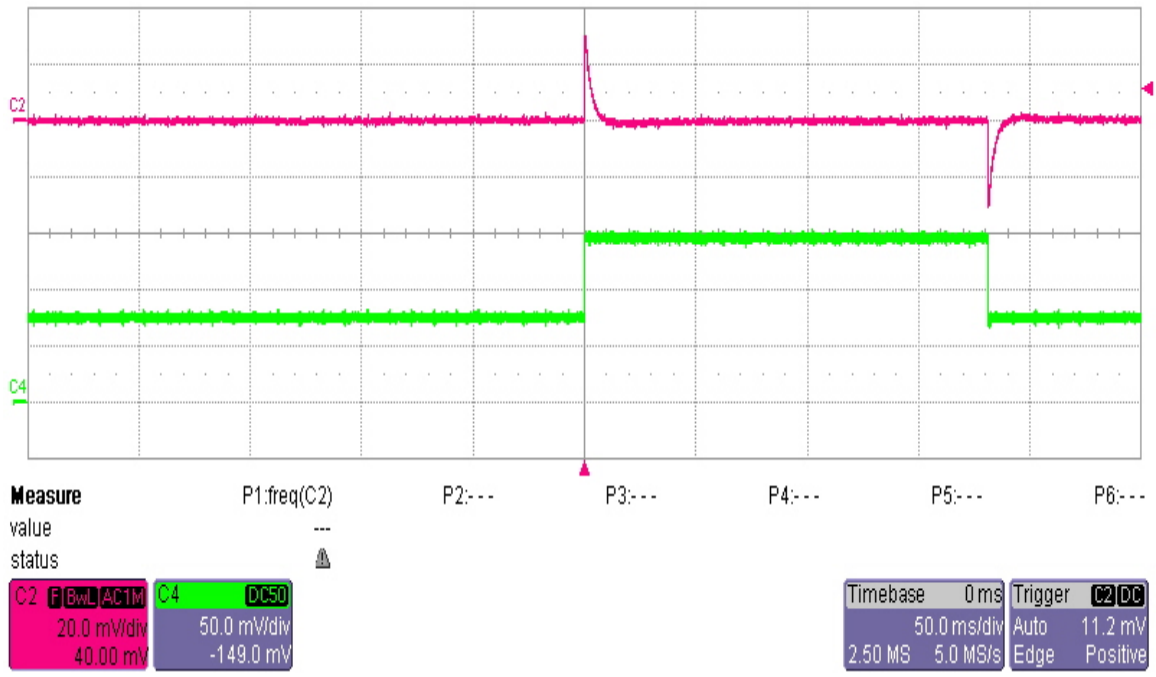
500ns/div AC coupling

20MHz bandwidth

Figure 13

8 Load Transients

An output current change from 75mA to 150mA results in following Figure 14.The input voltage was set to 15V



Ch2=> output voltage

AC coupled 20mV/div

Ch4=> output current 50mA/div

50ms/div

20MHz bandwidth

Figure 14

9 Thermal Image

The following picture show the thermal image at 150mA output current. Figure 15 is the photo taken with 15V input voltage.

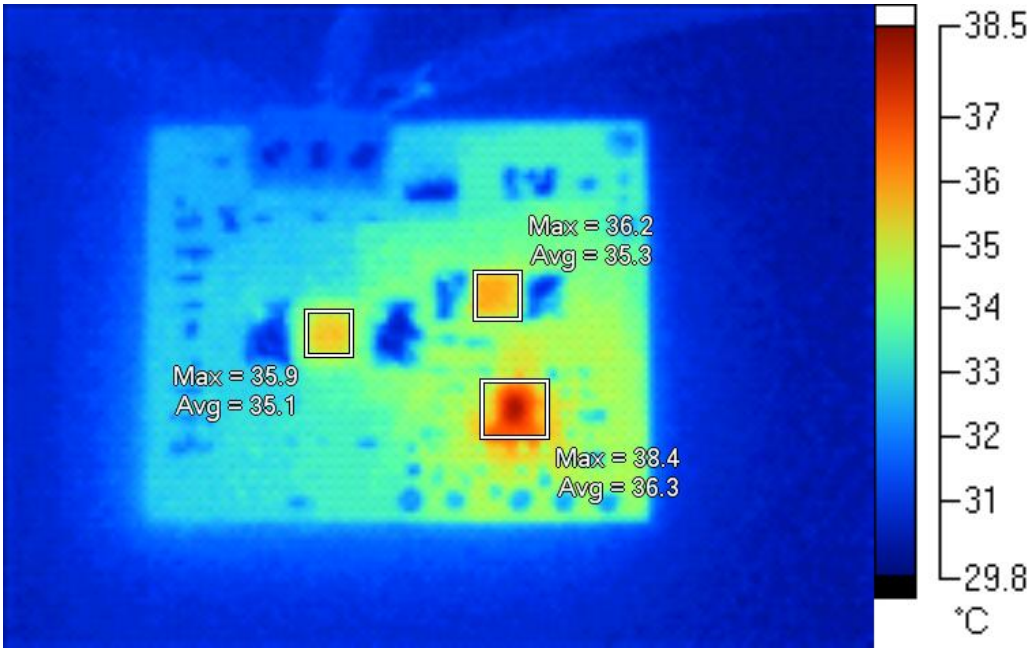


Figure 15

TPS54140 at 38.4c max,
Inductor at 35.9c max,
Rectifier at 36.2c max.

Temperature rise below 15K.

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