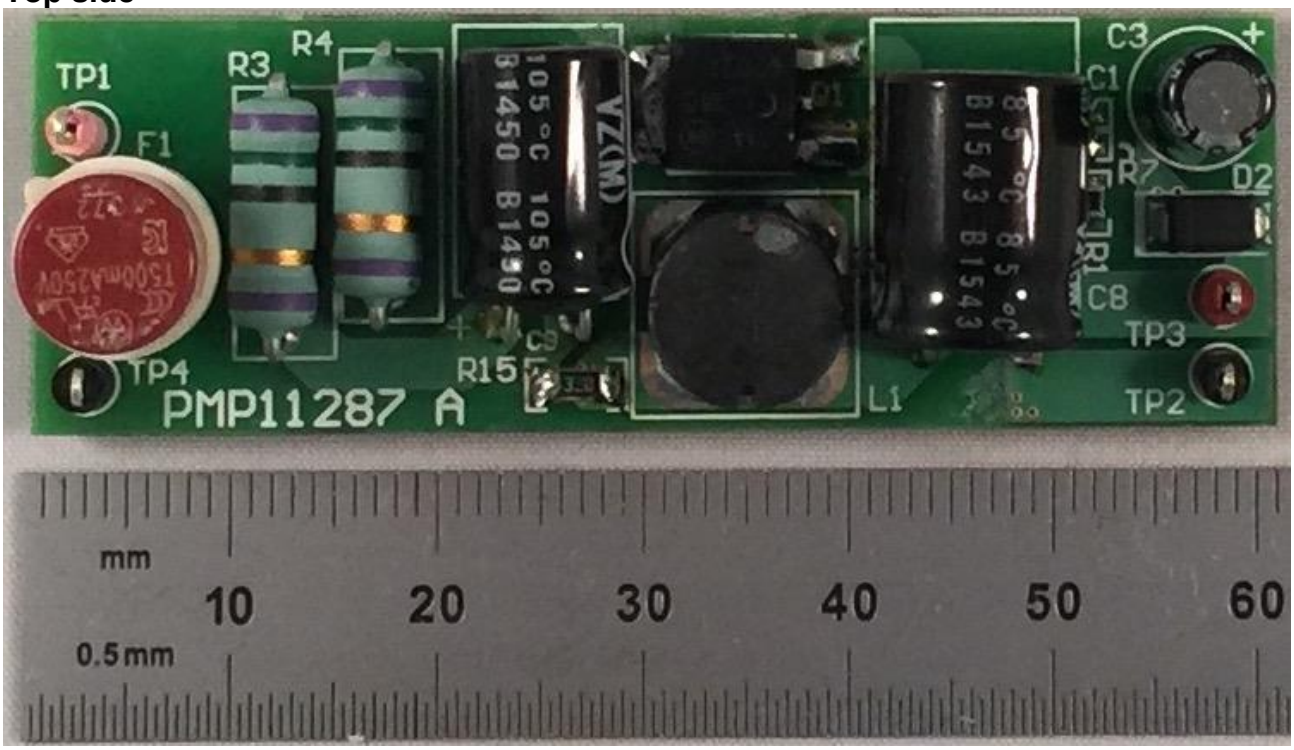
1 Photo

The photographs below show the PMP11287 Rev A assembly. This circuit was built on a PMP11287 Rev A PCB.

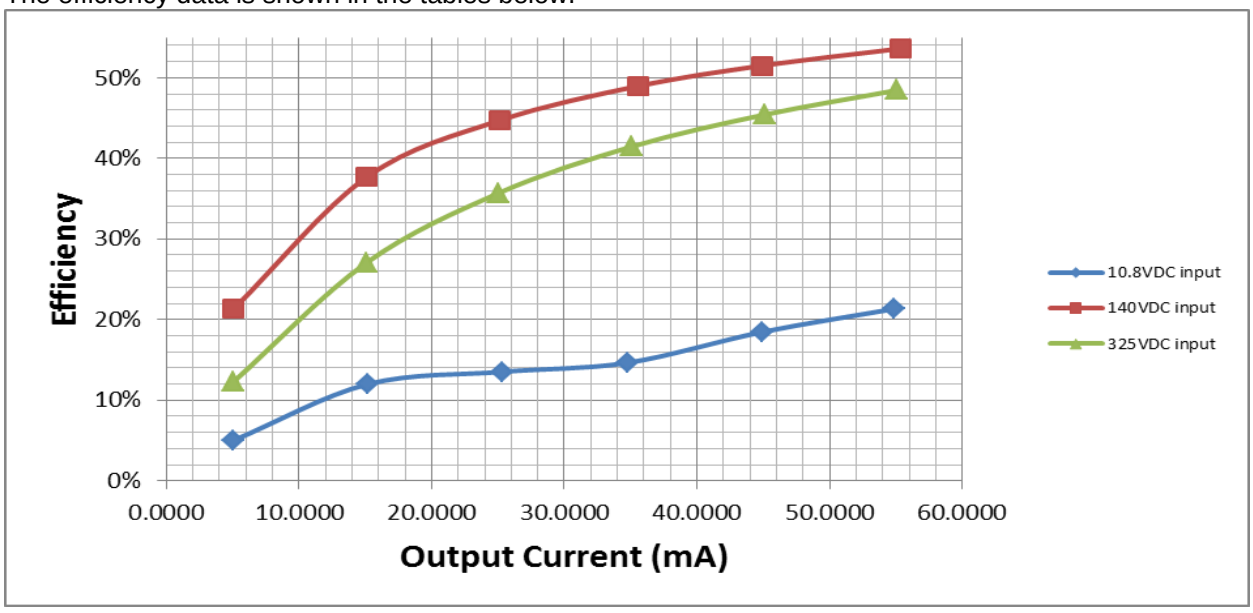
Top side



Bottom side

2 Converter Efficiency

The efficiency data is shown in the tables below.



V_{in}=10.8V_{DC}

Vin(V)	Iin(A)	Pin(W)	Vout(V)	Iout(mA)	Pout(W)	Losses(W)	Efficiency (%)
10.77	0.2799	3.01	11.72	54.9000	0.64	2.37	21.34%
10.78	0.2800	3.02	12.41	44.9000	0.56	2.46	18.46%
10.78	0.2803	3.02	12.74	34.7300	0.44	2.58	14.64%
10.78	0.2236	2.41	12.86	25.3700	0.33	2.08	13.54%
10.79	0.1475	1.59	12.57	15.1800	0.19	1.40	11.99%
10.84	0.1175	1.27	12.67	5.0100	0.06	1.21	4.98%
10.73	0.1078	1.16	12.77	0.0000	0.00	1.16	0.00%

V_{in}=140V_{DC}

Vin(V)	Iin(A)	Pin(W)	Vout(V)	Iout(mA)	Pout(W)	Losses(W)	Efficiency (%)
140.40	0.0088	1.23	11.93	55.4000	0.66	0.57	53.65%
140.40	0.0074	1.04	11.96	44.9000	0.54	0.51	51.51%
140.40	0.0062	0.87	11.99	35.6100	0.43	0.44	48.99%
140.40	0.0048	0.68	12.03	25.1200	0.30	0.37	44.72%
140.40	0.0034	0.48	12.08	15.0900	0.18	0.30	37.67%
140.40	0.0021	0.29	12.18	5.0700	0.06	0.23	21.33%
140.40	0.0014	0.19	12.26	0.0000	0.00	0.19	0.00%

V_{in}=325V_{DC}

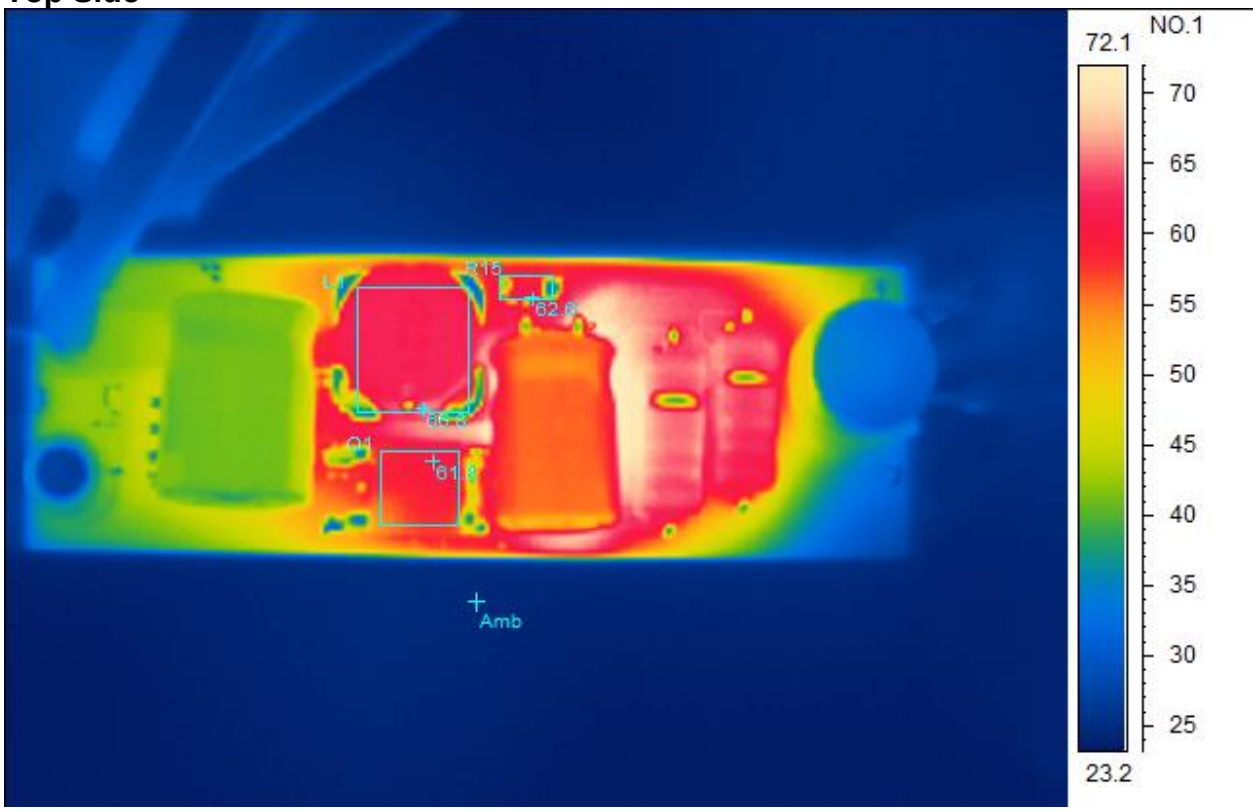
Vin(V)	Iin(A)	Pin(W)	Vout(V)	Iout(mA)	Pout(W)	Losses(W)	Efficiency (%)
325.10	0.0042	1.35	11.87	55.1000	0.65	0.70	48.47%
325.10	0.0036	1.18	11.90	45.1000	0.54	0.64	45.43%
325.10	0.0031	1.01	11.94	35.0600	0.42	0.59	41.46%
325.10	0.0026	0.84	11.99	25.0400	0.30	0.54	35.70%
325.10	0.0021	0.67	12.05	15.0500	0.18	0.49	27.01%
325.10	0.0015	0.50	12.15	5.0600	0.06	0.44	12.30%
325.10	0.0012	0.39	12.50	0.0000	0.00	0.39	0.00%

3 Thermal Images

The thermal images below show a top view and bottom view of the board at 12V/55mA full load. The ambient temperature was 20ºC with no forced air flow.

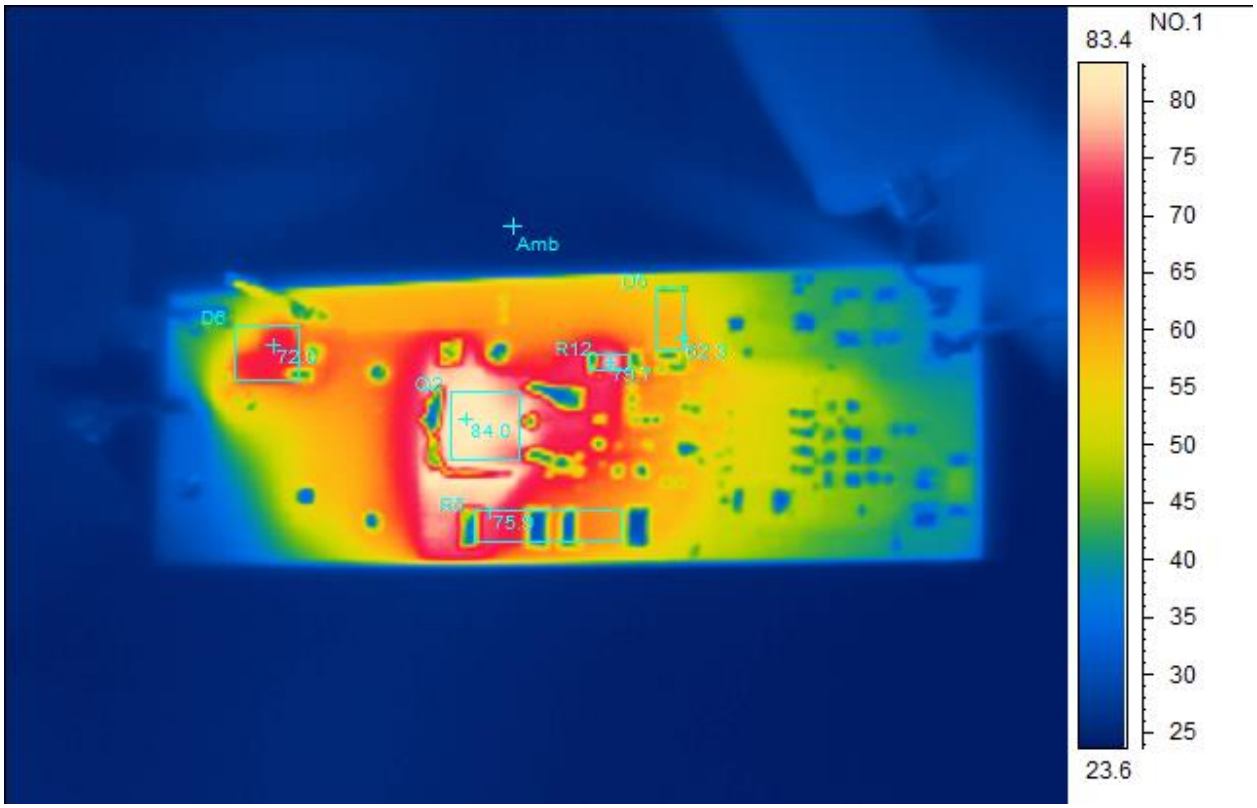
V_{in}=10.8V_{DC}

Top Side



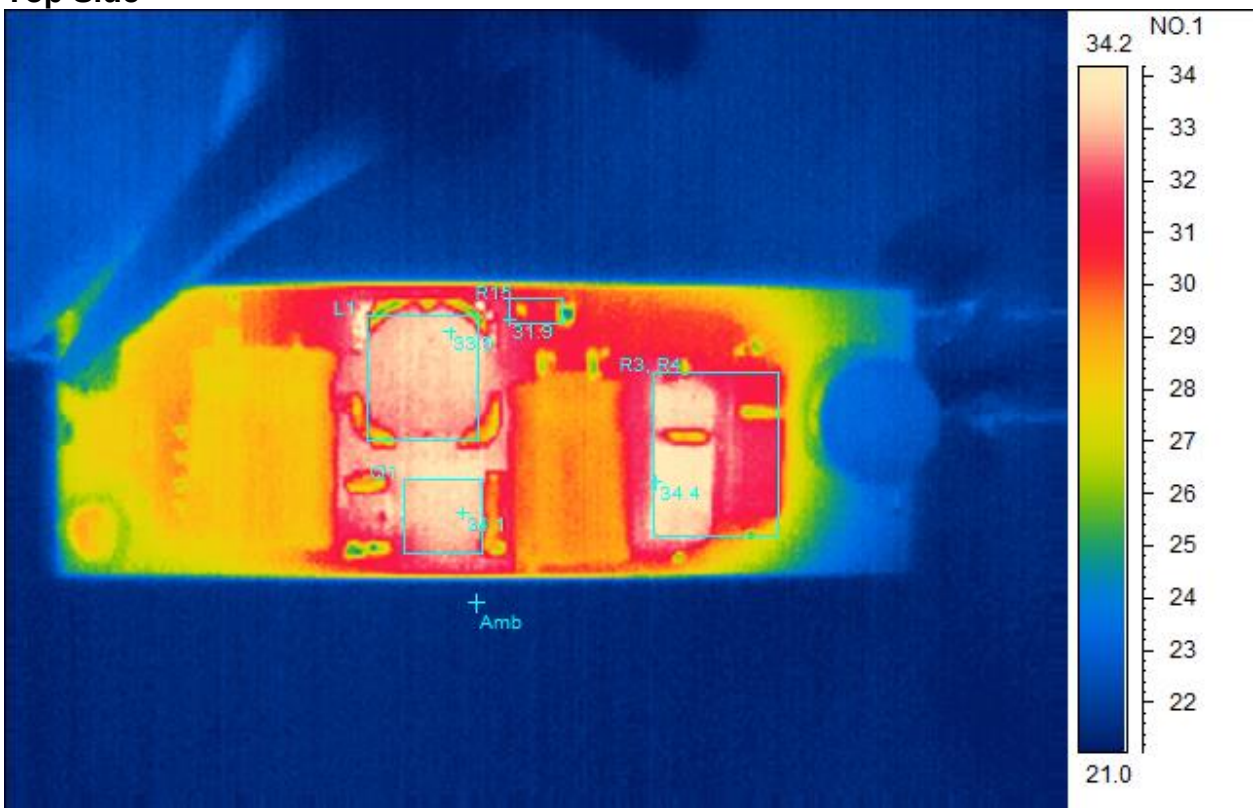
Spot analysis	Value
Amb Temperature	24.7°C
Area analysis	**Value**
Q1Max	61.8°C
L1Max	66.8°C
R15Max	62.6°C

V_{in}=10.8V_{DC}
Bottom Side



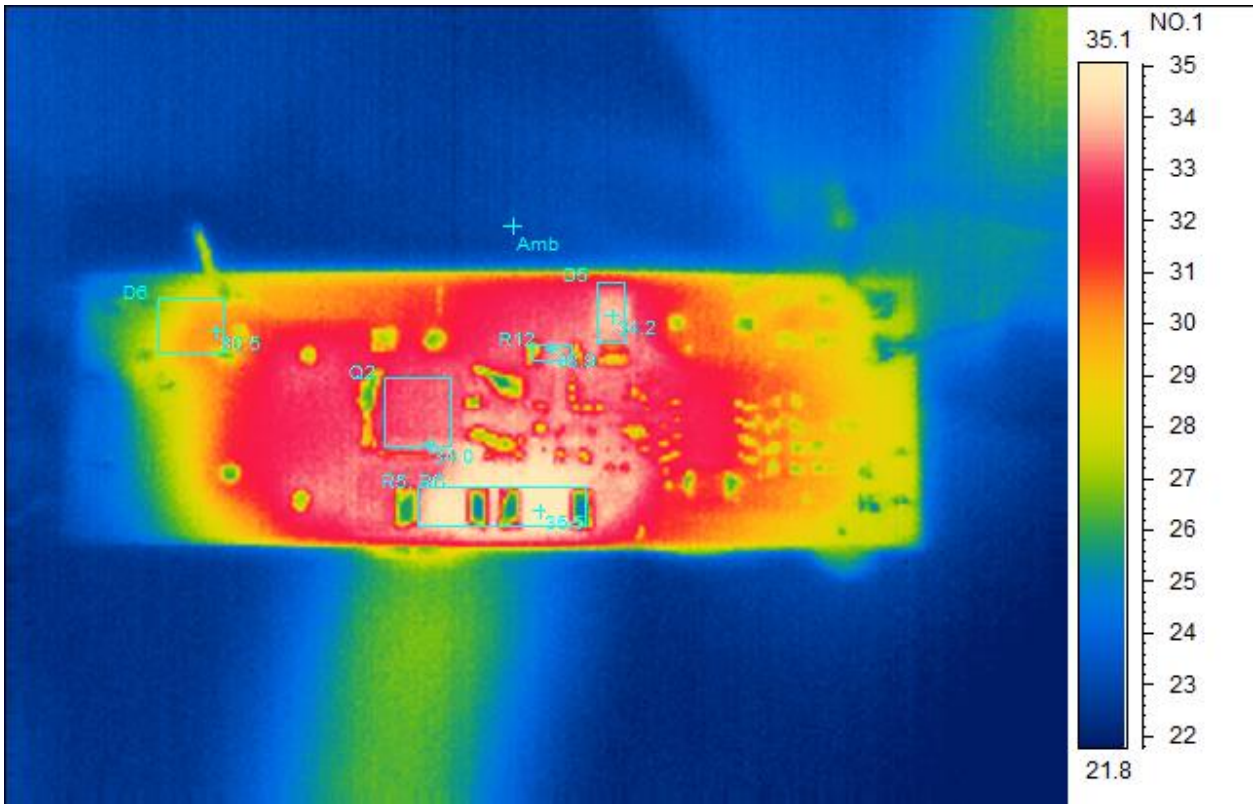
Spot analysis	Value
Amb Temperature	25.3°C
Area analysis	**Value**
D6Max	72.0°C
Q2Max	84.0°C
R5Max	75.9°C
R12Max	79.7°C
D5Max	62.3°C

V_{in}=140V_{DC}
Top Side



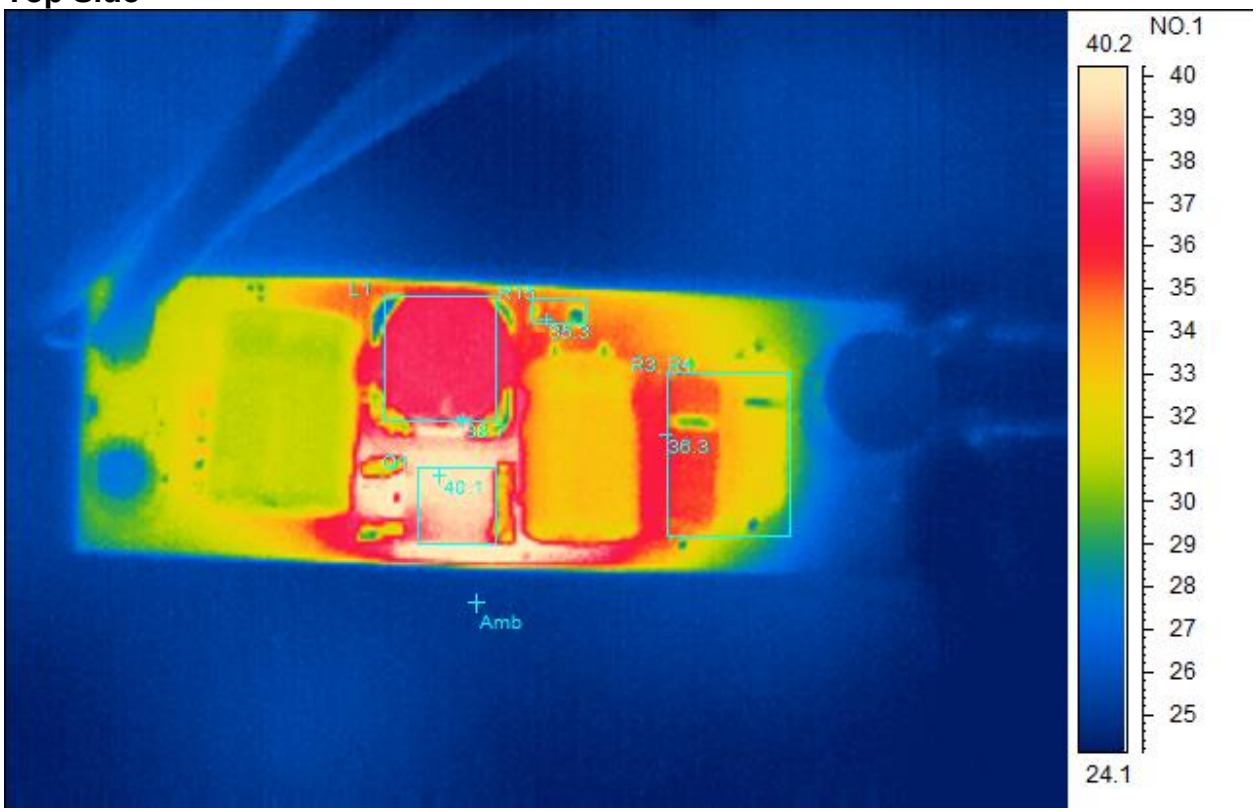
Spot analysis	Value
Amb Temperature	21.4°C
Area analysis	**Value**
Q1Max	34.1°C
L1Max	33.9°C
R15Max	31.9°C
R3, R4 Max	34.4°C

V_{in}=140V_{DC}
Bottom Side



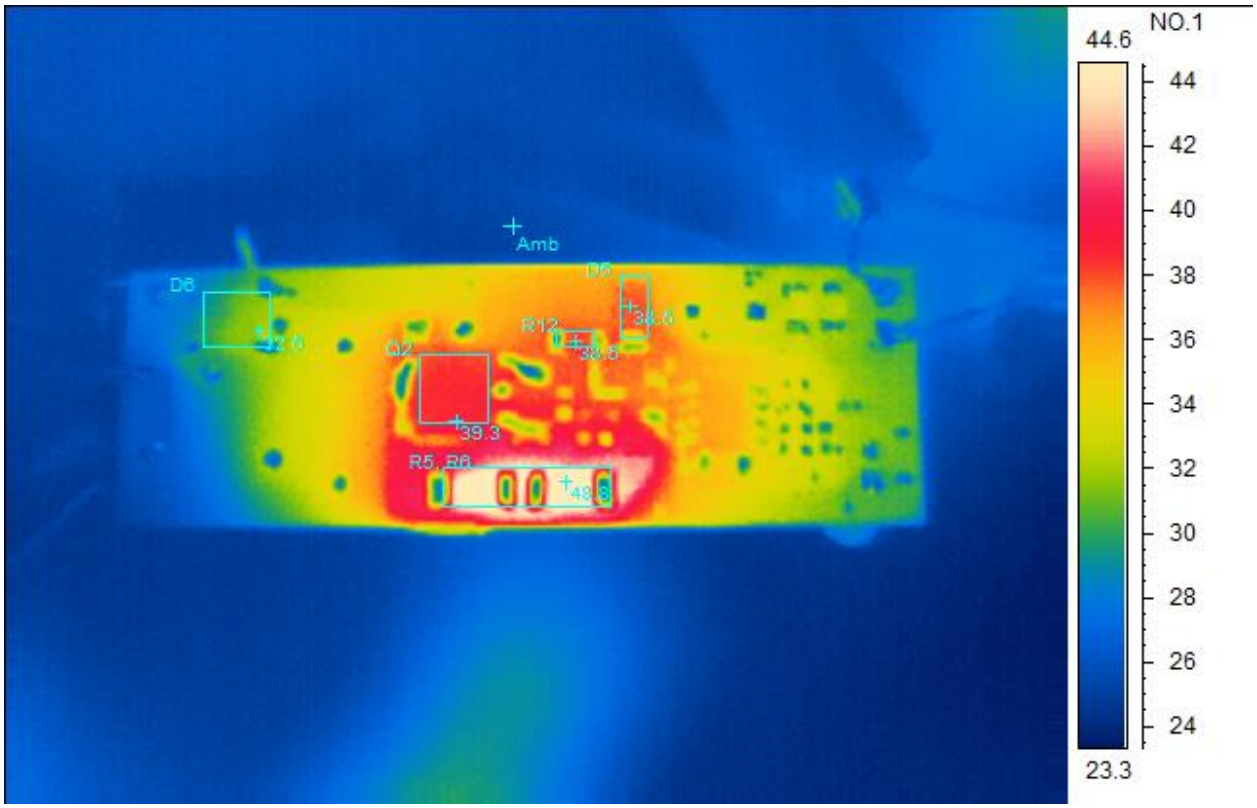
Spot analysis	Value
Amb Temperature	23.2°C
Area analysis	**Value**
D6Max	30.5°C
Q2Max	34.0°C
R5, R6 Max	35.5°C
R12Max	33.9°C
D5Max	34.2°C

V_{in}=325V_{DC}
Top Side



Spot analysis	Value
Amb Temperature	25.4°C
Area analysis	**Value**
Q1Max	40.1°C
L1Max	38.7°C
R15Max	35.3°C
R3, R4 Max	36.3°C

V_{in}=325V_{DC}
Bottom Side



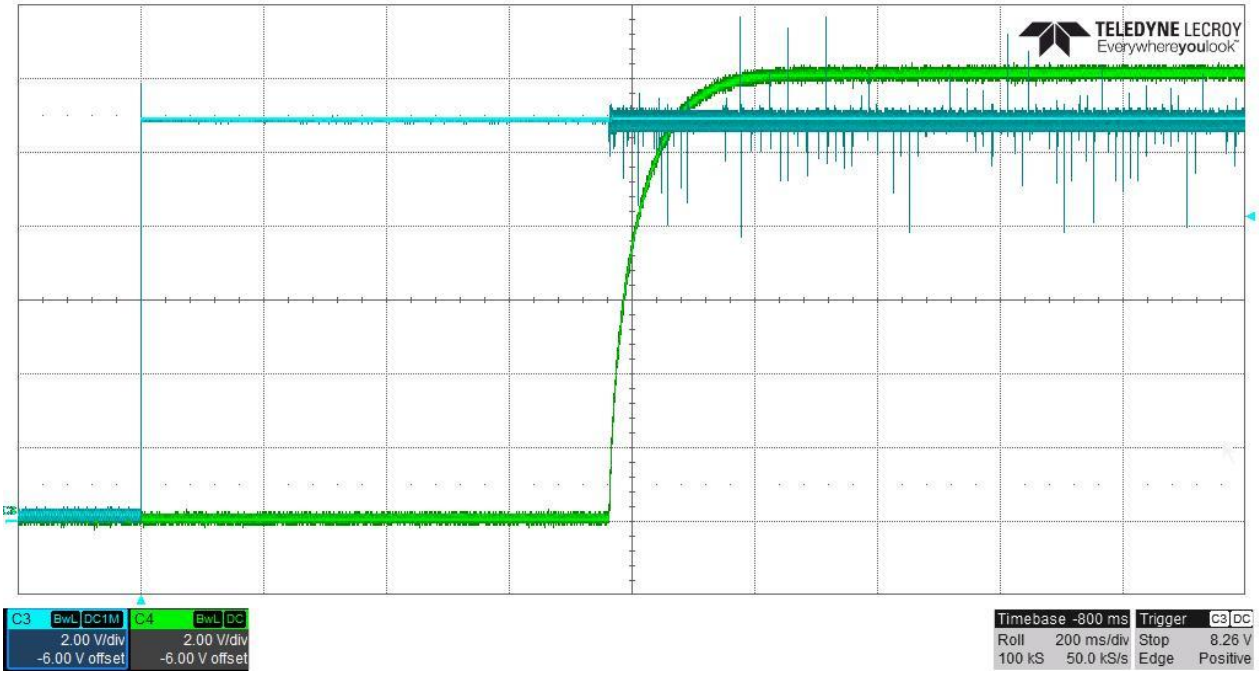
Spot analysis	Value
Amb Temperature	25.8°C
Area analysis	**Value**
D6Max	32.5°C
Q2Max	39.3°C
R5, R6 Max	48.8°C
R12Max	38.5°C
D5Max	38.5°C

4 Startup Waveforms

The output voltage at startup is shown in the images below.

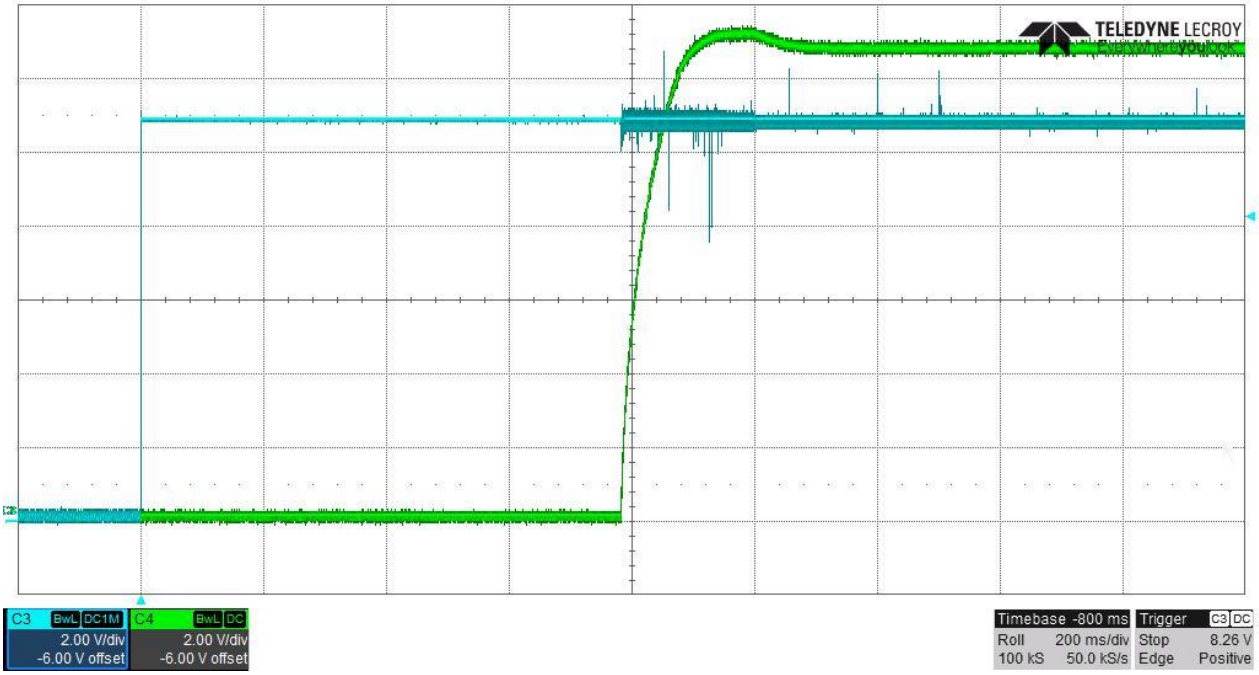
4.1 Start Up @ 10.8V_{DC} input, 12V/55mA output.

CH3: input voltage, CH4: output voltage



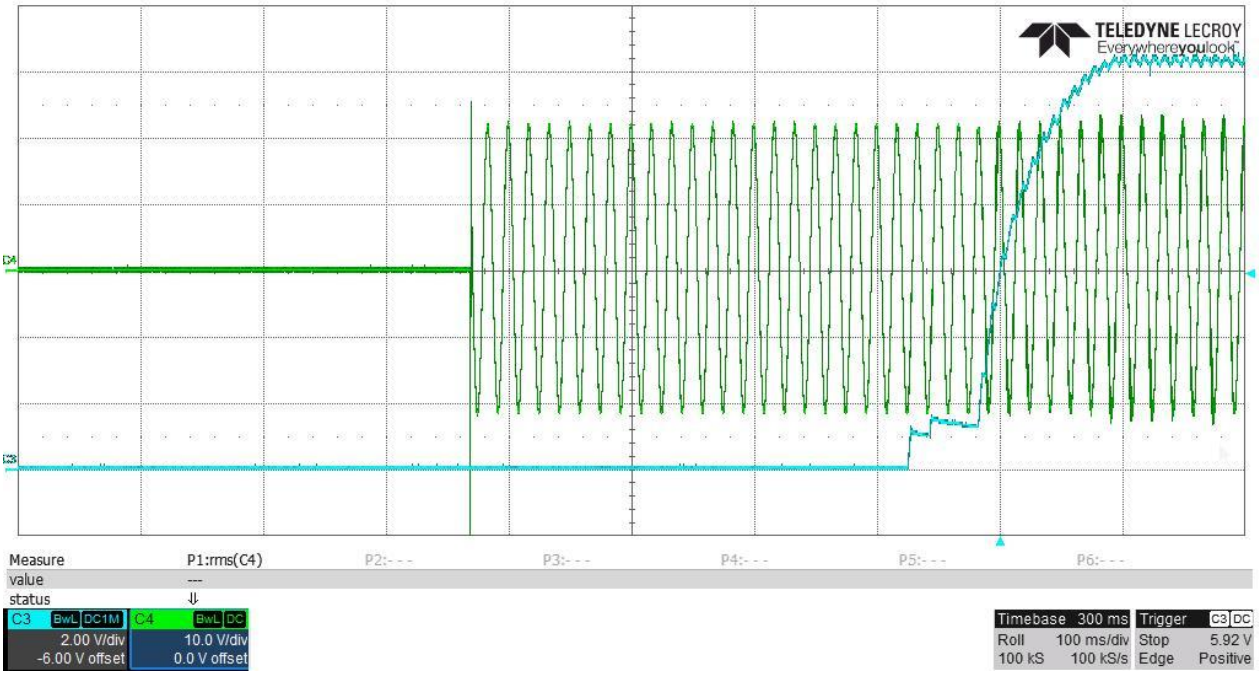
4.2 Start Up @ 10.8V_{DC} input, 12V/0A output.

CH3: input voltage, CH4: output voltage



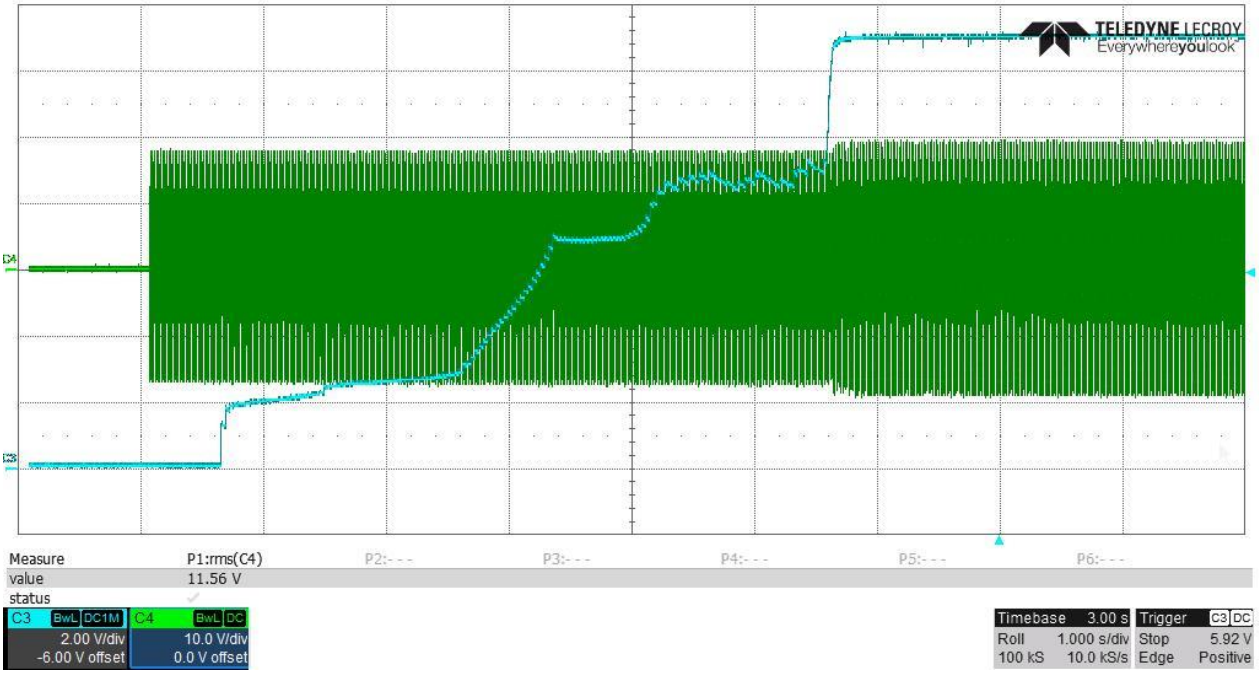
4.3 Start Up @ 15V_{AC}/60Hz input, 12V/55mA output.

CH3: output voltage, CH4: input voltage



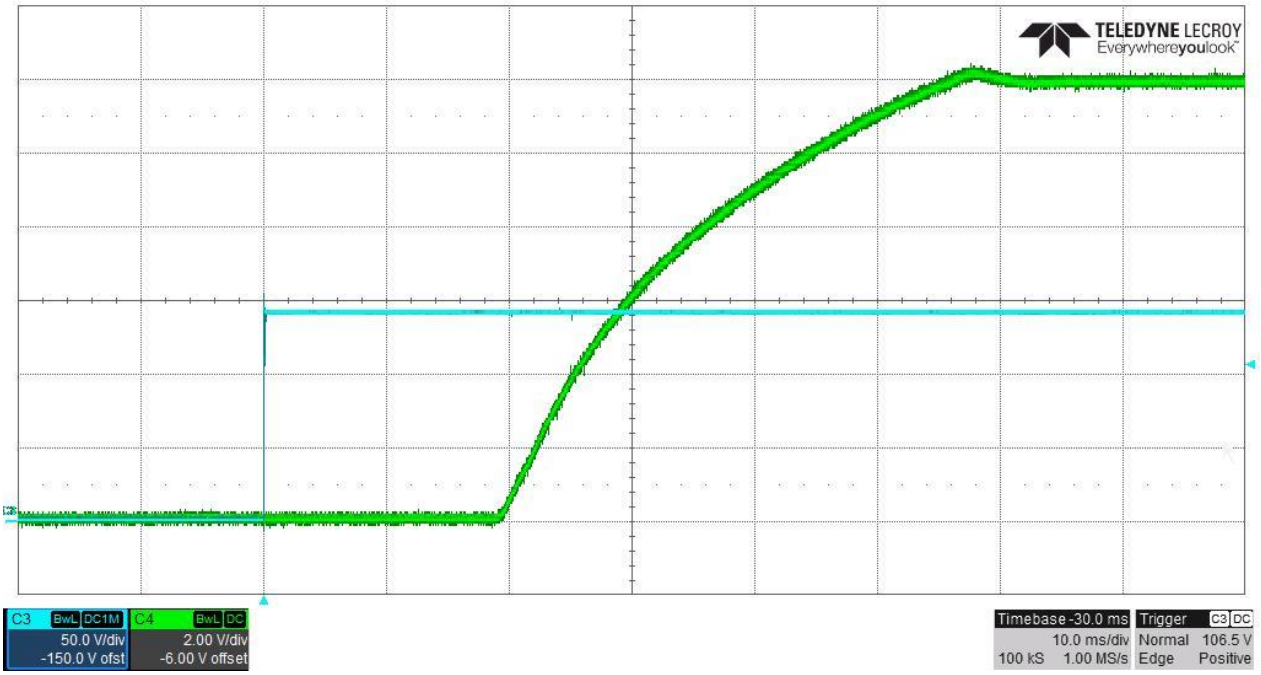
4.4 Start Up @ 12V_{AC}/60Hz input, 12V/0A output.

CH3: output voltage, CH4: input voltage



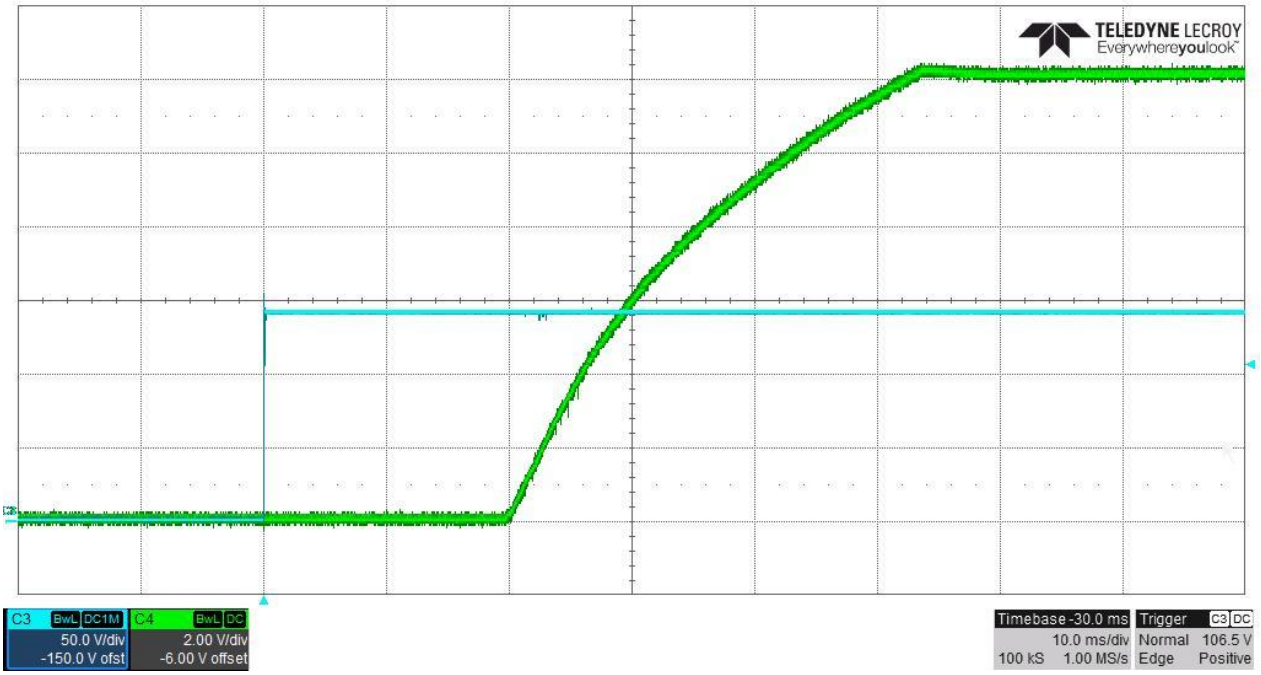
4.5 Start Up @ 140V_{DC} input, 12V/55mA output.

CH3: input voltage, CH4: output voltage



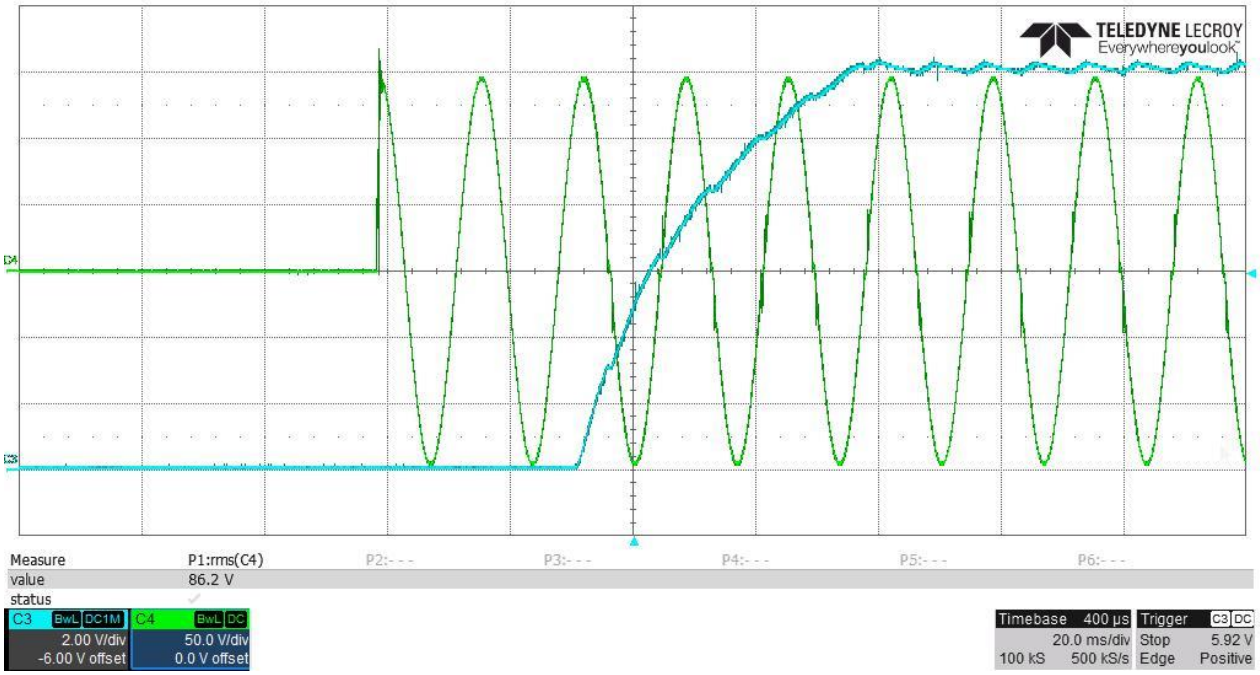
4.6 Start Up @ 140V_{DC} input, 12V/0A output.

CH3: input voltage, CH4: output voltage



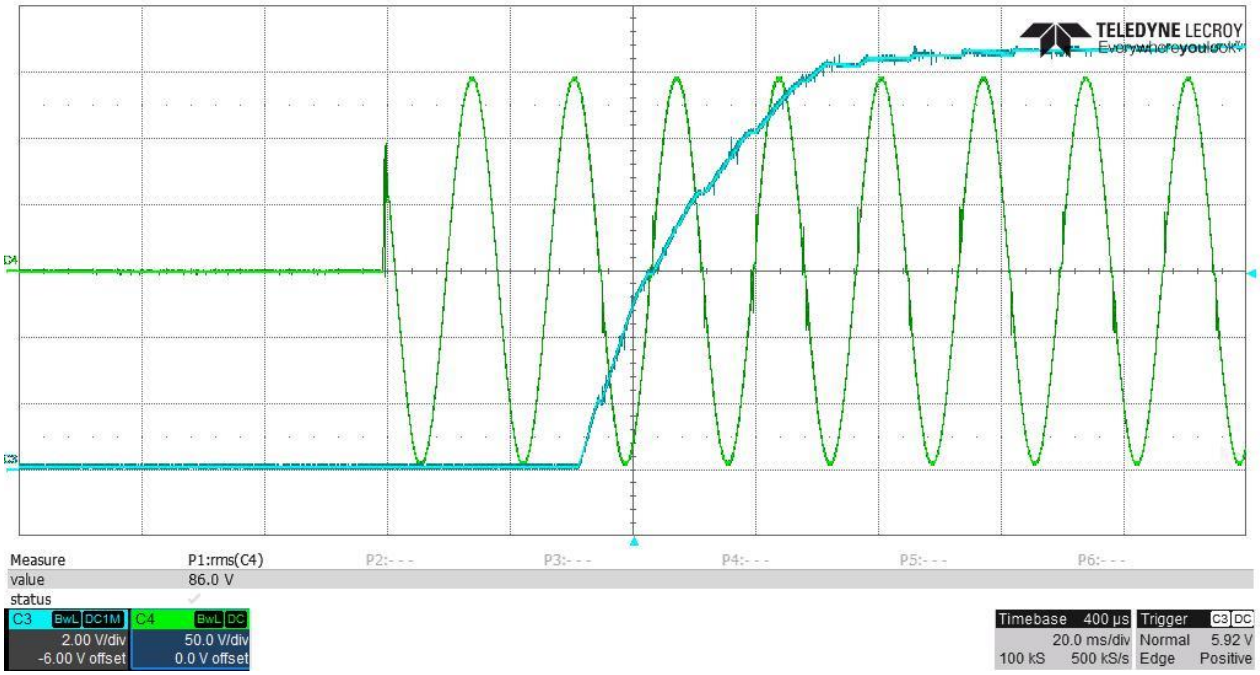
4.7 Start Up @ 100V_{AC}/60Hz input, 12V/55mA output.

CH3: output voltage, CH4: input voltage



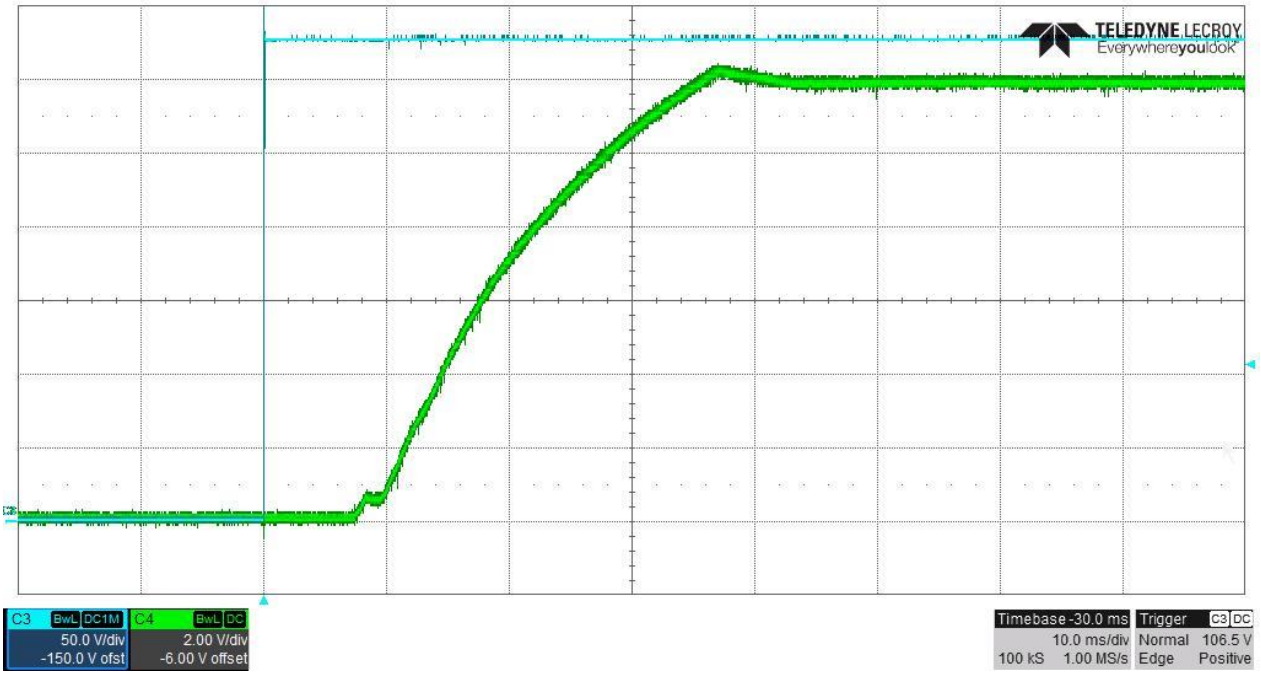
4.8 Start Up @ 100V_{AC}/60Hz input, 12V/0A output.

CH3: output voltage, CH4: input voltage



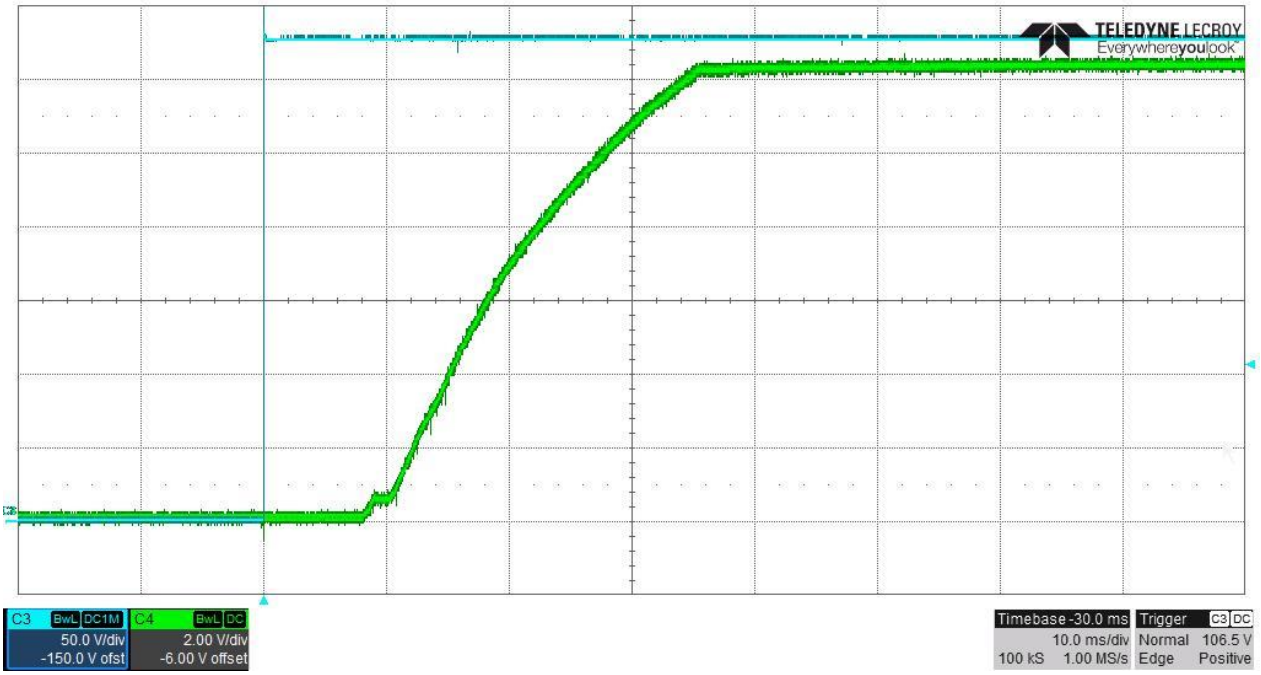
4.9 Start Up @ 325V_{DC} input, 12V/55mA output.

CH3: input voltage, CH4: output voltage



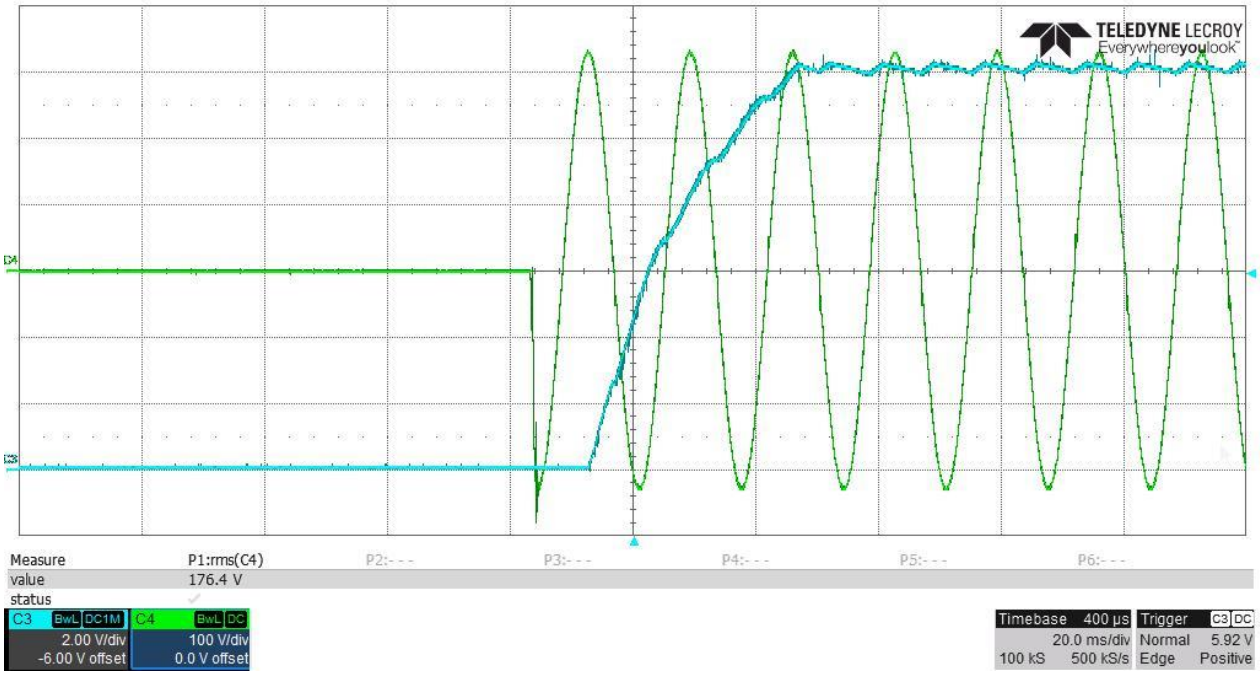
4.10 Start Up @ 325V_{DC} input, 12V/0A output.

CH3: input voltage, CH4: output voltage



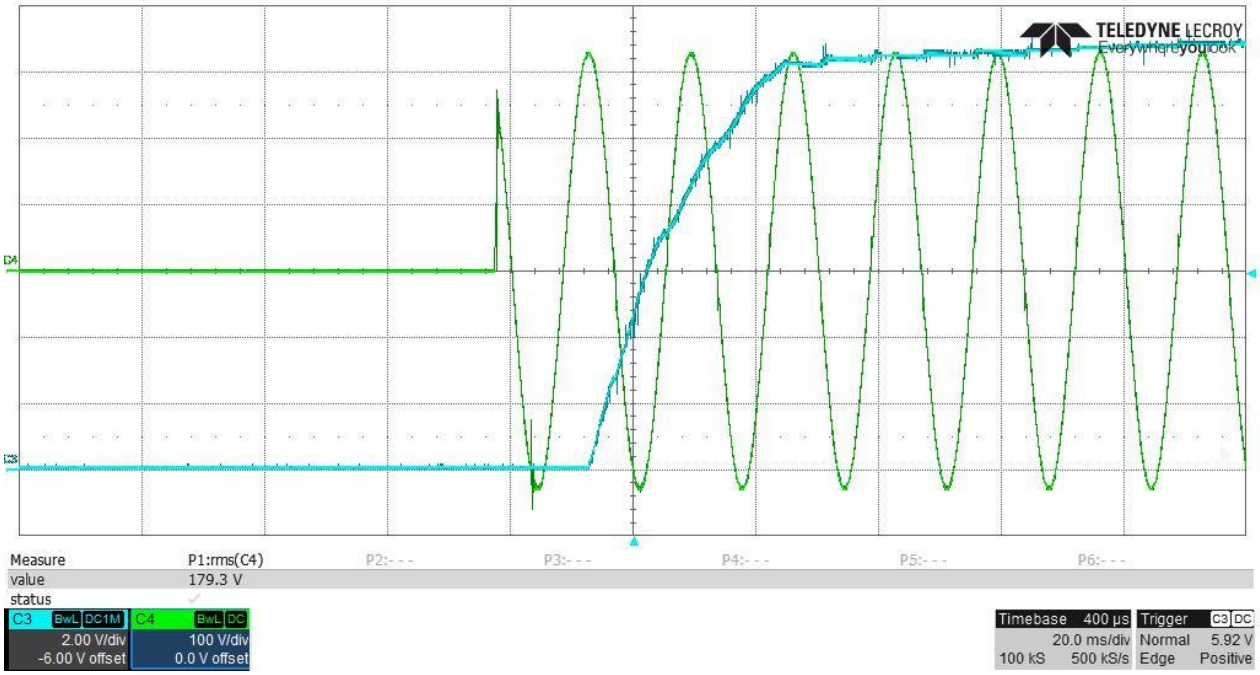
4.11 Start Up @ 230V_{AC}/50Hz input, 12V/55mA output.

CH3: output voltage, CH4: input voltage



4.12 Start Up @ 230V_{AC}/50Hz input, 12V/0A output.

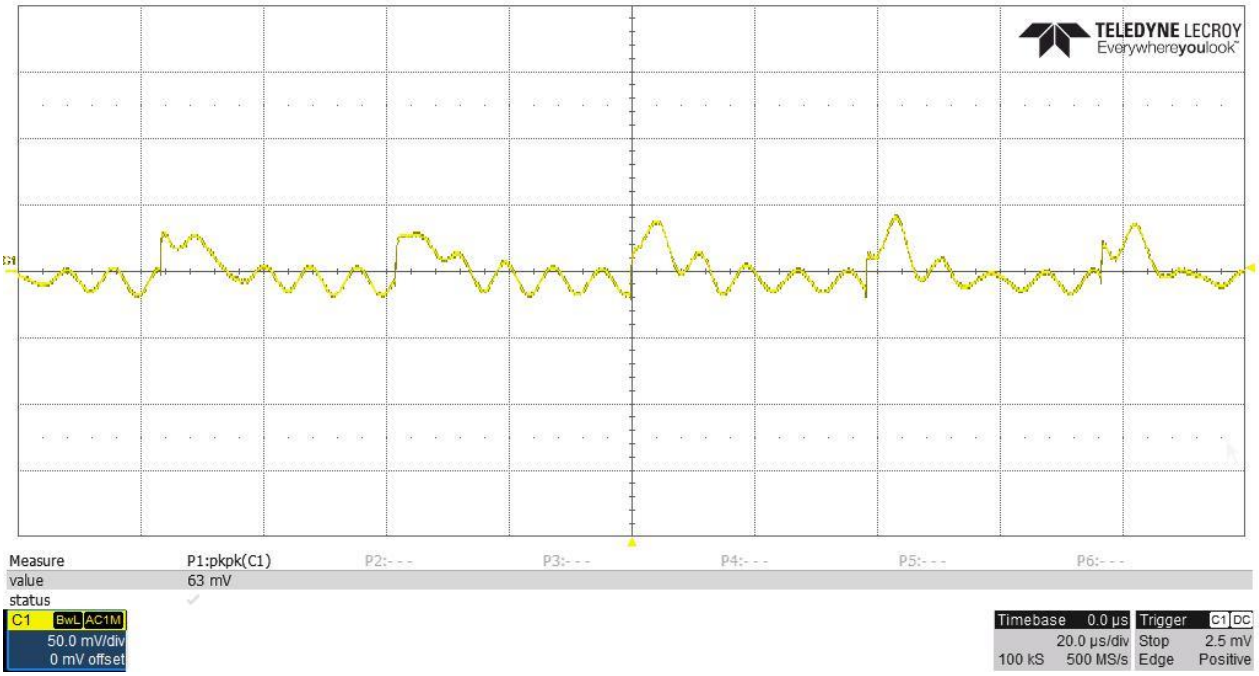
CH3: output voltage, CH4: input voltage



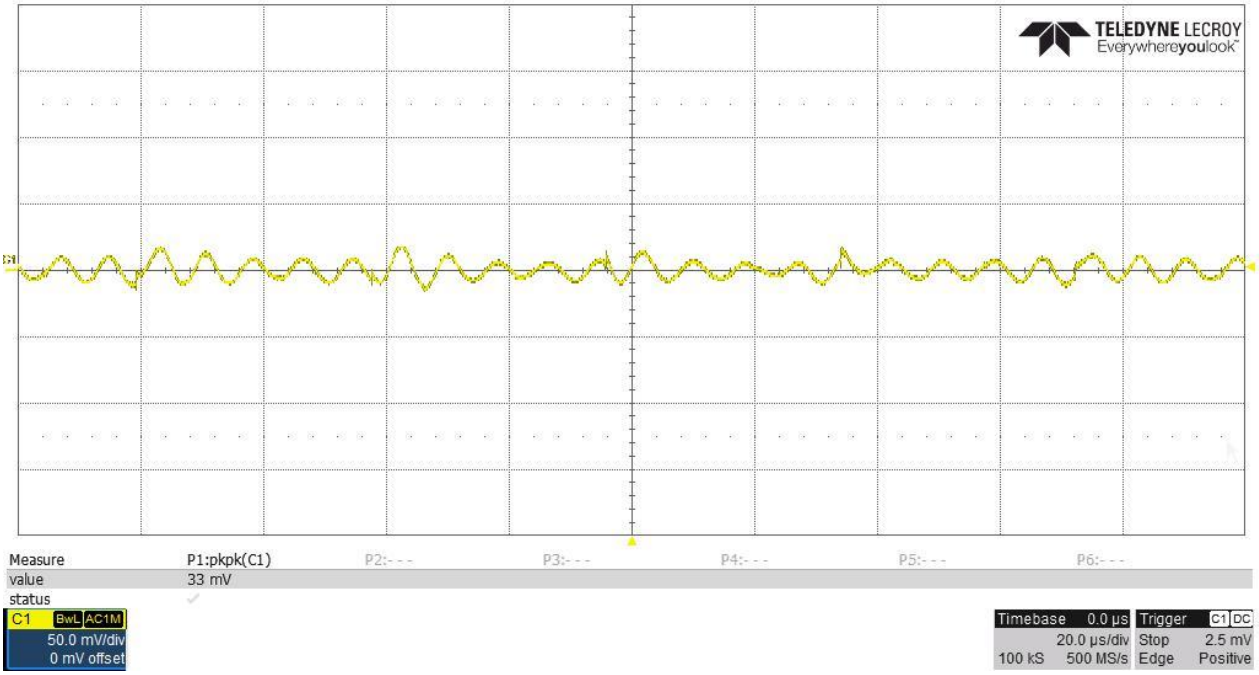
5 Output Ripple Voltages

The output ripple voltages are shown in the plots below.

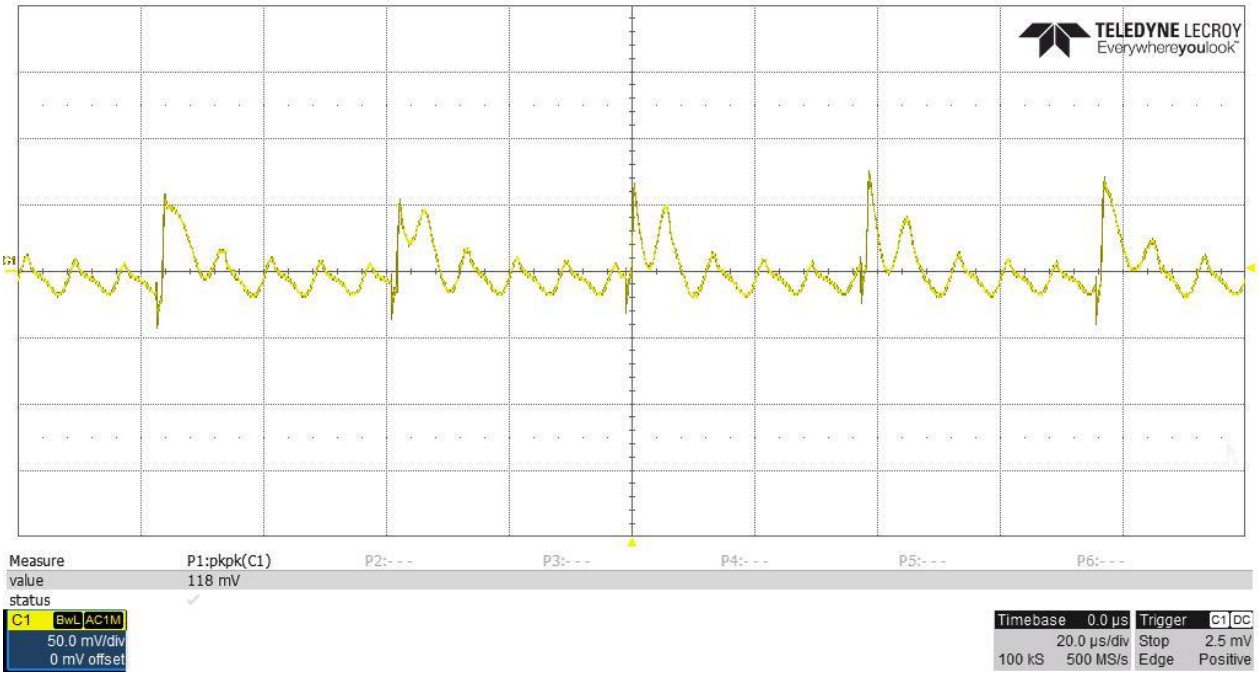
5.1 10.8V_{DC} input, 12V/55mA output.



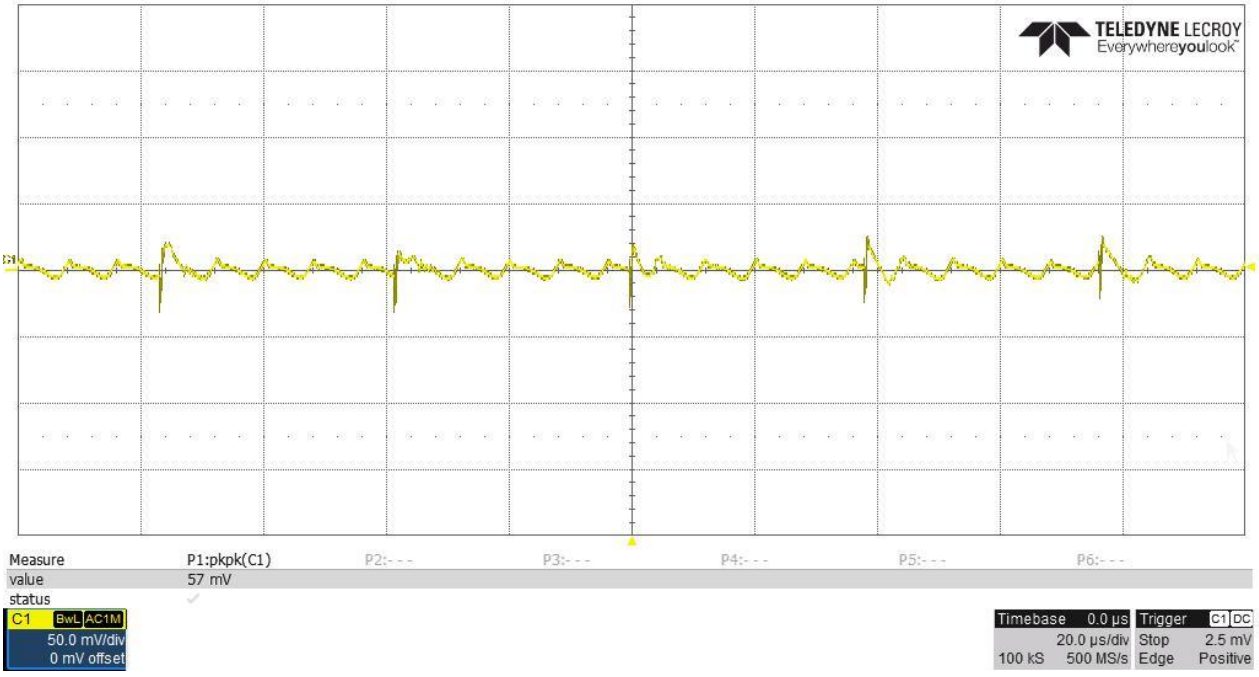
5.2 10.8V_{DC} input, 12V/0A output.



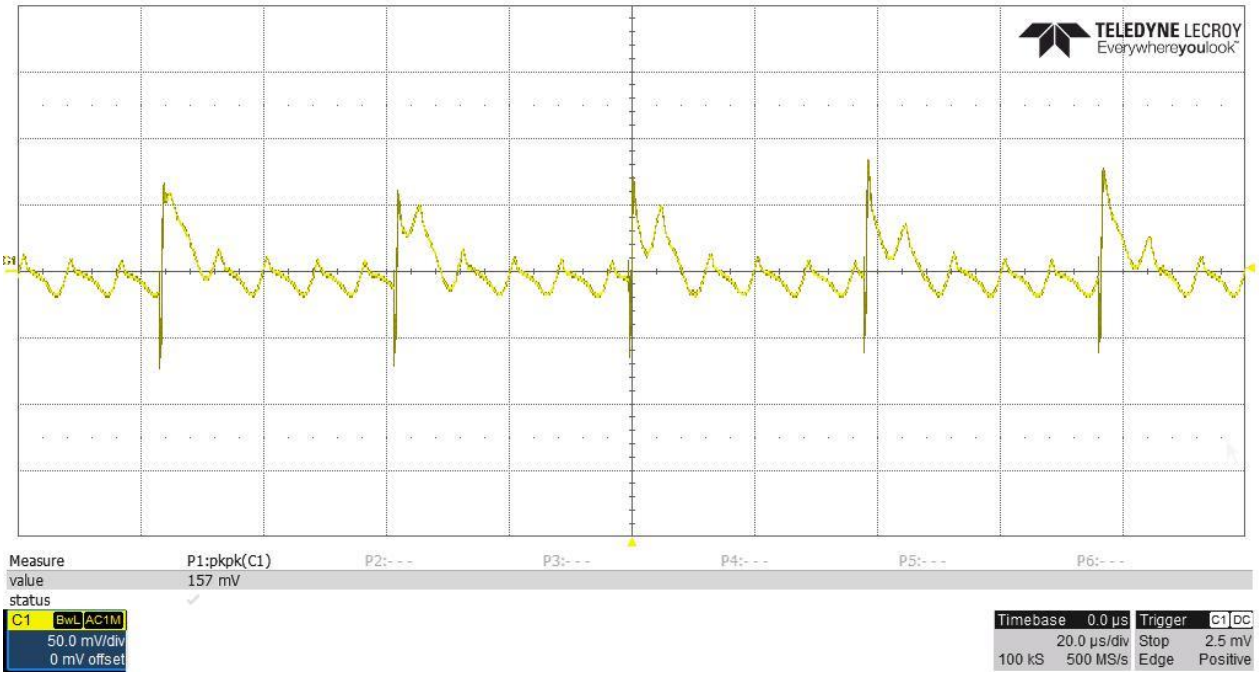
5.3 140V_{DC} input, 12V/55mA output.



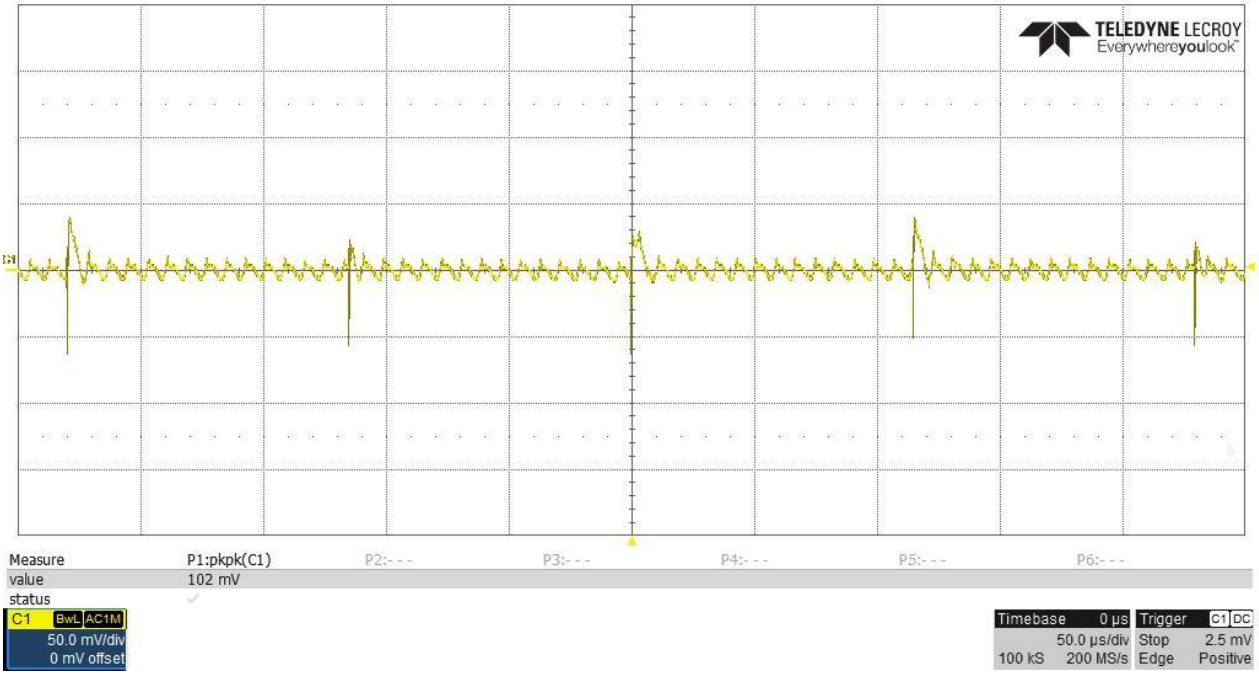
5.4 140V_{DC} input, 12V/0A output.



5.5 325V_{DC} input, 12V/55mA output.



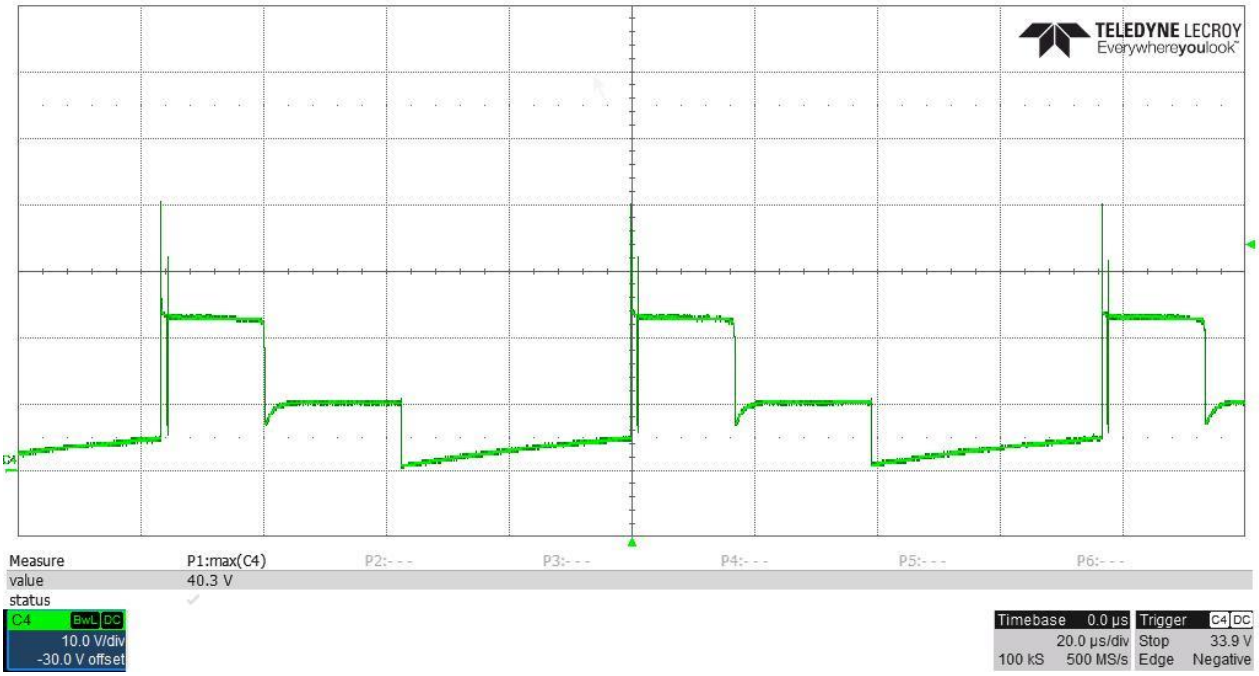
5.6 325V_{DC} input, 12V/0A output.



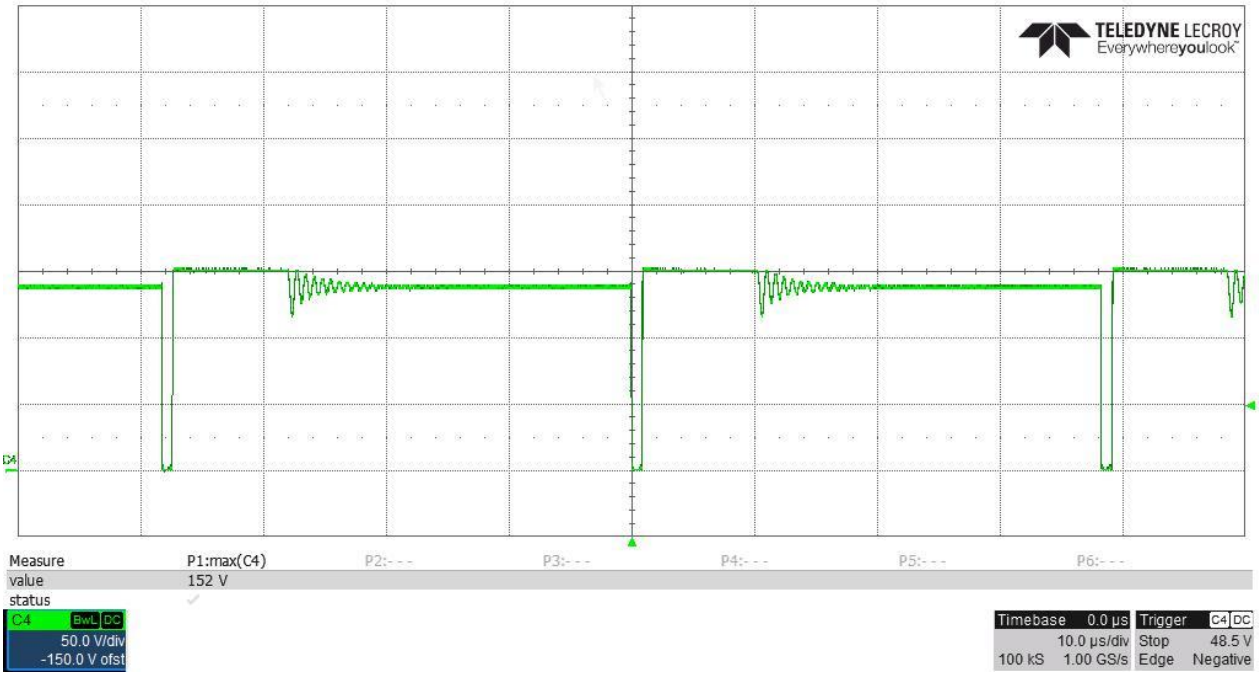
6 Switching Waveforms

The images below show key switching waveforms of PMP11287RevA. The waveforms are measured with 12V/55mA output. CH1: V_{D5}.

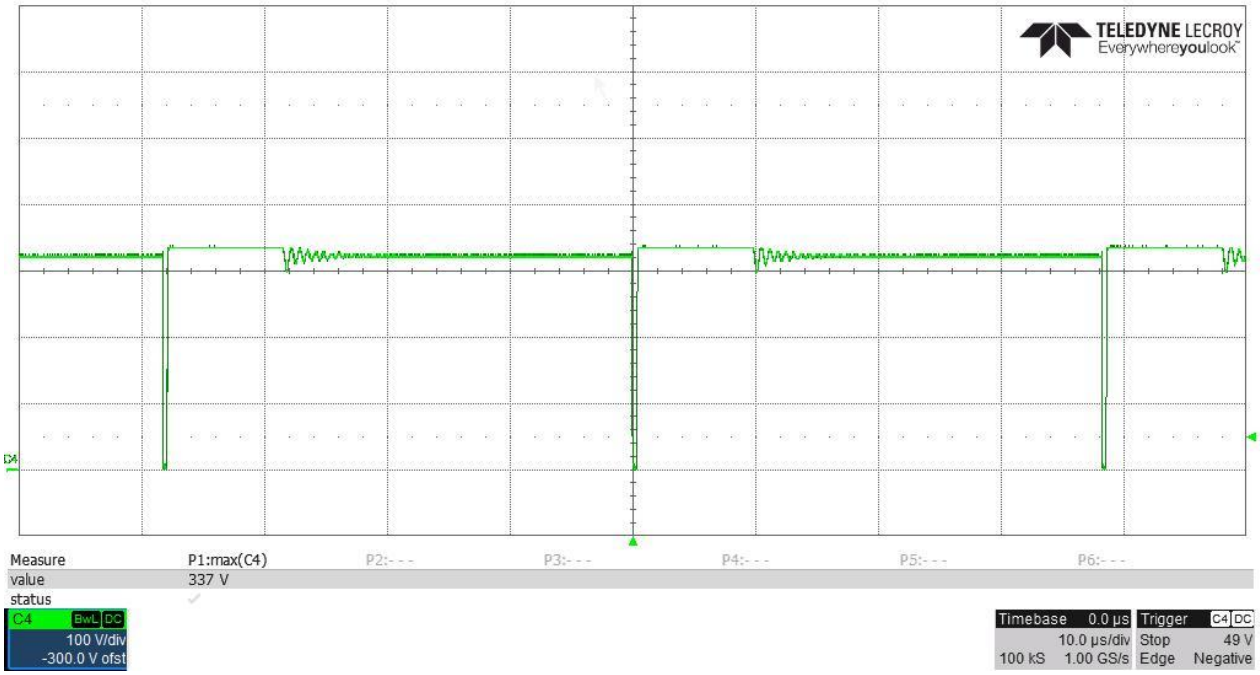
6.1 10.8V_{DC} input, 12V/55mA output.



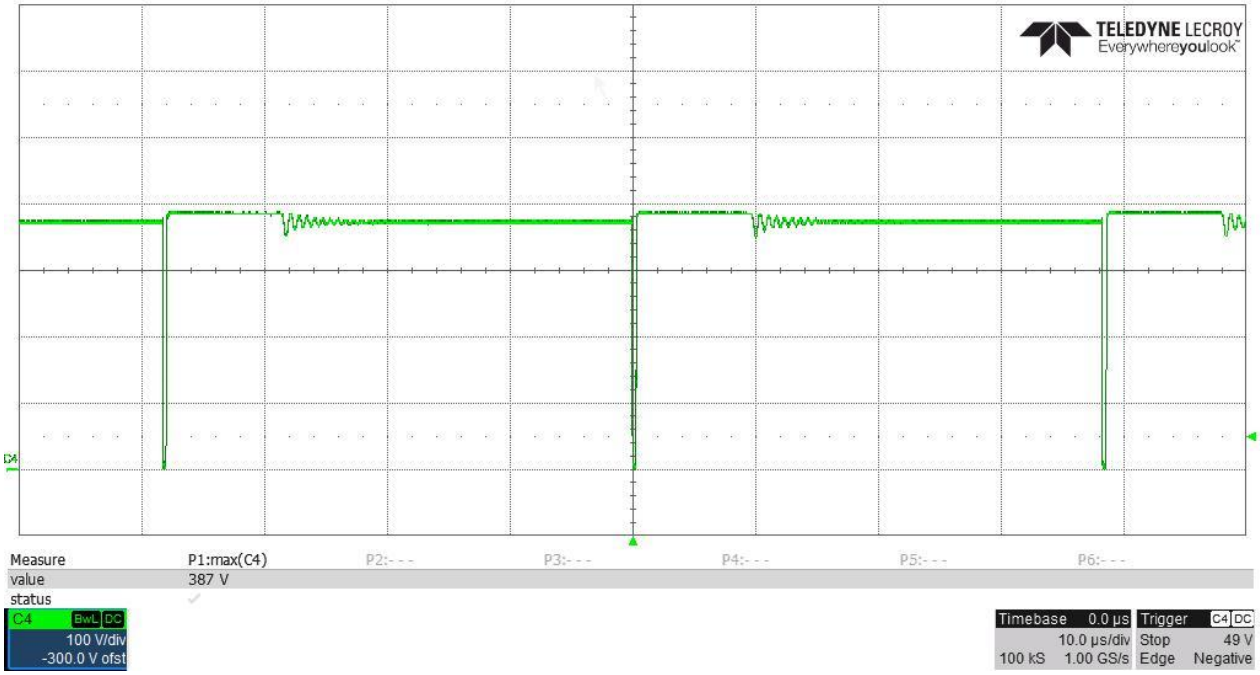
6.2 140V_{DC} input, 12V/55mA output.



6.3 325V_{DC} input, 12V/55mA output.



6.4 375V_{DC} input, 12V/55mA output.



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