



AC/DC Converter Specifications

IC: VIPER26HN

Topology: ISOLATED FLYBACK

Input: 185 Vac - 265 Vac

Output : 12 V (2 %) - 12 W

Operating Conditions

@VinAC - min 185 V / max 265 V: 185 V

@Pout - min 0 W / max 12 W: 12 W

@Ta - min 25 °C / max 125 °C: 25 °C

Actuals

Tj: 125.1 °C

Rthja: 90 °C/W

fsw: 115 kHz

burst mode: off

conduction mode: discontinuous

Transformer Design

Core:

Manufacturer: **Core Part Number:** PC47EE19-Z **Bobbin Part Number:** BE19-116CPFR

Type: EE19 **Area product:** 837 mm⁴ **Orientation:** Vertical **Volume (Ve):** 0.9 mm³

Cross-Sectional Area (Ae): 23.0 mm² **Bobbin Winding Area (Aw):** 36.4 mm²

Bobbin Avg. Turn Length: 36.8 mm **Bobbin Centr. Leg Length:** 9.1 mm

Core Gap:

0.24 mm

Inductance Factor (AL):

122 nH/N²

Primary:

Turns: 93 **Layers:** 5 **Paralleled wires:** 1

Wire:

Manufacturer: Würth Elektronik **Part Number:** 9262-0031 **Type:** TCA2 DIW

Number of strands: 1 **Strand copper ø:** 226.0 mm **Wire gross ø:** 406.0 mm

Resistance per meter: 0.439 Ω/m

Secondary:

Turns: 12 **Layers:** 3 **Paralleled wires:** 3

Wire:

Manufacturer: Würth Elektronik **Part Number:** 9220-0142 **Type:** Litz

Number of strands: 40 **Strand copper ø:** 63.5 mm **Wire gross ø:** 610.0 mm

Resistance per meter: 0.139 Ω/m

Auxiliary:

Feedback

Turns: 13 **Layers:** 1

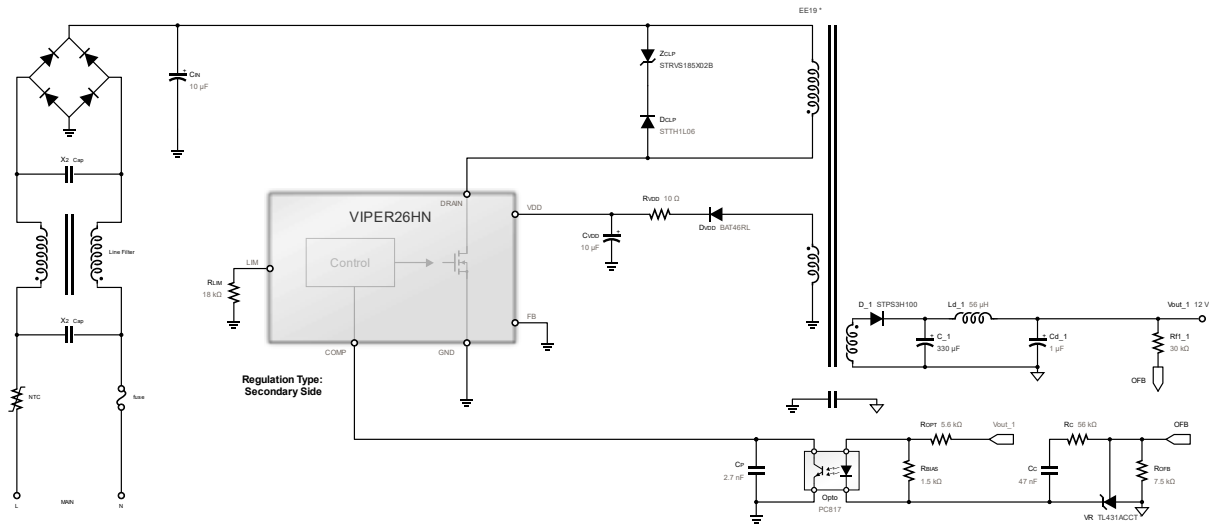
Wire:

Manufacturer: Wurth Elektronik **Part Number:** PN180 9283-0040 **Type:** Single

Number of strands: 1 **Strand copper ϕ :** 79.0 mm **Wire gross ϕ :** 86.0 mm

Resistance per meter: 3.780 Ω /m

Circuit - Schematic



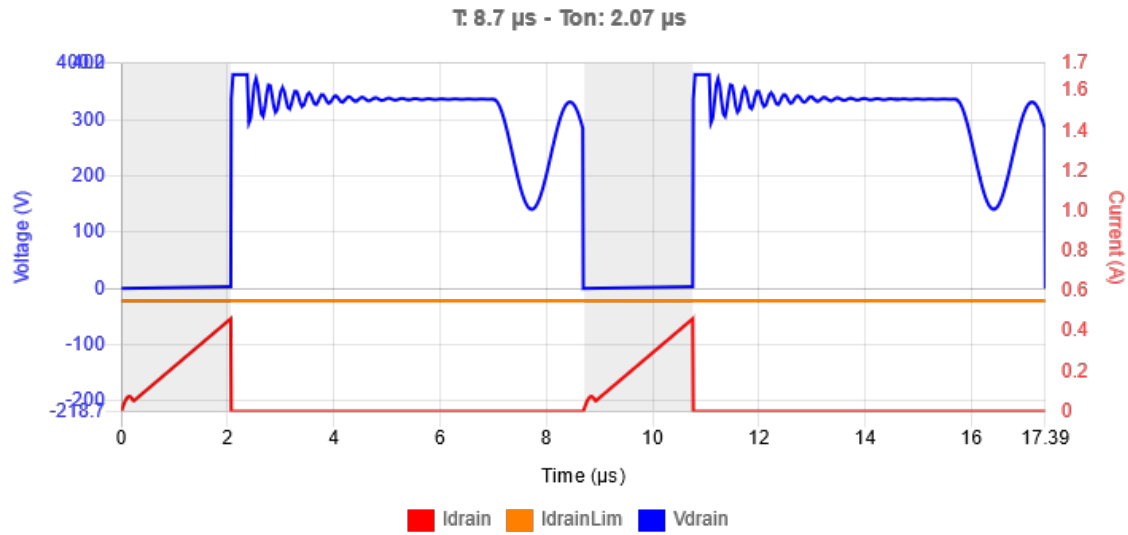
Feedback

Circuit - BOM

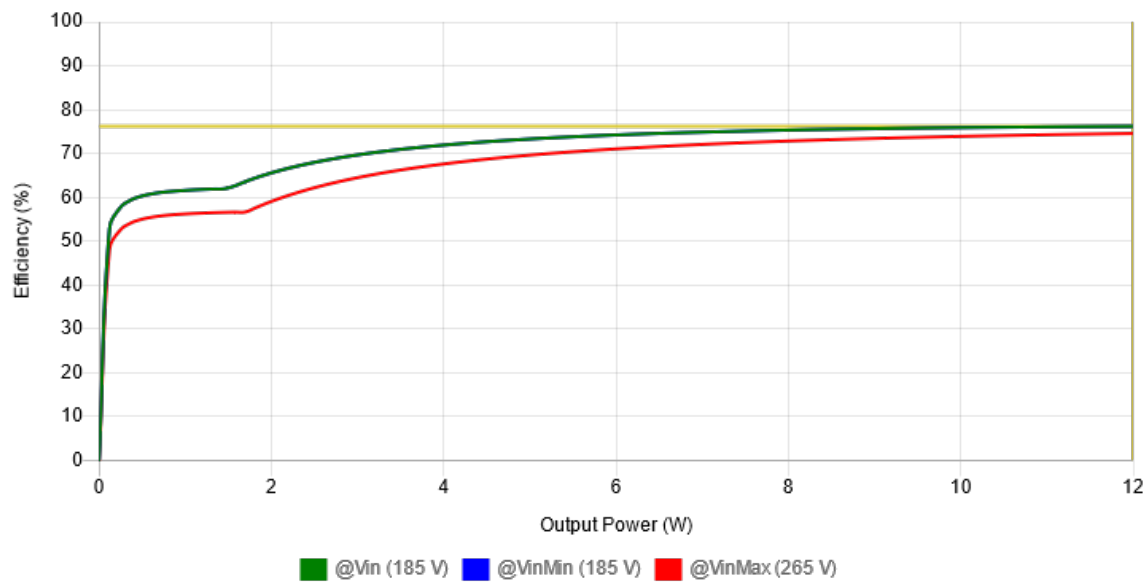
Type	Ref	Value	Description
IC 	IC	VIPER26HN	- DIP 7
Capacitor	Cin	10 μ F	393.5 V - 20%
Diode	Dbridge	Full bridge diode	210.24 mA, 562.15 V -
Resistor	Rlim	18 k Ω	18 k Ω
Diode 	Dclp	STTH1L06	1 A, 1 kV - STMicroelectronics
Transil 	Zclp	STRVS185X02B	143 V, Transil - STMicroelectronics
Diode 	Dvdd	BAT46RL	150 mA, 100 V - STMicroelectronics
Capacitor	Cvdd	10 μ F	35 V - 20% - Würth Elektronik - 865090543004
Resistor	Rvdd	10 Ω	10 Ω
OptoCoupler	Opto	PC817	
Resistor	Rbias	1.5 k Ω	1.5 k Ω
Voltage Reference 	VR *	TL431ACCT	2.5 V - STMicroelectronics
Resistor	Ropt	5.6 k Ω	5.6 k Ω
Resistor	Rofb	7.5 k Ω	7.5 k Ω
Diode 	D_1	STPS3H100	3 A, 100 V - STMicroelectronics
Capacitor	C_1	330 μ F	35 V - 20% - Würth Elektronik - 860160574023
Resistor	Rf1_1	30 k Ω	30 k Ω
Capacitor	Cd_1	1 μ F	
Inductor	Ld_1	56 μ H	
Capacitor	Cc	47 nF	47 nF
Capacitor	Cp	2.7 nF	2.7 nF
Resistor	Rc	56 k Ω	56 k Ω
Capacitor	Cfb	330 nF	330 nF
Resistor	Rfb	47 k Ω	47 k Ω
Transformer	T *	EE19	Custom Transformer

Feedback

Simulation

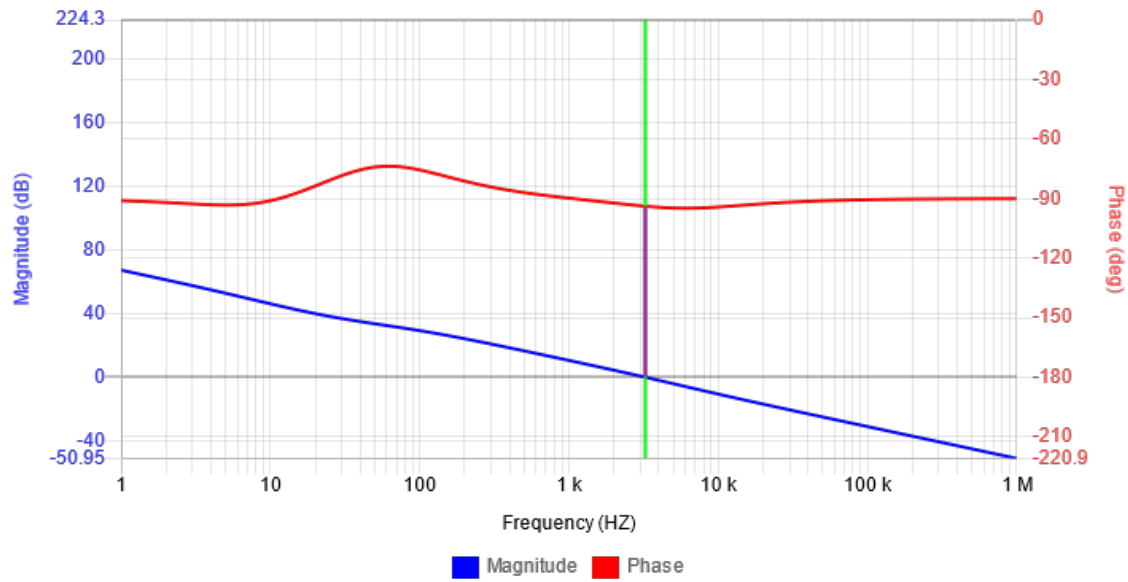


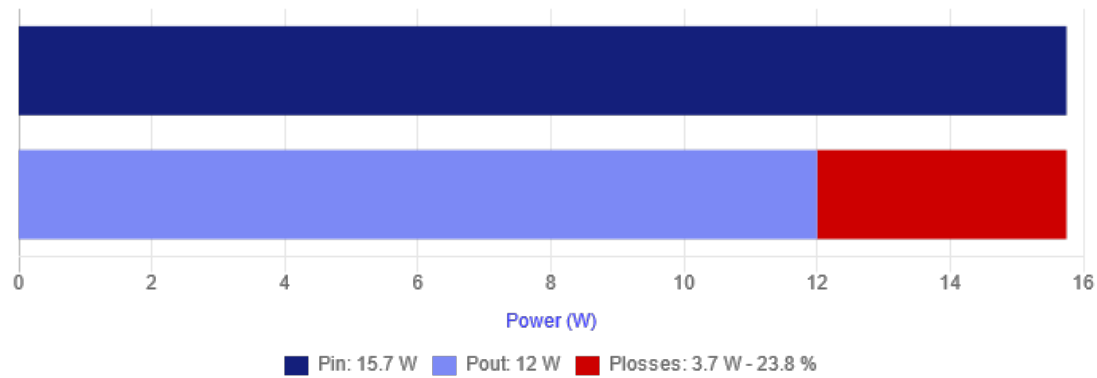
Efficiency: 76.2 %



Feedback

Bode: $f_c = 3.25 \text{ kHz}$ - phase margin = 86.1°



Efficiency: 76.2 %

Losses details

