

19 V - 65 W quasi resonant flyback adapter board

Data brief

Features

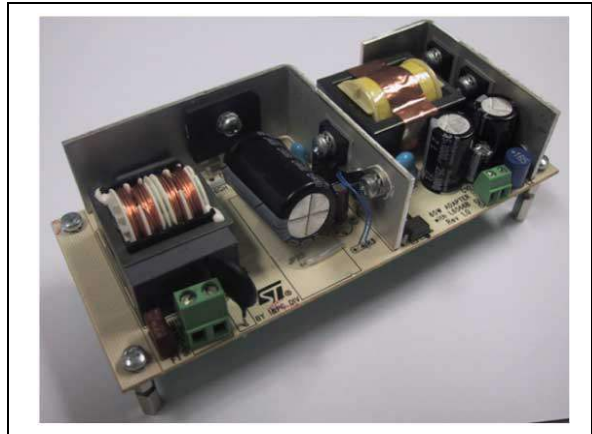
- Universal input mains range: 90 264 Vac - frequency 45 65Hz
- Output voltage: 19 V @ 3.42 A continuous operation
- Mains harmonics: according to EN61000-3-2 Class-D or JEITA-MITI Class-D
- Stand-by mains consumption: <100 mW @ 230 Vac
- Average efficiency: better than 89% without synchronous rectification
- EMI: according to EN55022-Class-B
- Safety: according to EN60950
- Dimensions: 58x121 mm, 25 mm components maximum height
- PCB: single side, 35 μ m, CEM-1, mixed PTH/SMT

Description

The EVL6566B-65W-QR is a demonstration board tailored on specification of a typical hi-end portable computer power supply. The peculiarities of this design are the very high average efficiency of about 90% without synchronous rectification and very low no load consumption of 100mW at 230 Vac. The result is that this converter is compliant to energy star eligibility criteria. The flyback stage implements the new ST dedicated current mode controller L6566B, operating in quasi-resonant mode and detecting the transformer demagnetization by pin ZCD.

The resistor on pin OSC sets the maximum switching frequency at about 165 kHz.

Because the maximum switching frequency is imposed, the converter operates in discontinuous conduction mode during light load operation. The L6566B valley skipping function is capable to



turn-on the MOSFET in valley switching even in DCM, thus reducing switching losses.

The Power MOSFET is a standard 800 V, STF7NM80, housed in TO-220FP package, needing just a small heat sink. The transformer is layer type, using a standard ferrite size EER28L, designed according to the EN60950.

The flyback reflected voltage is ~150 V, providing enough room for the leakage inductance voltage spike with good margin for the reliability of the MOSFET.

The output rectifiers are two, dual centre tap Schottky diode in parallel, STPS20H100CFP, housed in TO-220FP. They have been selected according to the maximum reverse voltage, forward voltage drop and power dissipation. The snubber damps the oscillation produced by the diode capacitance and the leakage inductance.

A small LC filter has been added on the output, filtering the high frequency ripple and spikes.

Thanks to the L6566B valley skipping feature it has been possible to dimension the power transformer parameters optimizing efficiency at different loads achieving an outstanding result even without synchronous rectification.

1 Electrical diagram and efficiency

Figure 1. Electrical diagram

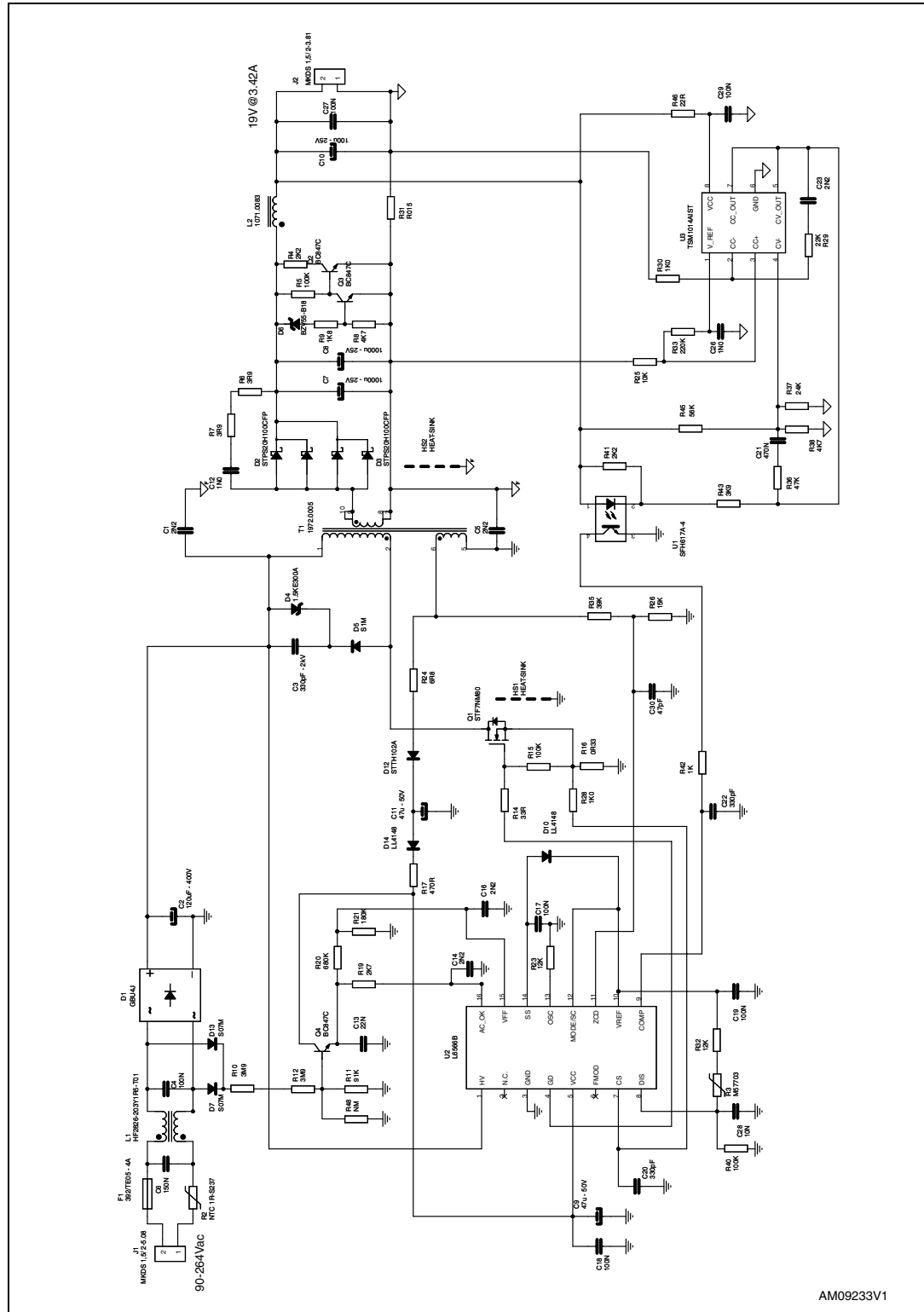


Table 1. Overall efficiency and no load consumption

Test	230 V-50 Hz					115 V-60 Hz				
	Vout [V]	Iout [mA]	Pout [W]	Pin [W]	Eff. [%]	Vout [V]	Iout [A]	Pout [W]	Pin [W]	Eff. [%]
No load	19.00	0.00	0.00	94mW	-	19.00	0.00	0.00	75mW	-
25% load eff.	18.97	0.86	16.37	18.53	88.3	18.97	0.86	16.32	18.03	90.5
50% load eff.	18.97	1.71	32.50	35.77	90.9	18.97	1.72	32.54	35.91	90.6
75% load eff.	18.98	2.57	48.74	53.44	91.2	18.97	2.57	48.82	54.39	89.8
100% load eff.	18.98	3.42	64.89	71.18	91.2	18.98	3.42	64.99	73.30	88.7
Average eff.					90.4					89.9

2 Revision history

Table 2. Document revision history

Date	Revision	Changes
21-Feb-2011	1	Initial release.

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