

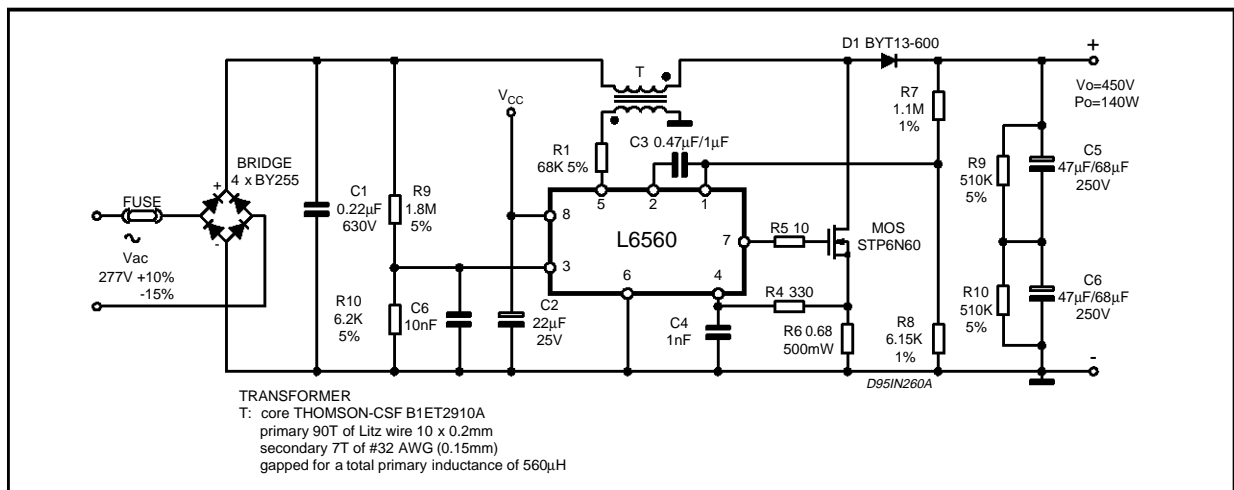
## L6560/A PFC IN LAMP BALLAST APPLICATIONS

The L6560 IC is especially designed to be used in lighting applications. In fact, the IC is very simple to use and its needs, in terms of external components, are minimized. Information about the use of the IC is given in the AN667; this section presents an overview of some circuits for ballast applications using L6560 in several configuration.

The first application (see fig 1) is a standard boost topology suitable for high mains input with the target specifications as follows:

Rated Mains	$V_{in(rms)} = 277 \text{ Vac (+10% -15%)}$
Max. Output Power	$P_o = 140\text{W}$
Output Voltage	$V_o = 450\text{V}$

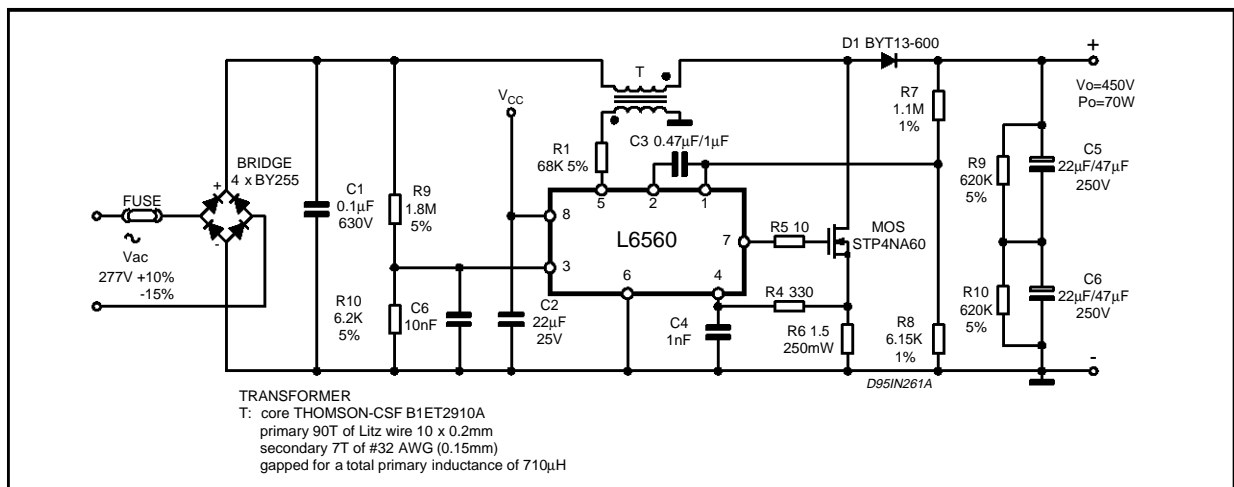
**Figure 1:**  $V_{MAINS} = 277\text{VAC}$ ,  $V_o = 450\text{V}$ ,  $P_o = 140\text{W}$



The second one (see fig 2) is still a boost topology with high mains input but it has a lower output power. The target specifications are:

Rated Mains	$V_{in(rms)} = 277 \text{ Vac (+10% -15%)}$
Max. Output Power	$P_o = 70\text{W}$
Output Voltage	$V_o = 450\text{V}$

**Figure 2:**  $V_{MAINS} = 277\text{VAC}$ ,  $V_o = 450\text{V}$ ,  $P_o = 70\text{W}$



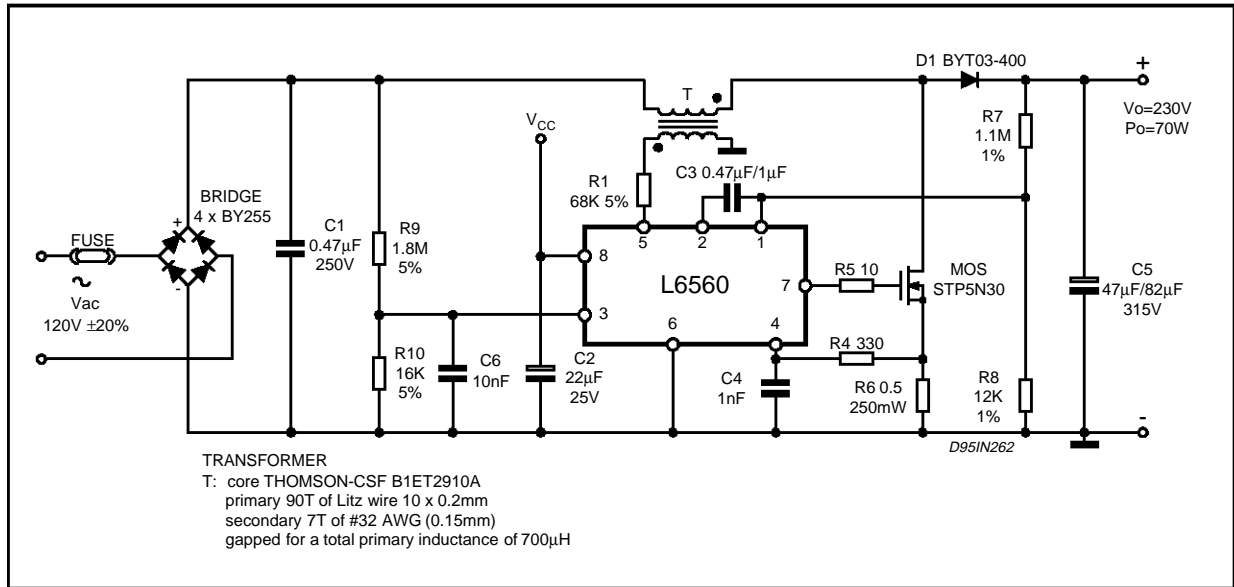
# APPLICATION NOTE

Note: The core of the transformer is oversized for the rated power, ETD core is generally an "easy to use" low cost solution.  
 For both the above described circuits, to sustain the high output voltage value, we suggest using two capacitor connected in series, 250V rated voltage each one.

The third solution (see fig 3) shows the same PFC configuration for a lower rated input mains,  
**Figure 3:**  $V_{MAINS} = 120VAC$ ,  $V_O = 230V$ ,  $P_O = 70W$

directed to a different market area. It can be noticed the lower rated parameter of some external components like MOS, D1, C1 and C5. The target specifications are:

Rated Mains	$V_{in(rms)} = 120 \pm 20\% Vac$
Max. Output Power	$P_O = 70W$
Output Voltage	$V_O = 230V$

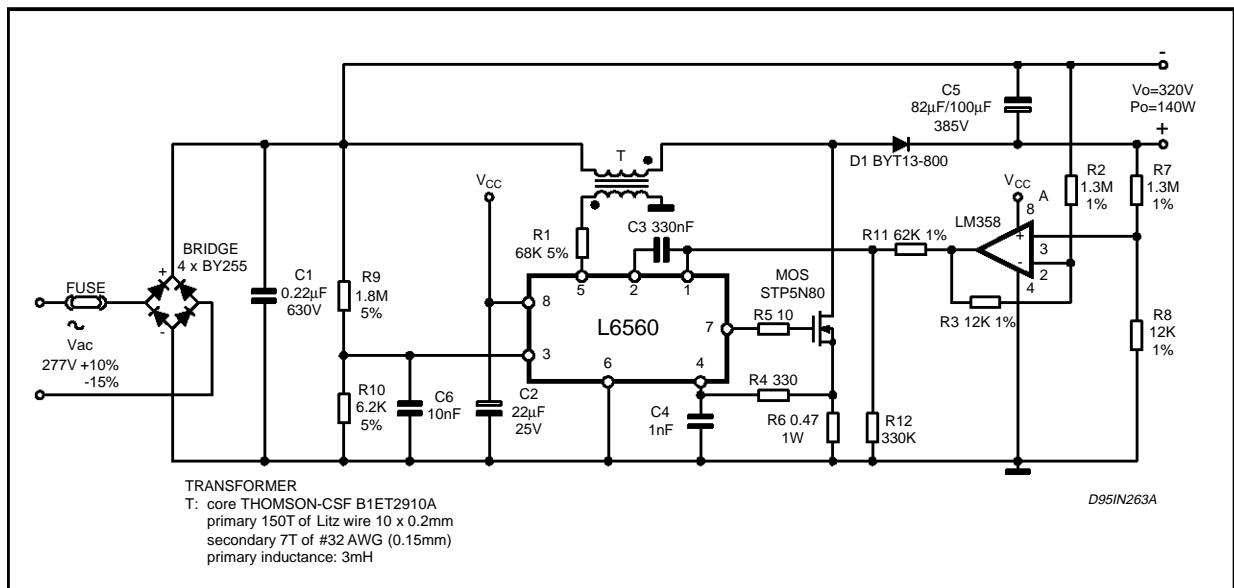


Here it is shown a different topology (see fig 4), suitable for PFC in lighting, that allows to keep the output voltage at an advantageous value even if the rated input mains value is high. This has been realized using a "Level shift configura-

tion" The target specifications are:

Rated Mains	$V_{in(rms)} = 277Vac (+10\% - 15\%)$
Max. Output Power	$P_O = 140W$
Output Voltage	$V_O = 320V$

**Figure 4:**  $V_{MAINS} = 277VAC$ ,  $V_O = 320V$ ,  $P_O = 140W$ , buck-boost topology



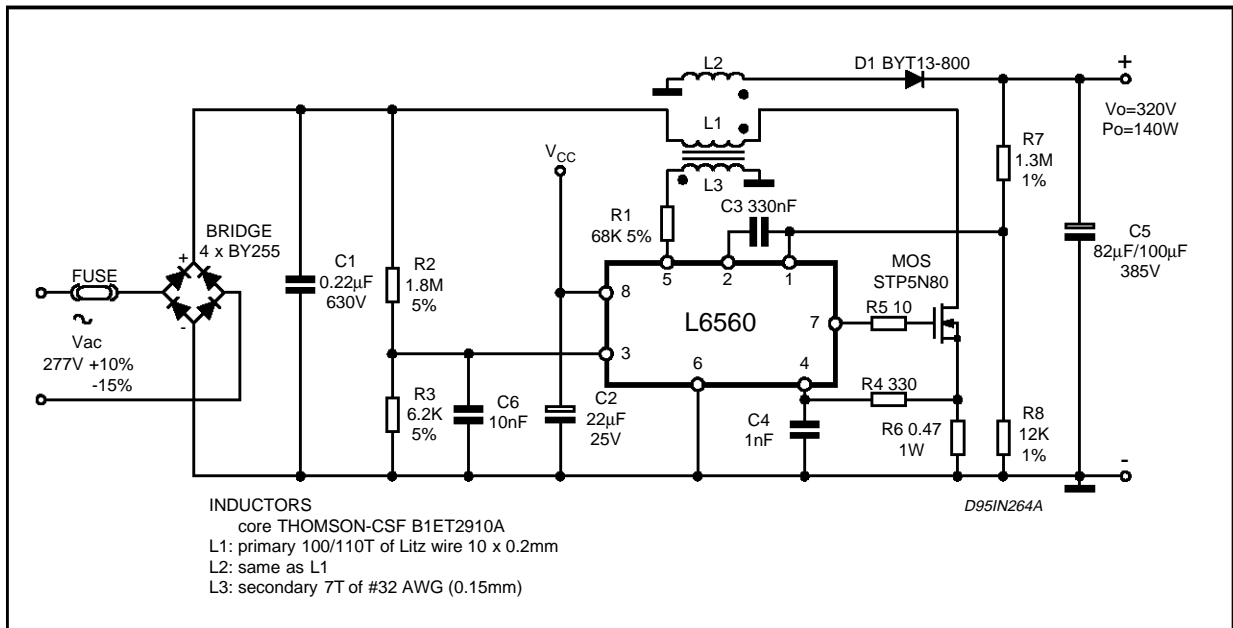
**Note:** This topology involves a peak inductor current higher than in the standard boost topology, so a bigger EMI filter is necessary. An external E/A is used to shift the output feedback. The ground of the PFC section is not the same of the ballast one.

A flyback topology (see fig 5), allows the same advantages as the previous application with level shift configuration but with a common ground. The target specifications are:

Rated Mains	$V_{in(rms)} = 277V_{ac} (+10\% - 15\%)$
Max. Output Power	$P_o = 140W$
Output Voltage	$V_o = 320V$

**Note:** This last topology involves higher peak current in the transformer in comparison with the standard boost topology, this requiring a bigger EMI filter. The transformer assembly is more complicated than the inductor with the auxiliary winding used for the other applications.

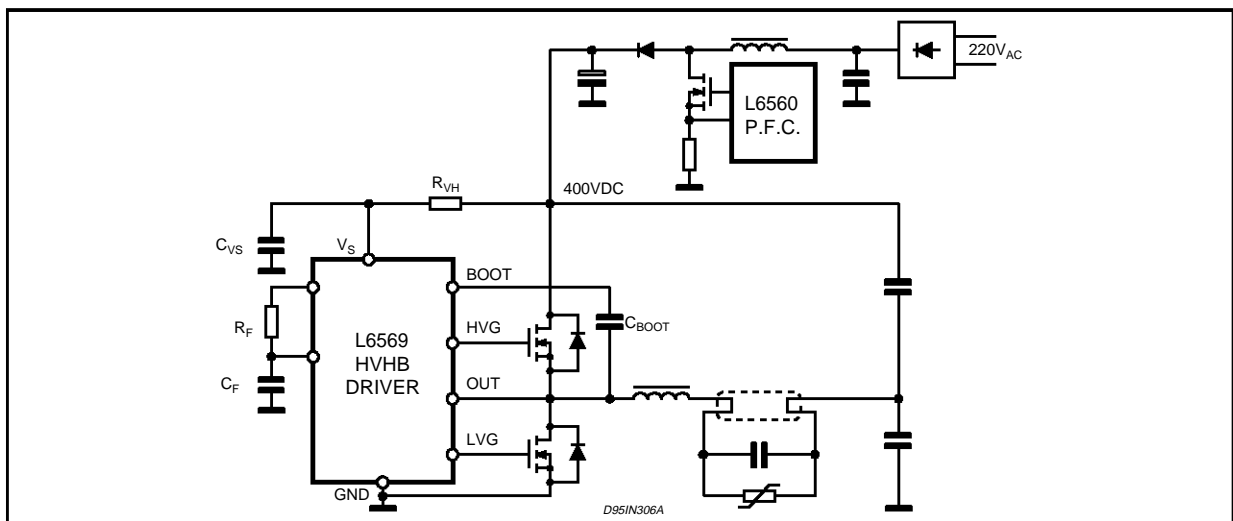
**Figure 5:** Circuit with  $V_{MAINS} = 277V_{AC}$ ,  $V_o = 320V$ ,  $P_o = 140W$ , flyback topology



Finally, fig. 6 shows a block diagram of a common electronic ballast. The PFC section is based on

the already described L6560 PFC controller, and the ballast section is based on the L6569, high voltage push-pull gate driver.

**Figure 6:** Electronic ballast.



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