Design Summary

IC: L6566B - SO 16-N
Input: 185 - 265 Vac (47 - 53 Hz) - Nominal: 230 Vac
Output: 12 V (2 % ripple) - 36 W max
Switching Frequency: 30 kHz - 120 kHz
Expected Average Efficiency: 87 %
Max. Ambient Temperature: 60 °C

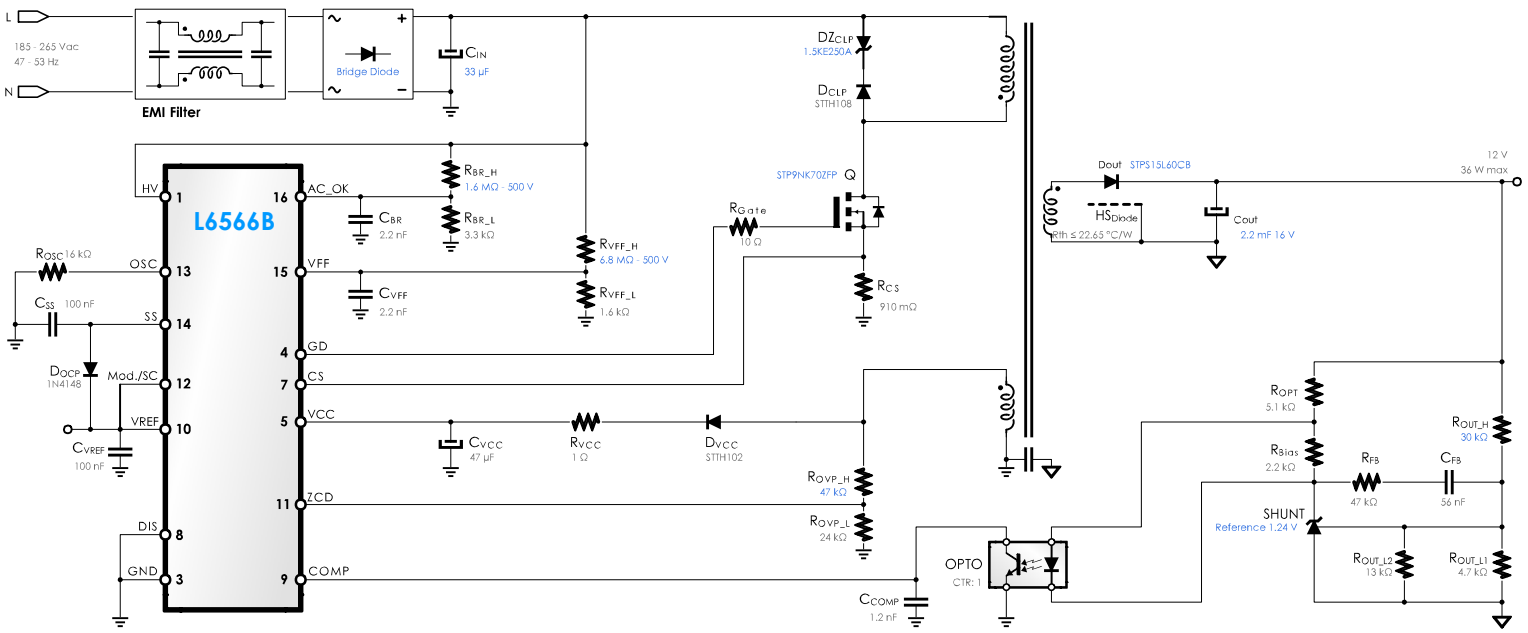
Transformer Specifications:

fsw range: 30 kHz - 120 kHz - **Lp:** 2.92 mH - **leakage:** 29.24 µH
Primary - Ipk: 971 mA - **Irms:** 310 mA
Secondary - Irms: 4.28 A - **Np/Ns:** 11.719
Auxiliary - Irms: 29 mA - **Iavg:** 20 mA - **Np/Naux:** 11.719

Transformer Design:

Core:

Type EER28 Vertical - **Area Product** 5895 mm^4 - **Orientation** Vertical
Volume (Ve) 5250 mm^3 - **Cross-Sectional Area (Ae)** 82.10 mm^2 - **Bobbin Winding Area (Aw)** 71.80 mm^2
Bobbin Average Turn Lenght 52.20 mm - **Bobbin Centr. Leg Lenght** 16.70 mm
Material: N27, N67, N87, 3C81, 3C90, 3C91, 3C95, PC40, PC44, PC50 or equivalent
Core Gap: 0.48 mm
Inductance factor (AL): 214 nH/N^2
Primary: Turns 117 - **Layers** 4
Wire: Type TIW - **Number of strands** 1 - **Strand copper Ø** 0.300 mm
Wire gross Ø 0.500 mm - **Resistance per meter** 0.2629 Ω/m
Secondary: Turns 10 - **Layers** 2 - **Paralleled wires** 3
Wire: Type Litz - **Number of strands** 45 - **Strand copper Ø** 0.100 mm
Wire gross Ø 1.073 mm - **Resistance per meter** 0.0559 Ω/m
Auxiliary: Turns 10

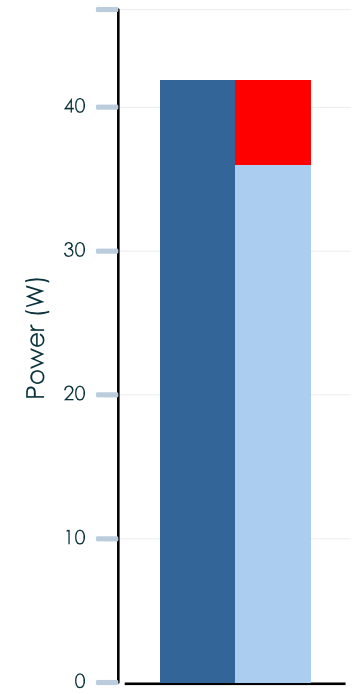


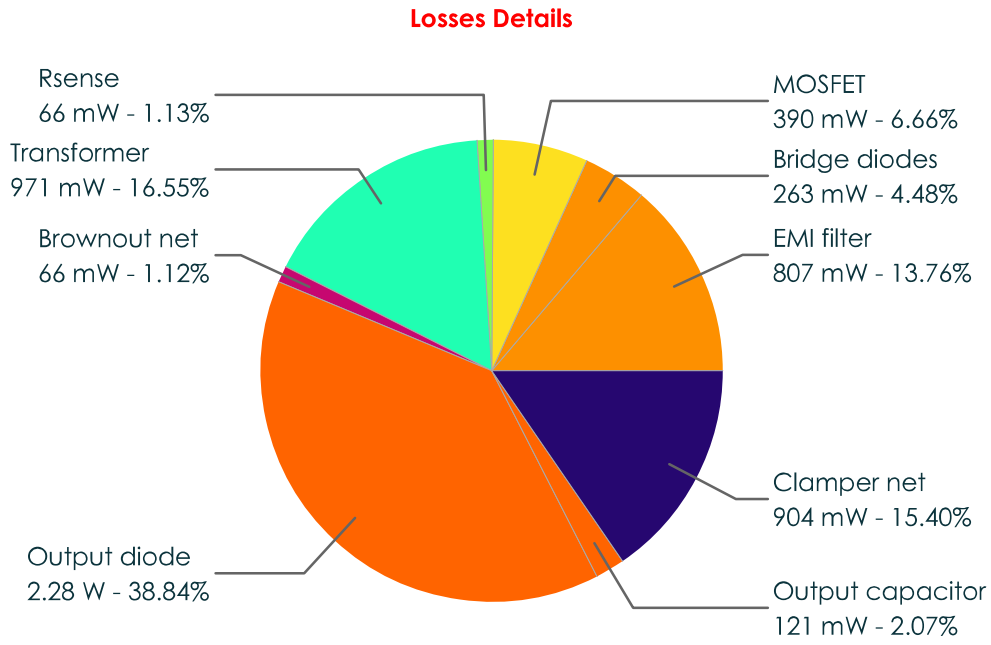
Bill of Materials

Reference	Value	Description
IC	L6566B	PWM Controller
Q	STP9NK70ZFP	Power MOSFET
Rgate	10 Ω	Standard Resistor - 5% 250 ppm/°C
DZclp	1.5KE250A	250 V Transil
Dclp	STTH108	800 V Diode
Rosc	16 kΩ	Standard Resistor - 1% 100 ppm/°C
Css	100 nF	50 V Standard ceramic capacitor
Rcs	910 mΩ	1/4 W Resistor - 5% 250 ppm/°C
Rbr_h	1.6 MΩ - 500 V	High Voltage Resistor - 1% 100 ppm/°C
Rbr_l	3.3 kΩ	Standard Resistor - 1% 100 ppm/°C
Cbr	2.2 nF	50 V Standard ceramic capacitor
Rovp_h	47 kΩ	Standard Resistor - 5% 250 ppm/°C
Rovp_l	24 kΩ	Standard Resistor - 5% 250 ppm/°C
Docp	1N4148	Fast signal diode
Rvff_h	6.8 MΩ - 500 V	High Voltage Resistor - 1% 100 ppm/°C
Rvff_l	1.6 kΩ	Standard Resistor - 1% 100 ppm/°C
Cvff	2.2 nF	50 V Standard ceramic capacitor
Cvref	100 nF	50 V Standard ceramic capacitor
Cvcc	47 µF	35 V Electrolytic capacitor
Rvcc	1 Ω	Standard Resistor - 5% 250 ppm/°C
Dvcc	STTH102	High efficiency ultrafast diode
SHUNT	Reference 1.24 V	Shunt voltage reference
Rout_h	30 kΩ	Standard Resistor - 1% 100 ppm/°C
Rout_l1	4.7 kΩ	Standard Resistor - 1% 100 ppm/°C
Rout_l2	13 kΩ	Standard Resistor - 1% 100 ppm/°C
Cin	33 µF	400 V Electrolytic capacitor
BD	Bridge Diode	600 V Bridge rectifier
Cout	2.2 mF 16 V	16 V - ESR ≤ 15 mΩ - Electrolytic capacitor
Dout	STPS15L60CB	Low drop power schottky rectifier
HSdiode	Rth ≤ 22.65 °C/W	Heatsink
Ccomp	1.2 nF	50 V Standard ceramic capacitor
Cfb	56 nF	50 V Standard ceramic capacitor
Rfb	47 kΩ	Standard Resistor - 5% 250 ppm/°C
Ropto	5.1 kΩ	Standard Resistor - 5% 250 ppm/°C

Reference	Value	Description
Rbias	2.2 kΩ	Standard Resistor - 5% 250 ppm/°C
OPTO	CTR: 1	Optocoupler - CTR: 1

Power Losses @(Vin 230 Vac - Pout 36 W)



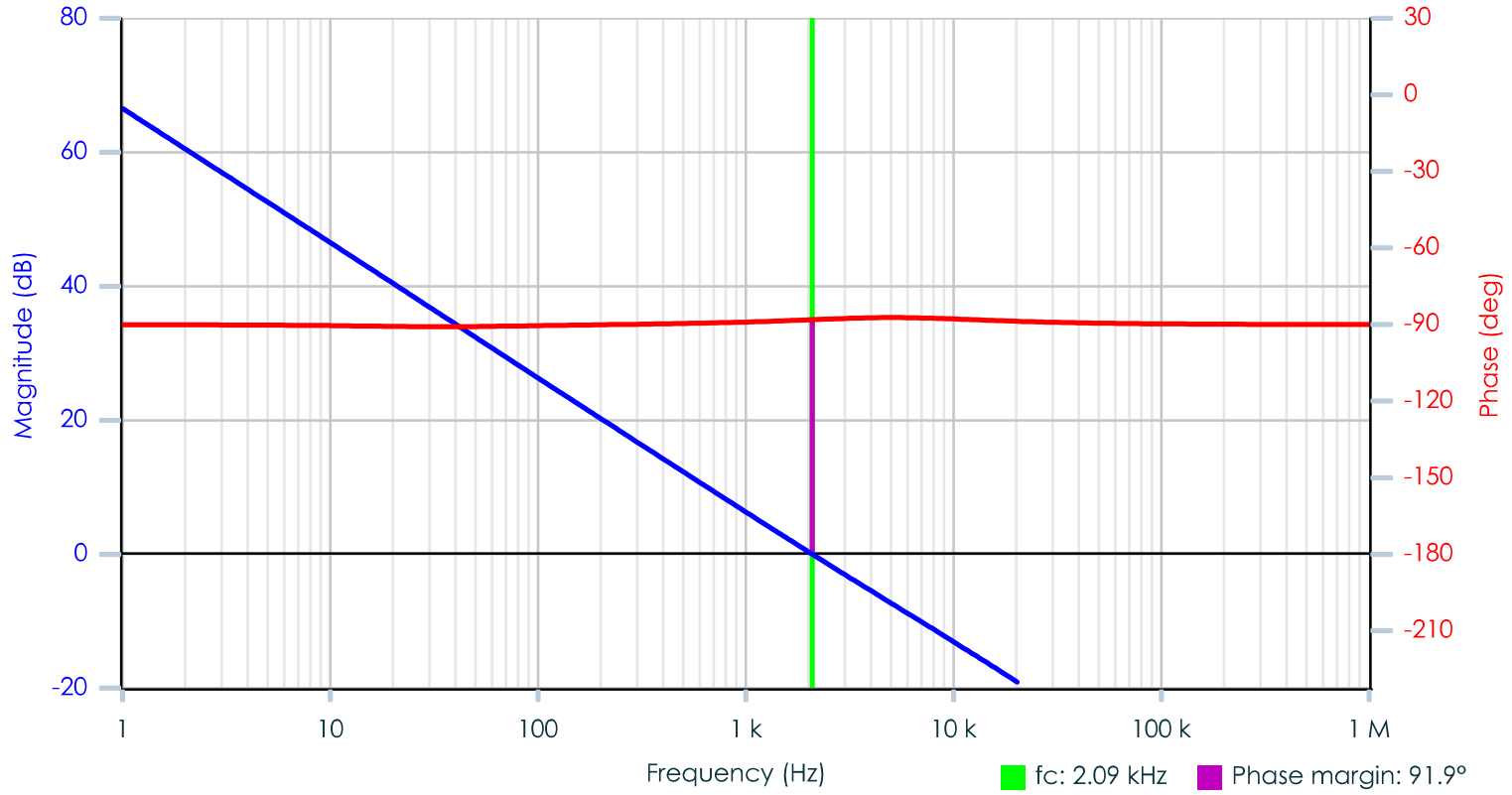


Pin: 41.89 W Pout: 36 W

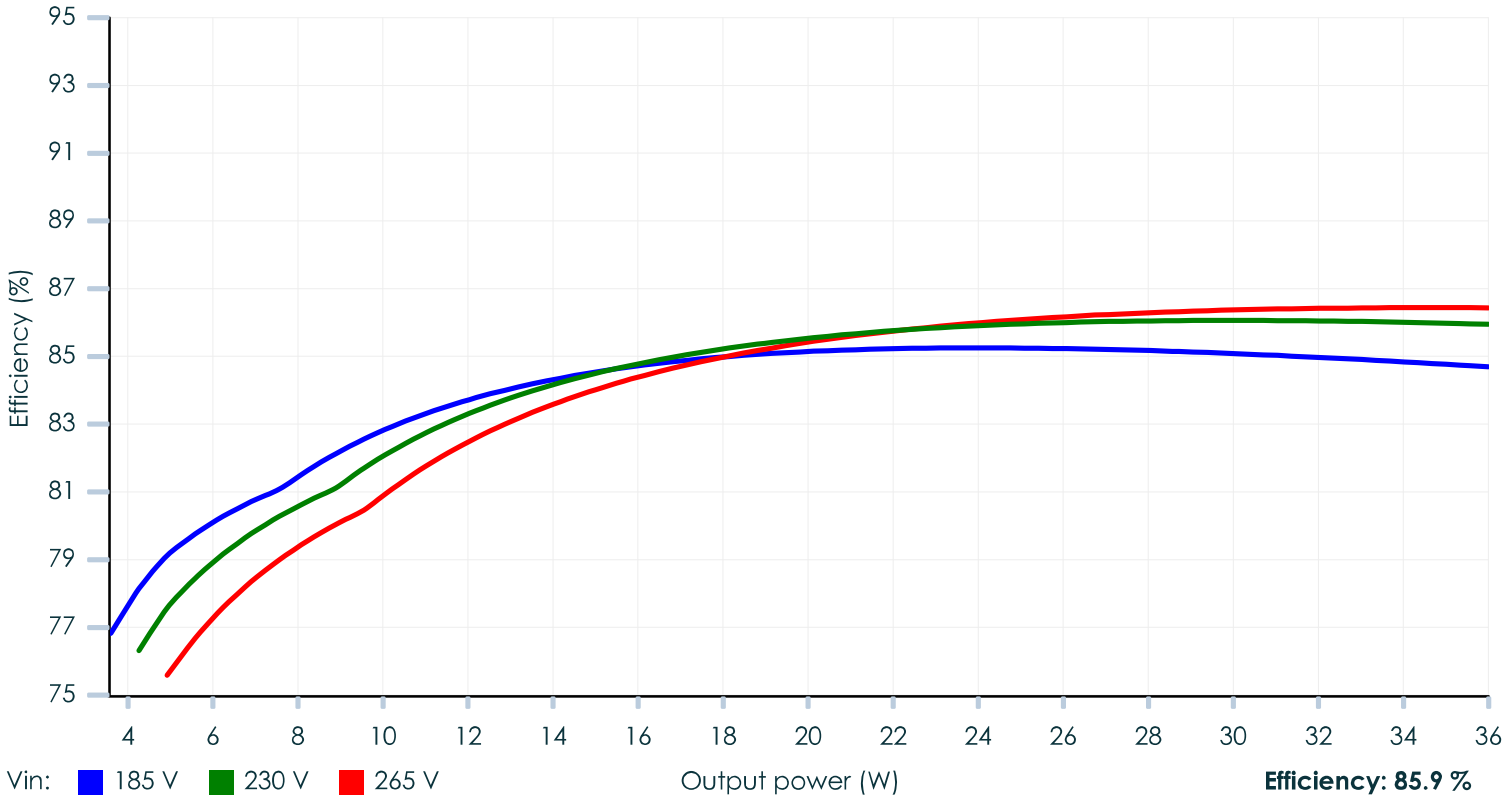
Power losses: 5.89 W - 14.05% details

Efficiency: 85.95%

Bode @(Vin 230 Vac - Pout 36 W)



Efficiency @(**Vin** 230 Vac - **Pout** 36 W)



Simulation @(**Vin** 230 Vac - **Pout** 36 W)