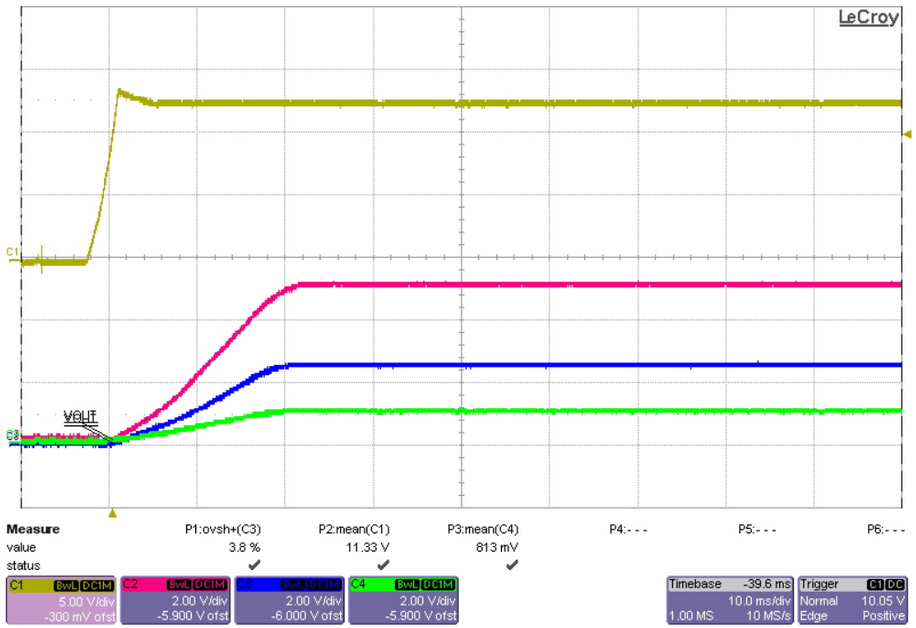
1 Startup

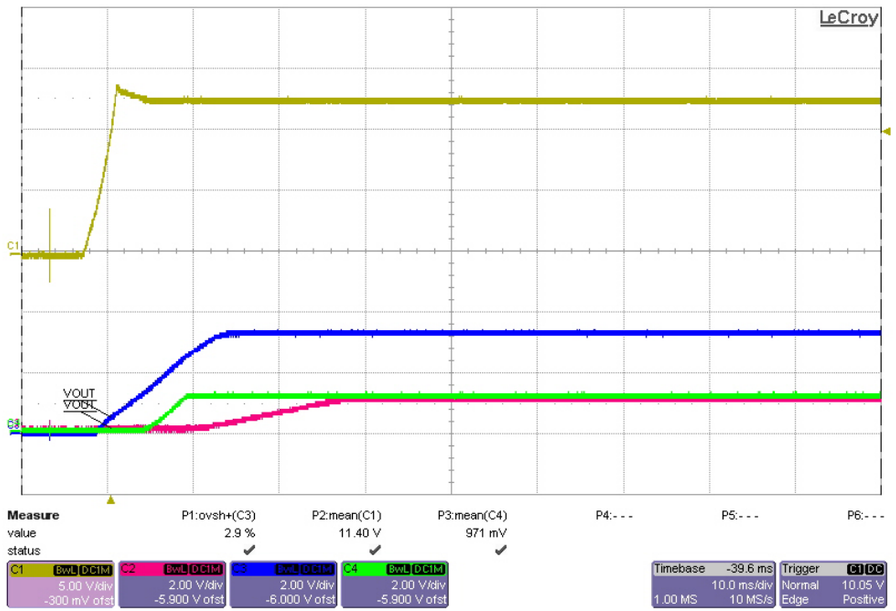
The startup waveforms are shown in the figures below. The input voltage was set at 12V, with no loads on the outputs.

Yellow = Input, Red = 5V0, Blue = 2V5, Green = 1V0

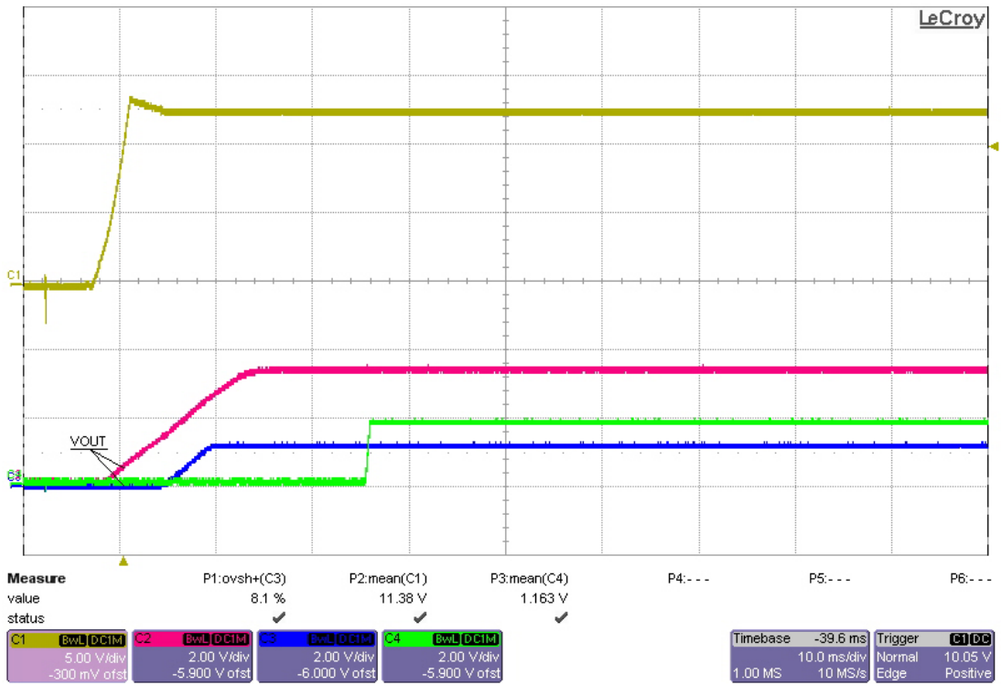


Yellow = Input, Red = 1V0 AVS, Blue = 3V3, Green = 1V2

PMP6638 Test Results



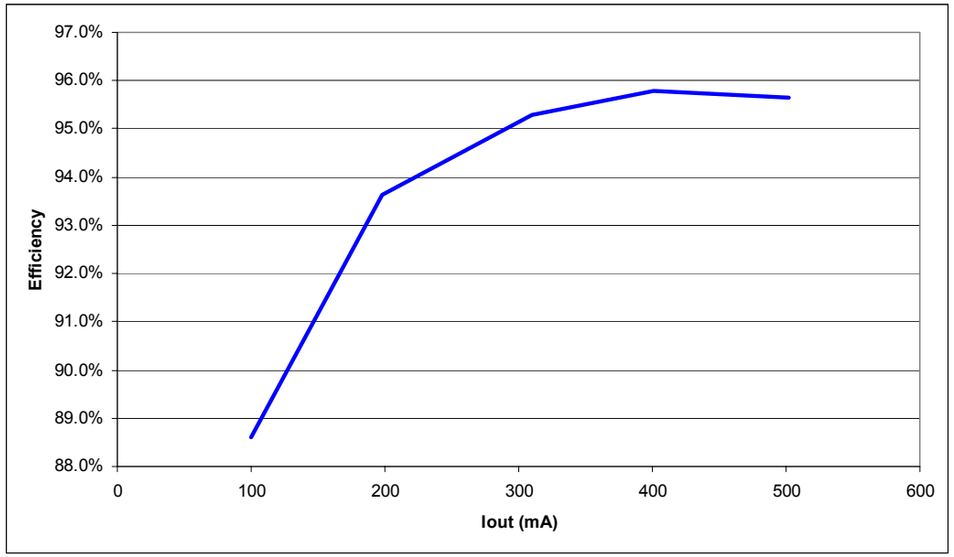
Yellow = Input, Red = 3V3, Blue = 1V2, Green = 1V8



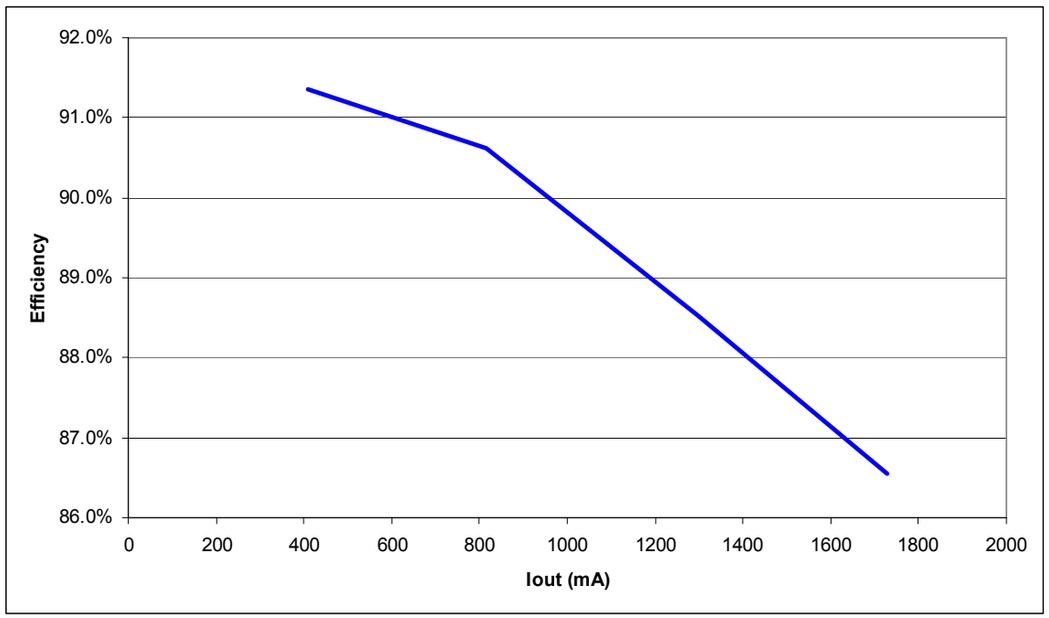
2 Efficiency

The efficiency is shown in the figures below.

5V0

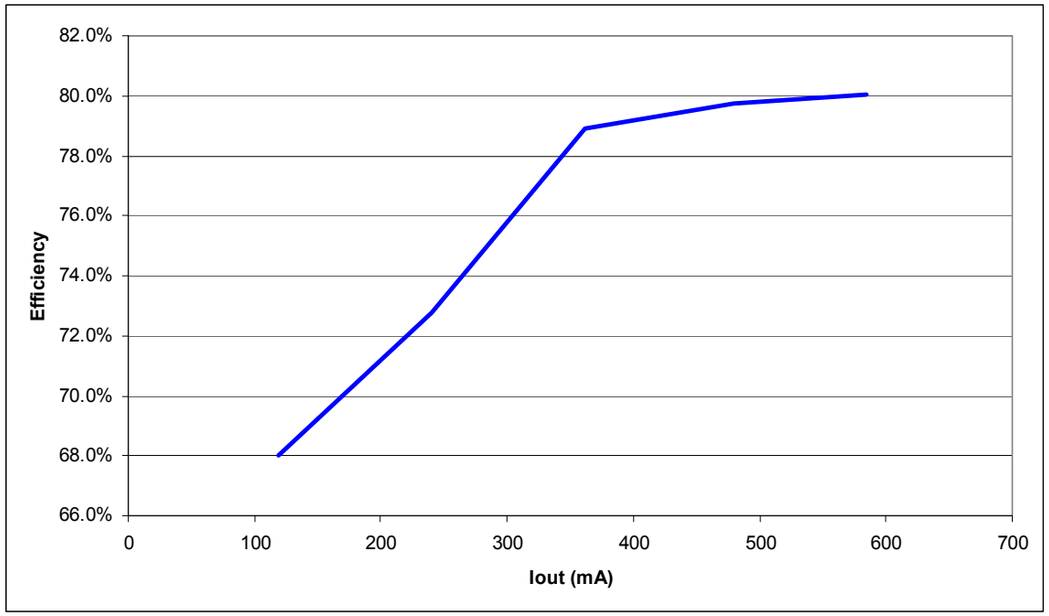


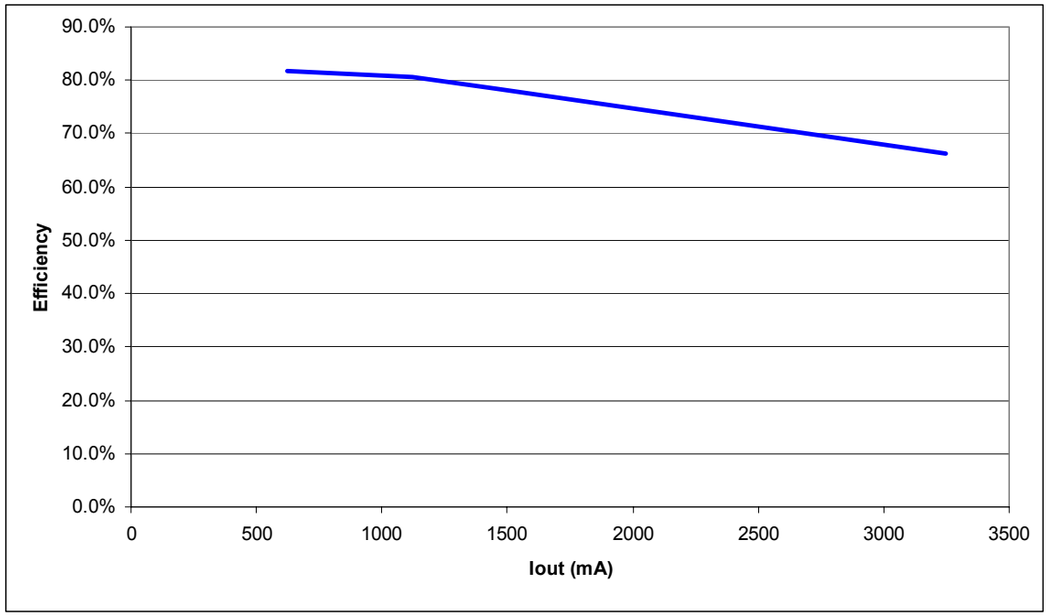
2V5


92.0%
91.0%
90.0%
89.0%
88.0%
87.0%
86.0%
Efficiency
0
200
400
600
800
1000
1200
1400
1600
1800
2000
Iout (mA)

1V0

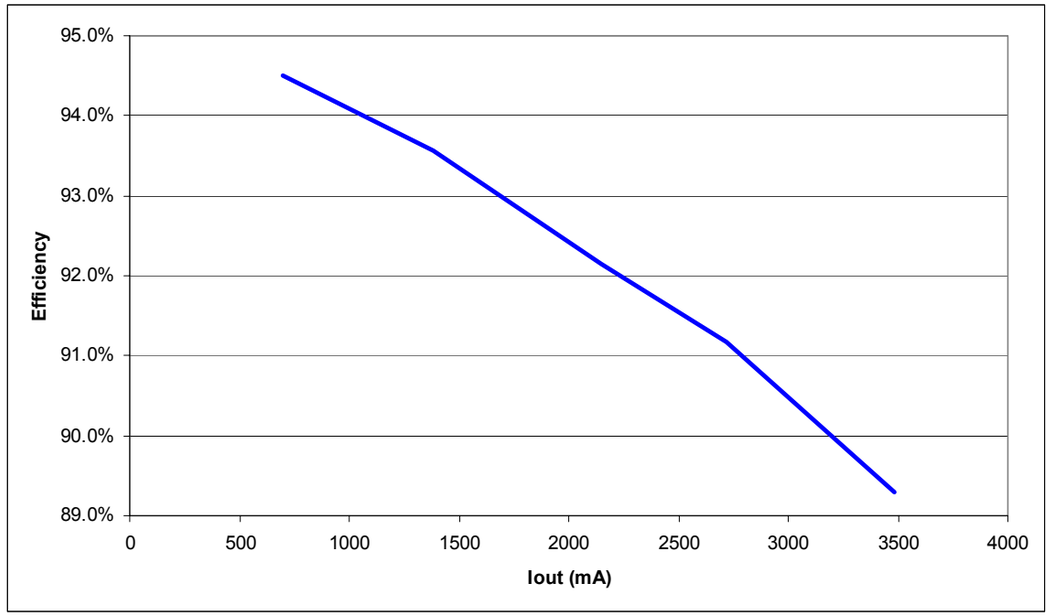
PMP6638 Test Results




90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
Efficiency
0
500
1000
1500
2000
2500
3000
3500
Iout (mA)

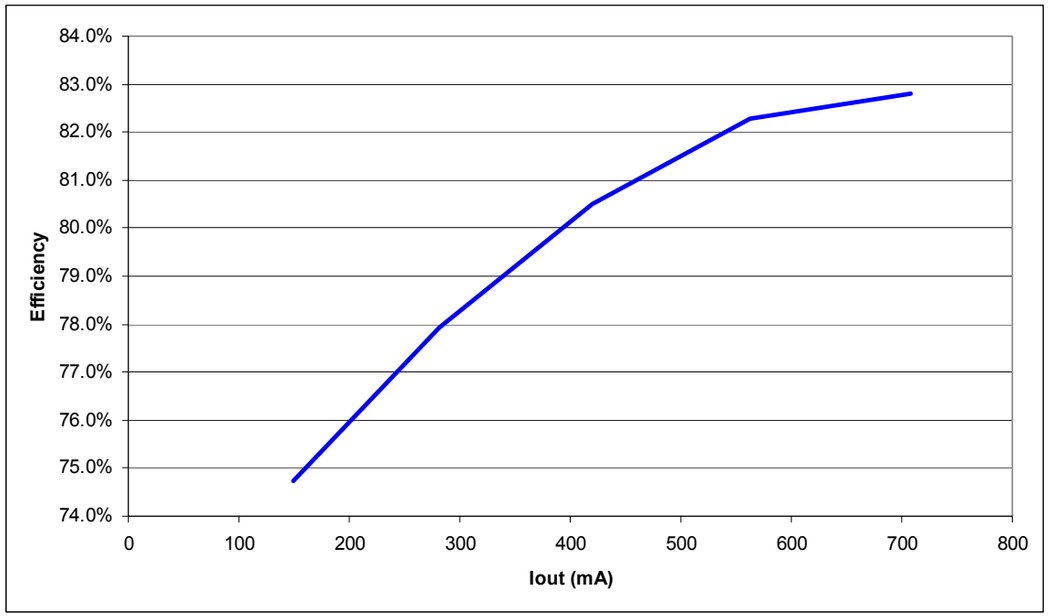
1V0AVS

3V3

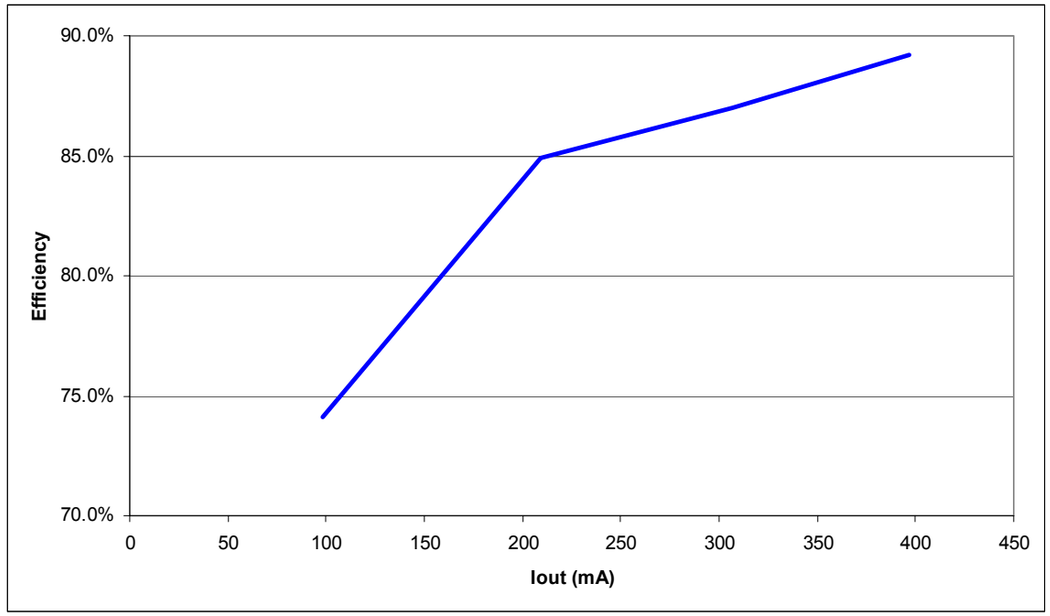

95.0%
94.0%
93.0%
92.0%
91.0%
90.0%
89.0%
Efficiency
0
500
1000
1500
2000
2500
3000
3500
4000
Iout (mA)

PMP6638 Test Results

1V2



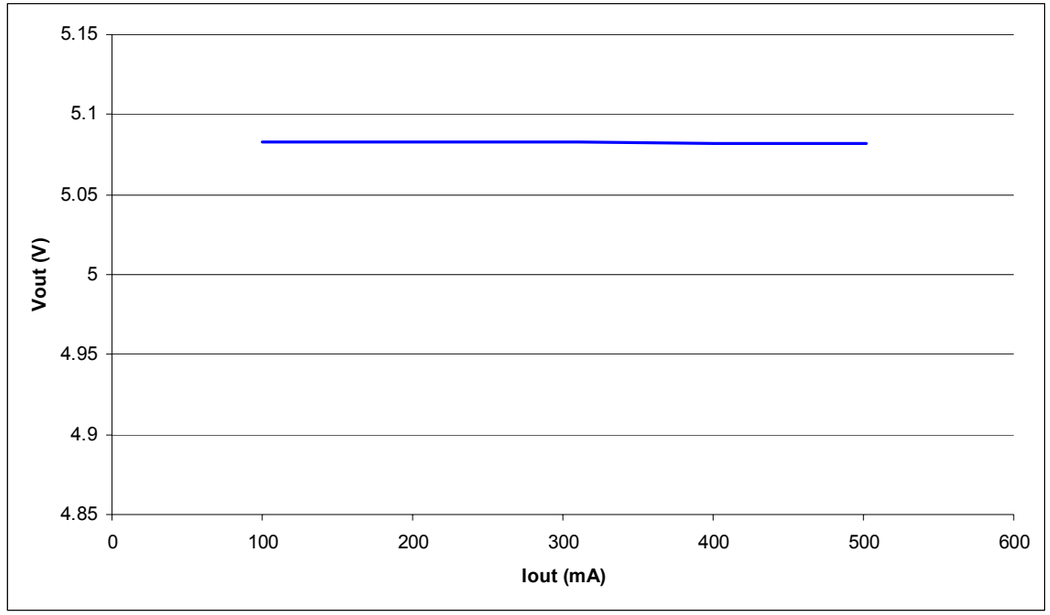
1V8


90.0%
85.0%
80.0%
75.0%
70.0%
Efficiency
0
50
100
150
200
250
300
350
400
450
Iout (mA)

3 Load Regulation

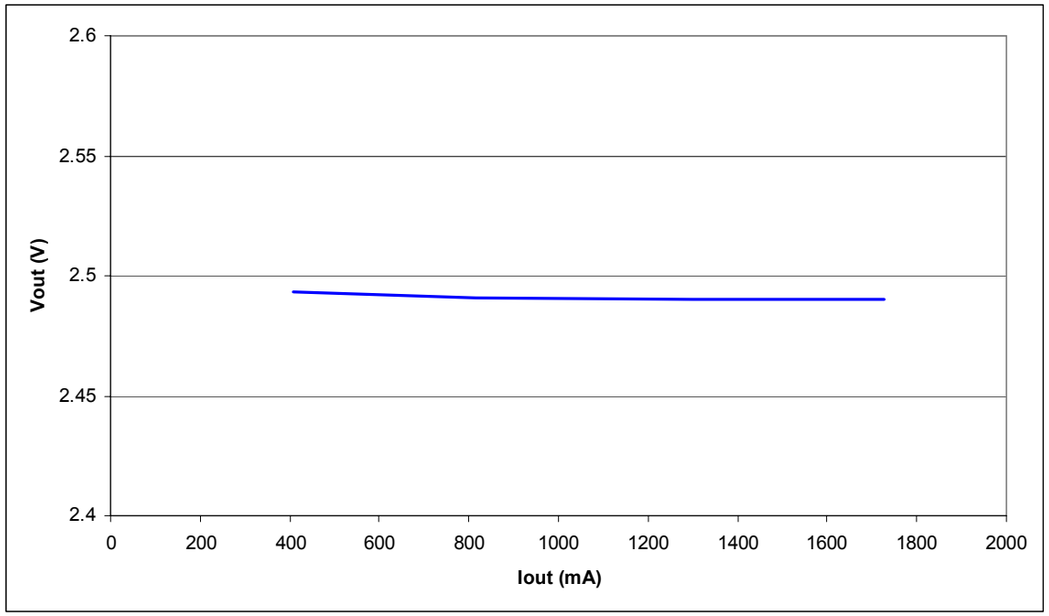
Load regulation of the outputs is shown in the graphs below.

5V0

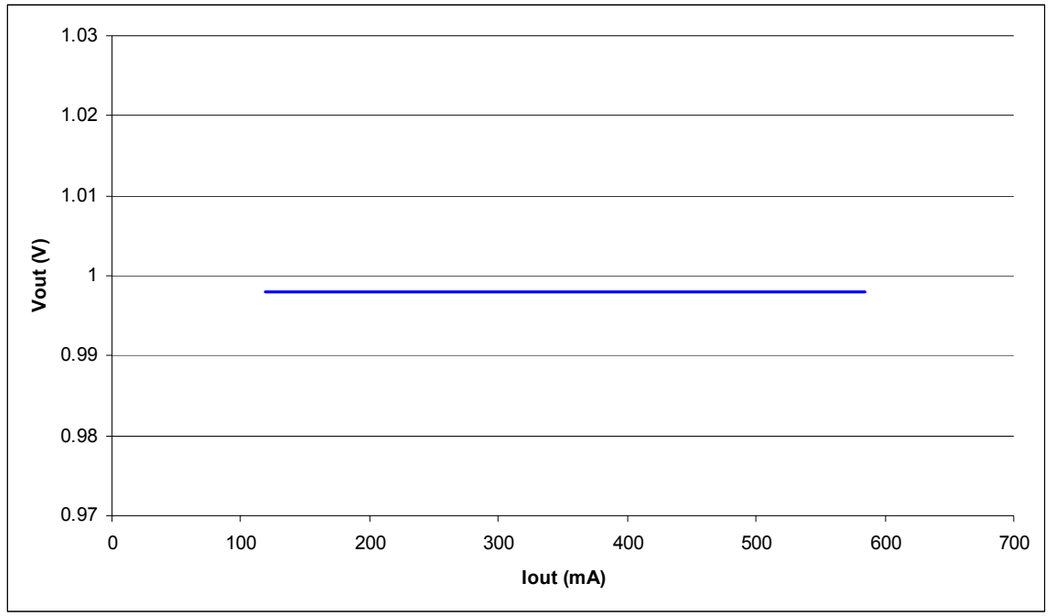


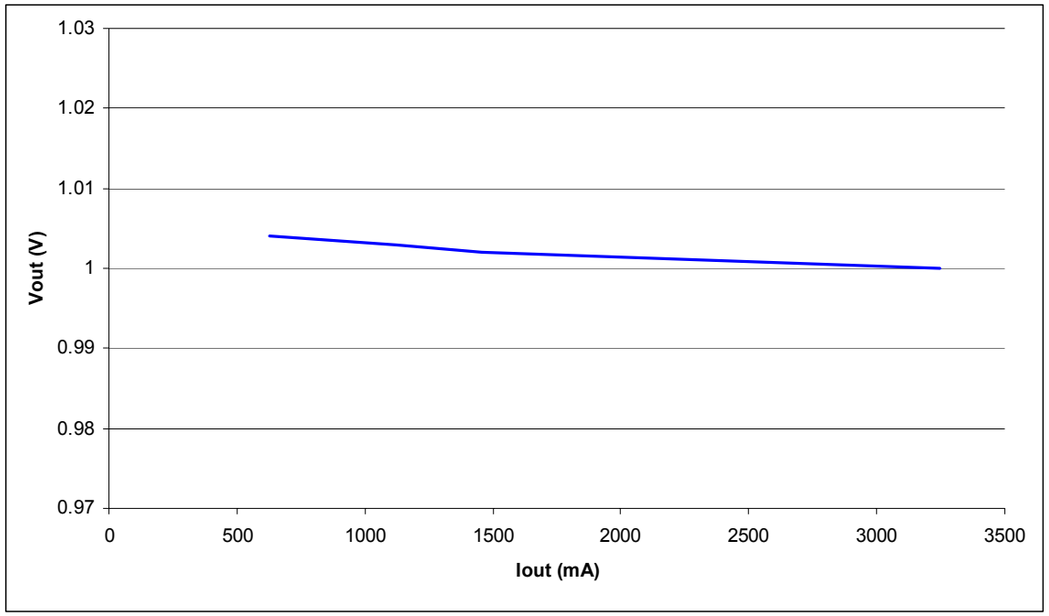
2V5

PMP6638 Test Results



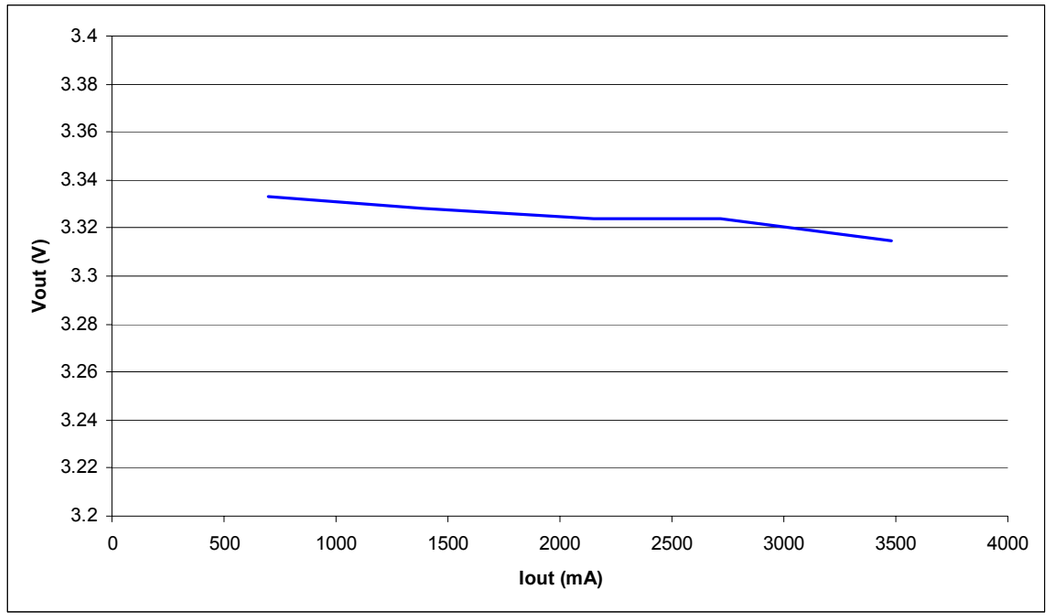
1V0


1.03
1.02
1.01
1
0.99
0.98
0.97
Vout (V)
0
100
200
300
400
500
600
700
Iout (mA)

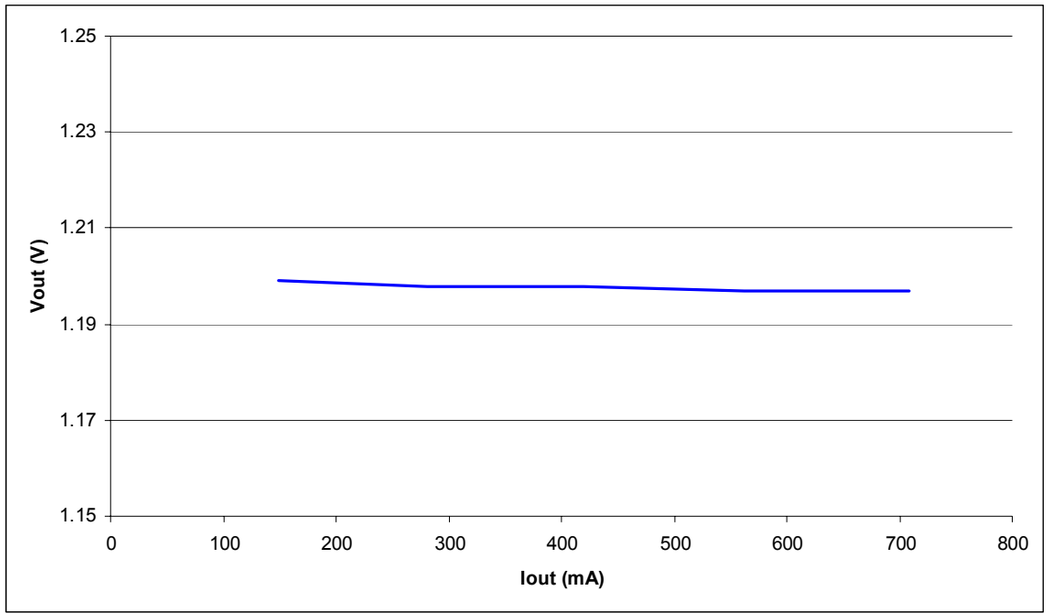

1.03
1.02
1.01
1
0.99
0.98
0.97
Vout (V)
0
500
1000
1500
2000
2500
3000
3500
Iout (mA)

1V0AVS

3V3


3.4
3.38
3.36
3.34
3.32
3.3
3.28
3.26
3.24
3.22
3.2
Vout (V)
0
500
1000
1500
2000
2500
3000
3500
4000
Iout (mA)

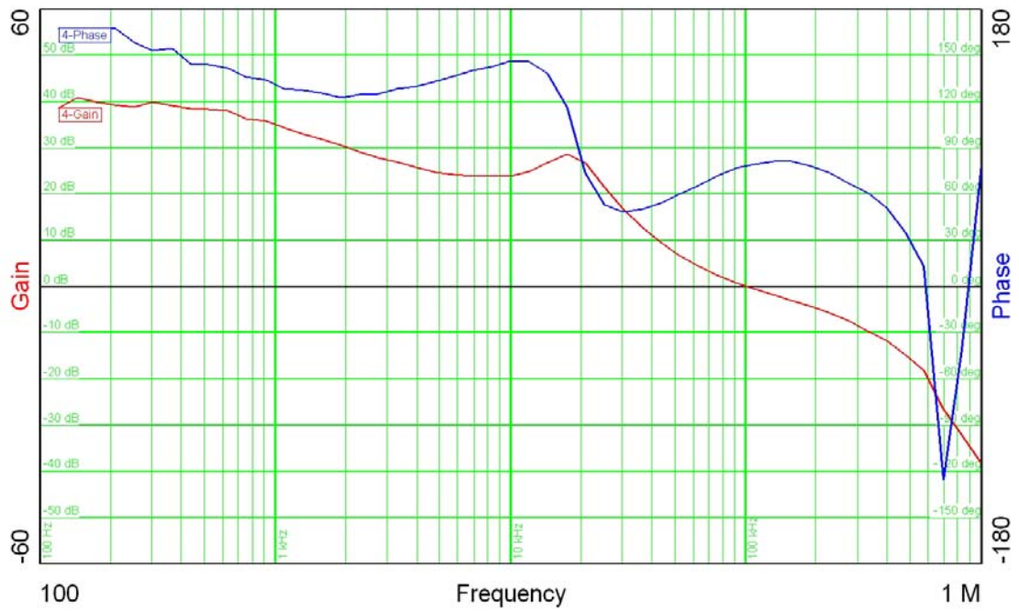
1V2

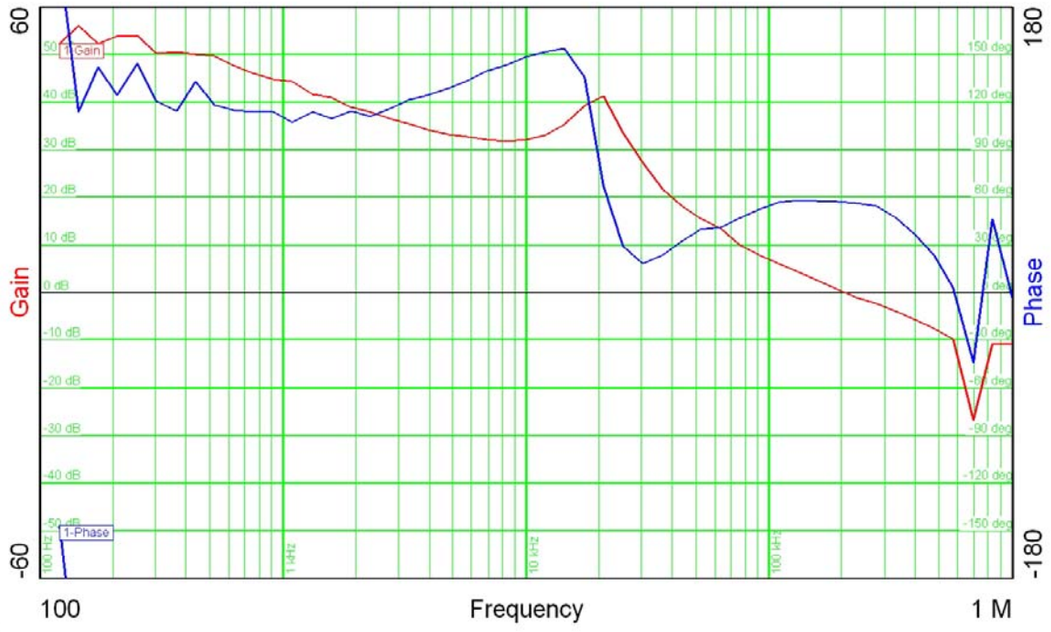

1.25
1.23
1.21
1.19
1.17
1.15
Vout (V)
0
100
200
300
400
500
600
700
800
Iout (mA)

4 Control Loops

The control loops are shown in the graphs below.

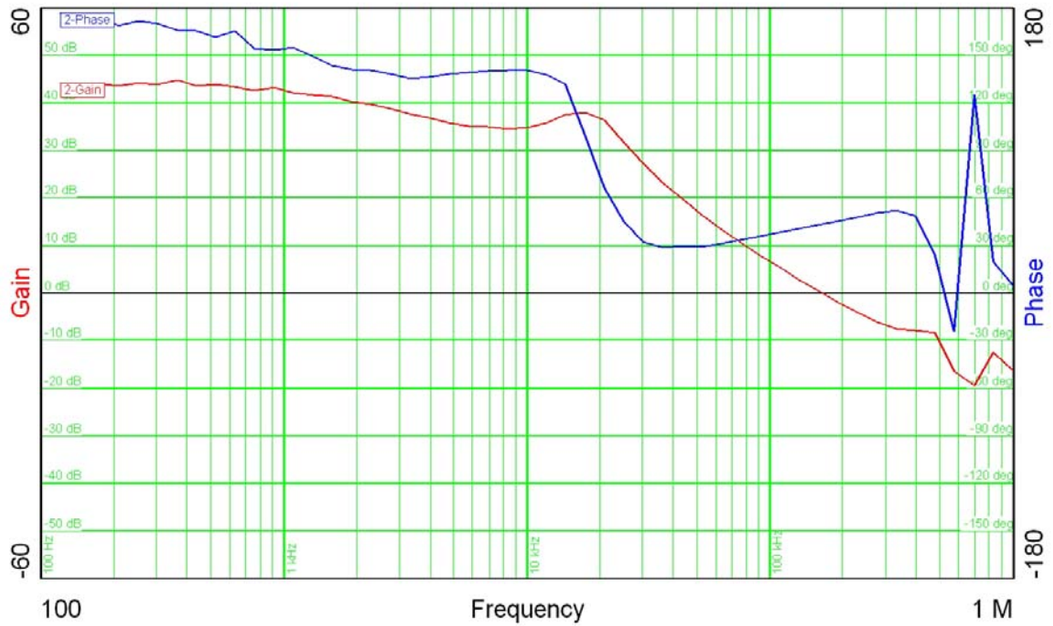
5V0



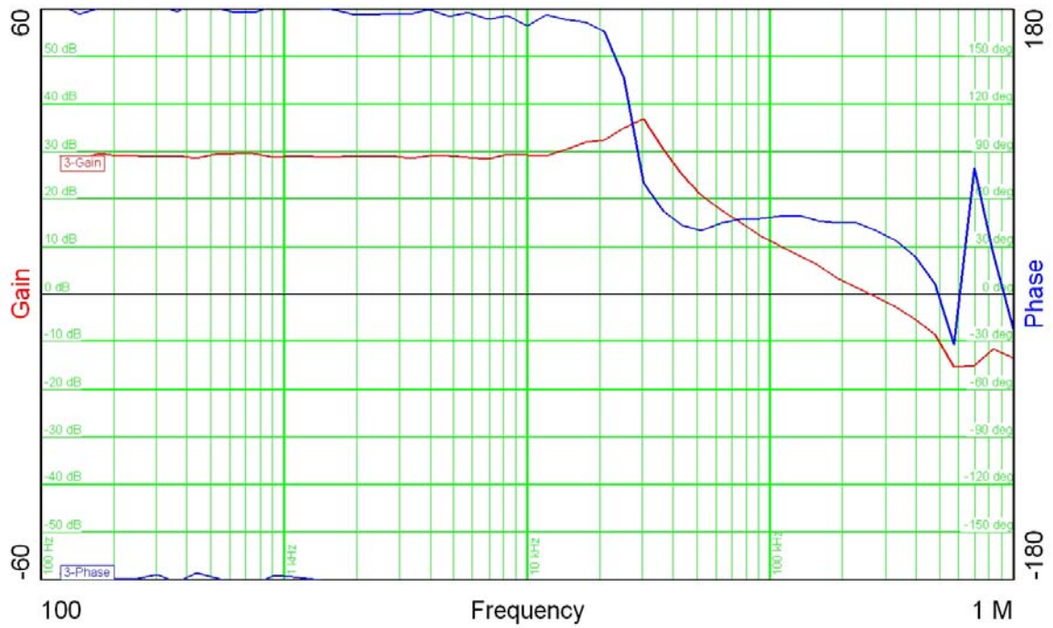


2V5

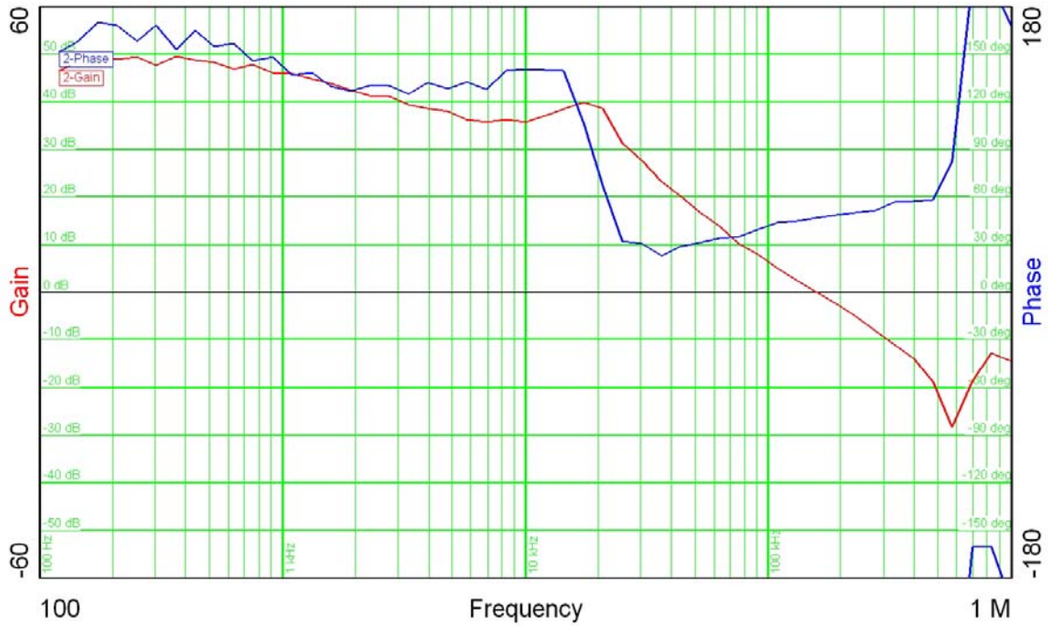
1V0


2-Phase
2-Gain
60
50 dB
40
30 dB
20 dB
10 dB
0 dB
-10 dB
-20 dB
-30 dB
-40 dB
-50 dB
-60
Gain
180
150 deg
120 deg
90 deg
60 deg
30 deg
0 deg
-30 deg
-60 deg
-90 deg
-120 deg
-150 deg
-180
Phase
100 Hz
1 kHz
10 kHz
100 kHz
100
Frequency
1 M

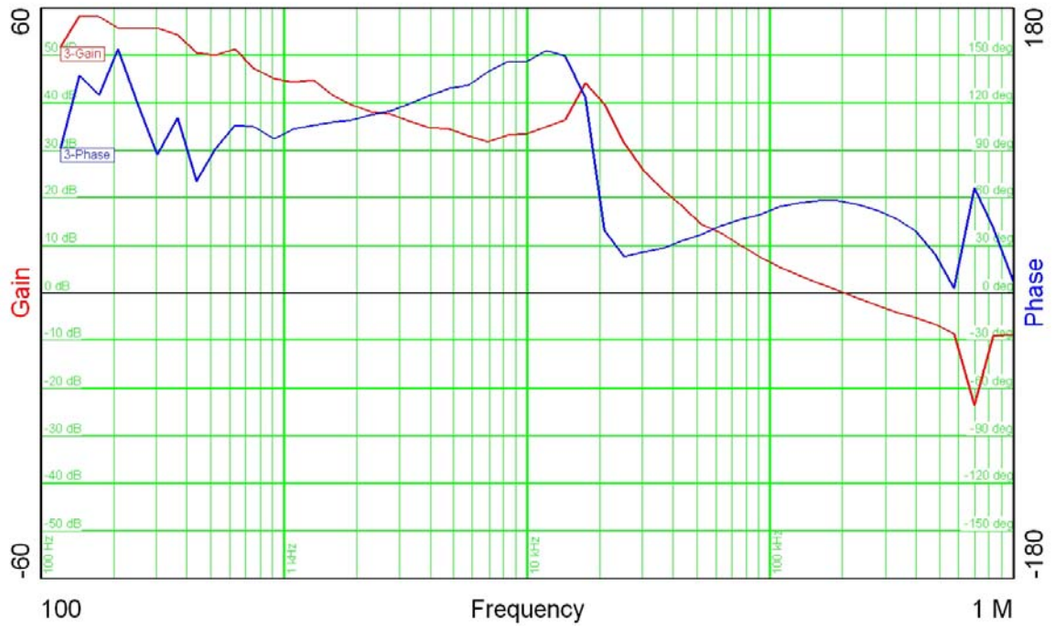
3V3


60
50 dB
40 dB
30 dB
3-Gain
20 dB
10 dB
0 dB
-10 dB
-20 dB
-30 dB
-40 dB
-50 dB
-60
100 Hz
1 kHz
10 kHz
100 kHz
3-Phase
Gain
180
150 deg
120 deg
90 deg
60 deg
30 deg
0 deg
-30 deg
-60 deg
-90 deg
-120 deg
-150 deg
-180
Phase
100
Frequency
1 M

1V2



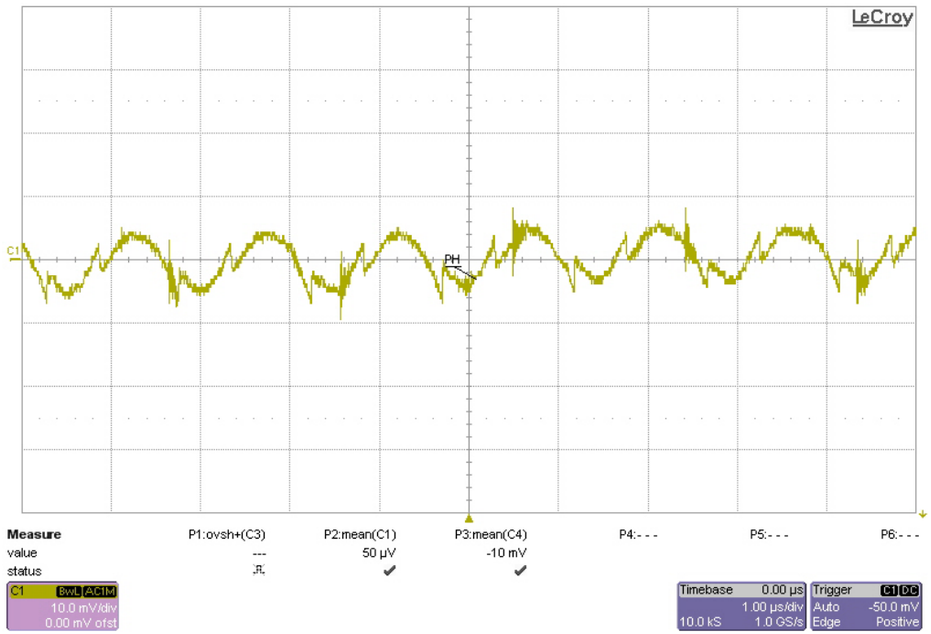
1V8



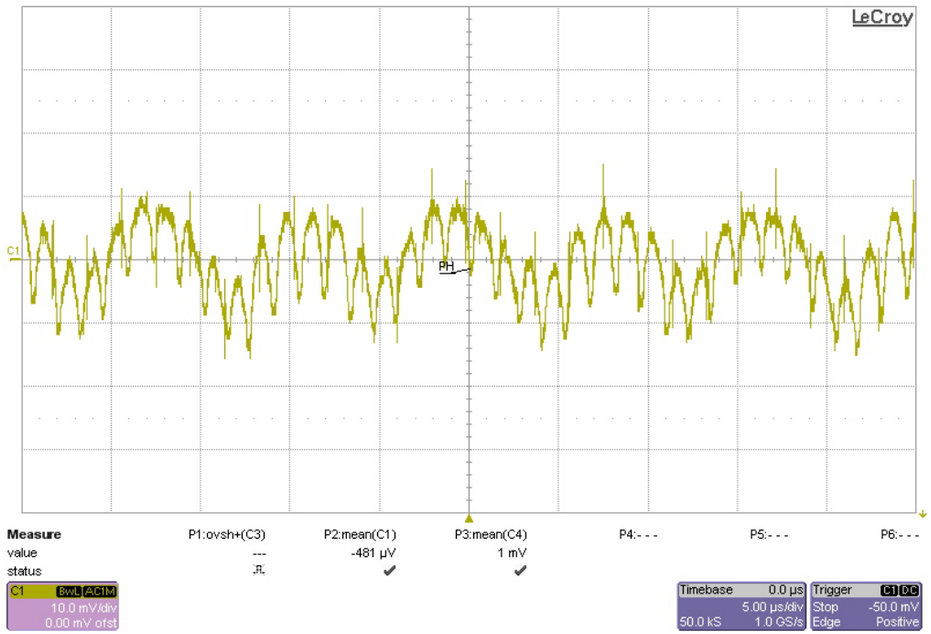
5 Output Ripple Voltage

The output ripple voltage is shown in the figure below. The image was taken at Full Load (2A) and No Load, respectively. 10 mV/div Vertical and 1 uS/div Horizontal.

5V0

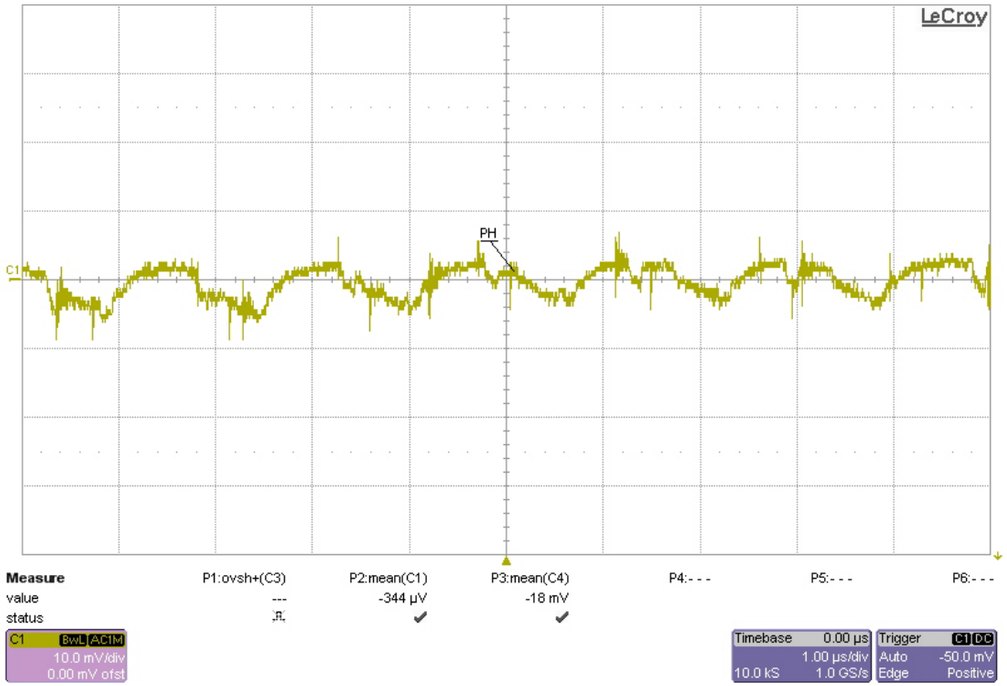

LeCroy
C1
PH
Measure
P1:ovsh+(C3)
P2:mean(C1)
P3:mean(C4)
P4:- - -
P5:- - -
P6:- - -
value
---
50 µV
-10 mV
status
C1 BwL ACIM
10.0 mV/div
0.00 mV ofst
Timebase 0.00 µs
1.00 µs/div
10.0 kS 1.0 GS/s
Trigger C1 DC
Auto -50.0 mV
Edge Positive

2V5


LeCroy
C1
Measure
P1:ovsh+(C3)
P2:mean(C1)
P3:mean(C4)
P4:- - -
P5:- - -
P6:- - -
value

-481 µV
1 mV
status
C1 BwL ACIM
10.0 mV/div
0.00 mV ofst
Timebase 0.0 µs
5.00 µs/div
50.0 kS 1.0 GS/s
Trigger C1 DC
Stop -50.0 mV
Edge Positive

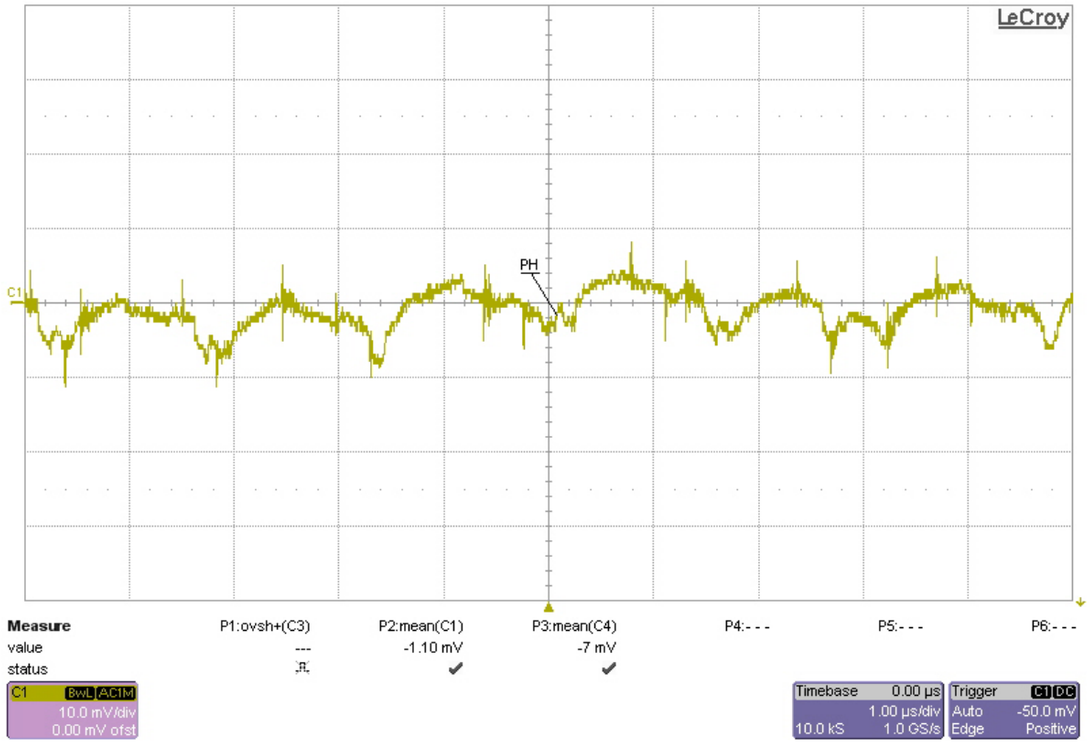
1V0


LeCroy
PH
C1
Measure
P1:ovsh+(C3)
P2:mean(C1)
P3:mean(C4)
P4:- - -
P5:- - -
P6:- - -
value

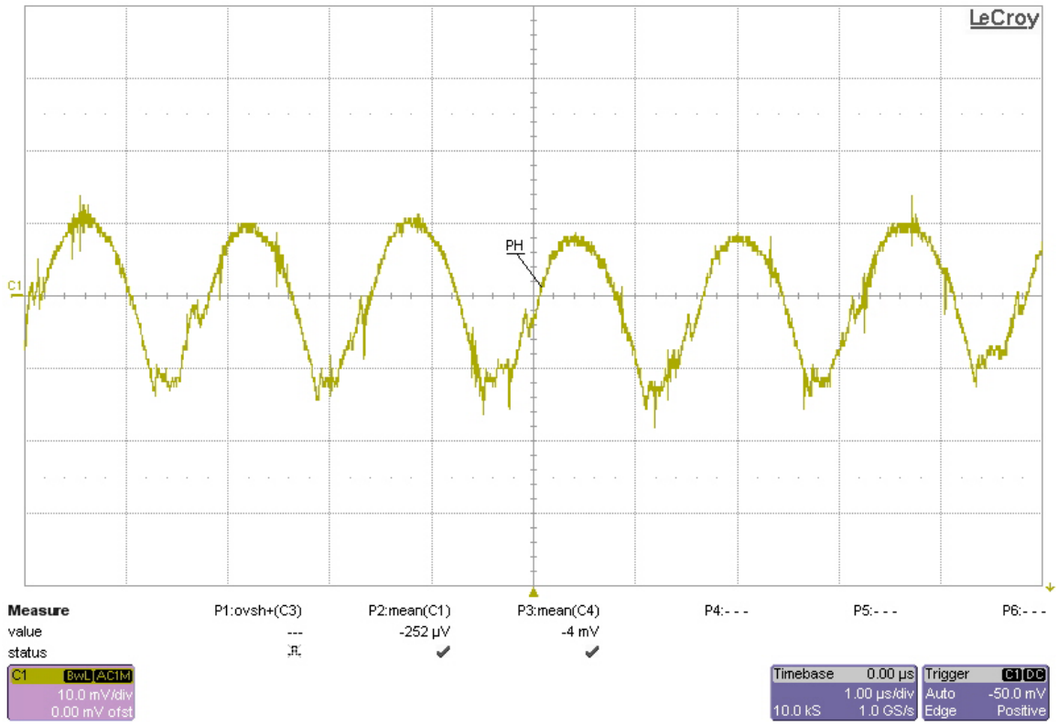
-344 µV
-18 mV
status
C1 BwL AC1M
10.0 mV/div
0.00 mV ofst
Timebase 0.00 µs
1.00 µs/div
10.0 kS 1.0 GS/s
Trigger C1 DC
Auto -50.0 mV
Edge Positive

1V0AVS

PMP6638 Test Results



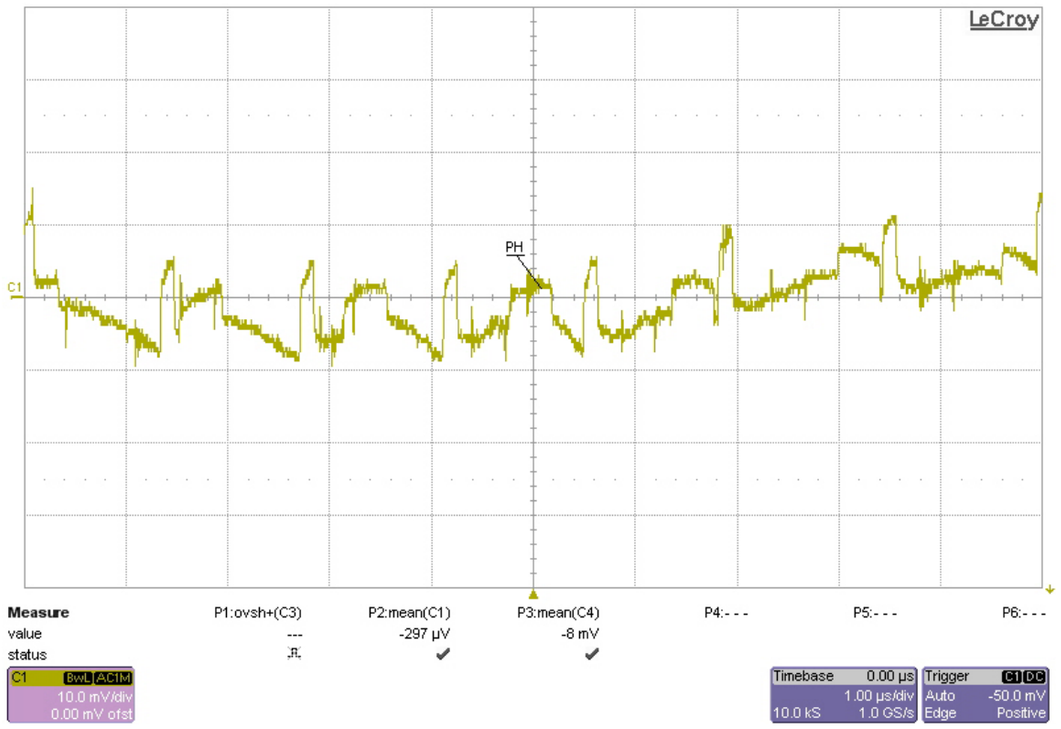
3V3


LeCroy
PH
C1
Measure
value
status
P1:ovsh+(C3)

P2:mean(C1)
-252 µV
P3:mean(C4)
-4 mV
P4:- - -
P5:- - -
P6:- - -
C1 BwL AC1M
10.0 mV/div
0.00 mV ofst
Timebase 0.00 µs
1.00 µs/div
10.0 kS 1.0 GS/s
Trigger C1 DC
Auto -50.0 mV
Edge Positive

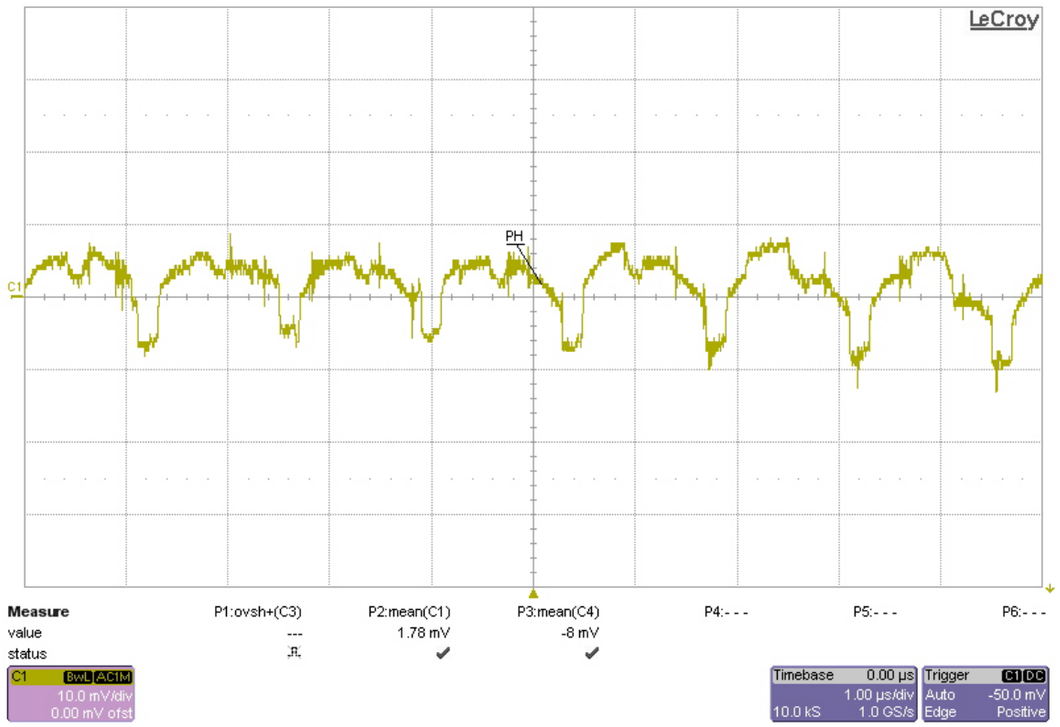
1V2

PMP6638 Test Results



1V8

PMP6638 Test Results

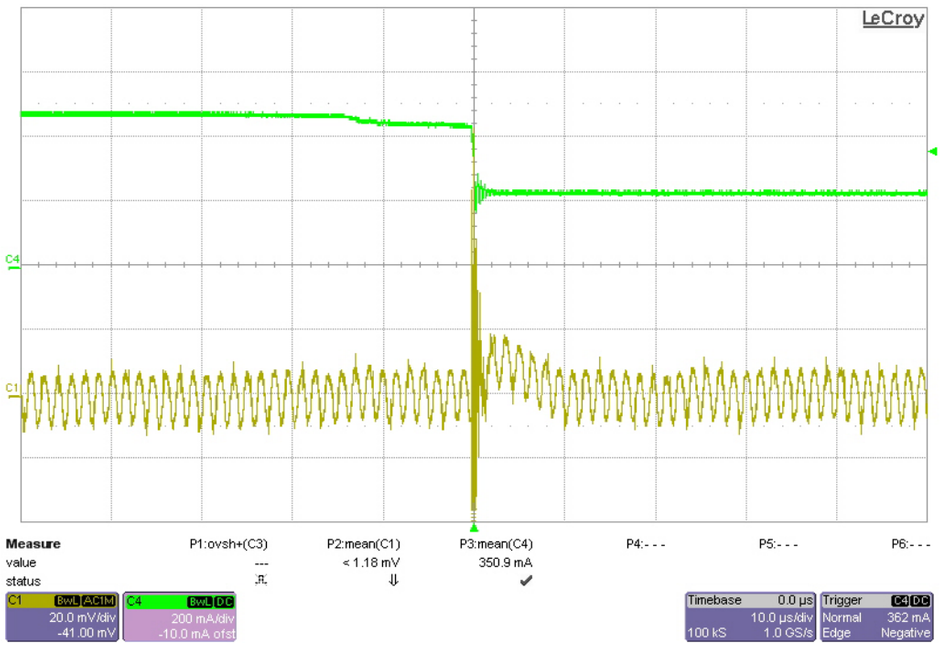


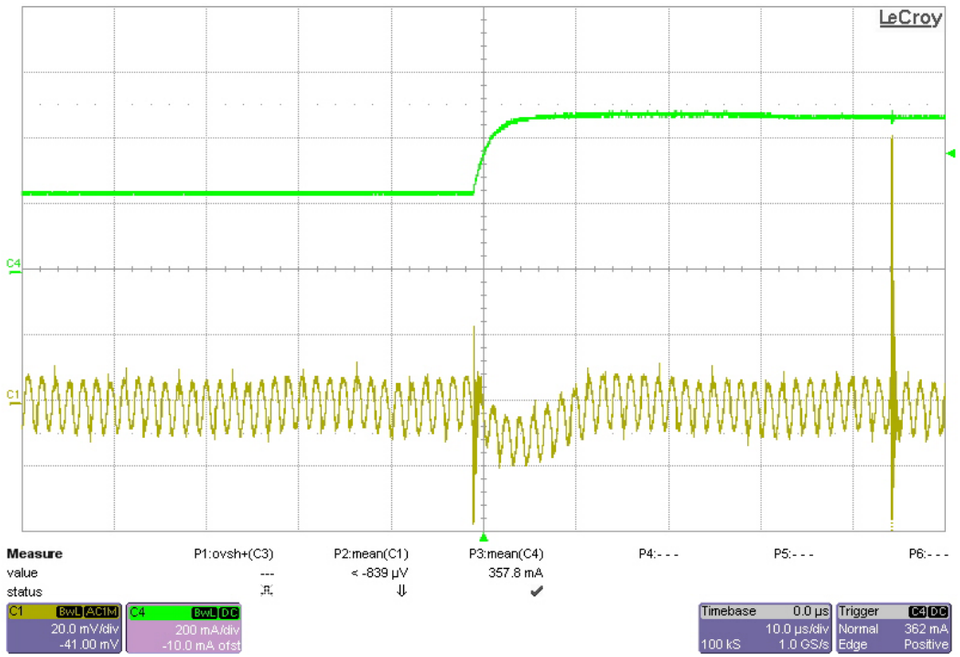
6 Load Transients

The figures below show the volt output response to load transients. The input voltage was set to 12V.

Channel 1 : Vout (AC coupled)
Channel 4 : Load current

5V0

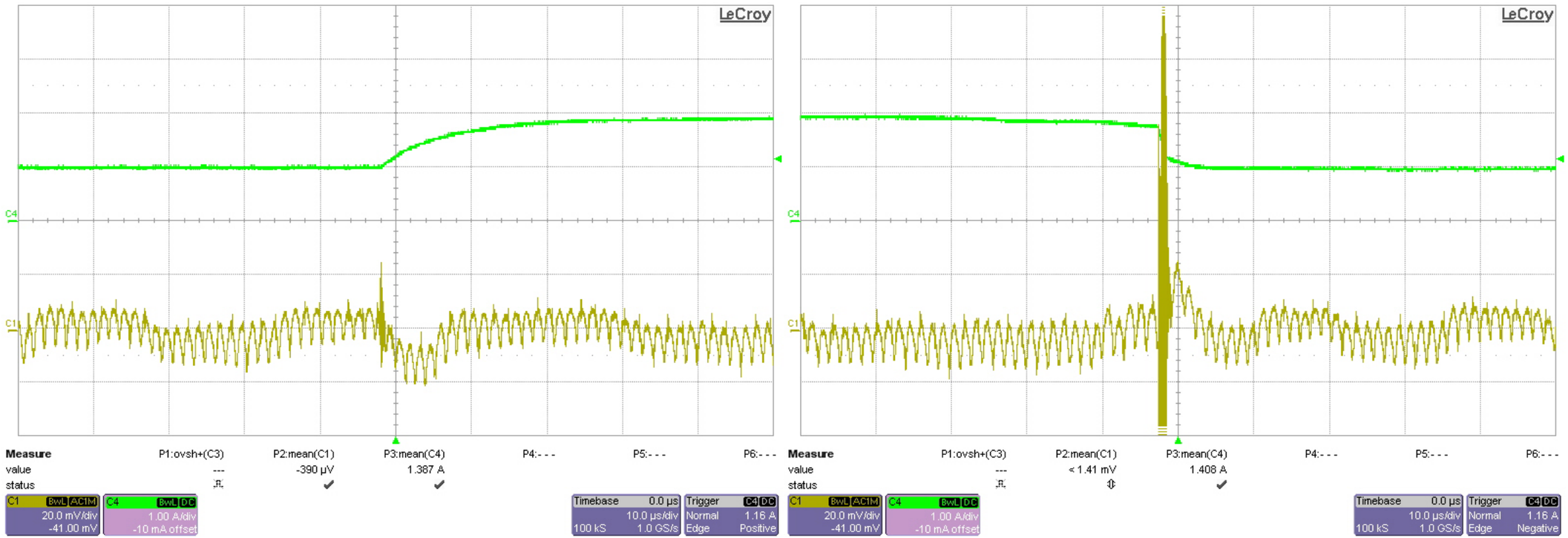



LeCroy
C4
C1
Measure
P1:ovsh+(C3)
P2:mean(C1)
P3:mean(C4)
P4:- - -
P5:- - -
P6:- - -
value

< -839 µV
357.8 mA
status
C1 BwL AC1M
20.0 mV/div
-41.00 mV
C4 BwL DC
200 mA/div
-10.0 mA ofst
Timebase 0.0 µs
10.0 µs/div
100 kS 1.0 GS/s
Trigger C4 DC
Normal 362 mA
Edge Positive

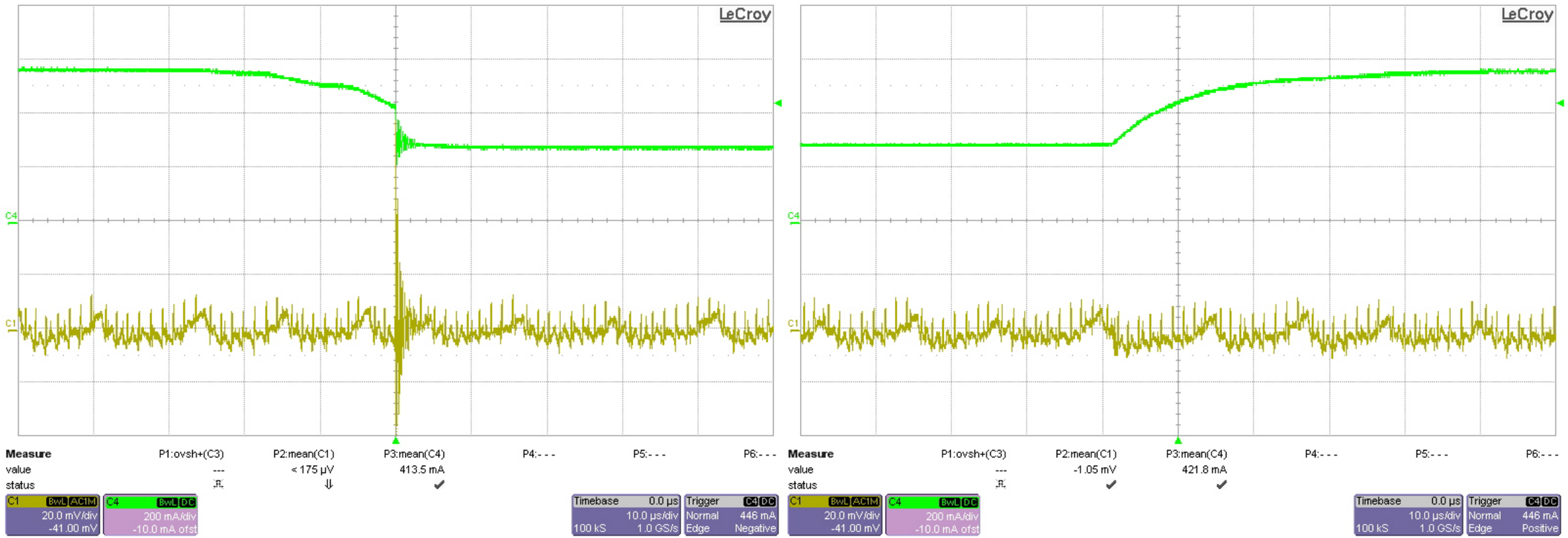
2V5

PMP6638 Test Results

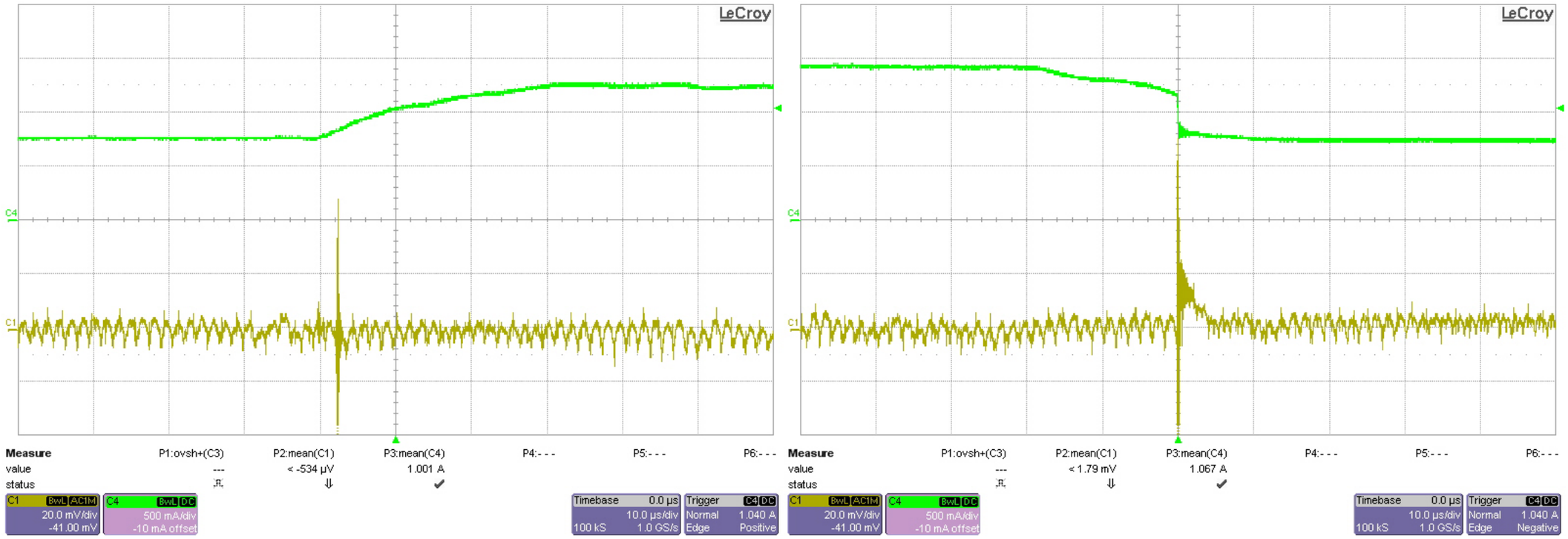


1V0

PMP6638 Test Results



1V0AVS

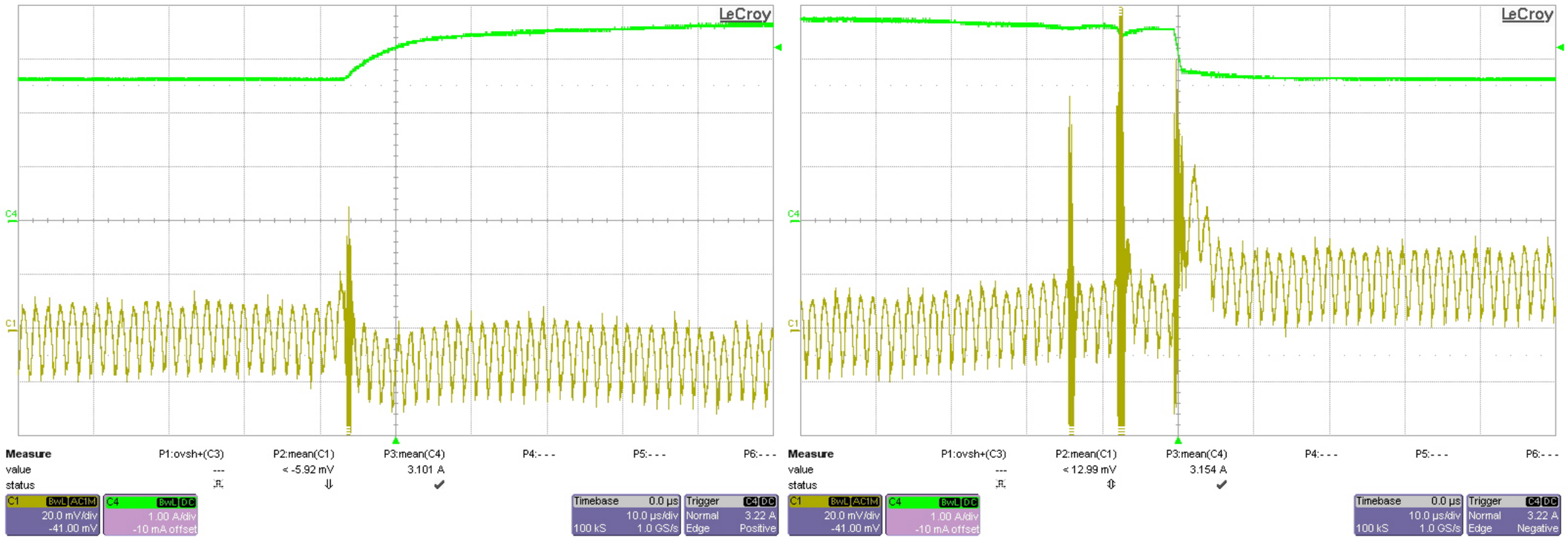

LeCroy
C4
C1
Measure
value
status
P1:ovsh+(C3)

P2:mean(C1)
< -534 µV
P3:mean(C4)
1.001 A
P4:- - -
P5:- - -
P6:- - -
C1 BwL AC1M
20.0 mV/div
-41.00 mV
C4 BwL DC
500 mA/div
-10 mA offset
Timebase 0.0 µs
10.0 µs/div
100 kS 1.0 GS/s
Trigger C4 DC
Normal 1.040 A
Edge Positive
LeCroy
C4
C1
Measure
value
status
P1:ovsh+(C3)

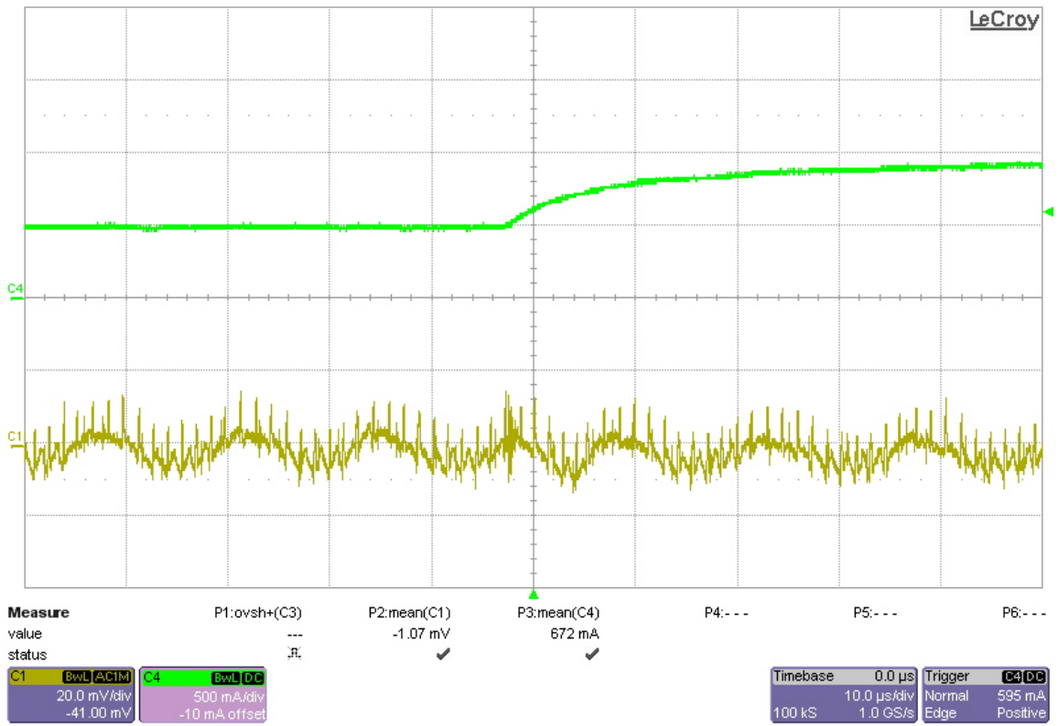
P2:mean(C1)
< 1.79 mV
P3:mean(C4)
1.067 A
P4:- - -
P5:- - -
P6:- - -
C1 BwL AC1M
20.0 mV/div
-41.00 mV
C4 BwL DC
500 mA/div
-10 mA offset
Timebase 0.0 µs
10.0 µs/div
100 kS 1.0 GS/s
Trigger C4 DC
Normal 1.040 A
Edge Negative

3V3

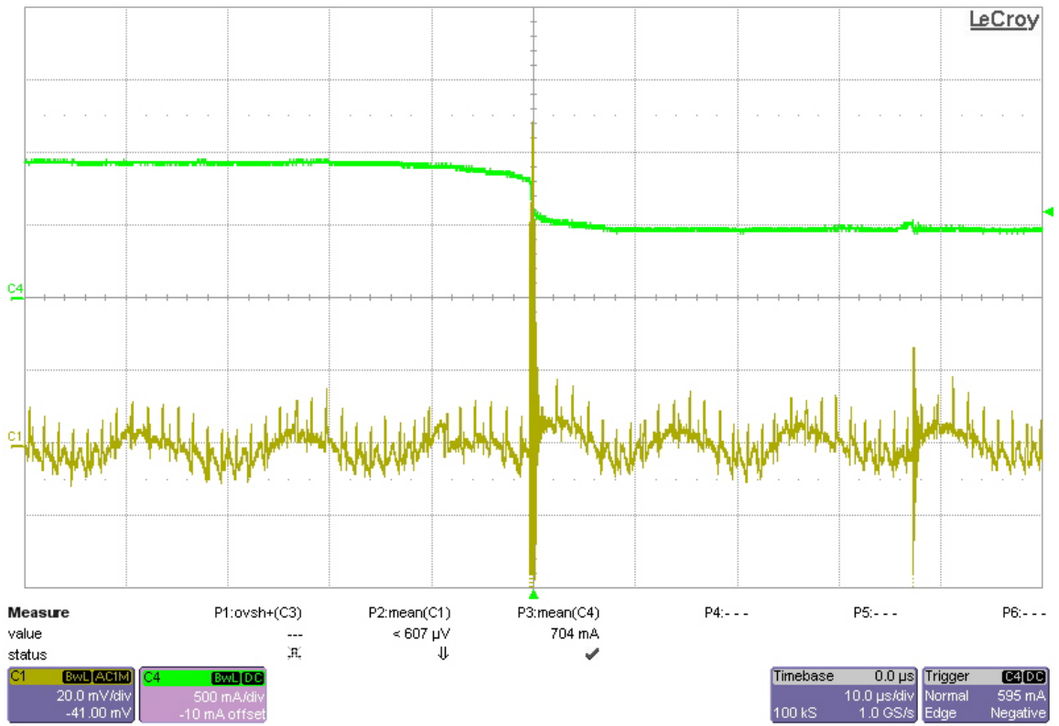
PMP6638 Test Results



1V2


LeCroy
C4
C1
Measure
P1:ovsh+(C3)
P2:mean(C1)
P3:mean(C4)
P4:- - -
P5:- - -
P6:- - -
value

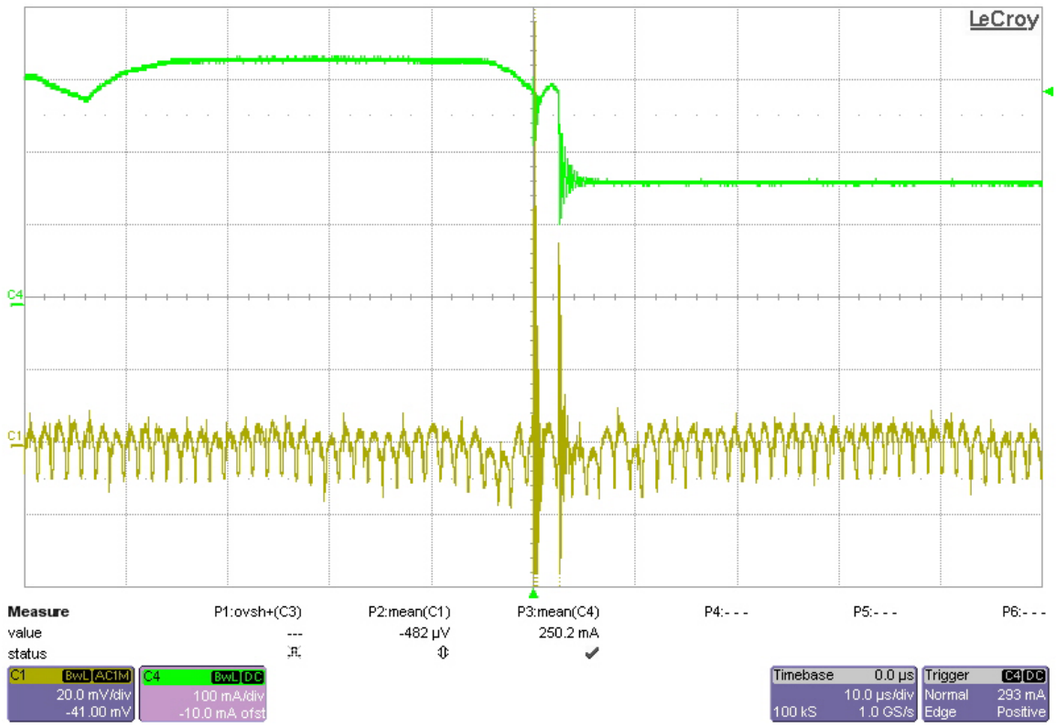
-1.07 mV
672 mA
status
C1 BwL AC1M
20.0 mV/div
-41.00 mV
C4 BwL DC
500 mA/div
-10 mA offset
Timebase 0.0 µs
10.0 µs/div
100 kS 1.0 GS/s
Trigger C4 DC
Normal 595 mA
Edge Positive

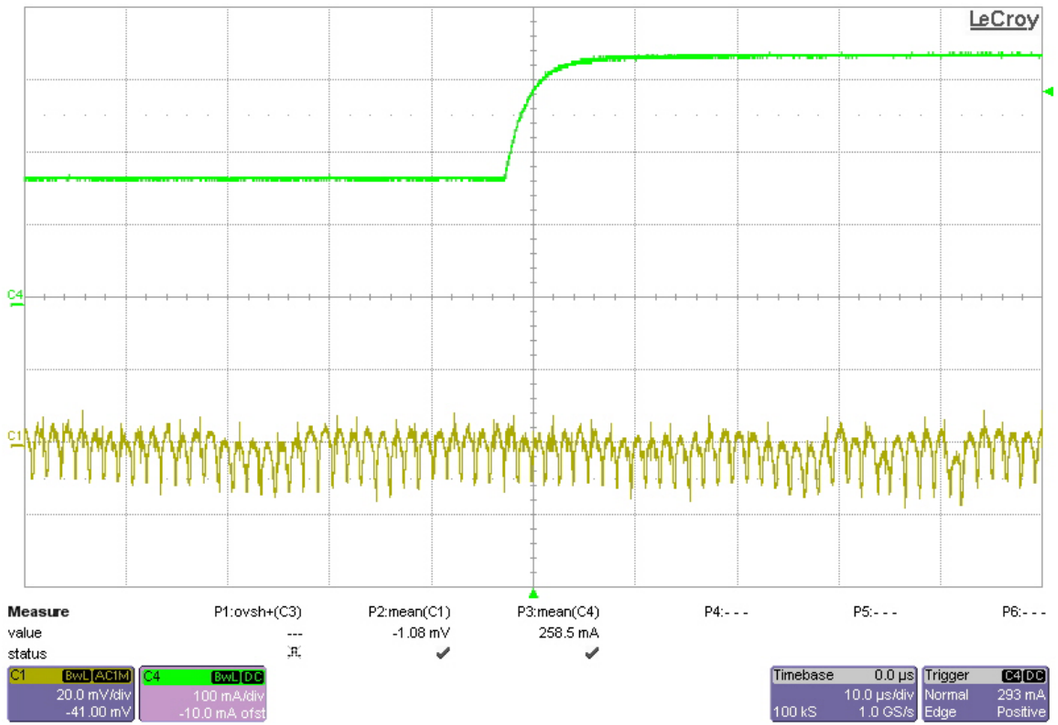

LeCroy
C4
C1
Measure
P1:ovsh+(C3)
P2:mean(C1)
P3:mean(C4)
P4:- - -
P5:- - -
P6:- - -
value

< 607 µV
704 mA
status
C1 BwL AC1M
20.0 mV/div
-41.00 mV
C4 BwL DC
500 mA/div
-10 mA offset
Timebase 0.0 µs
10.0 µs/div
100 kS 1.0 GS/s
Trigger C4 DC
Normal 595 mA
Edge Negative

1V8

PMP6638 Test Results

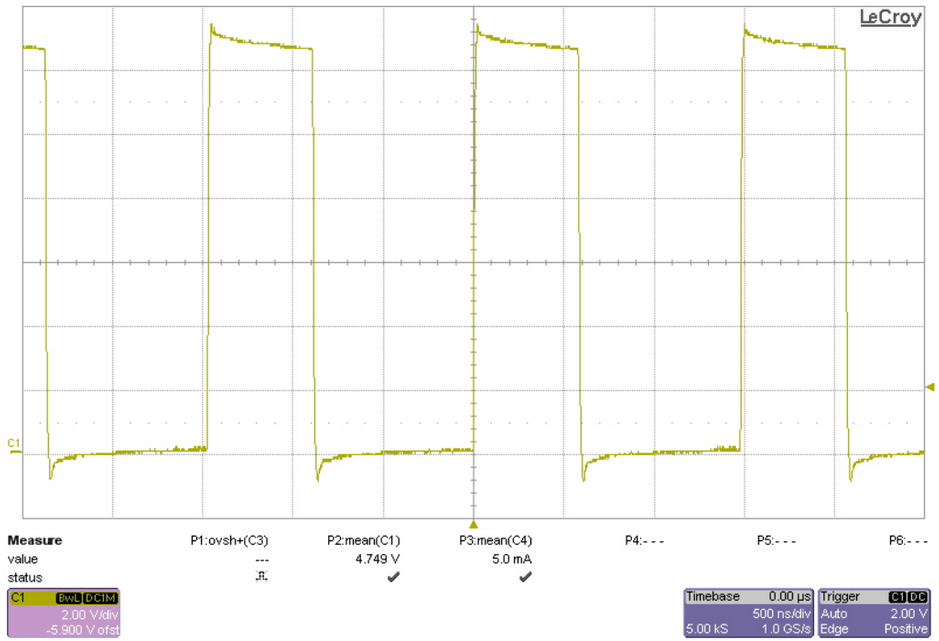




7 Switch Node Waveforms

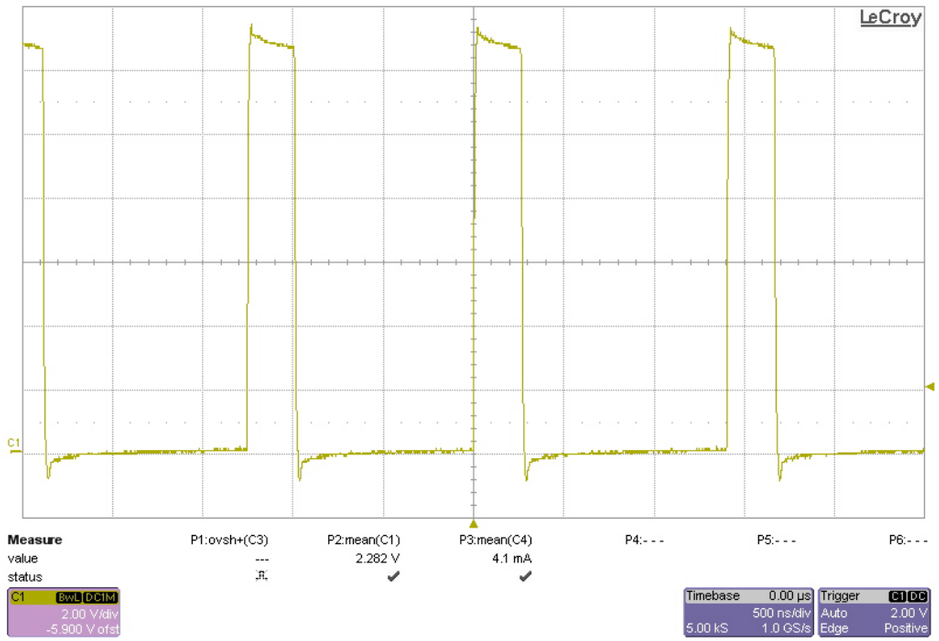
The following figures show the switch node waveforms.

5V0


LeCroy
C1
Measure
P1:ovsh+(C3)
P2:mean(C1)
P3:mean(C4)
P4:- - -
P5:- - -
P6:- - -
value

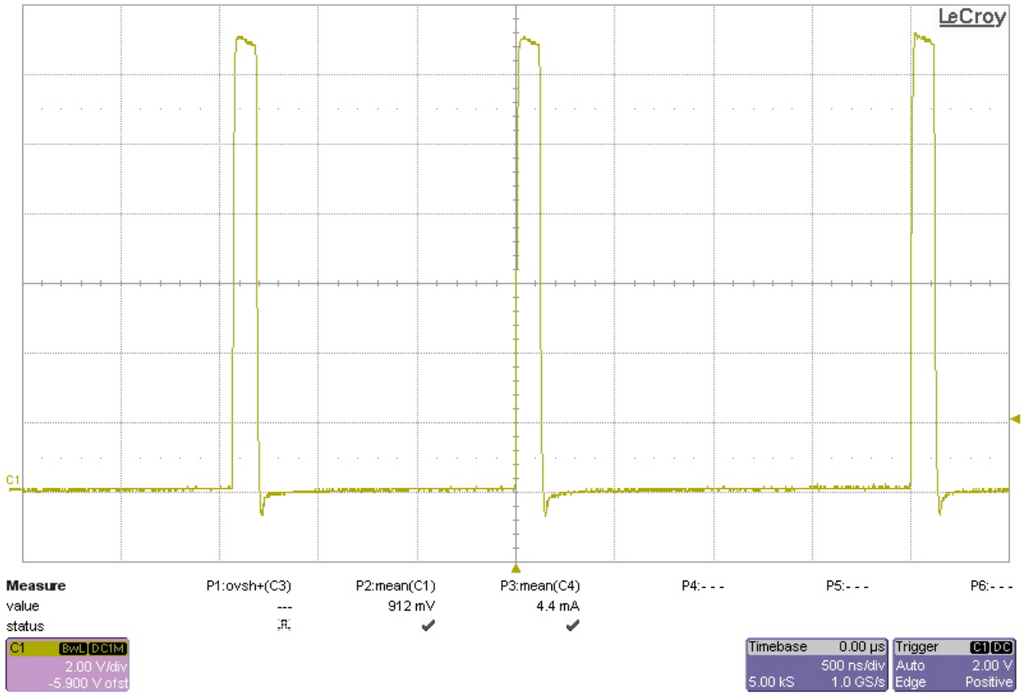
4.749 V
5.0 mA
status
C1 BwL DC1M
2.00 V/div
-5.900 V ofst
Timebase 0.00 µs
500 ns/div
5.00 kS 1.0 GS/s
Trigger C1 DC
Auto 2.00 V
Edge Positive

2V5


LeCroy
C1
Measure
P1:ovsh+(C3)
P2:mean(C1)
P3:mean(C4)
P4:- - -
P5:- - -
P6:- - -
value

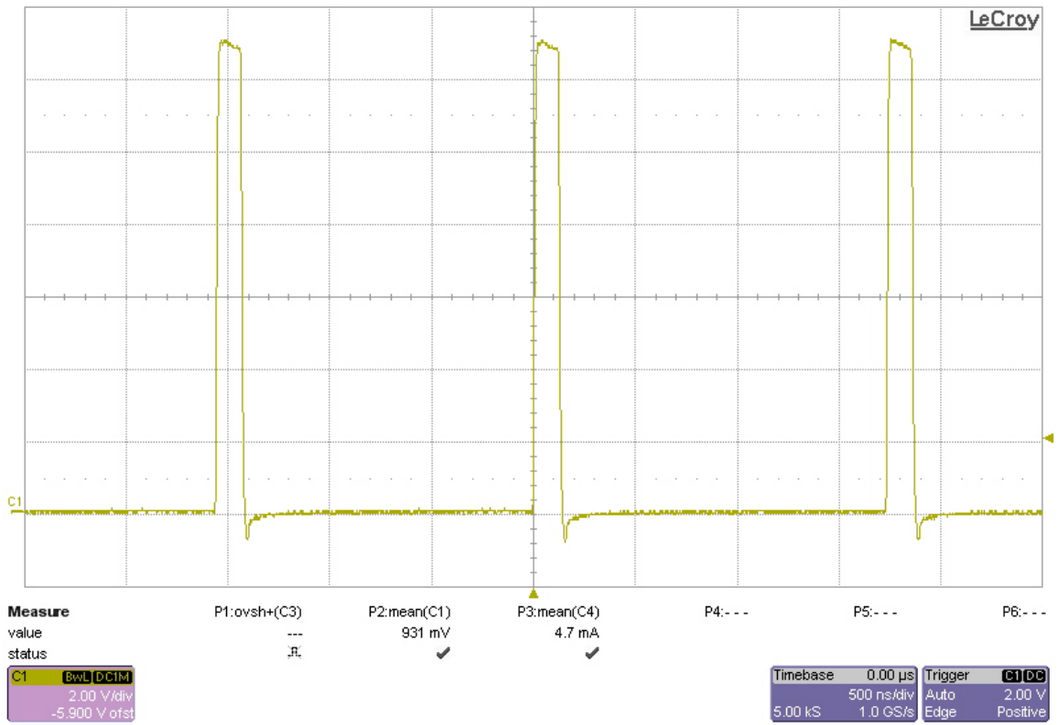
2.282 V
4.1 mA
status
C1 BwL DC1M
2.00 V/div
-5.900 V ofst
Timebase 0.00 µs
500 ns/div
5.00 kS 1.0 GS/s
Trigger C1 DC
Auto 2.00 V
Edge Positive

1V0

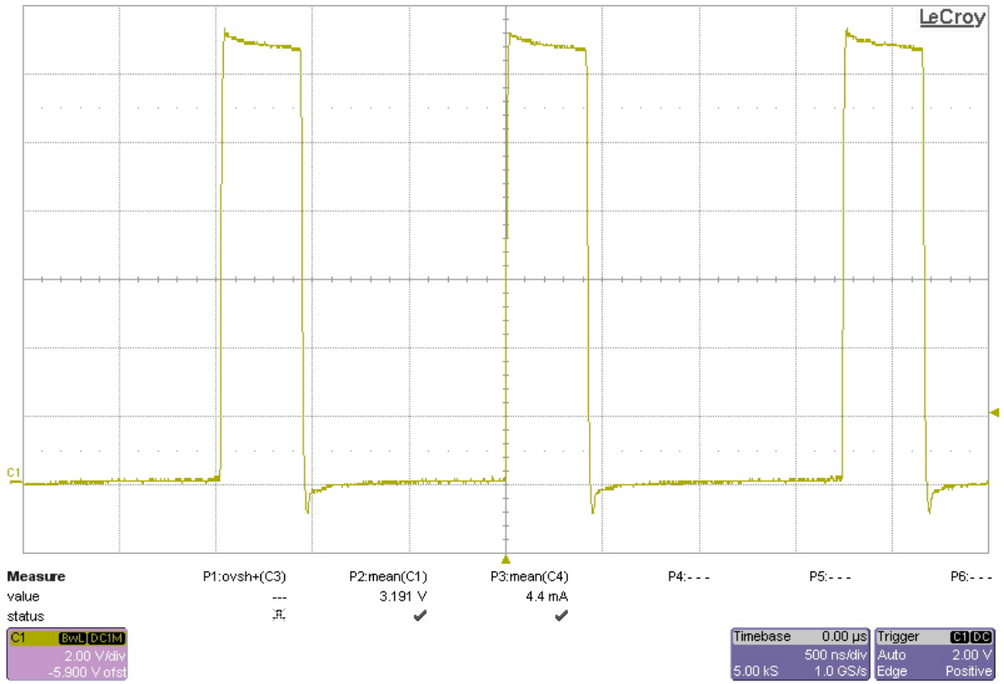

LeCroy
C1
Measure
P1:ovsh+(C3)
P2:mean(C1)
P3:mean(C4)
P4:- - -
P5:- - -
P6:- - -
value
---
912 mV
4.4 mA
status
C1 BwL DC1M
2.00 V/div
-5.900 V ofst
Timebase 0.00 µs
500 ns/div
5.00 kS 1.0 GS/s
Trigger C1 DC
Auto 2.00 V
Edge Positive

1V0AVS

PMP6638 Test Results

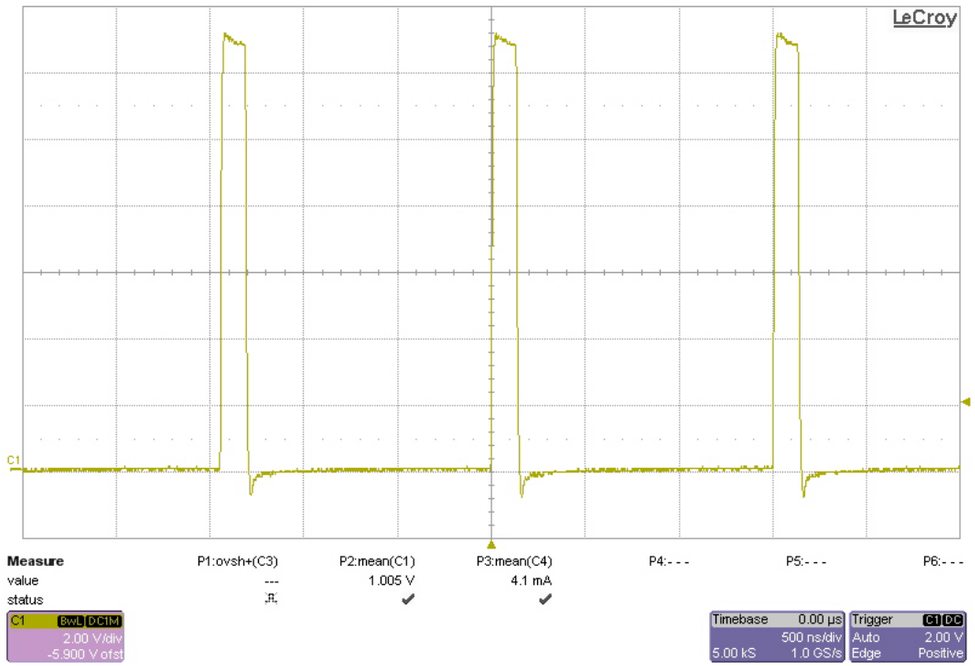


3V3


LeCroy
C1
Measure
P1:ovsh+(C3)
P2:mean(C1)
P3:mean(C4)
P4:- - -
P5:- - -
P6:- - -
value

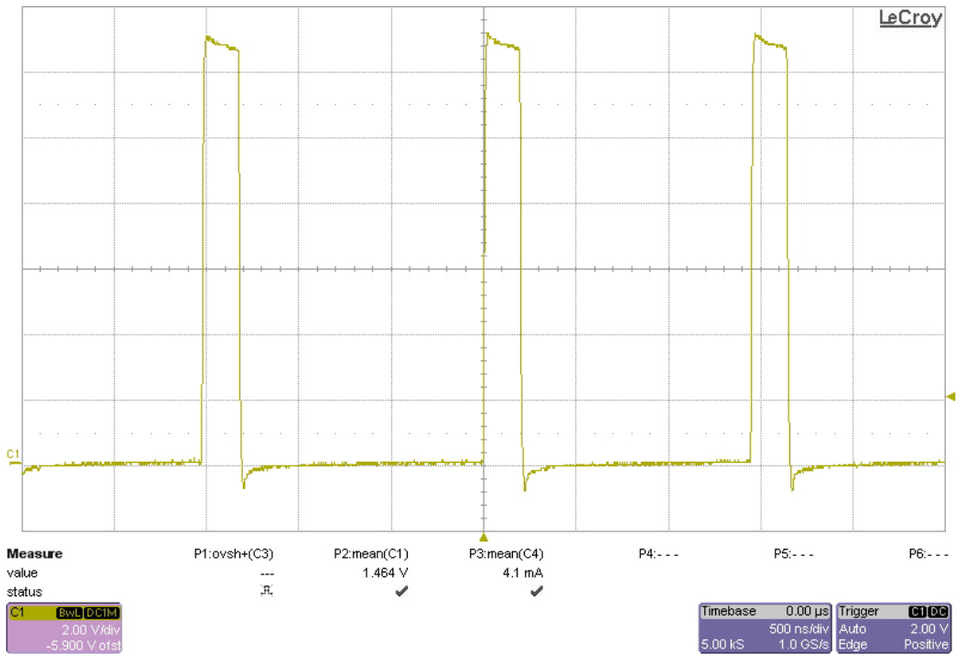
3.191 V
4.4 mA
status
C1 BwL DC1M
2.00 V/div
-5.900 V ofst
Timebase 0.00 µs
500 ns/div
5.00 kS 1.0 GS/s
Trigger C1 DC
Auto 2.00 V
Edge Positive

1V2


LeCroy
C1
Measure
P1:ovsh+(C3)
P2:mean(C1)
P3:mean(C4)
P4:- - -
P5:- - -
P6:- - -
value

1.005 V
4.1 mA
status
C1 BwL DC1M
2.00 V/div
-5.900 V ofst
Timebase 0.00 µs
500 ns/div
5.00 kS 1.0 GS/s
Trigger C1 DC
Auto 2.00 V
Edge Positive

1V8


LeCroy
C1
Measure
P1:ovsh+(C3)
P2:mean(C1)
P3:mean(C4)
P4:- - -
P5:- - -
P6:- - -
value

1.464 V
4.1 mA
status
C1 BwL DC1M
2.00 V/div
-5.900 V ofst
Timebase 0.00 µs
500 ns/div
5.00 kS 1.0 GS/s
Trigger C1 DC
Auto 2.00 V
Edge Positive

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