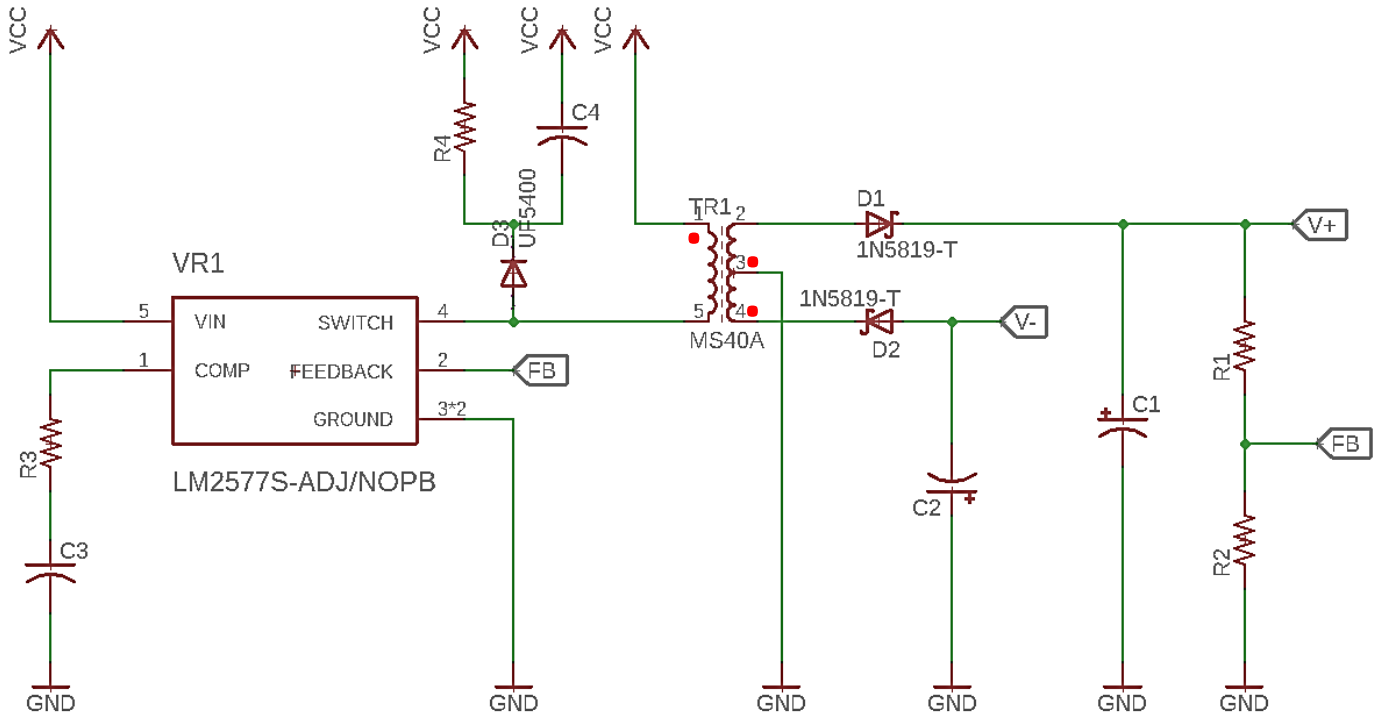
Fuente flyback



Relación de transformación:

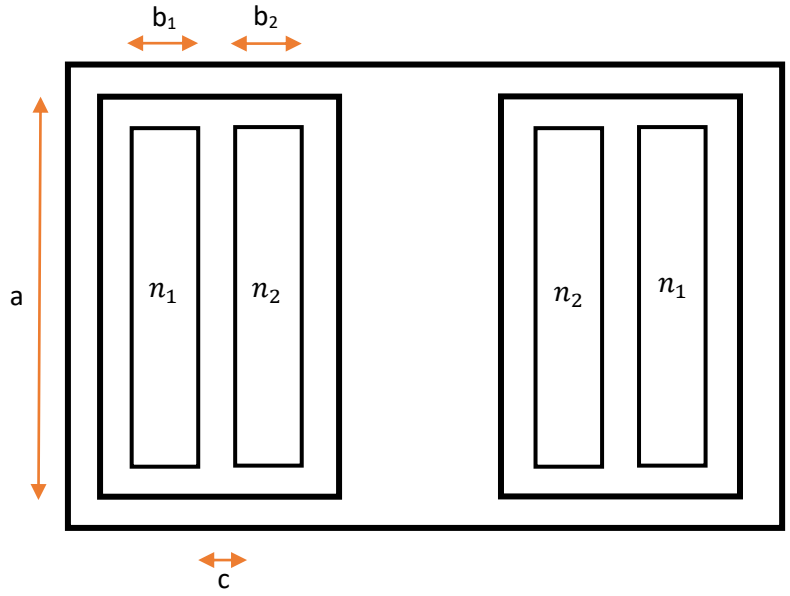
$$\frac{V_p}{V_s} = \frac{n_1}{n_2} \cong \frac{I_2}{I_1} \quad [1]$$

Relación de impedancias:

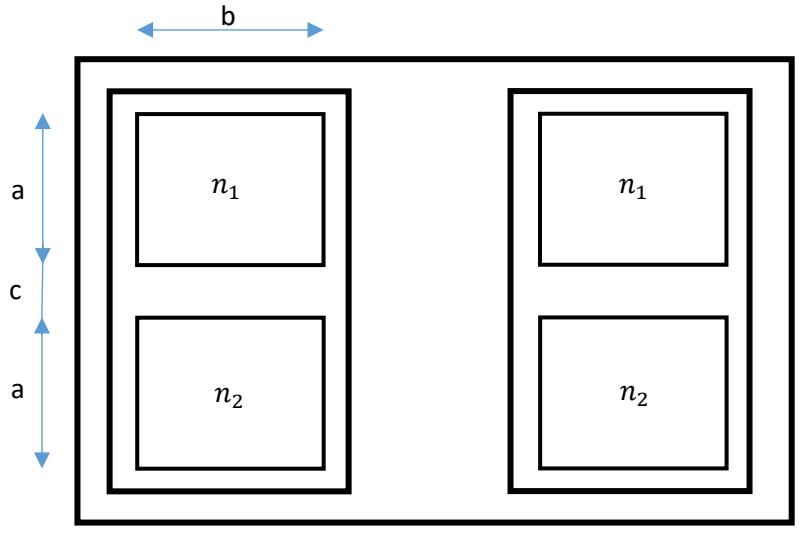
$$\frac{Z_1}{Z_2} = \frac{n_1^2}{n_2^2} \quad [2]$$

Conocido A_L podemos despejar el número de espiras o sabiendo el número de espiras y la inductancia calculamos A_L:

$$n = \sqrt{\frac{L}{A_L}} \quad \text{ó} \quad A_L = \frac{L}{n^2}$$



$$L_{d1} = \frac{1.2\ l_m\ n_1^2}{a}\left(c + \frac{b_1 + b_2}{3}\right) 10^{-10}$$



$$L_{d2} = \frac{1.33\ l_m\ n_1^2}{b}\left(c + \frac{\sum a}{3}\right) 10^{-10}$$

Procedimiento de diseño

1. Selección del transformador

Transformer Type		Input Voltage	Dual Output Voltage	Maximum Output Current
	L_P = 100 µH	5V	±10V	325 mA
1	N = 1	5V	±12V	275 mA
		5V	±15V	225 mA
		10V	±10V	700 mA
		10V	±12V	575 mA
2	L_P = 200 µH	10V	±15V	500 mA
	N = 0.5	12V	±10V	800 mA
		12V	±12V	700 mA
		12V	±15V	575 mA
3	L_P = 250 µH	15V	±10V	900 mA
	N = 0.5	15V	±12V	825 mA
		15V	±15V	700 mA

2. Red de compensación

$$R_c \leq \frac{750\, I_{Max} \left(15 + V_{in(min)}\, N\right)^2}{V_{in(min)}^2}$$

Donde I_{Max} es la corriente máxima requerida en ambas salidas.

$$C_{out} \geq \frac{0{,}19\, R_c\, L_p\, I_{Max}}{15\, V_{in(min)}}$$

$$C_C \geq \frac{58{,}5\, C_{out}\, V_{out} \left(V_{out} + \left(V_{in(min)}\, N\right)\right)}{R_c^2\, V_{in(min)}\, N}$$

3. Fórmulas del regulador Flyback

$$D = \frac{V_{out} + V_F}{N(V_{in} - V_{sat}) + V_{out} + V_F}$$

$$\Delta I_p = \frac{D(V_{in} - V_{sat})}{L_p \; 52000}$$

$$I_{p(PK)} = \frac{N}{\eta} \frac{I_{Max}}{1 - D} + \frac{\Delta I_p}{2}$$

$$V_{Sw(off)} = V_{in} + \frac{V_{out} + V_F}{N}$$

$$V_{out} = 1{,}23 \left(1 + \frac{R_1}{R_2}\right)$$

4. Red snubber

$$C \geq \frac{0{,}02 \; L_p \; I_{p(PK)}^2}{\left(V_{clamp}^2 - V_{Sw(off)}\right)^2}$$

$$R \leq \left(\frac{V_{clamp} + V_{Sw(off)} - V_{in}}{2}\right)^2 \left(\frac{19{,}2 \; 10^{-4}}{L_p \; I_{p(PK)}^2}\right)$$