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### Regulation, losses and efficiency:

<b>Vin Volts</b>	<b>Iin mA</b>	<b>Vout1 Volts</b>	<b>Iout1 mA</b>	<b>Losses in mW</b>	<b>Efficiency %</b>
<b>100uHy</b>	<b>Choke</b>	<b>MSS1048</b>	<b>Coilcraft</b>		
18.11	2.07	5.01	5.01	12.388	67.0
18.11	3.63	5.01	10.01	15.589	76.3
18.10	6.76	5.01	20.05	21.906	82.1
18.09	12.91	5.01	40.16	32.340	86.2
18.07	22.16	5.01	70.2	48.729	87.8
18.05	31.68	5.01	101.2	64.812	88.7
<b>220uHy</b>	<b>Choke</b>	<b>MSS1038</b>	<b>Coilcraft</b>		
18.10	2.01	5.01	5.02	11.231	69.1
18.09	3.54	5.01	10.00	13.939	78.2
18.09	6.54	5.01	20.04	17.908	84.9
18.08	12.62	5.01	40.15	27.018	88.2
18.06	21.68	5.01	70.1	40.340	89.7
18.04	31.10	5.01	101.1	54.533	90.3
<b>470uHy</b>	<b>Choke</b>	<b>MSS1038</b>	<b>Coilcraft</b>		
18.10	2.04	5.01	5.01	11.824	68.0
18.09	3.49	5.01	10.00	13.034	79.4
18.08	6.55	5.01	20.02	18.124	84.7
18.07	12.545	5.01	40.14	25.587	88.7
18.05	21.83	5.01	70.8	39.324	90.0
18.03	31.00	5.01	101.1	52.419	90.6

220uHy choke left in and tests completed with it. However, many waveforms from testing with 100uHy choke are also shown for comparison.

470uHy choke can also be considered.

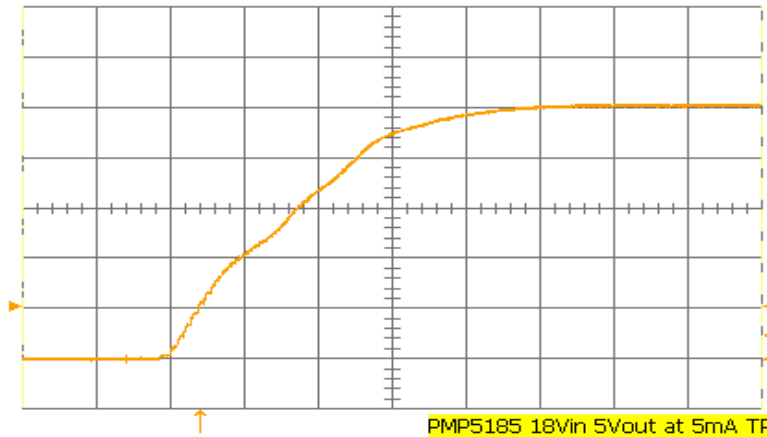
47uHy choke was also tested in hope of getting pulse skipping and better efficiency at 5mA load, but efficiency was worse at 5mA load.

Both with 47uHy and 100uHy chokes, load had to be reduced below 1.66mA to get any pulse skipping.

Start up: 18Vin applied 5mA resistive load (1k ohms) off 5V: Size of choke has very little effect if any on this waveform

13-Oct-09  
18:30:01

1 ms  
1.00 V



maximum(1)	5.06 V
Freq(1)	- - -
pkpk(1)	5.16 V
mean(1)	3.244 V
mean(4)	0.08mV

PMP5185 18Vin 5Vout at 5mA TPS54040  
R6=1.4Meg for 86kHz; Lout = 220uHy Cout = 47uF  
Start up of Vout as 18Vin applied suddenly:  
full rise in about 5msec with no overshoot

1 ms BWL  
1 1 V DC  
2 1 V DC  
3 10 mV AC  
4 10 mV 50Ω

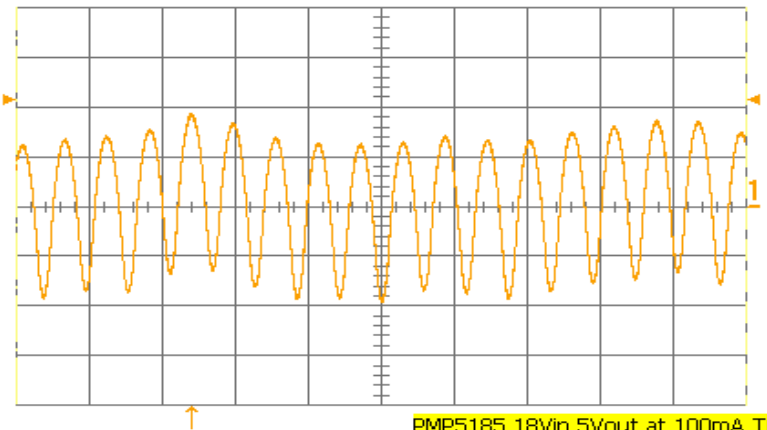
1 DC 1.08 V

25 MS/s  
SLOW TRIGGER  
 NORMAL

Output ripple: 18Vin Full 100mA load off 5V: 220uHy choke

13-Oct-09  
18:25:53

20 μs  
5.0mV



maximum(1)	9.37mV
Freq(1)	86.1504 kHz
pkpk(1)	19.06mV
mean(1)	704 μV
mean(4)	-0.07mV

PMP5185 18Vin 5Vout at 100mA TPS54040  
R6=1.4Meg for 86kHz; Lout = 220uHy Cout = 47uF  
Output ripple at C5 (Cout)  
19mV p-p almost all basic ripple with 3mV jitter  
With 100uHy choke ripple was 28mV p-p

20 μs BWL  
1 5 mV AC  
2 1 V DC  
3 10 mV AC  
4 10 mV 50Ω

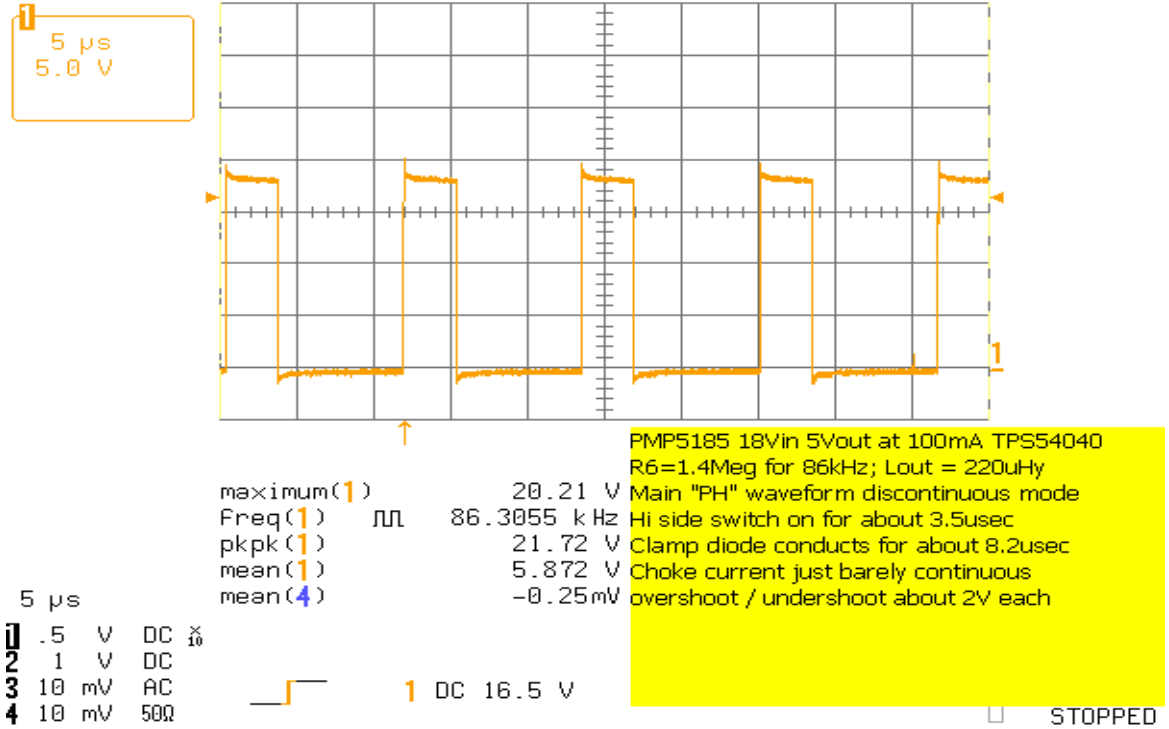
1 DC 10.8mV

1 GS/s  
 STOPPED

Qq

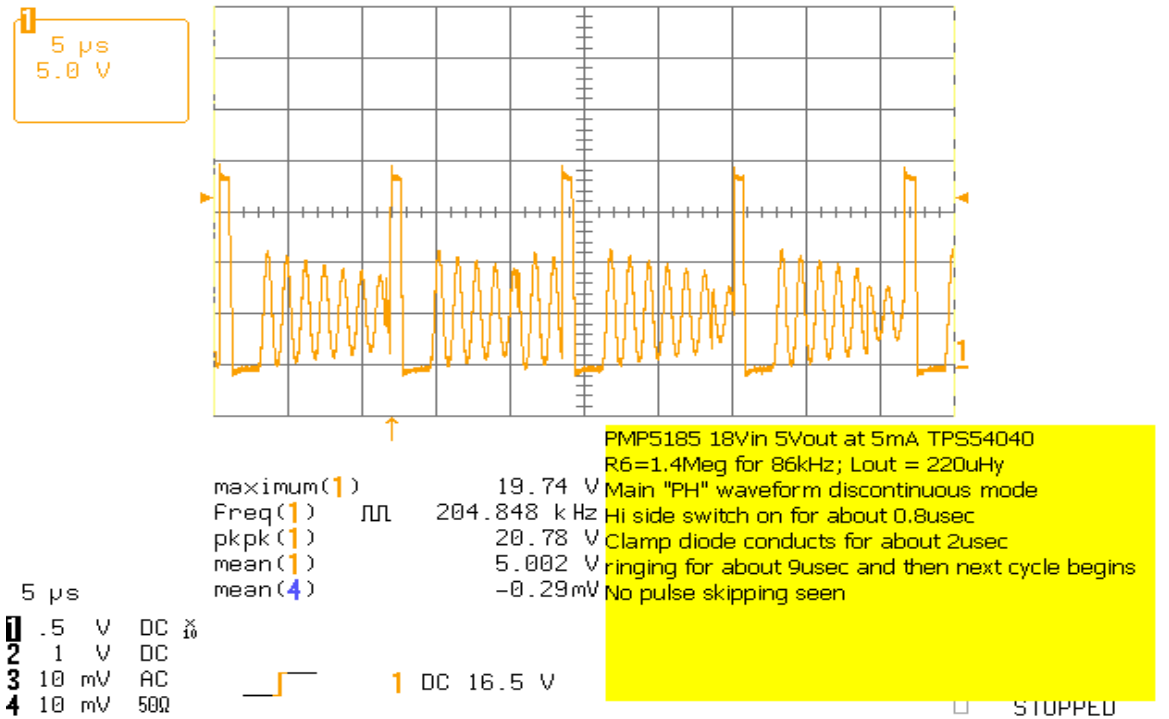
Main switching waveform: Full 100mA load off 5V: 220uHy choke

13-Oct-09  
17:24:45



Same, but load only 5mA off 5Vout:

13-Oct-09  
17:25:34

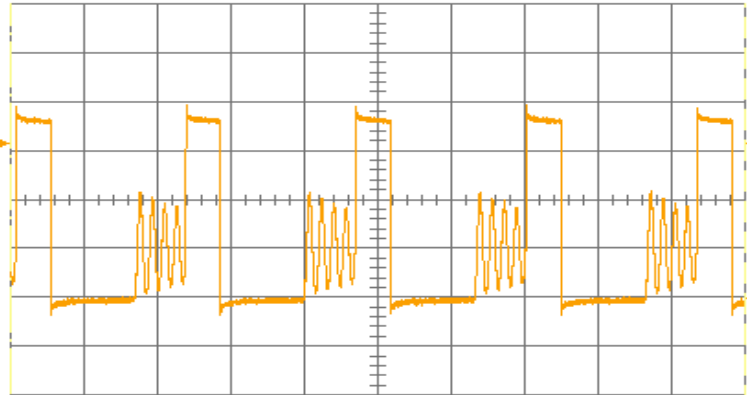


Main switching waveform: Full 100mA load off 5V: 100uHy choke

13-Oct-09  
13:35:13

Reading Floppy Disk Drive

5  $\mu$ s  
5.0 V



PMP5185 18Vin 5Vout at 100mA TPS54040  
R6=1.4Meg for 86kHz; Lout = 100uHy  
Main "PH" waveform discontinuous mode  
Hi side switch on for about 2.3usec  
Clamp diode conducts for 5.8usec  
ringing for 3.5usec and then next cycle begins  
overshoot / undershoot about 2V each

maximum(1) 19.69 V  
Freq(1)  $\mu$ L 86.3620 kHz  
pkpk(1) 21.56 V  
mean(1) 5.522 V  
mean(4) -0.20mV

5  $\mu$ s  
1 .5 V DC  $\times$   
2 1 V DC  
3 10 mV AC  
4 10 mV 50 $\Omega$

1 DC 15.9 V

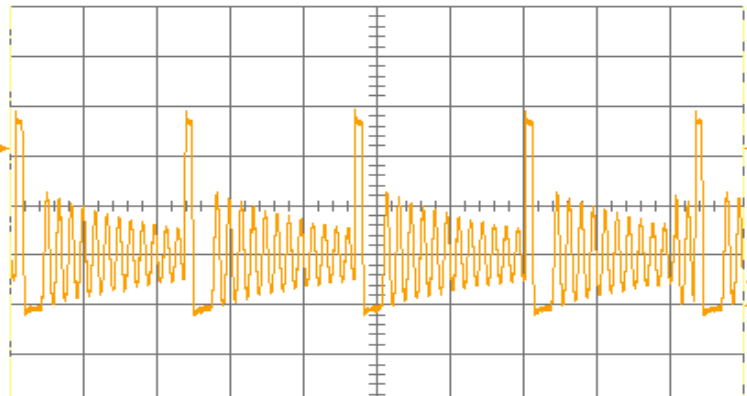
STOPPED

Qq

Main switching waveform: Minimum application load of 5mA off 5V: 100uHy choke

13-Oct-09  
13:36:23

5  $\mu$ s  
5.0 V



PMP5185 18Vin 5Vout at 5mA TPS54040  
R6=1.4Meg for 86kHz; Lout = 100uHy  
Main "PH" waveform discontinuous mode  
Hi side switch on for about 0.6usec  
Clamp diode conducts for about 1.5usec  
ringing for 9.5usec and then next cycle begins  
No pulse skipping seen, only when load less than 1.66mA does any pulse skipping happen

maximum(1) 19.69 V  
Freq(1)  $\mu$ L 289.209 kHz  
pkpk(1) 20.78 V  
mean(1) 5.033 V  
mean(4) -0.22mV

5  $\mu$ s  
1 .5 V DC  $\times$   
2 1 V DC  
3 10 mV AC  
4 10 mV 50 $\Omega$

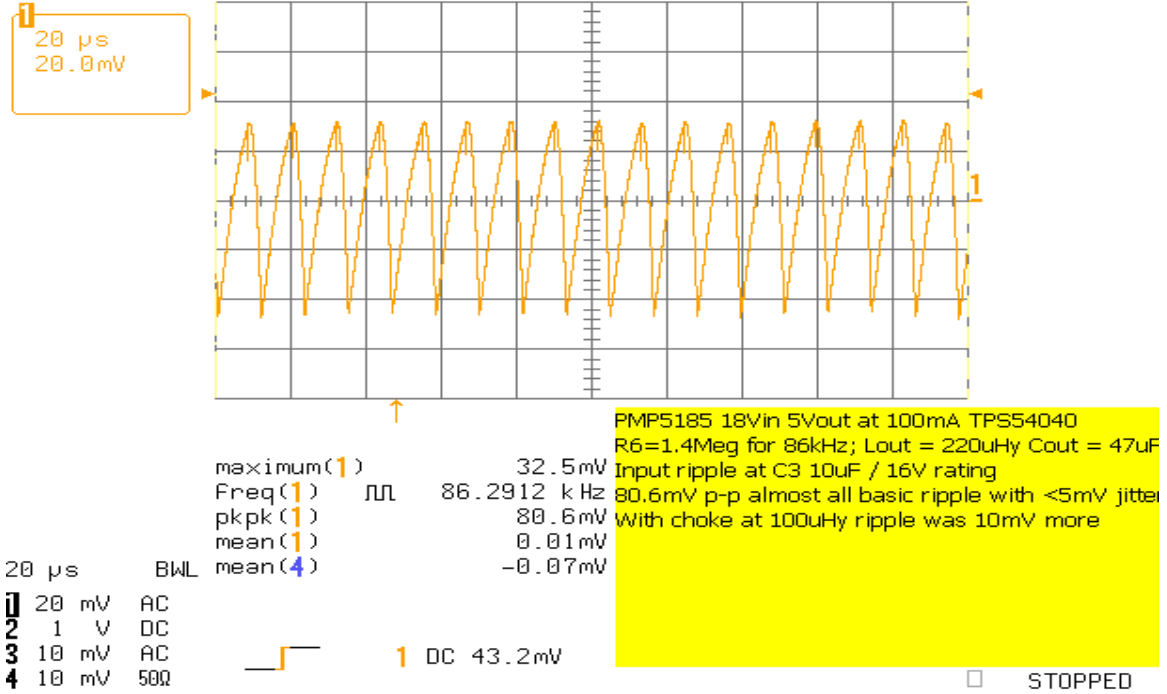
1 DC 15.9 V

STOPPED

Qq

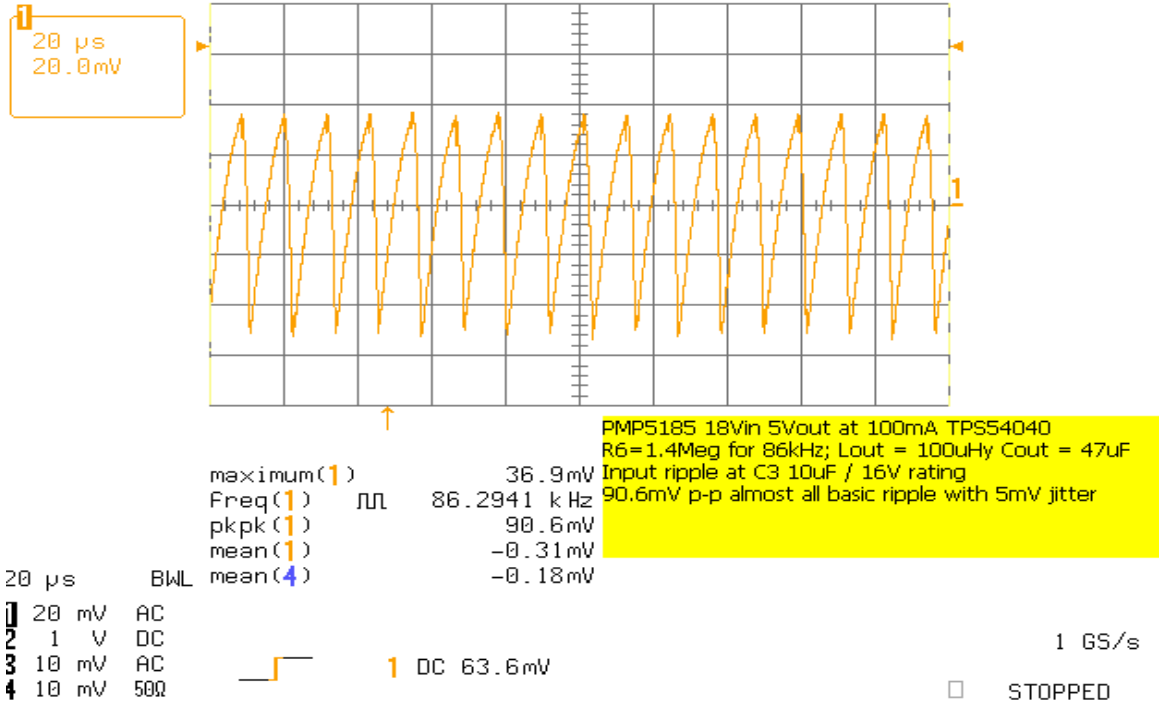
Input ripple: 18Vin and full load: 220uHy choke

13-Oct-09  
18:26:46



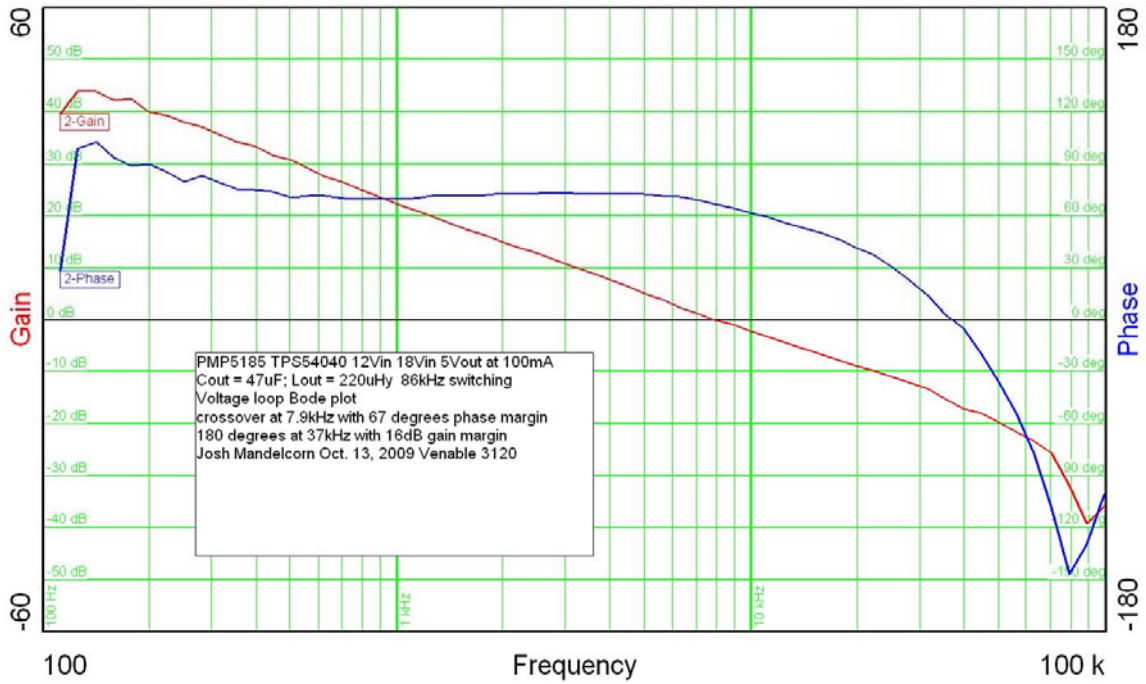
Input ripple: 18Vin and full load: 100uHy choke

13-Oct-09  
13:53:25

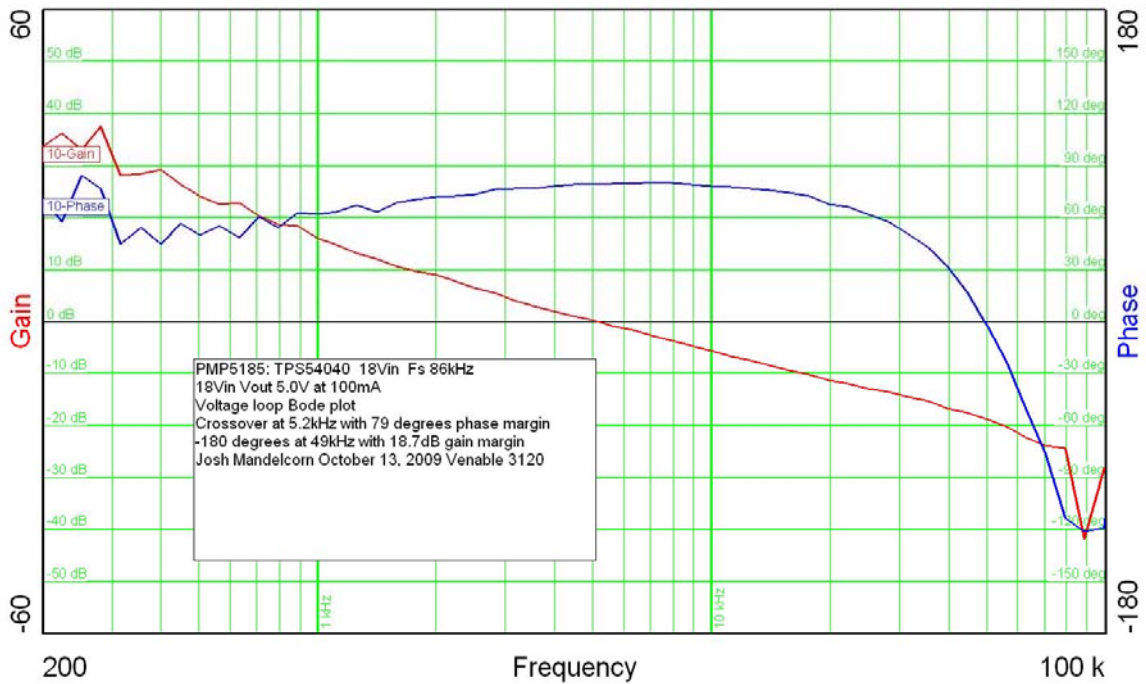


Qq

Bode plots: Full 100mA load with 220uHy choke and then with 100uHy choke:

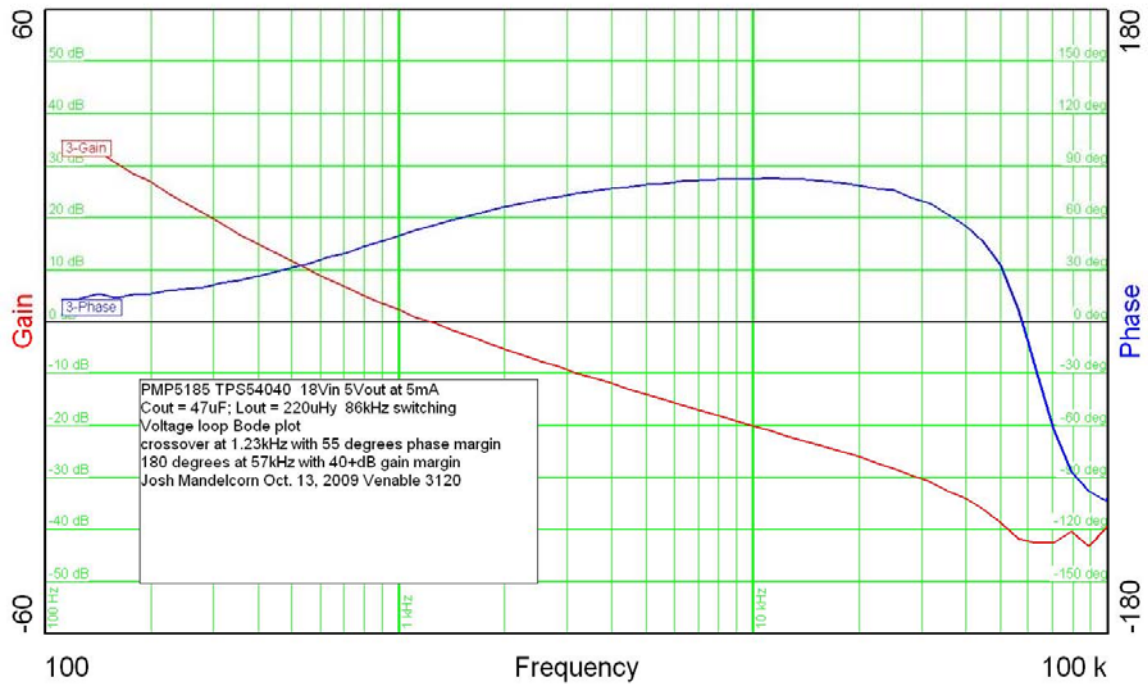


Full load 100uHy choke:

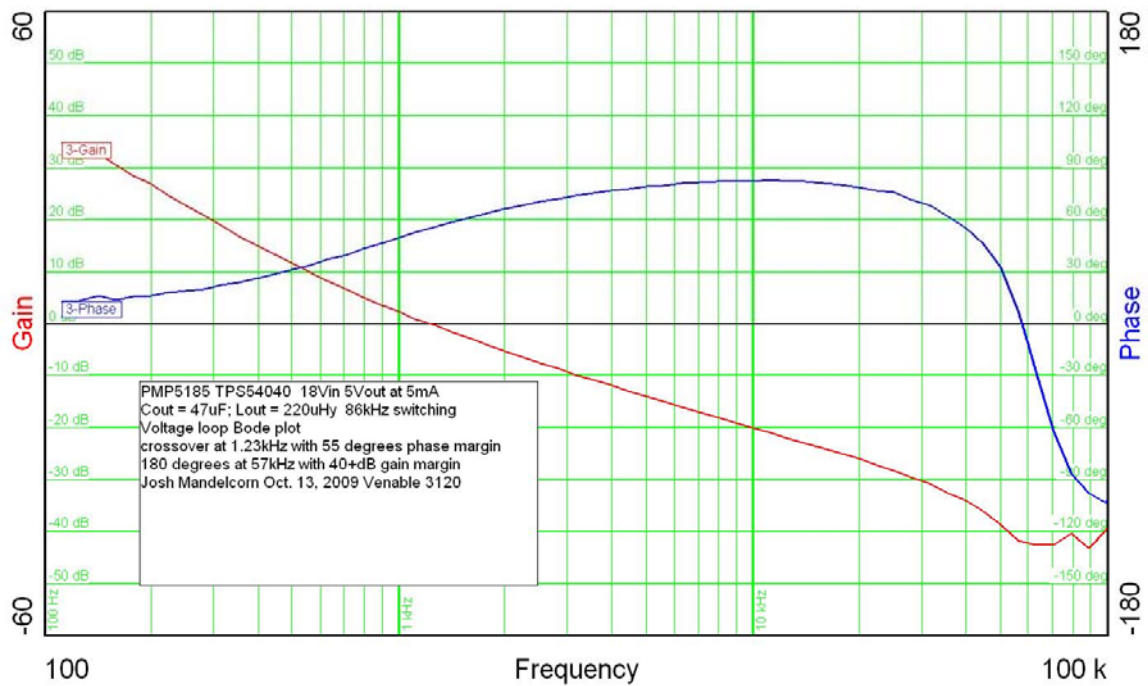


Qq

Bode plots: Minimum 5mA load with 220uHy choke and then with 100uHy choke:



5mA load with 100uHy choke:



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