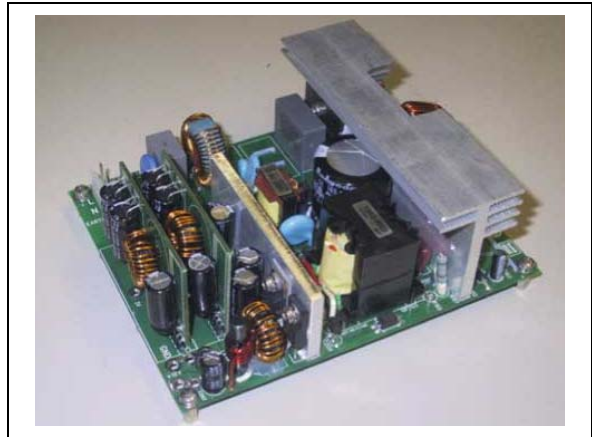


## 250 W ATX SMPS demonstration board

Data brief

### Features

- Input mains range:
  - Vin: 88 ~ 264 Vrms
  - Frequency: 45 ~ 66 Hz
- Outputs:
  - +12 Vdc  $\pm$  2% - 13.5 A
  - +5 Vdc  $\pm$  2% - 12 A
  - +3.3 Vdc  $\pm$  2% - 8 A
  - +5 Vstby  $\pm$  2% - 2 A
- Stand-by consumption: < 0.2 W
- Protections:
  - Short-circuit
  - Overload
  - Output overvoltage
  - Brownout
- PCB type and size:
  - FR4
  - Double side CU 70 $\mu$ m
  - 148 x 120 mm
- Safety: according to EN60950
- EMI: according to EN55022 - class B



### Description

The EVL250W-ATX80PL is a demonstration board of a 250 W power supply unit that implements an ATX like (multiple output configuration) or a server like (single output configuration) design.

The EVL250W-ATX80PL has been certified by ECOS Consulting committee compliant to the 80 PLUS<sup>®</sup> specifications.

# 1 Instructions

The converter consists of four main blocks:

- a PFC front-end stage using the L6563S PFC controller that generates the +400 V bus voltage.
- an AHB (asymmetrical half bridge) stage using the L6591 ZVS half bridge controller which performs the conversion from the high voltage bus to the +12 V output providing insulation.
- two DC-DC post-regulator stages using the L6727 which obtain the +5 V and +3.3 V outputs from the +12 V bus (for multiple output configuration).
- an auxiliary power supply (stand-by) stage using the VIPer27H in isolated flyback configuration that provides the +5 V stand-by output with 10 W power capability.

The PFC stage is realized using a boost topology working in line modulated fixed off time (LM-FOT) mode which offers the advantage of having CCM operation (with lower rms current with respect to TM mode) without the needing to use a complex and expensive controller.

The second stage is an asymmetrical half bridge converter, driven by the L6591, a STMicroelectronics controller dedicated to this topology. This IC integrates all the functions and protections needed by the AHB stage and an interface for the PFC controller. The L6591 includes two gate drivers for the half bridge MOSFETs, a fixed frequency complementary PWM logic with 50% maximum duty cycle with programmable dead time and current mode control technique.

The last stage is the auxiliary power supply that provides the +5V stby output (2 A capability) and the VCC supply for the L6563S and L6591. It is realized with a standard flyback topology operating in CCM/DCM with fixed frequency using the VIPer27H. This stage takes the PFC output voltage as input and it is always working when the mains is plugged. The VIPer27H has all the protections to safely drive the stand-by stage.

The overall efficiency of the board is very high and it is given by the product of the efficiency of each stage, in fact, the multiple output configuration is compliant with 80 PLUS<sup>®</sup> Silver level of efficiency, according to 80 PLUS<sup>®</sup> initiative.

The single output configuration can be obtained from the complete system just removing the two daughter boards that realize the DC-DC post regulation. This configuration can manage the same power of the multi-output board achieving higher level of efficiency with respect to the multiple output one, over performing 80 PLUS<sup>®</sup> Gold level of efficiency.

## 2 Revision history

Table 1. Document revision history

| Date        | Revision | Changes          |
|-------------|----------|------------------|
| 23-Feb-2011 | 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.**

**UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED ST REPRESENTATIVE, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.**

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.

© 2011 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](http://www.st.com)