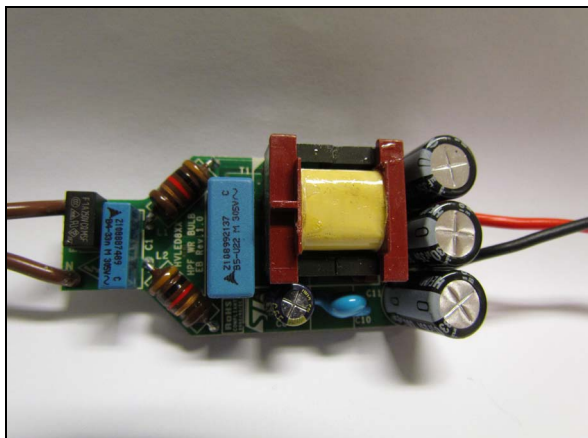

10 W wide-range high power factor – isolated LED driver based on HVLED815PF

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

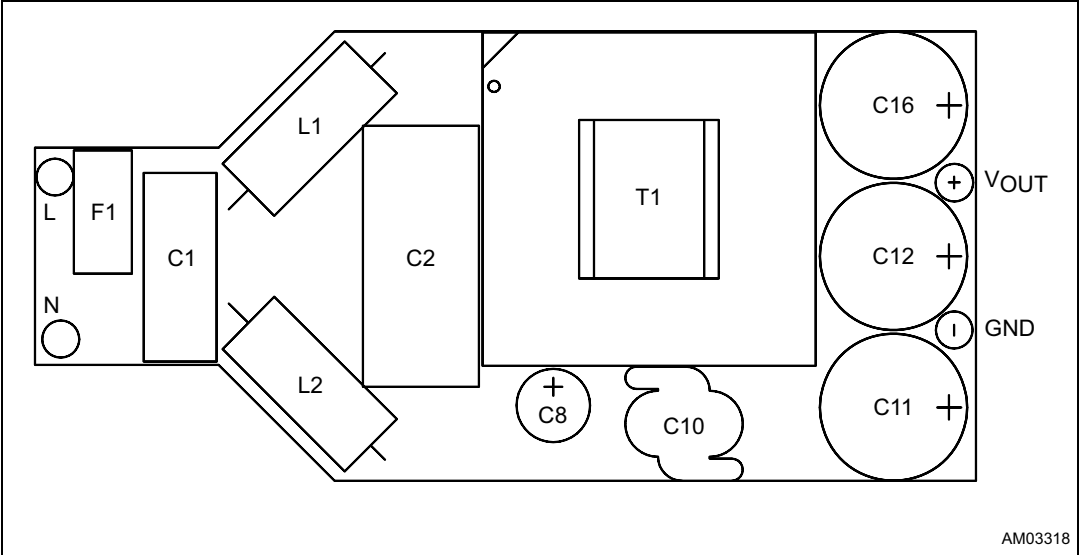


Table 2. Connector A pinout

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

Figure 2. Schematic

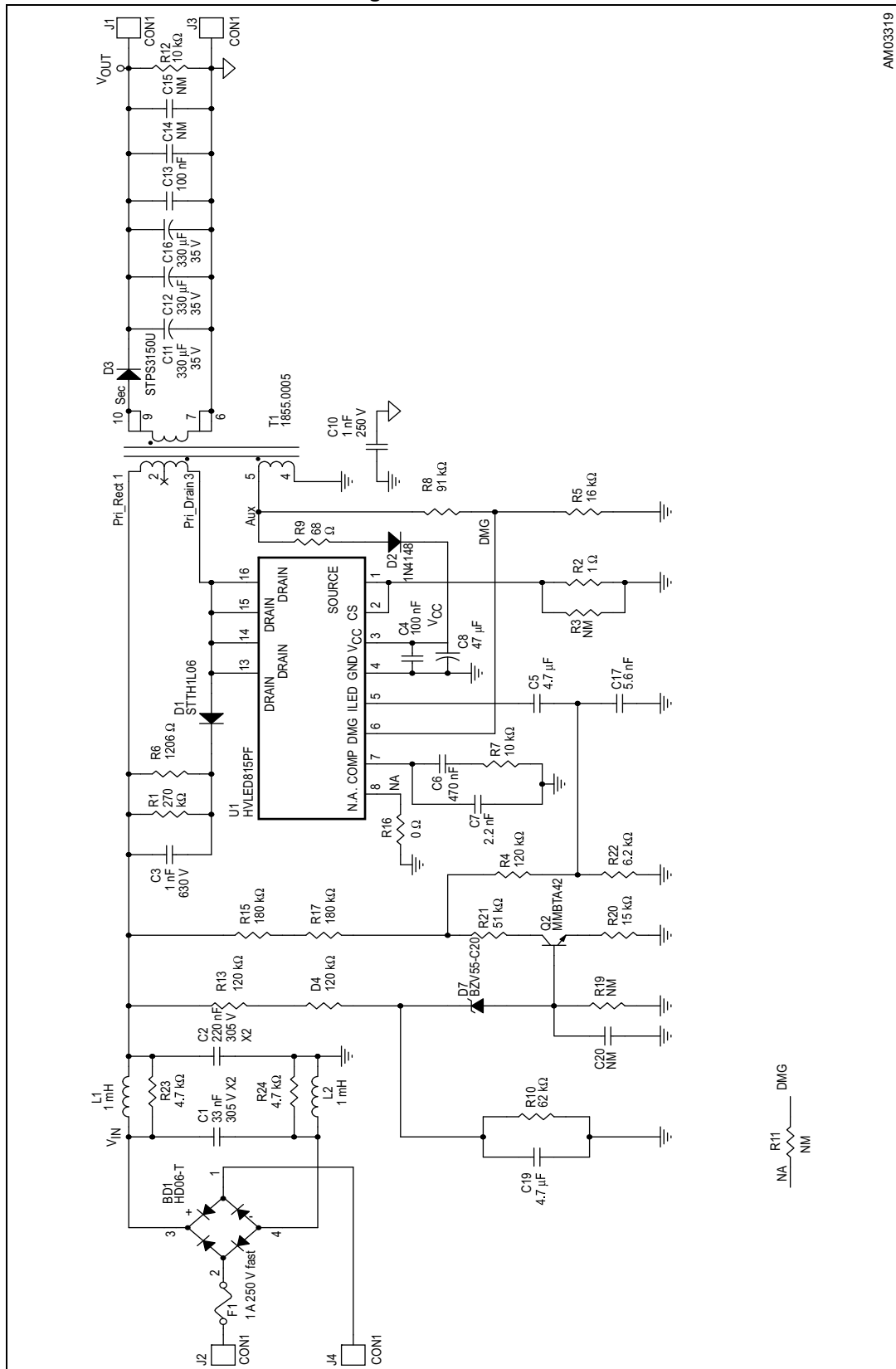


Table 3. Bill of material

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 μ F
C6	C0805C474K3RACTU	470 nF
C7	GRM2165C1H222JA01D	2.2 nF
C8	EEUFR1H470	47 μ F 50 V 105 °C
C10	DE1E3KX102MN5A	1 nF X1 Y1 250 V
C11, C12, C16	UHE1V331MPD	330 μ F 35 V 105 °C LL LOW ESR
C13	C1206C104K5RACTU	100 nF
C17	GRM2195C1H562JA01D	5.6 nF
C19	UMK316BJ475KL-T	4.7 μ F
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 k Ω
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 k Ω 1/4 W
R2	CRCW12061R00FKEA	1 Ω
R4	CRCW0805120KFKEA	120 k Ω
R5	CRCW080516K0FKEA	16 k Ω
R7, R12	CRCW080510K0FKEA	10 k Ω
R8	CRCW080591K0FKEA	91 k Ω
R9	CRCW080568R0FKEA	68 Ω
R10	CRCW080562K0FKEA	62 k Ω
R13	CRCW1206120KFKEA	120 k Ω 1/4 W
R15, R17	WCR1206-180KFI	180 k Ω 1/4 W
R16	CRCW06030000Z0EA	0 Ω
R20	CRCW080515K0FKEA	15 k Ω 1/8 W
R21	CRCW080551K0FKEA	51 k Ω 1/8 W

Table 3. Bill of material (continued)

Reference	Value	Description
R22	CRCW08056K20FKEA	6.2 k Ω 1/8 W
R23, R24	CRCW08054K70FKEA	4.7 k Ω 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)

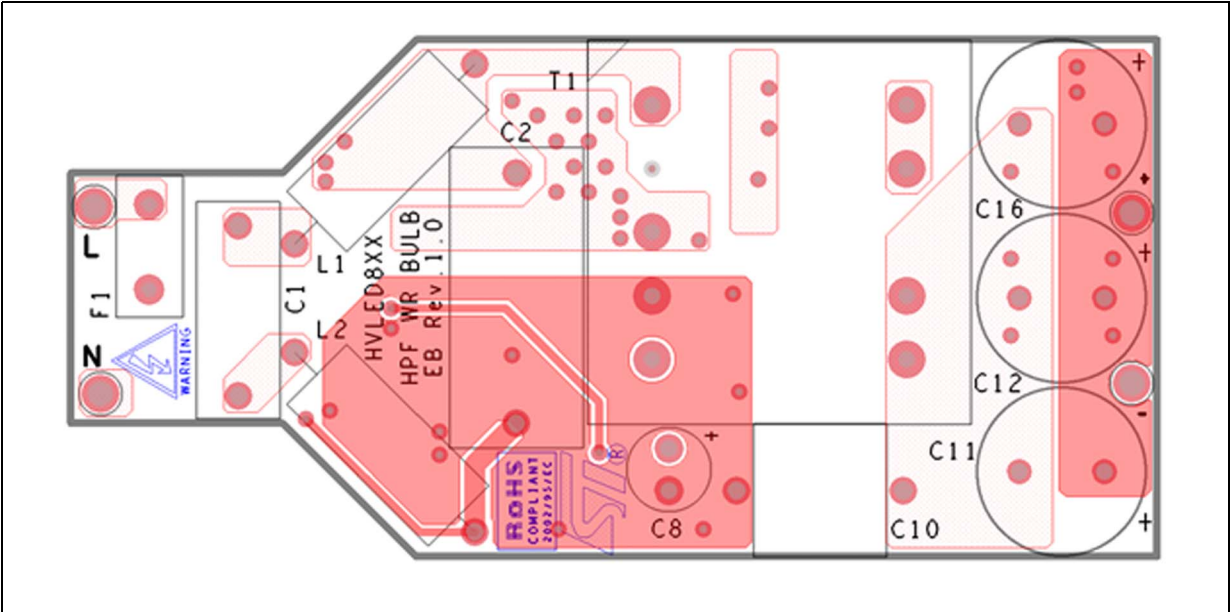
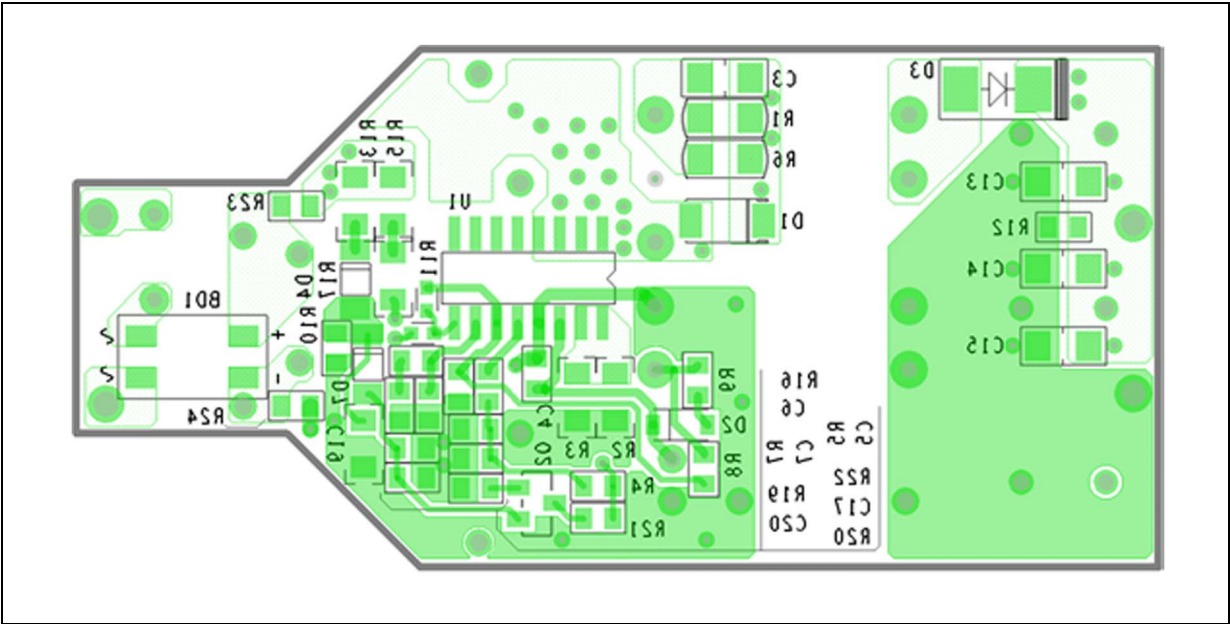


Figure 4. Layout (bottom layer)



Revision history

Table 4. Document revision history

Date	Revision	Changes
23-Sep-2013	1	Initial release.



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