*Test Report: PMP30817*

# *10-VDC to 30-VDC Input PSR Flyback Converter With Dual-Output Reference Design*

## 1 Description

This reference design provides two isolated voltages (6 V at 200 mA, 12 V at 200 mA) from a DC input supply (10 V–30 V). By means of 0-Ω resistors, a flexible transformer can be configured to change the turns ratio and output voltages without any layout change. The converter enables an isolated DC/DC solution with high density and low component count. No auxiliary transformer winding is required and a 100-V rated primary-side switch is integrated.

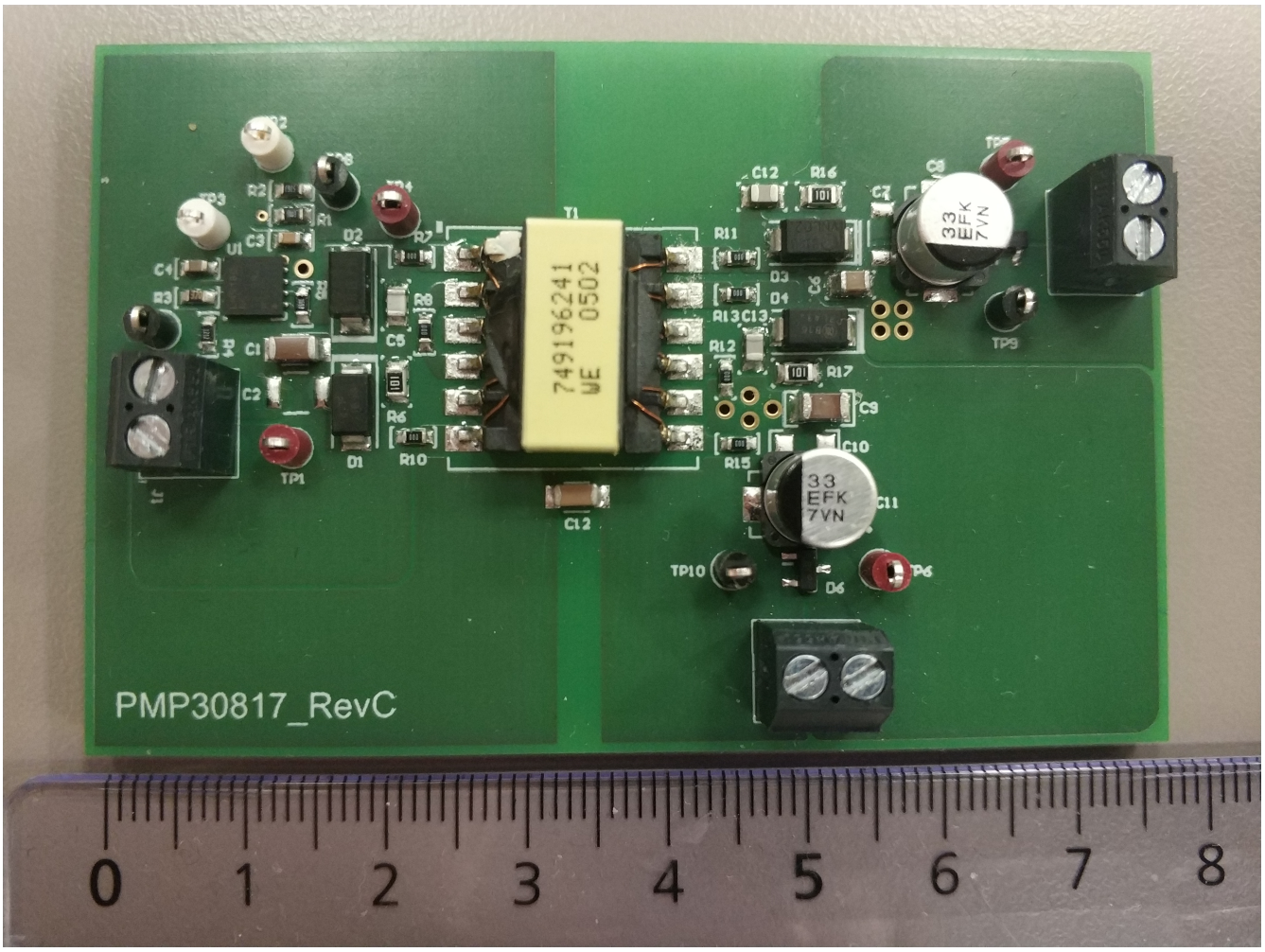



**Figure 1-1. PMP30817_RevC Board Top**

# 2 Testing and Results

## 2.1 Efficiency Graphs

Efficiency is shown in the following figure.

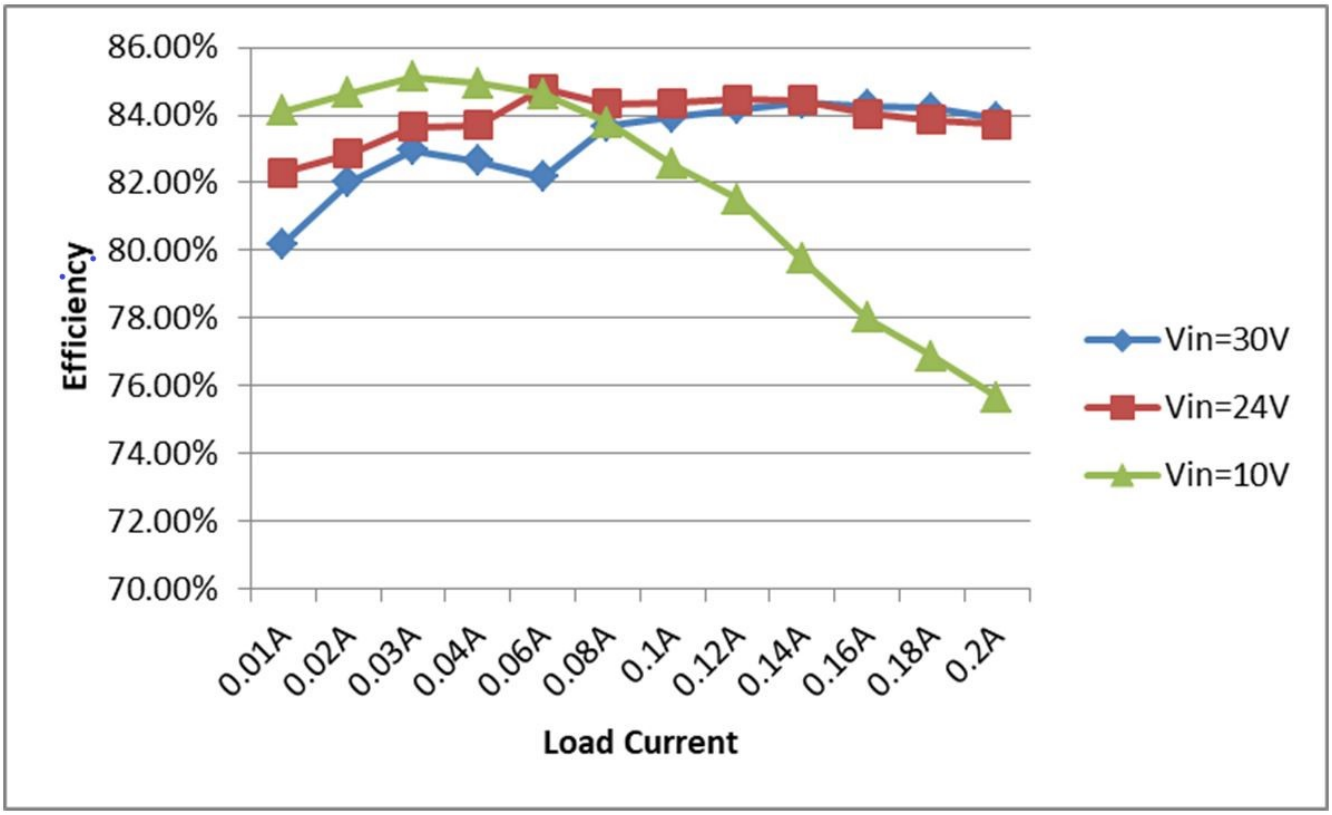



**Figure 2-1. Efficiency Graph**

## 2.2 Load Regulation

The load regulations of the two outputs is shown in the following figures.

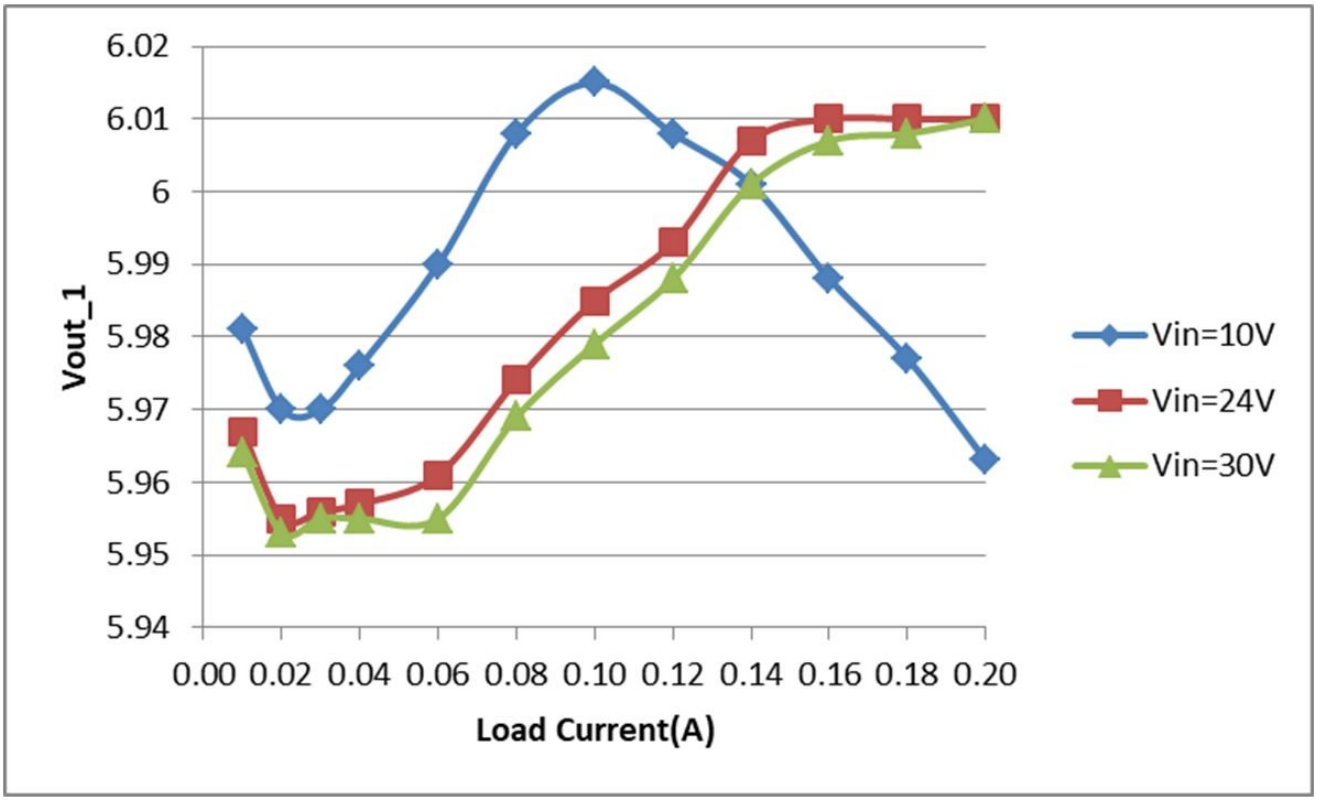



**Figure 2-2. Load Regulation Output1**

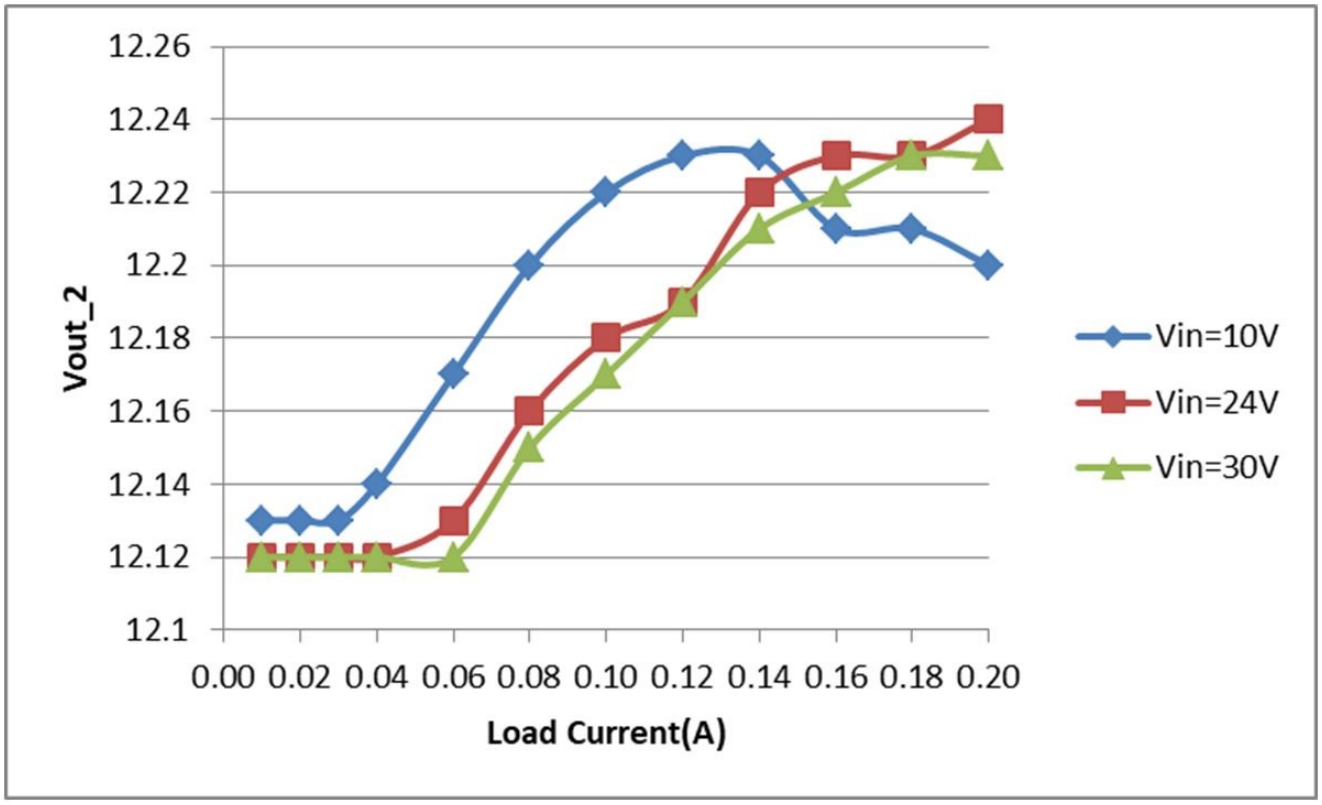
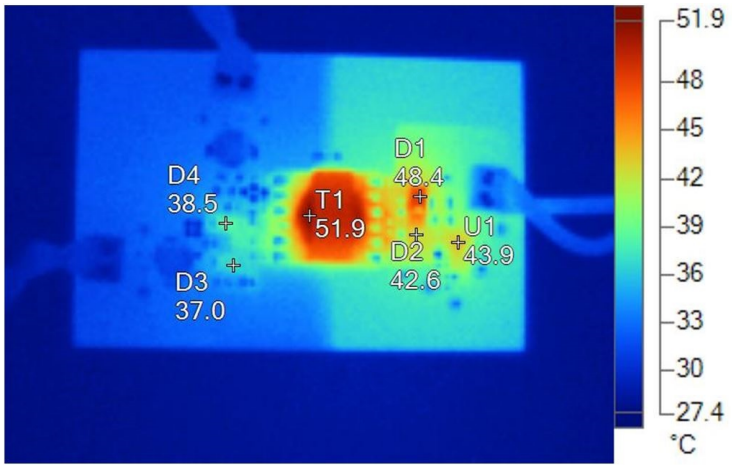



**Figure 2-3. Load Regulation Output2**

## 2.3 Thermal Image

The thermal image is shown in the following figure.




| Name | Temperature | Background |
|---|---|---|
| T1 | 51.9°C | 25.5°C |
| U1 | 43.9°C | 25.5°C |
| D1 | 48.4°C | 25.5°C |
| D2 | 42.6°C | 25.5°C |
| D3 | 37.0°C | 25.5°C |
| D4 | 38.5°C | 25.5°C |

**Figure 2-4. Input Voltage = 10 V; Load Current = Full Load**

# 3 Waveforms

## 3.1 Switch Node Voltage

Switching behavior is shown in the following figures.

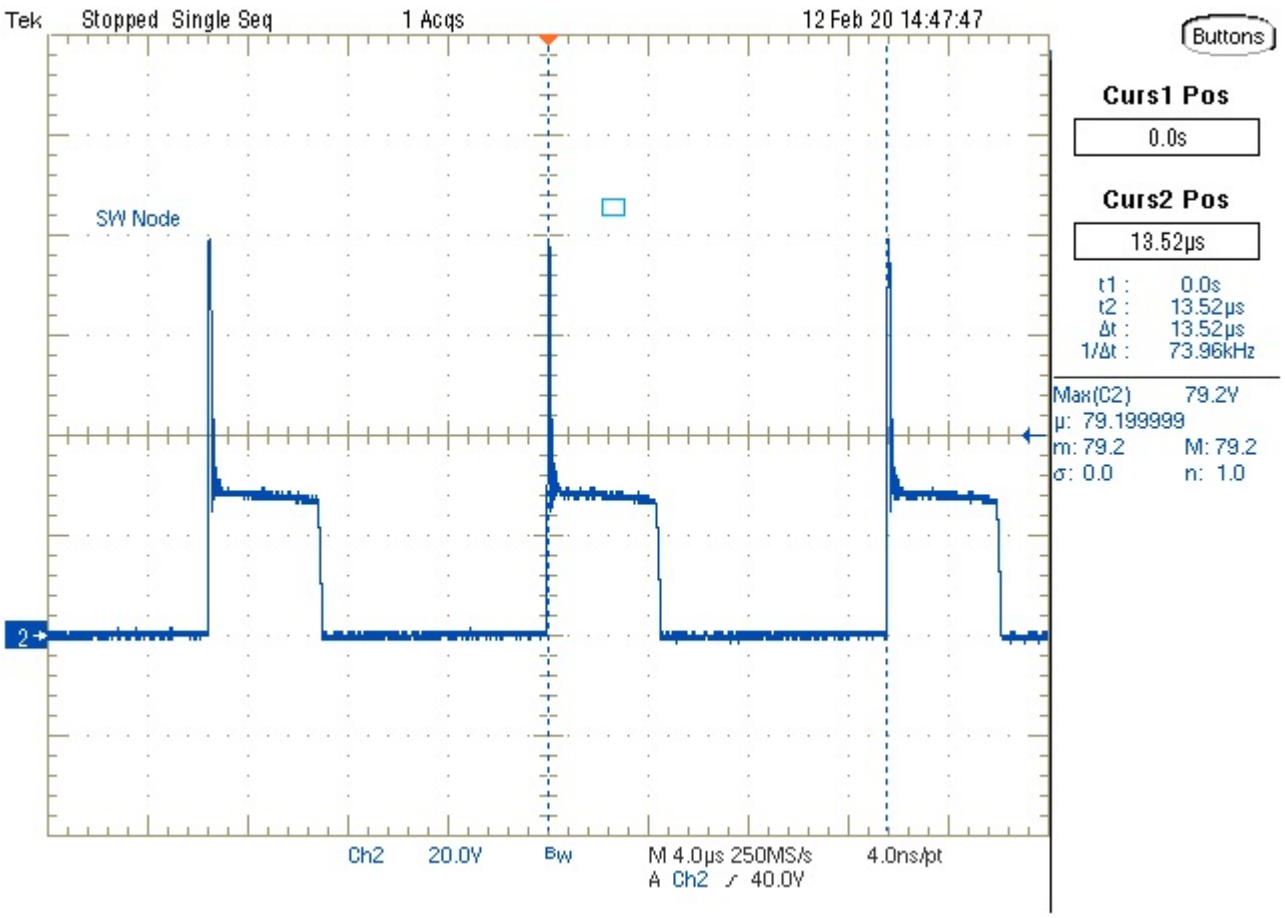



**Figure 3-1. Input Voltage = 10 V; Load Current = Full Load**

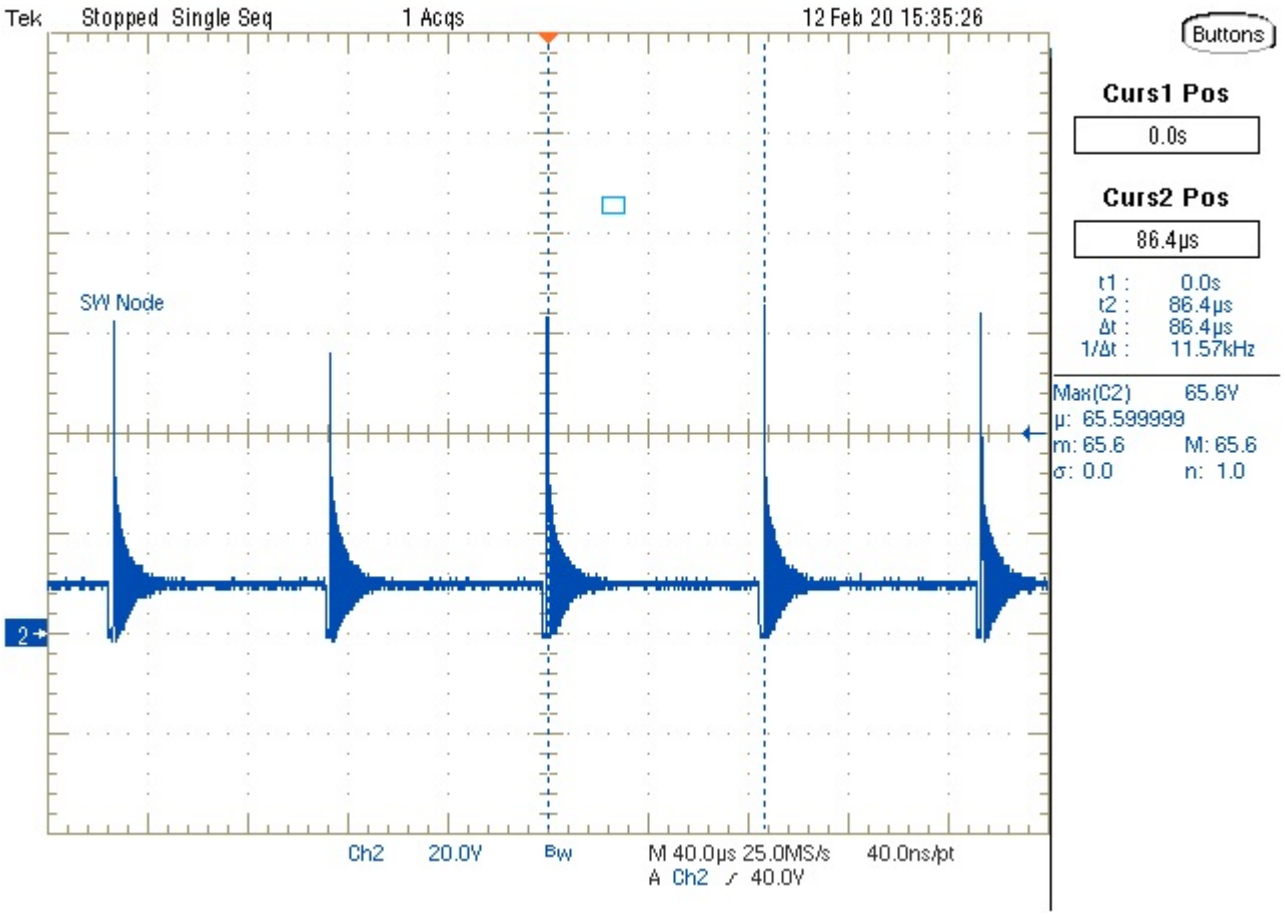



**Figure 3-2. Input Voltage = 10 V; Load Current = No Load**

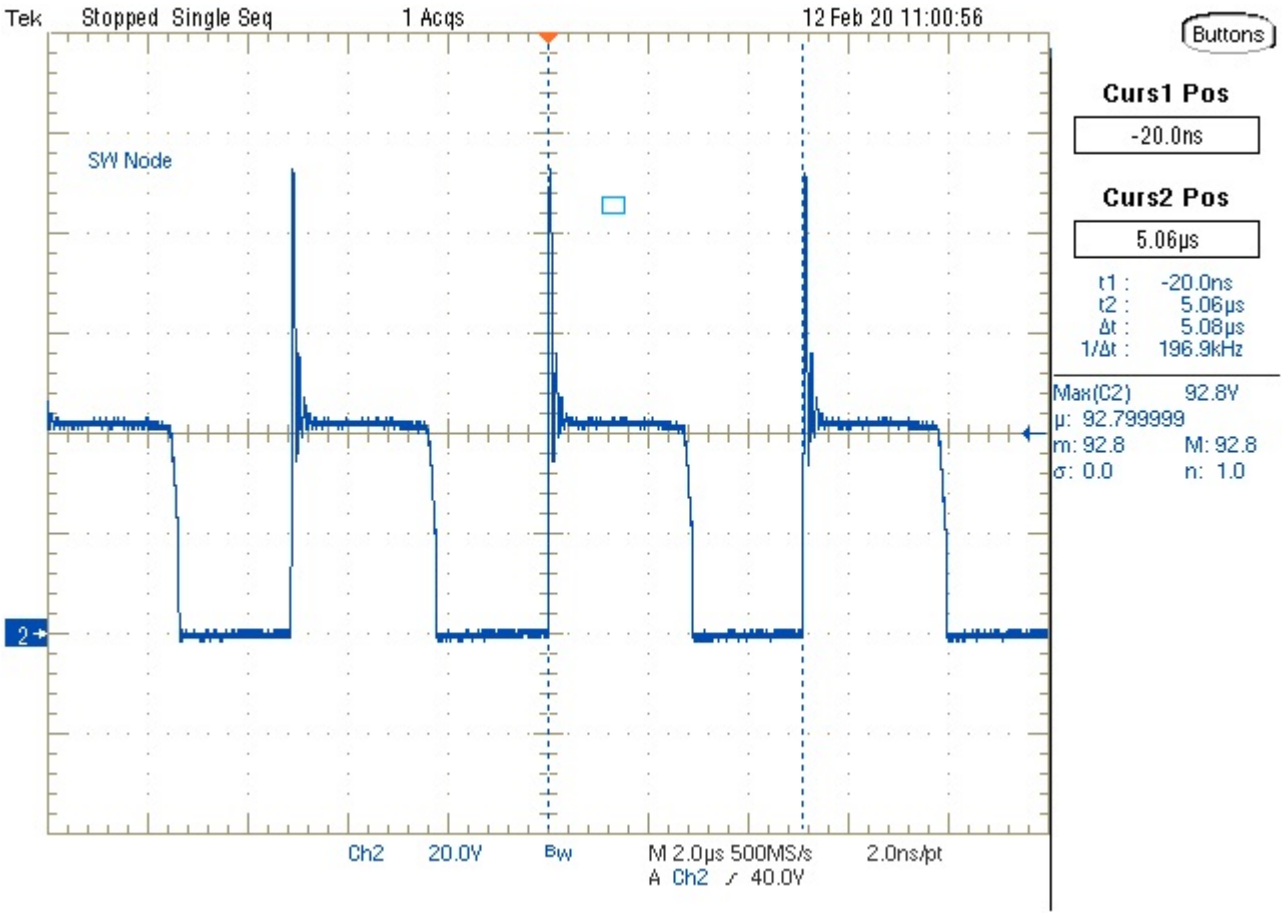



**Figure 3-3. Input Voltage = 24 V; Load Current = Full Load**

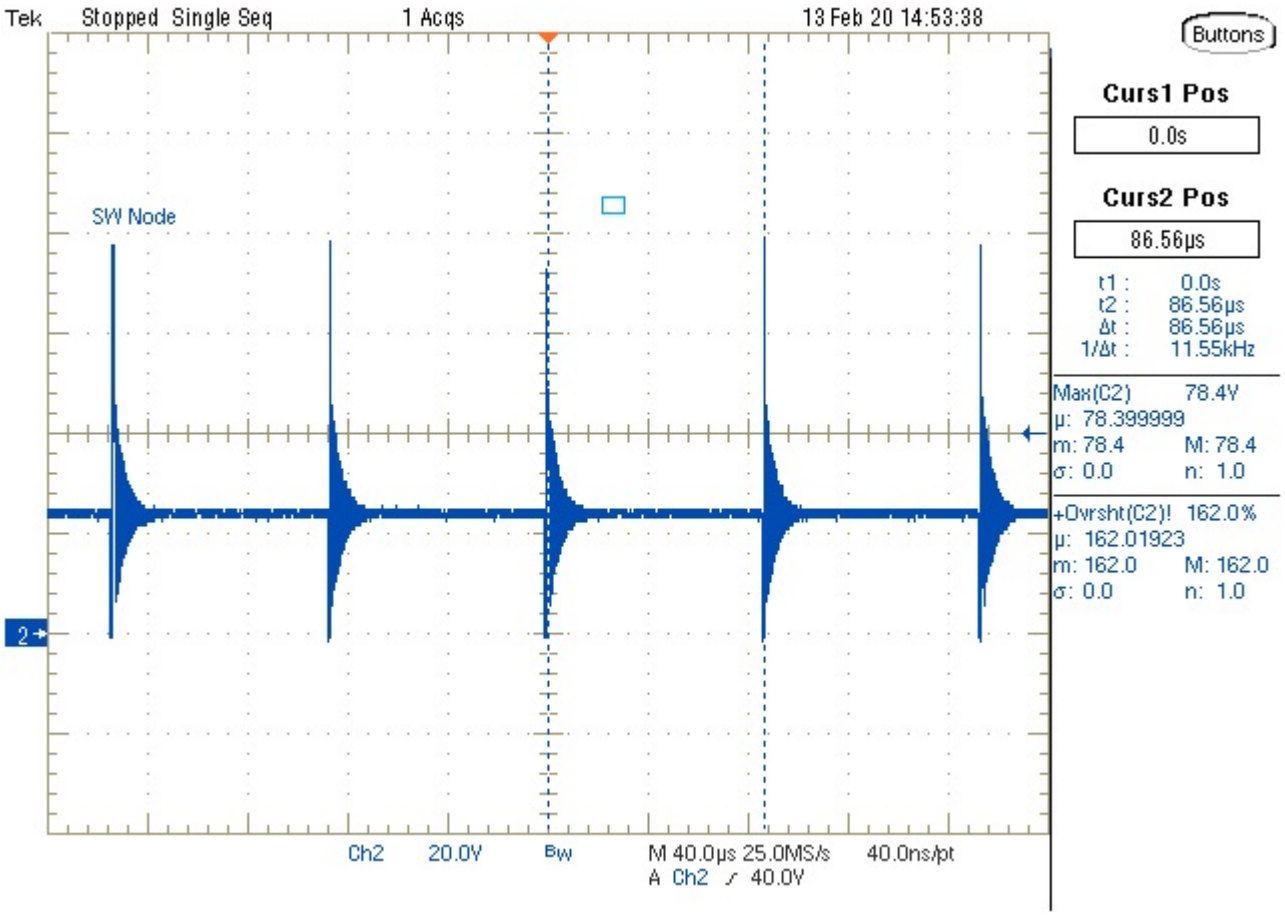



**Figure 3-4. Input Voltage = 24 V; Load Current = No Load**

## 3.2 Output Voltage Ripple

Output voltage ripple is shown in the following figures.

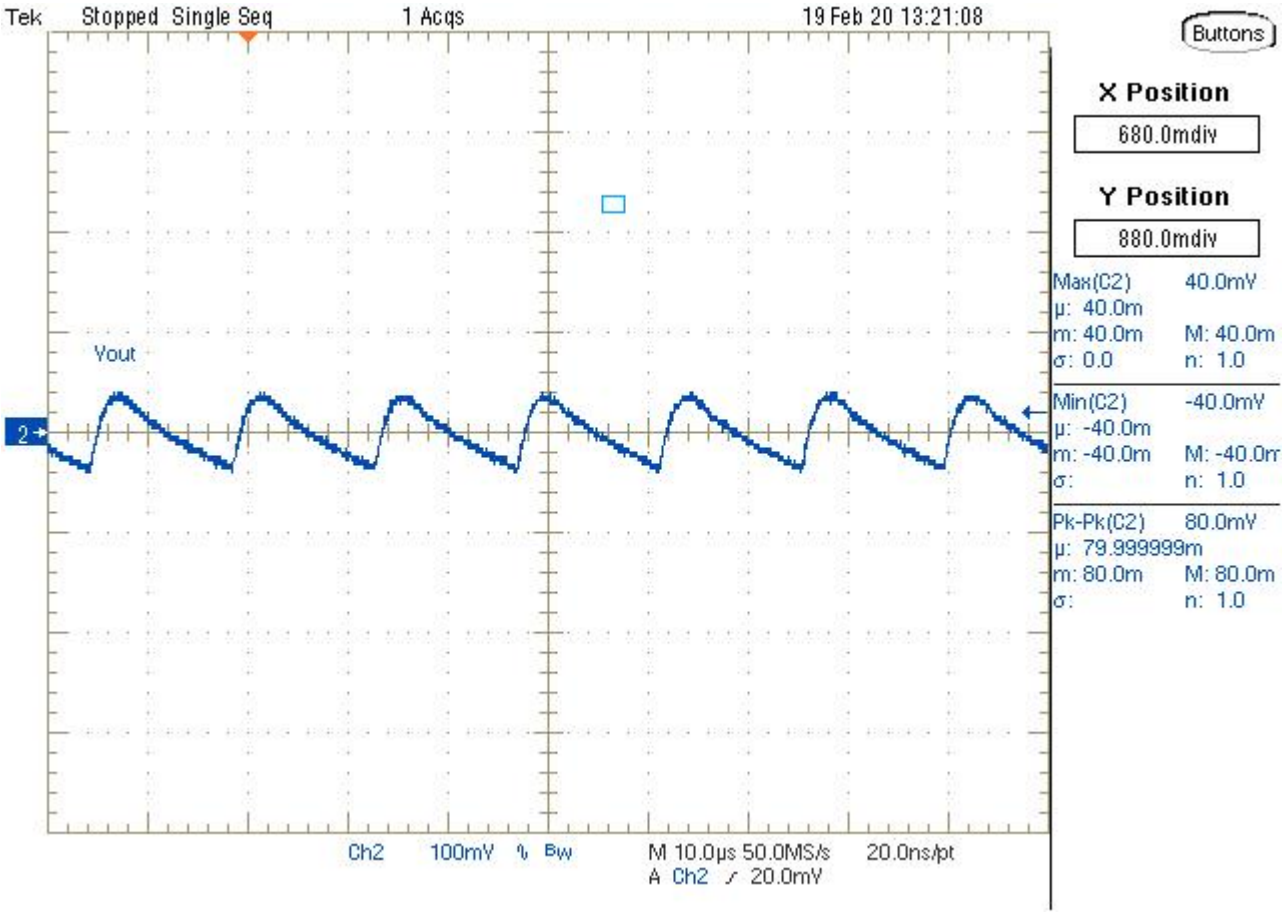



**Figure 3-5. Output1: Input Voltage = 10 V; Load Current = Full Load**

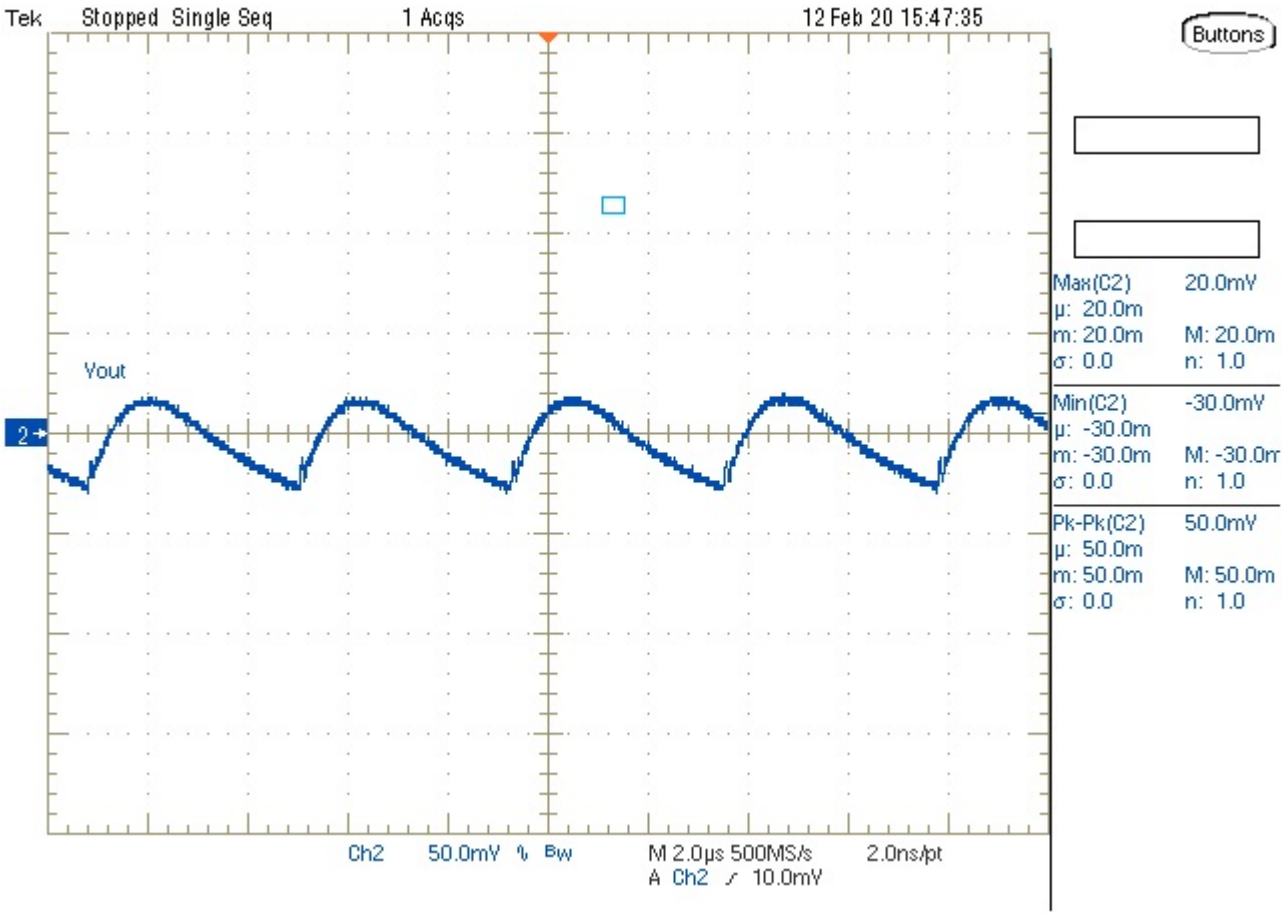



**Figure 3-6. Output1: Input Voltage = 30 V; Load Current = Full Load**

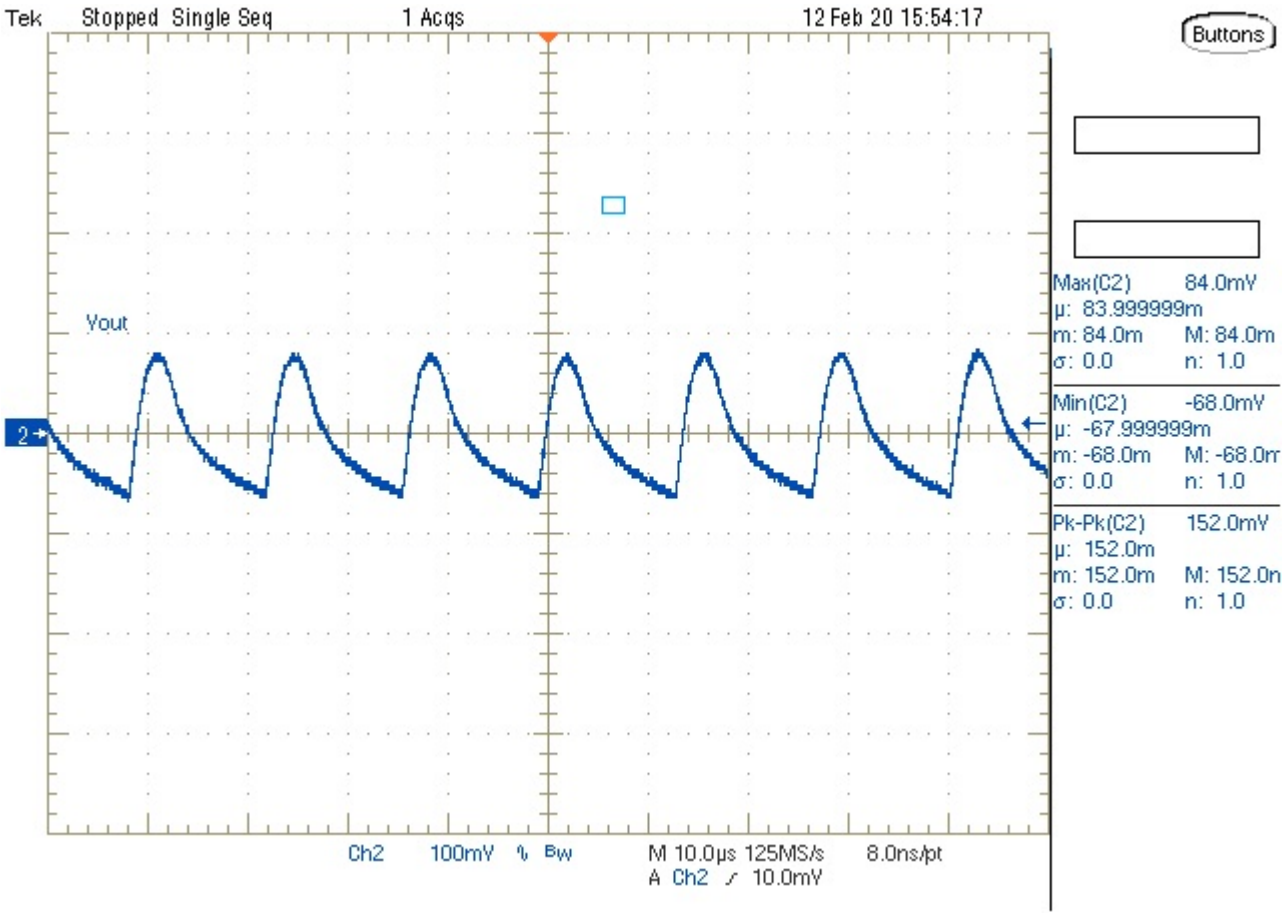



**Figure 3-7. Output2: Input Voltage = 10 V; Load Current = Full Load**

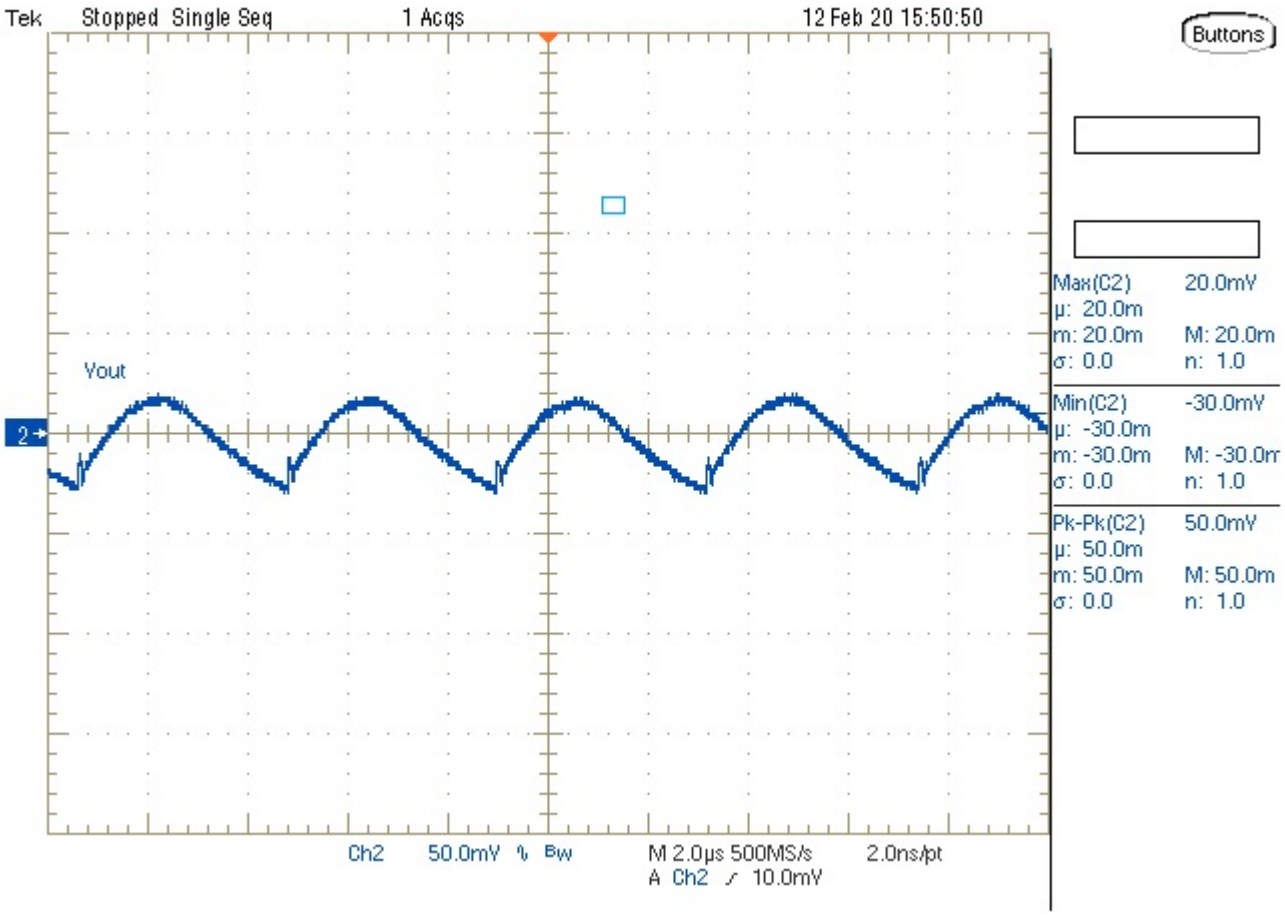



**Figure 3-8. Output2: Input Voltage = 30 V; Load Current = Full Load**

## 3.3 Load Transients

Load transient response is shown in the following figures.

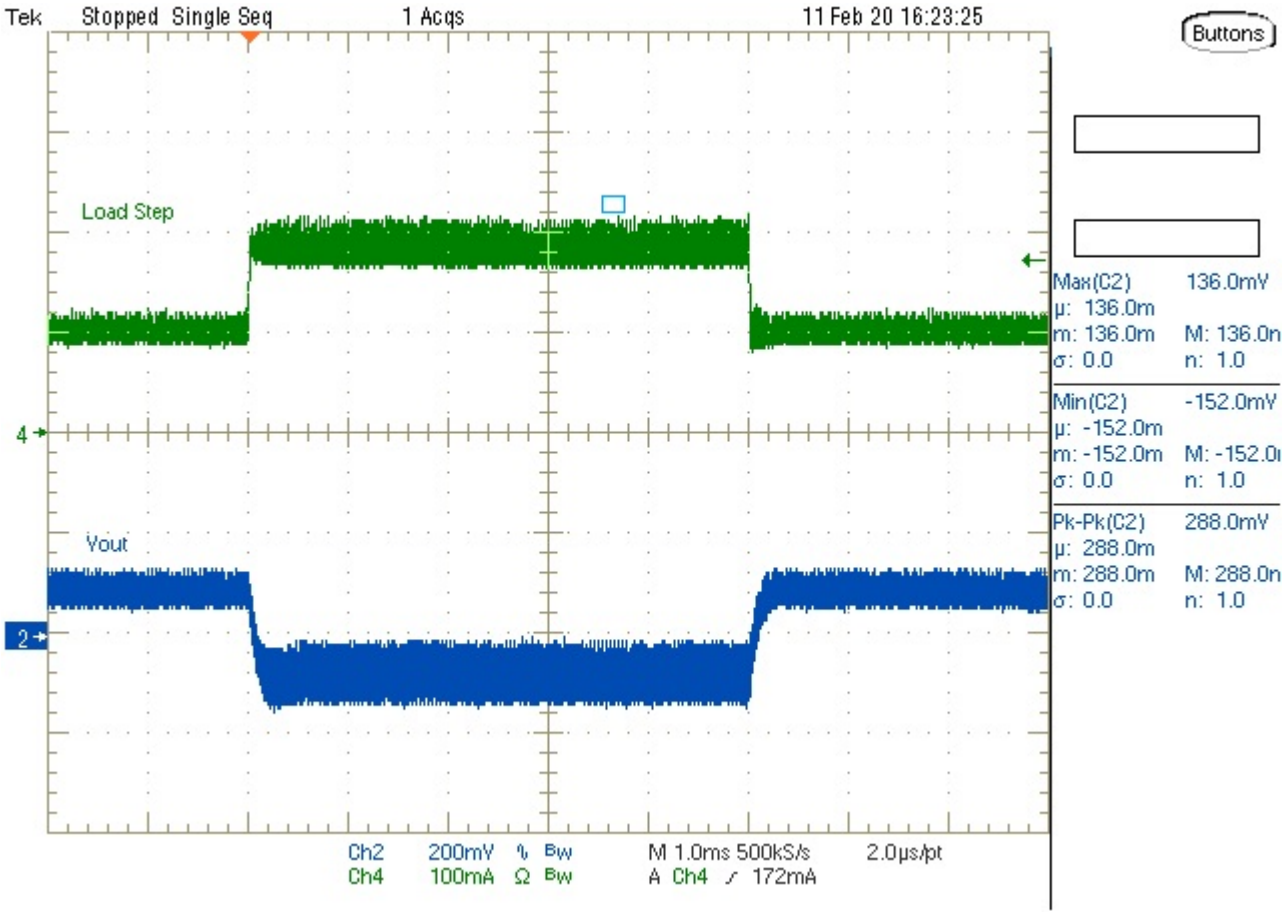



**Figure 3-9. Output1: Input Voltage = 10 V; Load Current = 0.1 A to 0.2 A**

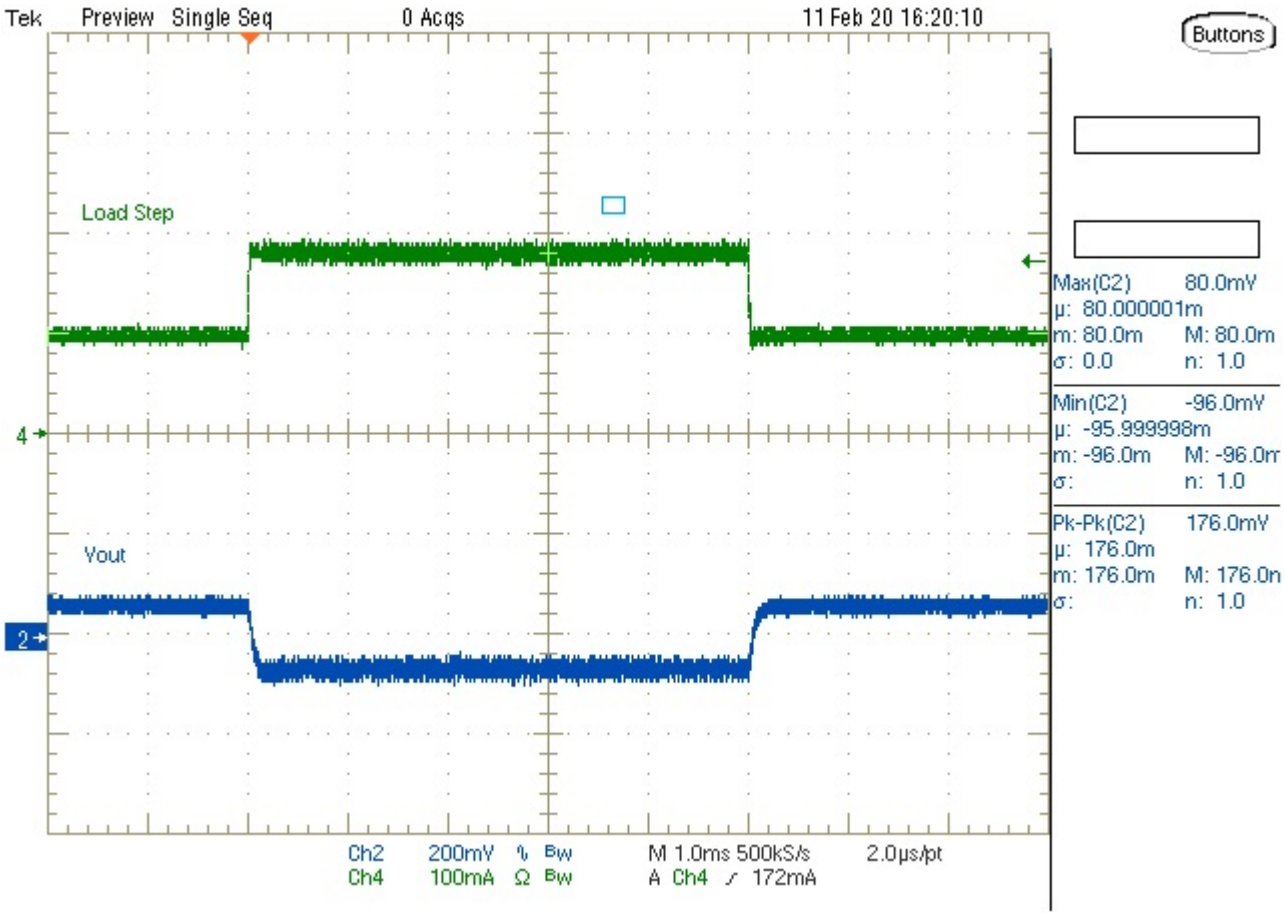



**Figure 3-10. Output1: Input Voltage = 30 V; Load Current = 0.1 A to 0.2 A**

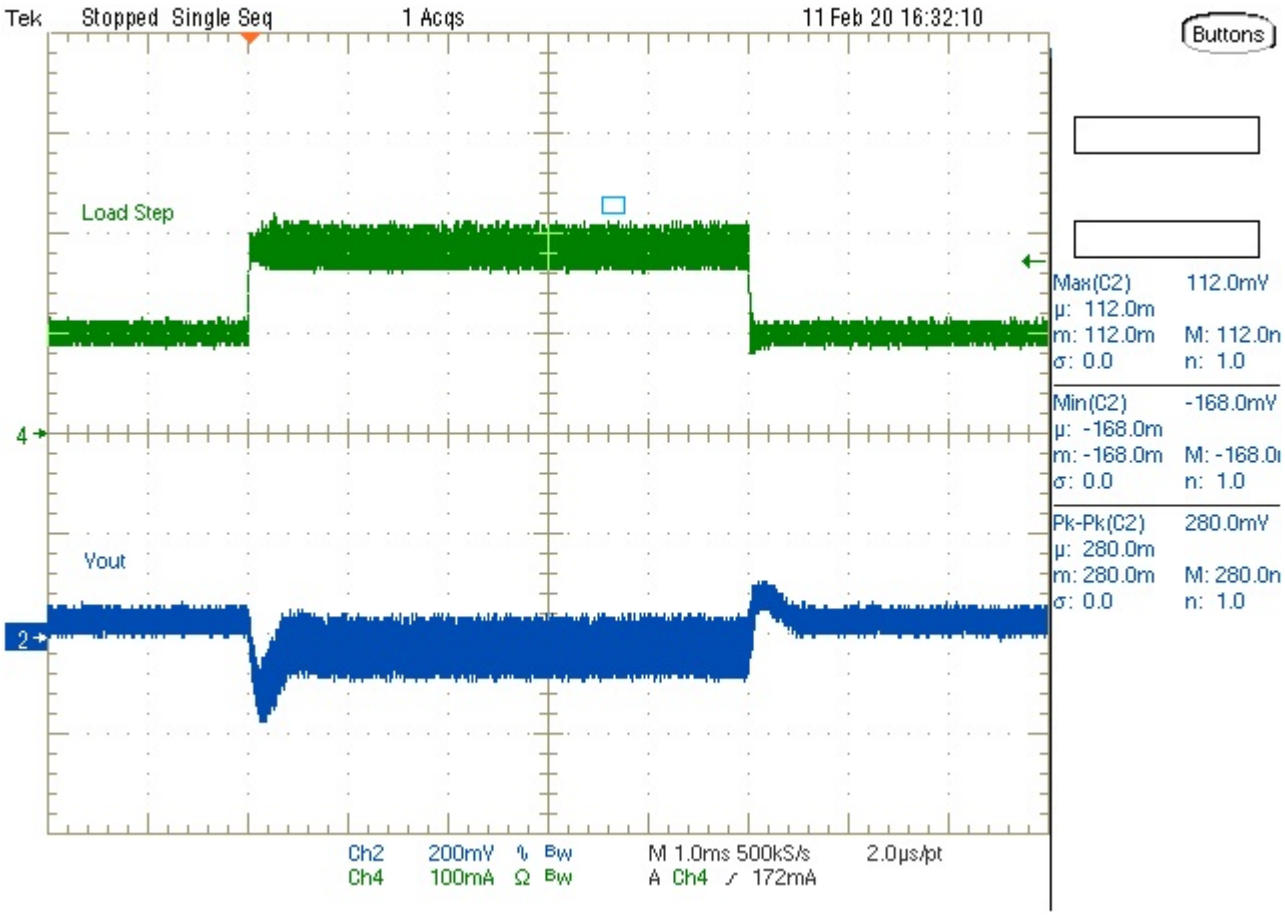



**Figure 3-11. Output2: Input Voltage = 10 V; Load Current = 0.1 A to 0.2 A**

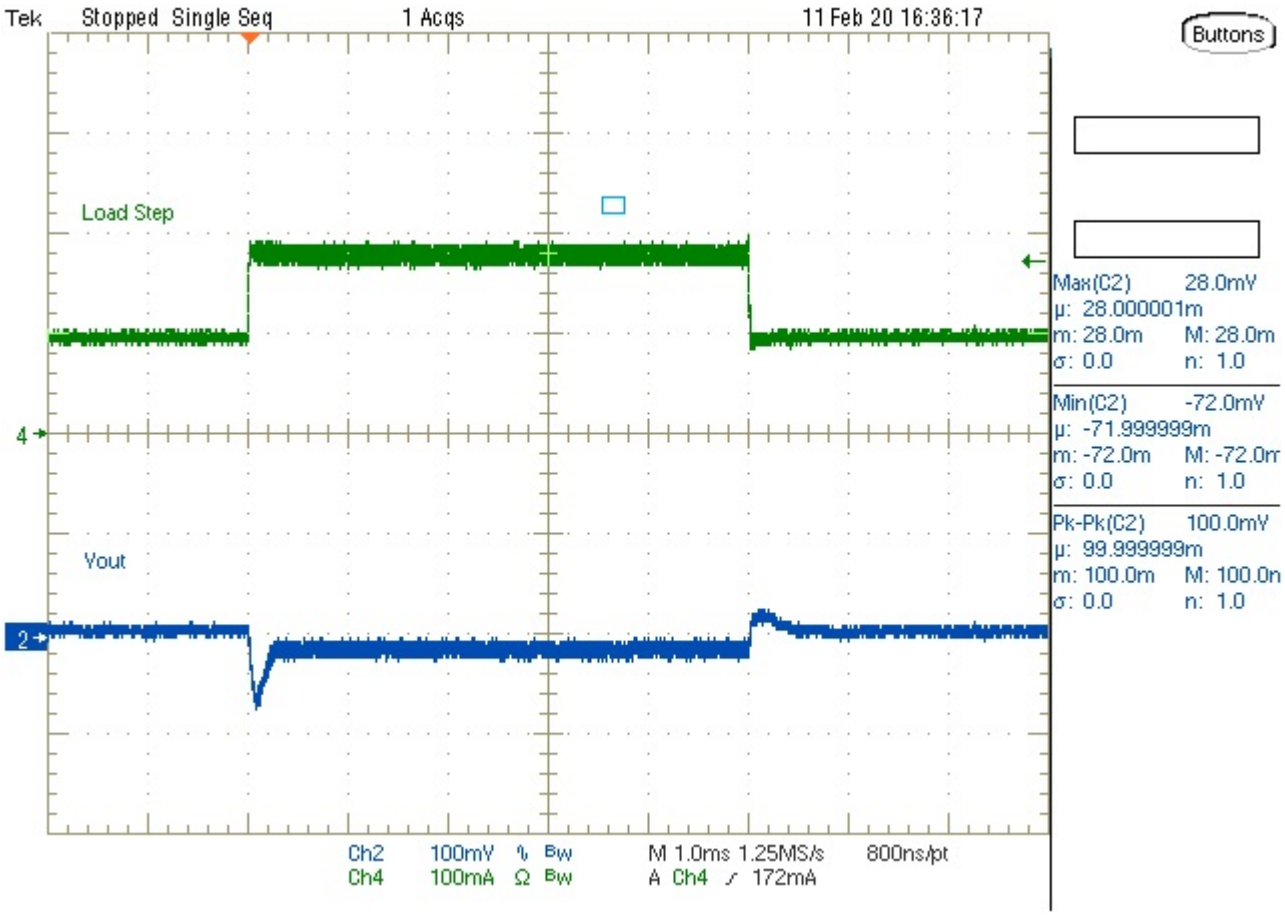



**Figure 3-12. Output2: Input Voltage = 30 V; Load Current = 0.1 A to 0.2 A**

### 3.4 Start-up Sequence

Start-up behavior is shown in the following figures.

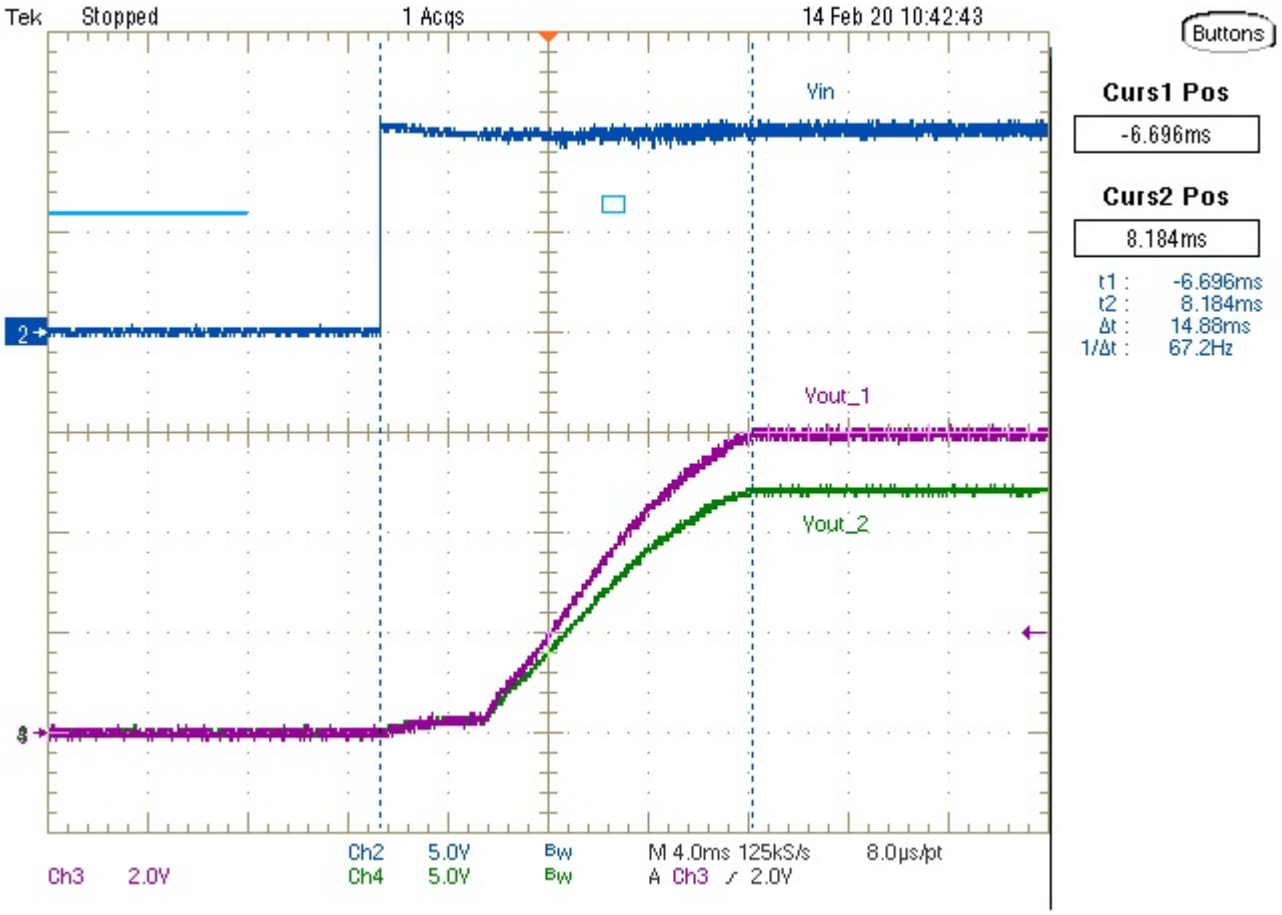



**Figure 3-13. Input Voltage = 10 V; Load Current = Full Load**

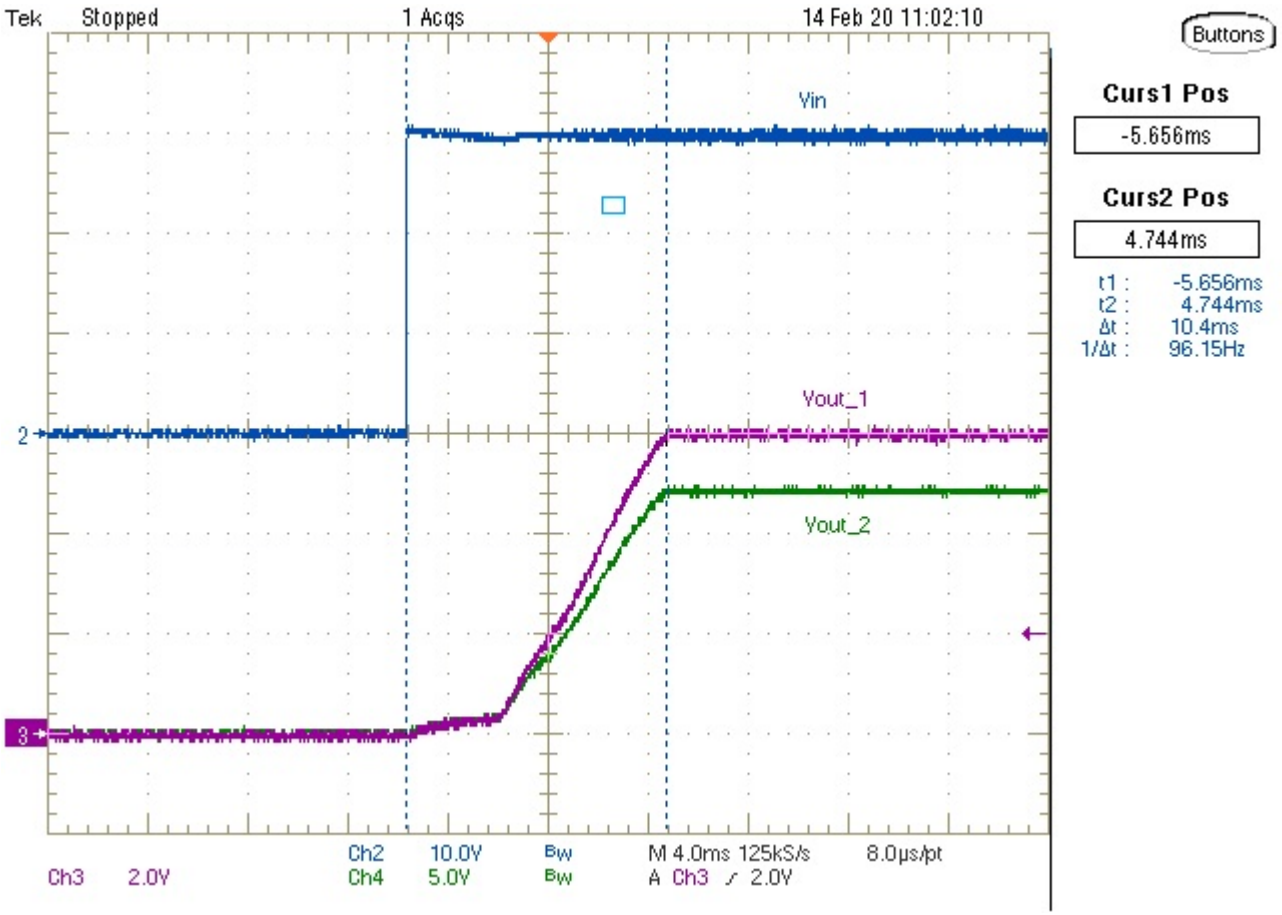



**Figure 3-14. Input Voltage = 30 V; Load Current = Full Load**

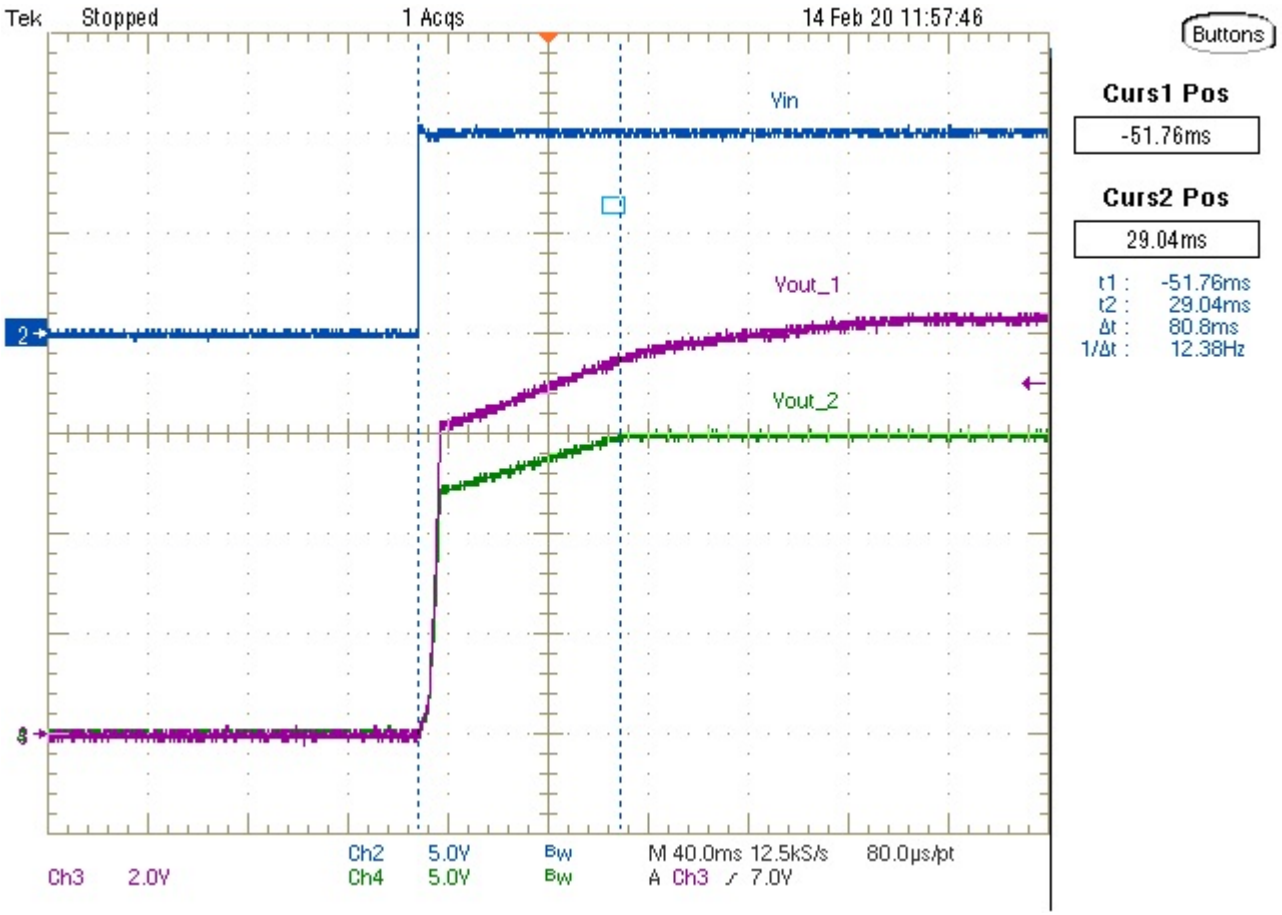



**Figure 3-15. Input Voltage = 10 V; Load Current = No Load**

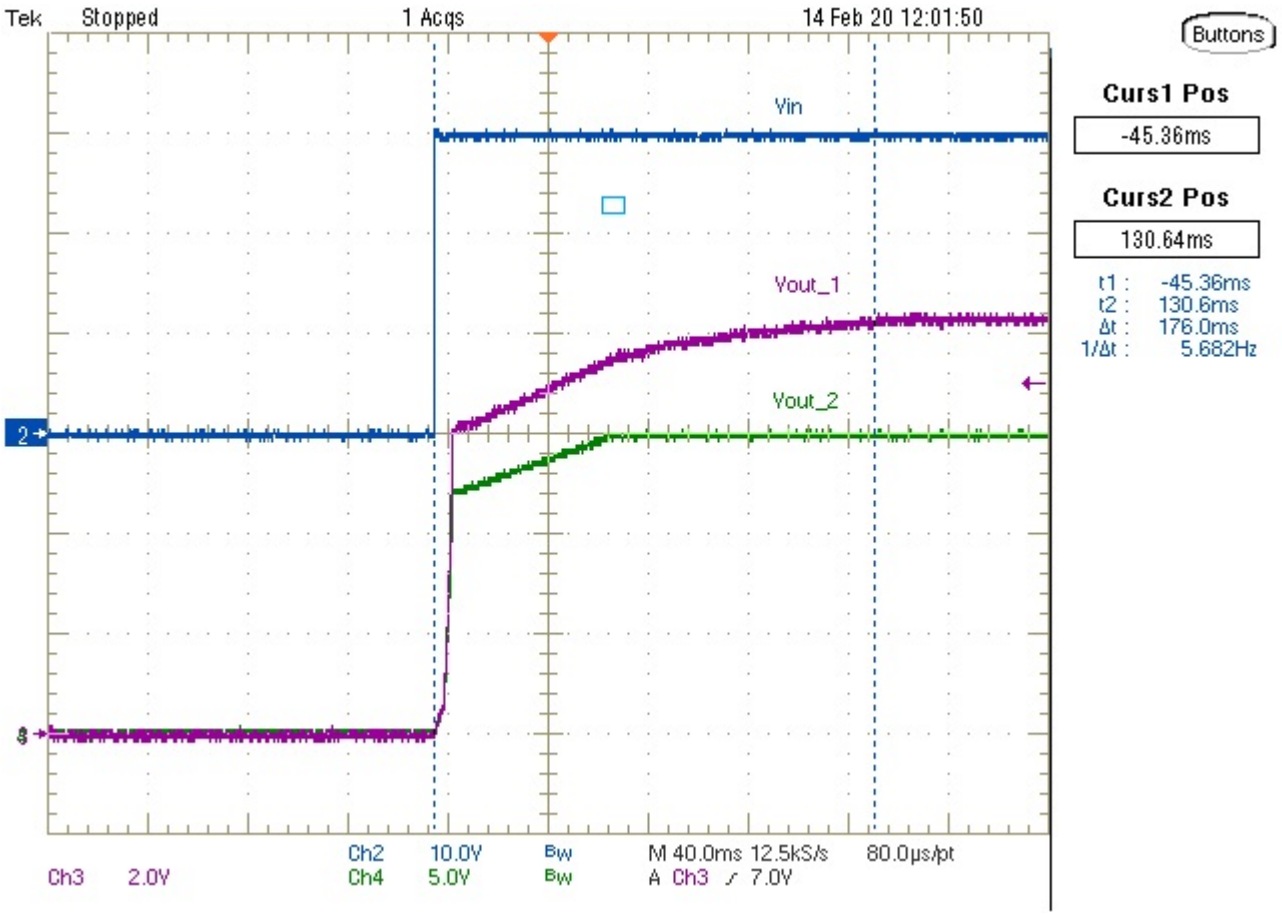



**Figure 3-16. Input Voltage = 30 V; Load Current = No Load**

### 3.5 Shut-down Sequence

Shut-down sequence is shown in the following figures.

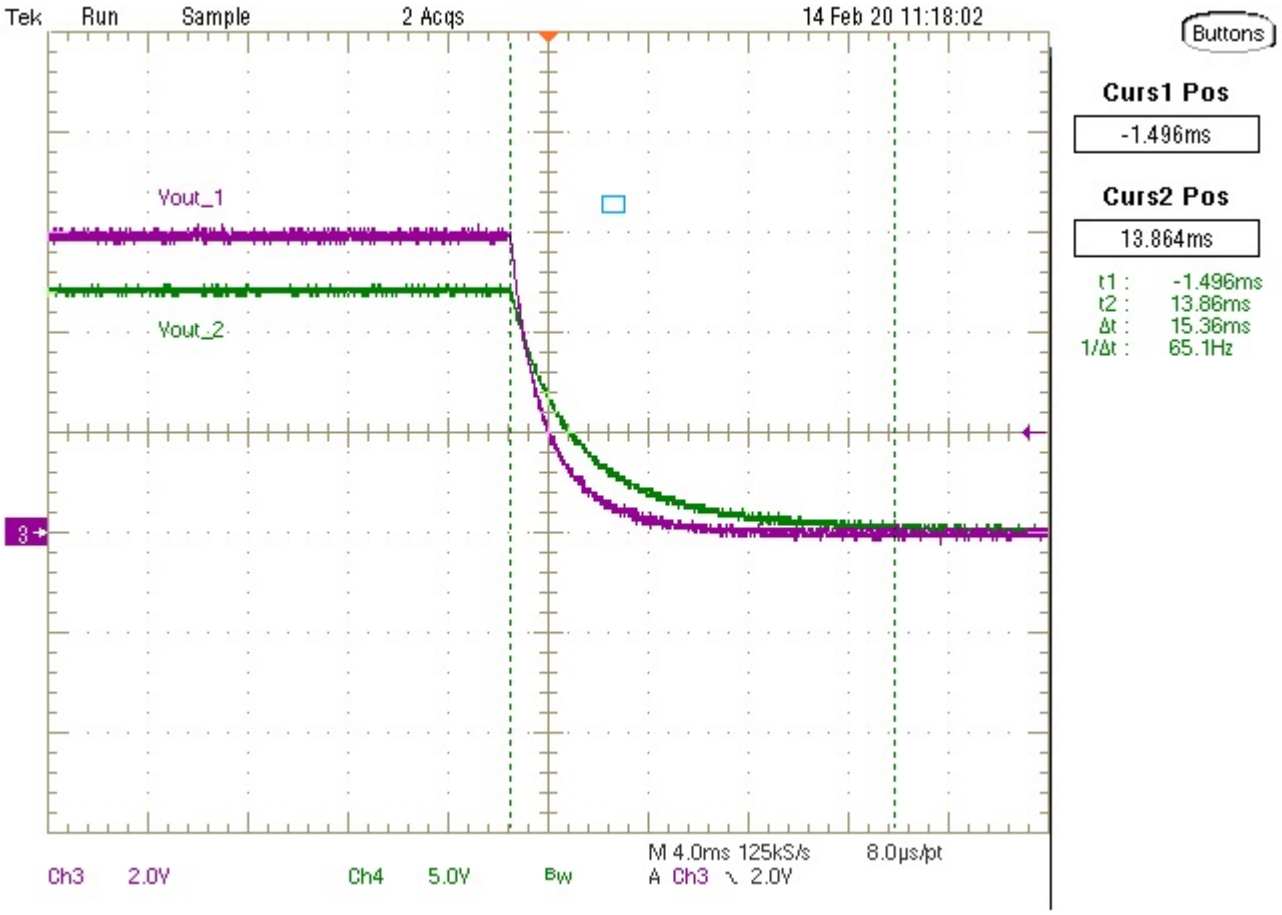



**Figure 3-17. Input Voltage = 10 V; Load Current = Full Load**

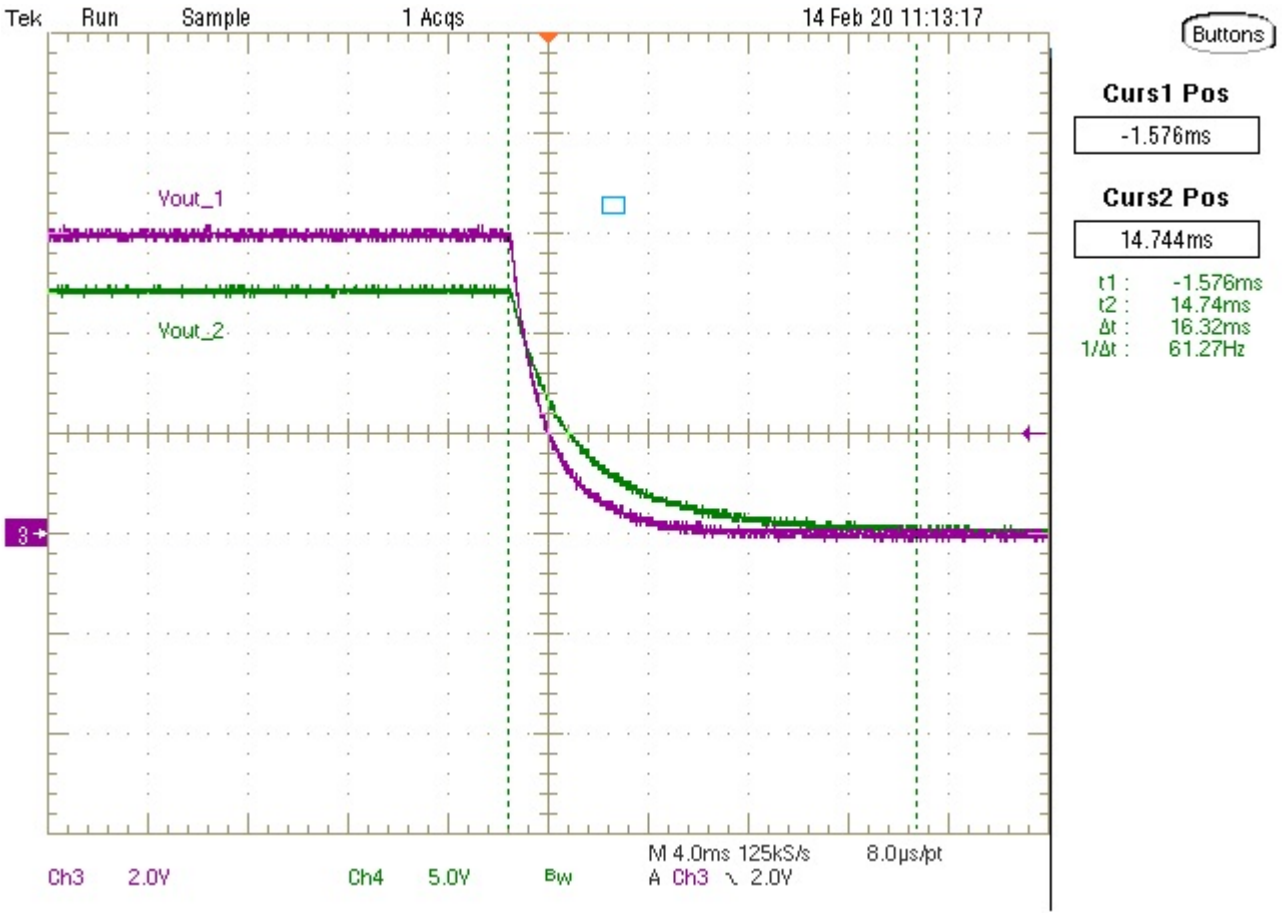



**Figure 3-18. Input Voltage = 30 V; Load Current = Full Load**

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