

Power over Ethernet - PD converter with 3.3 V 3 A output, standard IEEE 802.3af compliant

Data brief



Description

This document focuses on a reference design for a simple, low cost 3.3 V 3 A flyback converter based on the PM8800A device.

The PM8800A is a highly integrated device embedding an IEEE 802.3af compliant “Powered Device” (PD) interface together with a PWM controller.

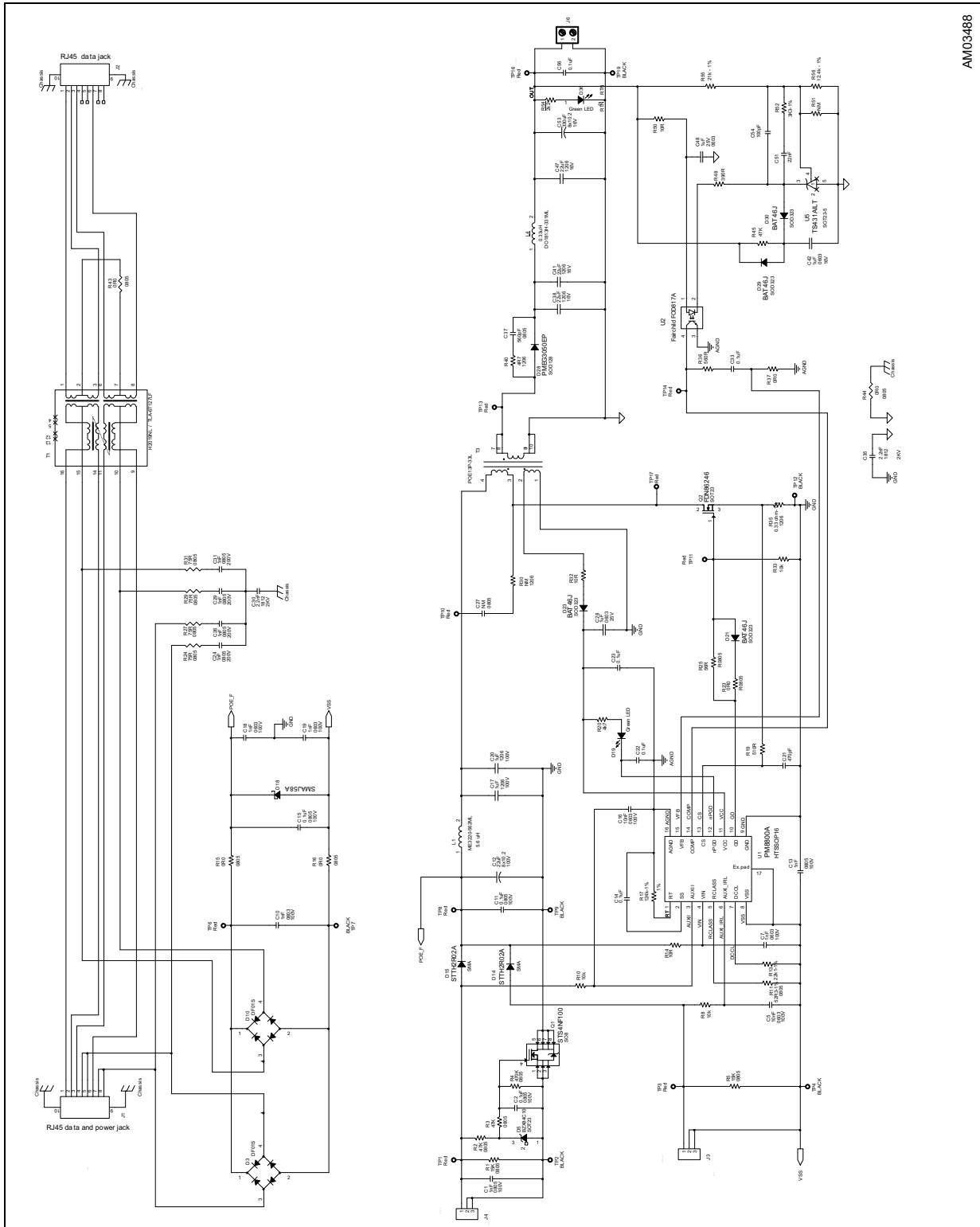
It can be successfully used in all low power, low cost PoE applications.

Features

- IEEE 802.3af compliant PD interface
- Works with power supplied from Ethernet LAN cables or from local auxiliary sources
- Line input voltage range: 40 Vdc to 60 Vdc, output voltage: 3.3 Vdc \pm 5%
- Output current: 3 A
- Peak-to-peak output ripple: 30 mV
- Efficiency DC-DC full-load: > 83%
- Efficiency overall peak: > 80%
- Transient response $\Delta V_{out, pk-pk}$ to 50% load step: < 400 mV_{pp}
- ΔV in load line case: < 0.5%

1 Electrical diagram

Figure 1. STEVAL-TSP006V2 demonstration board: electrical schematic



AM03488



2 Introduction

This document details the characteristics and performances of the PM8800A demonstration kit STEVAL-TSP006V2 which has been designed to cover a broad range of power over ethernet (PoE) applications.

The PM8800A is a highly integrated device embedding an IEEE 802.3af compliant powered device (PD) interface together with a PWM controller and support for auxiliary sources.

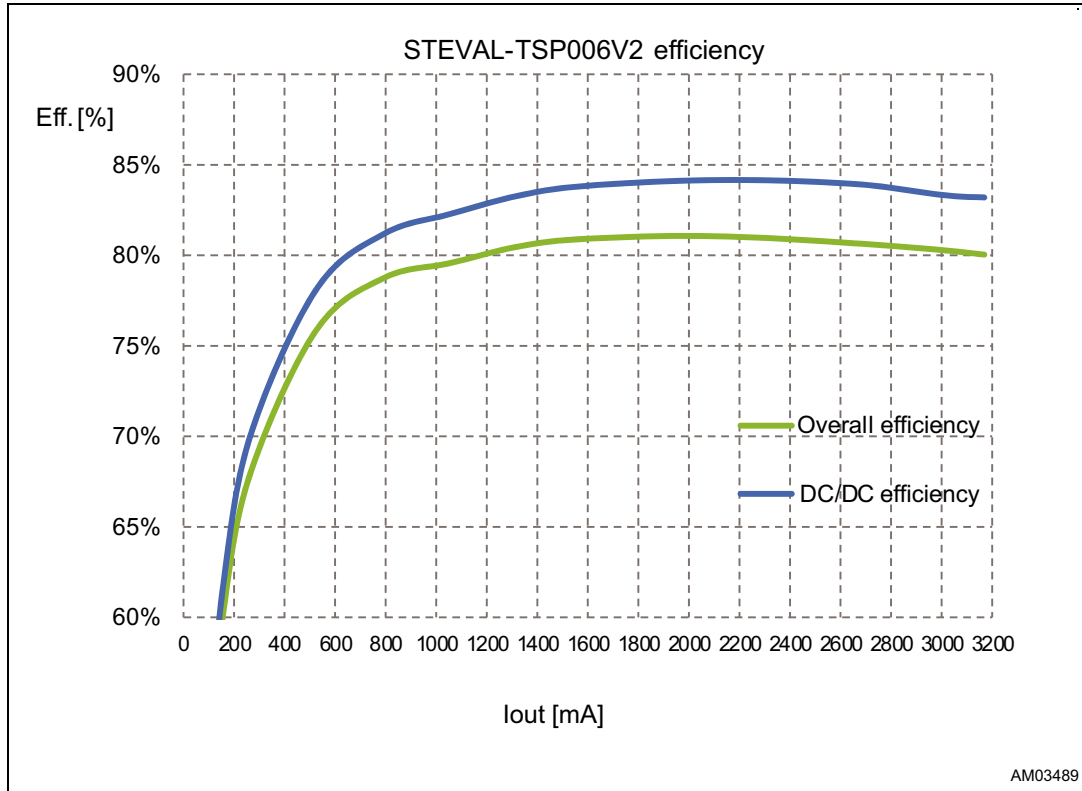
Even though the PM8800A can be configured to work in both isolated and non-isolated topologies, single or double output; this document focuses on a low cost isolated flyback converter topology with diode rectification, 3.3 V output voltage with an up to 3 A output current capability.

Auxiliary sources can be connected to the board on 2 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 usage of a wall adaptor with voltage lower than the internal PoE UVLO threshold and still benefits from the inherent inrush and DC current limit.

The above mentioned configurations are all supported by the PM8800A demonstration kit as options on the same PCB.

3 Efficiency

Figure 2. STEVAL-TSP006V2 overall and DC/DC efficiency



4 References

1. PM8800A - datasheet - "Integrated IEEE 802.3af compliant PoE-PD interface and PWM controller with support of external source".
2. AN4415 - "Power over Ethernet - PD converter with 3.3 V 3 A output, standard IEEE 802.3af compliant".

5 Revision history

Table 1. Document revision history

Date	Revision	Changes
30-May-2014	1	Initial release.

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

ST PRODUCTS ARE NOT DESIGNED OR AUTHORIZED FOR USE IN: (A) SAFETY CRITICAL APPLICATIONS SUCH AS LIFE SUPPORTING, ACTIVE IMPLANTED DEVICES OR SYSTEMS WITH PRODUCT FUNCTIONAL SAFETY REQUIREMENTS; (B) AERONAUTIC APPLICATIONS; (C) AUTOMOTIVE APPLICATIONS OR ENVIRONMENTS, AND/OR (D) AEROSPACE APPLICATIONS OR ENVIRONMENTS. WHERE ST PRODUCTS ARE NOT DESIGNED FOR SUCH USE, THE PURCHASER SHALL USE PRODUCTS AT PURCHASER'S SOLE RISK, EVEN IF ST HAS BEEN INFORMED IN WRITING OF SUCH USAGE, UNLESS A PRODUCT IS EXPRESSLY DESIGNATED BY ST AS BEING INTENDED FOR "AUTOMOTIVE, AUTOMOTIVE SAFETY OR MEDICAL" INDUSTRY DOMAINS ACCORDING TO ST PRODUCT DESIGN SPECIFICATIONS. PRODUCTS FORMALLY ESCC, QML OR JAN QUALIFIED ARE DEEMED SUITABLE FOR USE IN AEROSPACE BY THE CORRESPONDING GOVERNMENTAL AGENCY.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2014 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com

