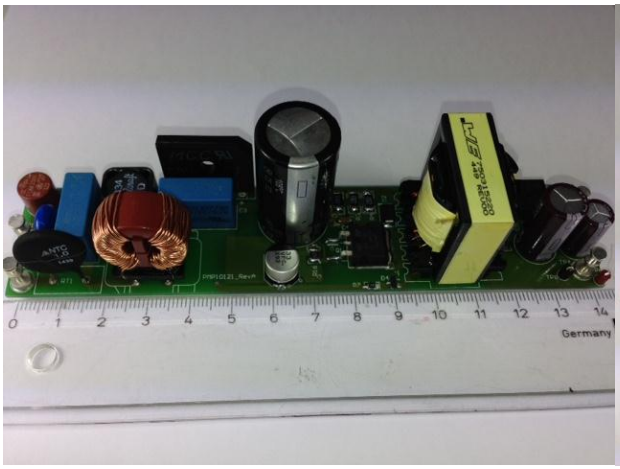
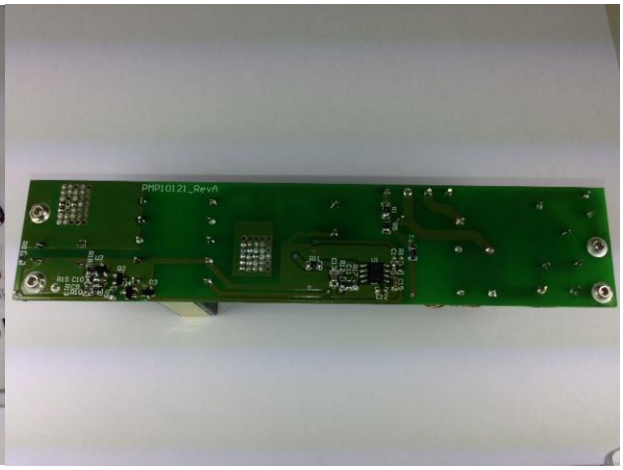
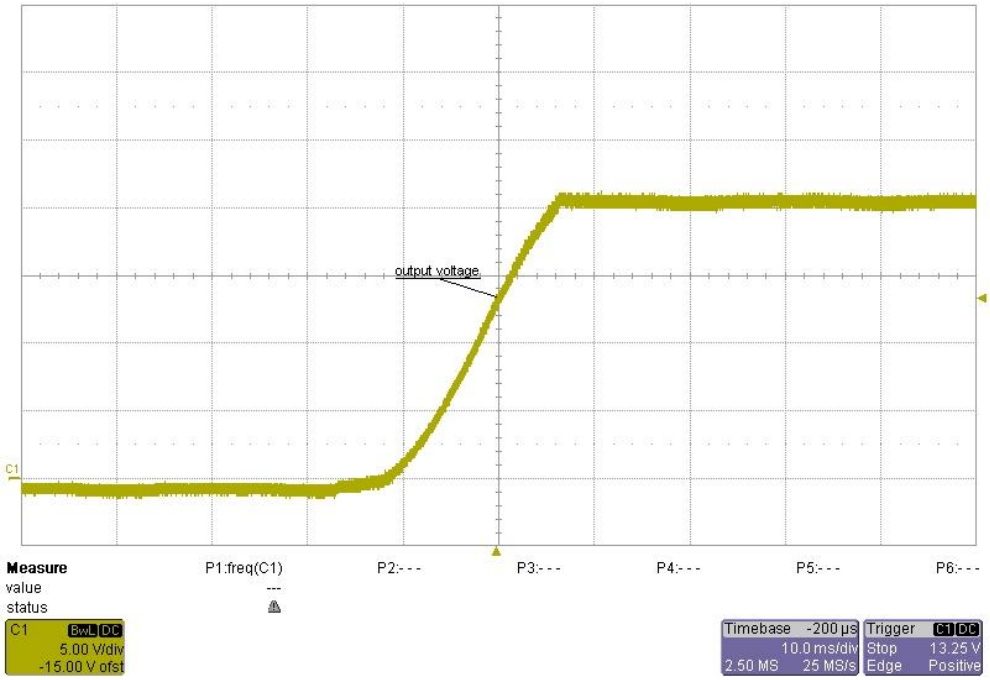




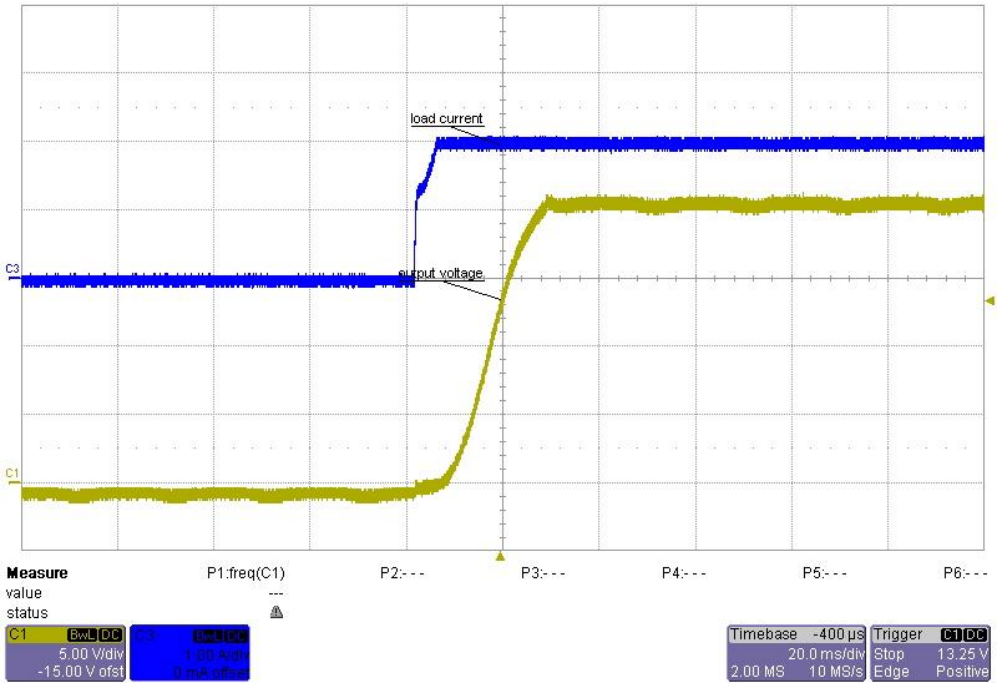
1 Startup

1.2 Startup load current = 2A

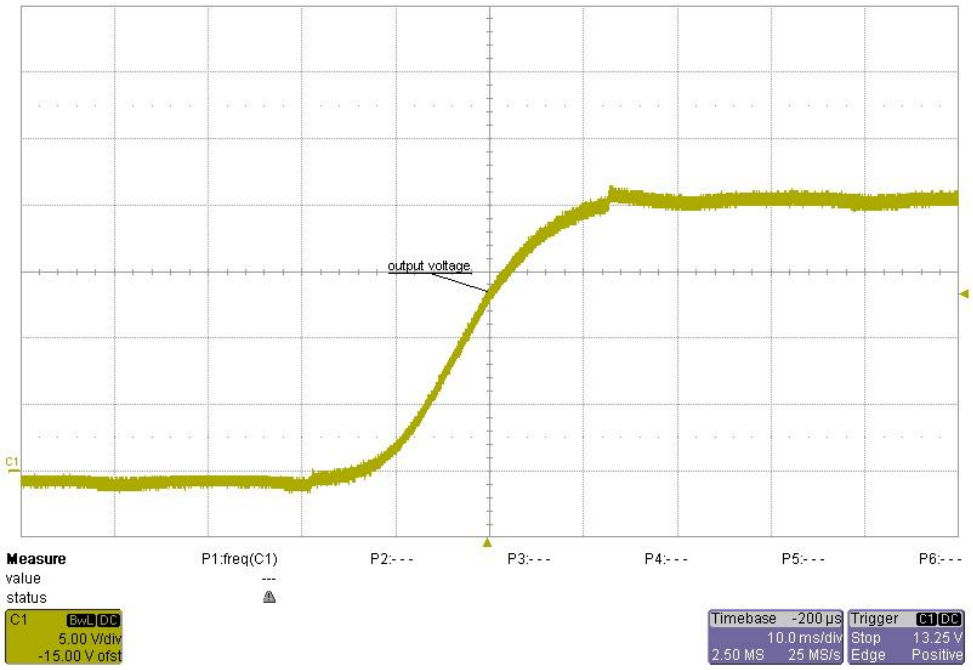
Input voltage = 165VAC
Load current = 2.0A



Input voltage = 230VAC
Load current = 2.0A

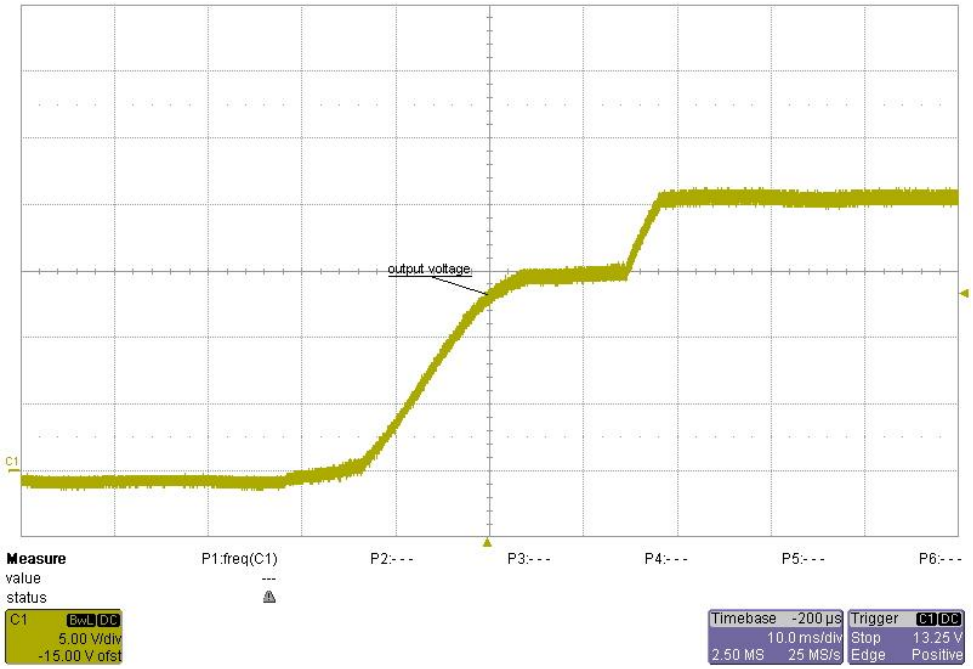


Input voltage = 275VAC
Load current = 2.0A

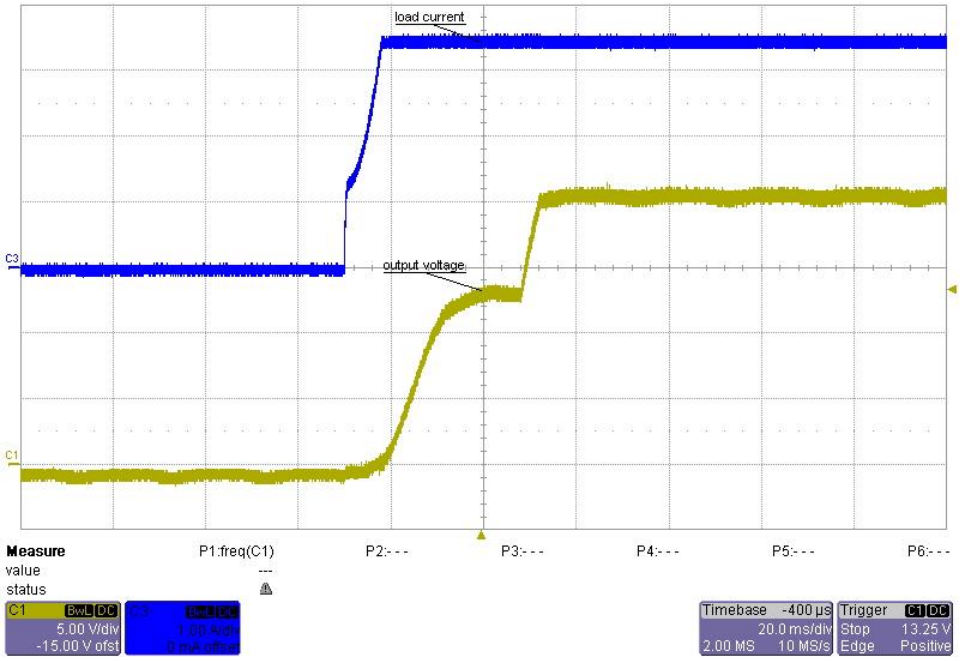


1.3 Startup load current = 3.5A (maximum peak output power)

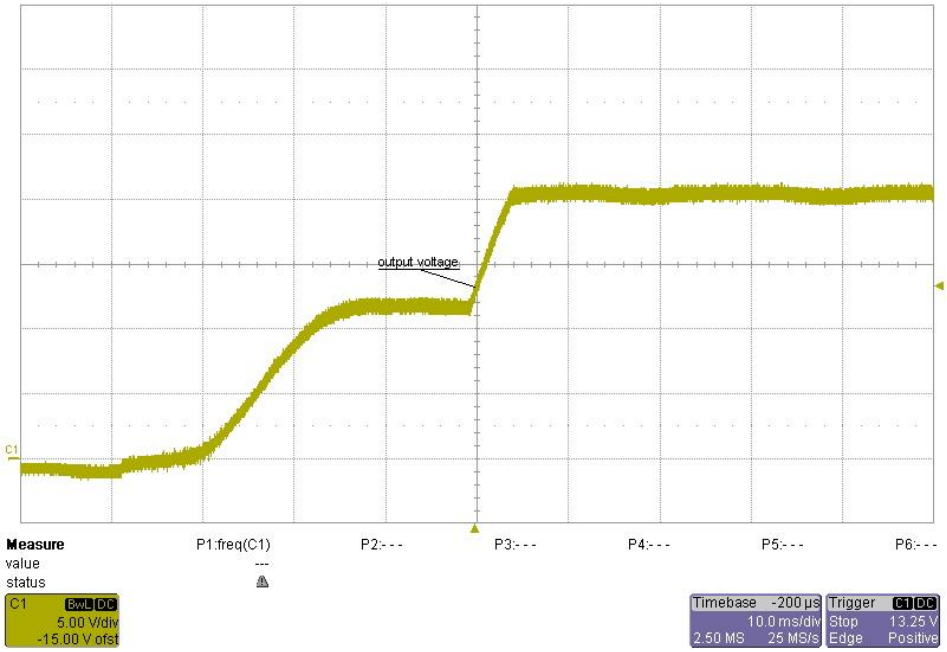
Input voltage = 165VAC
Load current = 3.5A



Input voltage = 230VAC
Load current = 3.5A



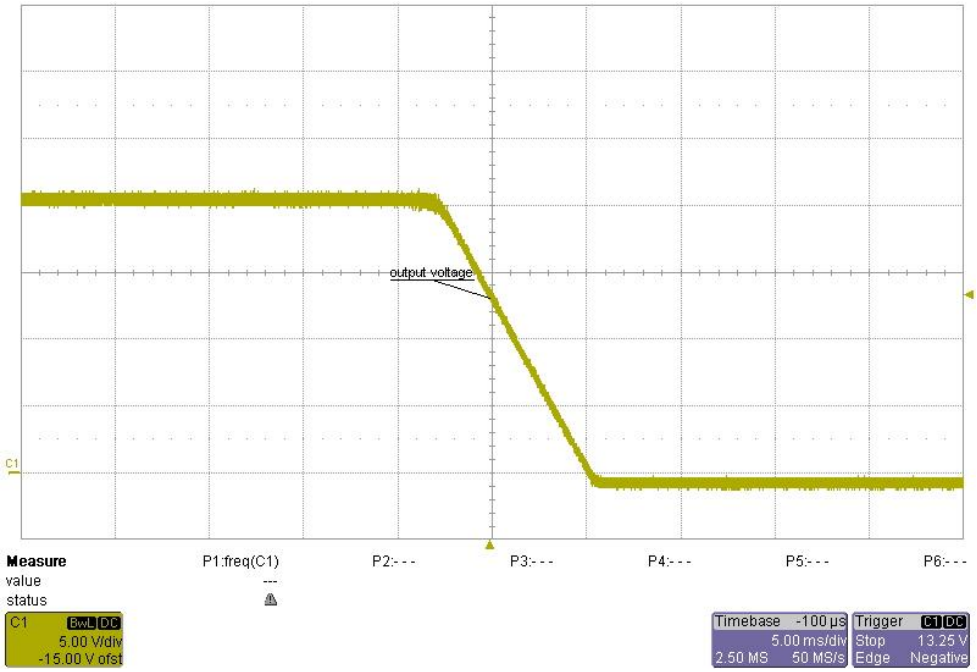
Input voltage = 275VAC
Load current = 3.5A


output voltage
C1
Measure
value
status
P1:freq(C1)

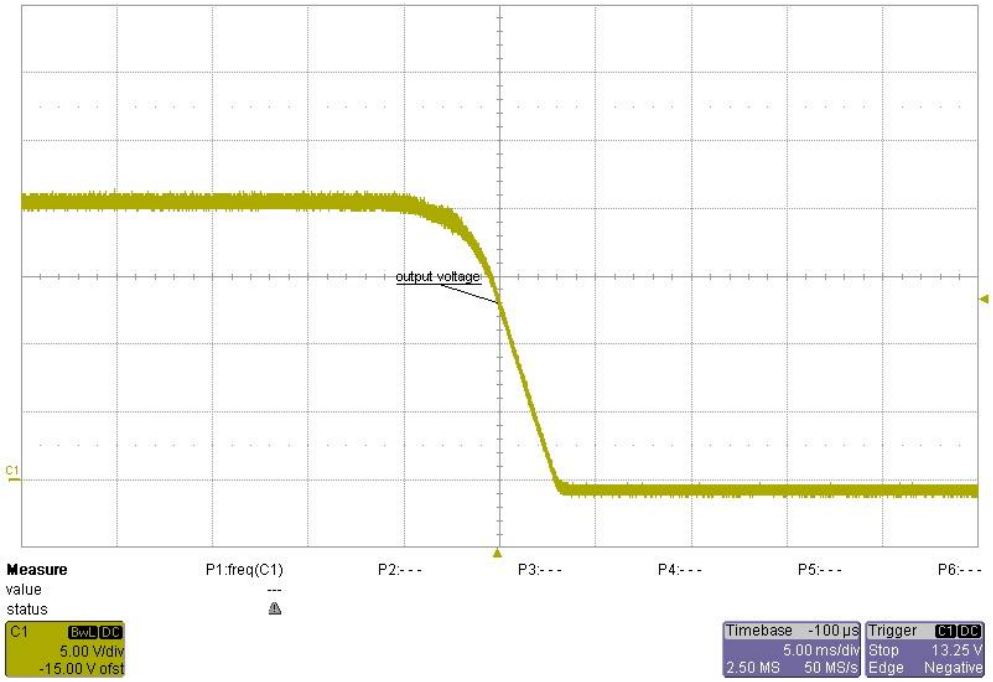
P2:- - -
P3:- - -
P4:- - -
P5:- - -
P6:- - -
C1 BwL DC
5.00 V/div
-15.00 V ofst
Timebase -200 µs
10.0 ms/div
2.50 MS 25 MS/s
Trigger C1 DC
Stop 13.25 V
Edge Positive

2 Shutdown

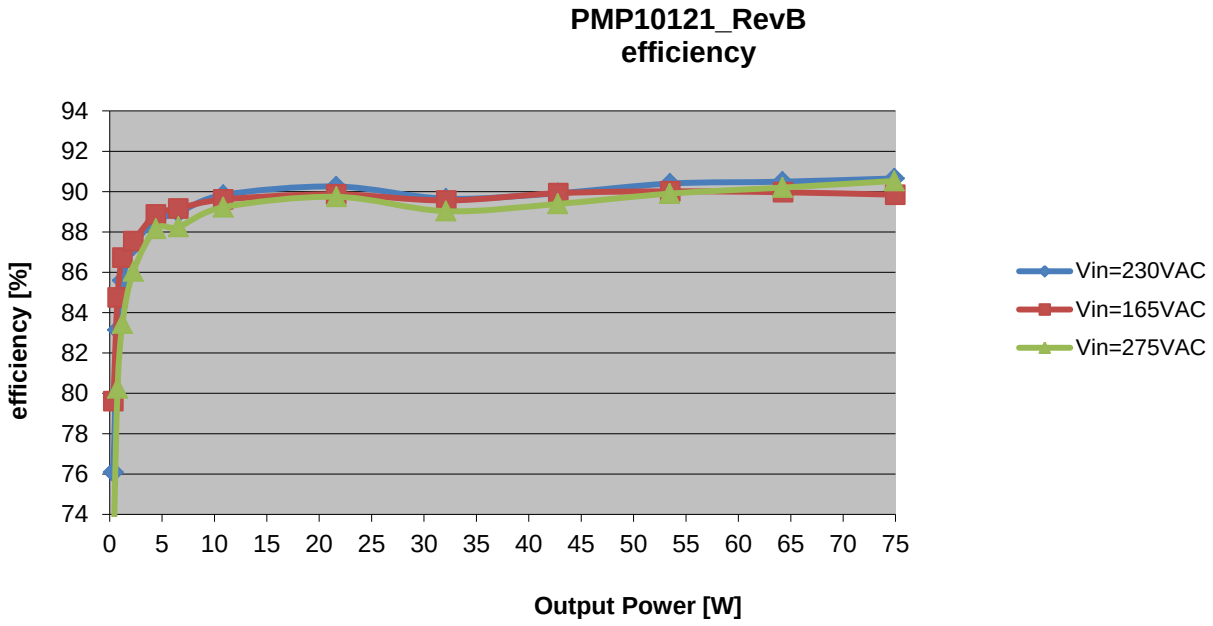
Input voltage = 230VAC
Load current = 2.0A



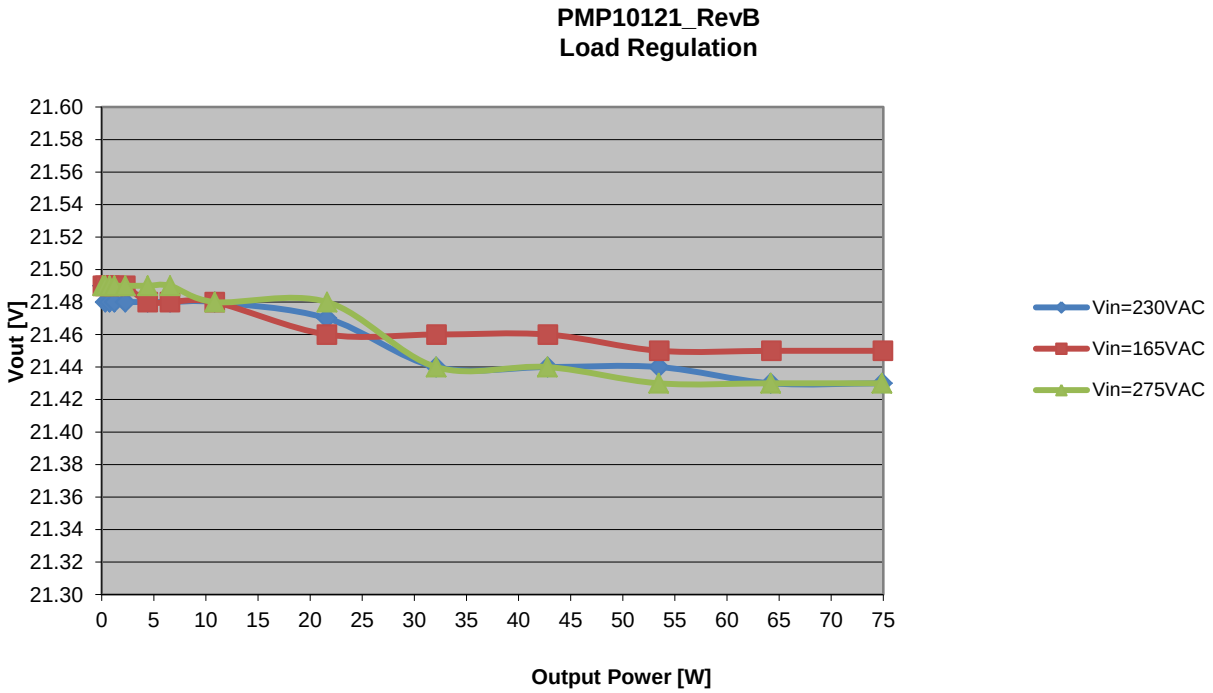
Input voltage = 230VAC
Load current = 3.5A



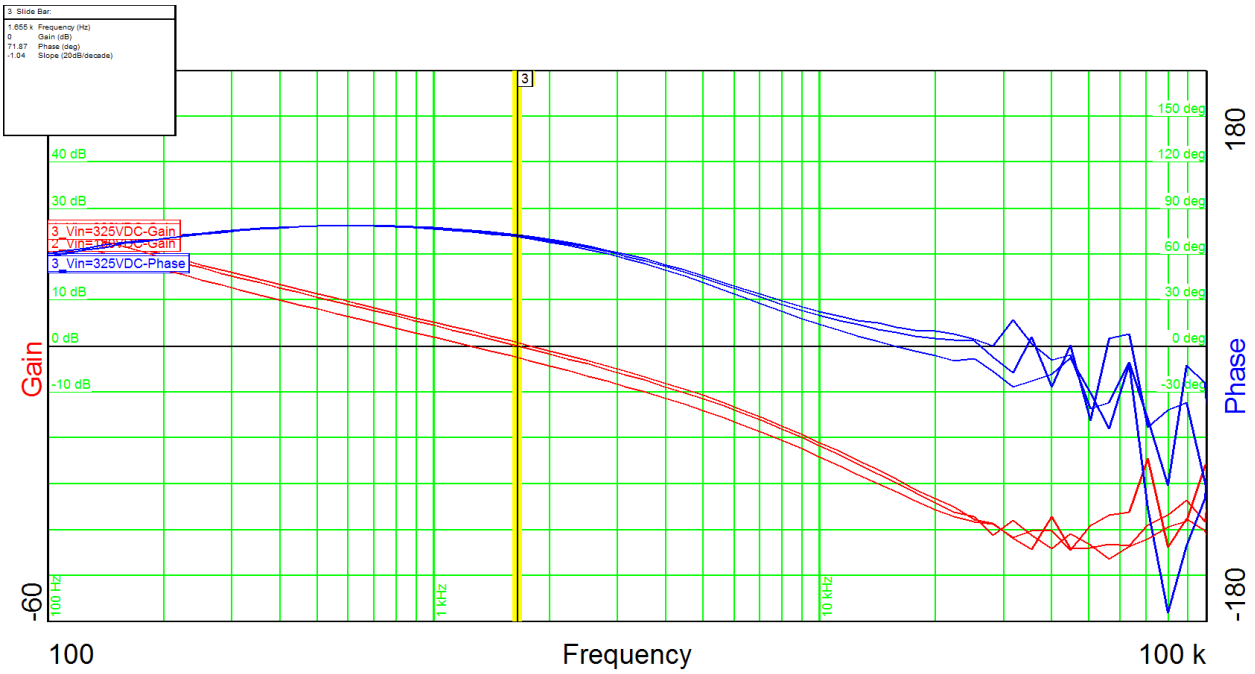
3 Efficiency



4 Load regulation



5 Control Loop Frequency Response



Output power = 22V@3.5A
Input voltage = 180VDC
Phase margin = 75°
Bandwidth = 1.2kHz

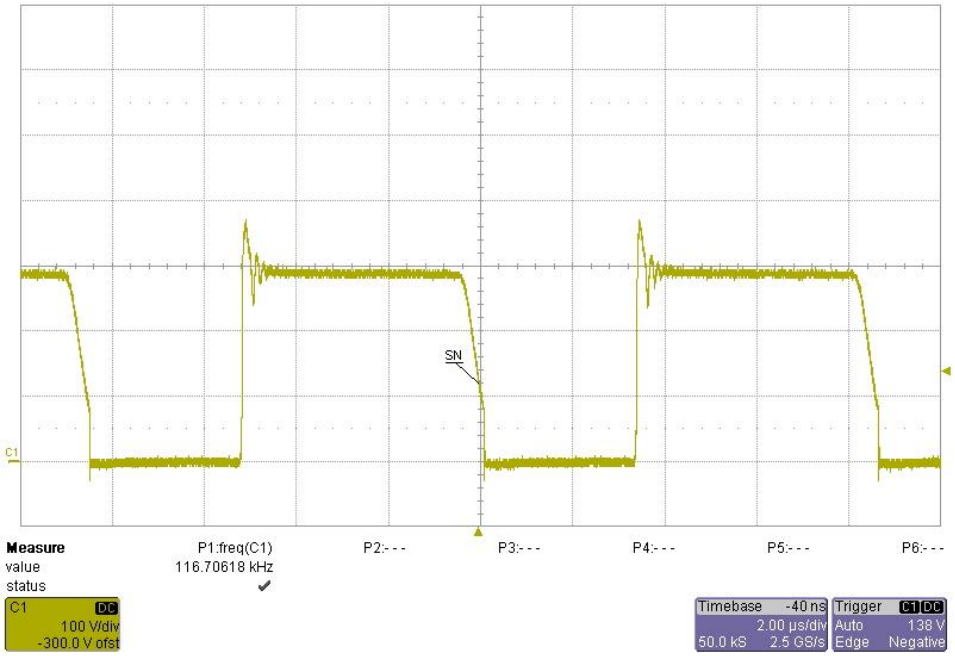
Output power = 22V@3.5A
Input voltage = 325VDC
Phase margin = 72°
Bandwidth = 1.7kHz

Output power = 22V@3.5A
Input voltage = 389VDC
Phase margin = 72°
Bandwidth = 1.8kHz

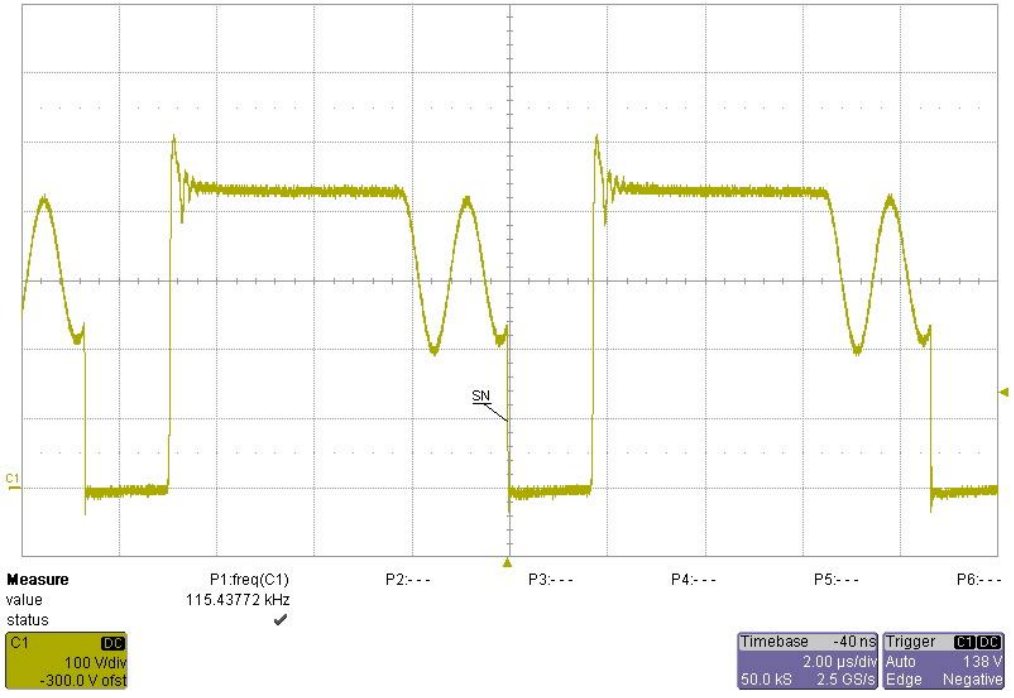
6 Switch Node

6.1 Switch Node load current = 2A

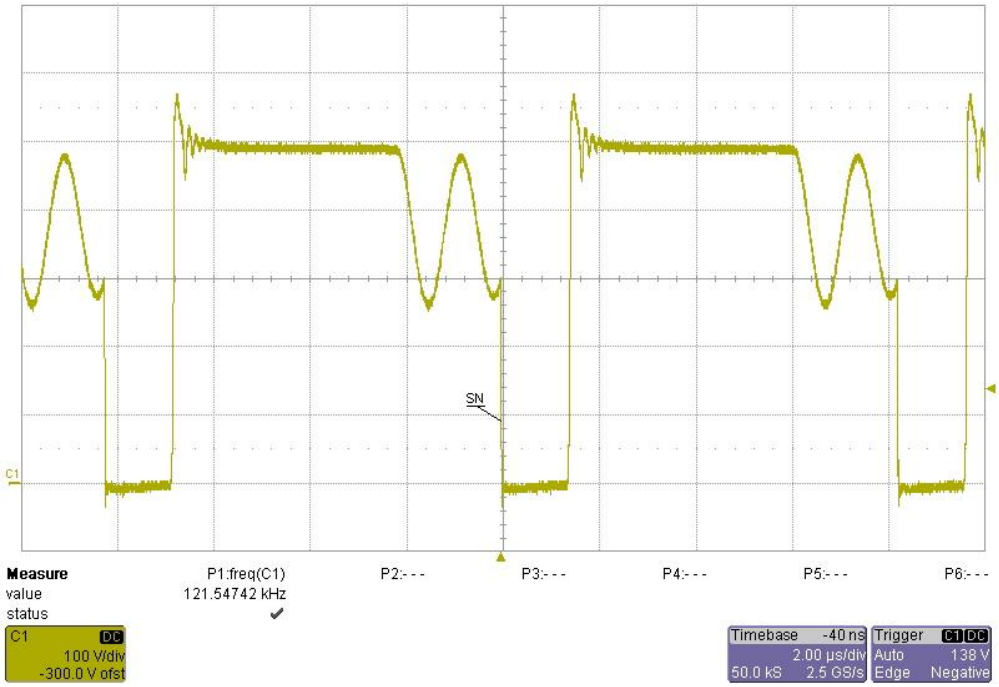
Input voltage = 180VDC
Load current = 2.0A



Input voltage = 325VDC
Load current = 2.0A

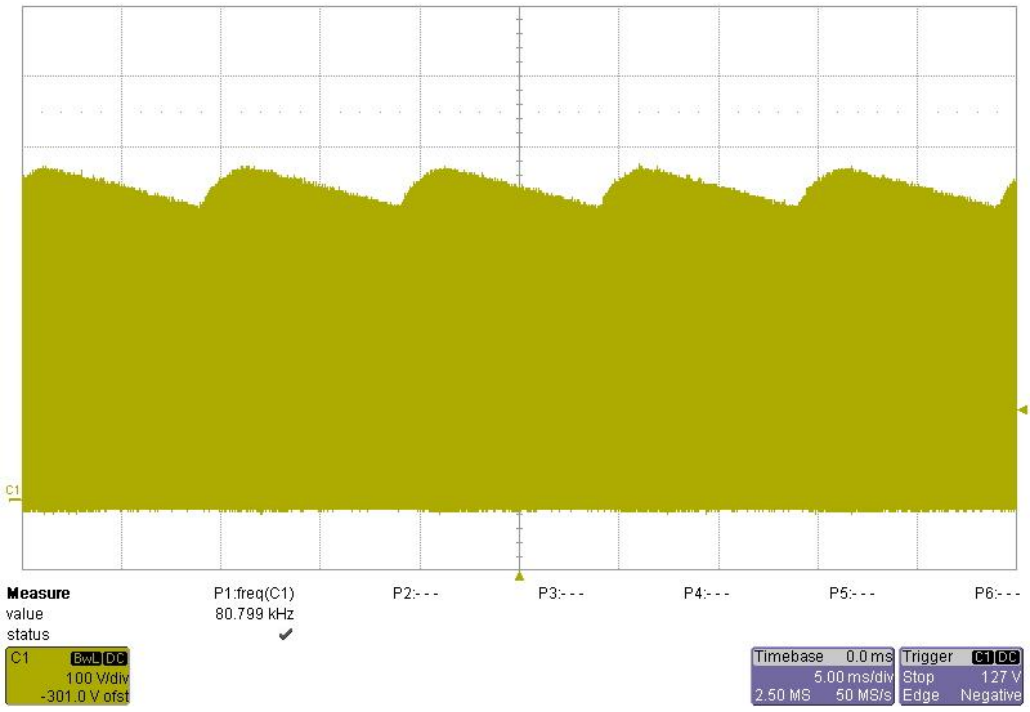


Input voltage = 375VDC
Load current = 2.0A

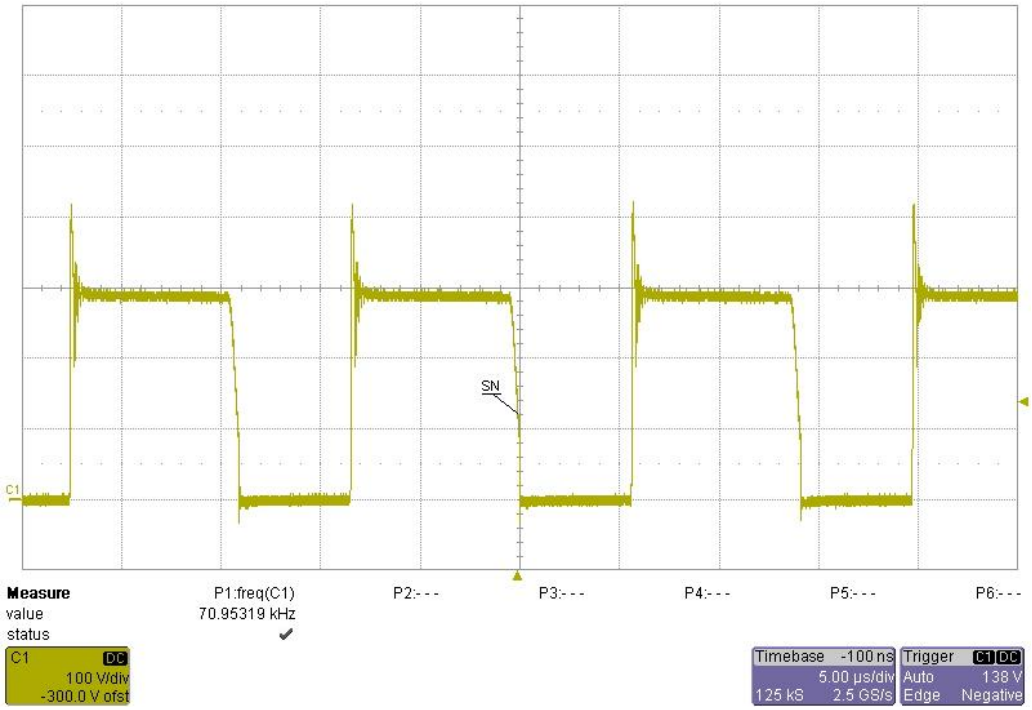


6.2 Switch Node load current = 3.5A (maximum peak output power)

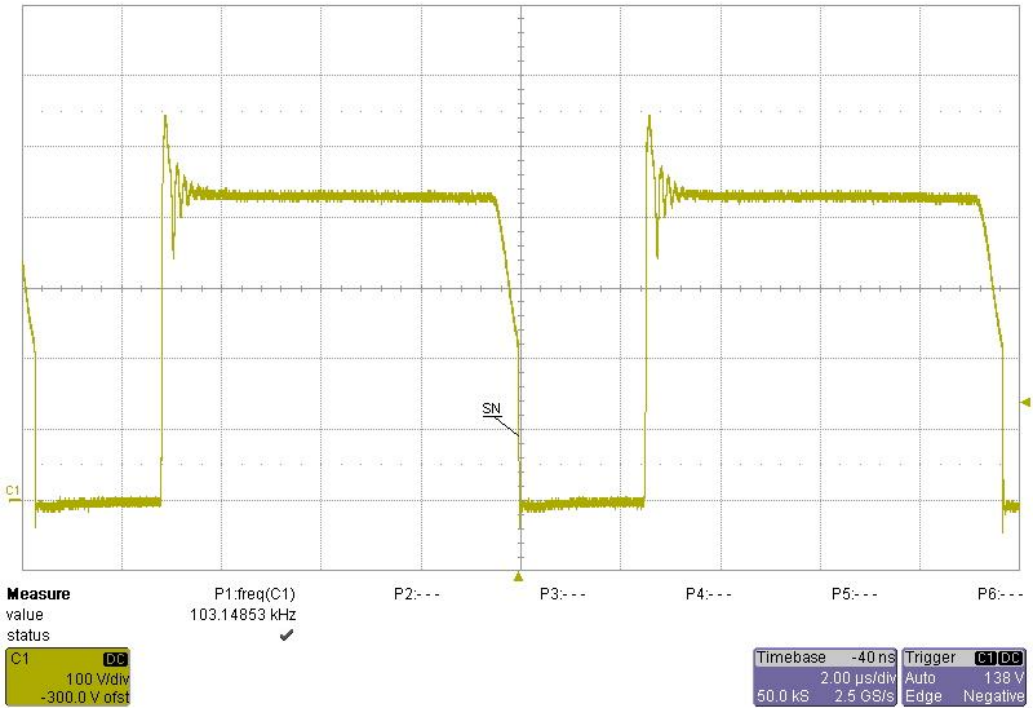
Input voltage = 165VAC
Load current = 3.5A



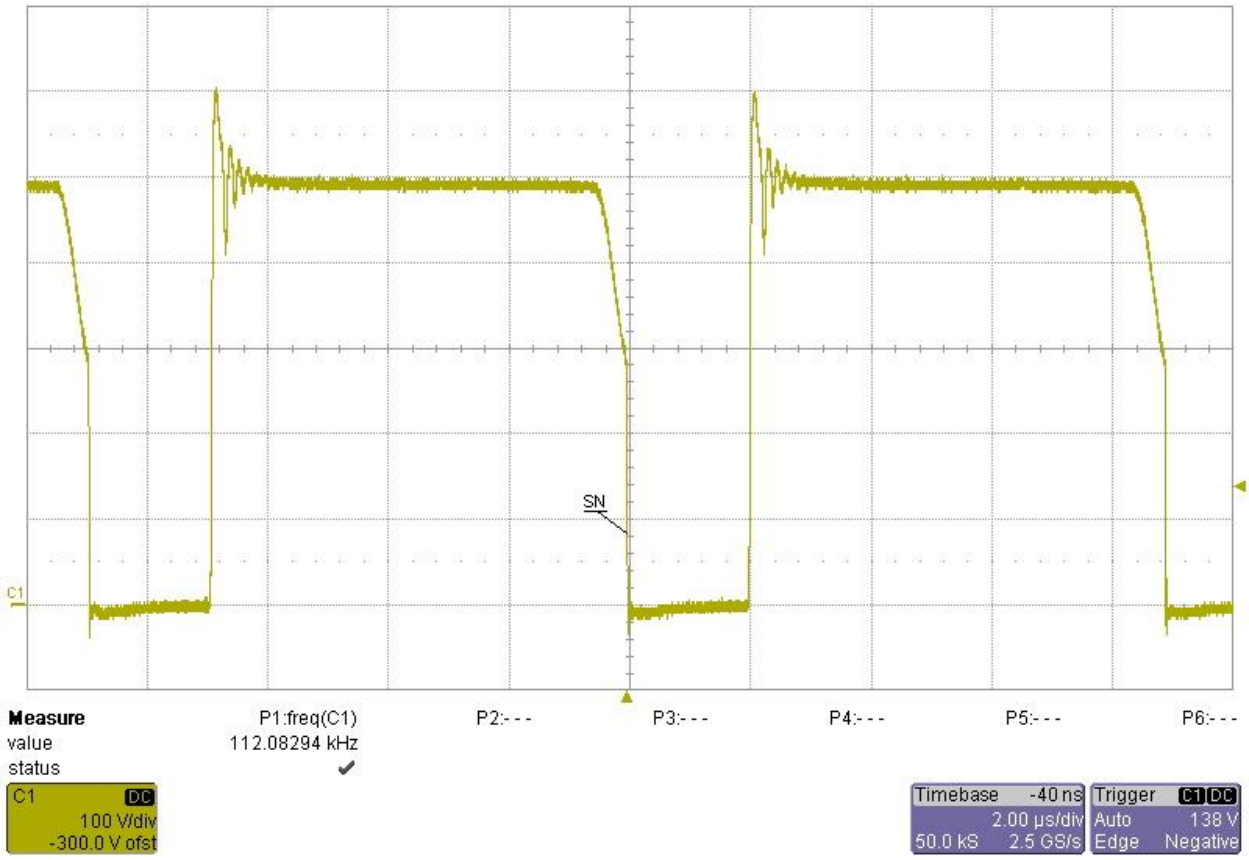
Input voltage = 180VDC
Load current = 3.5A



Input voltage = 325VDC
Load current = 3.5A

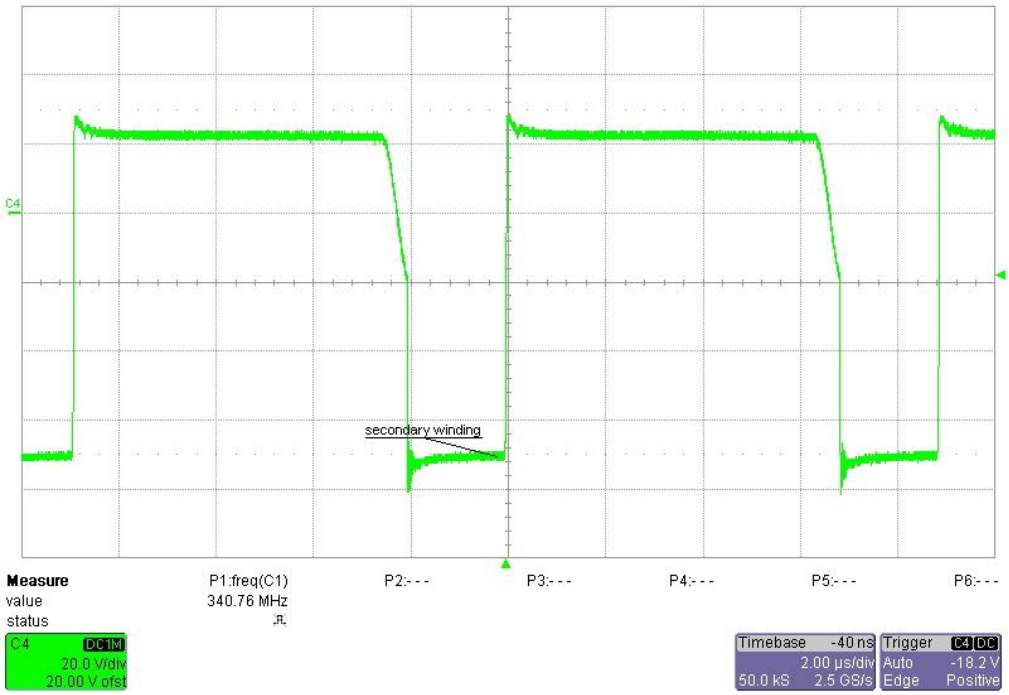


Input voltage = 389VDC
Load current = 3.5A

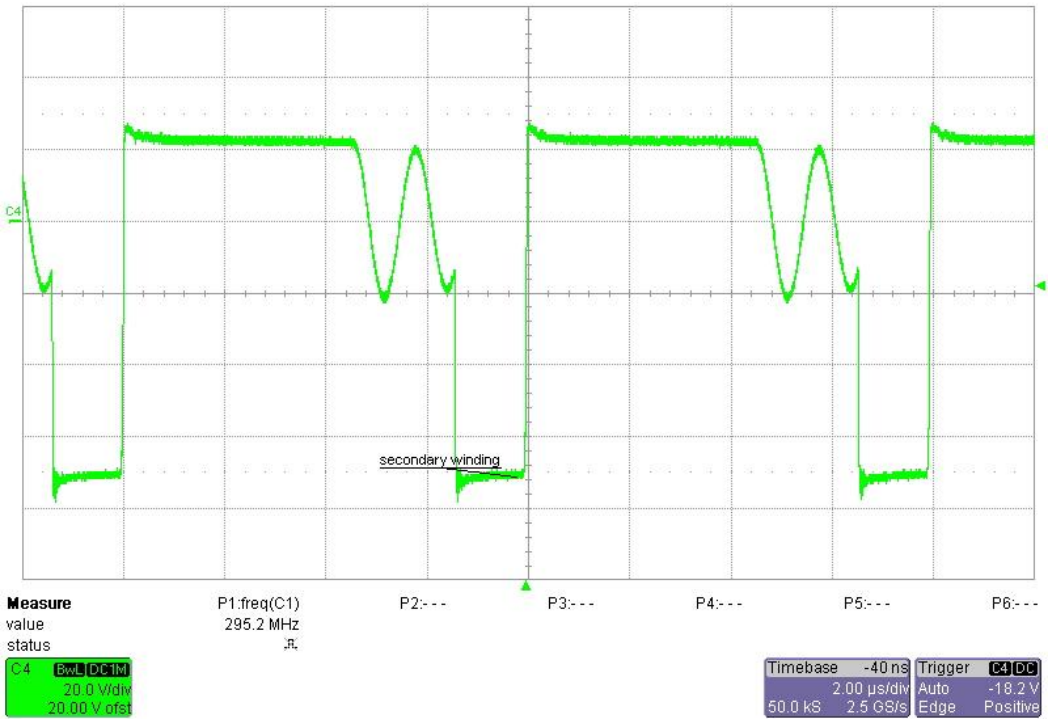


7 Switch Node secondary side

Input voltage = 389VDC
Load current = 3.5A

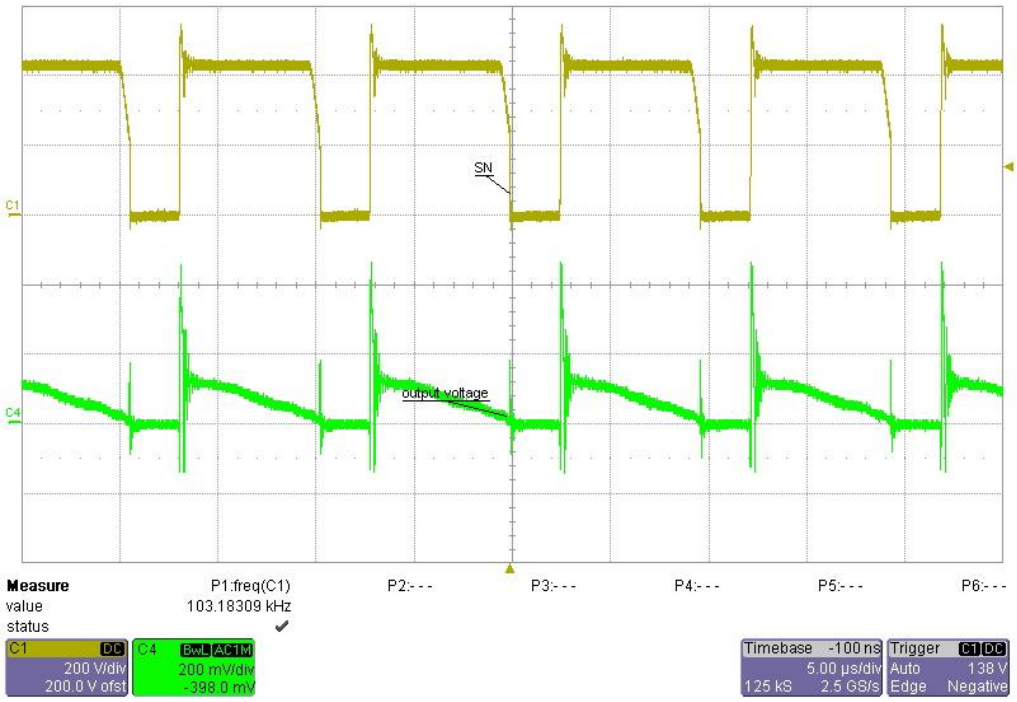


Input voltage = 389VDC
Load current = 2A

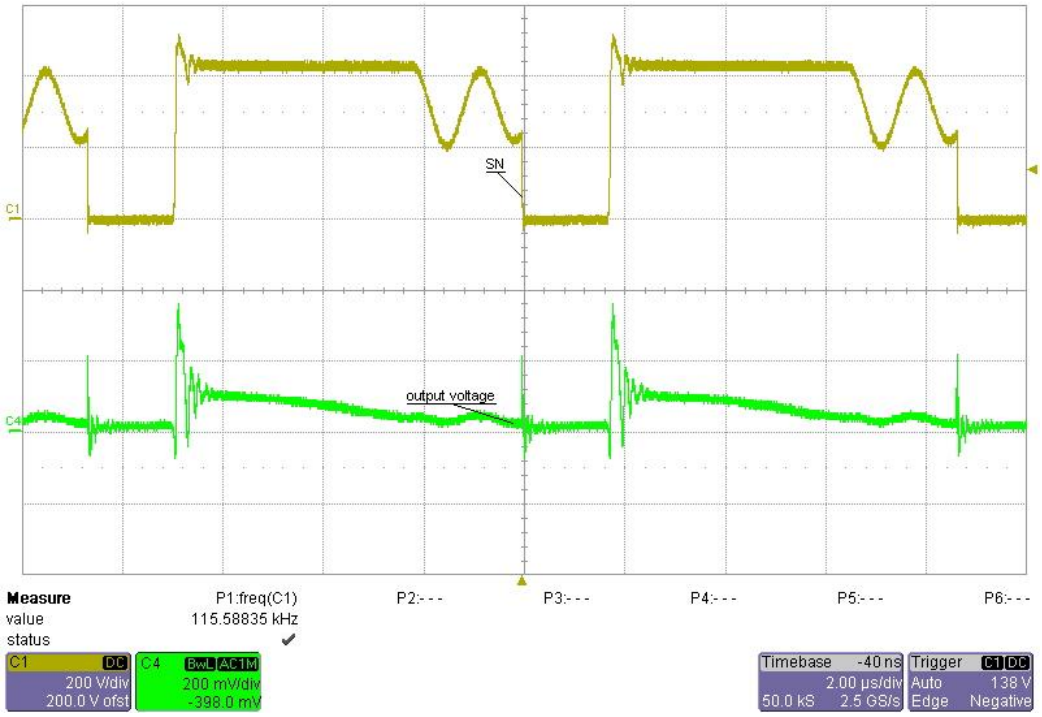


8 Output ripple voltage

Input voltage = 325VDC
Load current = 3.5A

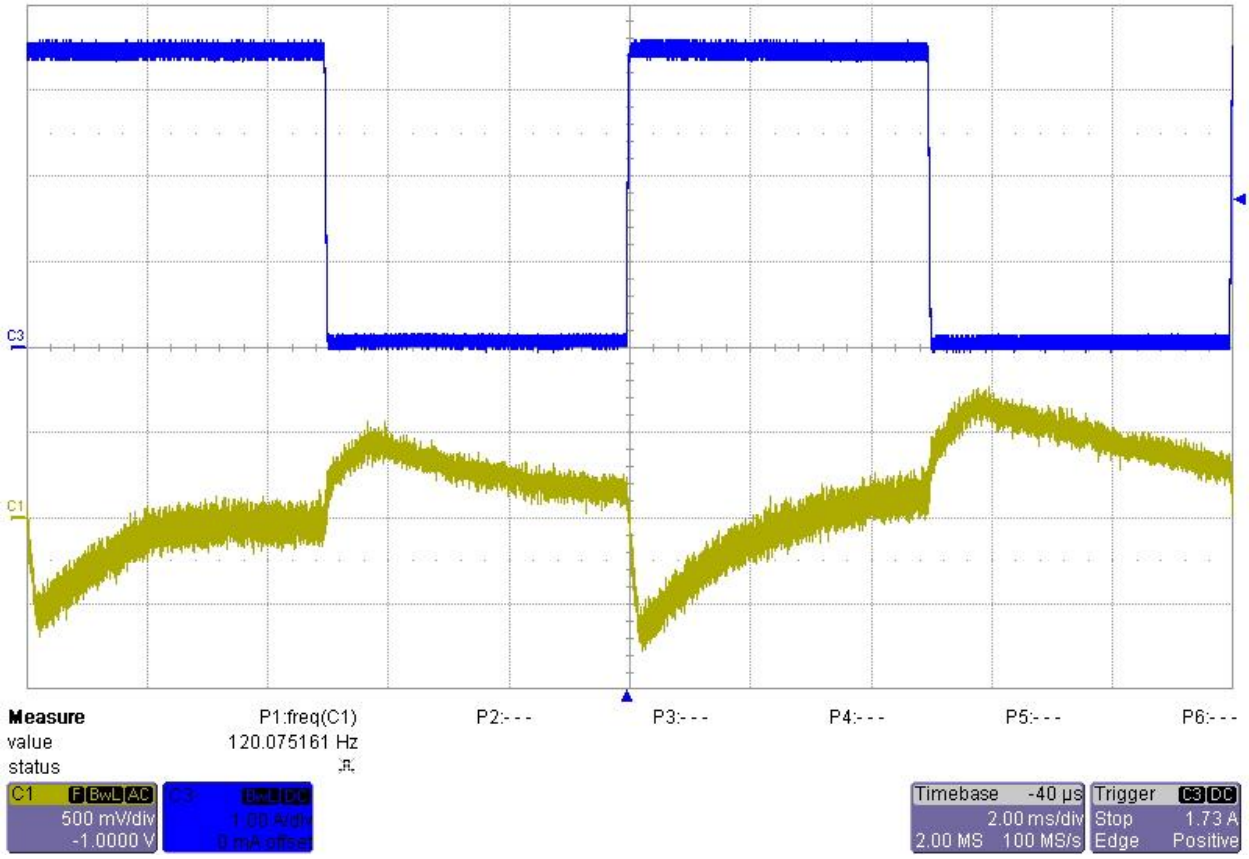


Input voltage = 325VDC
Load current = 2.0A



9 Load Transients

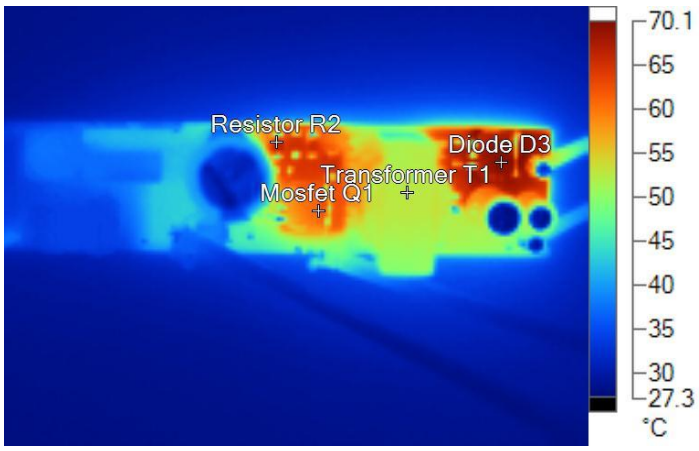
Input voltage = 230VAC
Load current = 0.05A to 3.5A



10 Thermal Analysis

The images below show the infrared images taken from the FlexCam after 15min at 2.0A and at 3.5A output load.

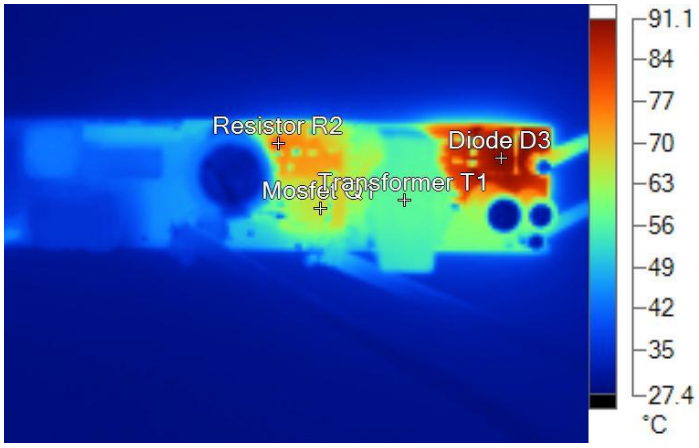
Input voltage = 230VAC
Output power = 44W (22V@2.0A)
Ambient temperature = 25°C
No heatsink, no airflow



Name	Temperature	
Resistor R2	66.0°C	
Mosfet Q1	61.0°C	
Transformer T1	52.9°C	
Diode D3	69.9°C	

IR20150123_0537 230VAC 22V@2.0A.is2

Input voltage = 230VAC
Output power = 77W (22V@3.5A)
Ambient temperature = 25°C
No heatsink, no airflow

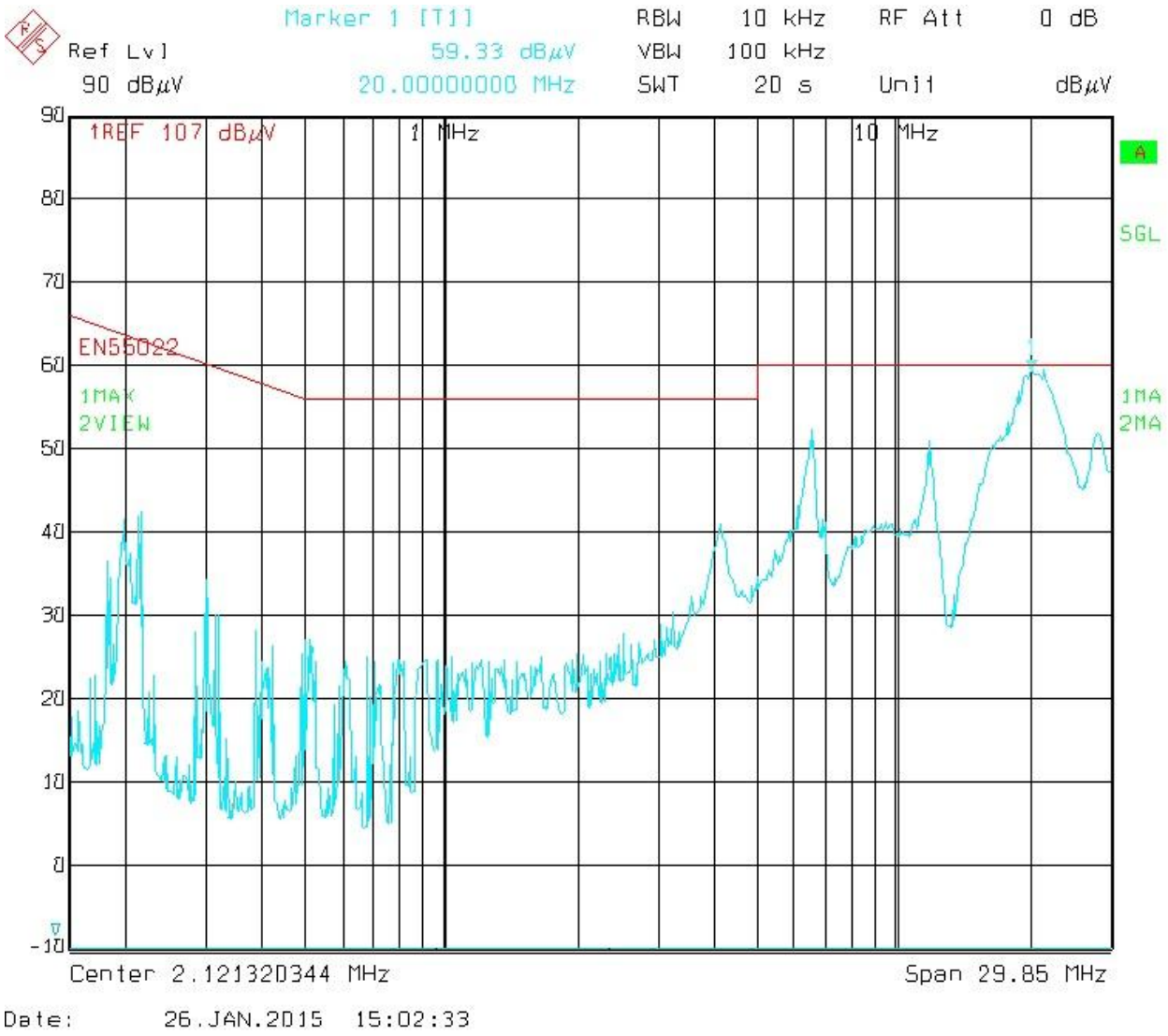


Name	Temperature	
Resistor R2	79.7°C	
Mosfet Q1	67.1°C	
Transformer T1	56.8°C	
Diode D3	91.1°C	

IR20150123_0536.is2

11 EMI Measurement

The graph below shows the conducted emission EMI noise and the EN55022 Class-B Quasi-Peak limits (measurement from the worst case line). The load was connected to a LISN and an isolation transformer; the load was a power resistor, while the input voltage was 230Vac.The receiver was set to Quasi-peak detector, 10 KHz bandwidth.
The negative terminal of the converter has **not** been connected to the ground of the LISN.



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