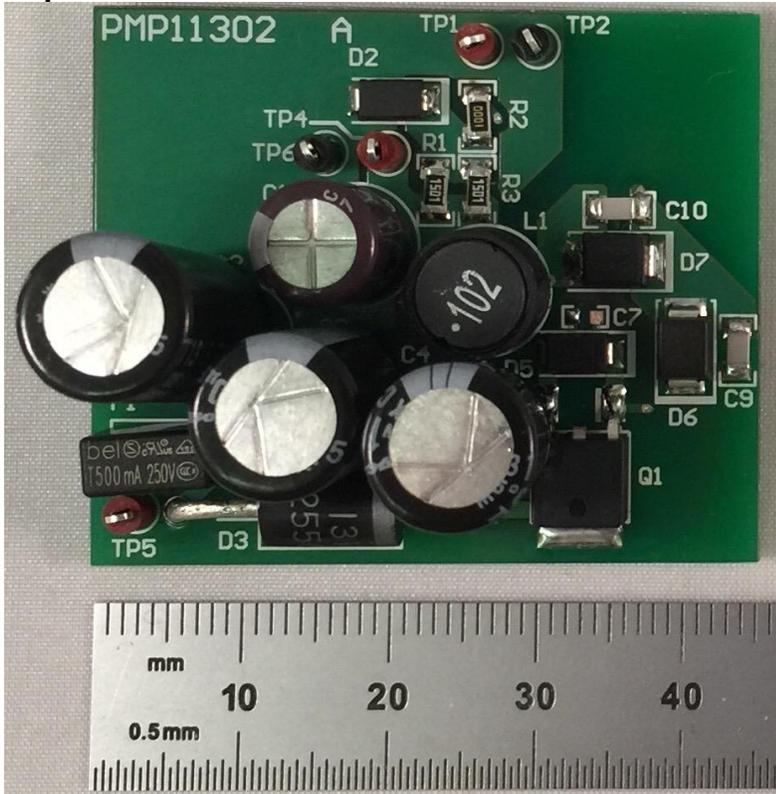


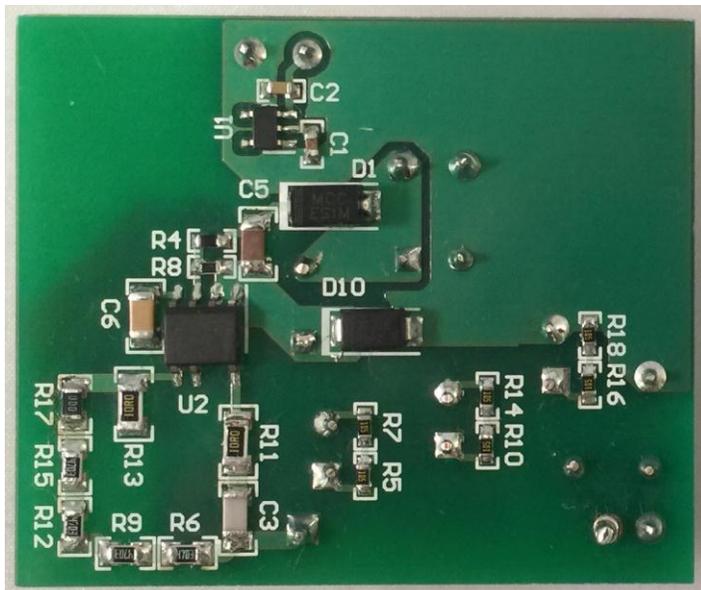
## 1 Photo

The photographs below show the PMP11302 Rev A assembly. This circuit was built on a PMP11302 Rev A PCB.

### Top side



### Bottom side



## 2 Converter Efficiency

The efficiency data is shown in the tables below. No load is applied to 5V output during this test.

### $V_{in}=166V_{AC}/60Hz$

Vin(V)	Iin(mA)	Pin(W)	Vo1(V)	Io1(A)	Pout(W)	Losses(W)	Efficiency (%)
165.96	64.05	4.38	24.41	0.120	2.93	1.45	66.99%
195.96	55.41	3.78	24.58	0.100	2.46	1.32	65.19%
165.97	47.35	3.18	24.81	0.080	1.98	1.19	62.43%
165.98	38.84	2.52	25.08	0.060	1.50	1.01	59.83%
165.99	30.81	1.91	25.38	0.040	1.02	0.90	53.10%
166.00	22.69	1.31	25.89	0.020	0.52	0.80	39.44%
166.01	18.53	1.02	26.35	0.010	0.26	0.76	25.78%
166.01	16.43	0.88	26.71	0.005	0.13	0.75	15.18%
166.01	14.34	0.74	27.19	0.000	0.00	0.74	0.00%

### $V_{in}=914V_{DC}$ (914V<sub>DC</sub> is generated by an AC source with a voltage tripler circuit)

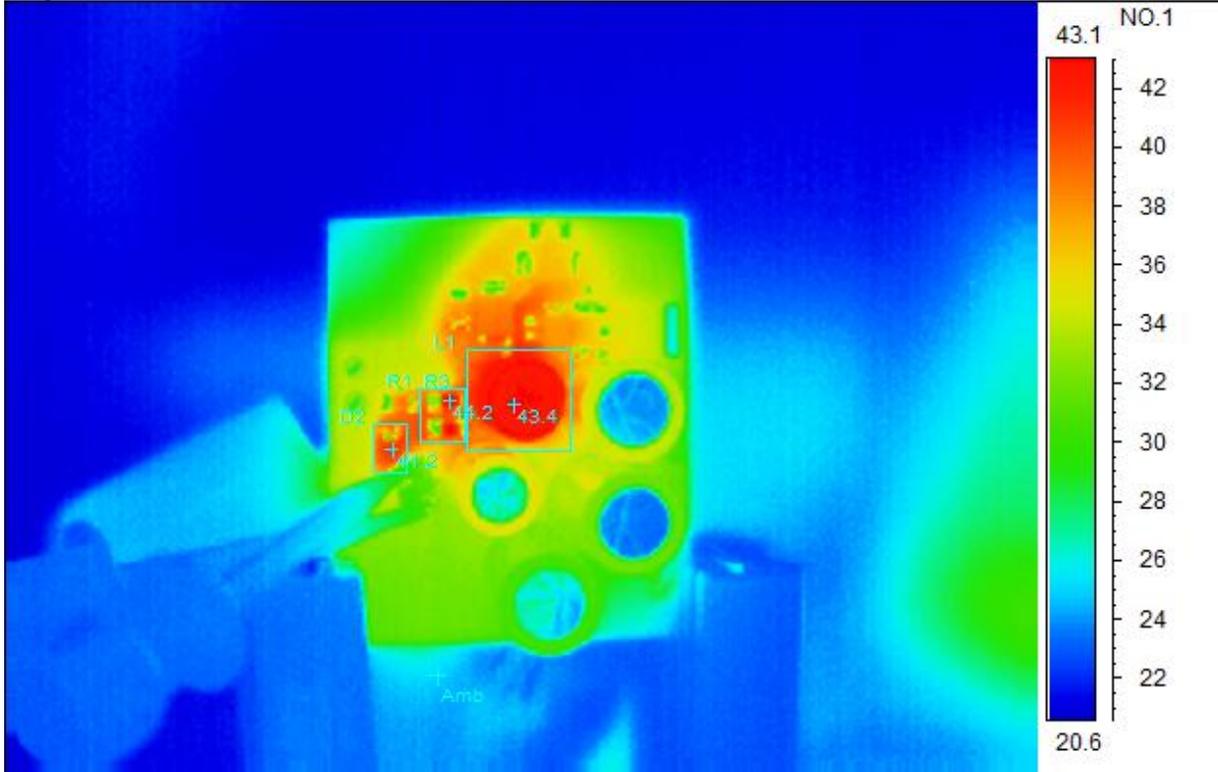
Vin(V)	Iin(mA)	Pin(W)	24V(V)	24V(A)	Pout(W)	Losses(W)	Efficiency (%)
217.50	72.49	6.18	24.62	0.121	2.99	3.19	48.38%
217.50	64.52	5.39	24.92	0.100	2.49	2.90	46.20%
217.50	56.76	4.65	25.24	0.080	2.02	2.64	43.33%
216.80	48.68	3.89	25.55	0.060	1.53	2.36	39.38%
216.80	40.84	3.17	25.97	0.040	1.04	2.13	32.77%
216.80	32.47	2.44	26.76	0.020	0.54	1.90	21.94%
216.80	28.31	2.09	27.45	0.010	0.27	1.81	13.15%
216.80	26.26	1.92	27.95	0.005	0.14	1.78	7.28%
216.80	24.32	1.76	28.60	0.000	0.00	1.76	0.00%

### 3 Thermal Images

The thermal images below show a top view and bottom view of the board under 166V<sub>AC</sub>/60Hz and 914V<sub>DC</sub> input conditions. The ambient temperature was 20°C with no forced air flow. The output was at full load: 24V/100mA and 5V/20mA.

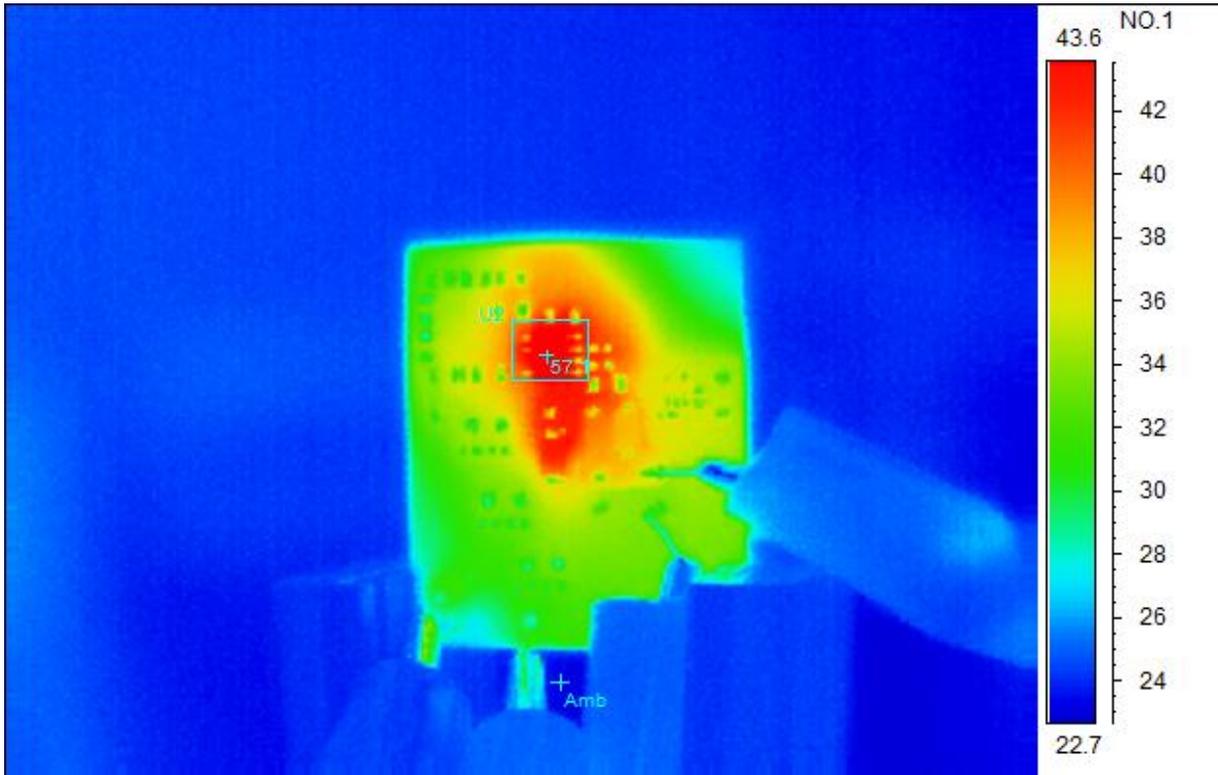
**V<sub>in</sub>=166V<sub>AC</sub>/60Hz**

**Top Side**



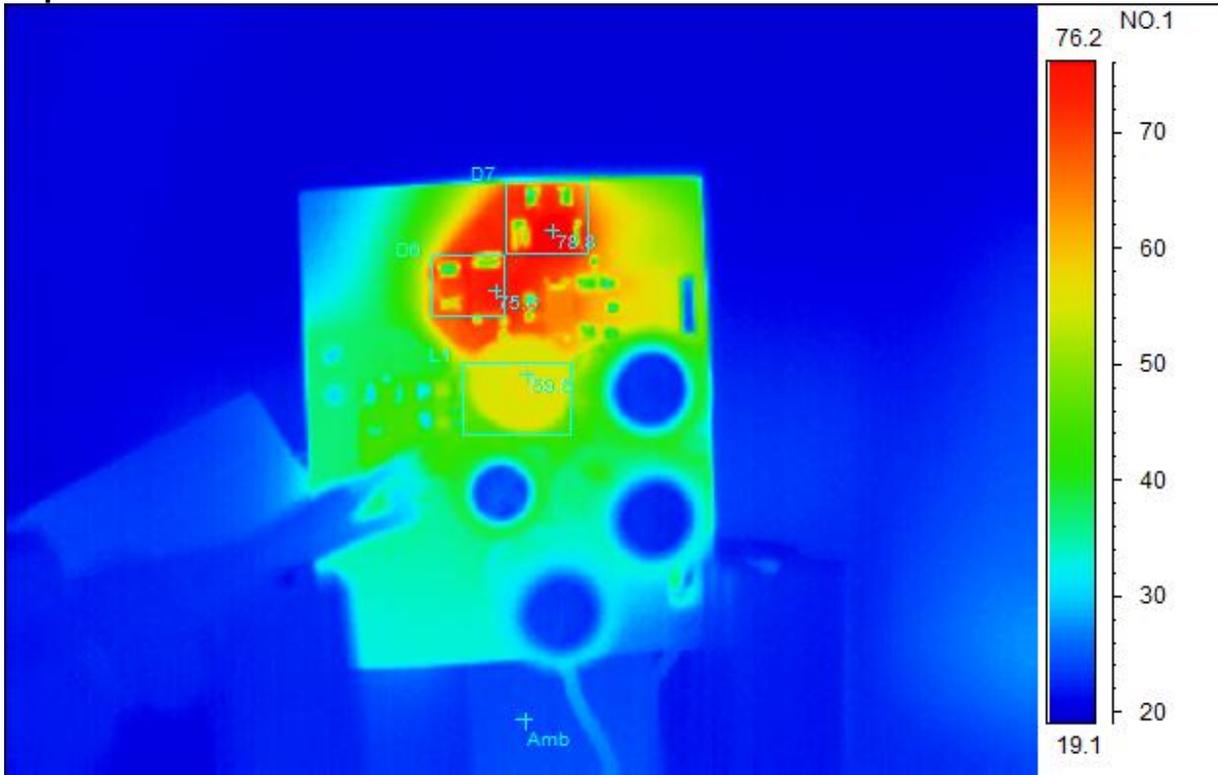
Spot analysis	Value
AmbTemperature	25.1°C
Area analysis	Value
D2Max	41.2°C
R1, R3 Max	44.2°C
L1 Max	43.4°C

**V<sub>in</sub>=166V<sub>AC</sub>/60Hz**  
**Bottom Side**



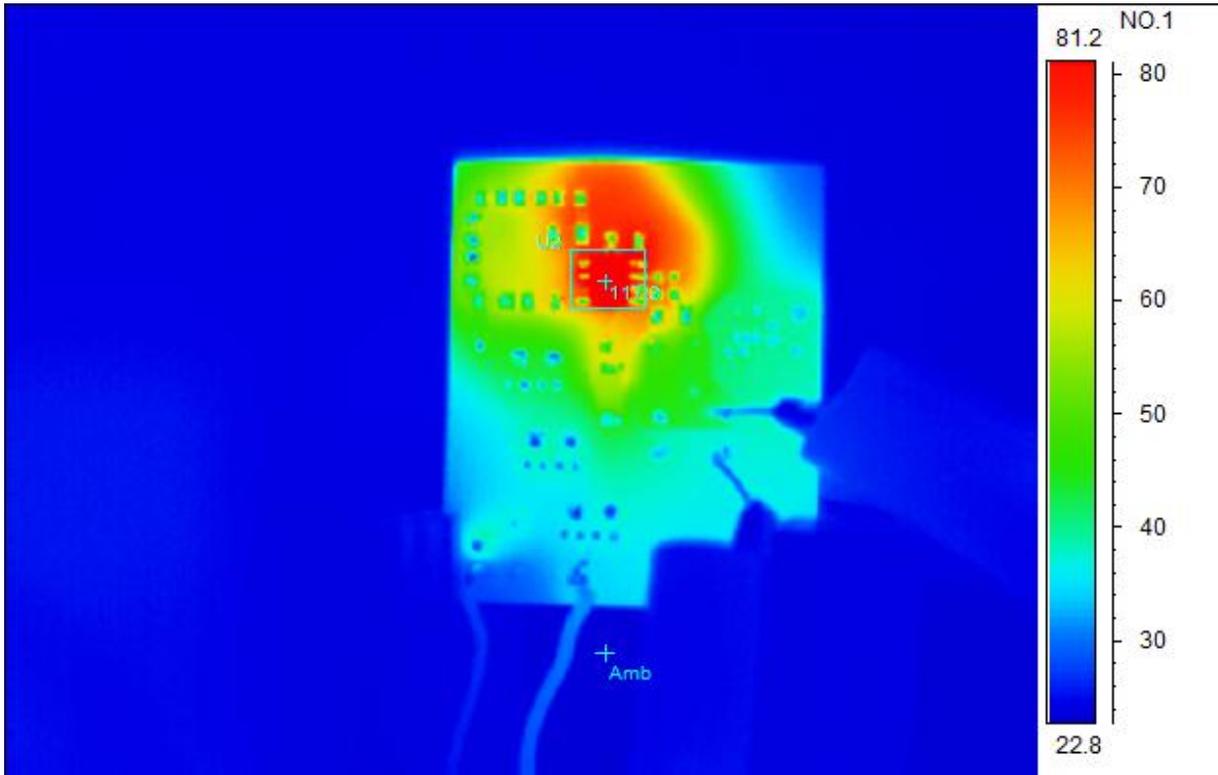
Spot analysis	Value
Amb Temperature	23.4°C
Area analysis	Value
U2 Max	57.1°C

**$V_{in}=914V_{DC}$  ( $914V_{DC}$  is generated by an AC source with a voltage tripler circuit)  
Top Side**



Spot analysis	Value
AmbTemperature	25.0°C
Area analysis	Value
L1Max	59.5°C
D6Max	75.6°C
D7 Max	78.8°C

**$V_{in}=914V_{DC}$  ( $914V_{DC}$  is generated by an AC source with a voltage tripler circuit)  
Bottom Side**

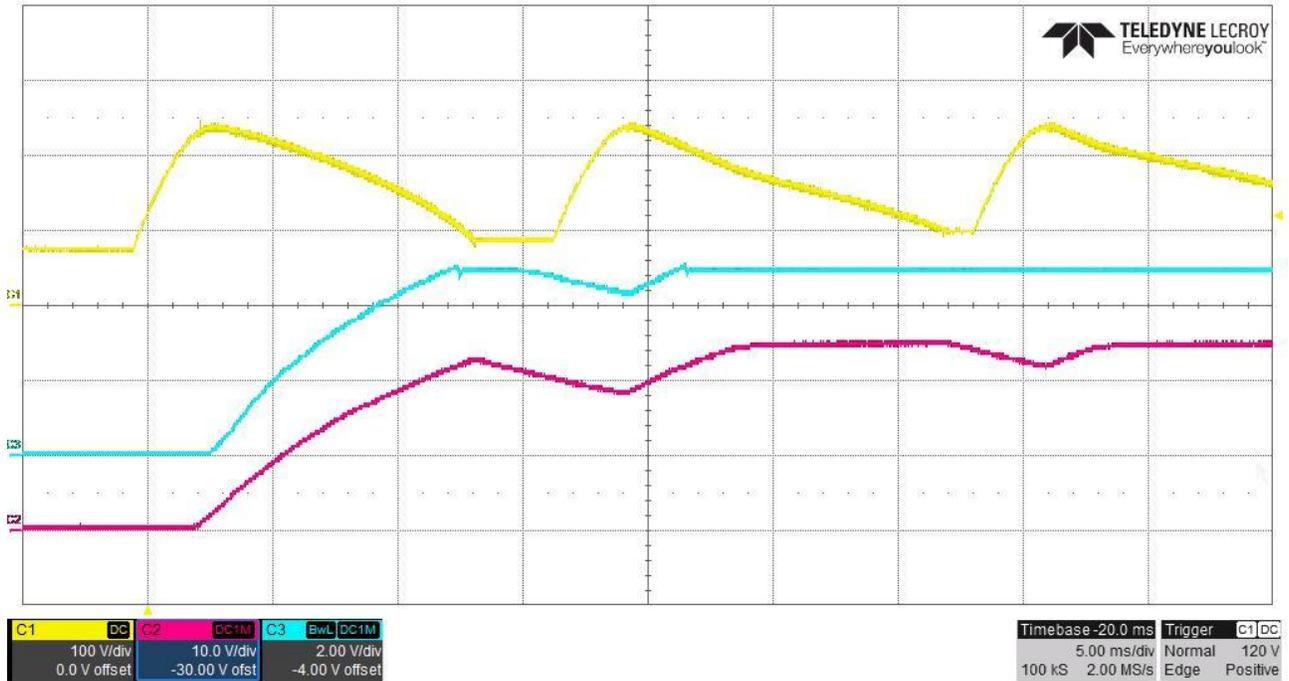


Spot analysis	Value
Amb Temperature	23.5°C
Area analysis	Value
U2 Max	117.3°C

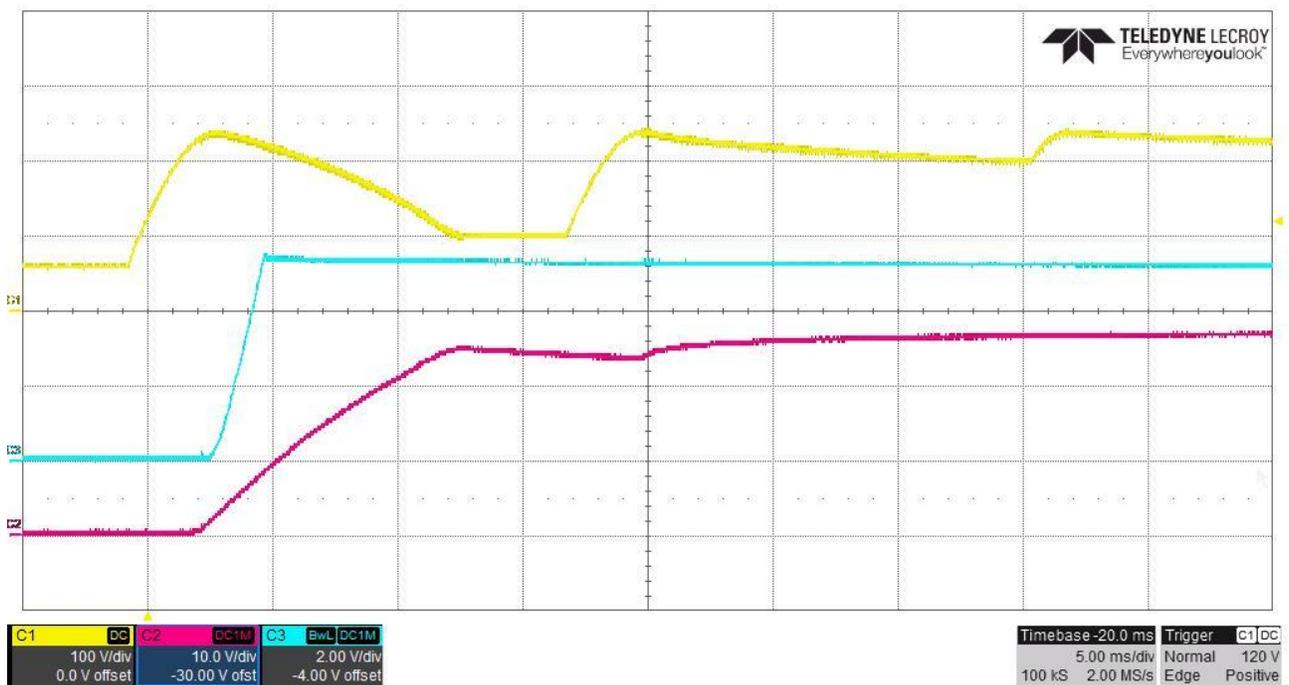
## 4 Startup Waveforms

The output voltages at startup are shown in the images below. CH1: Voltage after input rectifier, CH2: 24Vout, CH3: 5Vout

### 4.1 Start Up @ 166V<sub>AC</sub>/60Hz input, 24V/100mA and 5V/20mA outputs.



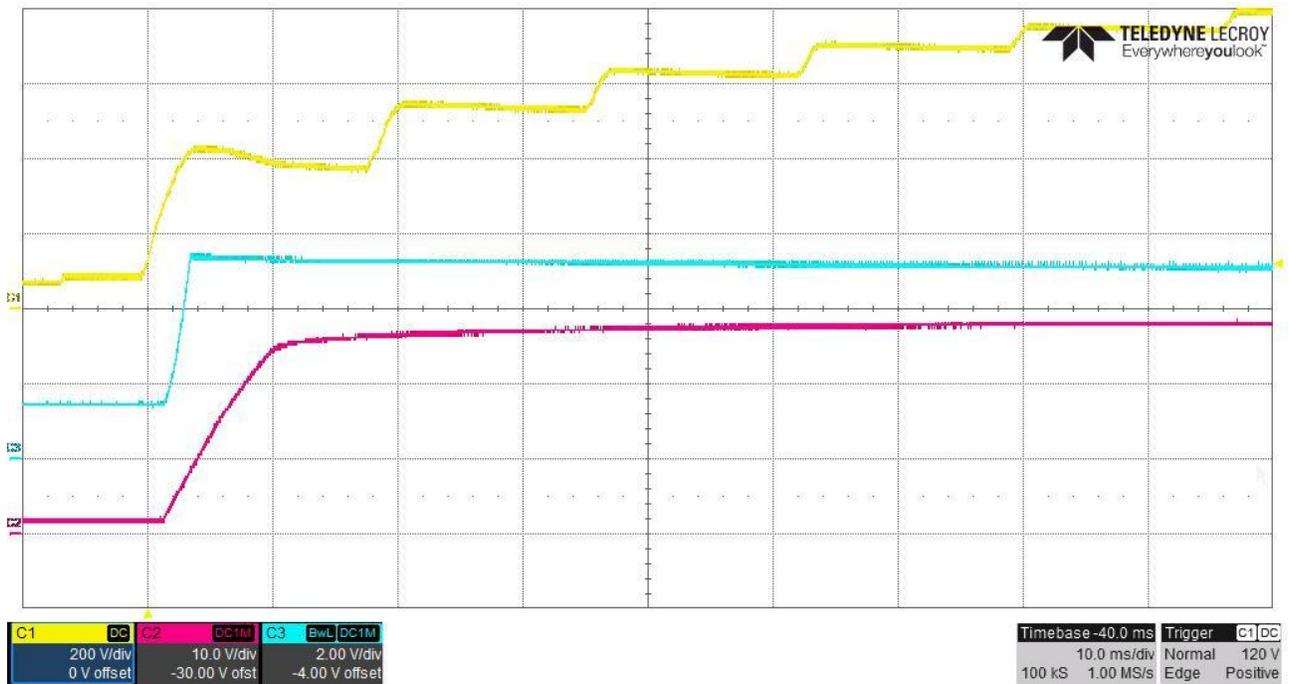
### 4.2 Start Up @ 166V<sub>AC</sub>/60Hz input and no loads.



### 4.3 Start Up @ 914V<sub>DC</sub> (914V<sub>DC</sub> is generated by an AC source with a voltage tripler circuit) input, 24V/100mA and 5V/20mA outputs.



### 4.4 Start Up @ 914V<sub>DC</sub> (914V<sub>DC</sub> is generated by an AC source with a voltage tripler circuit) input and no load.

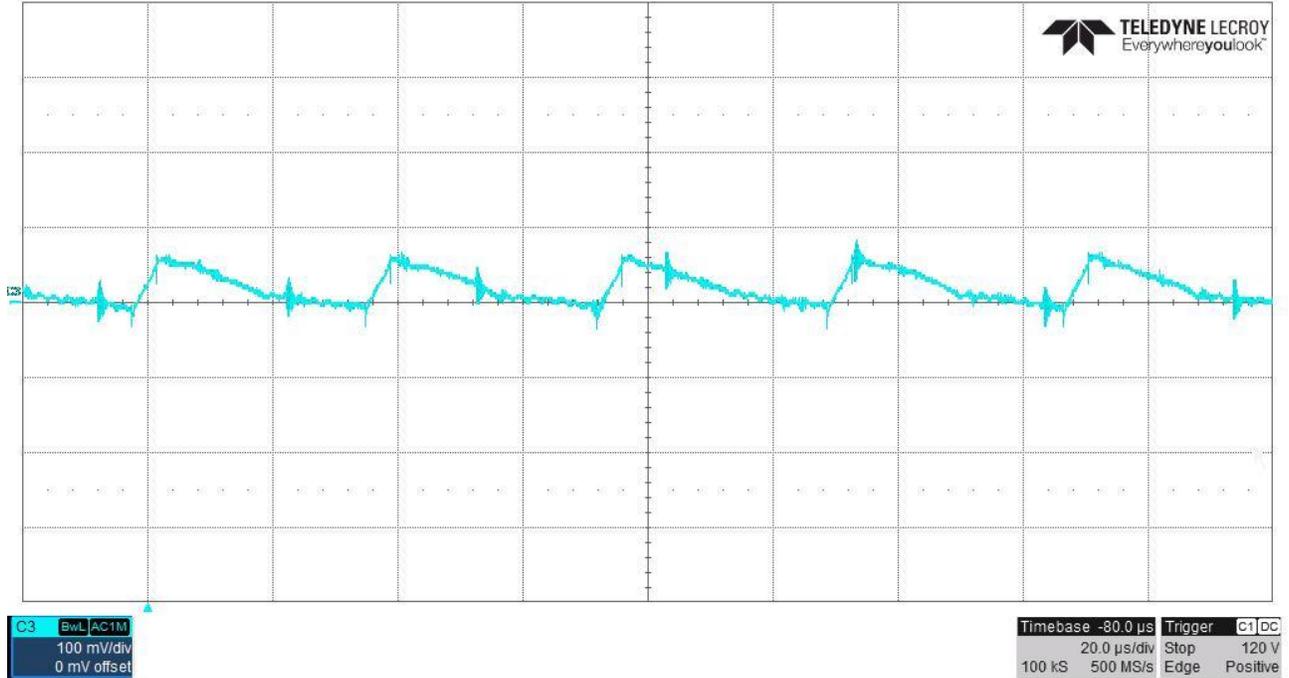


## 5 Output Ripple Voltages

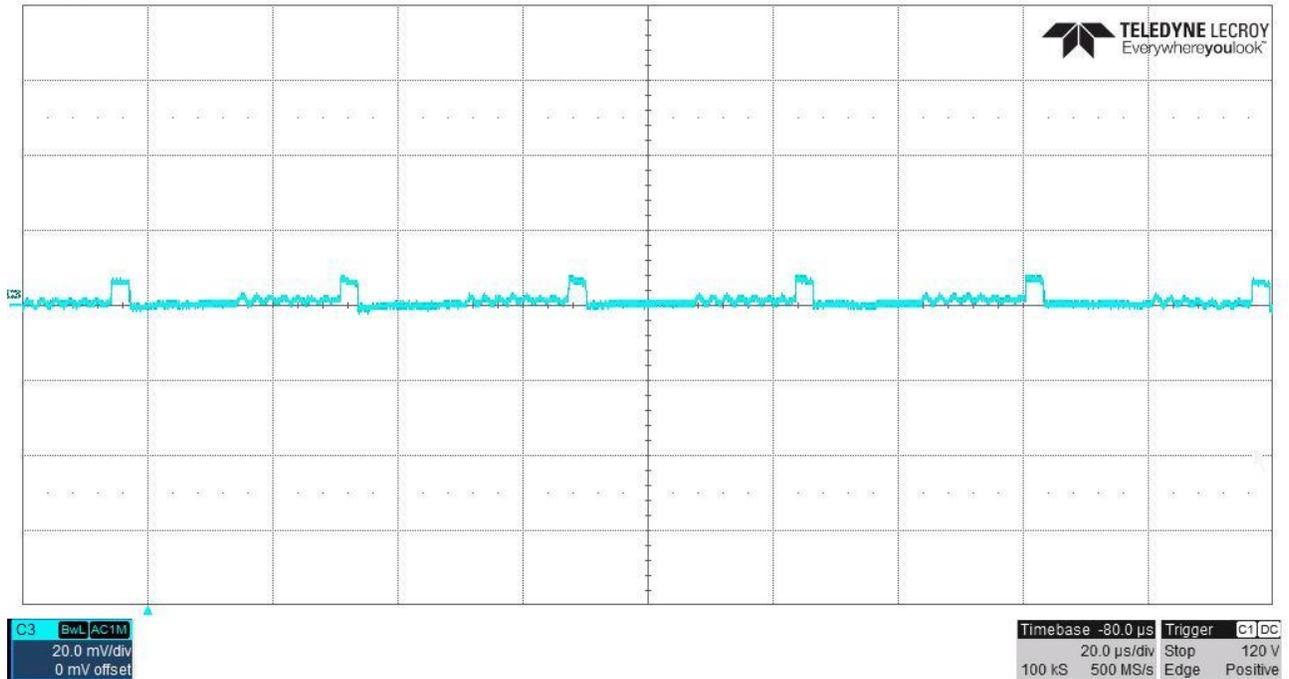
The output ripple voltages are shown in the plots below.

### 5.1 166V<sub>AC</sub>/60Hz: 24V/100mA and 5V/20mA.

24V ripple:

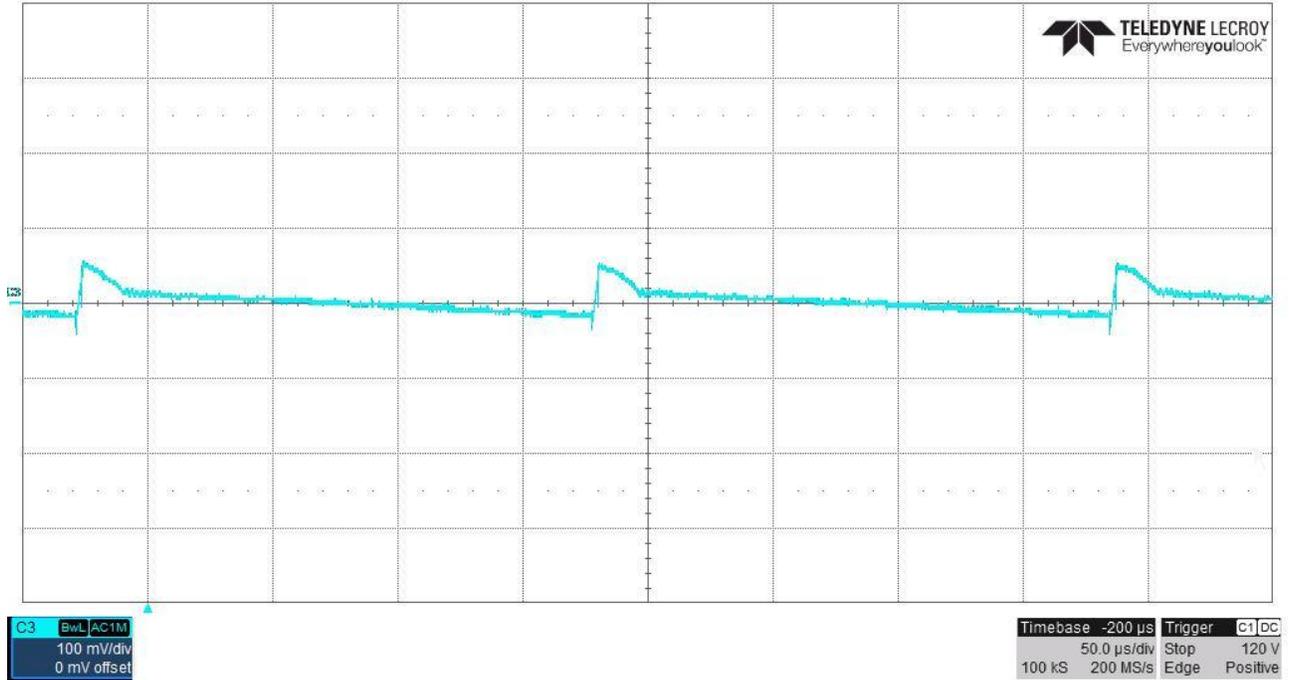


5V ripple:

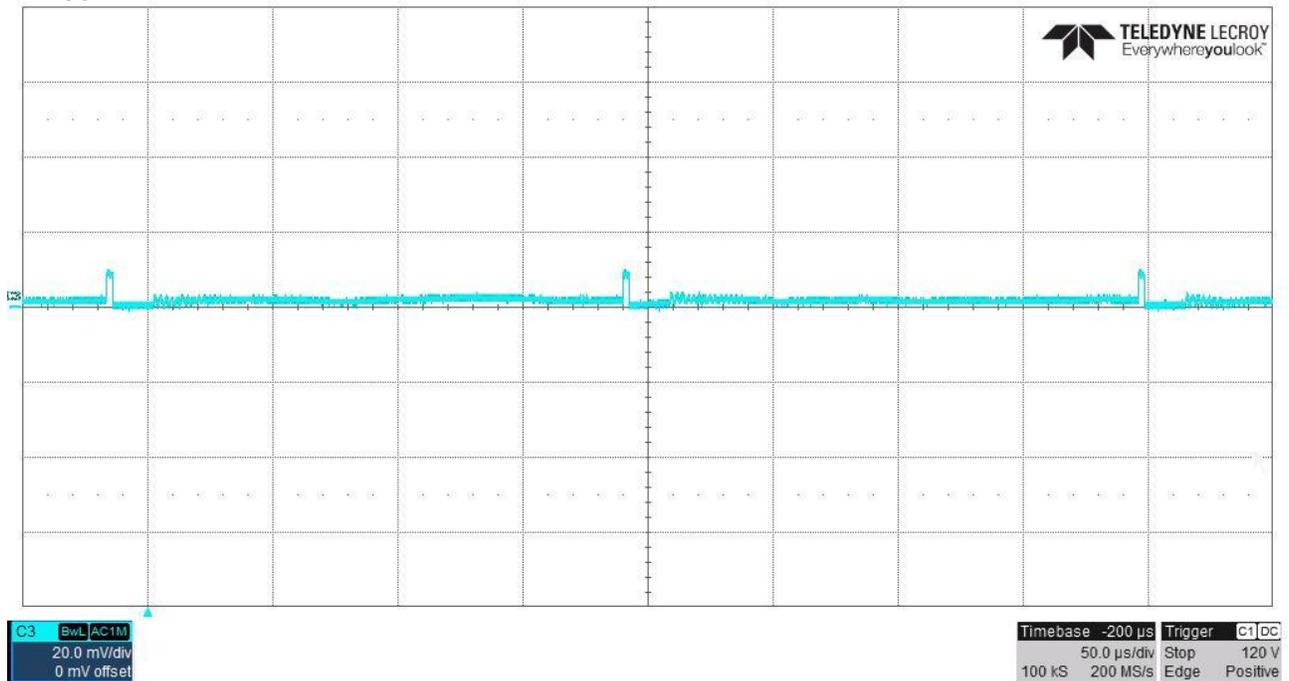


## 5.2 166V<sub>AC</sub>/60Hz: no load applied to both 5V and 24V.

24V ripple:

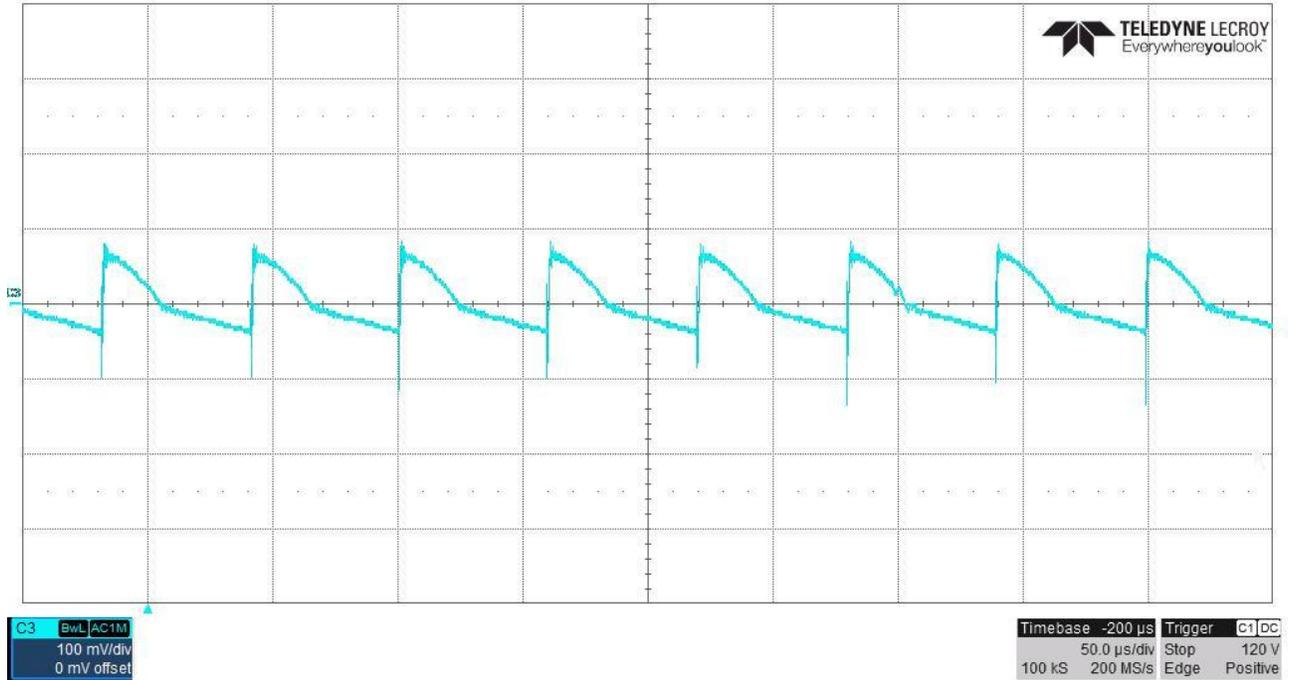


5V ripple:

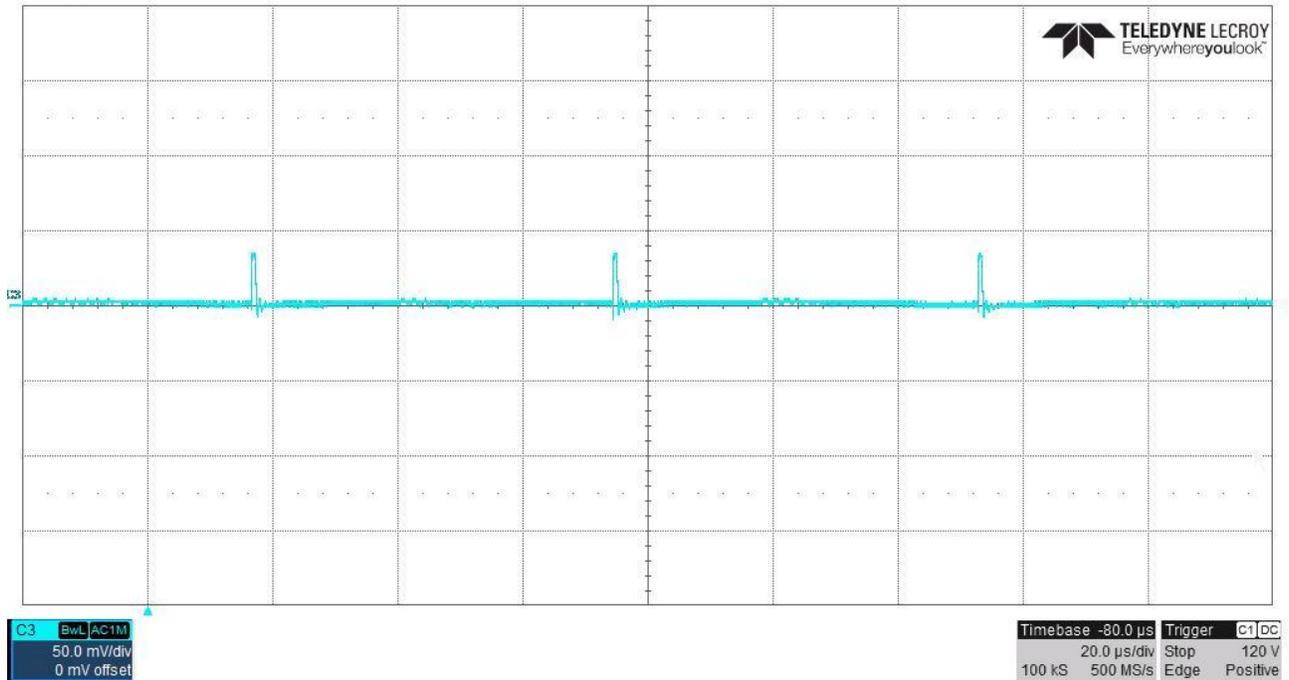


### 5.3 914V<sub>DC</sub> (914V<sub>DC</sub> is generated by an AC source with a voltage tripler circuit): 24V/100mA and 5V/20mA.

24V ripple:

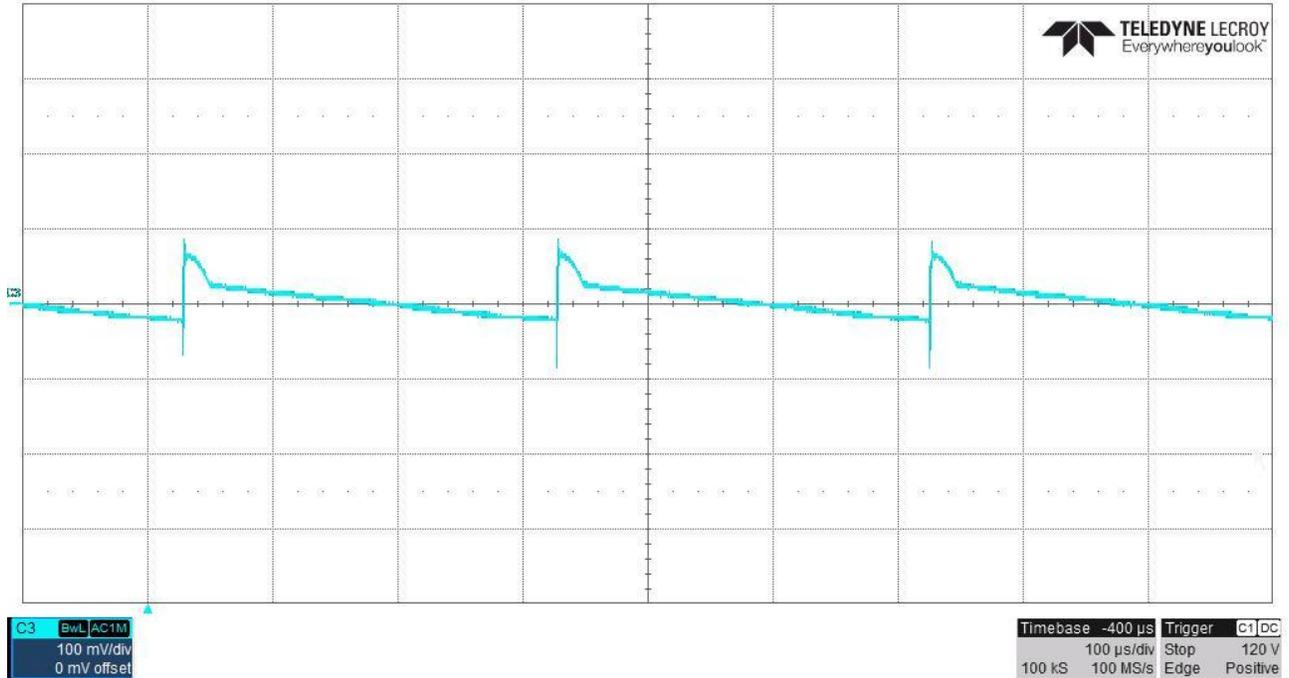


5V ripple:

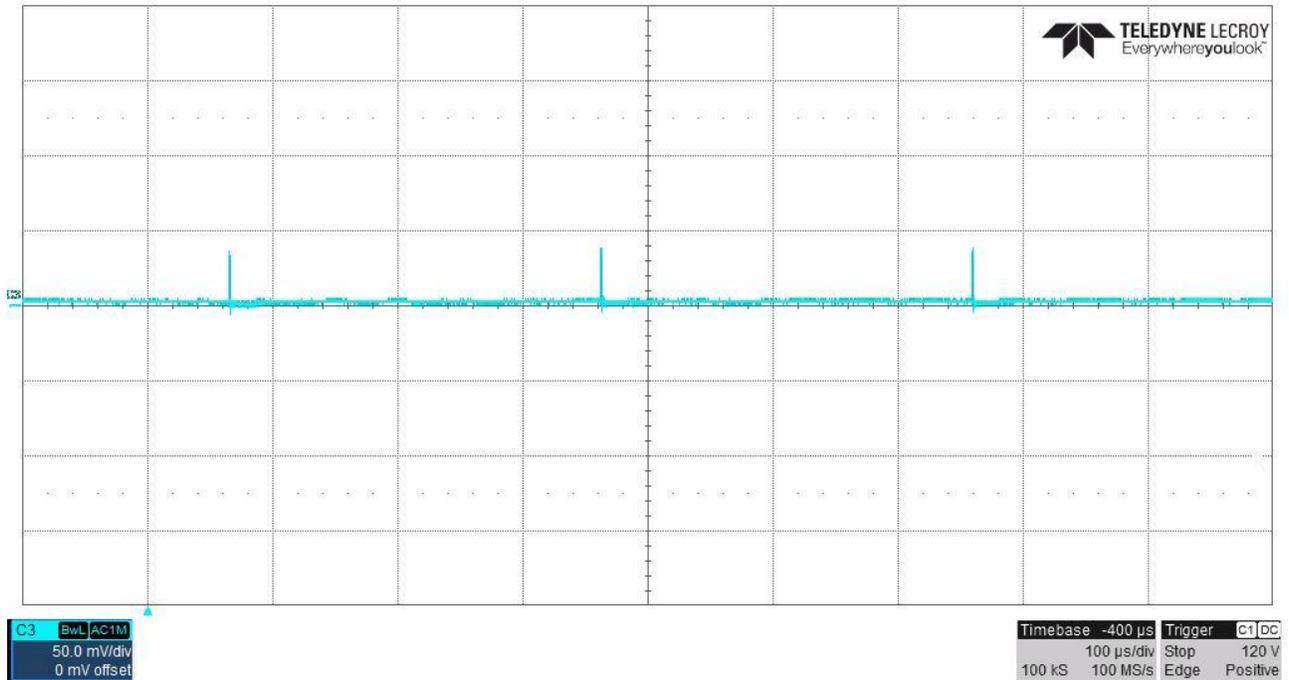


### 5.4 914V<sub>DC</sub> (914V<sub>DC</sub> is generated by an AC source with a voltage tripler circuit): no load applied to both 5V and 24V.

24V ripple:



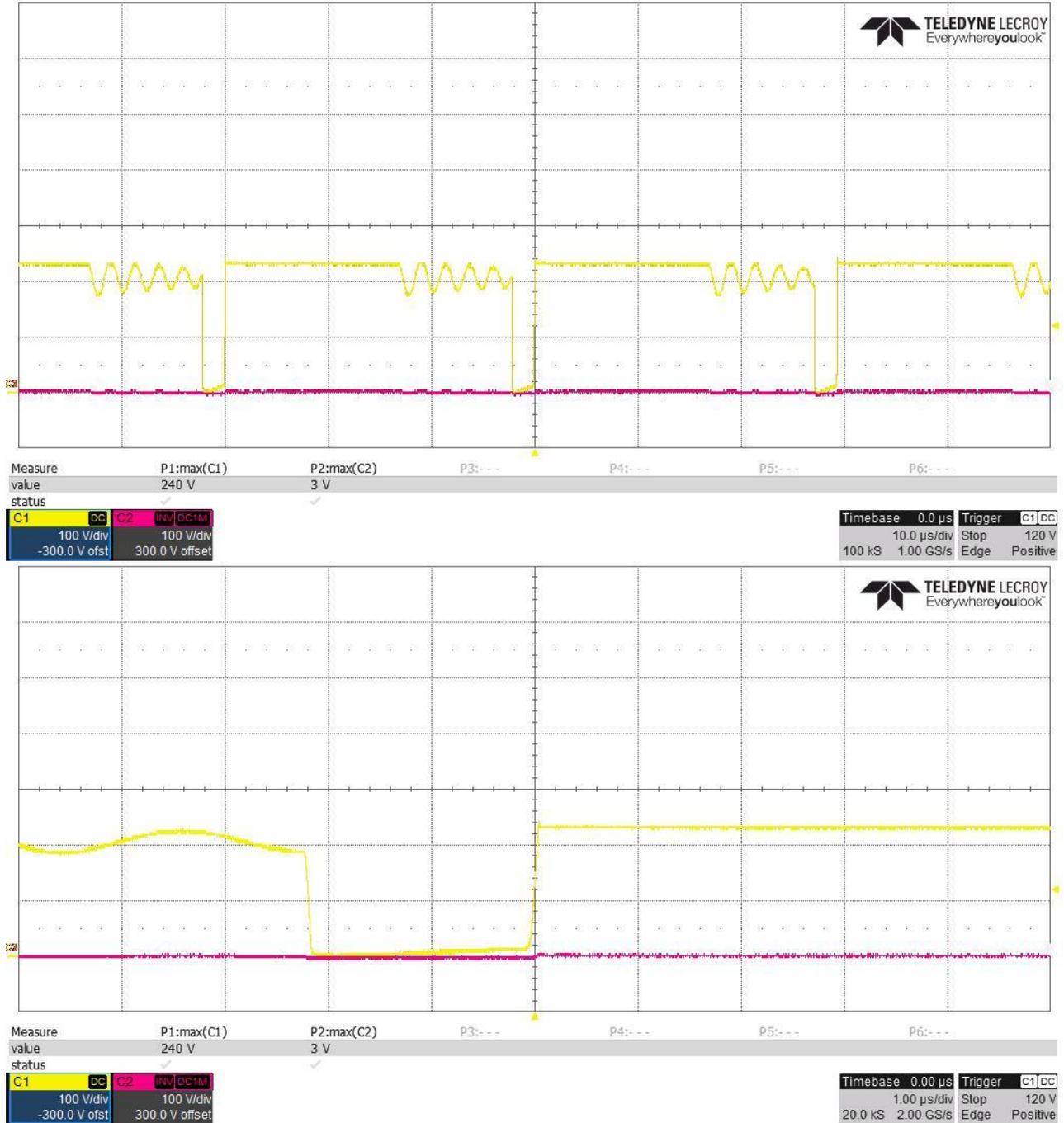
5V ripple:



## 6 Switching Waveforms

The images below show key switching waveforms of PMP11302RevA. The waveforms are measured with 5V/0A and 24V/120mA. CH1: U2 pin 8 to pin 1; CH2: Q1  $V_{DS}$ .

### 6.1 166V<sub>AC</sub>/60Hz input





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