Table of Contents:
Channel 1 first:

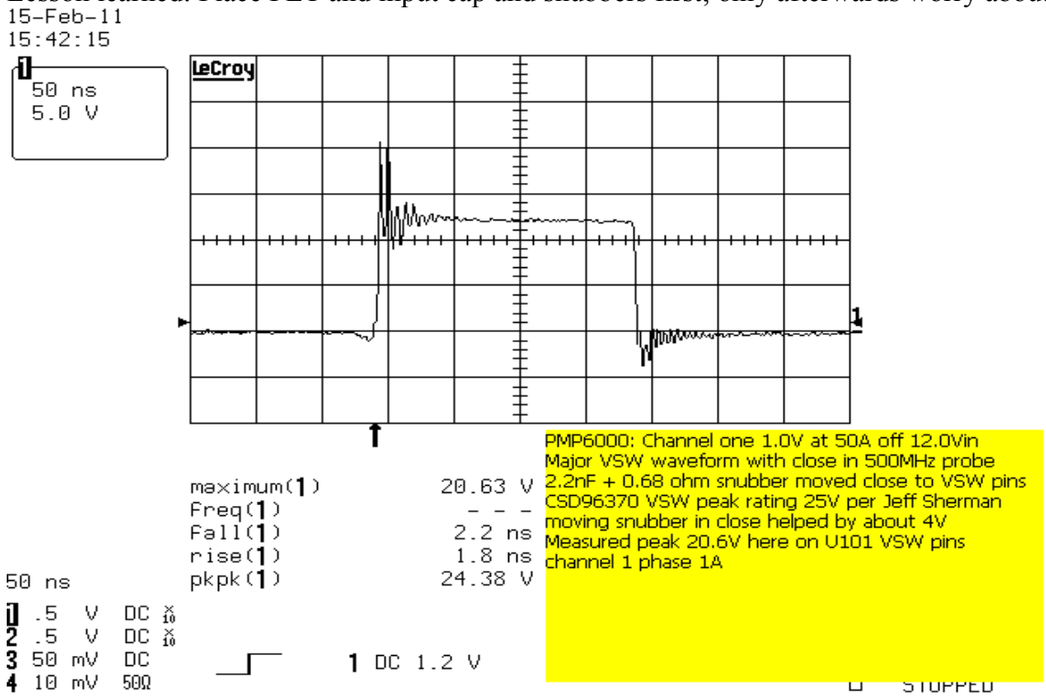
Input, output data and efficiency: (room ambient temperature and ~100LFM air)
Channel 1only: 500kHz operation
Power drawn by UCD9224 and Test interface (30mA off 12Vin) not included

Vin Volts	Iin A	Vout Volts	Iout A	% Effi ciency	Losses in W
12.04	4.862	0.995	50.08	85.1	8.709
12.045	4.320	0.995	45.07	86.2	7.190
12.02	3.805	0.995	40.07	87.2	5.866
12.02	3.296	0.996	35.08	88.2	4.678
12.02	2.8035	0.996	30.075	88.9	3.743
12.01	2.324	0.996	25.07	89.5	2.942
12.05	1.848	0.996	20.07	89.8	2.279
12.02	1.3955	0.996	15.07	89.5	1.764
12.06	0.943	0.996	10.07	88.2	1.343
12.00	0.502	0.995	5.07	83.7	0.979
12.02	0.2775	0.995	2.57	76.7	0.778
12.03	0.164	0.995	1.27	64.0	0.709
12.04	0.056	0.995	0	0.0	0.674

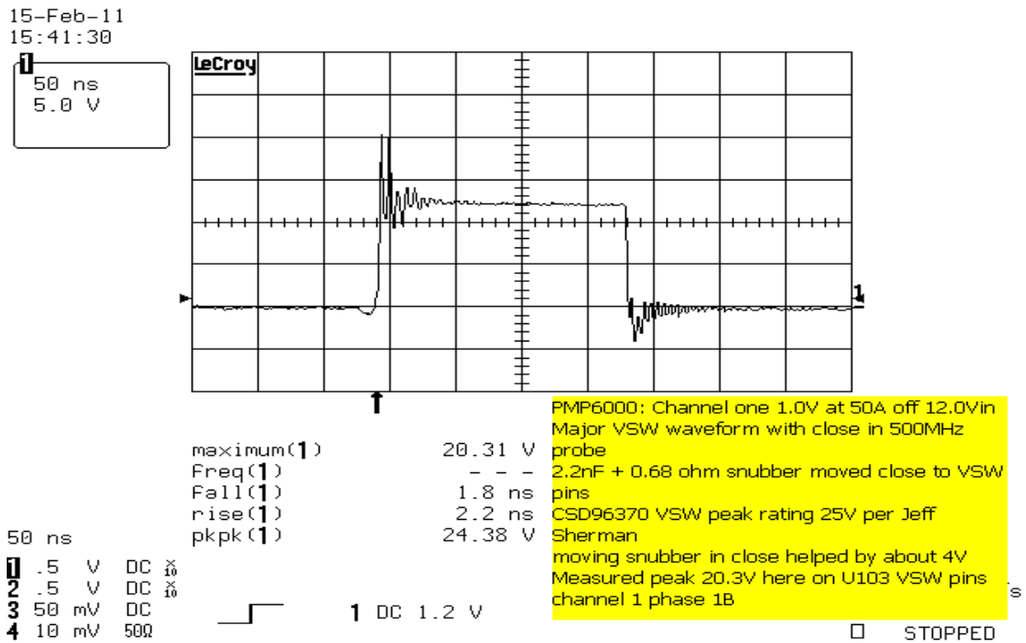
Lesson learned: Again, best efficiency is always at about ½ full load. To get best efficiency at 50A will need to design a 100A power train. In the past one customer pushed a 10A design with 90% efficiency. Then later in the project he discovered he actually needed 20A in all. No problem, the power train was already rated for 20A!!!

See separate Thermal Report: Very little difference was seen with 500kHz operation vs. 375kHz operation thermally. Since 500kHz operation allows output ripple spec (<20mV p-p) to be met with less output ceramic capacitance; 500kHz was chosen.

Major waveforms after snubbers moved close in to main switches.
Lesson learned: Place FET and input cap and snubbers first; only afterwards worry about inductor!!!



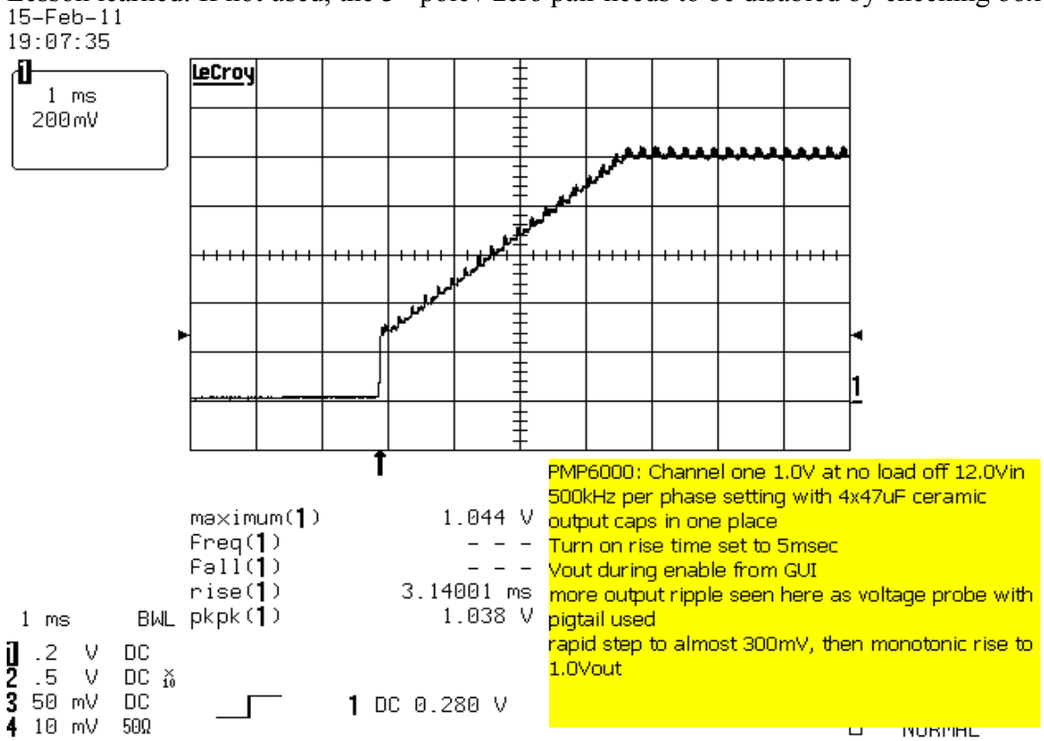
And the other phase:


15-Feb-11
15:41:30
50 ns
5.0 V
LeCroy
maximum(1) 20.31 V
Freq(1) - - -
Fall(1) 1.8 ns
rise(1) 2.2 ns
pkpk(1) 24.38 V
PMP6000: Channel one 1.0V at 50A off 12.0Vin
Major VSW waveform with close in 500MHz probe
2.2nF + 0.68 ohm snubber moved close to VSW pins
CSD96370 VSW peak rating 25V per Jeff Sherman
moving snubber in close helped by about 4V
Measured peak 20.3V here on U103 VSW pins
channel 1 phase 1B
50 ns
1 .5 V DC
2 .5 V DC
3 50 mV DC
4 10 mV 50Ω
1 DC 1.2 V
STOPPED

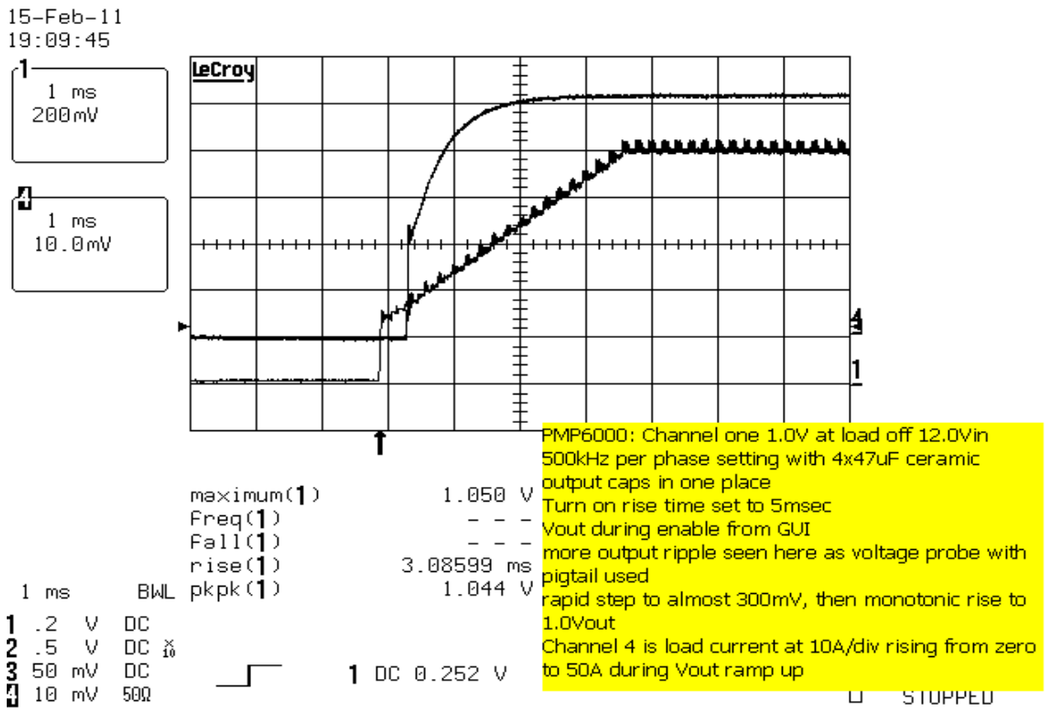
Qq

Turn on:

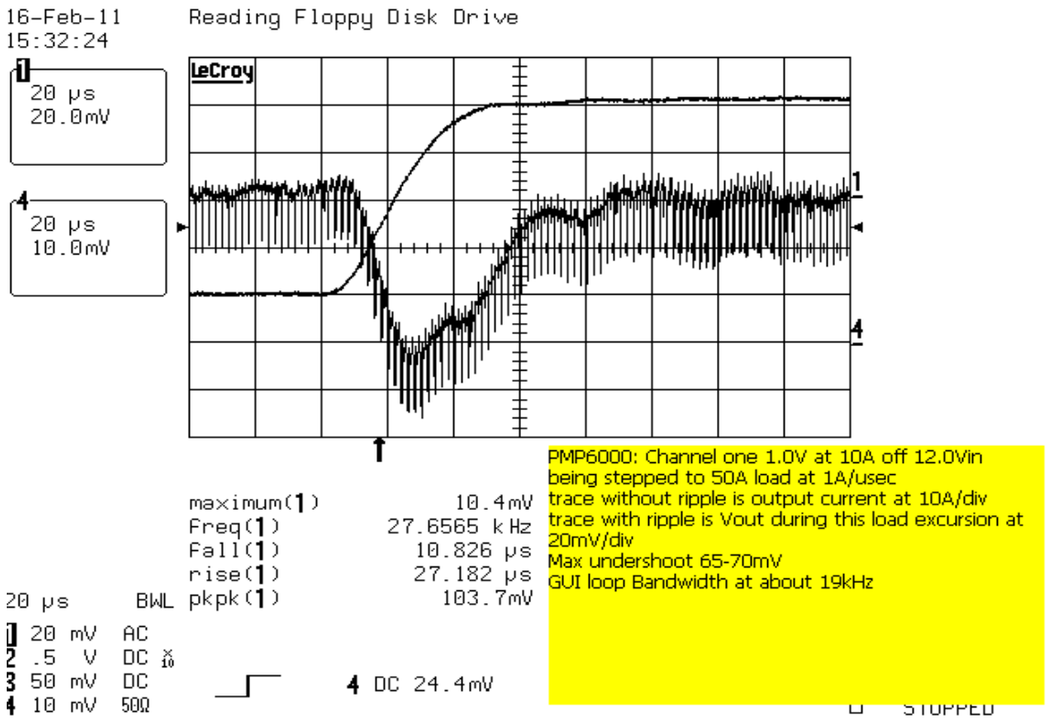
Lesson learned: If not used, the 3rd pole / zero pair needs to be disabled by checking box in the GUI.



And with load:

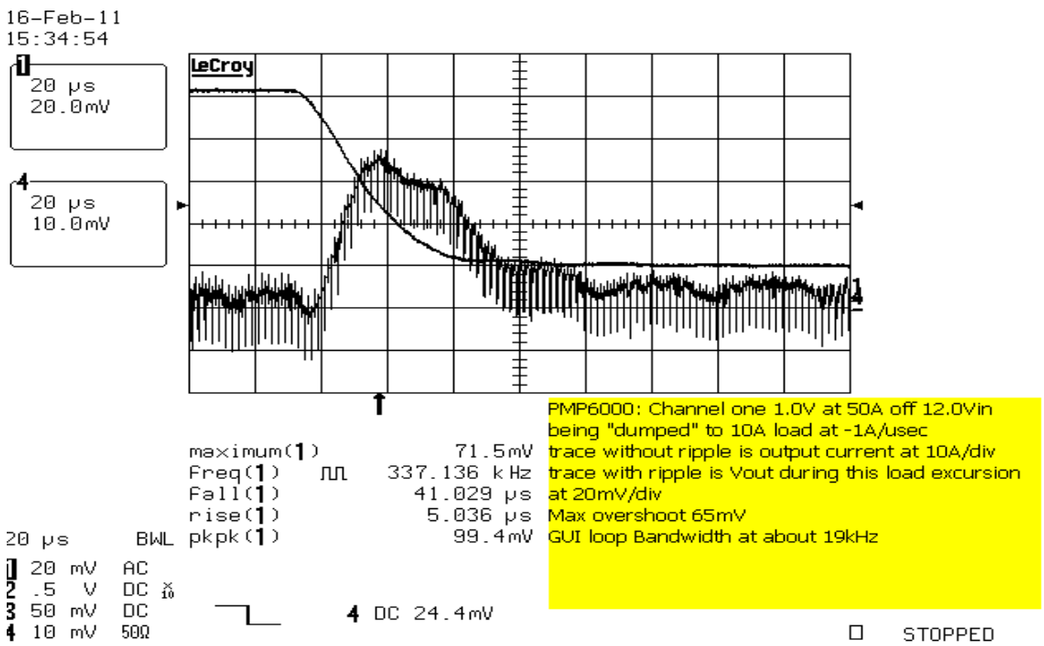


Load Step response:



Qq

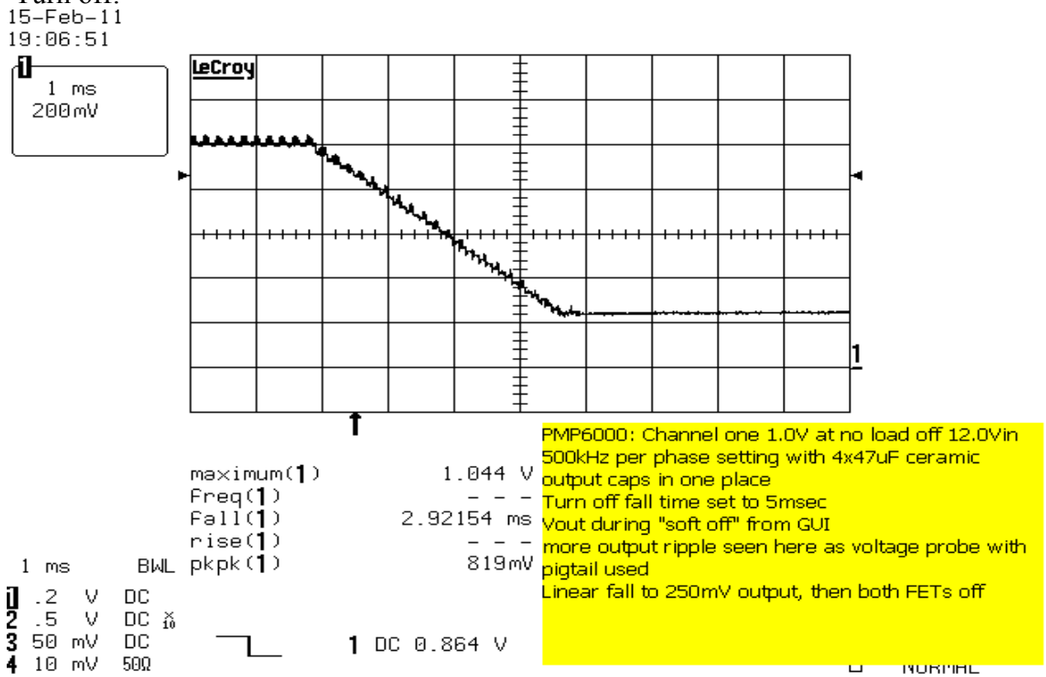
Load Dump response:


16-Feb-11
15:34:54
LeCroy
20 µs
20.0mV
20 µs
10.0mV
maximum(1) 71.5mV
Freq(1) 337.136 kHz
Fall(1) 41.029 µs
rise(1) 5.036 µs
pkpk(1) 99.4mV
20 µs BWL
1 20 mV AC
2 .5 V DC
3 50 mV DC
4 10 mV 50Ω
4 DC 24.4mV
STOPPED
PMP6000: Channel one 1.0V at 50A off 12.0Vin
being "dumped" to 10A load at -1A/usec
trace without ripple is output current at 10A/div
trace with ripple is Vout during this load excursion
at 20mV/div
Max overshoot 65mV
GUI loop Bandwidth at about 19kHz

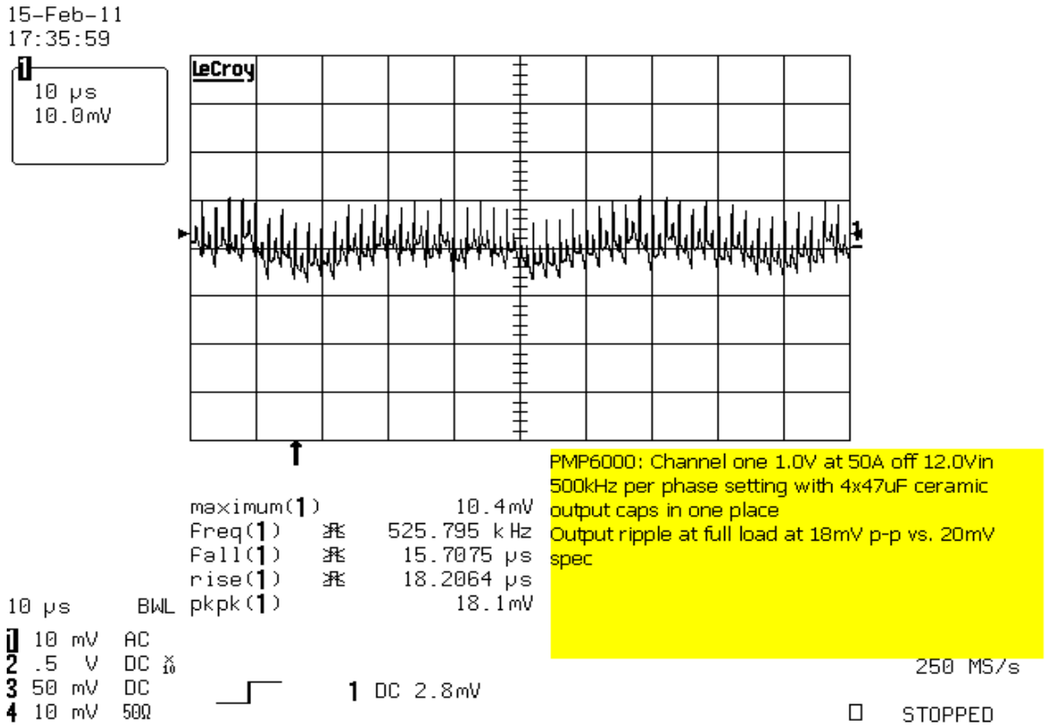
Qq

Q

Turn off:



Output ripple with close in 1x probe:
Lesson learned: All output ceramics need to be at one point!!!



Qq

Channel two from here on:

Input, output data and efficiency: (room ambient temperature and ~100LFM air)

Channel 1only: 500kHz operation

Power drawn by UCD9224 and Test interface (30mA off 12Vin) not included

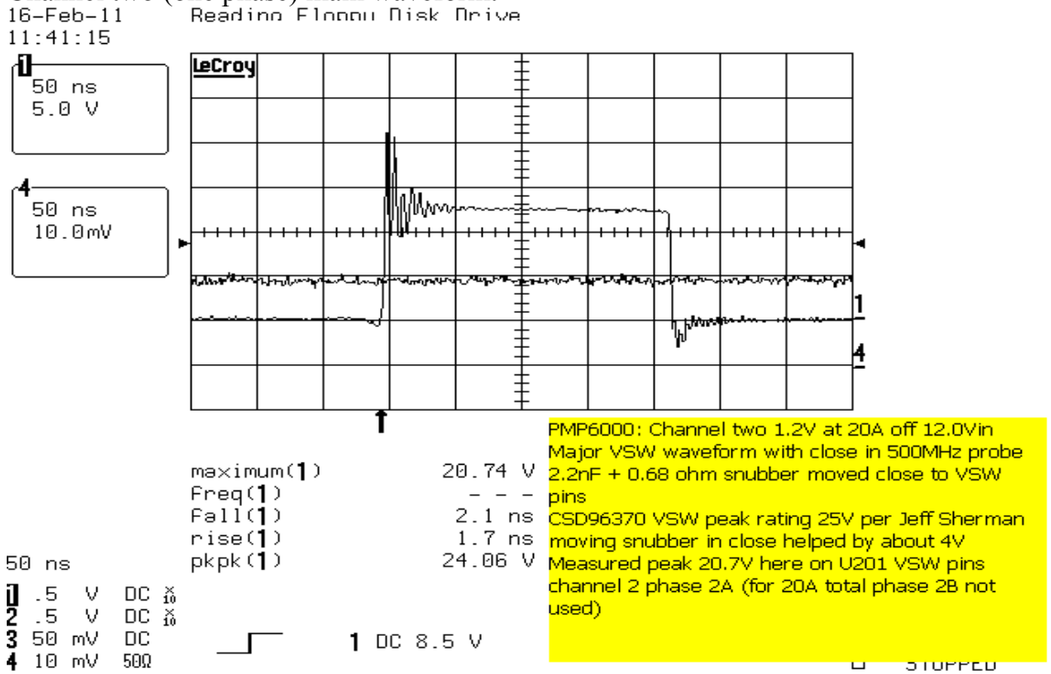
Note: Detail data taken at 1.2Vout setting, then corrected Vout to 1.25V as desired by application, and several points re-taken

Vin Volts	Iin A	Vout Volts	Iout A	% Effi ciency	Losses in W
12.03	2.229	1.195	20.065	89.4	2.837

12.02	1.998	1.195	18.06	89.9	2.434
12.04	1.764	1.195	16.06	90.4	2.047
12.02	1.540	1.195	14.07	90.8	1.697
12.04	1.315	1.195	12.06	91.0	1.421
12.03	1.097	1.195	10.06	91.1	1.175
12.05	0.880	1.195	8.065	90.9	0.966
12.00	0.670	1.195	6.065	90.1	0.792
12.01	0.459	1.195	4.065	88.1	0.655
12.03	0.246	1.195	2.07	83.6	0.486
12.04	0.1405	1.195	1.065	75.2	0.419
12.05	0.031	1.195	0	N/A	0.374
12.06	2.313	1.246	20.07	89.6	2.888
12.01	1.839	1.246	16.07	90.7	2.063
12.06	1.3665	1.246	12.07	91.3	1.441
12.02	1.142	1.246	10.07	91.4	1.180
12.04	0.916	1.246	8.07	91.2	0.973
12.03	0.477	1.246	4.07	88.4	0.667
12.07	0.031	1.246	0	N/A	0.374

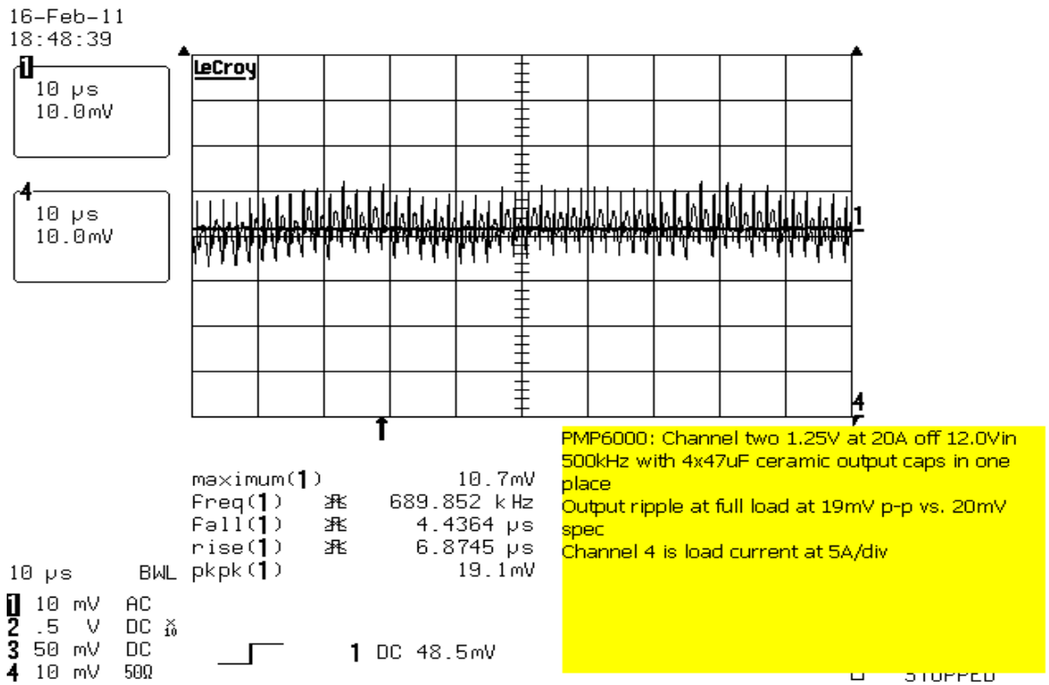
Here also, 10A per phase is where the CSD96370 is most efficient.
Increasing Vout from 1.2V to 1.25V boosts efficiency by 0.2 to 0.3%.

Channel two (one phase) main waveform:



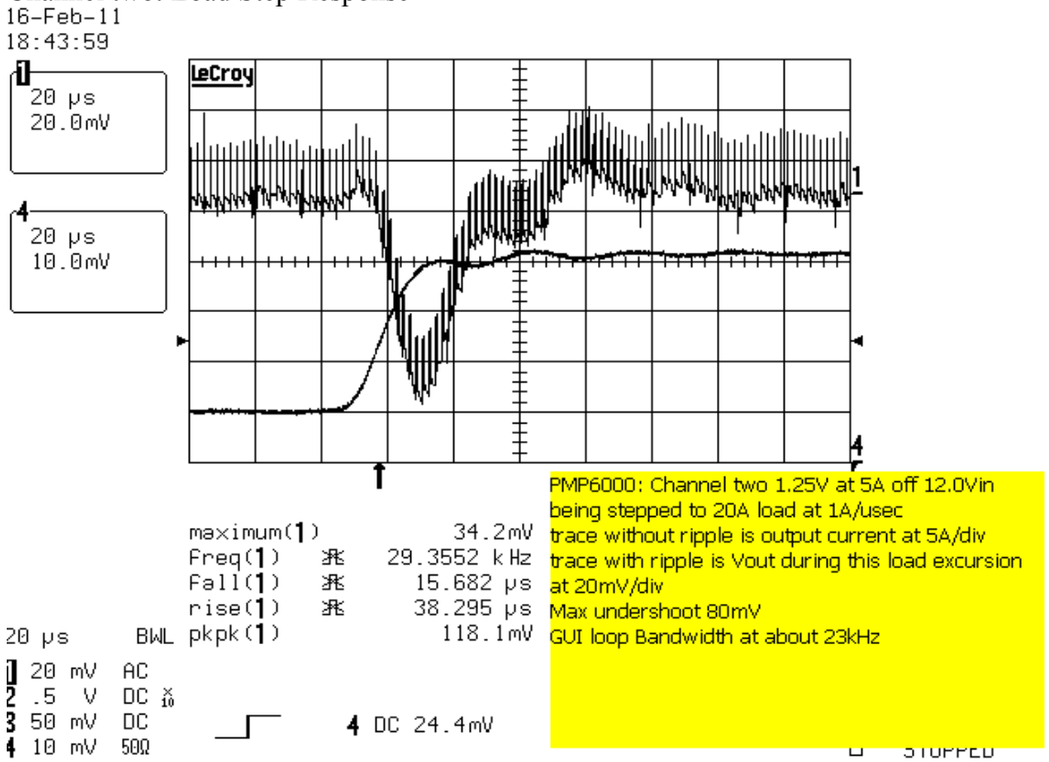
Qq

Output ripple:

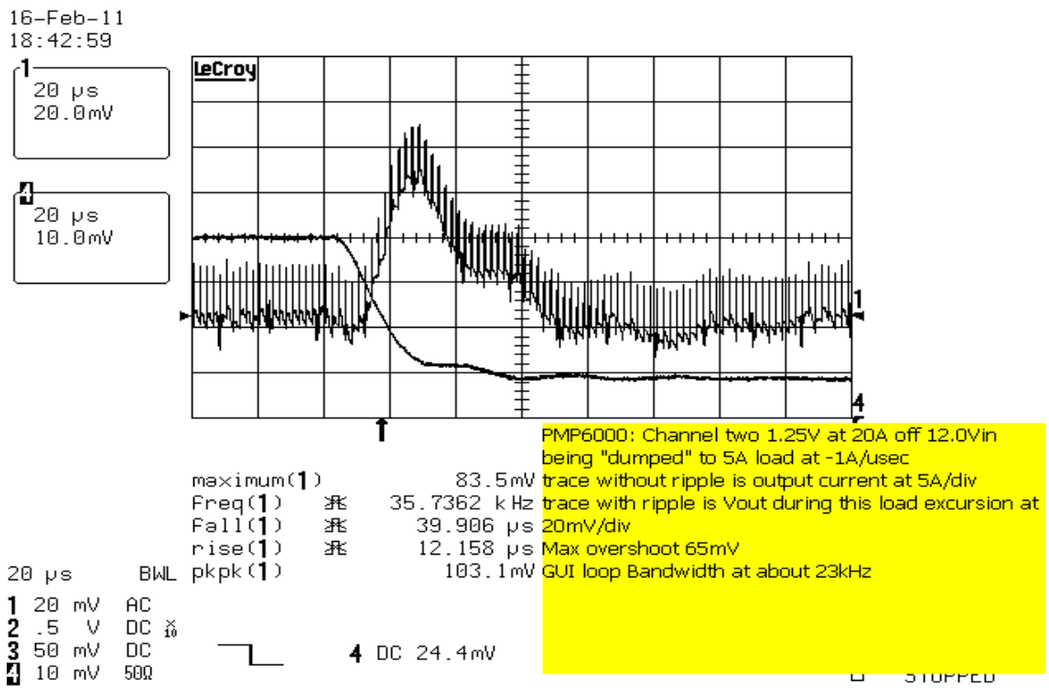

16-Feb-11
18:48:39
LeCroy
10 µs
10.0mV
10 µs
10.0mV
maximum(1) 10.7mV
Freq(1) 689.852 kHz
Fall(1) 4.4364 µs
rise(1) 6.8745 µs
10 µs BWL pkpk(1) 19.1mV
1 10 mV AC
2 .5 V DC
3 50 mV DC
4 10 mV 50Ω
1 DC 48.5mV
STOPPED
PMP6000: Channel two 1.25V at 20A off 12.0Vin
500kHz with 4x47uF ceramic output caps in one
place
Output ripple at full load at 19mV p-p vs. 20mV
spec
Channel 4 is load current at 5A/div

Qq

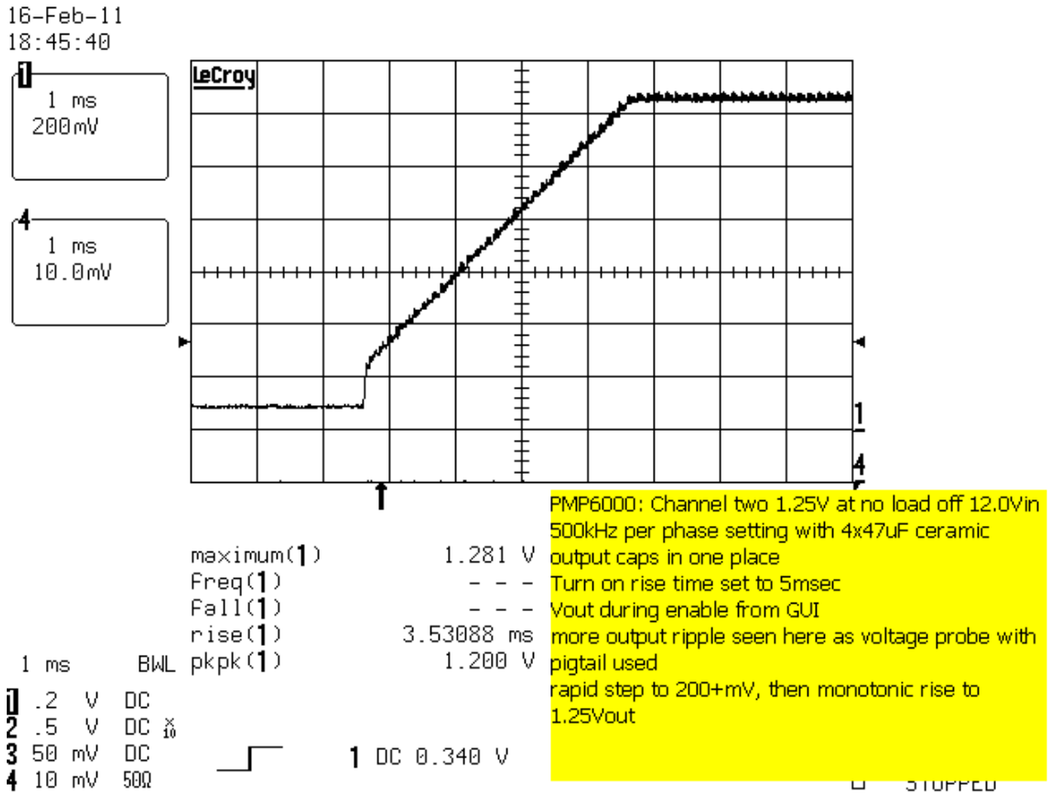
Channel two: Load Step Response



Load dump:



Channel two: Start up



PMP6000: Channel two 1.25V at no load off 12.0Vin
500kHz per phase setting with 4x47uF ceramic output caps in one place
Turn on rise time set to 5msec
Vout during enable from GUI
more output ripple seen here as voltage probe with pigtail used
rapid step to 200+mV, then monotonic rise to 1.25Vout

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