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Efficiency and losses vs. load for Vout set at 0.9V:
Airflow about 200 LFM or 1.3Meter per second: 263kHz operation
Chokes PA2202.321NL

Vin Volts	Iin A	Vout Volts	Iout A	% Effi ciency	Losses in W
5.000	24.7	0.901	120.0	87.5	15.380
5.000	22.45	0.901	110.0	88.3	13.140
5.000	20.2	0.901	100.0	89.2	10.900
4.999	**19.35**	**0.901**	**96.0**	**89.4**	**10.235**
4.999	18.05	0.901	90.0	89.9	9.142
5.000	15.9	0.901	80.0	90.7	7.420
5.000	13.83	0.901	70.0	91.2	6.080
4.999	11.78	0.901	60.0	91.8	4.828
5.000	9.75	0.901	50.0	92.4	3.700
4.999	7.8	0.901	40.0	92.4	2.952
4.999	5.85	0.901	30.0	92.4	2.214
4.999	3.95	0.901	20.0	91.3	1.726
5.000	2.1	0.901	10.0	85.8	1.490
5.000	0.25	0.901	0	0.0	1.250

For 32A per output or 96A in all I had estimated 90 to 90.8% efficiency. I measured the copper path drops in the 6 power trains, and they came to 29.3mV on the average vs. 16.25mV drop I had used in my estimations. This added 13mV times 96A is 1.25W. If this added loss can be eliminated by improving the copper paths, then losses will be reduced from 10.235W to 8.985W, and efficiency improved from 89.4% to 90.6%.

Efficiency and losses vs. load for Vout set at 0.85V:
R12 set to 46.4k (from 34.8k for 0.9V setting)
Airflow about 200 LFM or 1.3Meter per second: 263kHz operation
Chokes PA2202.321NL

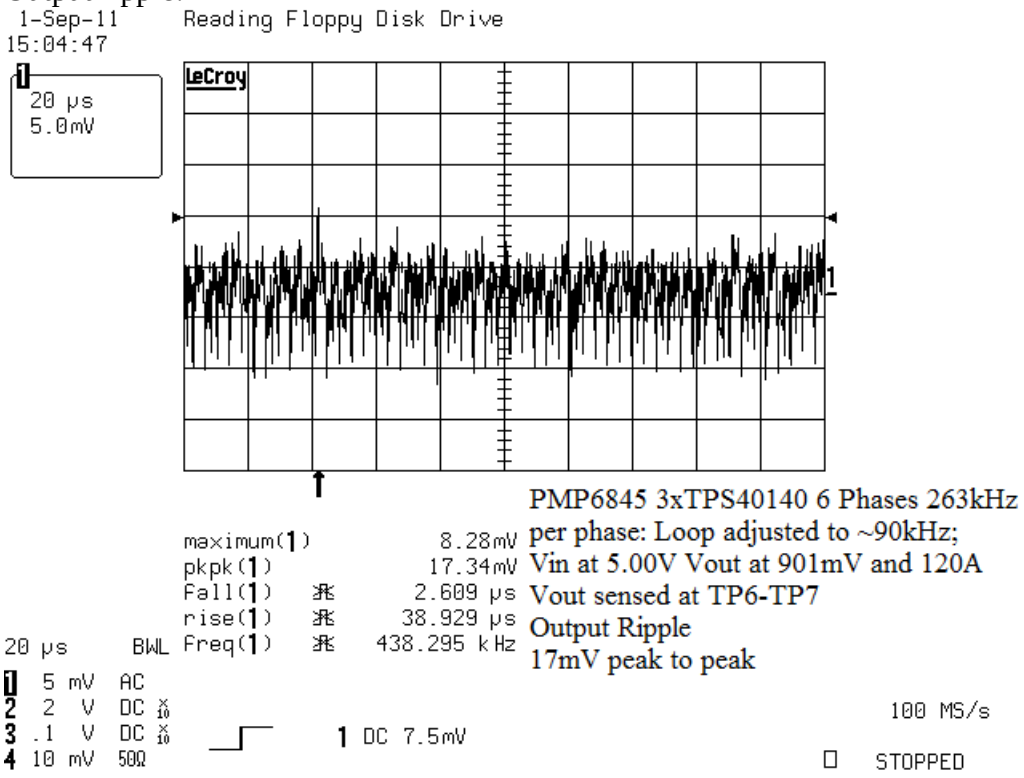
Vin Volts	Iin A	Vout Volts	Iout A	% Effi ciency	Losses in W
5.000	23.45	0.851	120.0	87.1	15.130
5.000	19.15	0.851	100.0	88.9	10.650
5.000	**18.35**	**0.851**	**96.0**	89.0	10.054
4.999	15.10	0.851	80.0	90.2	7.405
5.000	11.15	0.851	60.0	91.6	4.690
4.999	7.40	0.8515	40.0	92.1	2.933
5.000	3.75	0.852	20.0	90.9	1.710
5.000	0.25	0.852	0	0.0	1.250

Reducing Vout does reduce losses slightly for a given Iout. This saving varies from 250mW at max load down to near zero at no load. At 96A savings is 180mW. This is due to the high side FET with its higher on resistance conducting less of the period. However, the lower output power when Vout is 0.85V vs. 0.9V causes the efficiencies to be lower.

Efficiency and losses vs. load for Vout set at 0.9V: with the six Q11-Q66 CSD16325s removed:
Airflow about 200 LFM or 1.3Meter per second: 263kHz operation
Chokes PA2202.321NL

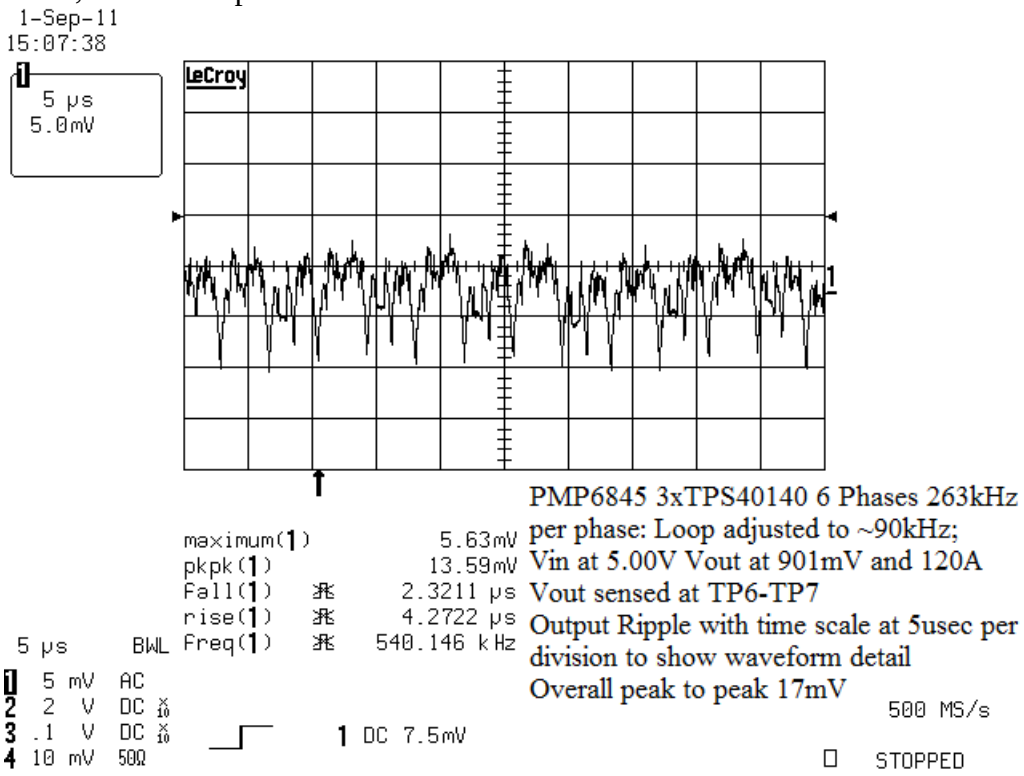
Vin Volts	Iin A	Vout Volts	Iout A	% Effi ciency	Losses in W	Added loss due to tnx removal
5.000	25.25	0.900	120.0	85.5	18.250	2.87
4.999	22.90	0.900	110.0	86.5	15.477	2.34
5.000	20.60	0.9005	100.0	87.4	12.950	2.05
5.000	**19.675**	**0.9005**	**96.0**	87.9	11.927	1.69
5.000	18.35	0.9005	90.0	88.3	10.705	1.56
4.999	16.15	0.901	80.0	89.3	8.654	1.23
5.000	14.00	0.901	70.0	90.1	6.930	0.85
4.999	11.90	0.901	60.0	90.9	5.428	0.60
5.000	9.85	0.901	50.0	91.5	4.200	0.50
4.999	7.85	0.901	40.0	91.8	3.202	0.25
5.000	5.85	0.901	30.0	92.4	2.220	0.01
5.000	3.95	0.901	20.0	91.2	1.730	0.00
4.999	2.05	0.901	10.0	87.9	1.238	-0.25
4.999	0.20	0.901	0	0.0	1.000	-0.25

Output ripple:



PMP6845 3xTPS40140 6 Phases 263kHz
per phase: Loop adjusted to ~90kHz;
Vin at 5.00V Vout at 901mV and 120A
Vout sensed at TP6-TP7
Output Ripple
17mV peak to peak

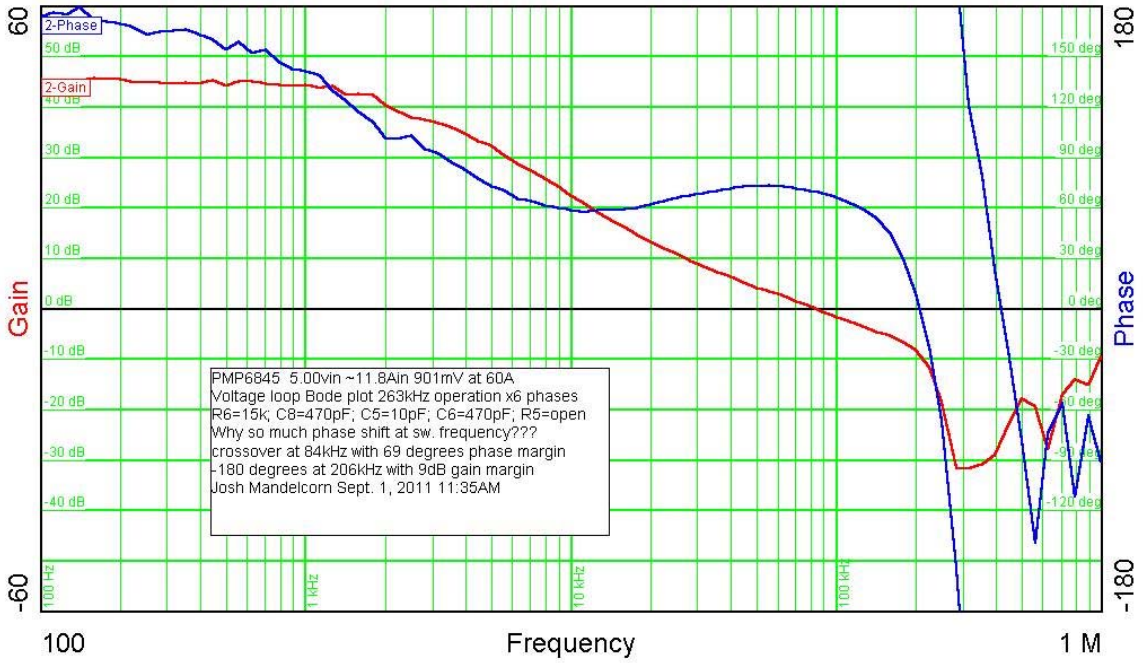
Same, but time expanded to show waveform



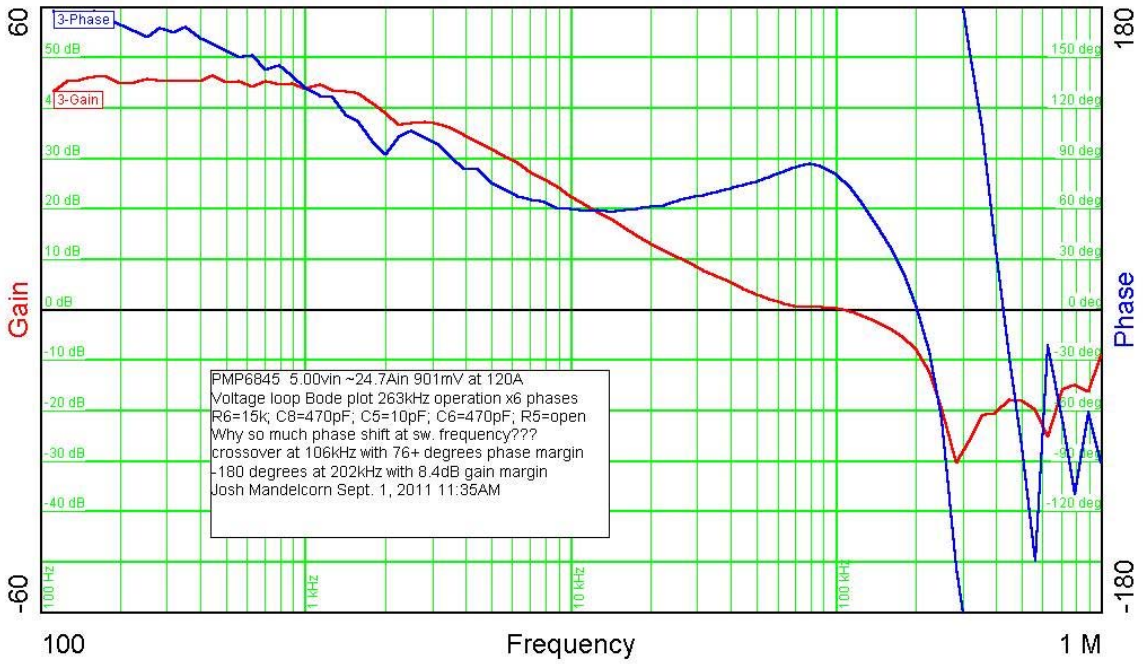
PMP6845 3xTPS40140 6 Phases 263kHz
per phase: Loop adjusted to ~90kHz;
Vin at 5.00V Vout at 901mV and 120A
Vout sensed at TP6-TP7
Output Ripple with time scale at 5usec per division to show waveform detail
Overall peak to peak 17mV

Qq

Bode plots:
Half load:

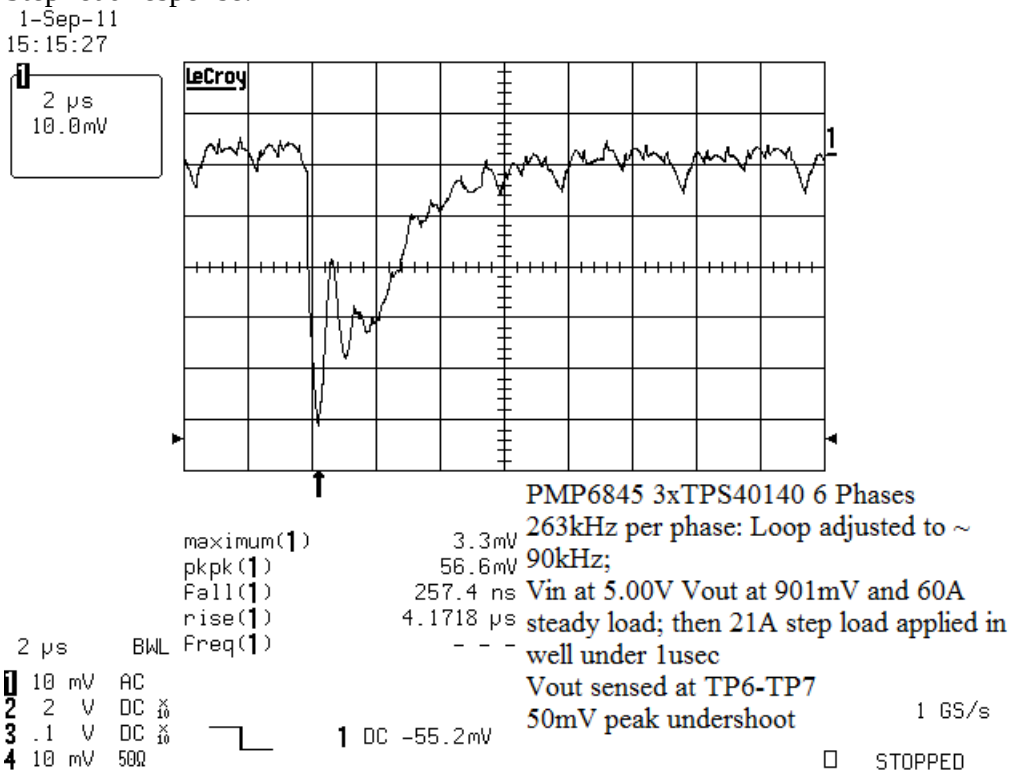


Full load:



qq

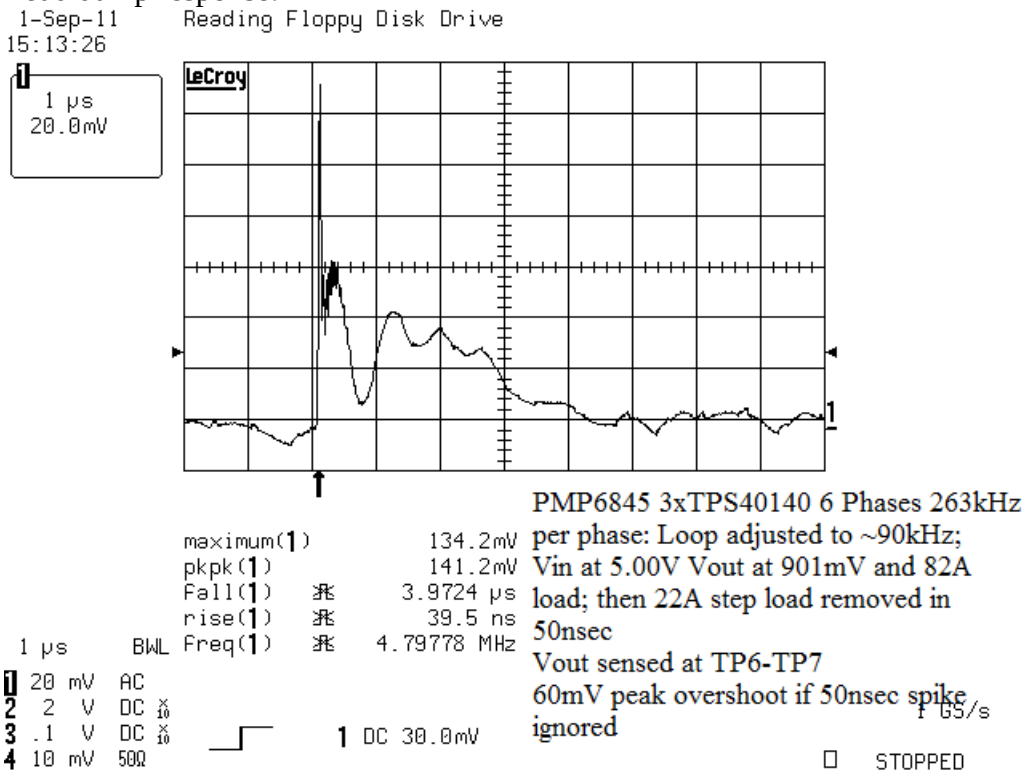
Step load response:



PMP6845 3xTPS40140 6 Phases
263kHz per phase: Loop adjusted to ~ 90kHz;
Vin at 5.00V Vout at 901mV and 60A steady load; then 21A step load applied in well under 1usec
Vout sensed at TP6-TP7
50mV peak undershoot

Qq

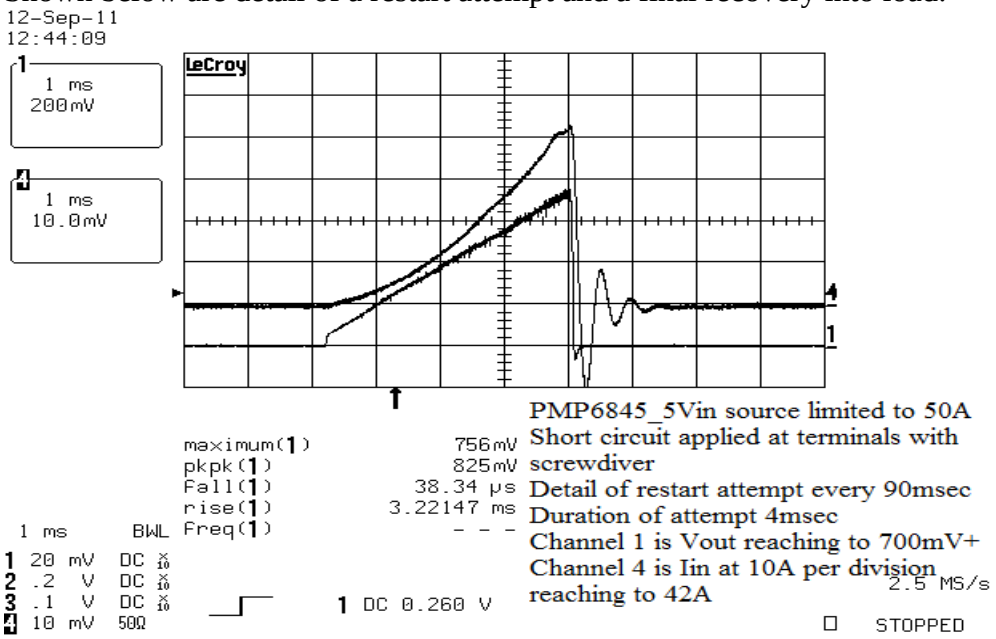
Load dump response:



PMP6845 3xTPS40140 6 Phases 263kHz per phase: Loop adjusted to ~90kHz;
Vin at 5.00V Vout at 901mV and 82A load; then 22A step load removed in 50nsec
Vout sensed at TP6-TP7
60mV peak overshoot if 50nsec spike ignored

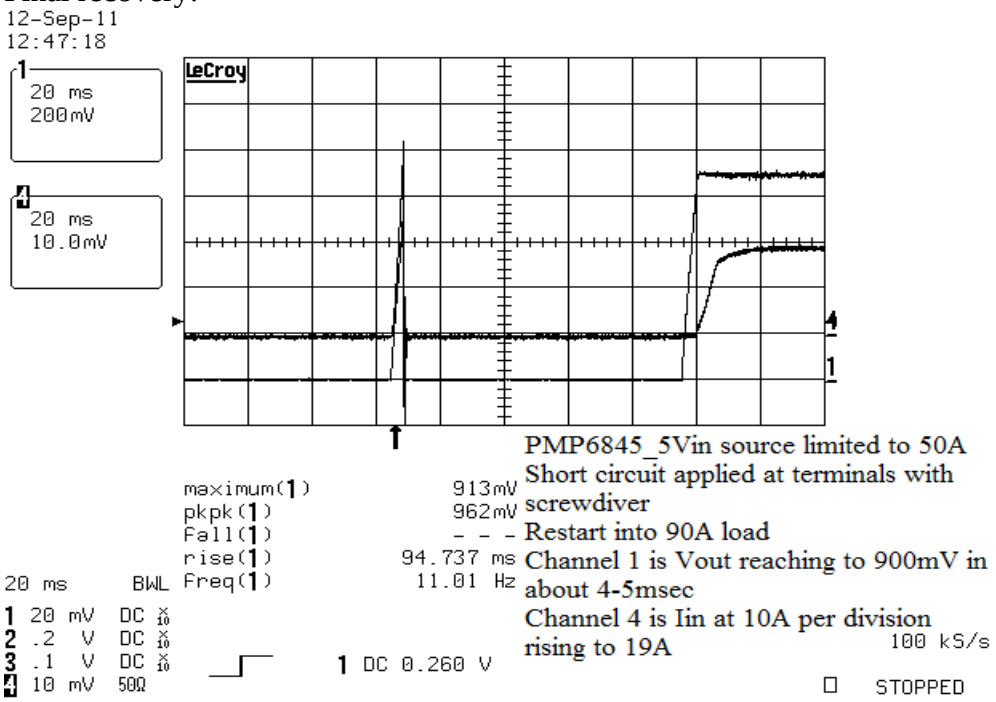
Qq

Short circuit and recovery:
This test was done without the added low side FETs.
A screwdriver was applied to output terminals to short output.
External Load was set to 90A off the 900mV output.
Source was set to deliver 5.0V when load at 90A, and source current limit at 50A.
Vout and Iin were monitored, as current probe used is only rated to 100A peak, well below that needed to monitor short circuit off a 120A rated output.
Restart attempts occurred every 90msec and lasted about 4-5msec each.
Shown below are detail of a restart attempt and a final recovery into load:



PMP6845_5Vin source limited to 50A
Short circuit applied at terminals with screwdiver
Detail of restart attempt every 90msec
Duration of attempt 4msec
Channel 1 is Vout reaching to 700mV+
Channel 4 is Iin at 10A per division reaching to 42A

Final recovery:



PMP6845_5Vin source limited to 50A
Short circuit applied at terminals with screwdiver
Restart into 90A load
Channel 1 is Vout reaching to 900mV in about 4-5msec
Channel 4 is Iin at 10A per division rising to 19A

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