



EVL6566A-75WADP

19 V - 75 W laptop adapter with tracking boost PFC pre-regulator, using the L6563 and the L6566A

Data Brief

Features

- Universal input mains range: 90÷264Vac - Frequency 45 ÷ 65 Hz
- Output voltage: 19 V@4 A continuous operation
- Mains harmonics: Acc. to EN61000-3-2 Class-D
- ST-by mains consumption: Less than 0.25 W @265Vac
- Overall efficiency: Better than 86%
- EMI: According to EN55022-Class-B
- Safety: According to EN60950
- Low profile design: 25 mm maximum height
- PCB single layer: single side, 70 µm, CEM-1, 78x174 mm, Mixed PTH/SMT



Description

In this data brief of the EVL6566A-75WADP demo board, the main characteristics and features of a 75 W adapter wide-range input mains, power-factor-corrected AC-DC adapter using the new L6566A controller and the L6563 dedicated to the PFC stage are described.

High efficiency and the very low standby input consumption are highlighted in the following figures and tables. The board is programmed for working at fixed frequency (65 kHz) under nominal condition (19 V at 4 A).

On the secondary side the TSM1014 with a precise voltage reference and the optocoupler SFH617A-4 to transfer the error amplifiers information to the primary side have been used.



1 Efficiency

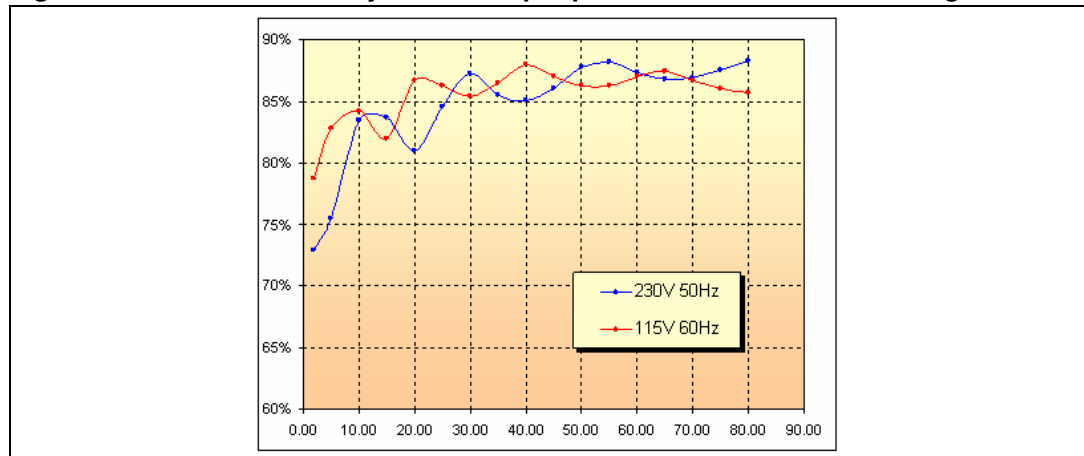
Table 1 below shows the efficiency with two different input voltages. The table begins with the nominal load at 80 W on the output and it displays the efficiency at every power decrease of 5 W.

Table 1. Efficiency measurements

230 V-50 Hz			115 V-60 Hz		
Pin	Pout	Eff.	Pin	Pout	Eff.
85.73	75.05	87.5%	87.24	75.06	86.0%
80.56	70.00	86.9%	80.73	70.00	86.7%
74.91	65.01	86.8%	74.34	65.01	87.4%
68.68	59.97	87.3%	68.95	60.00	87.0%
62.40	55.01	88.2%	63.80	55.02	86.2%
56.96	50.00	87.8%	58.03	50.04	86.2%
52.31	45.02	86.1%	51.80	45.05	87.0%
47.03	40.00	85.1%	45.45	40.00	88.0%
41.01	35.05	85.5%	40.53	35.05	86.5%
34.40	30.00	87.2%	35.15	30.00	85.3%
29.60	25.02	84.5%	29.00	25.02	86.3%
24.70	20.00	81.0%	23.07	20.00	86.7%
17.86	14.94	83.7%	18.36	15.05	82.0%
11.98	10.00	83.5%	11.88	10.00	84.2%
6.64	5.01	75.5%	6.10	5.05	82.8%
2.73	1.99	72.9%	2.53	1.99	78.7%

Above the 20 W power output, the efficiency is constant over 85%.

Figure 1. Overall efficiency versus output power at nominal mains voltages



2 Full load

Figure 2 and Figure 3 below show the drain and gate fly-back waveforms and the relevant switching frequency at full load.

Figure 2. L6566A fly-back stage waveforms at 115 V-60 Hz full load

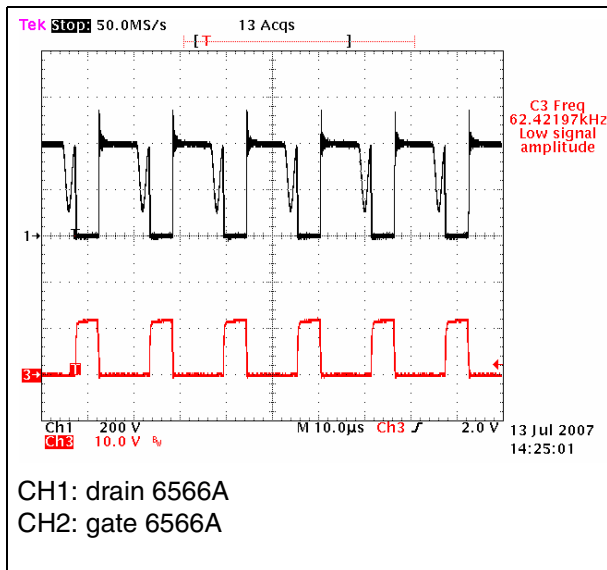
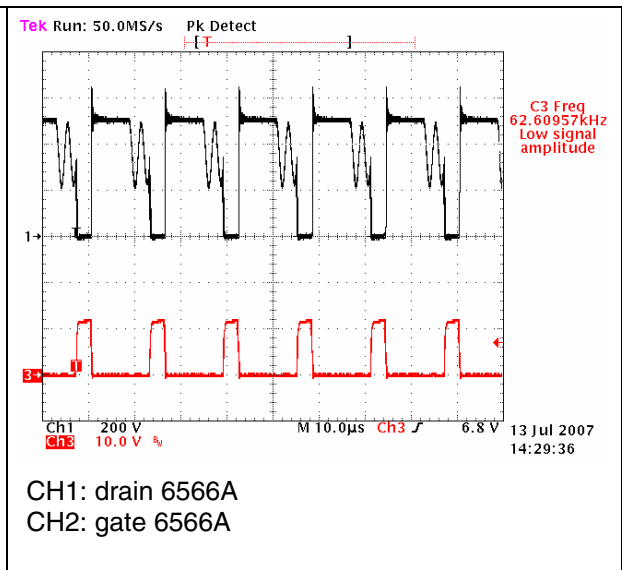


Figure 3. L6566A fly-back stage waveforms at 230 V-50 Hz full load



3 Light load condition (fold back frequency)

To improve the efficiency at light load, a frequency shifting has been implemented on the board. Thus, at decreasing load, the frequency also decreases. *Figure 4* and *Figure 5* below show the drain and gate fly-back waveforms and the relevant switching frequency with a load of 0.2 A.

Figure 4. L6566A fly-back stage waveforms at 115 V-60 Hz 0.2 A

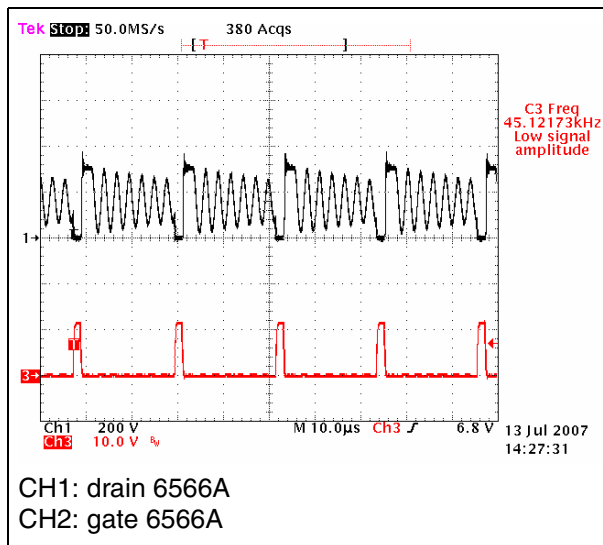


Figure 5. L6566A fly-back stage waveforms at 230 V-50 Hz full load

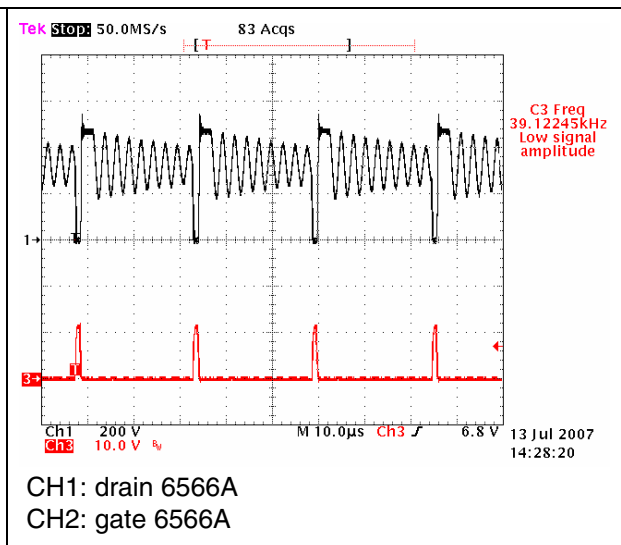


Table 2 below shows the efficiency when we set the power input with 2.4 or 1.7 W in two different voltage inputs with the fold back network plugged in.

Table 2. Standby consumption

Light load condition				
	Vin = 230 V		Vin = 115 V	
Pin	2.40	1.69	2.41	1.71
Pout	1.51	1.06	1.70	1.14
Efficiency	62.9%	62.7%	70.5%	66.7%

4 No-load

Table 3 gives the power consumption of the circuit during no-load operation. Figure 6 and Figure 7 show the main waveforms under this condition.

Table 3. No-load consumption

Vin [Vrms]	Input power [W]
90	0.94
115	0.107
230	0.202
265	0.260

Figure 6. L6566A fly-back stage waveforms at 115 V-60 Hz no-load

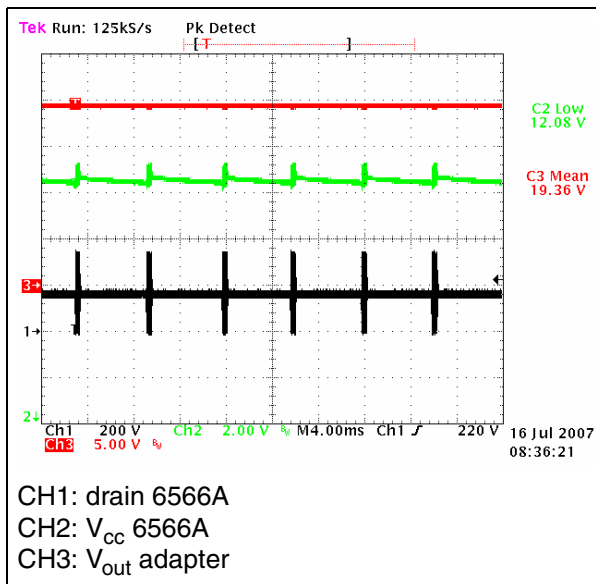
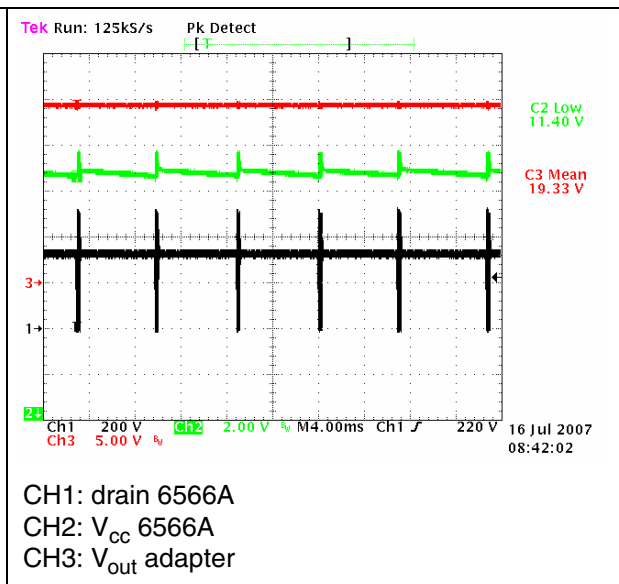
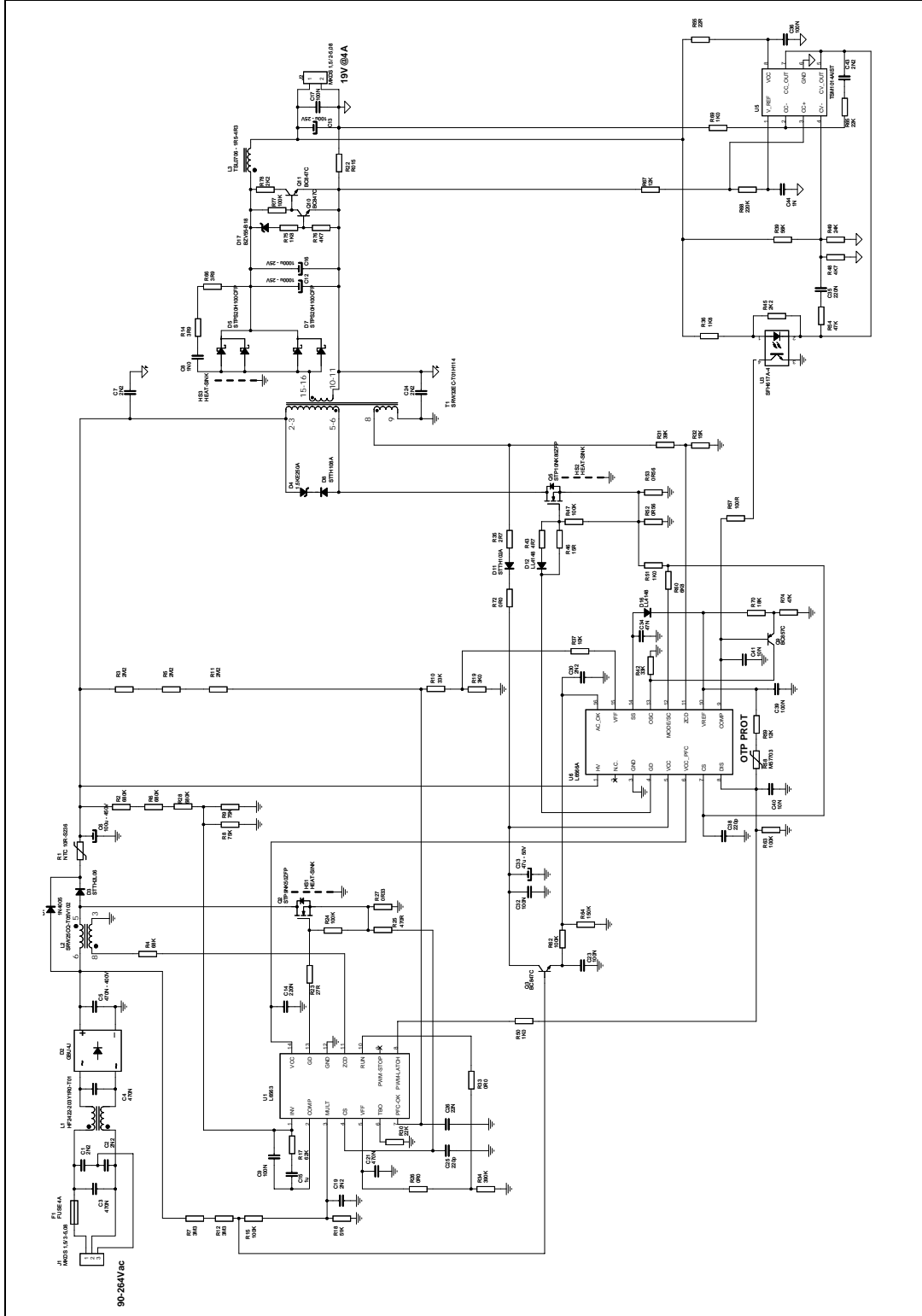


Figure 7. L6566A fly-back stage waveforms at 230 V-50 Hz no-load



5 Schematic

Figure 8. EVL6562A-TM-80W schematic



6 Revision history

Table 4. Document revision history

Date	Revision	Changes
28-Sep-2007	1	Initial release

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