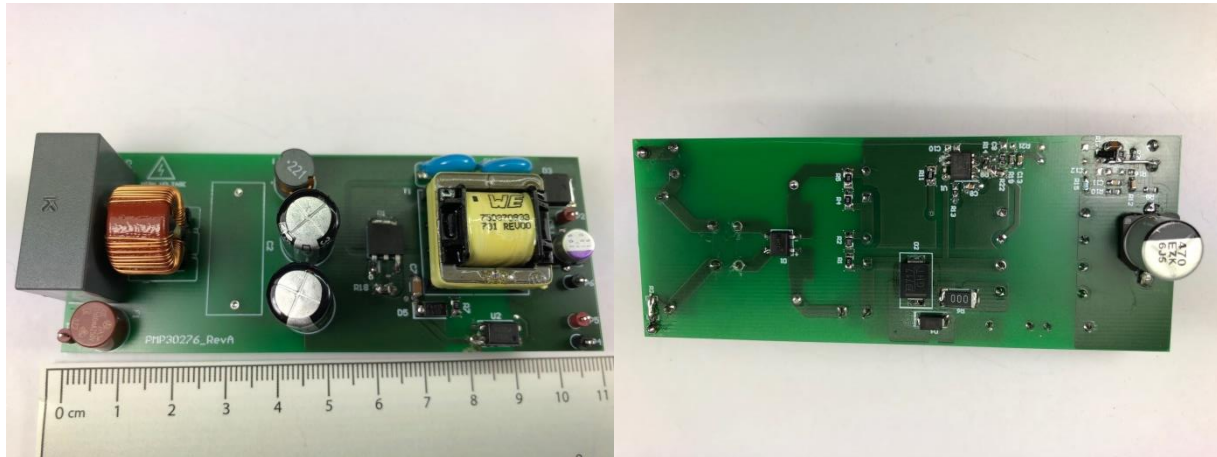


The PMP30276 is a tampering protected power supply for smart meters. Therefore this board was tested under an external magnet field. A magnet (Neodym, N35, Br=1.21T, 50mm x 12.5mm x 50mm) was placed on the top of the transformer. The distance D between transformer and magnet was <5mm. The magnet generates a magnetic field of about 200mT for D=5mm.

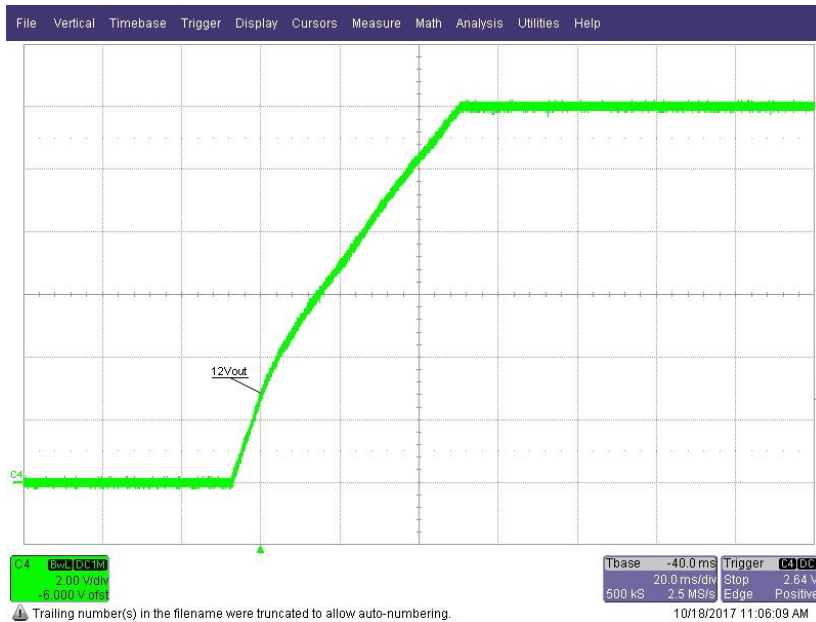


1 Startup

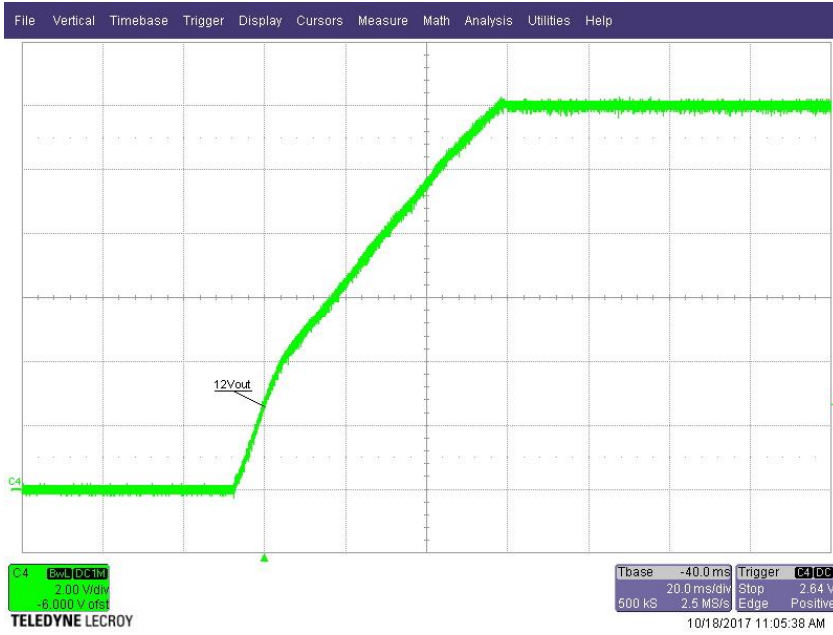
1.1 No external magnet field

Input voltage = 156VAC

Load current = 1.0A

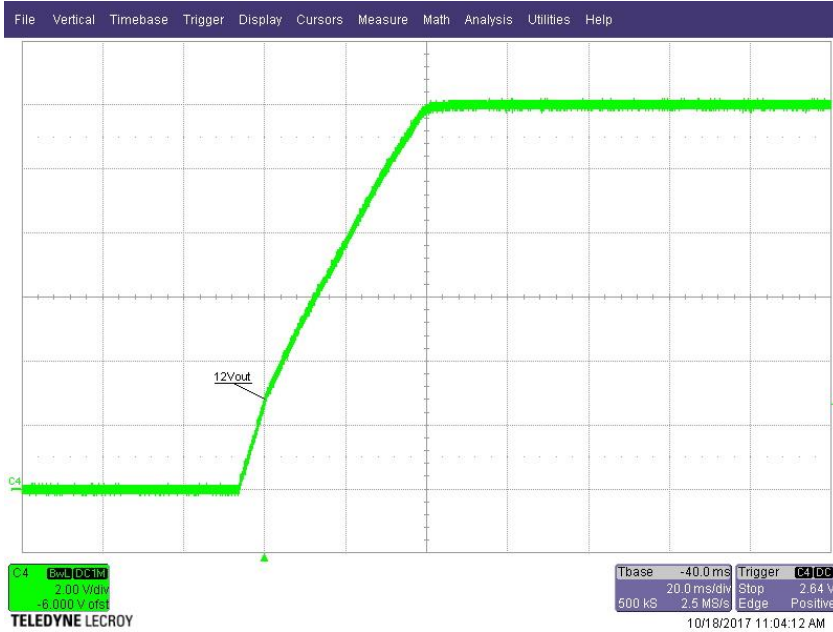


Input voltage = 156VAC
Load current = 1.0A



1.2 External magnet field = 200mT

Input voltage = 156VAC
Load current = 1.0A



2 Shutdown

2.1 No external magnet field

Input voltage = 156VAC

Load current = 1.0A



Input voltage = 273VAC

Load current = 1.0A



2.2 External magnet field =200mT

Input voltage = 156VAC

Load current = 1.0A

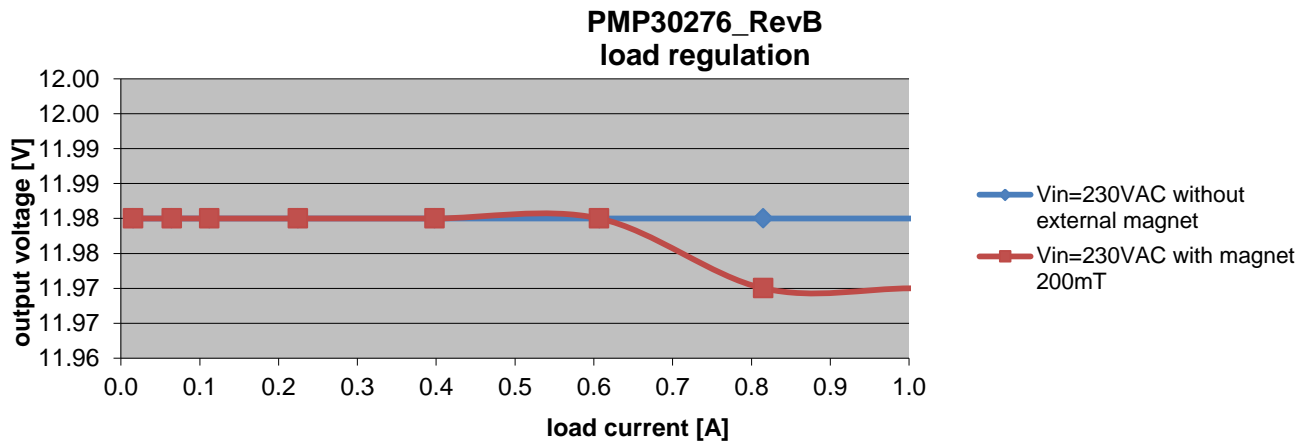
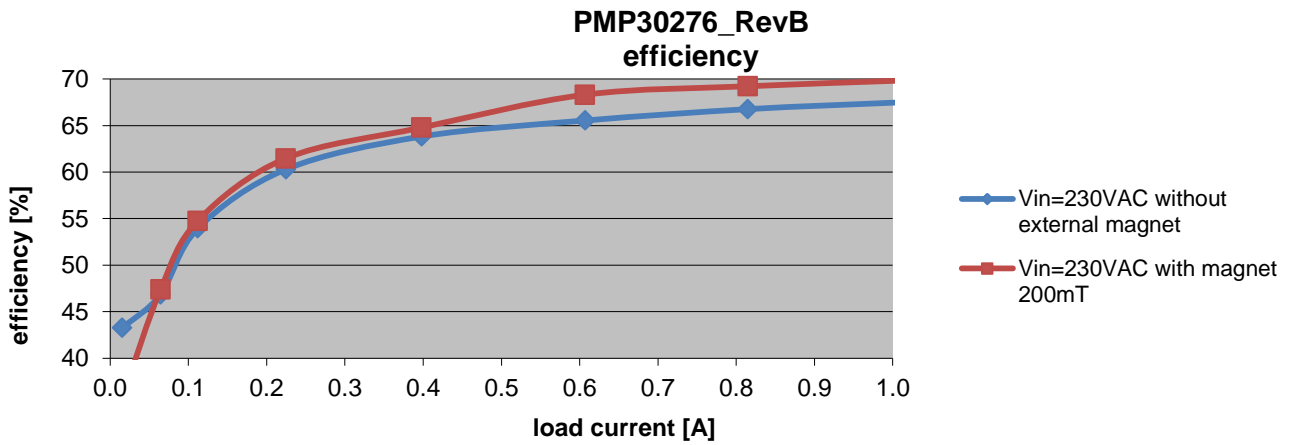


Input voltage = 273VAC

Load current = 1.0A



3 Efficiency and Load regulation

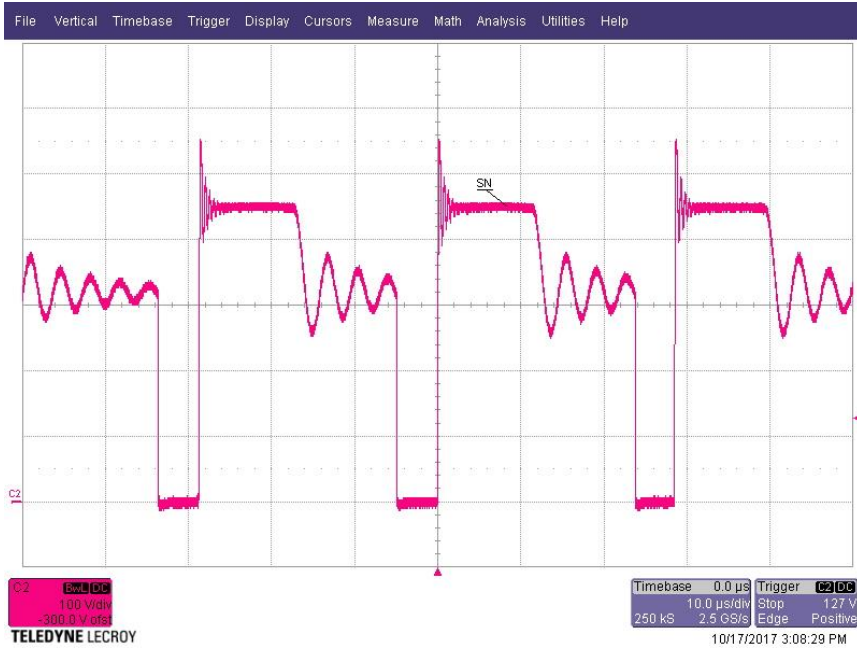


4 Switch Node

4.1 No external magnet field

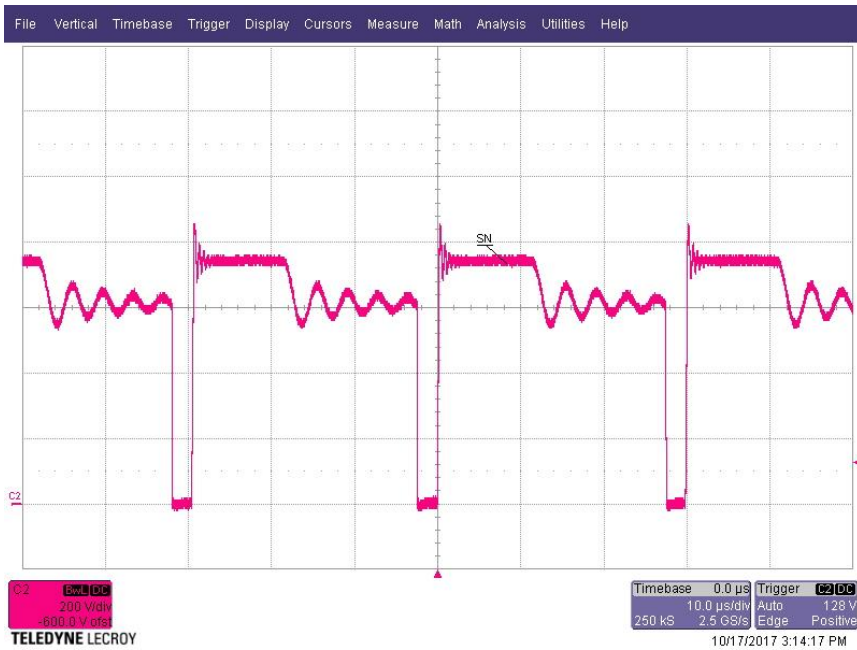
Input voltage = 325VDC

Load current = 1.0A



Input voltage = 622VDC

Load current = 1.0A



4.2 External magnet field =200mT

Input voltage = 325VDC

Load current = 1.0A



5 Output Ripple

5.1 No external magnet field

Input voltage = 230VAC

Load current = 1.0A



5.2 External magnet field = 200mT

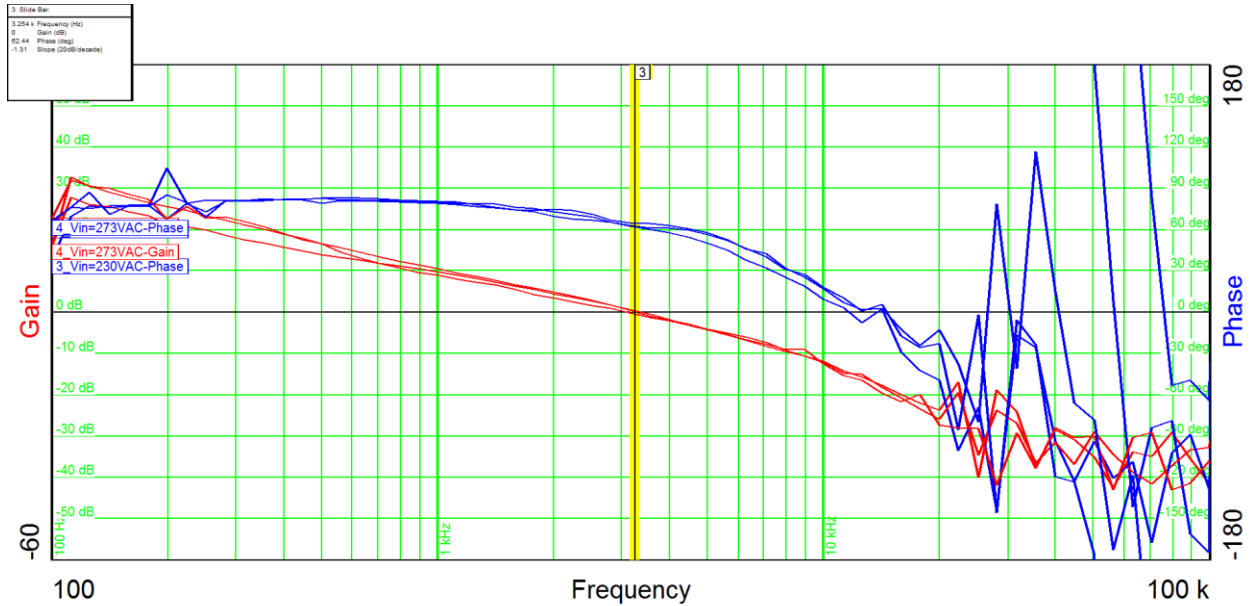
Input voltage = 230VAC

Load current = 1.0A



6 Control Loop Frequency Response

6.1 No external magnet field

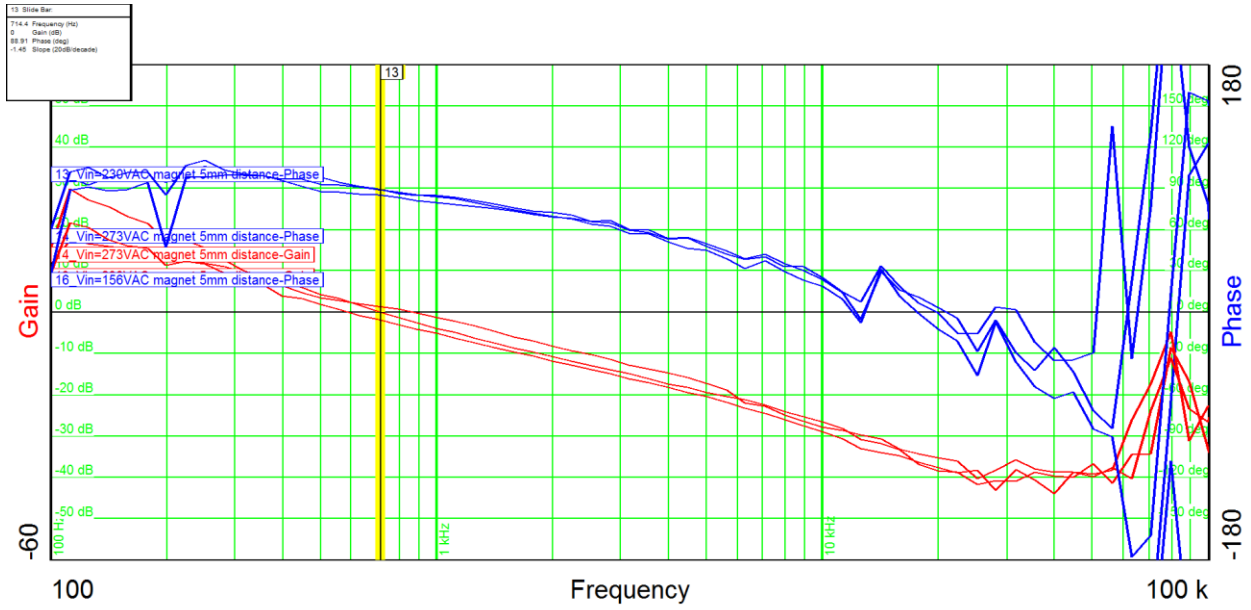


Output Load = 1.0A
 Input voltage = 156VAC
 Phase margin = 61°
 Bandwidth = 3.4kHz

Output Load = 1.0A
 Input voltage = 230VAC
 Phase margin = 62°
 Bandwidth = 3.3kHz

Output Load = 1.0A
 Input voltage = 273VAC
 Phase margin = 65°
 Bandwidth = 3.1kHz

6.2 External magnet field =200mT



Output Load = 1.0A
 Input voltage = 156VAC
 Phase margin = 92°
 Bandwidth = 0.59kHz

Output Load = 1.0A
 Input voltage = 230VAC
 Phase margin = 89°
 Bandwidth = 0.71kHz

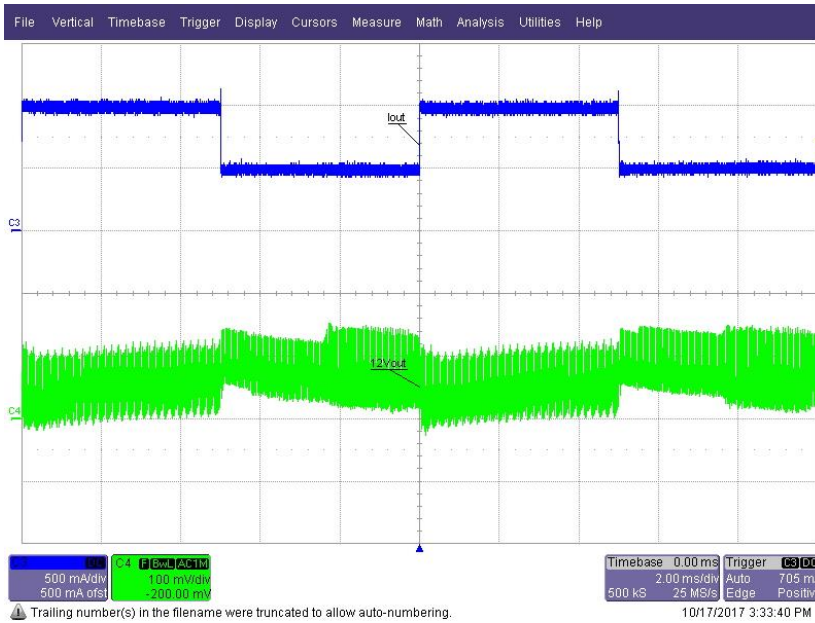
Output Load = 1.0A
 Input voltage = 273VAC
 Phase margin = 82°
 Bandwidth = 0.87kHz

7 Load step

7.1 No external magnet field

Input voltage = 230VAC

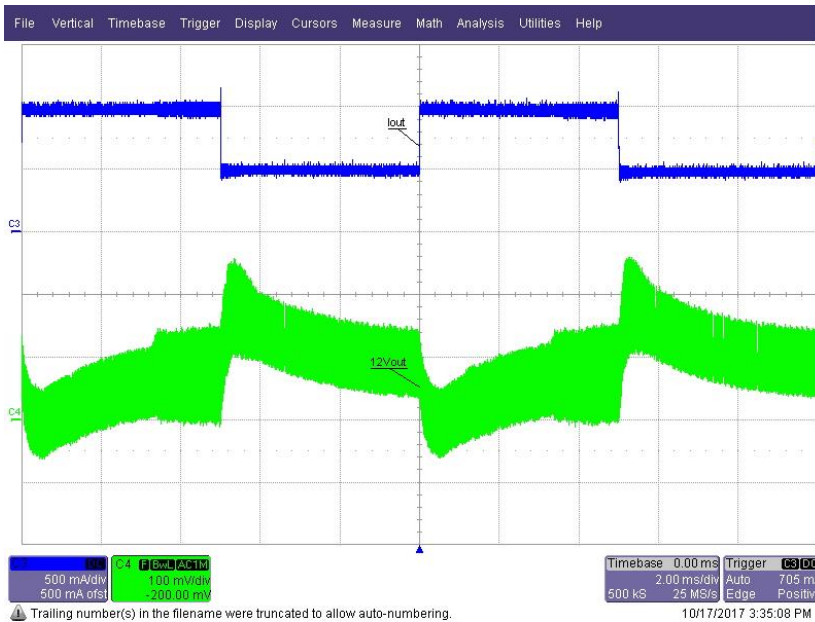
Load current = 0.5A – 1A



7.2 External magnet field =200mT

Input voltage = 230VAC

Load current = 0.5A – 1A

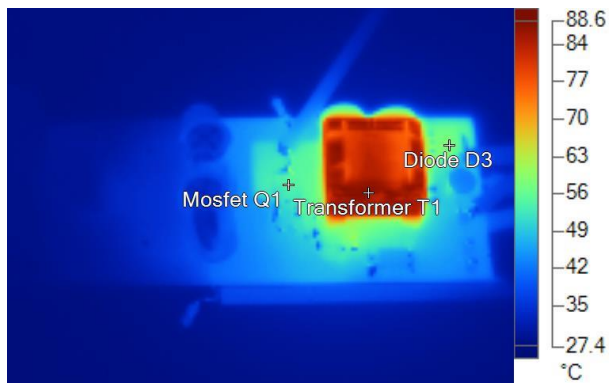


8 Thermal Analysis

8.1 No external magnet field

The images below show the infrared images taken from the FlexCam after 15min at 0.5A output power.

Input voltage = 230VAC
 Load current = 0.5A
 Ambient temperature = 25°C
 No heatsink, no airflow

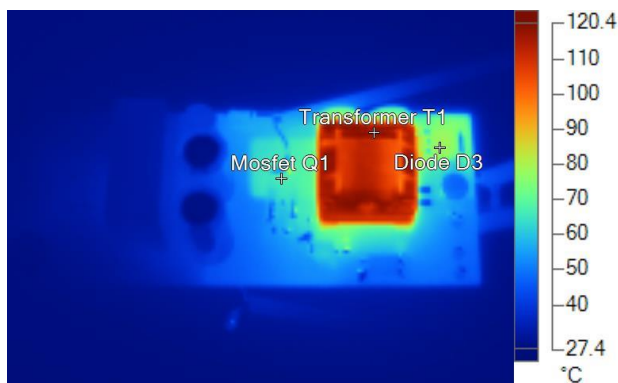


Top Vin=230VAC Iload=500mA.is2

Name	Temperature	
Transformer T1	88.3°C	
Mosfet Q1	54.3°C	
Diode D3	58.1°C	

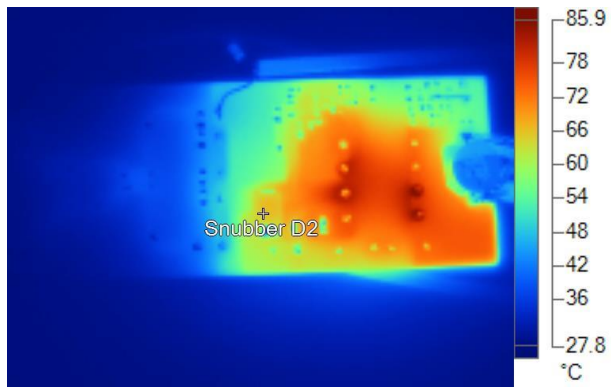
The images below show the infrared images taken from the FlexCam after 15min at full output power.

Input voltage = 230VAC
 Load current = 1.0A
 Ambient temperature = 25°C
 No heatsink, no airflow



Top Vin=230VAC full load_1143.is2

Name	Temperature	
Transformer T1	118.9°C	
Mosfet Q1	67.1°C	
Diode D3	78.4°C	



Bottom Vin=230VAC full load_1144.is2

Name	Temperature
Snubber D2	66.1°C

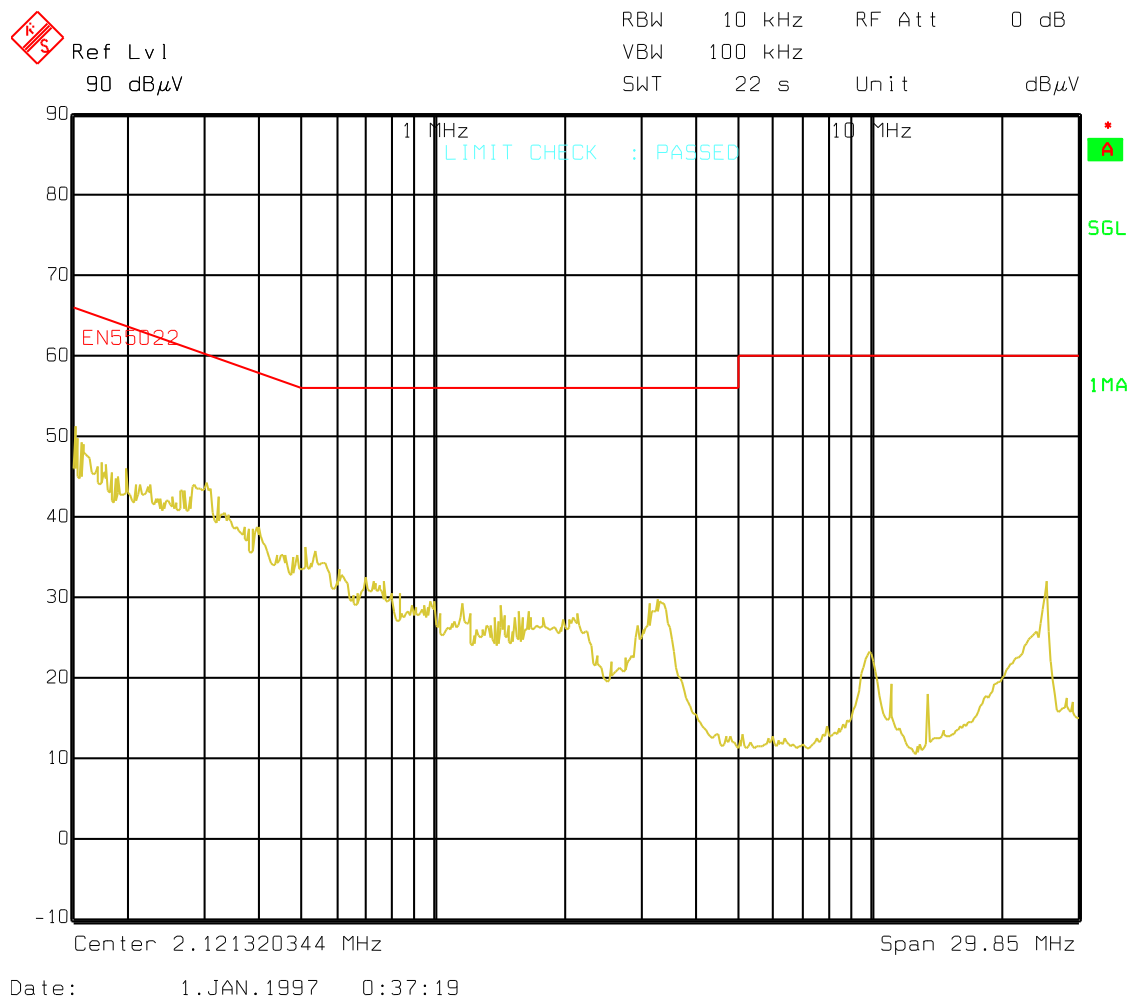
9 EMI Measurement

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

9.1 No external magnet field

Input voltage = 230VAC

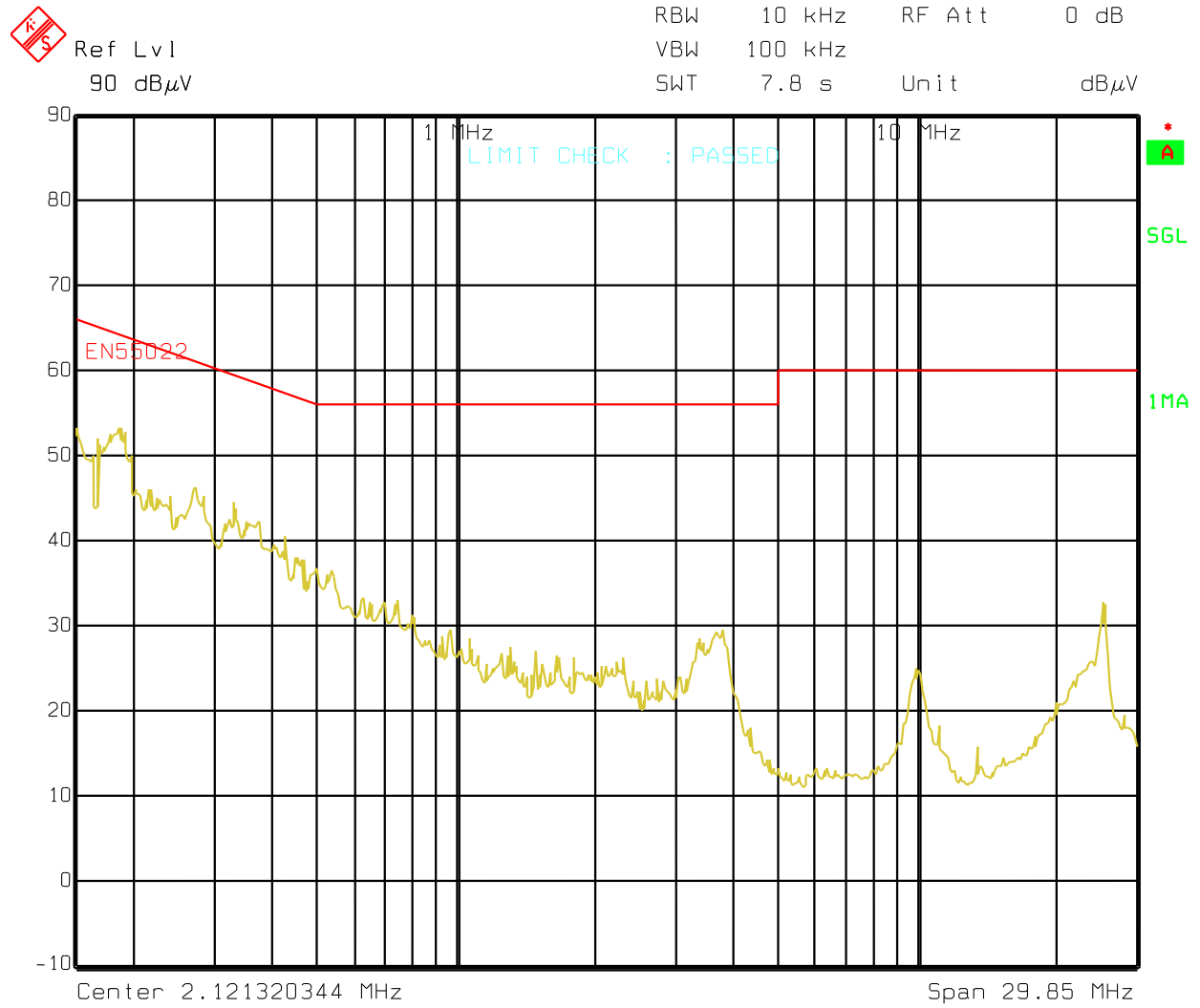
Load current = 1A



9.2 External magnet field =200mT

Input voltage = 230VAC

Load current = 1A



Date: 1.JAN.1997 2:01:53

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