

## PMP5754 Test Report

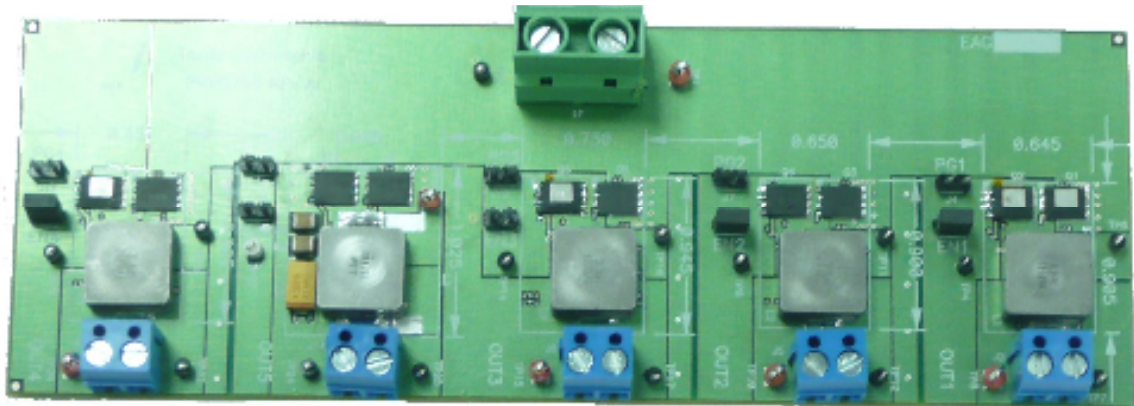
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## Operating Parameters

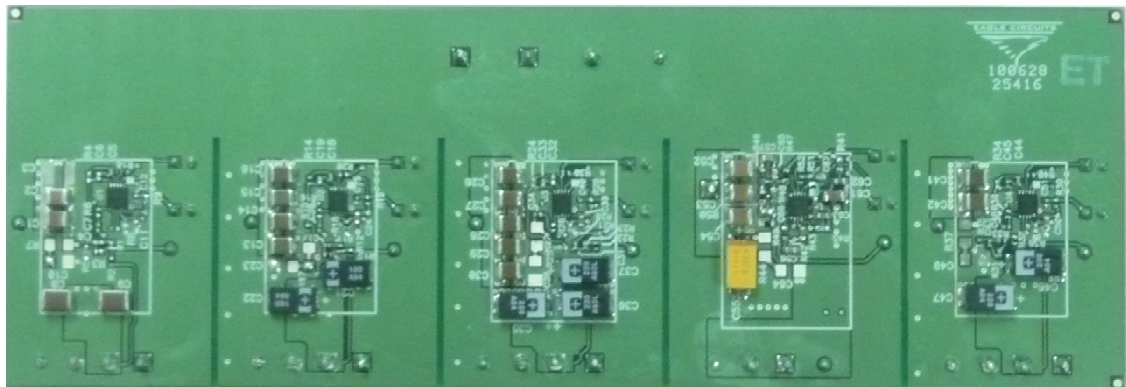
Parameter	Min	Typ	Max	Unit
$V_{in}$	12	18	20	V
$V_{out}$		4		V
		3.3		V
		2.5		V
		0.9		V
		-4		V
$I_{out}$	3		14	A
$F_{switching}$	300		1200	kHz

## 1 Board Images

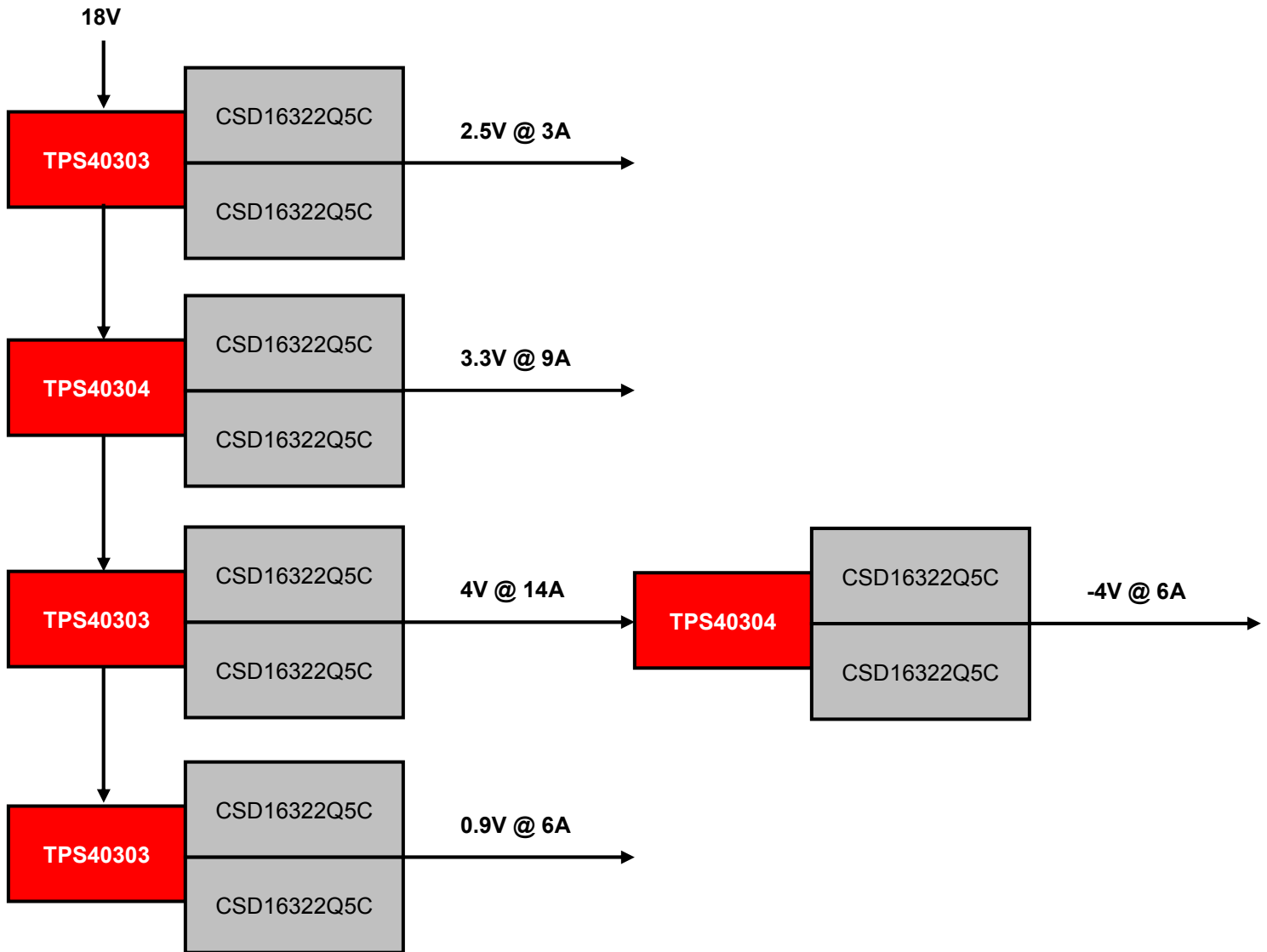
### 1.1 Top



### 1.2 Bottom



## 2 Block Diagram



### 3 TPS40303 – 4.0V @ 14A

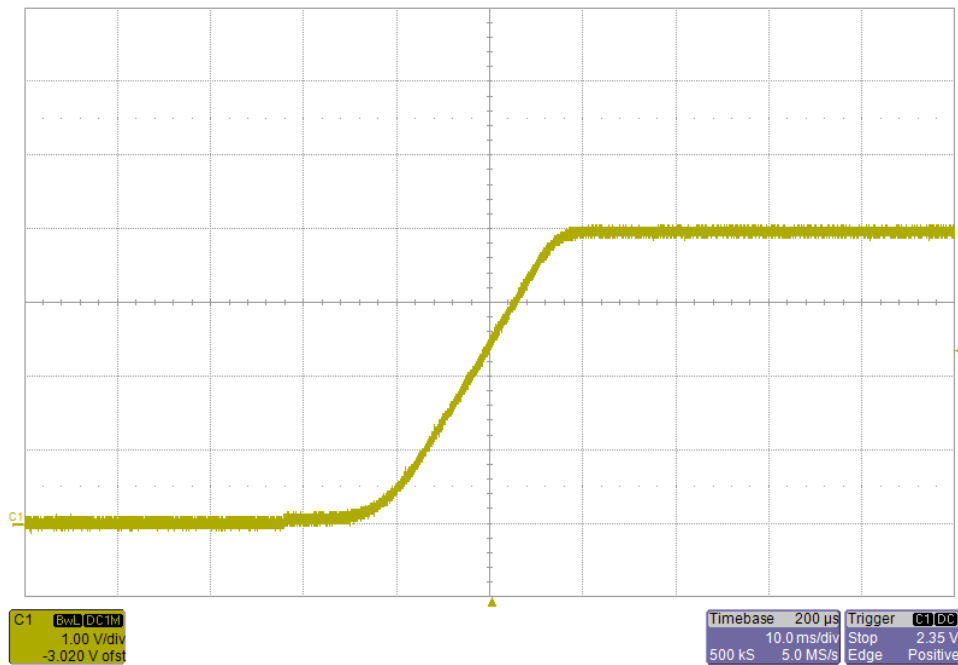
#### 3.1 Performance Summary

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

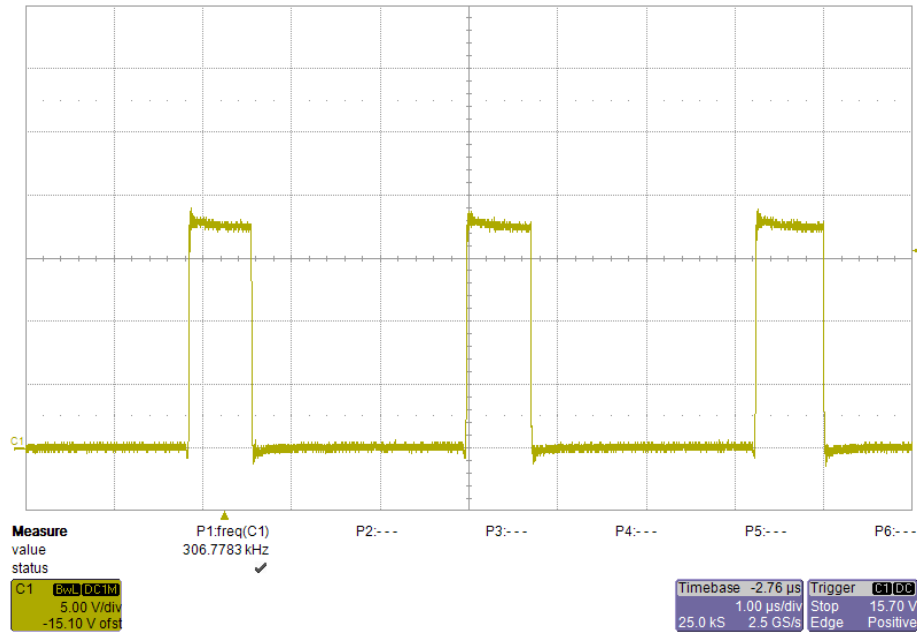
#### 3.2 Start-up Waveform

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

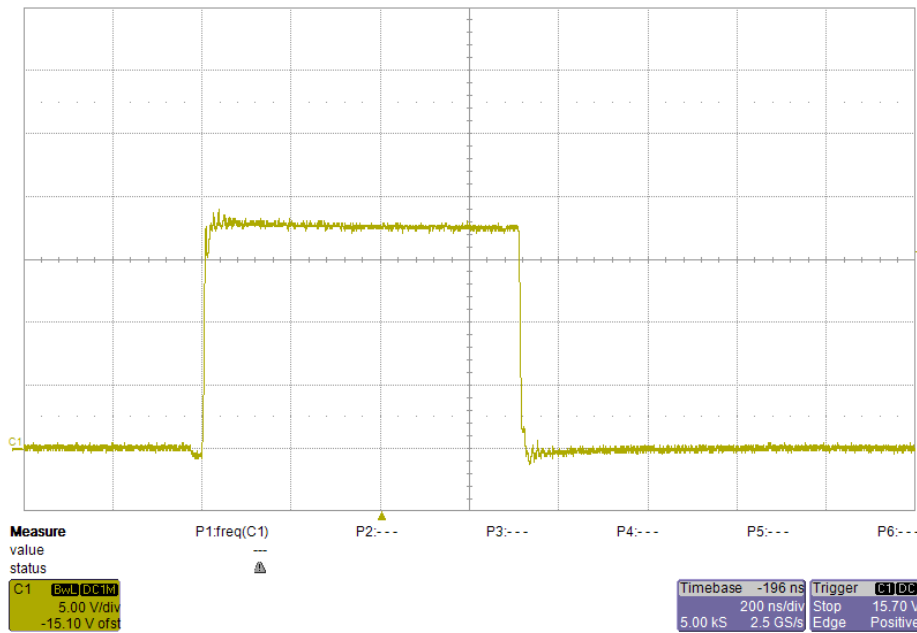


### 3.3 Switch Node

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

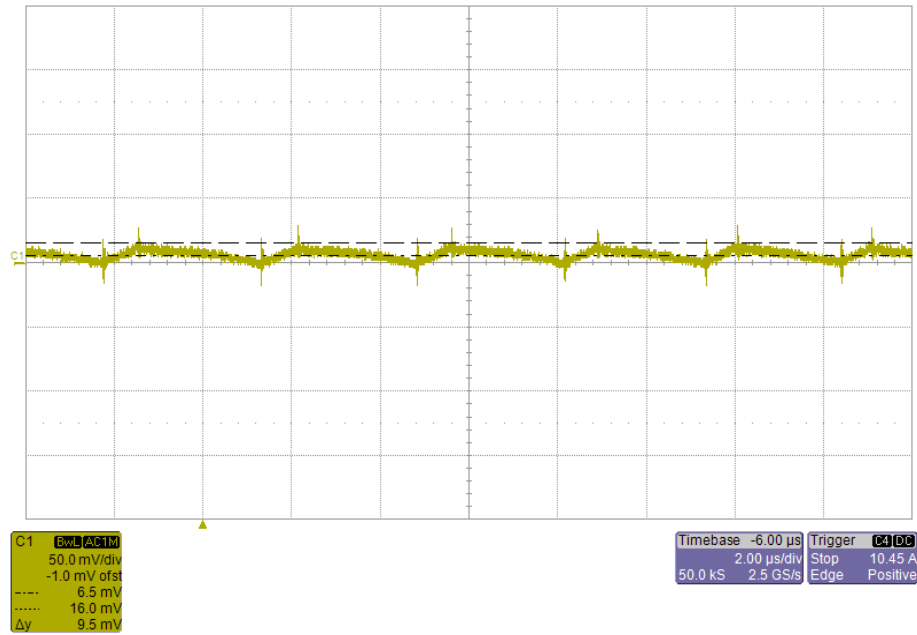


Zoom



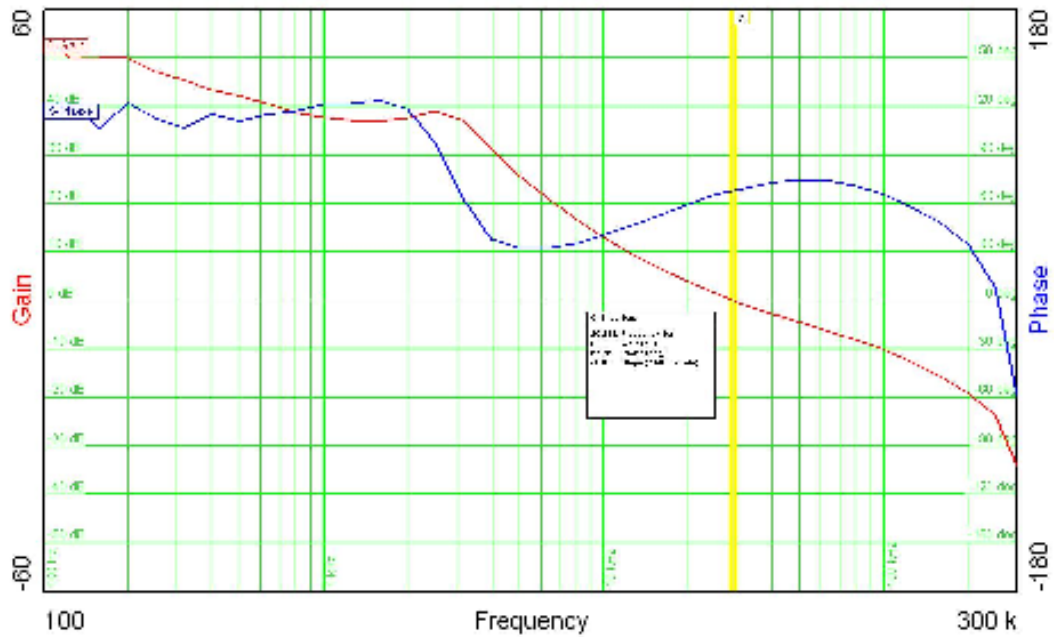
### 3.4 Output Voltage Ripple

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



### 3.5 Loop Response

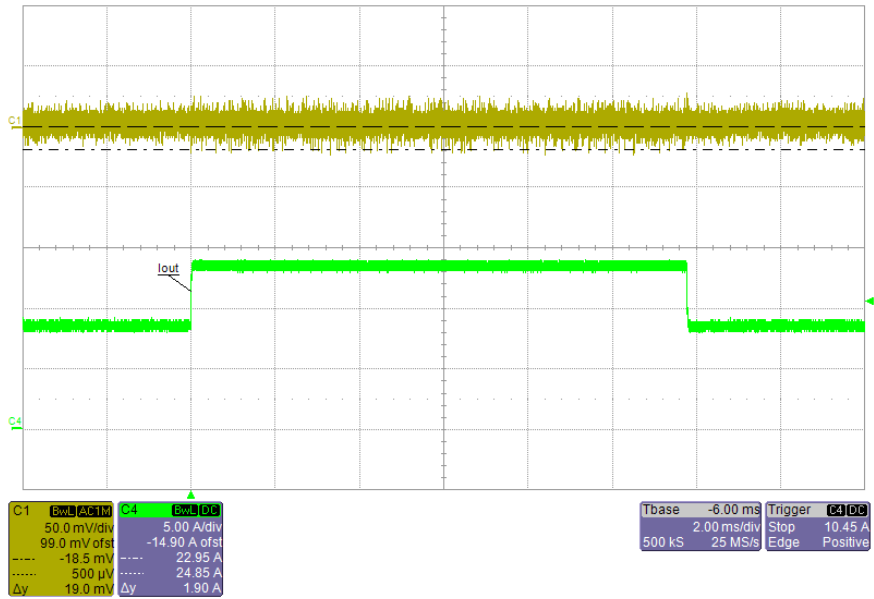
$V_{in} = 18V$ ,  $V_{out} = 4.0V$ ,  $I_{out} = 14A$



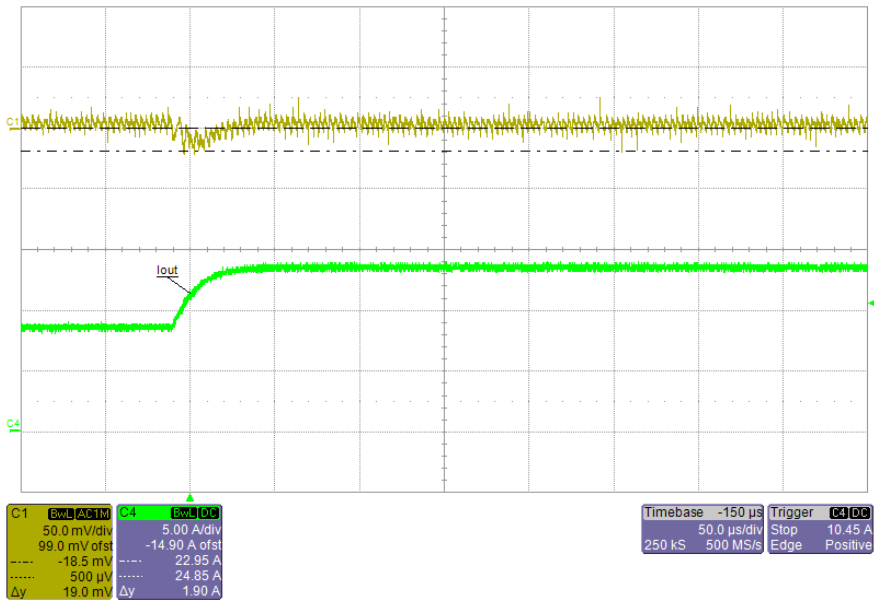
Phase Margin = 67.76 @ 29.28 kHz

### 3.6 Load Transient

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



Zoom

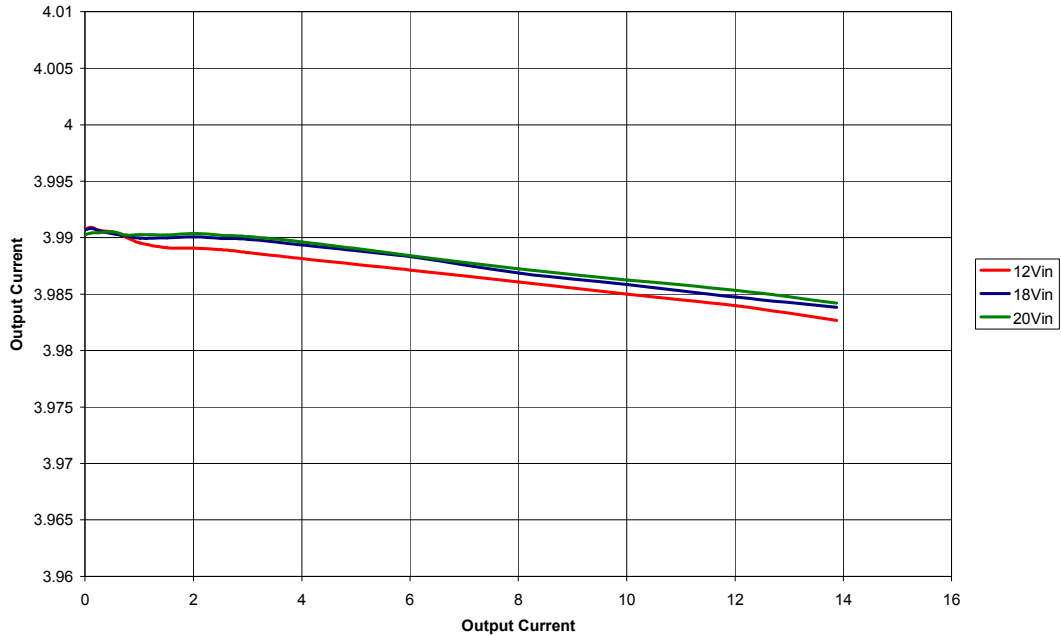




### 3.7 Load Regulation

$V_{out} = 4.0V$

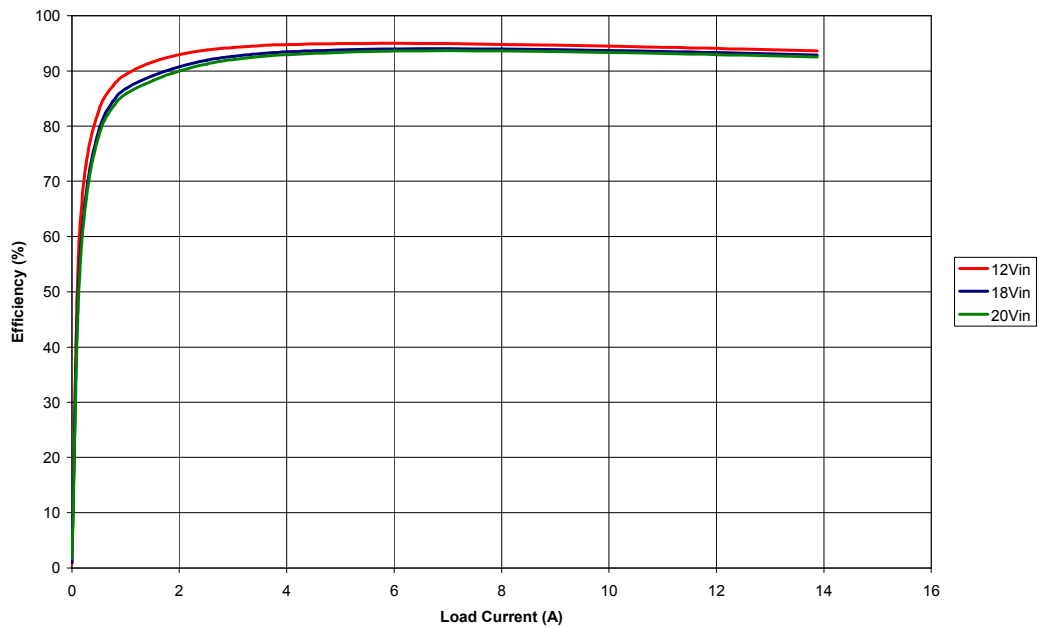
Output Voltage vs Output Current



### 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.

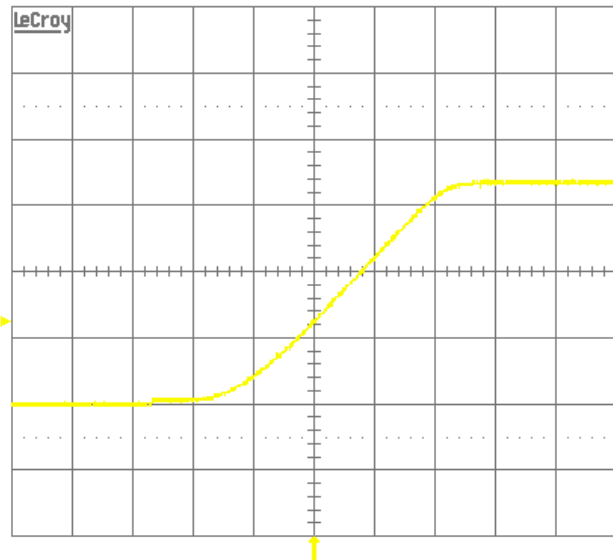
Parameter	Test Conditions	Min	Typ	Max	Unit
Loop Bandwidth	$V_{in} = 18V, I_{out} = 9A$		70.69		kHz
Phase Margin	$V_{in} = 18V, I_{out} = 9A$		55.29		°
Output Voltage Ripple	$I_{out} = 9A$		10		mV
Maximum Efficiency			94.52		%
Load Regulation	$V_{in} = 18V, I_{out} = 0A \text{ to } 9A$		0.9		%
Switching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

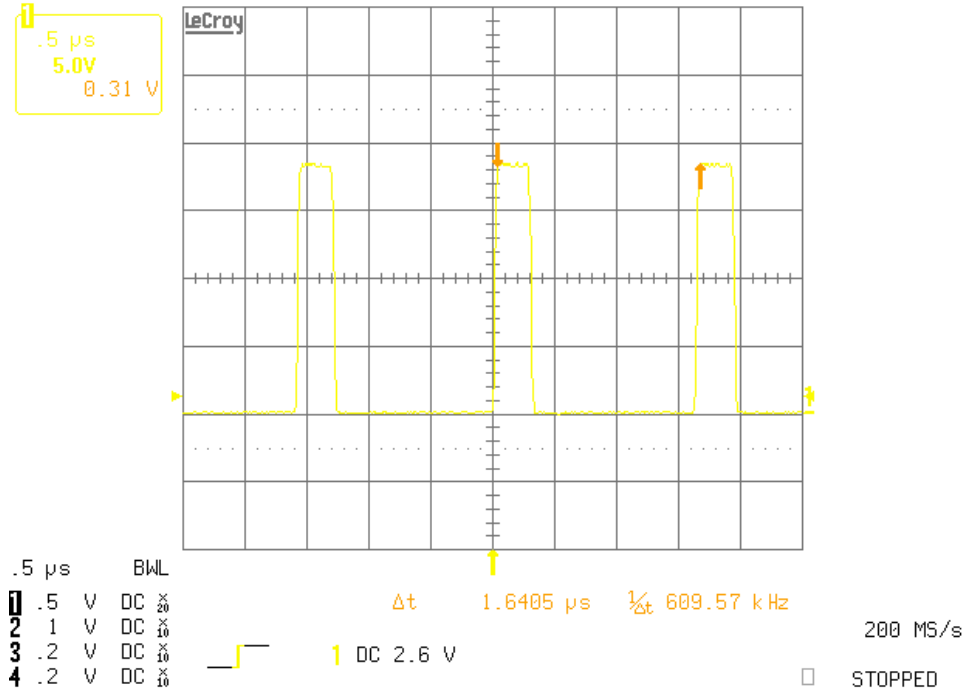
1 DC 2.52 V

500 kS/s  
SLOW TRIGGER  
 NORMAL

### 4.3 Switch Node

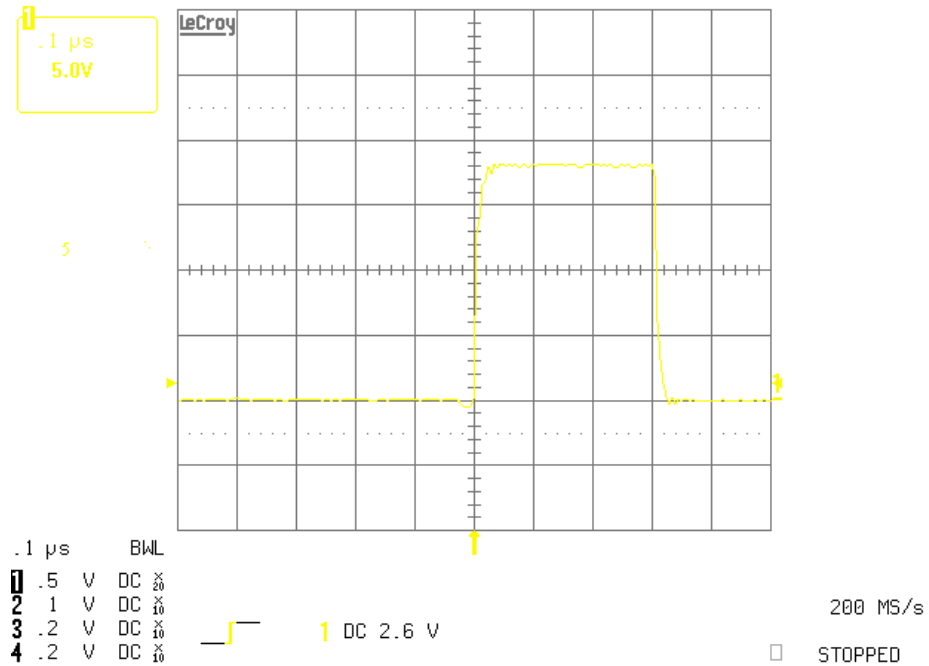
$V_{in} = 18V$ ,  $V_{out} = 3.3V$ ,  $I_{out} = 9A$

20-Jul-10  
13:43:40



Zoom

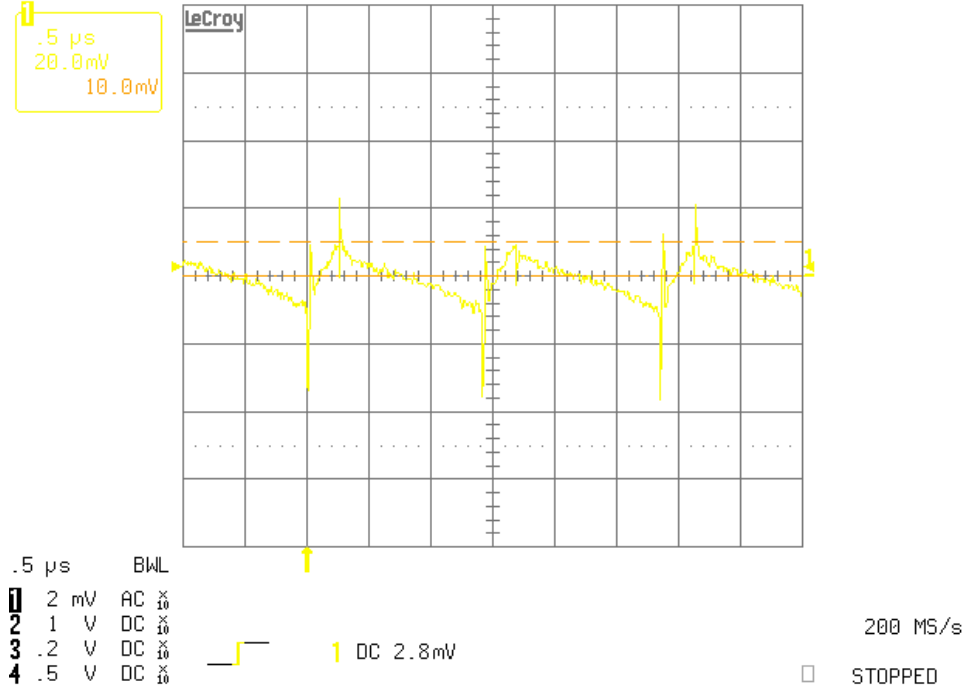
20-Jul-10  
13:44:23



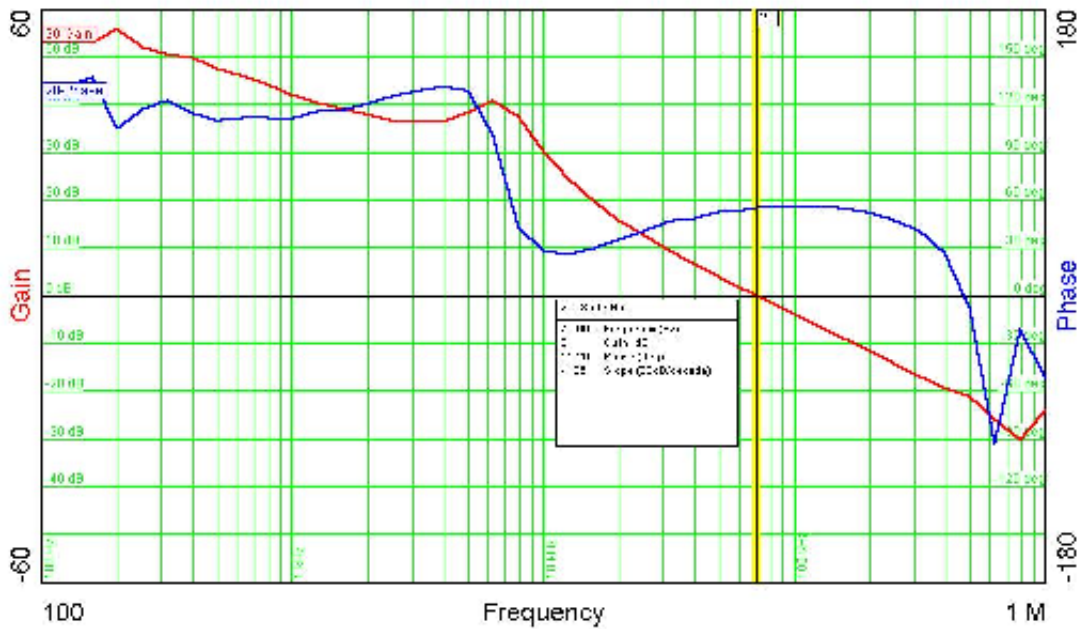
### 4.4 Output Voltage Ripple

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

22-Jul-10  
20:19:07



### 4.5 Loop Response

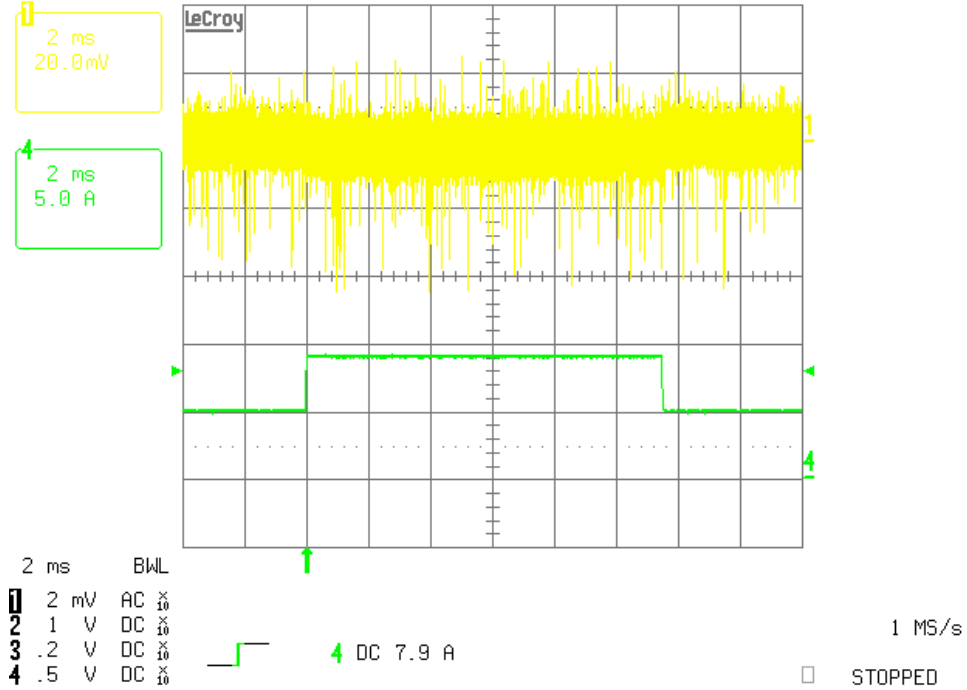


Phase Margin = 55.29 @ 70.69 kHz

### 4.6 Load Transient

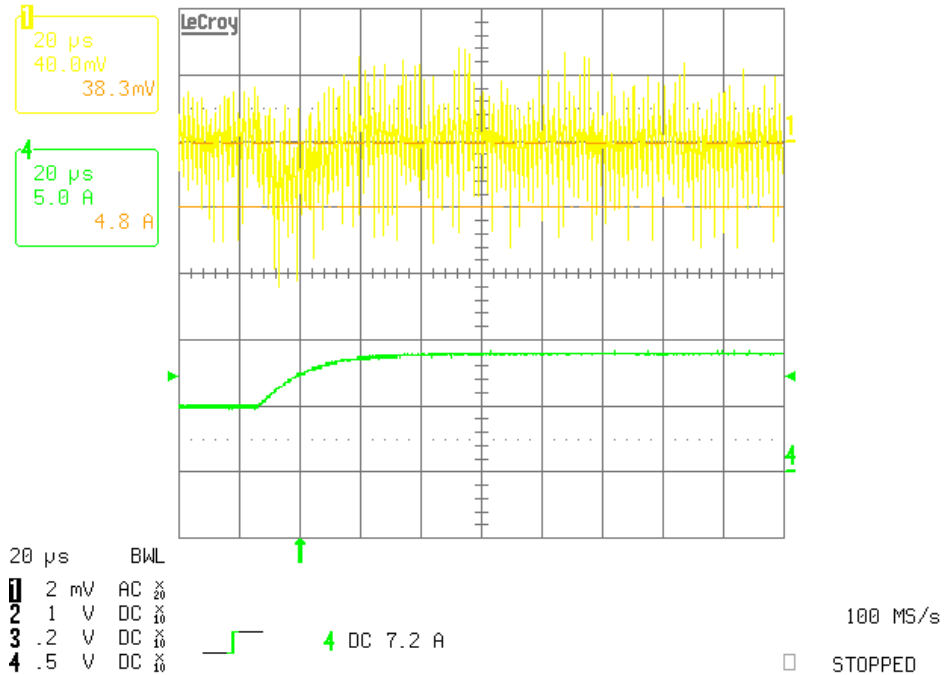
$V_{in} = 18V$ ,  $V_{out} = 3.3V$ ,  $I_{out} = 5A$  to  $9A$

22-Jul-10  
20:13:09



Zoom

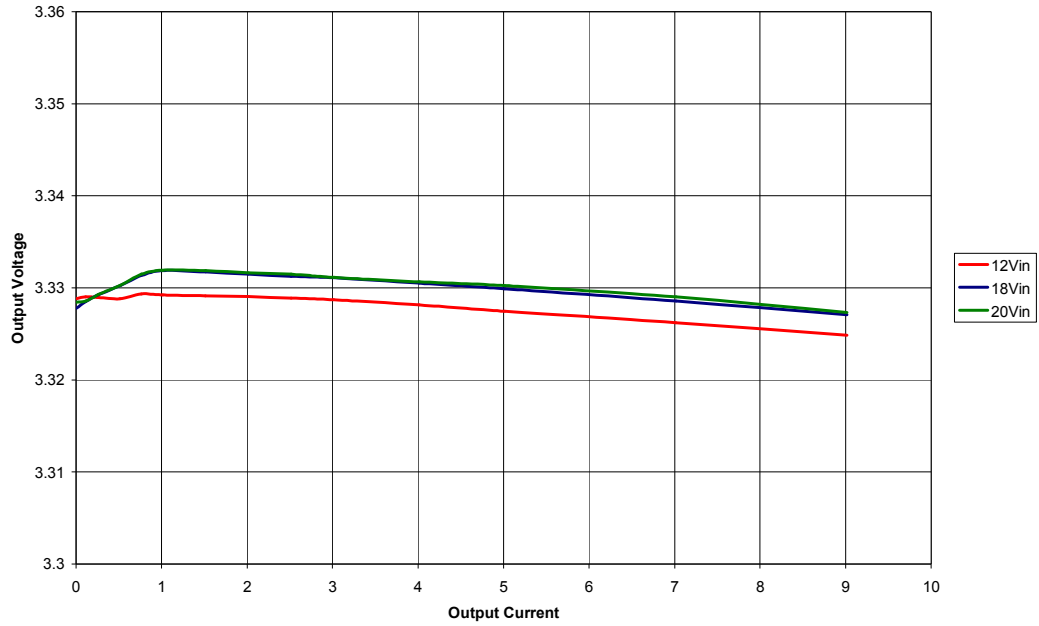
20-Jul-10  
13:56:25



### 4.7 Load Regulation

$V_{out} = 3.3V$

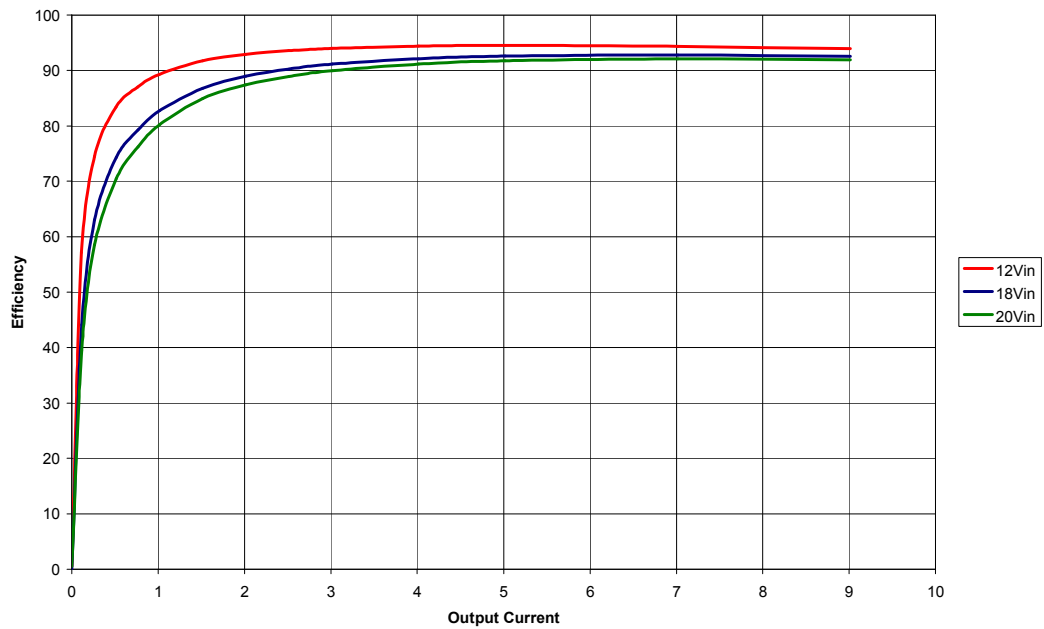
Output Voltage vs Output Current



### 4.8 Efficiency

$V_{out} = 3.3V$

Efficiency vs Output Current



## 5 TPS40304 – 2.5V @ 3A

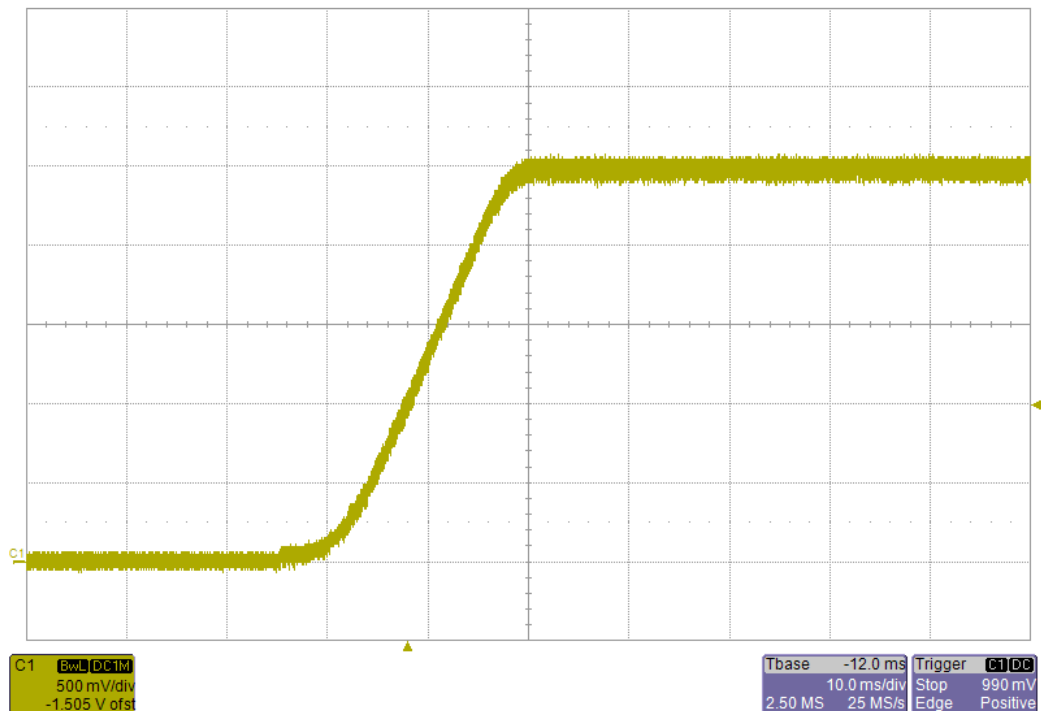
### 5.1 Performance Summary

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

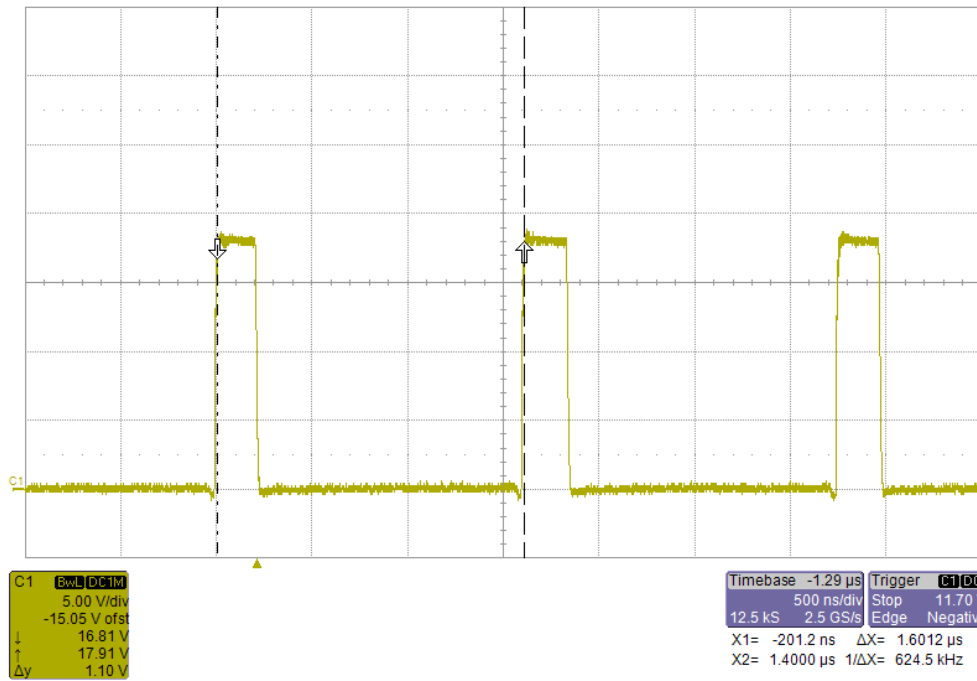
### 5.2 Start-up Waveform

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

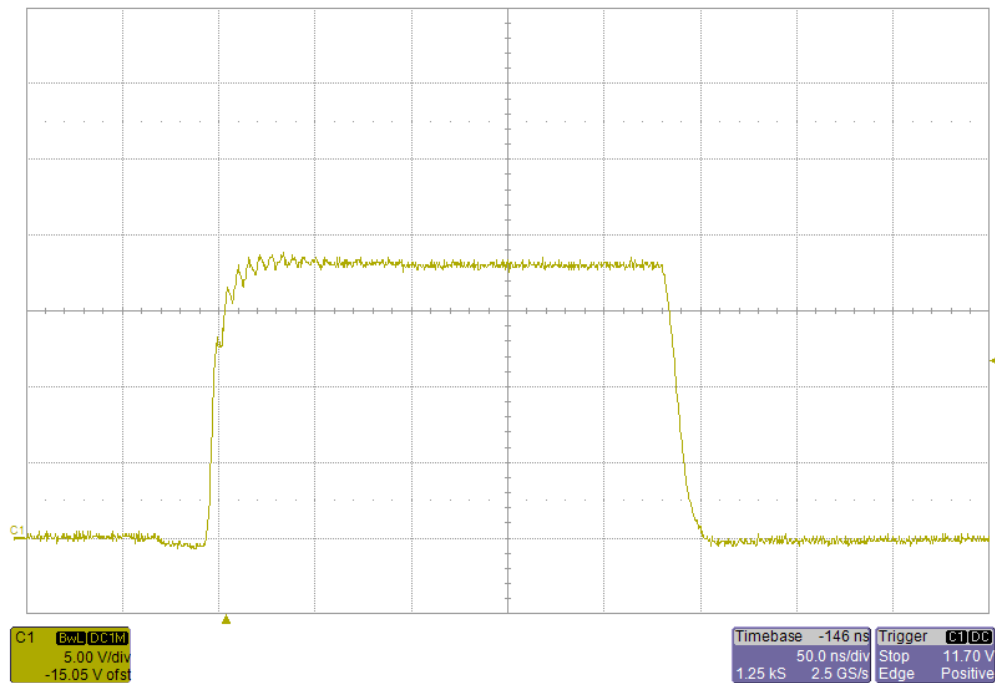


### 5.3 Switch Node

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



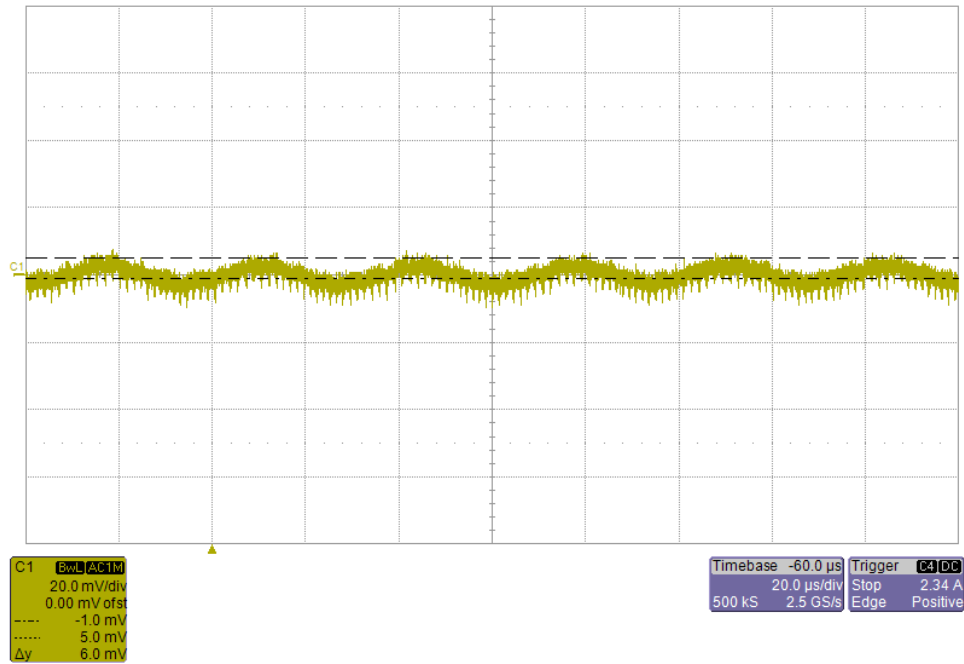
Zoom





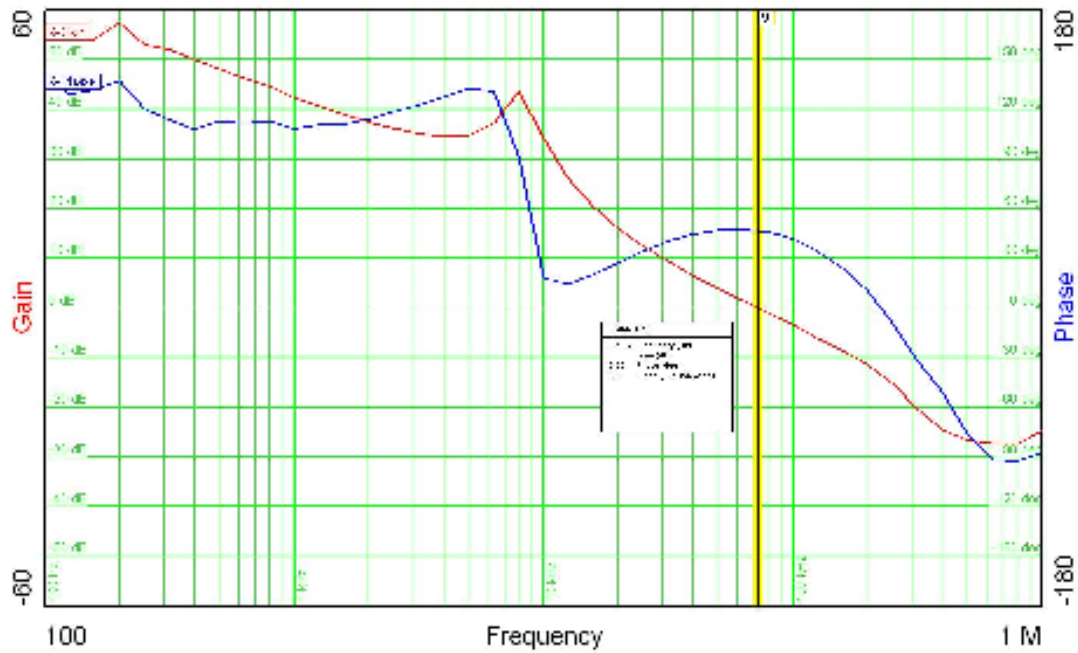
### 5.4 Output Voltage Ripple

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



### 5.5 Loop Response

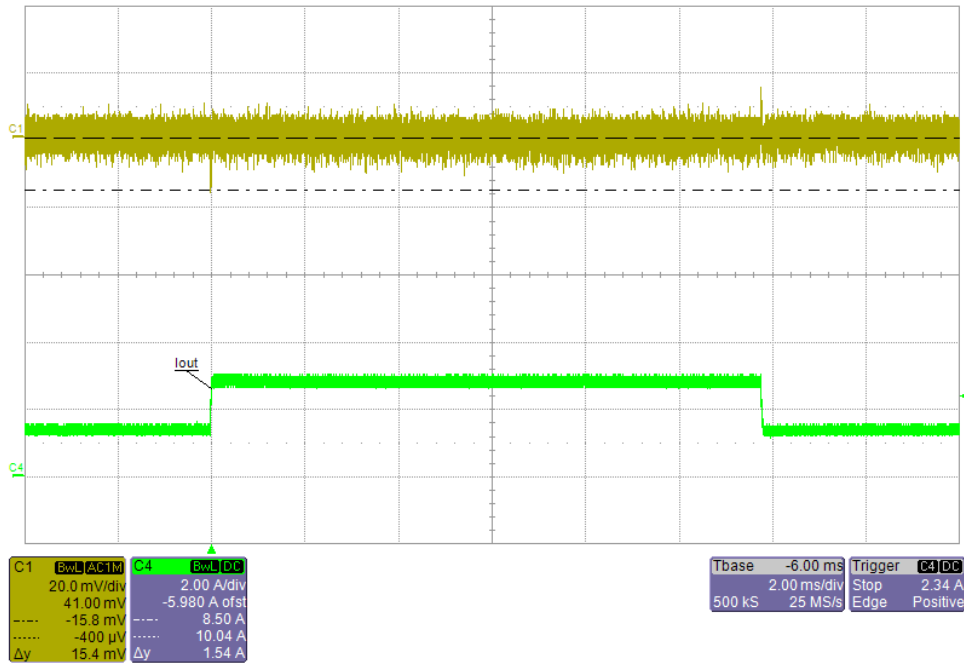
$V_{in} = 18V$ ,  $V_{out} = 2.5V$ ,  $I_{out} = 3A$



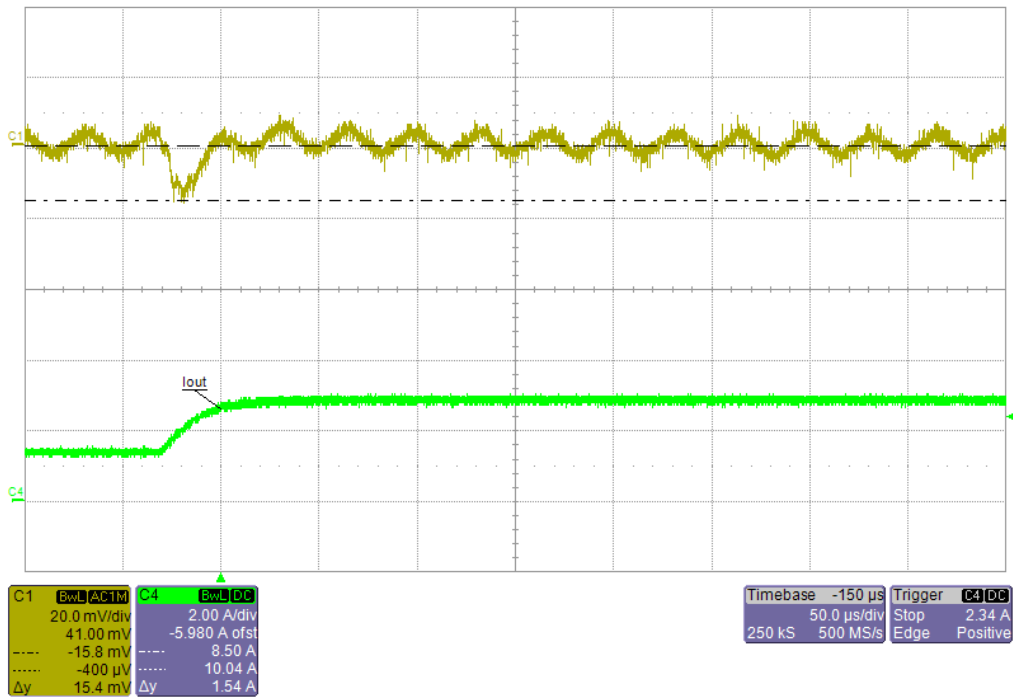
Phase Margin 46.56 @ 72.52 kHz

### 5.6 Load Transient

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



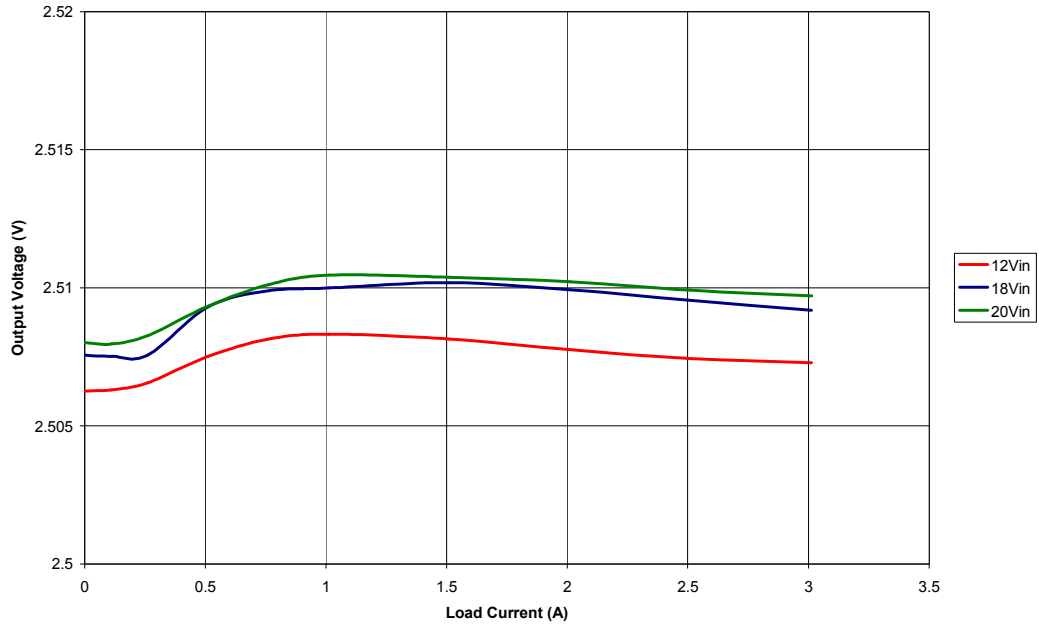
Zoom



### 5.7 Load Regulation

$V_{in} = 2.5V$

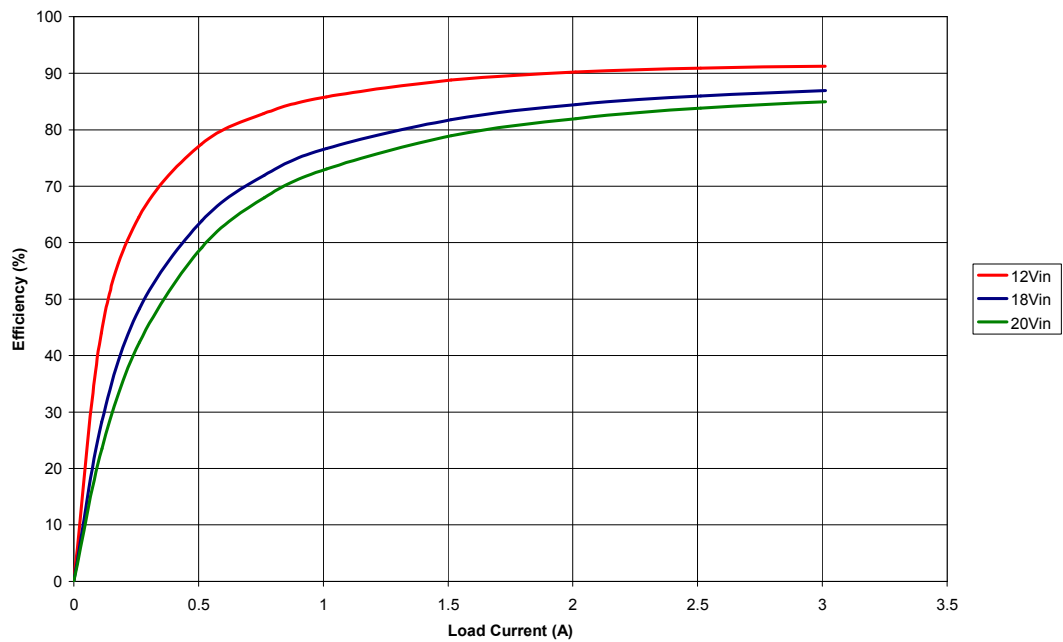
Output Voltage vs Load Current



### 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.

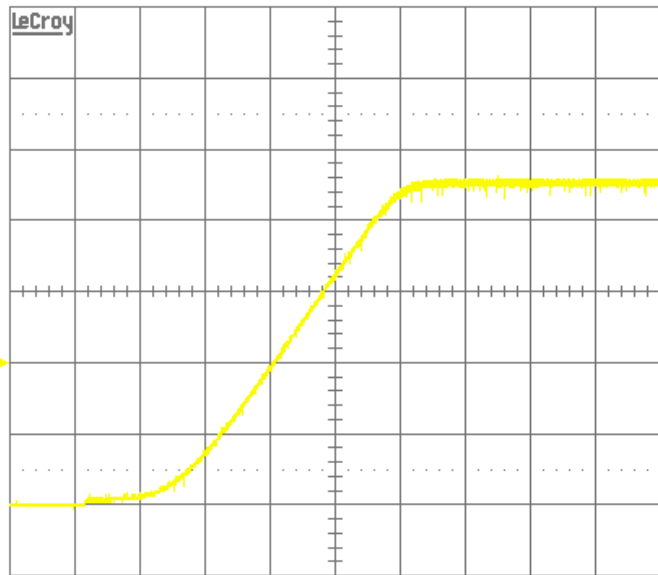
Parameter	Test Conditions	Min	Typ	Max	Unit
Loop Bandwidth	$V_{in} = 18V, I_{out} = 6A$		62.73		kHz
Phase Margin	$V_{in} = 18V, I_{out} = 6A$		49.73		°
Output Voltage Ripple	$I_{out} = 6A$		9		mV
Maximum Efficiency			90.14		%
Load Regulation	$V_{in} = 18V, I_{out} = 0A \text{ to } 6A$		0.3		%
Switching 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  $\times_{10}$   
 2 1 V DC  $\times_{10}$   
 3 .2 V DC  $\times_{10}$   
 4 .5 V DC  $\times_{10}$



1 DC 0.400 V

500 kS/s

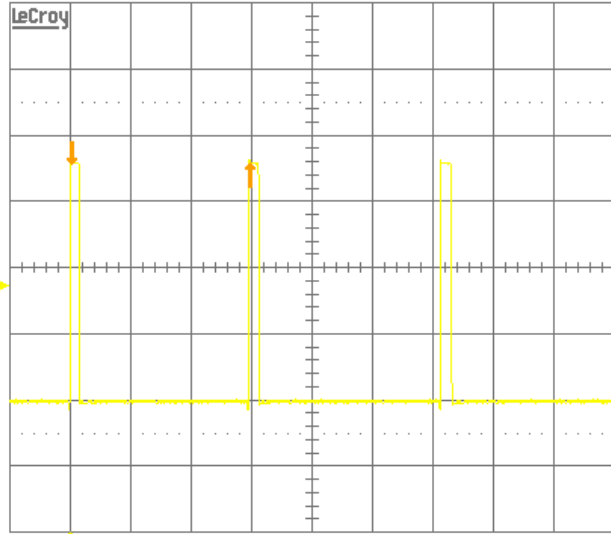
STOPPED

### 6.3 Switch Node

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

22-Jul-10  
18:05:02

2  $\mu s$   
5.0 V  
0.16 V



2  $\mu s$  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  $\times \frac{10}{10}$

$\Delta t$  5.900  $\mu s$   $\frac{1}{\Delta t}$  169.48 kHz

1 DC 8.7 V

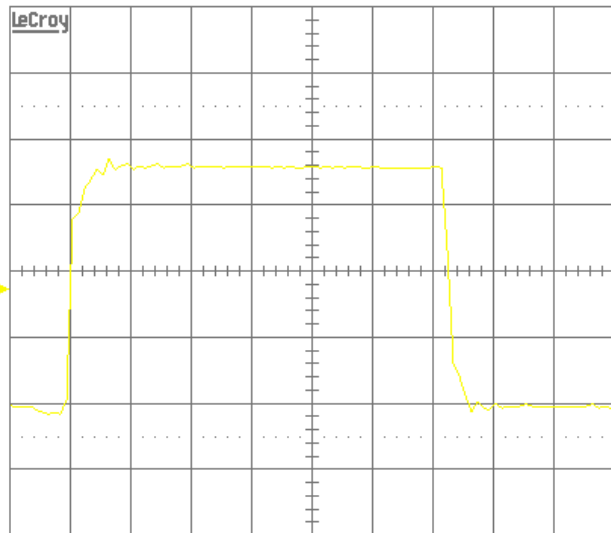
200 MS/s

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

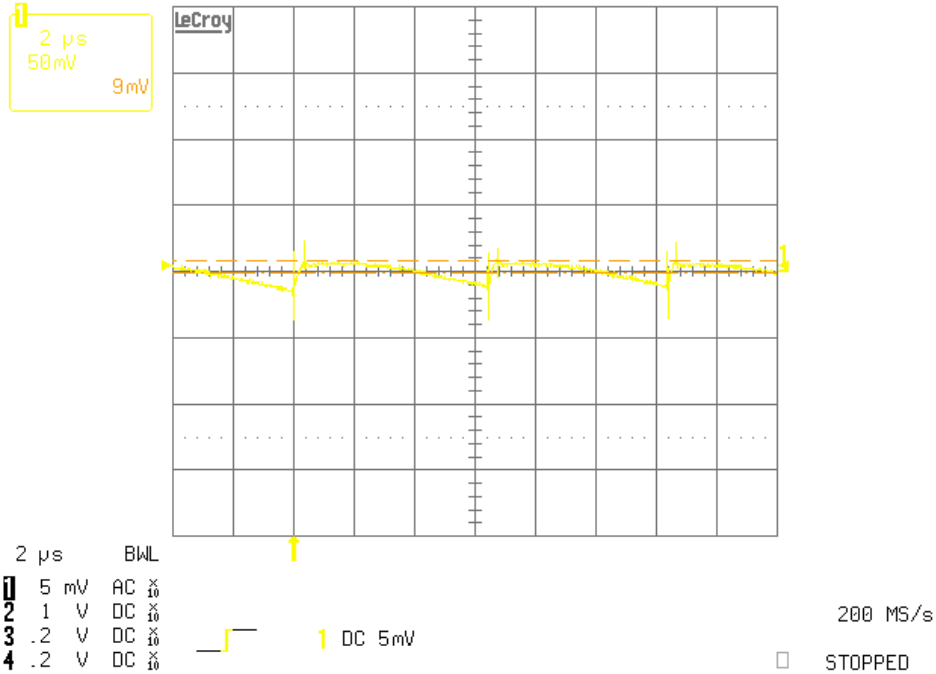
200 MS/s

STOPPED

### 6.4 Output Voltage Ripple

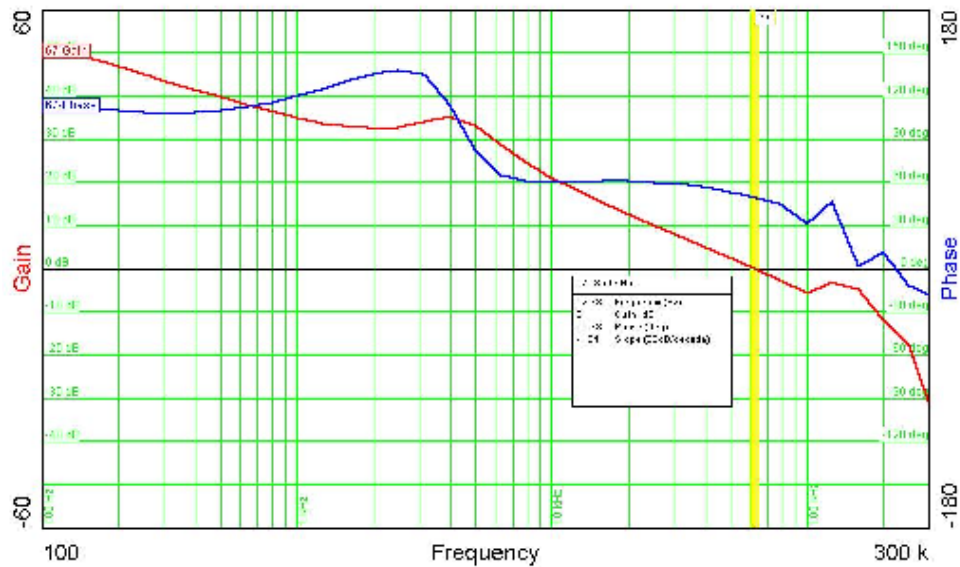
$V_{in} = 18V, V_{out} = 0.9V, I_{out} = 6A$

22-Jul-10  
17:58:24



### 6.5 Loop Response

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



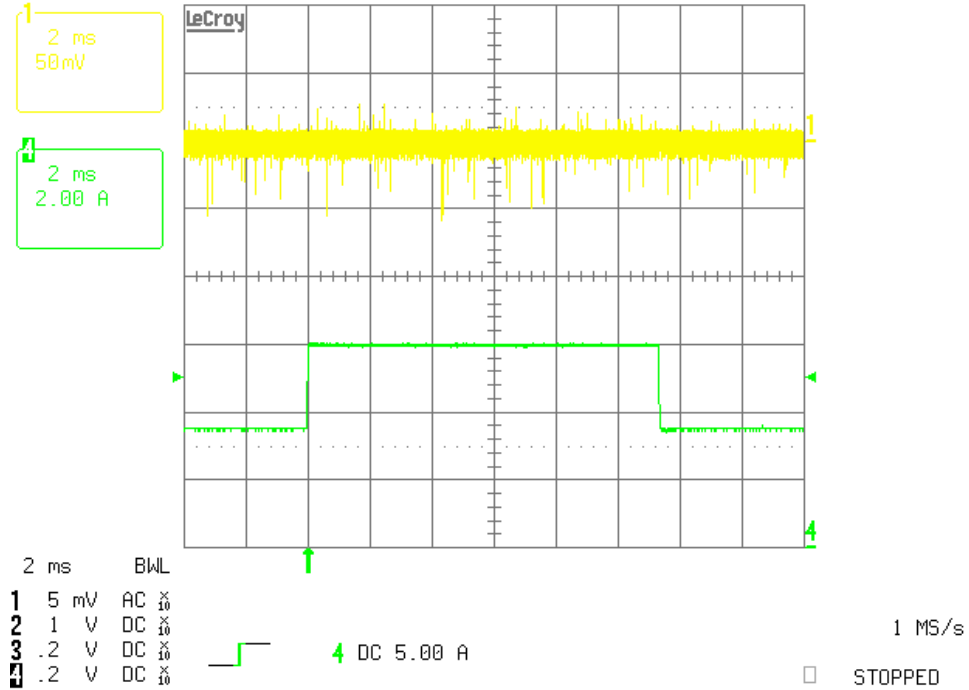
Phase Margin 49.73 @ 62.73 kHz

### 6.6 Load Transient

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

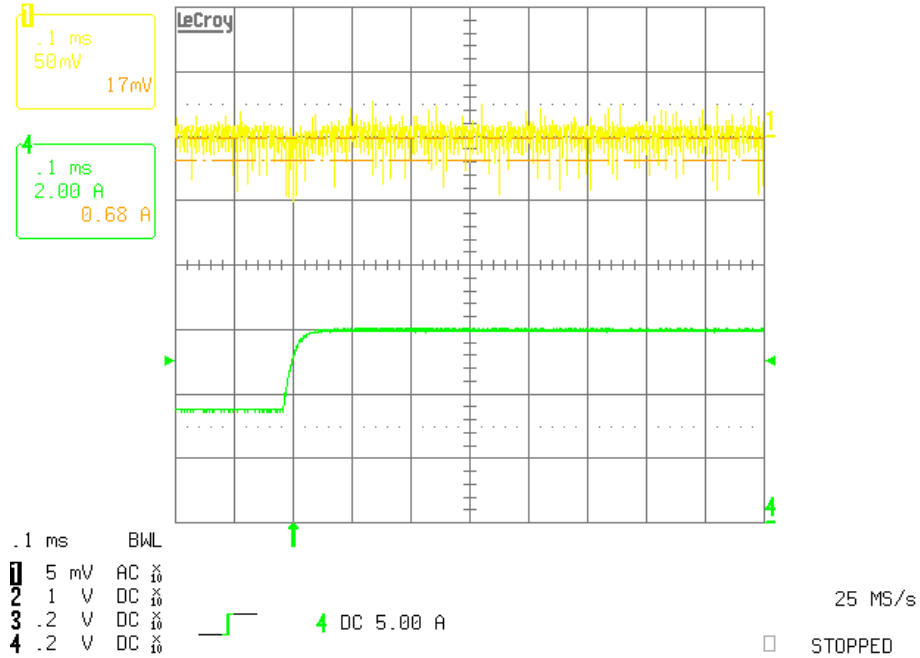
22-Jul-10  
17:55:13

CHANNEL 4



#### Zoom

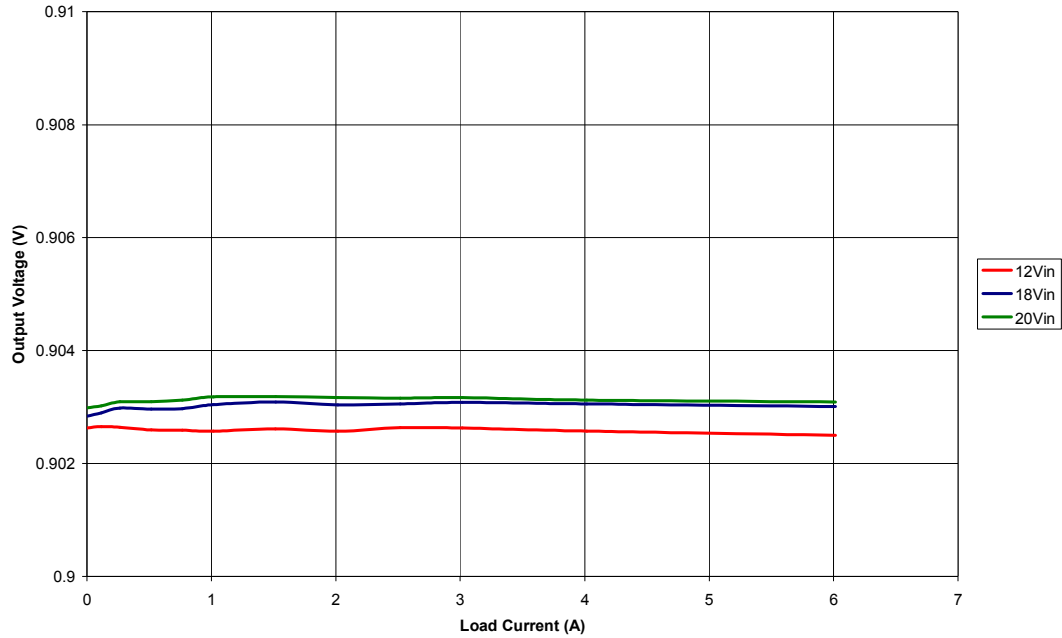
22-Jul-10  
17:56:27



### 6.7 Load Regulation

$$V_{out} = 0.9V$$

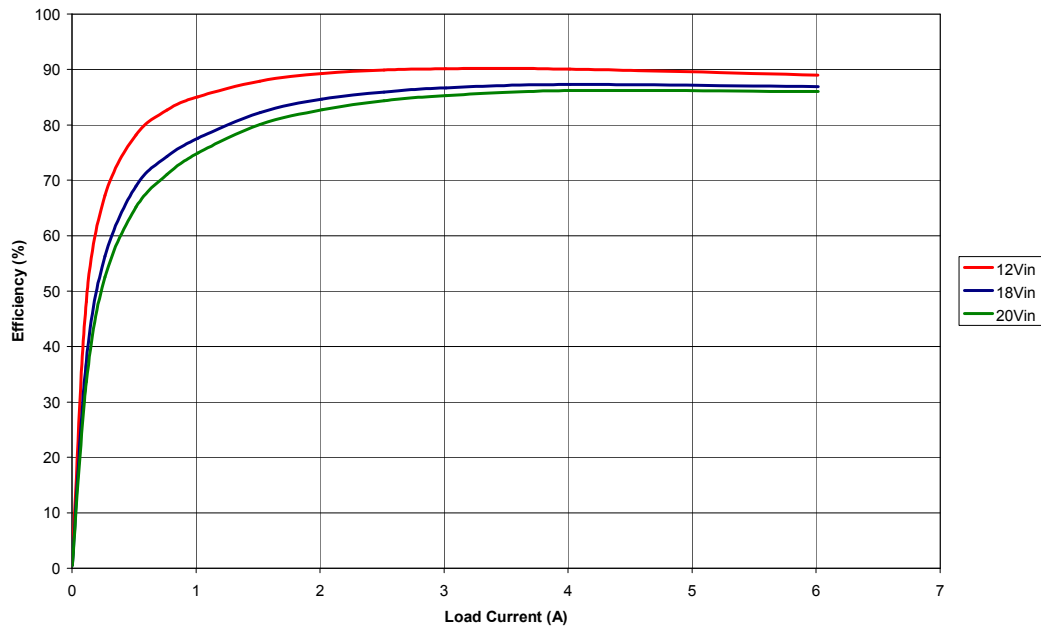
Output Voltage vs Load Current



### 6.8 Efficiency

$$V_{out} = 0.9V$$

Efficiency vs Load Current





## 7 TPS40304 – -4V @ 6A

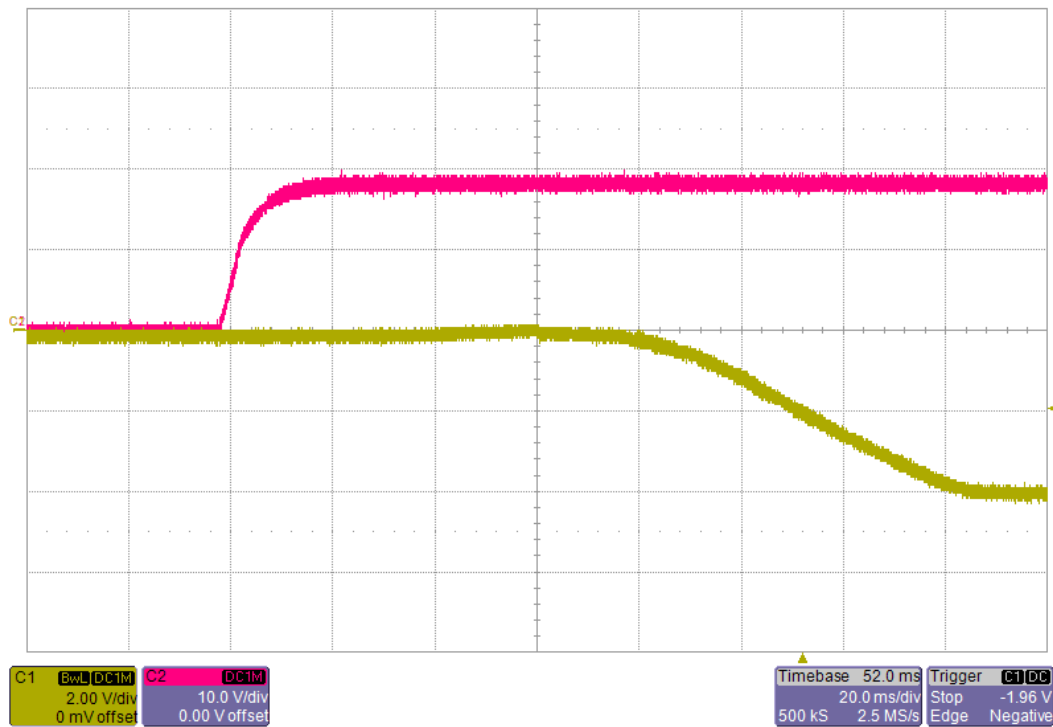
### 7.1 Performance Summary

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

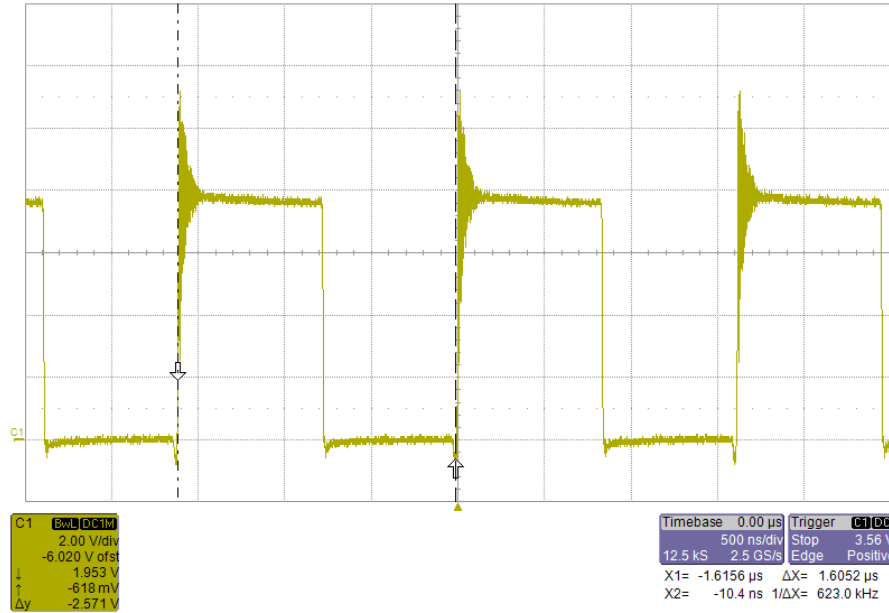
### 7.2 Start-up Waveform

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

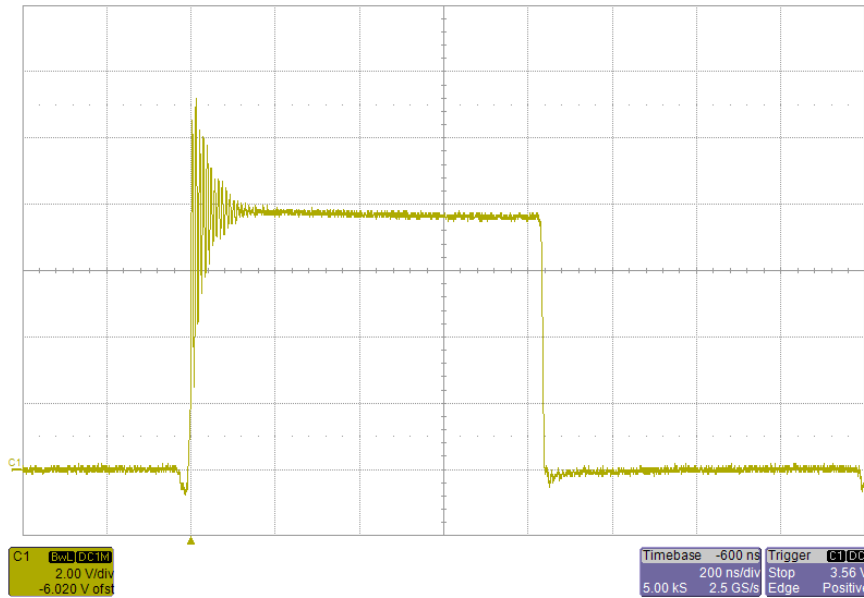


### 7.3 Switch Node

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

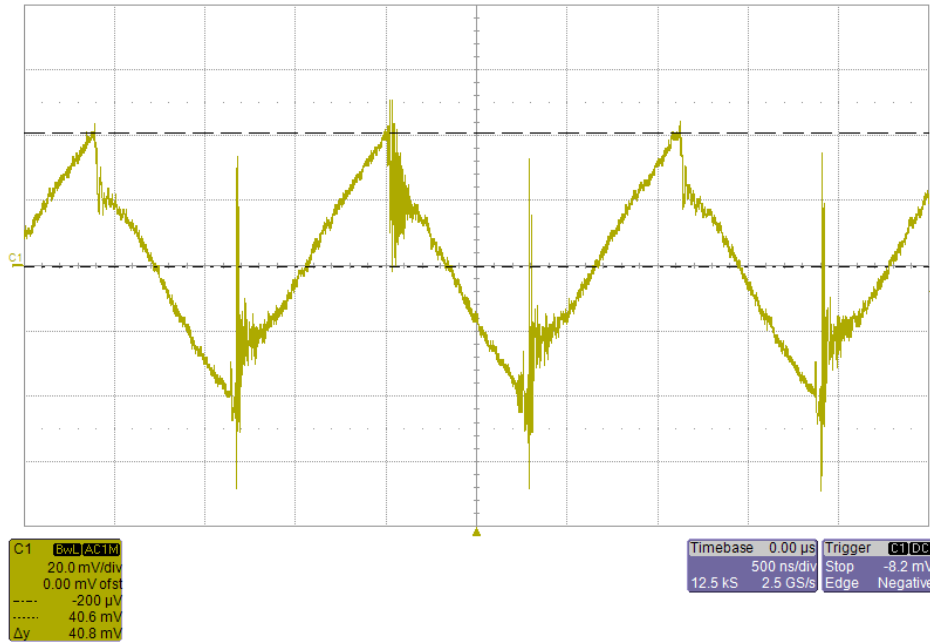


Zoom -  $V_{in} = 18V$ ,  $V_{out} = -4V$ ,  $I_{out} = 6A$



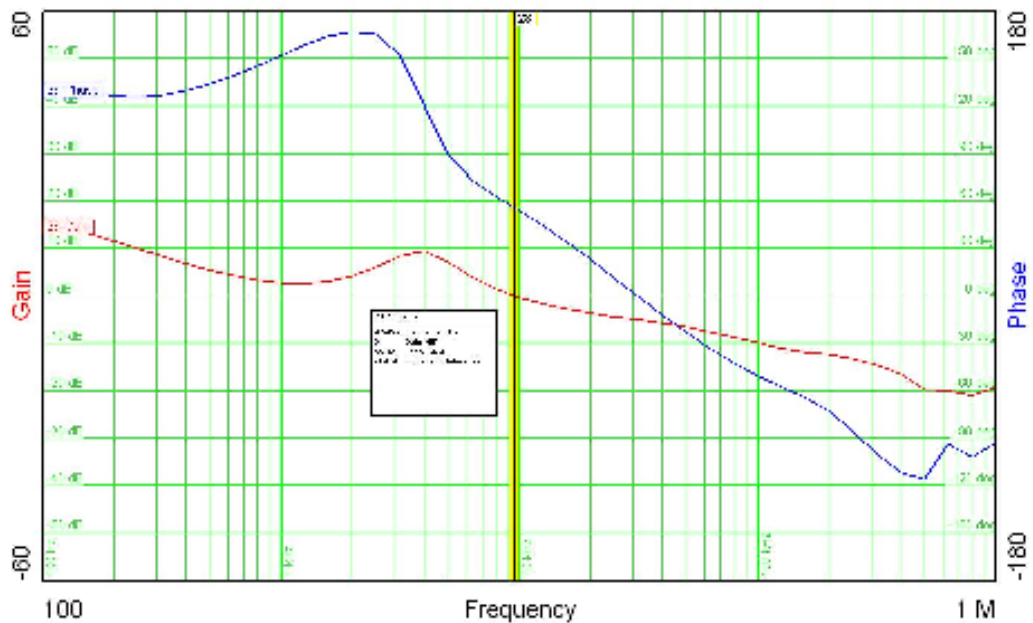
### 7.4 Output Voltage Ripple

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



### 7.5 Loop Response

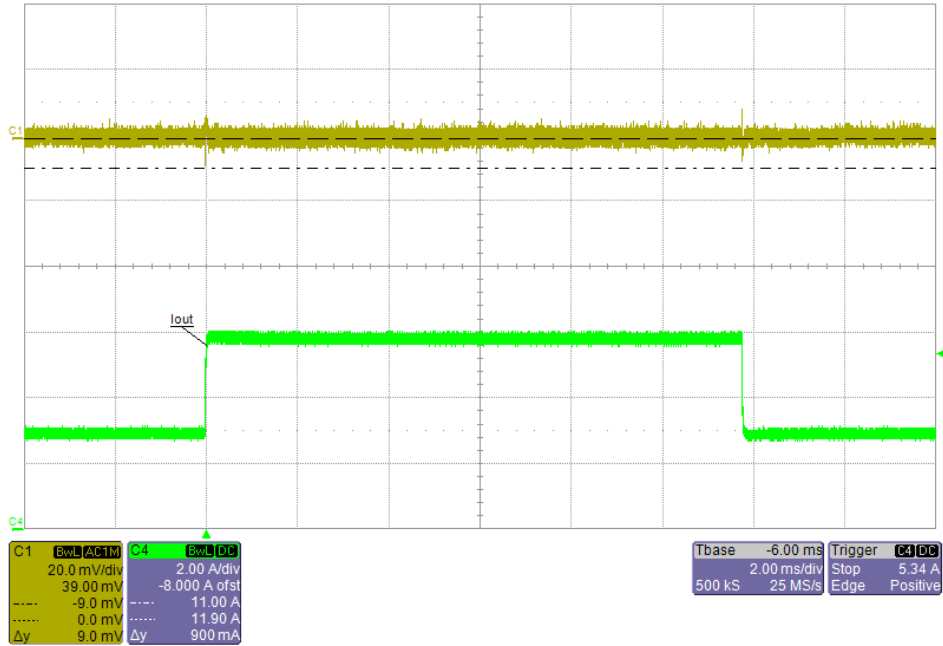
$V_{in} = 18V$ ,  $V_{out} = -4V$ ,  $I_{out} = 6A$



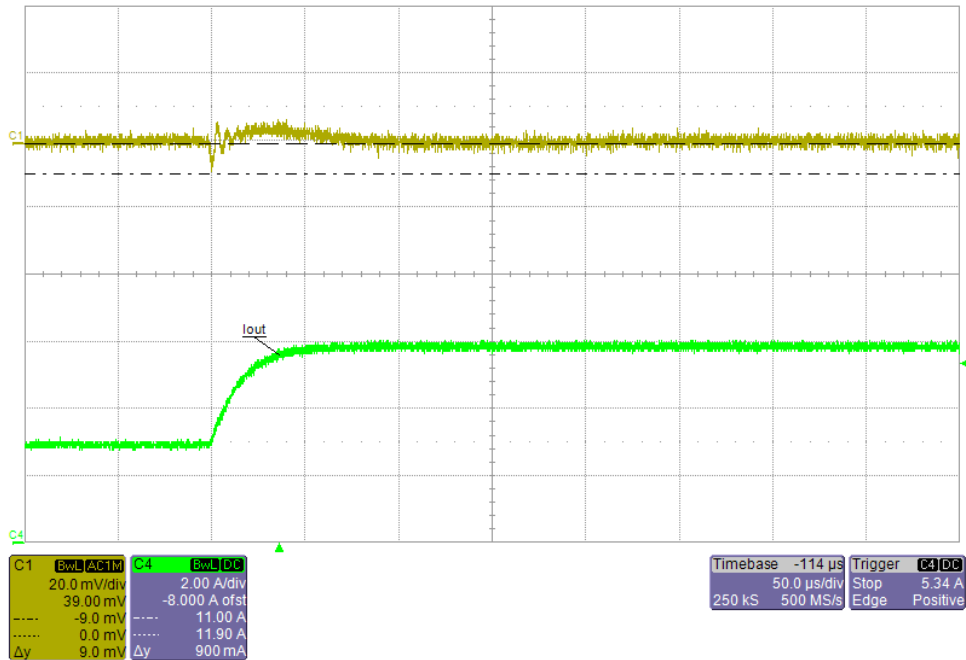
Phase Margin 55.82 @ 9.545 kHz

### 7.6 Load Transient

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

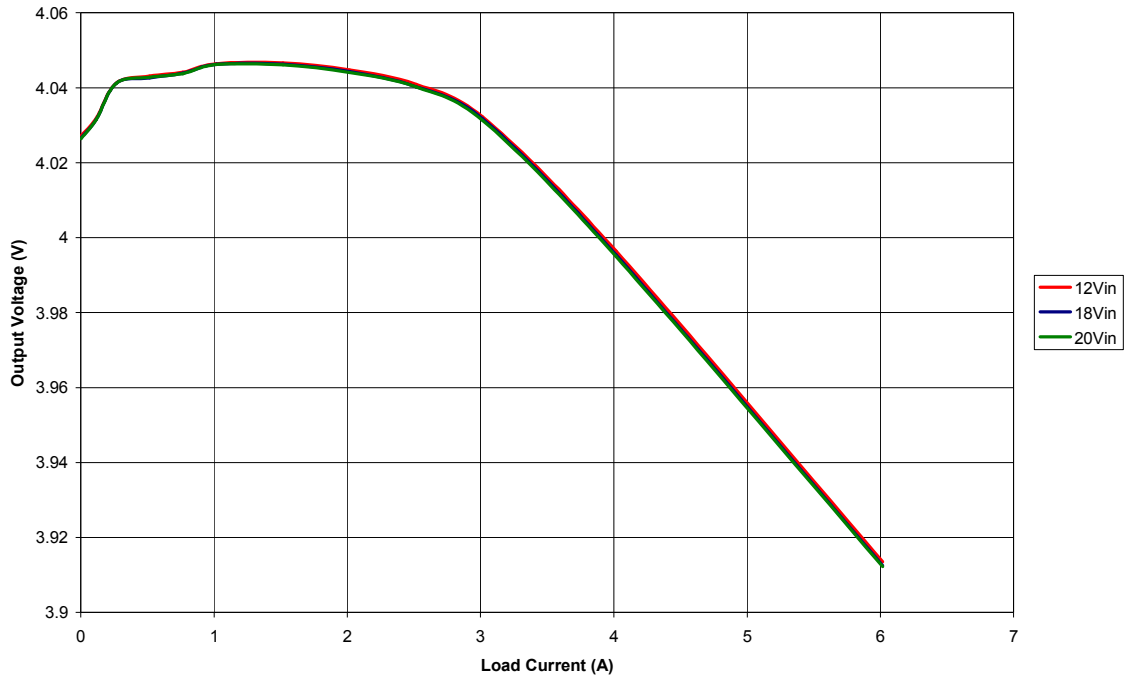


Zoom



### 7.7 Load Regulation

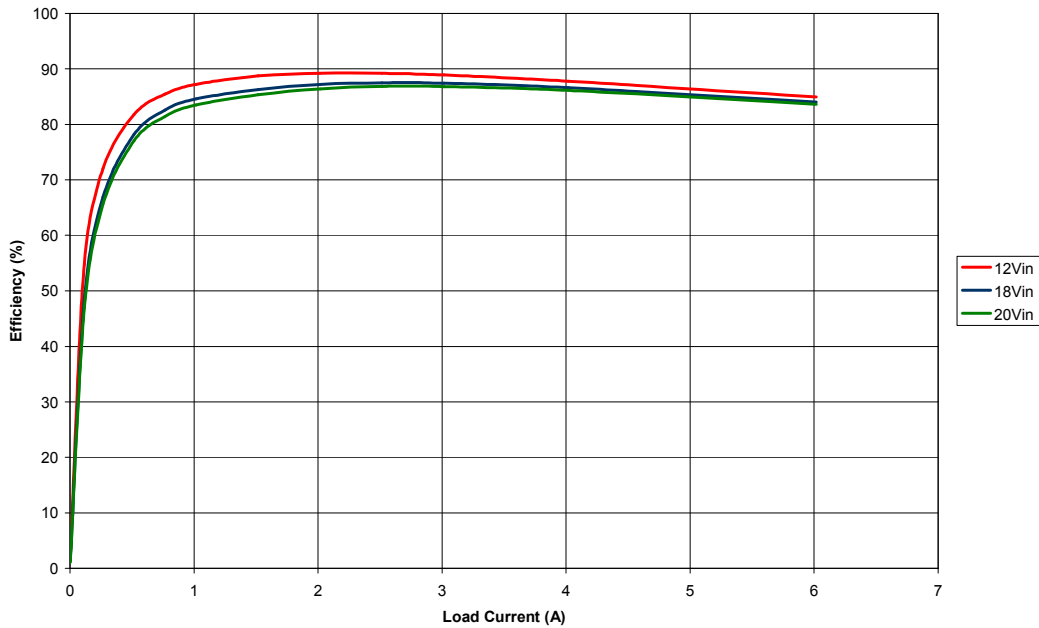
Output Voltage vs Load Current



### 7.8 Efficiency

$V_{out} = -4V$

Efficiency vs Load Current



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