

## 2 kW two-channel interleaved PFC based on the STNRGPF12 digital controller with digital inrush current control



### Features

- The 2 kW interleaved PFC evaluation kit features:
  - STEVAL-IPFC12P1 power board
  - STEVAL-IPFC12C1 control board
  - STEVAL-IPFC01A1 adapter board
- Input voltage range: 90 to 265 V<sub>AC</sub>
- Line frequency range: 47 to 63 Hz
- Maximum output power: 2 kW at 230 V
- Digital Inrush Current Limiter function performed with SCR
- Output voltage: 400 V
- Power factor: > 0.98 at 20% load
- Total Harmonic Distortion: <5% at 20% load
- Mixed-signal Average Current Mode control, CCM fixed frequency operation
- Switching Frequency (f<sub>sw</sub>): 60 kHz
- Cycle-by-cycle regulation (analog current control loop)
- Input voltage and load feed-forwards
- Phase shedding
- Burst-mode operation
- Overvoltage protection
- Thermal protection
- Status indicator LEDs
- Cooling function

Product summary	
2 kW two-channel interleaved PFC based on the STNRGPF12 digital controller	STEVAL-IPFC12V1
Two-channel interleaved CCM PFC digital controller	STNRGPF12
automotive-grade SCR Thyristor	TN3050H-12WY
high voltage rectifier for bridge applications	STBR3012
trench gate field-stop IGBT	STGW20H65FB
power Schottky silicon carbide diode	STPSC12065D
Application	PFC Converter - Single Phase Input

### Description

The **STEVAL-IPFC12V1** 2 kW interleaved PFC converter kit provides very high power factor supply power with very low harmonic distortion and features advanced dynamic performance and condition monitoring, including analog cycle-by-cycle current regulation.

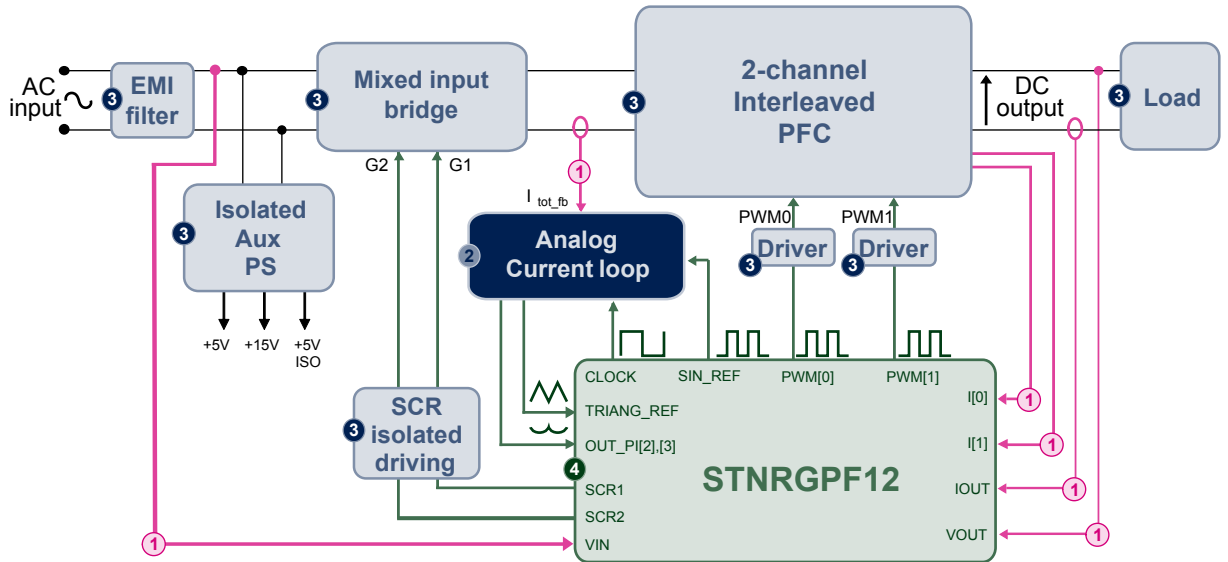
Digital functionality is based on the **STNRGPF12** digital PFC controller, which features digital inrush current control and can drive up to two interleaved PFC channels with mixed signal (analog/digital) average current mode control in CCM at fixed frequency.

You can use the **eDesignSuite** software available on the ST website to configure the **STNRGPF12** according to your design requirements for each interleaved PFC.

# 1 Block diagram and schematics

## 1.1 Block diagram

Figure 2. STEVAL-IPFC12V1 block diagram



## 1.2 STEVAL-IPFC12P1 power board schematics

Figure 3. STEVAL-IPFC12P1 schematic - input section

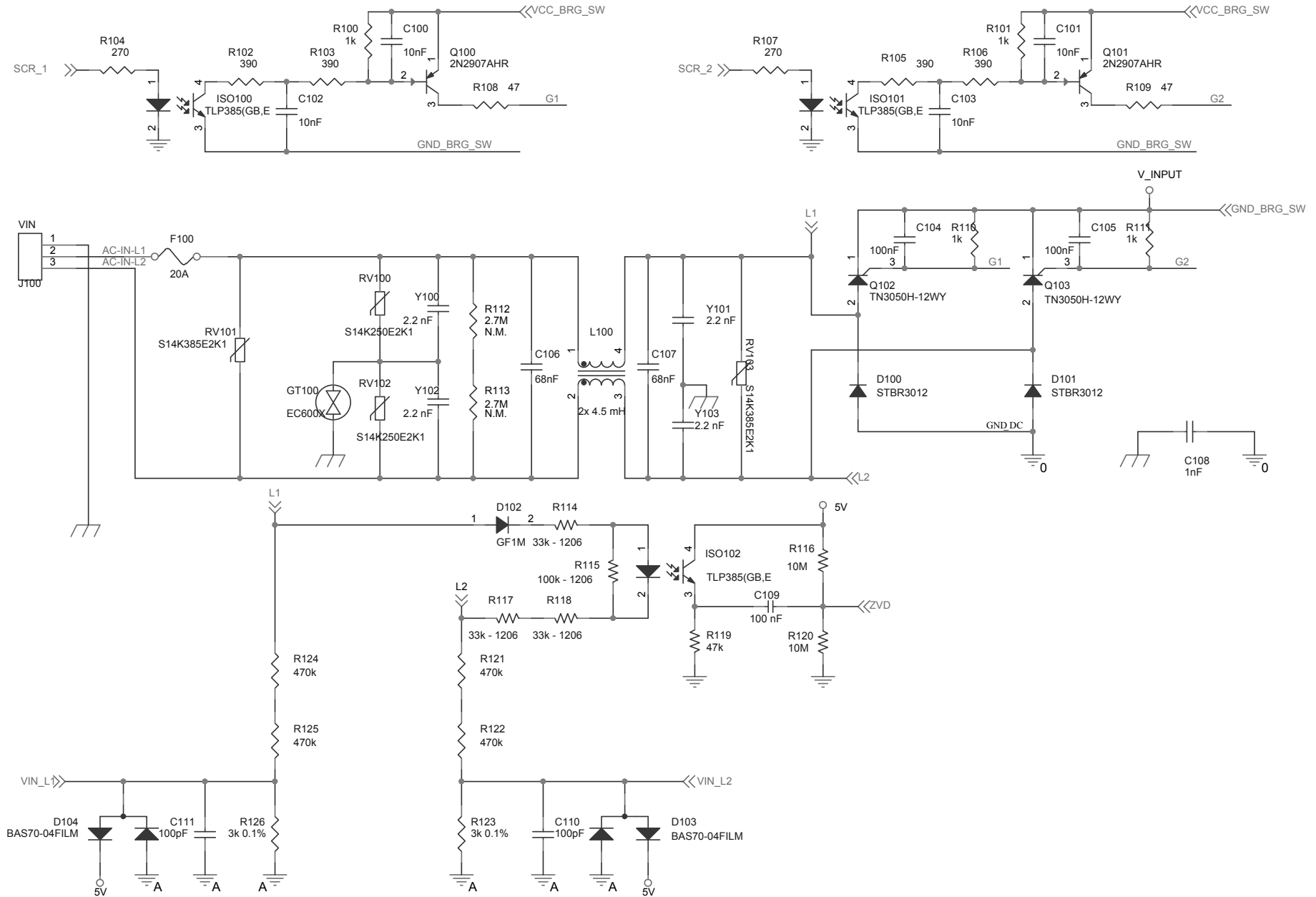


Figure 4. STEVAL-IPFC12P1 schematic - auxiliary power supply

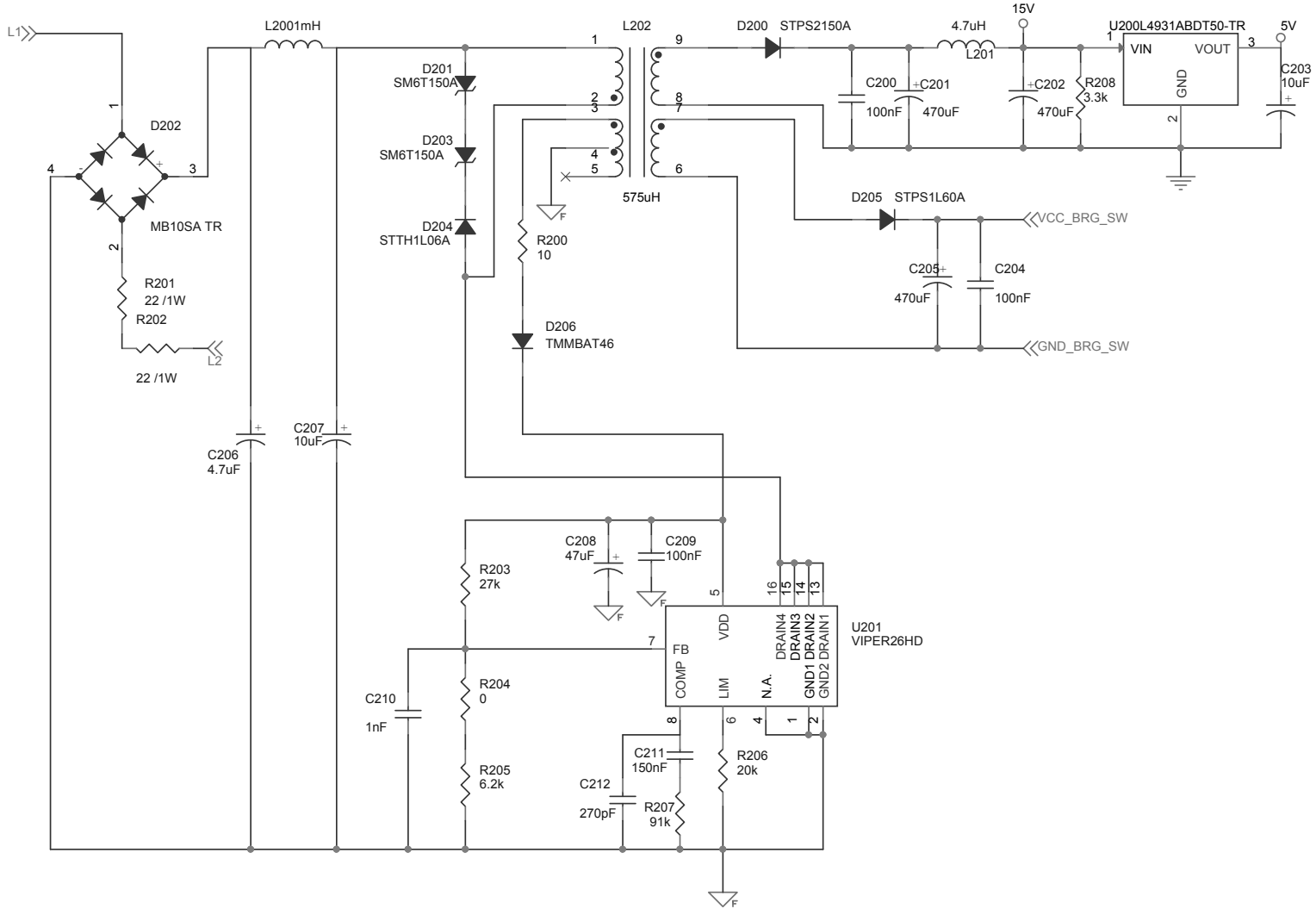
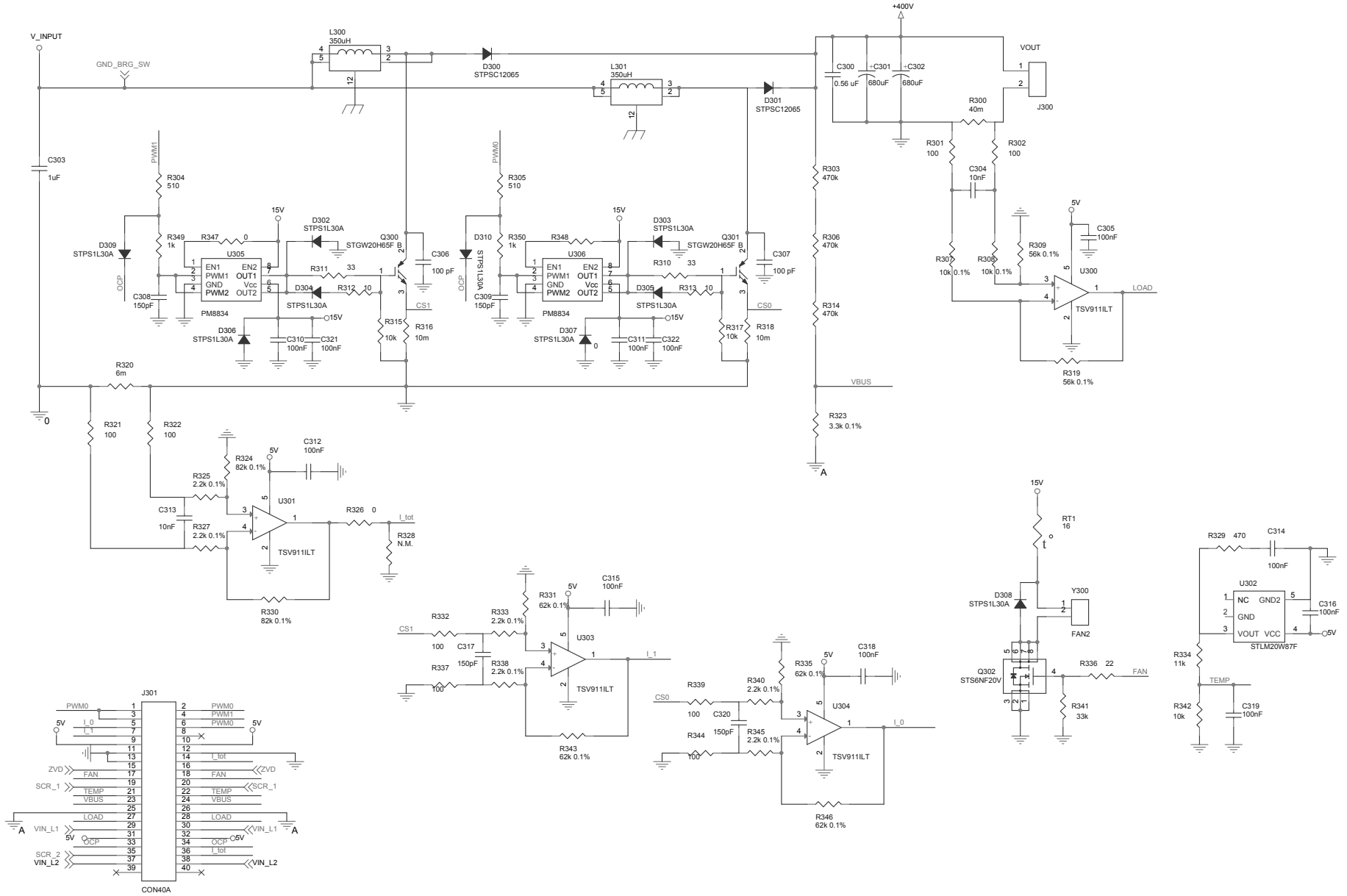
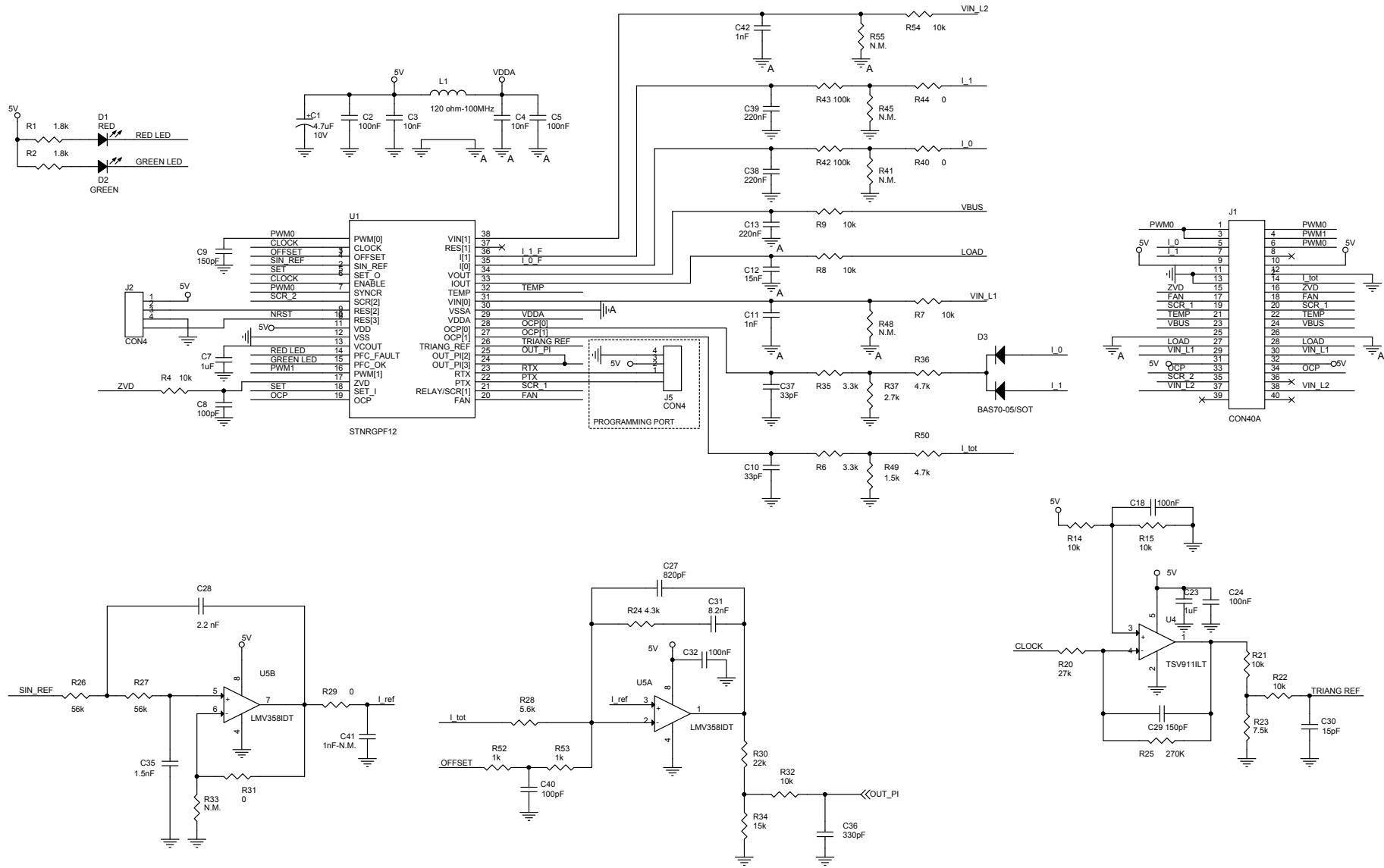


Figure 5. STEVAL-IPFC12P1 schematic - boost interleaving section



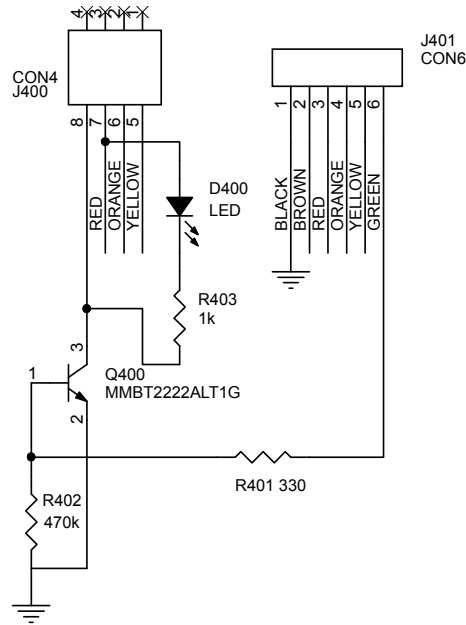
# 1.3 STEVAL-IPFC12C1 control board schematic

Figure 6. STEVAL-IPFC12C1 schematic



## 1.4 STEVAL-IPFC01A1 adapter board schematic

Figure 7. STEVAL-IPFC01A1 schematic



## Revision history

**Table 1. Document revision history**

Date	Version	Changes
08-Mar-2019	1	Initial release.



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