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Notes:

Voltage across “active or-ing diode” or Q100 off 3 to 3.6V in at load of 4.5A regulated to 10.7mV, and overall efficiency varies from 91.5% at 3vin to 91.7% at 3.6Vin.

At 10A off 1.2V, voltage across Q100 was 25.4mV at 3Vin down to 20mV at 3.6Vin.

Overall efficiency was 84.5% at 3Vin and 85.3% at 3.6Vin.

At 13.2Vin and 1.088Ain and load of 10A off 1.2V had drop of 295 across or-ing D100 MBRS340, for a loss of 321mW in or-ing diode.

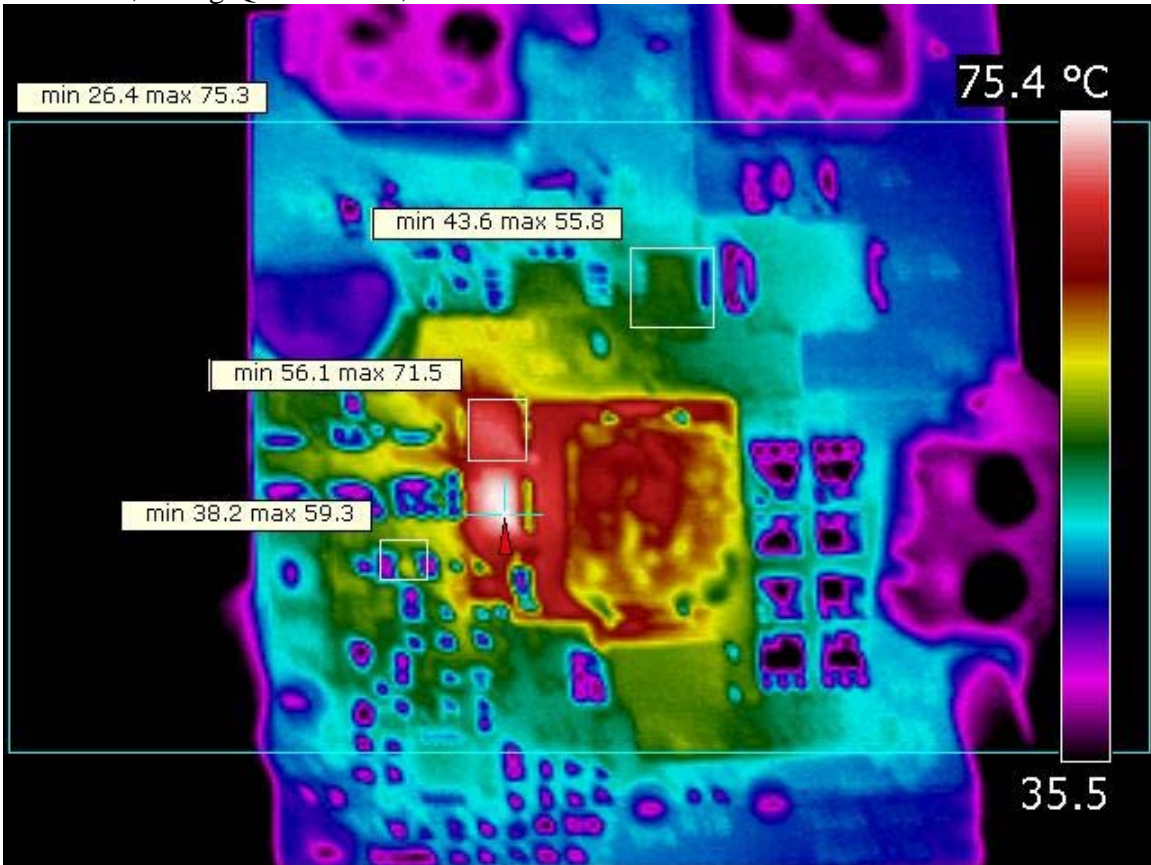
See PMP4994 for conversion efficiency details of TPS40303 stage.

Thermal summary:

PMP5140: TPS40303 & TPS2412:

3.3V input feed only at 3.0V to 1.2Vout at 10A: 2.213W on board

Ambient 23-25 degrees Celsius; Hot spot lo side FET Q2 at 75.3; hi side Q1 at 71.5; L1 at 70 max; or-ing Q100 at 55.8; snubber R6 at 59.3

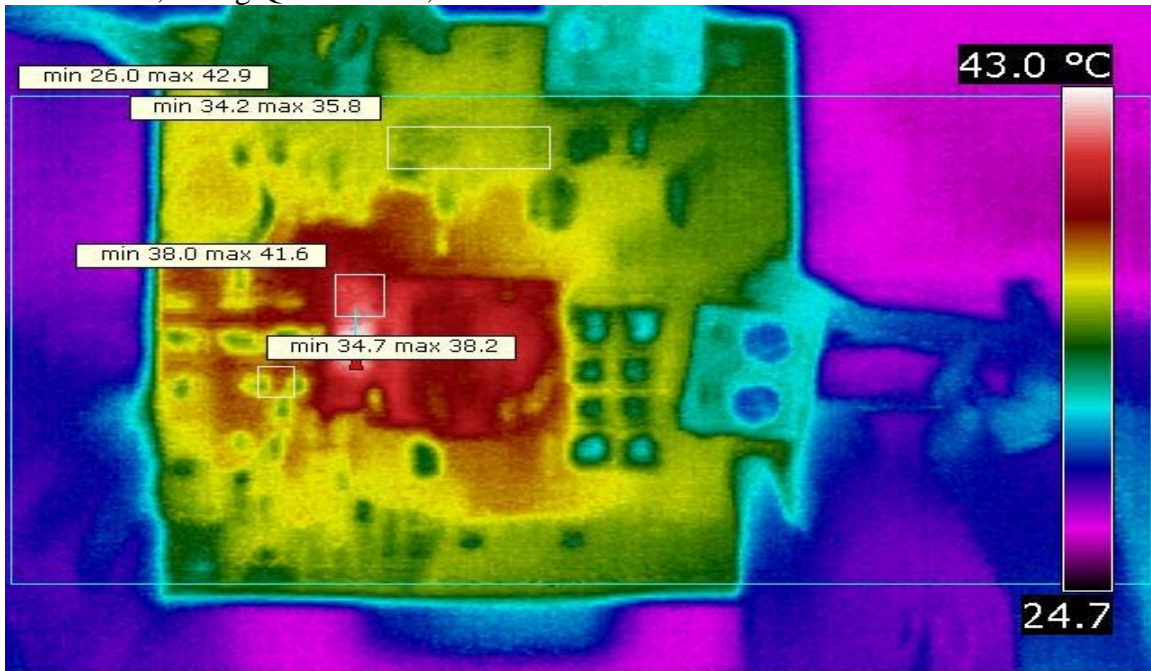


Qq

PMP5140: TPS40303 & TPS2412:

3.3V input feed only at 3.0V to 1.2Vout at 5A: 604mW on board

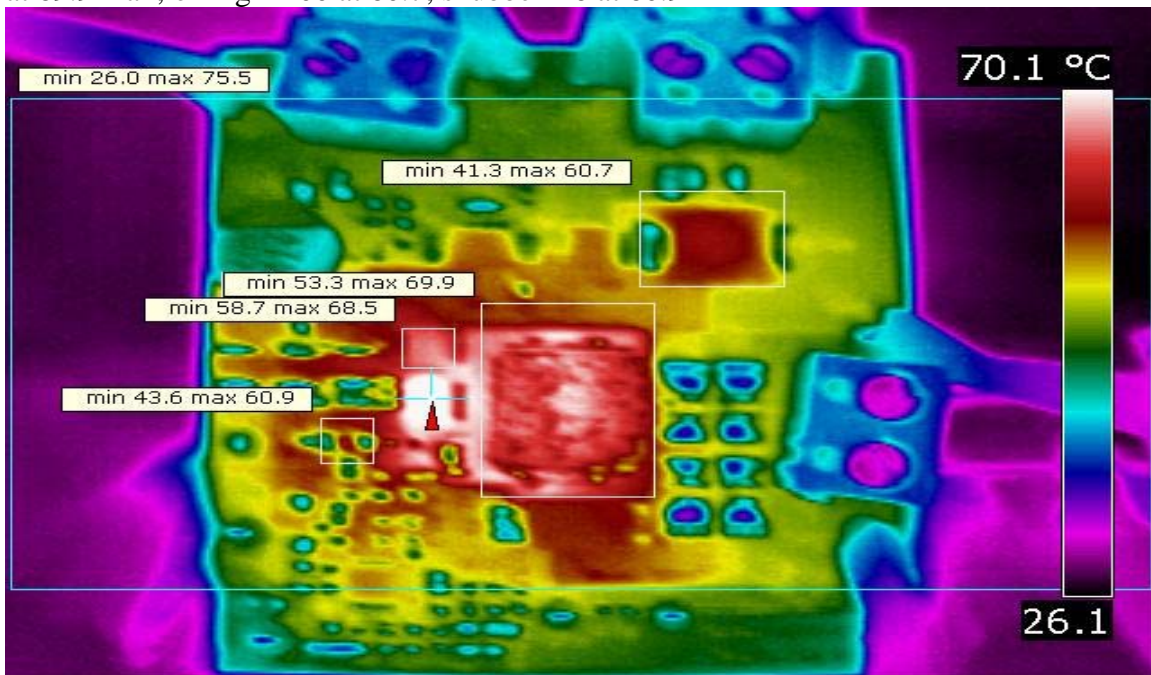
Ambient 23-25 degrees Celsius; Hot spot lo side FET Q2 at 42.9; hi side Q1 at 41.6; L1 at 40.8 max; or-ing Q100 at 35.8; snubber R6 at 38.2



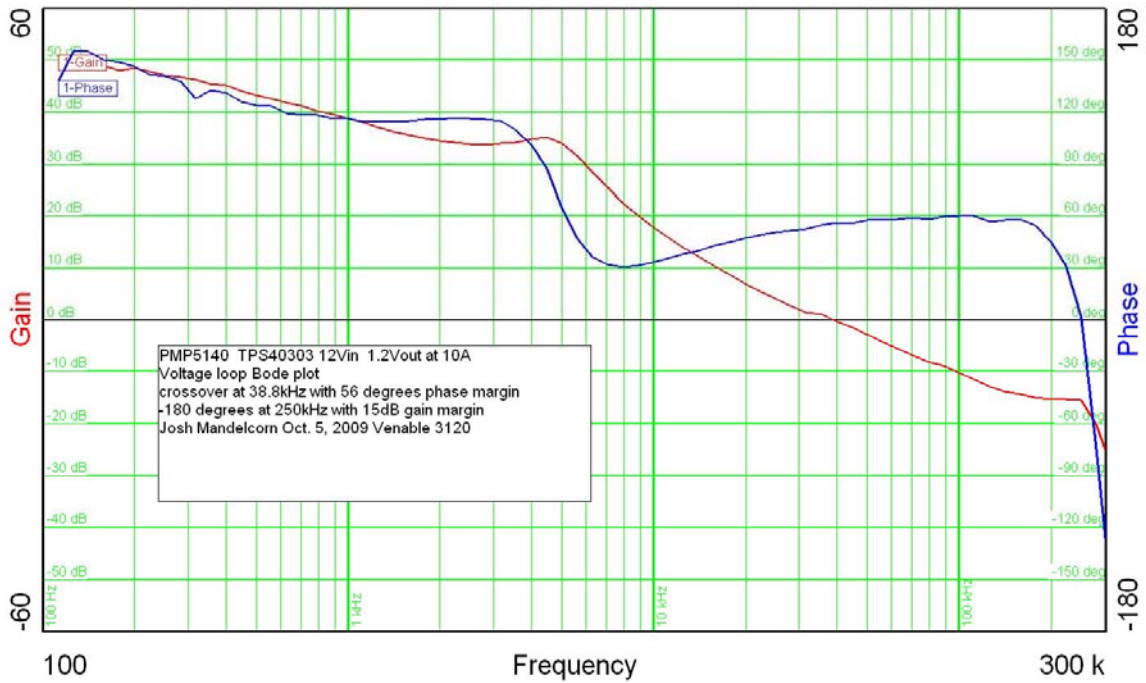
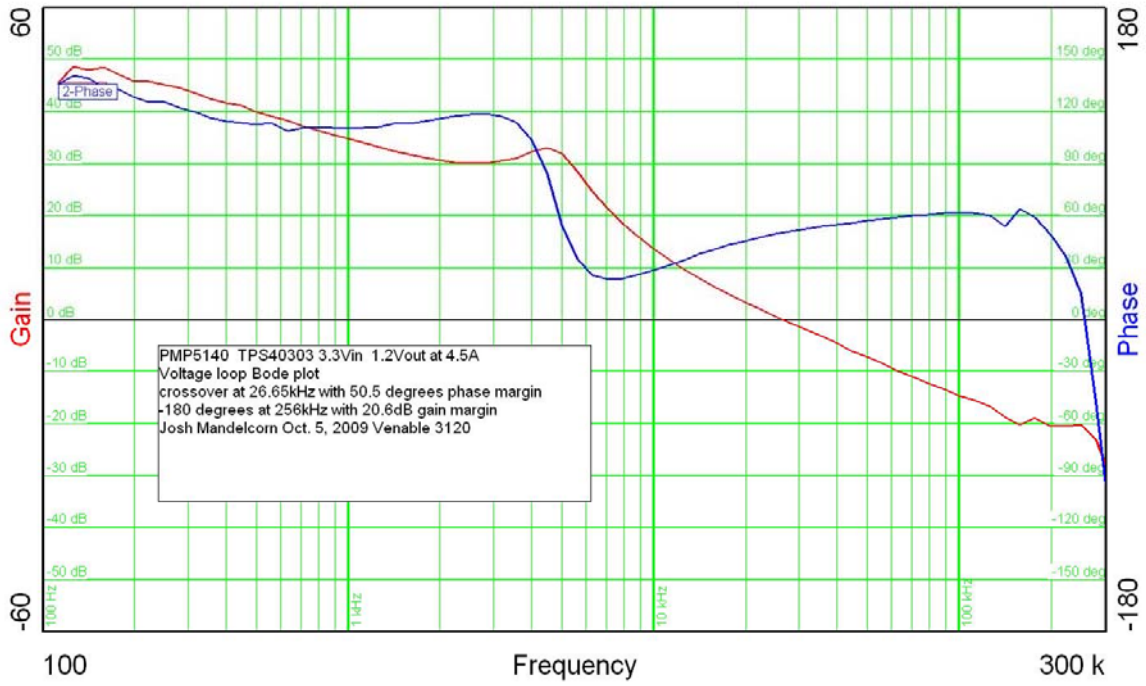
PMP5140: TPS40303 & TPS2412:

12V input feed at 13.2V to 1.2Vout at 10A: 2.372W on board

Ambient 23-25 degrees Celsius; Hot spot lo side FET Q2 at 75.5; hi side Q1 at 68.5; L1 at 69.9 max; or-ing D100 at 60.7; snubber R6 at 60.9

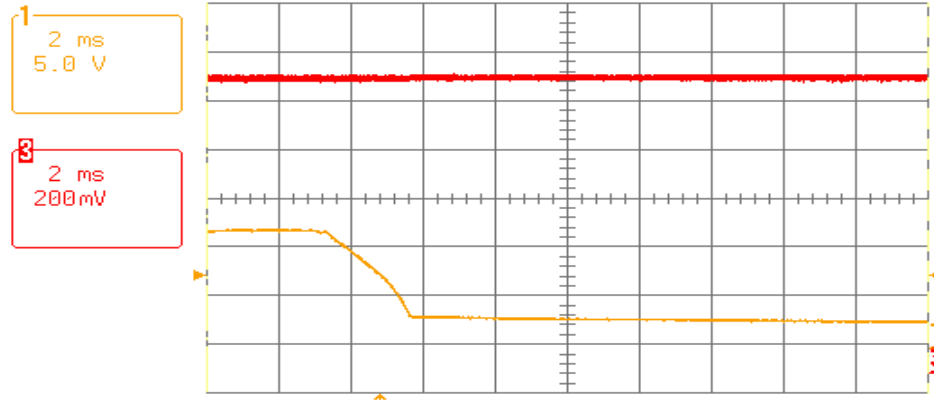


Bode Plots: 1.2Vout: 3.3Vin and 4.5A load and then 12Vin at 10A load



12V suddenly removed:

1-Oct-09 18:55:57 Reading Floppy Disk Drive



2 ms
200mV

maximum(1)	12.13 V
Freq(1)	- - -
pkpk(1)	9.69 V
maximum(4)	-11.5mV
mean(4)	-12.41mV

2 ms BWL

1	.5 V	DC	⏏
2	1 V	DC	⏏
3	.2 V	DC	⏏
4	10 mV	500	⏏

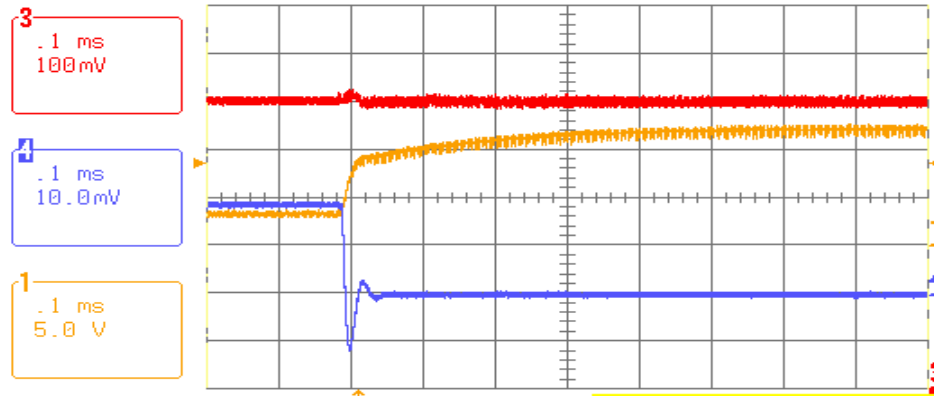
1 DC 7.5 V

STOPPED

PMP5140: dual feed TPS40303 regulator
 12V feed and 3.3V feed when 12V removed
 1.2Vout has 10A load on it
 Channel 1 brown: 12V feed
 Channel 3 red: 1.2Vout DC at 200mV per division
 No dip on the 1.2Vout seen when 12V removed
 Vin transition slowed by total input cap off 12Vin
 C19 plus C1-C3 and C105 or about 500uF in all

12V suddenly applied:

5-Oct-09 17:30:39



.1 ms
100mV

.1 ms
10.0mV

.1 ms
5.0 V

maximum(3)	1.235 V
Freq(3)	- - -
pkpk(3)	44mV
mean(3)	1.2075 V
mean(4)	3.12mV

.1 ms BWL

1	.5 V	DC	⏏
2	1 V	DC	⏏
3	.1 V	DC	⏏
4	10 mV	500	⏏

1 DC 8.7 V

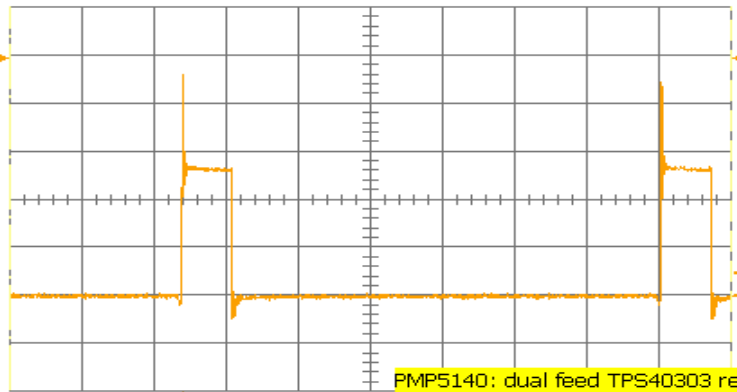
PMP5140: dual feed TPS40303 regulator
 12V feed and 3.3V feed when 12V applied suddenly
 1.2Vout has 4.5A load on it
 Channel 1 brown: or-ed Vin on board
 Channel 3 red: 1.2Vout DC at 100mV per division
 about 20-30mV glitch seen on Vout sometimes
 positive (as here) and sometimes negative
 Vin transition mostly in about 30usec, much faster
 than when 12V removed
 Channel 4: Current off 3.3V feed, one short negative
 ringing to about 1.1A peak, then to zero

Qq

Major waveform:

5-Oct-09
15:14:46

0.5 μ s
5.0 V



PMP5140: dual feed TPS40303 regulator
All FETs CSD16323Q3
12V feed at 13.2V Output: 1.2V 10A
Major switching waveform or Vds of lo side MOSFET Q2
Channel 1 brown: Vds of Q2 with close in 10x ripple probe 9.5pF 500MHz Bandwidth
peak 23V; MOSFET Vds rating 25V plus avalanche

maximum(1) 22.97 V
Freq(1) 300.873 kHz
pkpk(1) 25.47 V
mean(1) 1.728 V
mean(4) -0.32mV

.5 μ s
1 .5 V DC \times
2 1 V DC
3 5 mV AC
4 10 mV 50 Ω

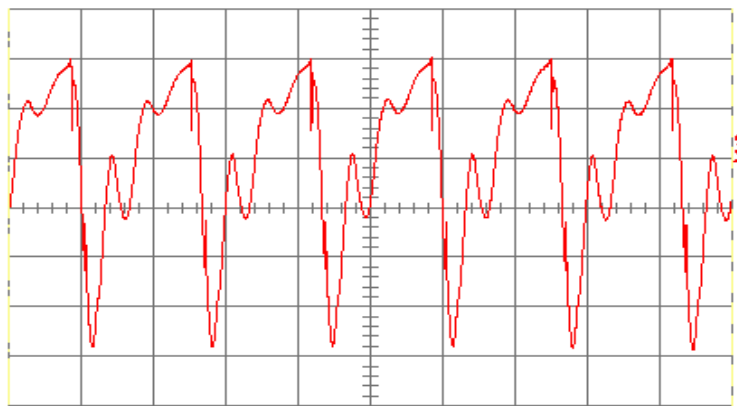
1 DC 24.8 V

STOPPED

Input Ripple:

5-Oct-09
15:25:10

2 μ s
20.0 mV



PMP5140: dual feed TPS40303 regulator
12V feed at 12V Output: 1.2V 10A
Input ripple at "VIN" or-ed input
Channel 1 brown: ripple across C1 with 1x ripple probe and 20MHz Bandwidth
118mV p-p

maximum(3) 41.6mV
Freq(3) 301.078 kHz
pkpk(3) 118.1mV
mean(3) 0.36mV
mean(4) -0.30mV

2 μ s BWL
1 .5 V DC \times
2 1 V DC
3 20 mV AC
4 10 mV 50 Ω

1 DC 24.8 V

STOPPED

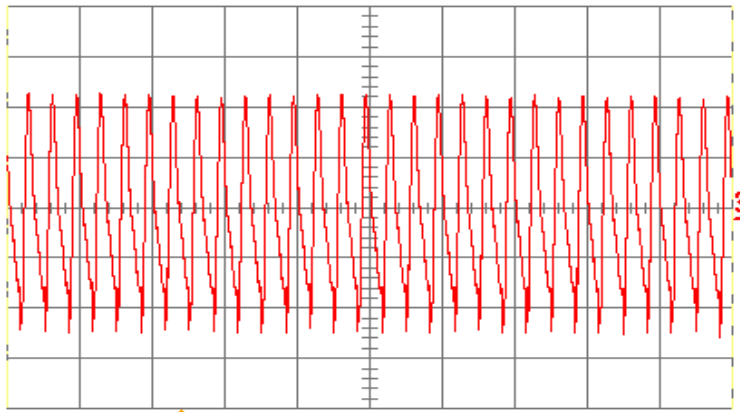
Qq

Output ripple:

Max Vin at 10A load:

5-Oct-09
15:17:32

10 μ s
5.0mV



maximum(3) 12.41mV
 Freq(3) 300.837 kHz
 pkpk(3) 24.37mV
 mean(3) 139 μ V
 mean(4) -0.30mV

10 μ s BWL
 1 .5 V DC \times
 2 1 V DC
 3 5 mV AC
 4 10 mV 500

1 DC 24.8 V

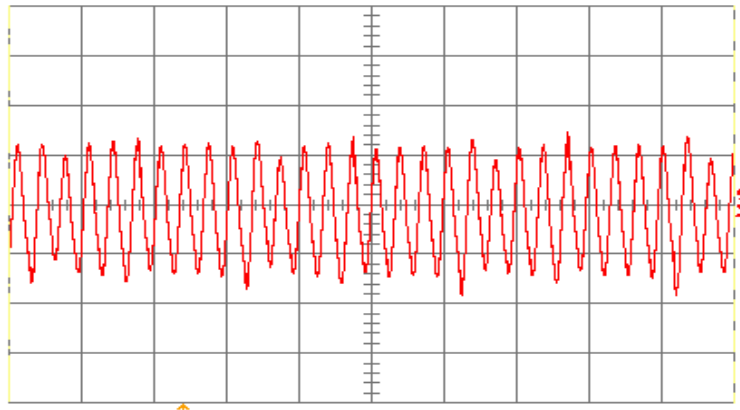
PMP5140: dual feed TPS40303 regulator
 12V feed at 13.2V Output: 1.2V 10A
 Output ripple at C17
 Channel 1 brown: ripple across C1 with 1x ripple probe and 20MHz Bandwidth
 24mV p-p
 target frequency 300kHz, actual frequency 301kHz

STOPPED

Min Vin at 5A load:

5-Oct-09
12:37:13

10 μ s
5.0mV



maximum(1) 0.12 V
 Freq(1) - - -
 pkpk(1) 0.13 V
 mean(1) 3mV
 mean(4) -0.33mV

10 μ s BWL
 1 .2 V DC \times
 2 1 V DC
 3 5 mV AC
 4 10 mV 500

1 DC 3.00 V

PMP5140: dual feed TPS40303 regulator
 3.3V feed at 2.99V Output: 1.2V 5A
 Output ripple at C17
 Channel 1 brown: ripple across C1 with 1x ripple probe and 20MHz Bandwidth
 15mV p-p

1 GS/s

STOPPED

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