

PMP5754 Test Report

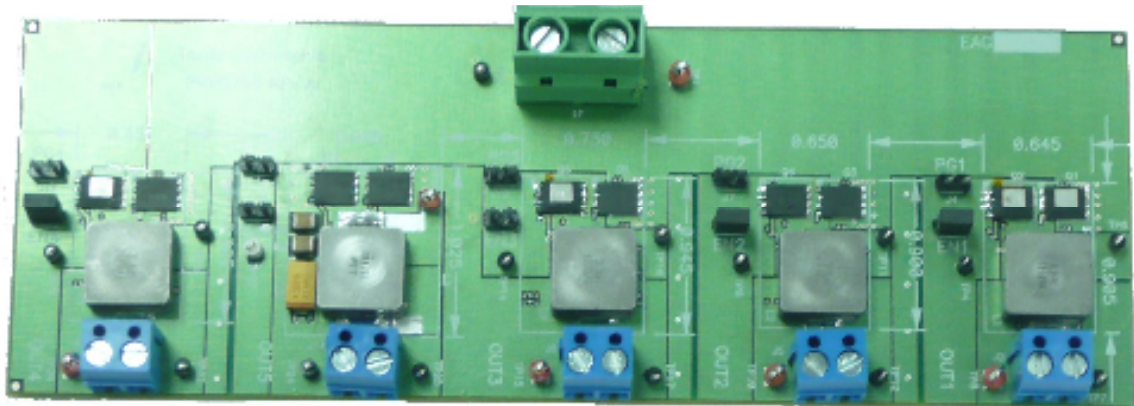
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Operating Parameters

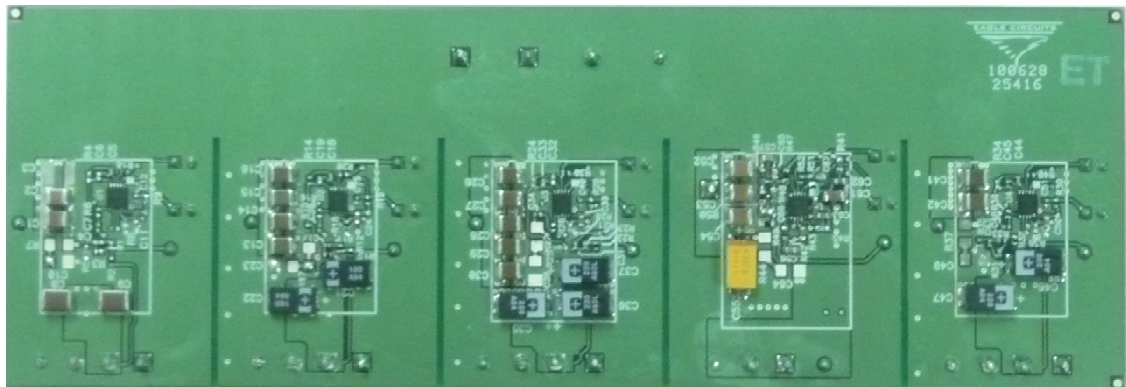
Parameter	Min	Typ	Max	Unit
V _{in}	12	18	20	V
V _{out}		4		V
		3.3		V
		2.5		V
		0.9		V
		-4		V
I _{out}	3		14	A
F _{switching}	300		1200	kHz

1 Board Images

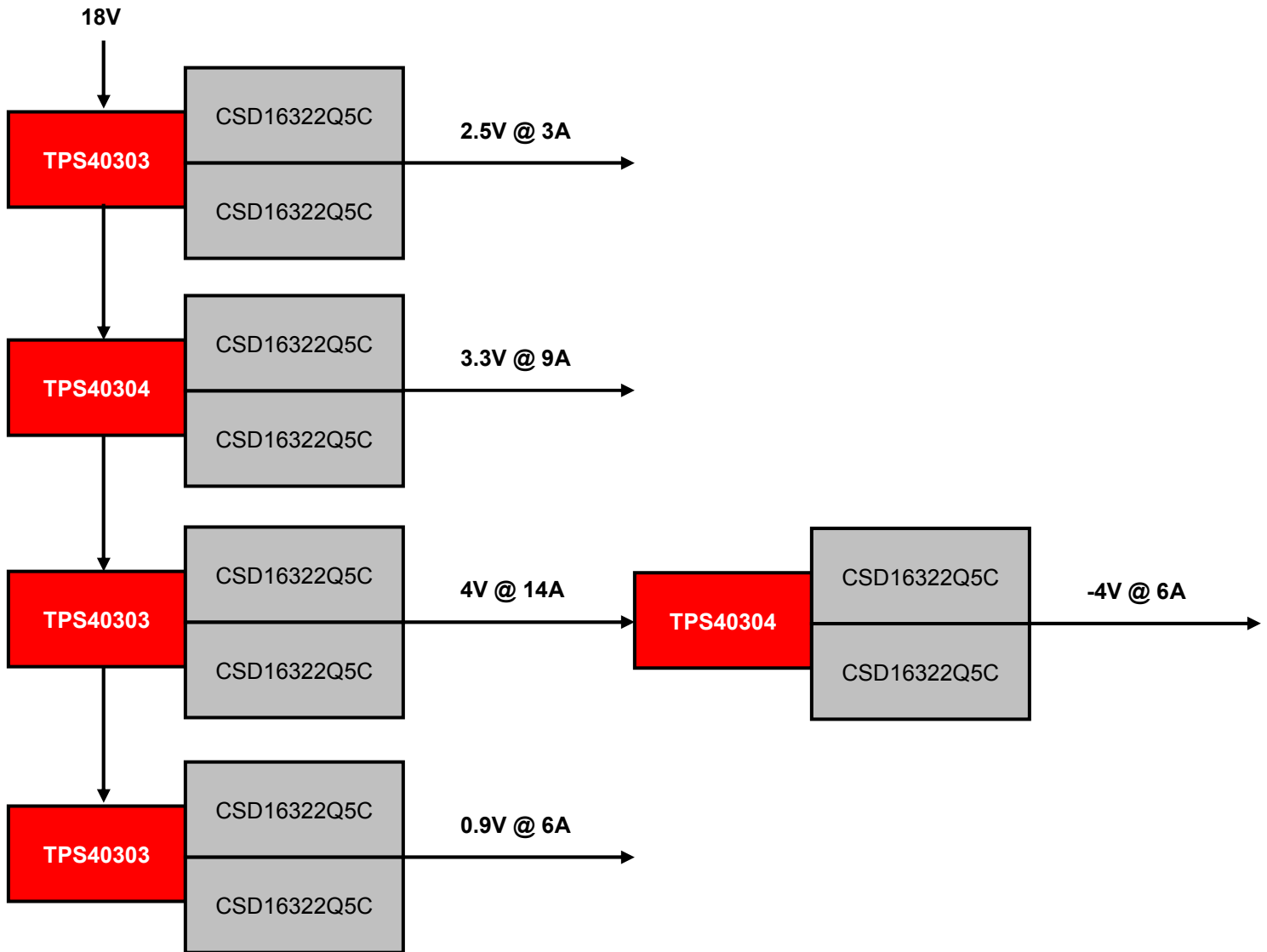
1.1 Top



1.2 Bottom



2 Block Diagram



3 TPS40303 – 4.0V @ 14A

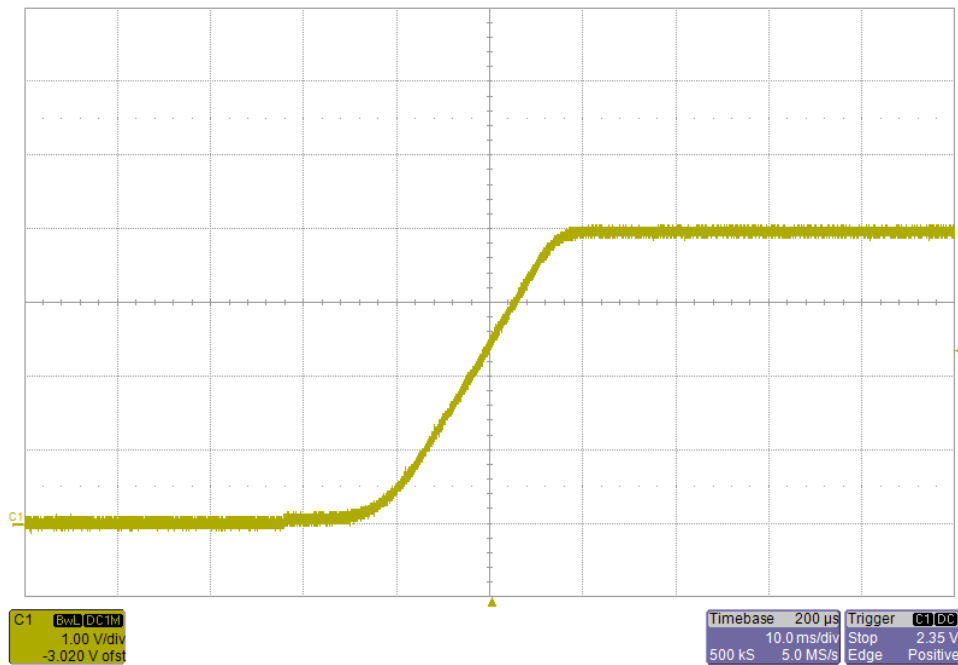
3.1 Performance Summary

Performance parameters below represent data obtained from the PMP5754 design; changes to the design, component selection or layout may result in varied performance.

Parameter	Test Conditions	Min	Typ	Max	Unit
Loop Bandwidth	$V_{in} = 18V, I_{out} = 14A$		29.28		kHz
Phase Margin	$V_{in} = 18V, I_{out} = 14A$		67.76		°
Output Voltage Ripple	$I_{out} = 14A$		9.5		mV
Maximum Efficiency			95		%
Load Regulation	$V_{in} = 18V, I_{out} = 0A \text{ to } 14A$		0.4		%
Switching Frequency	$I_{out} = 14A$		306		kHz

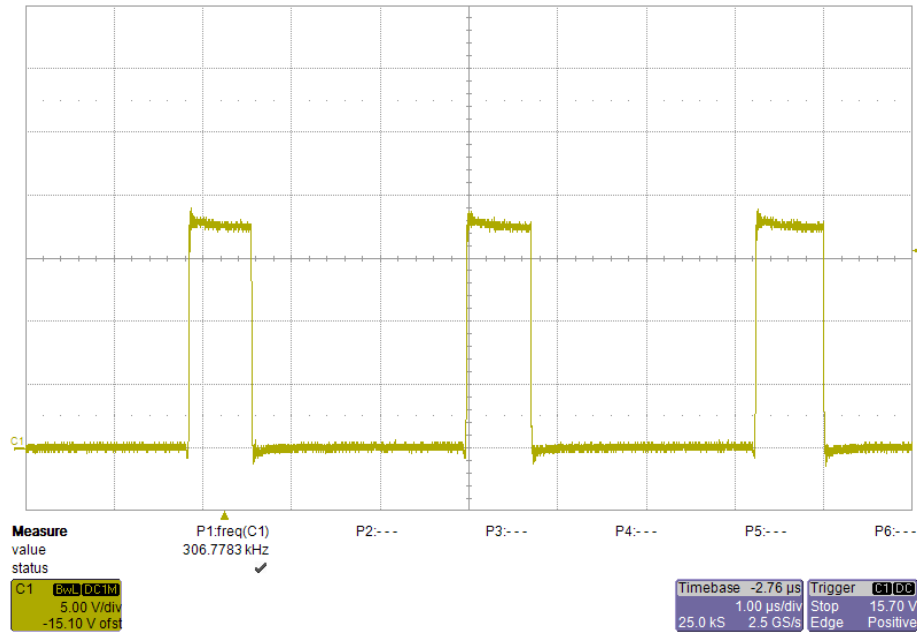
3.2 Start-up Waveform

$V_{in} = 18V, V_{out} = 4.0V, I_{out} = 1A$

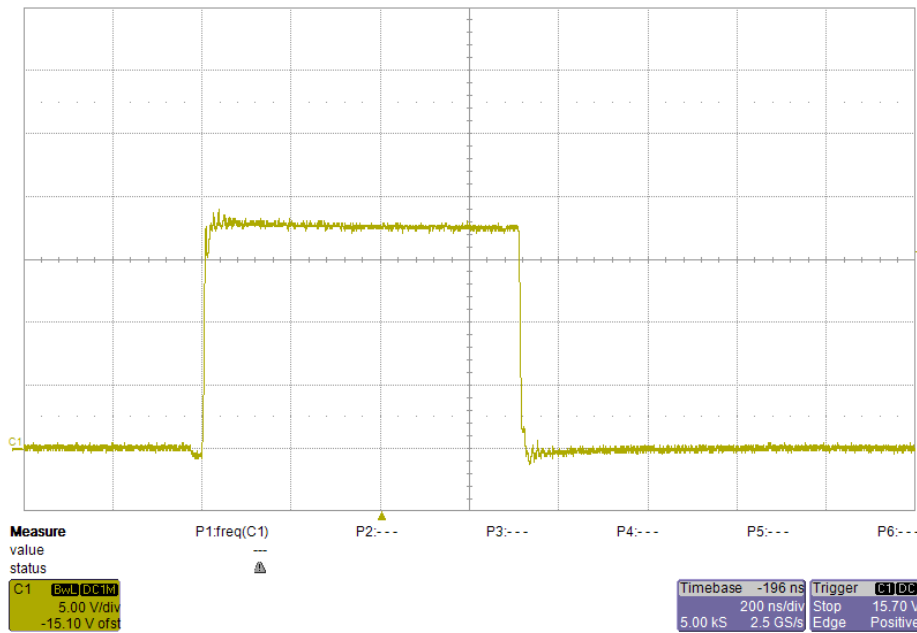


3.3 Switch Node

$V_{in} = 18V$, $V_{out} = 4.0V$, $I_{out} = 14A$

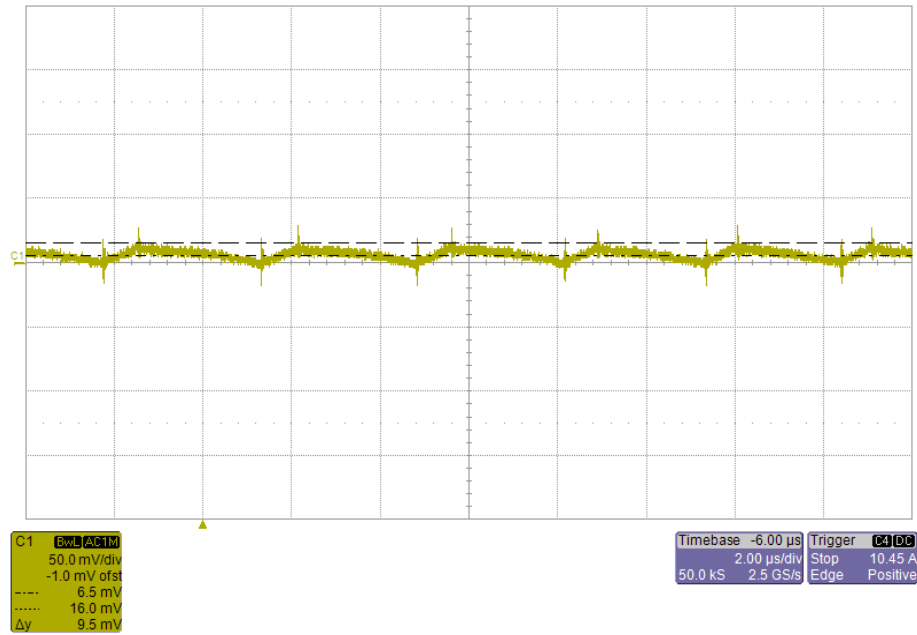


Zoom



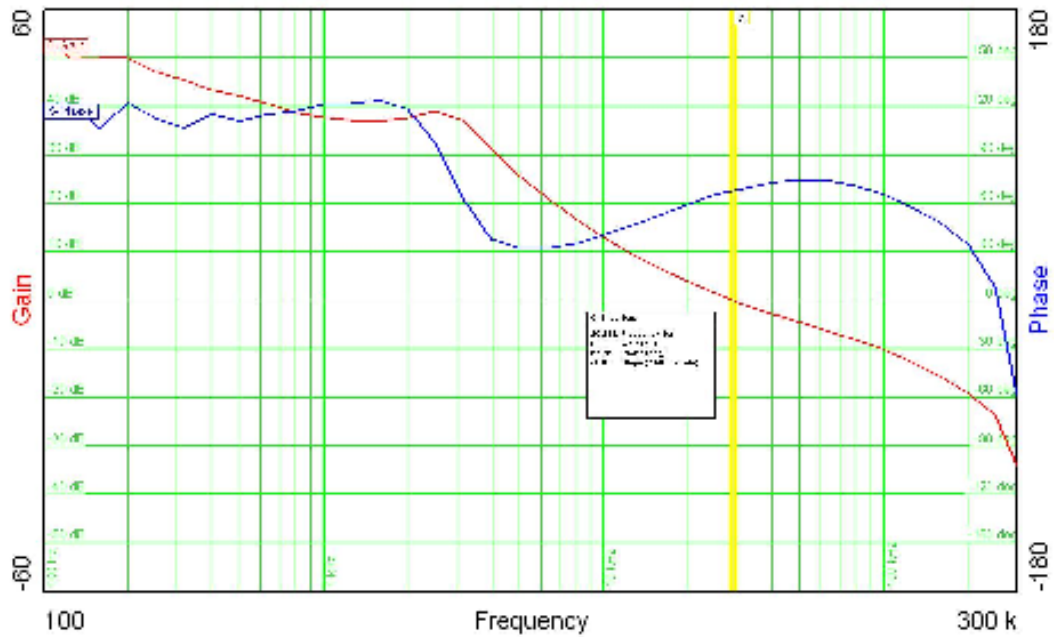
3.4 Output Voltage Ripple

$V_{in} = 18V, V_{out} = 4.0V, I_{out} = 14A$



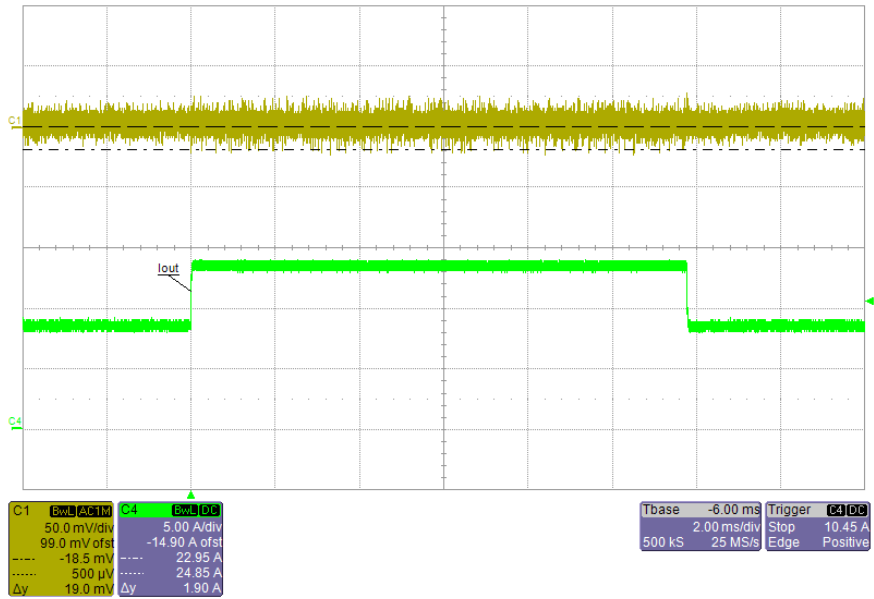
3.5 Loop Response

$V_{in} = 18V, V_{out} = 4.0V, I_{out} = 14A$

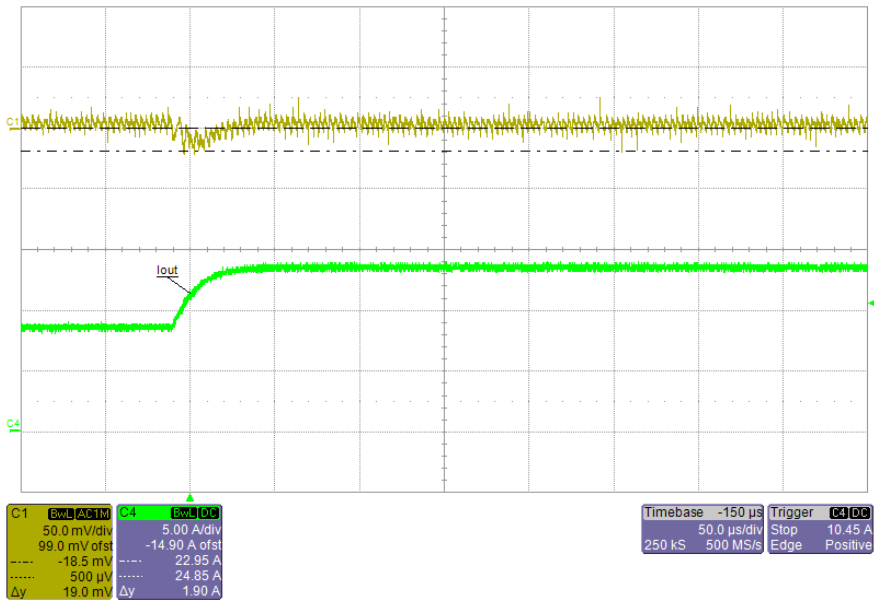


3.6 Load Transient

$V_{in} = 18V$, $V_{out} = 4.0V$, $I_{out} = 9A$ to $14A$



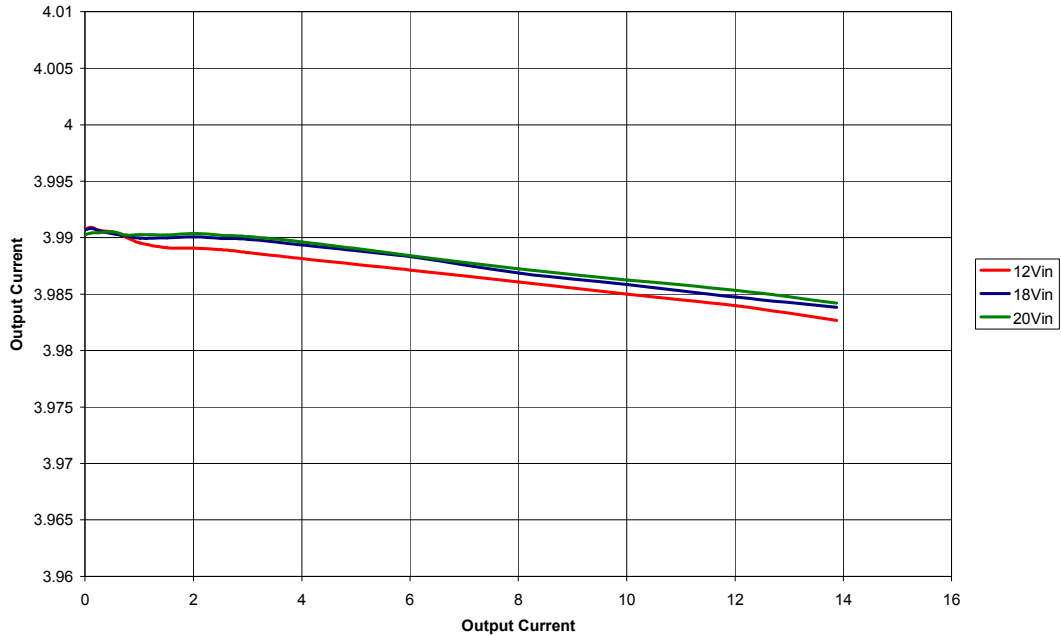
Zoom



3.7 Load Regulation

$V_{out} = 4.0V$

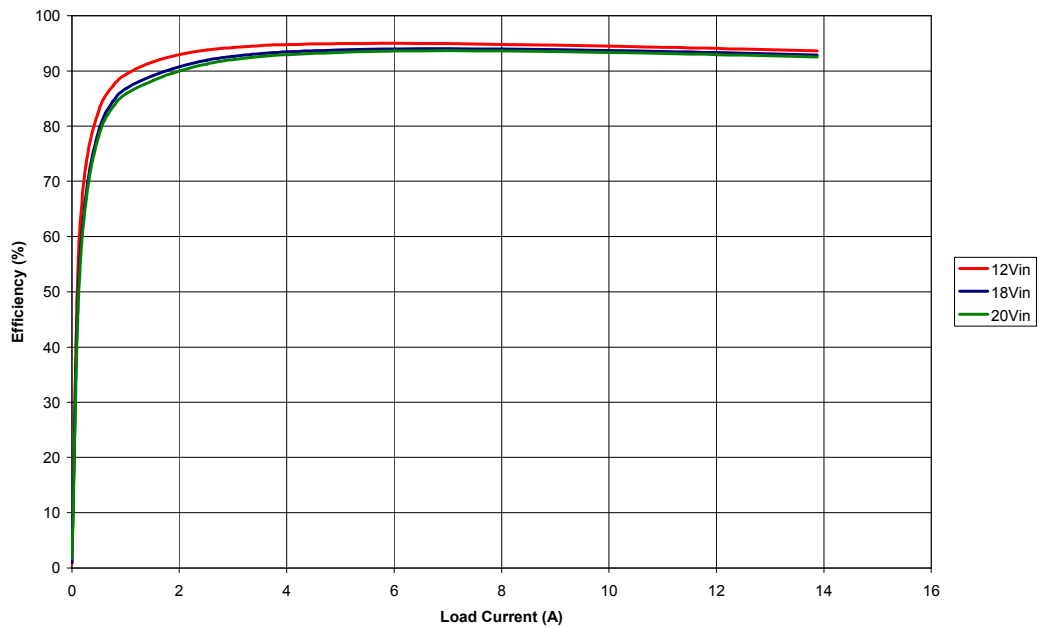
Output Voltage vs Output Current



3.8 Efficiency

$V_{out} = 4.0V$

Efficiency vs Load Current



4 TPS40304 – 3.3V @ 9A

4.1 Performance Summary

Performance parameters below represent data obtained from the PMP5754 design; changes to the design, component selection or layout may result in varied performance.

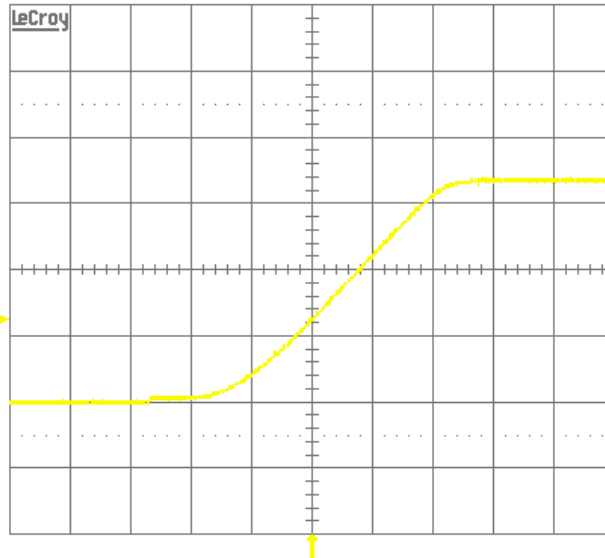
Parameter	Test Conditions	Min	Typ	Max	Unit
Loop Bandwidth	$V_{in} = 18V, I_{out} = 9A$		70.69		kHz
Phase Margin	$V_{in} = 18V, I_{out} = 9A$		55.29		°
Output Voltage Ripple	$I_{out} = 9A$		10		mV
Maximum Efficiency			94.52		%
Load Regulation	$V_{in} = 18V, I_{out} = 0A \text{ to } 9A$		0.9		%
Switching Frequency	$I_{out} = 9A$		609		kHz

4.2 Start-up Waveform

$V_{in} = 18V, V_{out} = 3.3V, I_{out} = 500mA$

20-Jul-10
13:41:32

5 ms
1.0V



5 ms BWL
1 .1 V DC $\times \frac{20}{10}$
2 1 V DC $\times \frac{10}{10}$
3 .2 V DC $\times \frac{10}{10}$
4 .2 V DC $\times \frac{10}{10}$

—|

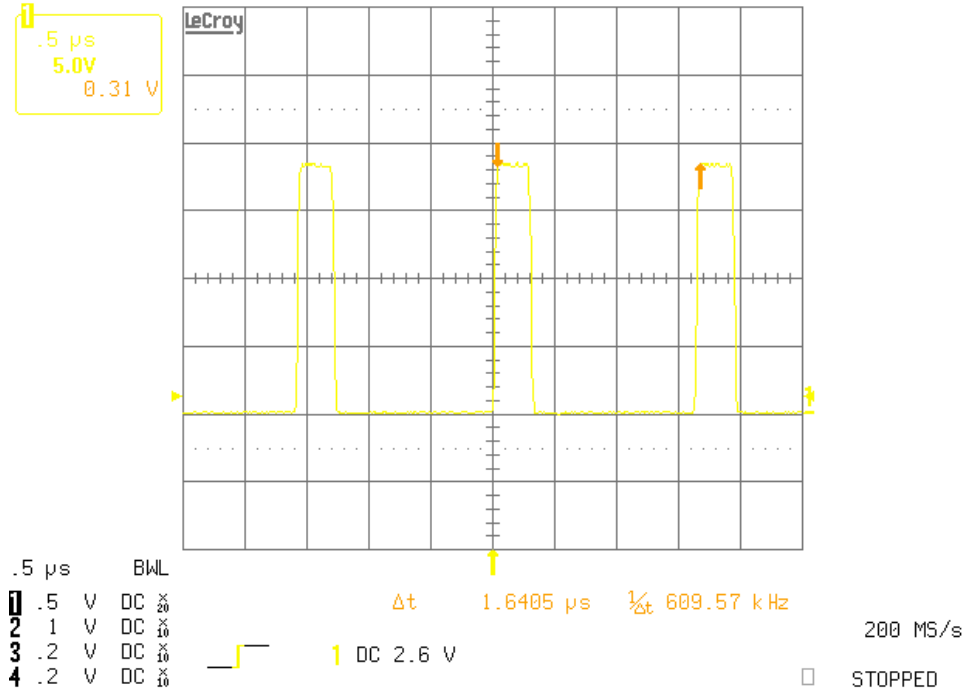
1 DC 2.52 V

500 kS/s
SLOW TRIGGER
 NORMAL

4.3 Switch Node

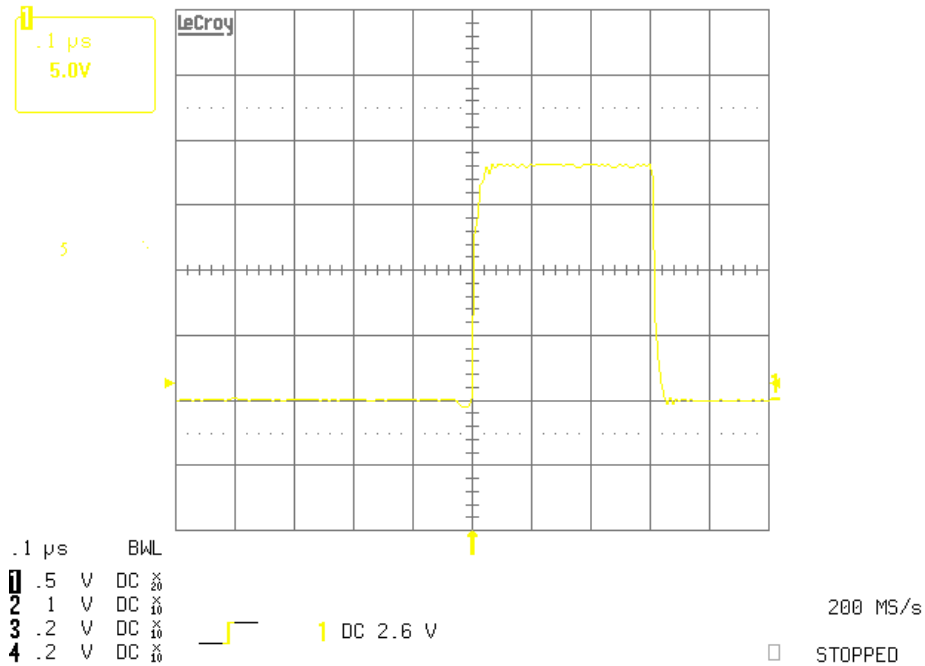
$V_{in} = 18V$, $V_{out} = 3.3V$, $I_{out} = 9A$

20-Jul-10
13:43:40



Zoom

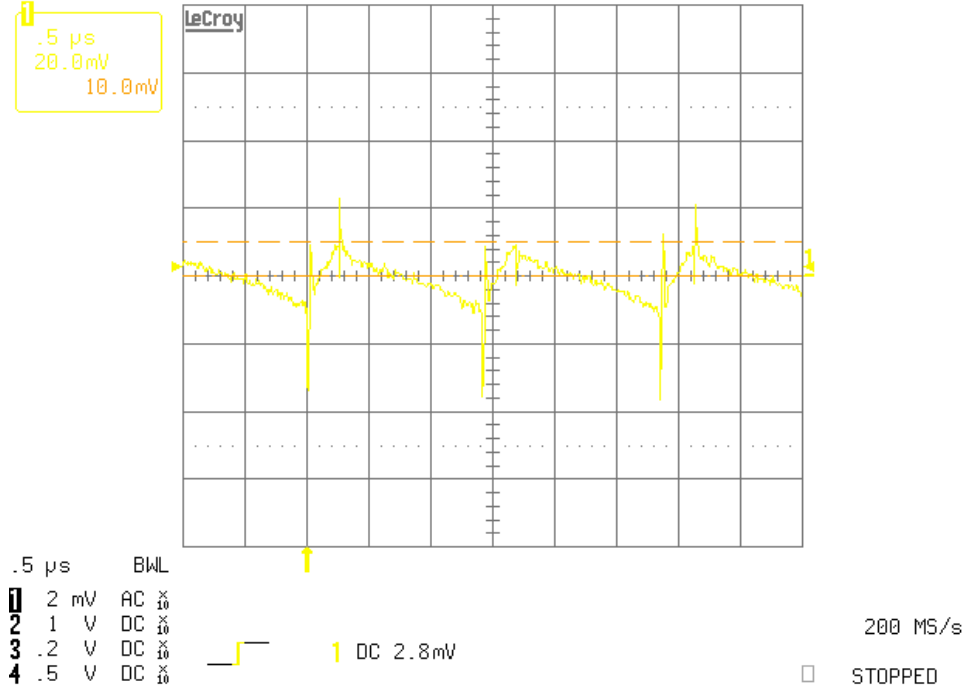
20-Jul-10
13:44:23



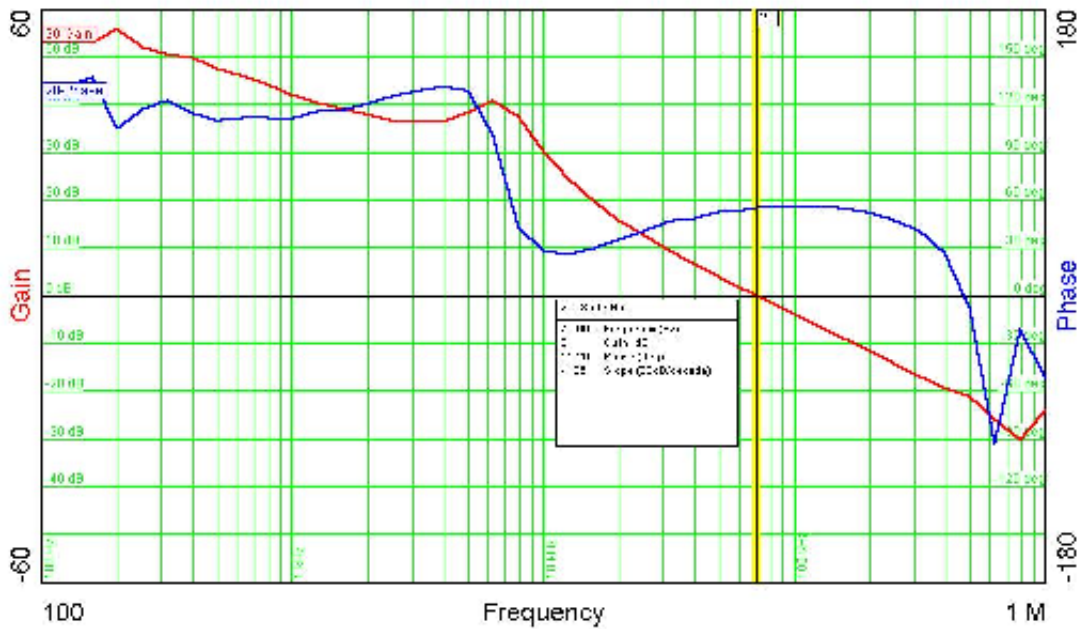
4.4 Output Voltage Ripple

$V_{in} = 18V, V_{out} = 3.3V, I_{out} = 9A$

22-Jul-10
 20:19:07



4.5 Loop Response

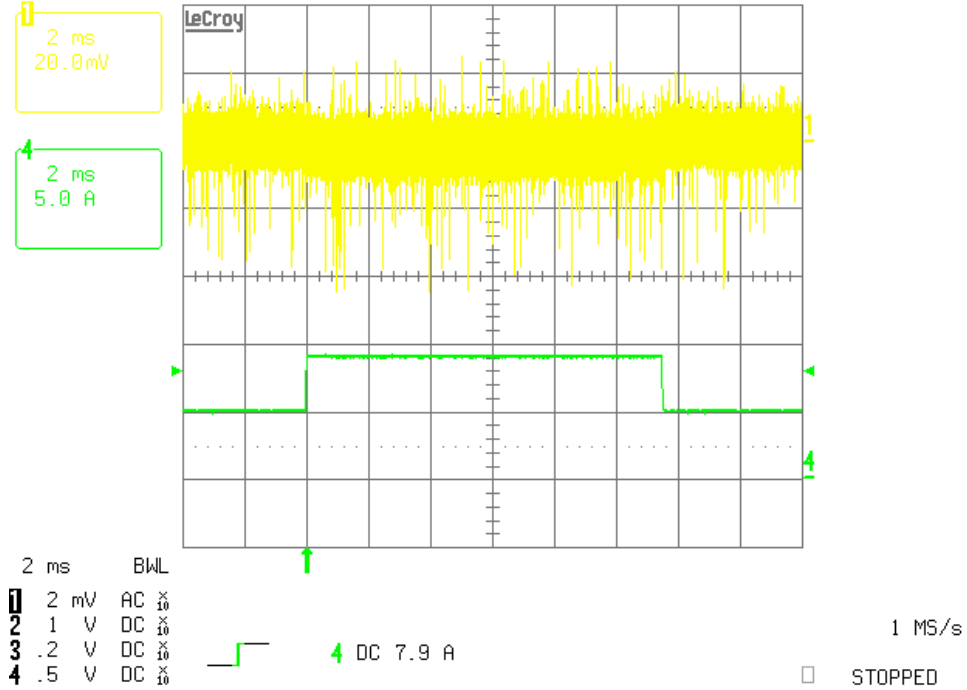


Phase Margin = 55.29 @ 70.69 kHz

4.6 Load Transient

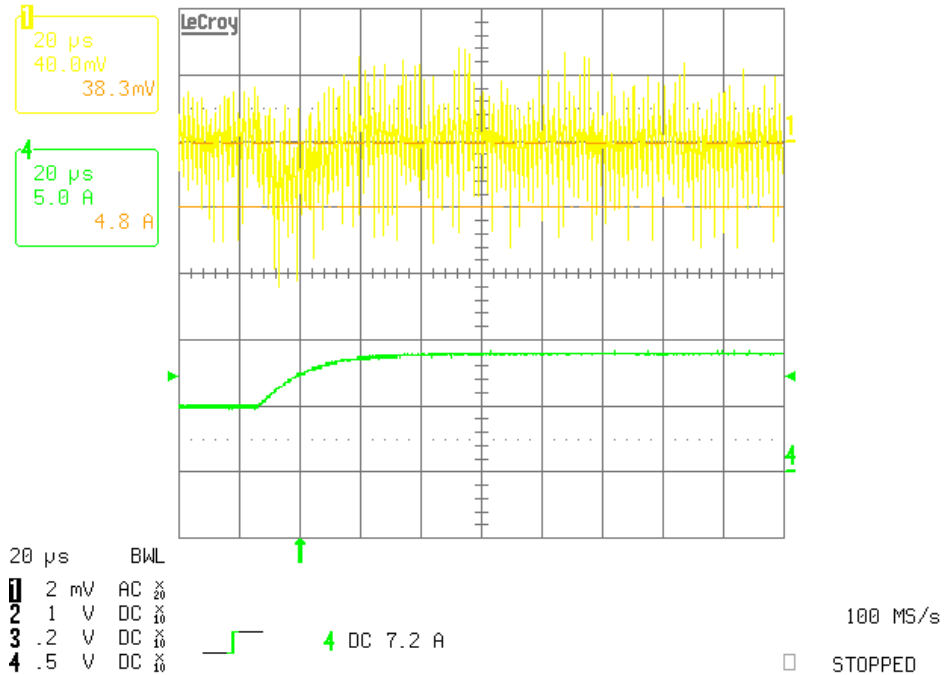
$V_{in} = 18V$, $V_{out} = 3.3V$, $I_{out} = 5A$ to $9A$

22-Jul-10
20:13:09



Zoom

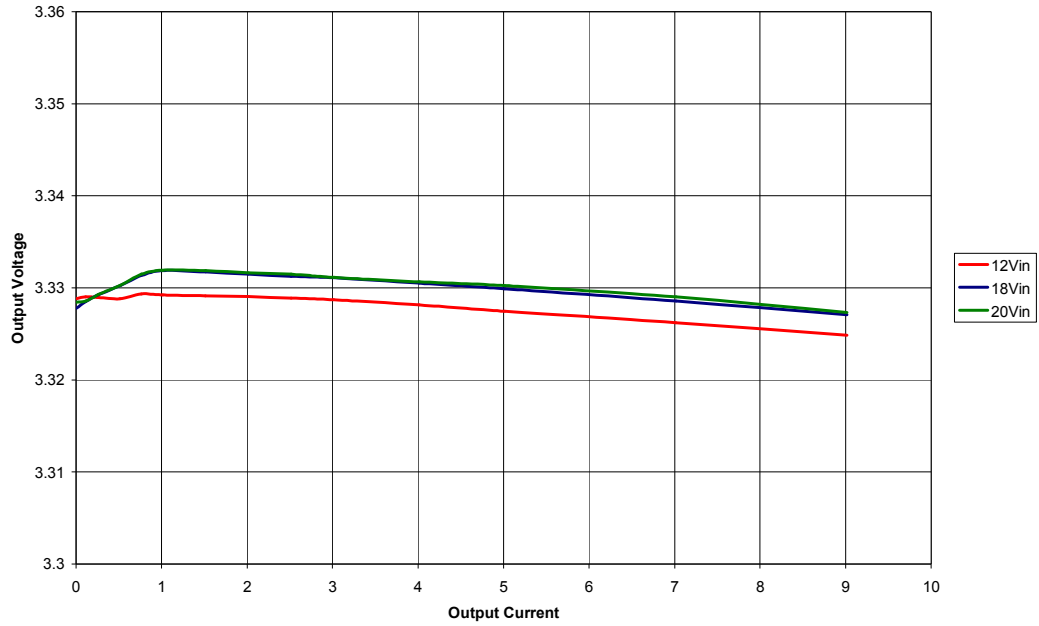
20-Jul-10
13:56:25



4.7 Load Regulation

$V_{out} = 3.3V$

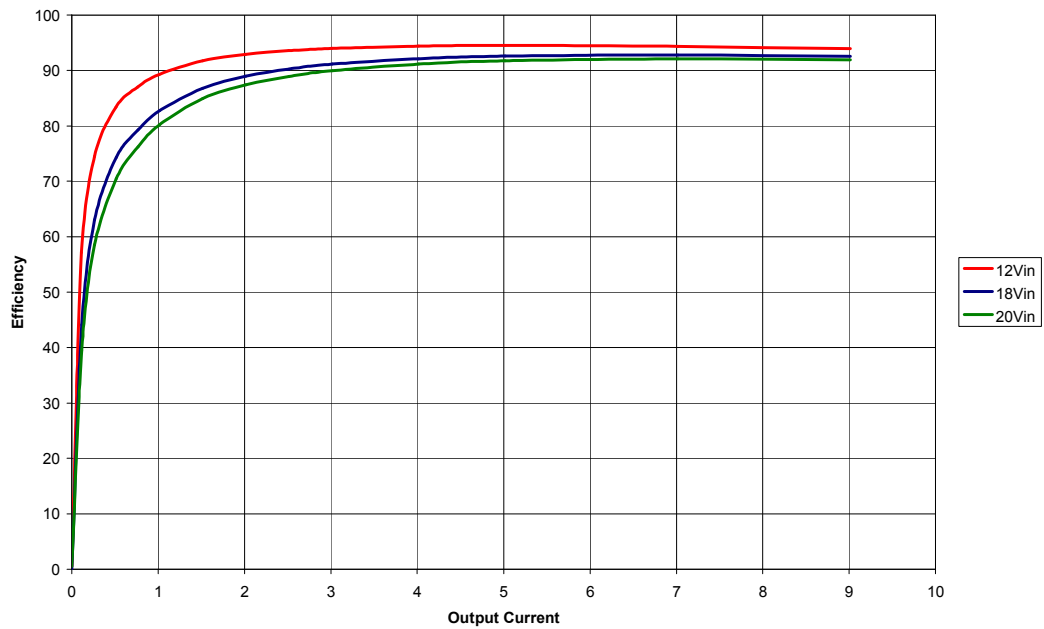
Output Voltage vs Output Current



4.8 Efficiency

$V_{out} = 3.3V$

Efficiency vs Output Current



5 TPS40304 – 2.5V @ 3A

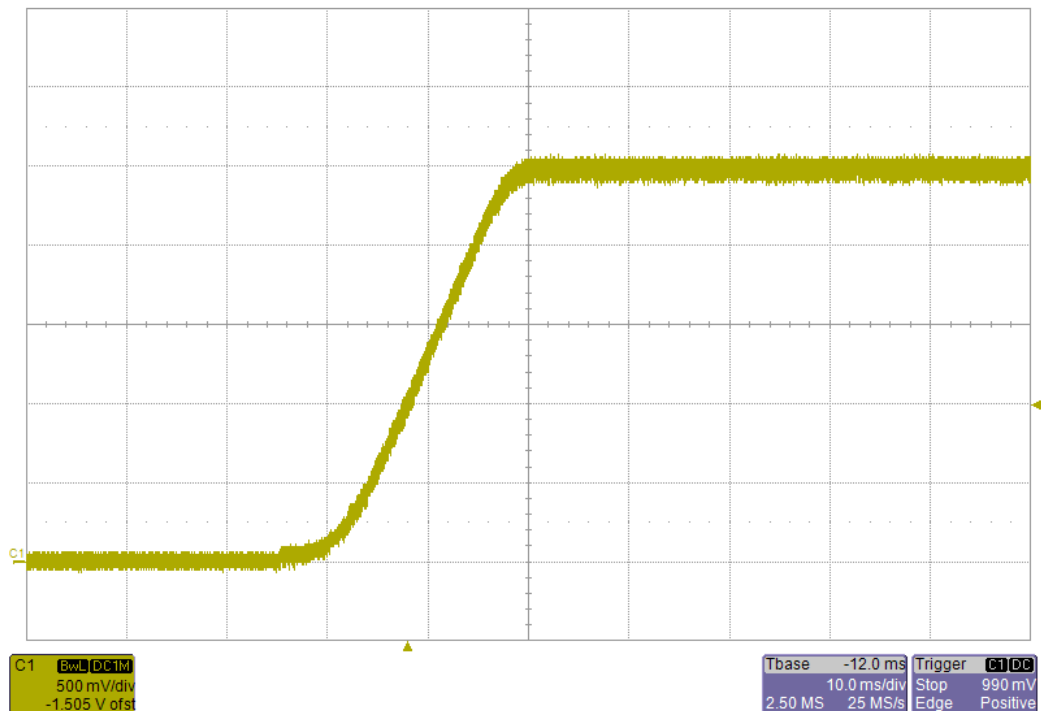
5.1 Performance Summary

Performance parameters below represent data obtained from the PMP5754 design; changes to the design, component selection or layout may result in varied performance.

Parameter	Test Conditions	Min	Typ	Max	Unit
Loop Bandwidth	$V_{in} = 18V, I_{out} = 3A$		72.52		kHz
Phase Margin	$V_{in} = 18V, I_{out} = 3A$		46.56		°
Output Voltage Ripple	$I_{out} = 3A$		6		mV
Maximum Efficiency			91.24		%
Load Regulation	$V_{in} = 18V, I_{out} = 0A \text{ to } 3A$		0.4		%
Switching Frequency	$I_{out} = 3A$		624		kHz

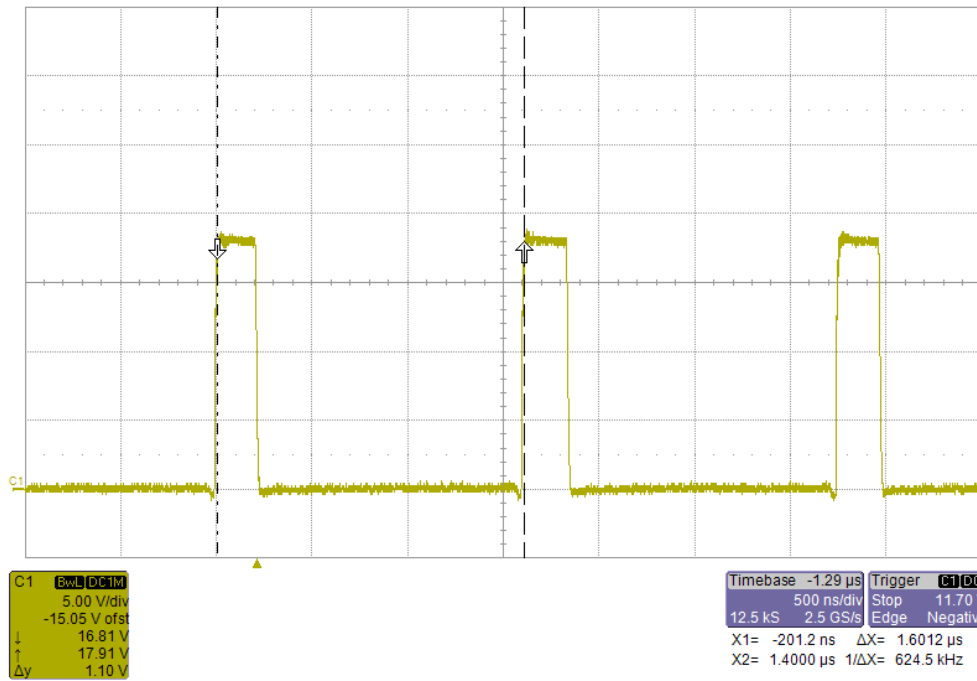
5.2 Start-up Waveform

$V_{in} = 18V, V_{out} = 2.5V, I_{out} = 500mA$

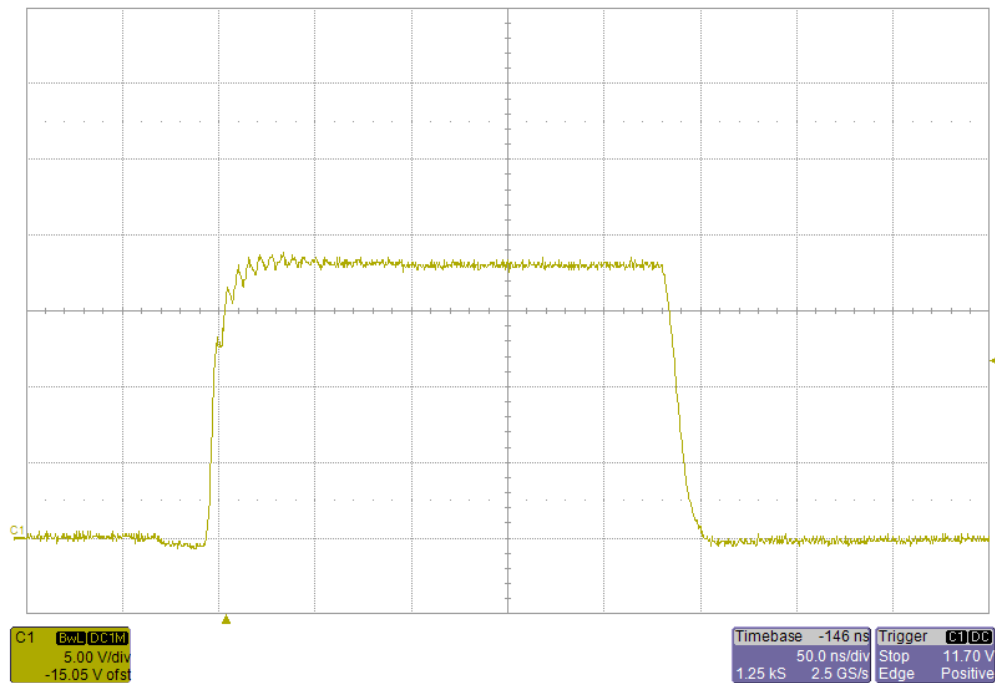


5.3 Switch Node

$V_{in} = 18V$, $V_{out} = 2.5V$, $I_{out} = 3A$

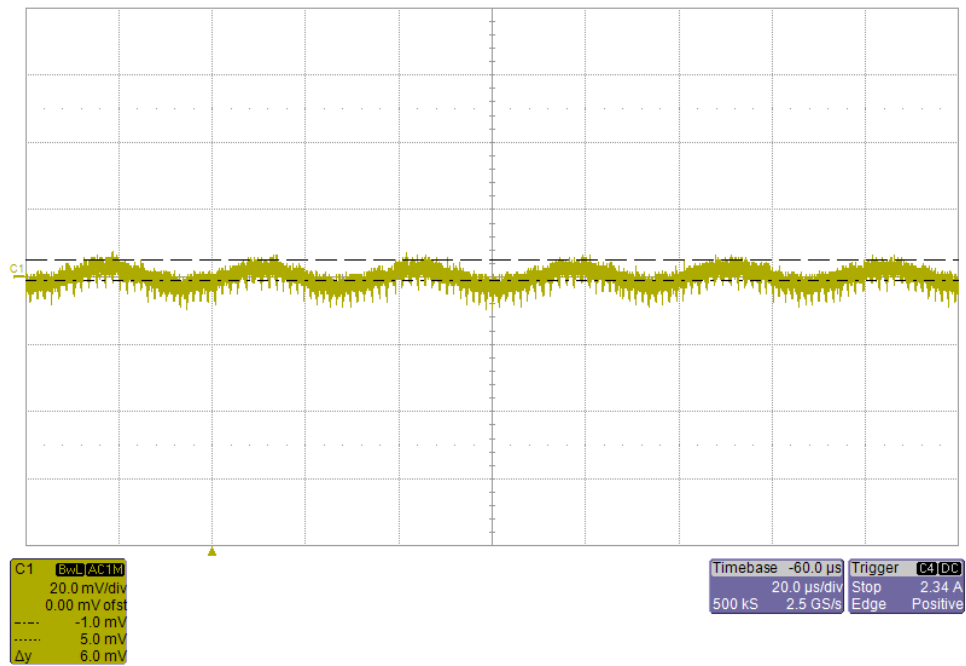


Zoom



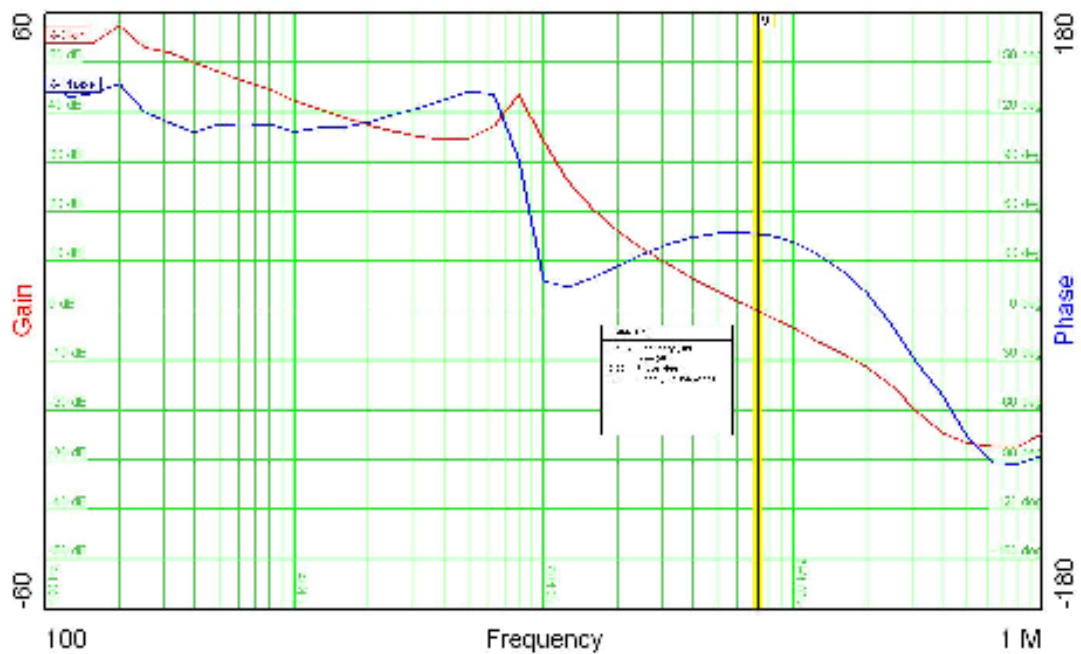
5.4 Output Voltage Ripple

$V_{in} = 18V$, $V_{out} = 2.5V$, $I_{out} = 3A$



5.5 Loop Response

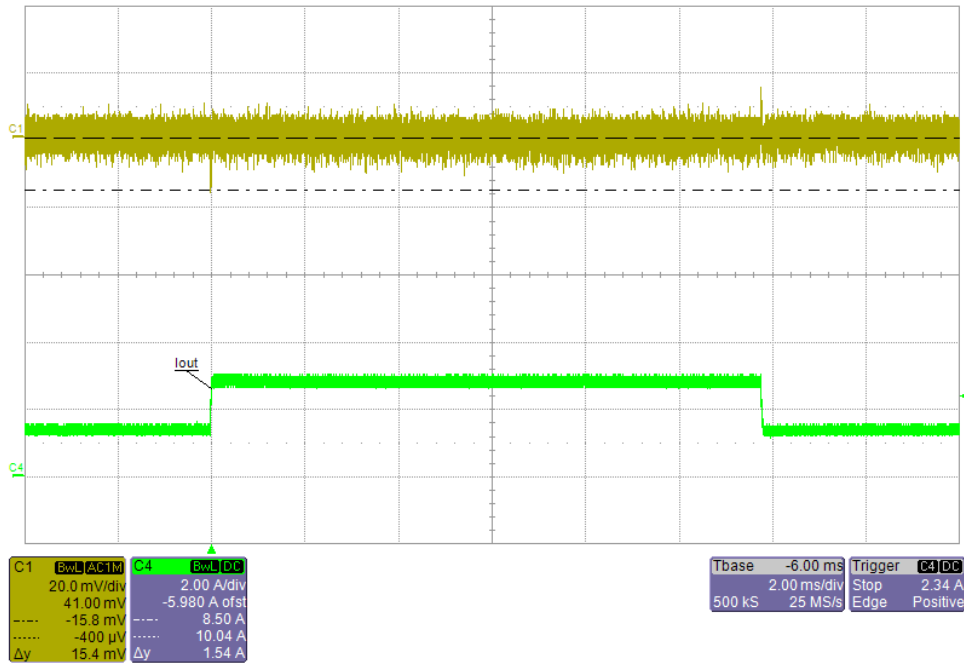
$V_{in} = 18V$, $V_{out} = 2.5V$, $I_{out} = 3A$



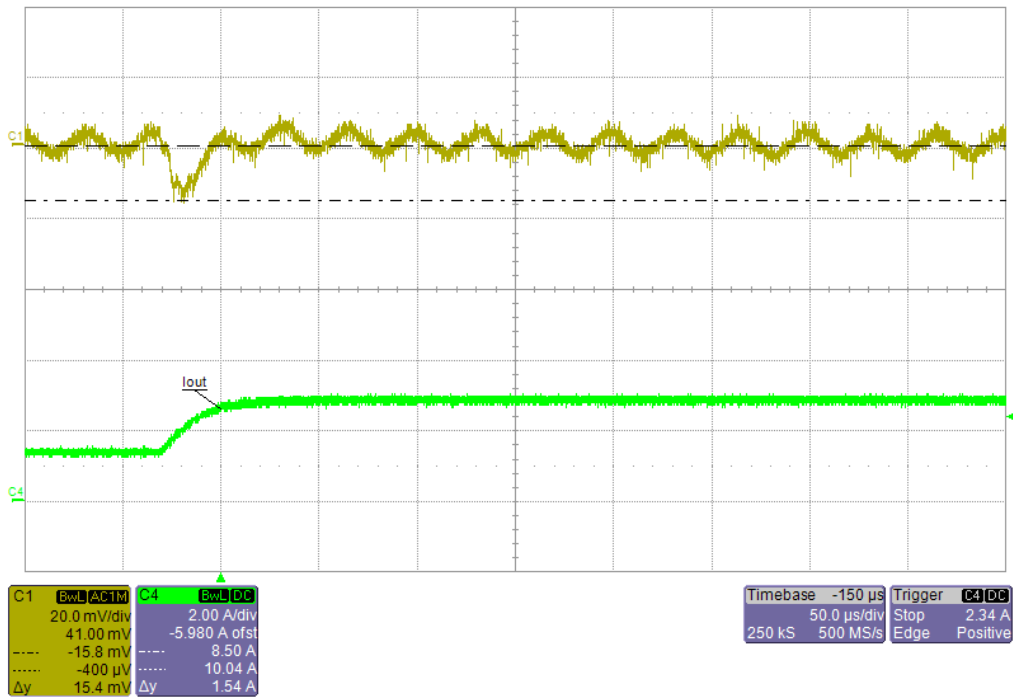
Phase Margin 46.56 @ 72.52 kHz

5.6 Load Transient

$V_{in} = 18V$, $V_{out} = 2.5V$, $I_{out} = 1.5A$ to $3A$



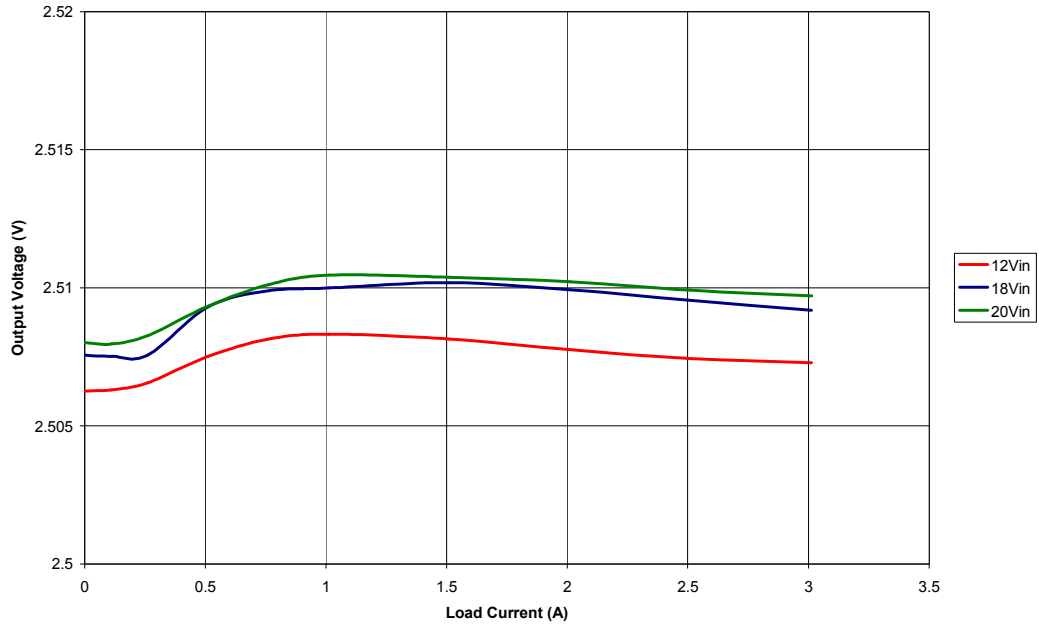
Zoom



5.7 Load Regulation

$V_{in} = 2.5V$

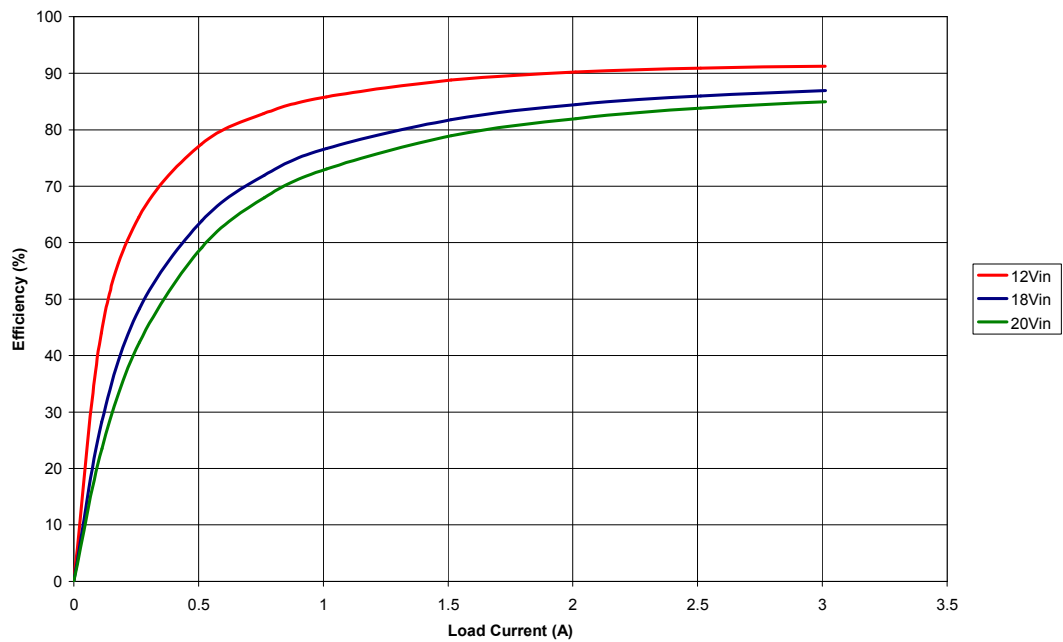
Output Voltage vs Load Current



5.8 Efficiency

$V_{in} = 2.5V$

Efficiency vs Load Current



6 TPS40303 – 0.9V @ 6A

6.1 Performance Summary

Performance parameters below represent data obtained from the PMP5754 design; changes to the design, component selection or layout may result in varied performance.

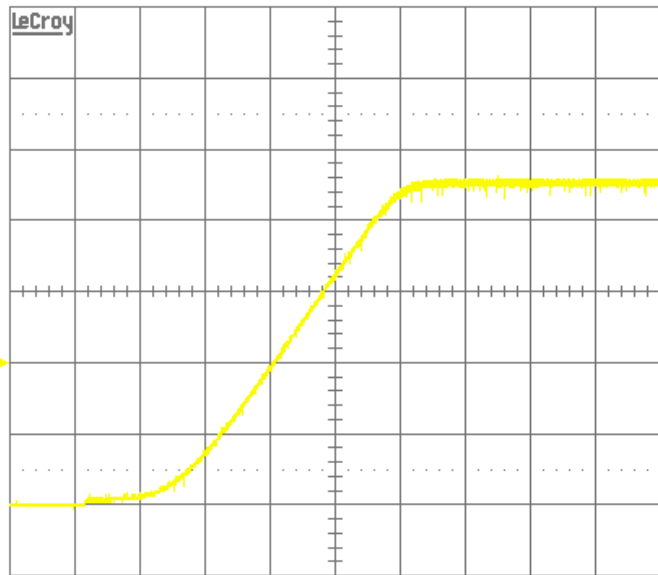
Parameter	Test Conditions	Min	Typ	Max	Unit
Loop Bandwidth	$V_{in} = 18V, I_{out} = 6A$		62.73		kHz
Phase Margin	$V_{in} = 18V, I_{out} = 6A$		49.73		°
Output Voltage Ripple	$I_{out} = 6A$		9		mV
Maximum Efficiency			90.14		%
Load Regulation	$V_{in} = 18V, I_{out} = 0A \text{ to } 6A$		0.3		%
Switching Frequency	$I_{out} = 6A$		306		kHz

6.2 Start-up Waveform

$V_{in} = 18V, V_{out} = 0.9V, I_{out} = 500mA$

22-Jul-10
17:50:08

5 ms
200mV



5 ms BWL

1 20 mV DC \times
2 1 V DC \times
3 .2 V DC \times
4 .5 V DC \times



1 DC 0.400 V

500 kS/s

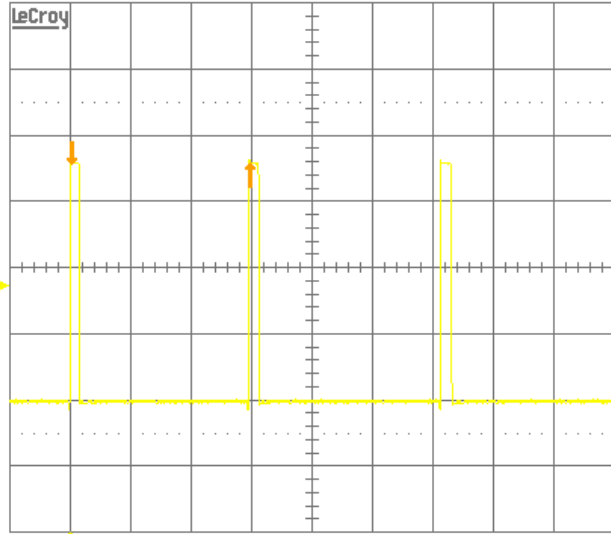
STOPPED

6.3 Switch Node

$V_{in} = 18V$, $V_{out} = 0.9V$, $I_{out} = 6A$

22-Jul-10
18:05:02

2 μs
5.0 V
0.16 V



2 μs BWL
1 .5 V DC $\times \frac{10}{10}$
2 1 V DC $\times \frac{10}{10}$
3 .2 V DC $\times \frac{10}{10}$
4 .2 V DC $\times \frac{10}{10}$

Δt 5.900 μs $\frac{1}{\Delta t}$ 169.48 kHz

1 DC 8.7 V

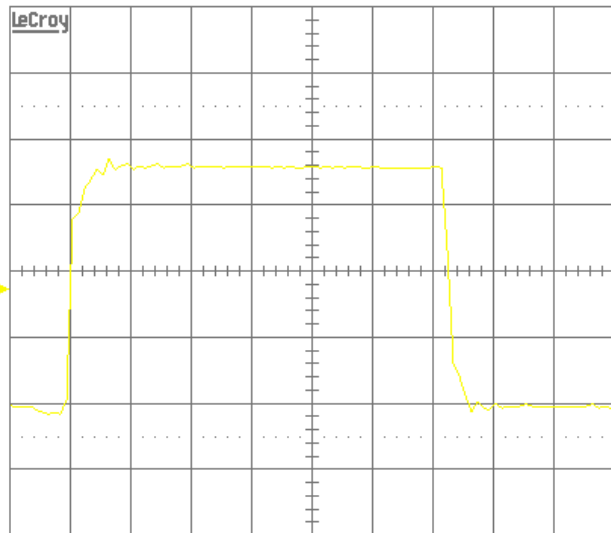
200 MS/s

STOPPED

Zoom

22-Jul-10
18:05:45

50 ns
5.0 V



50 ns BWL
1 .5 V DC $\times \frac{10}{10}$
2 1 V DC $\times \frac{10}{10}$
3 .2 V DC $\times \frac{10}{10}$
4 .2 V DC $\times \frac{10}{10}$

1 DC 8.7 V

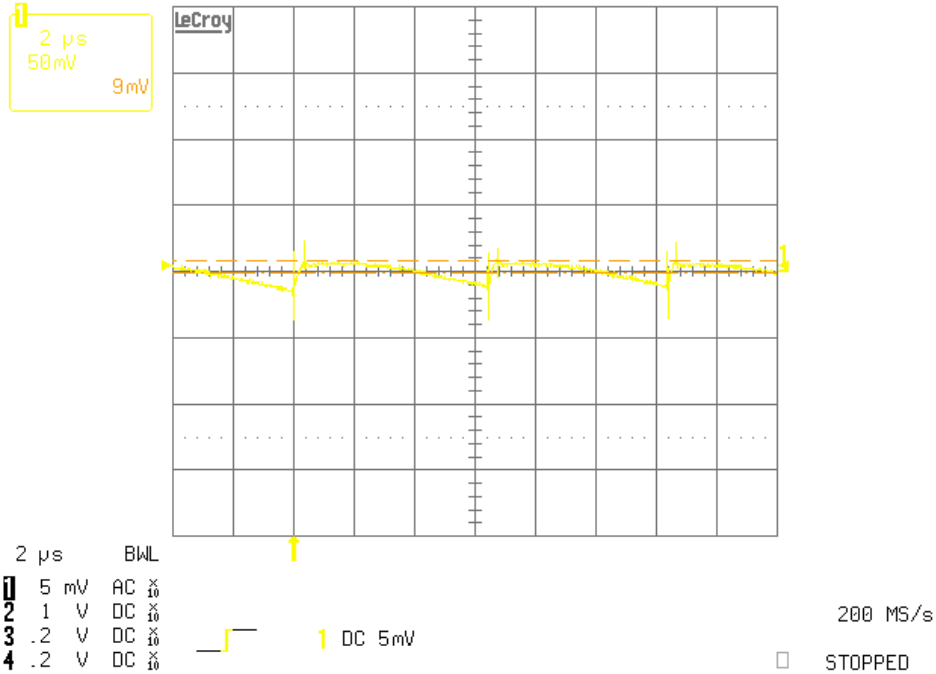
200 MS/s

STOPPED

6.4 Output Voltage Ripple

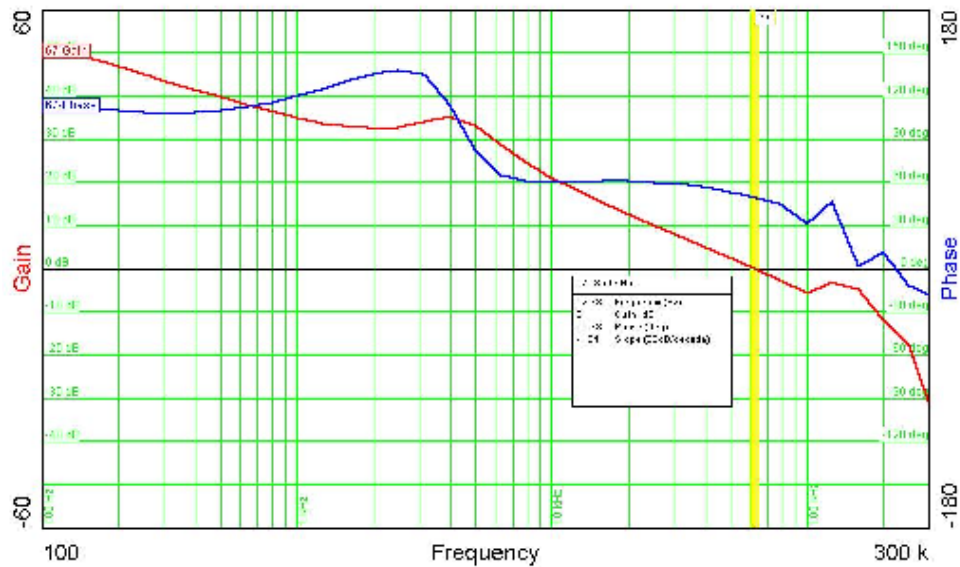
$V_{in} = 18V, V_{out} = 0.9V, I_{out} = 6A$

22-Jul-10
17:58:24



6.5 Loop Response

$V_{in} = 18V, V_{out} = 0.9V, I_{out} = 6A$



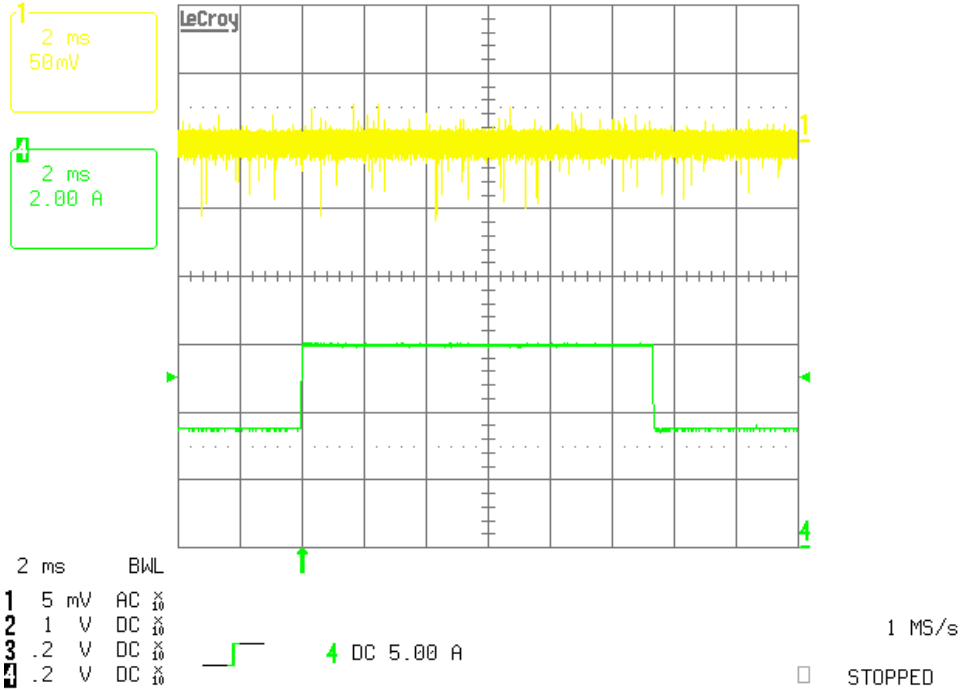
Phase Margin 49.73 @ 62.73 kHz

6.6 Load Transient

$V_{in} = 18V$, $V_{out} = 0.9V$, $I_{out} = 3A$ to $6A$

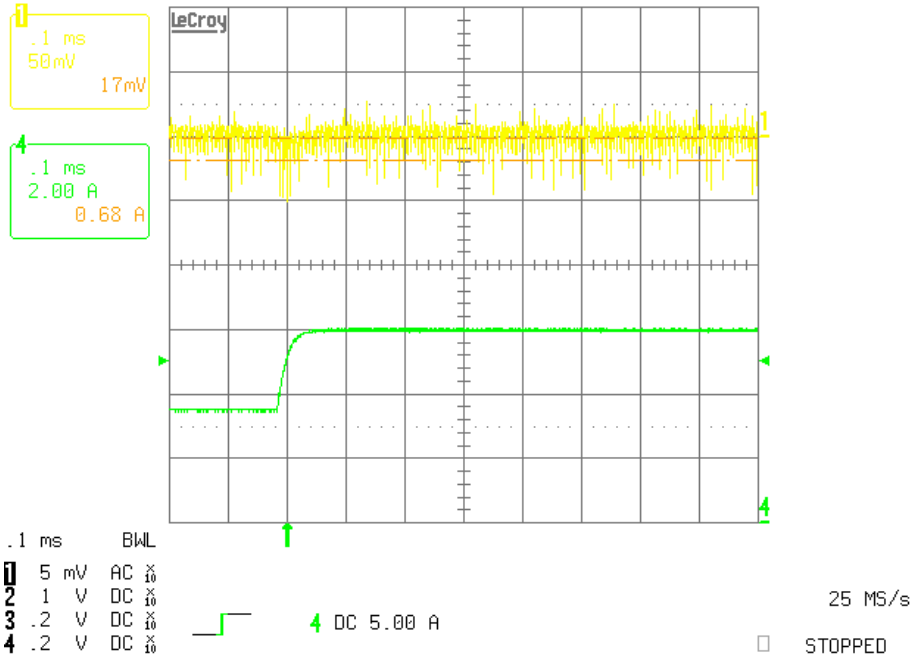
22-Jul-10
17:55:13

CHANNEL 4



Zoom

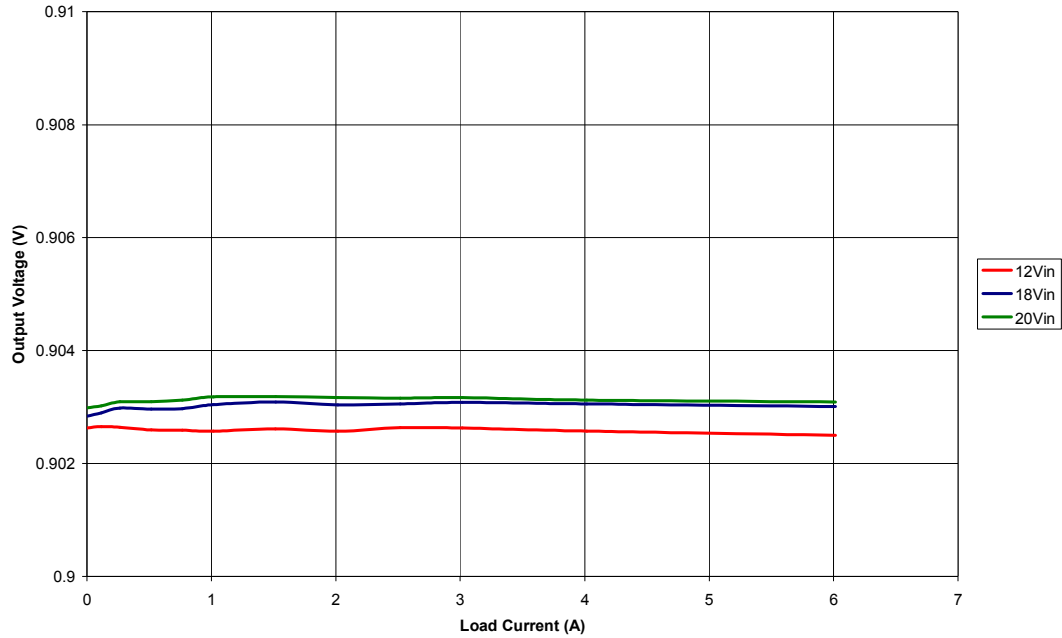
22-Jul-10
17:56:27



6.7 Load Regulation

$$V_{out} = 0.9V$$

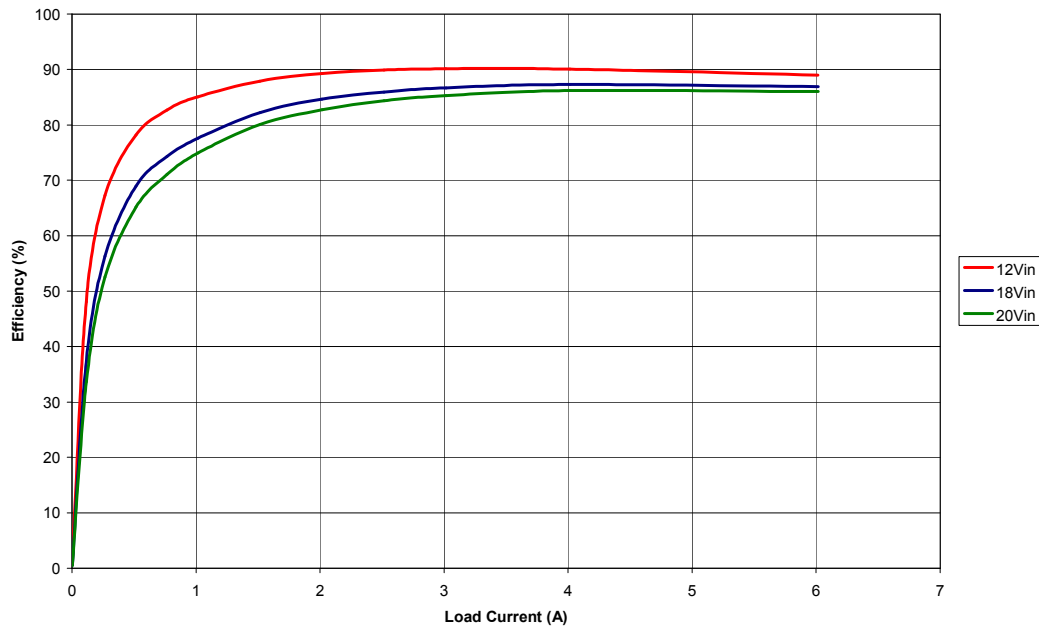
Output Voltage vs Load Current



6.8 Efficiency

$$V_{out} = 0.9V$$

Efficiency vs Load Current



7 TPS40304 – -4V @ 6A

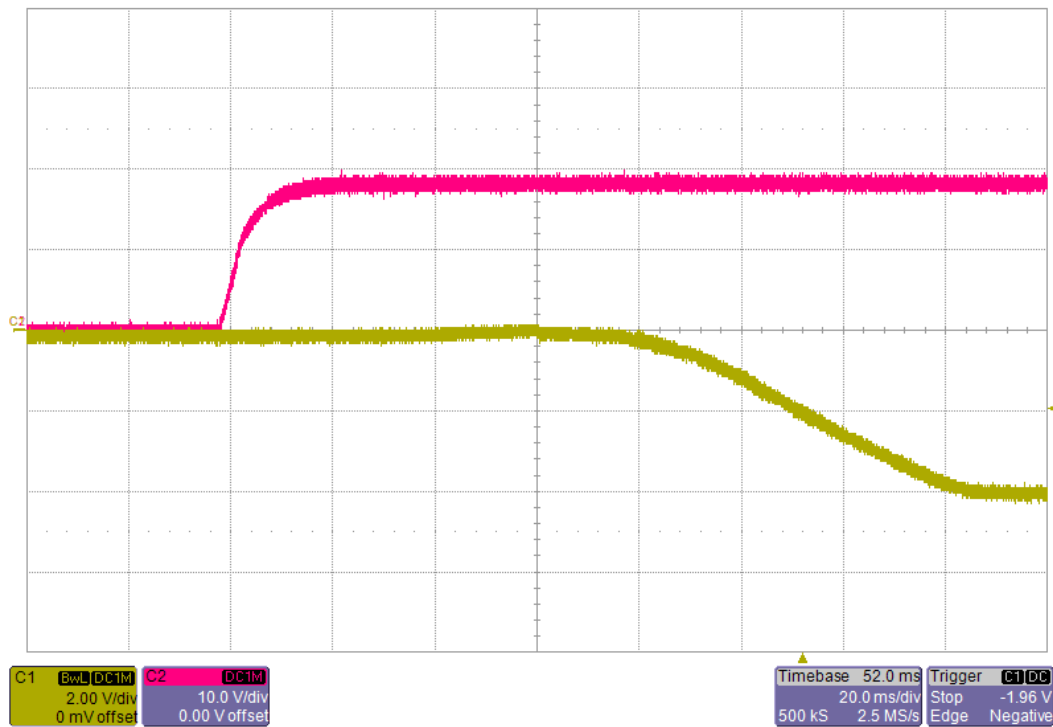
7.1 Performance Summary

Performance parameters below represent data obtained from the PMP5754 design; changes to the design, component selection or layout may result in varied performance.

Parameter	Test Conditions	Min	Typ	Max	Unit
Loop Bandwidth	$V_{in} = 18V, I_{out} = 6A$		9.545		kHz
Phase Margin	$V_{in} = 18V, I_{out} = 6A$		55.82		°
Output Voltage Ripple	$I_{out} = 6A$		40.8		mV
Maximum Efficiency			89.2		%
Load Regulation	$V_{in} = 18V, I_{out} = 0A \text{ to } 6A$		2.1		%
Switching Frequency	$I_{out} = 6A$		623		kHz

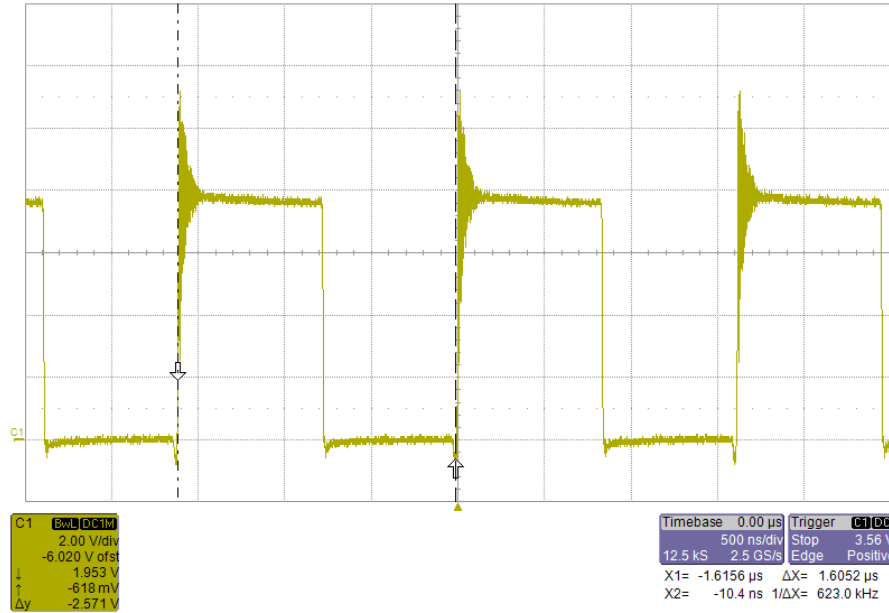
7.2 Start-up Waveform

$V_{in} = 18V, V_{out} = -4V, I_{out} = 500mA$

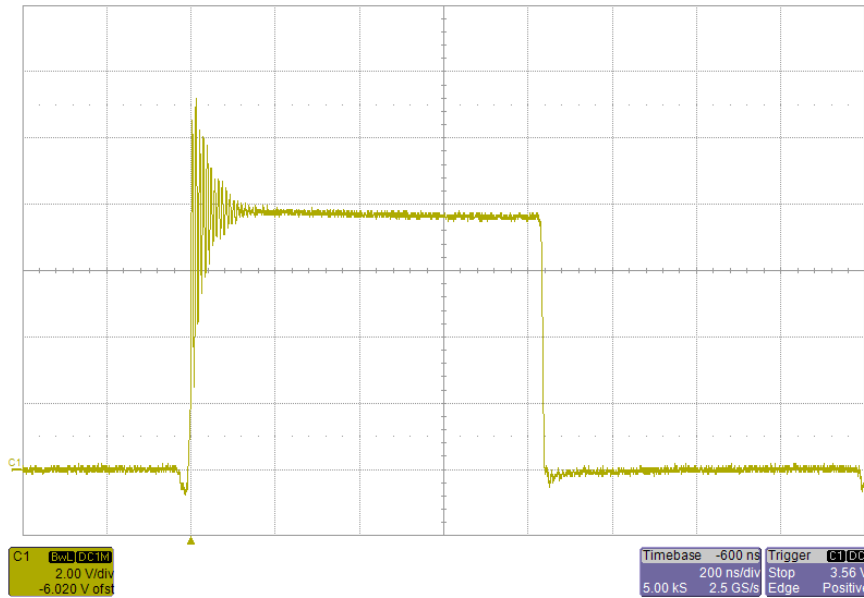


7.3 Switch Node

$V_{in} = 18V$, $V_{out} = -4V$, $I_{out} = 6A$

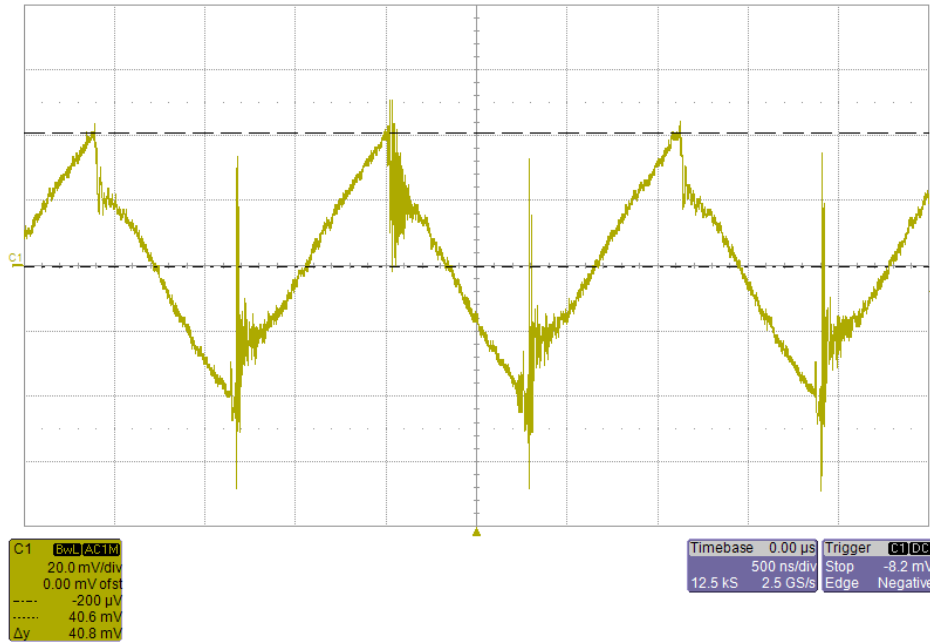


Zoom - $V_{in} = 18V$, $V_{out} = -4V$, $I_{out} = 6A$



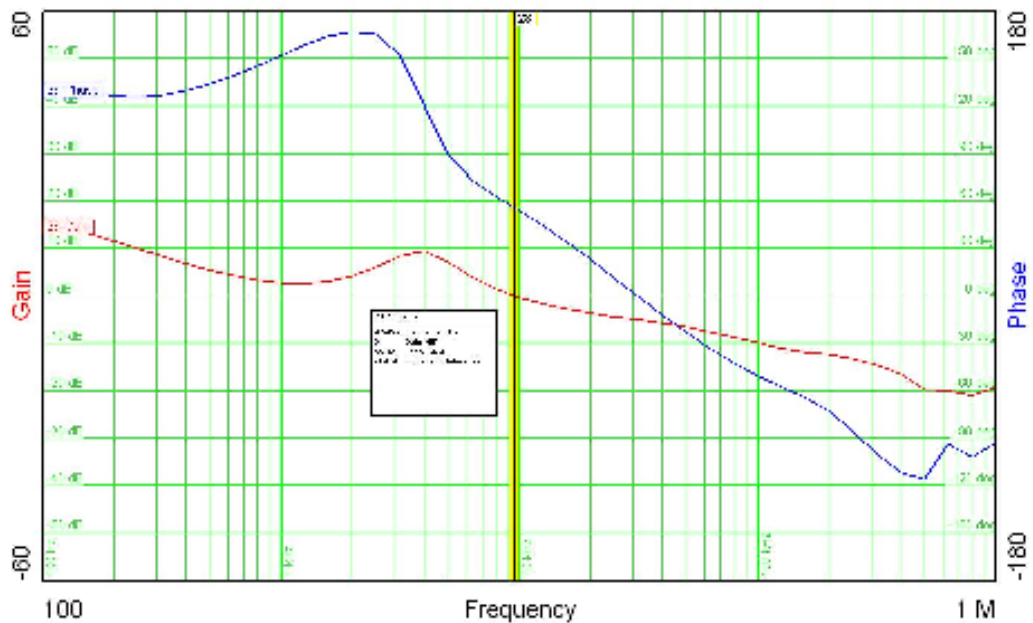
7.4 Output Voltage Ripple

$V_{in} = 18V$, $V_{out} = -4V$, $I_{out} = 6A$



7.5 Loop Response

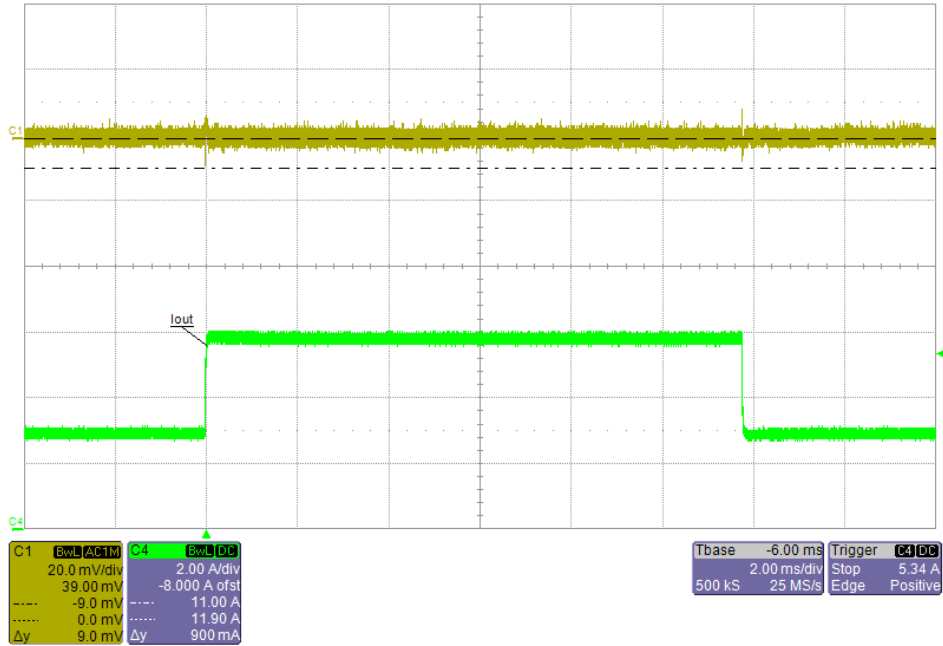
$V_{in} = 18V$, $V_{out} = -4V$, $I_{out} = 6A$



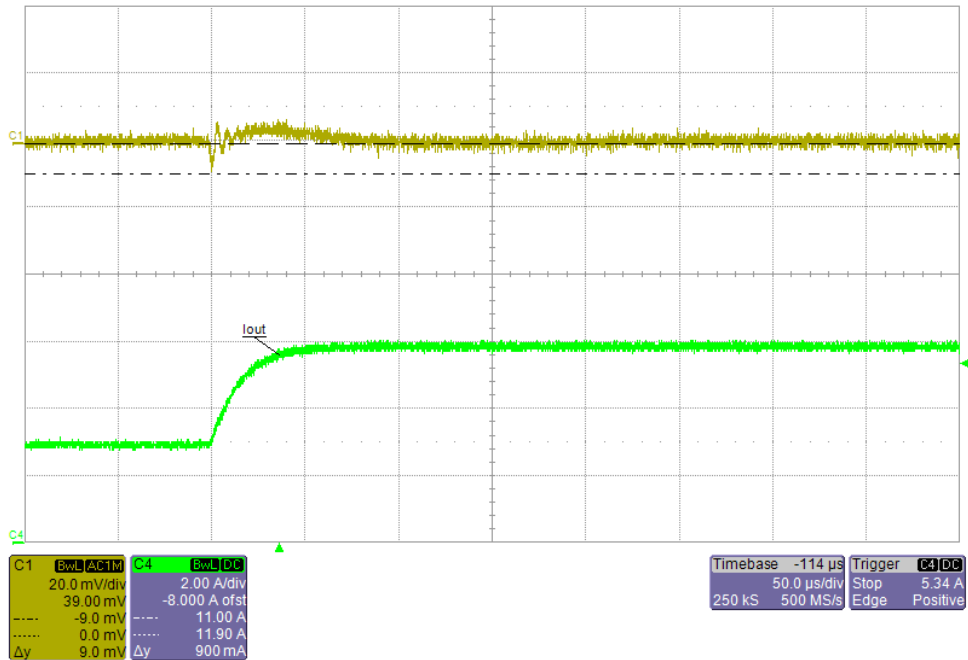
Phase Margin 55.82 @ 9.545 kHz

7.6 Load Transient

$V_{in} = 18V$, $V_{out} = -4V$, $I_{out} = 3$ to $6A$

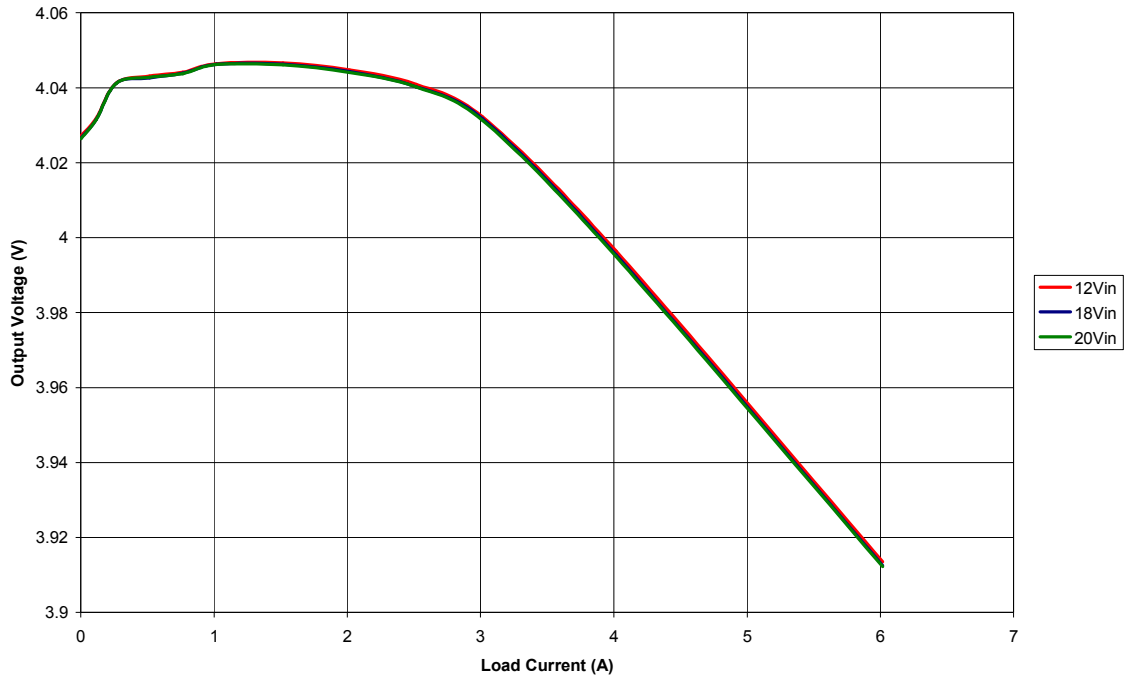


Zoom



7.7 Load Regulation

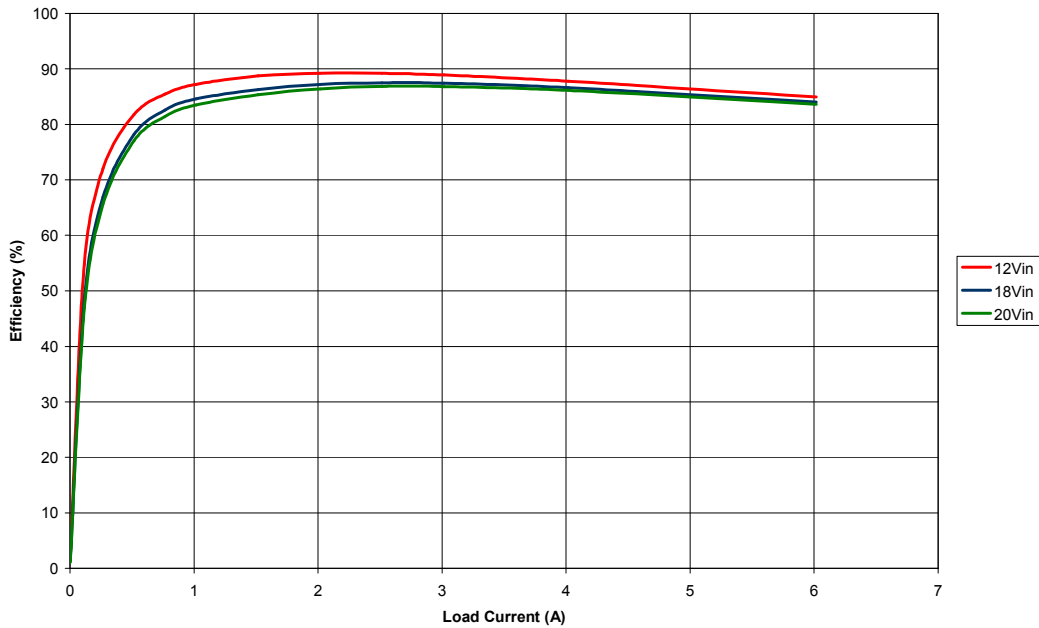
Output Voltage vs Load Current



7.8 Efficiency

$V_{out} = -4V$

Efficiency vs Load Current



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