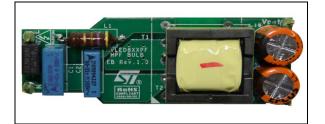


EVLHVLED815W15

15 W high power factor LED driver based on HVLED815PF

Data brief



Features

- 15 W LED driver
- Single stage HPF flyback
- Primary side regulation no optocoupler
- Power factor > 0.95
- LED driver efficiency > 84%
- THD < 20%
- European input range

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 highperformance 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).

August 2013

For further information contact your local STMicroelectronics sales office.

DocID025159 Rev 1

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Board description

Table 1. Electrical specifications		
Parameter	Value	
Input voltage	220 Vac +/- 20%	
Output LED current	485 mA (typ.)	
Output LED voltage	30.5 V (typ.)	
Power factor (PF)	> 0.95	
Total harmonic distortion (THD)	< 20%	
LED driver efficiency	> 84%	

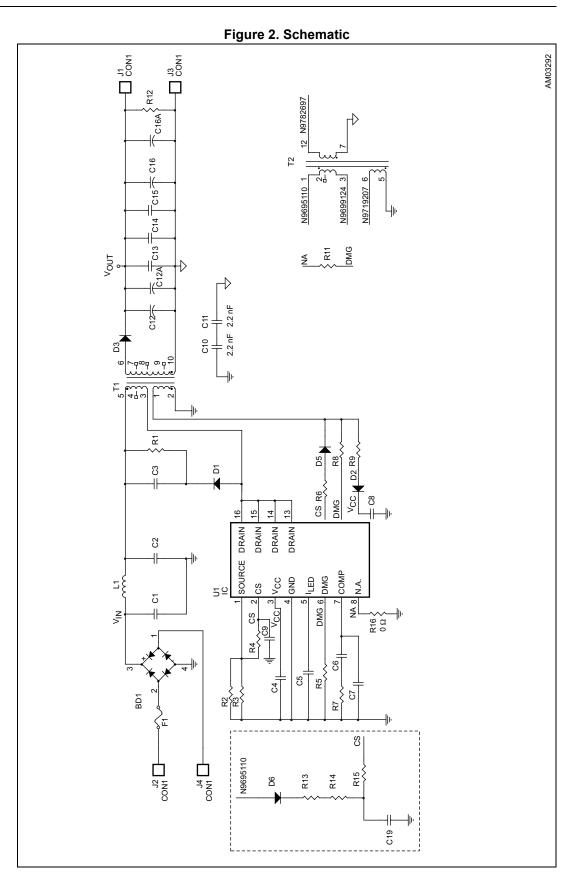
V _{OUT} GND	
	AM03293

Figure 1.	Jumpers	and	connectors	location
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 Table 2. Connector A pinout

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







Part reference Part value Part description BD1 HD06-T 600 V - 0.8 A C1 B32921C3333 47 n F - X2 C2 B32921C3333 47 n F - X2 C3 C3216X7R2J222K 2.2 n F - 630 V - X7R C4 C2012X6R1E106K 10 μ F - 25 V - X5R C5 C1608X5R1A106K 10 μ F - 10 V - X5R C6 470 n F - 10 V C C7 1 n F - 25 V C C8 100 n F - 25 V C C68 100 n F - 25 V C C7 1 n F C C10 GA342DR7GF102KW02L 1000 p F - 250 V C11 GA342DR7GF102KW02L 1000 p F - 50 V C12 N.M. C C13 C3216X5R1H106K 10 μ F - 50 V C14 N.M. C C15 C3216X5R1H106K 10 μ F - 50 V - X5R C14 N.M. C C15 C3216X5R1H106K 10 μ F - 50 V - X5R C16 N.M. C	Table 3. Bill of material		
C1 B32921C3473 47 nF - X2 C2 B32921C3333 47 nF - X2 C3 C3216X7R2J222K 2.2 nF - 630 V - X7R C4 C2012X5R1E106K 10 µF - 25 V - X5R C5 C1608X5R1A106K 10 µF - 10 V - X5R C6 470 nF - 10 V C7 1 nF - 25 V C8 100 nF - 25 V C9 1 nF C10 GA342DR7GF102KW02L 1000 pF - 250 V C11 GA342DR7GF102KW02L 1000 pF - 250 V C12 N.M. C12A C13 C3216X5R1H106K 10 µF - 50 V C14 NM. C15 C15 C3216X5R1H106K 10 µF - 50 V - X5R C14 N.M. C16A B4188BD6157M 150 µF - 50 V C19 C2012X5R1H25K 2.2 µF - 50 V - X5R C19 C2012X5R1H25K 2.2 µF - 50 V - X5R D1 STTH1L06A 1 A - 600 V D2 1N4148 100 D6 1N4148 100	Part reference	Part value	Part description
C2 B32921C3333 47 nF - X2 C3 C3216X7R2J222K 2.2 nF - 630 V - X7R C4 C2012X5R1E106K 10 μ F - 25 V - X5R C5 C1608X5R1A106K 10 μ F - 10 V - X5R C6 470 nF - 10 V C7 1 nF - 25 V C8 100 nF - 25 V C9 1 nF C10 GA342DR7GF102KW02L 1000 pF - 250 V C11 GA342DR7GF102KW02L 1000 pF - 250 V C12 N. M. 150 μF - 50 V C12 N. M. 150 μF - 50 V C13 C3216X5R1H106K 10 μF - 50 V - X5R C14 N. M. 150 μF - 50 V C15 C3216X5R1H106K 10 μF - 50 V - X5R C16 N. M. 100 μF - 50 V C16 N. M. 100 μF - 50 V C19 C2012X5R1H225K 2.2 μF - 60 V - X5R D1 STTH1L06A 1 A - 600 V D2 1N4148 100 D3 STPS3150UF 3 A - 150 V D5 1 N4148	BD1	HD06-T	600 V - 0.8 A
C3 C3216X7R2J222K 2.2 nF - 630 V - X7R C4 C2012XSR1E106K 10 μ F - 25 V - X5R C5 C1608X5R1A106K 10 μ F - 10 V - X5R C6 470 nF - 10 V C7 1 nF - 25 V C8 100 nF - 25 V C9 1 nF C10 GA342DR7GF102KW02L 1000 pF - 250 V C11 GA342DR7GF102KW02L 1000 pF - 250 V C12 N.M. C122 C14 GA342DR7GF102KW02L 1000 pF - 250 V C12 N.M. C124 C14 N.M. C124 C15 C3216X5R1H106K 10 μ F - 50 V C16 N.M. C15 C16 N.M. C16A B41888D6157M 150 μ F - 50 V C16 N.M. C16A D1 STTH1L06A 1 A - 600 V D2 1N4148 D3 STFS3150UF 3 A - 150 V D5 1N4148 D6 1N4148 </td <td>C1</td> <td>B32921C3473</td> <td>47 nF - X2</td>	C1	B32921C3473	47 nF - X2
C4 C2012X5R1E106K 10 μF - 25 V - X5R C5 C1608X5R1A106K 10 μF - 10 V C6 470 nF - 10 V C7 1 nF - 25 V C8 100 nF - 25 V C9 1 nF C10 GA342DR7GF102KW02L 1000 pF - 250 V C11 GA342DR7GF102KW02L 1000 pF - 250 V C12 N. M. 100 μF - 50 V C12 N. M. 100 μF - 50 V C13 C3216X5R1H106K 10 μF - 50 V C14 N. M. 10 μF - 50 V - X5R C14 N. M. 10 μF - 50 V - X5R C16 N. M. 10 μF - 50 V - X5R C16 N. M. 10 μF - 50 V C16A B41888D6157M 150 μF - 50 V C16A B41888D6157M 150 μF - 50 V C19 C2012X5R1H225K 2.2 μF - 50 V - X5R D1 STTH1L06A 1 A - 600 V D2 1N4148 104 D6 1N4148 104 D6 1N4148 150 kΩ	C2	B32921C3333	47 nF - X2
C5 C1608X5R1A106K 10 μF - 10 V - X5R C6 470 nF - 10 V C7 1 nF - 25 V C8 100 nF - 25 V C9 1 nF C10 GA342DR7GF102KW02L 1000 pF - 250 V C11 GA342DR7GF102KW02L 1000 pF - 250 V C12 N.M. C122 C13 C3216X5R1H106K 10 μF - 50 V - X5R C14 N.M. C15 C15 C3216X5R1H106K 10 μF - 50 V - X5R C16 N.M. C16A C16A B41888D6157M 150 μF - 50 V C16 N.M. C16A C16A B41888D6157M 150 μF - 50 V C16 N.M. C16A D1 STTH1L06A 1 A - 600 V D2 1 N4148 D D3 STPS3150UF 3 A - 150 V D5 1 N4148 1 A - 250 V L1 B82144A2474J000 680 μH R1 150 kΩ 2.2 Ω - 1% R2 1.5 Ω - 1% <td>C3</td> <td>C3216X7R2J222K</td> <td>2.2 nF - 630 V - X7R</td>	C3	C3216X7R2J222K	2.2 nF - 630 V - X7R
C6 470 nF -10 V C7 1 nF - 25 V C8 100 nF - 25 V C9 1 nF C10 GA342DR7GF102KW02L 1000 pF - 250 V C11 GA342DR7GF102KW02L 1000 pF - 250 V C12 N. M. C12A B41888D6157M 150 μF - 50 V C13 C3216X5R1H106K 10 μF - 50 V - X5R C14 N. M. C15 C3216X5R1H106K 10 μF - 50 V - X5R C16 N. M. C16A B41888D6157M 150 μF - 50 V C16 N. M. C16A B41888D6157M 150 μF - 50 V C16 N. M. C16A B41888D6157M 150 μF - 50 V C19 C2012X5R1H225K 2.2 μF - 50 V - X5R D1 STTH1L06A 1 A - 600 V D2 1N4148 D5 1 N4148 D6 1 N4148 D6 1 N4148 R1 150 kΩ R2<	C4	C2012X5R1E106K	10 μF - 25 V - X5R
C7 1 nF - 25 V C8 100 nF - 25 V C9 1 nF C10 GA342DR7GF102KW02L 1000 pF - 250 V C11 GA342DR7GF102KW02L 1000 pF - 250 V C12 N. M. C12A B41888D6157M 150 μF - 50 V C13 C3216X5R1H106K 10 μF - 50 V - X5R C14 N. M. C15 C3216X5R1H106K 10 μF - 50 V - X5R C16 N. M. C16A B41888D6157M 150 μF - 50 V C16 N. M. C16A B41888D6157M 150 μF - 50 V C19 C2012X5R1H225K 2.2 μF - 50 V - X5R D1 STTH1L06A 1 A - 600 V D2 1N4148 D3 STPS3150UF 3 A - 150 V D5 1 N4148 D6 1 N4148 D6 1 N4148 R1 MCMSF 1 A 250 V 1 A - 250 V L1 B82144A2474J000 680 μH R2	C5	C1608X5R1A106K	10 μF - 10 V - X5R
C8 100 nF - 25 V C9 1 nF C10 GA342DR7GF102KW02L 1000 pF - 250 V C11 GA342DR7GF102KW02L 1000 pF - 250 V C12 N. M. 150 µF - 50 V C13 C3216X5R1H106K 10 µF - 50 V - X5R C14 N. M. 150 µF - 50 V - X5R C14 N. M. 150 µF - 50 V - X5R C14 N. M. 150 µF - 50 V - X5R C16 N. M. 150 µF - 50 V C16 N. M. 150 µF - 50 V C16 N. M. 150 µF - 50 V C19 C2012X5R1H225K 2.2 µF - 50 V - X5R D1 STTH1L06A 1 A - 600 V D2 1N4148 1000 V D3 STPS3150UF 3 A - 150 V D5 1N4148 14 - 250 V C11 B82144A2474J000 680 µH R1 150 kΩ 150 kΩ R2 1.5 Ω - 1% 150 kΩ R2 1.5 Ω - 1% 150 kΩ R3 2.2 Ω - 1%	C6		470 nF -10 V
C9 1 nF C10 GA342DR7GF102KW02L 1000 pF - 250 V C11 GA342DR7GF102KW02L 1000 pF - 250 V C12 N.M. C12 N.M. C13 C3216X5R1H106K 10 μF - 50 V C14 N.M. C15 C3216X5R1H106K 10 μF - 50 V - X5R C16 N.M. C16 N.M. C16 N.M. C16 N.M. C19 C2012X5R1H225K 2.2μ F - 50 V C19 C2012X5R1H225K 2.2μ F - 50 V - X5R D1 STTH1L06A 1 A - 600 V D2 1N4148 D3 STPS3150UF 3 A - 150 V D5 1N4148 D6 1N4148 R1 MCMSF 1 A 250 V 1 A - 250 V L1 B82144A2474J000 680 μH R1 150 kΩ R2 1.5 Ω - 1% <td>C7</td> <td></td> <td>1 nF - 25 V</td>	C7		1 nF - 25 V
C10GA342DR7GF102KW02L1000 pF - 250 VC11GA342DR7GF102KW02L1000 pF - 250 VC12N. M.C12AB41888D6157M150 μ F - 50 VC13C3216X5R1H106K10 μ F - 50 V - X5RC14N. M.C15C3216X5R1H106K10 μ F - 50 V - X5RC16N. M.C16AB41888D6157M150 μ F - 50 VC19C2012X5R1H225K2.2 μ F - 50 V - X5RD1STTH1L06A1 A - 600 VD21N4148D3STPS3150UF3 A - 150 VD51N4148D61N4148F1MCMSF 1 A 250 V1 A - 250 VL1B82144A2474J000680 μ HR1150 κ ΩR22.2 Ω - 1%R4560 Ω - 1%R524 κ Ω - 1%R712 κ Ω	C8		100 nF - 25 V
C11 GA342DR7GF102KW02L 1000 pF - 250 V C12 N. M. C12A B41888D6157M 150 μ F - 50 V C13 C3216X5R1H106K 10 μ F - 50 V - X5R C14 N. M. C15 C3216X5R1H106K 10 μ F - 50 V - X5R C16 N. M. C16A B41888D6157M 150 μ F - 50 V C19 C2012X5R1H225K 2.2 μ F - 50 V - X5R D1 STTH1L06A 1 A - 600 V D2 1N4148 D3 STPS3150UF 3 A - 150 V D5 1N4148 D6 1N4148 D6 1N4148 R1 MCMSF 1 A 250 V 1 A - 250 V L1 B82144A2474J000 680 μ H R1 150 $k\Omega$ R2 1.5 Ω - 1% R3 2.2 Ω - 1% R4 560 Ω - 1% R5 24 $k\Omega$ - 1% R6 30 $k\Omega$ - 1%	C9		1 nF
C12 N. M. C12A B41888D6157M 150 μF - 50 V C13 C3216X5R1H106K 10 μF - 50 V - X5R C14 N. M. C15 C3216X5R1H106K 10 μF - 50 V - X5R C16 N. M. C16 N. M. C16 N. M. C16 N. M. C17 C2012X5R1H25K C19 C2012X5R1H225K D1 STTH1L06A D2 1N4148 D3 STPS3150UF D4 150 μF - 50 V D5 1N4148 D6 1N4148 D6 1N4148 D6 11N4148 D6 11N4148 D6 11N4148 R1 MCMSF 1 A 250 V L1 B82144A2474J000 680 μH R1 150 kΩ R2 1.5 Ω - 1% R3 2.2 Ω - 1% R4 560 Ω - 1% R5 24 kΩ - 1% R6 30 kΩ - 1%	C10	GA342DR7GF102KW02L	1000 pF - 250 V
C12A B41888D6157M 150μ F - 50 V C13 C3216X5R1H106K 10μ F - 50 V - X5R C14 N. M. C15 C3216X5R1H106K 10μ F - 50 V - X5R C16 N. M. C179 C2012X5R1H225K 2.2μ F - 50 V - X5R D1 STTH1L06A 1 A - 600 V D2 1N4148 10 D3 STPS3150UF 3 A - 150 V D5 1N4148 14882144A2474J000 D6 1N4148 150 μ F R1 MCMSF 1 A 250 V 1 A - 250 V L1 B82144A2474J000 680 μ H R1 150 $k\Omega$ 150 $k\Omega$ R2 1.5 Ω - 1% 150 $k\Omega$ R3 2.2 Ω - 1% R4 R4 560 Ω - 1% R5 R6 30 $k\Omega$ - 1% R7	C11	GA342DR7GF102KW02L	1000 pF - 250 V
C13 C3216X5R1H106K 10 μF - 50 V - X5R C14 N. M. C15 C3216X5R1H106K 10 μF - 50 V - X5R C16 N. M. C16A B41888D6157M 150 μF - 50 V C19 C2012X5R1H225K 2.2 μF - 50 V - X5R D1 STTH1L06A 1 A - 600 V D2 1N4148 1 D3 STPS3150UF 3 A - 150 V D5 1 N4148 1 D6 1N4148 1 R1 MCMSF 1 A 250 V 1 A - 250 V L1 B82144A2474J000 680 μH R1 150 kΩ 1.5 Ω - 1% R2 1.5 Ω - 1% 1.5 Ω - 1% R3 2.2 Ω - 1% 1.5 Ω - 1% R4 560 Ω - 1% 1.5 Ω - 1% R5 24 kΩ - 1% 1.5 Ω R6 30 kΩ - 1% 1.2 kΩ	C12		N. M.
C14N. M.C15C3216X5R1H106K10 μF - 50 V - X5RC16N. M.C16AB41888D6157M150 μF - 50 VC19C2012X5R1H225K 2.2μ F - 50 V - X5RD1STTH1L06A1 A - 600 VD21N4148100 VD3STPS3150UF3 A - 150 VD51N4148100 VD61N4148F1MCMSF 1 A 250 V1 A - 250 VL1B82144A2474J000680 μHR1150 kΩR21.5 Ω - 1%R32.2 Ω - 1%R4560 Ω - 1%R712 kΩ	C12A	B41888D6157M	150 μF - 50 V
C15C3216X5R1H106K10 μF - 50 V - X5RC16N. M.C16AB41888D6157M150 μF - 50 VC19C2012X5R1H225K 2.2μ F - 50 V - X5RD1STTH1L06A1 A - 600 VD21N41481000000000000000000000000000000000000	C13	13 C3216X5R1H106K 10 μF - 50 \	
C16N. M.C16AB41888D6157M $150 \ \mu$ F - 50 VC19C2012X5R1H225K $2.2 \ \mu$ F - 50 V - X5RD1STTH1L06A1 A - 600 VD21N4148 $1 \ A - 600 \ V$ D3STPS3150UF3 A - 150 VD51N4148 $1 \ A - 250 \ V$ D61N4148 $1 \ A - 250 \ V$ L1B82144A2474J000680 $\ \mu$ HR1150 kΩR2 $1.5 \ \Omega - 1\%$ R4 $560 \ \Omega - 1\%$ R5 $24 \ k\Omega - 1\%$ R7 $12 \ k\Omega$	C14	N. M.	
C16AB41888D6157M150 μF - 50 VC19C2012X5R1H225K $2.2 μF - 50 V - X5R$ D1STTH1L06A1 A - 600 VD21N4148 $3 A - 150 V$ D3STPS3150UF3 A - 150 VD51N4148 $-150 V$ D61N4148 $-150 V$ F1MCMSF 1 A 250 V1 A - 250 VL1B82144A2474J000 $680 μH$ R1 $-150 k\Omega$ R2 $1.5 \Omega - 1\%$ R3 $2.2 \Omega - 1\%$ R4 $560 \Omega - 1\%$ R5 $24 k\Omega - 1\%$ R7 $12 k\Omega$	C15	C3216X5R1H106K	10 μF - 50 V - X5R
C19 C2012X5R1H225K 2.2 μF - 50 V - X5R D1 STTH1L06A 1 A - 600 V D2 1N4148 D3 STPS3150UF 3 A - 150 V D5 1N4148 D6 1N4148 F1 MCMSF 1 A 250 V 1 A - 250 V L1 B82144A2474J000 680 μH R1 150 kΩ R2 1.5 Ω - 1% R3 2.2 Ω - 1% R4 560 Ω - 1% R5 24 kΩ - 1% R6 30 kΩ - 1% R7 12 kΩ	C16		N. M.
D1 STTH1L06A 1 A - 600 V D2 1N4148 D3 STPS3150UF 3 A - 150 V D5 1N4148 D6 1N4148 F1 MCMSF 1 A 250 V 1 A - 250 V L1 B82144A2474J000 680 μH R1 150 kΩ R2 1.5 Ω - 1% R3 2.2 Ω - 1% R4 560 Ω - 1% R5 24 kΩ - 1% R6 30 kΩ - 1% R7 12 kΩ	C16A	B41888D6157M	150 μF - 50 V
D21N4148D3STPS3150UF $3 A - 150 V$ D51N4148 $250 V$ D61N4148 $1A - 250 V$ F1MCMSF 1 A 250 V $1 A - 250 V$ L1B82144A2474J000 $680 \mu H$ R1 $150 k\Omega$ R2 $1.5 \Omega - 1\%$ R3 $2.2 \Omega - 1\%$ R4 $560 \Omega - 1\%$ R5 $24 k\Omega - 1\%$ R6 $30 k\Omega - 1\%$ R7 $12 k\Omega$	C19	C2012X5R1H225K	2.2 μF - 50 V - X5R
D3 STPS3150UF 3 A - 150 V D5 1N4148 D6 1N4148 F1 MCMSF 1 A 250 V 1 A - 250 V L1 B82144A2474J000 680 μH R1 150 kΩ R2 1.5 Ω - 1% R3 2.2 Ω - 1% R4 560 Ω - 1% R5 24 kΩ - 1% R6 30 kΩ - 1% R7 12 kΩ	D1	STTH1L06A	1 A - 600 V
D5 1N4148 D6 1N4148 F1 MCMSF 1 A 250 V 1 A - 250 V L1 B82144A2474J000 680 μH R1 150 kΩ R2 1.5 Ω - 1% R3 2.2 Ω - 1% R4 560 Ω - 1% R5 24 kΩ - 1% R6 30 kΩ - 1%	D2	1N4148	
D6 1N4148 F1 MCMSF 1 A 250 V 1 A - 250 V L1 B82144A2474J000 680 μH R1 150 kΩ R2 1.5 Ω - 1% R3 2.2 Ω - 1% R4 560 Ω - 1% R5 24 kΩ - 1% R6 30 kΩ - 1% R7 12 kΩ	D3	STPS3150UF	3 A - 150 V
F1 MCMSF 1 A 250 V 1 A - 250 V L1 B82144A2474J000 680 μH R1 150 kΩ R2 1.5 Ω - 1% R3 2.2 Ω - 1% R4 560 Ω - 1% R5 24 kΩ - 1% R6 30 kΩ - 1%	D5	1N4148	
L1 B82144A2474J000 680 μH R1 150 kΩ R2 1.5 Ω - 1% R3 2.2 Ω - 1% R4 560 Ω - 1% R5 24 kΩ - 1% R6 30 kΩ - 1% R7 12 kΩ	D6	1N4148	
R1 150 kΩ R2 1.5 Ω - 1% R3 2.2 Ω - 1% R4 560 Ω - 1% R5 24 kΩ - 1% R6 30 kΩ - 1% R7 12 kΩ	F1	MCMSF 1 A 250 V	1 A - 250 V
R2 1.5 Ω - 1% R3 2.2 Ω - 1% R4 560 Ω - 1% R5 24 kΩ - 1% R6 30 kΩ - 1% R7 12 kΩ	L1	B82144A2474J000	680 μH
R3 2.2 Ω - 1% R4 560 Ω - 1% R5 24 kΩ - 1% R6 30 kΩ - 1% R7 12 kΩ	R1		150 kΩ
R4 560 Ω - 1% R5 24 kΩ - 1% R6 30 kΩ - 1% R7 12 kΩ	R2		1.5 Ω - 1%
R5 24 kΩ - 1% R6 30 kΩ - 1% R7 12 kΩ	R3		2.2 Ω - 1%
R6 30 kΩ - 1% R7 12 kΩ	R4		560 Ω - 1%
R7 12 kΩ	R5		24 kΩ - 1%
	R6		30 kΩ - 1%
R8 180 kΩ - 1%	R7		12 kΩ
	R8		180 kΩ - 1%

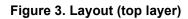
Table 3. Bill of material

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Part reference	Part value	Part description
R9		270 Ω
R11		NC
R12		10 kΩ
R13		91 kΩ - 1%
R14		82 kΩ - 1%
R15		39 kΩ - 1%
R16		0 Ω
T2	TDK xxxH004 x12375-3	EFD20
U1	HVLED815PF	IC LED driver with integrated MOSFET
J2, J4		Input connector
J1, J3		Output connector

Table 3. Bill of material (continued)



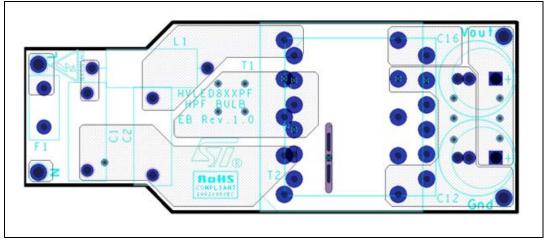
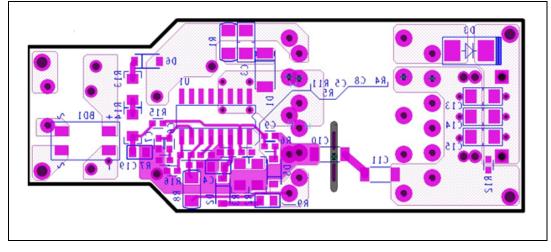


Figure 4. Layout (bottom layer)





Revision history

Date	Revision	Changes
27-Aug-2013	1	Initial release.

Table 4. Document revision history



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