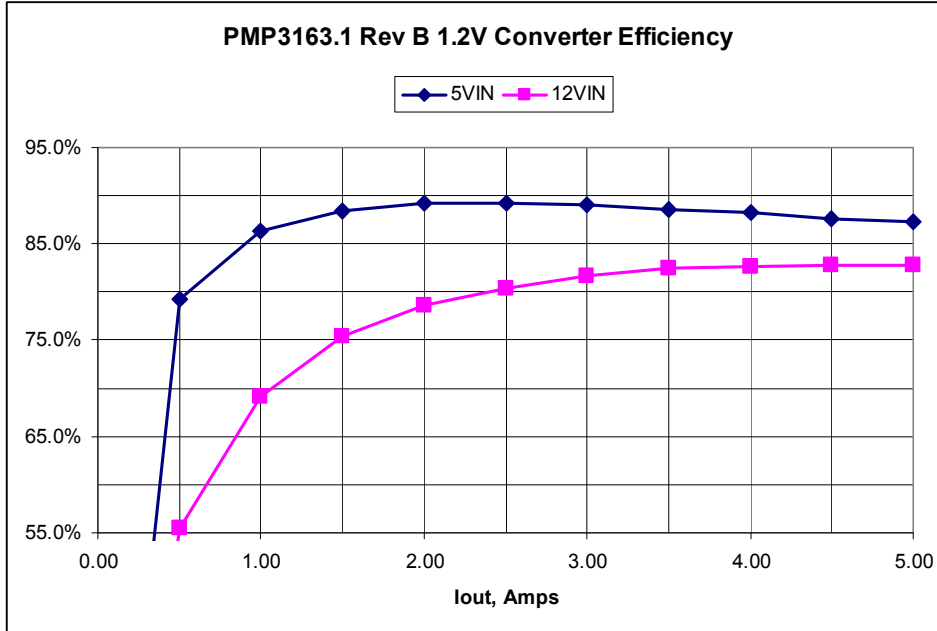


Title			
DM6467 Processor Power Supply, Low Power			
Size	Number	Company	Rev
C	PMP3163.1	Texas Instrumnts	B
Date	06-16-08		Drawn by D Strasser
Filename	PMP3163.1_RevB.Sch Sheet 1 of 1		

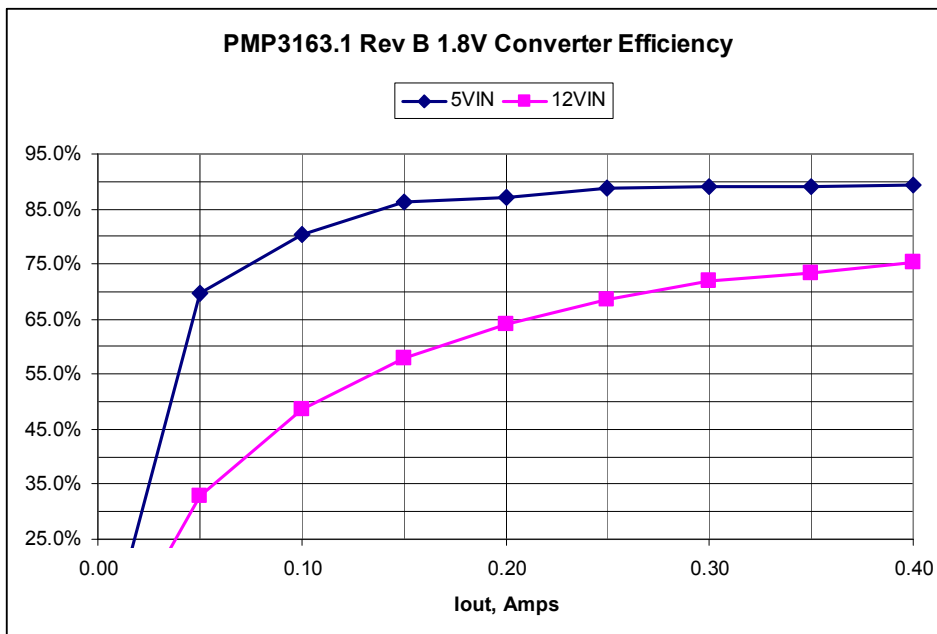
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Date: 06/16/2008						
PMP3163.1_RevB_BOM						
COUNT	RefDes	Value	Description	Size	Part Number	MFR
4	C4, C15, C37, C38	100pF	Capacitor, Ceramic, 50V, C0G, 10%	603	Std	Std
1	C28, 12V input	120pF	Capacitor, Ceramic, 50V, C0G, 5%	603	Std	Std
	C28, 5V input	56pF	Capacitor, Ceramic, 50V, C0G, 5%	604	Std	Std
1	C101	1000pF	Capacitor, Ceramic, 50V, C0G, 10%	603	Std	Std
3	C22, C36, C39	1000pF	Capacitor, Ceramic, 50V, X7R, 10%	603	Std	Std
1	C27	1200pF	Capacitor, Ceramic, 50V, X7R, 10%	603	Std	Std
2	C3, C14	1800pF	Capacitor, Ceramic, 50V, X7R, 10%	603	Std	Std
2	C5, C16	8200pF	Capacitor, Ceramic, 50V, X7R, 10%	603	Std	Std
1	C29, 12V input	0.01uF	Capacitor, Ceramic, 50V, X7R, 10%	603	Std	Std
	C29, 5V input	3900pF	Capacitor, Ceramic, 50V, X7R, 10%	604	Std	Std
3	C6, C17, C30	0.1uF	Capacitor, Ceramic, 50V, X7R, 10%	603	Std	Std
3	C9, C20, C34	1uF	Capacitor, Ceramic, 16V, X7R, 10%	603	Std	Std
3	C10, C21, C35	4.7uF	Capacitor, Ceramic, 6.3V, X5R, 20%	603	Std	Std
2	C2, C13	10uF	Capacitor, Ceramic, 16V, X5R, 20%	805	C2012X5R1C106M	TDK
2	C7, C18	22uF	Capacitor, Ceramic, 6.3V, X5R, 20%	805	C2012X5R0J226M	TDK
2	C25, C26	22uF	Capacitor, Ceramic, 16V, X5R, 20%	1206	C3216X5R1C226M	TDK
1	C33	47uF	Capacitor, Ceramic, 6.3V, X5R, 20%	1210	C3225X5R0J476M	TDK
1	C100	68uF	Capacitor, POSCAP, 16V, 50milliohm, 20%	7343(D)	16TQC68M	Sanyo
1	C31	330uF	Capacitor, POSCAP, 2V, 6milliohm, 20%	7343(D)	2TPF330M	Sanyo
3	J1, J2, J3		Terminal Block, 2-pin, 6-A, 3.5mm	0.27 x 0.25	ED555/2DS	OST
1	J4		Terminal Block, 2-pin, 15-A, 5.1mm	0.40 x 0.35	D120/2DS	OST
2	L1, L2	100uH	Inductor, SMT, 1.2A, 216milliohm	10x9.7mm	VLV10040T-101M1R2	TDK
1	L3	3.3uH	Inductor, SMT, 8A, 21milliohm	0.255 x 0.270	IHLP2525EZ-01-3R3	Vishay
1	L100	1.5uH	Inductor, SMT, 4.67A, 13milliohm	7.6mm sq	DR73-1R5	Cooper
2	Q1, Q2		MOSFET, Dual N Chan, 30V, 5.7A, 51milliohm	SO-8	SI4936BDY	Vishay
1	Q3		MOSFET, N-ch, 30V, 13.5A, 9.5milliohm	SO8	SI4386DY	Vishay
1	Q4		MOSFET, N-ch, 30V, 17A, 6milliohm	SO8	SI4430BDY	Vishay
3	R1, R10, R19	49.9	Resistor, Chip, 1/16W, 1%	603	Std	Std
2	R2, R11	604	Resistor, Chip, 1/16W, 1%	603	Std	Std
1	R26	1K	Resistor, Chip, 1/16W, 1%	603	Std	Std
1	R20	1.5K	Resistor, Chip, 1/16W, 1%	603	Std	Std
3	R7, R16, R25	4.02K	Resistor, Chip, 1/16W, 1%	603	Std	Std
1	R6	5.36K	Resistor, Chip, 1/16W, 1%	603	Std	Std
1	R23, 12V input	7.32K	Resistor, Chip, 1/16W, 1%	603	Std	Std
	R23, 5V input	17.8K	Resistor, Chip, 1/16W, 1%	604	Std	Std
2	R5, R14	10K	Resistor, Chip, 1/16W, 1%	603	Std	Std
1	R15	12.1K	Resistor, Chip, 1/16W, 1%	603	Std	Std
1	R24	23.7K	Resistor, Chip, 1/16W, 1%	603	Std	Std
3	R3, R12, R21	24.9K	Resistor, Chip, 1/16W, 1%	603	Std	Std
3	R4, R13, R22	100K	Resistor, Chip, 1/16W, 1%	603	Std	Std
1	R100	4.7	Resistor, Chip, 1/10W, 5%	805	Std	Std
10	TP1, TP2, TP4, TP5, TP8, TP9, TP10, TP13, TP14, TP15		Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100	5000	Keystone
7	TP3, TP6, TP7, TP11, TP12, TP16, TP17		Test Point, Black, Thru Hole Color Keyed	0.100 x 0.100	5001	Keystone
3	U1, U3, U5		IC, Low cost synchronous buck controller	DRC10	TPS40190DRC	TI
1	U2		IC, Low Quiescent Current, Programmable 1.8V	SOT23-6	TPS3808G18DBVR	TI
1	U4		IC, Low Quiescent Current, Programmable 1.2V	SOT23-6	TPS3808G12DBVR	TI
1	U6		IC, Precision Adjustable Shunt Regulator	SOT23-5	TL431ACDBVR	TI

Efficiency

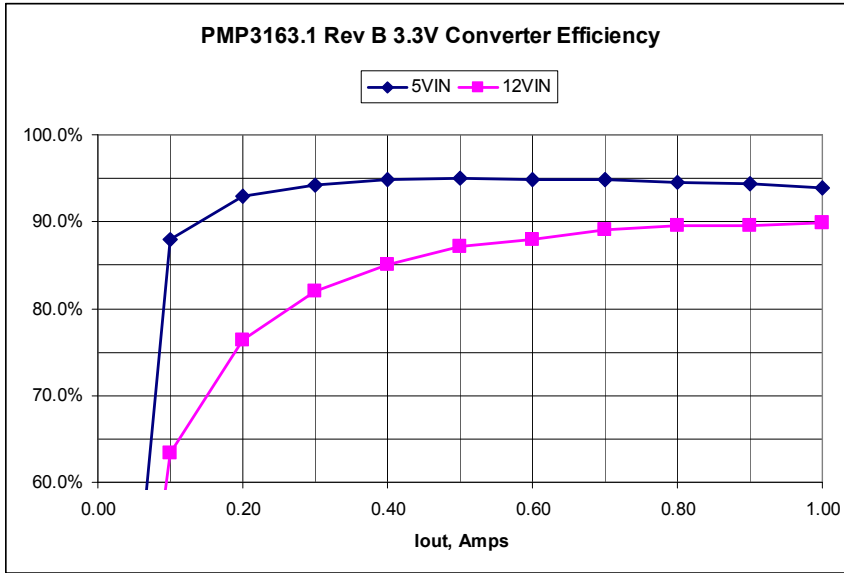
The efficiency of the 1.2V converter is shown below:



The efficiency of the 1.8V converter is shown below:



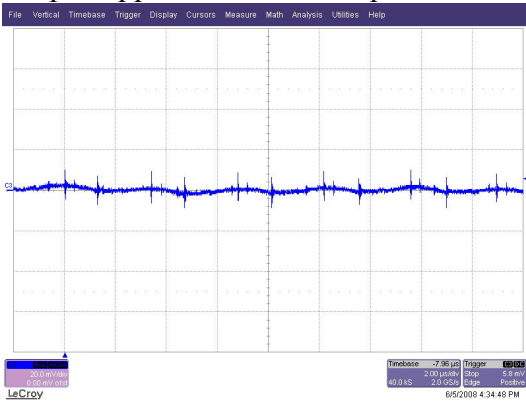
The efficiency of the 3.3V converter is shown below:



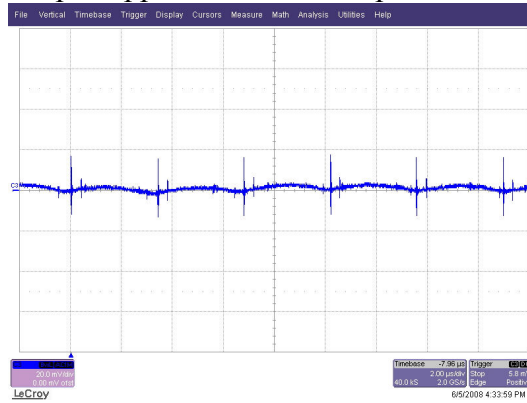
Ripple and Noise

All ripple measurements taken with a 20MHz bandwidth, max loads, and 12V input:

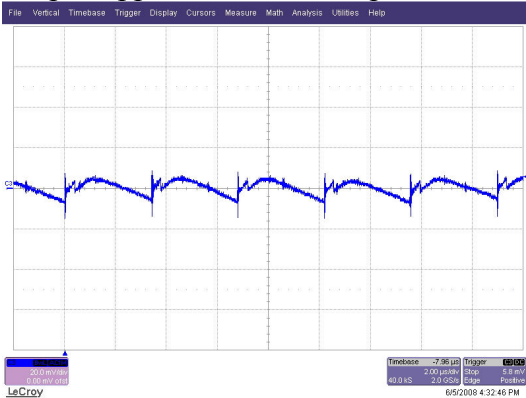
Output ripple/noise 3.3V output:



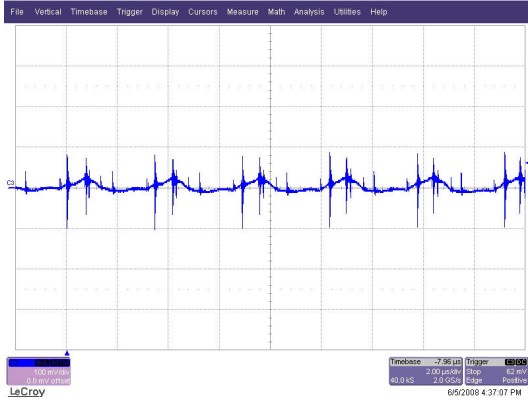
Output ripple/noise 1.8V output:



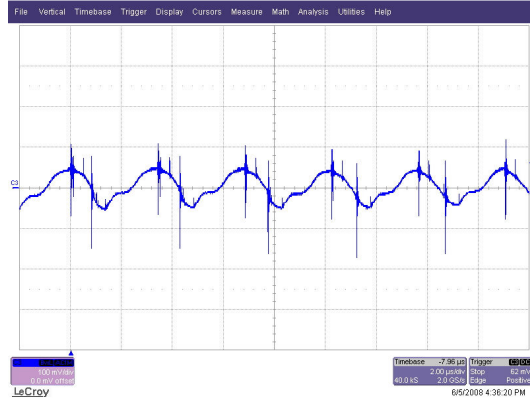
Output ripple/noise 1.2V output:



Input ripple/noise, 5V input:

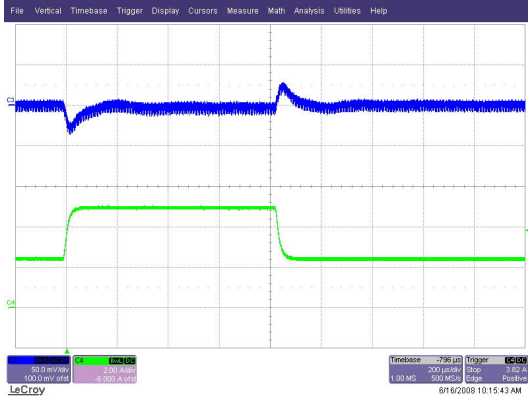


Input ripple/noise 12V input:

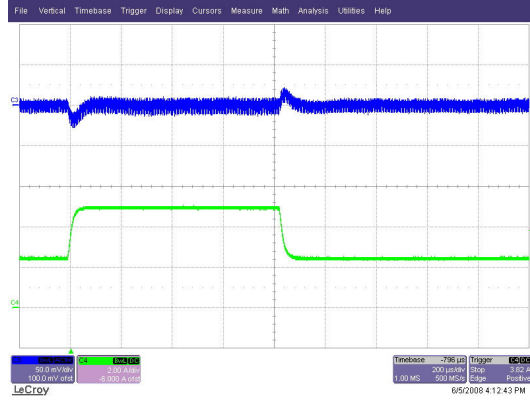


Dynamic Loading

1.2V dynamic load response, 5V input:

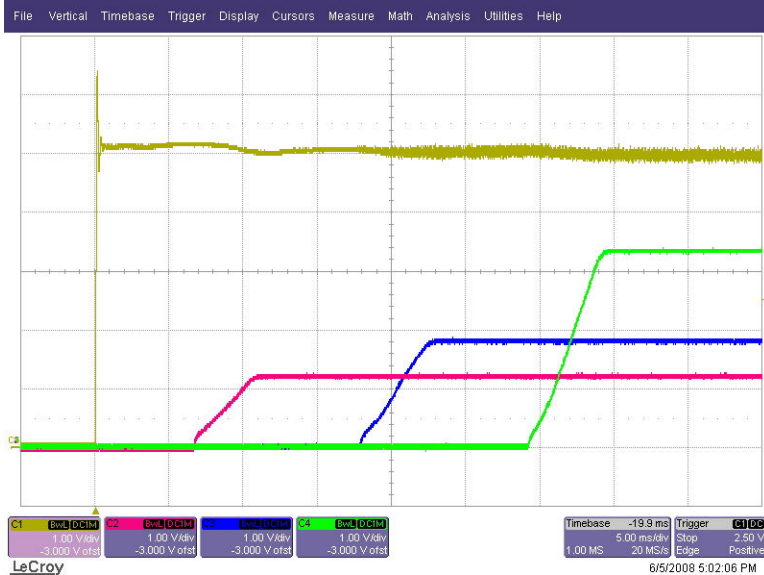


1.2V dynamic load response, 12V input:

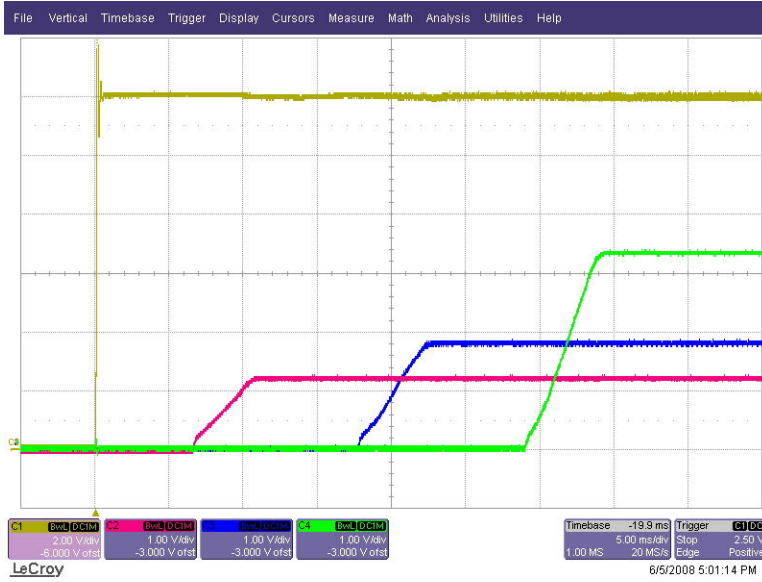


Turn On Response

Output voltage turn-on response (traces, top to bottom, are: 5VIN, 3.3V, 1.8V, 1.2V):

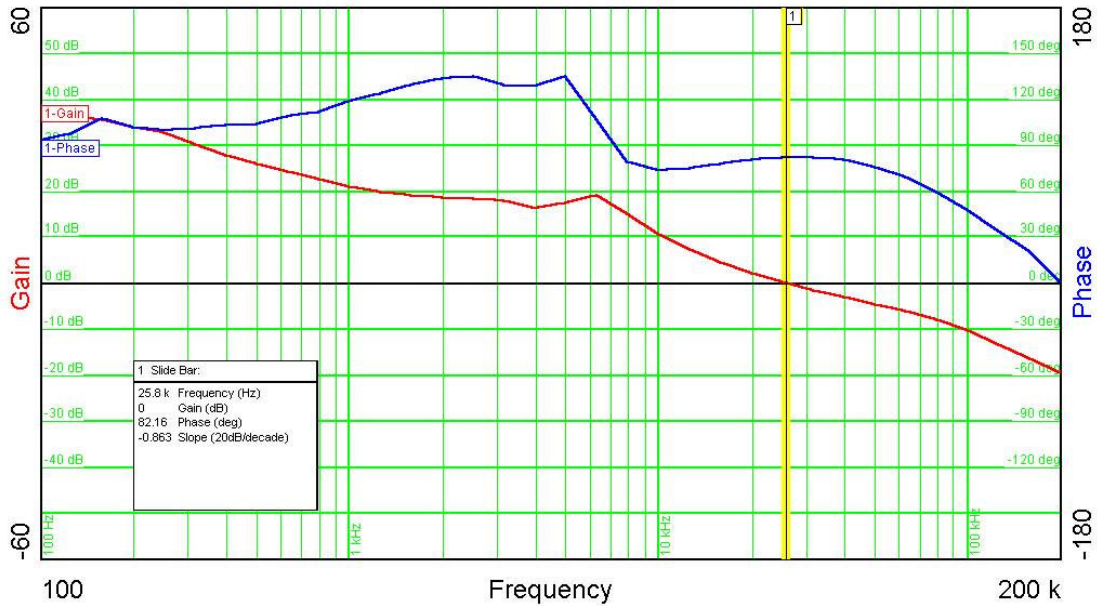


Output voltage turn-on response (traces, top to bottom, are: 12VIN, 3.3V, 1.8V, 1.2V):

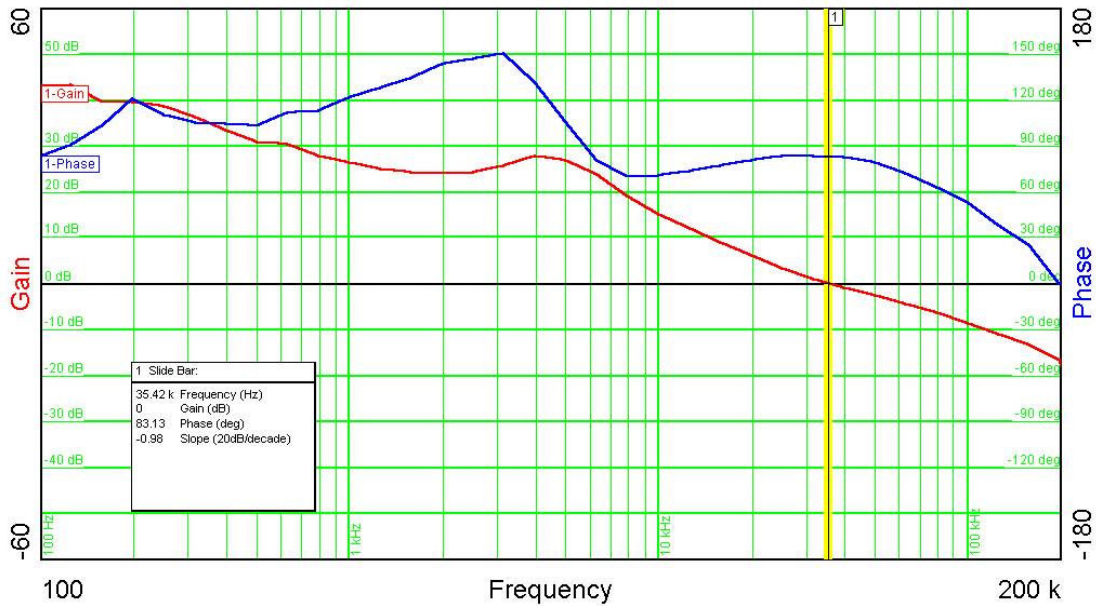


Stability Analysis (Loop Gain)

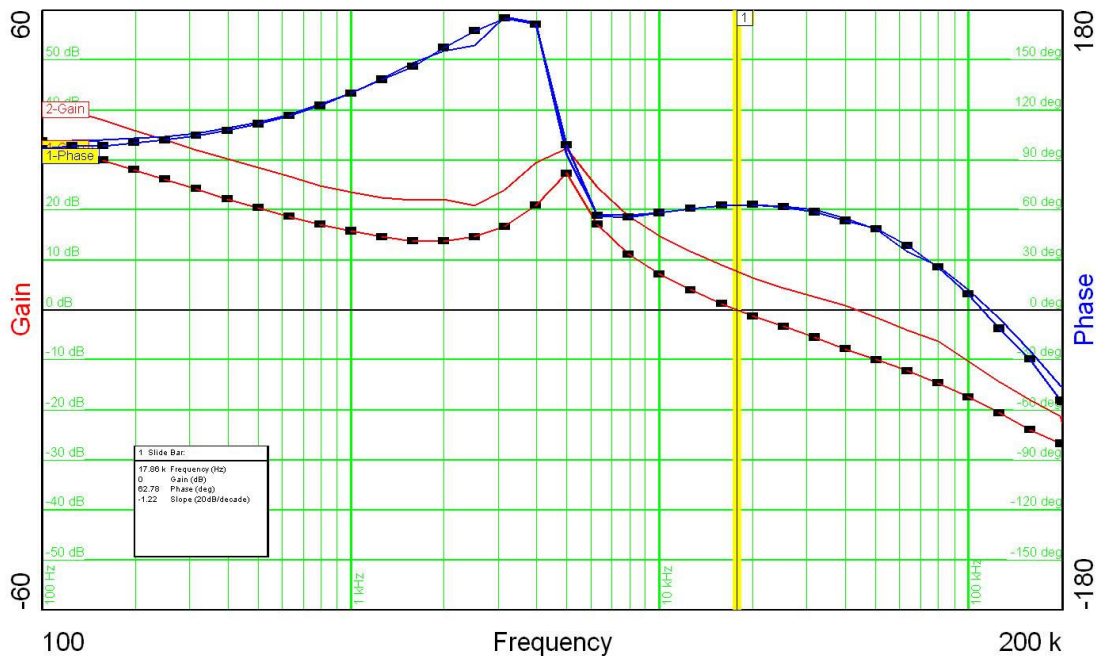
The figure below is the loop gain of the 1.2V converter with a 5V input and max load. The bandwidth is 25 KHz, the phase margin is 82 degrees, and the gain margin is 19 dB.



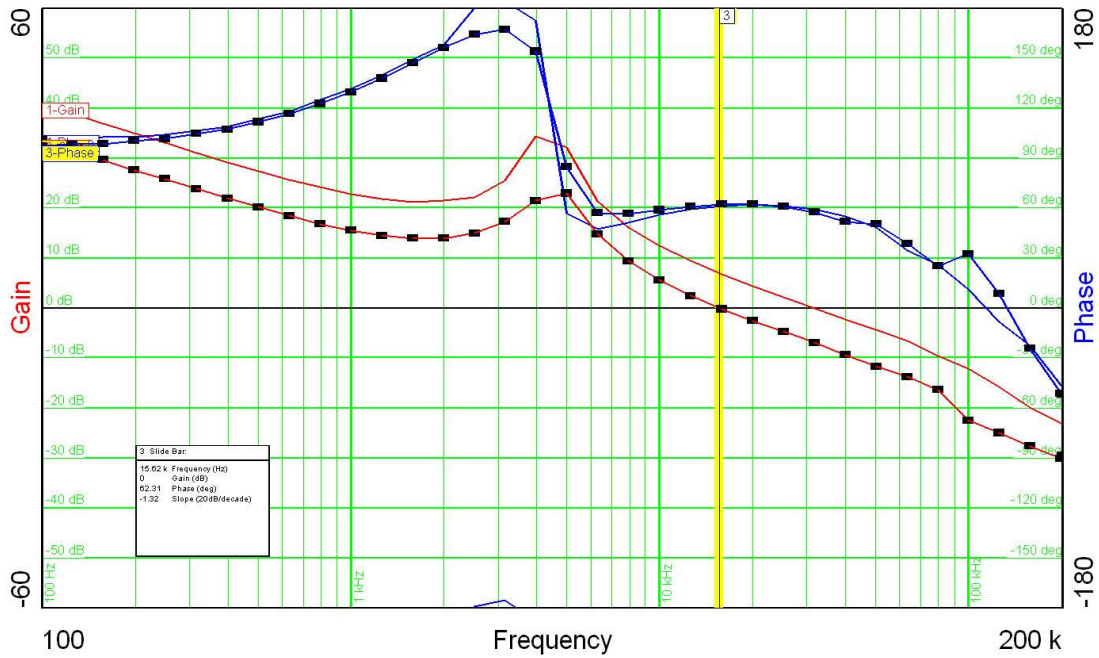
The figure below is the loop gain of the 1.2V converter with a 12V input and max load. The bandwidth is 35 KHz, the phase margin is 83 degrees, and the gain margin is 16 dB.



The figure below is the loop gain of the 1.8V converter with max load. The dotted traces are 5V input; the non-dotted traces are 12V input. With a 5V input, the bandwidth is 17 KHz, the phase margin is 62 degrees, and the gain margin is 18 dB. With a 12V input, the bandwidth is 43 KHz, the phase margin is 50 degrees, and the gain margin is 17 dB.



The figure below is the loop gain of the 3.3V converter with max load. The dotted traces are 5V input; the non-dotted traces are 12V input. With a 5V input, the bandwidth is 15 KHz, the phase margin is 62 degrees, and the gain margin is 25 dB. With a 12V input, the bandwidth is 31 KHz, the phase margin is 55 degrees, and the gain margin is 17 dB.



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