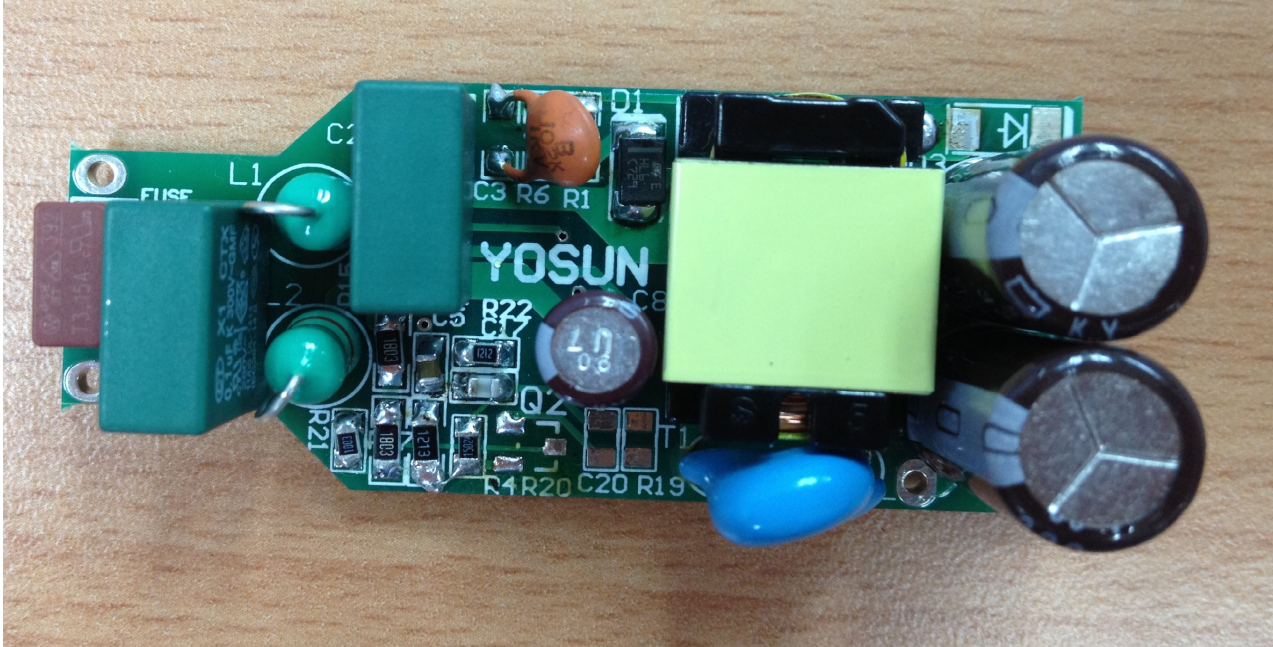




10W Wide Range - High power Factor - Isolated LED Driver
 using HVLED815PF

Yosung HVLED815WPF demo board



1.INTRODUCTION

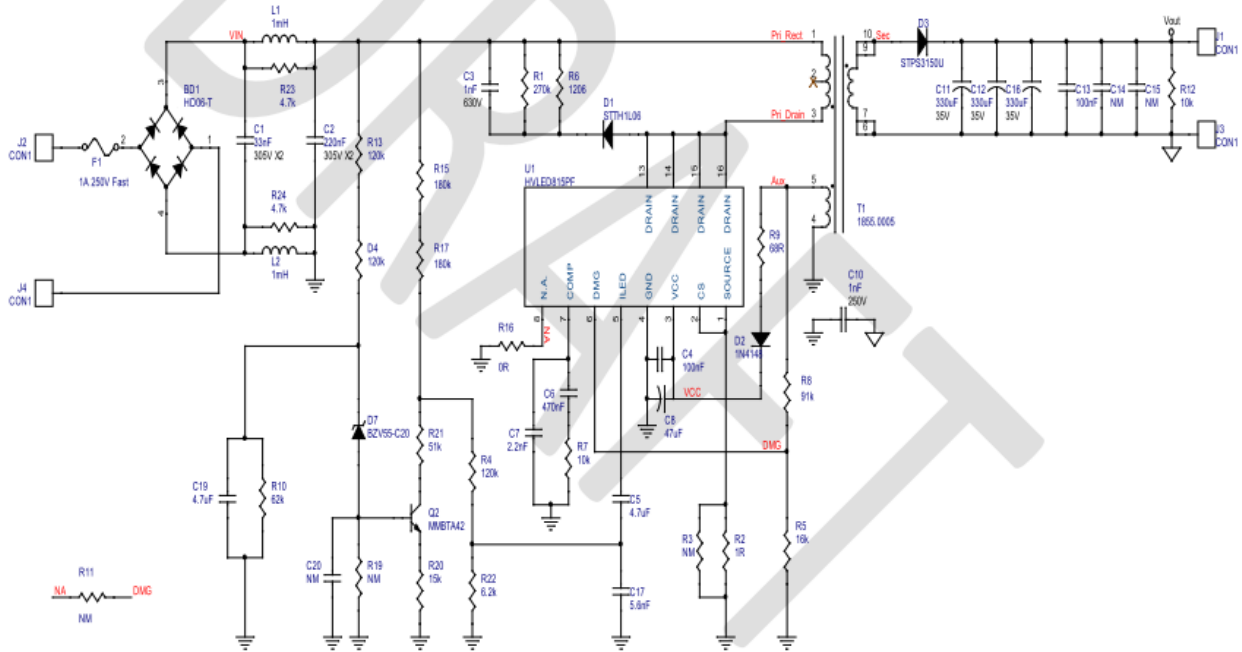
This application note describes the performances of an isolated 10 W, wide- range, regulated LED driver using HVLED815PF, with high power factor and constant output current regulation. Main input specifications are:

- Input Voltage: 88Vac-265Vac
- Isolated solution (Flyback topology)
- Output Power: 10W (nominal load)
- Output LEDs voltage (typ): 22V
- Output LEDs current (typ): 455mA
- Power Factor: >0.95
- LED driver efficiency: up to 84%

The architecture is based on a single-stage isolated flyback and it has been used the ST's HVLED815PF with primary-side control to achieve LED current regulation within +/-5% and high power factor.

The form factor has been designed to fit into a standard lighting case making easy the replacement of the incandescent lamp.

2. schematic

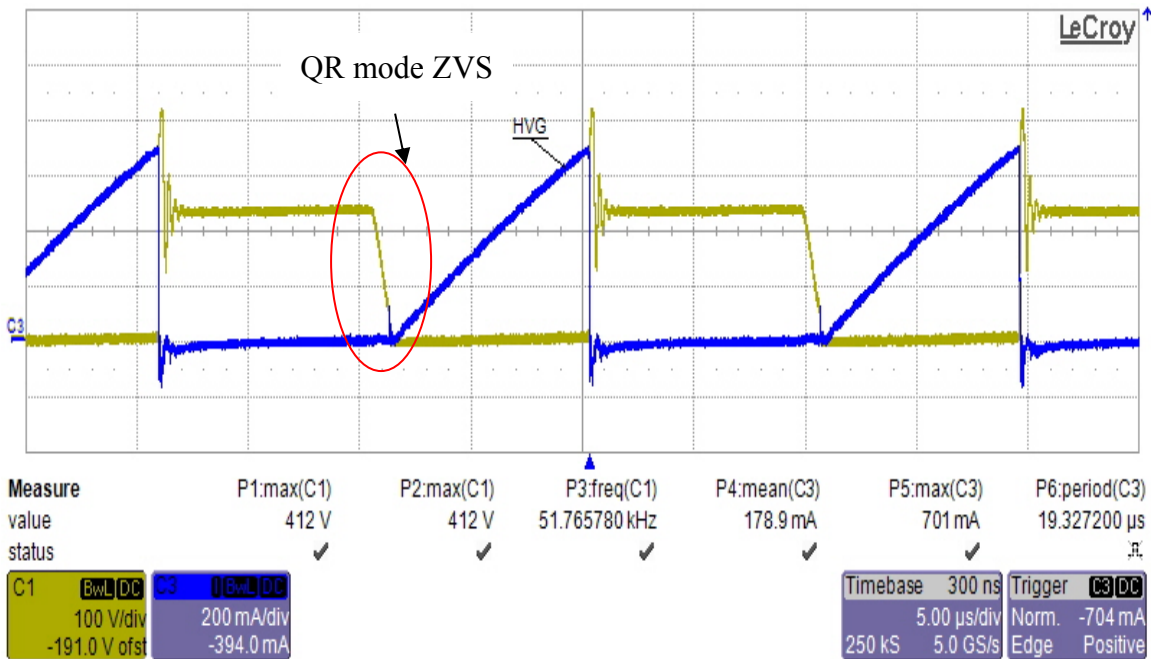


3. Measurement

3.1. Vds/Id waveform

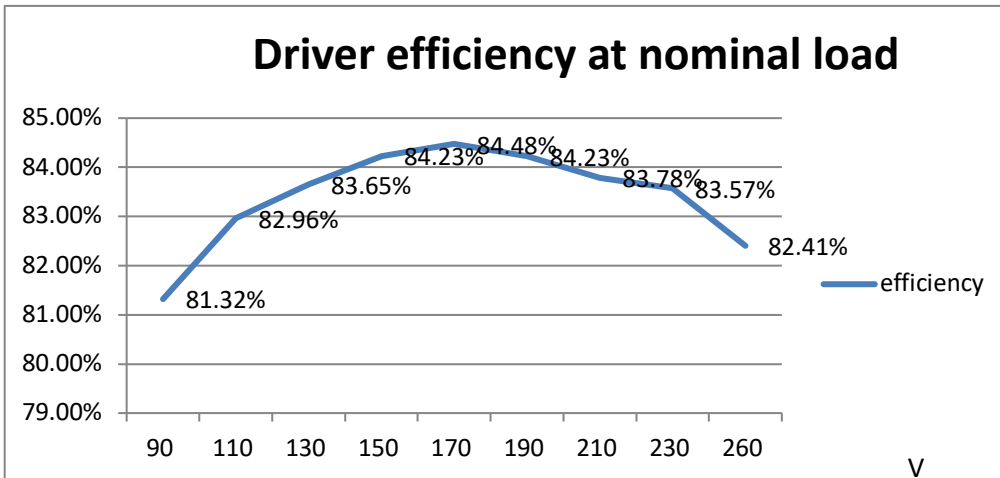
90Vac/10W

CH1:Vds CH3:Id



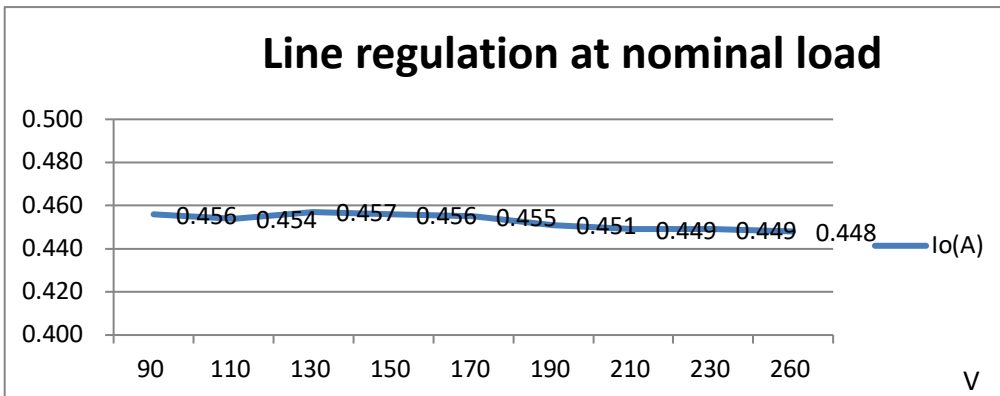
3.2. Efficiency

As shown in the picture the LED driver efficiency is up to 84%.



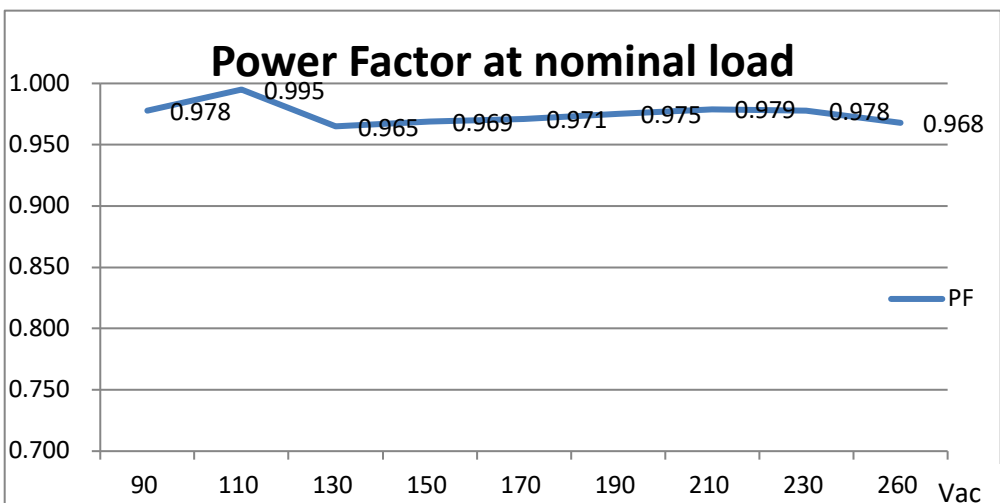
3.3. Regulation

The output current is 455mA +/- 0.5% over all the input voltage range



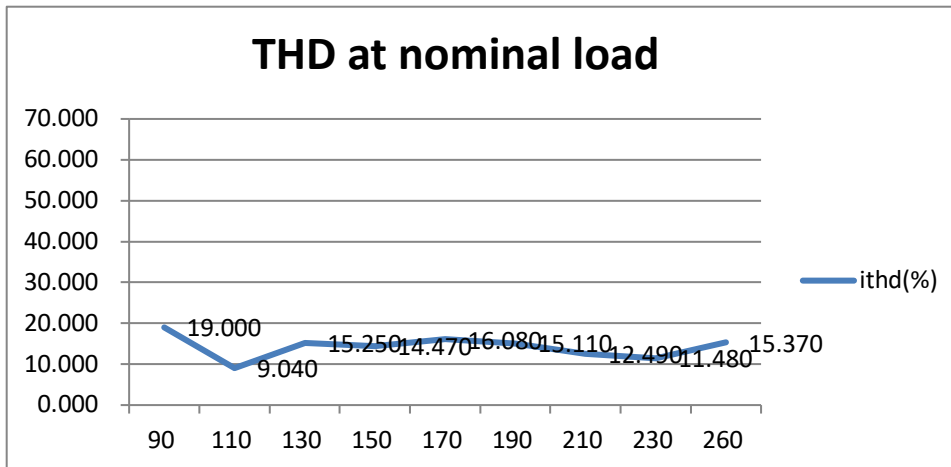
3.4. Power Factor

As shown in the previous picture the Power Factor (PF) is over 0.95 in all the input voltage



3.5. THD

THD at nominal input voltage is lower than 20%.



4.BOM

Ref.	Value	Description
BD1	HD06-T	Diode Bridge HD06-T600V 0.8A
C1	33nF	CAP 33nF nF X2 305V MKP P.10
C2	220nF	CAP 220nF nF X2 305V MKP P.15
C3	1nF	Cap. 1nF ±10% X7R 630V 1206
C4	100nF	Cap. 100nF ±10% X7R 50V 0805
C5	4.7uF	Cap. 4.7uF ±10% X5R 25V 0805
C6	470nF	Cap. 470nF ±10% X7R 25V 0805
C7	2.2nF	Cap. 2.2nF ±5% C0G 50V 0805
C8	47uF	Cap. 47uF ±20% EL. 50V 105°C
C11	560uF/35V	Cap. KZE chemicon
C12	560uF/35V	Cap. KZE chemicon
C13	100nF Cap.	100nF ±10% X7R 50V 1206
C17	5.6nF Cap.	5.6nF ±5% C0G 50V 0805
C19	10uF Cap.	10uF ±10% X5R 50V 1206
D1	STTH1L06	Diode Rect UFAST STTH1L06U 600V 1A SMB
D2	1N4148	Diode Rect. Fast 1N4148 75V 150mA SOD123
D3	STPS3150U	Diode Schottcky STPS3150U 150V 3A SMB
D4	120k Res.	100k 1/4W 1% 100ppm 1206 SMD
D7	BZV55-C20	Zener 20V ±5% 500mW miniMelf
F1	1A 250V	Fast Fuse 1A 250V Fast Radial 8.4mm x7.7mm P5mm Multicom
L1	1mH	Choke RF 1mH 370mA Axial D6.5 L12mm
L2	1mH	Choke RF 1mH 370mA Axial D6.5 L12mm
Q2	MMBTA42	NPN SML SIG G.P. AMP SOT23 STM MMBTA42
R1	270k	Res. 270k 1/4W 1% 100ppm 1206 SMD
R2	1R	Res. 1ohm 1/4W 1% 100ppm 1206 SMD
R4	120k	Res. 120k 1/8W 1% 100ppm 0805 SMD
R5	16k	Res. 16k 1/8W 1% 100ppm 0805 SMD
R7	10k	Res. 10k 1/8W 1% 100ppm 0805 SMD
R12	10k	Res. 10k 1/8W 1% 100ppm 0805 SMD
R8	91k	Res. 91k 1/8W 1% 100ppm 0805 SMD
R9	68R	Res. 68ohm 1/8W 1% 100ppm 0805 SMD
R10	62k	Res. 62k 1/8W 1% 100ppm 0805 SMD
R13	120k	Res. 120k 1/4W 1% 100ppm 1206 SMD
R15	180k	Res. 180k 1/4W 1% 100ppm 1206 SMD
R16	0R	Res. 0R 0603 SMD
R20	15k	Res. 15k 1/8W 1% 100ppm 0805 SMD
R21	51k	Res. 51k 1/8W 1% 100ppm 0805 SMD
R22	6.2k	Res. 6.2k 1/8W 1% 100ppm 0805 SMD
R23	4.7k	Res. 4.7k 1/8W 1% 100ppm 0805 SMD
R24	4.7k	Res. 4.7k 1/8W 1% 100ppm 0805 SMD
U1	HVLED815PF	Offline LED driver HVLED815PF SO16 STM HVLED815PF

5. Transformer specification

Core: EEE13

Lm : 1.3mH+/-10% (pin3~5)

Layer	S	F	turns	Wires	Tape
N1	3	4	40	0.18mm	N
N2	1	9	17	0.3mm(triple wire)	Y
N3	7	6	10	0.18mm	N
N4	4	5	40	0.2mm	Y

Sch:

