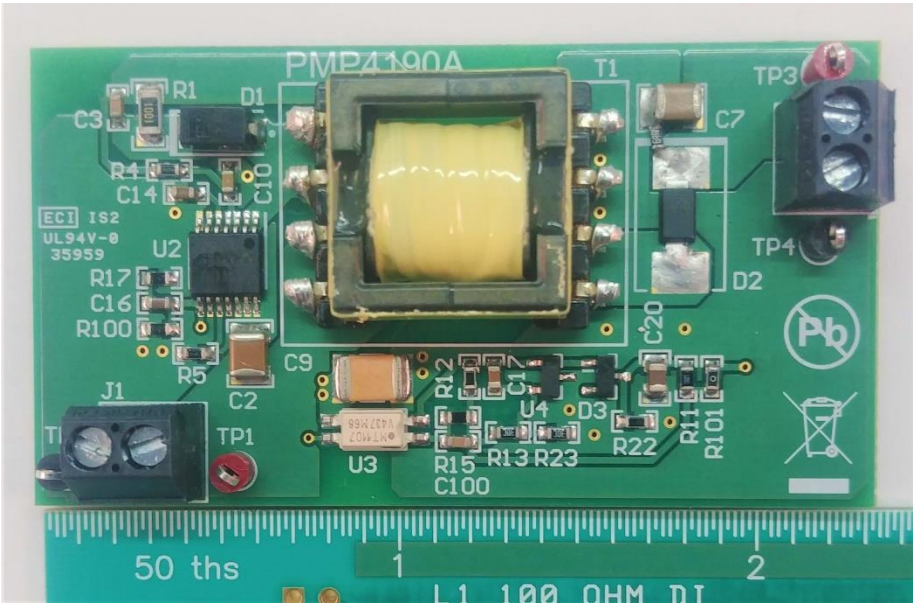
Test Report: PMP4190
3-V to 6-V DC Input, 5-V/0.5-A, 1-MHz Isolated Flyback Reference Design

Description

This simple and compact design demonstrates how integrated boost converters, usually relegated to portable applications, can be leveraged in isolated auxiliary supplies. This example showed how to use the TPS61175 with a low input voltage. This simple design can be placed in a small amount of board space. The design consumes a total of 1.8 in^2 on one side of the board.



1 Test Prerequisites

1.1 Voltage and Current Requirements

Table 1. Voltage and Current Requirements

PARAMETER	SPECIFICATIONS
Input Voltage Range	3VDC – 6VDC
Output Voltage/Current	5V/0.5A

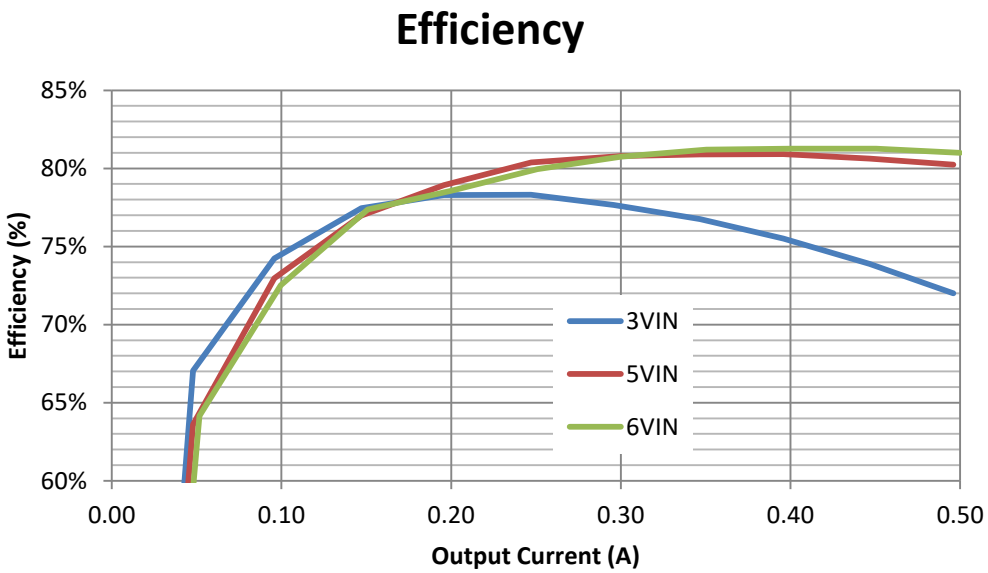
1.2 Required Equipment

- DC voltage source
- Electronic load
- Multi-meters
- Oscilloscope

2 Testing and Results

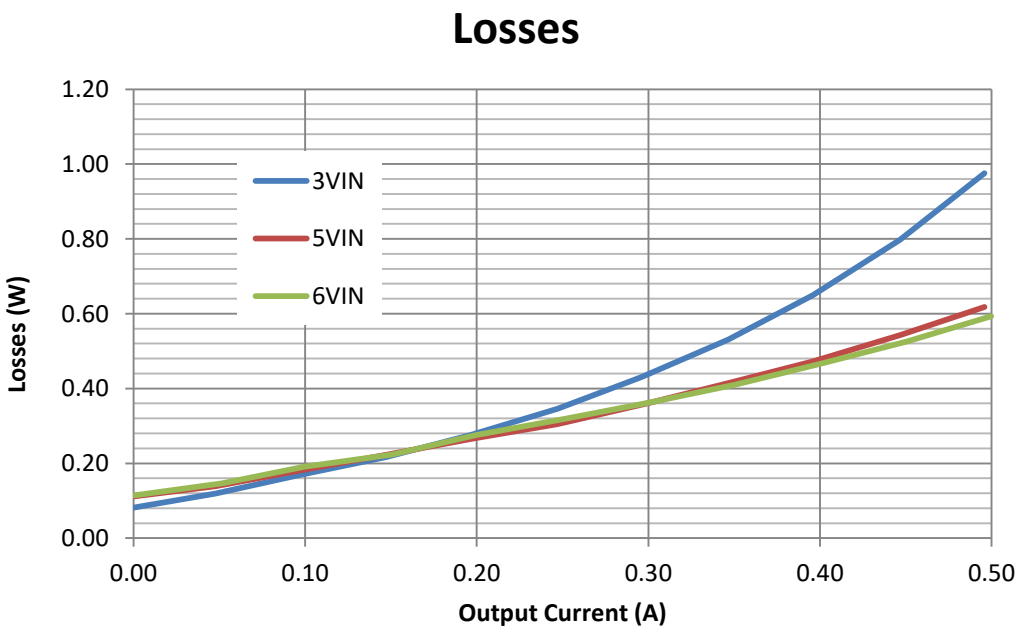
2.1 Efficiency

2.1.1 5V Output



2.2 Losses

2.2.1 5V Output

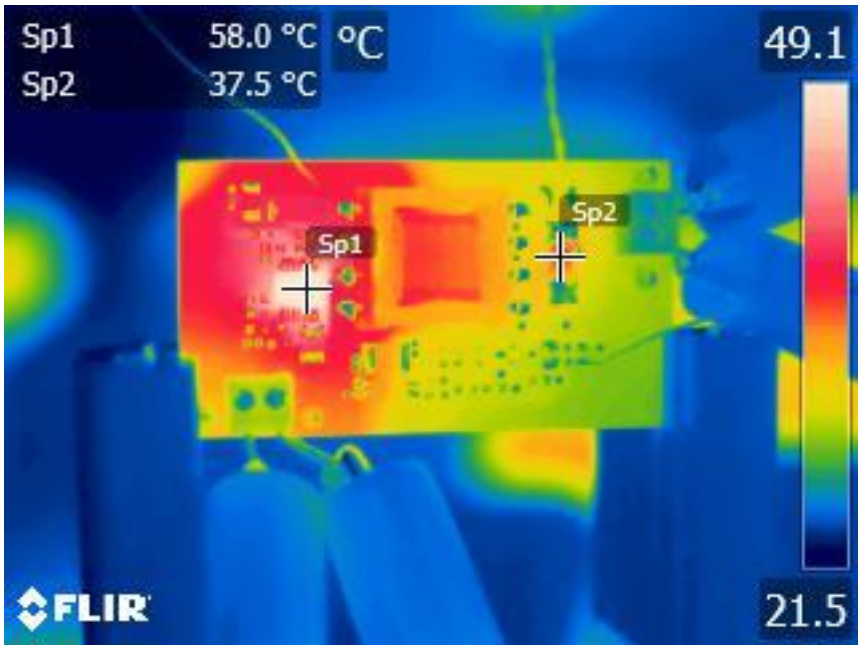


2.3 Thermal Images

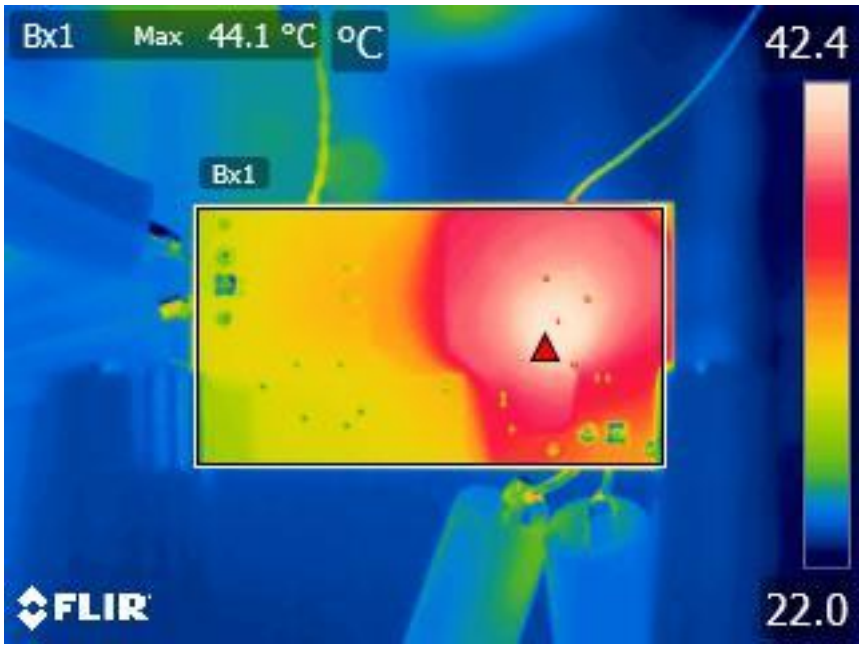
Measured after 30 minutes at full load and 25° C ambient temperature with no external airflow.

2.3.1 3VDC Input, Top, 5V/0.5A Output

Sp1 – U2
Sp2 – D2

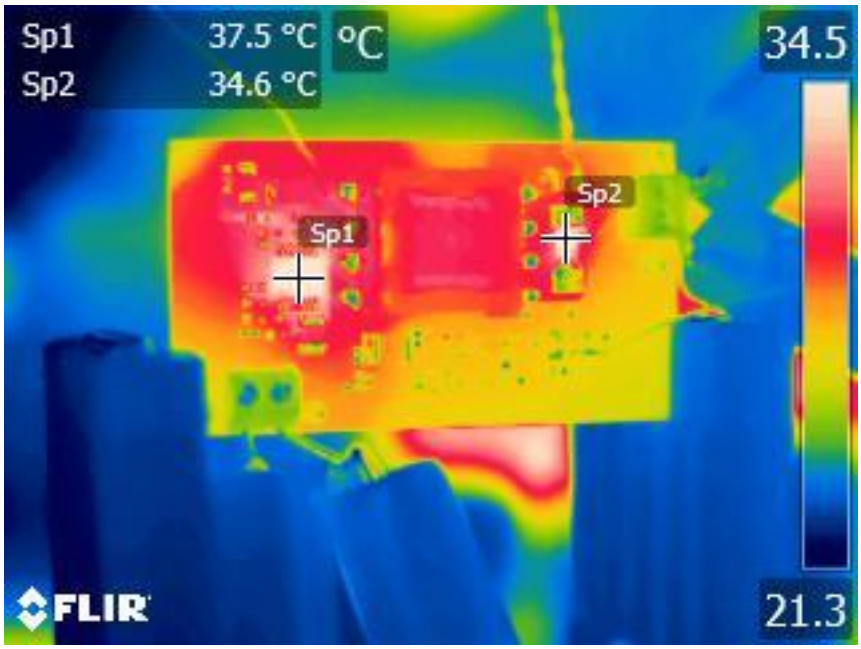


2.3.2 3VDC Input, Bottom, 5V/0.5A Output

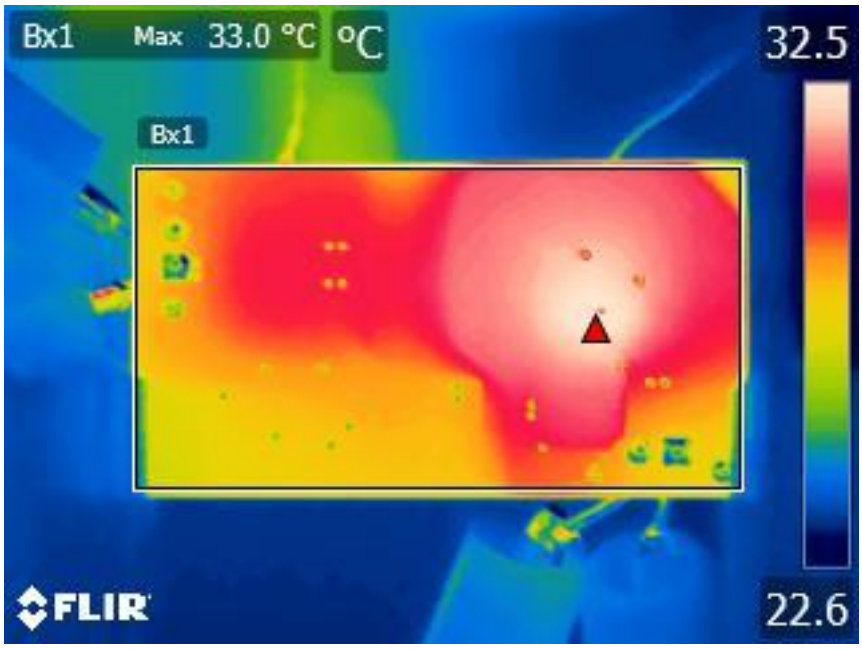


2.3.3 5VDC Input, Top, 5V/0.5A Output

Sp1 – U2
Sp2 – D2



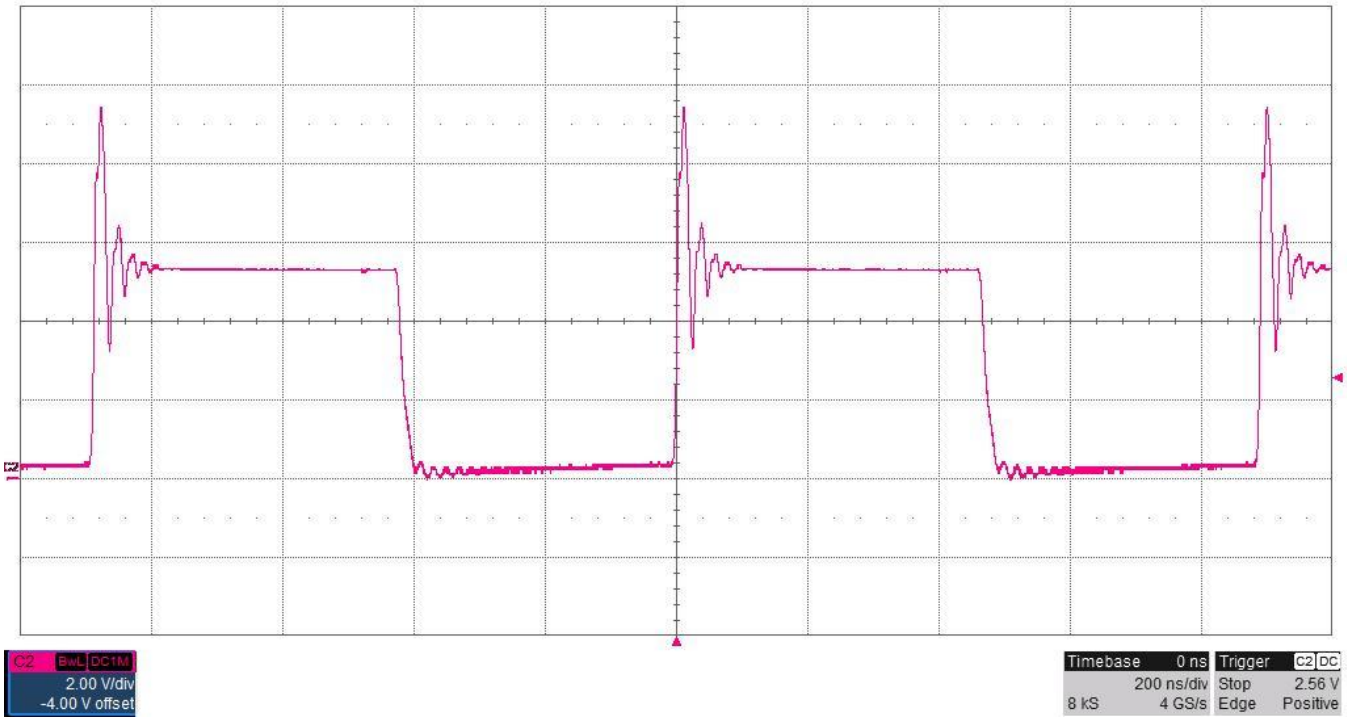
2.3.4 5VDC Input, Bottom, 5V/0.5A Output



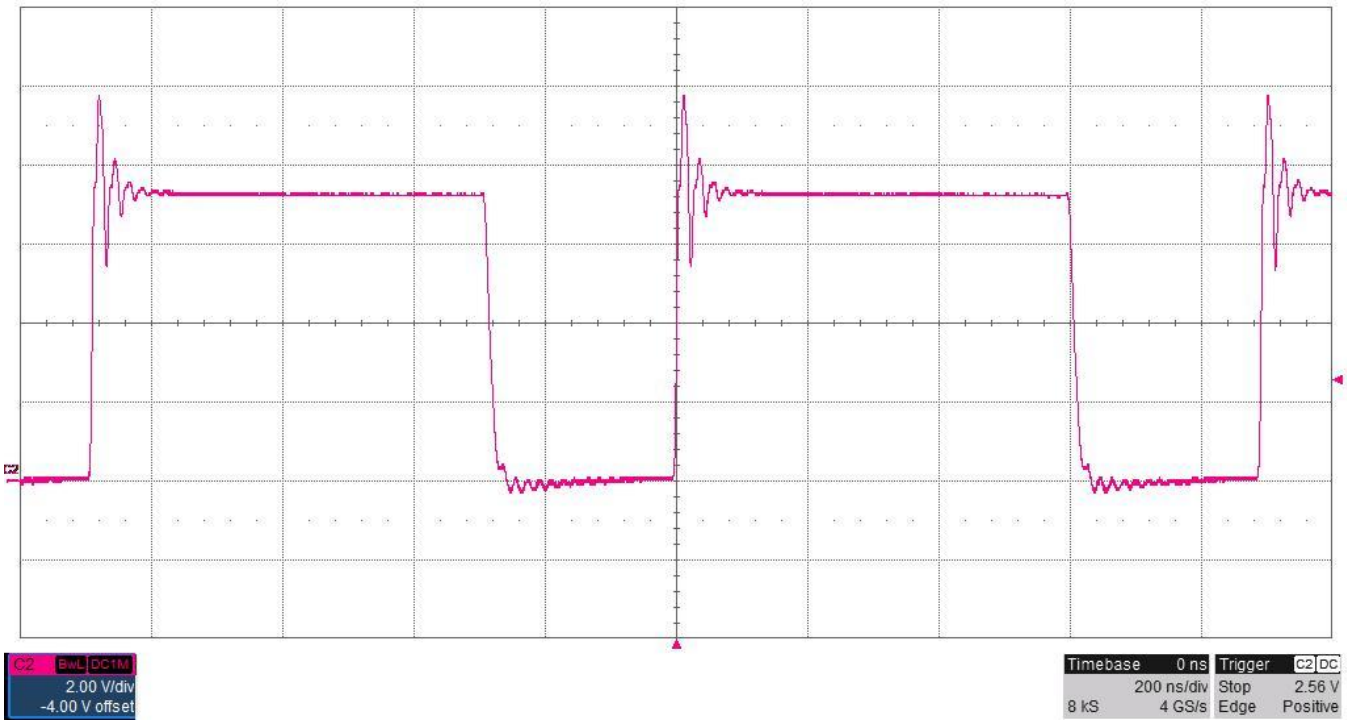
3 Waveforms

3.1 Switching

3.1.1 SW to GND, 3VDC Input, 5V/0.5A Output

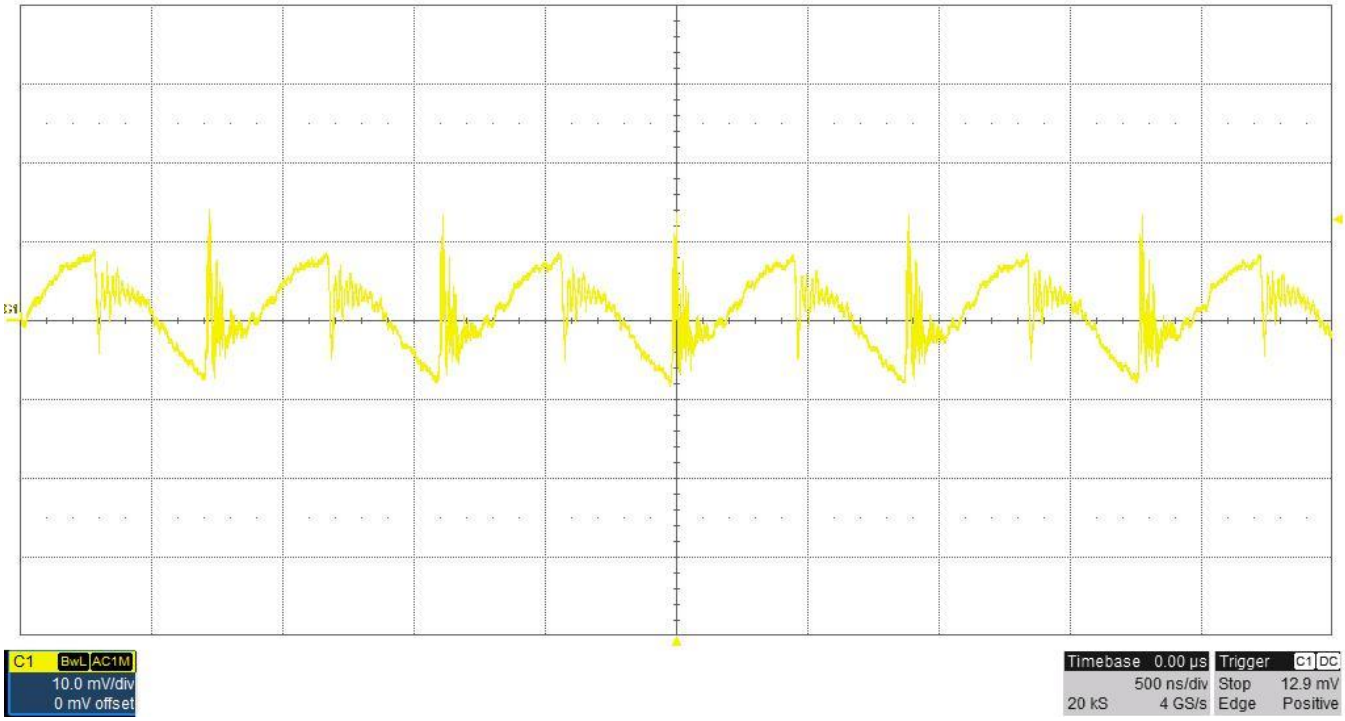


3.1.2 SW to GND, 5VDC Input, 5V/0.5A Output

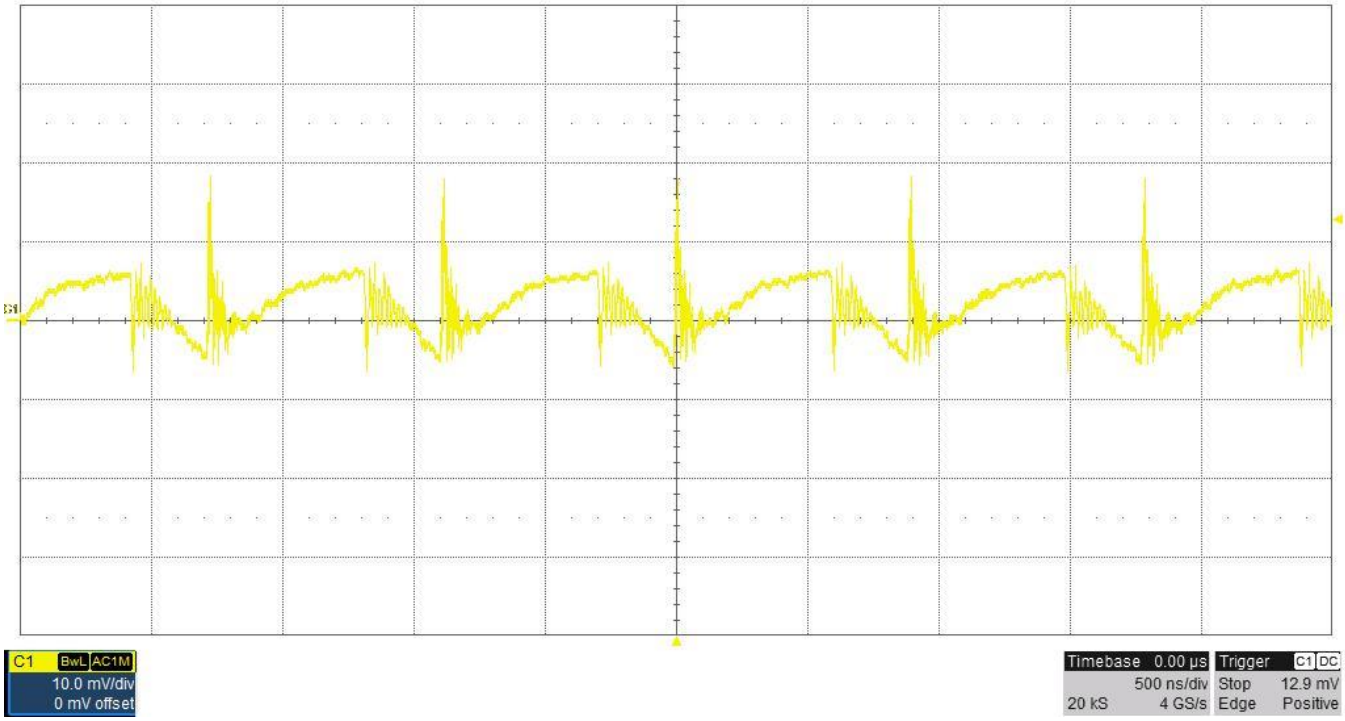


3.2 Output Voltage Ripple

3.2.1 5V/0.5A Output, 3VDC Input

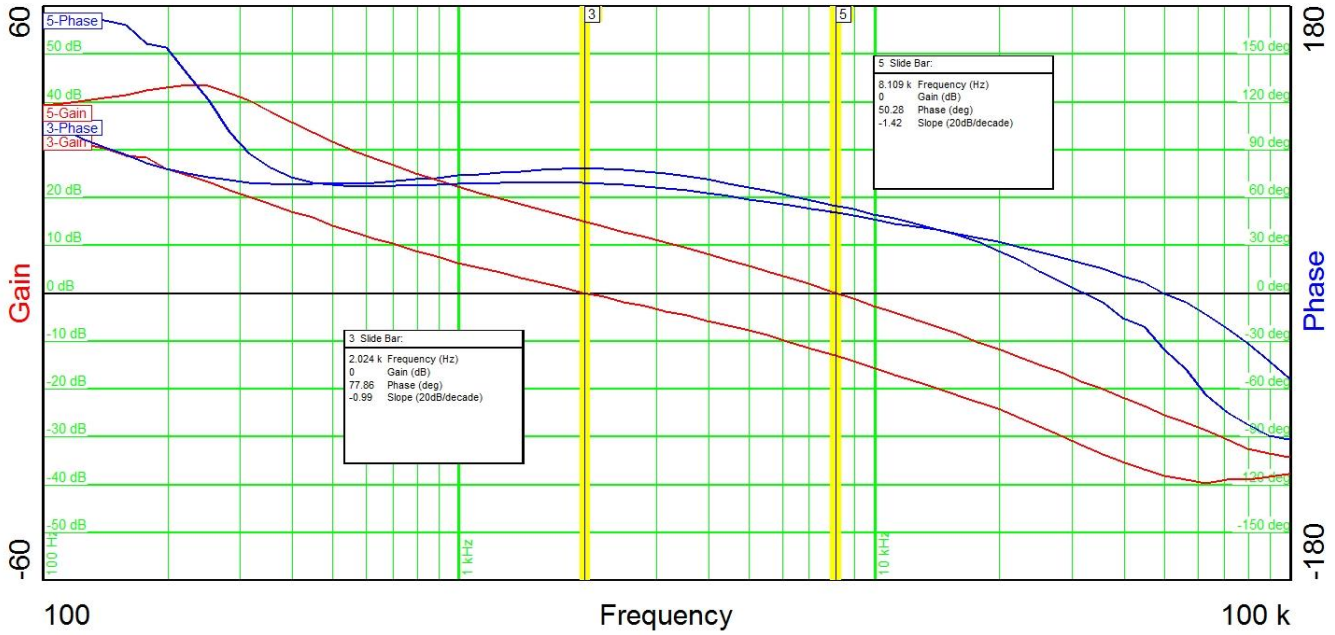


3.2.2 5V/0.5A Output, 5VDC Input



3.3 Bode Plot

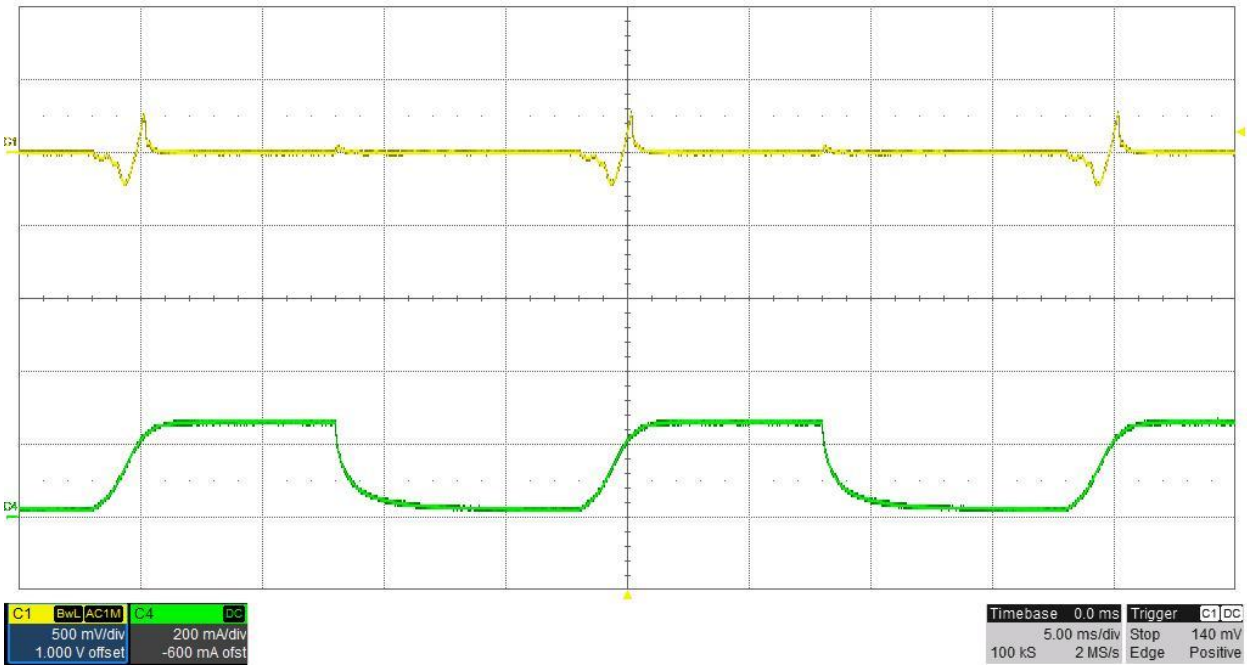
3.3.1 5V/0.5A Output, 3VDC (3-Gain/3-Phase) and 5VDC (5-Gain/5-Phase) Input



3.4 Load Transients

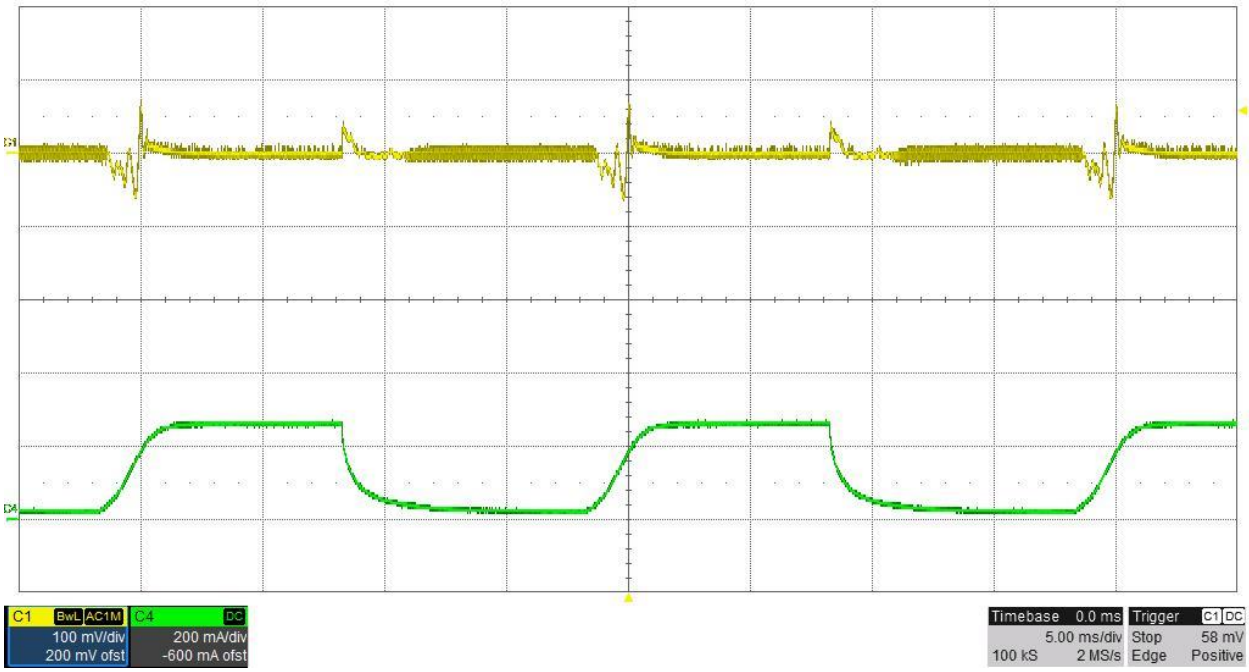
3.4.1 5V Output, 0A to 0.25A, 3VDC Input

C1 – Vout
C4 – Iout



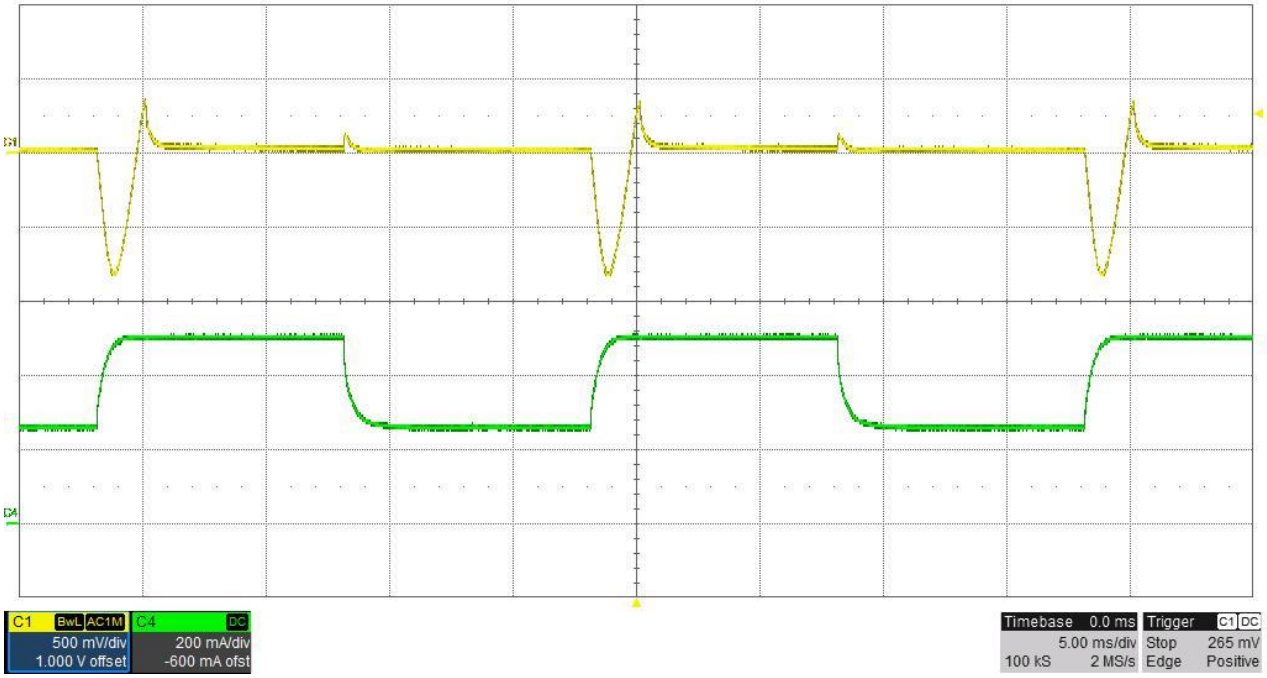
3.4.2 5V Output, 0A to 0.25A, 5VDC Input

C1 – Vout
C4 – Iout



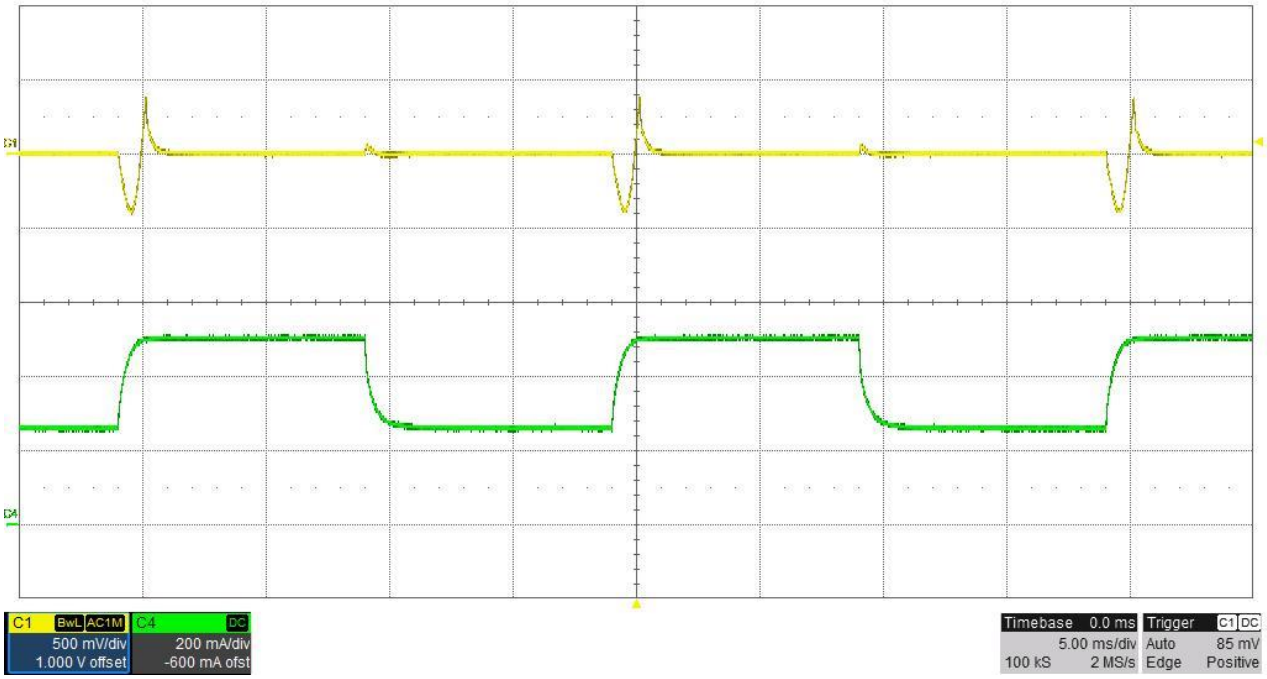
3.4.3 5V Output, 0.25A to 0.50A, 3VDC Input

C1 – Vout
C4 – Iout



3.4.4 5V Output, 0.25A to 0.50A, 5VDC Input

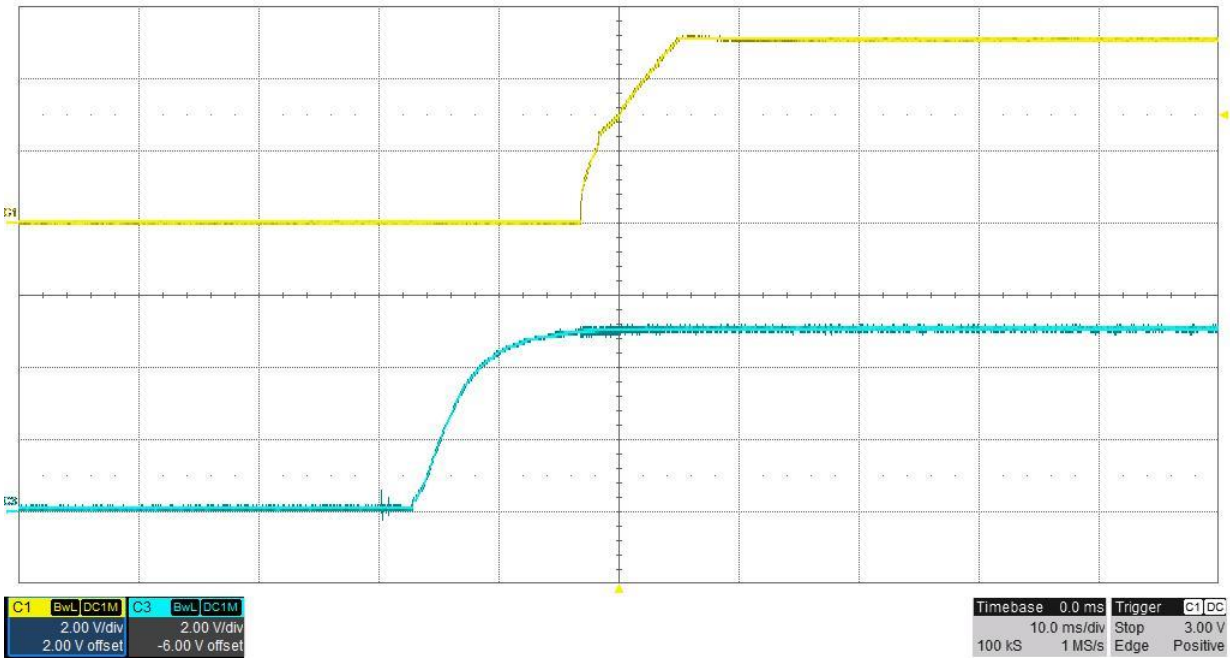
C1 – Vout
C4 – Iout



3.5 Start up

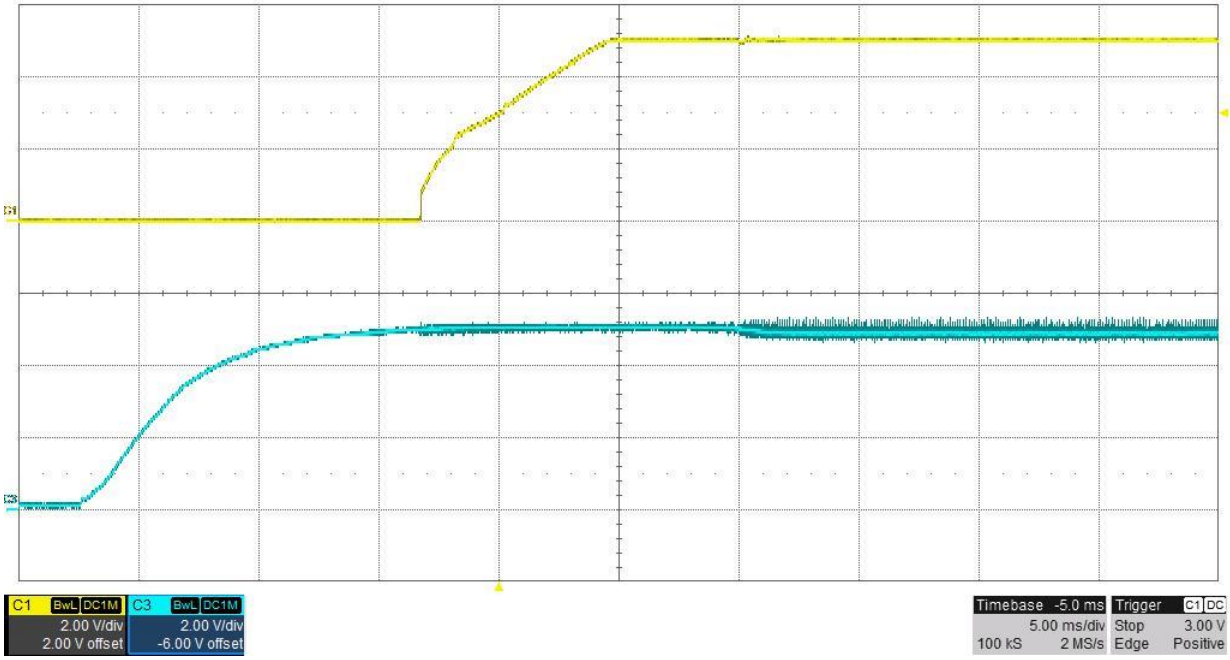
3.5.1 5V Output, No Load

C1 – Vout
C3 – Vin



3.5.2 5V Output, 0.5A,

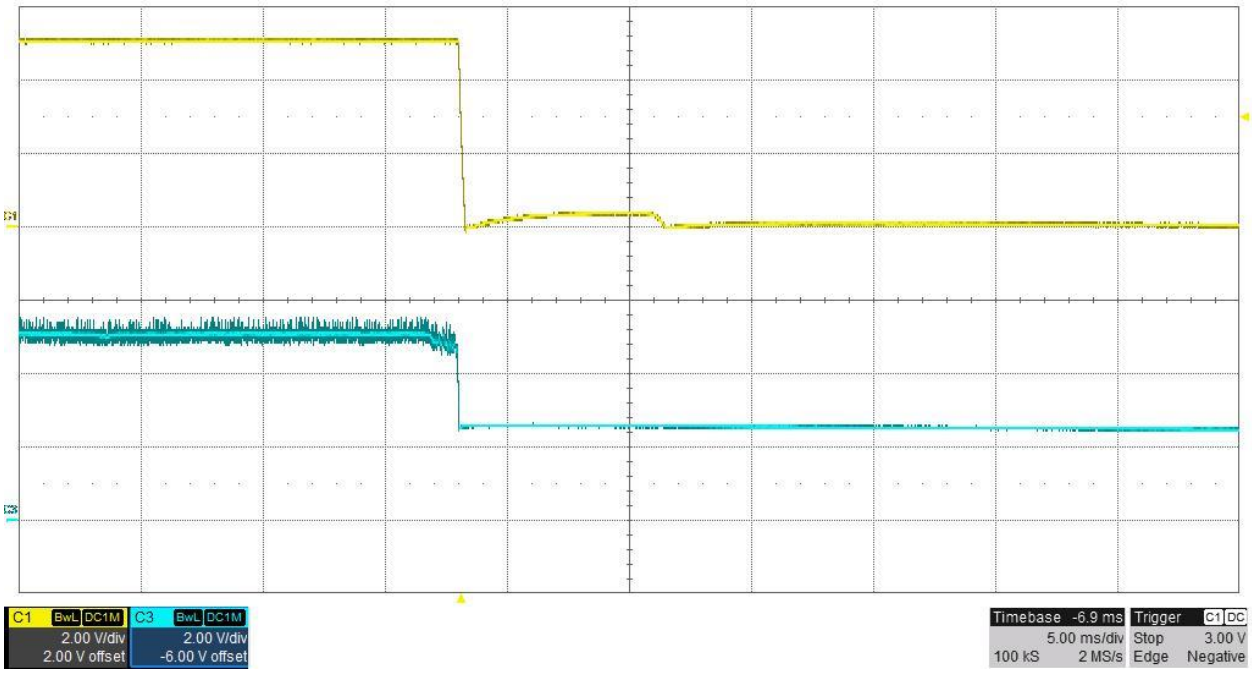
C1 – Vout
C3 – Vin



3.6 Shutdown

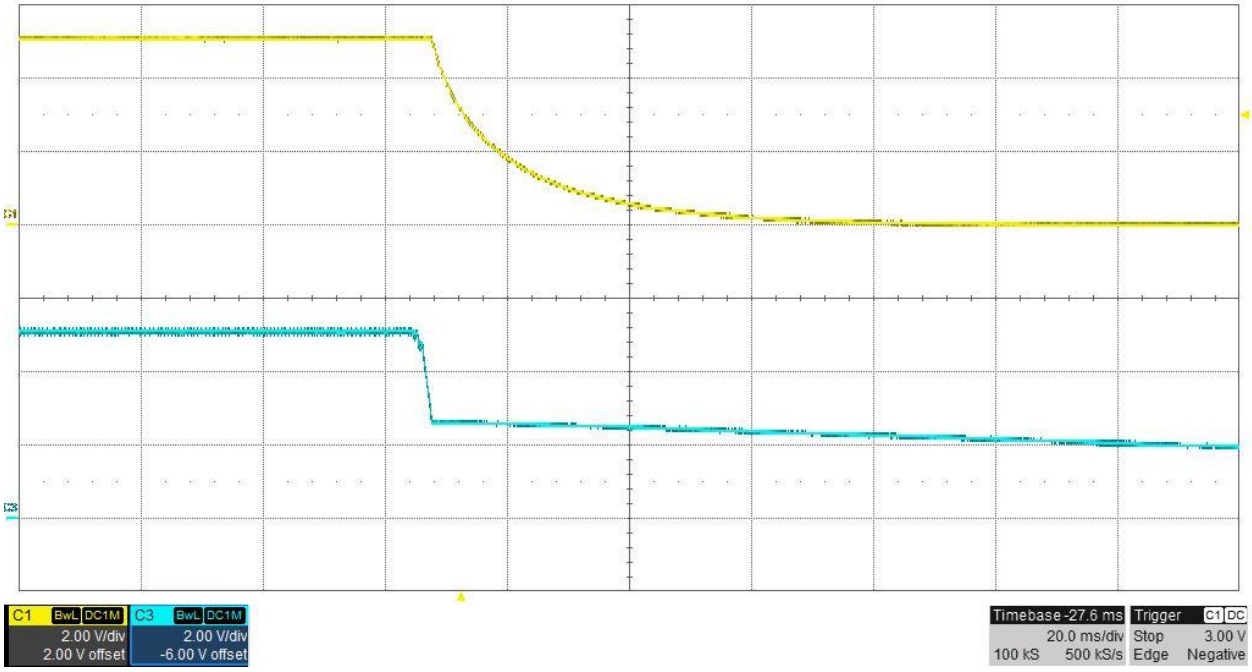
3.6.1 5V Output, No Load

C1 – Vout
C3 – Vin



3.6.2 5V Output, 0.5A,

C1 – Vout
C3 – Vin



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