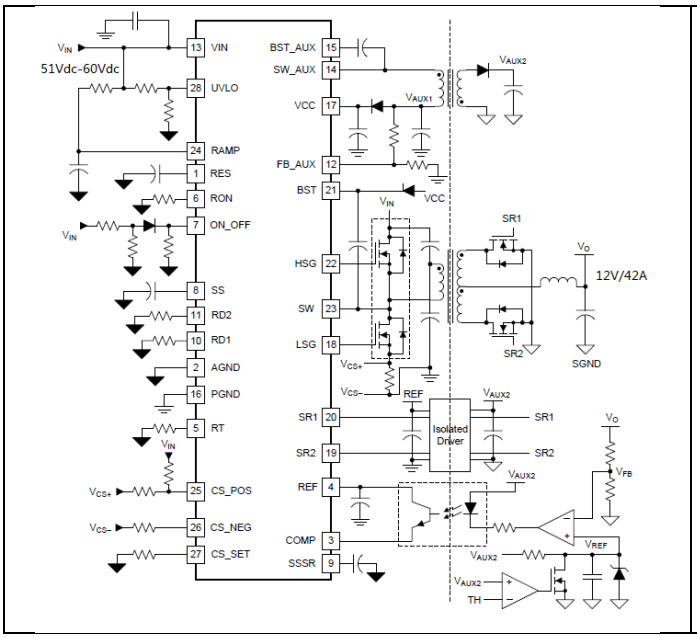
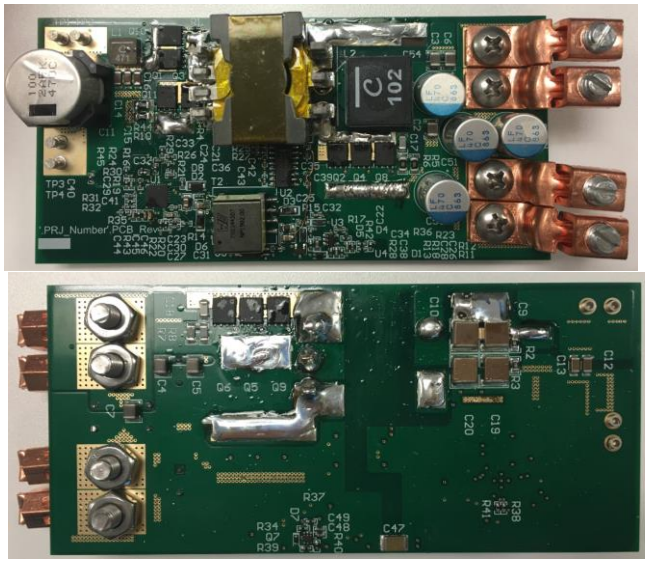
*Test Report: PMP40500*

# *54-Vdc Input, 12-V 42-A Output Half-Bridge Reference Design*

## Description

The PMP40500 is 12V42A output half-bridge reference design with LM5036. The primary and secondary isolated driver is UCC21220AD. This document also contains the comparison using different isolated driver such as UCC21220D, UCC21222D, UCC21540DW, UCC21540DWK, and UCC21541DW. These isolated drivers have the good performance. The design features high efficiency and various fault protections (over-current, short-circuit).





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# 1 Test Prerequisites

## *1.1 Voltage and Current Requirements*

**Table 1. Voltage and Current Requirements**

| PARAMETER | SPECIFICATIONS |
|---|---|
| Input | DC Source: 51.5V to 60.0V |
| Output | 12V/42A |

## *1.2 Required Equipment*

- DC Source: Chroma 62006P-100-25
- E-Load: Chroma 63101 module
- Multi-meter (voltage): Fluke 287C
- Multi-meter (current): Fluke 287C
- DPO 3054 Digital Phosphor Oscilloscope
- Fluke Thermal Imager


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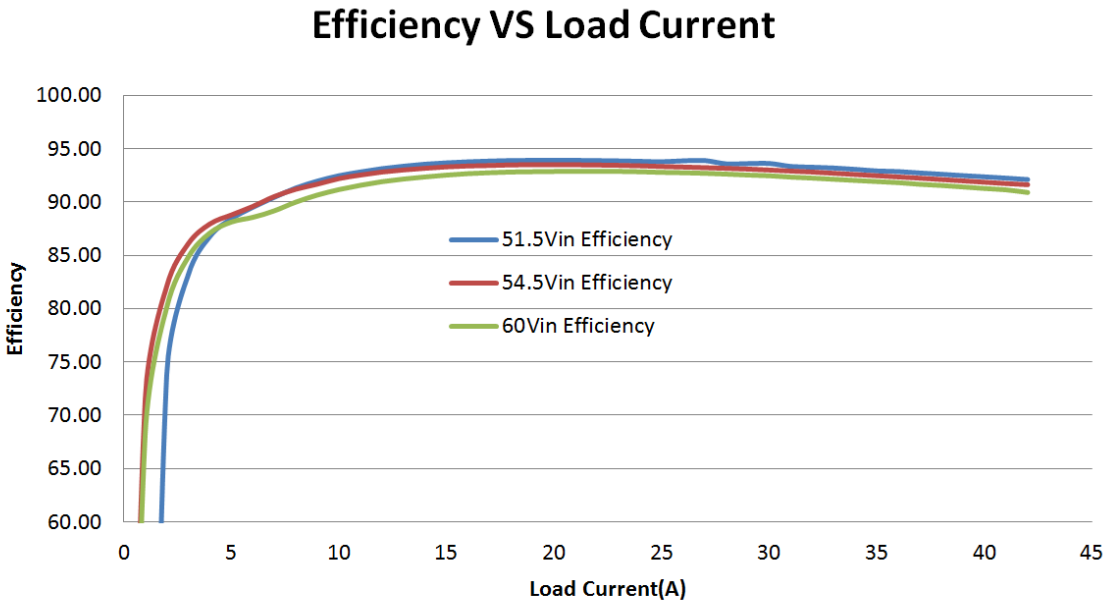
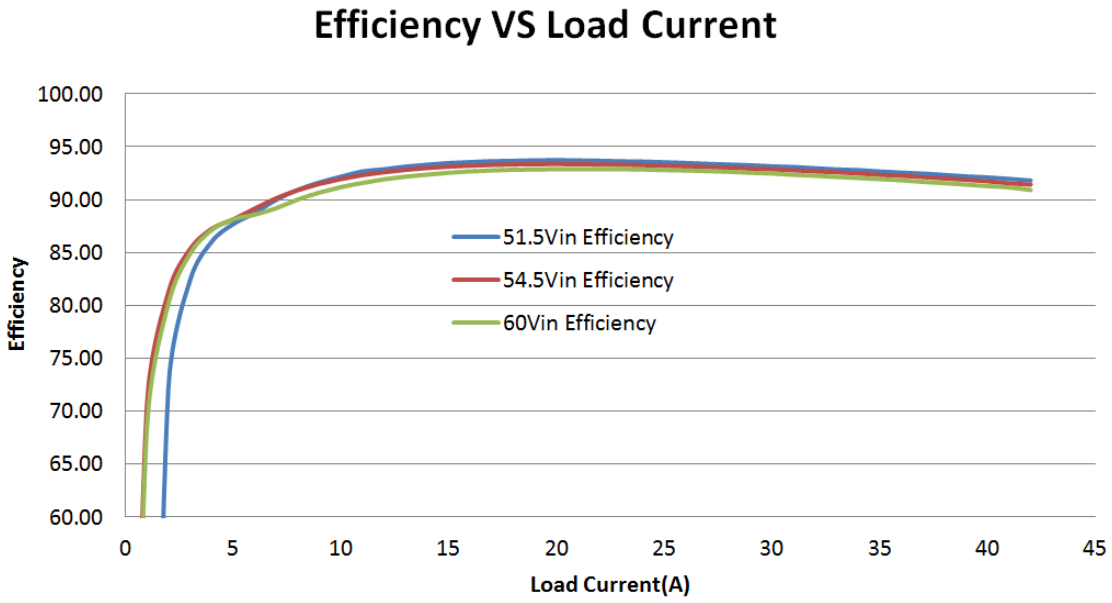
# 2 Testing and Results

## 2.1 Efficiency Graphs with UCC21220AD




## 2.2 Efficiency Graphs with UCC21220D

Note: just drop in UCC21220D on the PMP40500 U2 designator.





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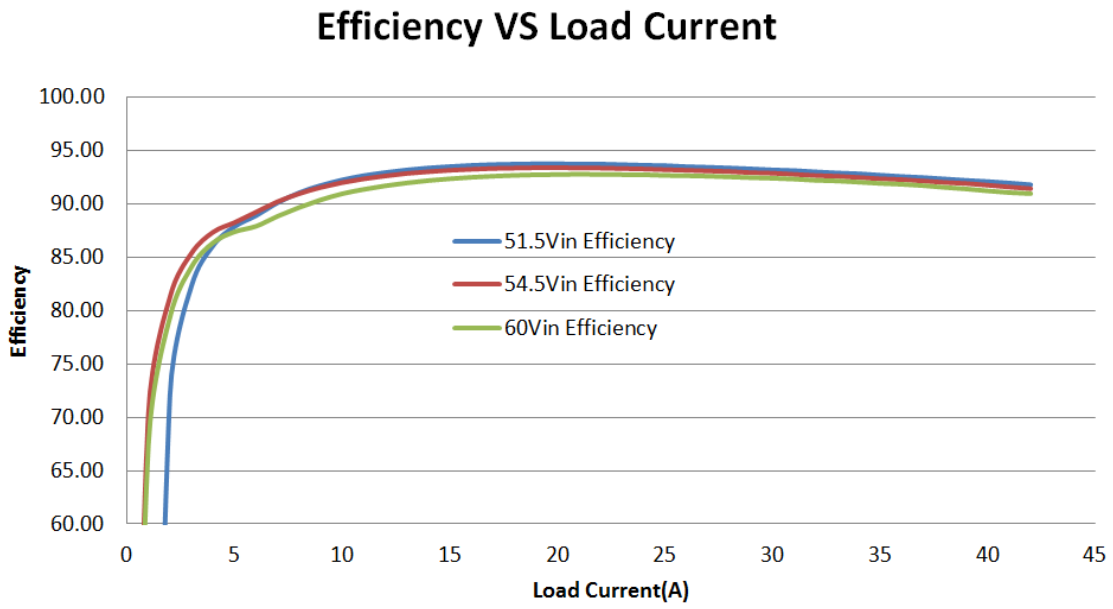
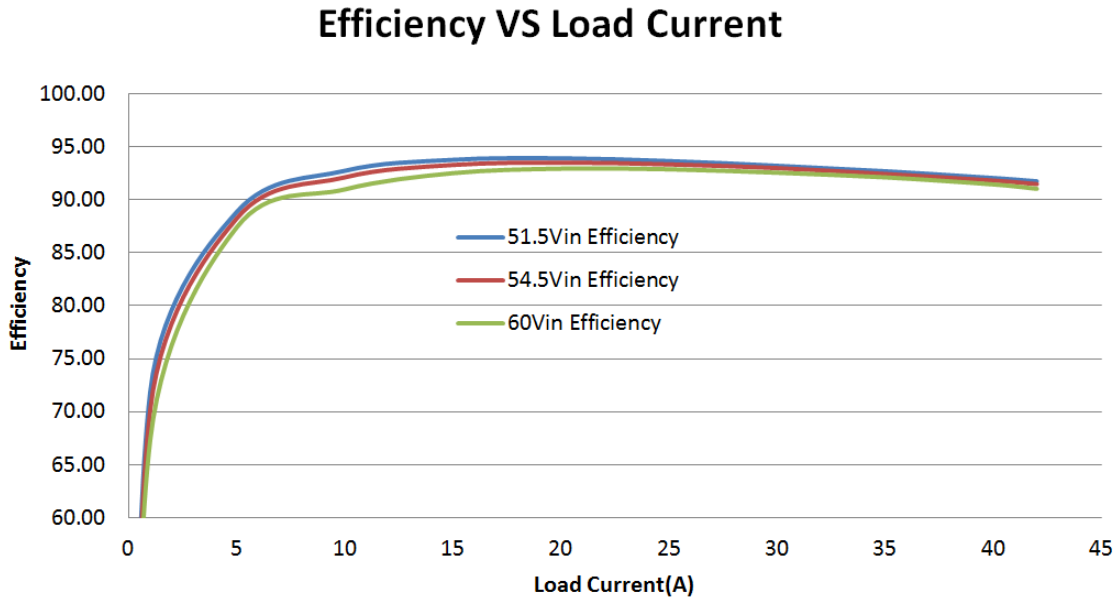
### 2.3 Efficiency Graphs with UCC21222D

Note: just drop in UCC21222D on the PMP40500 U2 designator.




### 2.4 Efficiency Graphs with UCC21540DW

Note: Need to use the fly-wire to solder UCC21540DW on the PMP40500 U2 designator and connect DT to VCCI





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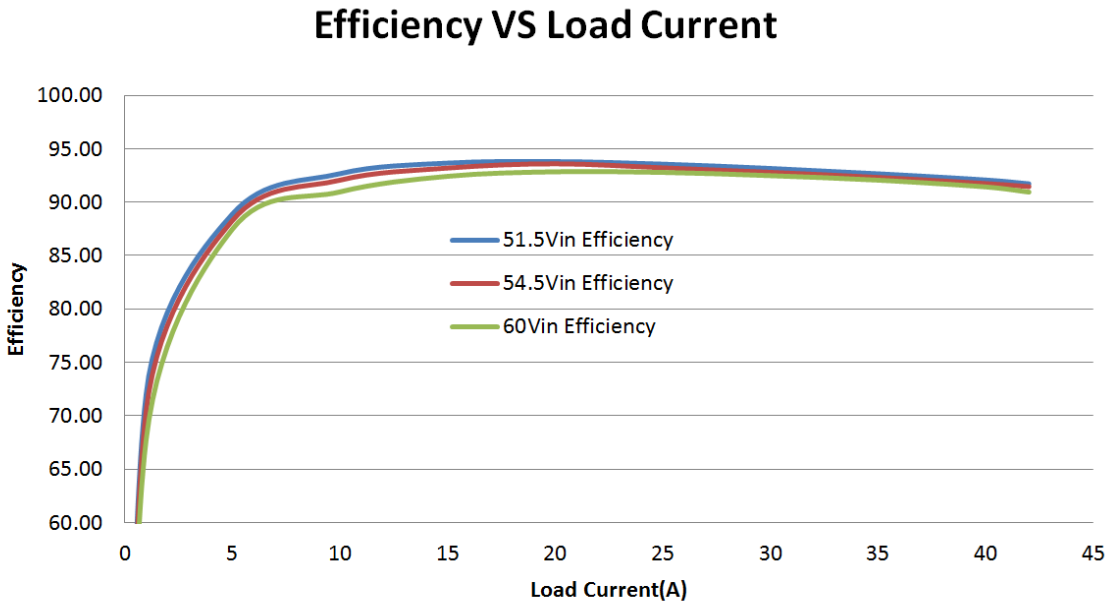
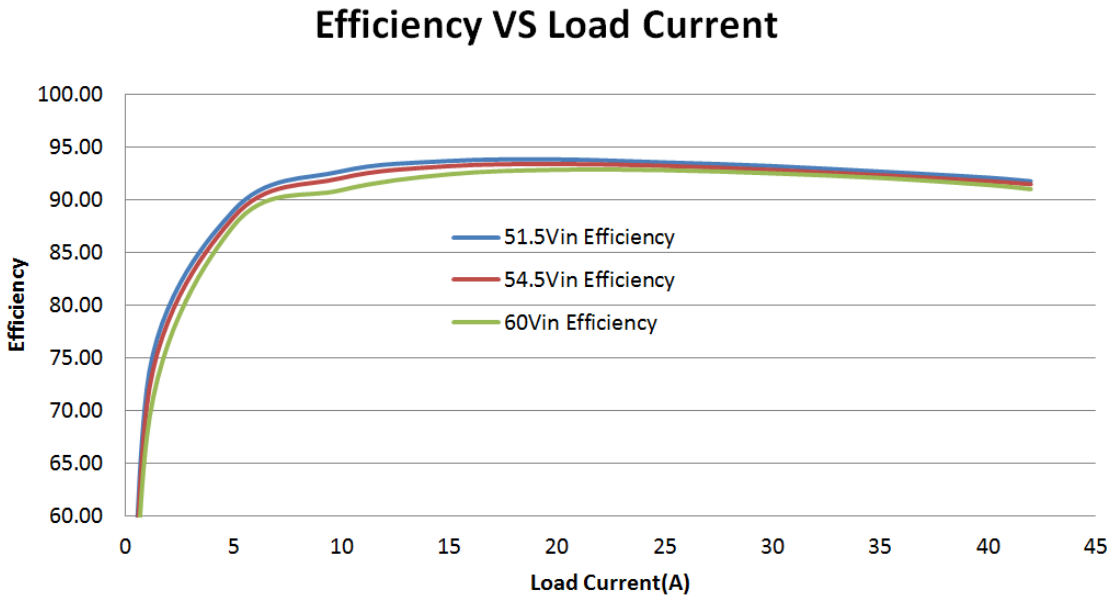
### 2.5 Efficiency Graphs with UCC21540DWK

Note: Need to use the fly-wire to solder UCC21540DW on the PMP40500 U2 designator and connect DT to VCCI




### 2.6 Efficiency Graphs with UCC21541DW

Note: Need to use the fly-wire to solder UCC21540DW on the PMP40500 U2 designator and connect DT to VCCI





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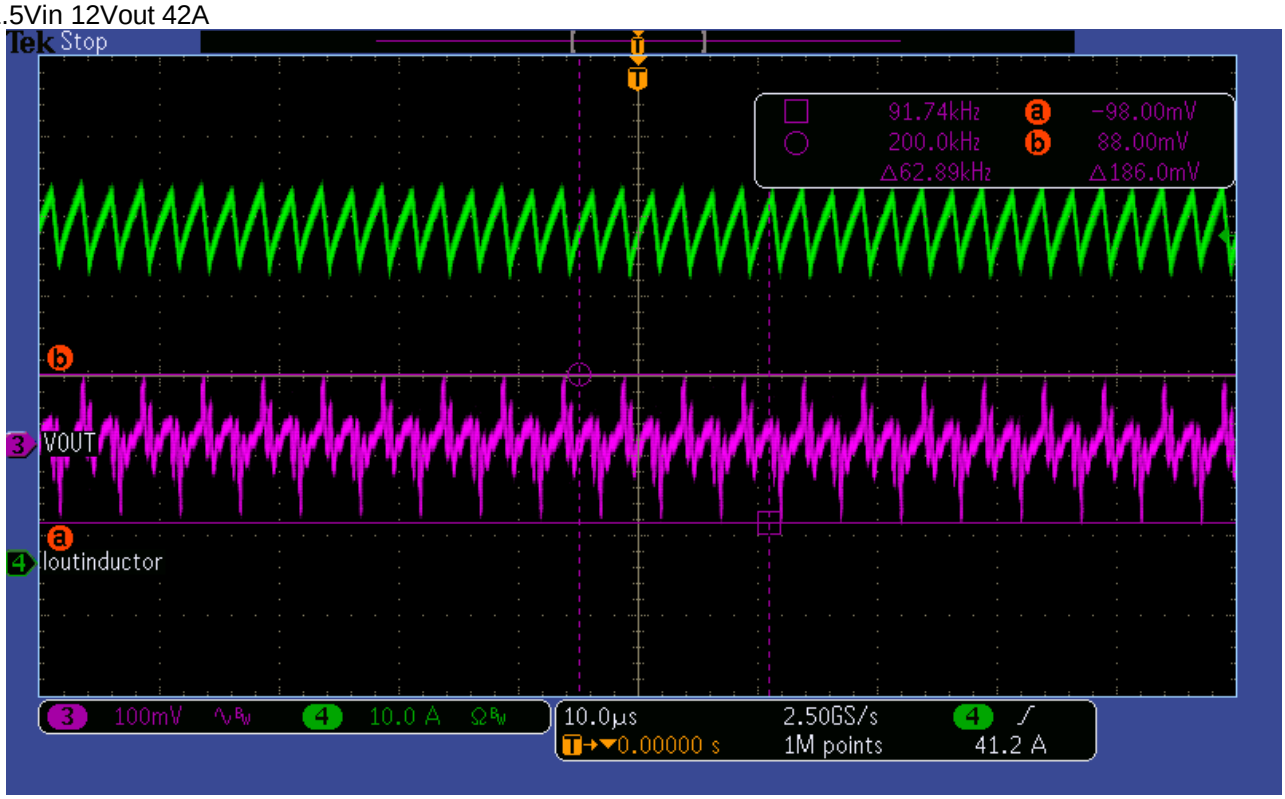
# 3 Waveforms

## 3.1 Output Voltage Ripple*

51.5Vin 12Vout 42A




51.5Vin 12Vout No Load

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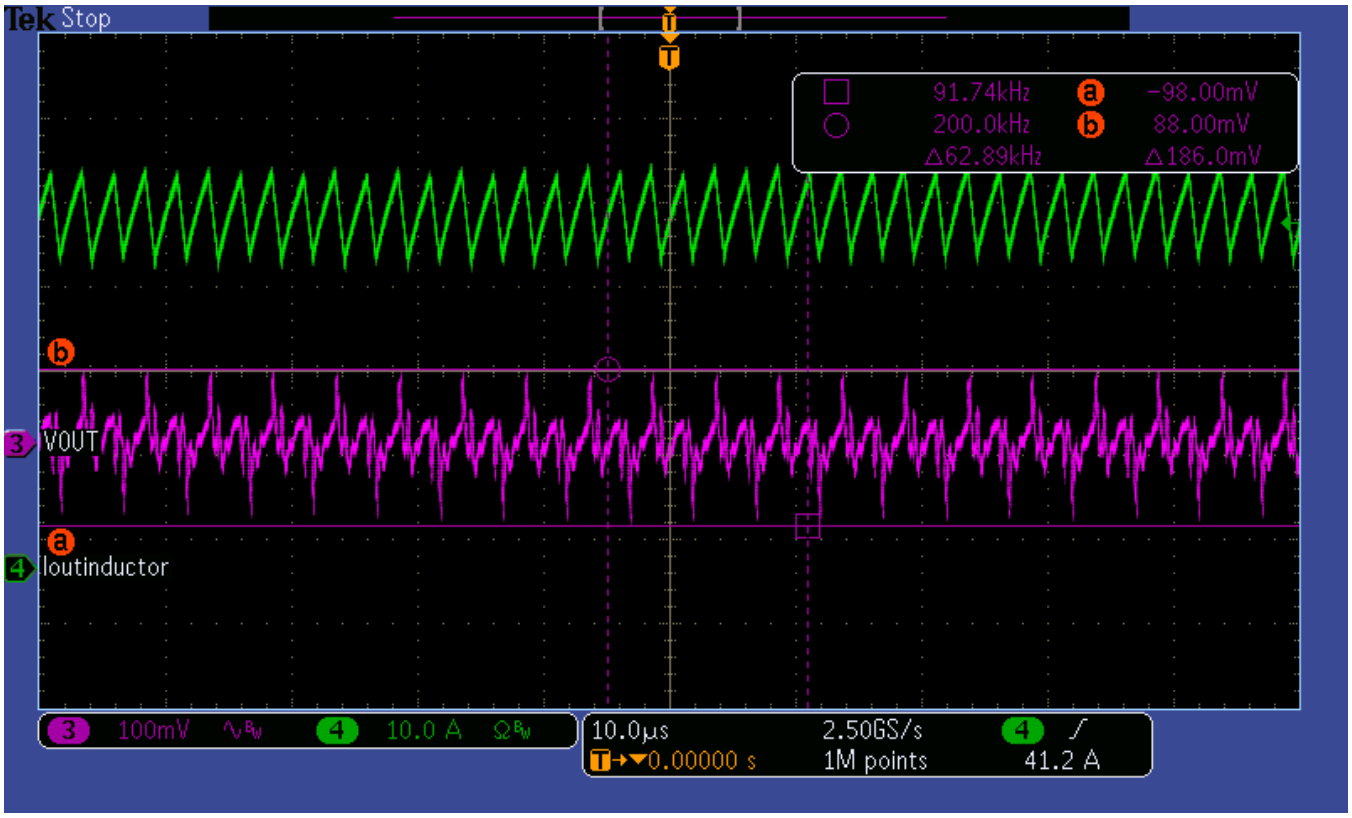
54.5Vin 12Vout 42A




54.5Vin 12Vout No Load

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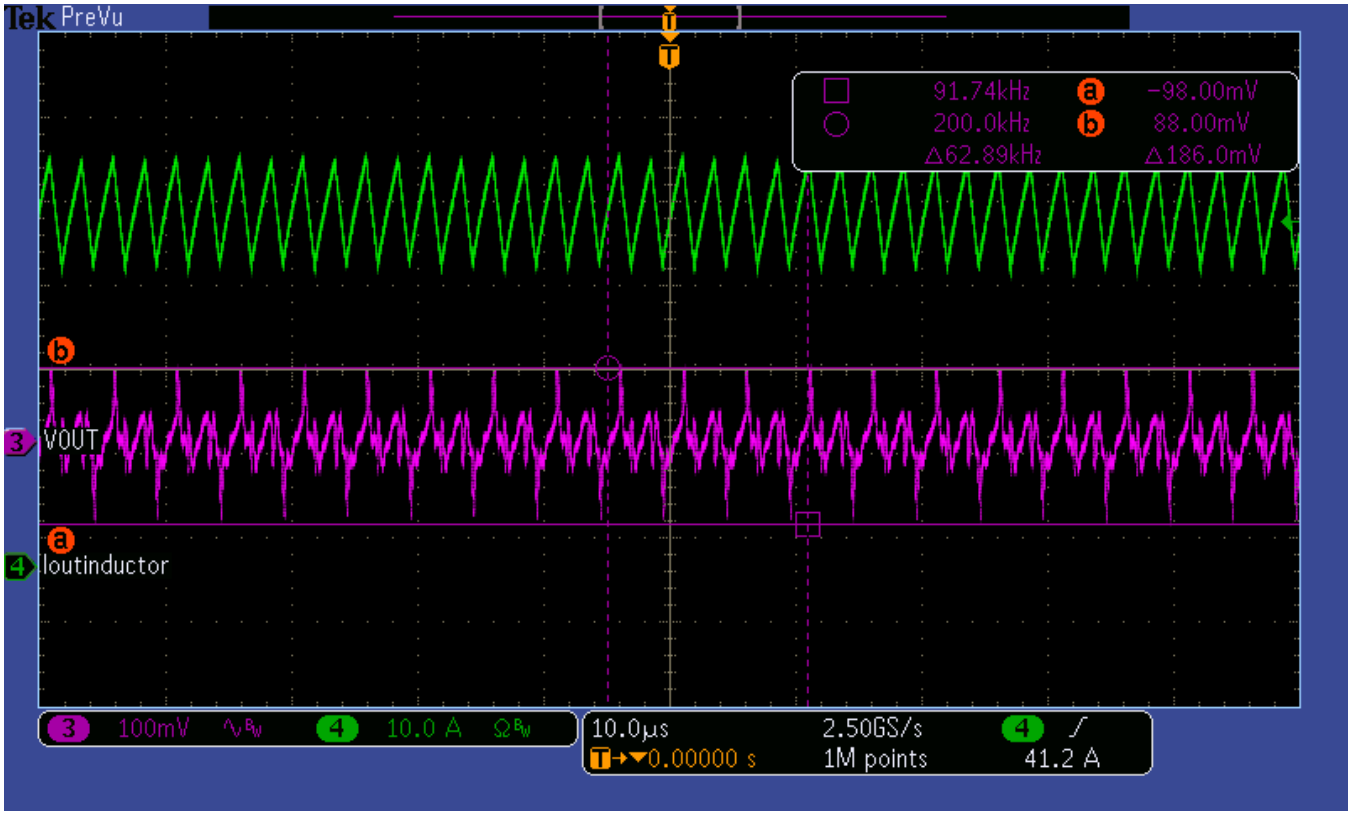
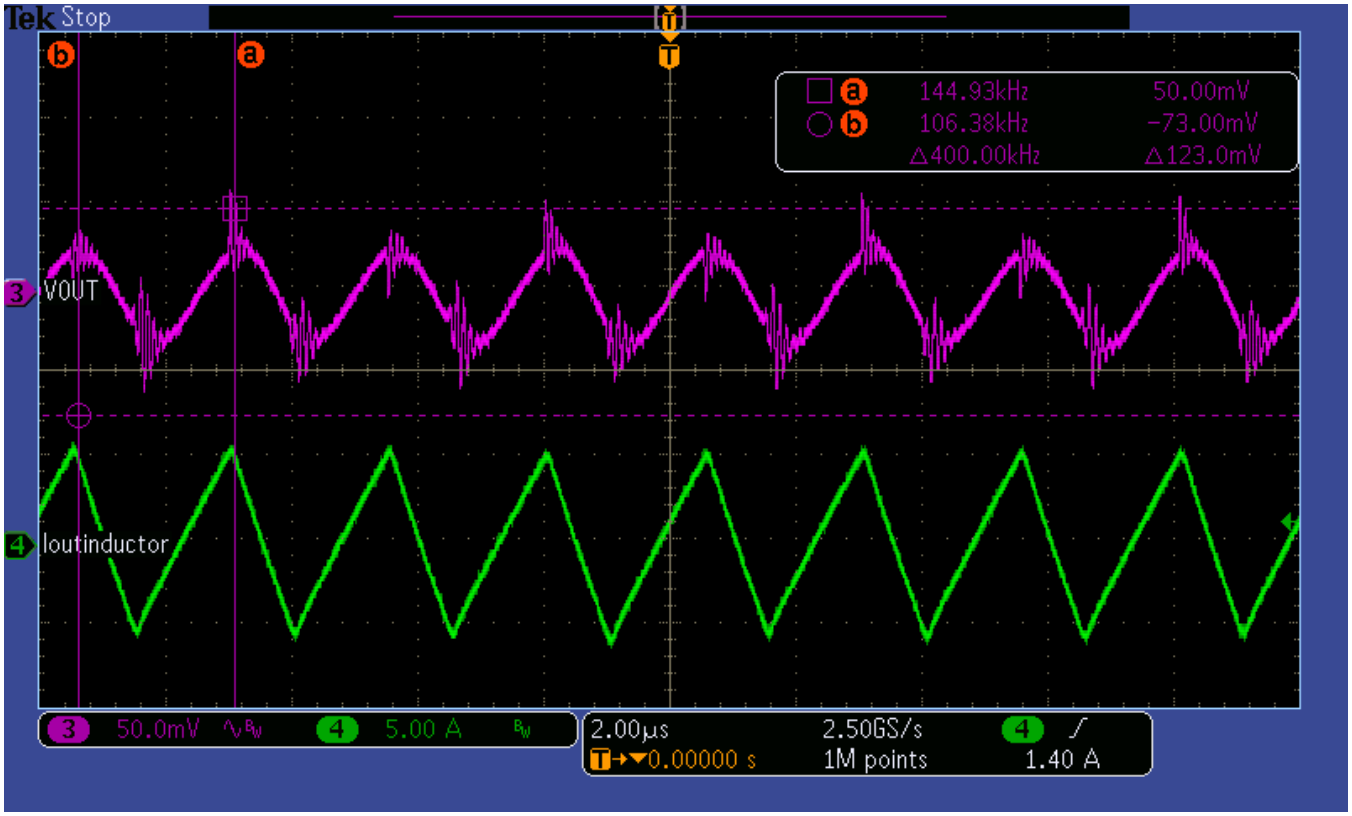
60.0Vin 12Vout 42A




60.0Vin 12Vout No Load





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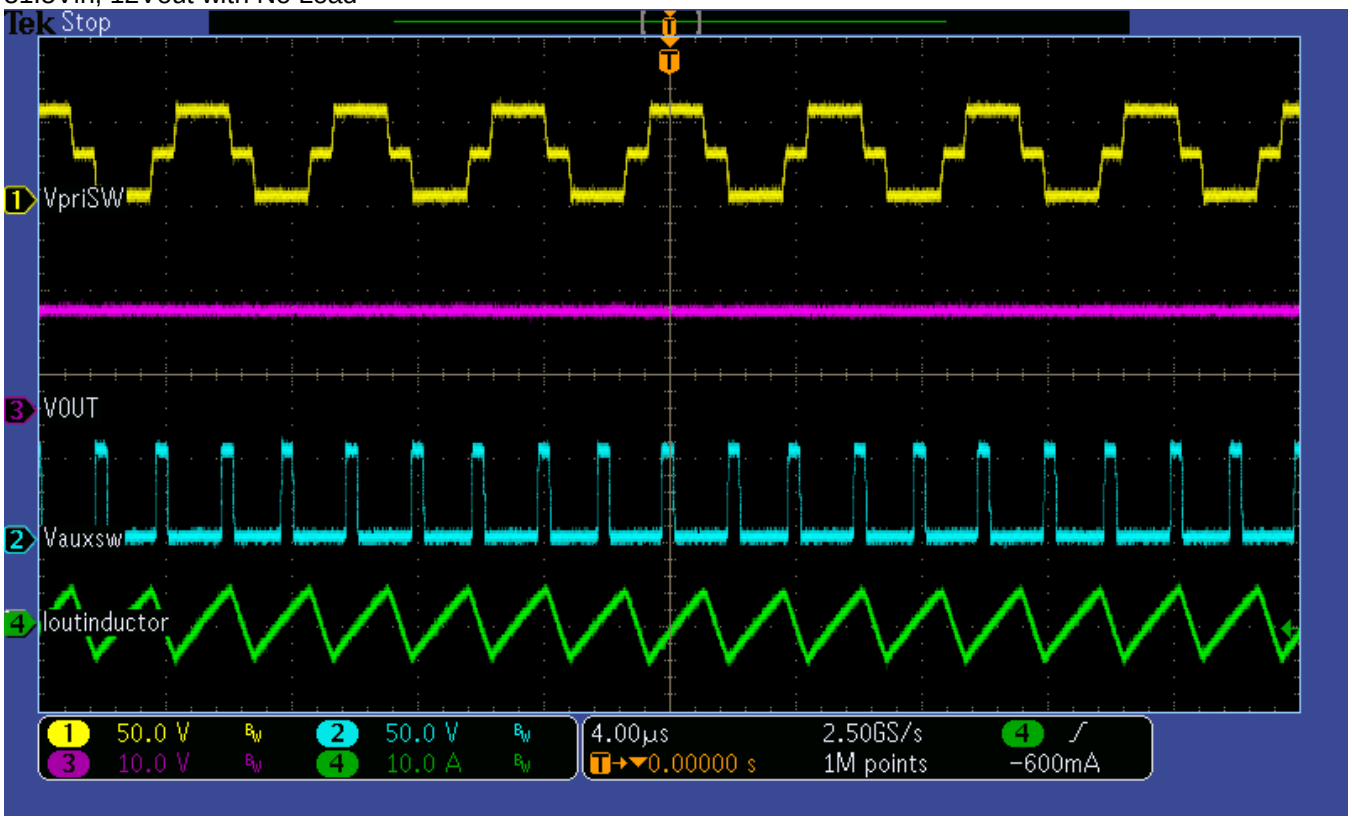
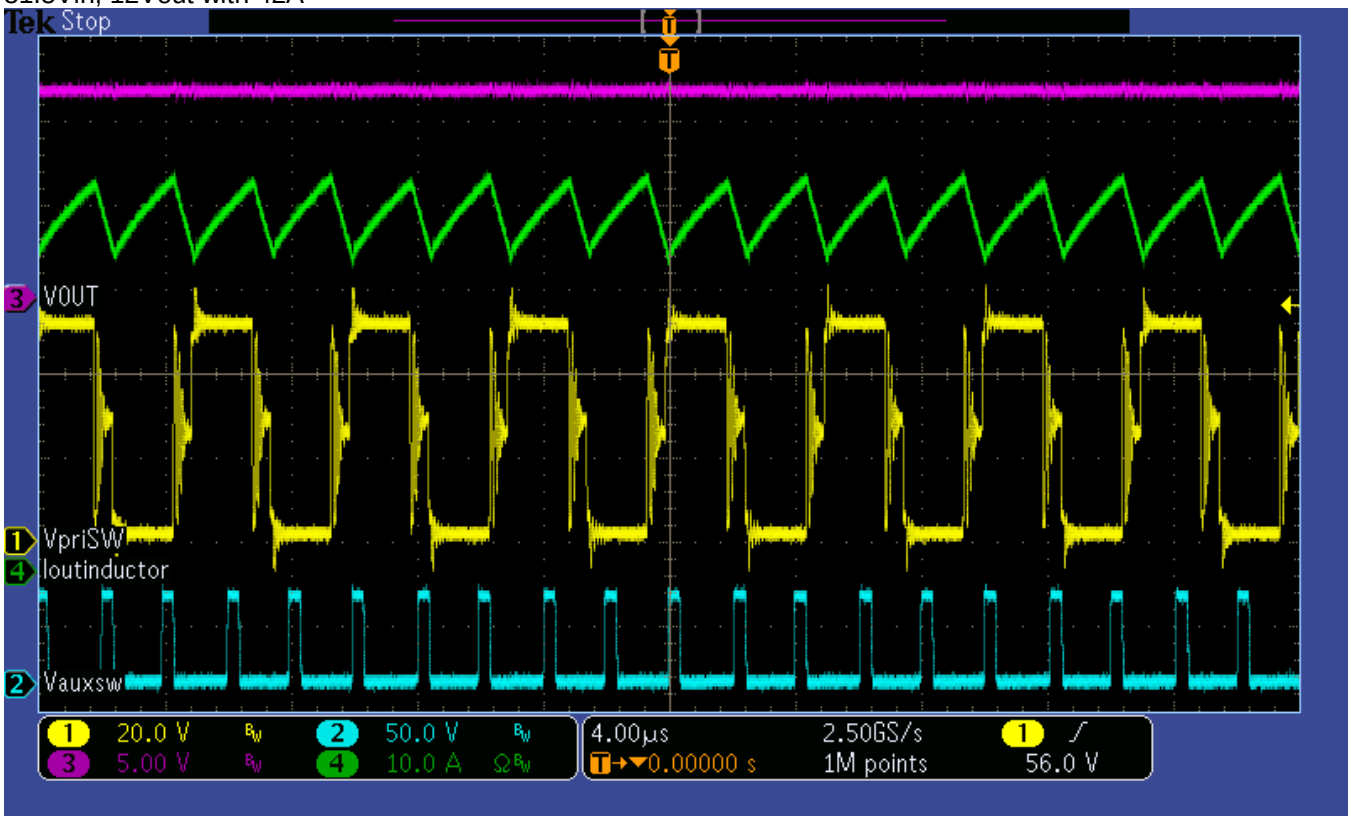
### 3.2 Steady State Waveform

51.5Vin, 12Vout with No Load




51.5Vin, 12Vout with 42A





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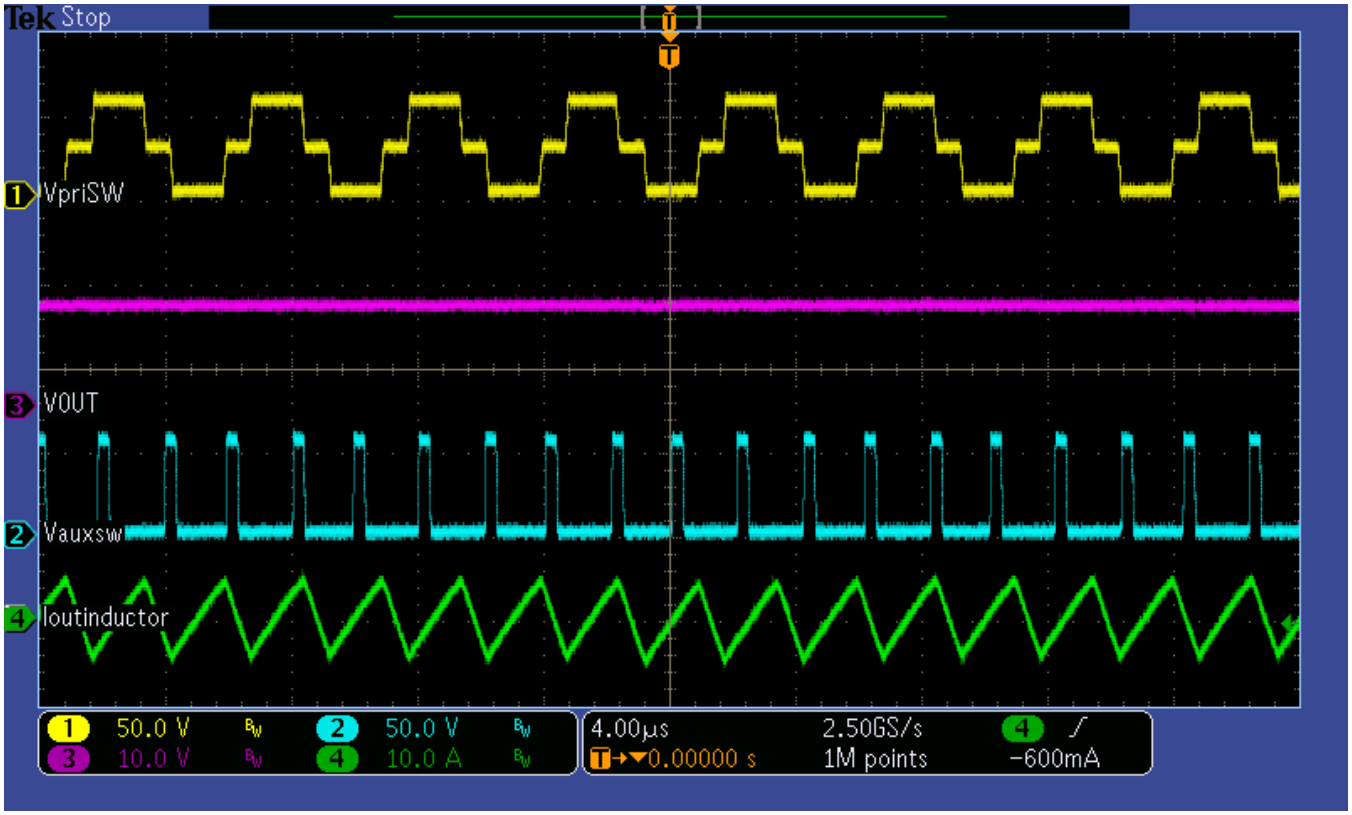
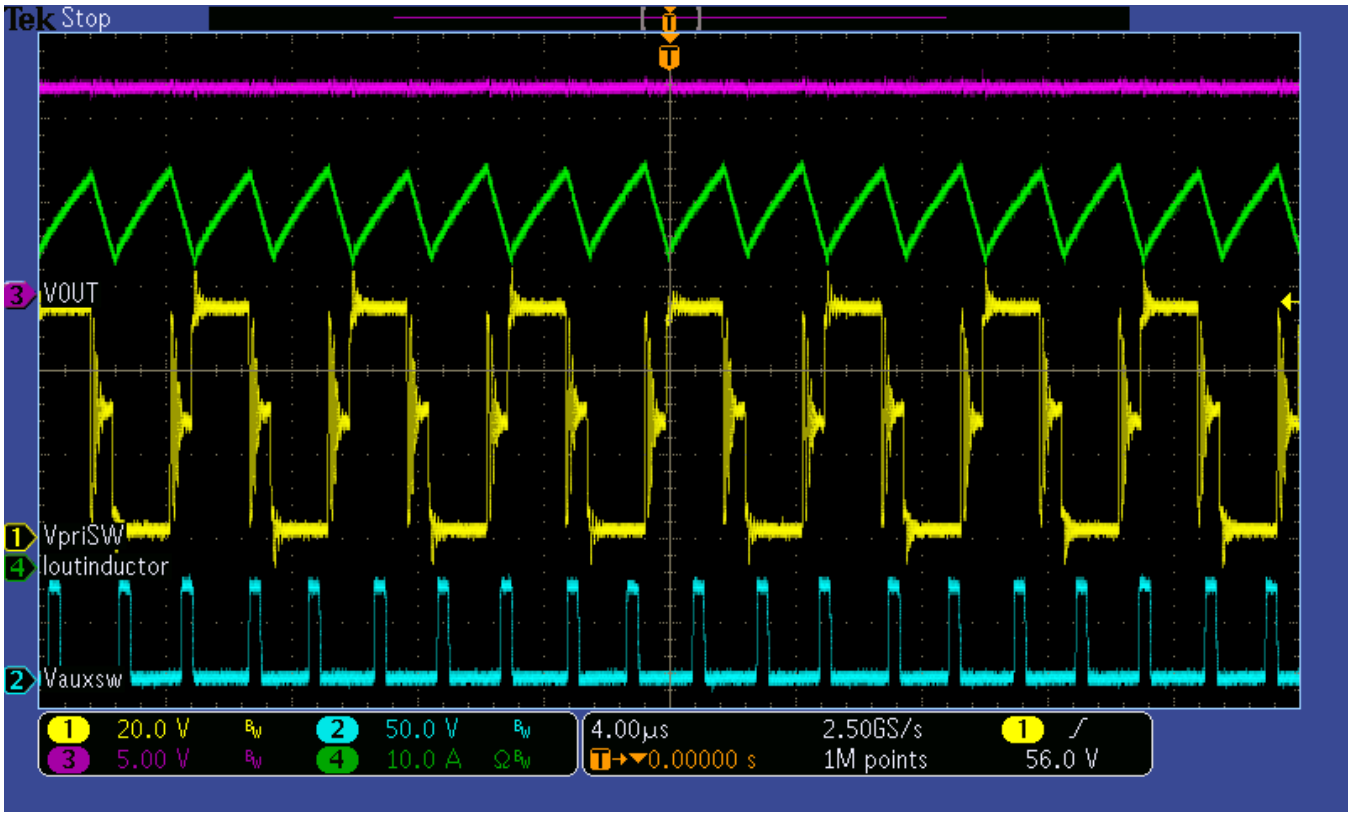
54.5Vin, 12Vout with No Load




54.5Vin, 12Vout with 42A





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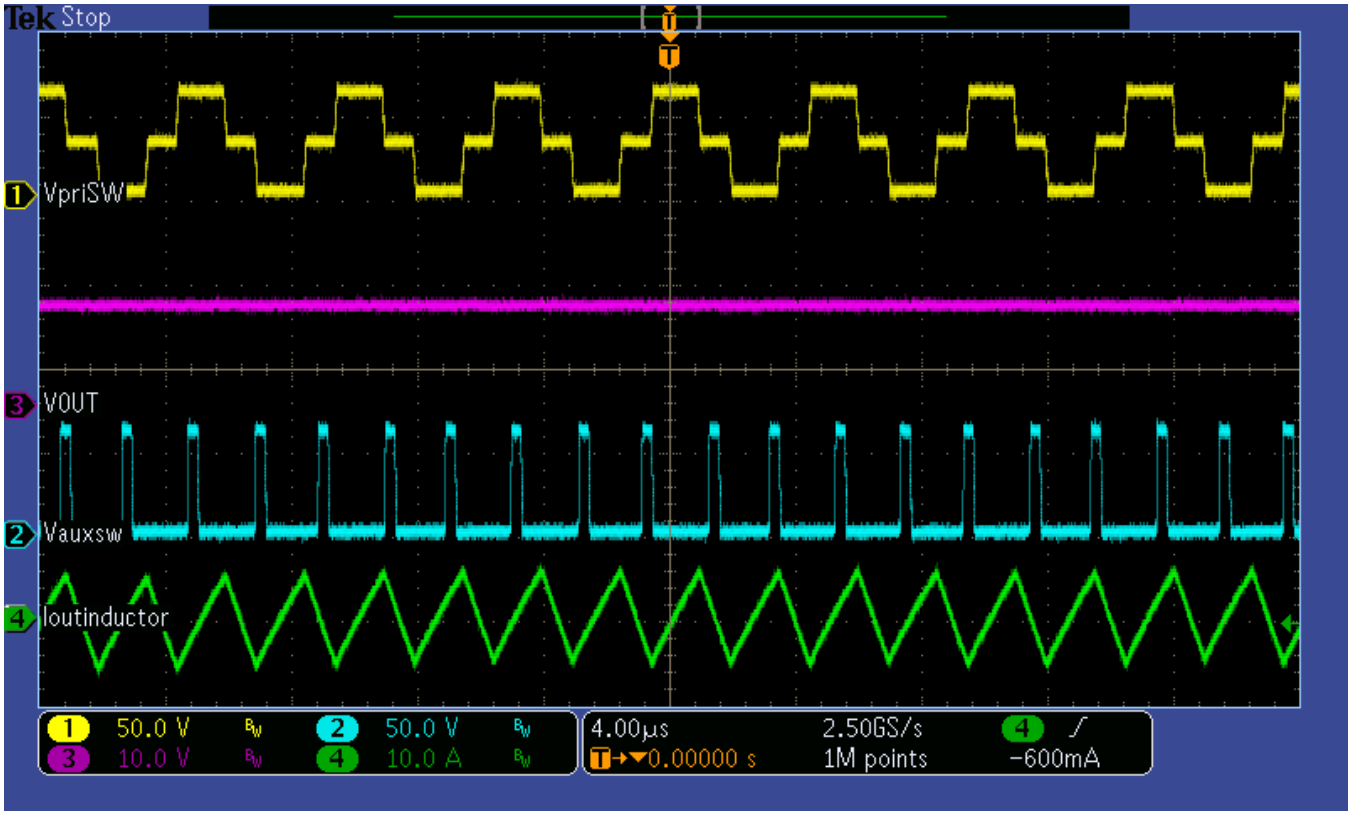
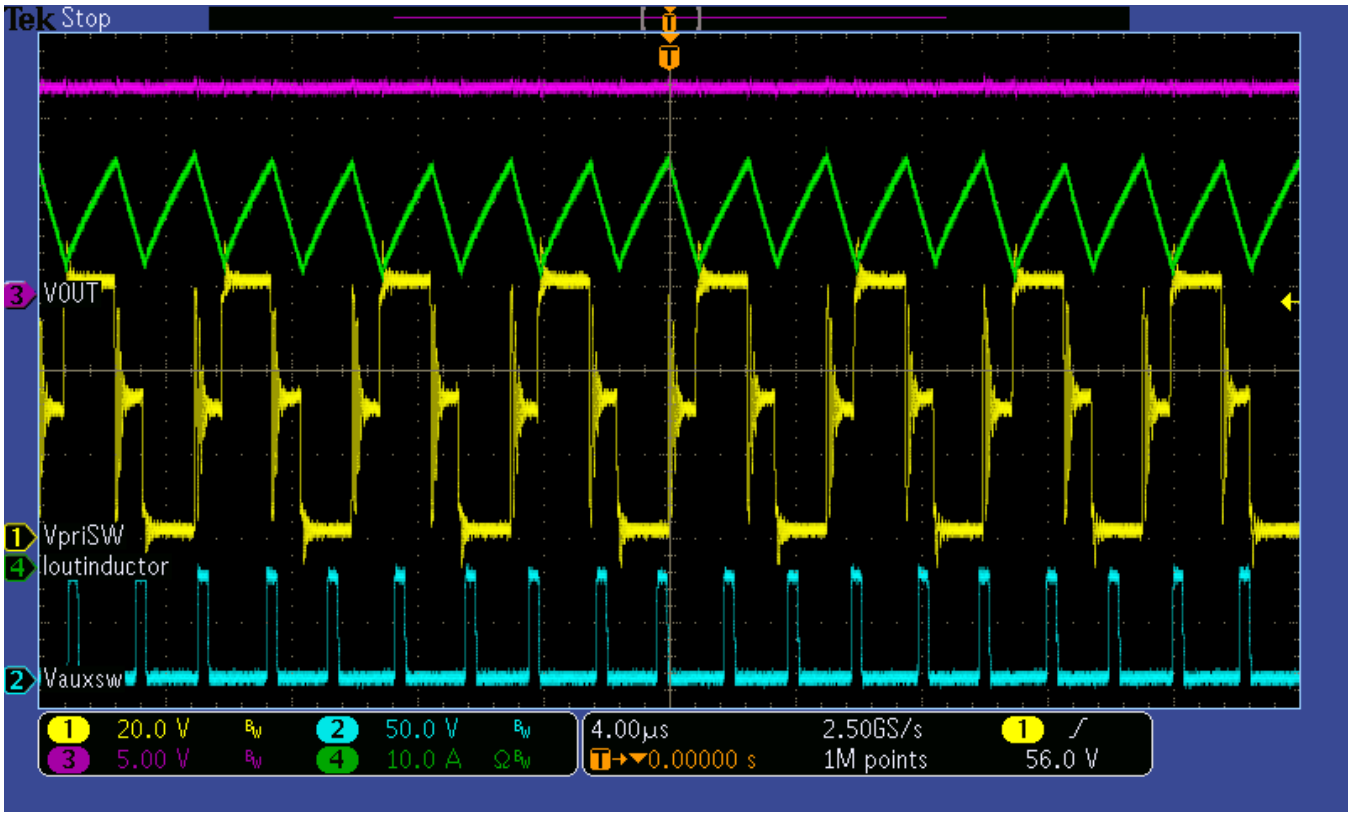
60.0Vin, 12Vout with No Load




60.0Vin, 12Vout with 42A





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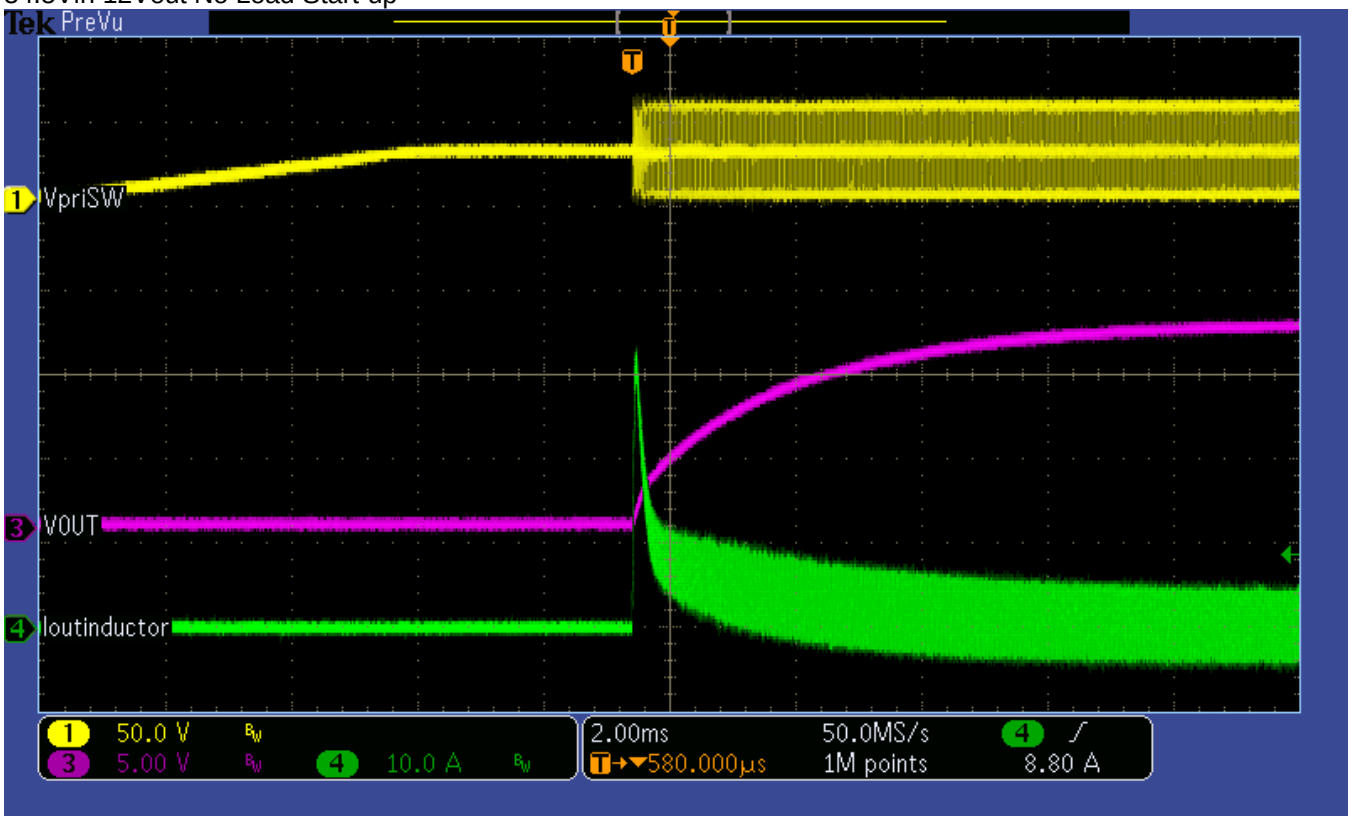
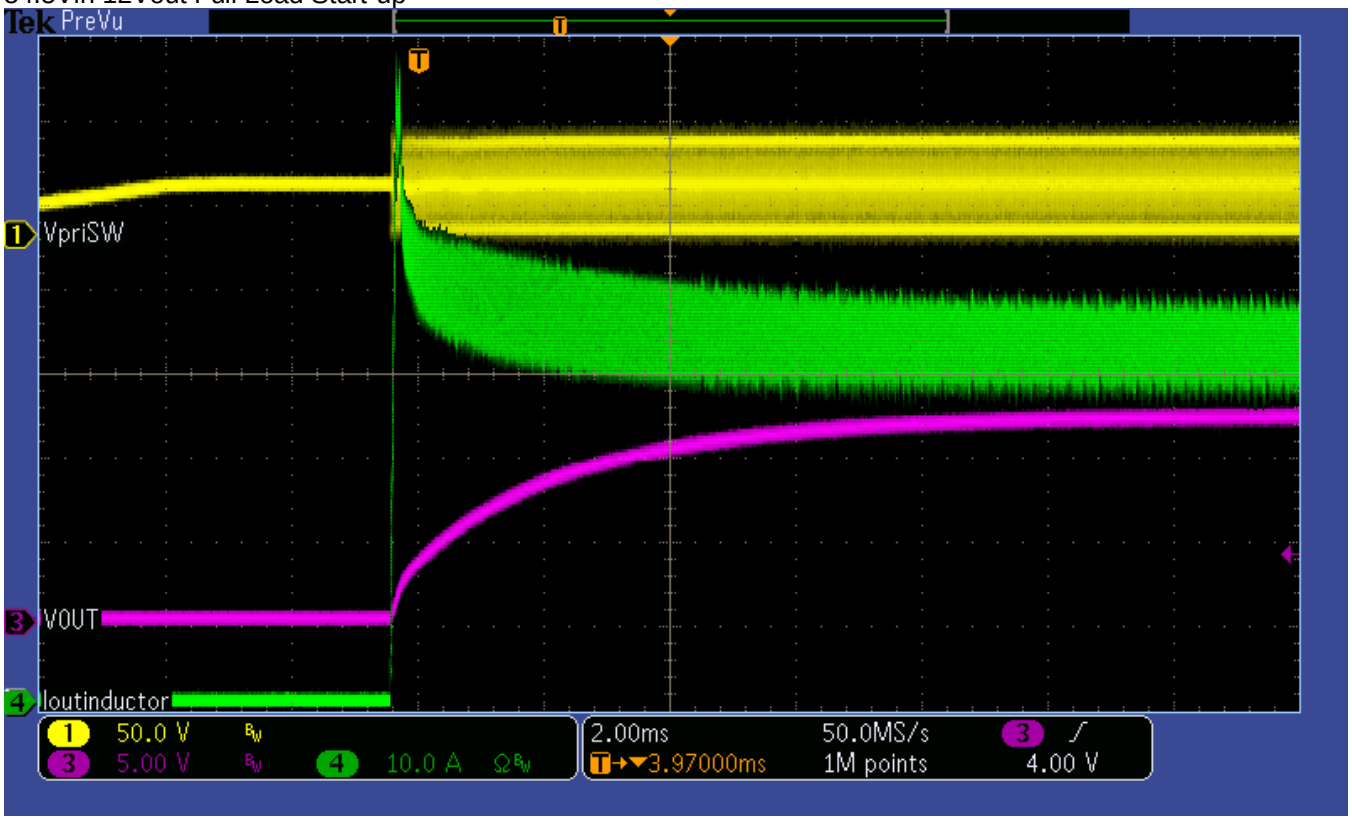
### 3.3 Start-up Sequence*

54.5Vin 12Vout No Load Start-up




54.5Vin 12Vout Full Load Start-up





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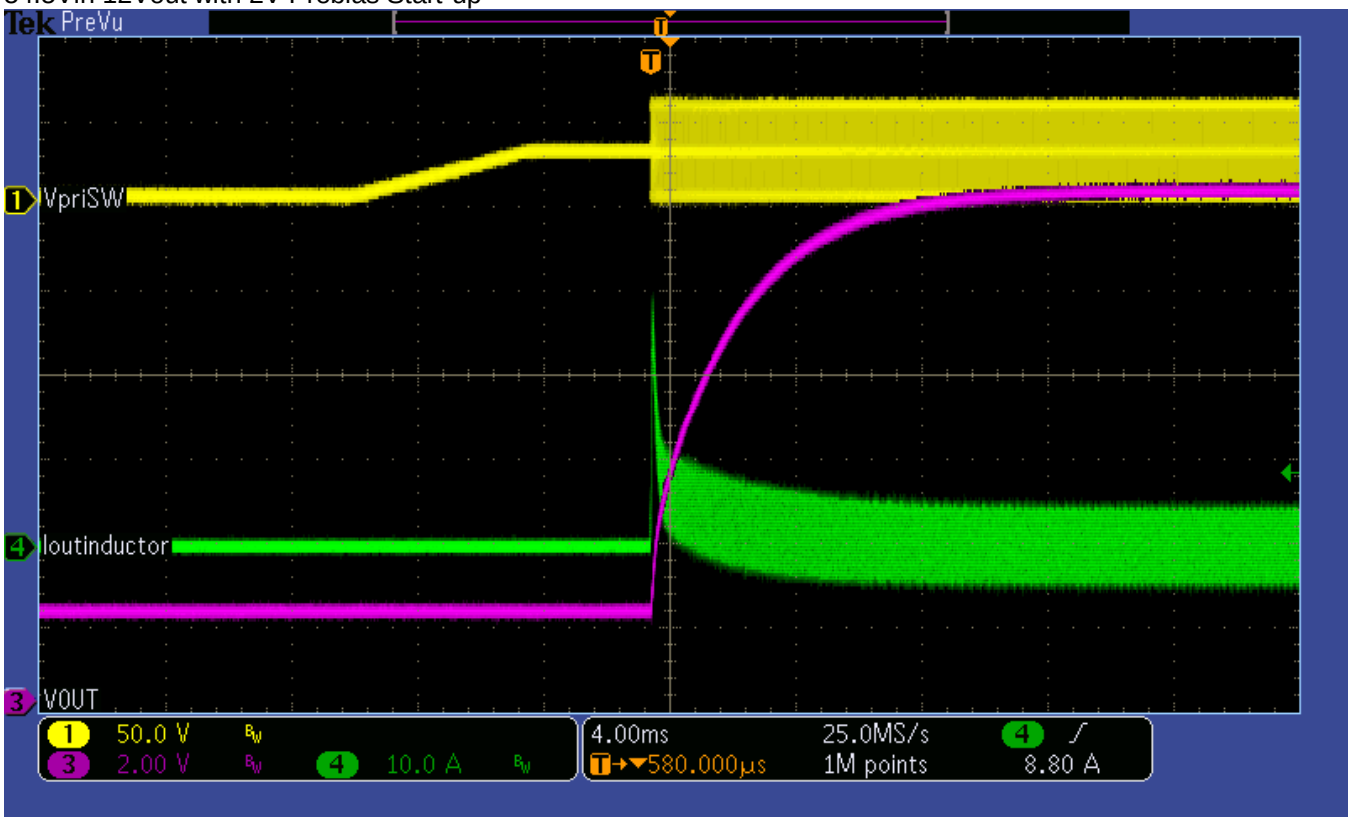
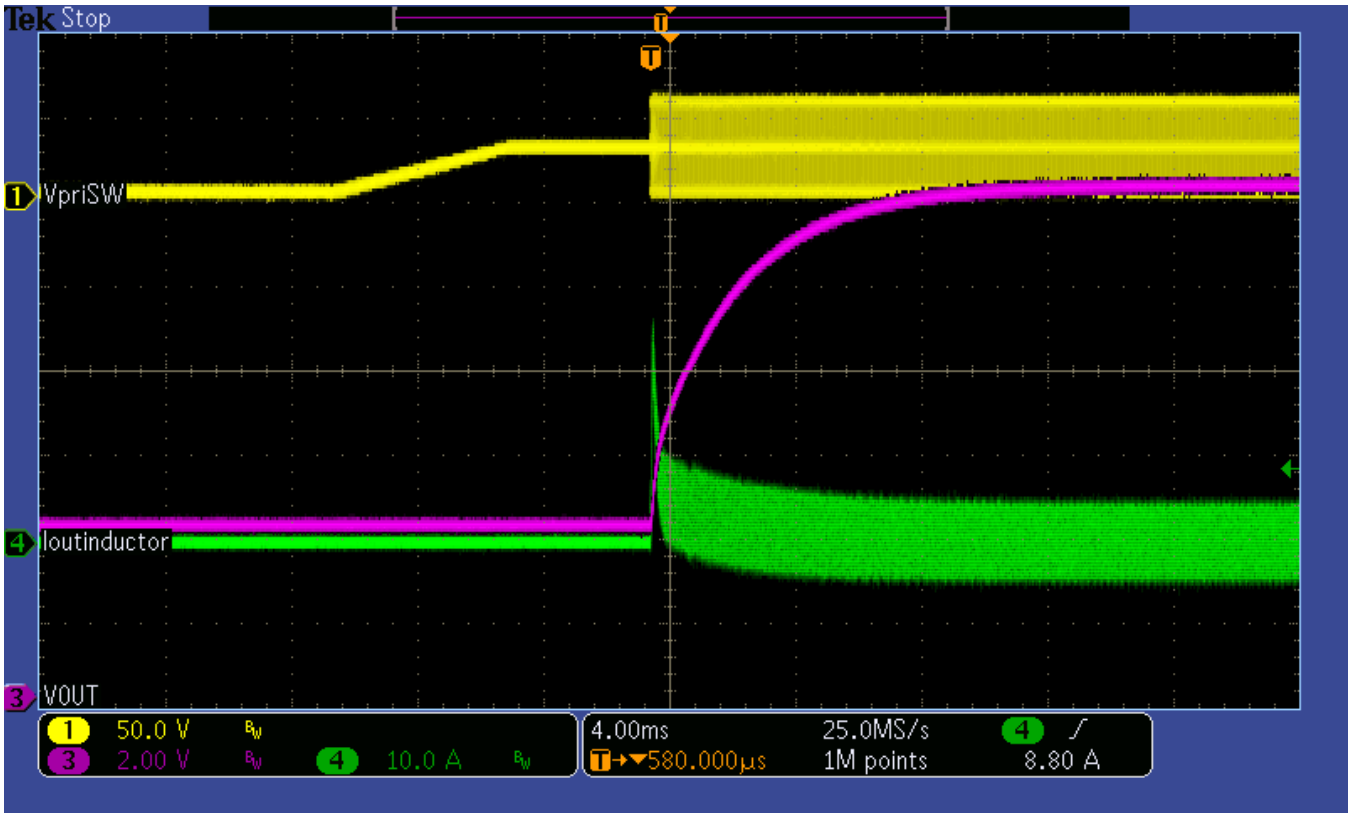
54.5Vin 12Vout with 2V Prebias Start-up




54.5Vin 12Vout with 4V Prebias Start-up





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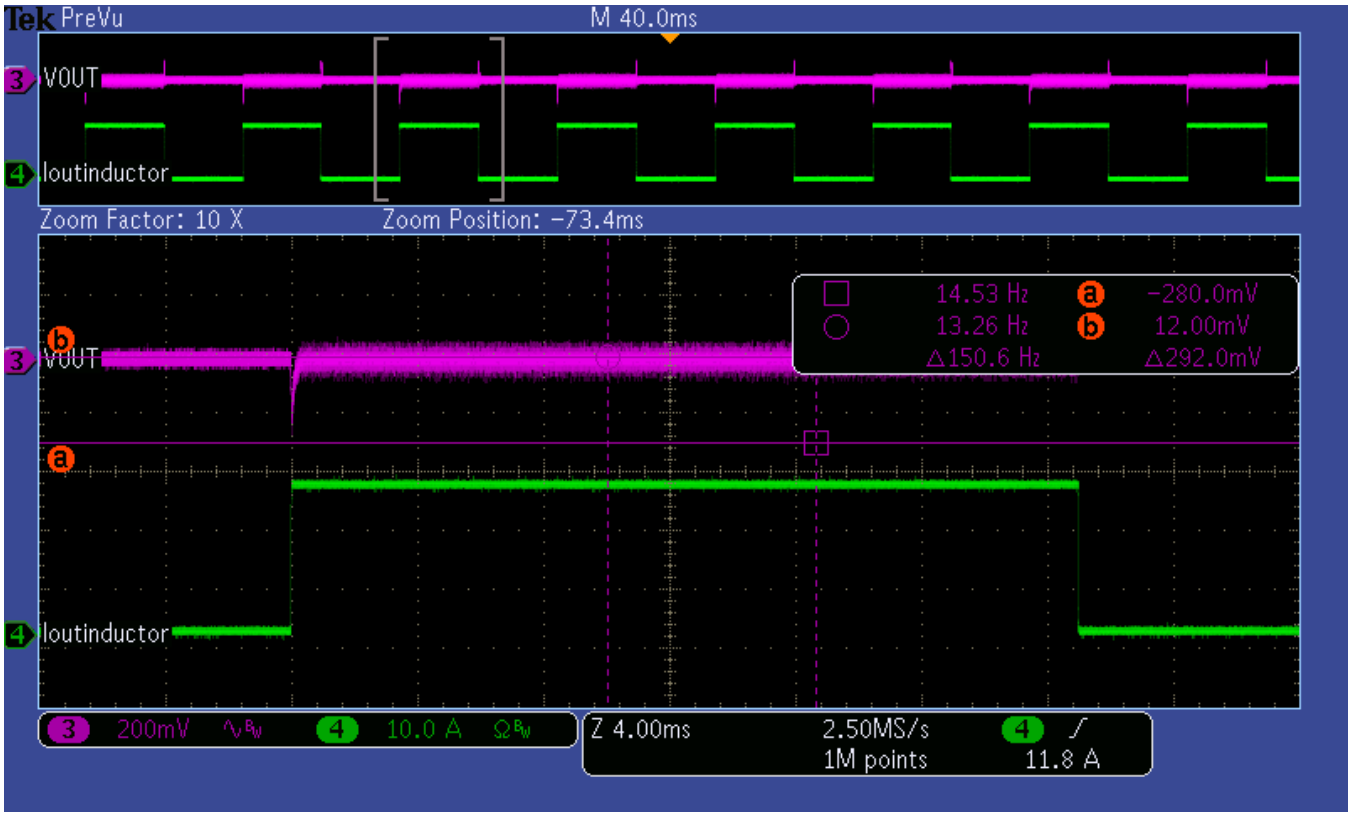
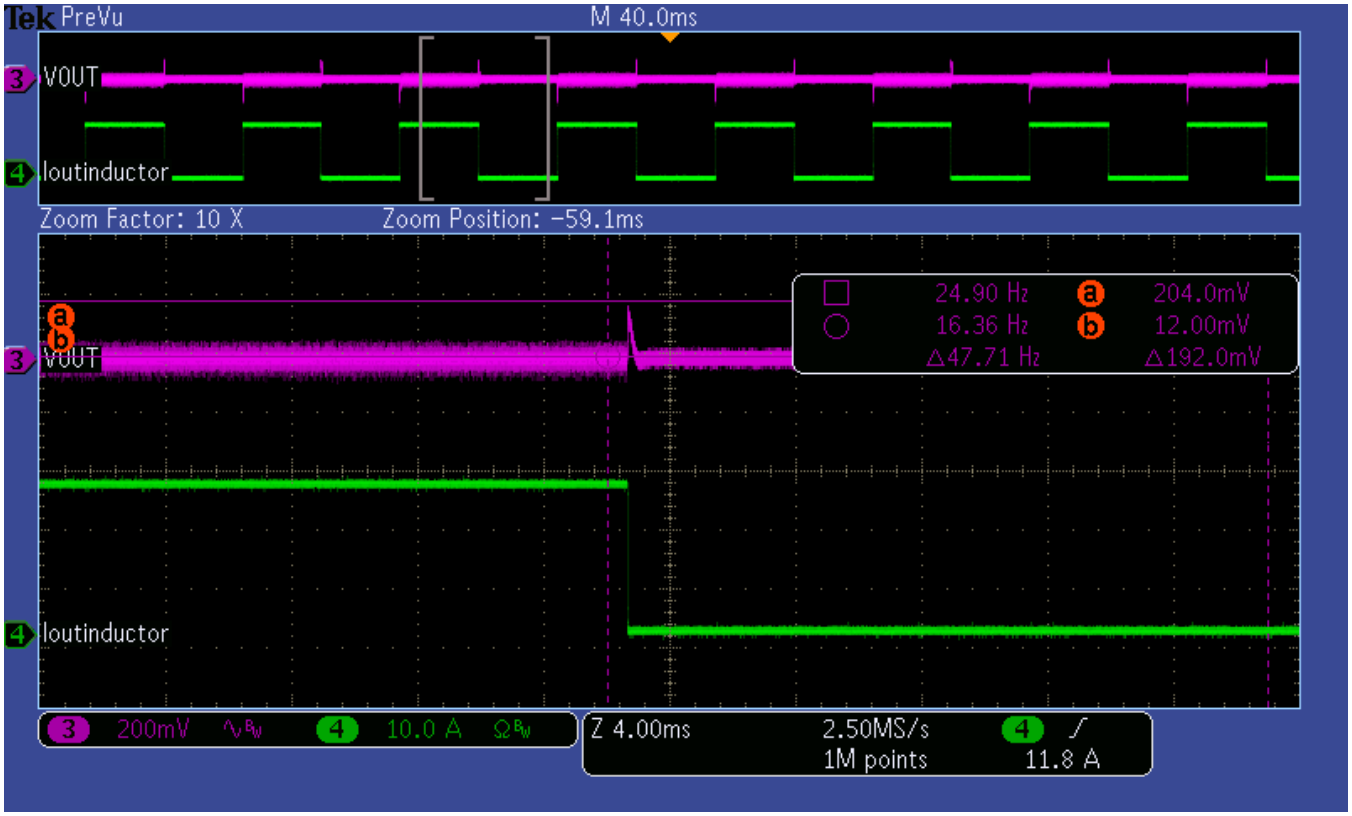
### 3.4 Dynamic Response

51.5Vin 12V Load from 0A to 25A to 0A, 20Hz, 2.5A/us.

Undershoot




Overshoot





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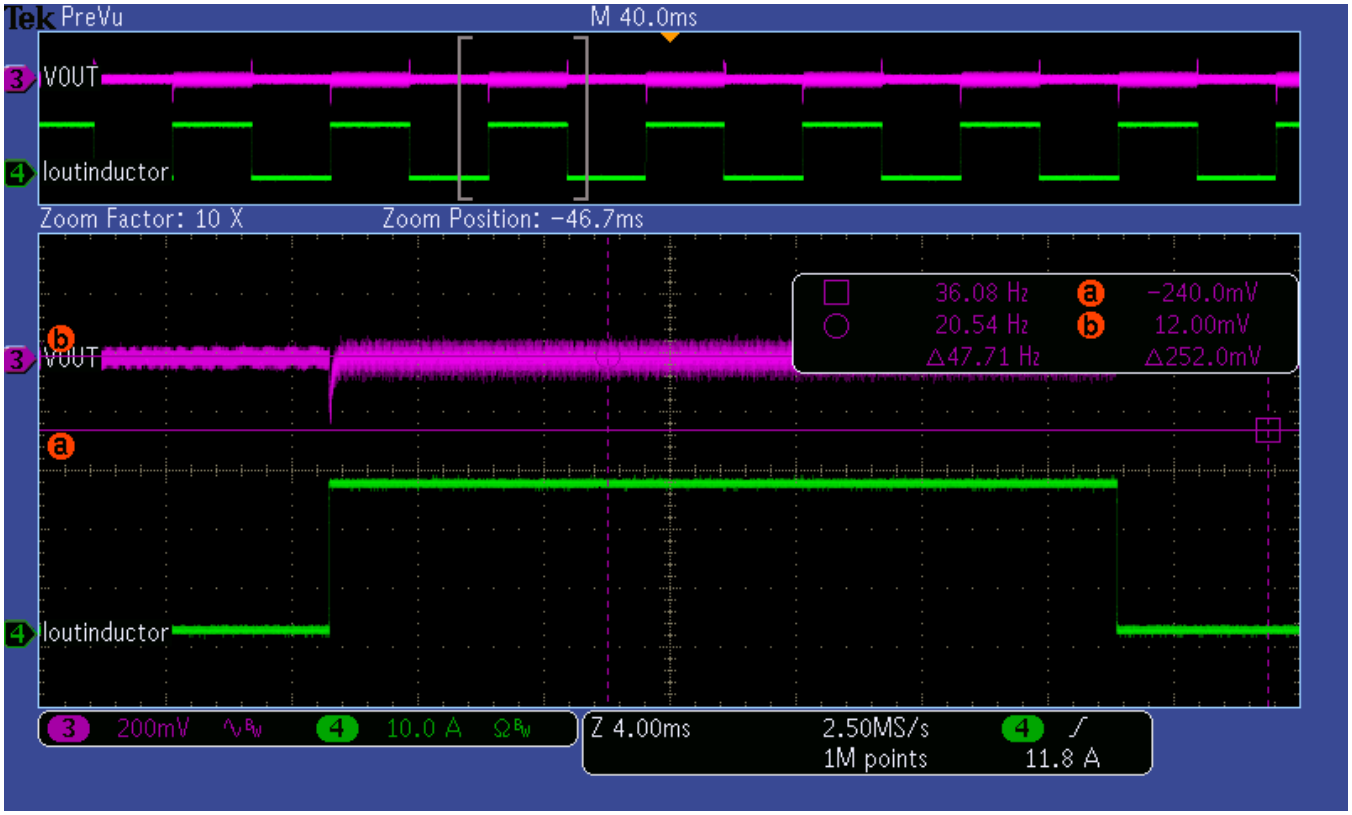
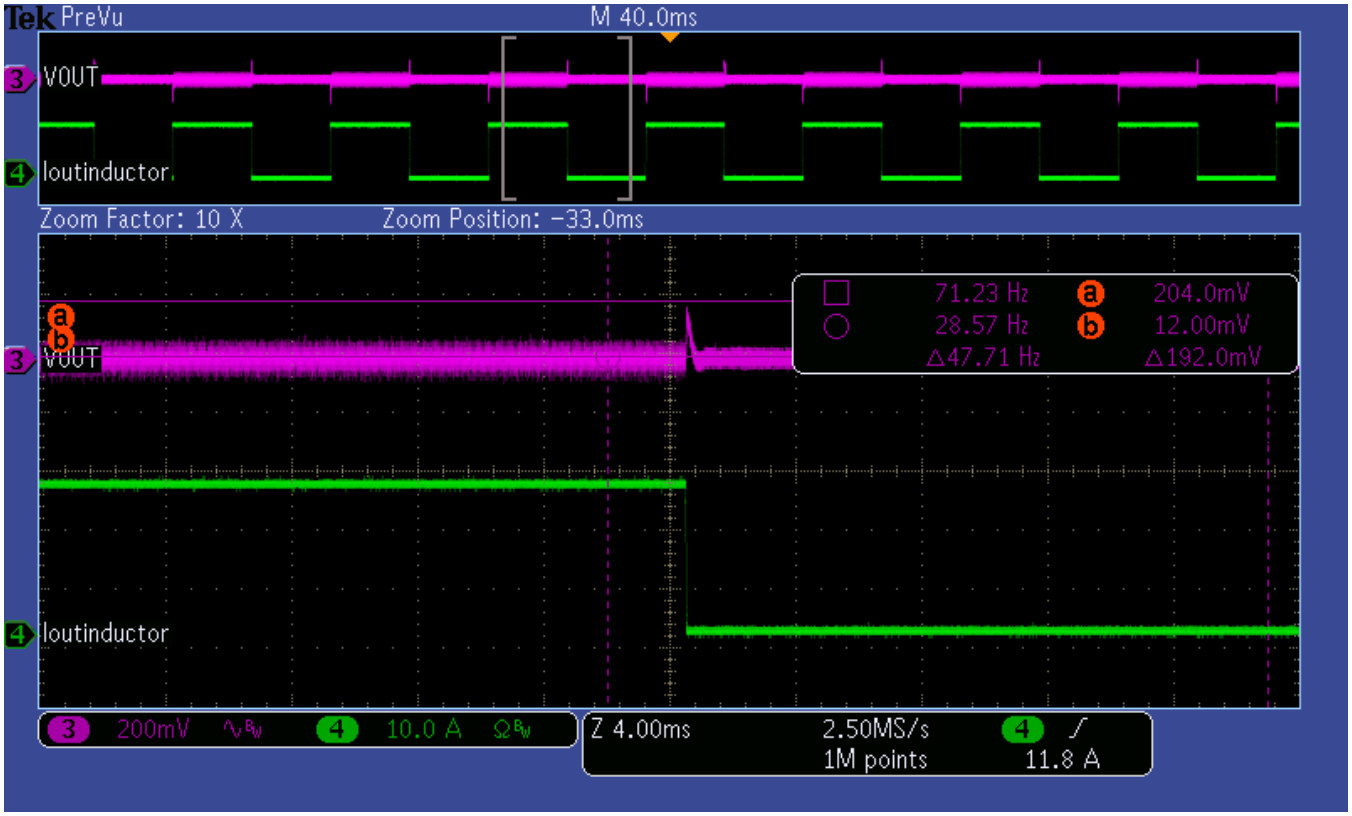
54.5Vin 12V Load from 0A to 25A to 0A, 20Hz, 2.5A/us.

Undershoot




Overshoot




60.0Vin 12V Load from 0A to 25A to 0A, 20Hz, 2.5A/us.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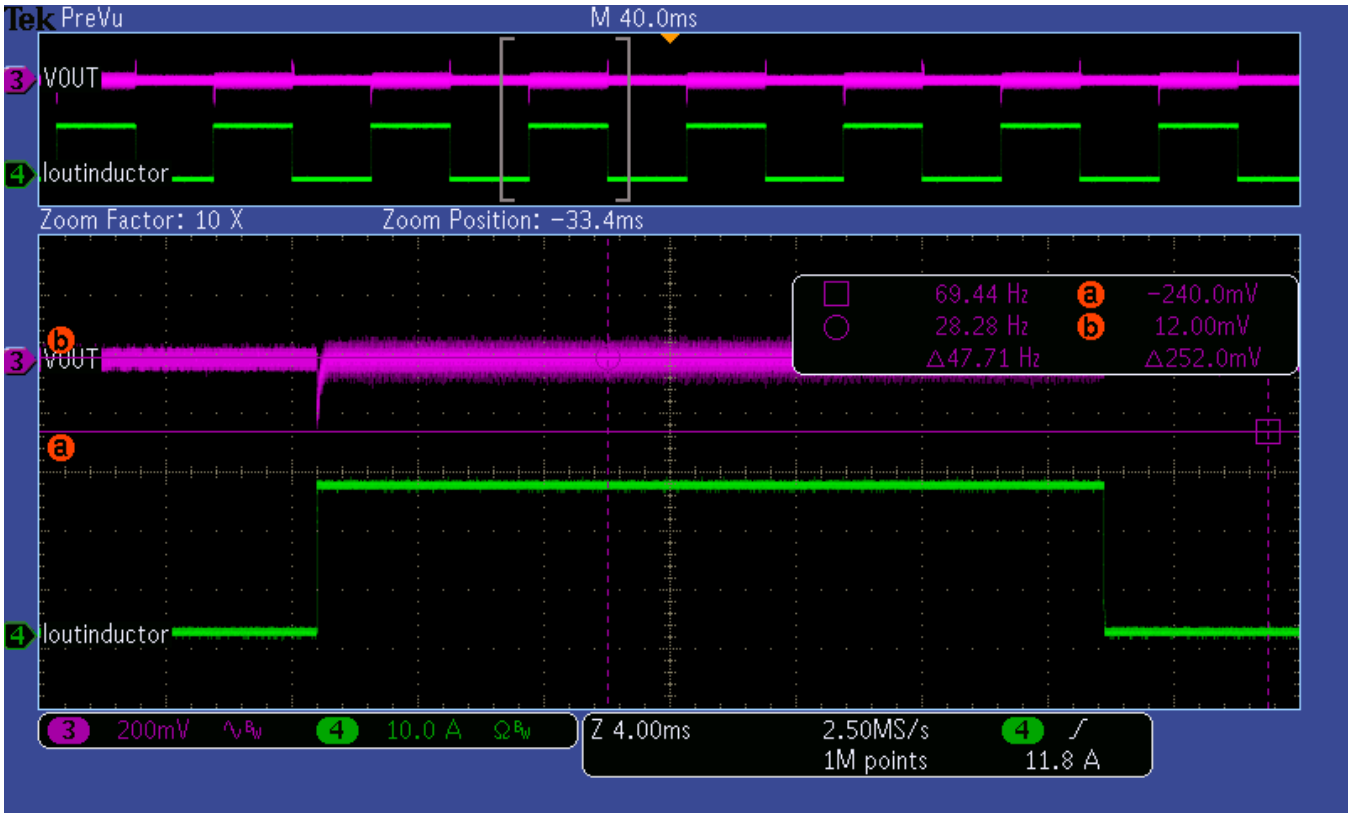
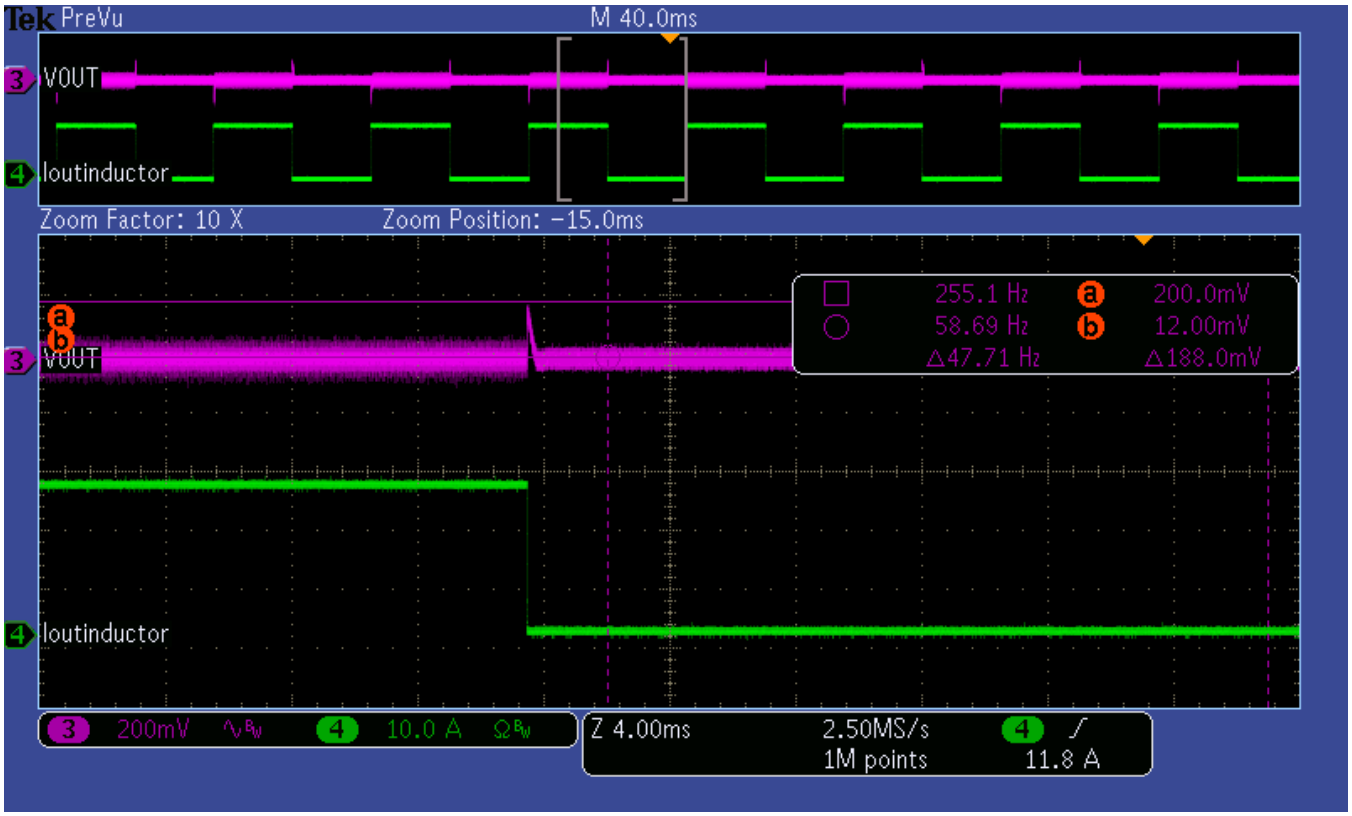
Undershoot




Overshoot





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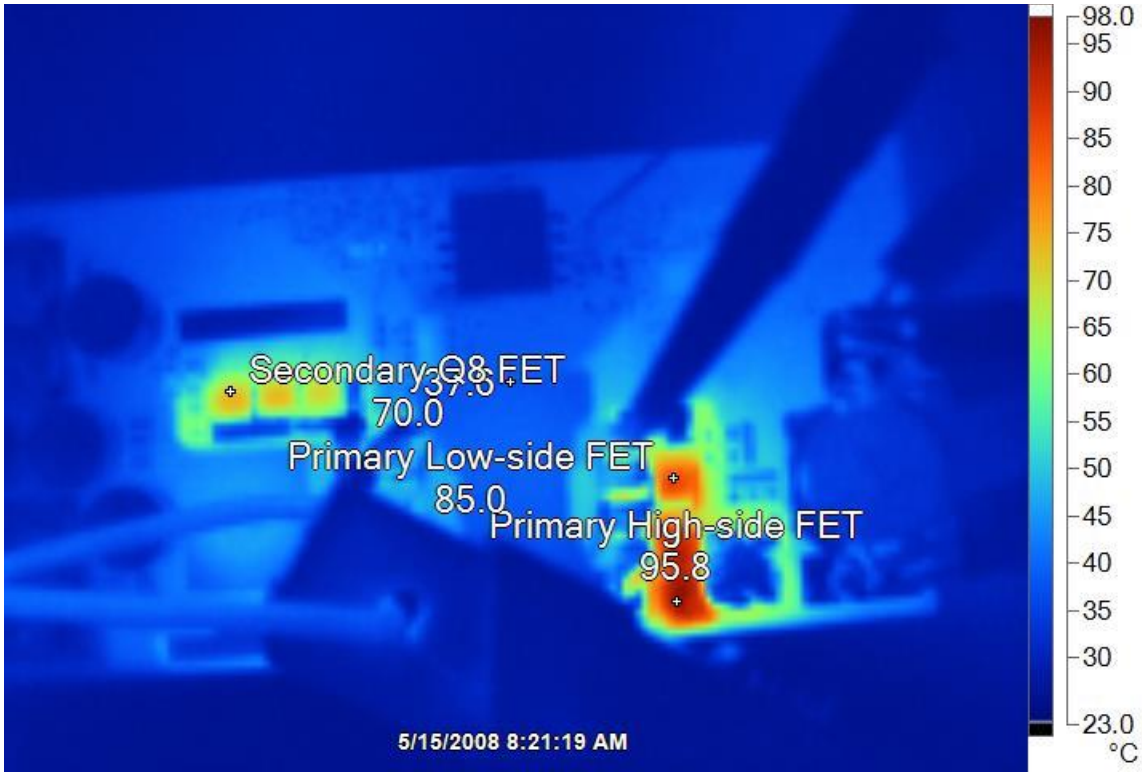
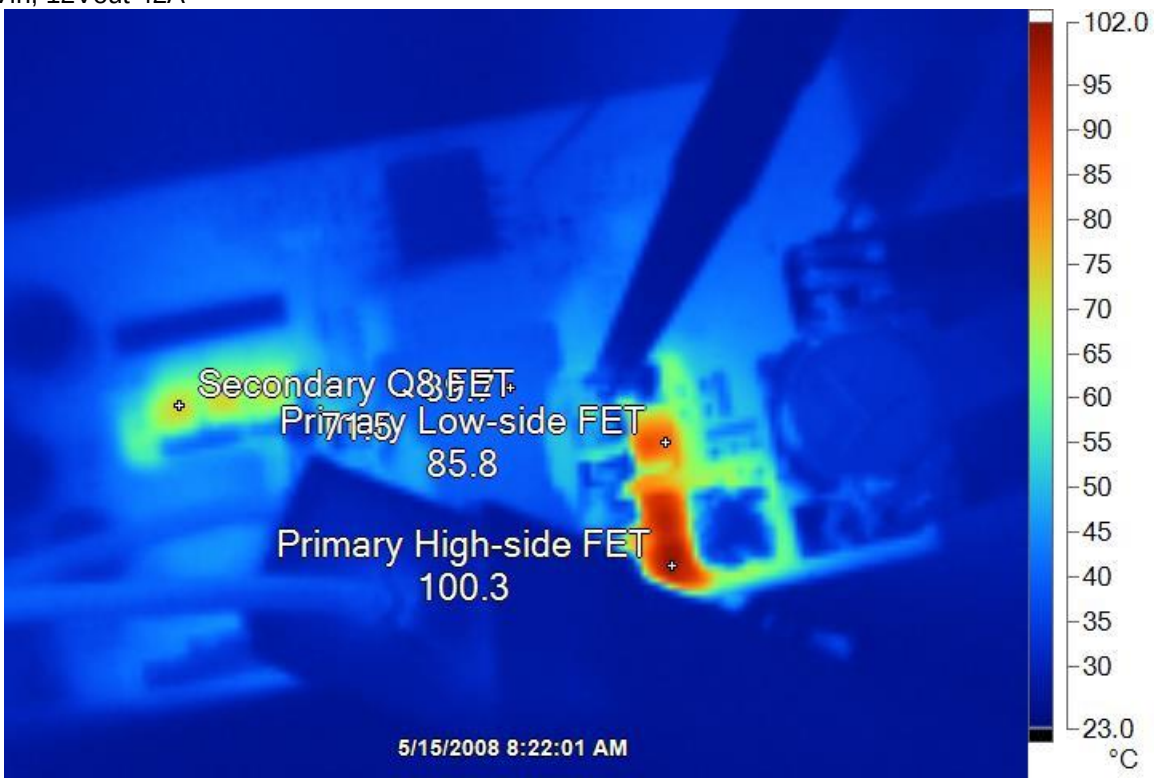
### 3.5 Thermal Performance

51.5Vin, 12Vout 42A
The converter runs 1mins at ambient temperature 25°C with external SUNON PSD1208PMB1-A DC 12V 9.4W Fan




54.5Vin, 12Vout 42A





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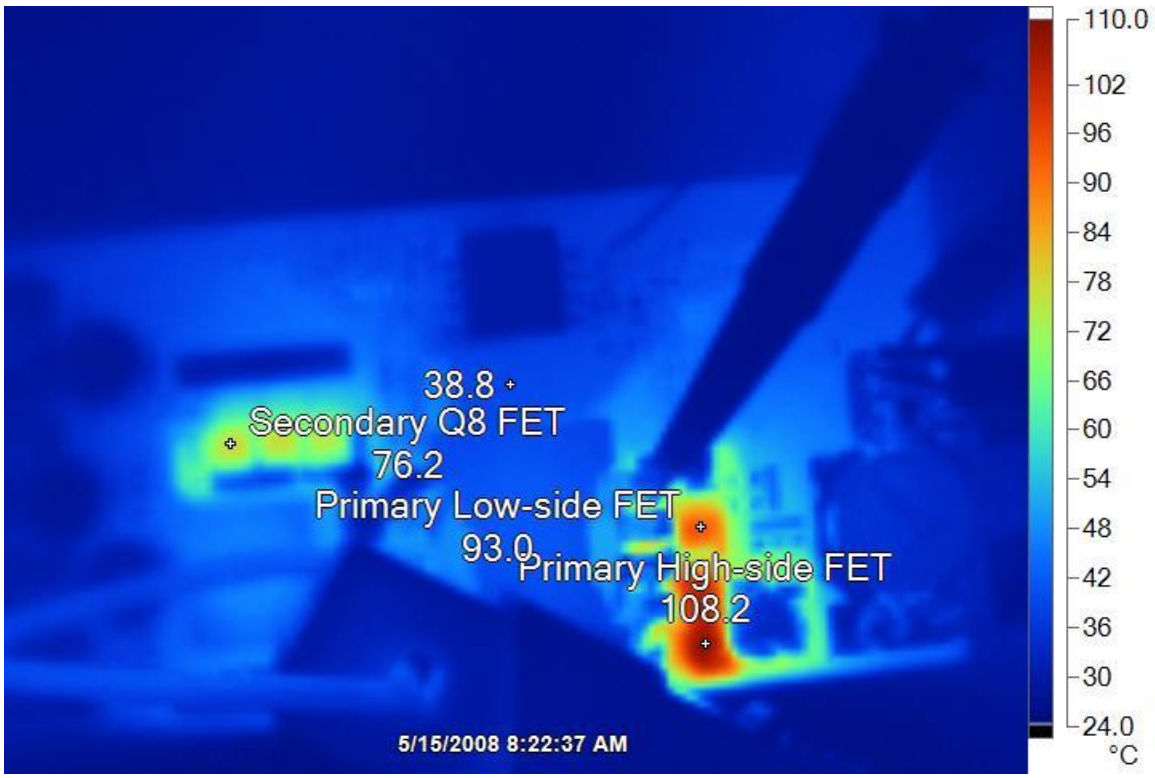
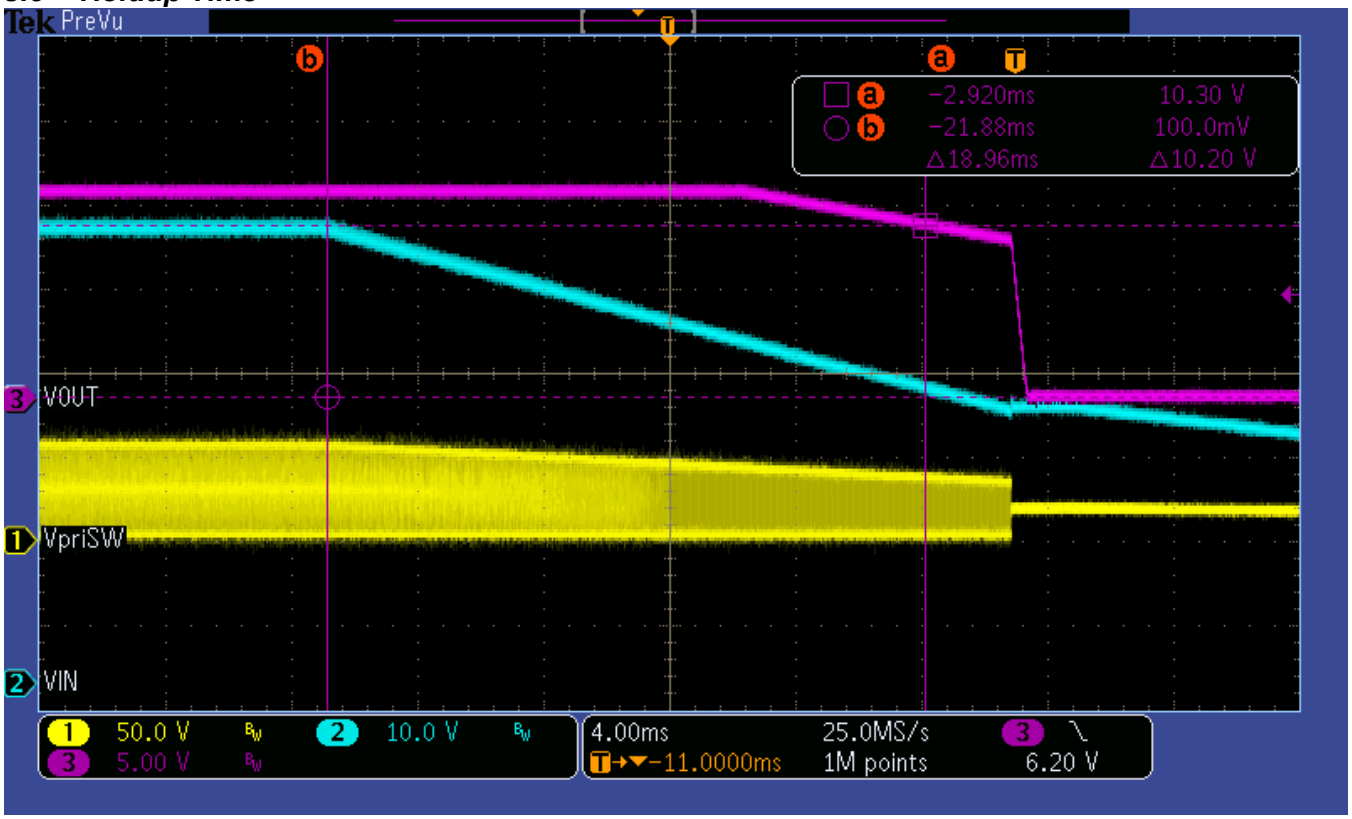
60.0Vin, 12Vout 42A
The converter runs 30mins at ambient temperature 25°C with external SUNON PSD1208PMB1-A DC 12V 9.4W Fan




### *3.6 Holdup Time*





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