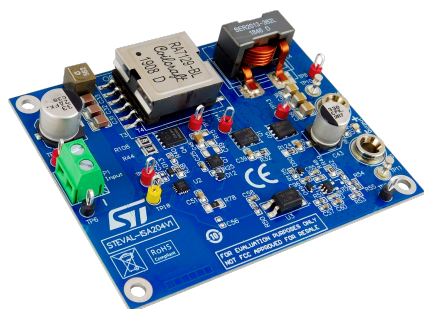


## 100W 5V/20A active clamp forward converter based on PM8804 for telecom systems



### Features

- DC-DC forward converter based on PM8804
- Input voltage range: 42 – 56 V<sub>DC</sub>
- Switching frequency: 250 kHz
- Output:
  - Power: 100 W
  - Voltage: 5 V<sub>DC</sub>
  - Current: up to 20 A
- Peak efficiency > 94%
- Open circuit protection
- RoHS complaint
- WEEE compliant

### Description

The [STEVAL-ISA204V1](#) evaluation board is designed to demonstrate high efficiency DC-DC conversion, able to output 100 W (5 V/20 A) from 42 to 56 V DC input, which is especially suitable for telecom applications.

The power conversion stage is based on an active clamp forward topology managed by a [PM8804](#) PWM controller featuring 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.

| Product summary                                              |                                            |
|--------------------------------------------------------------|--------------------------------------------|
| 100W 5V/20A forward converter based on PM8804 PWM controller | <a href="#">STEVAL-ISA204V1</a>            |
| PWM peak current mode controller for PoE and telecom systems | <a href="#">PM8804</a>                     |
| Application                                                  | <a href="#">Server &amp; Telecom Power</a> |

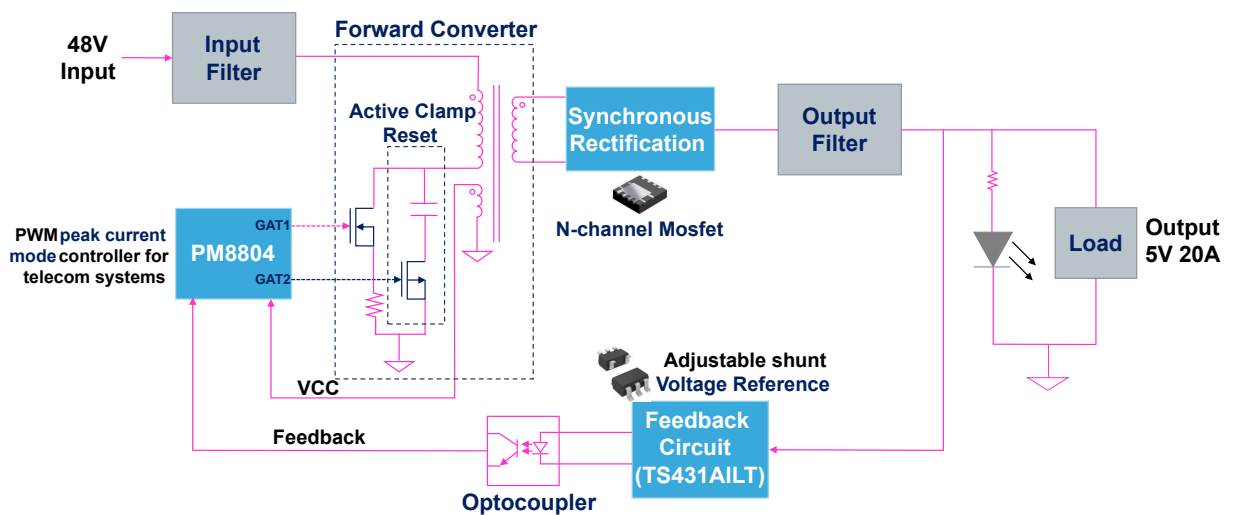
## 1 Application overview

The **STEVAL-ISA204V1** represents a forward converter application with synchronous rectification for 48 V auxiliary power supplies destined for server and telecommunications equipment. The board can supply an output current up to 20 A.

The **PM8804** 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 controls a P-channel MOSFET referred to PGND in active clamp forward topology.

The synchronous rectification stage can be paralleled by mounting two further **STL160N4F7** N-channel MOSFETs (Q2 and Q8), which can significantly reduce the operating temperatures of the mounted synchronous rectifier MOSFETs.

**Figure 1. STEVAL-ISA204V1 block diagram**



### RELATED LINKS

*Visit the [Server & Telecom application page](#) for more information on relevant power supply and conversion strategies*

## 2 Electrical and efficiency characteristics

**Table 1.** Electrical specifications of STEVAL-ISA204V1

| Electrical specifications | Range / Value |
|---------------------------|---------------|
| Input voltage range       | 42 – 56 V DC  |
| Output voltage            | 5 V           |
| Output current            | 20 A          |
| Total output power        | 100 W         |
| Maximum efficiency        | > 94 %        |

The STEVAL-ISA204V1 evaluation board attains a maximum efficiency of 94%. The figure below shows the efficiency of the board at different input voltages and load conditions.

**Figure 2.** Efficiency at different load conditions

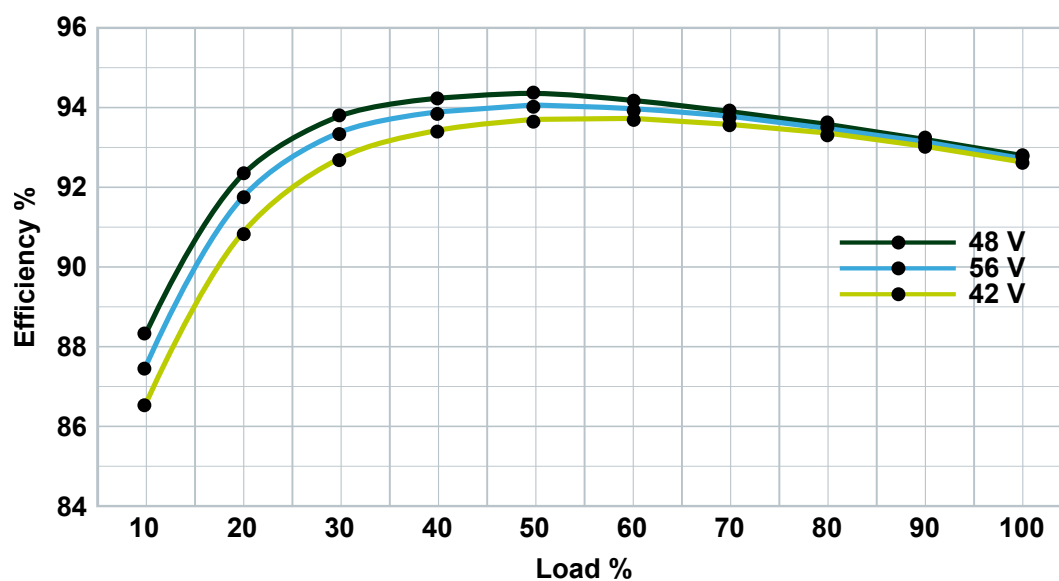


**Table 2.** STEVAL-ISA204V1 MOSFET temperatures at maximum load (20 A)

| Optional Q2 and Q8 | Synchronous rectifier Q1 | Synchronous rectifier Q5 | Forward Converter Q4 |
|--------------------|--------------------------|--------------------------|----------------------|
| unmounted          | 84 °C                    | 94.4 °C                  | 74 °C                |
| mounted            | 74 °C                    | 77.8 °C                  | 73 °C                |

### 3 Board layout

Figure 3. STEVAL-ISA204V1 top layer

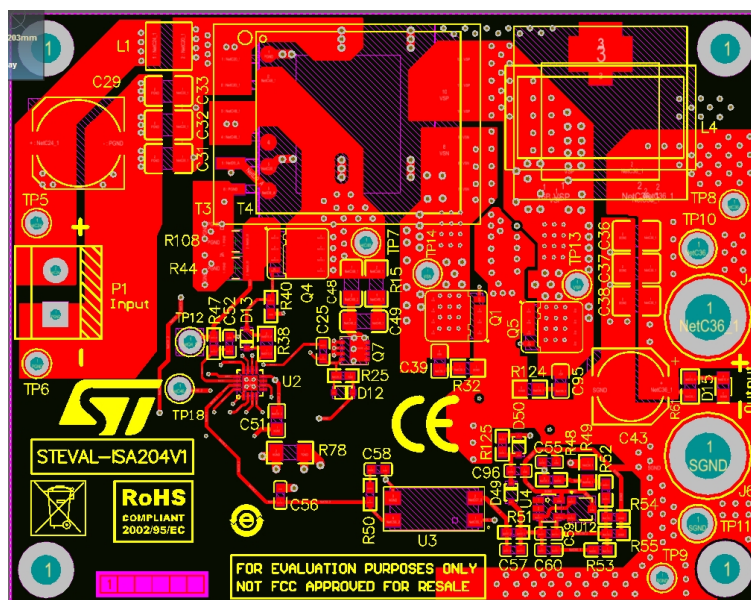
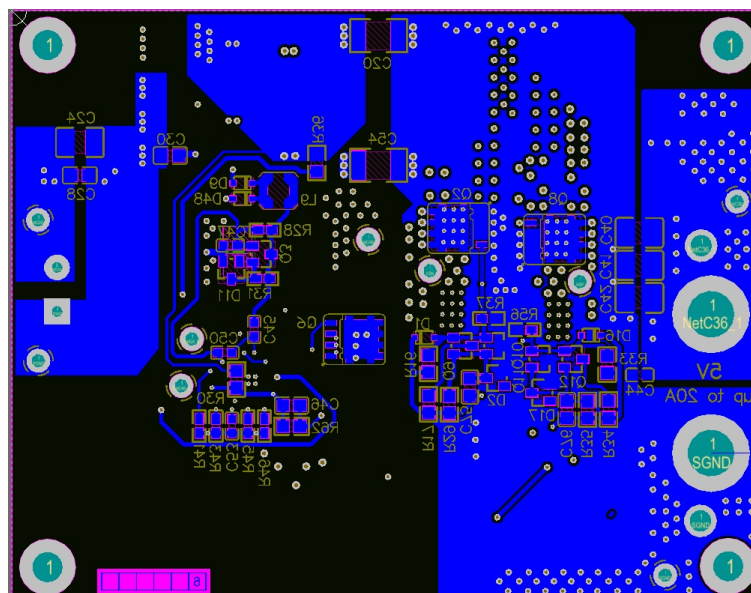
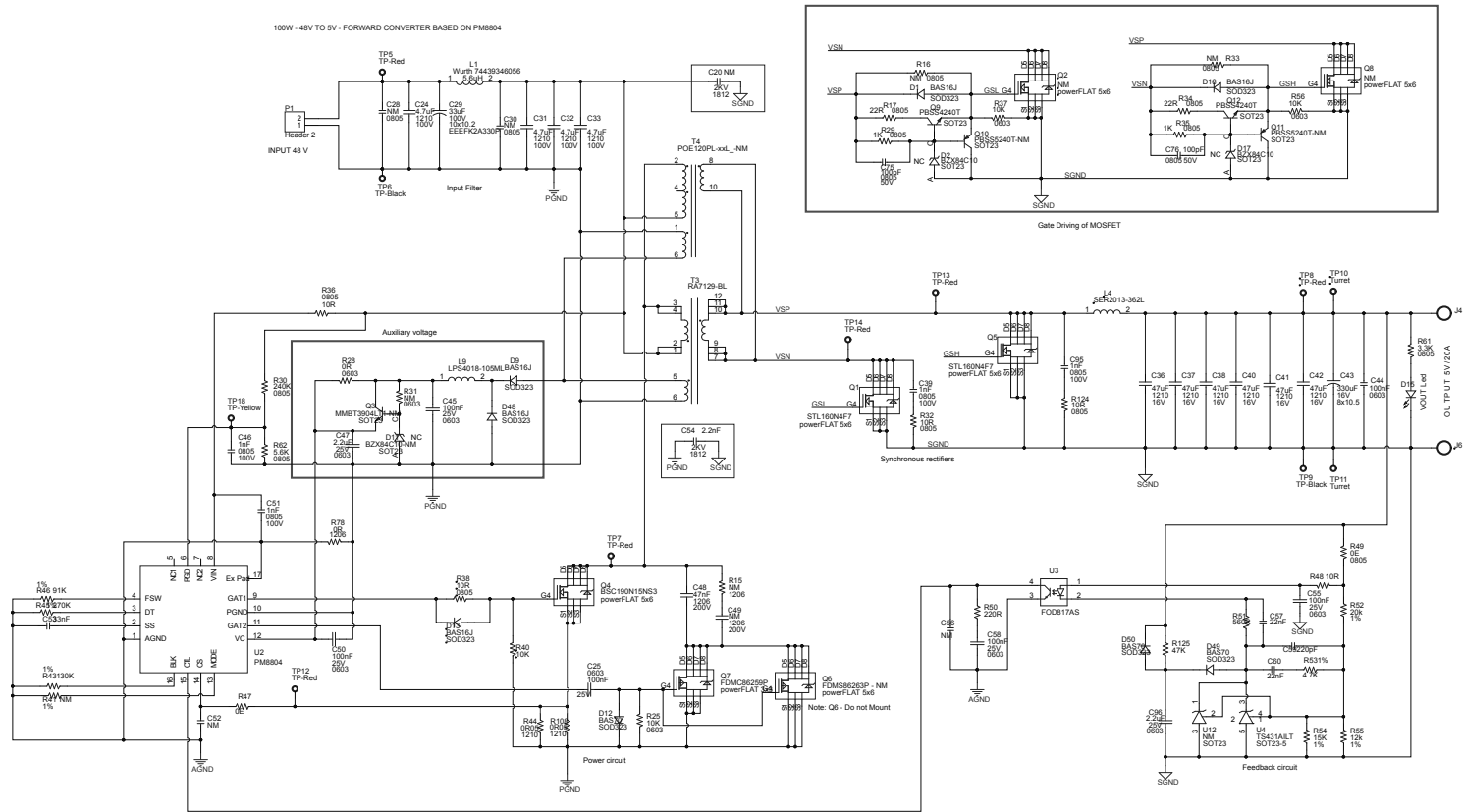


Figure 4. STEVAL-ISA204V1 bottom layer



## Schematic diagram



## Revision history

**Table 3. Document revision history**

| Date        | Version | Changes          |
|-------------|---------|------------------|
| 14-Jun-2019 | 1       | Initial release. |

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