48 V flyback converter 12 V – 5 A based on PM8804
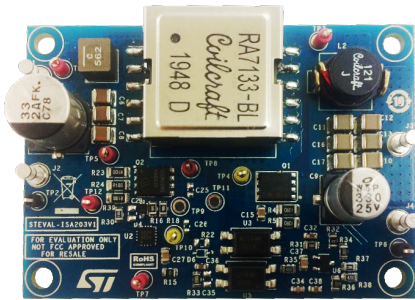
Features

- DC-DC flyback converter based on:
  - PM8804 PWM peak current mode controller, and
  - SRK1000 adaptive synchronous rectification controller
- Input voltage range 42 – 56 V_{DC}
- Switching frequency: 200 kHz
- Output:
  - Power: 60 W
  - Voltage: 12 V_{DC}
  - Current: 5 A
- Peak efficiency > 92%
- RoHS compliant

Description

STEVAL-ISA203V1 evaluation board is designed to demonstrate high efficiency DC-DC conversion with 60 W output (12 V/5 A) from 42 to 56 V_{DC} input (48 V nom.), which is especially suitable for telecom applications.

The power conversion stage is based on a flyback topology managed by the PM8804 controller, which features all the integrated circuitry necessary for a compact and efficient 48 V converter. The highly configurable controller includes a programmable oscillator for switching frequency regulation up to 1 Mhz, adjustable slope compensation, dual complementary low-side drivers with programmable dead time, programmable soft start, soft turn off and a programmable current sense blanking time.

The secondary side employs the SRK1000 adaptive synchronous rectification controller for flyback converters.

Product summary	
48 V flyback converter 12 V – 5 A based on PM8804	STEVAL-ISA203V1
PWM peak current mode controller for PoE and telecom systems	PM8804
Adaptive synchronous rectification controller for flyback converter	SRK1000
N-channel 80 V, 3.0 mΩ typ., 120 A STripFET F7 Power MOSFET in PowerFLAT 5x6 package	STL130N8F7
Application	Server & Telecom Power

DB4096 - Rev 1 - February 2020
For further information contact your local STMicroelectronics sales office.

www.st.com

1 Application overview

The STEVAL-ISA203V1 represents a compact and efficient continuous conduction mode flyback converter design with synchronous rectification from 48 V input power, especially suitable for server and telecommunications equipment. The board can supply an output voltage 12 V and load current up to 5 A.

The PM8804 PWM peak current mode controller integrates two MOSFET drivers with up to 1 A peak sink current capability. The GAT1 signal drives the main switching MOSFET, while the GAT2 signal is capable of controlling a P-channel MOSFET referred to PGND in active clamp flyback topology.

The SRK1000 flyback synchronous rectification controller takes body diode sensing feedback from the STL130N8F7 secondary MOSFET.

Figure 1. STEVAL-ISA203V1 block diagram
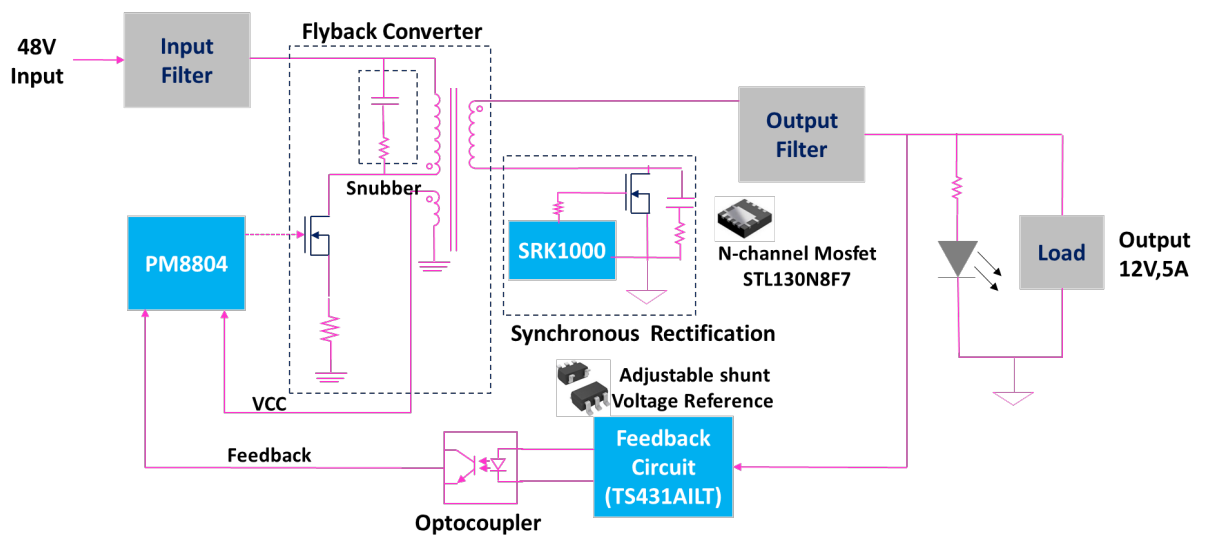
2 Board layout
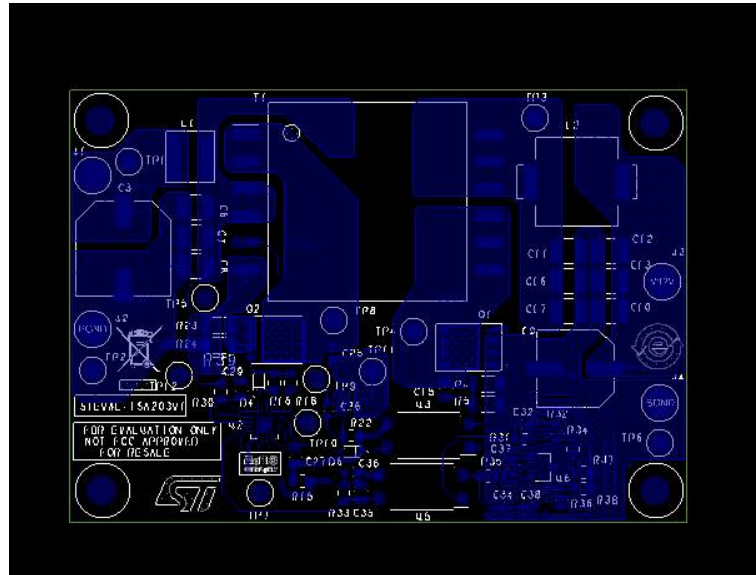
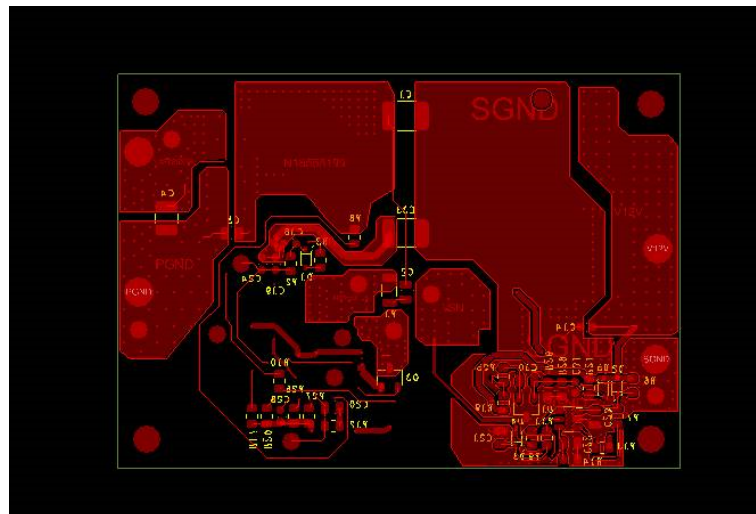**Figure 2. STEVAL-ISA203V1 top layer**

Figure 3. STEVAL-ISA203V1 bottom layer

3   Electrical and efficiency characteristics

Table 1. Electrical specifications of STEVAL-ISA203V1

Electrical specifications	Range / Value
Input voltage range	42-56 V_{DC}
Output voltage	12
Output current	5 A
Total output power	60 W
Maximum efficiency	> 92%

The STEVAL-ISA203V1 evaluation board attains a maximum efficiency of nearly 93%. The figure below shows the efficiency of the board at different input voltages and load conditions.

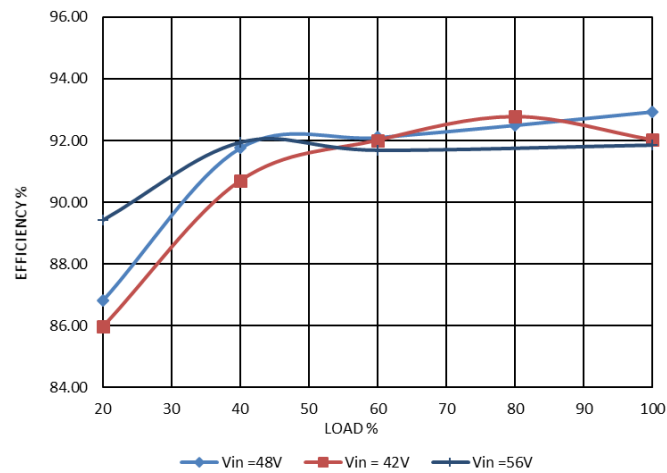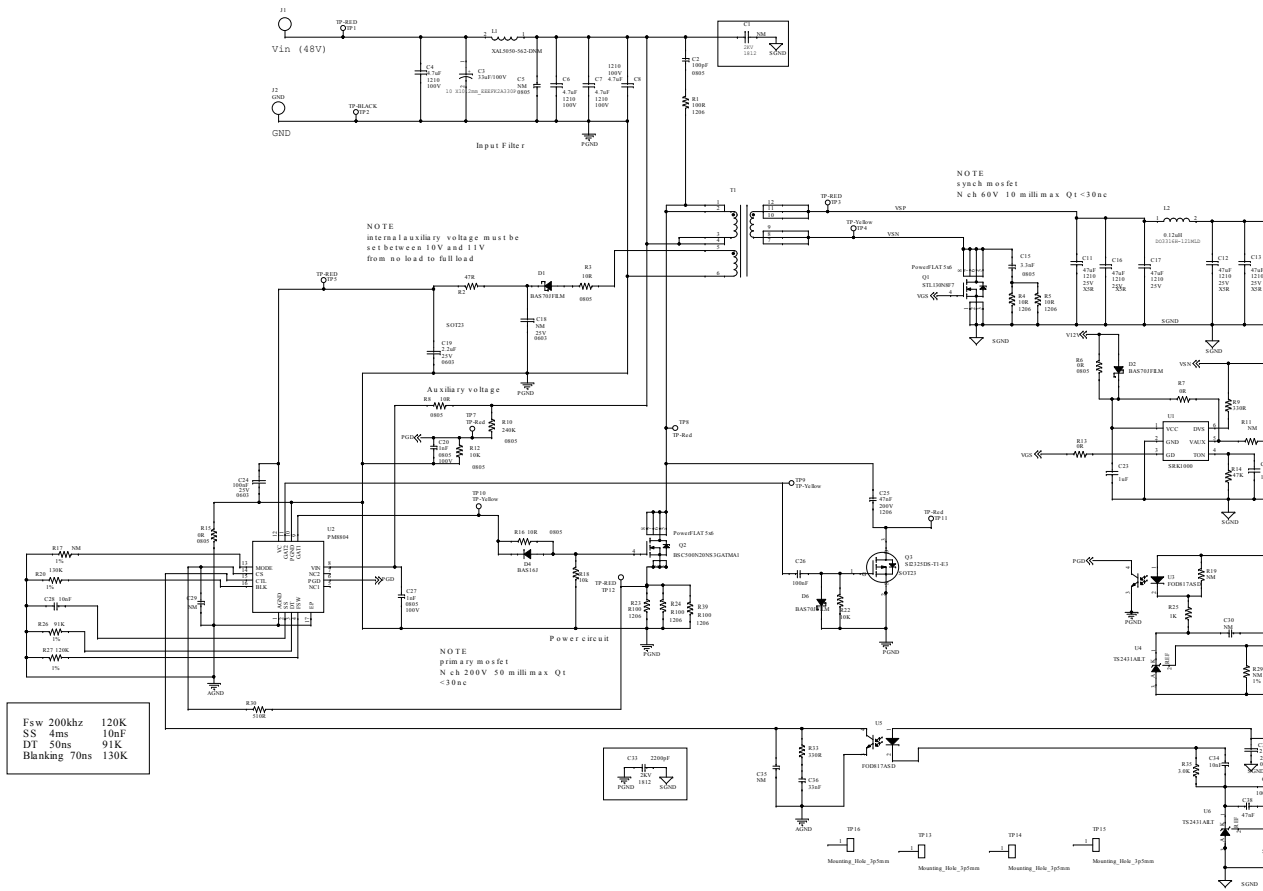**Figure 4. Efficiency at different load conditions of STEVAL-ISA203V1**

Table 2. STEVAL-ISA203V1 MOSFET temperatures at maximum load (5 A)

Synchronous MOSFET, Q1 STL90N6F7	Synchronous MOSFET, Alternative Q1 STL130N8F7
76 °C	68 °C

4 Schematic diagrams

Figure 5. STEVAL-ISA203V1 board schematic

Revision history

Table 3. Document revision history

Date	Version	Changes
06-Feb-2020	1	Initial release.

IMPORTANT NOTICE – PLEASE READ CAREFULLY

STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. For additional information about ST trademarks, please refer to www.st.com/trademarks. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Power Management IC Development Tools *category:*

Click to view products by STMicroelectronics *manufacturer:*

Other Similar products are found below :

EVAL-ADM1168LQEBZ EVB-EP5348UI MIC23451-AAAYFL EV MIC5281YMME EV DA9063-EVAL ADP122-3.3-EVALZ ADP130-0.8-EVALZ ADP130-1.2-EVALZ ADP130-1.5-EVALZ ADP130-1.8-EVALZ ADP1712-3.3-EVALZ ADP1714-3.3-EVALZ ADP1715-3.3-EVALZ ADP1716-2.5-EVALZ ADP1740-1.5-EVALZ ADP1752-1.5-EVALZ ADP1828LC-EVALZ ADP1870-0.3-EVALZ ADP1871-0.6-EVALZ ADP1873-0.6-EVALZ ADP1874-0.3-EVALZ ADP1882-1.0-EVALZ ADP199CB-EVALZ ADP2102-1.25-EVALZ ADP2102-1.875EVALZ ADP2102-1.8-EVALZ ADP2102-2-EVALZ ADP2102-3-EVALZ ADP2102-4-EVALZ ADP2106-1.8-EVALZ ADP2147CB-110EVALZ AS3606-DB BQ24010EVM BQ24075TEVM BQ24155EVM BQ24157EVM-697 BQ24160EVM-742 BQ24296MEVM-655 BQ25010EVM BQ3055EVM NCV891330PD50GEVB ISLUSBI2CKIT1Z LM2744EVAL LM2854EVAL LM3658SD-AEV/NOPB LM3658SDEV/NOPB LM3691TL-1.8EV/NOPB LM4510SDEV/NOPB LM5033SD-EVAL LP38512TS-1.8EV