Output Current Selection for RediSem LED drivers

This document provides design information for output current selection options for RediSem LED drivers. There are two methods of changing the output current in one driver: change the signal on the IC's CS (Current Sense) pin (***Input select***), or by changing the transformer turns ratio (***Output Select***).

Input Select

Selecting the output current by changing the signal on the CS pin is the simplest and lowest cost method of changing the output current. Using this method the output voltage remains the same so the output power is different for each current setting. The current selection range should be limited because THD and Power factor changes with the different settings and can drop out of specification.

Resistor select output current

This is the lowest cost method of selecting output current. The IC will regulate the voltage on the CS pin. If a potential divider is used to reduce the voltage on the on the CS resistor (0R39 in figure 1), the IC will increase the voltage across the CS resistor to maintain the same voltage on the CS pin. This means that as the resistance between the CS pin and GND reduces, the output current increases. Figure 1 shows a typical example circuit of a 1A output LED driver.

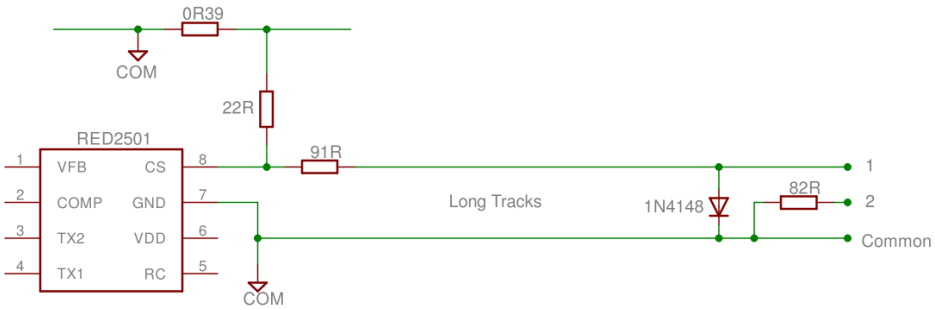

Figure 1: Current selection on the IC's CS pin

Using Figure 1 as an example, connecting to the terminals:

- Connect Pin 1 to Common to achieve the highest current setting
- Open circuit all the terminals to achieve the lowest current setting
- Connect pins 1 & 2 to generate a current between max and min
- A variable resistor, DIP switch or multiple terminals can all generate different output currents
- Be careful to keep the components in the correct places on the PCB to minimize noise. Note where the long tracks should be that link the terminal on the connector block to the CS pin
- Note that a 1N4148 has been added to help with ESD protection

AC select output current

We can change the output current by adding a select pin on the mains input:

- Add an extra select pin to input connector, so: Live, Neutral & Select
- Connect nothing to the Select pin => minimum current setting
- Connect Neutral to the Select pin => middle current setting
- Connect Live to the Select pin and => maximum current setting
- This selection can only reduce the output power of the converter.
- Current selection range should not be too large. Suggest 100%, 85% and 70%

The schematic in figure 2 gives an example of a galvanically isolated 60W driver which shows how to configure the driver to select input and output:

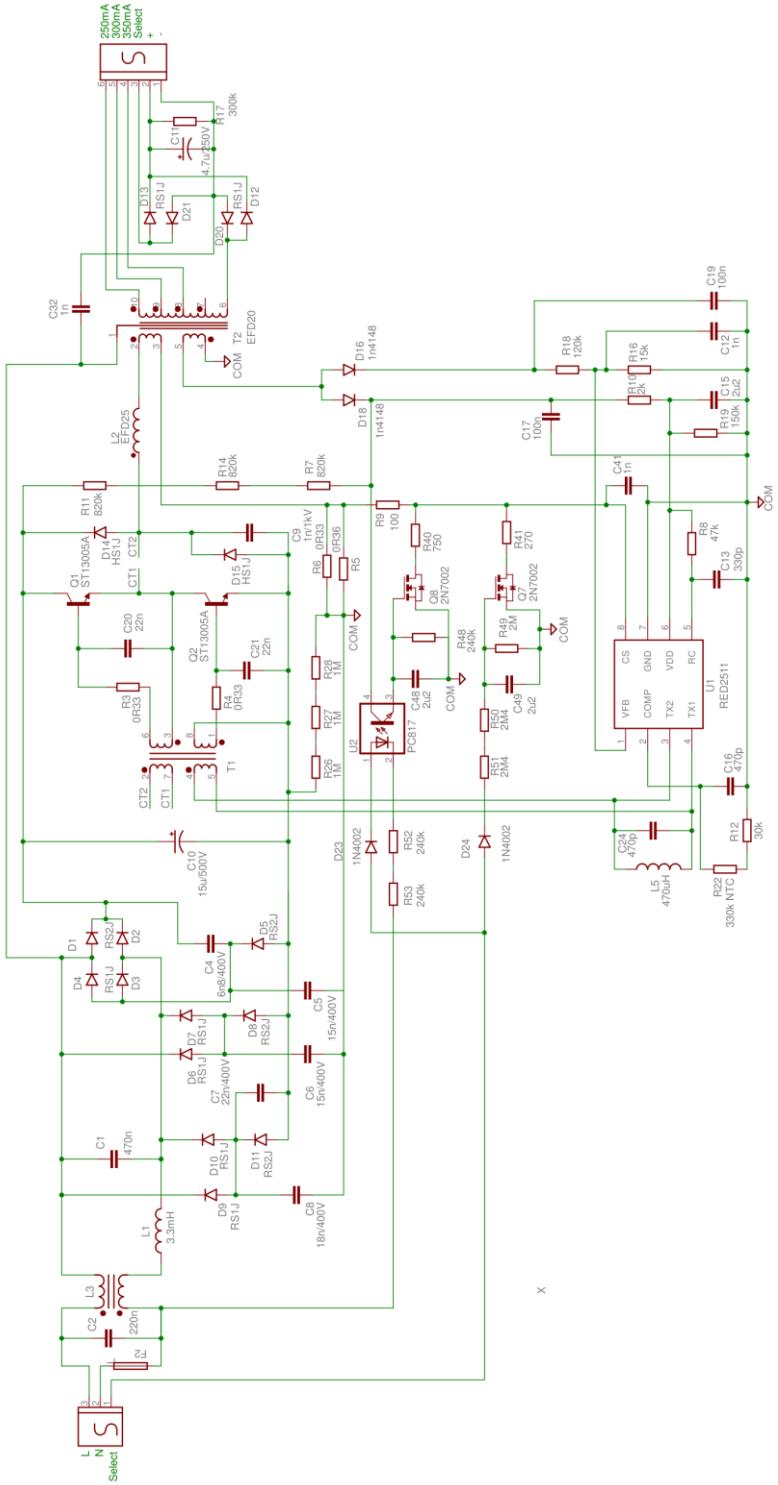

Figure 2: Schematic showing AC select and Multiple outputs

Output Select

When changing the transformer turns ratio, a big benefit is that the output power remains the same for each setting. It also means that the voltage range changes for different current settings

Switchable output setting

We can add a switch or selection to the output to choose between different current settings.

- EMI is not bad on the secondary so it is possible to add the terminals C, 1, 2, 4, 8 as terminals on the output
- Works particularly well with a high voltage output

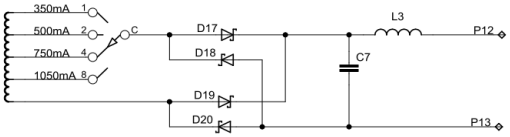

Figure 3: Switchable outputs

Multiple outputs

The converter is a forward type converter, so output current scales exactly with turns. For example, double the number of secondary turns and the output current will exactly halve.

- Customer can connect to either of the outputs for the required current
- E-caps can be stacked to save cost and space
- It is usually best to have a triple-insulated primary otherwise the secondary windings can be bulky

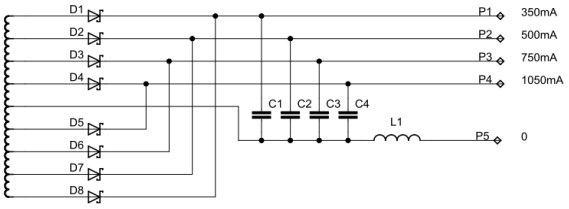

Figure 4: Multiple transformer tappings and multiple outputs

About RediSem

RediSem designs and supplies semiconductor ICs for energy efficient power management applications. RediSem uniquely combines extensive experience in power electronics with in-depth knowledge of IC design and manufacturing and works with the world's top suppliers and customers. RediSem's unique patented IC and converter technologies deliver maximum efficiency and performance, while reducing overall bill of materials cost through the use of bipolar transistors.

RediSem's range of LED control ICs can be used with RediSem's patented single stage LED control solution to provide very high efficiencies with low EMI – all with a single IC. When combined, these features deliver a low cost, high performance LED driver solution.

RediSem's fluorescent driver controller ICs achieve the advanced performance of MOSFET drivers by using bipolar transistors at a fraction of the BOM cost. RediSem's range of SMPS (Switched Mode Power Supply) control ICs enables low-cost LLC converters with bipolar transistors that deliver very high efficiencies already meeting DoE Level VI regulations, have low standby power and have much lower EMI compared to flyback converters.

All RediSem ICs are supported by comprehensive turn-key application designs enabling rapid time to market. For further information please use our contact details below

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