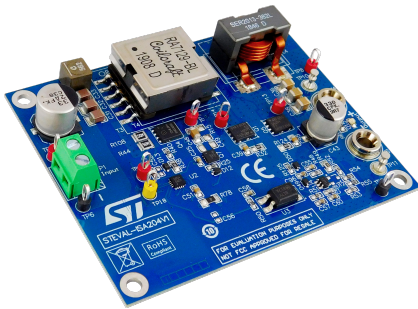


100W 5V/20A active clamp forward converter based on PM8804 for telecom systems



Features

- DC-DC forward converter based on PM8804
- Input voltage range: 42 – 56 V_{DC}
- Switching frequency: 250 kHz
- Output:
 - Power: 100 W
 - Voltage: 5 V_{DC}
 - Current: up to 20 A
- Peak efficiency > 94%
- Open circuit protection
- RoHS compliant
- 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	STEVAL-ISA204V1
PWM peak current mode controller for PoE and telecom systems	PM8804
Application	Server & Telecom Power

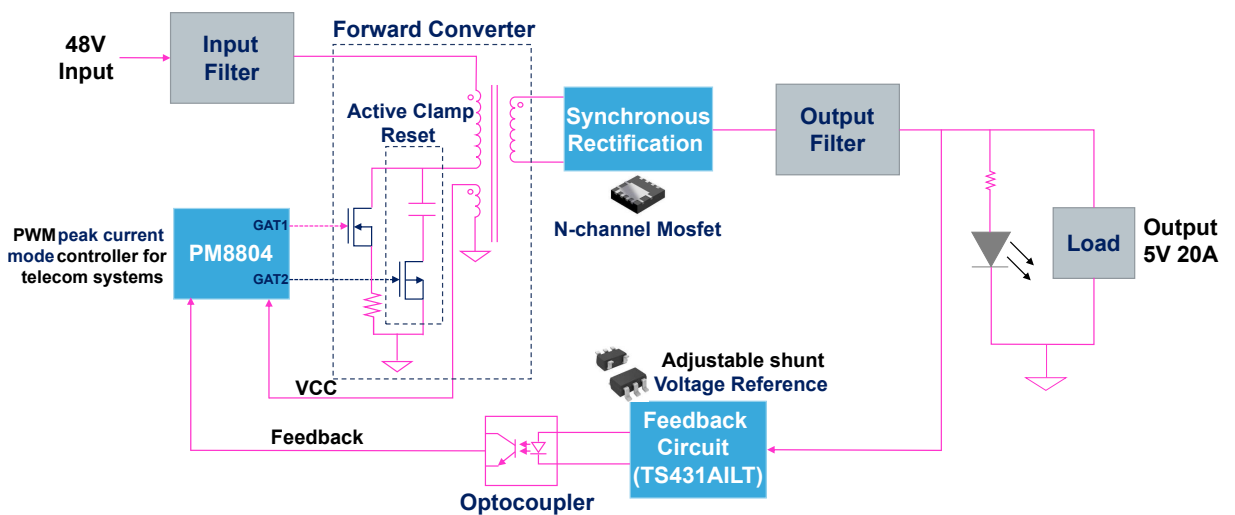
1 Application overview

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

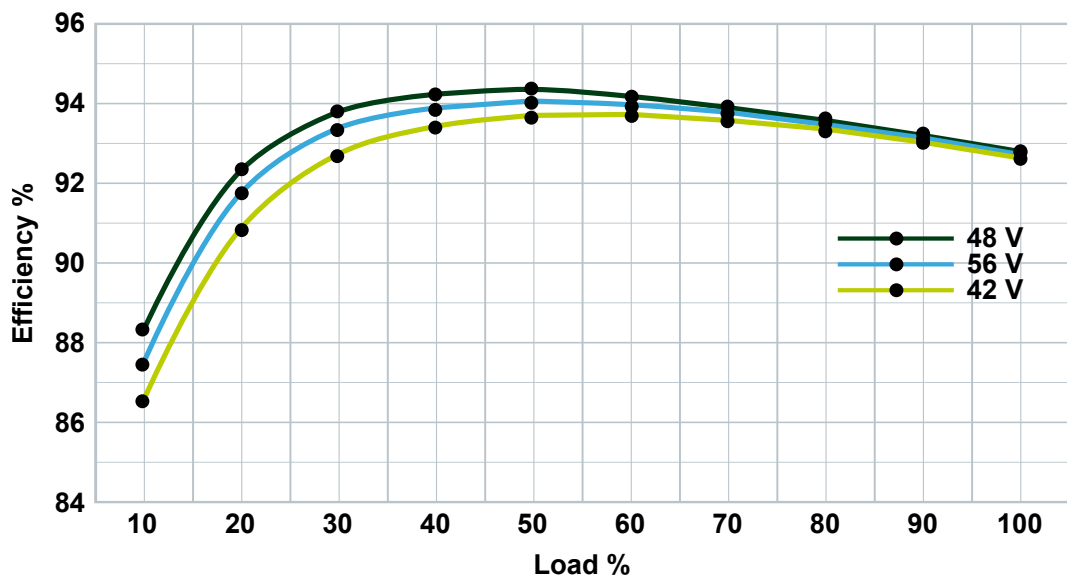


Table 2. STEVAL-ISA204V1 MOSFET temperatures at maximum load (20 A)

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

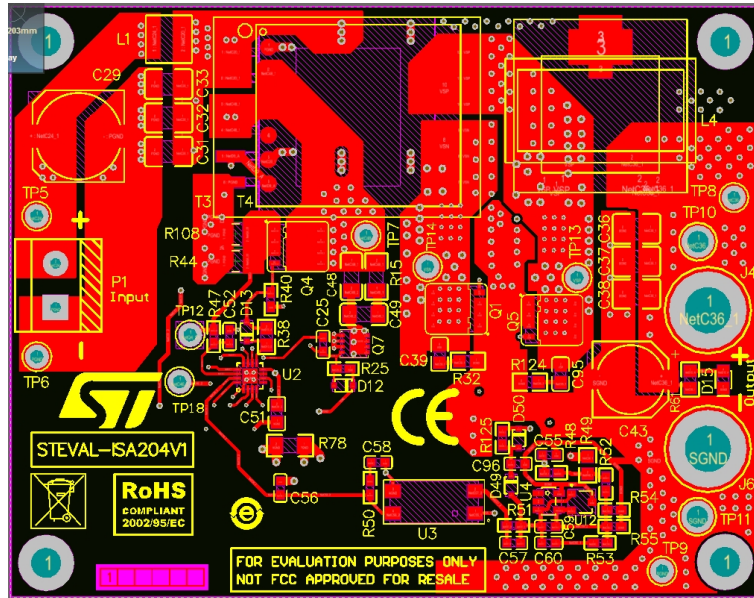
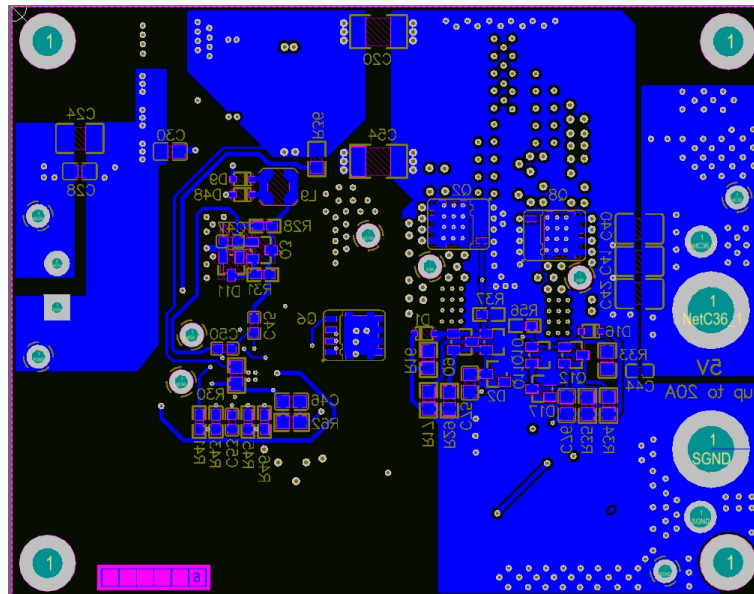


Figure 4. STEVAL-ISA204V1 bottom layer



Revision history

Table 3. Document revision history

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

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