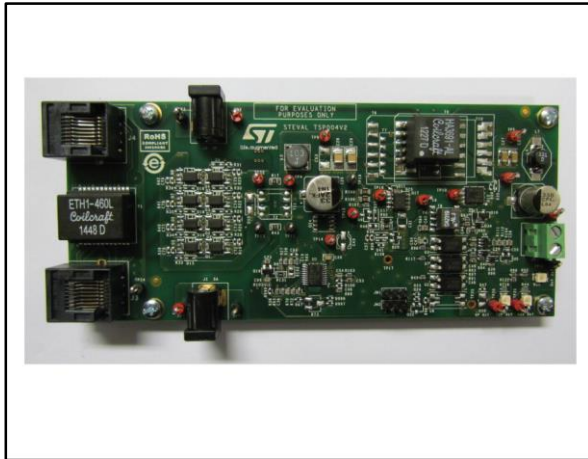


PoE 5 V - 4 A PD converter based on the PM8803 IEEE802.3at compliant synchronous flyback controller

Data brief



Description

The STEVAL-TSP004V2 is a reference design for a PoE+, high-efficiency, 5 V - 4 A flyback converter based on the PM8803 PoE controller. The PM8803 is a highly integrated device embedding an IEEE802.3at-compliant powered device (PD) interface together with a PWM controller and support for auxiliary sources.

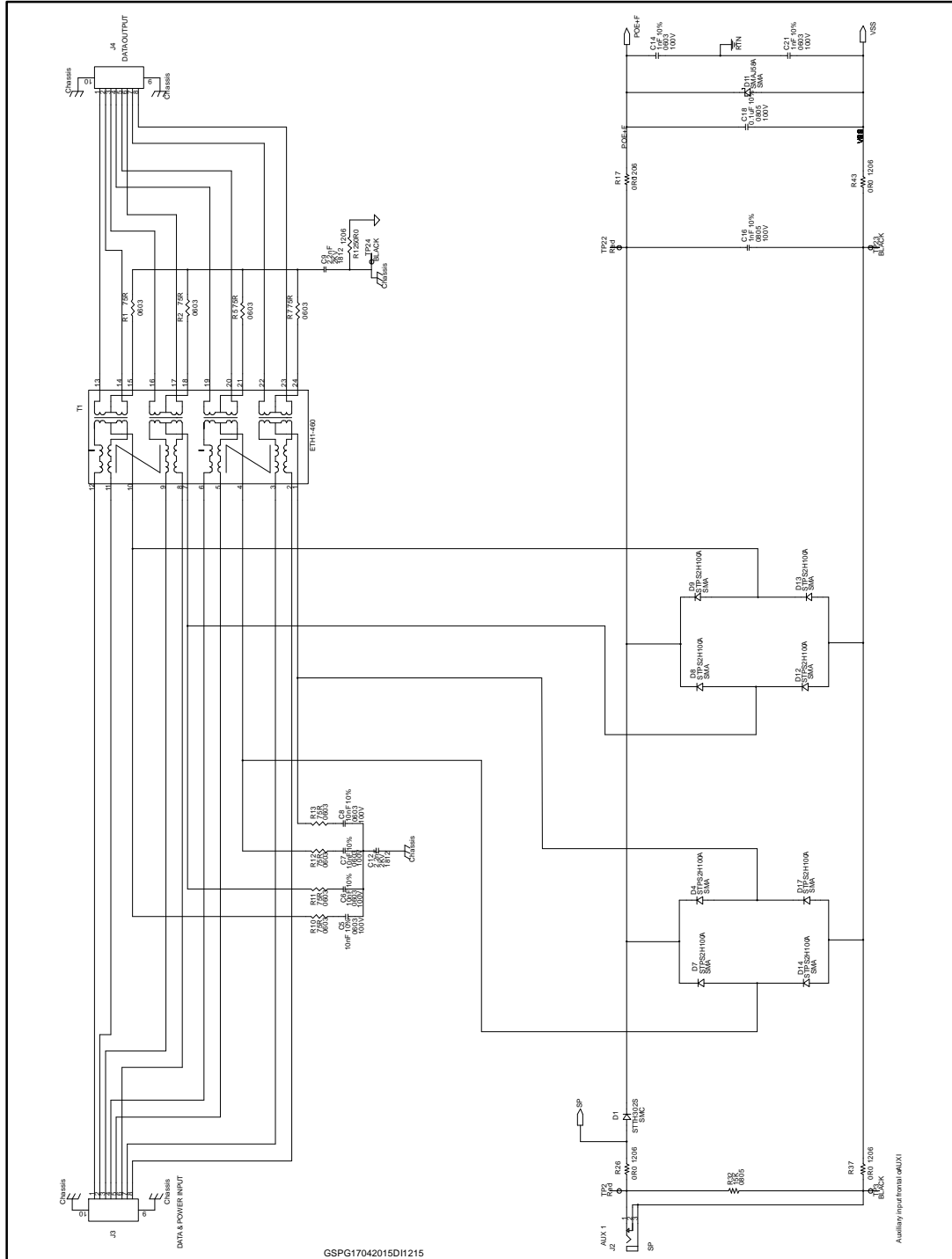
The STEVAL-TSP004V2 reference design is based on an isolated flyback topology CCM converter featuring synchronous rectification with gate driver transformer.

Features

- IEEE 802.3at compliant PD interface
- Works with power supplied from Ethernet LAN cables or from local auxiliary sources
- Line Input voltage range: 40 V_{DC} to 60 V_{DC}
- Output voltage: 5 V_{DC} ± 5%
- Output current: 4 A
- Peak-to-peak output ripple: < 30 mV
- Efficiency DC-DC full-load: > 92%
- Overall peak efficiency: > 89%
- Transient response $\Delta V_{OUTPK-PK}$ to 50% load step: < 170 mV
- ΔV in load line case: < 0.5%
- RoHs compliant

1 Schematic diagrams

Figure 1: STEVAL-TSP004V2 circuit schematic (1 of 2)



2 Detailed description

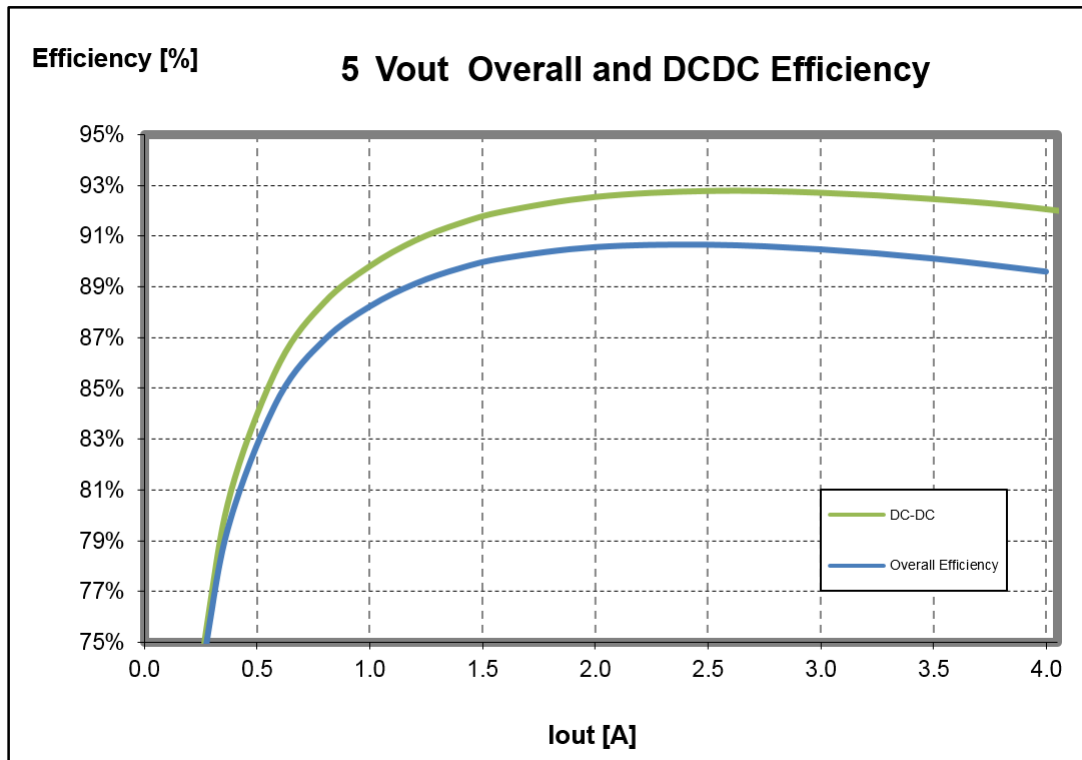
The PM8803 evaluation board, STEVAL-TSP004V2, has been designed to cover a broad range of Power over Ethernet (PoE) applications. The PM8803 is a highly integrated device embedding an IEEE802.3af/at-compliant powered device (PD) interface together with a PWM controller and support for auxiliary sources. Although the PM8803 can be configured to work in several isolated topologies (self-driven or transformer gate-driven), the focus here is on a high-efficiency isolated flyback converter topology with synchronous rectification, 5 V output voltage with 4 A output current capability.

Auxiliary sources can be connected to the board on 2 different input connectors. One input (AUX II) allows prevalence of the auxiliary sources with respect to the PoE, while the other input (AUX I) allows the use of a wall adapter with voltage lower than the internal PoE UVLO threshold, while still benefitting from the inherent inrush and DC current limit. The possible configurations supported by the PM8803 evaluation board as options on the same PCB are:

- Input diode bridges; 4 possible options, including active bridges
- Optional 4-pair detection circuit, to detect a high power PSE source
- Optional booster circuit, to increase the max input current over 800 mA
- Diode or synchronous rectification; 4 package options for diode and 3 package options for MOSFET
- Primary side snubber; 3 options including active clamp
- Power transformer; 3 size options for transformer gate-driven solutions and 2 size options for self-driven applications

3 Efficiency

Figure 3: Efficiency



4 Revision history

Table 1: Document revision history

Date	Version	Changes
24-Apr-2015	1	Initial release.

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