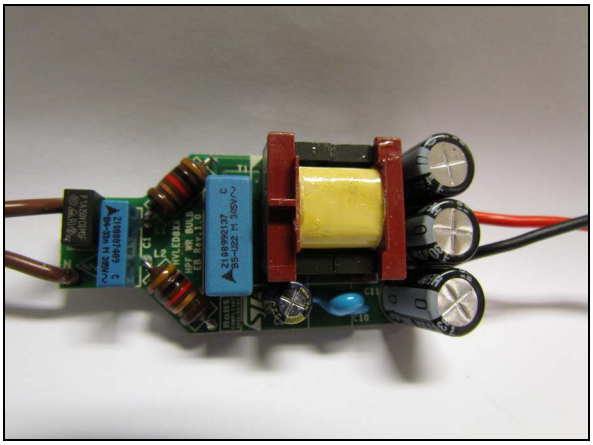
EVLHVLED815W10F

10 W wide-range high power factor – isolated LED driver based on HVLED815PF

Data brief



Features

- 10 W LED driver
- Wide-range input (88 - 265 VAC)
- Isolated solution
- Single stage HPF flyback
- Primary side regulation - no optocoupler
- Power factor > 0.95
- LED driver efficiency > 84%
- THD < 20%

Description

The LED driver board is based on a flyback topology using the STMicroelectronics® HVLED815PF device.

The HVLED815PF device is a high-voltage primary switcher intended for operating directly from the rectified mains with minimum external parts and enabling high power factor (> 0.95) to provide an efficient, compact and cost effective solution for LED driving. It combines a high-performance low voltage PWM controller chip and an 800 V, avalanche rugged Power MOSFET, in the same package. There is no need for the optocoupler thanks to the patented primary sensing regulation (PSR) technique. The device assures protection against LED string fault (open or short).

Board description

Table 1. Electrical specifications

Parameter	Value
Input voltage	88 - 265 VAC
Output LED current	455 mA (typ.) ± 5%
Output LED voltage	22 V (typ.)
Power factor (PF)	> 0.95
Total harmonic distortion (THD)	< 20%
LED driver efficiency	Up to 84%

Figure 1. Jumpers and connectors location

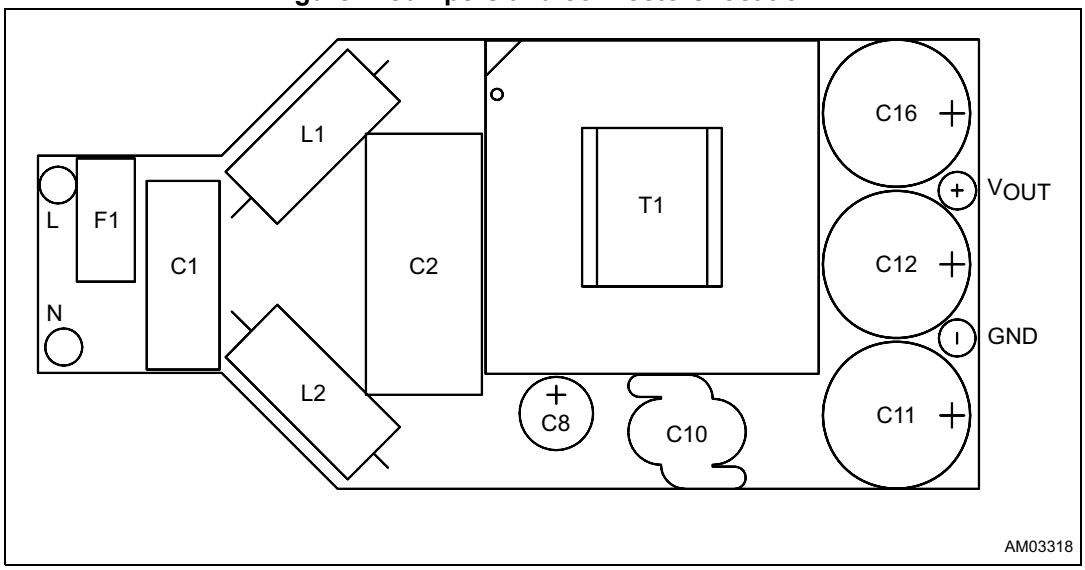


Table 2. Connector A pinout

Name	Type	Function
L	-	Line input voltage
N	-	Line input voltage
V_{OUT}	-	Positive output LED (+)
GND	-	Negative output GND (-)

Figure 2. Schematic

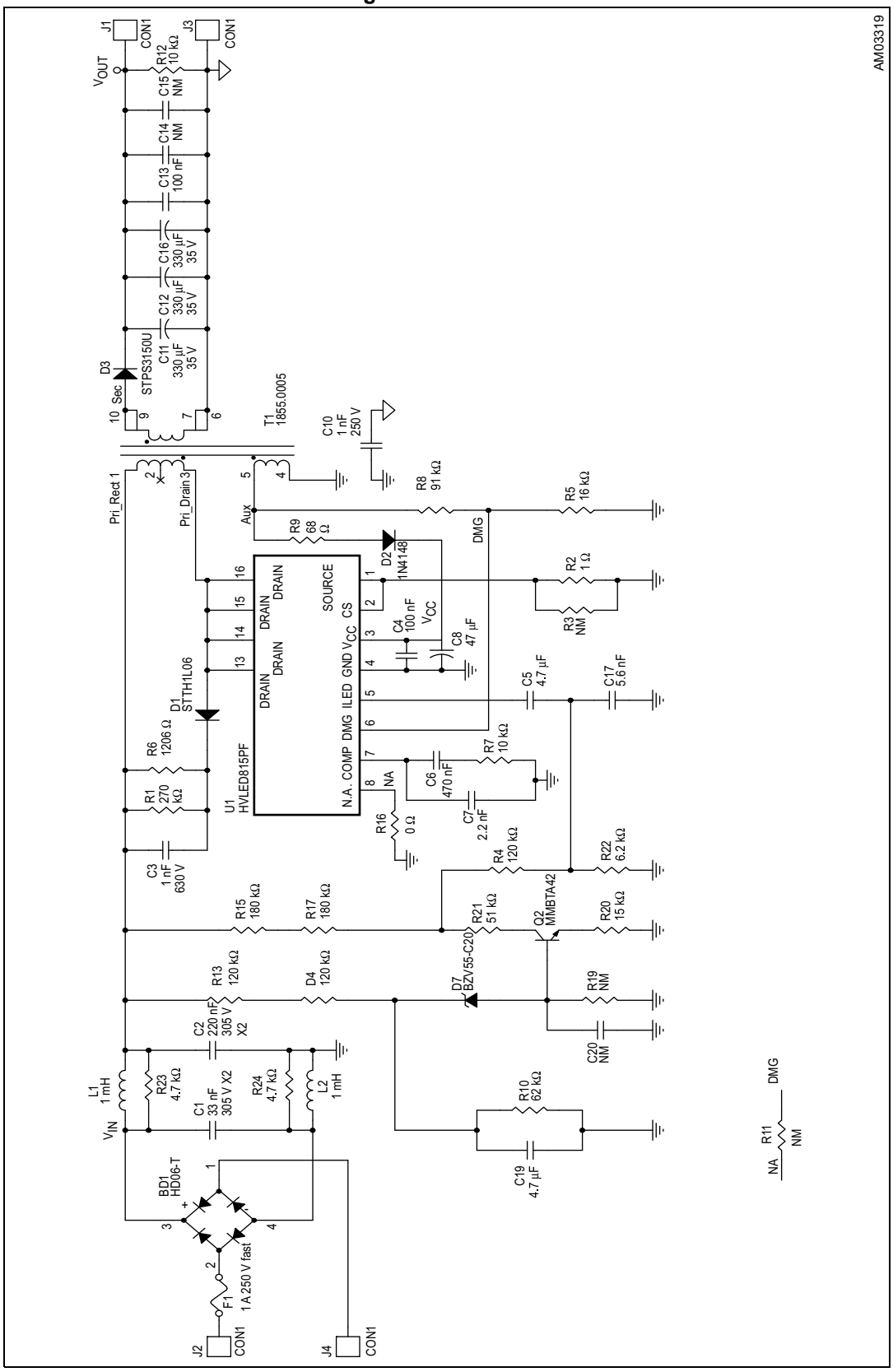


Table 3. Bill of material

Reference	Value	Description
BD1	HD06-T	600 V 0.8 A
C1	B32921C3333M	33 nF X2 305 V
C2	B32922C3224M	220 nF X2
C3	C3216X7R2J102K115AA	1 nF
C4	C0805C104K5RACTU	100 nF
C5	C0805C475K3PACTU	4.7 µF
C6	C0805C474K3RACTU	470 nF
C7	GRM2165C1H222JA01D	2.2 nF
C8	EEUFR1H470	47 µF 50 V 105 °C
C10	DE1E3KX102MN5A	1 nF X1 Y1 250 V
C11, C12, C16	UHE1V331MPD	330 µF 35 V 105 °C LL LOW ESR
C13	C1206C104K5RACTU	100 nF
C17	GRM2195C1H562JA01D	5.6 nF
C19	UMK316BJ475KL-T	4.7 µF
D1	STTH1L06U	600 V 1 A SMB
D2	1N4148W-V-GS08	75 V 150 mA
D3	STPS3150U	150 V 3 A SMB
D4	CRCW1206120KFKEA	100 kΩ
D7	BZV55-C20	Zener 20 V 500 mW
F1	MCMSF 1 A 250 V	Fuse 1 A 250 V
L1, L2	B82145A1105J000	1 mH 370 mA
Q2	MMBTA42	NPN
R1	CRCW1206270KFKEA	270 kΩ 1/4 W
R2	CRCW12061R00FKEA	1 Ω
R4	CRCW0805120KFKEA	120 kΩ
R5	CRCW080516K0FKEA	16 kΩ
R7, R12	CRCW080510K0FKEA	10 kΩ
R8	CRCW080591K0FKEA	91 k Ω
R9	CRCW080568R0FKEA	68 Ω
R10	CRCW080562K0FKEA	62 k Ω
R13	CRCW1206120KFKEA	120 kΩ 1/4 W
R15, R17	WCR1206-180KFI	180 kΩ 1/4 W
R16	CRCW06030000Z0EA	0 Ω
R20	CRCW080515K0FKEA	15 kΩ 1/8 W
R21	CRCW080551K0FKEA	51 kΩ 1/8 W

Table 3. Bill of material (continued)

Reference	Value	Description
R22	CRCW08056K20FKEA	6.2 kΩ 1/8 W
R23, R24	CRCW08054K70FKEA	4.7 kΩ 1/8 W
T1	1855.0005 Magnetica	Transformer flyback 10 W L_p = 1.5 mH N_p = 190 N_s = 42 N_{AUX} = 24 core EF20
U1	HVLED815PF	Offline LED driver HVLED815PF SO16

Figure 3. Layout (top layer)

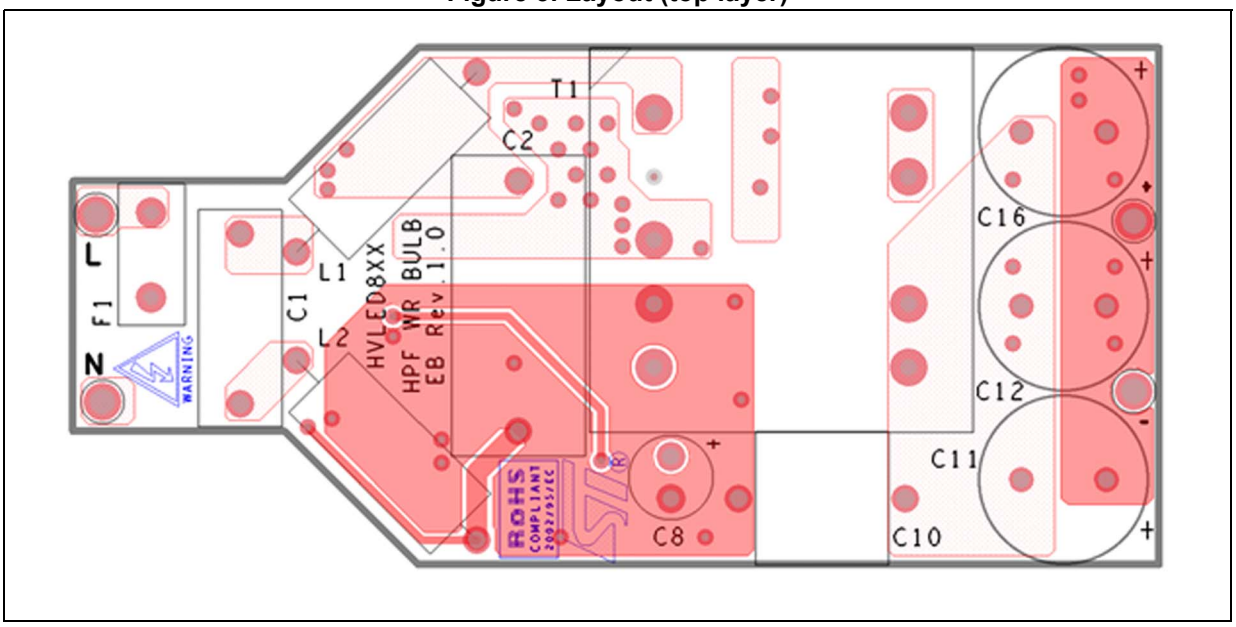
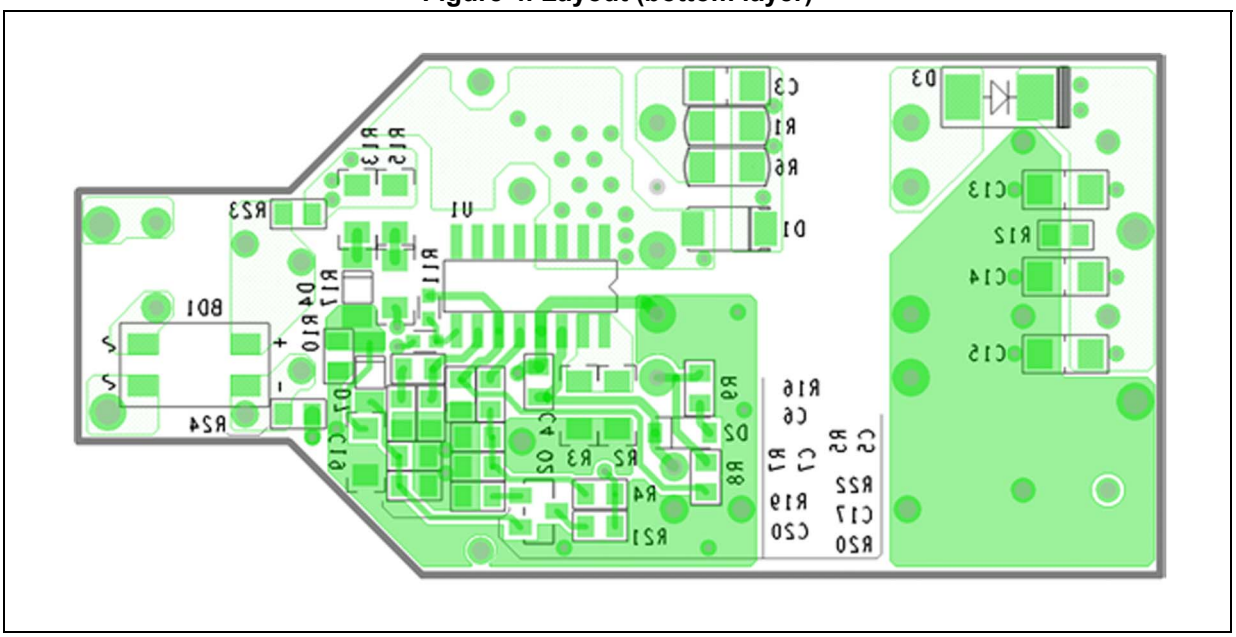


Figure 4. Layout (bottom layer)



Revision history

Table 4. Document revision history

Date	Revision	Changes
23-Sep-2013	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.

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

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

STMicroelectronics:
EVLHVLED815W10F