

PMP5832 Test Report

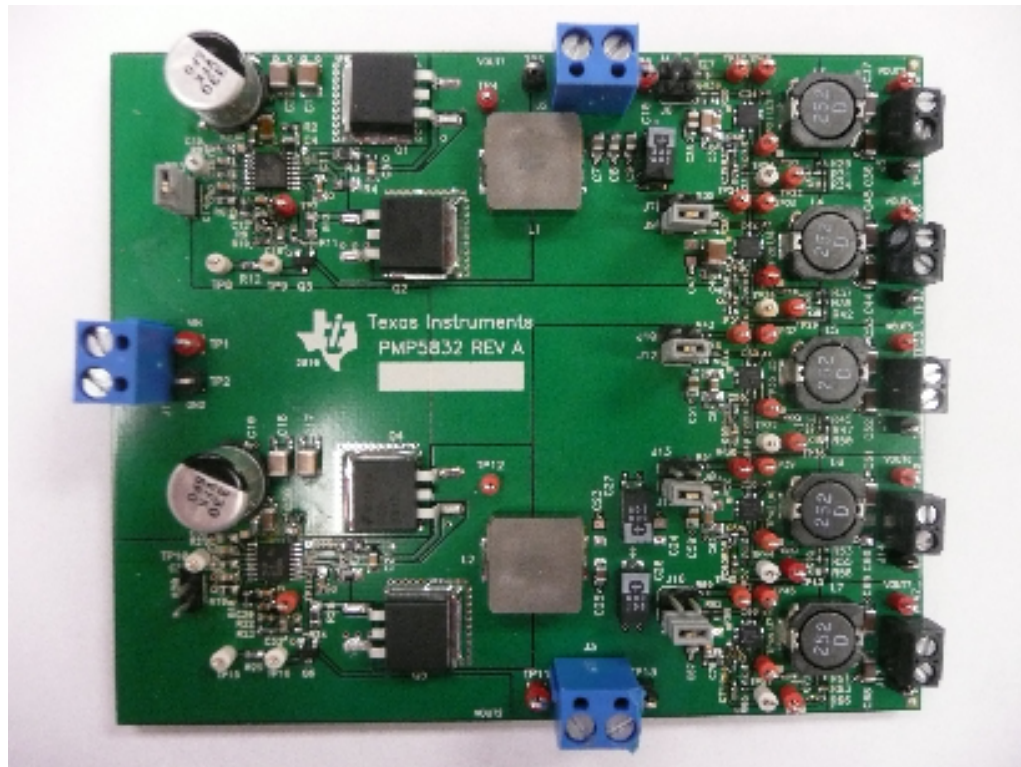
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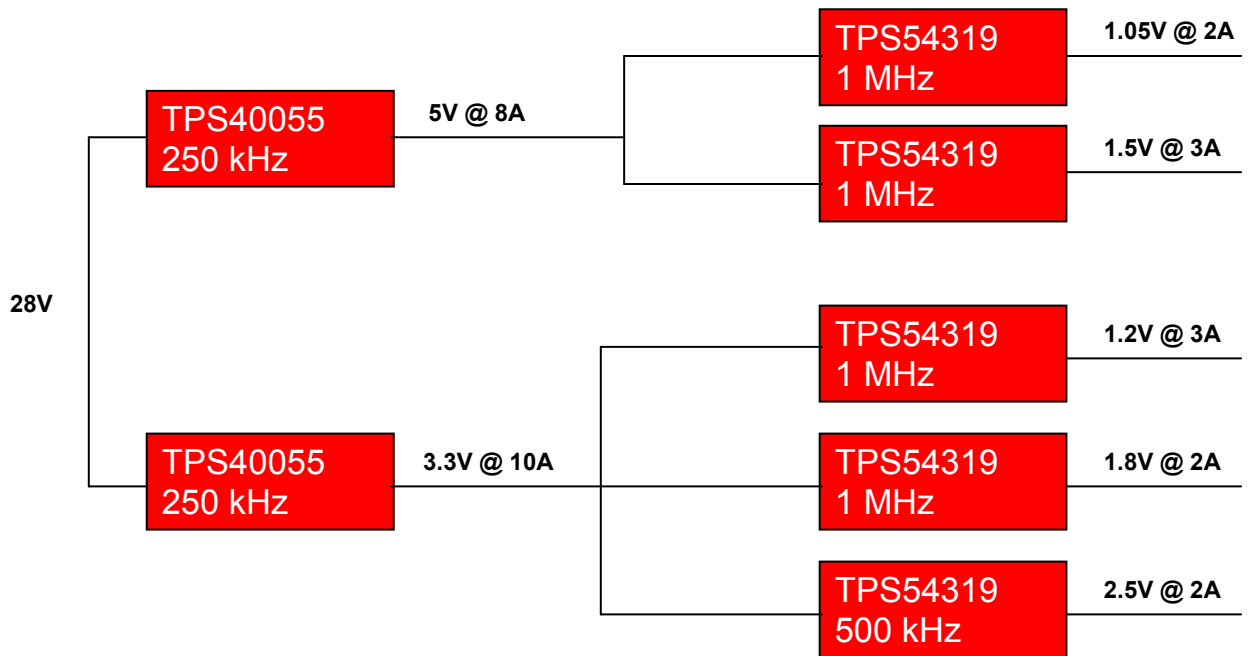
Operating Parameters

Parameter	Min	Typ	Max	Unit
V_{in}	26	28	30	V
V_{out}	1.05		5	V
I_{out}	2		3	A
$F_{switching}$	500		1000	kHz

1 PMP5832 Board Image



2 Block Diagram



3 TPS40055 – 5.0V Output

3.1 Performance Summary

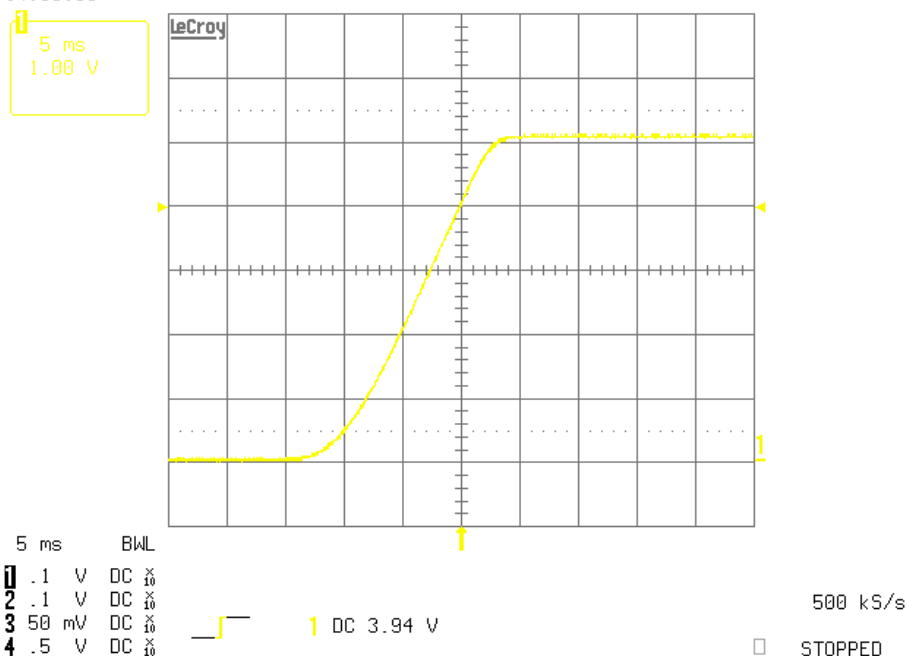
Performance parameters below represent data obtained from the PMP5832 design; changes to the design, component selection or layout may result in varied performance.

Parameter	Test Conditions	Min	Typ	Max	Unit
Loop Bandwidth	$V_{in}=28V$, $I_{out}=8A$		31.92		kHz
Phase Margin	$V_{in}=28V$, $I_{out}=8A$		74.37		°
Output Voltage Ripple	$I_{out}=8A$		15.5		mV
Maximum Efficiency			90.6		%
Load Regulation	$V_{in}=28V$, $I_{out}= 0A$ to 8A		0.5		%
Switching Frequency			264		kHz

3.2 Start-up Waveform

$V_{in} = 28V$, $V_{out} = 5V$, $I_{out} = 100mA$

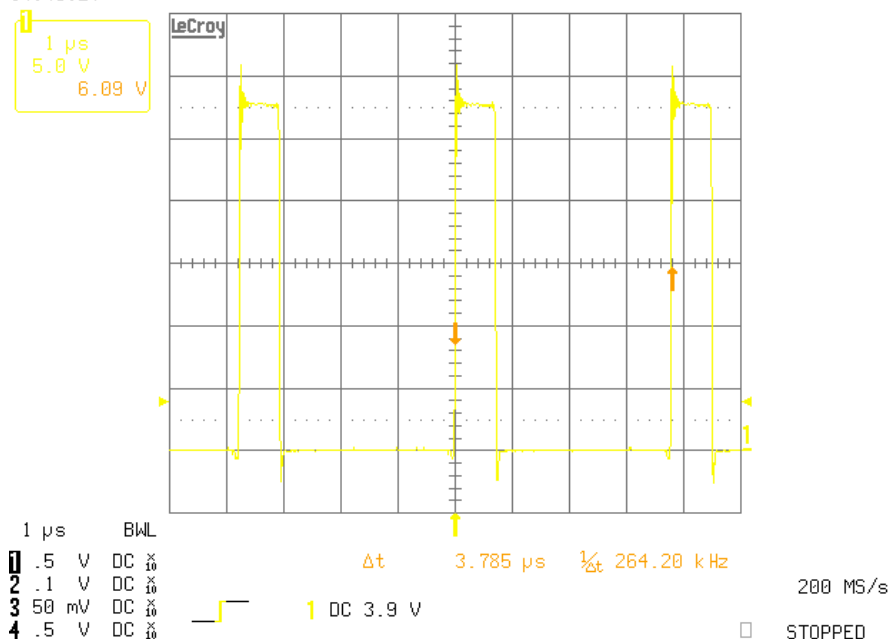
24-Sep-10
14:36:59



3.3 Switch Node

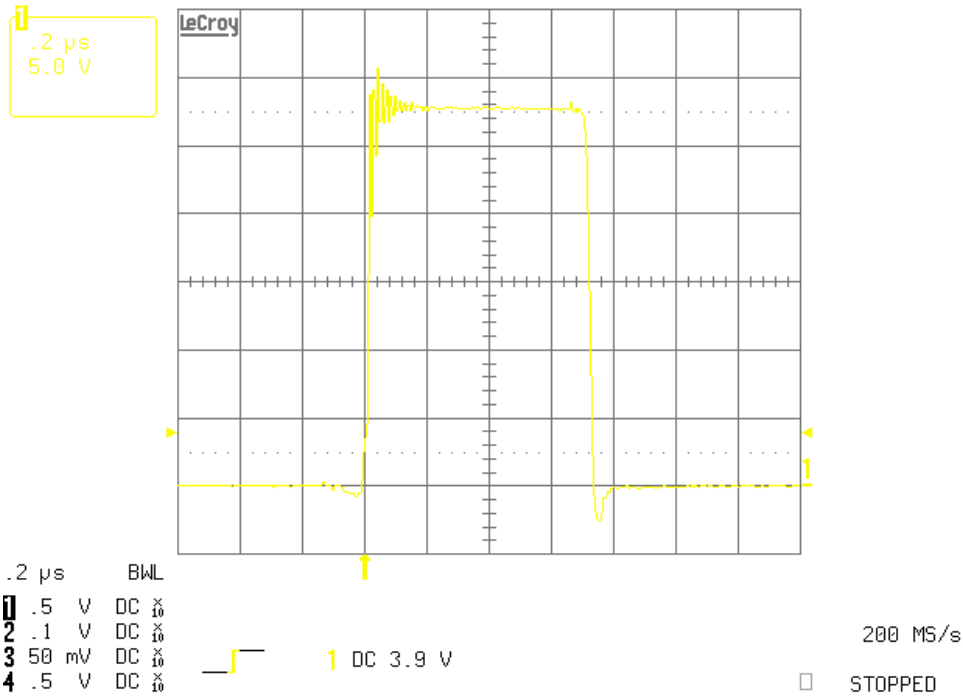
$V_{in} = 28V$, $V_{out} = 5V$, $I_{out} = 8A$

24-Sep-10
14:40:27



Zoom

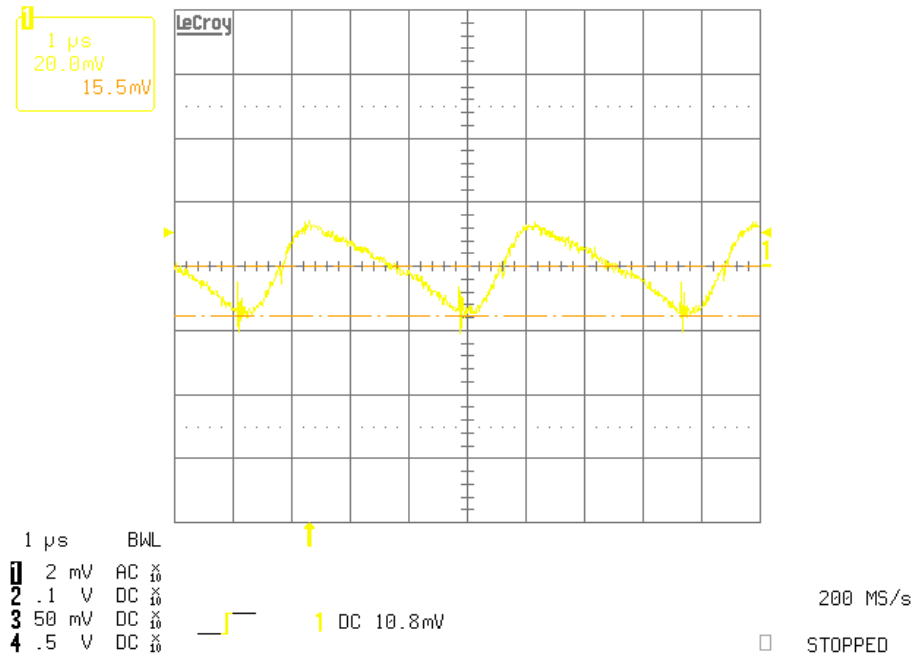
24-Sep-10
14:41:21



3.4 Output Voltage Ripple

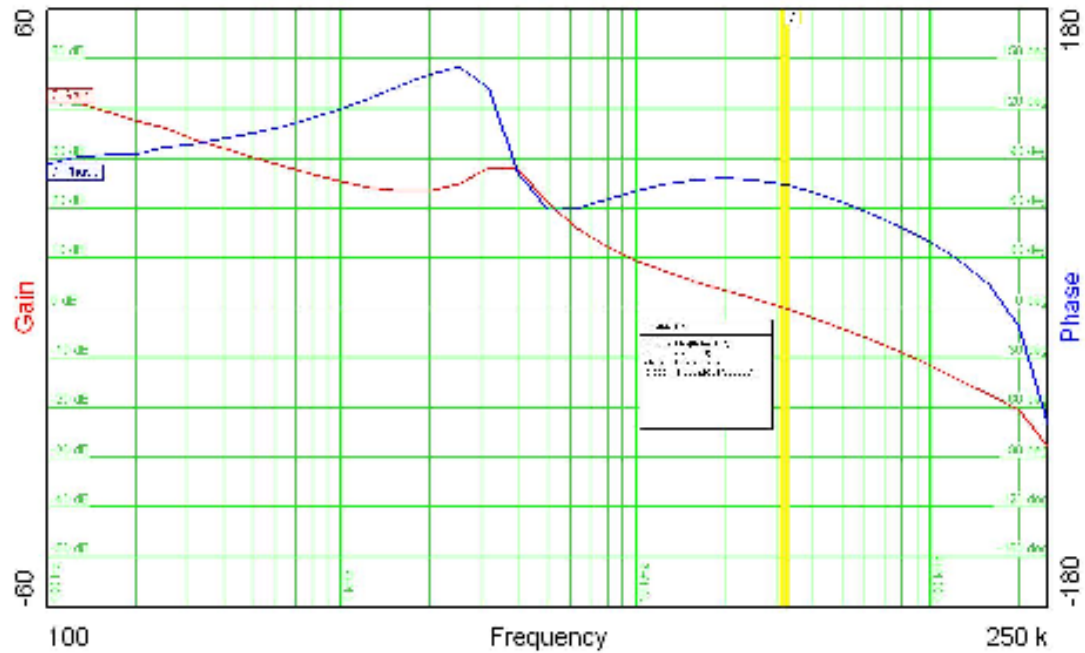
$V_{in} = 28V$, $V_{out} = 5V$, $I_{out} = 8A$

24-Sep-10
14:32:34



3.5 Loop Response

$V_{in} = 28V$, $V_{out} = 5V$, $I_{out} = 8A$

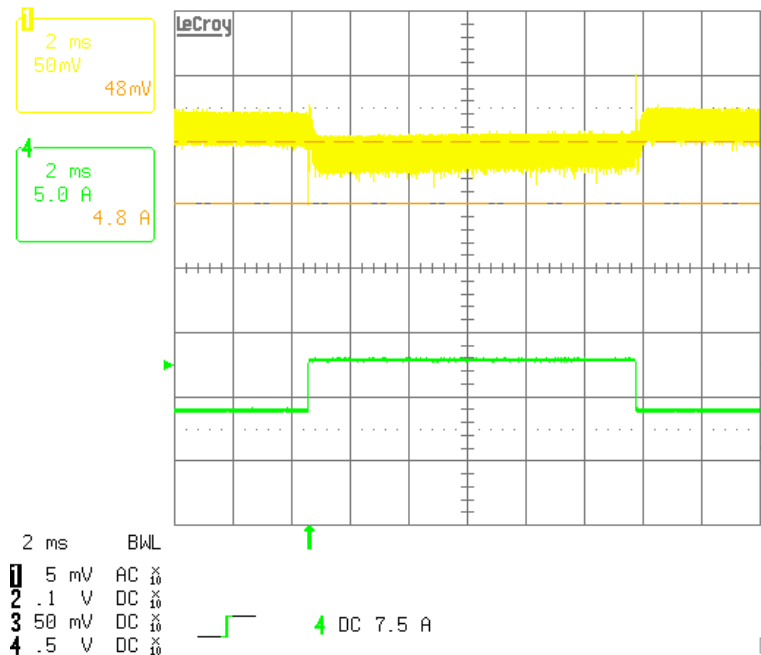


Phase margin = 74.37 @ 31.92 kHz

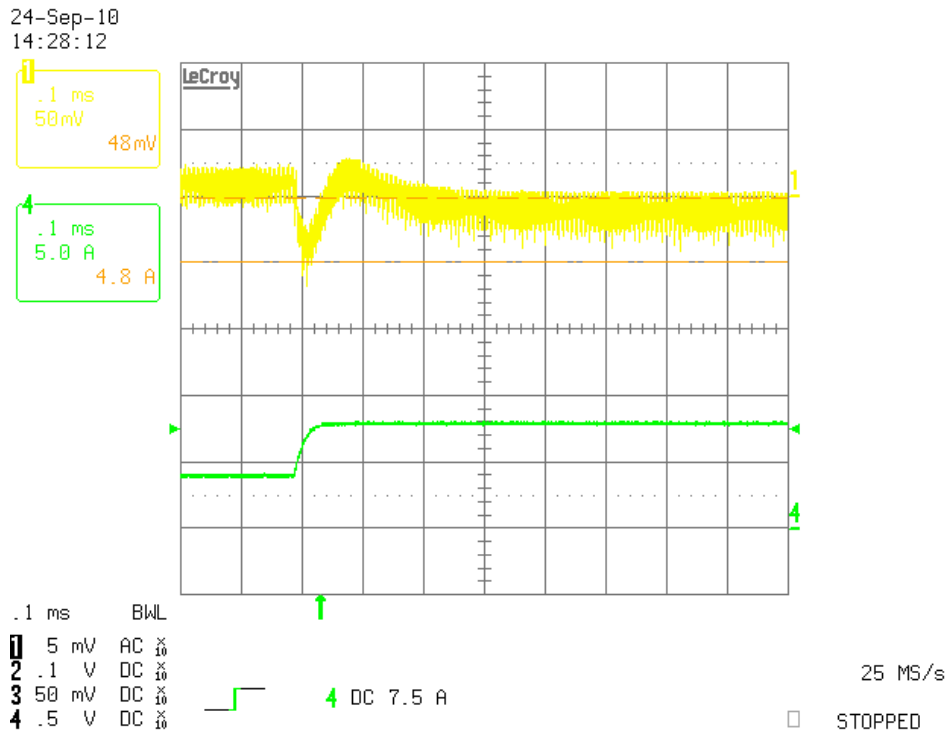
3.6 Transient Response

$V_{in} = 28V$, $V_{out} = 5V$, $I_{out} = 4A$ to $8A$

24-Sep-10
14:24:39



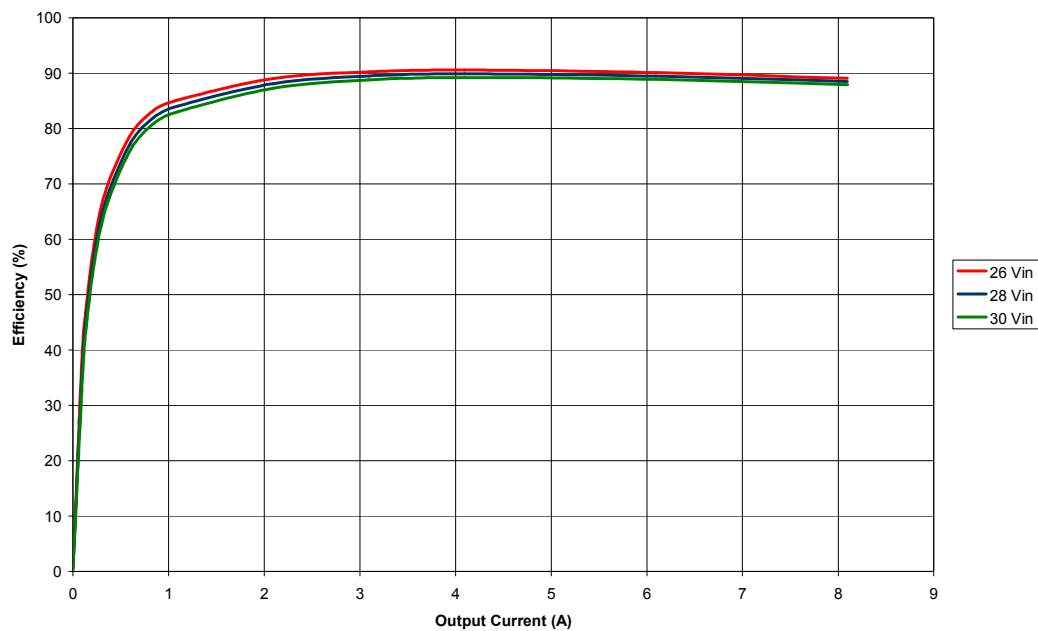
Zoom



3.7 Efficiency

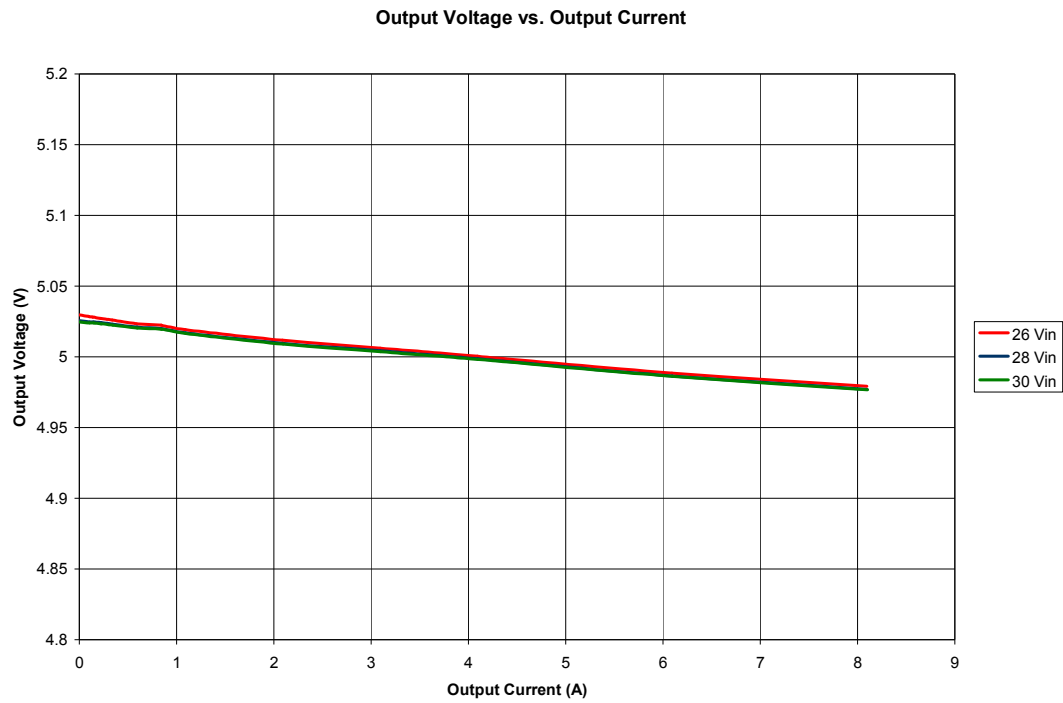
$V_{out} = 5V$, $I_{out} = 0A$ to $8A$

Efficiency vs. Output Current



3.8 Load Regulation

$V_{out} = 5V$, $I_{out} = 0A$ to $8A$



4 TPS40055 – 3.3V Output

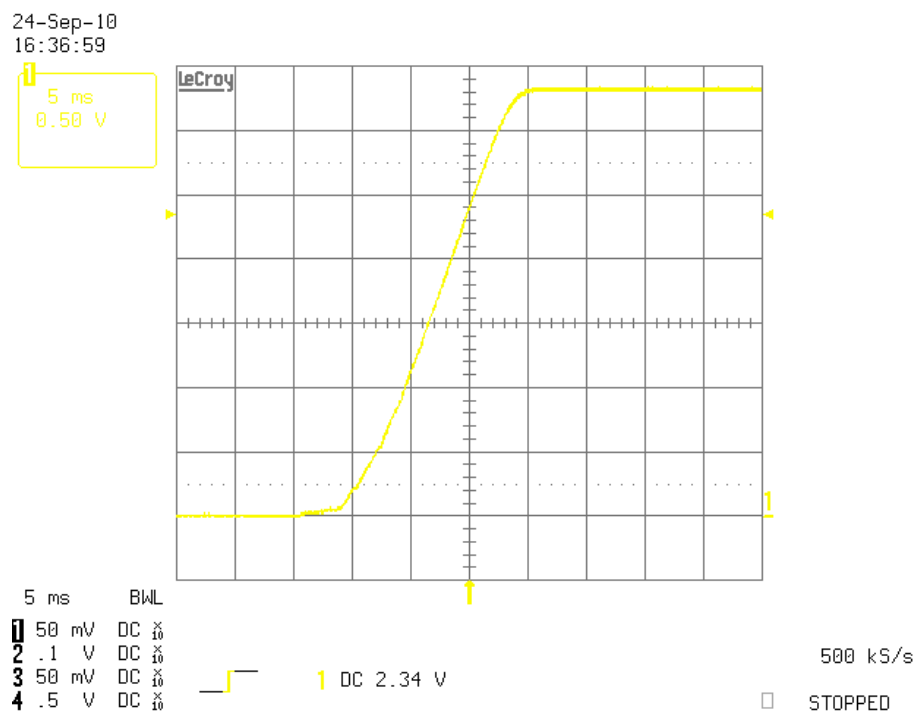
4.1 Performance Summary

Performance parameters below represent data obtained from the PMP5832 design; changes to the design, component selection or layout may result in varied performance.

Parameter	Test Conditions	Min	Typ	Max	Unit
Loop Bandwidth	$V_{in}=28V$, $I_{out}=10A$		21.96		kHz
Phase Margin	$V_{in}=28V$, $I_{out}=10A$		62.03		°
Output Voltage Ripple	$I_{out}=10A$		11.9		mV
Maximum Efficiency			87.6		%
Load Regulation	$V_{in}=28V$, $I_{out}= 0A$ to $10A$		0.8		%
Switching Frequency			268		kHz

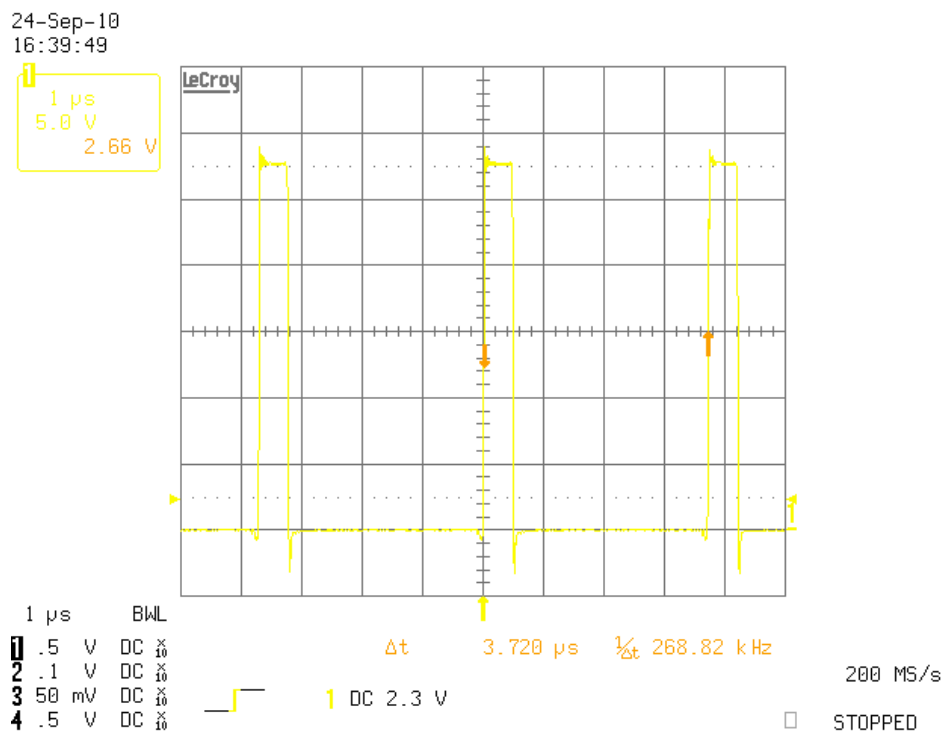
4.2 Startup Waveform

$V_{in} = 28V$, $V_{out} = 3.3V$, $I_{out} = 150A$



4.3 Switch Node

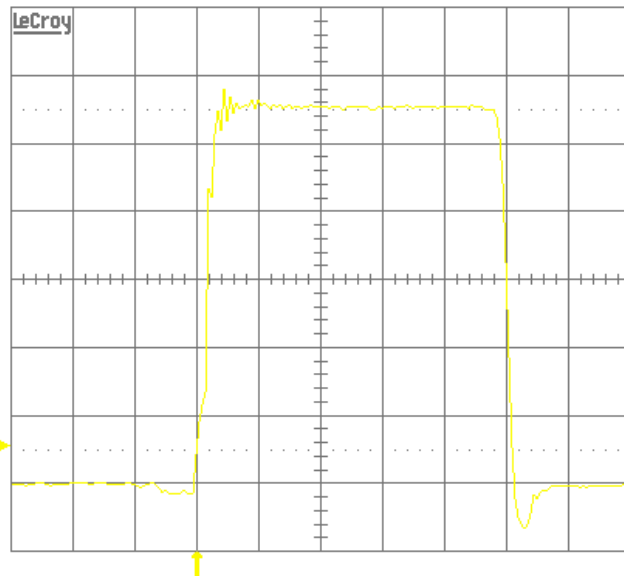
$V_{in} = 28V$, $V_{out} = 3.3V$, $I_{out} = 10A$



Zoom

24-Sep-10
16:40:47

1
.1 μ s
5.0 V



.1 μ s BWL

1 .5 V DC $\times 10$
2 .1 V DC $\times 10$
3 50 mV DC $\times 10$
4 .5 V DC $\times 10$



1 DC 2.8 V

200 MS/s

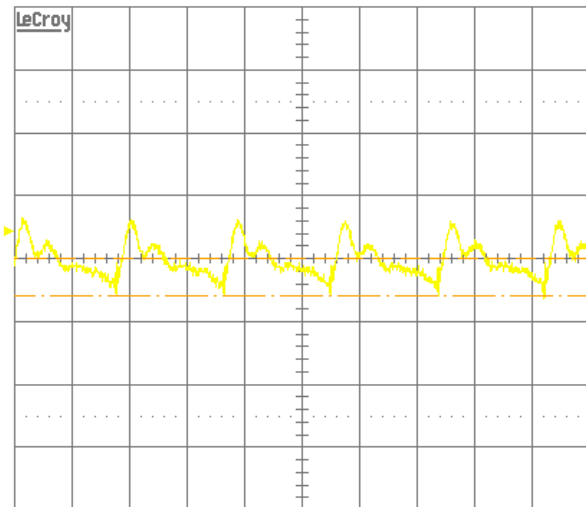
☐ STOPPED

4.4 Output Voltage Ripple

$V_{in} = 28V$, $V_{out} = 3.3V$, $I_{out} = 10A$

24-Sep-10
16:32:45

1
2 μ s
20.8 mV
11.9 mV



2 μ s BWL

1 2 mV AC $\times 10$
2 .1 V DC $\times 10$
3 50 mV DC $\times 10$
4 .5 V DC $\times 10$



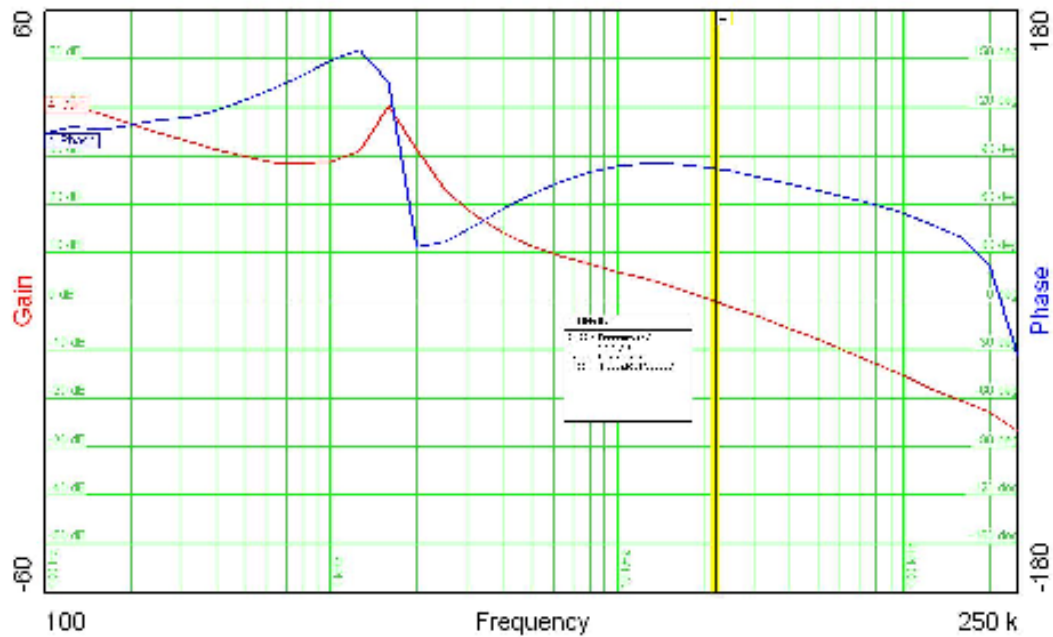
1 DC 8.8 mV

200 MS/s

☐ STOPPED

4.5 Loop Response

$V_{in} = 28V$, $V_{out} = 3.3V$, $I_{out} = 10A$

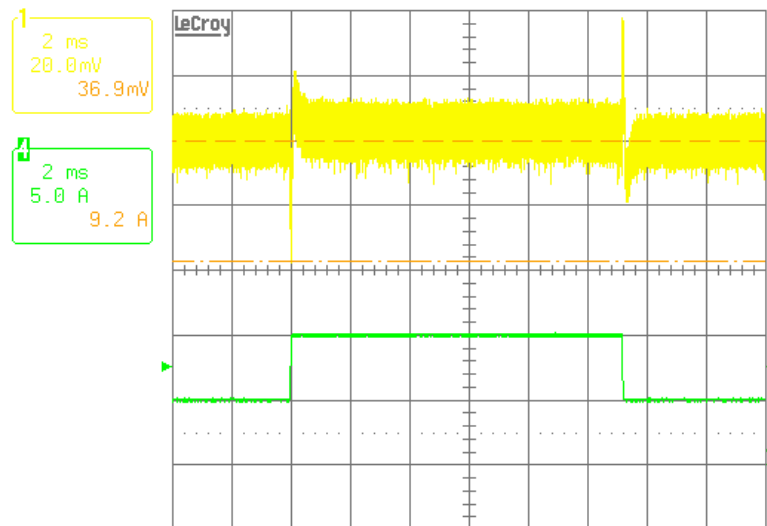


Phase Margin = 62.03 @ 21.96k

4.6 Transient Response

$V_{in} = 28V$, $V_{out} = 3.3V$, $I_{out} = 5A$ to $10A$

24-Sep-10
16:27:21



2 ms BWL

1 2 mV AC $\times 10$
2 .1 V DC $\times 10$
3 50 mV DC $\times 10$
4 .5 V DC $\times 10$

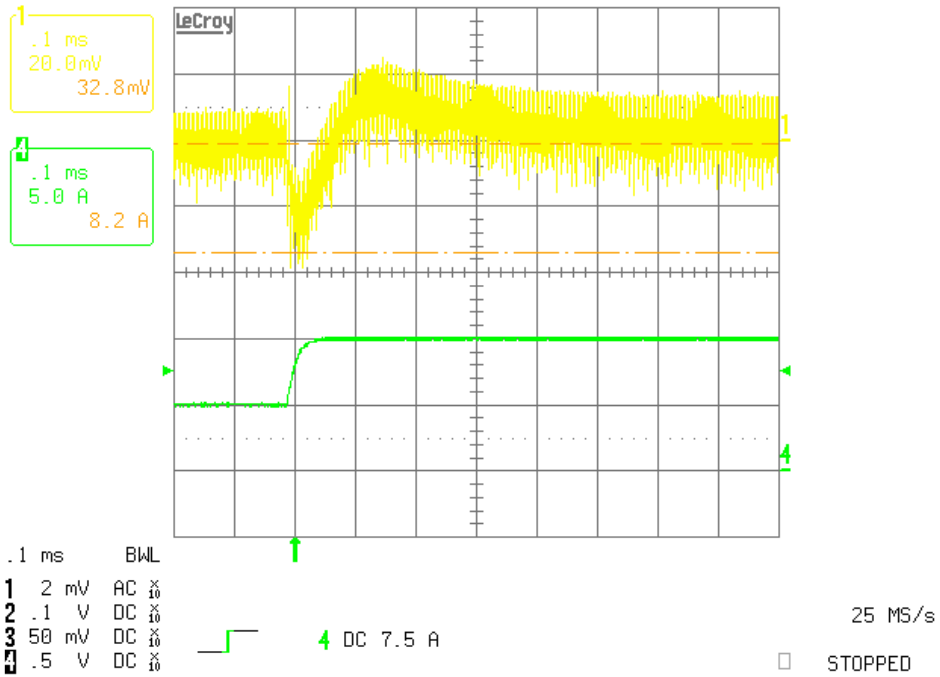
4 DC 7.5 A

1 MS/s

STOPPED

Zoom

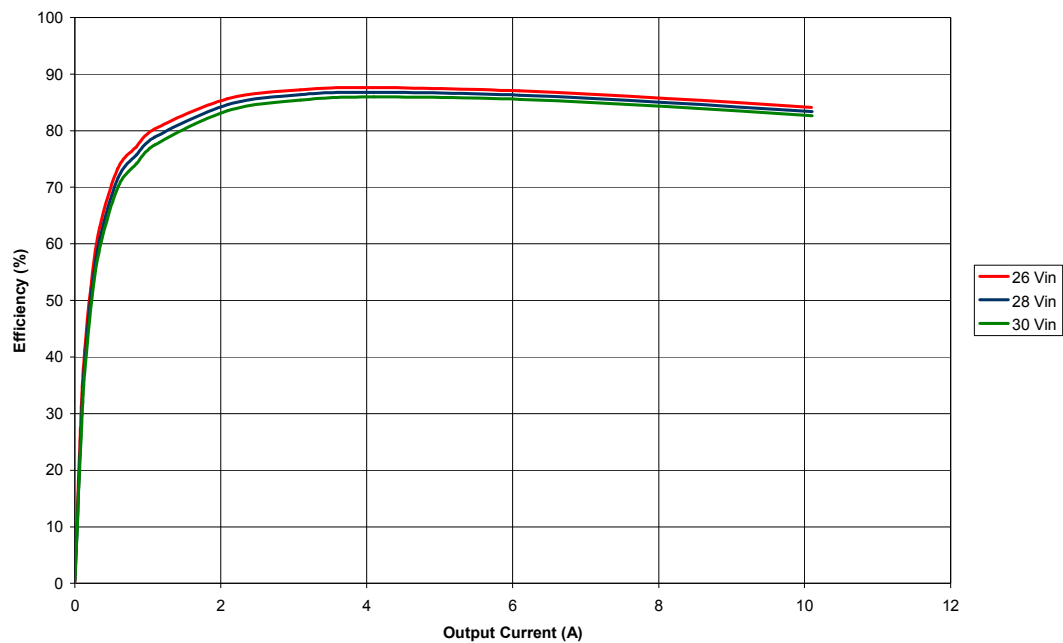
24-Sep-10
16:28:16



4.7 Efficiency

$V_{in} = 28V$, $V_{out} = 3.3V$, $I_{out} = 0A$ to $10A$

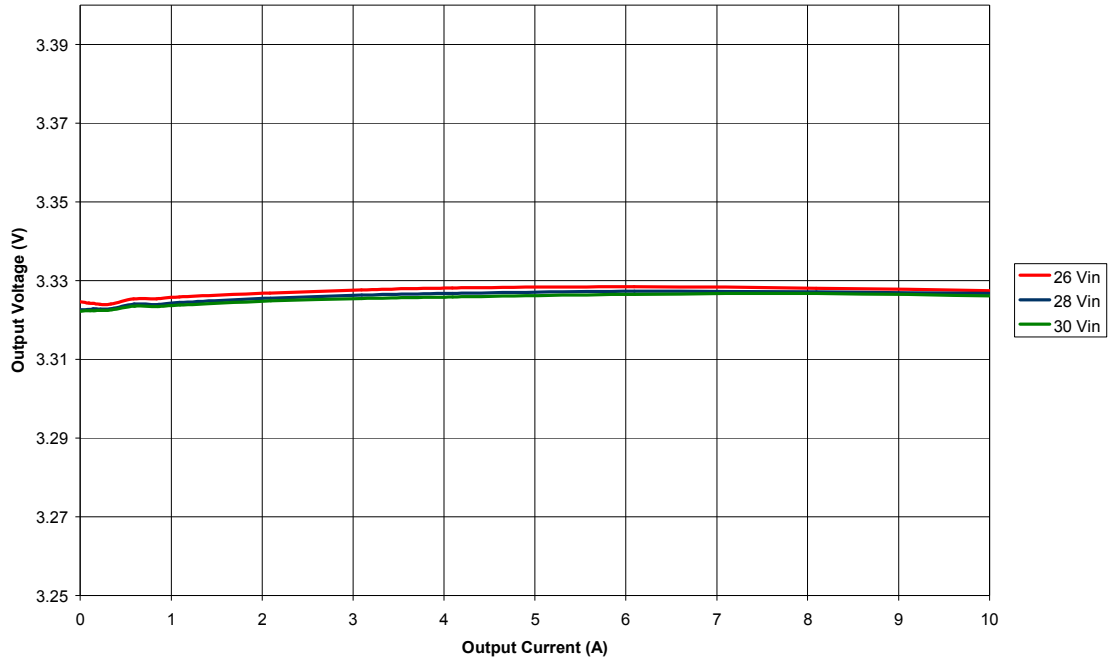
Efficiency vs. Output Current



4.8 Load Regulation

$V_{in} = 28V$, $V_{out} = 3.3V$, $I_{out} = 0A$ to $10A$

Output Voltage vs. Output Current



5 TPS54319 – 1.05V Output

5.1 Performance Summary

Performance parameters below represent data obtained from the PMP5832 design; changes to the design, component selection or layout may result in varied performance.

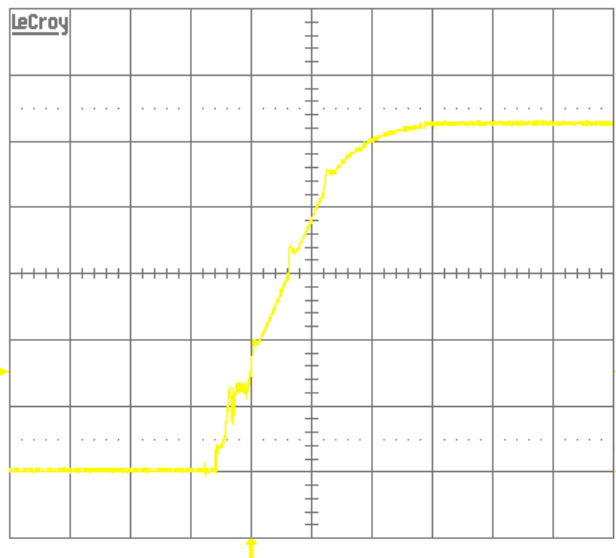
Parameter	Test Conditions	Min	Typ	Max	Unit
Loop Bandwidth	$V_{in}=5V$, $I_{out}=2A$		29.65		kHz
Phase Margin	$V_{in}=5V$, $I_{out}=2A$		62.05		°
Output Voltage Ripple	$I_{out}=2A$		4.6		mV
Maximum Efficiency			90.7		%
Load Regulation	$V_{in}=5V$, $I_{out}=0A$ to $2A$		0.2		%
Switching Frequency			941		kHz

5.2 Startup Waveform

$V_{in} = 5V$, $V_{out} = 1.05V$, $I_{out} = 100mA$

12-Oct-10
13:19:31

2 ms
200 mV



2 ms BWL

1 20 mV DC $\times 10$
2 2 mV AC $\times 10$
3 2 mV AC $\times 10$
4 .1 V DC $\times 10$



1 DC 0.300 V

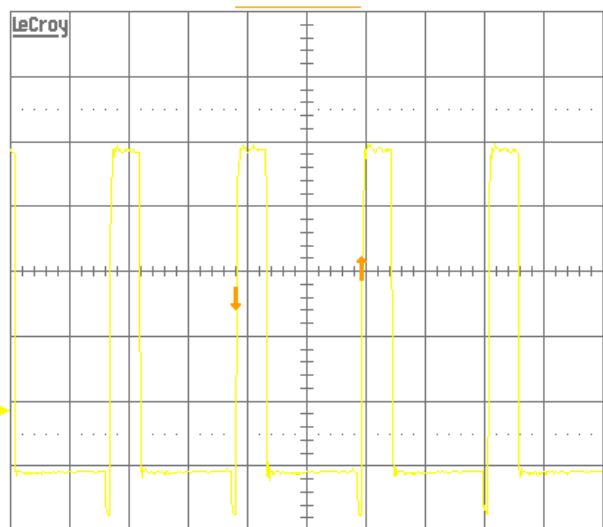
1 MS/s
SLOW TRIGGER
☐ NORMAL

5.3 Switch Node

$V_{in} = 5V$, $V_{out} = 1.05V$, $I_{out} = 2A$

12-Oct-10
12:47:29

.5 μs
1.00 V
831 mV



.5 μs BWL

1 .1 V DC $\times 10$
2 2 mV AC $\times 10$
3 2 mV AC $\times 10$
4 .2 V DC $\times 10$



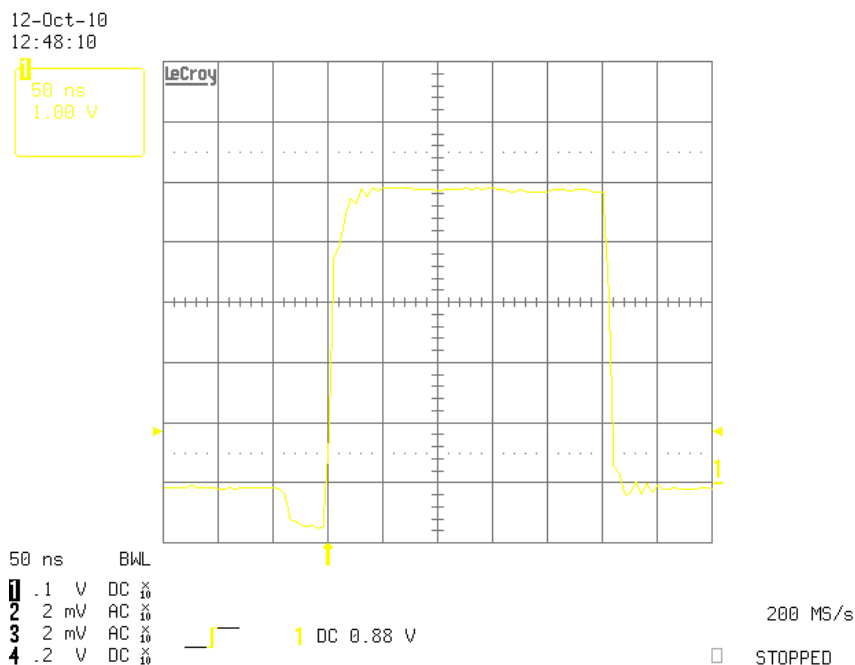
1 DC 0.88 V

Δt 1.0625 μs $1/\Delta t$ 941.18 kHz

200 MS/s

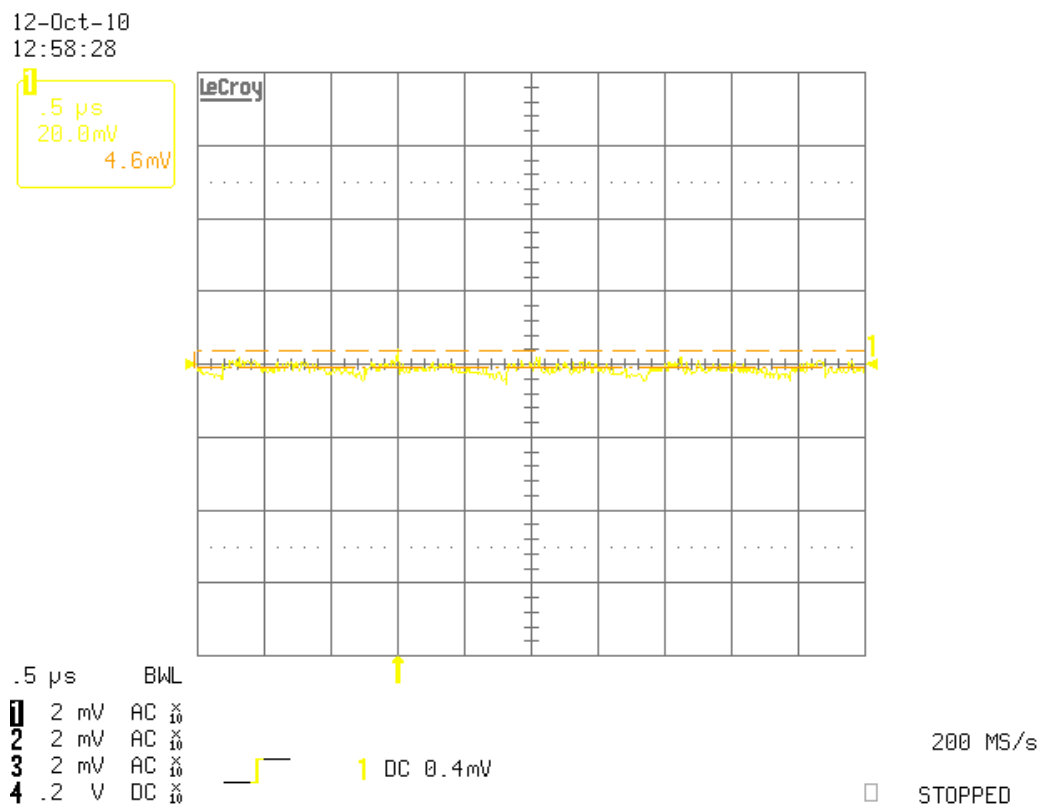
☐ STOPPED

Zoom



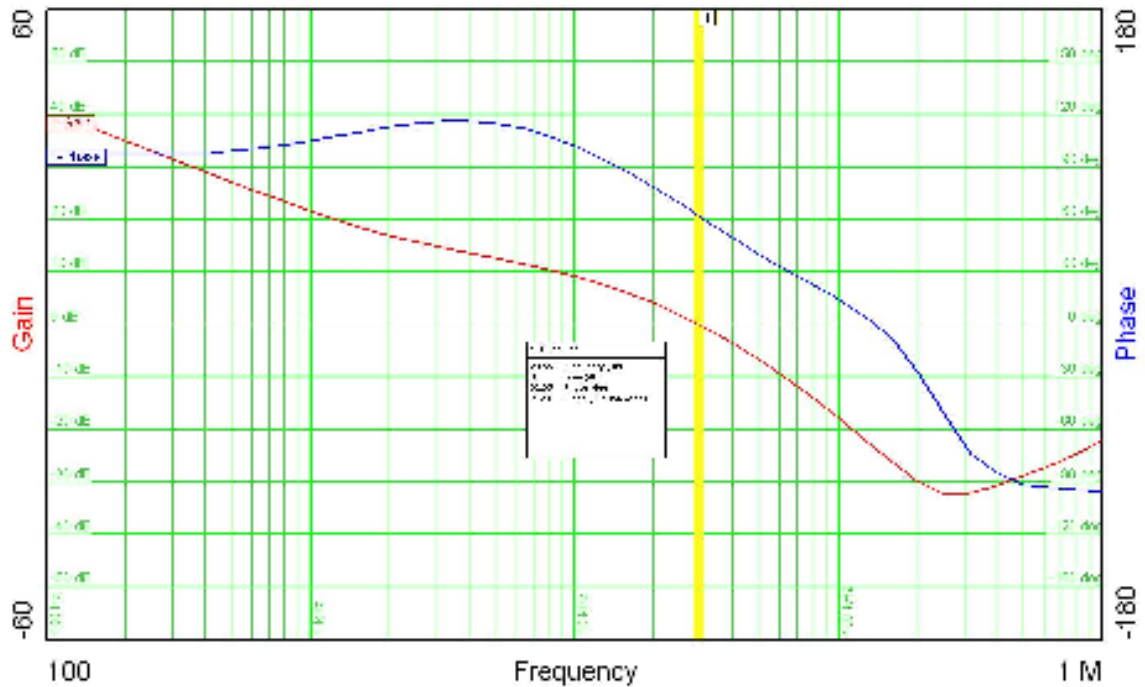
5.4 Output Voltage Ripple

$V_{in} = 5V$, $V_{out} = 1.05V$, $I_{out} = 2A$



5.5 Loop Response

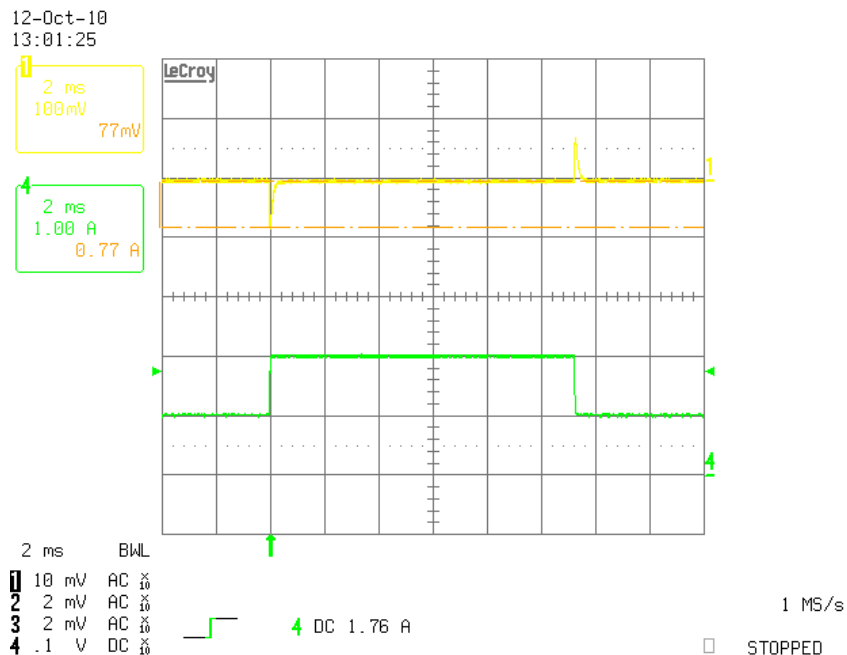
$V_{in} = 5V$, $V_{out} = 1.05V$, $I_{out} = 2A$



Phase Margin = 62.05 @ 29.65

5.6 Transient Response

$V_{in} = 5V$, $V_{out} = 1.05V$, $I_{out} = 1A$ to $2A$

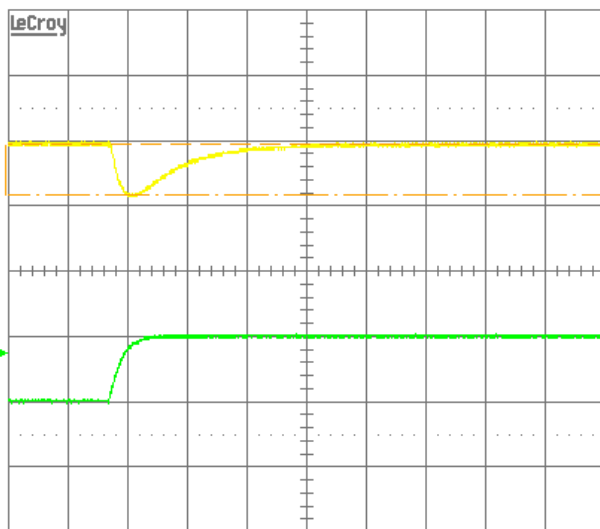


Zoom

12-Oct-10
13:01:47

1
.1 ms
100 mV
77 mV

4
.1 ms
1.00 A
0.77 A



.1 ms BWL

1 10 mV AC $\times \frac{1}{10}$
2 2 mV AC $\times \frac{1}{10}$
3 2 mV AC $\times \frac{1}{10}$
4 .1 V DC $\times \frac{1}{10}$



4 DC 1.76 A

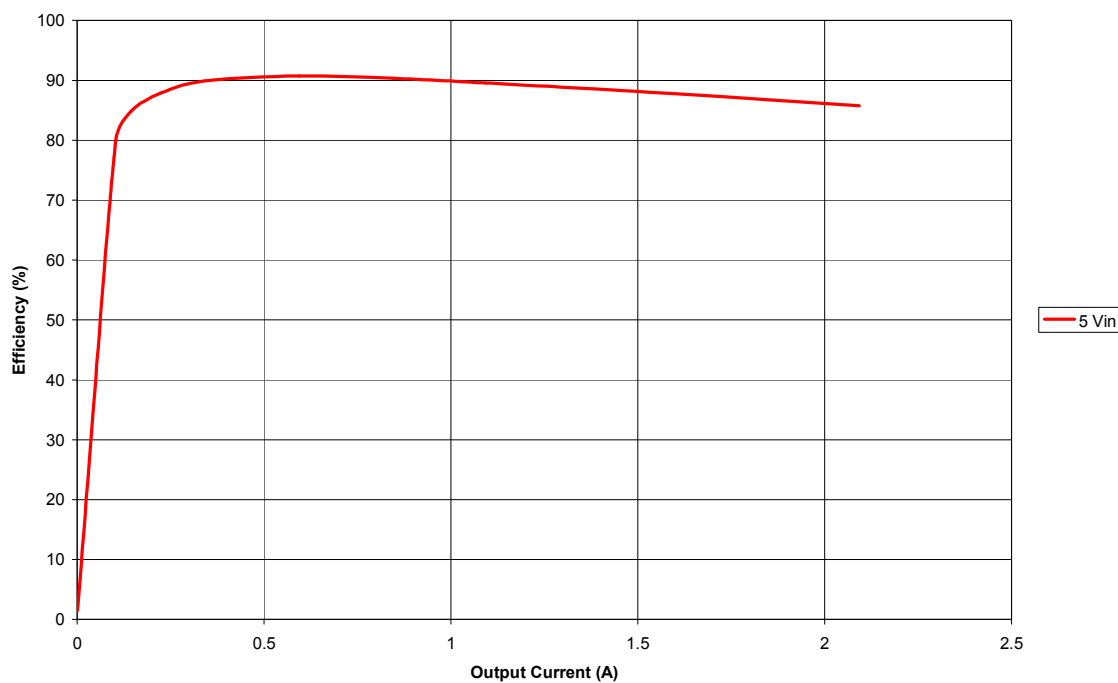
25 MS/s

STOPPED

5.7 Efficiency

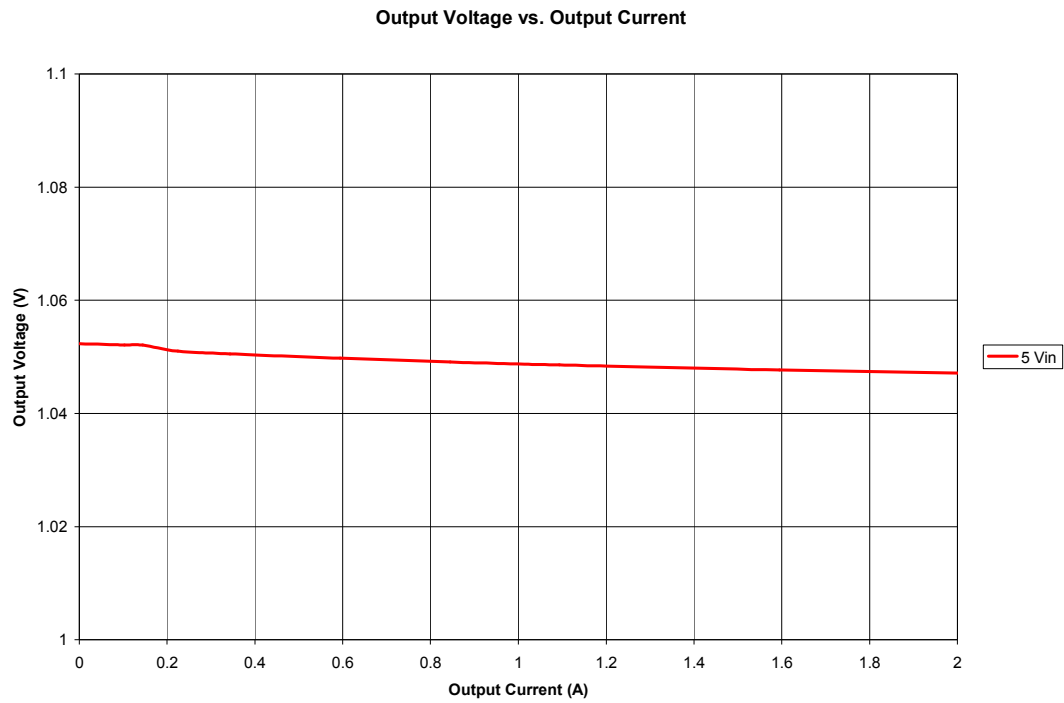
$V_{in} = 5V$, $V_{out} = 1.05V$

Efficiency vs. Output Current



5.8 Load Regulation

$$V_{in} = 5V, V_{out} = 1.05V$$



6 TPS54319 – 1.5V Output

6.1 Performance Summary

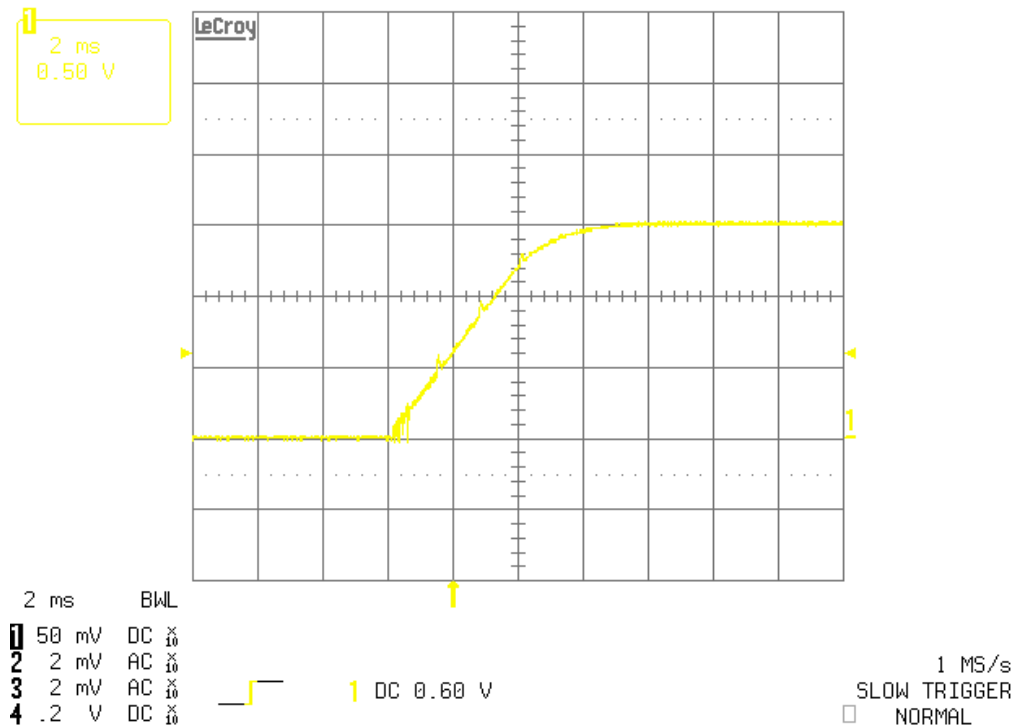
Performance parameters below represent data obtained from the PMP5832 design; changes to the design, component selection or layout may result in varied performance.

Parameter	Test Conditions	Min	Typ	Max	Unit
Loop Bandwidth	$V_{in}=5V, I_{out}=3A$		22.13		kHz
Phase Margin	$V_{in}=5V, I_{out}=3A$		62.85		°
Output Voltage Ripple	$I_{out}=3A$		3.6		mV
Maximum Efficiency			93.2		%
Load Regulation	$V_{in}=5V, I_{out}=0A \text{ to } 3A$		0.6		%
Switching Frequency			943		kHz

6.2 Startup Waveform

$V_{in} = 5V$, $V_{out} = 1.5V$, $I_{out} = 150mA$

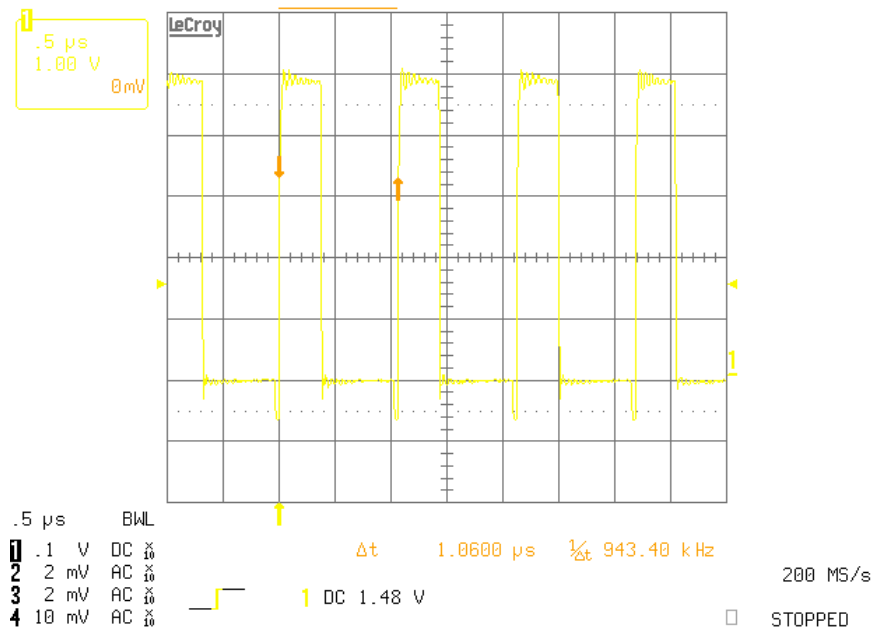
12-Oct-10
11:17:02



6.3 Switch Node

$V_{in} = 5V$, $V_{out} = 1.5V$, $I_{out} = 3A$

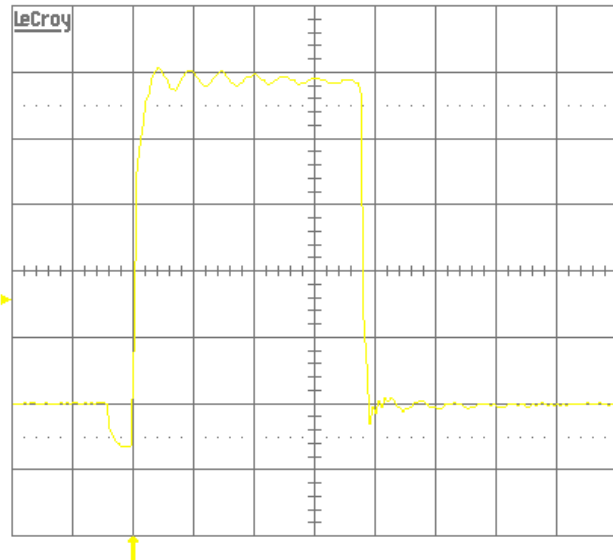
12-Oct-10
10:56:17



Zoom

12-Oct-10
10:57:42


.1 μ s
1.00 V



.1 μ s BWL

1 .1 V DC $\times_{10}$
2 2 mV AC $\times_{10}$
3 2 mV AC $\times_{10}$
4 10 mV AC $\times_{10}$



1 DC 1.48 V

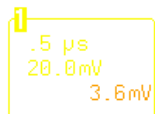
200 MS/s

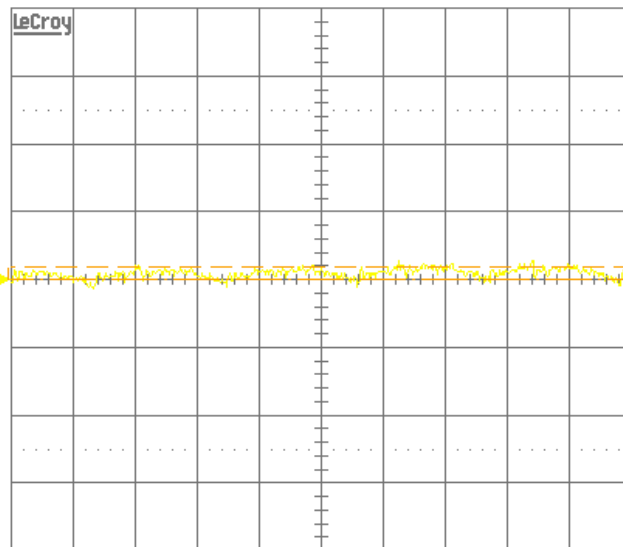
☐ STOPPED

6.4 Output Voltage Ripple

$V_{in} = 5V$, $V_{out} = 1.5V$, $I_{out} = 3A$

12-Oct-10
11:03:05


.5 μ s
20.0 mV
3.6 mV



.5 μ s BWL

1 2 mV AC $\times_{10}$
2 2 mV AC $\times_{10}$
3 2 mV AC $\times_{10}$
4 10 mV AC $\times_{10}$



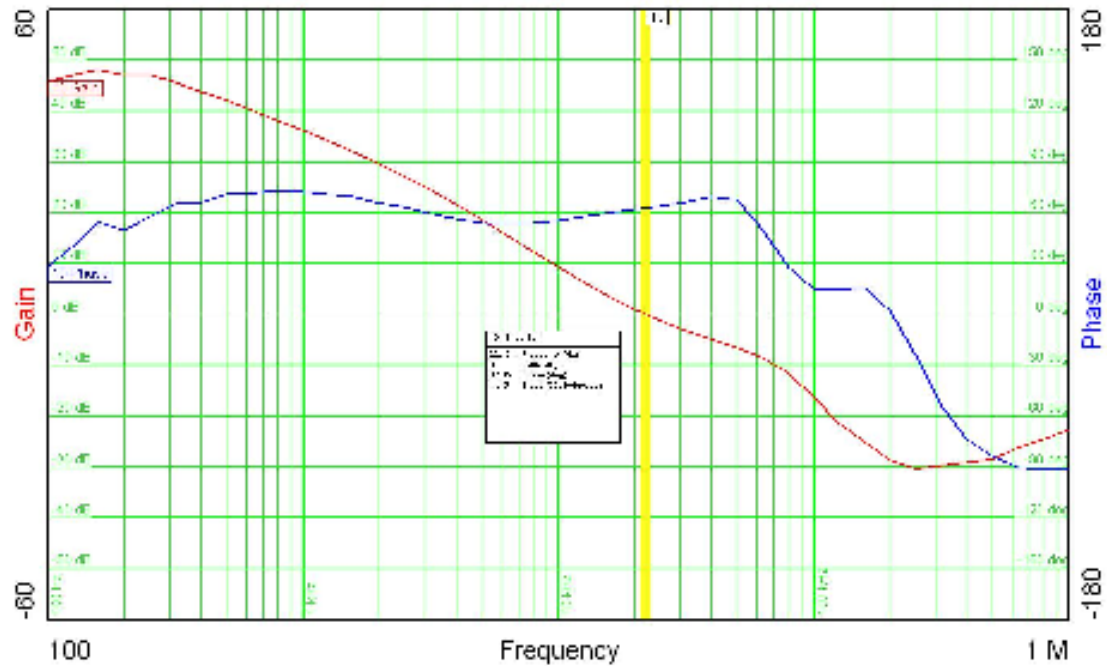
1 DC 0.4 mV

200 MS/s

☐ STOPPED

6.5 Loop Response

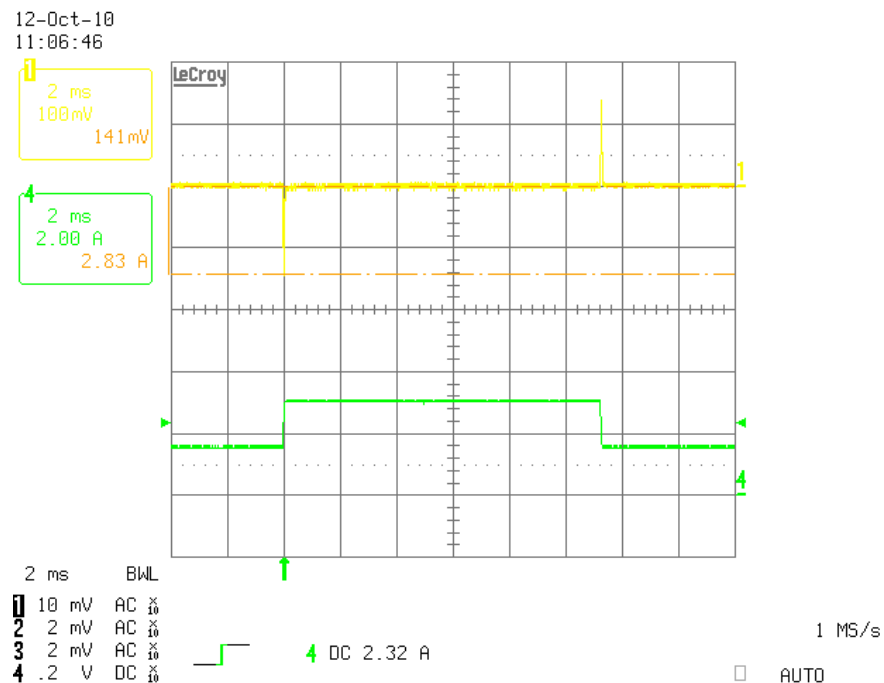
$V_{in} = 5V$, $V_{out} = 1.5V$, $I_{out} = 3A$



Phase Margin = 62.85 @ 22.13 kHz

6.6 Load Transient

$V_{in} = 5V$, $V_{out} = 1.5V$, $I_{out} = 1.5A$ to $3A$

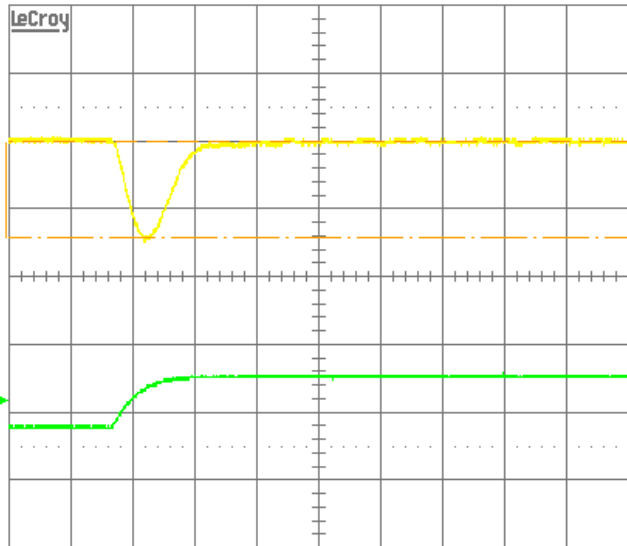


Zoom

12-Oct-10
11:07:10

1
50 μ s
100 mV
141 mV

4
50 μ s
2.00 A
2.83 A



50 μ s B/WL

1 10 mV AC $\times 10$
2 2 mV AC $\times 10$
3 2 mV AC $\times 10$
4 .2 V DC $\times 10$



4 DC 2.32 A

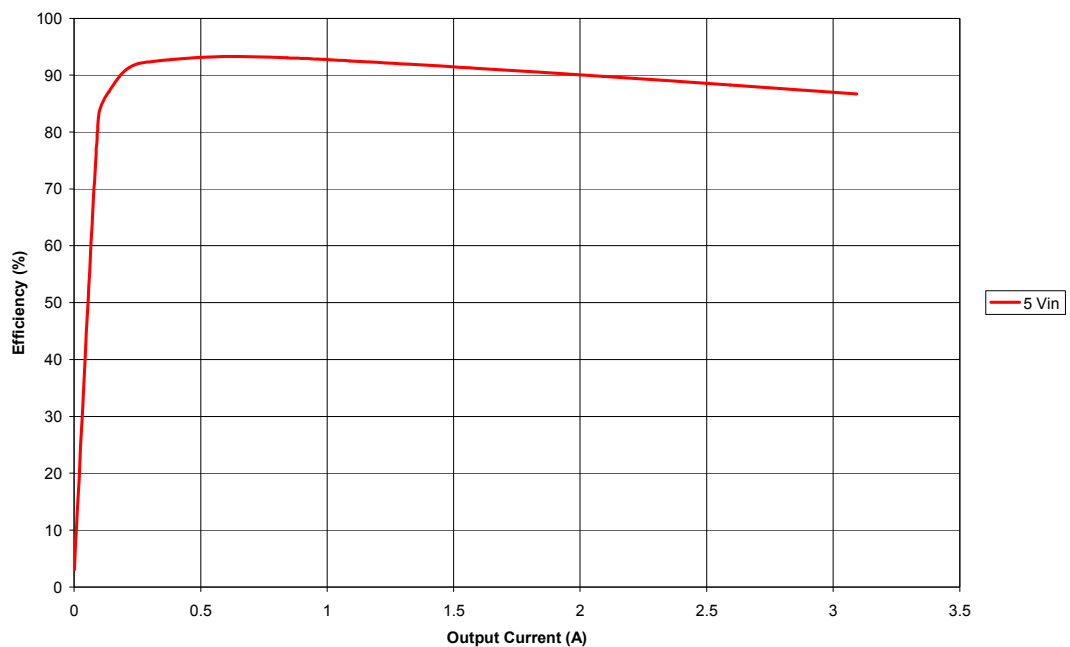
50 MS/s

STOPPED

6.7 Efficiency

$V_{in} = 5V$, $V_{out} = 1.5V$

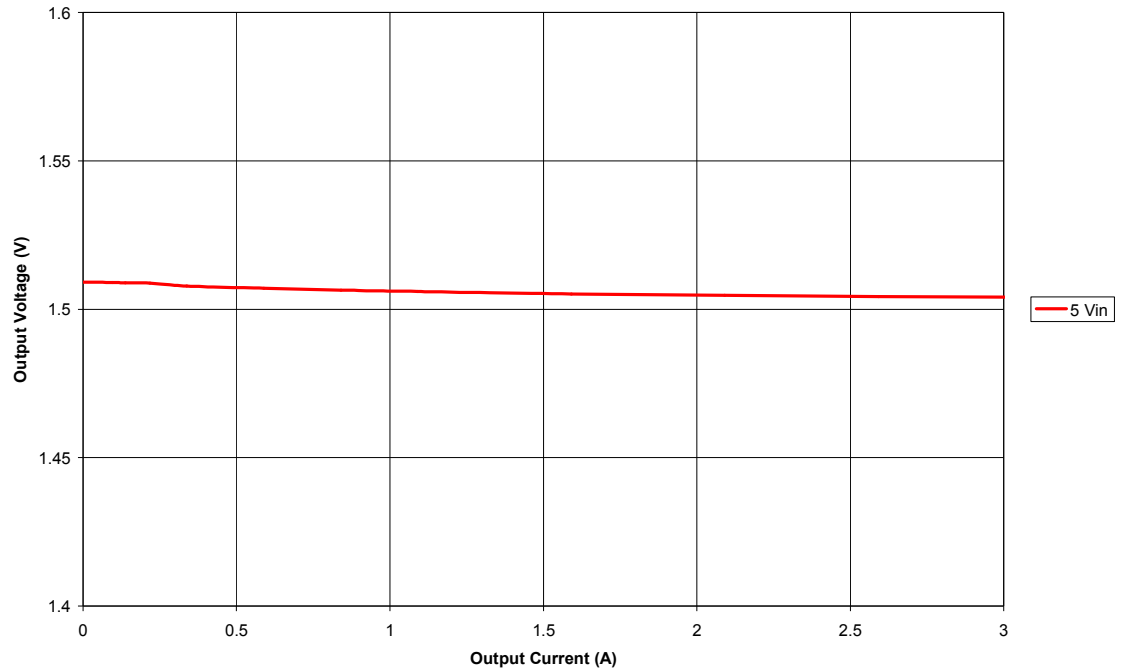
Efficiency vs. Output Current



6.8 Load Regulation

$$V_{in} = 5V, V_{out} = 1.5V$$

Output Voltage vs. Output Current



7 TPS54319 – 1.2V Output

7.1 Performance Summary

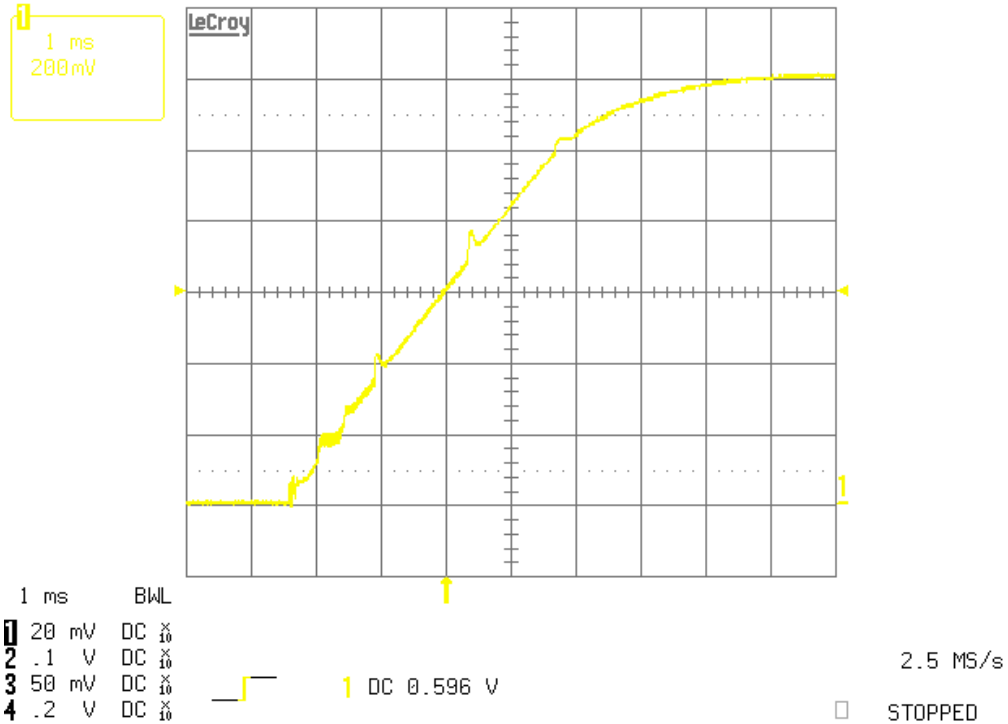
Performance parameters below represent data obtained from the PMP5832 design; changes to the design, component selection or layout may result in varied performance.

Parameter	Test Conditions	Min	Typ	Max	Unit
Loop Bandwidth	$V_{in}=3.3V$, $I_{out}=3A$		25.69		kHz
Phase Margin	$V_{in}=3.3V$, $I_{out}=3A$		56.45		°
Output Voltage Ripple	$I_{out}=3A$		2.7		mV
Maximum Efficiency			93.1		%
Load Regulation	$V_{in}=3.3V$, $I_{out}=0A$ to $3A$		0.6		%
Switching Frequency			928		kHz

7.2 Startup Waveform

$V_{in} = 3.3V$, $V_{out} = 1.2V$, $I_{out} = 150mA$

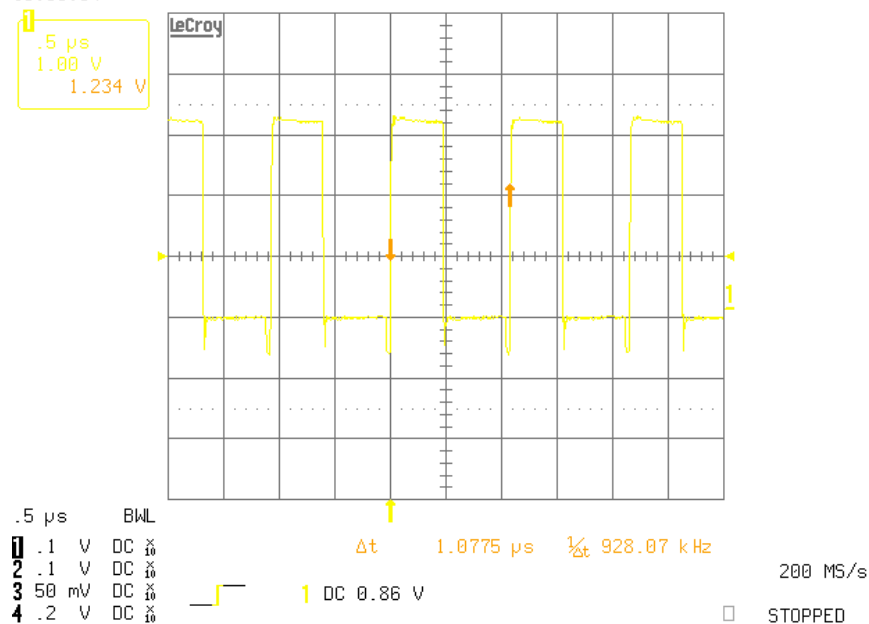
27-Sep-10
16:51:35



7.3 Switch Node

$V_{in} = 3.3V$, $V_{out} = 1.2V$, $I_{out} = 3A$

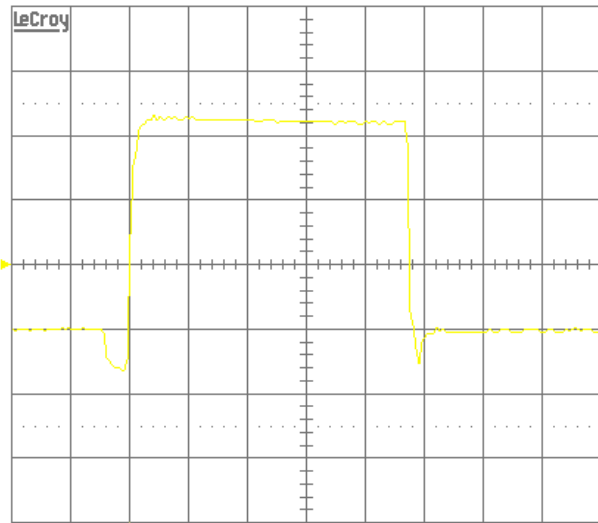
27-Sep-10
16:55:04



Zoom

27-Sep-10
16:55:39


.1 μ s
1.00 V



.1 μ s BWL

1 .1 V DC $\times_{10}$
2 .1 V DC $\times_{10}$
3 50 mV DC $\times_{10}$
4 .2 V DC $\times_{10}$



1 DC 0.86 V

200 MS/s

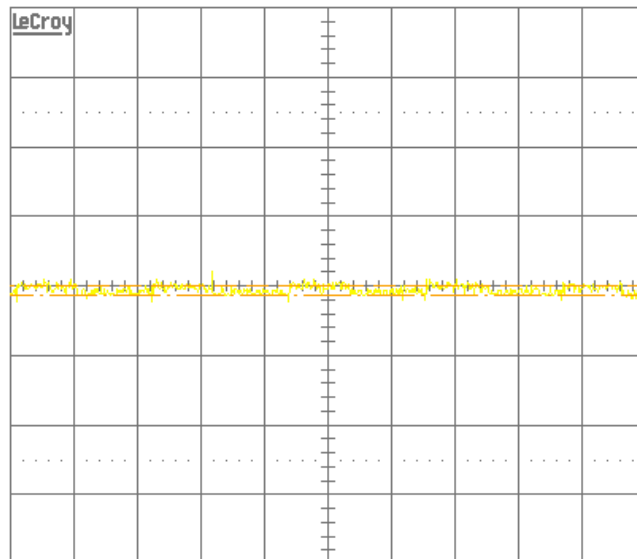
☐ STOPPED

7.4 Output Voltage Ripple

$V_{in} = 3.3V$, $V_{out} = 1.2V$, $I_{out} = 3A$

27-Sep-10
16:45:06


.5 μ s
20.0 mV
2.7 mV



.5 μ s BWL

1 2 mV AC $\times_{10}$
2 .1 V DC $\times_{10}$
3 50 mV DC $\times_{10}$
4 .2 V DC $\times_{10}$



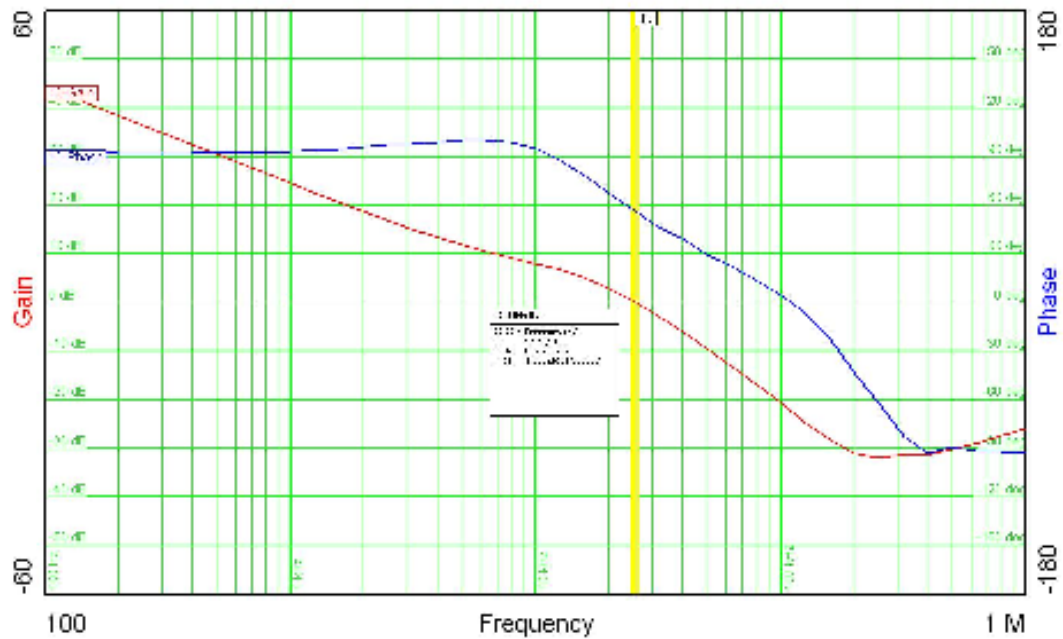
4 DC 2.36 A

200 MS/s

☐ STOPPED

7.5 Loop Response

$V_{in} = 3.3V$, $V_{out} = 1.2V$, $I_{out} = 3A$



Phase Margin = 56.45 @ 25.69 kHz

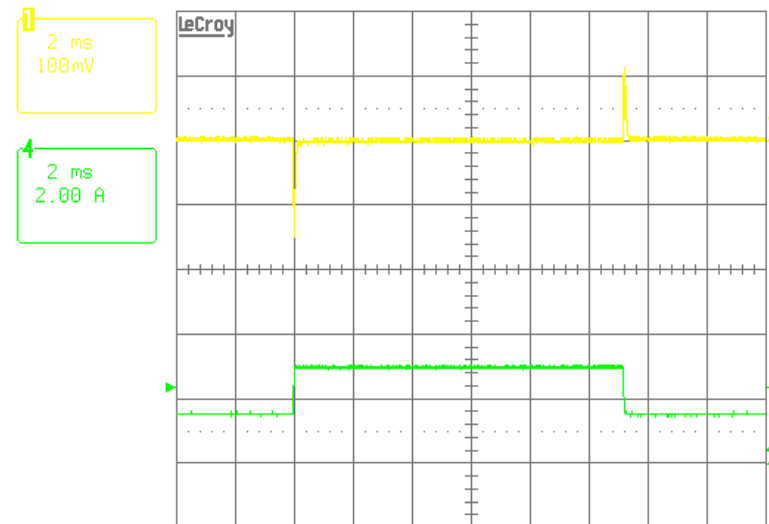
7.6 Load Transient

$V_{in} = 3.3V$, $V_{out} = 1.2V$, $I_{out} = 1.5A$ to $3A$

27-Sep-10
16:41:30

2 ms
100 mV

2 ms
2.00 A



2 ms BWL

1 10 mV AC $\times 10$
2 .1 V DC $\times 10$
3 50 mV DC $\times 10$
4 .2 V DC $\times 10$

4 DC 2.36 A

1 MS/s

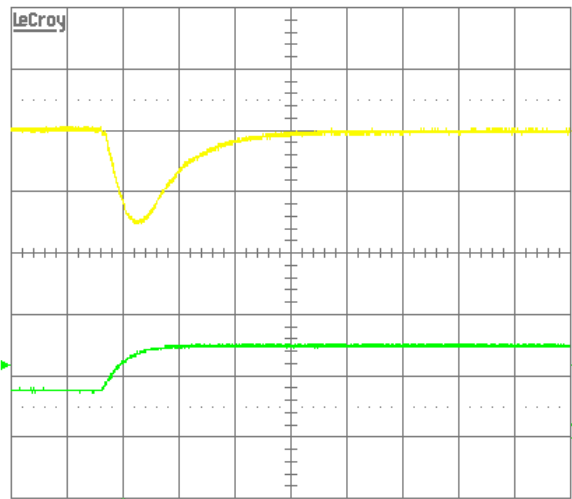
STOPPED

Zoom

27-Sep-10
16:41:08

1
50 μ s
100mV

4
50 μ s
2.00 A



50 μ s BWL

1 10 mV AC $\times$
2 .1 V DC $\times$
3 50 mV DC $\times$
4 .2 V DC $\times$

4 DC 2.36 A

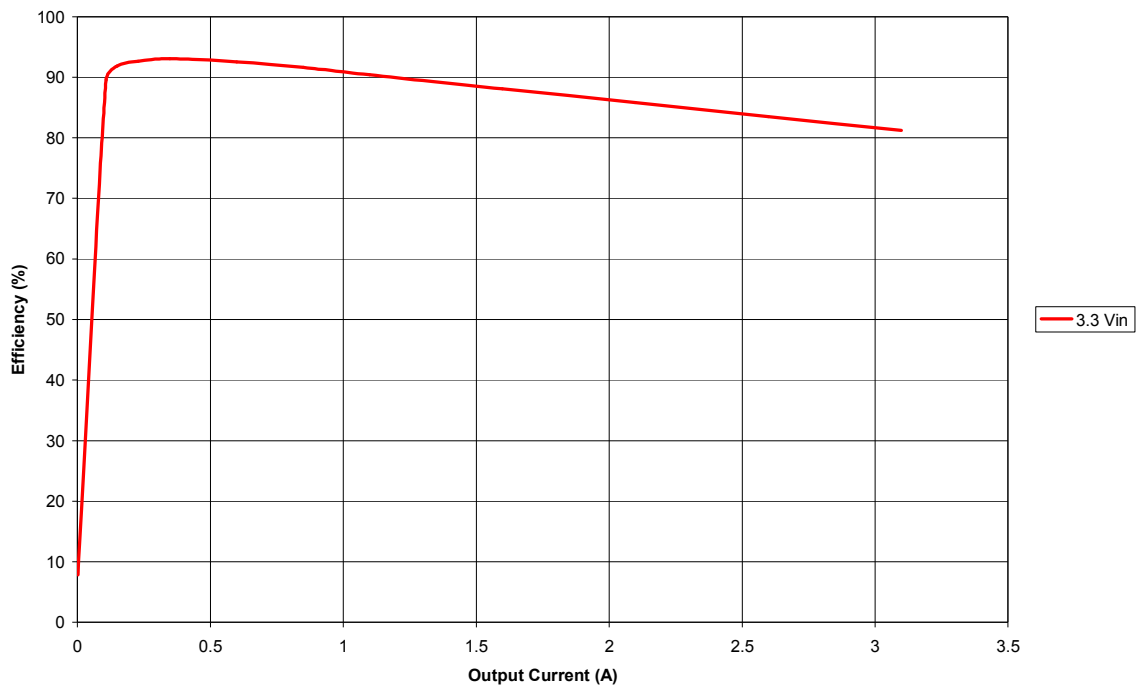
50 MS/s

STOPPED

7.7 Efficiency

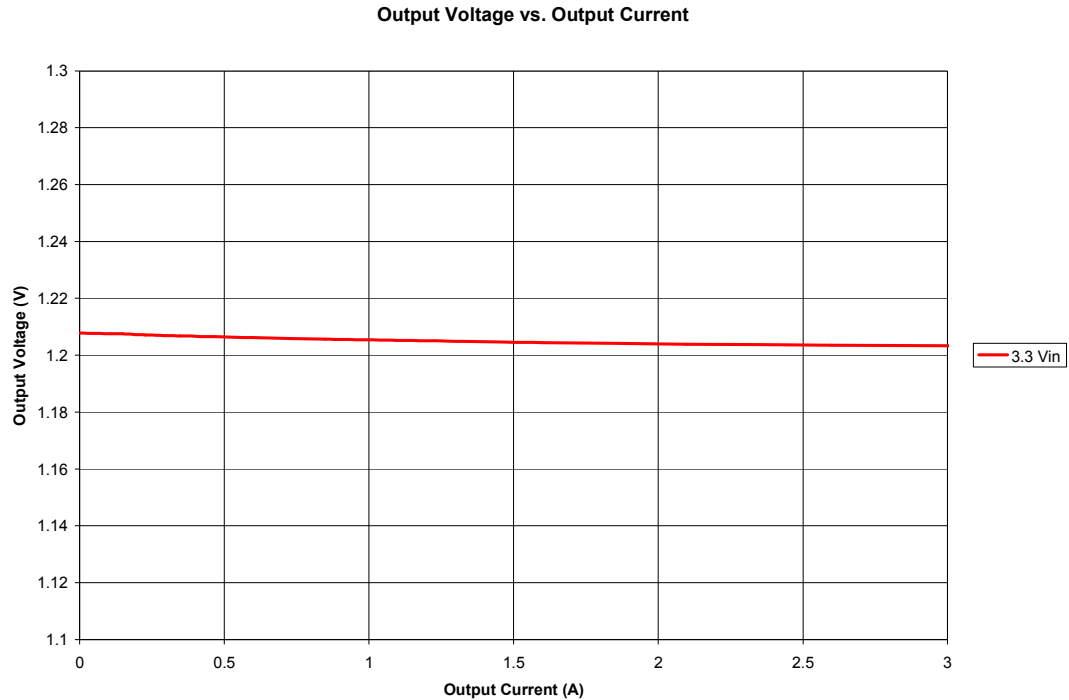
$V_{in} = 3.3V$, $V_{out} = 1.2V$

Efficiency vs. Output Current



7.8 Load Regulation

$$V_{in} = 3.3V, V_{out} = 1.2V$$



8 TPS54319 – 1.8V Output

8.1 Performance Summary

Performance parameters below represent data obtained from the PMP5832 design; changes to the design, component selection or layout may result in varied performance.

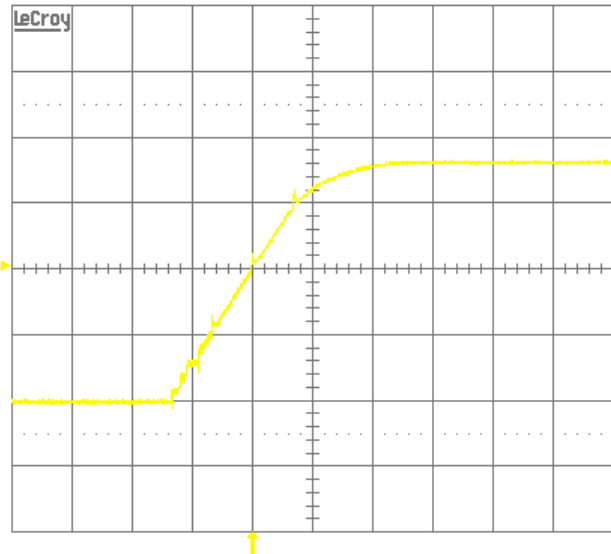
Parameter	Test Conditions	Min	Typ	Max	Unit
Loop Bandwidth	$V_{in}=3.3V, I_{out}=2A$		27.49		kHz
Phase Margin	$V_{in}=3.3V, I_{out}=2A$		60.1		°
Output Voltage Ripple	$I_{out}=2A$		2.3		mV
Maximum Efficiency			95.5		%
Load Regulation	$V_{in}=3.3V, I_{out}=0A \text{ to } 2A$		0.8		%
Switching Frequency			932		kHz

8.2 Startup Waveform

$V_{in} = 3.3V$, $V_{out} = 1.8V$, $I_{out} = 150mA$

27-Sep-10
18:00:00

2 ms
0.50 V



2 ms BWL

1 50 mV DC $\times 10$
2 .1 V DC $\times 10$
3 50 mV DC $\times 10$
4 .1 V DC $\times 10$

1 DC 1.03 V

1 MS/s

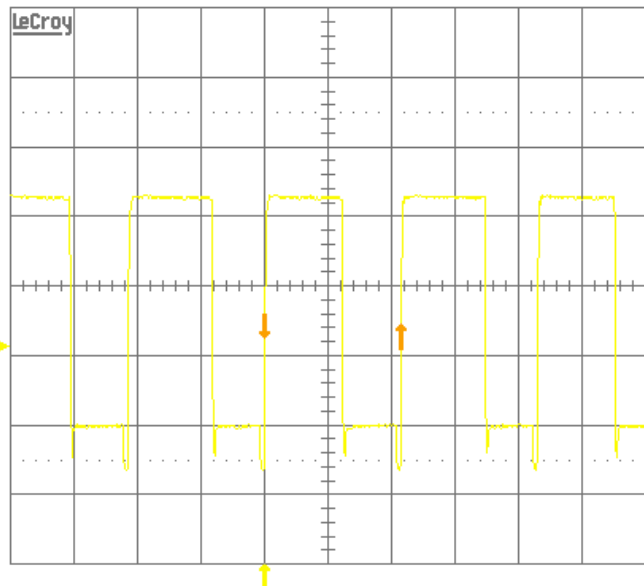
STOPPED

8.3 Switch Node

$V_{in} = 3.3V$, $V_{out} = 1.8V$, $I_{out} = 2A$

27-Sep-10
18:01:55

.5 μs
1.00 V
203 mV



.5 μs BWL

1 .1 V DC $\times 10$
2 .1 V DC $\times 10$
3 50 mV DC $\times 10$
4 .1 V DC $\times 10$

Δt 1.0725 μs $\frac{1}{\Delta t}$ 932.40 kHz

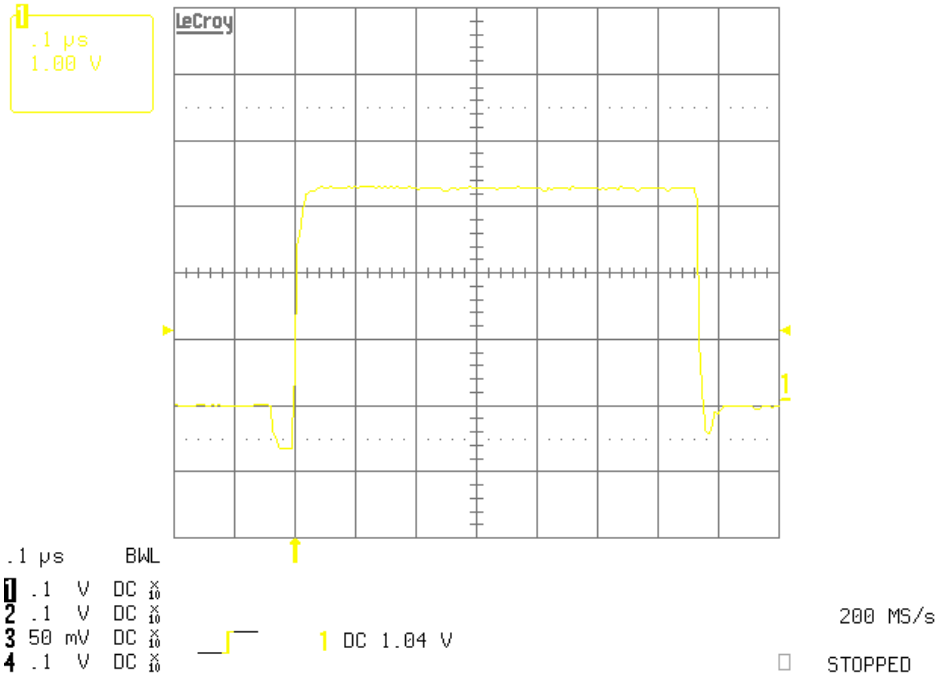
1 DC 1.04 V

200 MS/s

STOPPED

Zoom

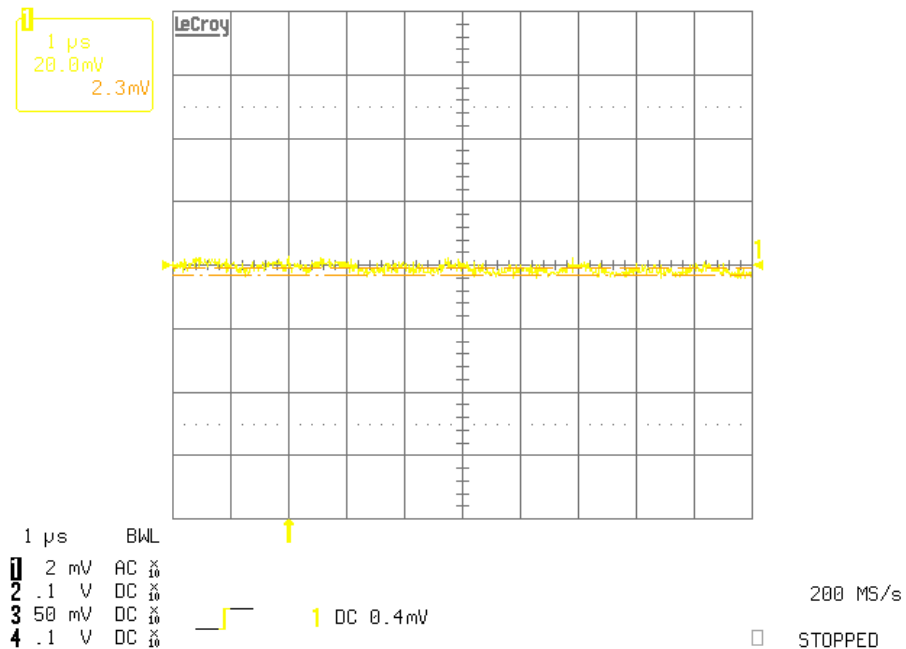
27-Sep-10
18:02:45



8.4 Output Voltage Ripple

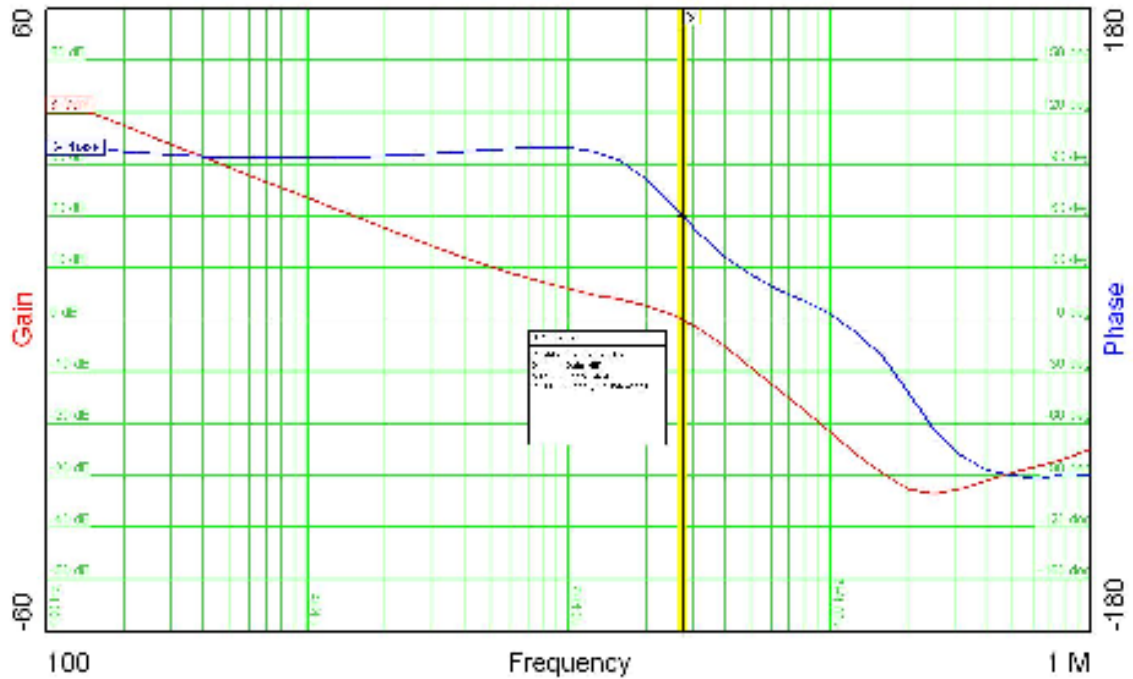
$V_{in} = 3.3V$, $V_{out} = 1.8V$, $I_{out} = 2A$

27-Sep-10
17:56:12



8.5 Loop Response

$V_{in} = 3.3V$, $V_{out} = 1.8V$, $I_{out} = 2A$

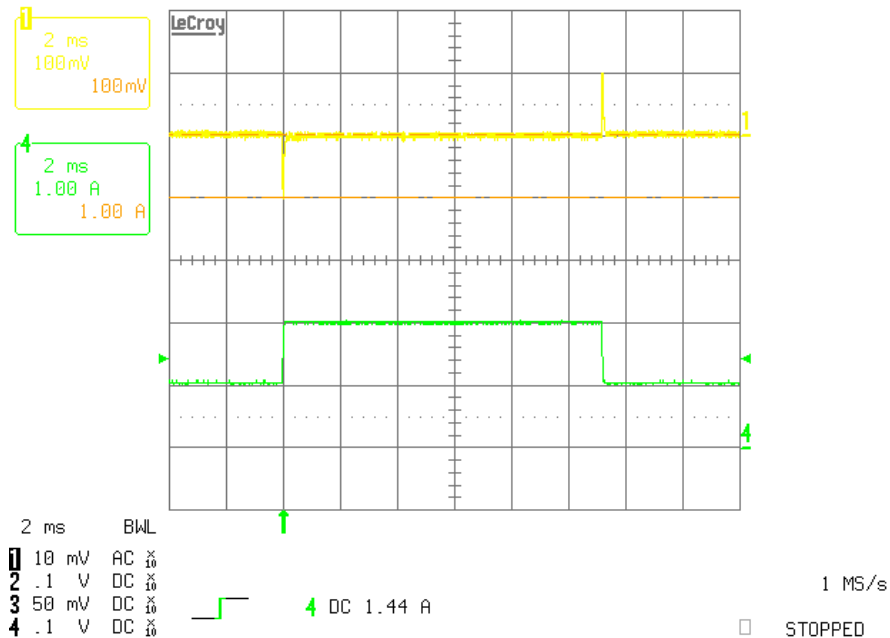


Phase Margin = 60.1 @ 27.49 kHz

8.6 Load Transient

$V_{in} = 3.3V$, $V_{out} = 1.8V$, $I_{out} = 1A$ to $2A$

27-Sep-10
17:43:42

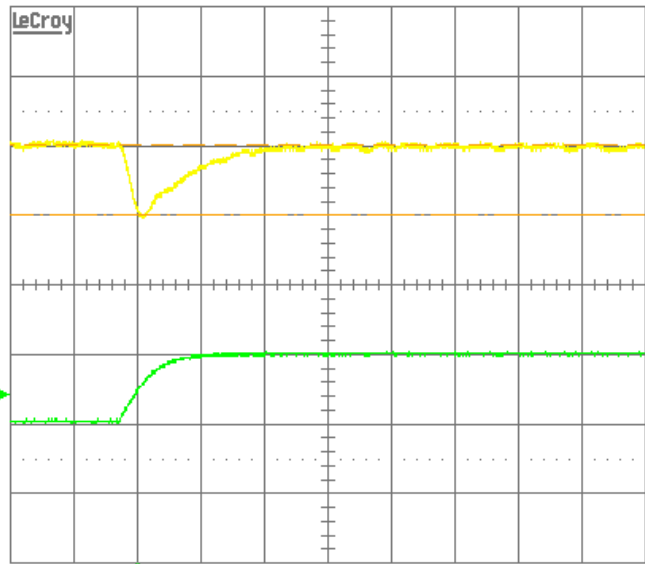


Zoom

27-Sep-10
17:44:23

1
50 μ s
100mV
100mV

4
50 μ s
1.00 A
1.00 A



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

4 DC 1.44 A

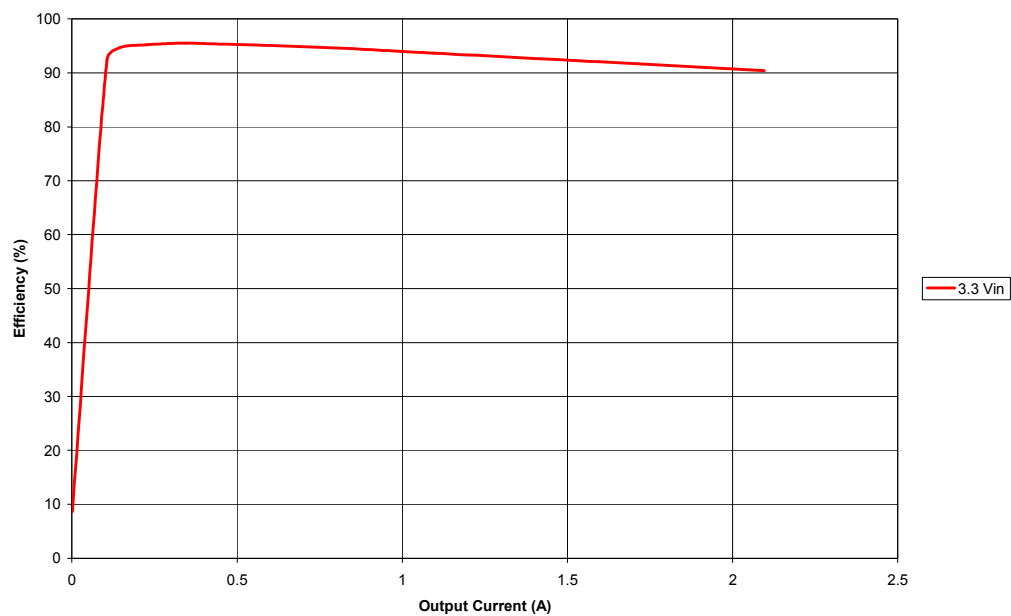
50 MS/s

STOPPED

8.7 Efficiency

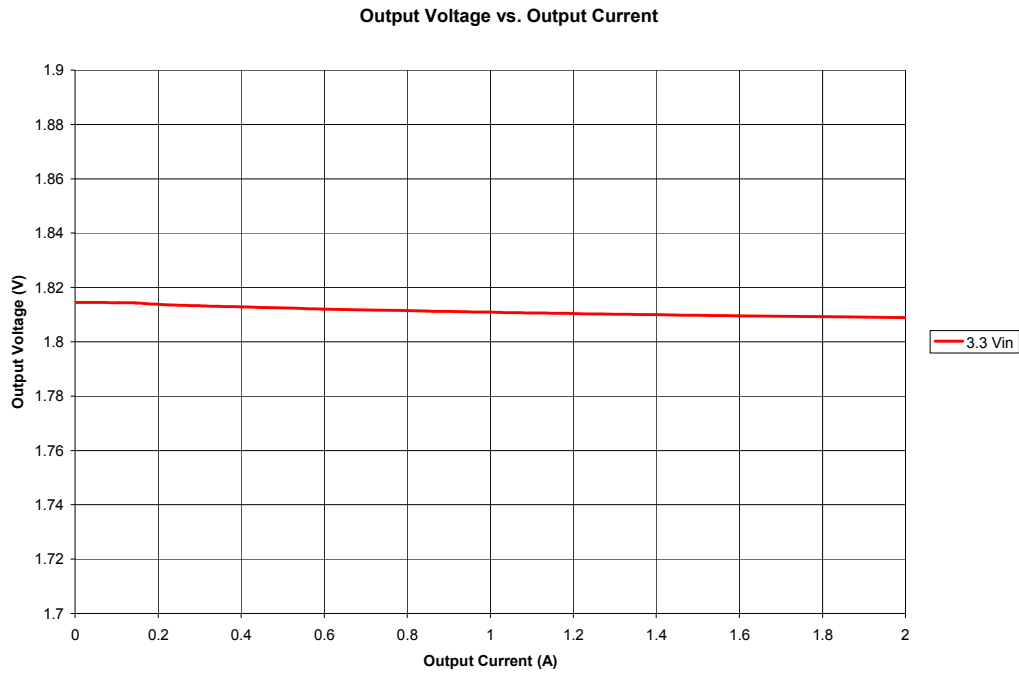
$V_{in} = 3.3V$, $V_{out} = 1.8V$

Efficiency vs. Output Current



8.8 Load Regulation

$$V_{in} = 3.3V, V_{out} = 1.8V$$



9 TPS54319 – 2.5V Output

9.1 Performance Summary

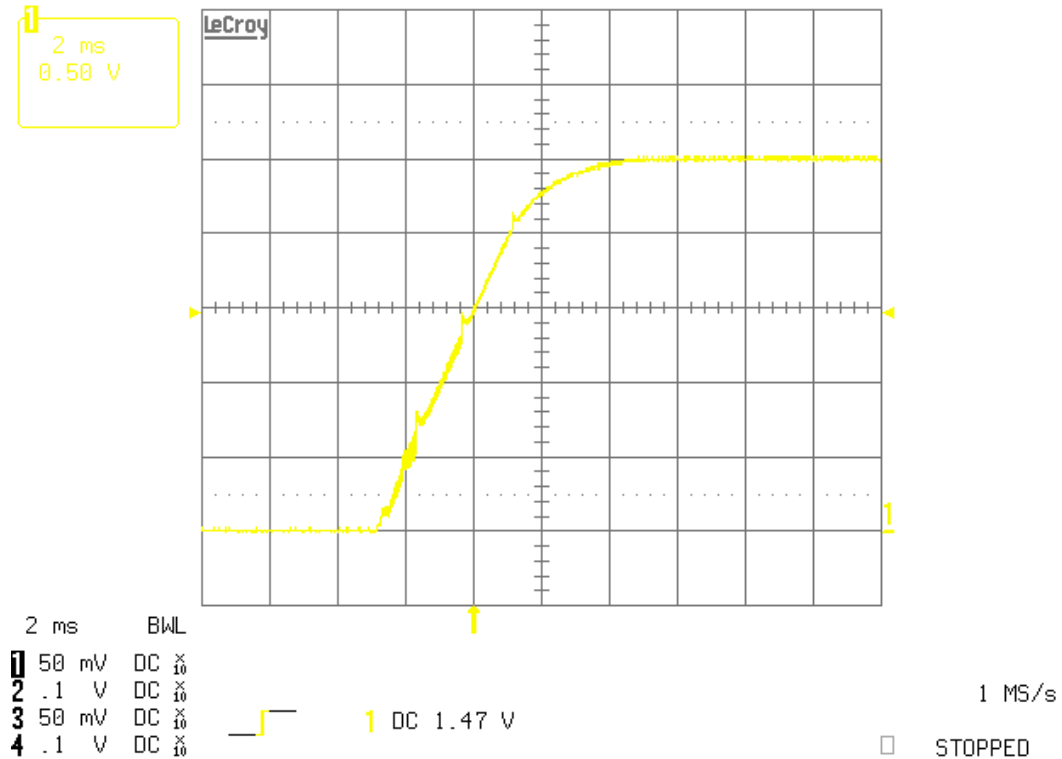
Performance parameters below represent data obtained from the PMP5832 design; changes to the design, component selection or layout may result in varied performance.

Parameter	Test Conditions	Min	Typ	Max	Unit
Loop Bandwidth	$V_{in}=3.3V, I_{out}=2A$		33.88		kHz
Phase Margin	$V_{in}=3.3V, I_{out}=2A$		51.89		°
Output Voltage Ripple	$I_{out}=2A$		2.7		mV
Maximum Efficiency			97.4		%
Load Regulation	$V_{in}=3.3V, I_{out}=0A \text{ to } 2A$		0.2		%
Switching Frequency			463		kHz

9.2 Startup Waveform

$V_{in} = 3.3V$, $V_{out} = 2.5V$, $I_{out} = 150mA$

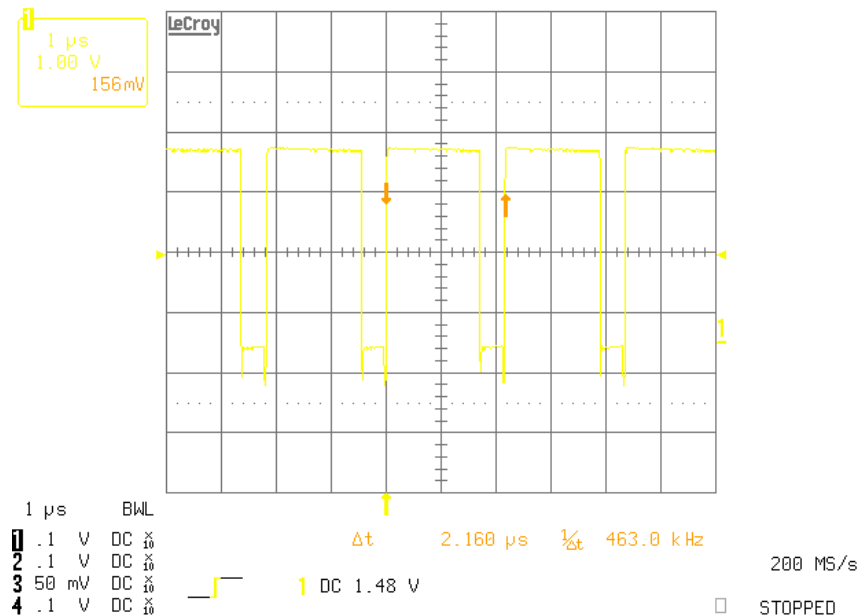
28-Sep-10
14:06:03



9.3 Switch Node

$V_{in} = 3.3V$, $V_{out} = 2.5V$, $I_{out} = 2A$

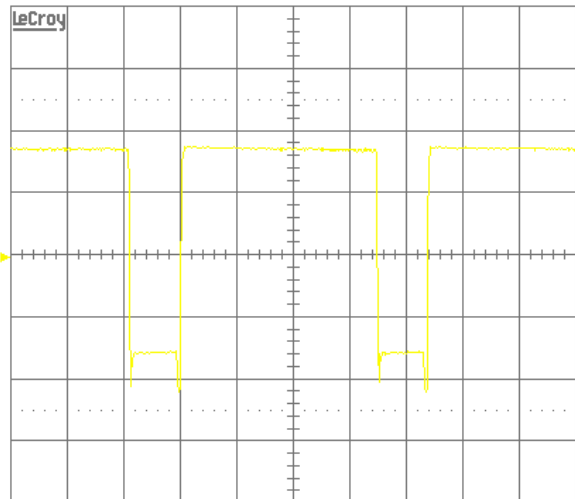
28-Sep-10
14:08:14



Zoom

28-Sep-10
14:08:49

1
.5 μ s
1.00 V



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



1 DC 1.48 V

200 MS/s

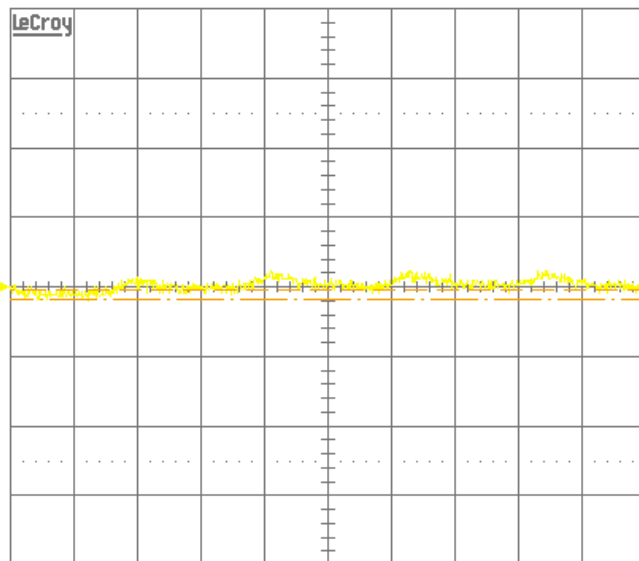
☐ STOPPED

9.4 Output Voltage Ripple

$V_{in} = 3.3V$, $V_{out} = 2.5V$, $I_{out} = 2A$

28-Sep-10
13:56:25

1
1 μ s
20.0 mV
2.7 mV



1 μ s BWL
1 2 mV AC $\times \frac{10}{10}$
2 .1 V DC $\times \frac{10}{10}$
3 50 mV DC $\times \frac{10}{10}$
4 .1 V DC $\times \frac{10}{10}$



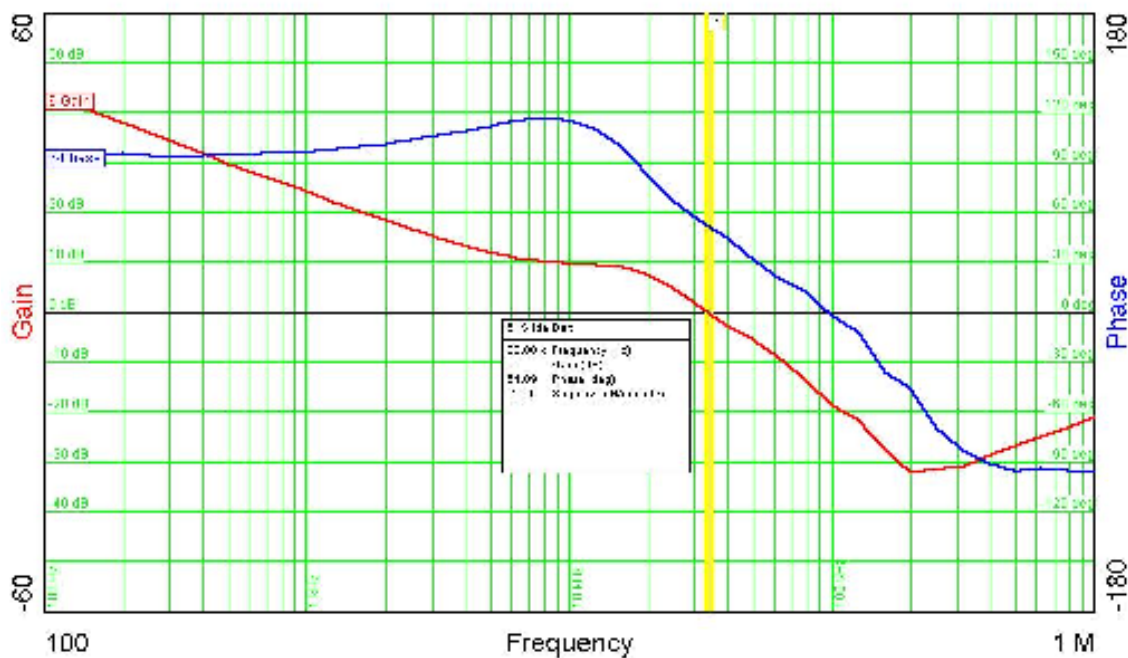
1 DC 0.4 mV

200 MS/s

☐ STOPPED

9.5 Loop Response

$V_{in} = 3.3V$, $V_{out} = 2.5V$, $I_{out} = 2A$

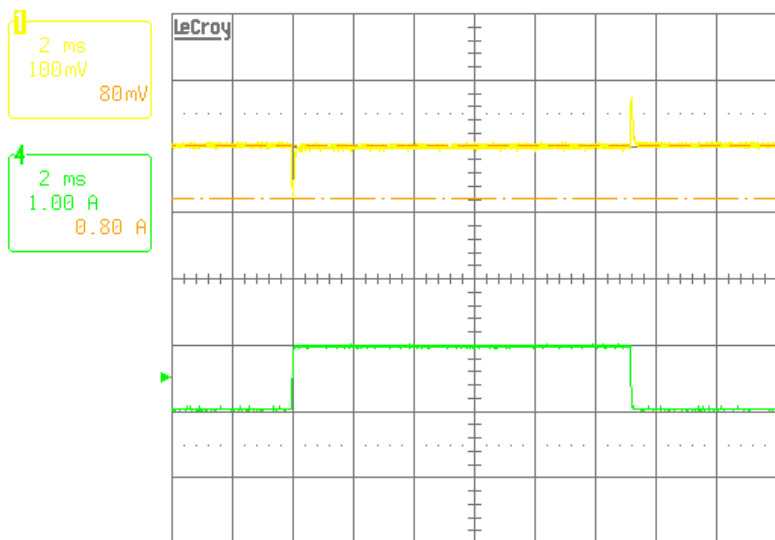


Phase Margin = 51.89 @ 33.88 kHz

9.6 Load Transient

$V_{in} = 3.3V$, $V_{out} = 2.5V$, $I_{out} = 1A$ to $2A$

28-Sep-10
13:54:27



2 ms BWL

1 10 mV AC X
2 .1 V DC X
3 50 mV DC X
4 .1 V DC X

4 DC 1.54 A

1 MS/s

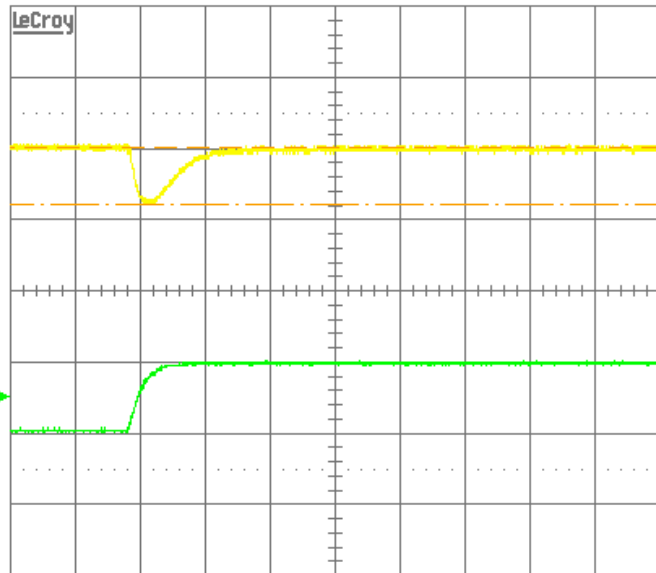
STOPPED

Zoom

28-Sep-10
13:54:53

.1 ms
100mV
80mV

.1 ms
1.00 A
0.80 A



.1 ms BWL

1 10 mV AC $\times 10$
2 .1 V DC $\times 10$
3 50 mV DC $\times 10$
4 .1 V DC $\times 10$



4 DC 1.54 A

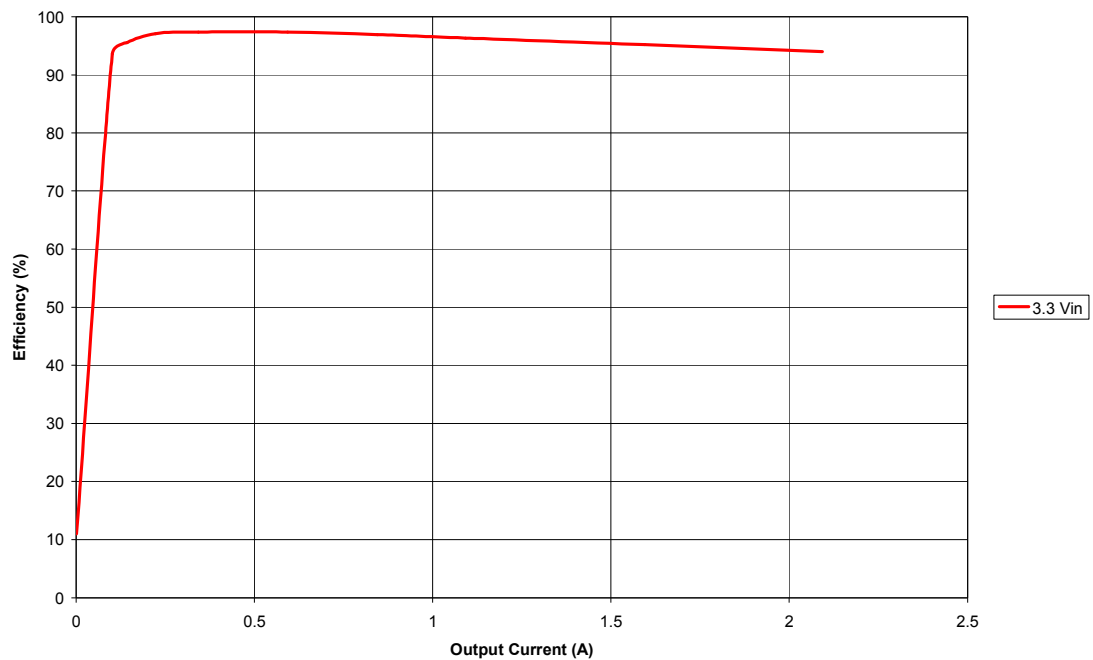
25 MS/s

STOPPED

9.7 Efficiency

$V_{in} = 3.3V$, $V_{out} = 2.5V$

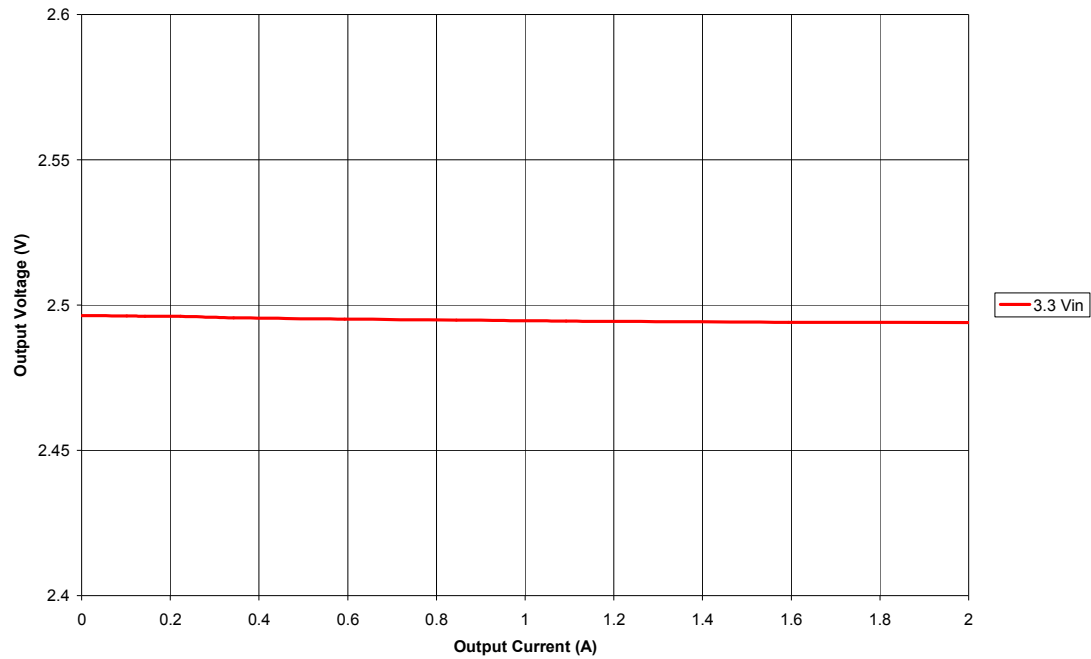
Efficiency vs. Output Current



9.8 Load Regulation

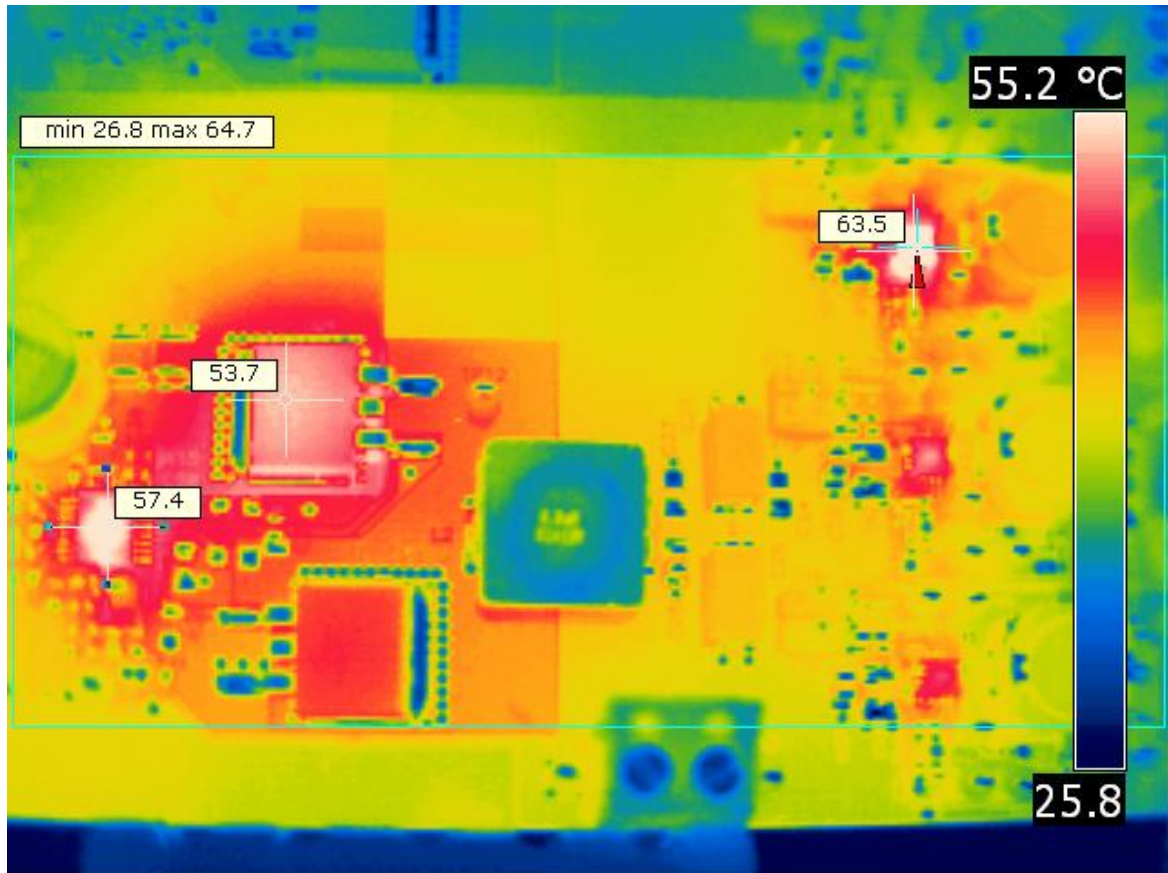
$$V_{in} = 3.3V, V_{out} = 2.5V$$

Output Voltage vs. Output Current



10 Thermal Image

3.3V, 1.2V @ 3A, 1.8V @ 2A, 2.5V @ 2A after 2 hours



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