SGS-THOMSON MICROELECTRONICS

APPLICATION NOTE

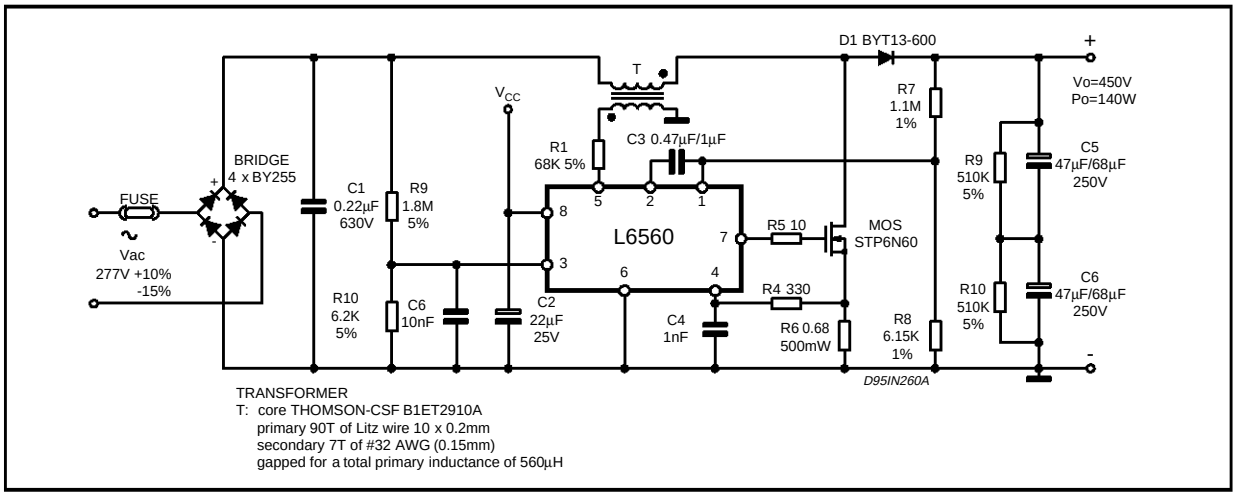
L6560/A PFC IN LAMP BALLAST APPLICATIONS

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 Vac (+10% -15%)
Max. Output Power	P_o = 140W
Output Voltage	V_o = 450V

Figure 1: V_{MAINS} = 277VAC, V_O = 450V, P_O = 140W

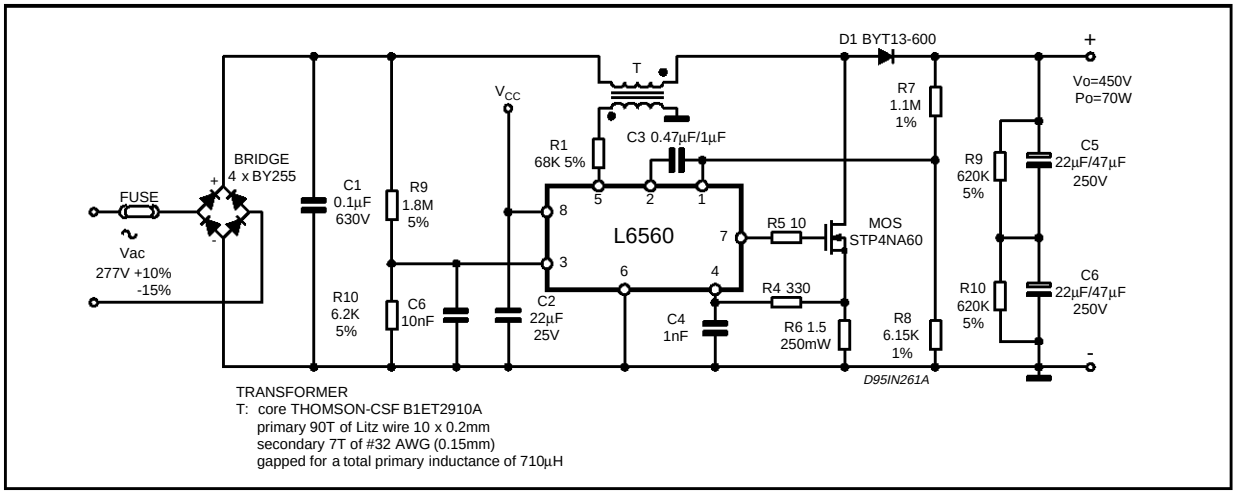


TRANSFORMER
T: core THOMSON-CSF B1ET2910A
primary 90T of Litz wire 10 x 0.2mm
secondary 7T of #32 AWG (0.15mm)
gapped for a total primary inductance of 560µH

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 Vac (+10% -15%)
Max. Output Power	P_o = 70W
Output Voltage	V_o = 450V

Figure 2: V_{MAINS} = 277VAC, V_O = 450V, P_O = 70W



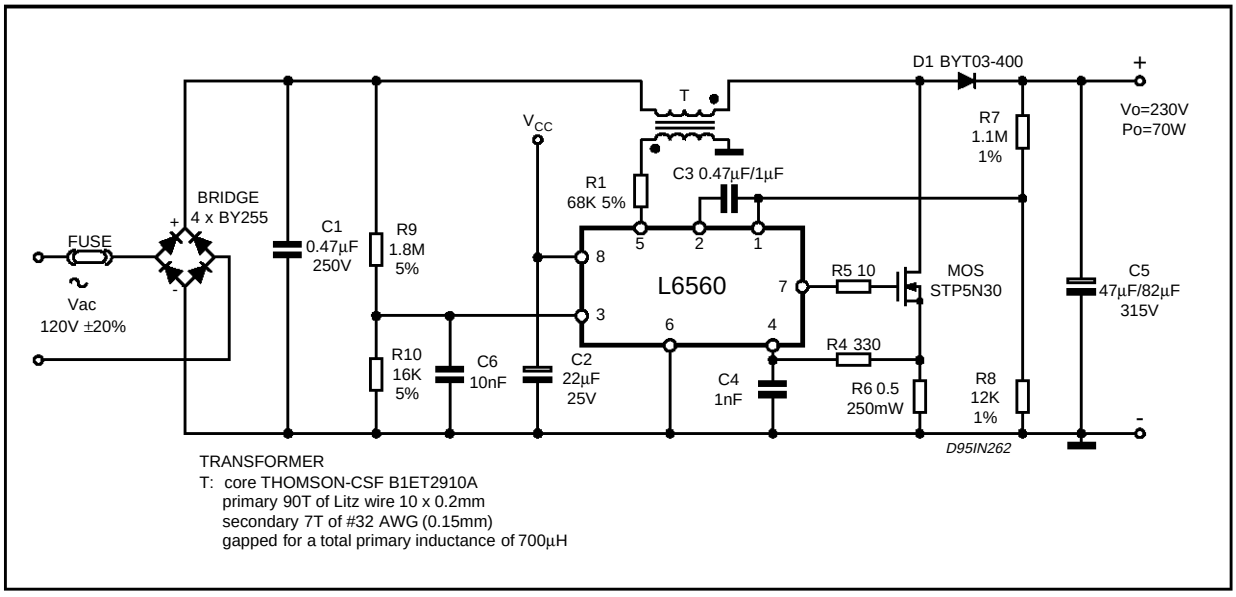
TRANSFORMER
T: core THOMSON-CSF B1ET2910A
primary 90T of Litz wire 10 x 0.2mm
secondary 7T of #32 AWG (0.15mm)
gapped for a total primary inductance of 710µH

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, 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 ±20% Vac
Max. Output Power	P_o = 70W
Output Voltage	V_o = 230V

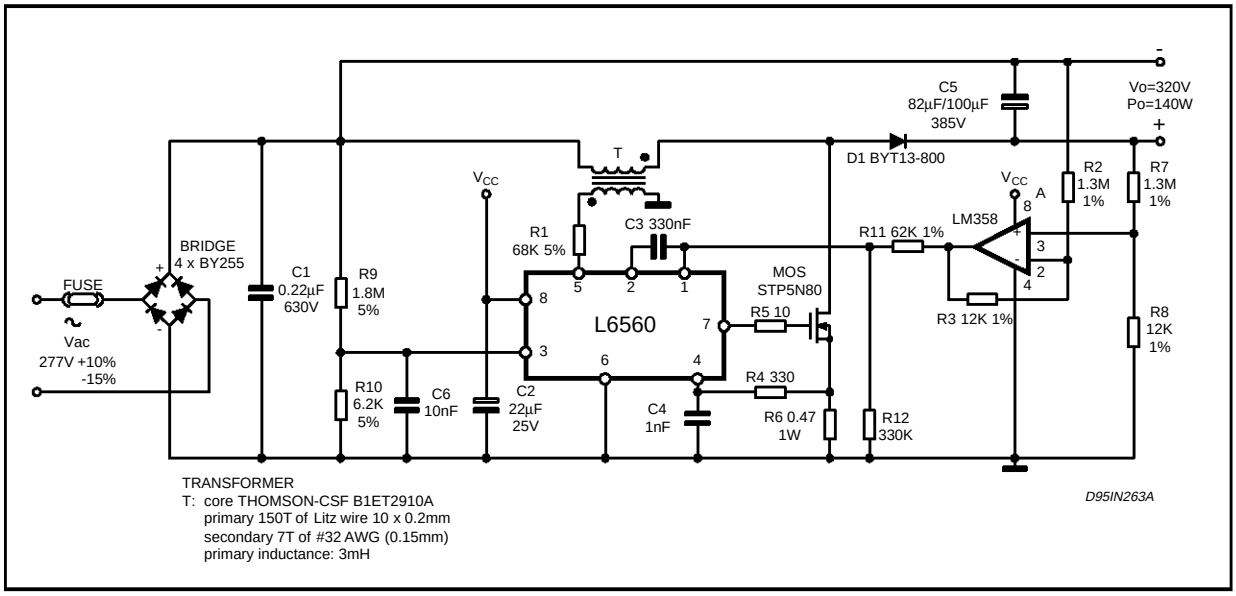
Figure 3: V_{MAINS} = 120VAC, V_O = 230V, P_O = 70W



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 configuration" 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



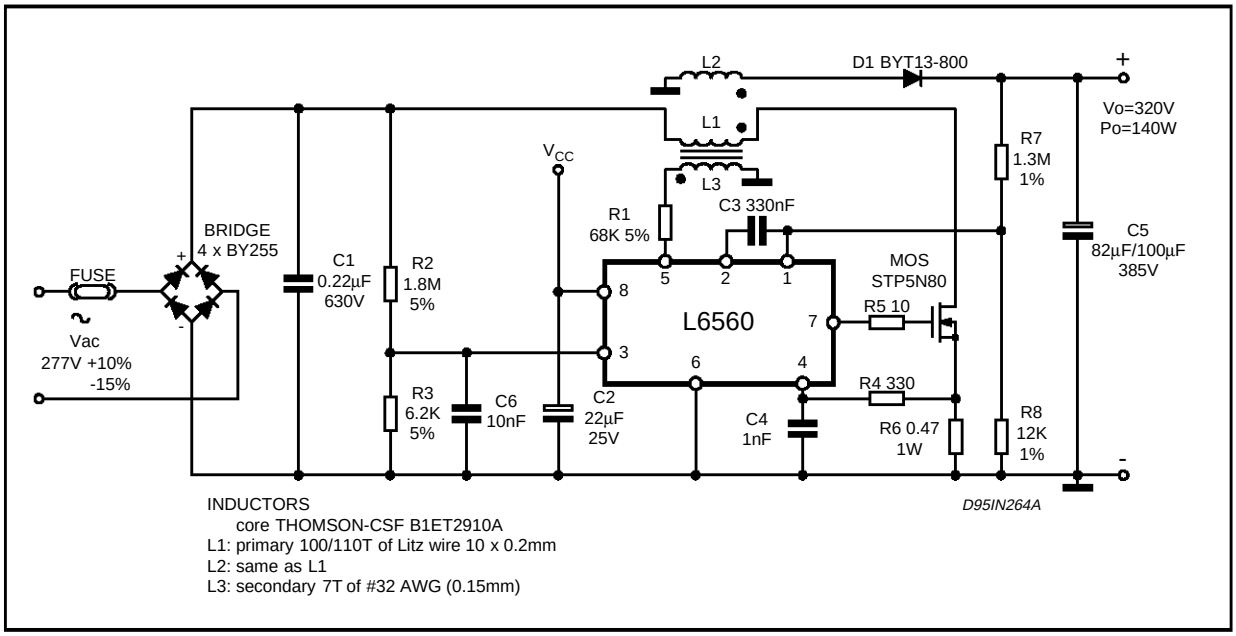
Note: This topology involves a peak inductor current higher than in the standard boost topology, so a bigger EMI filter is necessary. An external E/A is used to shift the output feedback. The ground of the PFC section is not the same of the ballast one.

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

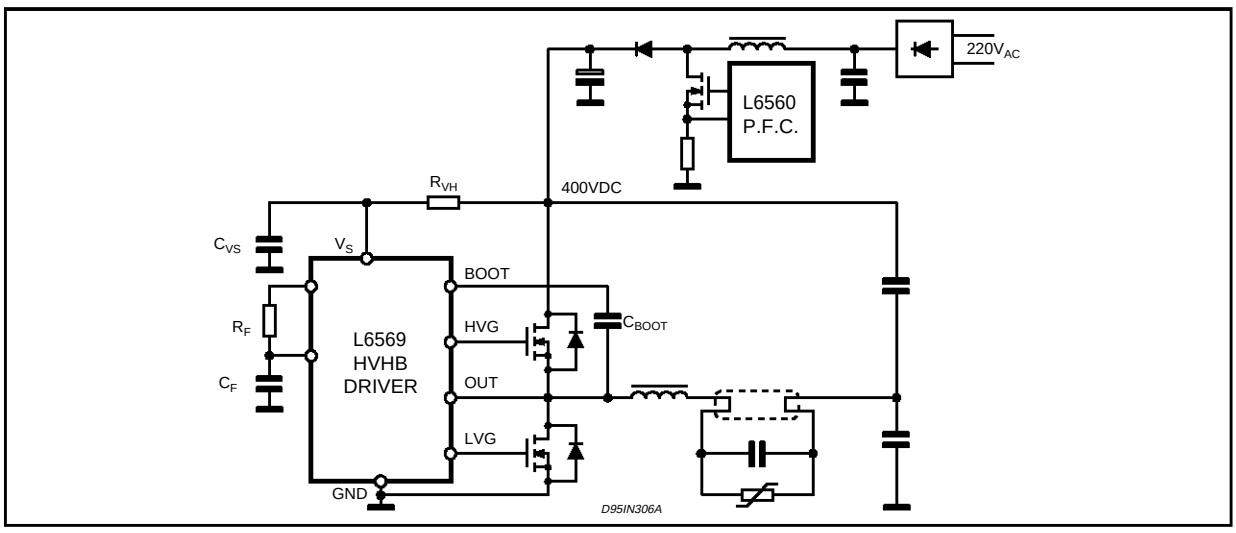
Note: This last topology involves higher peak current in the transformer in comparison with the standard boost topology, this requiring a bigger EMI filter. The transformer assembly is more complicated than the inductor with the auxiliary winding used for the other applications.

Figure 5: Circuit with V_{MAINS} = 277VAC, 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.



littlediode
COMPONENTS FOR ALL

Littlediode supplies new, hard to find or obsolete electronic components and semiconductors all over the world.

With over two million different components listed you are sure to find the part you need.

Feel free to visit us today at our online store:

LittleDiode.com

Looking forward to providing you with the best possible service.