Test Report: PMP41085

100W Automotive Infotainment Display Module Reference Design With Functional Safety Capabilities

Description

This reference design demonstrates a power supply system for infotainment display modules with common system requirements like cold crank, load dump, and Automotive Safety Integrity Level (ASIL). The LM74900-Q1 is the first stage of the design playing a role of protection for negative input voltage, undervoltage, locked output, and overcurrent protection. The LM5152-Q1 is the second stage to function as pre-boost controller which can boost up to a specific voltage if battery voltage is low when starting up. The device supports battery voltages down to 4.2V and 100W power output. At the third stage, the design uses LMQ644A2-Q1, TPS62813-Q1, and TPS745-Q1 to provide the desired voltage to the subsystem like local dimming backlight, TCON, and SerDes. Lastly the design uses voltage monitors to monitor each rail and to aid ISO 26262 system design to achieve the targeted ASIL.

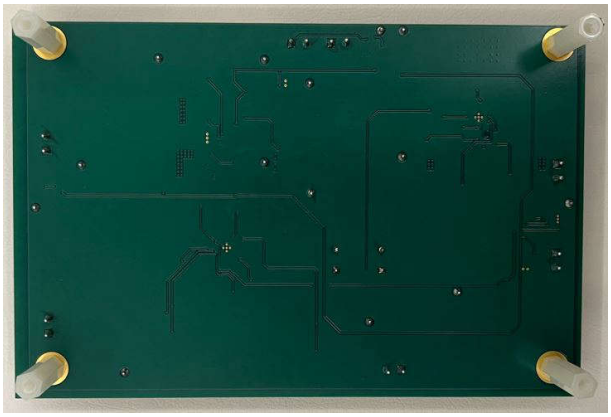
Features

- LM74900-Q1 is the automotive ideal diode with circuit breaker, undervoltage (UV), and overvoltage (OV) protection with fault output
- LM5152-Q1 is the automotive low-I_Q synchronous boost controller for start-stop and backup battery power supply
- LMQ644A2-Q1 is the 3V to 36V, low-I_Q, dual 6A automotive buck converter optimized for power density and low EMI
- TPS37-Q1 is the wide V_{IN}, 65V dual channel OV and UV detector with programmable sense and reset delay function for automotive
- TPS3704-Q1 is the low V_{IN} automotive quad window or standard voltage supervisor
- Total 100W power rating with 4.2V battery voltage input
- Reference design aids ISO 26262 system design to achieve the targeted ASIL

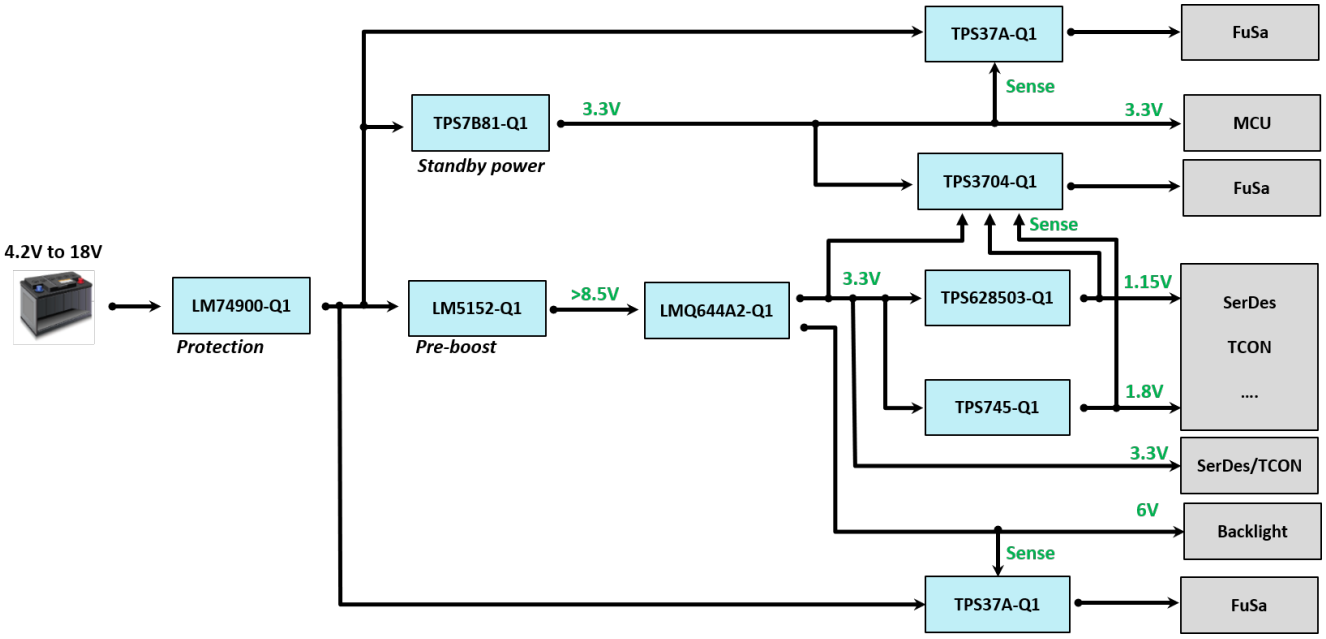
Applications

- Automotive display module

Top of Board



Bottom of Board



Block Diagram

1 Test Prerequisites

1.1 Voltage and Current Requirements

Table 1-1. Key System Specifications

Device	Parameter	Value (MIN)	Value (TYP)	Value (MAX)	Unit
LM74900-Q1	Input voltage	4.2	13.5	18	Volt
	Output voltage	4.2	13.5	18	Volt
	Output current	24	7.4	5.55	Amp
LM5152-Q1	Input voltage	4.2	13.5	18	Volt
	Output voltage	8.5	13.5	18	Volt
	Output current	11.76	7.4	5.55	Amp
	Switching frequency	440			kHz
TPS7B8133-Q1	Input voltage	4.2	13.5	18	Volt
	Output voltage	3.3			Volt
	Output current	0.15			Amp
LMQ644A2-Q1	Input voltage	8.5	13.5	18	Volt
	Output voltage_1	3.3			Volt
	Output current_1	4			Amp
	Output voltage_2	6			Volt
	Output current_2	6			Amp
	Switching frequency	440			kHz
TPS628503-Q1	Input voltage	3.3			Volt
	Output voltage	1.15			Volt
	Output current	3			Amp
	Switching frequency	2200			kHz
TPS745-Q1	Input voltage	3.3			Volt
	Output voltage	1.8			Volt
	Output current	0.5			Amp

1.2 Required Equipment

- DC Source: Chroma 62006P-100-50
- DC electronic load: Chroma 6314A
- Oscilloscope: Tektronix DPO3054
- Electrical thermography: Fluke TiS55
- Digital Power meter: Yokogama WT310E
- Vector Network Analyzer: OMICRON Bode100
- Multimeter: Fluke 287C

1.3 Dimensions

The board dimensions are 137mm (length) × 90.7mm (width) × 15mm (height).

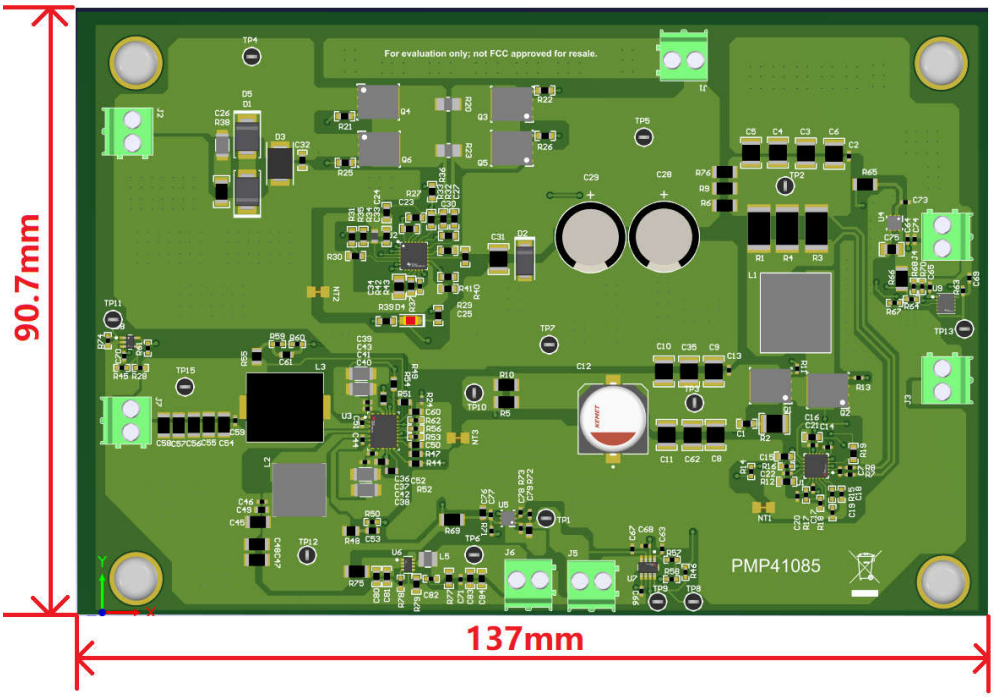


Figure 1-1. Board Dimension

2 Testing and Results

2.1 Thermal Images

LM5152-Q1 thermal images are shown in the following figures. The test conditions include room temperature with no airflow.

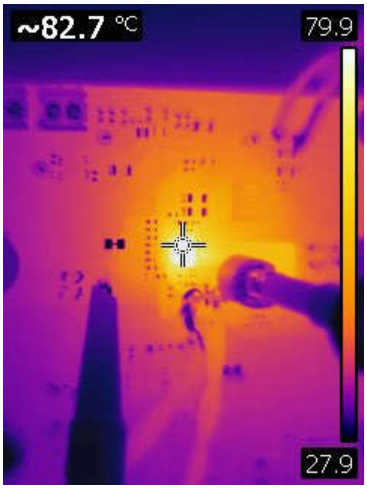


Figure 2-1. Thermal Image at 13.5 V_{IN}, 13.5 V_{OUT}, 7.4A I_{OUT}

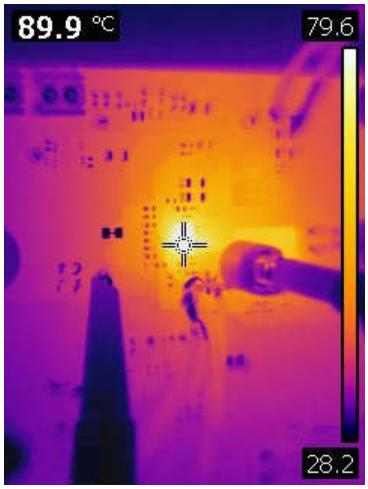


Figure 2-2. Thermal Image at 18 V_{IN}, 18 V_{OUT}, 5.55A I_{OUT}

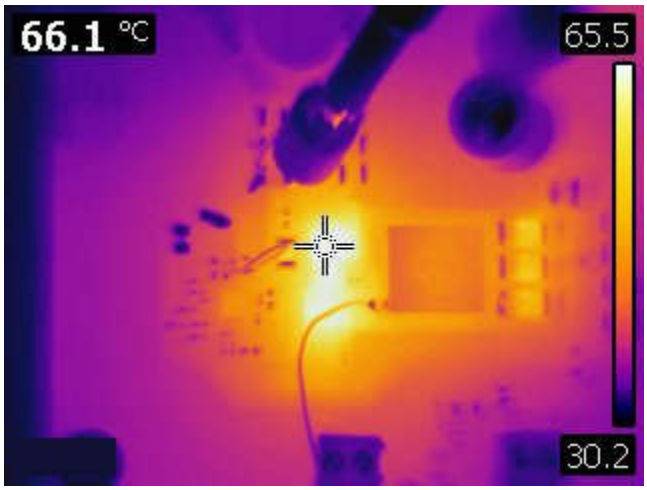


Figure 2-3. Thermal Image at 4.2 V_{IN}, 8.5 V_{OUT}, 11.76A I_{OUT}

LM74900-Q1 thermal images are shown in the following figures. The test conditions include room temperature, no airflow.

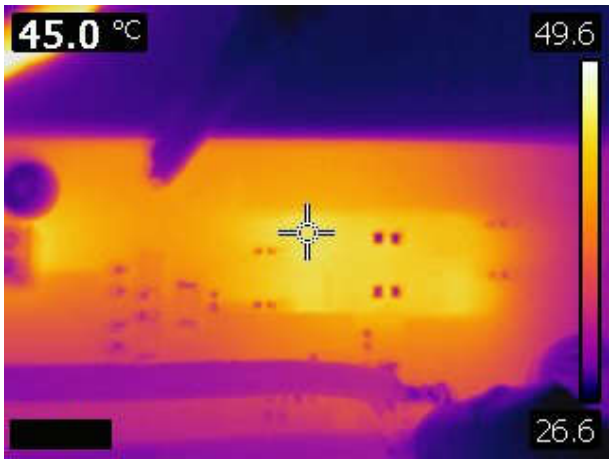


Figure 2-4. Thermal Image at 4.2 V_{IN}, 4.2 V_{OUT}, 24A I_{OUT}

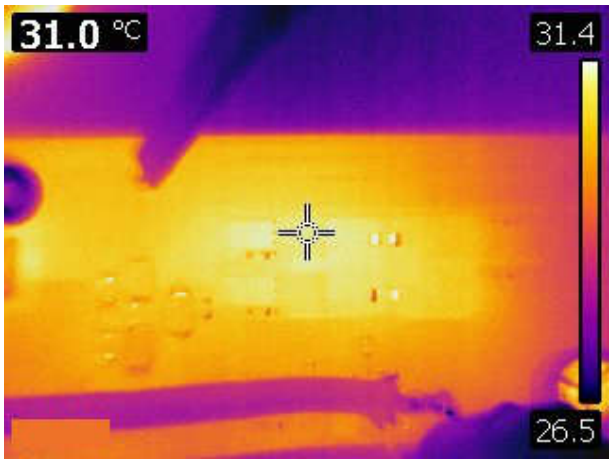


Figure 2-5. Thermal Image at 13.5 V_{IN}, 13.5 V_{OUT}, 7.48A I_{OUT}

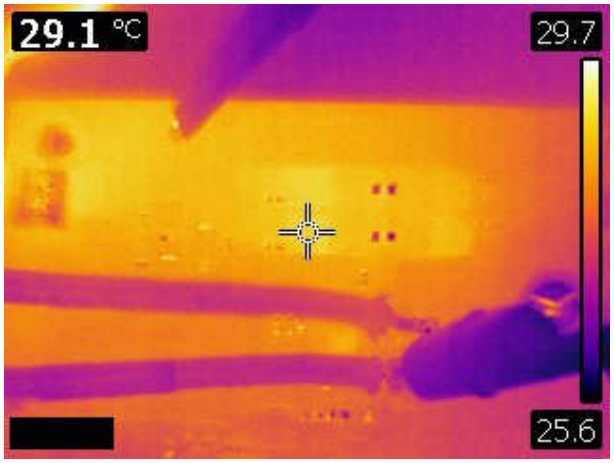


Figure 2-6. Thermal Image at 18 V_{IN}, 18 V_{OUT}, 5.55A I_{OUT}

LMQ644A2-Q1 thermal images are shown in the following figures. The test conditions include room temperature, output1 3.3V, 4A, output2 6V, 6A with no airflow.

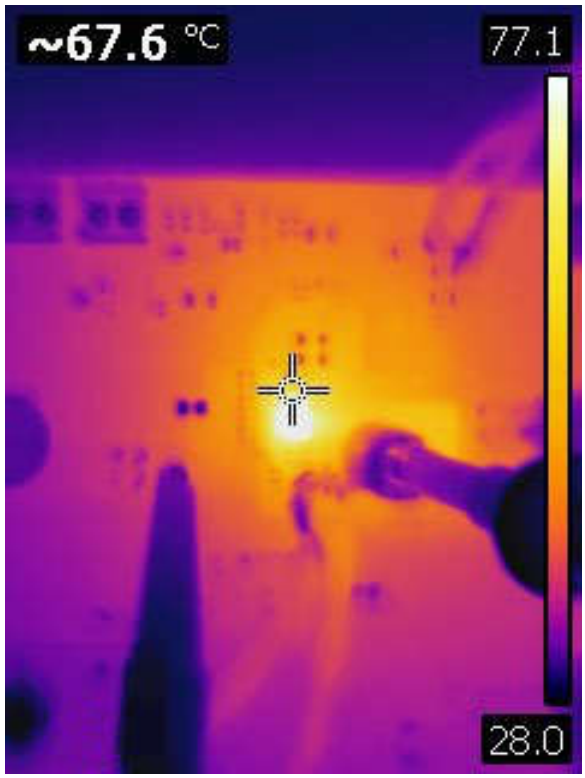


Figure 2-7. Thermal Image at 8.5 V_{IN}

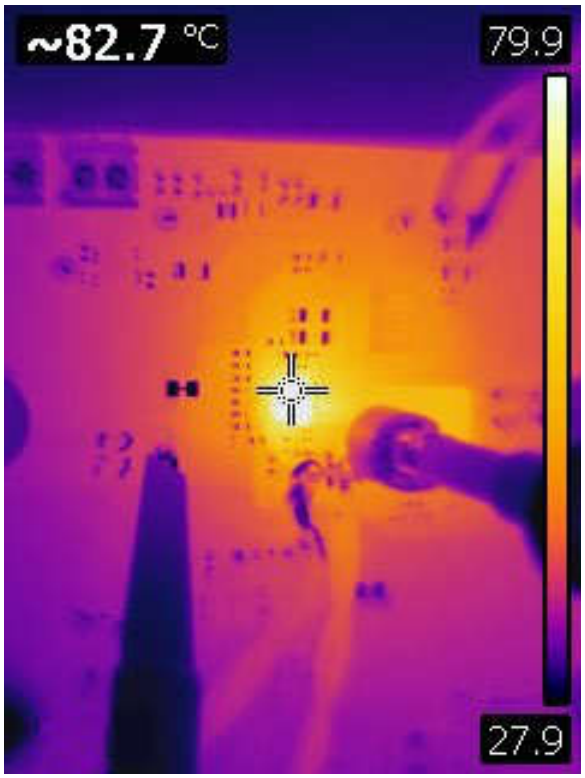


Figure 2-8. Thermal Image at 13.5 V_{IN}

Figure 2-9. Thermal Image at 18 V_{IN}

Thermal images of TPS7B81-Q1 are shown in the following figure. The test conditions include room temperature, no airflow.

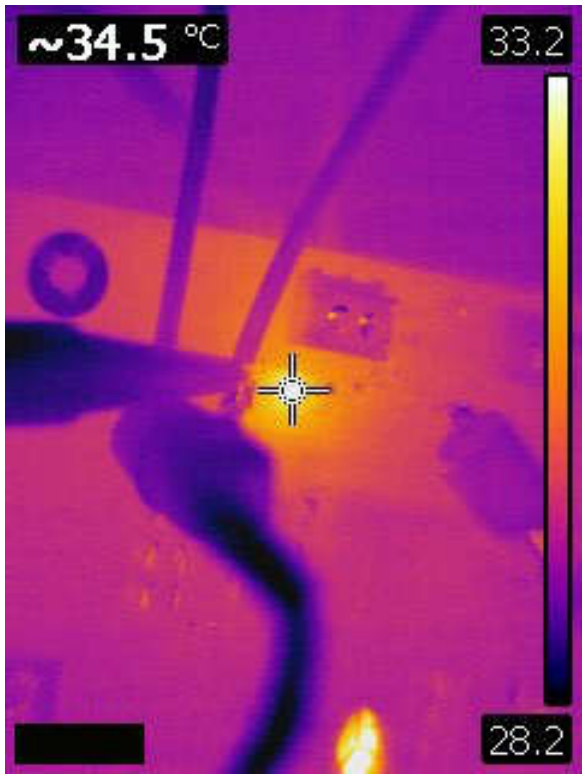


Figure 2-10. Thermal Image at 4.2 V_{IN}, 3.3 V_{OUT}, 0.15A I_{OUT}

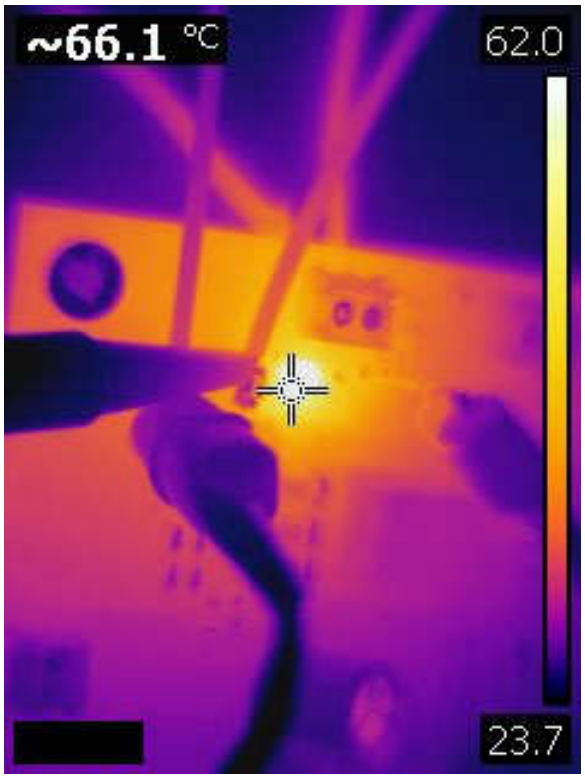


Figure 2-11. Thermal Image at 13.5 V_{IN}, 3.3 V_{OUT}, 0.15A I_{OUT}

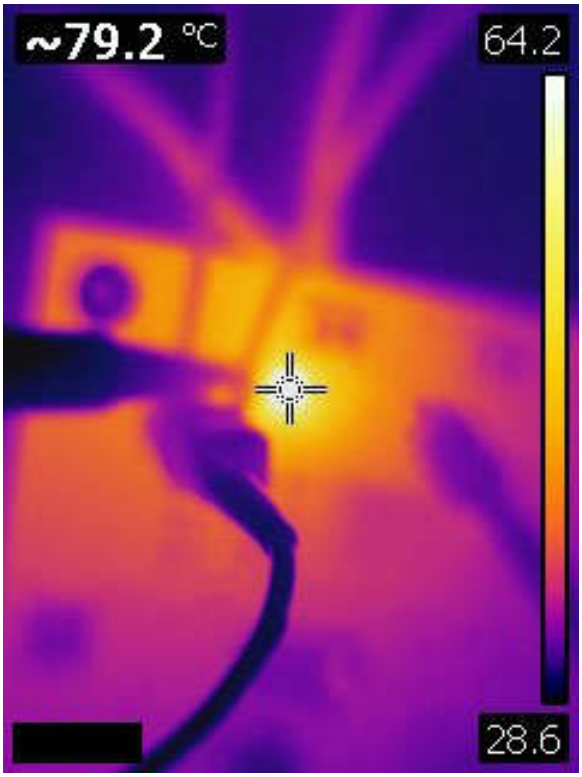


Figure 2-12. Thermal Image at 18 V_{IN}, 3.3 V_{OUT}, 0.15A I_{OUT}

Thermal images of TPS628503-Q1 are shown in the following figure. The test conditions include room temperature, no airflow.

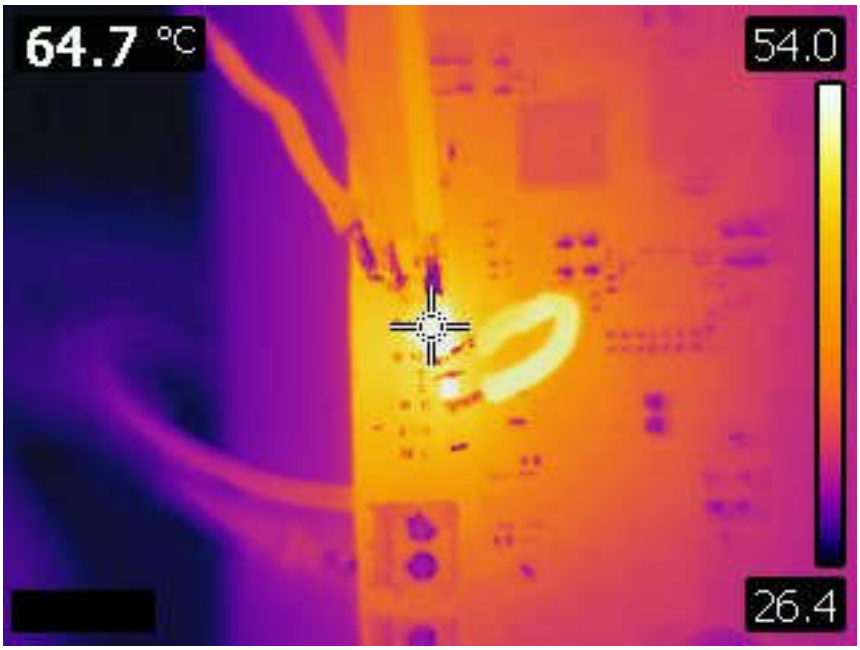


Figure 2-13. Thermal Image at 3.3 V_{IN}, 1.15 V_{OUT}, 3A I_{OUT}

2.2 Bode Plots

Bode plots of LMQ644A2-Q1 are shown in the following figures.

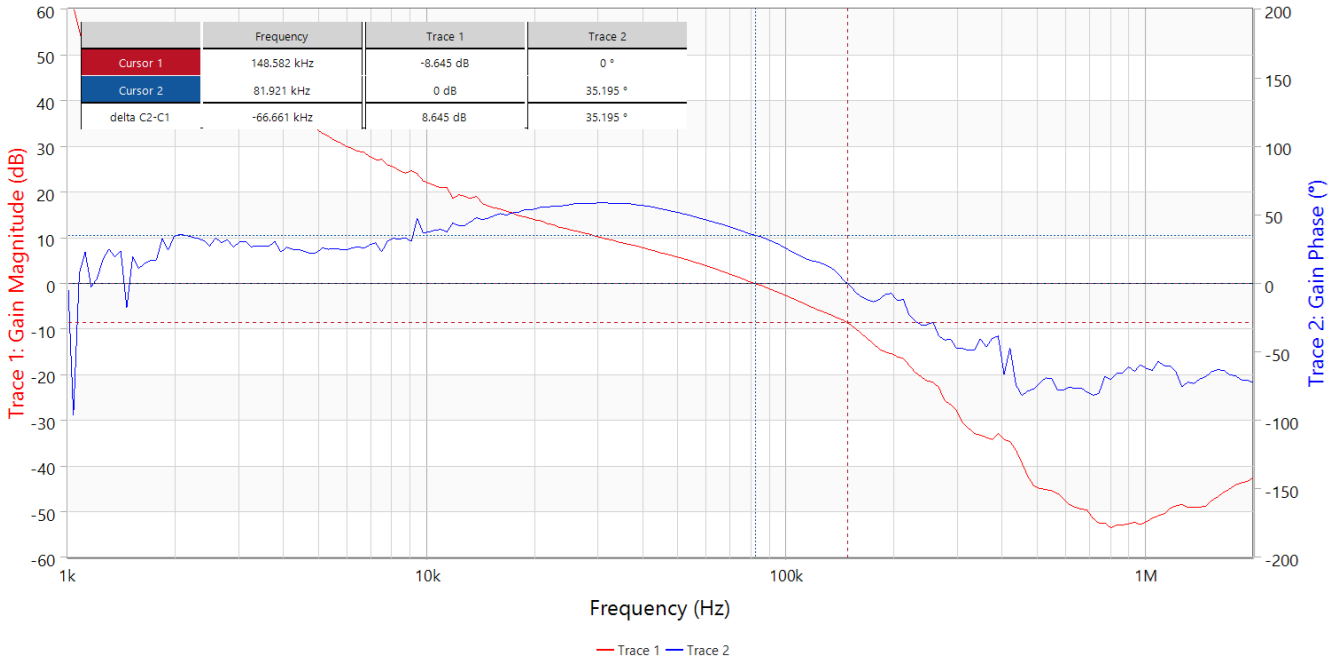


Figure 2-14. Bode Plot at 8.5 V_{IN}, 3.3 V_{OUT}, 0A I_{OUT}

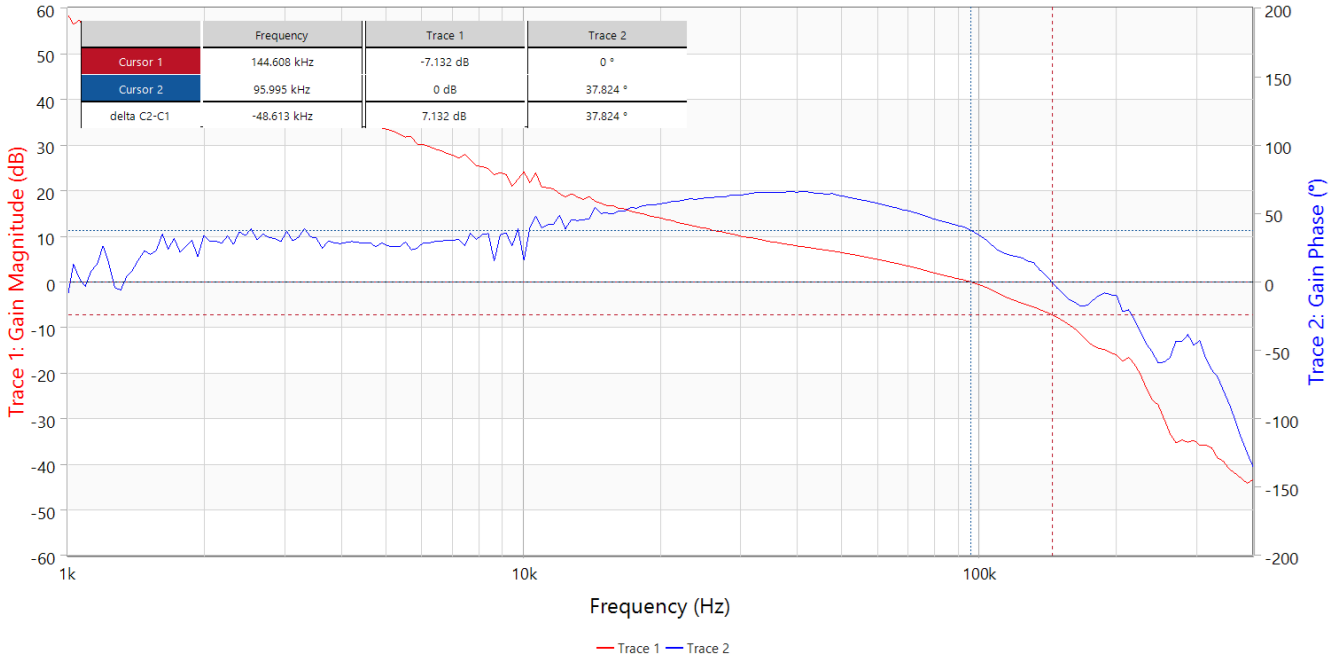


Figure 2-15. Bode Plot at 8.5 V_{IN}, 3.3 V_{OUT}, 4A I_{OUT}

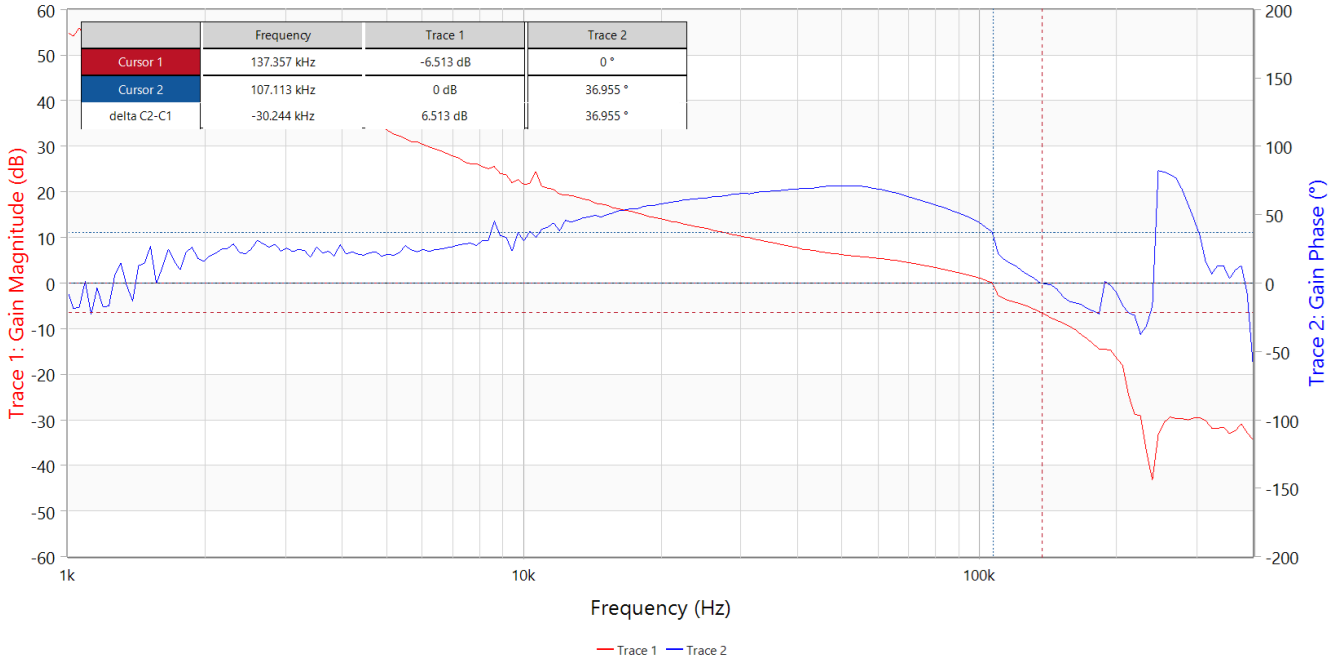


Figure 2-16. Bode Plot at 13.5 V_{IN}, 3.3 V_{OUT}, 4A I_{OUT}

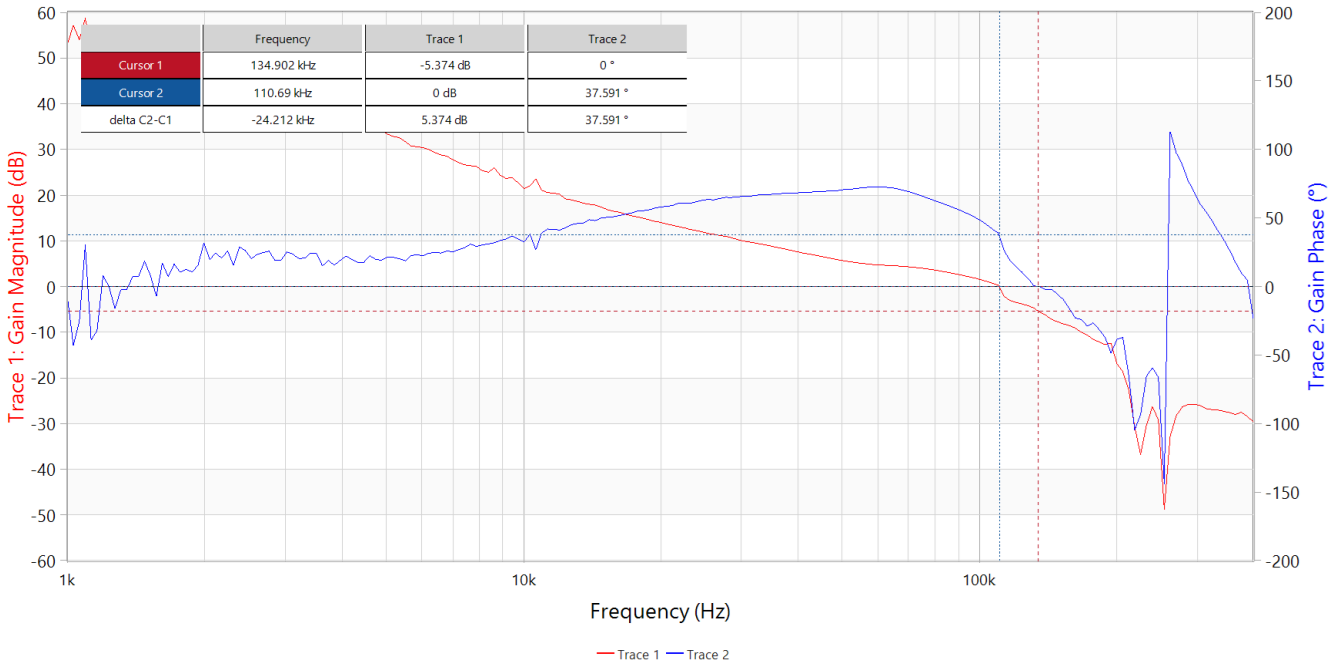


Figure 2-17. Bode Plot at 18 V_{IN}, 3.3 V_{OUT}, 4A I_{OUT}

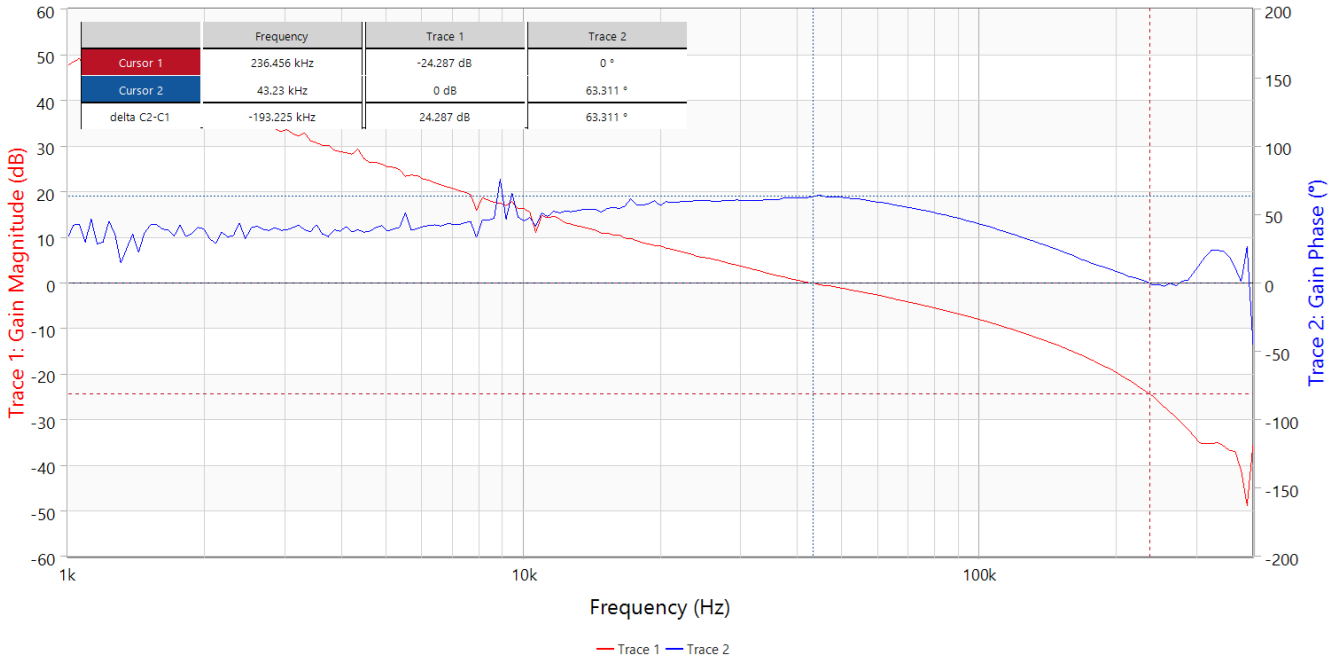


Figure 2-18. Bode Plot at 8.5 V_{IN}, 6 V_{OUT}, 6A I_{OUT}

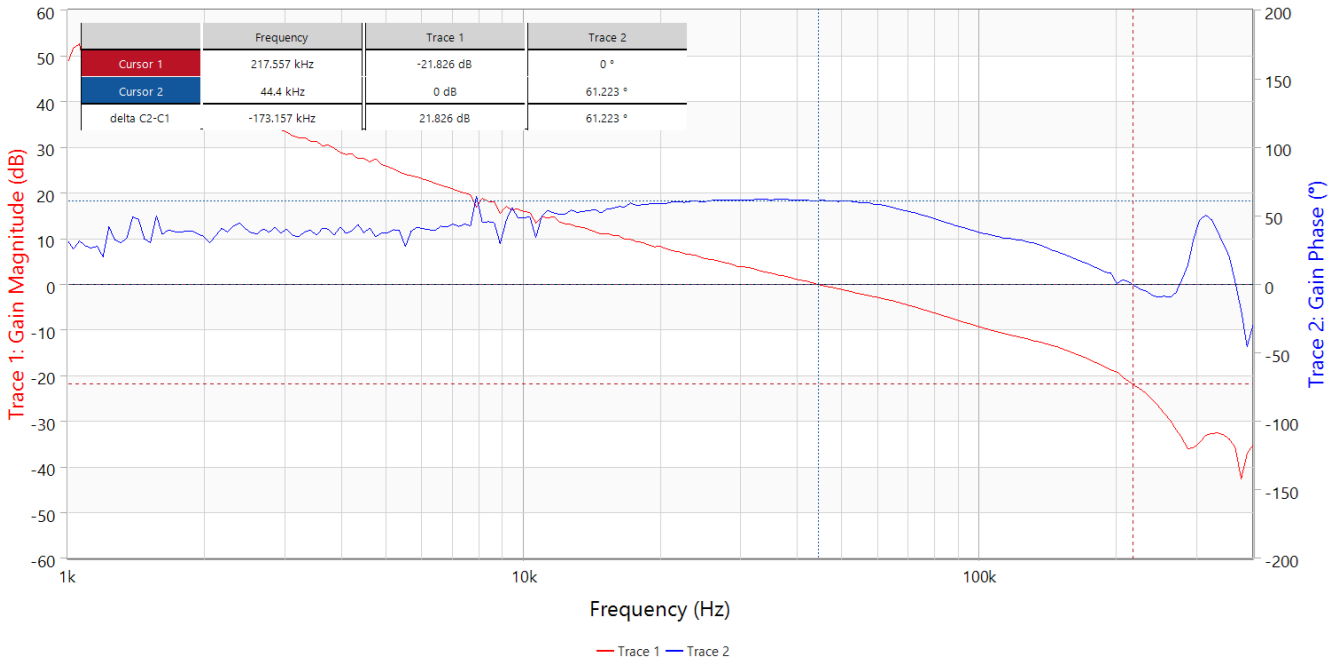


Figure 2-19. Bode Plot at 13.5 V_{IN}, 6 V_{OUT}, 6A I_{OUT}

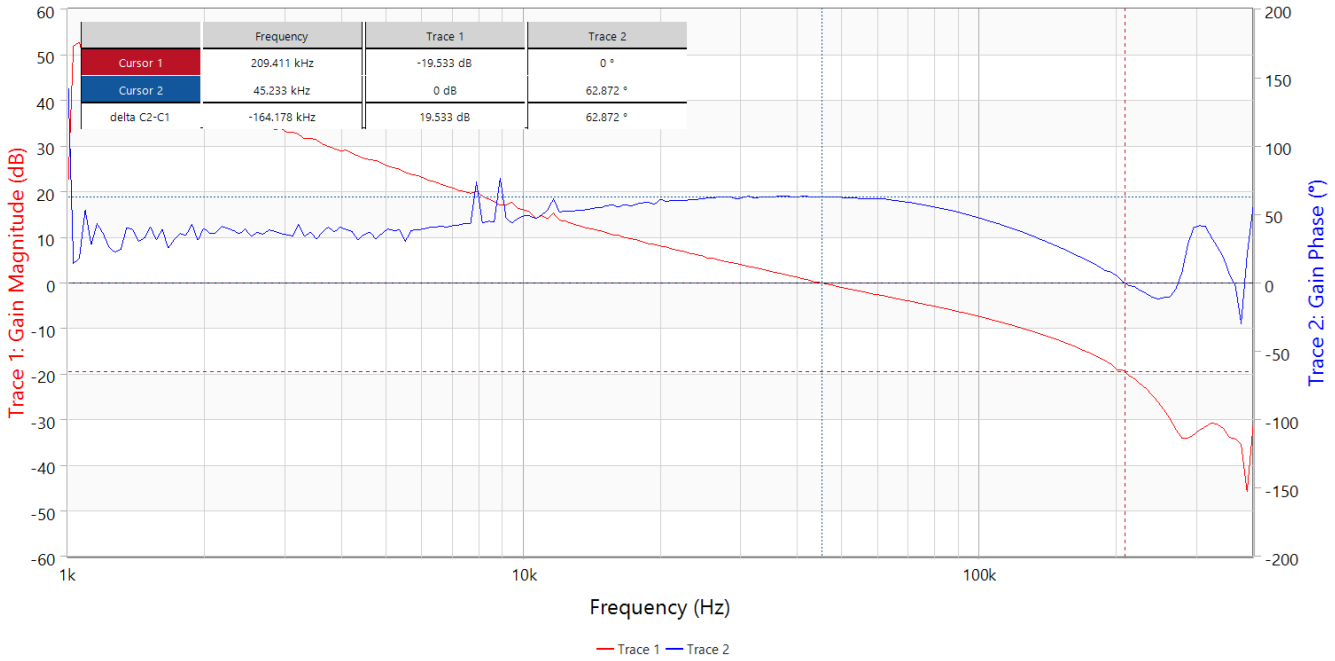


Figure 2-20. Bode Plot at 18 V_{IN}, 6 V_{OUT}, 6A I_{OUT}

Bode plots of TPS628503-Q1 are shown in the following figures.

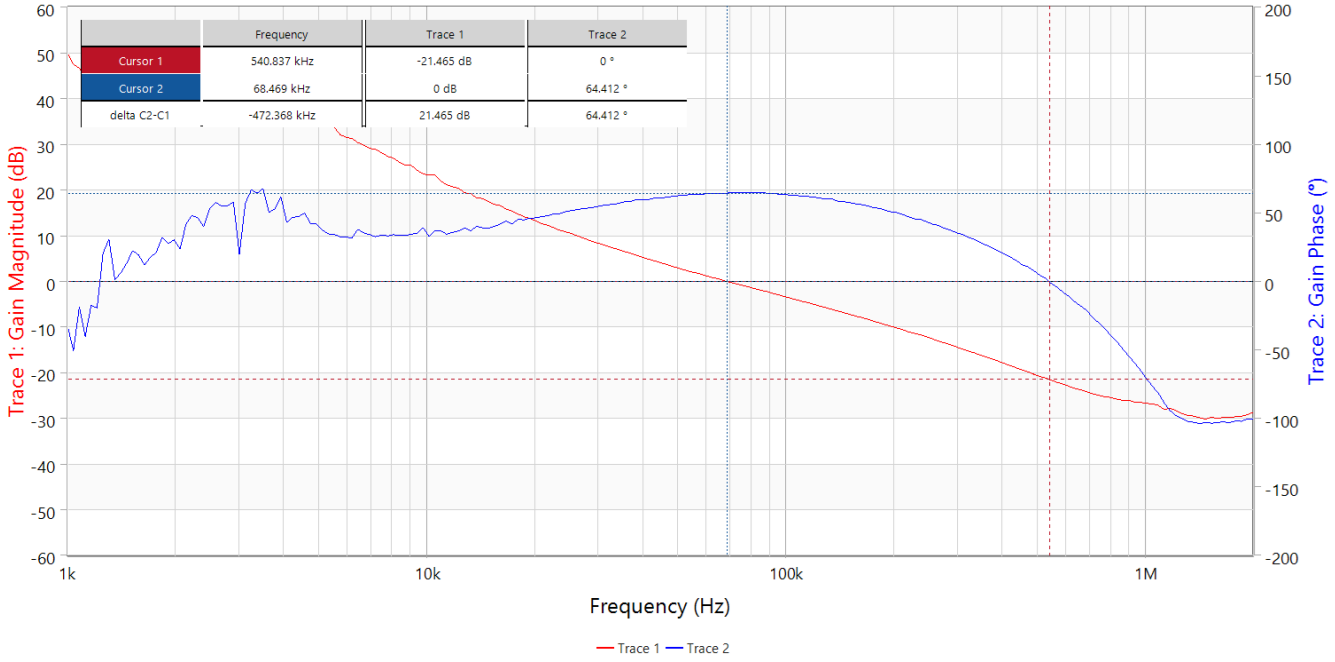


Figure 2-21. Bode Plot at 3.3 V_{IN}, 1.15 V_{OUT}, 0A I_{OUT}

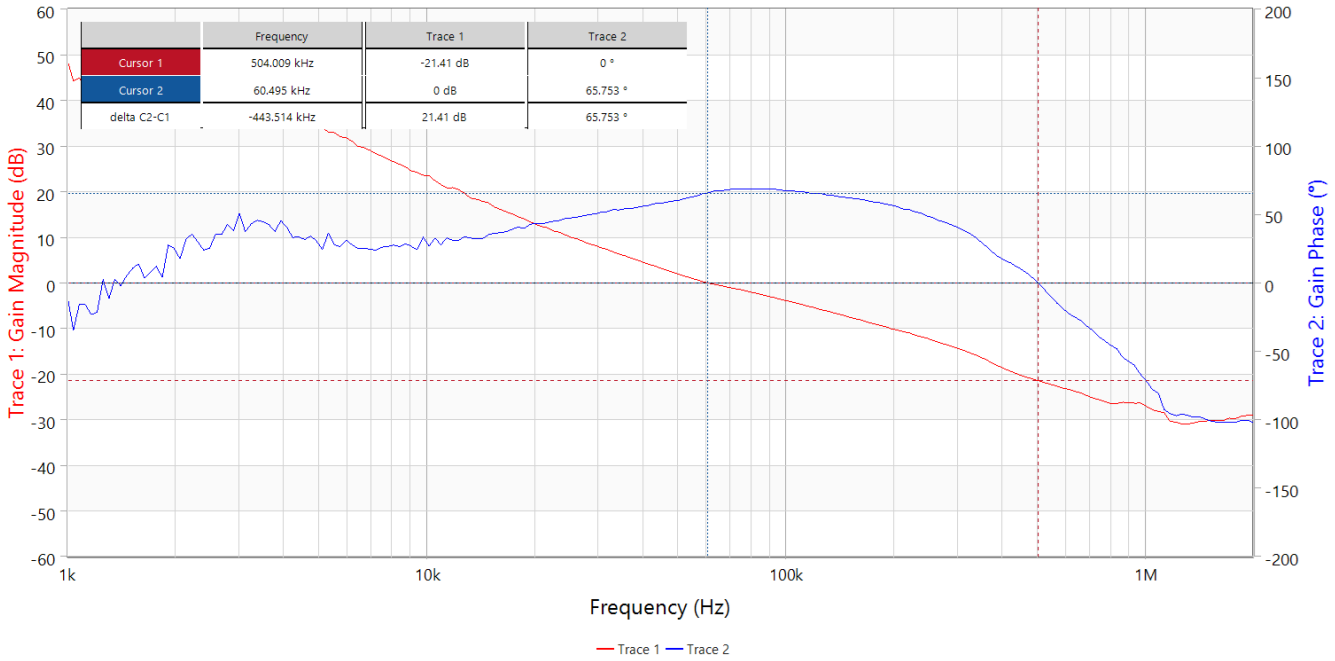


Figure 2-22. Bode Plot at 3.3 V_{IN}, 1.15 V_{OUT}, 3A I_{OUT}

3 Waveforms

3.1 Cold Crank

The cold crank waveform of the board is shown in the following figure by setting appropriate UVLO circuit.

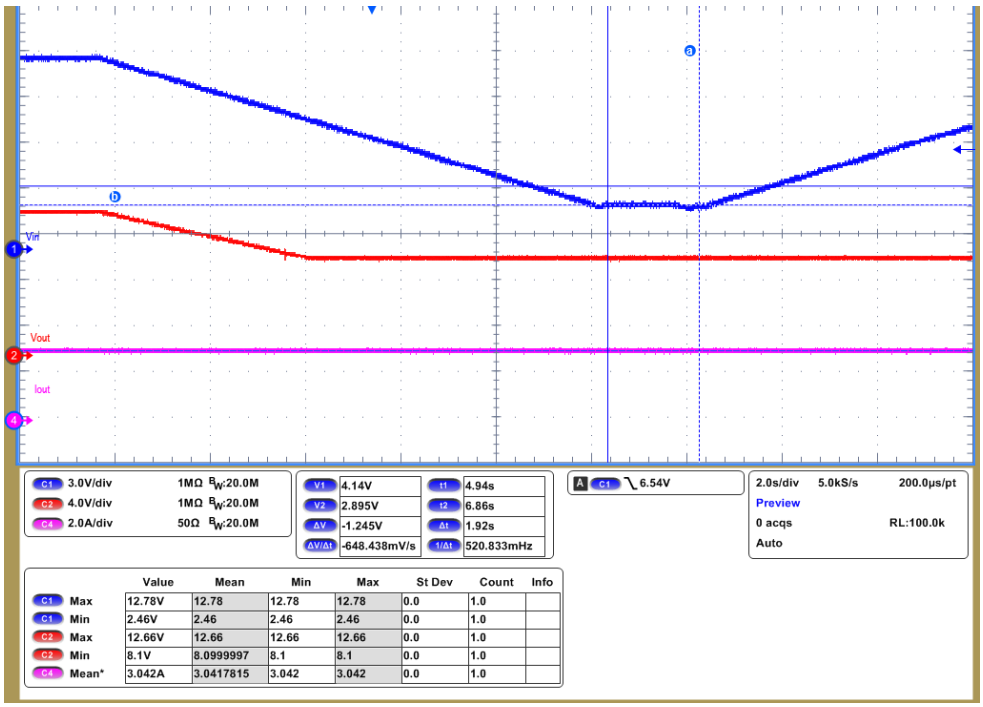


Figure 3-1. Cold Crank at 2.8V_{IN}, 8.5V_{OUT}, 3A I_{OUT}

3.2 Start-up

Start-up behaviors of the LM5152-Q1 are shown in the following figures.

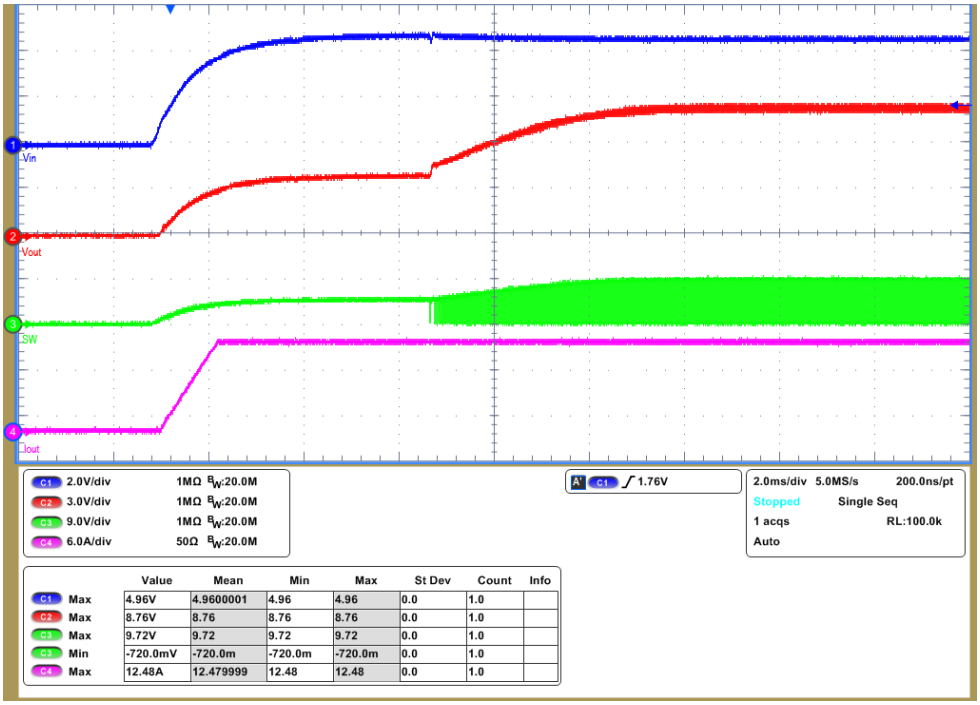


Figure 3-2. Start-up at 4.2 V_{IN}, 8.5 V_{OUT}, 11.76A I_{OUT}

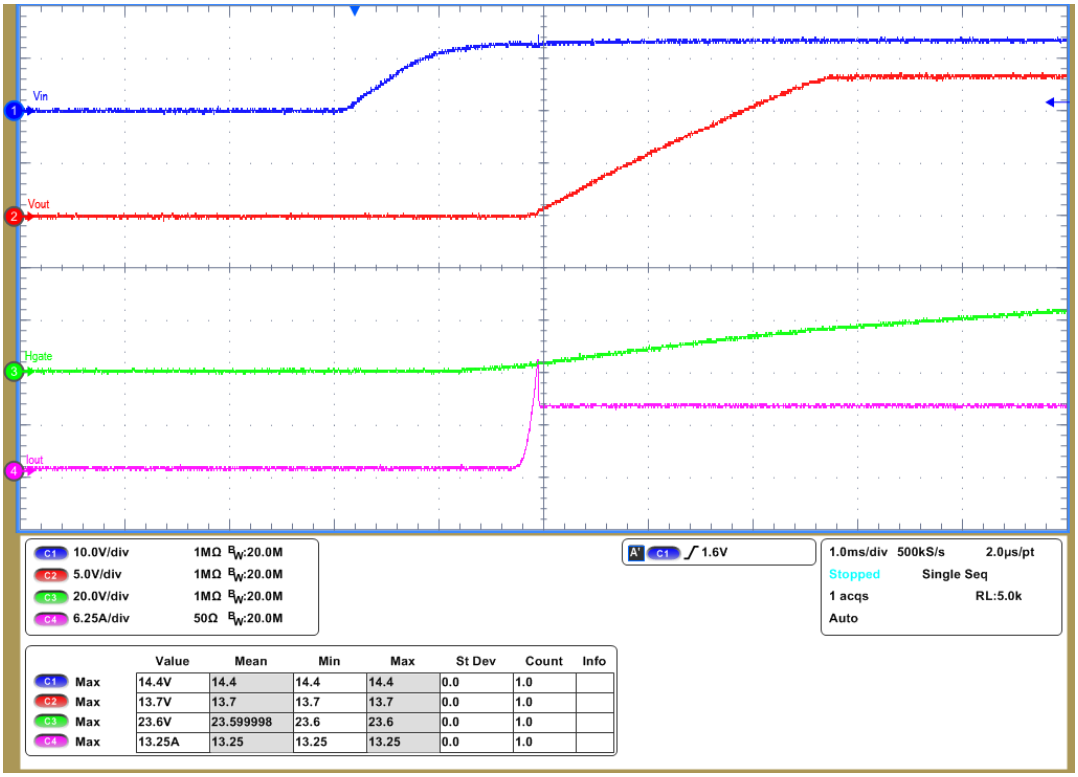


Figure 3-3. Start-up at 13.5 V_{IN}, 13.5 V_{OUT}, 7.48A I_{OUT}

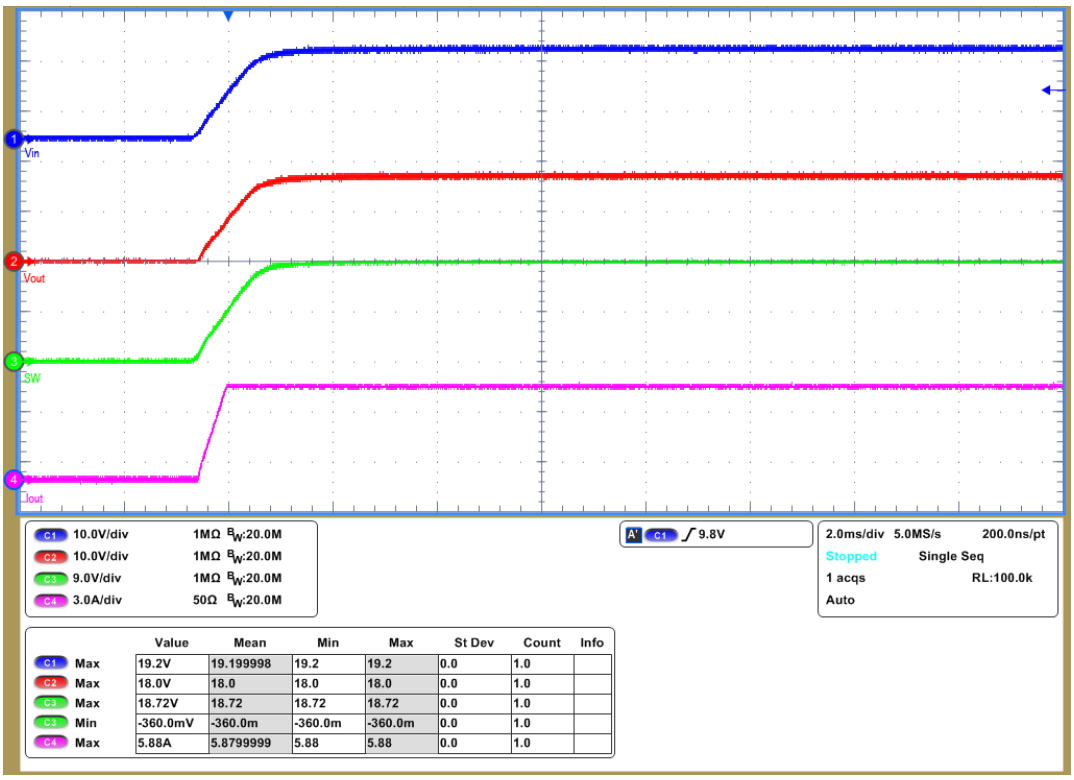


Figure 3-4. Start-up at 18 V_{IN}, 18 V_{OUT}, 5.55A I_{OUT}

Start-up behaviors of LM74900-Q1 are shown in the following figures.

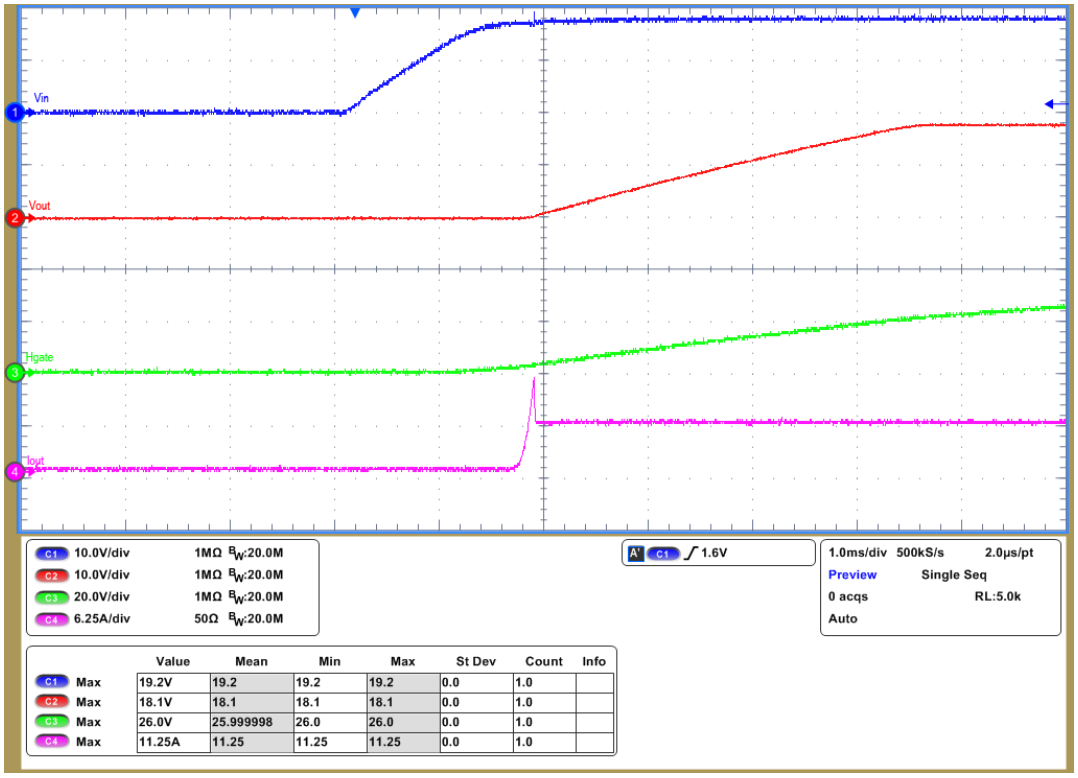


Figure 3-5. Start-up at 18 V_{IN}, 18 V_{OUT}, 5.78A I_{OUT}

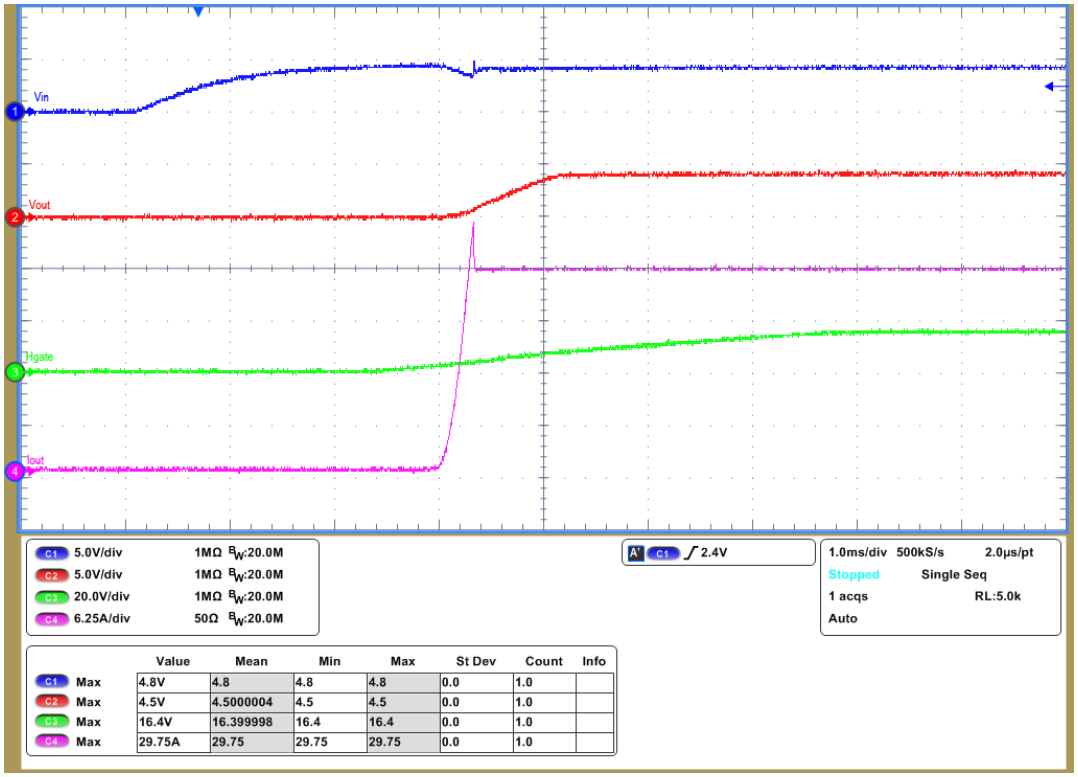


Figure 3-6. Start-up at 4.2 V_{IN}, 4.2 V_{OUT}, 24A I_{OUT}

Start-up behaviors of LMQ644A2-Q1 are shown in the following figures.

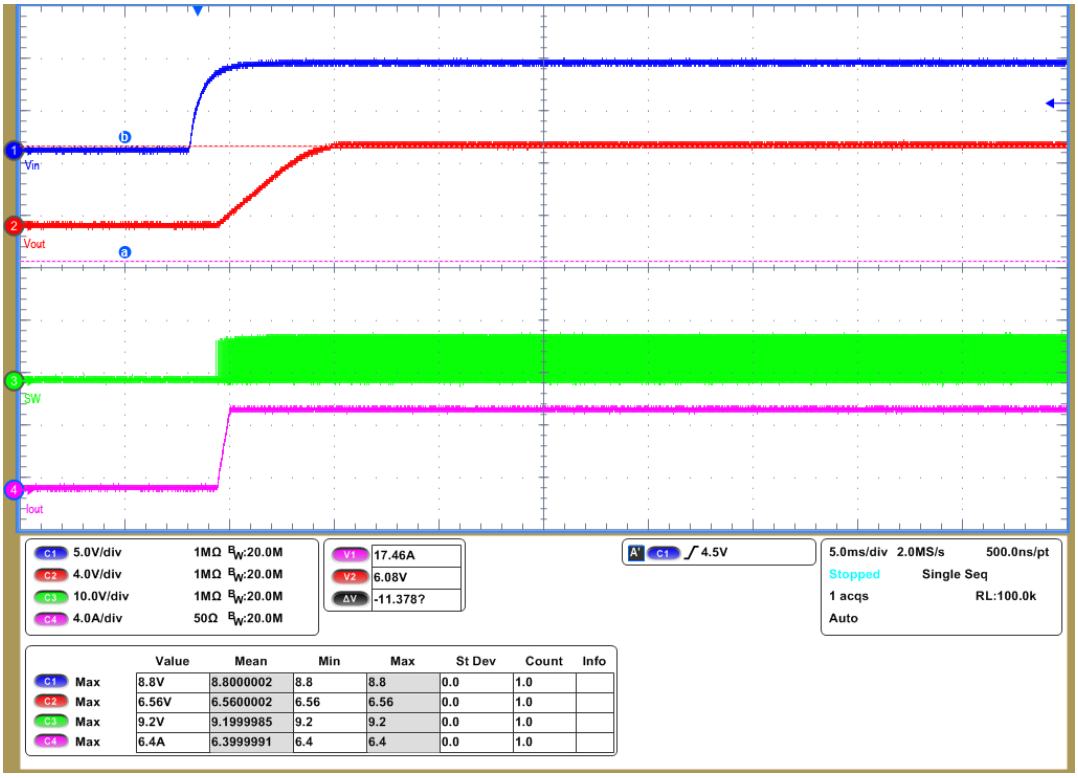


Figure 3-7. Start-up at 8.5 V_{IN}, 6 V_{OUT}, 6A I_{OUT}

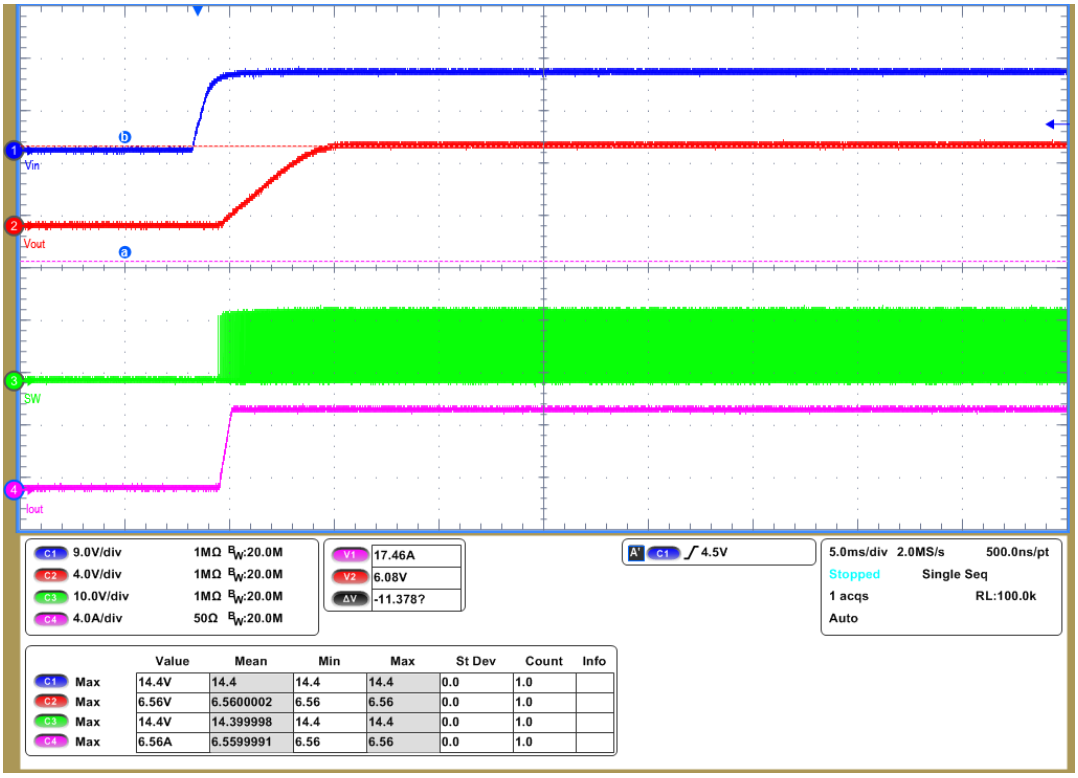


Figure 3-8. Start-up at 13.5 V_{IN}, 6 V_{OUT}, 6A I_{OUT}

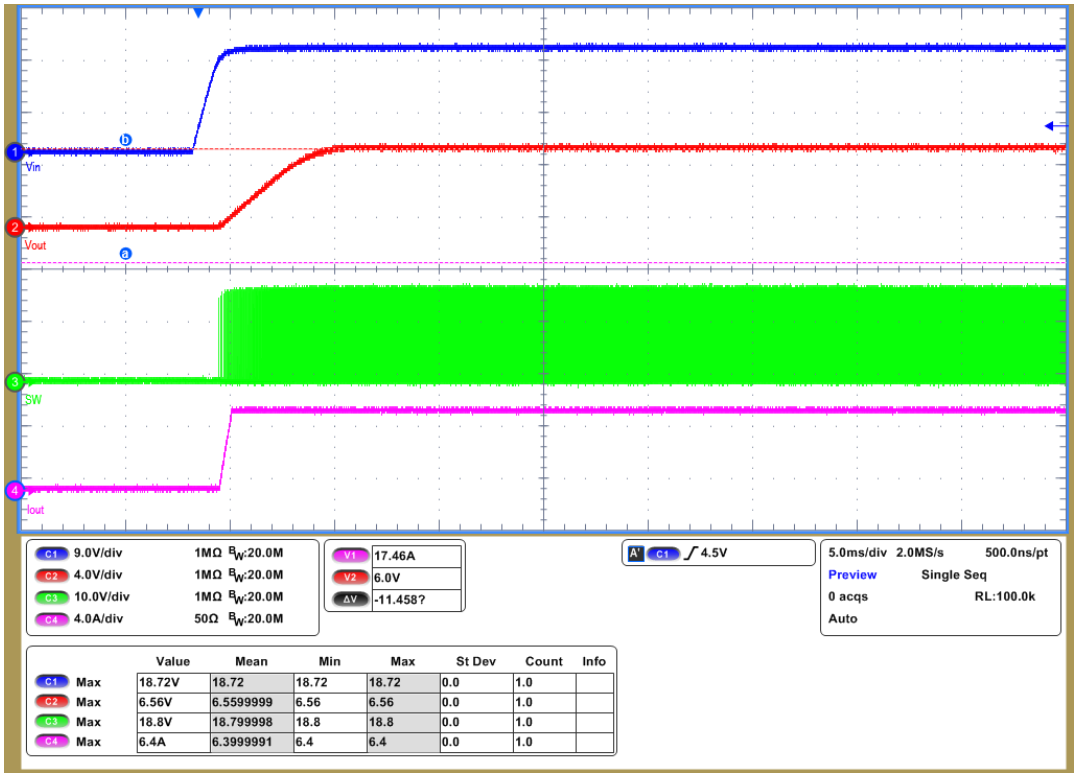


Figure 3-9. Start-up at 18 V_{IN}, 6 V_{OUT}, 6A I_{OUT}

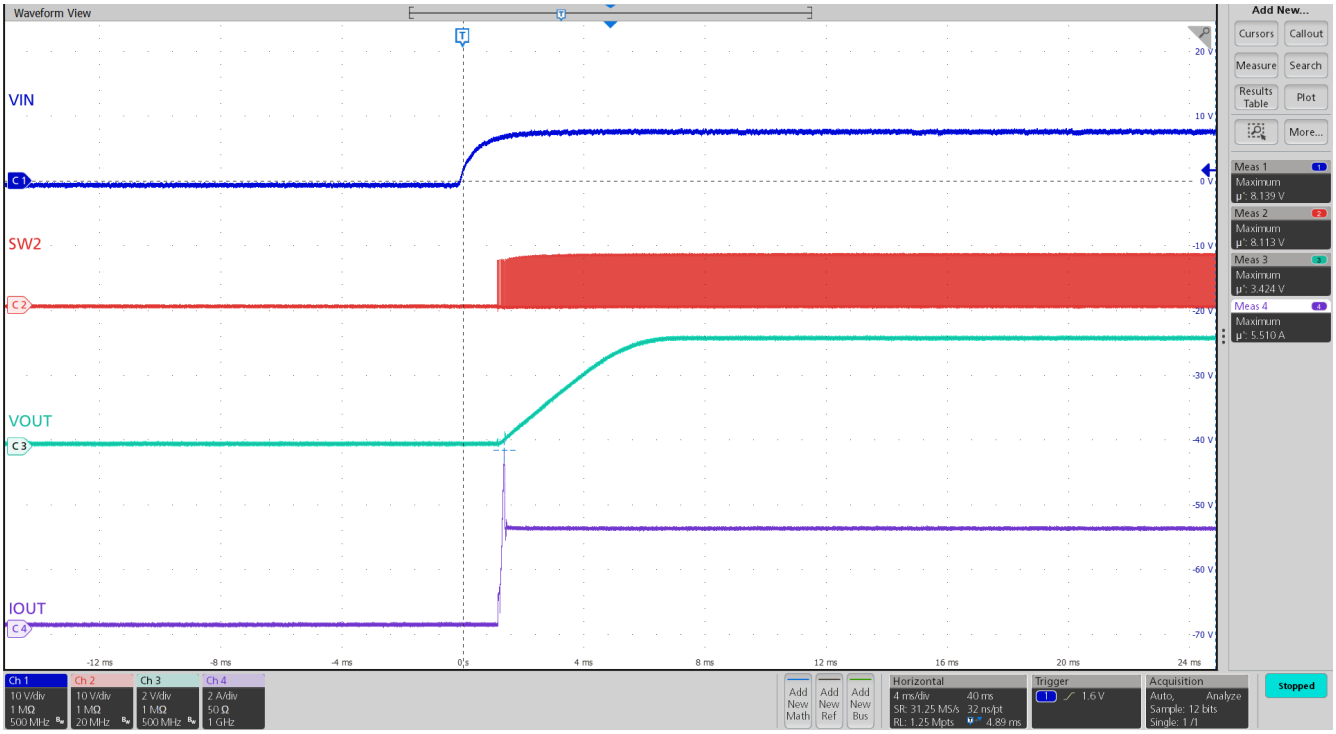


Figure 3-10. Start-up at 8.5 V_{IN}, 3.3 V_{OUT}, 3A I_{OUT}

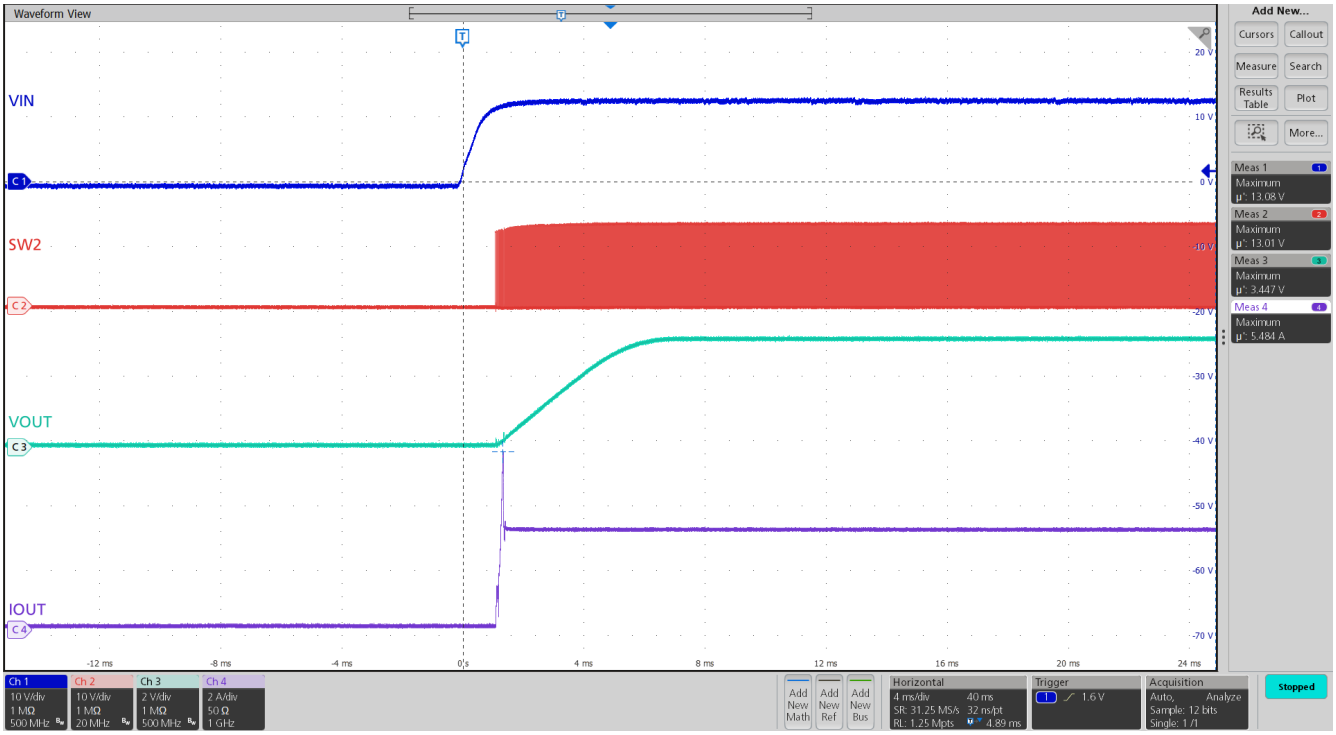


Figure 3-11. Start-up at 13.5 V_{IN}, 3.3 V_{OUT}, 3A I_{OUT}

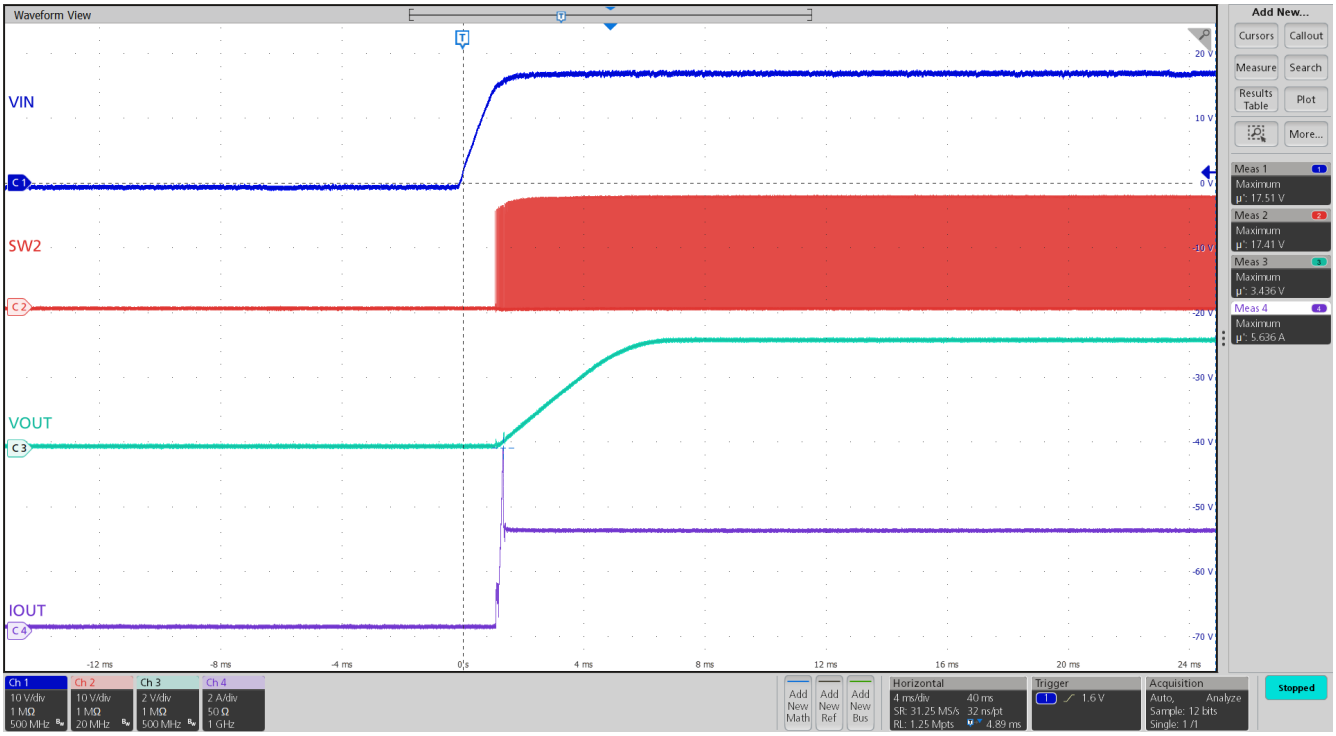


Figure 3-12. Start-up at 18 V_{IN}, 3.3 V_{OUT}, 3A I_{OUT}

Start-up behaviors of TPS7B81-Q1 are shown in the following figures.

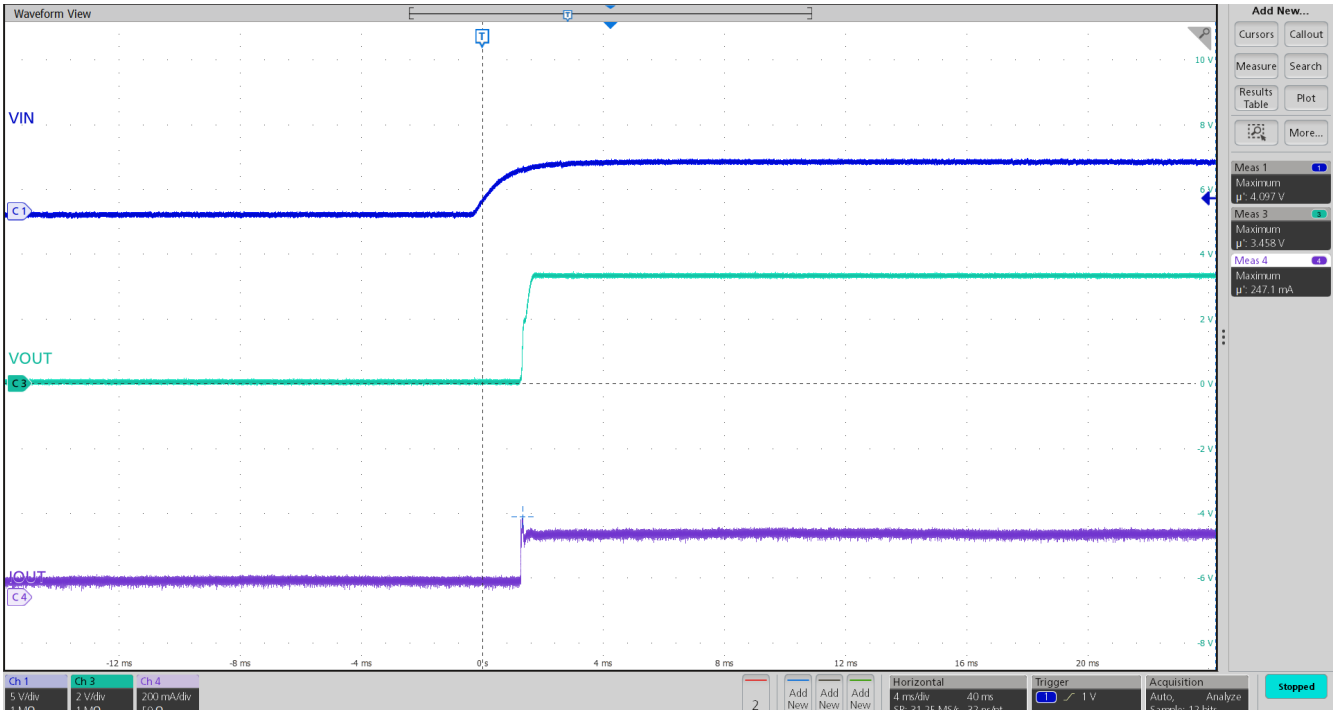


Figure 3-13. Start-up at 4.2 V_{IN}, 6 V_{OUT}, 0.15A I_{OUT}

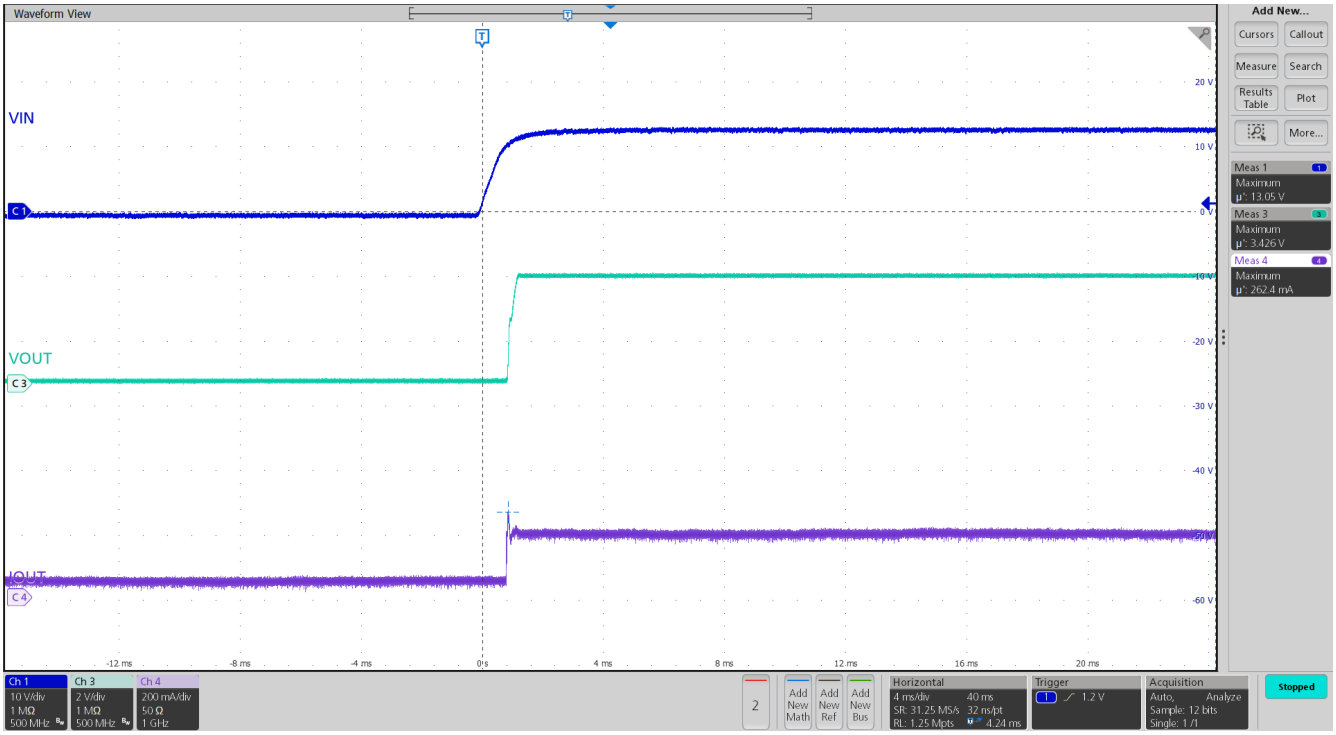


Figure 3-14. Start-up at 13.5 V_{IN}, 6 V_{OUT}, 0.15A I_{OUT}

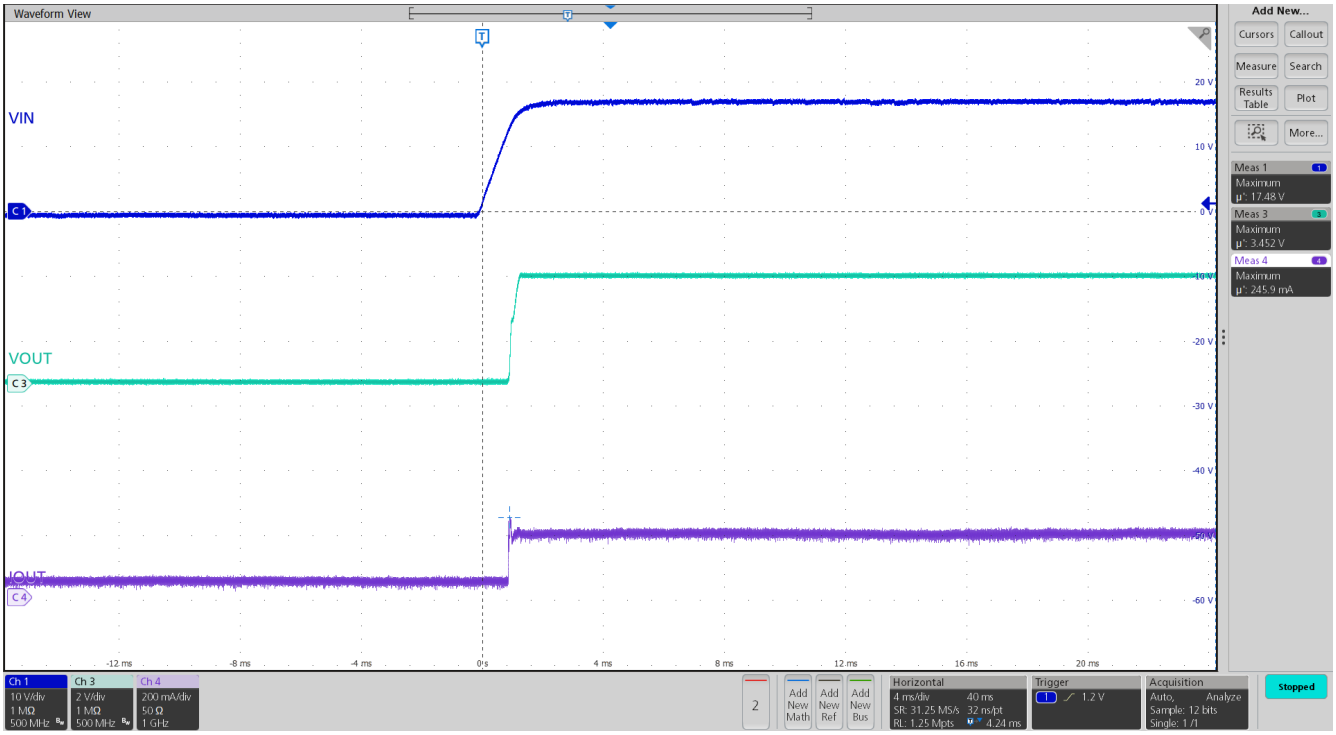


Figure 3-15. Start-up at 18 V_{IN}, 6 V_{OUT}, 0.15A I_{OUT}

Start-up behaviors of TPS745-Q1 are shown in the following figures.

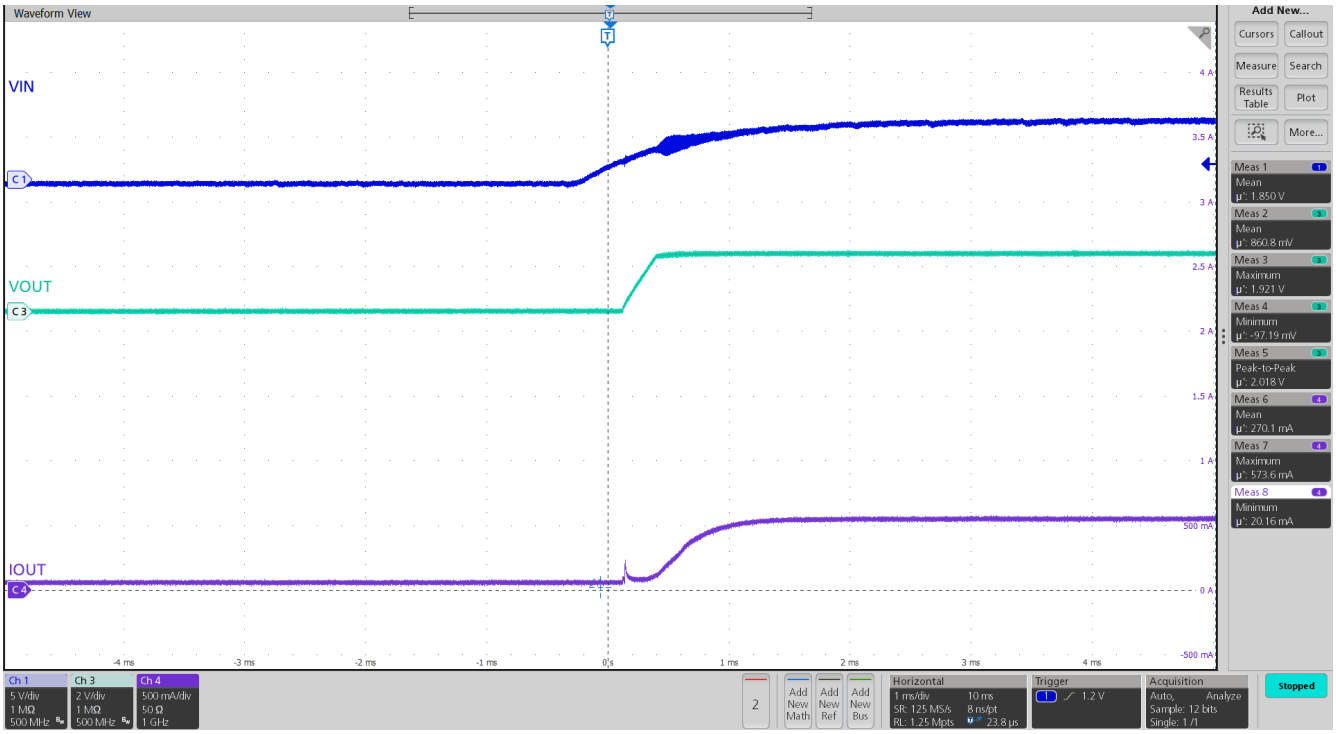


Figure 3-16. Start-up at 3.3 V_{IN}, 1.8 V_{OUT}, 0.5A I_{OUT}

Start-up behaviors of the TPS628503-Q1 are shown in the following figures.

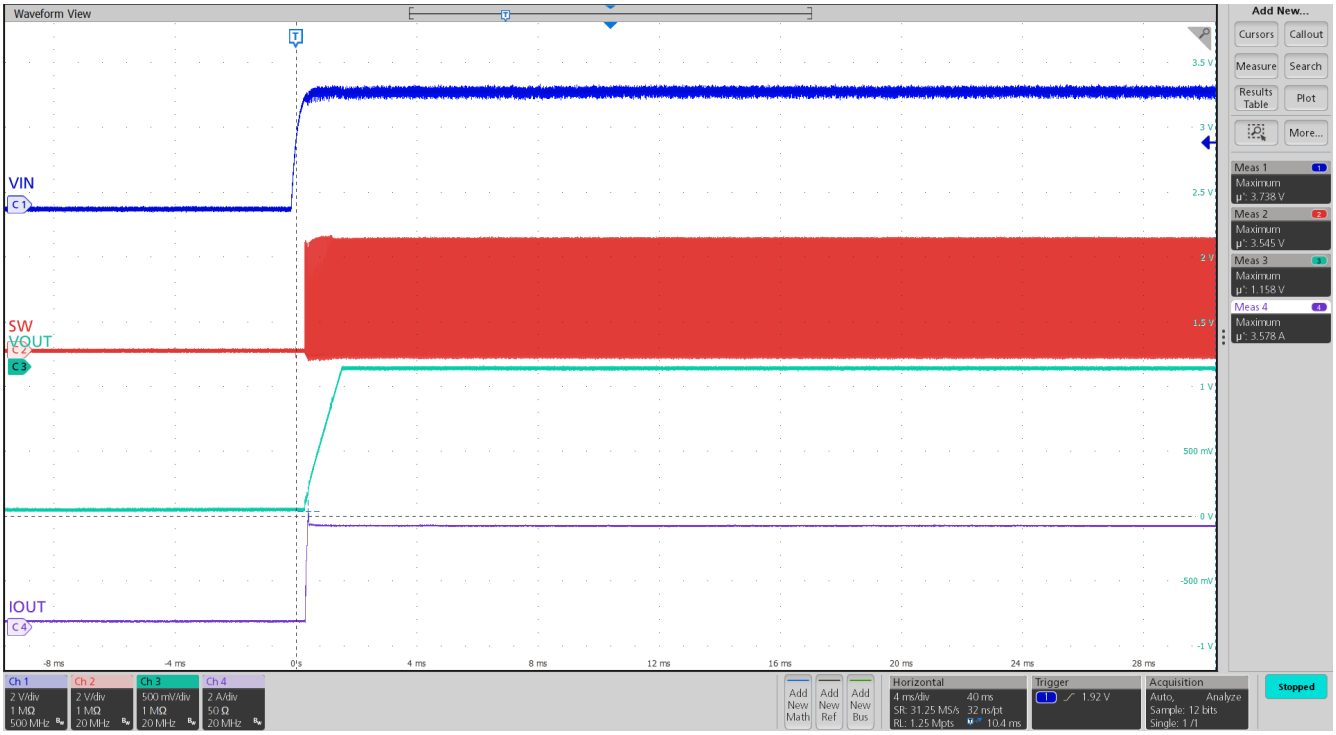


Figure 3-17. Start-up at 3.3 V_{IN}, 1.8 V_{OUT}, 3A I_{OUT}

3.3 Steady State

Steady state waveforms of LM5152-Q1 are shown in the following figures.

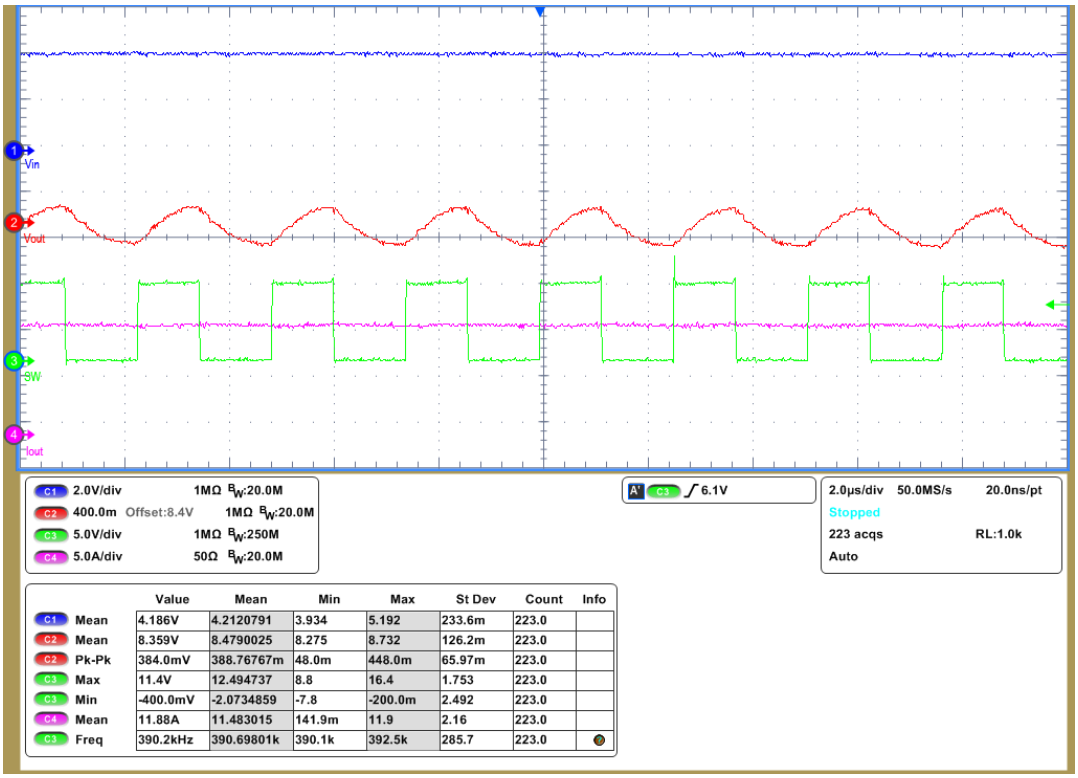


Figure 3-18. Steady State at 4.2 V_{IN}, 8.5 V_{OUT}, 11.76A I_{OUT}

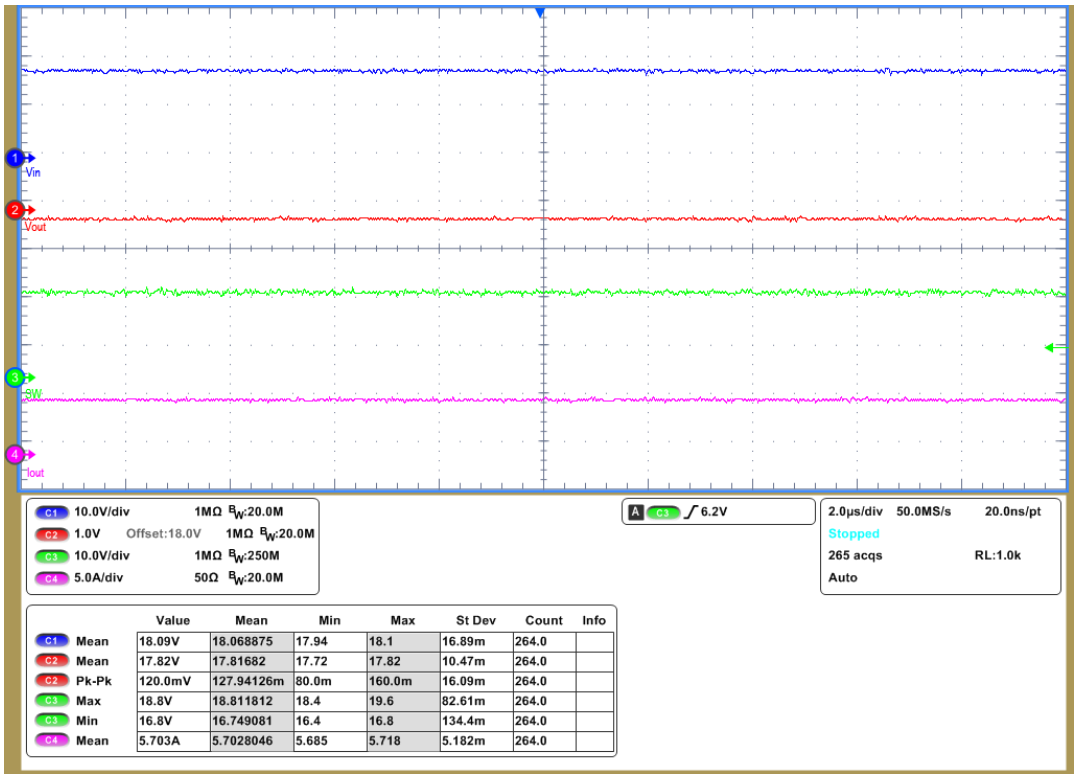


Figure 3-19. Steady State at 18 V_{IN}, 18 V_{OUT}, 5.5A I_{OUT}

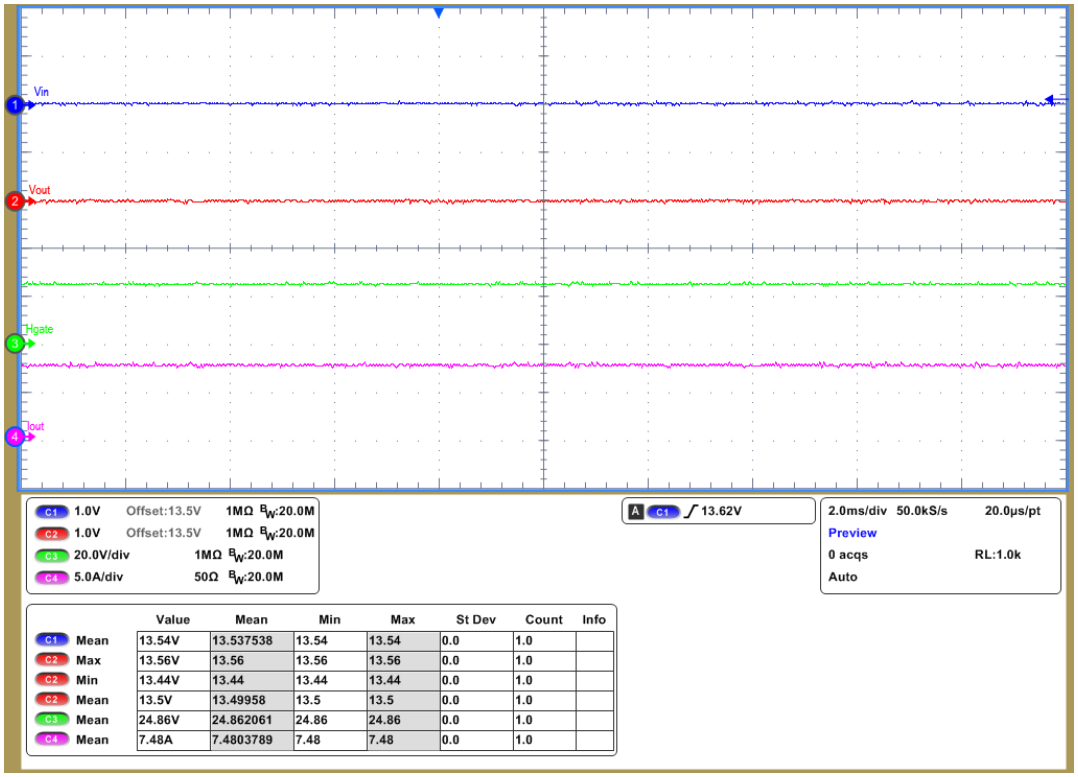


Figure 3-20. Steady State at 13.5 V_{IN}, 13.5 V_{OUT}, 7.48A I_{OUT}

Steady state waveforms of LM74900-Q1 are shown in the following figures.

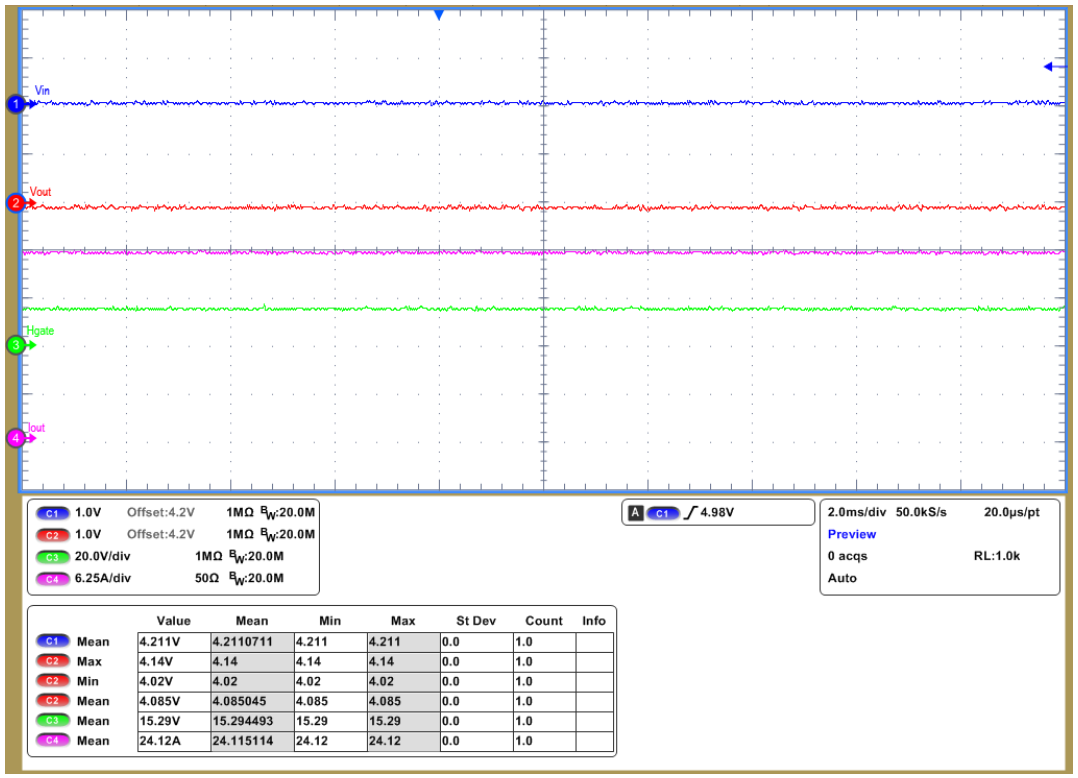


Figure 3-21. Steady State at 4.2 V_{IN}, 4.2 V_{OUT}, 24A I_{OUT}

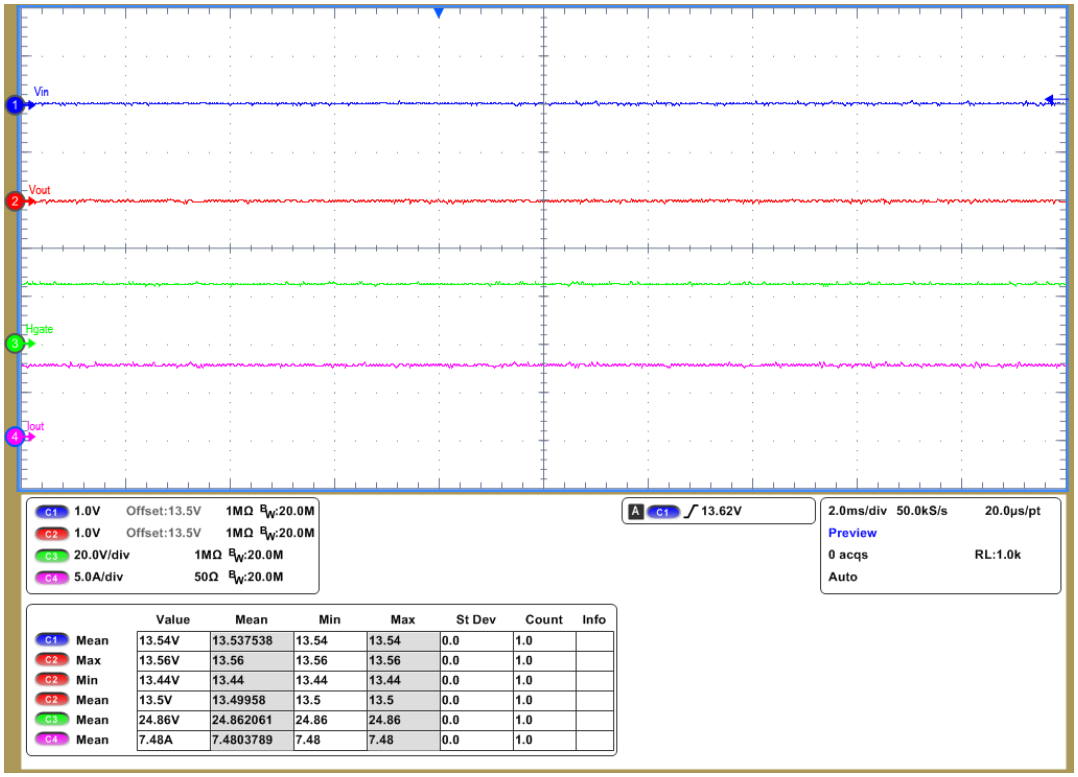


Figure 3-22. Steady State at 13.5 V_{IN}, 13.5 V_{OUT}, 7.48A I_{OUT}

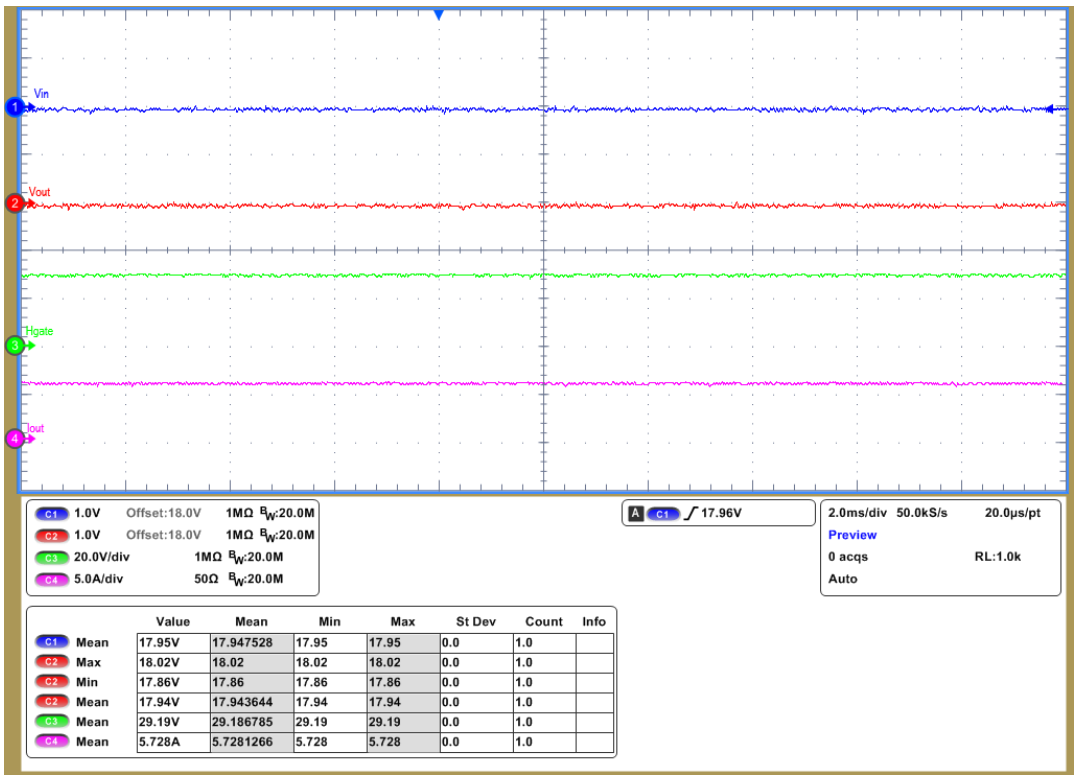


Figure 3-23. Steady State at 18 V_{IN}, 18 V_{OUT}, 5.5A I_{OUT}

Steady state waveforms of LMQ644A2-Q1 are shown in the following figures.

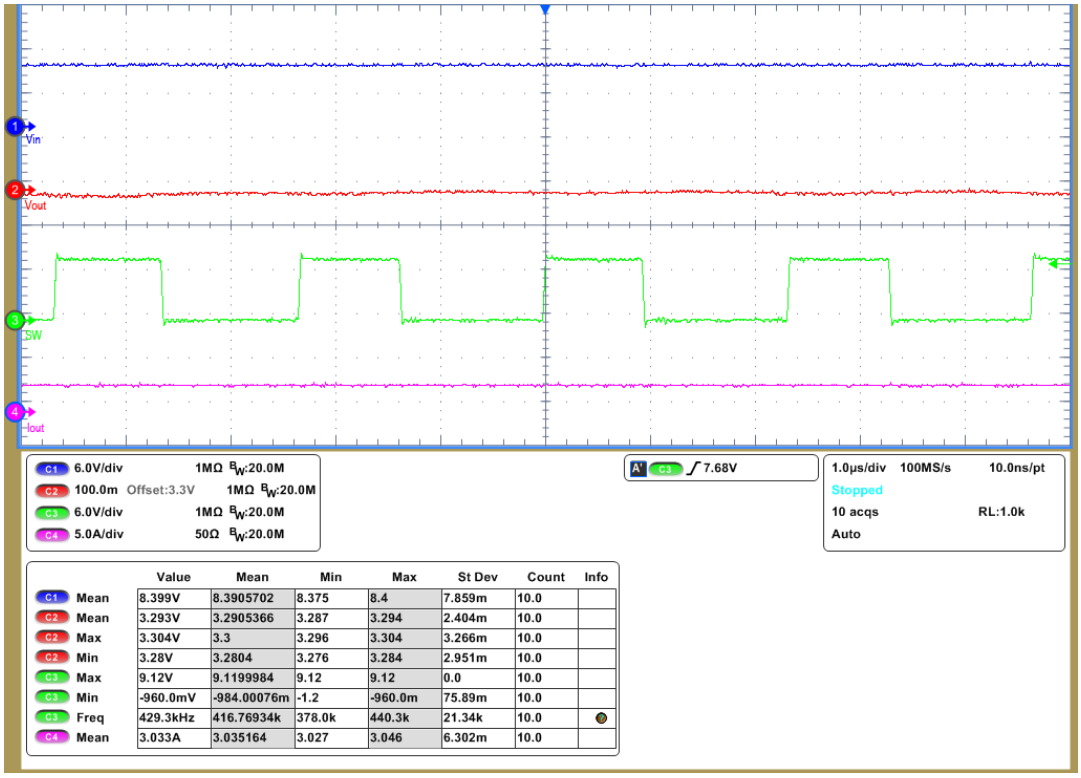


Figure 3-24. Steady State at 8.5 V_{IN}, 3.3 V_{OUT}, 3A I_{OUT}

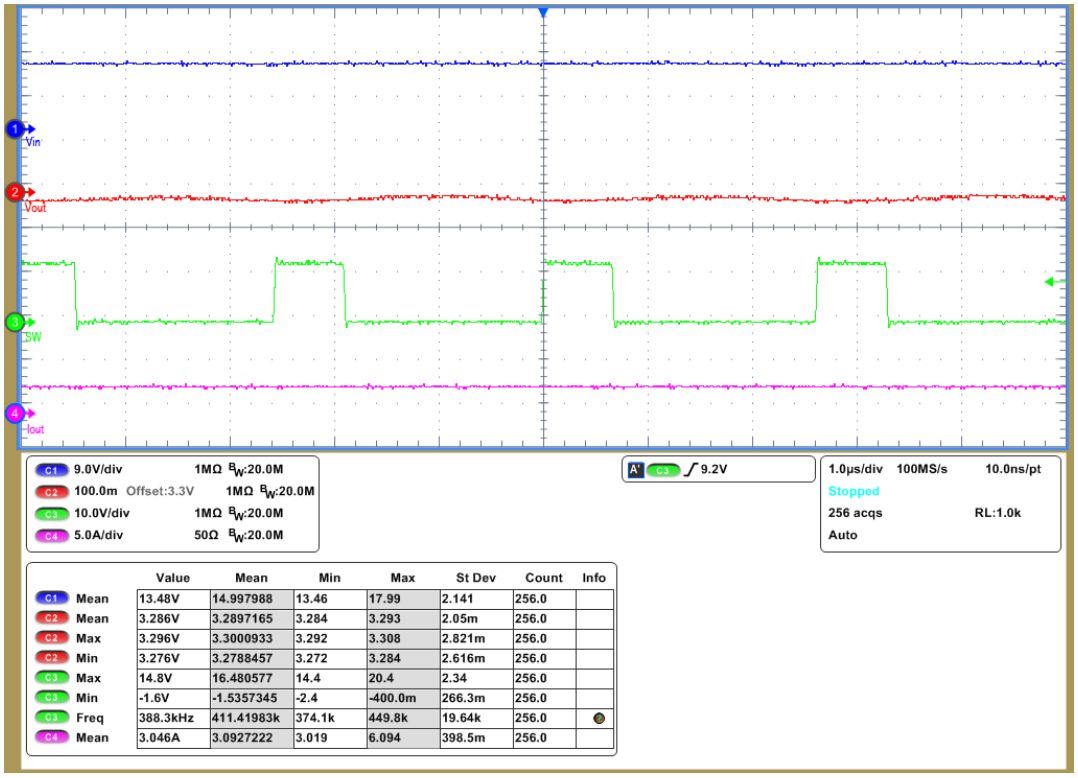
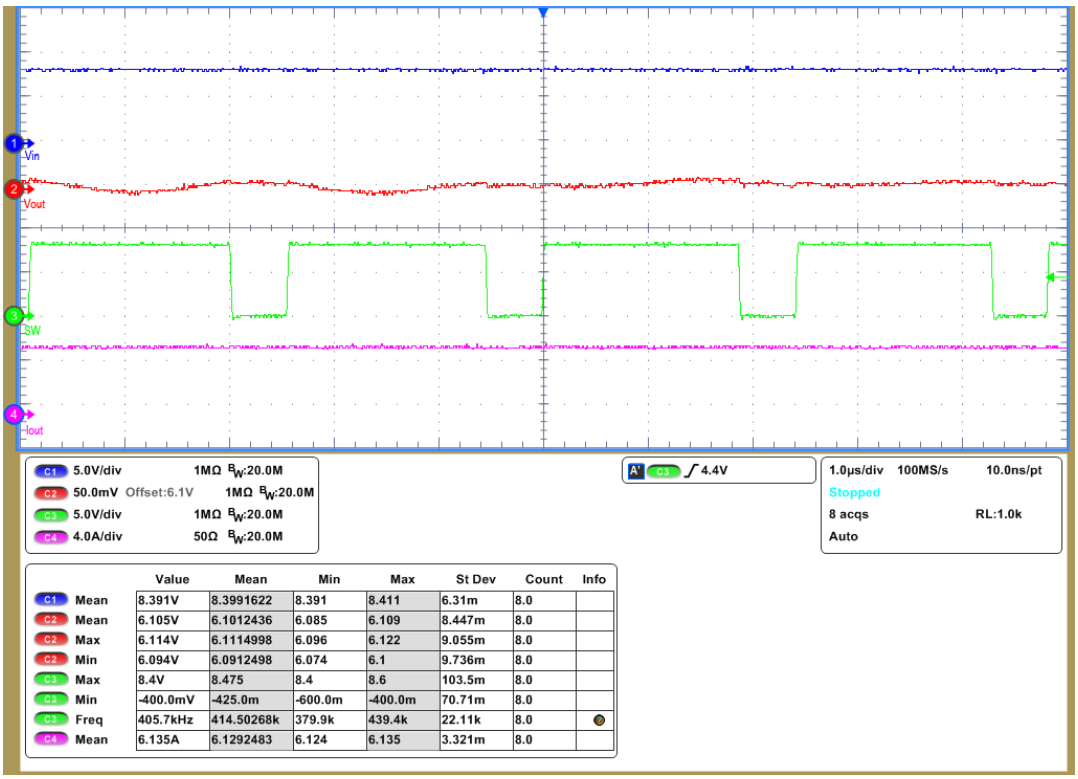


Figure 3-25. Steady State at 13.5 V_{IN}, 3.3 V_{OUT}, 3A I_{OUT}

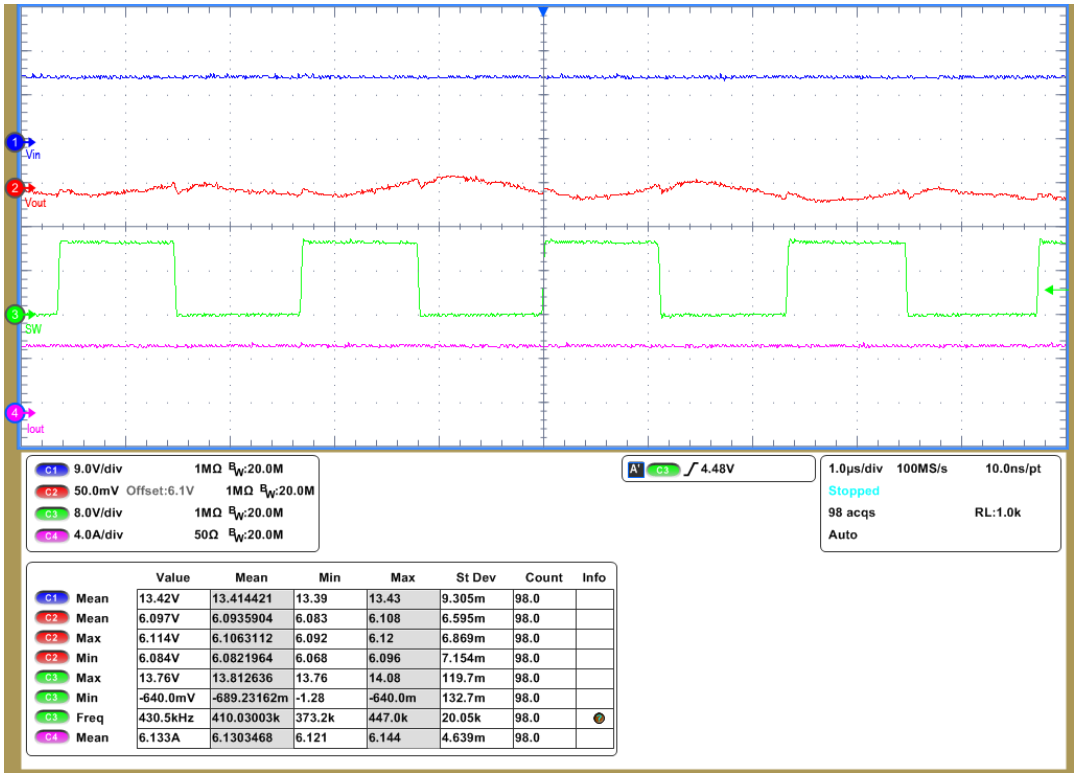
	Value	Mean	Min	Max	St Dev	Count	Info
C1 Mean	17.97V	17.958219	17.94	17.99	8.726m	222.0	
C2 Mean	3.289V	3.2893619	3.284	3.293	1.904m	222.0	
C2 Max	3.3V	3.3001916	3.292	3.308	2.605m	222.0	
C2 Min	3.28V	3.2780069	3.272	3.284	2.647m	222.0	
C3 Max	19.6V	19.704273	18.4	20.4	307.8m	222.0	
C3 Min	-1.6V	-1.6901405	-2.4	-400.0m	315.2m	222.0	
C3 Freq	410.5kHz	412.29806k	374.1k	449.6k	22.5k	222.0	
C4 Mean	3.042A	3.1935853	3.019	6.094	672.0m	222.0	

Figure 3-26. Steady State at 18 V_{IN}, 3.3 V_{OUT}, 3A I_{OUT}



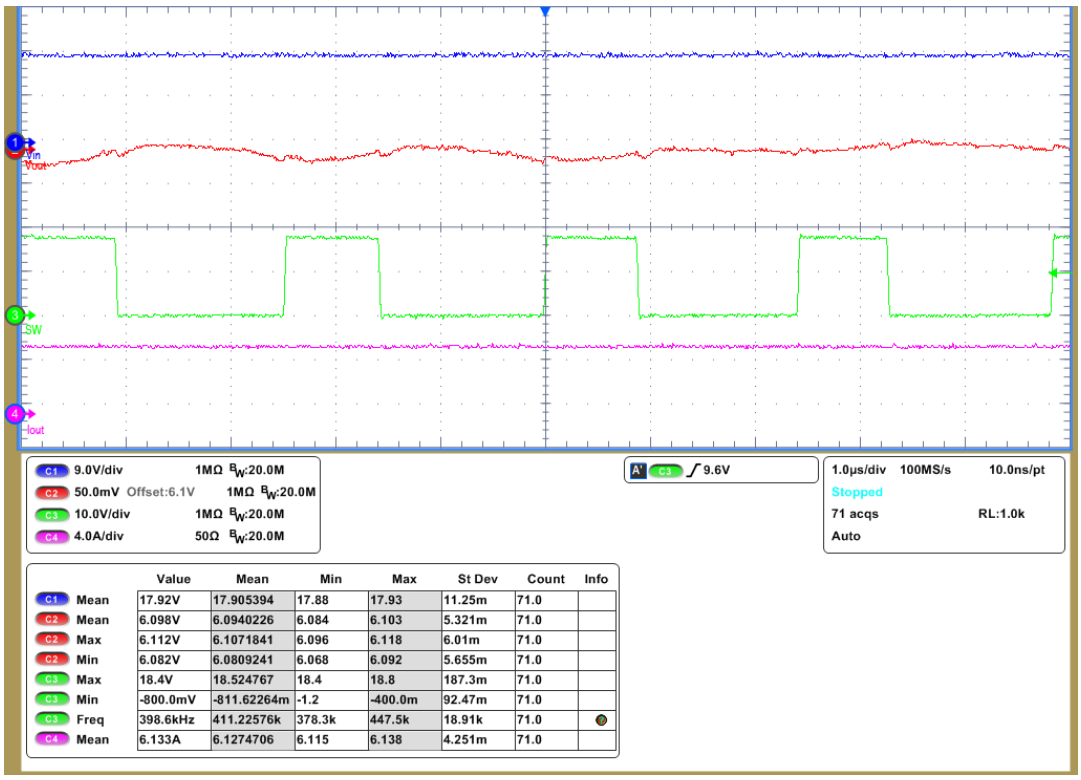
	Value	Mean	Min	Max	St Dev	Count	Info
C1 Mean	8.391V	8.3991622	8.391	8.411	6.31m	8.0	
C2 Mean	6.105V	6.1012436	6.085	6.109	8.447m	8.0	
C2 Max	6.114V	6.1114998	6.096	6.122	9.055m	8.0	
C2 Min	6.094V	6.0912498	6.074	6.1	9.736m	8.0	
C3 Max	8.4V	8.475	8.4	8.6	103.5m	8.0	
C3 Min	-400.0mV	-425.0m	-600.0m	-400.0m	70.71m	8.0	
C3 Freq	405.7kHz	414.50268k	379.9k	439.4k	22.11k	8.0	
C4 Mean	6.135A	6.1292483	6.124	6.135	3.321m	8.0	

Figure 3-27. Steady State at 8.5 V_{IN}, 6 V_{OUT}, 6.13A I_{OUT}



	Value	Mean	Min	Max	St Dev	Count	Info
C1 Mean	13.42V	13.414421	13.39	13.43	9.305m	98.0	
C2 Mean	6.097V	6.0935904	6.083	6.108	6.595m	98.0	
C2 Max	6.114V	6.1063112	6.092	6.12	6.869m	98.0	
C2 Min	6.084V	6.0821964	6.068	6.096	7.154m	98.0	
C3 Max	13.76V	13.812636	13.76	14.08	119.7m	98.0	
C3 Min	-640.0mV	-689.23162m	-1.28	-640.0m	132.7m	98.0	
C3 Freq	430.5kHz	410.03003k	373.2k	447.0k	20.05k	98.0	
C4 Mean	6.133A	6.1303468	6.121	6.144	4.639m	98.0	

Figure 3-28. Steady State at 13.5 V_{IN}, 6 V_{OUT}, 6.13A I_{OUT}



	Value	Mean	Min	Max	St Dev	Count	Info
C1 Mean	17.92V	17.905394	17.88	17.93	11.25m	71.0	
C2 Mean	6.098V	6.0940226	6.084	6.103	5.321m	71.0	
C2 Max	6.112V	6.1071841	6.096	6.118	6.01m	71.0	
C2 Min	6.082V	6.0809241	6.068	6.092	5.655m	71.0	
C3 Max	18.4V	18.524767	18.4	18.8	187.3m	71.0	
C3 Min	-800.0mV	-811.62264m	-1.2	-400.0m	92.47m	71.0	
C3 Freq	398.6kHz	411.22576k	378.3k	447.5k	18.91k	71.0	
C4 Mean	6.133A	6.1274706	6.115	6.138	4.251m	71.0	

Figure 3-29. Steady State at 18 V_{IN}, 6 V_{OUT}, 6.13A I_{OUT}

Steady state waveforms of TPS7B81-Q1 are shown in the following figures.

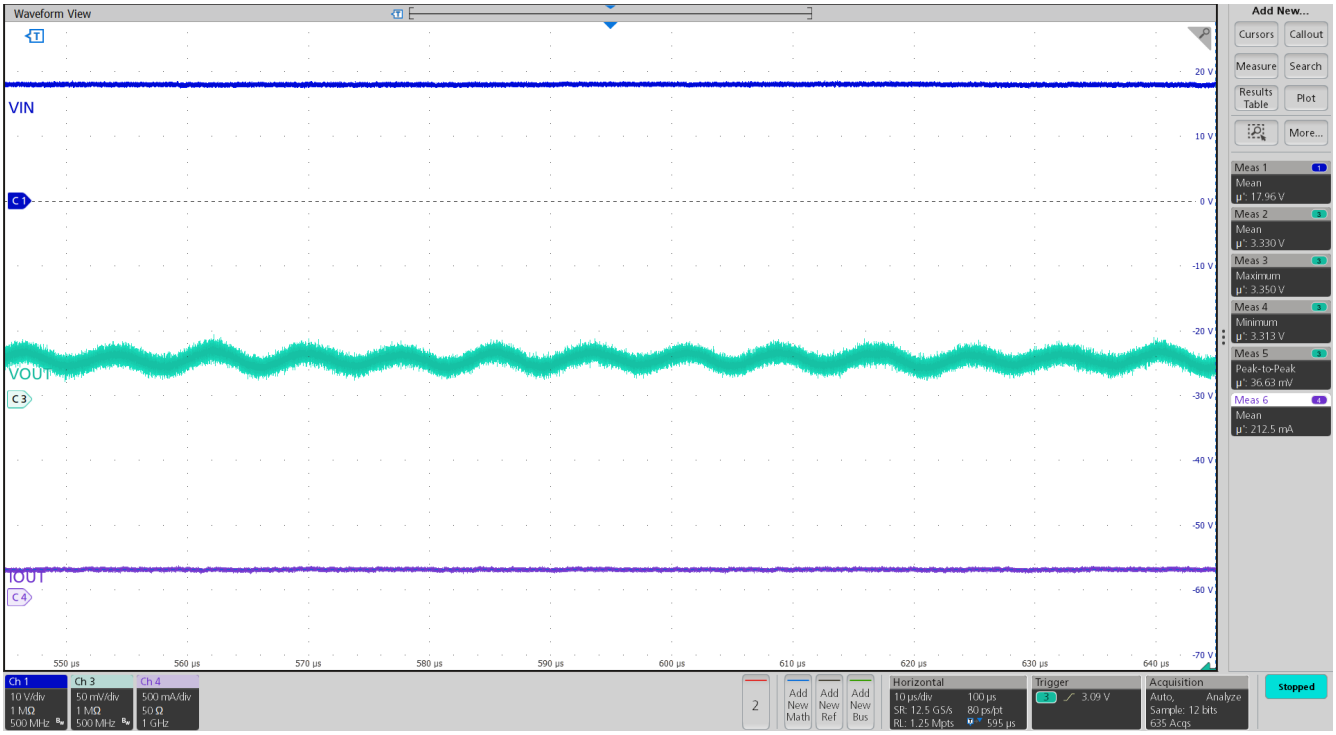


Figure 3-30. Steady State at 18 V_{IN}, 3.3 V_{OUT}, 0.15A I_{OUT}

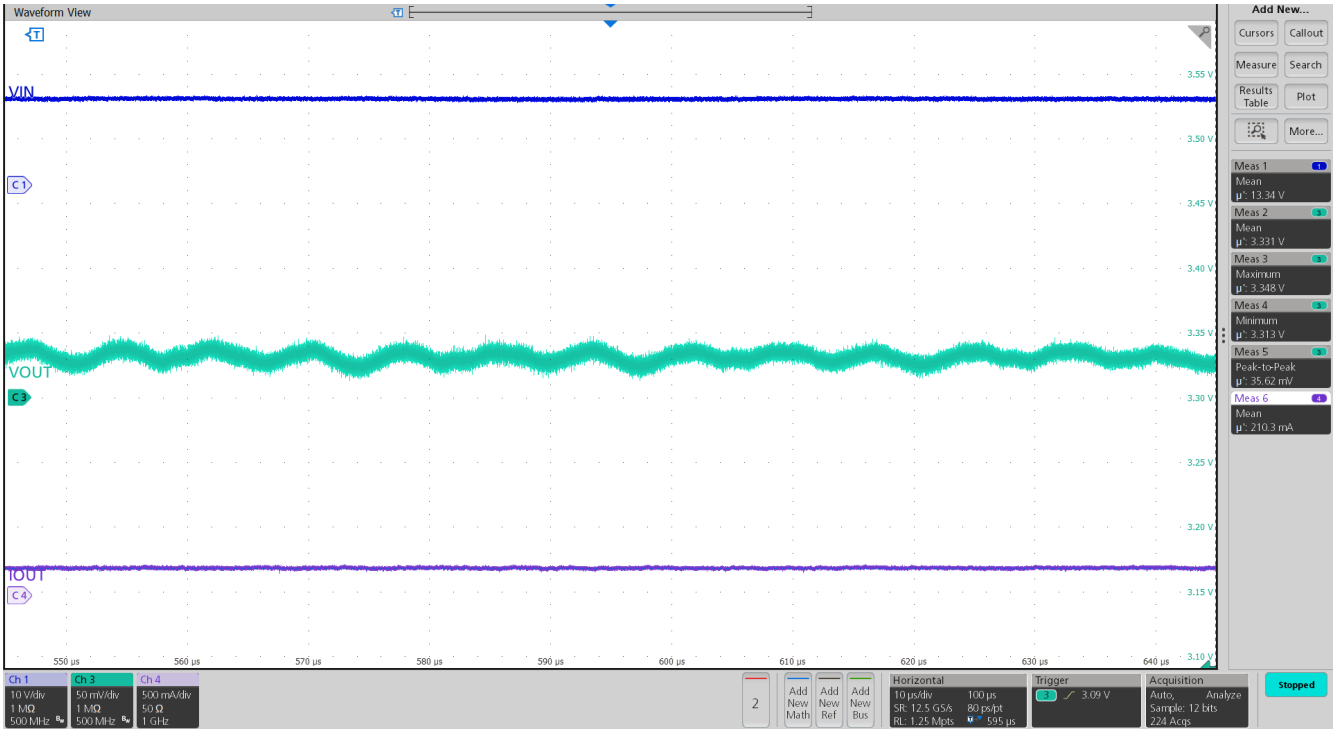


Figure 3-31. Steady State at 13.5 V_{IN}, 3.3 V_{OUT}, 0.15A I_{OUT}

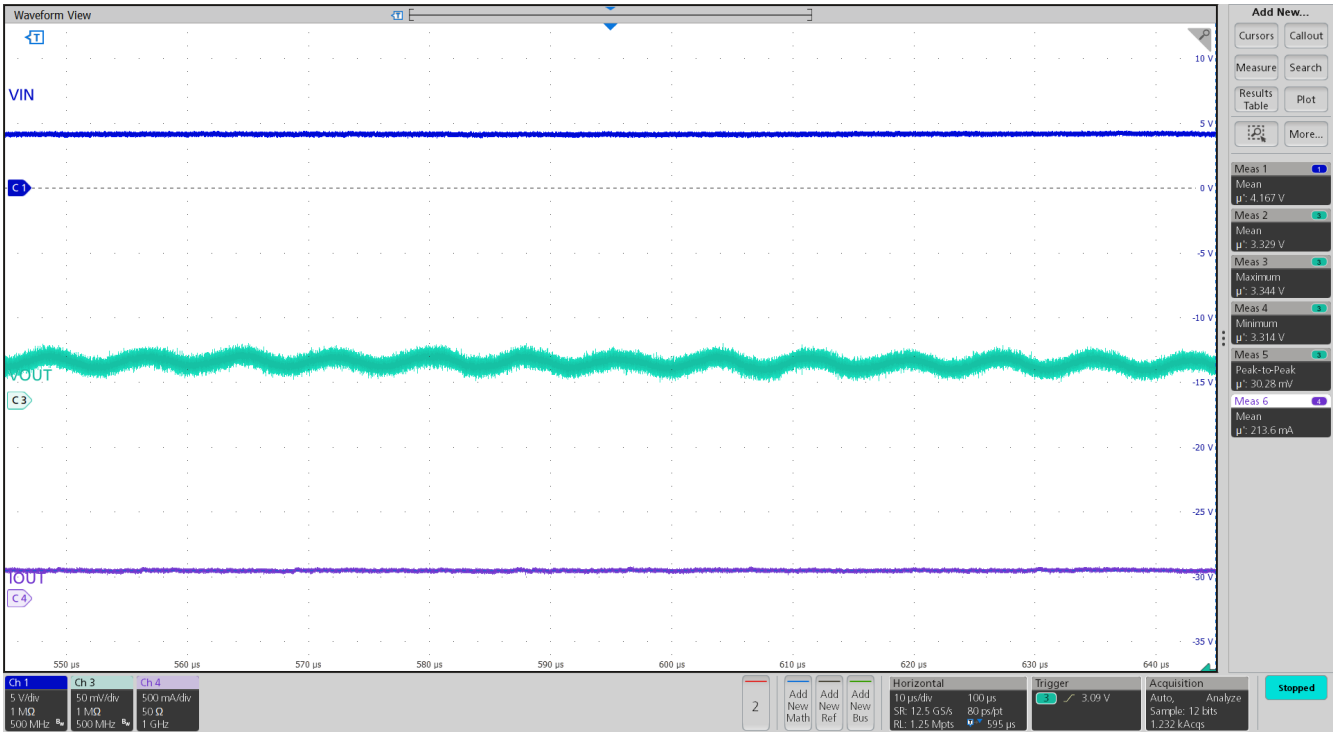


Figure 3-32. Steady State at 4.2 V_{IN}, 3.3 V_{OUT}, 0.15A I_{OUT}

Steady state waveforms of TPS745-Q1 are shown in the following figure.

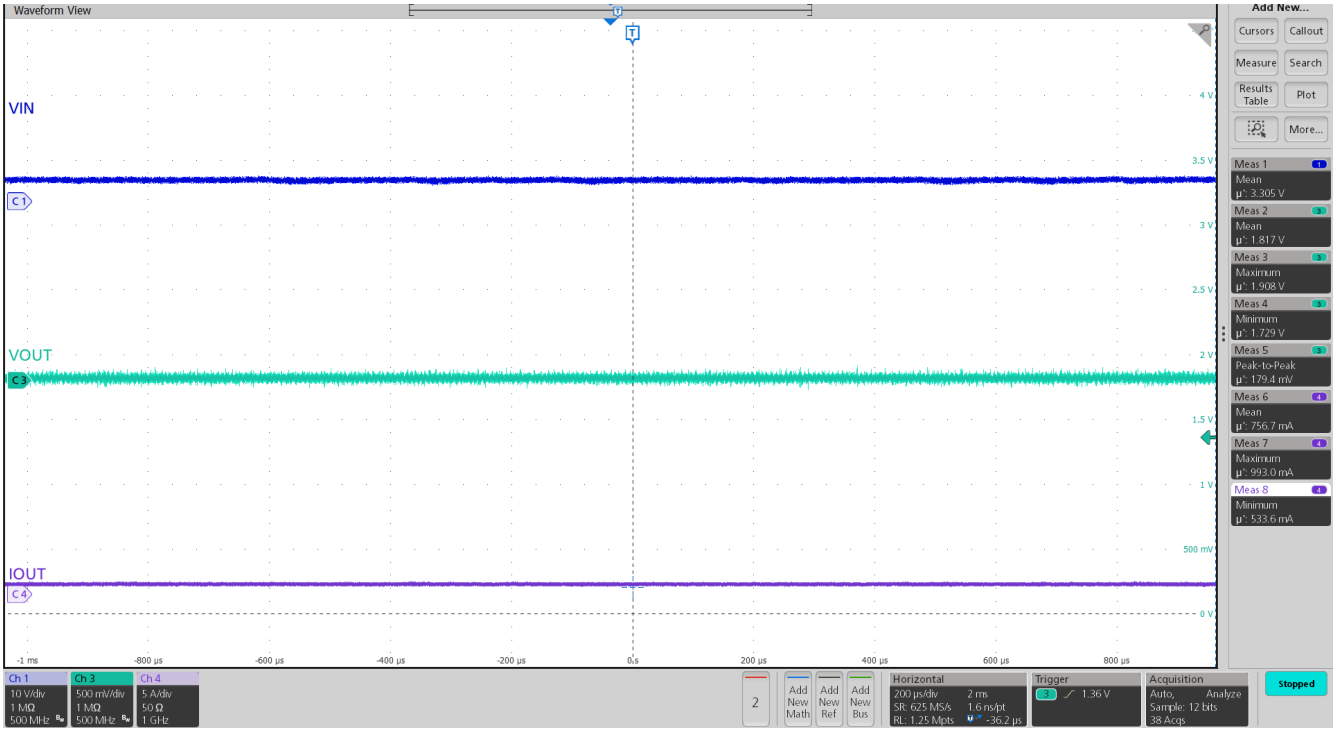


Figure 3-33. Steady State at 3.3 V_{IN}, 1.8 V_{OUT}, 0.5A I_{OUT}

Steady state waveforms of TPS628503-Q1 are shown in the following figure.

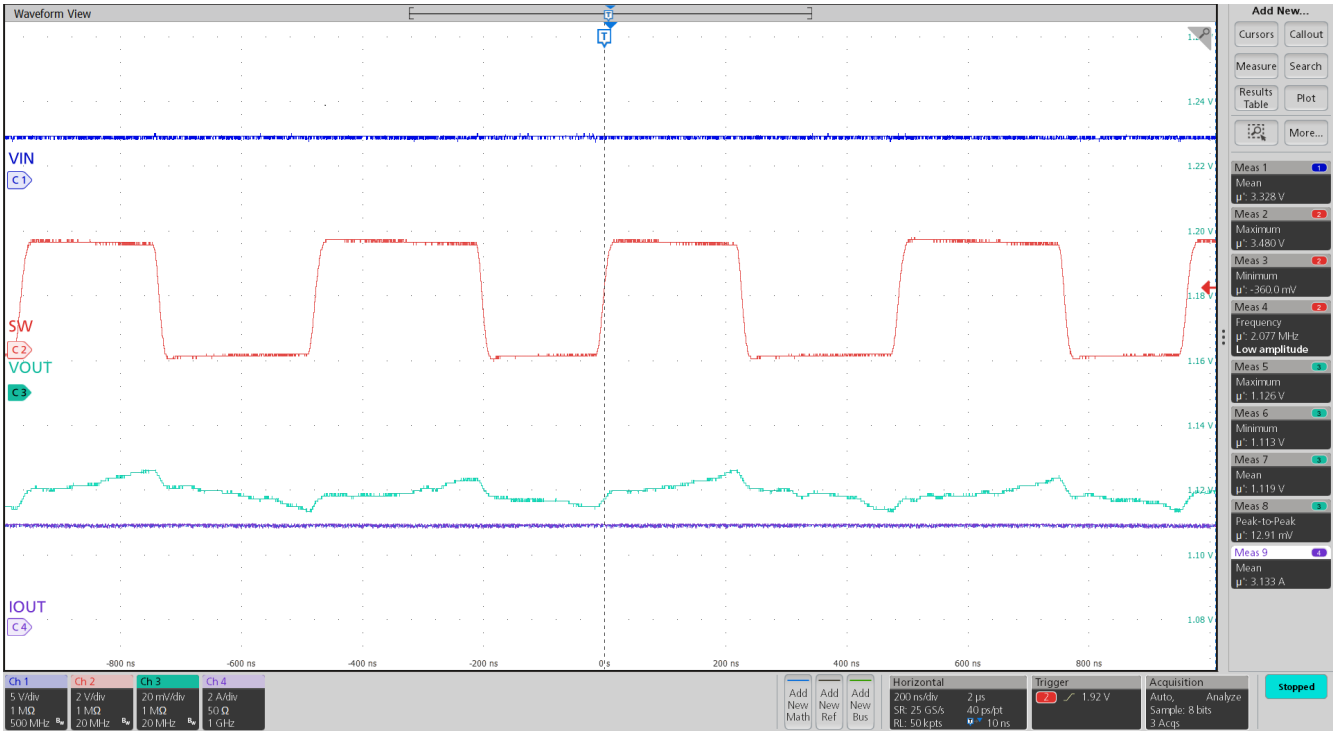


Figure 3-34. Steady State at 3.3 V_{IN}, 1.15 V_{OUT}, 3A I_{OUT}

3.4 Short-Circuit Protection

Short-circuit protection waveforms of LM74900-Q1 are shown in the following figure.

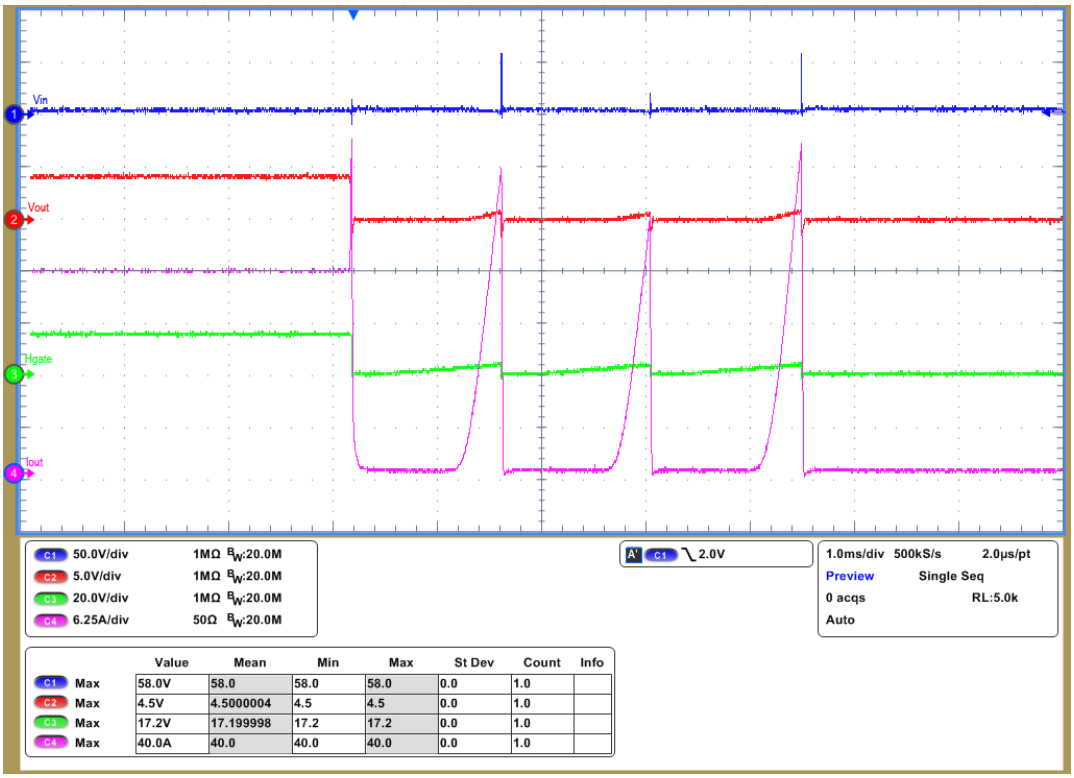


Figure 3-35. Short-Circuit Protection at 4.2 V_{IN}

Short-circuit protection waveforms of LMQ644A2-Q1 are shown in the following figures.

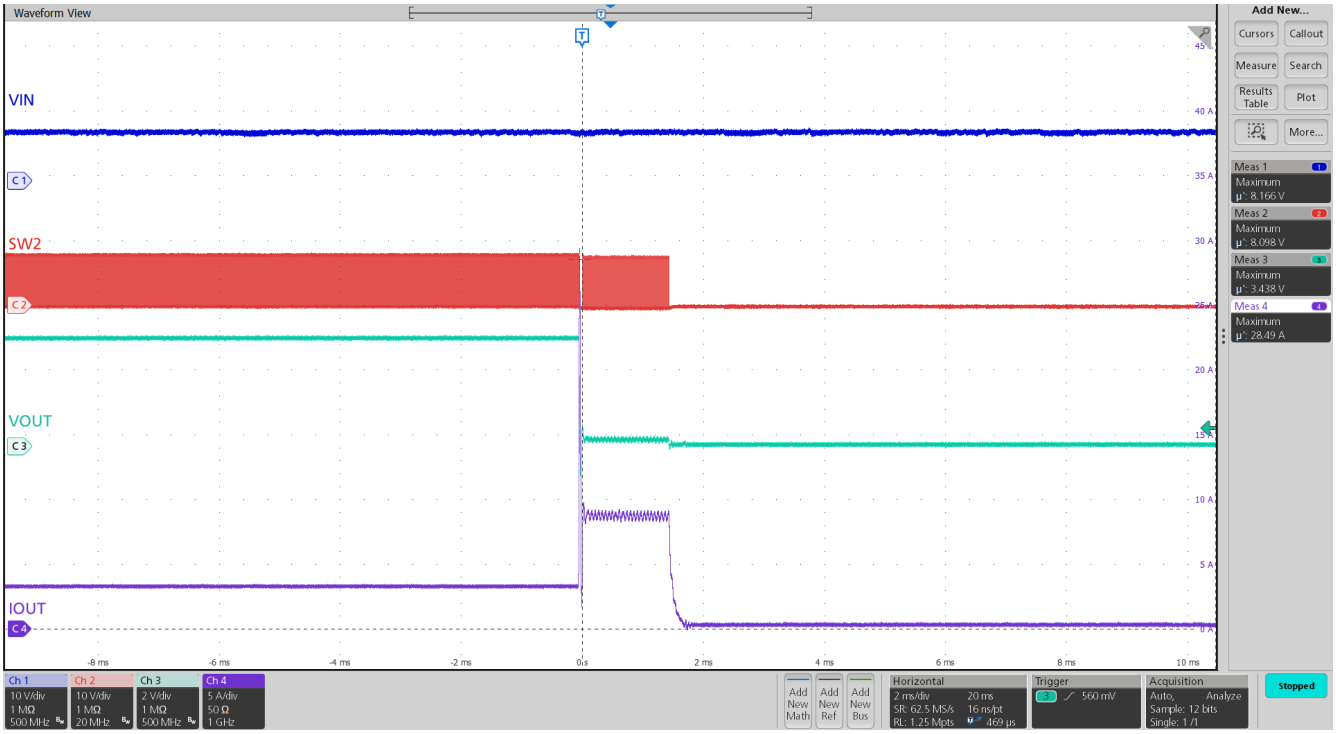


Figure 3-36. Short-Circuit Protection at 8.5 V_{IN}, 3.3 V_{OUT}

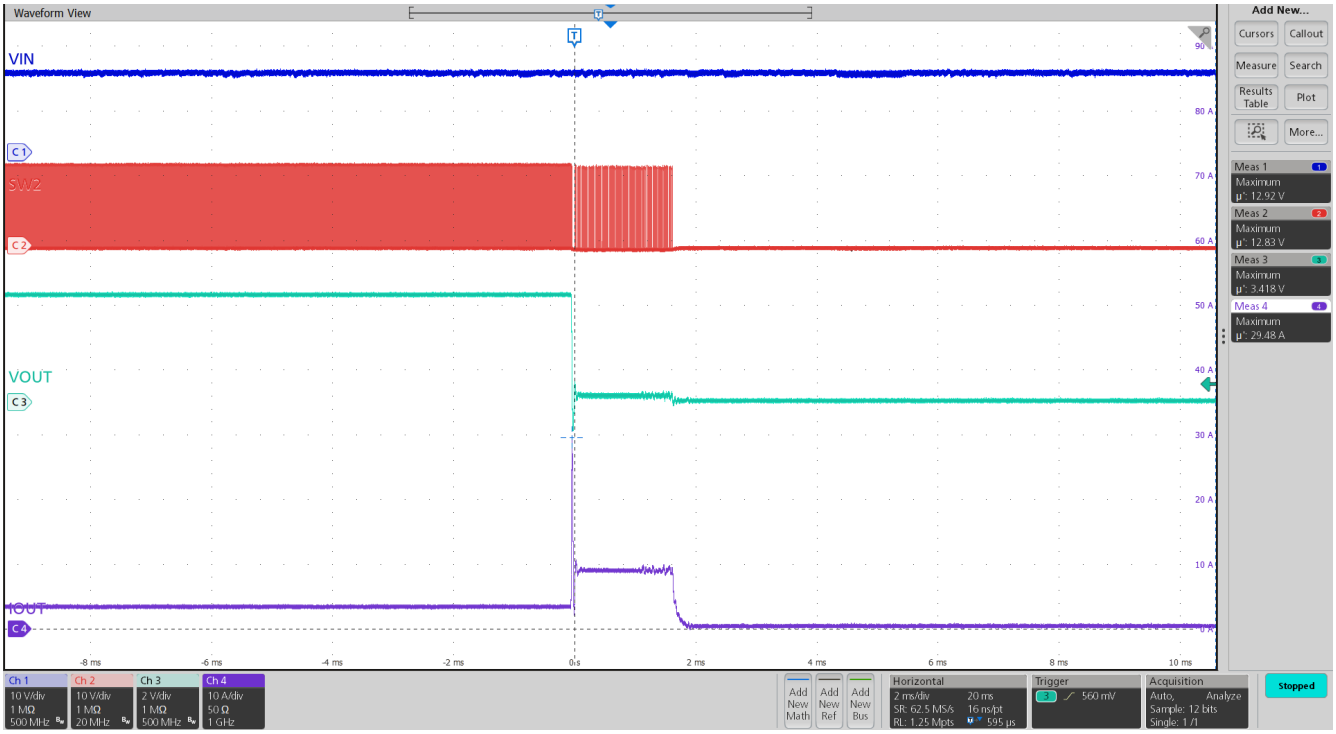


Figure 3-37. Short-Circuit Protection at 13.5 V_{IN}, 3.3 V_{OUT}

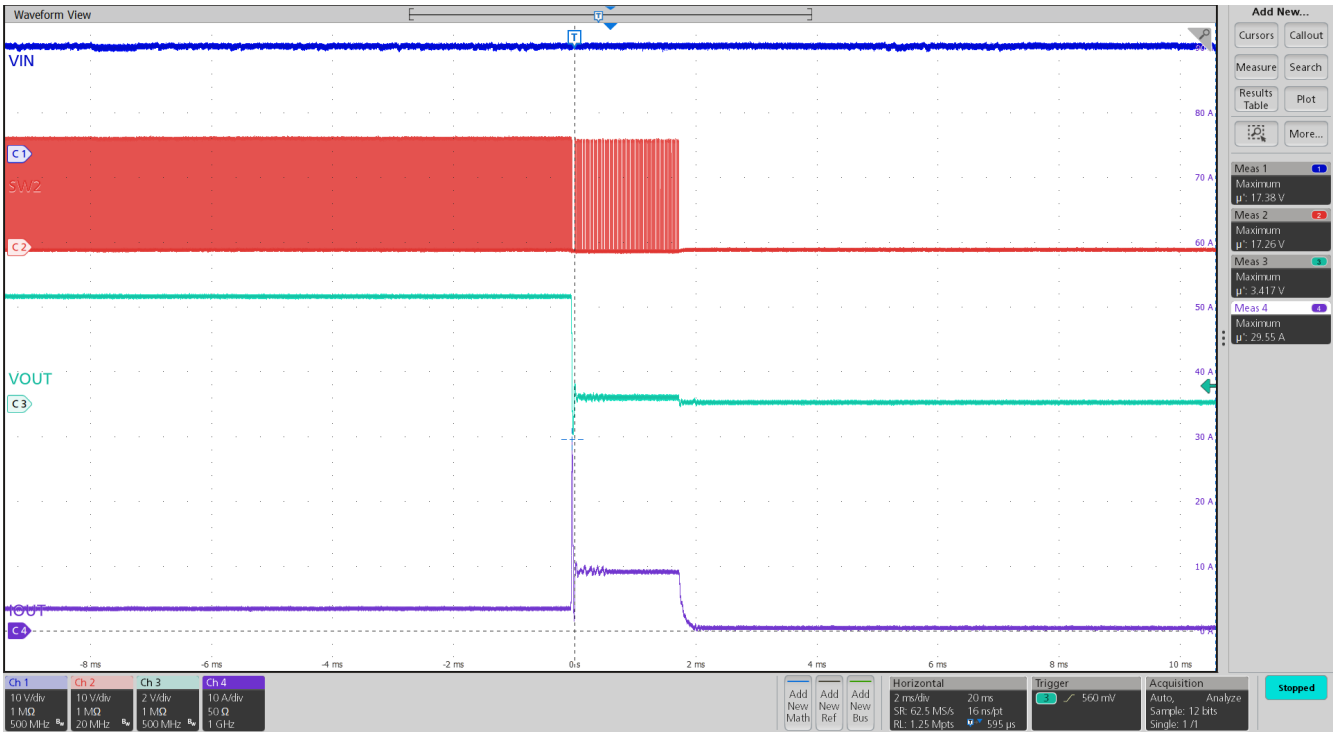


Figure 3-38. Short-Circuit Protection at 18 V_{IN}, 3.3 V_{OUT}

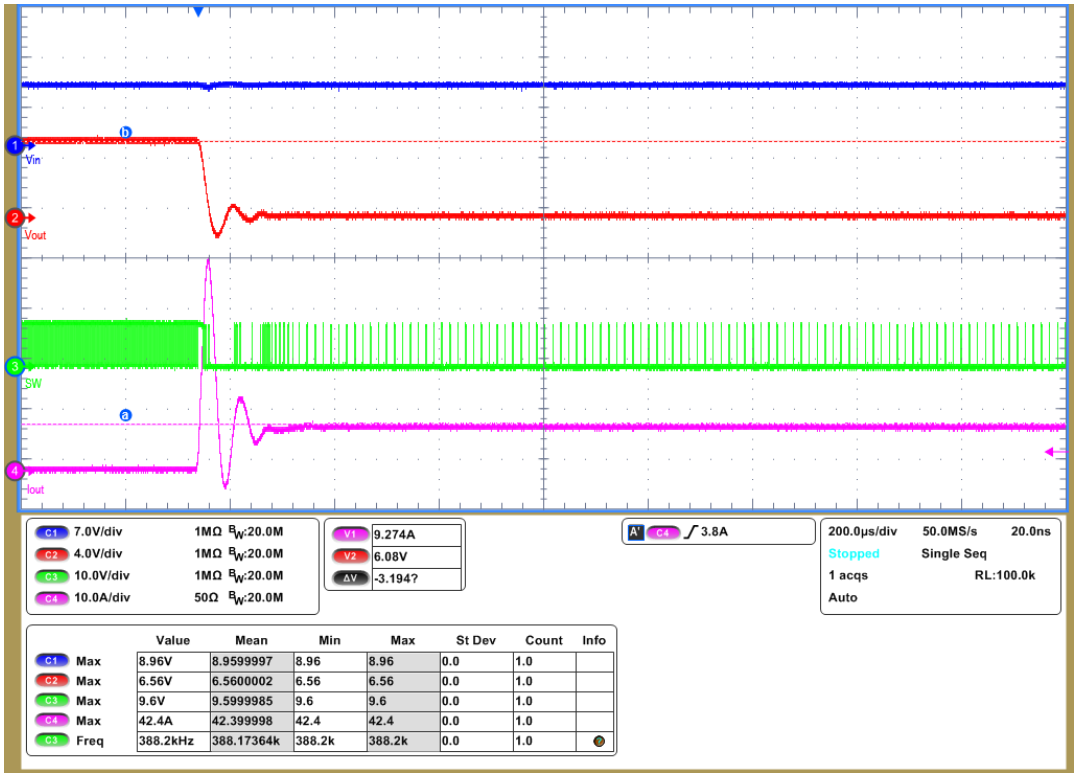


Figure 3-39. Short-Circuit Protection at 8.5 V_{IN}, 6 V_{OUT}

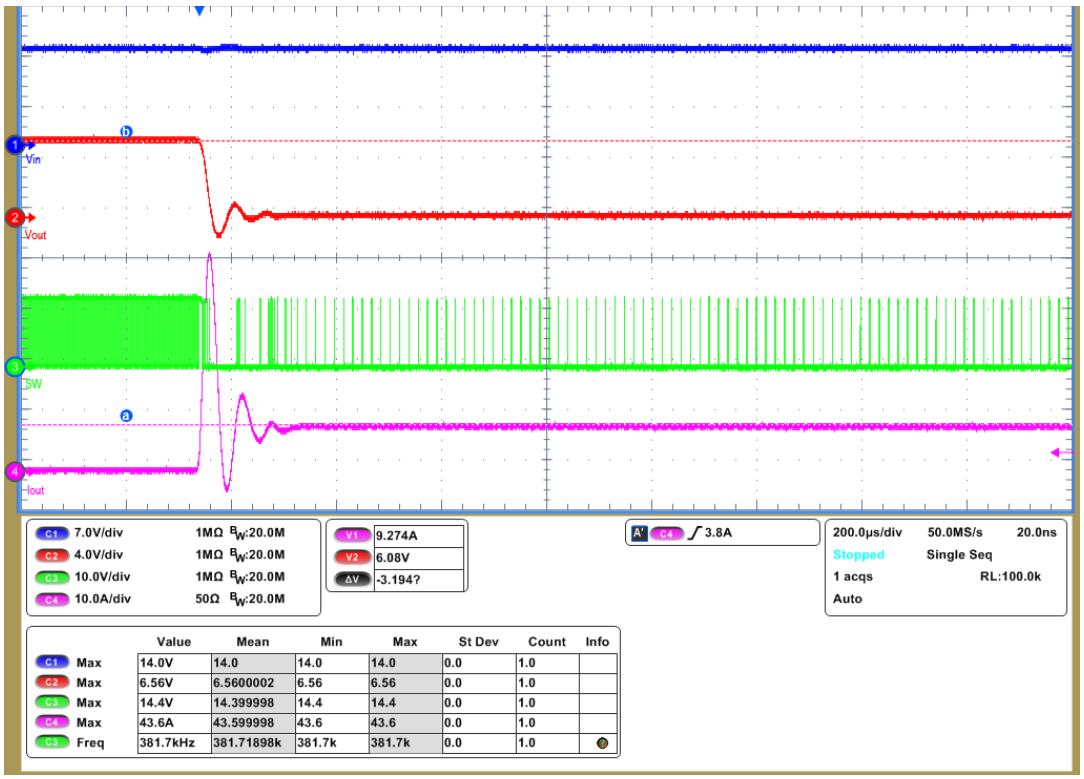


Figure 3-40. Short-Circuit Protection at 13.5 V_{IN}, 6 V_{OUT}

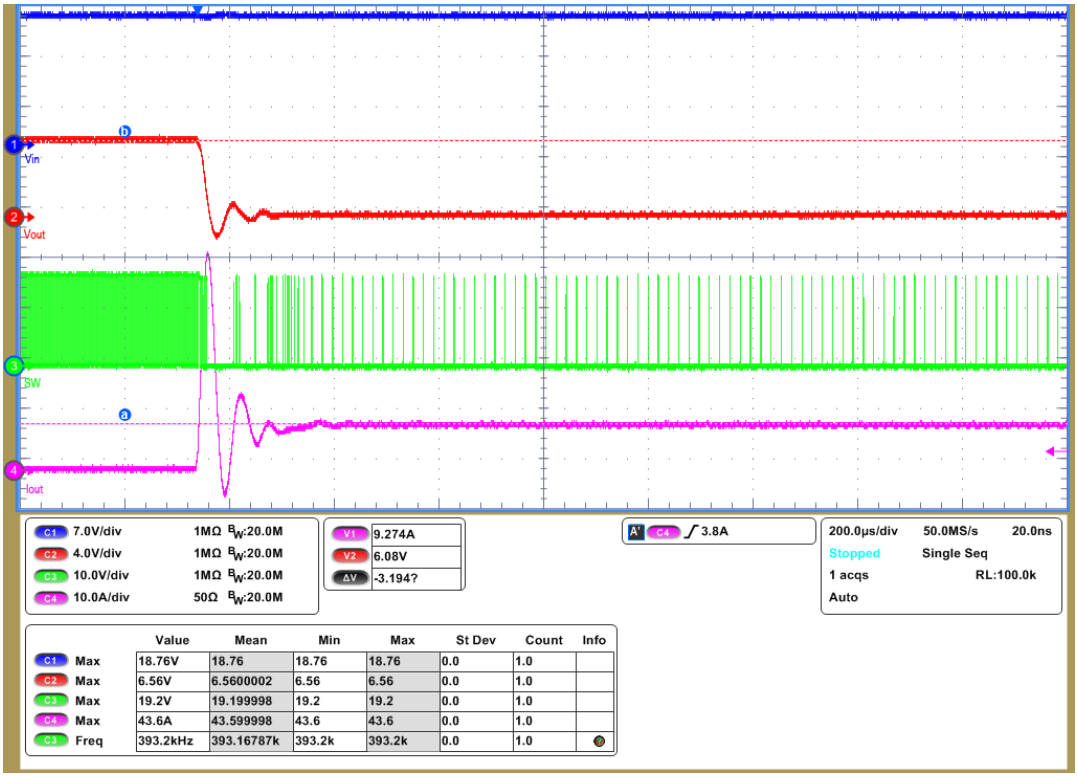


Figure 3-41. Short-Circuit Protection at 18 V_{IN}, 6 V_{OUT}

Short-circuit protection waveforms of TPS745-Q1 are shown in the following figure.

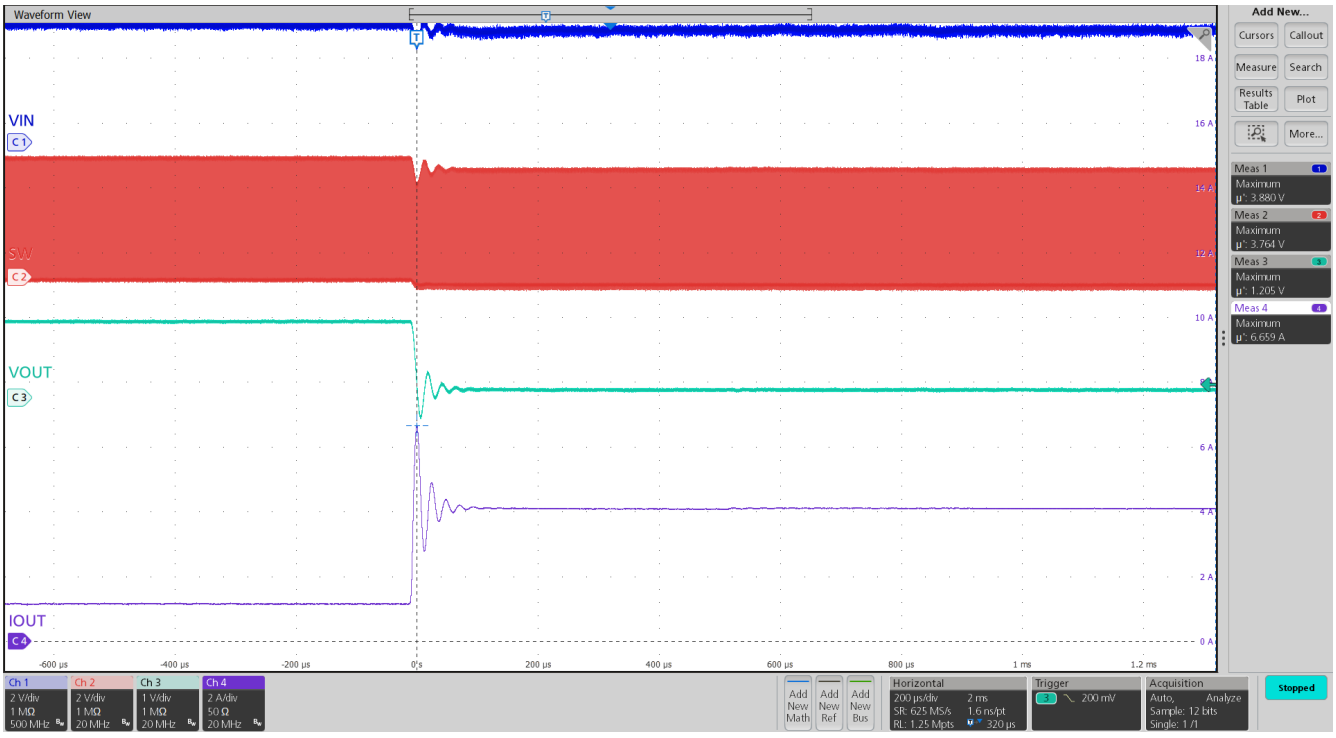


Figure 3-42. Short-Circuit Protection at 3.3 V_{IN}, 1.8 V_{OUT}

Short-circuit protection waveforms of TPS7B81-Q1 are shown in the following figures.

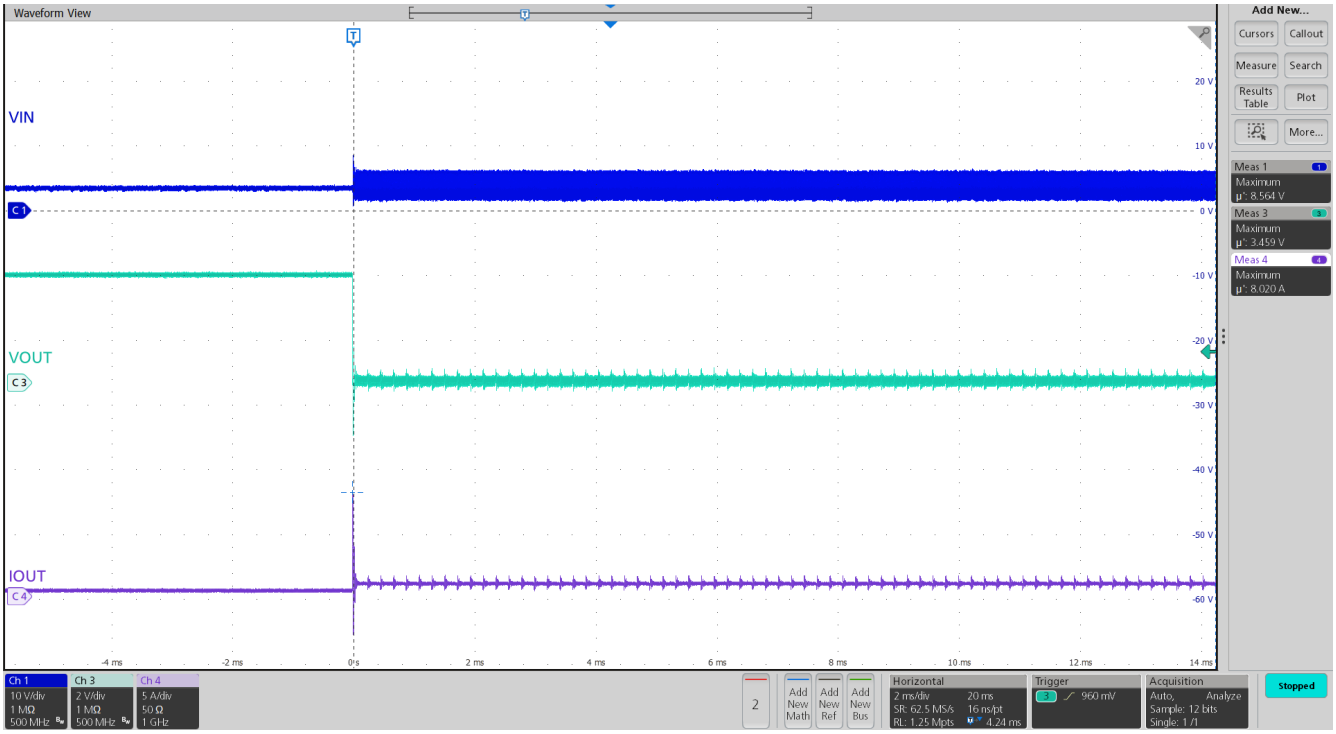


Figure 3-43. Short-Circuit Protection at 8.5 V_{IN}, 3.3 V_{OUT}

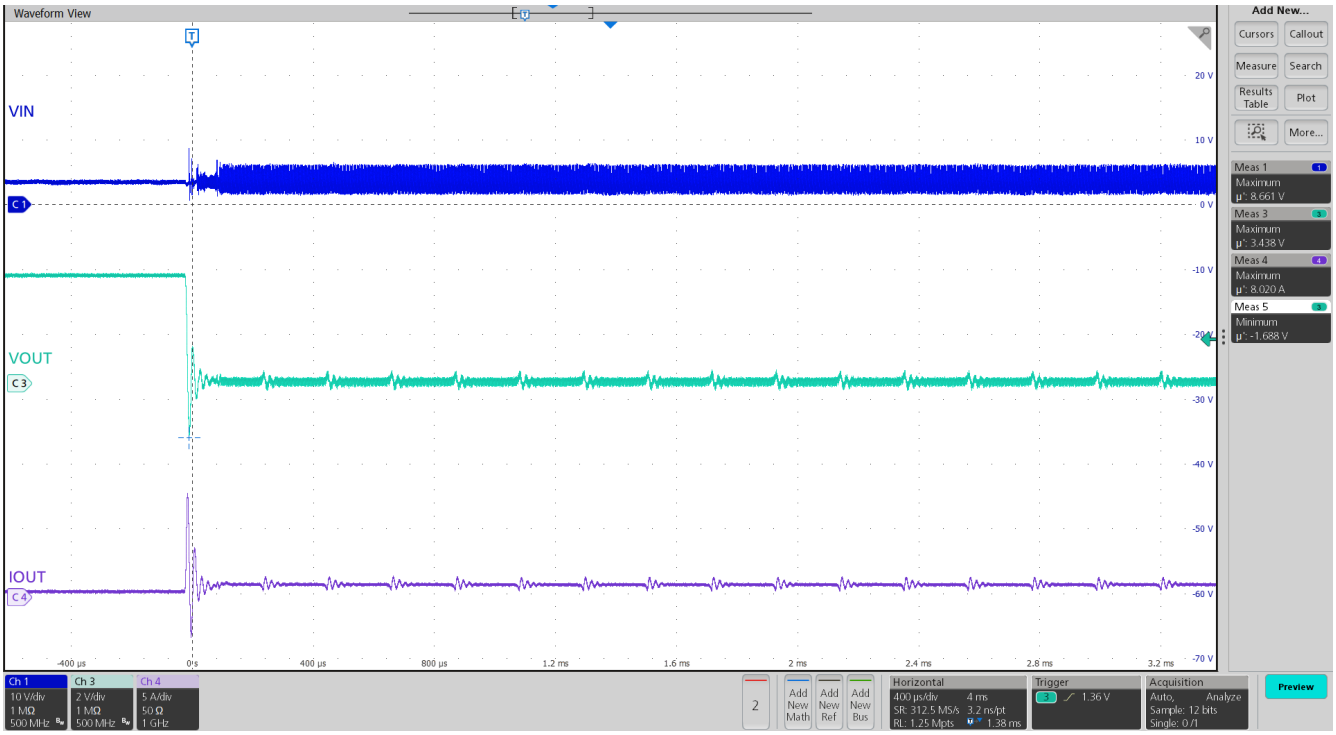


Figure 3-44. Short-Circuit Protection at 13.5 V_{IN}, 3.3 V_{OUT}

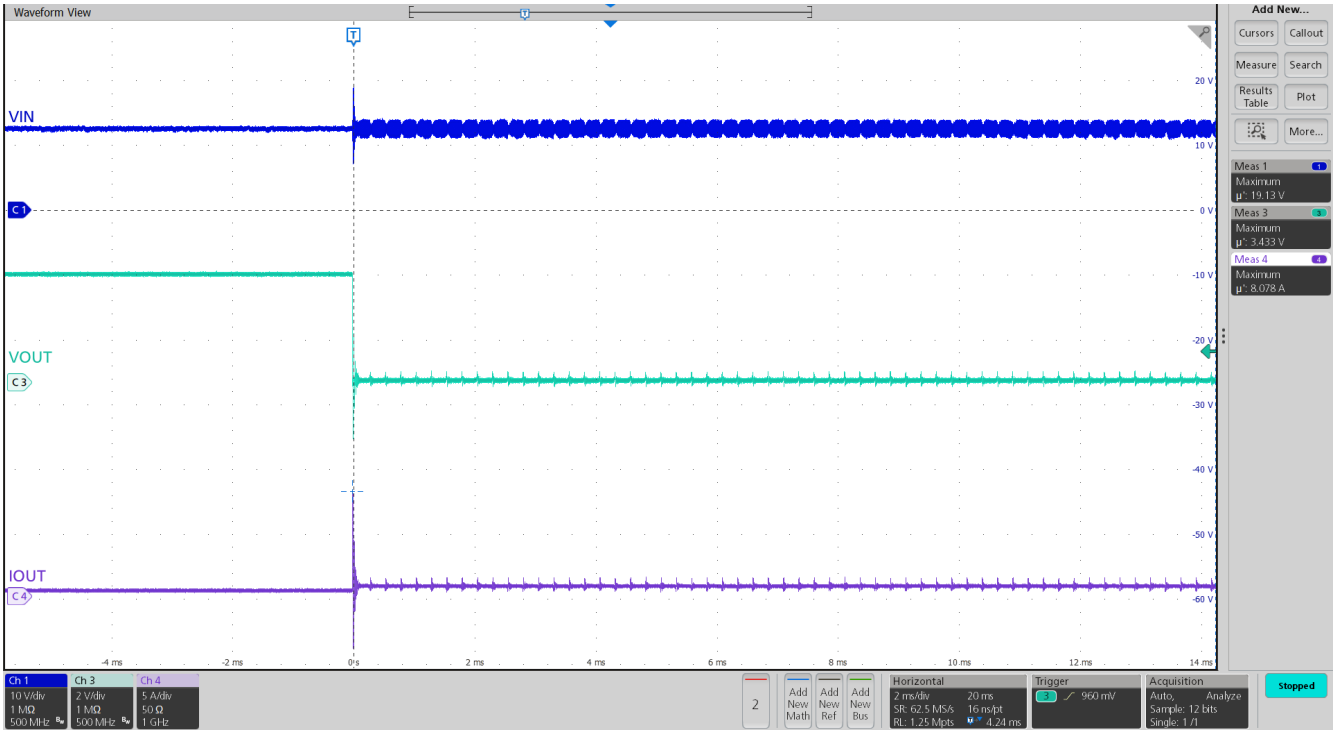


Figure 3-45. Short-Circuit Protection at 18 V_{IN}, 3.3 V_{OUT}

Short-circuit protection waveforms of TPS628503-Q1 are shown in the following figure.

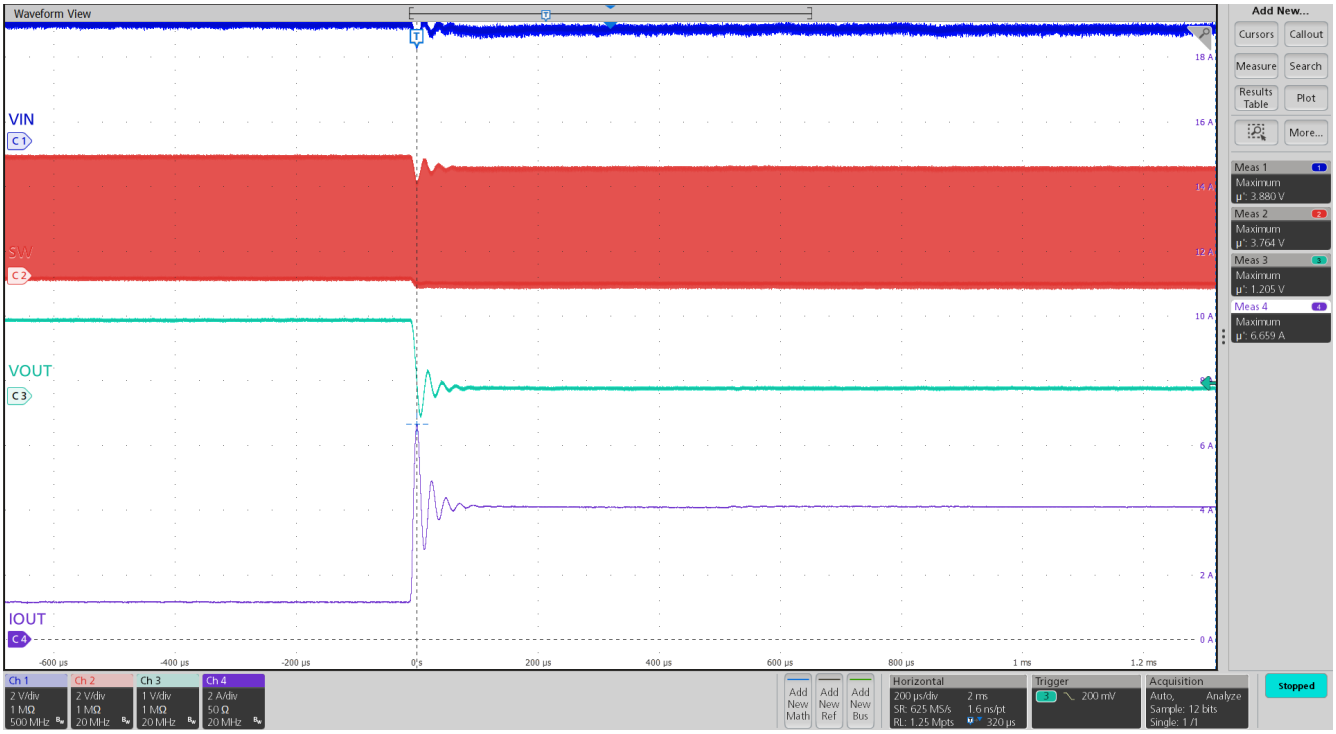
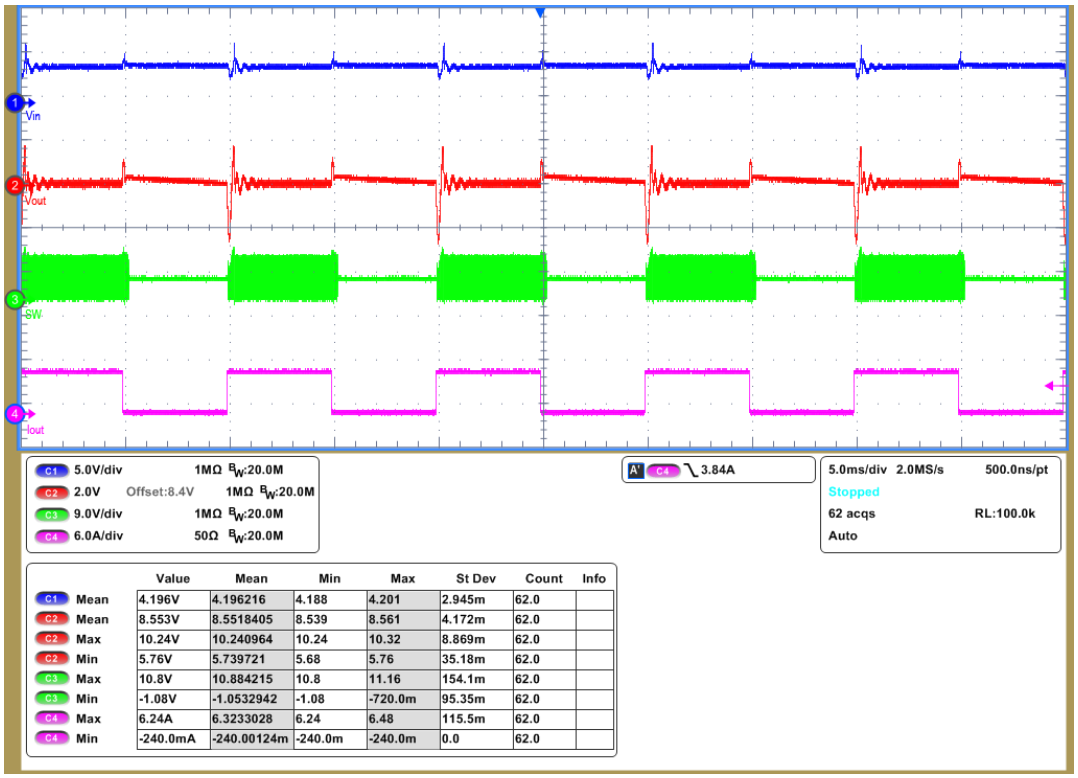


Figure 3-46. Short-Circuit Protection at 3.3 V_{IN}, 1.15 V_{OUT}

3.5 Load Transients

Load transient response waveforms of the LM5152-Q1 are shown in the following figures.



		Value	Mean	Min	Max	St Dev	Count	Info
C1	Mean	4.196V	4.196216	4.188	4.201	2.945m	62.0	
C2	Mean	8.553V	8.5518405	8.539	8.561	4.172m	62.0	
C2	Max	10.24V	10.240964	10.24	10.32	8.869m	62.0	
C2	Min	5.76V	5.739721	5.68	5.76	35.18m	62.0	
C3	Max	10.8V	10.884215	10.8	11.16	154.1m	62.0	
C3	Min	-1.08V	-1.0532942	-1.08	-720.0m	95.35m	62.0	
C4	Max	6.24A	6.3233028	6.24	6.48	115.5m	62.0	
C4	Min	-240.0mA	-240.00124m	-240.0m	-240.0m	0.0	62.0	

Figure 3-47. Load Transient at 4.2 V_{IN}, 8.5 V_{OUT}, 0A–5.88A

		Value	Mean	Min	Max	St Dev	Count	Info
C1	Mean	4.205V	4.1939908	4.144	4.207	21.53m	114.0	
C2	Mean	8.431V	8.42466	8.396	8.432	12.56m	114.0	
C2	Max	9.84V	9.9149558	9.84	10.04	58.63m	114.0	
C2	Min	6.8V	6.8127416	6.76	6.84	19.13m	114.0	
C3	Max	10.44V	10.570928	10.44	11.16	181.6m	114.0	
C3	Min	-720.0mV	-679.9368m	-1.08	-360.0m	121.1m	114.0	
C4	Max	12.48A	12.484167	12.48	12.72	31.64m	114.0	
C4	Min	5.76A	5.628359	5.52	5.76	120.5m	114.0	

Figure 3-48. Load Transient at 4.2 V_{IN}, 8.5 V_{OUT}, 5.88A–11.48A

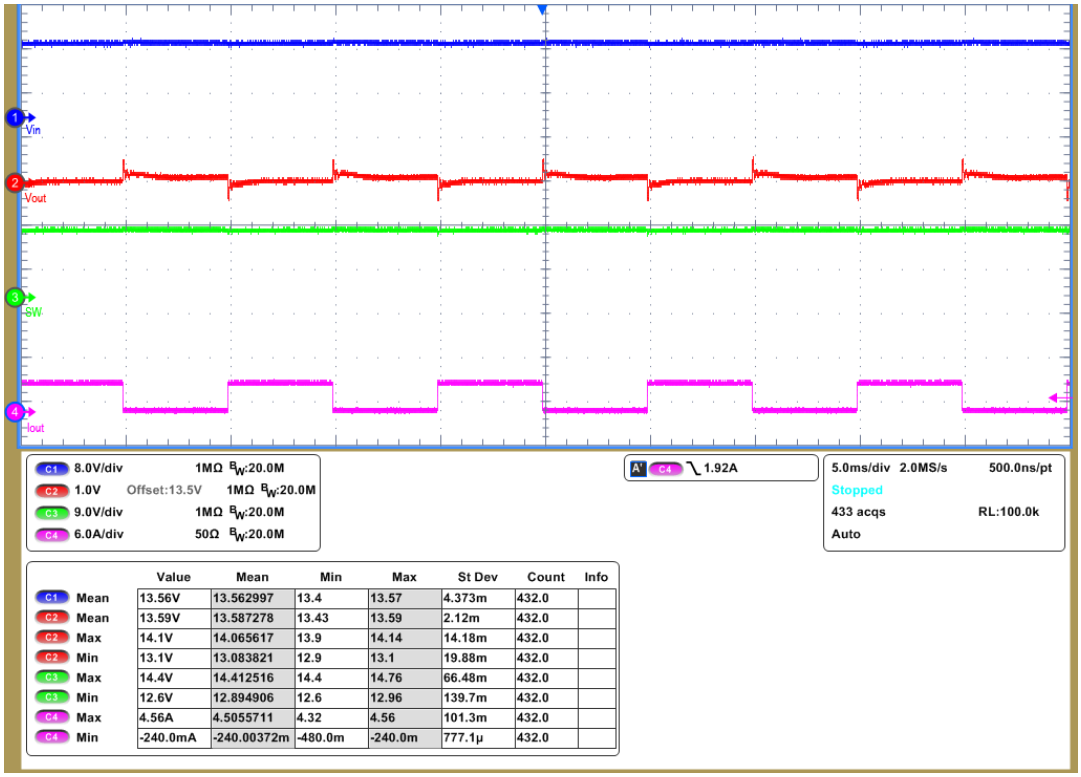


Figure 3-49. Load Transient at 13.5 V_{IN}, 13.5 V_{OUT}, 0A–3.74A

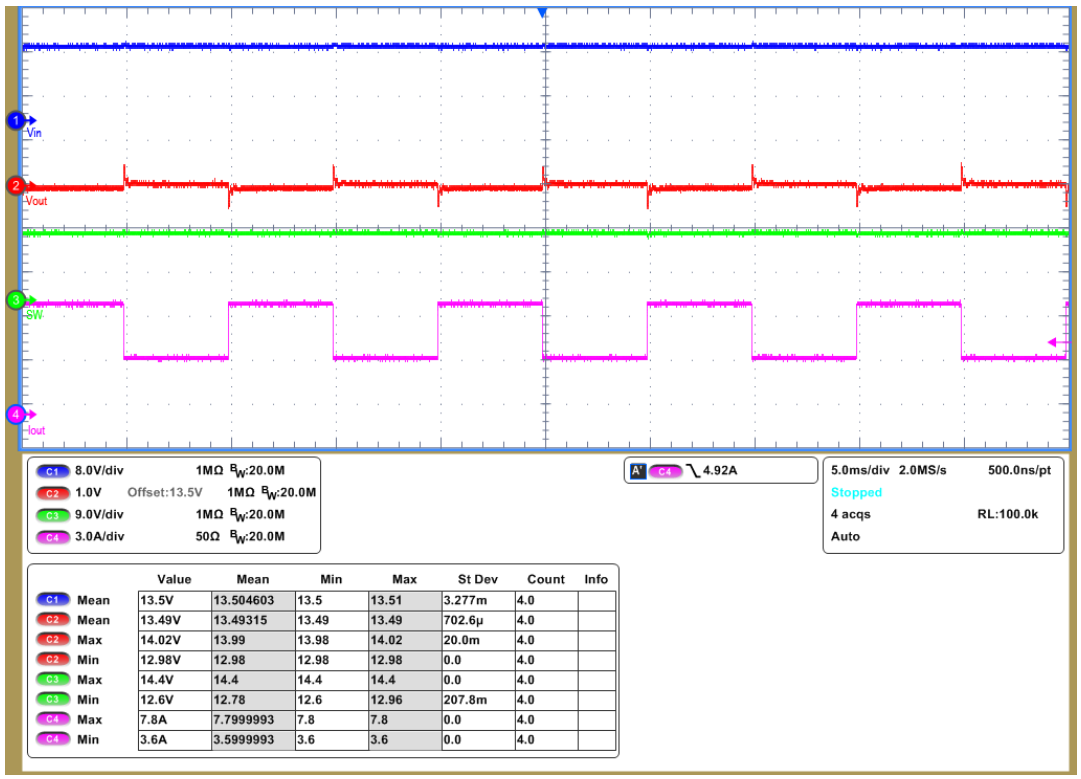


Figure 3-50. Load Transient at 13.5 V_{IN}, 13.5 V_{OUT}, 3.74A–7.48A

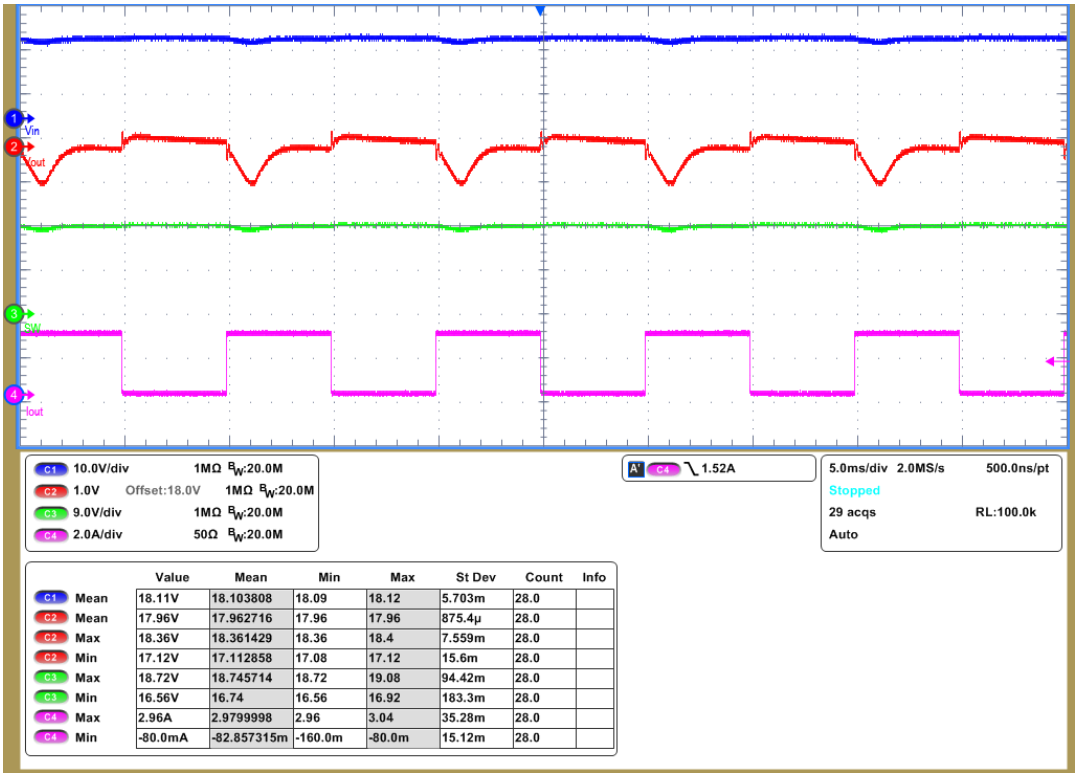


Figure 3-51. Load Transient at 18 V_{IN}, 18 V_{OUT}, 0A–2.78A

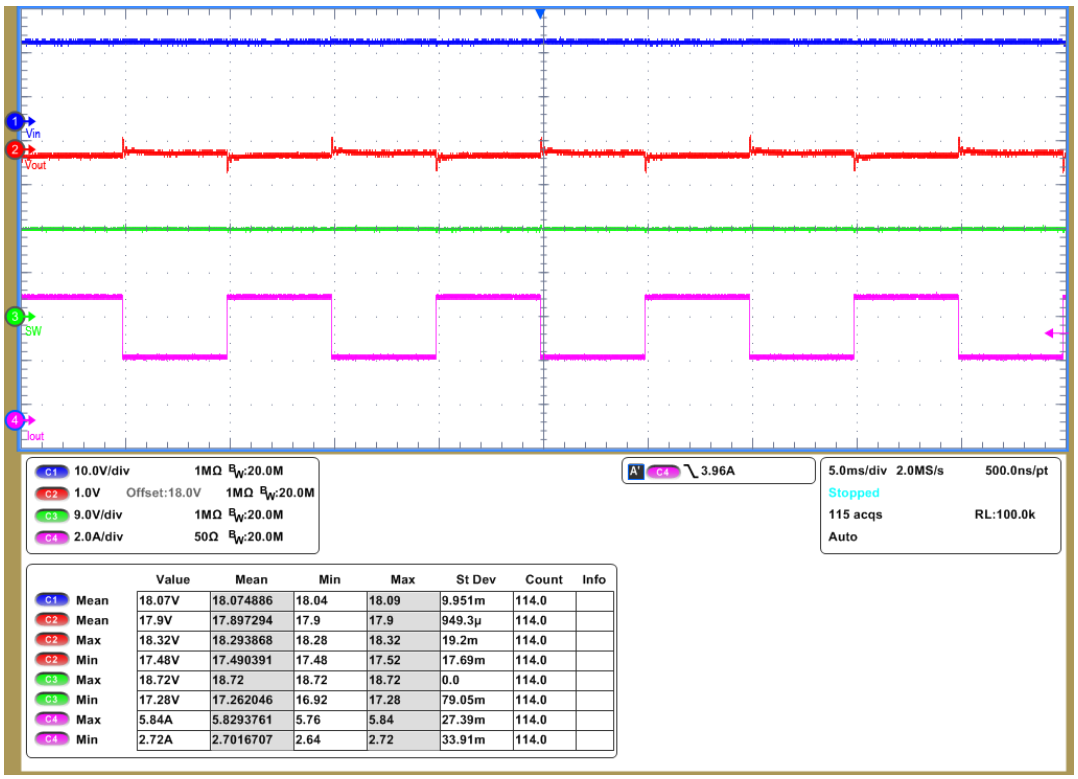
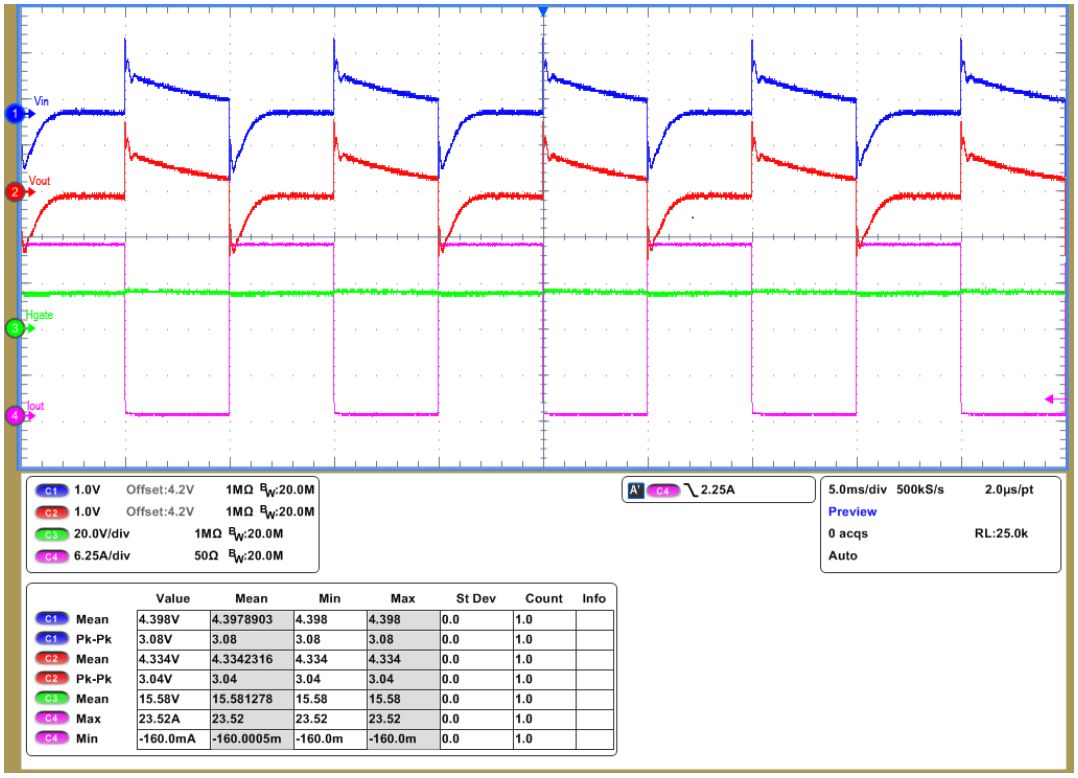


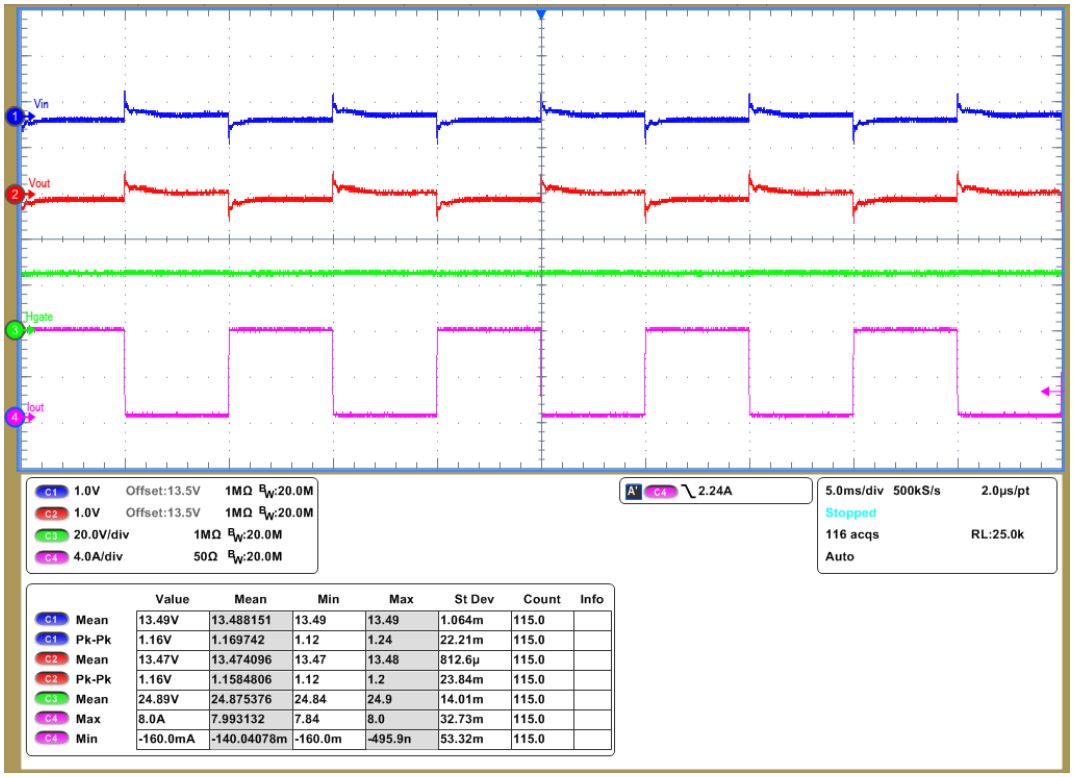
Figure 3-52. Load Transient at 18 V_{IN}, 18 V_{OUT}, 2.78A–5.55A

Load transient response waveforms of LM74900-Q1 are shown in the following figures.



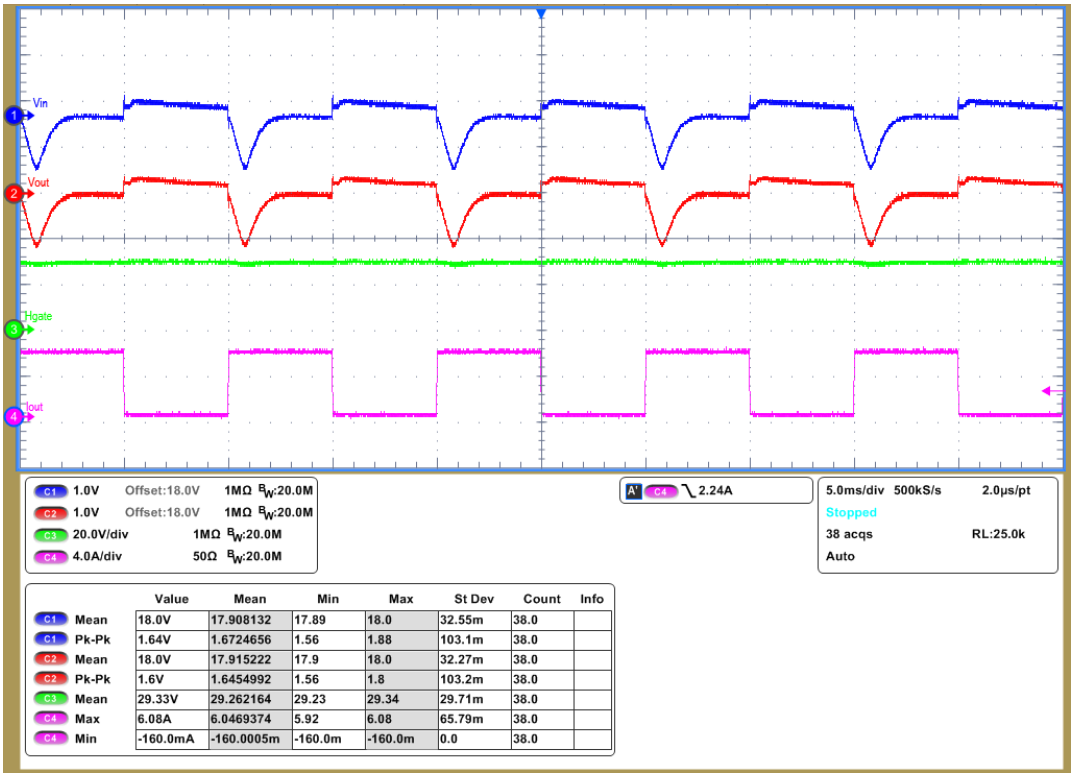
		Value	Mean	Min	Max	St Dev	Count	Info
C1	Mean	4.398V	4.3978903	4.398	4.398	0.0	1.0	
C1	Pk-Pk	3.08V	3.08	3.08	3.08	0.0	1.0	
C2	Mean	4.334V	4.3342316	4.334	4.334	0.0	1.0	
C2	Pk-Pk	3.04V	3.04	3.04	3.04	0.0	1.0	
C3	Mean	15.58V	15.581278	15.58	15.58	0.0	1.0	
C4	Max	23.52A	23.52	23.52	23.52	0.0	1.0	
C4	Min	-160.0mA	-160.0005m	-160.0m	-160.0m	0.0	1.0	

Figure 3-53. Load Transient at 4.2 V_{IN}, 4.2 V_{OUT}, 0A–24A



		Value	Mean	Min	Max	St Dev	Count	Info
C1	Mean	13.49V	13.488151	13.49	13.49	1.064m	115.0	
C1	Pk-Pk	1.16V	1.169742	1.12	1.24	22.21m	115.0	
C2	Mean	13.47V	13.474096	13.47	13.48	812.6µ	115.0	
C2	Pk-Pk	1.16V	1.1584806	1.12	1.2	23.84m	115.0	
C3	Mean	24.89V	24.875376	24.84	24.9	14.01m	115.0	
C4	Max	8.0A	7.993132	7.84	8.0	32.73m	115.0	
C4	Min	-160.0mA	-140.04078m	-160.0m	-495.9n	53.32m	115.0	

Figure 3-54. Load Transient at 13.5 V_{IN}, 13.5 V_{OUT}, 0A–7.48A



	Value	Mean	Min	Max	St Dev	Count	Info
C1 Mean	18.0V	17.908132	17.89	18.0	32.55m	38.0	
C1 Pk-Pk	1.64V	1.6724656	1.56	1.88	103.1m	38.0	
C2 Mean	18.0V	17.915222	17.9	18.0	32.27m	38.0	
C2 Pk-Pk	1.6V	1.6454992	1.56	1.8	103.2m	38.0	
C3 Mean	29.33V	29.262164	29.23	29.34	29.71m	38.0	
C4 Max	6.08A	6.0469374	5.92	6.08	65.79m	38.0	
C4 Min	-160.0mA	-160.0005m	-160.0m	-160.0m	0.0	38.0	

Figure 3-55. Load Transient at 18 V_{IN}, 18 V_{OUT}, 0A–6A

Load transient response waveforms of LMQ644A2-Q1 are shown in the following figures.

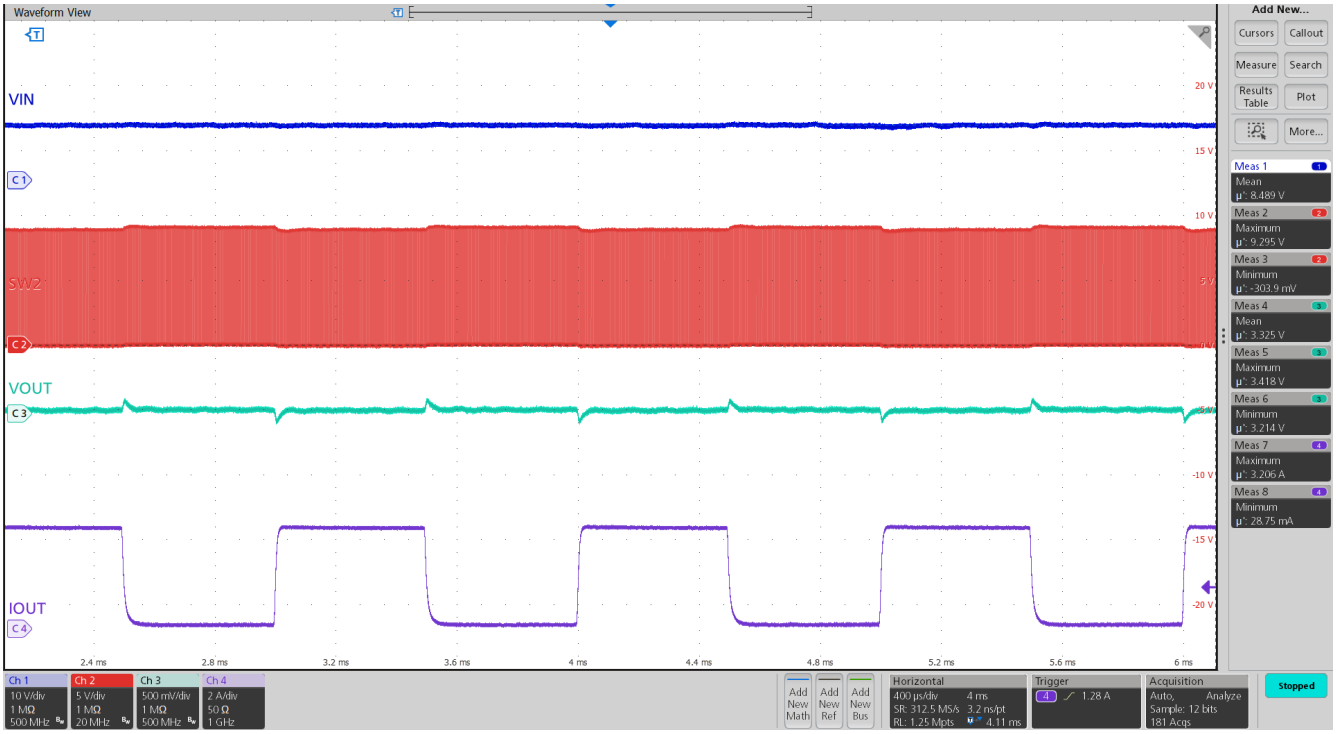


Figure 3-56. Load Transient at 8.5 V_{IN}, 3.3 V_{OUT}, 0A–3A

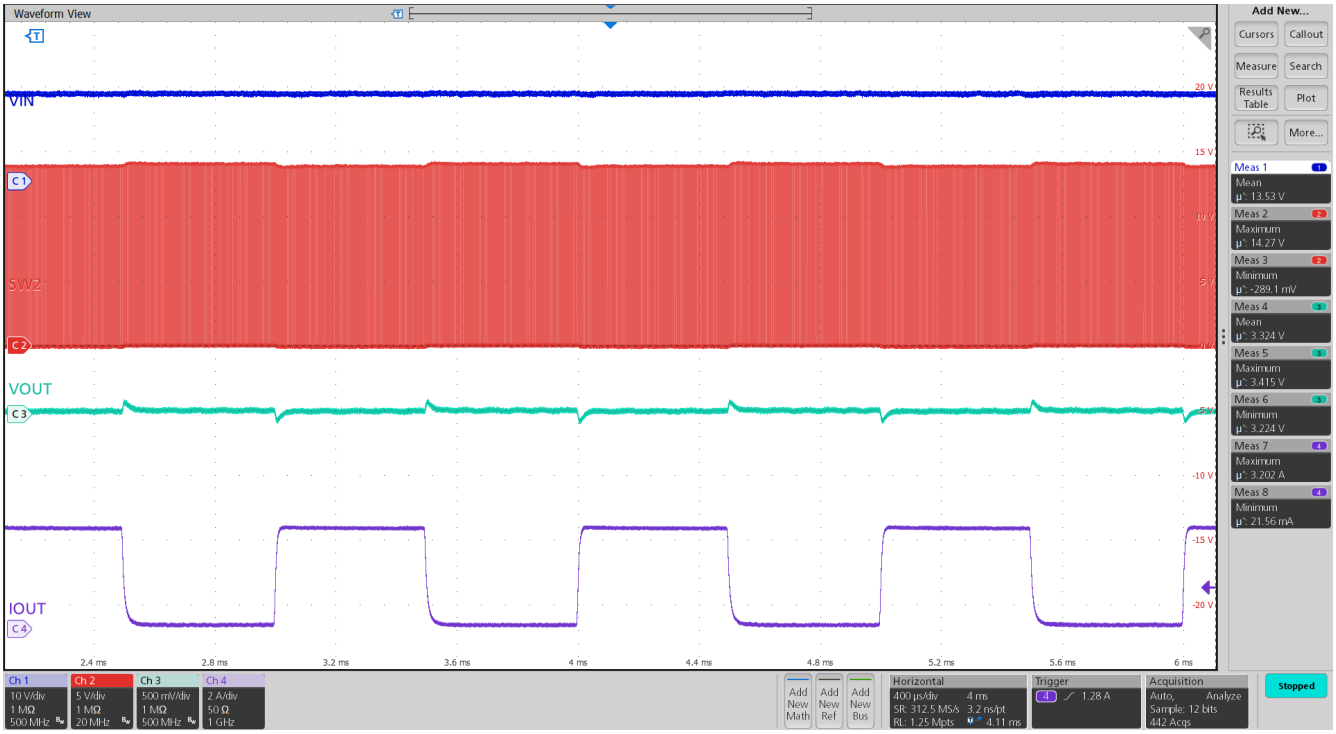


Figure 3-57. Load Transient at 13.5 V_{IN}, 3.3 V_{OUT}, 0A–3A

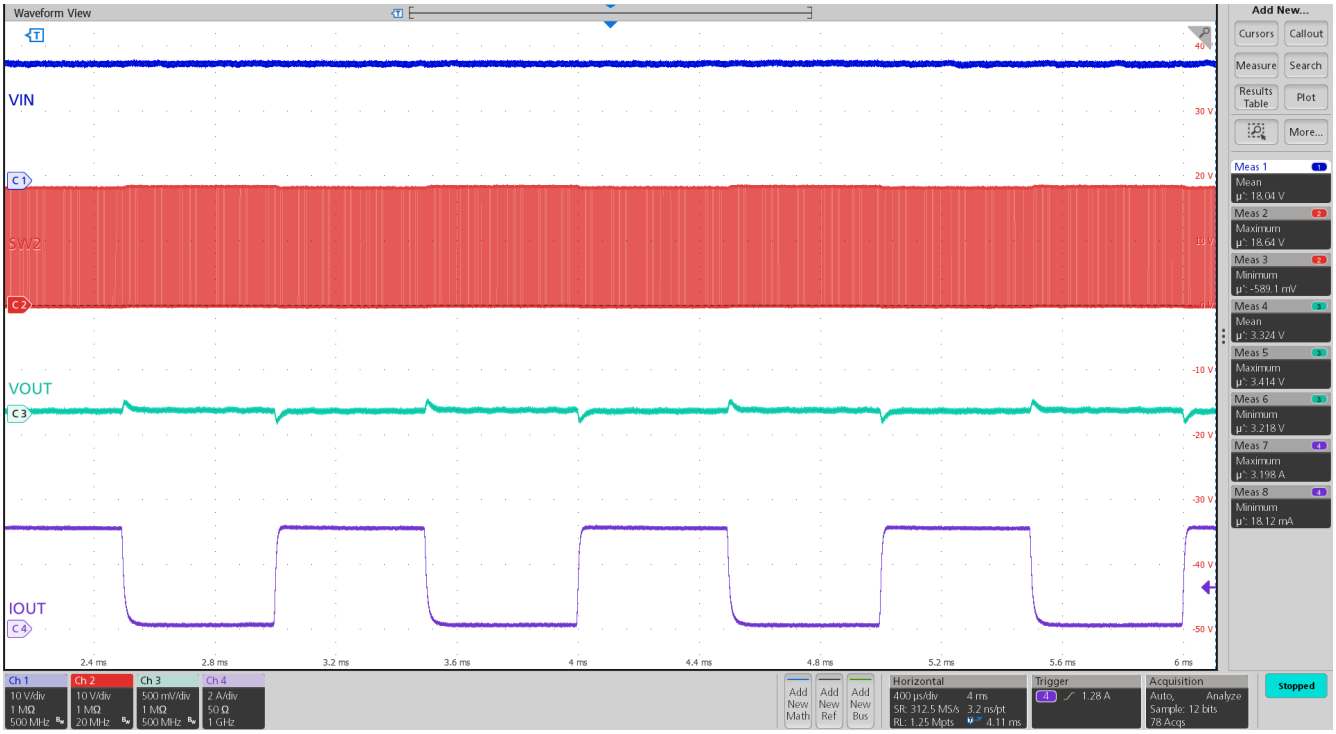


Figure 3-58. Load Transient at 18 V_{IN}, 3.3 V_{OUT}, 0A–3A

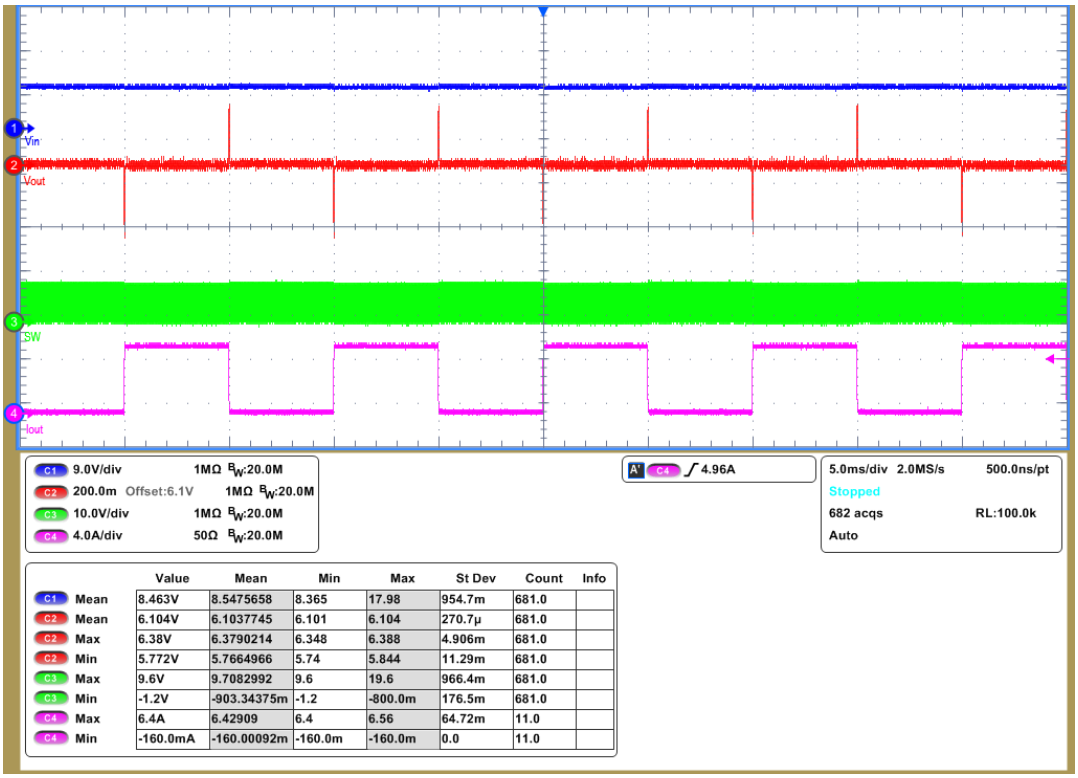


Figure 3-59. Load Transient at 8.5 V_{IN}, 6 V_{OUT}, 0A–6A

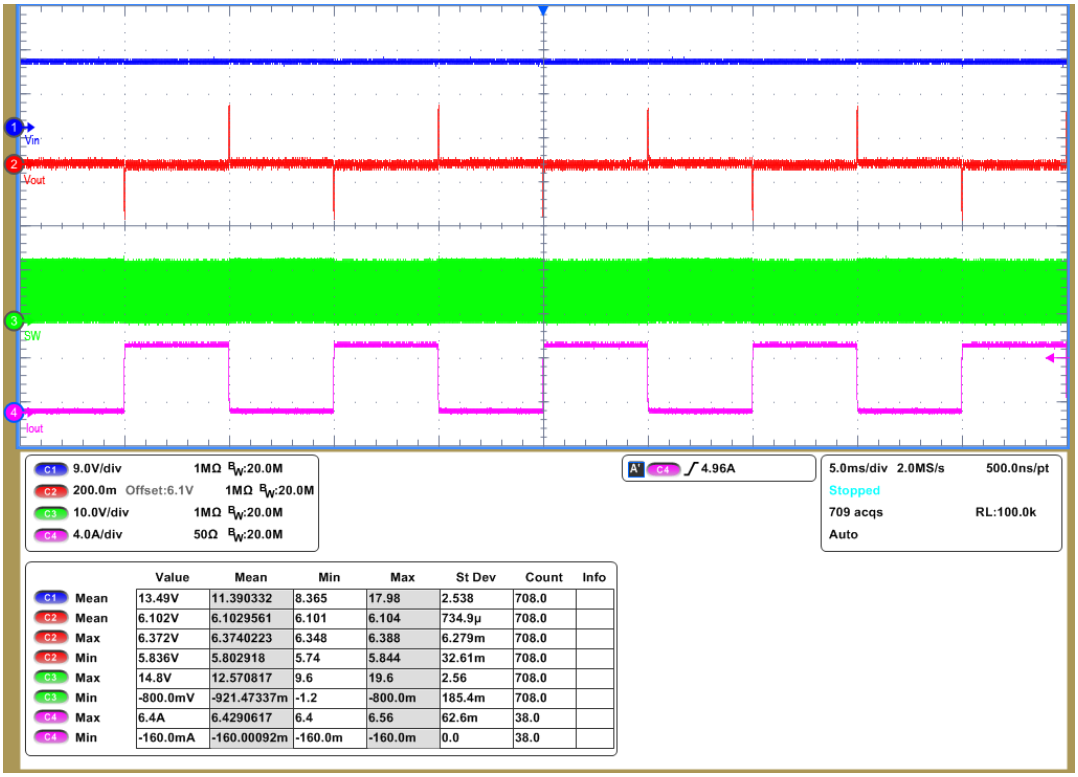


Figure 3-60. Load Transient at 13.5 V_{IN}, 6 V_{OUT}, 0A–6A

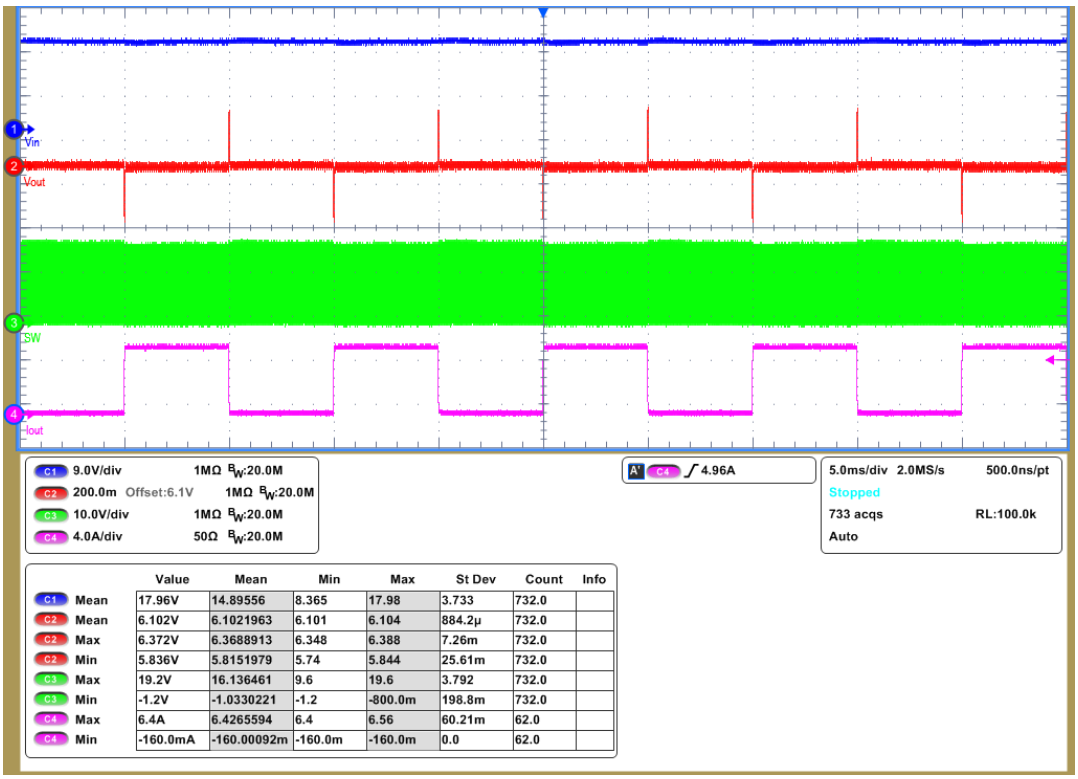


Figure 3-61. Load Transient at 18 V_{IN}, 6 V_{OUT}, 0A–6A

Load transient response waveforms of TPS628503-Q1 are shown in the following figure.

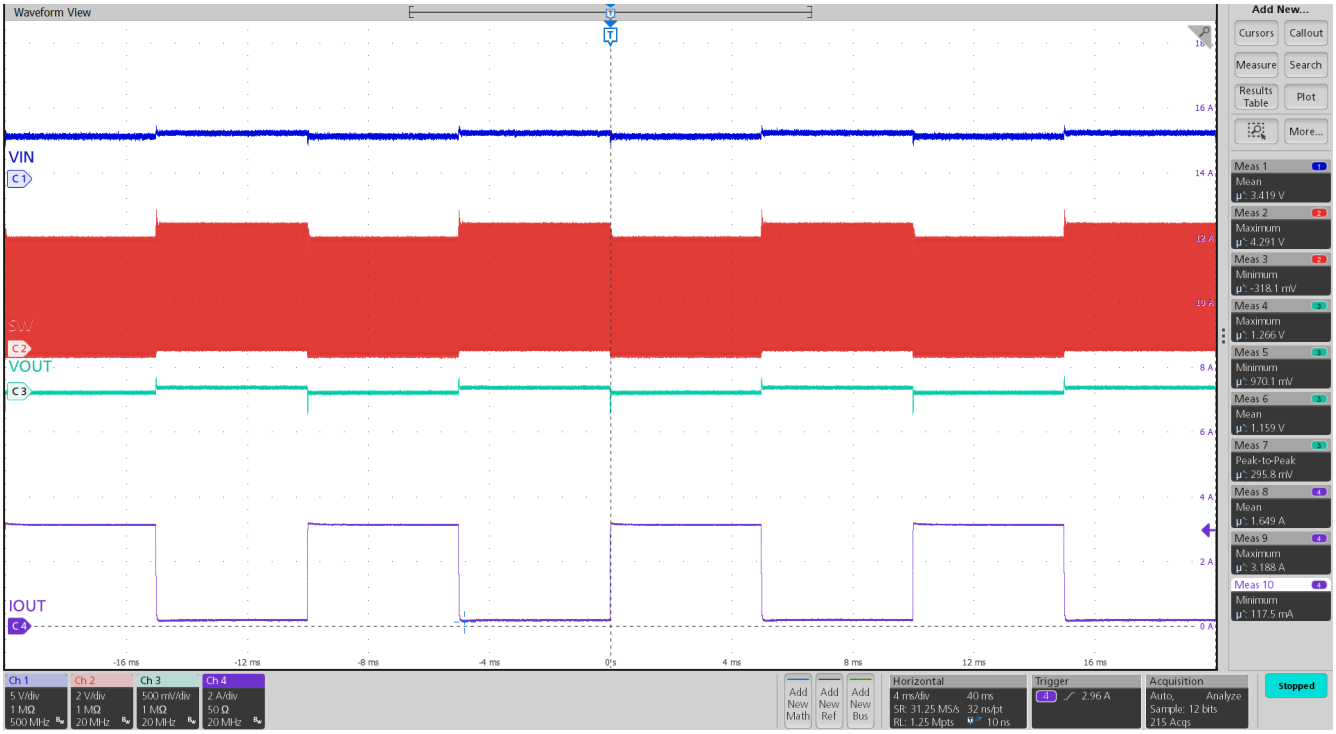


Figure 3-62. Load Transient at 3.3 V_{IN}, 1.15 V_{OUT}, 0A–3A

Load transient response waveforms of TPS745-Q1 are shown in the following figure.

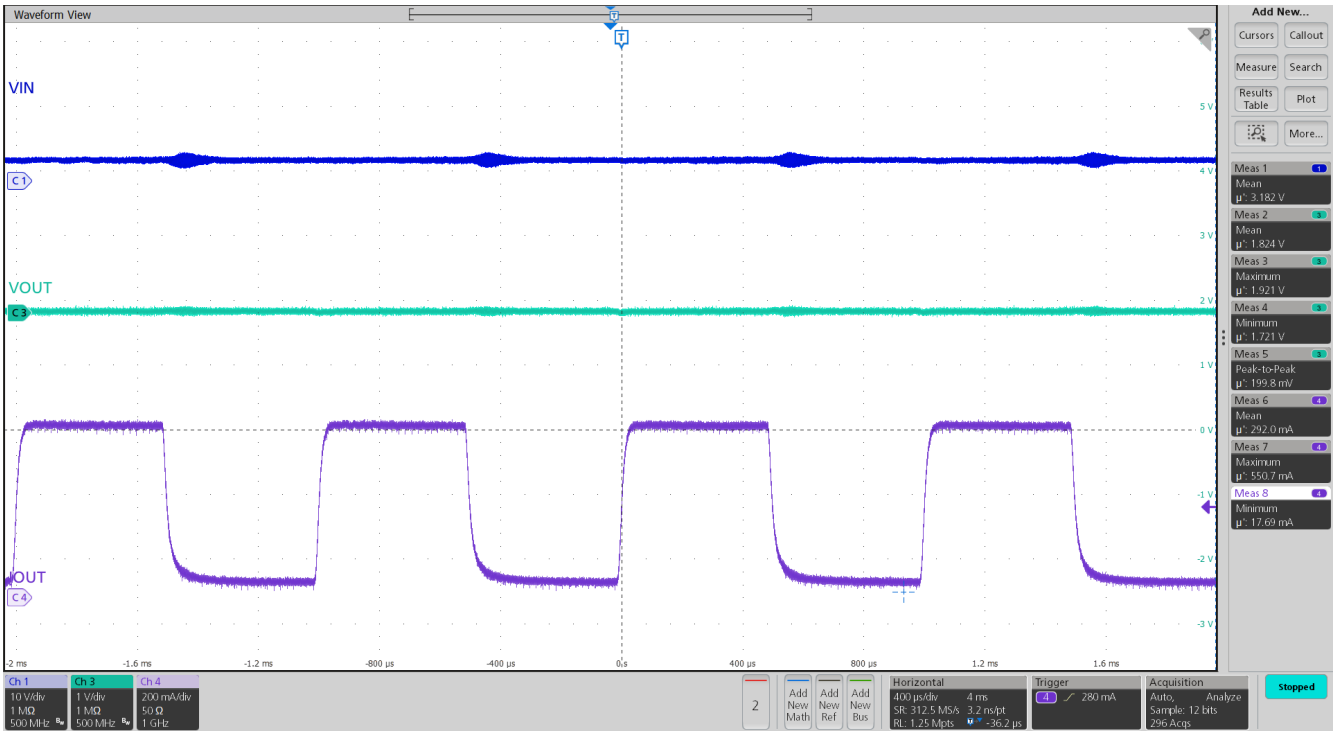


Figure 3-63. Load Transient at 3.3 V_{IN}, 1.8 V_{OUT}, 0A–0.5A

Load transient response waveforms of TPS7B81-Q1 are shown in the following figures.

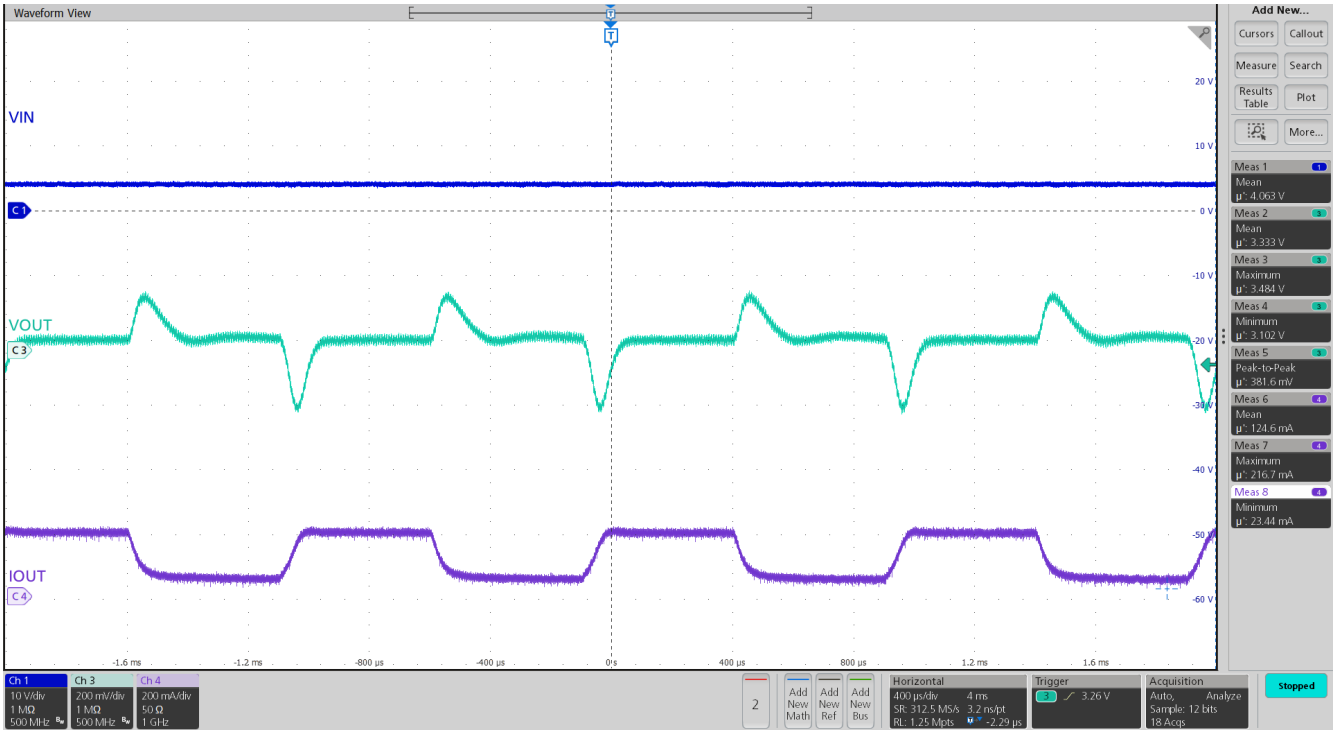


Figure 3-64. Load Transient at 4.5 V_{IN}, 3.3 V_{OUT}, 0A–0.15A

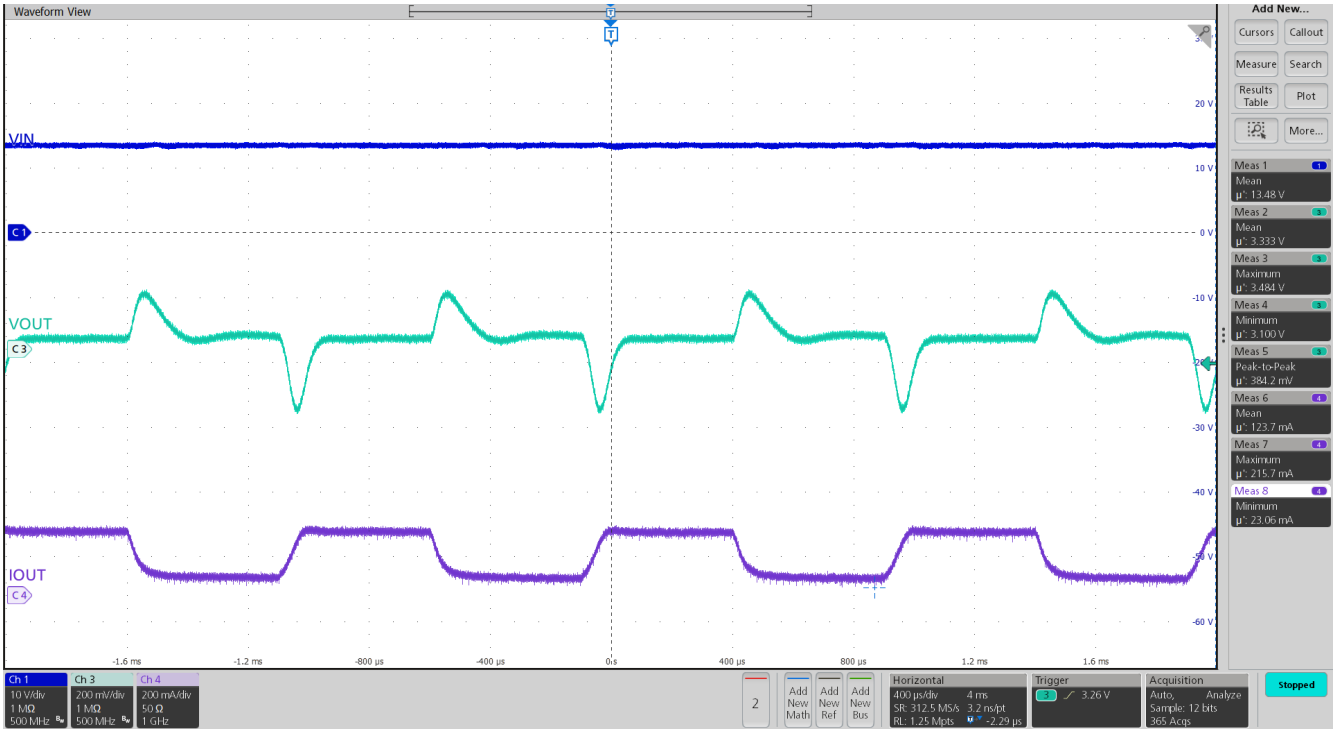


Figure 3-65. Load Transient at 13.5 V_{IN}, 3.3 V_{OUT}, 0A–0.15A

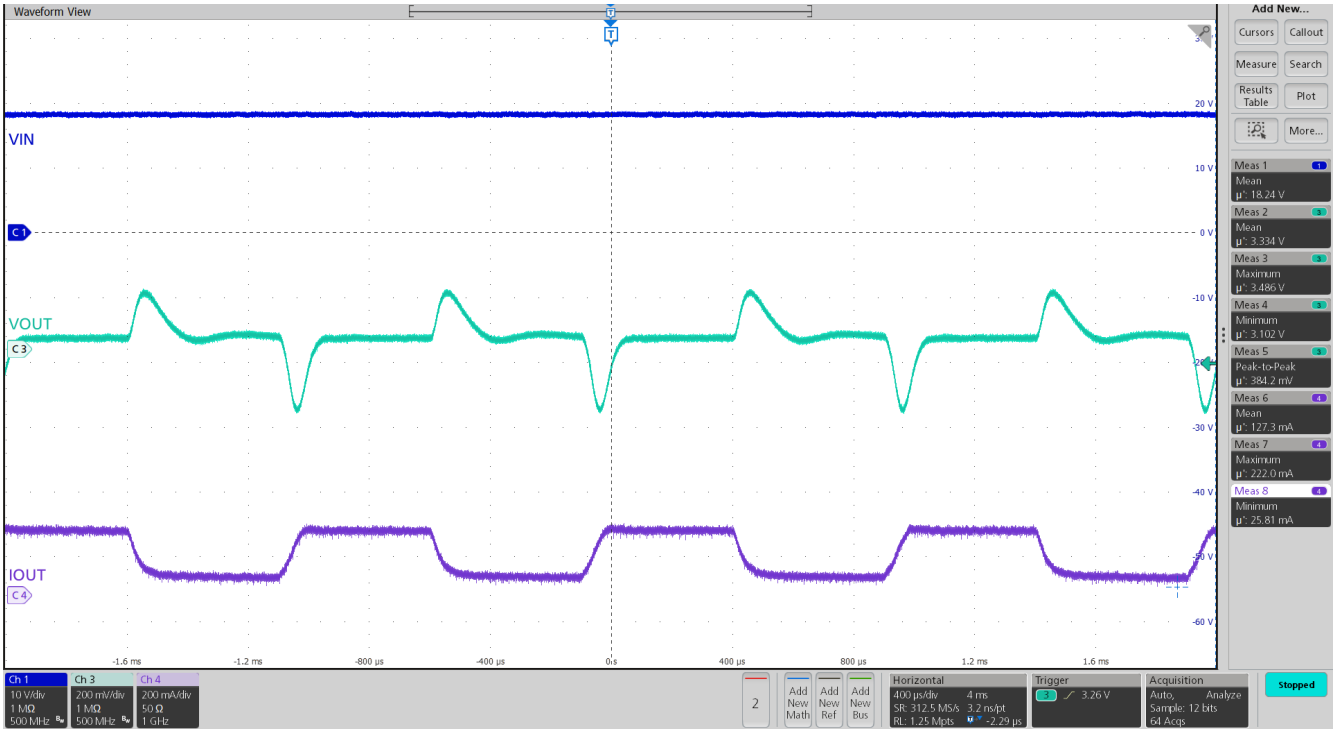


Figure 3-66. Load Transient at 18 V_{IN}, 3.3 V_{OUT}, 0A–0.15A

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