LM5021-1 Dual Flyback Converter

TI reference design number: PMP7917 Rev A

Input: 40V – 60V
Outputs: 6V @ 4.33A, 4V @ 3.5A

DC – DC Test Results

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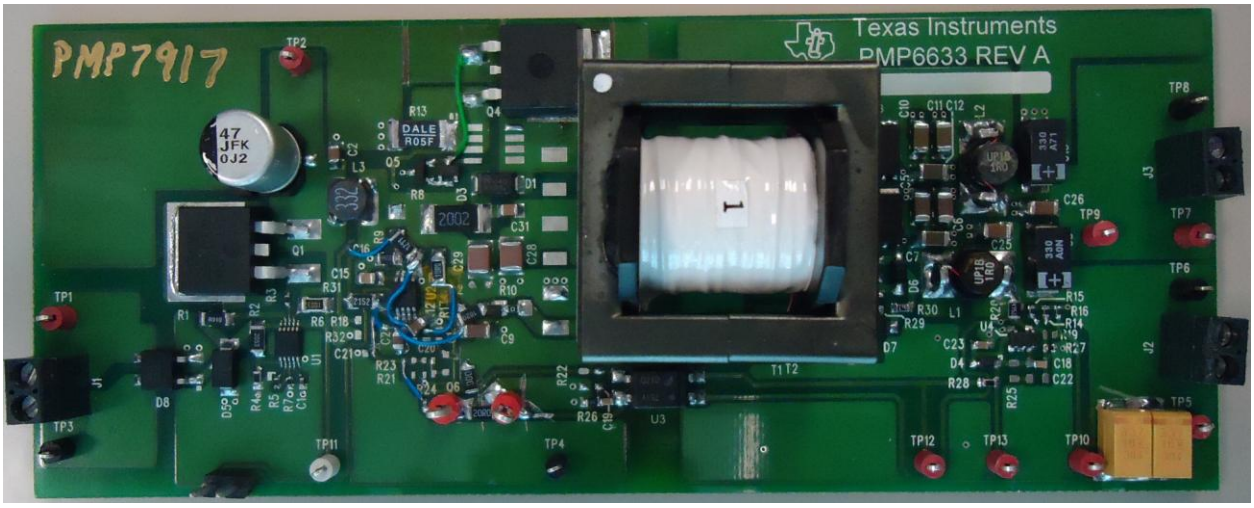
1 Circuit Description

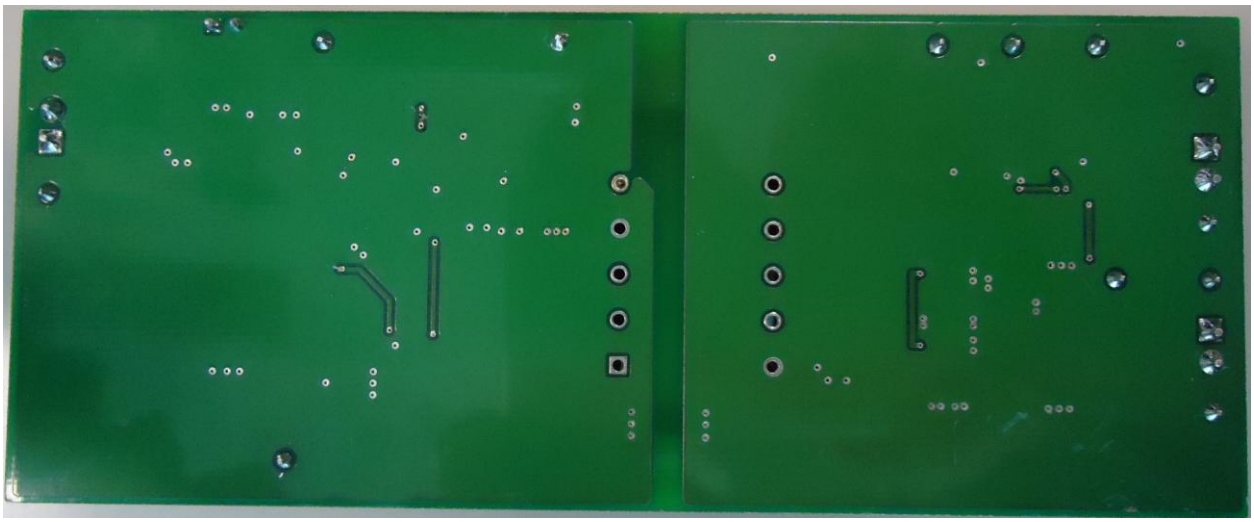
PMP7917 is a dual output flyback converter capable of 40W output power. This design uses the LM5021-1 current-mode PWM controller. The operating input voltage range is 40V to 60. The outputs are 6V at 4.33A and 4V at 3.5A. Self-driven synchronous operation is employed for the secondary rectifiers, resulting in good cross regulation.

All tests were performed at room temperature on an open bench.

2 Photos

The circuit was built on PMP6633 Rev A printed circuit board.





3 Efficiency and Regulation

3.1 Efficiency Data at 50V Input

Vin (V)	Iin (A)	6Vout (V)	6V Iout (A)	4Vout (V)	4V Iout (A)	Pout (W)	Efficiency (%)
49.342	0.5021	6.0797	2.17	4.0945	1.75	20.36	82.18
49.176	0.9527	6.0554	4.33	4.0735	3.50	40.48	86.40

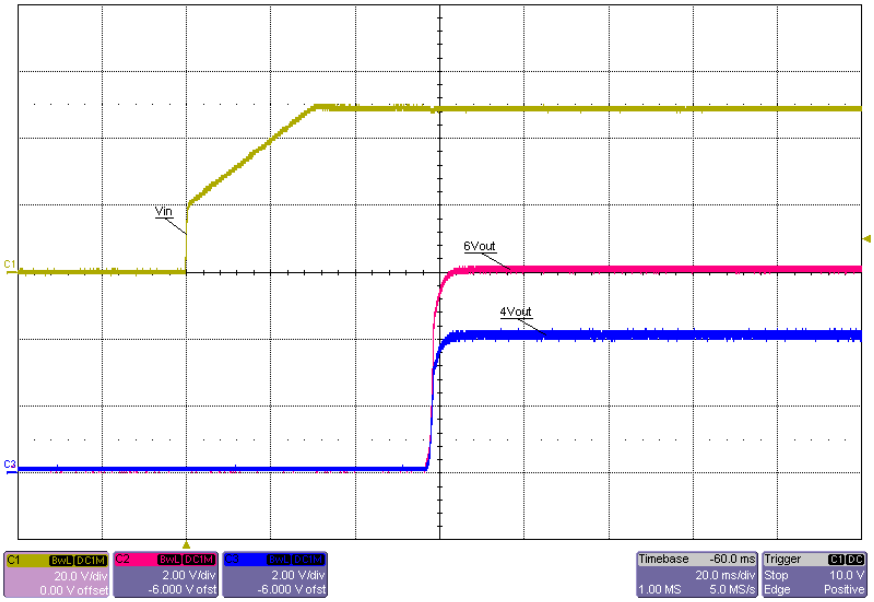
3.1 Regulation Data at 50V Input

6V Iout (A)	4V Iout (A)	6Vout (V)	4Vout (V)
0	0	6.1014	4.1145
2.17	0	6.0771	4.2180
4.33	0	6.0515	4.3272
0	1.75	6.1024	3.9939
2.17	1.75	6.0767	4.0954
4.33	1.75	6.0517	4.2028
0	3.50	6.1018	3.8687
2.17	3.50	6.0765	3.9711
4.33	3.50	6.0507	4.0767

4 Power Up

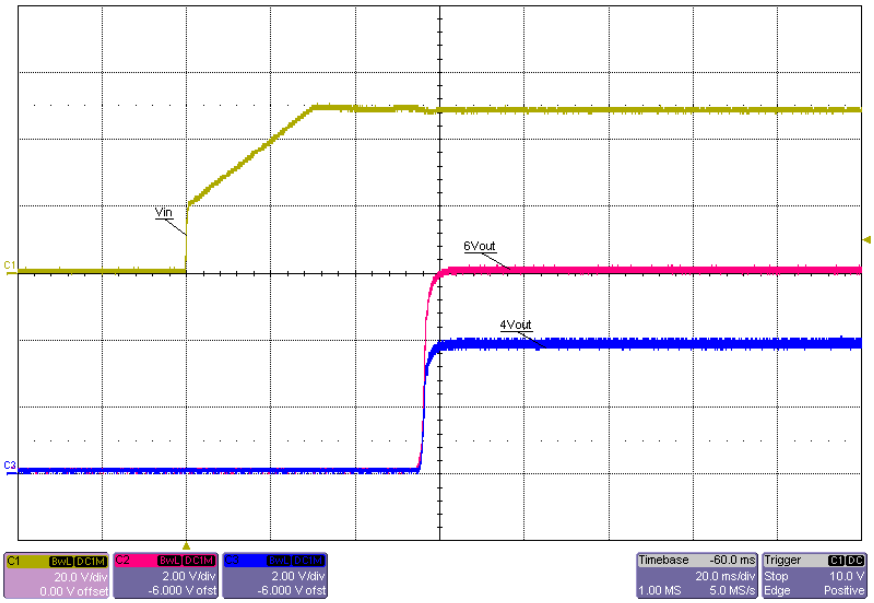
4.1 Power Up at 50V Input – No Load

VIN
4V OUT
6V OUT



4.2 Power Up at 50V Input – Full Load

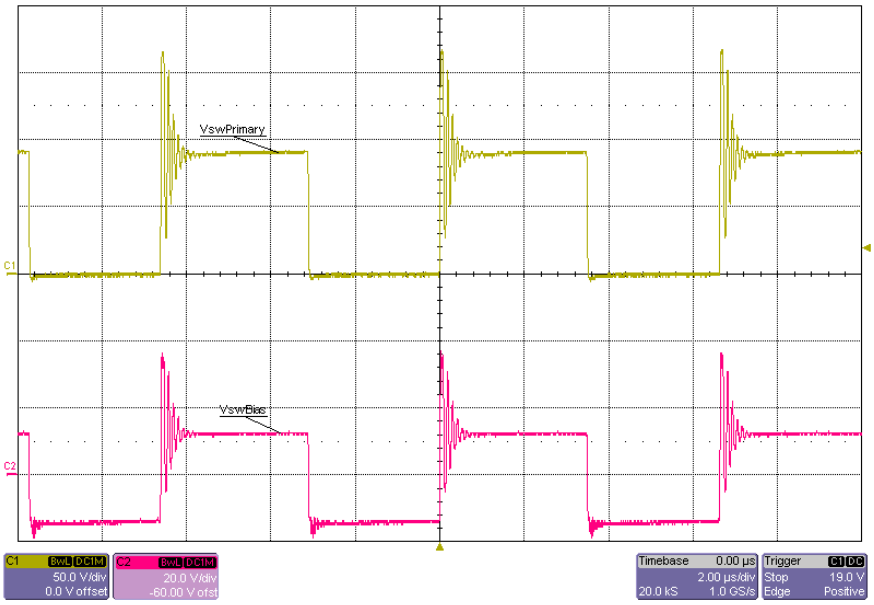
VIN
4V OUT
6V OUT



5 Switching Voltages

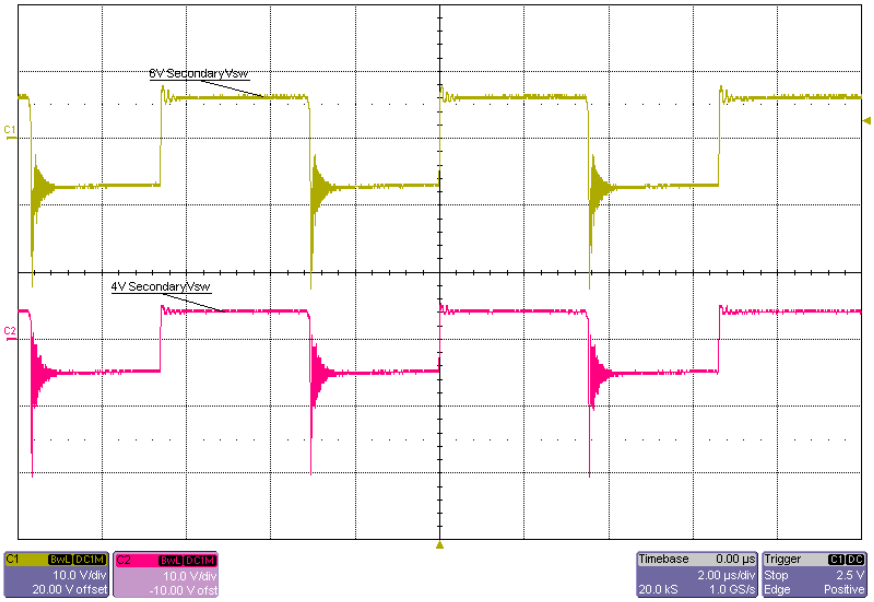
5.1 50V Input – Full Load

Primary
Bias



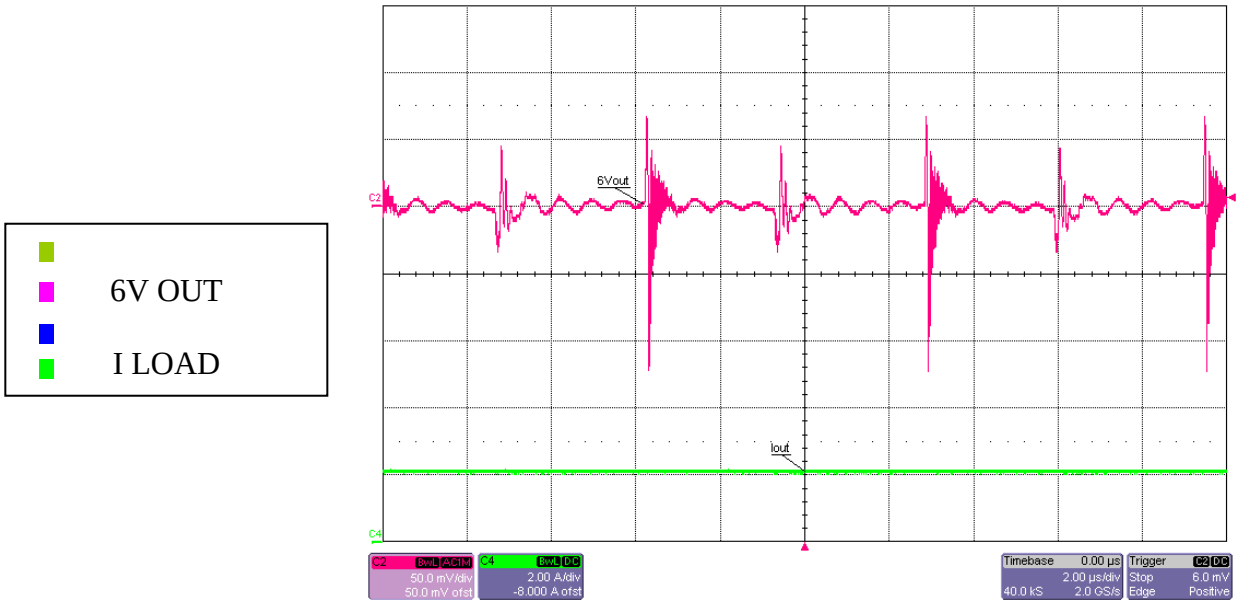
5.2 50V Input – Full Load

6V Secondary
4V Secondary

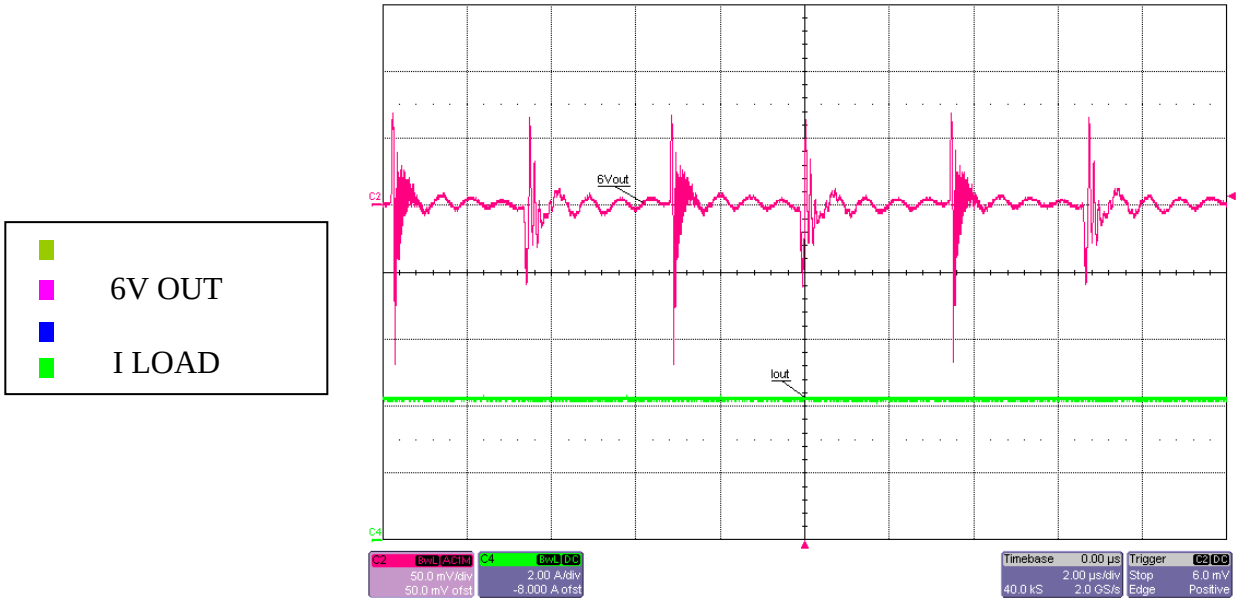


6 Ripple Voltages

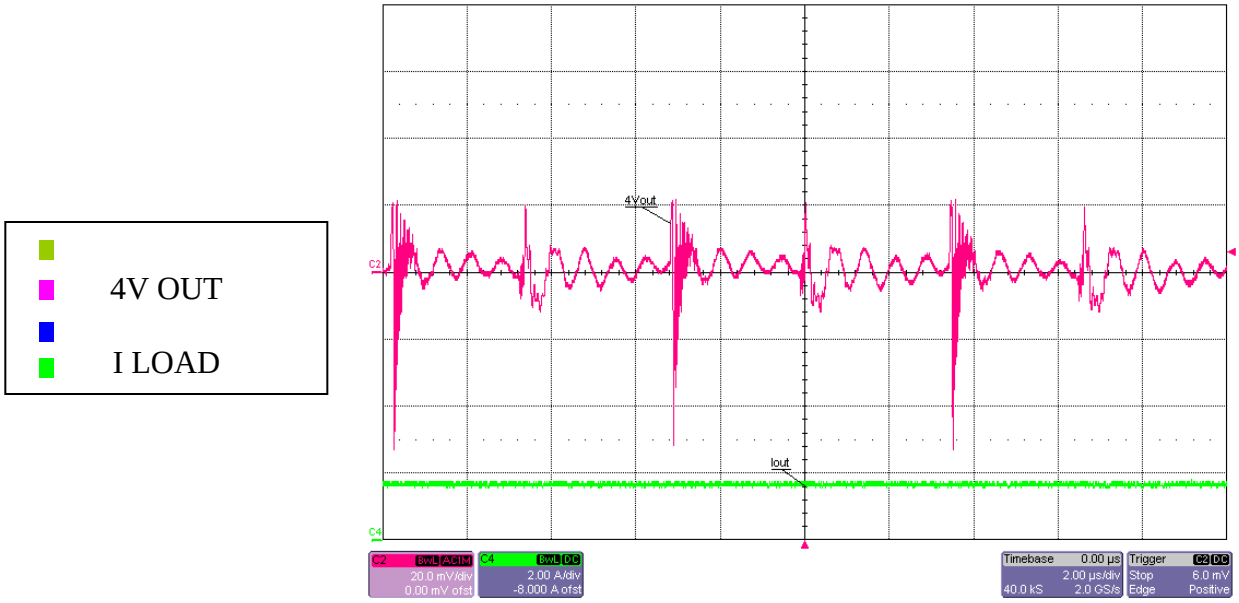
6.1 50V Input – 6V Output – 2.17A Load



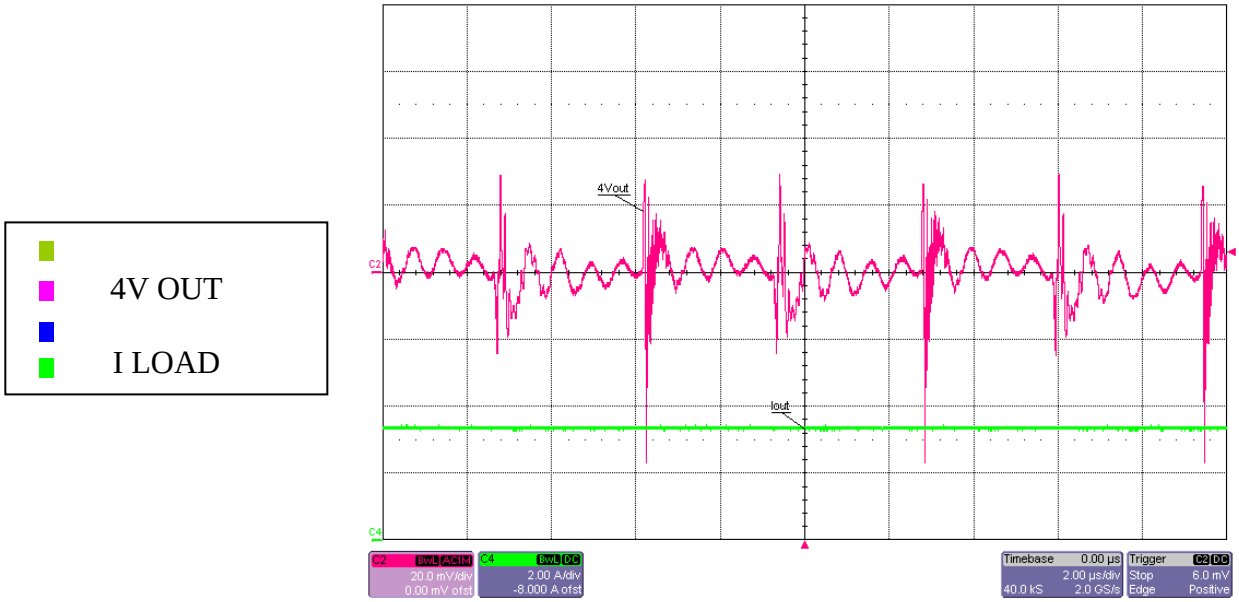
6.2 50V Input – 6V Output – 4.33A Load



6.3 50V Input – 4V Output – 1.75A Load



6.4 50V Input – 4V Output – 3.5A Load

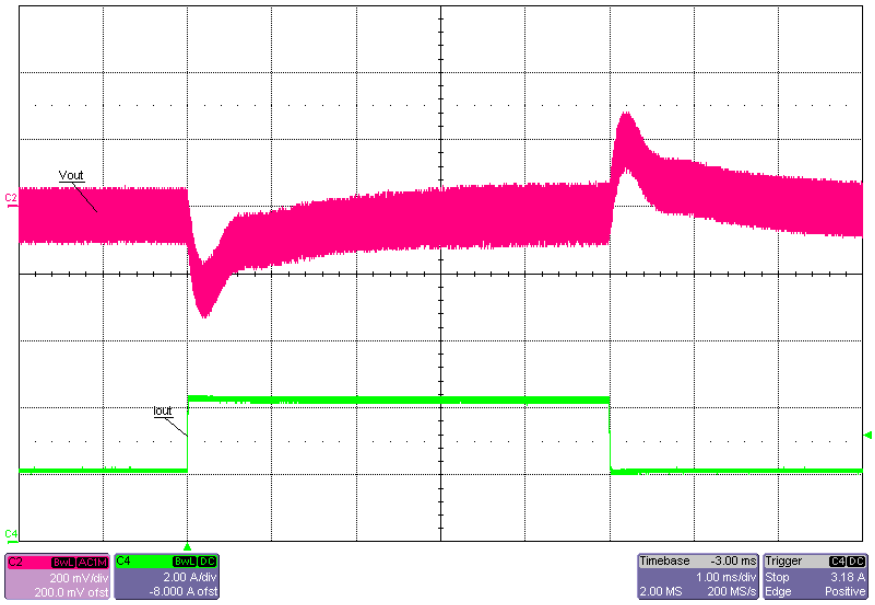


7 Transient Response

7.1 50V Input – 6V Output – 2.17A Load Step

6V OUT

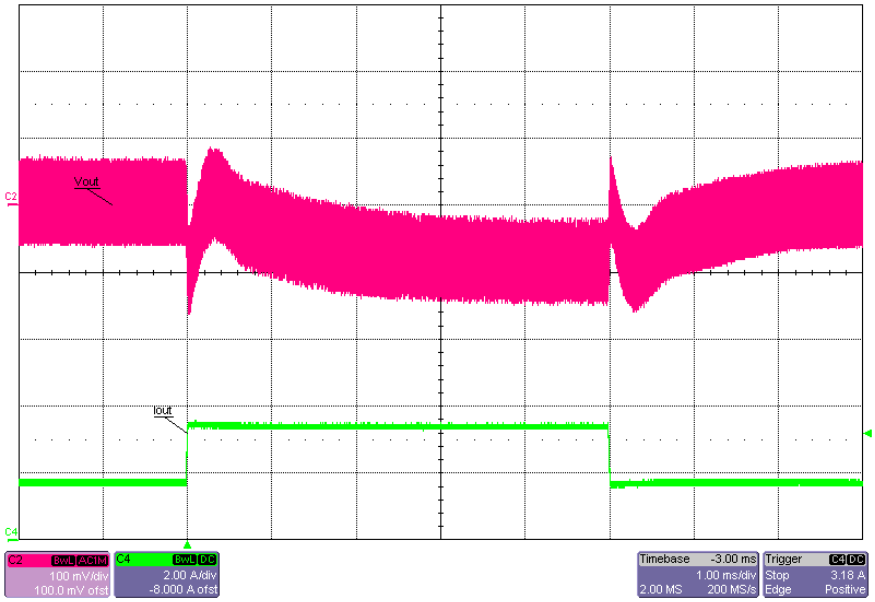
I LOAD



7.2 50V Input – 4V Output – 1.75A Load Step

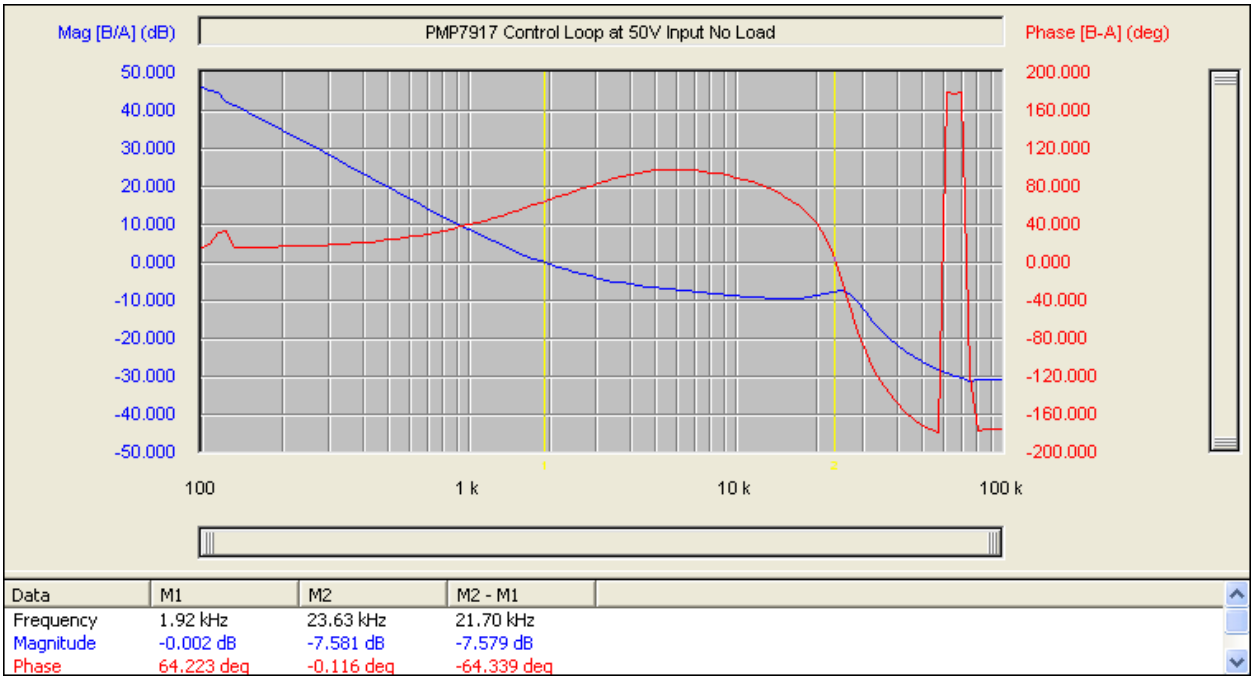
4V OUT

I LOAD



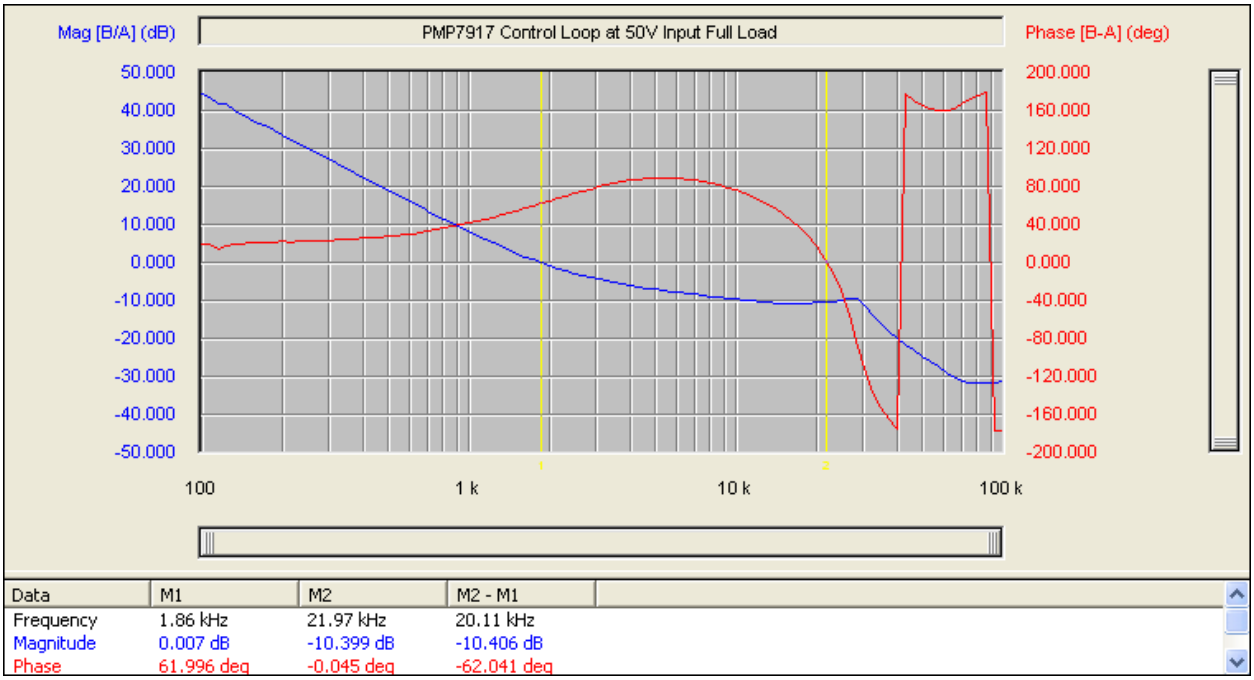
8 Frequency Response

8.1 50V Input – No Load



Data	M1	M2	M2 - M1
Frequency	1.92 kHz	23.63 kHz	21.70 kHz
Magnitude	-0.002 dB	-7.581 dB	-7.579 dB
Phase	64.223 deg	-0.116 deg	-64.339 deg

8.2 50V Input – Full Load



Data	M1	M2	M2 - M1
Frequency	1.86 kHz	21.97 kHz	20.11 kHz
Magnitude	0.007 dB	-10.399 dB	-10.406 dB
Phase	61.996 deg	-0.045 deg	-62.041 deg

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