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Modified from PMP5040 rev B whose details are available on WEB:
Only R14 changed for 5Vout vs. 6.5Vout in PMP5040, and signal Zeners D2 & D4 each 1 Volt less for 17Vin minimum vs. 18Vin in PMP5040. R7 is zero ohms and is changed to about 50 ohms only during Bode loop testing for signal injection. Afterwards it was changed back to zero ohms.
While there was a 5V 1.5A application with input range of 17-32V, this report for the full 2.5A off 5V is for the 18V to 60V range to match the same 18-60V range of PMP5040. At 17Vin and full 2.5A load, the flyback mode shifts from discontinuous mode to continuous mode. For continuous mode flyback operation, the loop compensation will need to be modified.

PMP11012 Model t1: Efficiency / losses __99_kHz / no fan 60Vin
Model loaded to full 2.5A load and run until stabilized, then load stepped down in 100mA increments and data recorded after 90 seconds delay at each increment.

Vin Volts	Iin A	Vout Volts	Iout A	% Effi ciency	Losses in W
60.021	0.269	4.990	2.511	77.47	3.64
59.991	0.259	4.990	2.411	77.33	3.53
59.991	0.249	4.990	2.311	77.31	3.39
59.992	0.238	4.990	2.211	77.33	3.23
59.992	0.227	4.990	2.111	77.27	3.10
59.992	0.217	4.990	2.011	77.12	2.98
59.992	0.206	4.990	1.911	76.99	2.85
59.992	0.196	4.990	1.811	76.88	2.72
59.992	0.185	4.990	1.711	76.79	2.58
59.992	0.175	4.990	1.611	76.55	2.46
59.992	0.165	4.990	1.511	76.28	2.34
59.992	0.154	4.990	1.411	76.04	2.22
59.992	0.144	4.989	1.311	75.76	2.09
59.992	0.134	4.989	1.211	75.33	1.98
59.992	0.124	4.989	1.111	74.77	1.87
59.992	0.113	4.989	1.011	74.25	1.75
59.992	0.103	4.989	0.911	73.57	1.63
59.992	0.093	4.989	0.811	72.54	1.53
59.992	0.083	4.989	0.711	71.37	1.42
59.992	0.073	4.989	0.611	69.83	1.32
59.992	0.063	4.989	0.511	67.61	1.22
59.992	0.053	4.989	0.411	64.79	1.11
59.992	0.043	4.989	0.311	60.22	1.02
59.992	0.033	4.989	0.211	53.41	0.92
59.992	0.023	4.989	0.111	40.07	0.83
59.992	0.012	4.989	0.000	0.00	0.72

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PMP11012 Model t1: Efficiency / losses __99_kHz / no fan 36Vin
Model loaded to full 2.5A load and run until stabilized, then load stepped down in 100mA increments and data recorded after 90 seconds delay at each increment.

Vin Volts	Iin A	Vout Volts	Iout A	% Effi ciency	Losses in W
35.995	0.441	4.990	2.511	78.98	3.33
35.995	0.423	4.990	2.411	78.96	3.21
35.995	0.406	4.990	2.311	78.95	3.07
35.995	0.388	4.990	2.211	79.00	2.93
35.995	0.370	4.990	2.111	79.09	2.78
35.995	0.353	4.990	2.011	79.05	2.66
35.995	0.335	4.990	1.911	78.99	2.54
35.995	0.318	4.990	1.810	78.96	2.41
35.995	0.300	4.990	1.711	79.01	2.27
35.995	0.283	4.990	1.610	78.90	2.15
35.995	0.266	4.990	1.510	78.74	2.03
35.995	0.249	4.990	1.410	78.66	1.91
35.995	0.231	4.990	1.311	78.56	1.78
35.995	0.214	4.989	1.210	78.26	1.68
35.995	0.197	4.989	1.111	78.02	1.56
35.995	0.180	4.989	1.010	77.78	1.44
35.995	0.163	4.989	0.910	77.24	1.34
35.995	0.146	4.989	0.810	76.71	1.23
35.995	0.129	4.989	0.710	76.03	1.12
35.996	0.113	4.989	0.611	74.90	1.02
35.996	0.096	4.989	0.511	73.70	0.91
35.996	0.080	4.989	0.411	71.46	0.82
35.996	0.063	4.989	0.310	68.52	0.71
35.996	0.047	4.989	0.211	62.72	0.62
35.996	0.030	4.989	0.110	51.02	0.53
35.996	0.012	4.989	0.000	0.00	0.42

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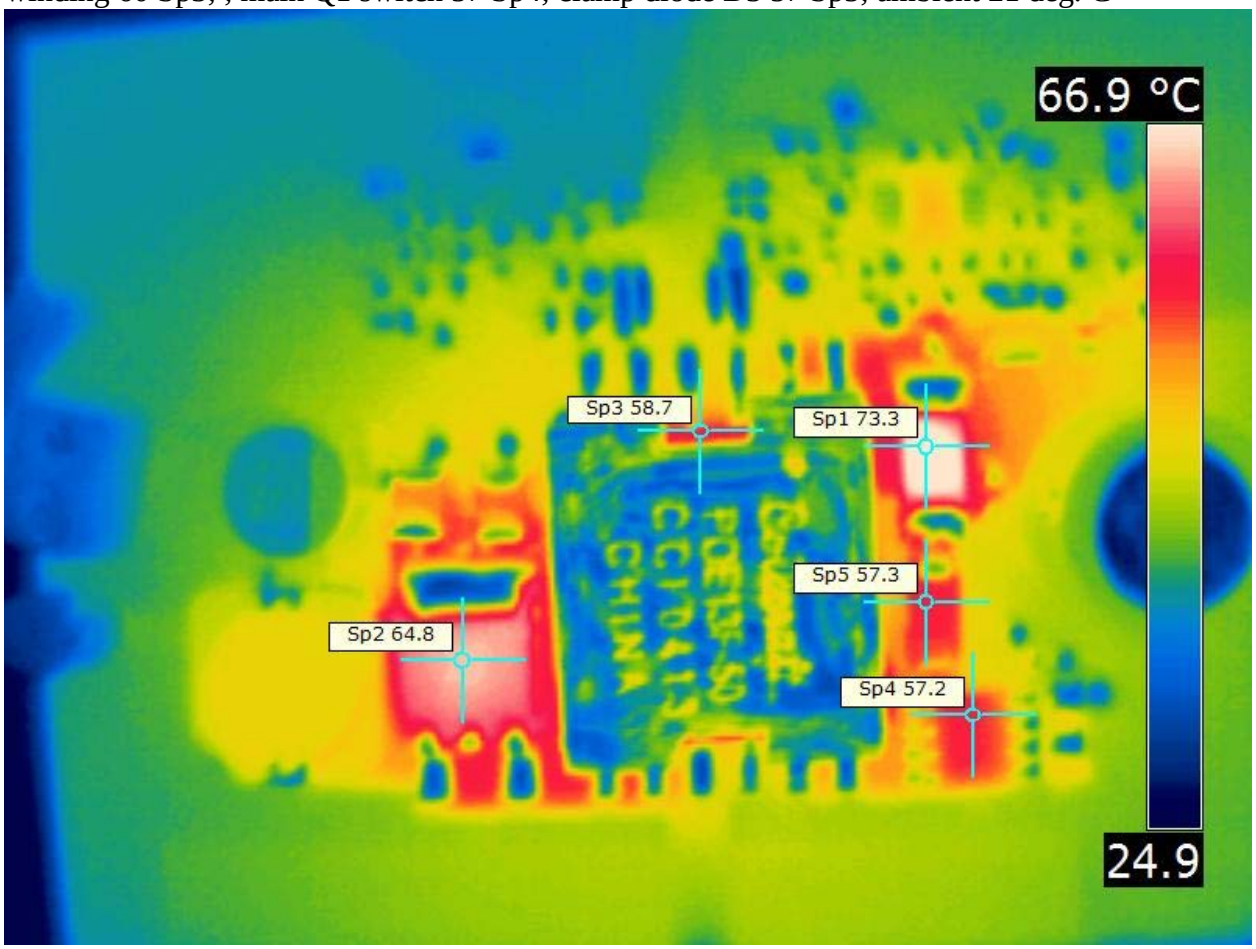
PMP11012 Model t1: Efficiency / losses __99_kHz / no fan 18Vin
Model loaded to full 2.5A load and run until stabilized, then load stepped down in 100mA increments and data recorded after 90 seconds delay at each increment.

Vin Volts	Iin A	Vout Volts	Iout A	% Effi ciency	Losses in W
17.998	0.878	4.990	2.511	79.32	3.27
17.998	0.843	4.990	2.411	79.28	3.14
17.998	0.808	4.990	2.311	79.31	3.01
17.998	0.772	4.990	2.211	79.44	2.85
17.998	0.736	4.990	2.111	79.55	2.71
17.998	0.701	4.990	2.010	79.50	2.59
17.998	0.666	4.990	1.911	79.55	2.45
17.998	0.630	4.990	1.810	79.73	2.30
17.998	0.596	4.990	1.711	79.60	2.19
17.998	0.561	4.990	1.610	79.60	2.06
17.998	0.525	4.990	1.510	79.75	1.91
17.998	0.491	4.990	1.410	79.56	1.81
17.998	0.457	4.990	1.310	79.54	1.68
17.998	0.422	4.990	1.210	79.55	1.55
17.998	0.388	4.989	1.110	79.31	1.45
17.999	0.353	4.989	1.010	79.31	1.31
17.999	0.320	4.989	0.910	78.91	1.21
17.999	0.285	4.989	0.810	78.71	1.09
17.999	0.252	4.989	0.710	78.16	0.99
17.999	0.218	4.989	0.610	77.67	0.88
17.999	0.185	4.989	0.510	76.58	0.78
17.999	0.151	4.989	0.410	75.48	0.66
17.999	0.118	4.989	0.310	73.03	0.57
17.999	0.085	4.989	0.210	68.78	0.48
17.999	0.052	4.989	0.110	59.04	0.38
17.999	0.005	4.990	0.000	0.00	0.09

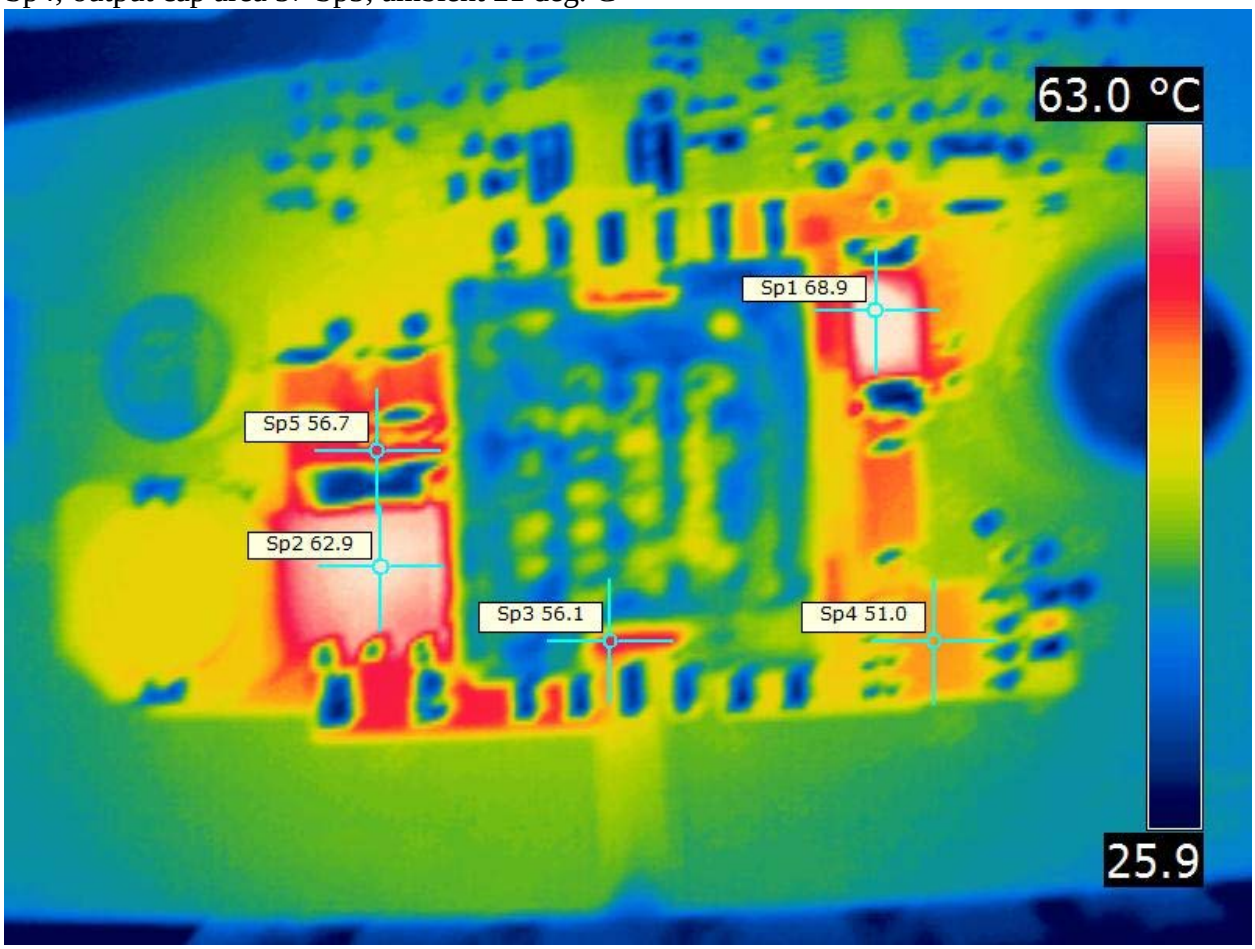
Q

Thermal image at 2.5A load: PMP11012: 60Vin Flyback to 5V 2.5A 100kHz no fan:Clamp resistor R1 hottest at 73 degrees C Sp1; main output diode D1 at 65 degrees C Sp2; ,xformer winding 60 Sp3; , main Q1 switch 57 Sp4; clamp diode D3 57 Sp5; ambient 21 deg. C



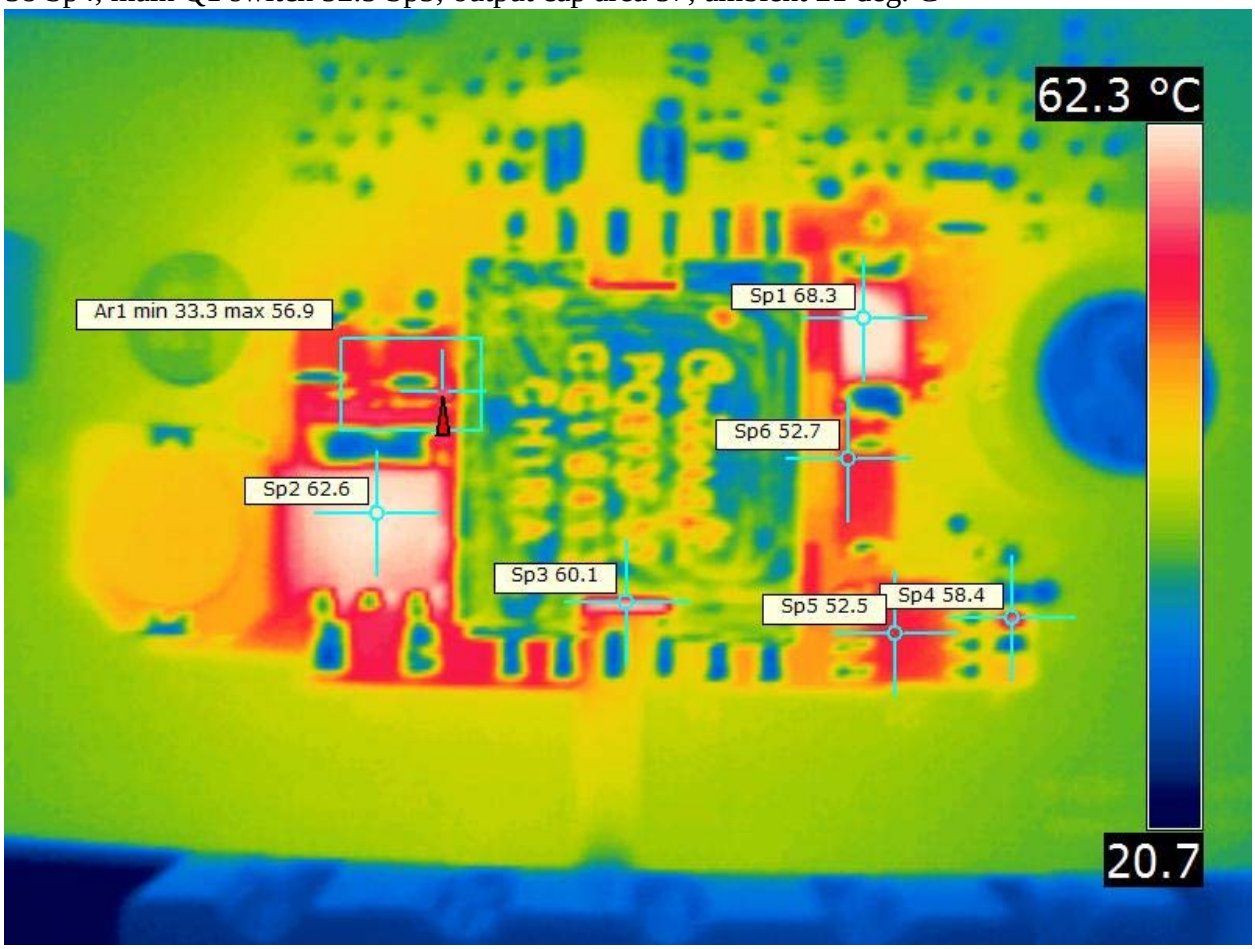
Qq
Q
Q
Q

PMP11012: 32Vin Flyback to 5V 2.5A 100kHz no fan:Clamp resistor R1 hottest at 69 degrees C Sp1; main output diode D1 at 63 degrees C Sp2; ,xformer winding 56 Sp3; main Q1 switch 51 Sp4; output cap area 57 Sp5; ambient 21 deg. C



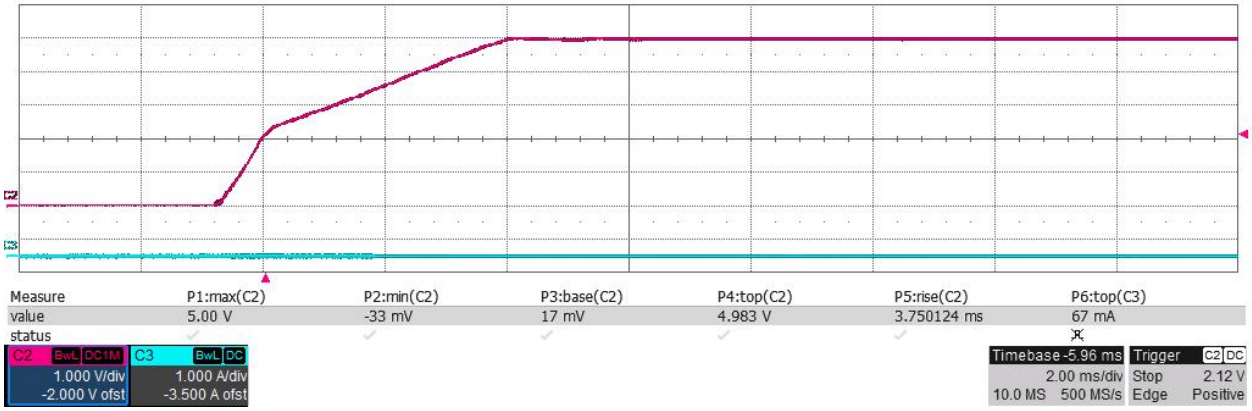
q

PMP11012: 17Vin Flyback to 5V 2.5A 100kHz no fan:Clamp resistor R1 hottest at 68 degrees C Sp1; main output diode D1 at 63 degrees C Sp2; ,xformer winding 60 Sp3; current sense R8 at 58 Sp4, main Q1 switch 52.5 Sp5; output cap area 57; ambient 21 deg. C

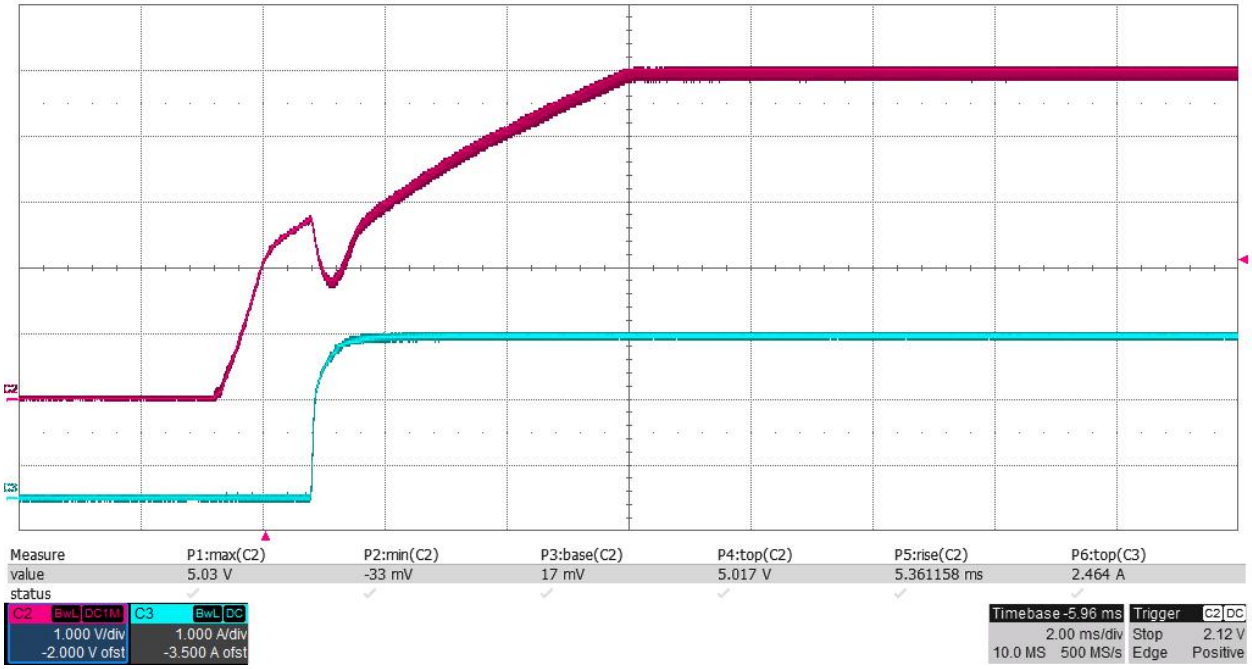


Q

Start up: 36Vin applied with no load: Overshoot is 17mV max

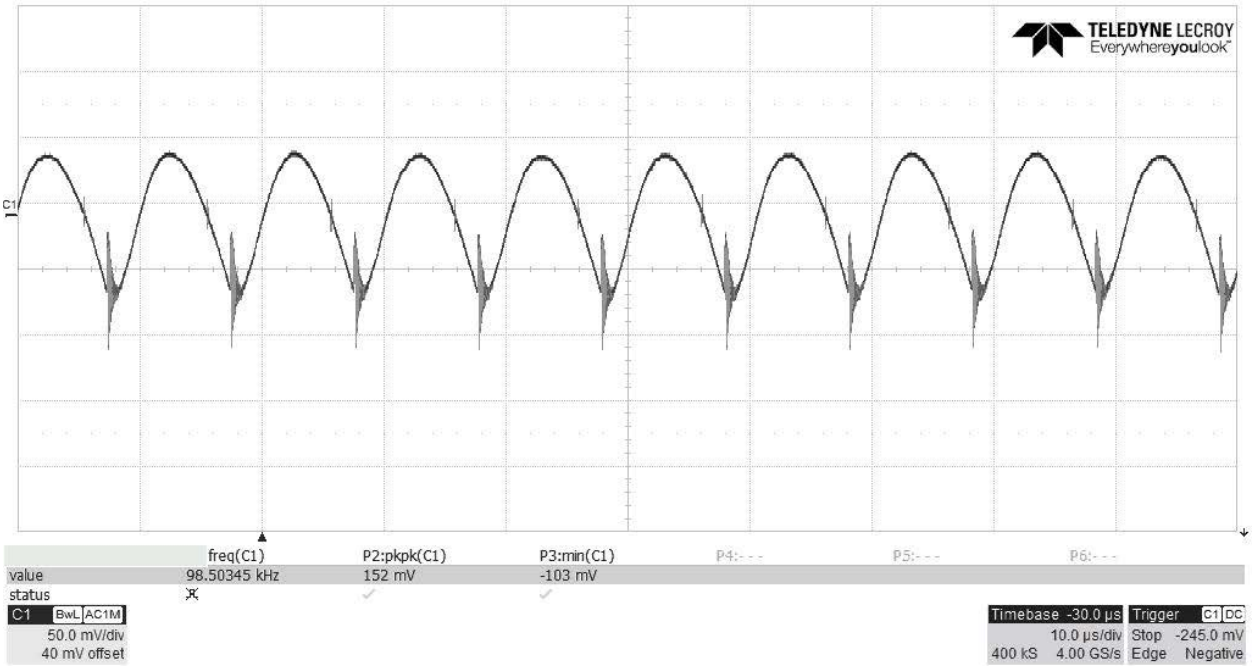


Start up at 36Vin, but with 2.5A constant current load kicking in during soft start, acting like large dynamic load causing 1 msec dip



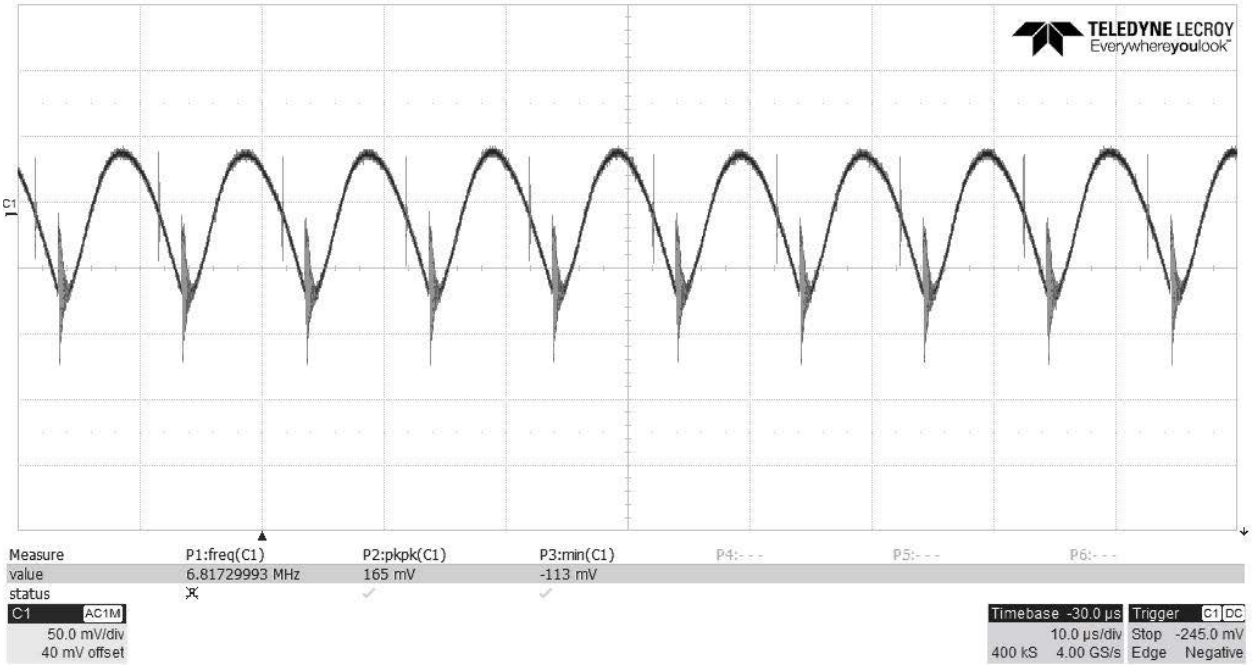
Q

Output ripple at 60Vin and 2.5A load off 5V: 20 MHz bandwidth measurement
Vout measured with 10x scope probe at load connection terminals J2:



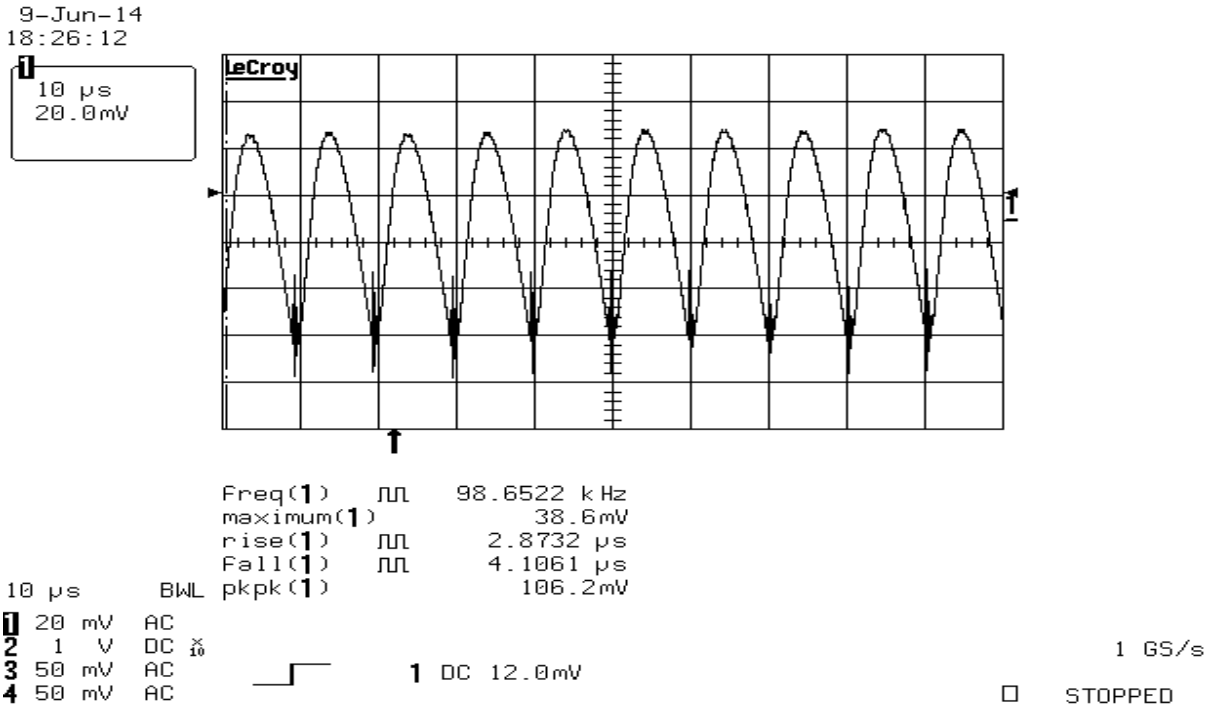
Q

Same, but with scope at full 750 MHz bandwidth measurement

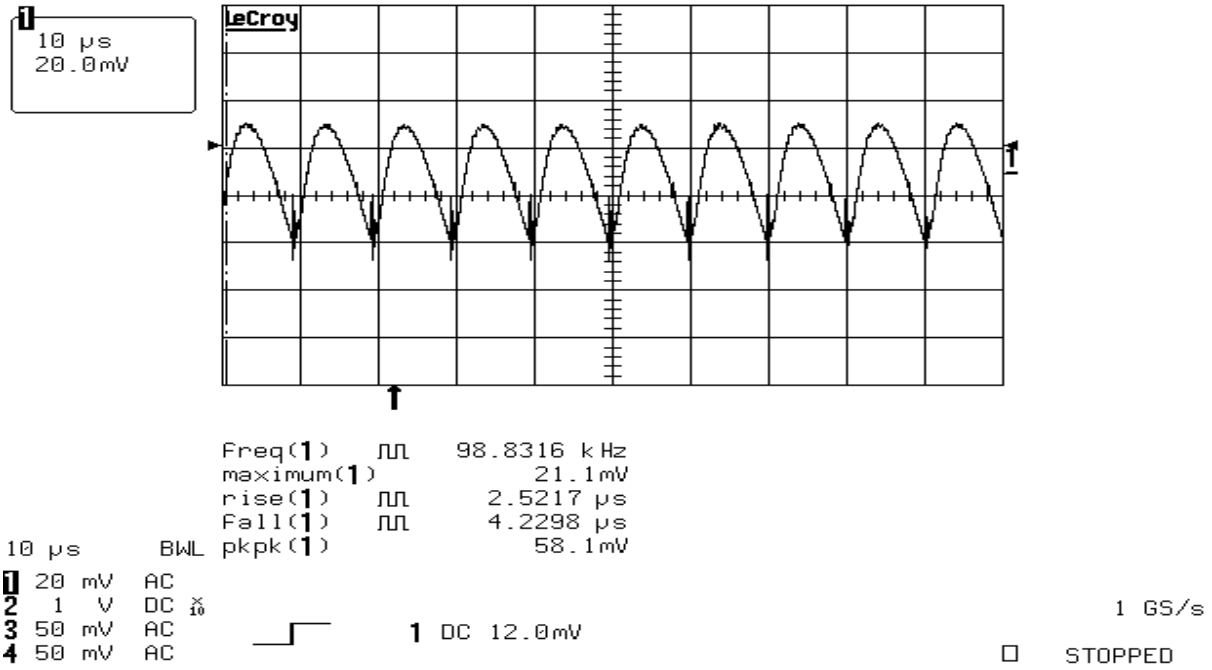


Q

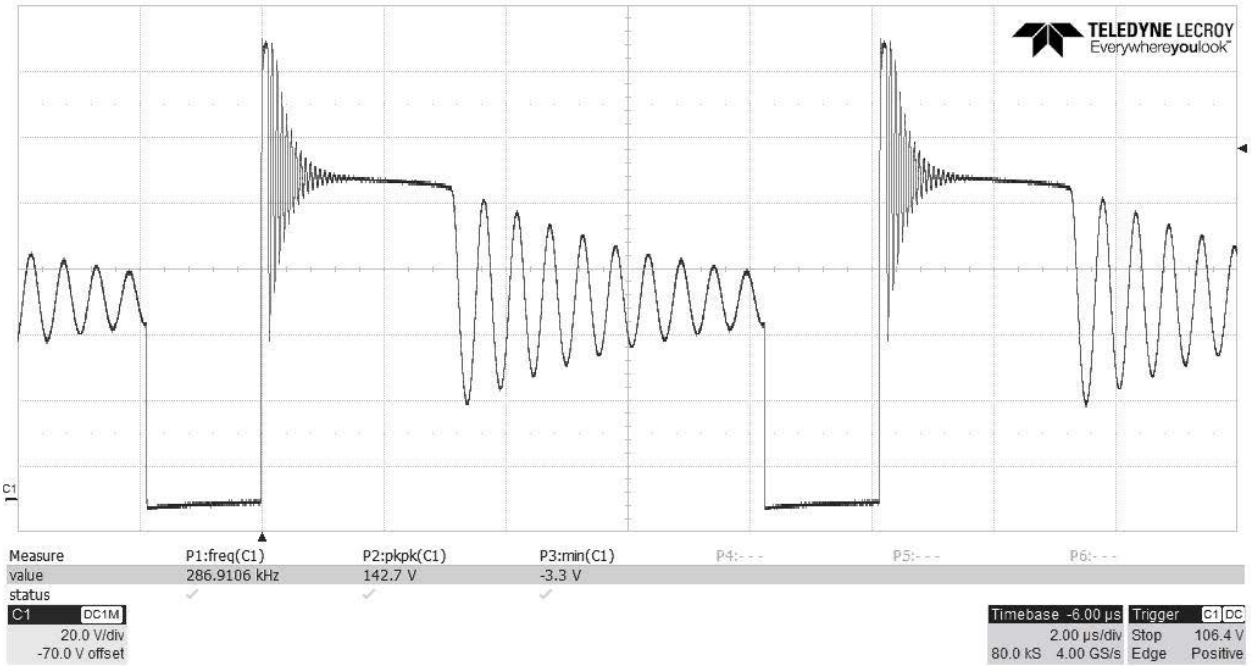
Ripple out at 1.5A load measured at main output J2 terminals: Vin is 32V Vout is 4.985V
106mV p-p ripple, slightly less at lower Vin's
This page only is on an earlier model – no circuit changes from earlier model
20 MHz bandwidth measurements:



Qq
Same 32Vin, but load cut in half to 0.75A off: Ripple here 58mV p-p
4.985Vout

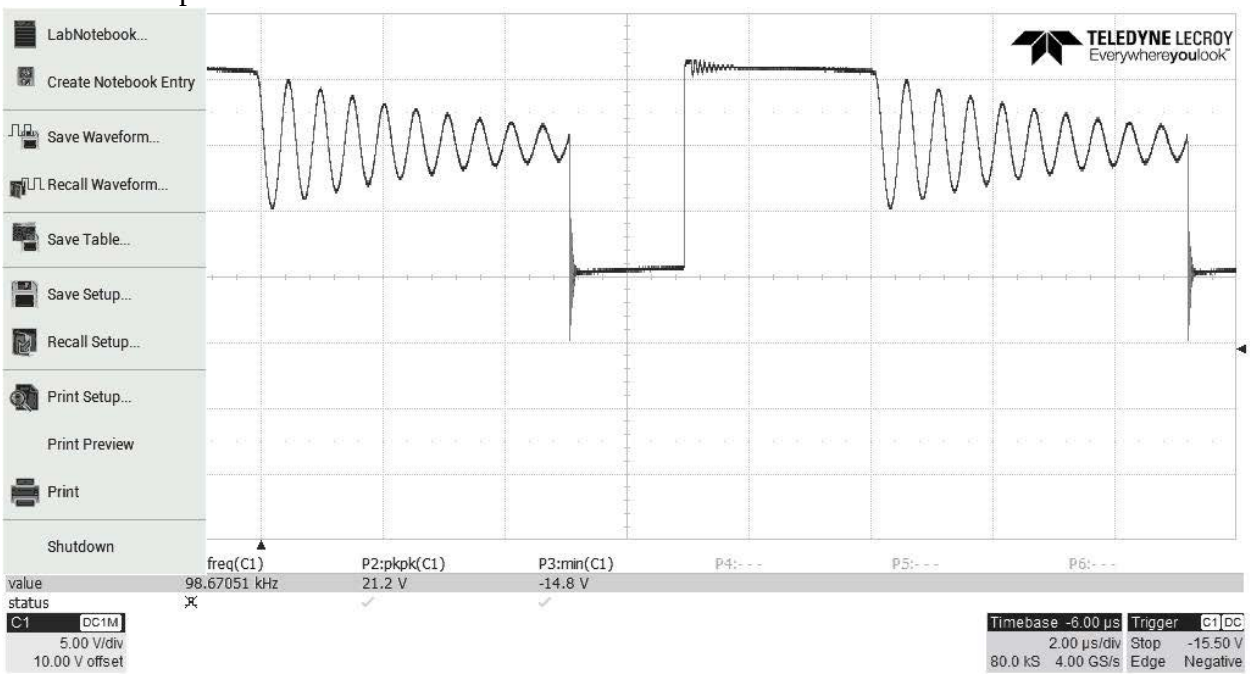


Main waveforms at 60Vin and full load: Q1 drain voltage



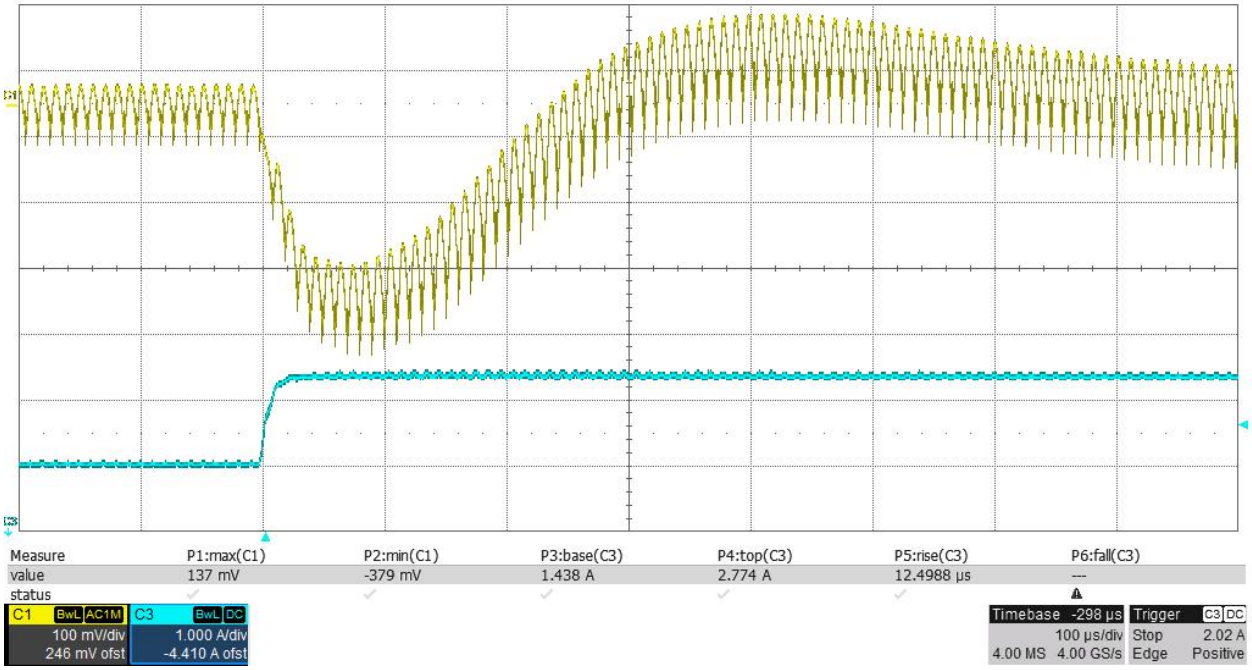
Q

And main output diode D1:



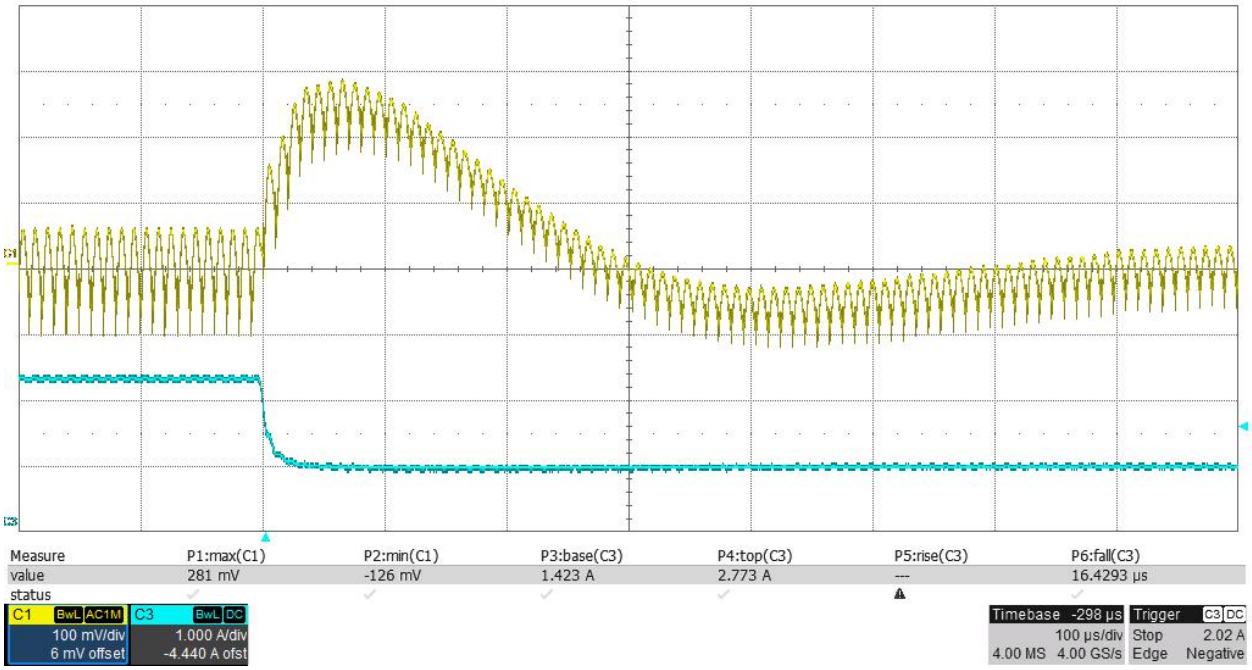
Q

Step load response: 36Vin from half load to full load



Q

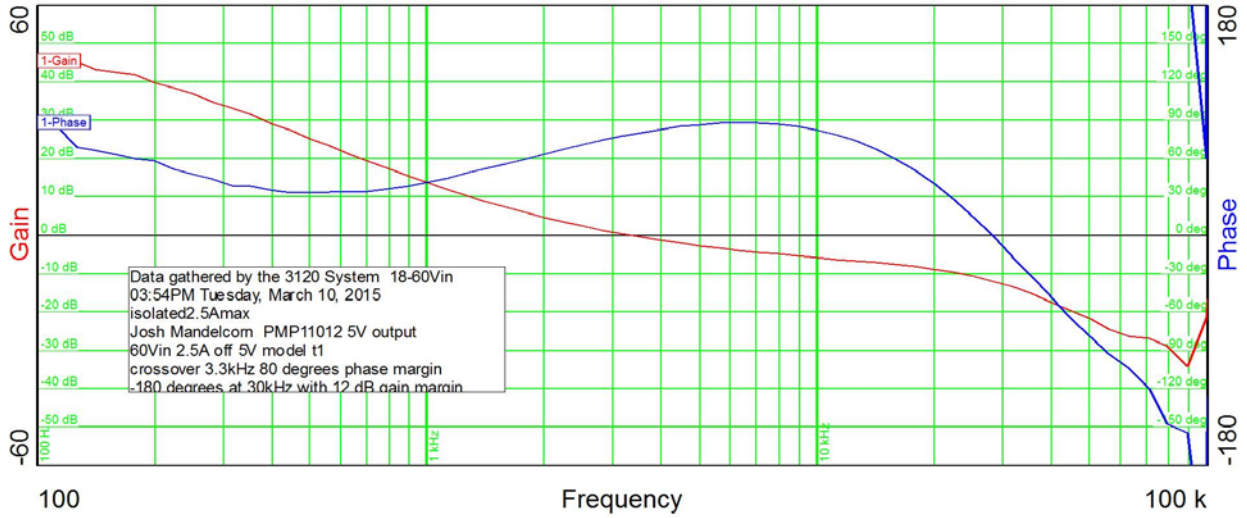
And now from full load back to half load:



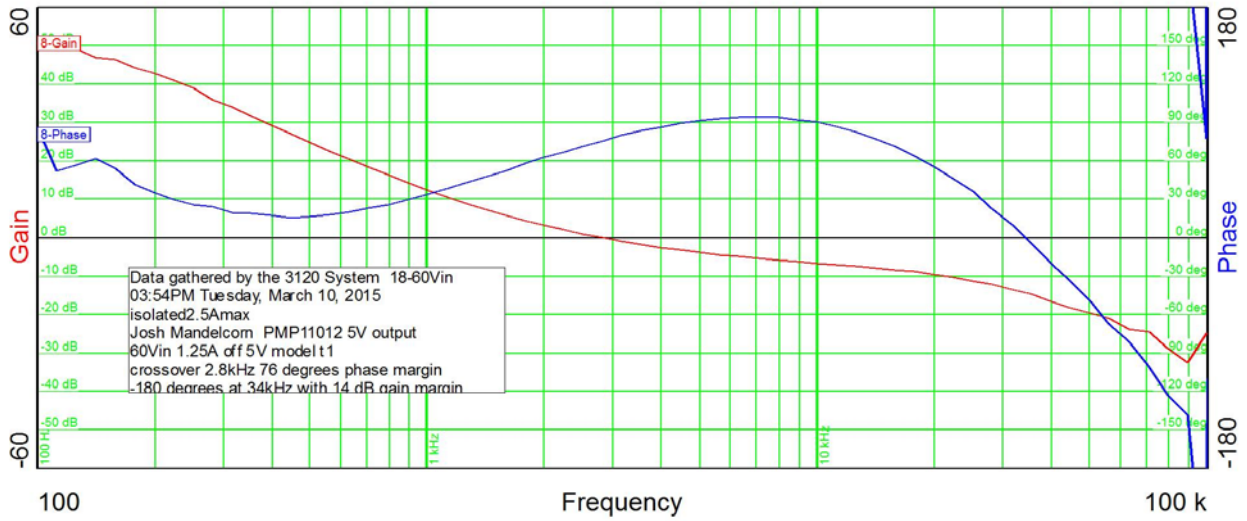
Q

Bode plots:

60Vin and full load:

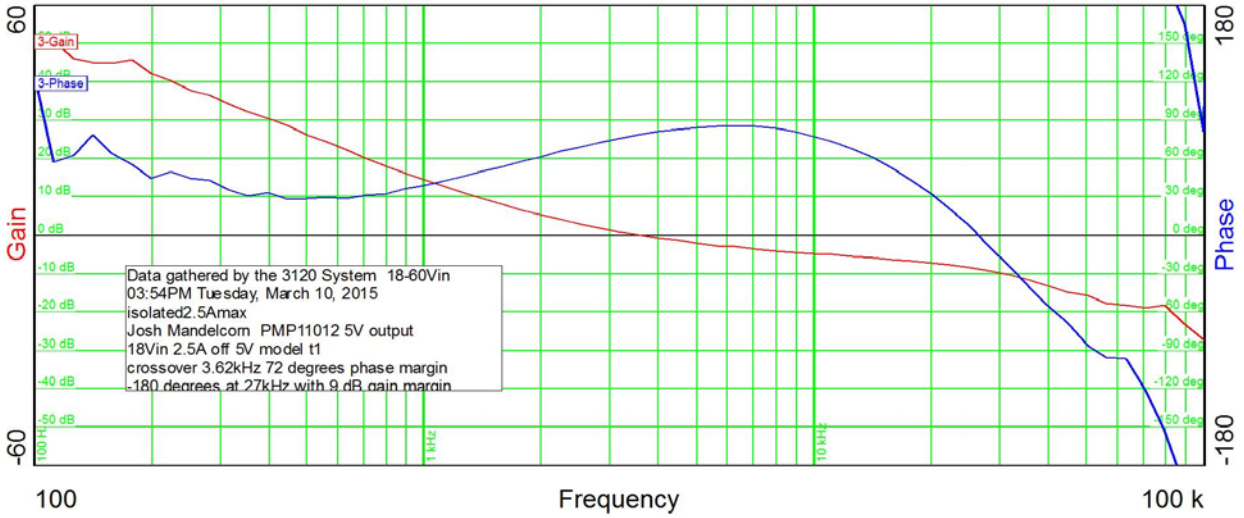


60Vin and half load:

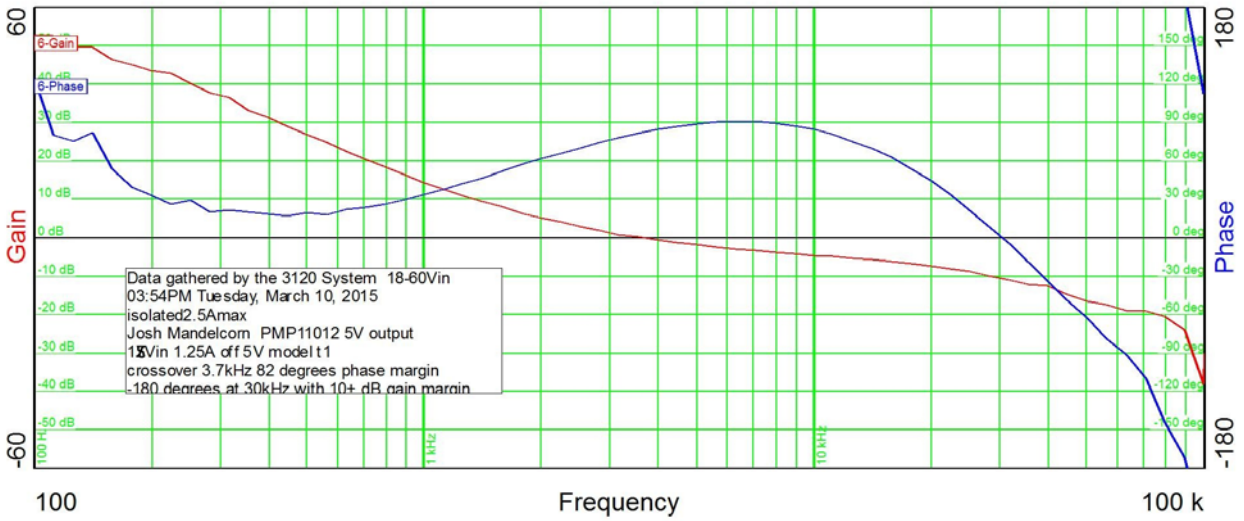


Bode plots: (continued)

18Vin and full load:



18Vin and half load:



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