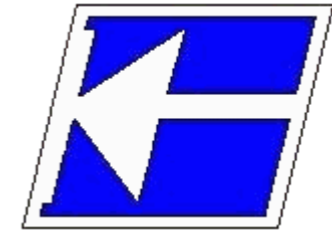


Instituto Federal de Educação, Ciência e Tecnologia de Santa Catarina

Departamento Acadêmico de Eletrônica

Eletrônica de Potência



# Conversores CC-CC Isolados

Prof. Clovis Antonio Petry.

Florianópolis, abril de 2015.

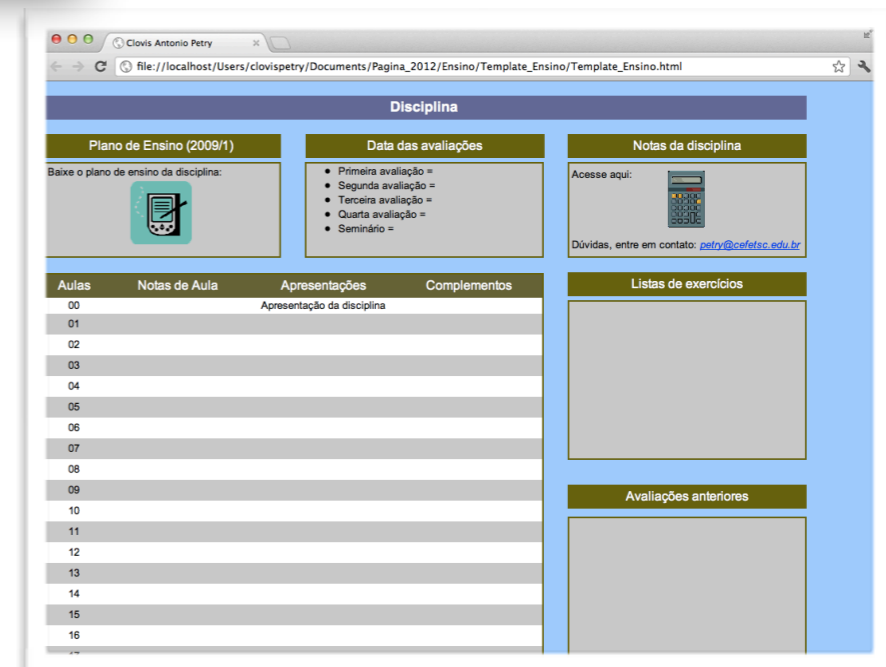
# Biografia para Esta Aula

## Capítulo 9 - Conversores cc-cc:

- Conversores cc-cc isolados.



[www.ProfessorPetry.com.br](http://www.ProfessorPetry.com.br)



Screenshot of a web page for a discipline, showing a table of classes and a sidebar with navigation options.

Aulas	Notas de Aula	Apresentações	Complementos
00		Apresentação da disciplina	
01			
02			
03			
04			
05			
06			
07			
08			
09			
10			
11			
12			
13			
14			
15			
16			

Disciplina

Plano de Ensino (2009/1)

Data das avaliações

- Primeira avaliação =
- Segunda avaliação =
- Terceira avaliação =
- Quarta avaliação =
- Seminário =

Notas da disciplina

Acesse aqui:

Dúvidas, entre em contato: [petry@cefetsc.edu.br](mailto:petry@cefetsc.edu.br)

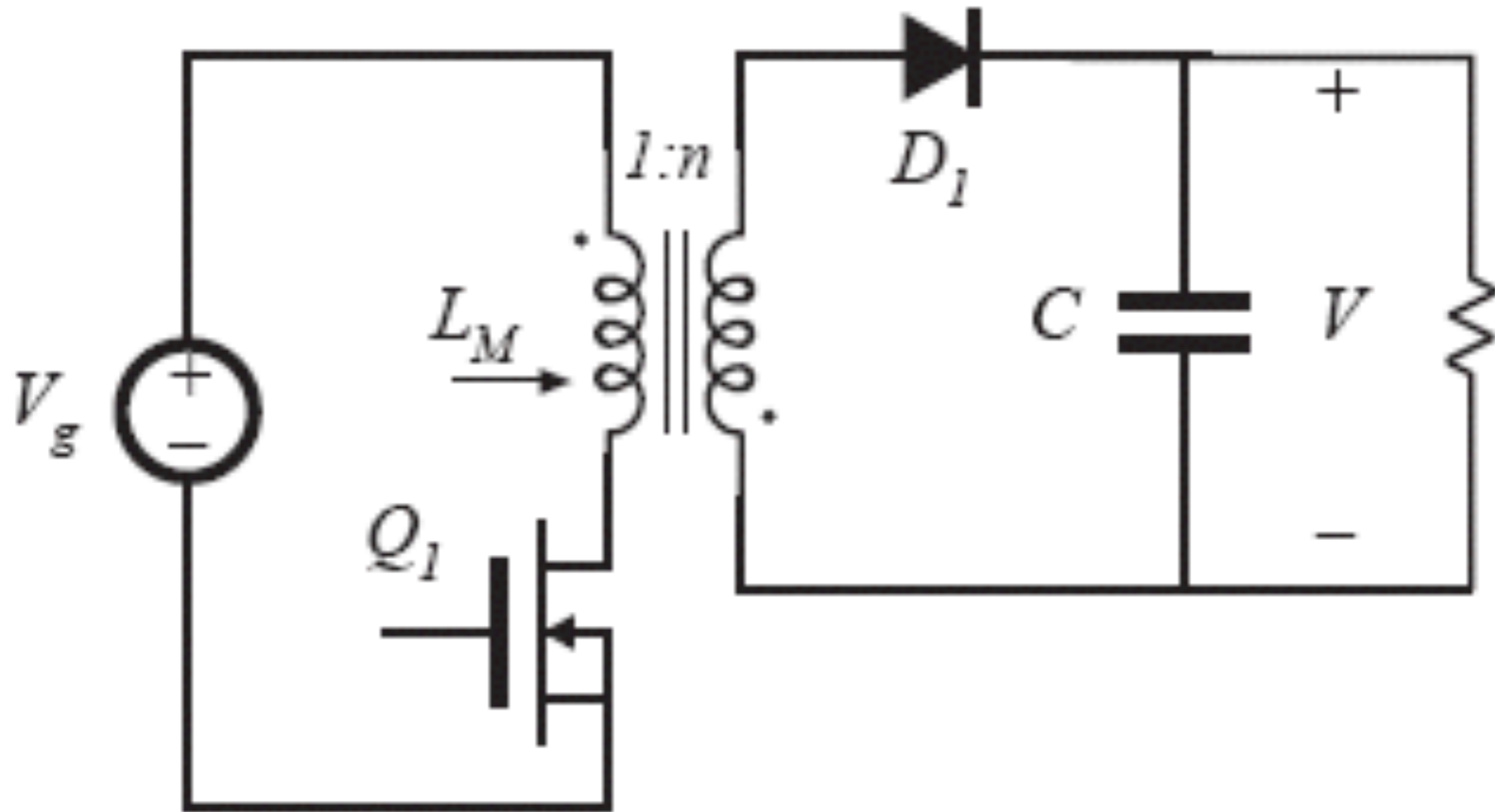
Listas de exercícios

Avaliações anteriores

## Conversores cc-cc isolados:

- Conversor Flyback;
- Conversor Forward;
- Outros conversores isolados.

# Conversor Flyback



# Conversor Flyback

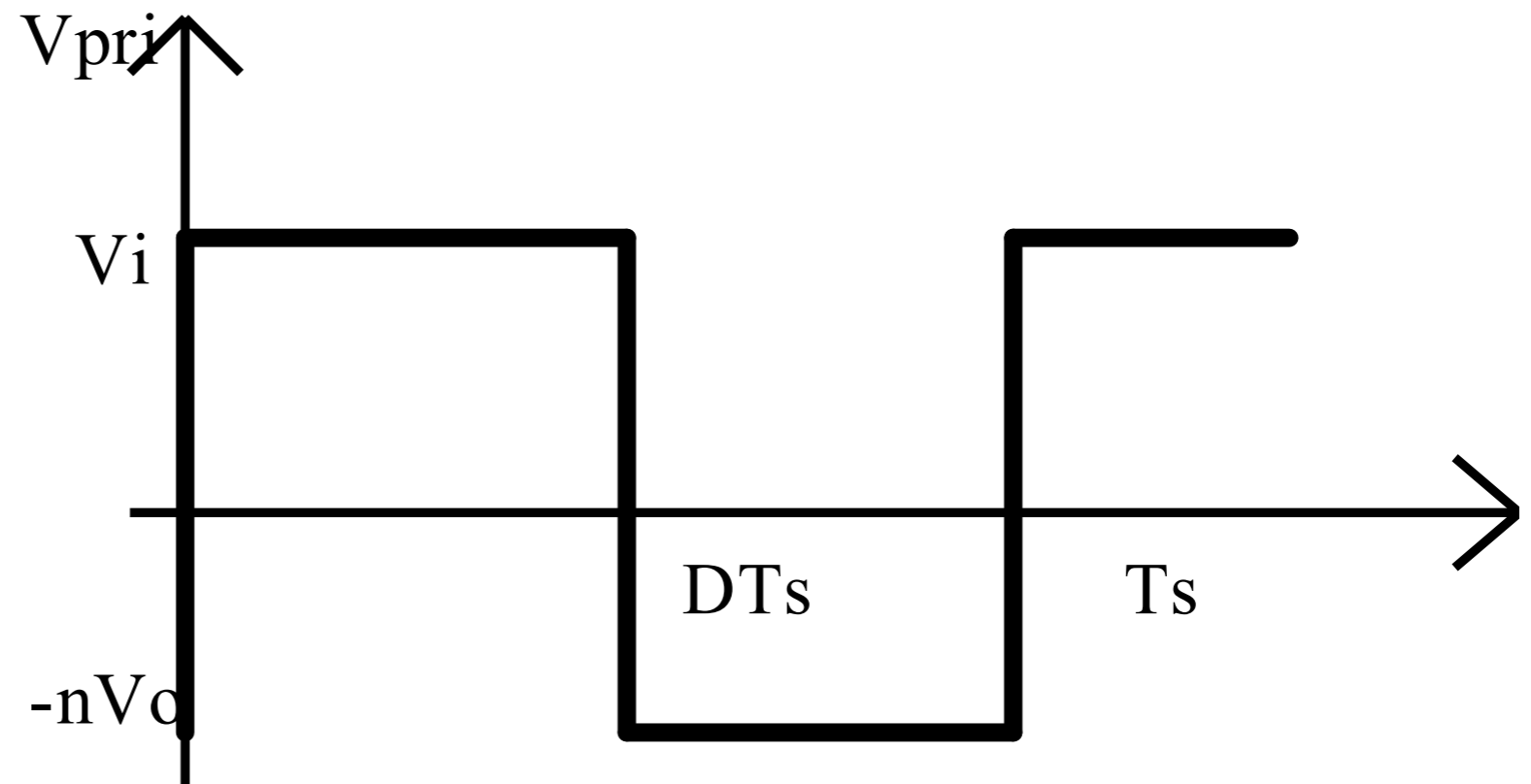
$$V_{pri} = \frac{1}{T_s} \int_0^{D \cdot T_s} V_i \cdot dt + \frac{1}{T_s} \int_{D \cdot T_s}^{T_s} (-n \cdot V_o) \cdot dt$$



$$\frac{n \cdot V_o}{V_i} = \frac{D}{1 - D}$$

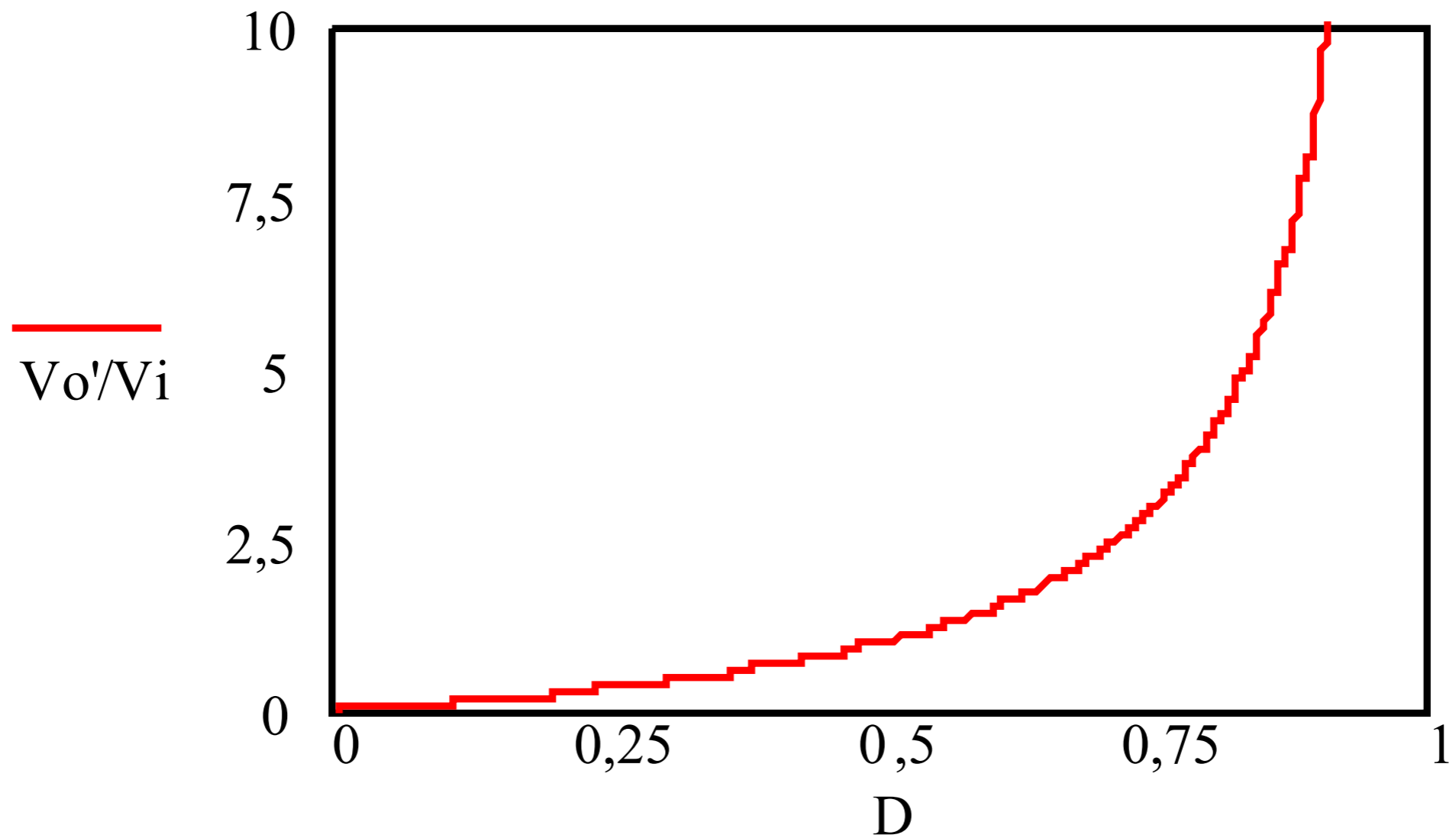
$$V'_o = n \cdot V_o$$

$$\frac{V'_o}{V_i} = \frac{D}{1 - D}$$

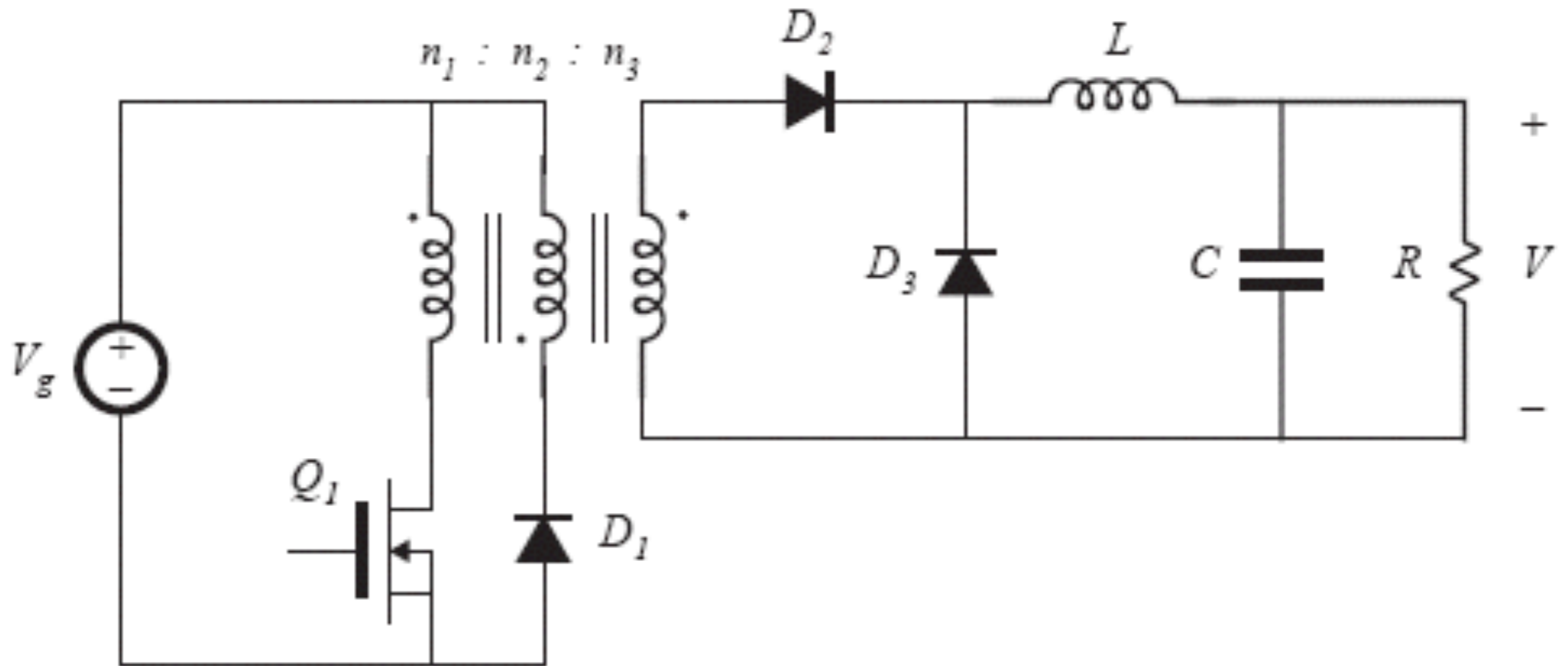


# Conversor Flyback

Ganho estático em função da razão cíclica:



# Conversor Forward



# Conversor Forward

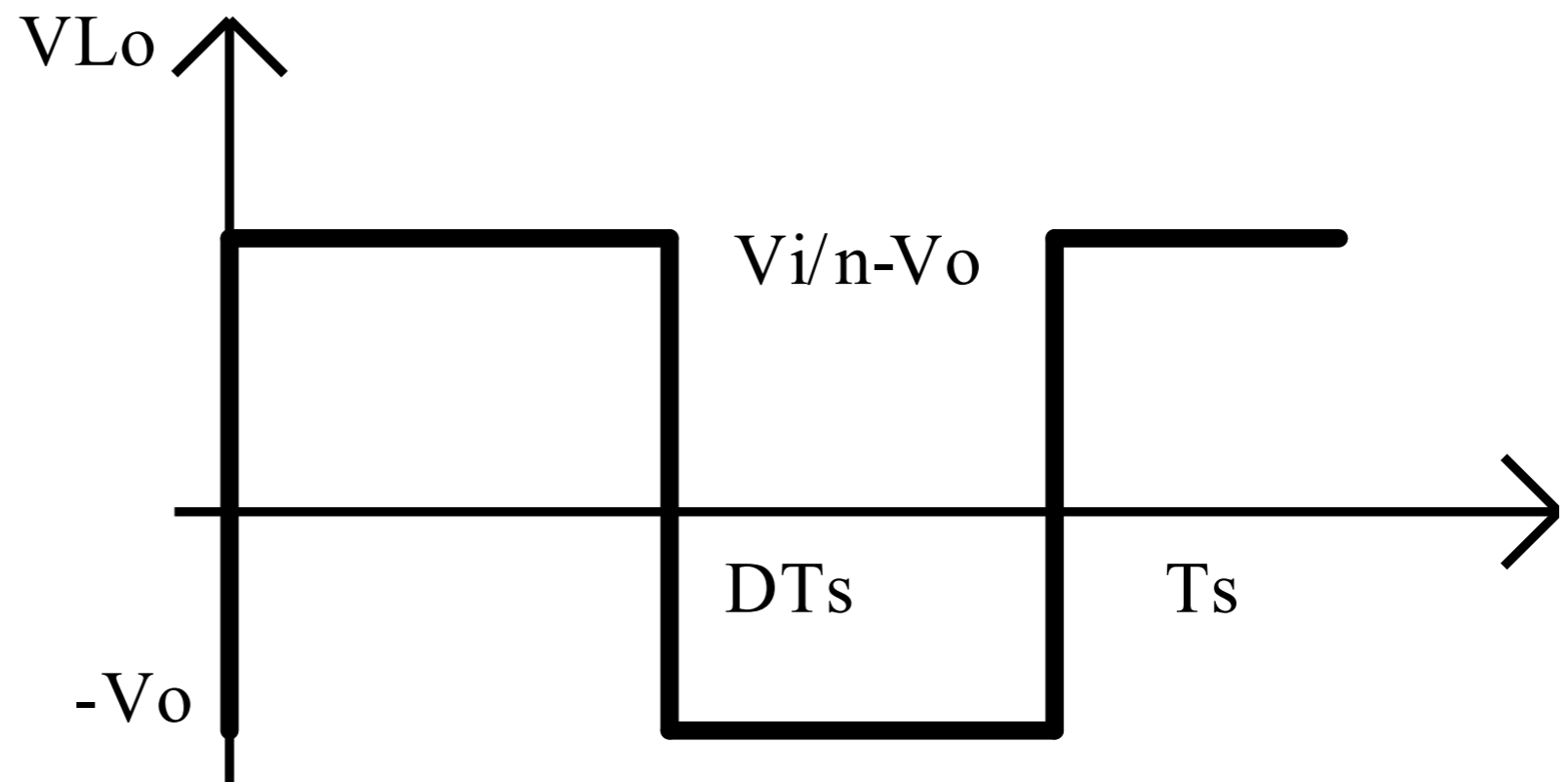
$$\frac{1}{T_s} \int_0^{DT_s} \left( \frac{V_i}{n} - V_o \right) dt = \frac{1}{T_s} \int_0^{(1-D)T_s} V_o dt$$



$$\frac{n \cdot V_o}{V_i} = D$$

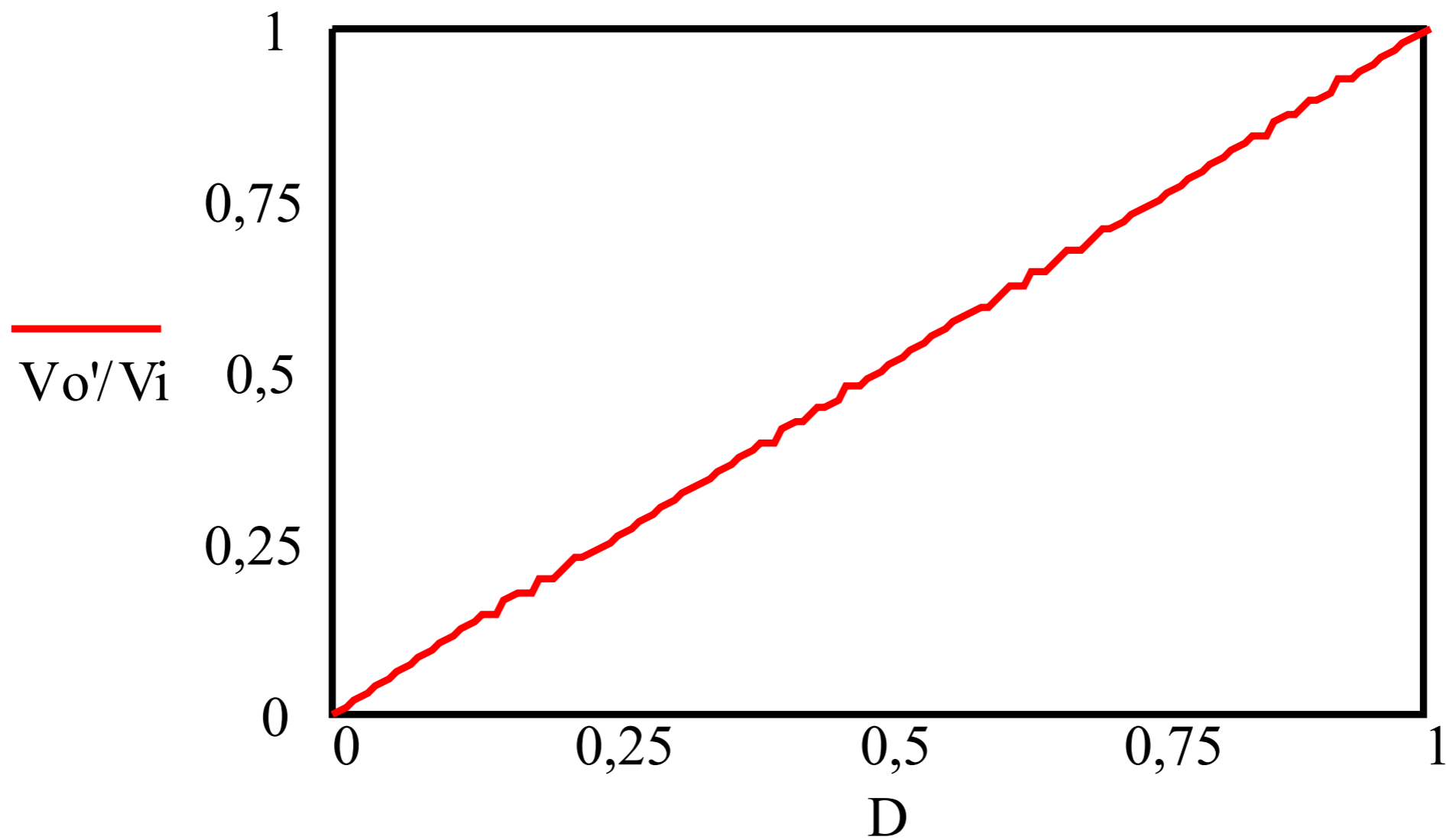
$$V'_o = n \cdot V_o$$

$$\frac{V'_o}{V_i} = D$$

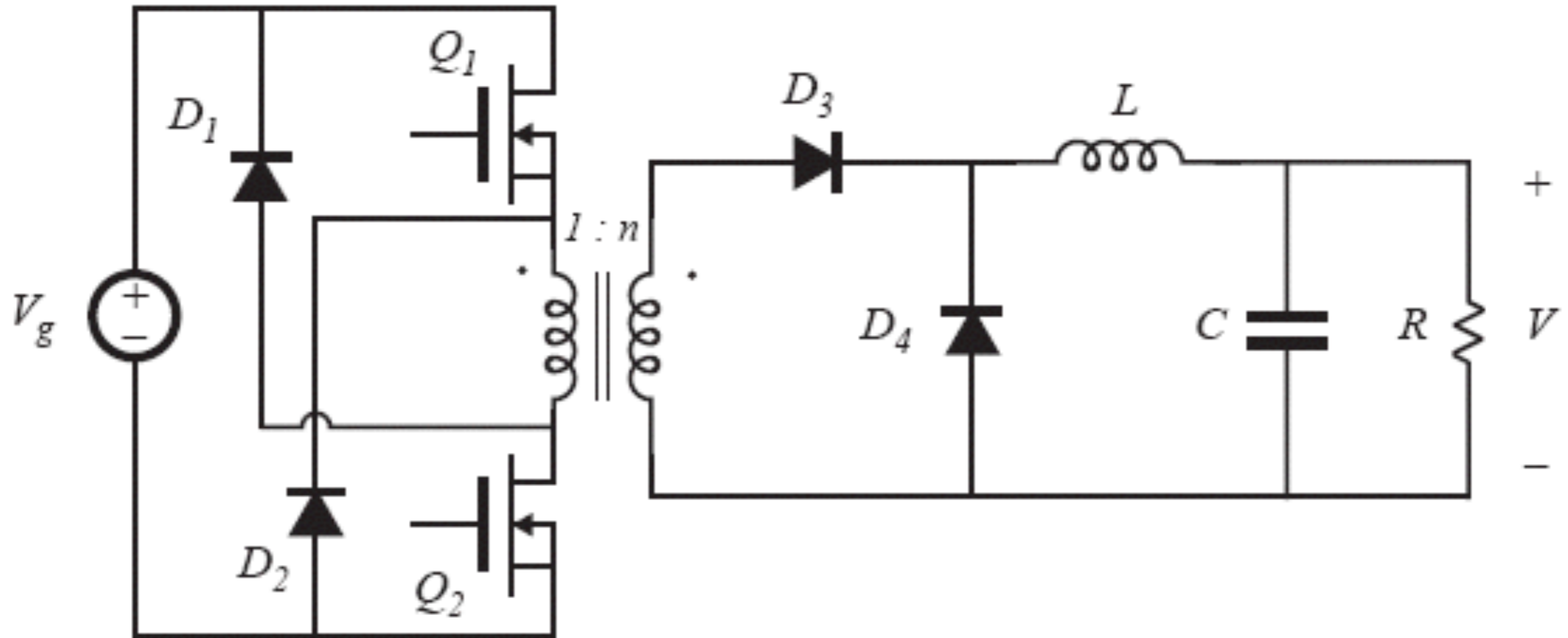


# Conversor Forward

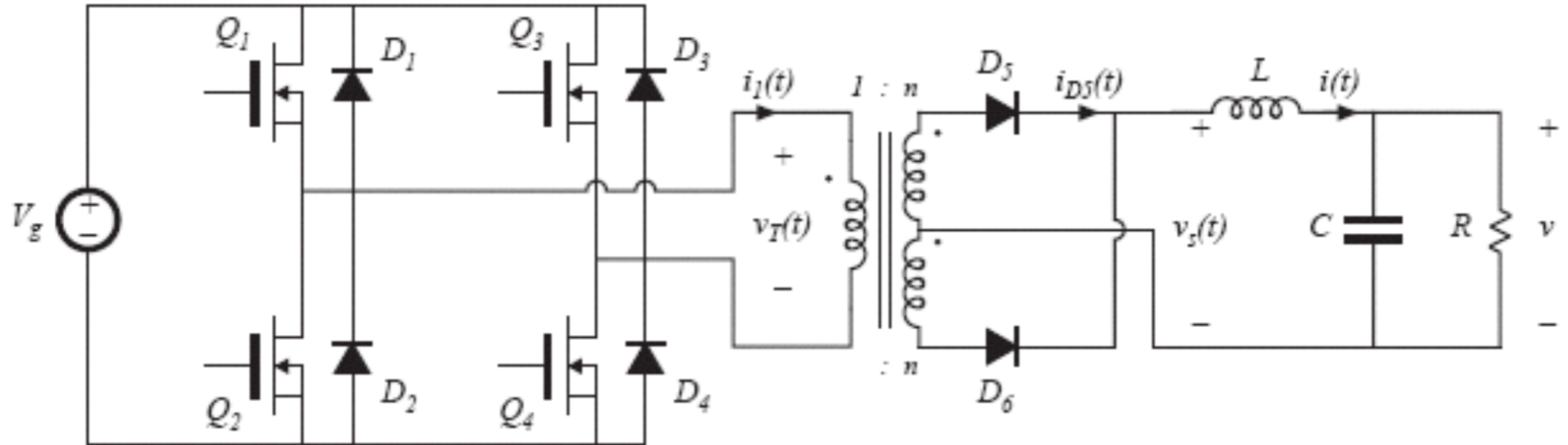
Ganho estático em função da razão cíclica:



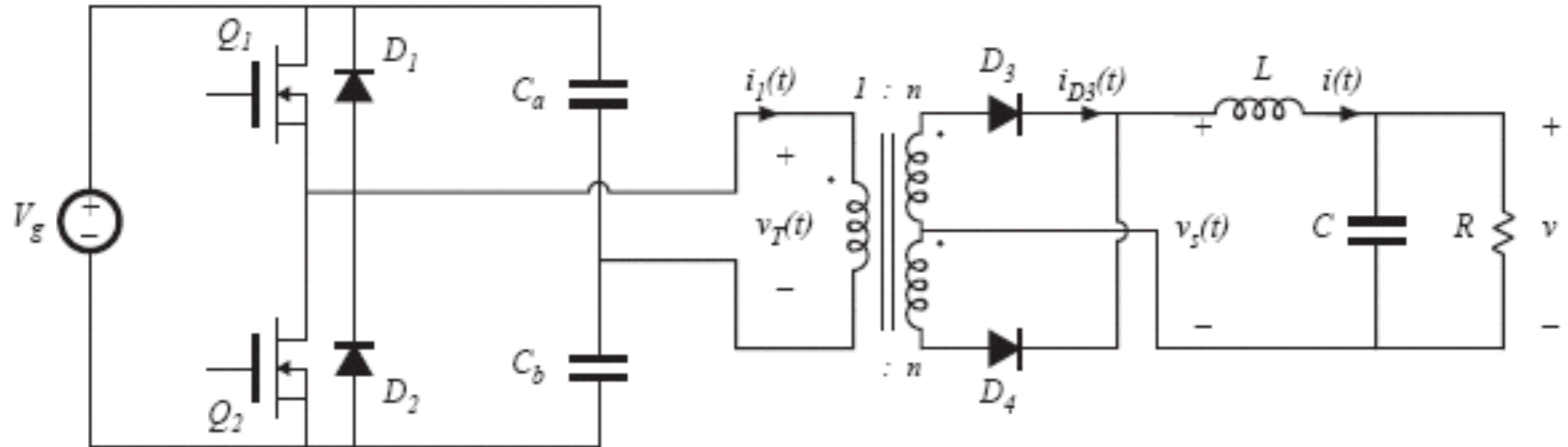
# Conversor Forward com Dois Transistores



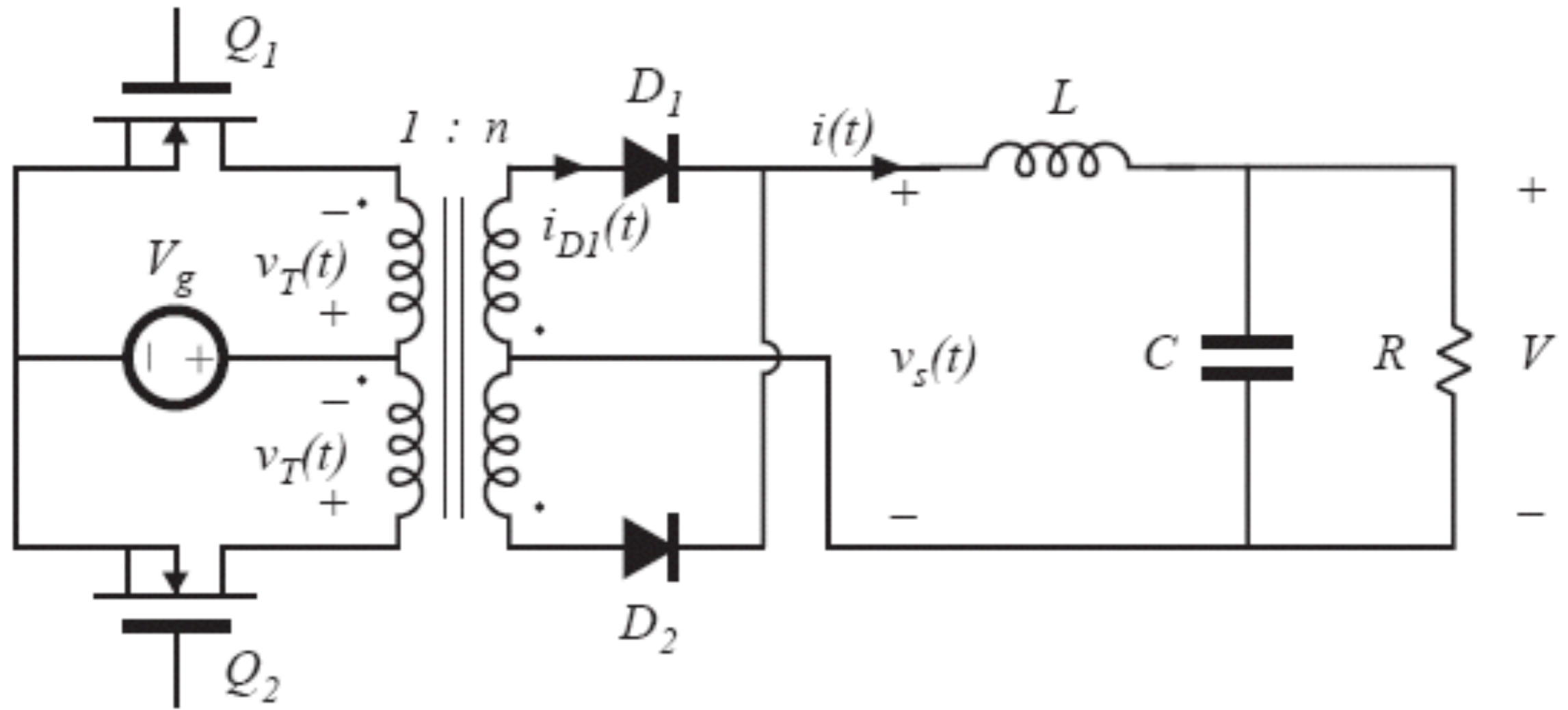
# Conversor Ponte Completa Isolado



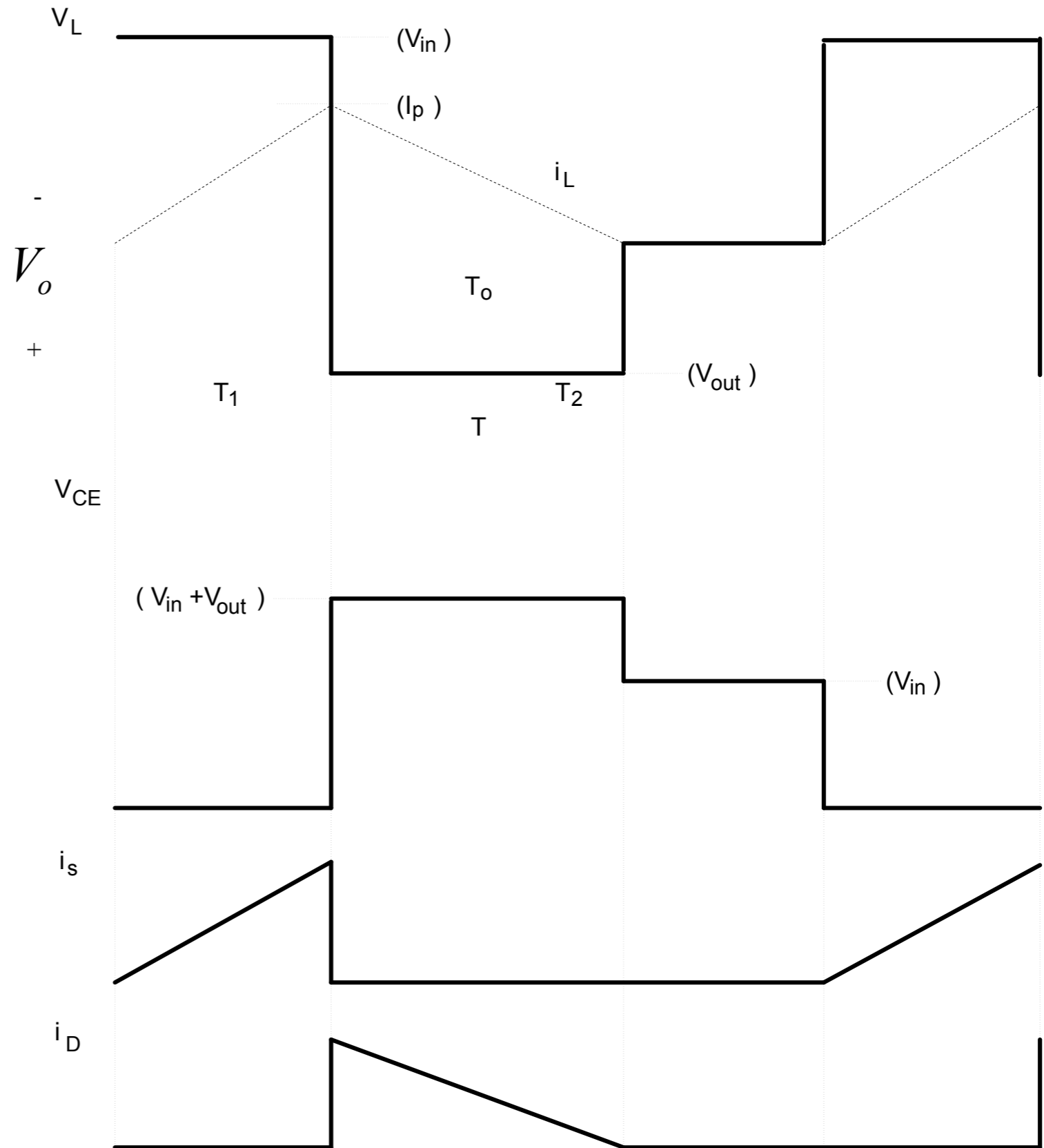
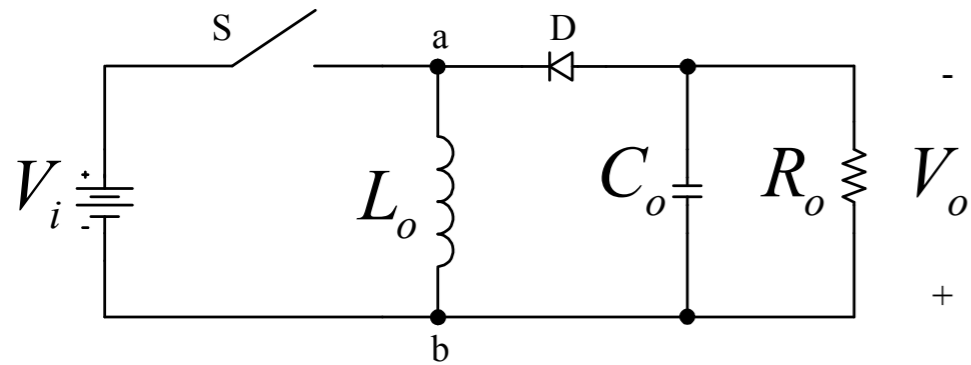
# Conversor Meia Ponte Isolado



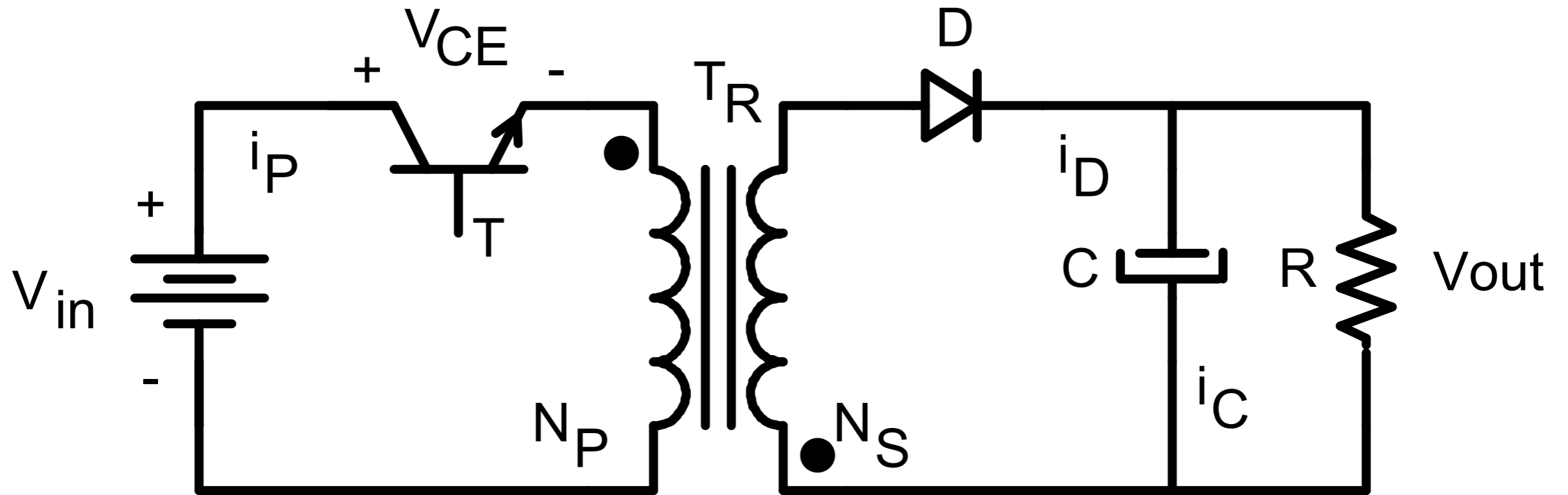
# Conversor Push-Pull



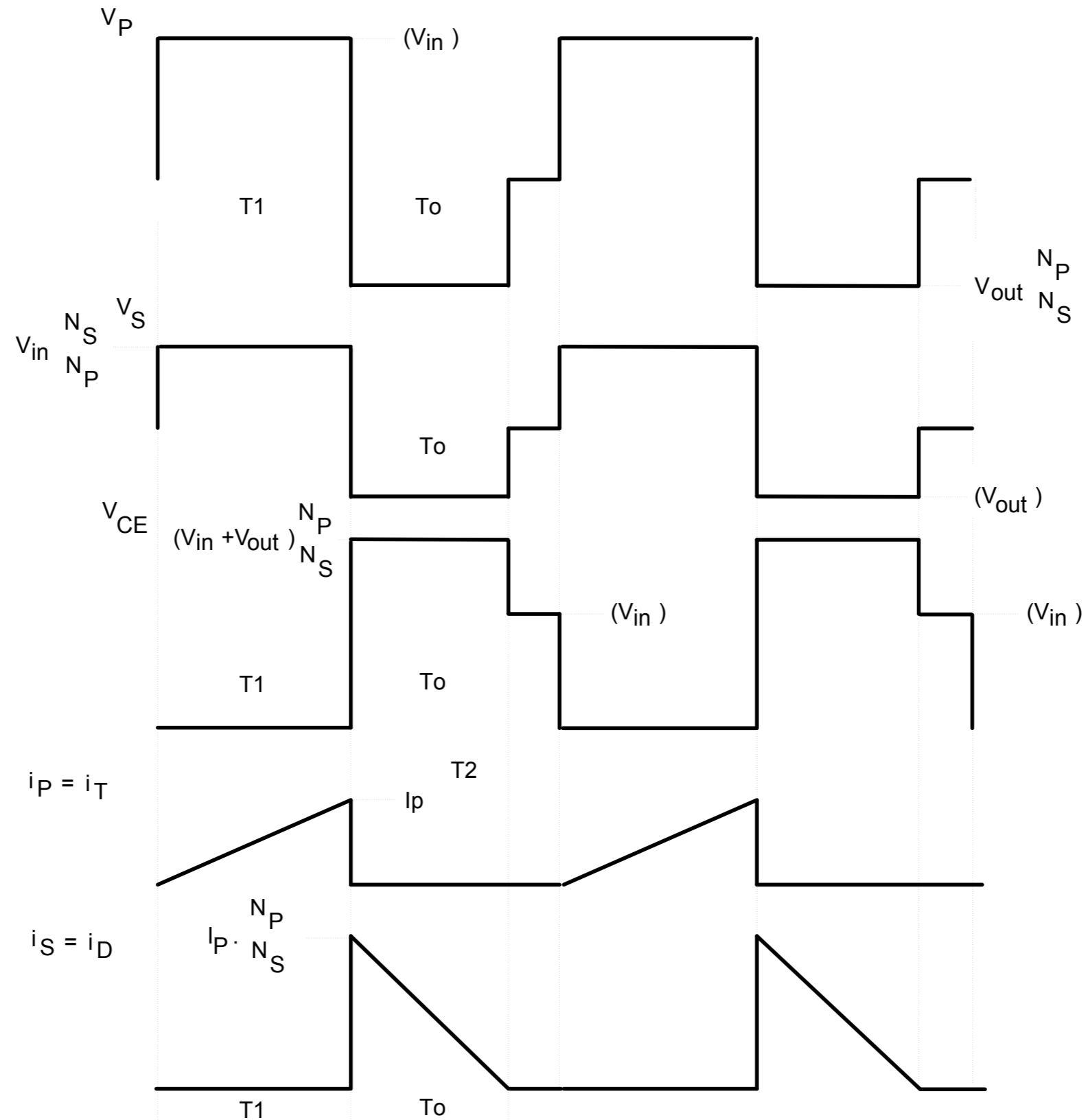
# Conversor Flyback - Detalhamento



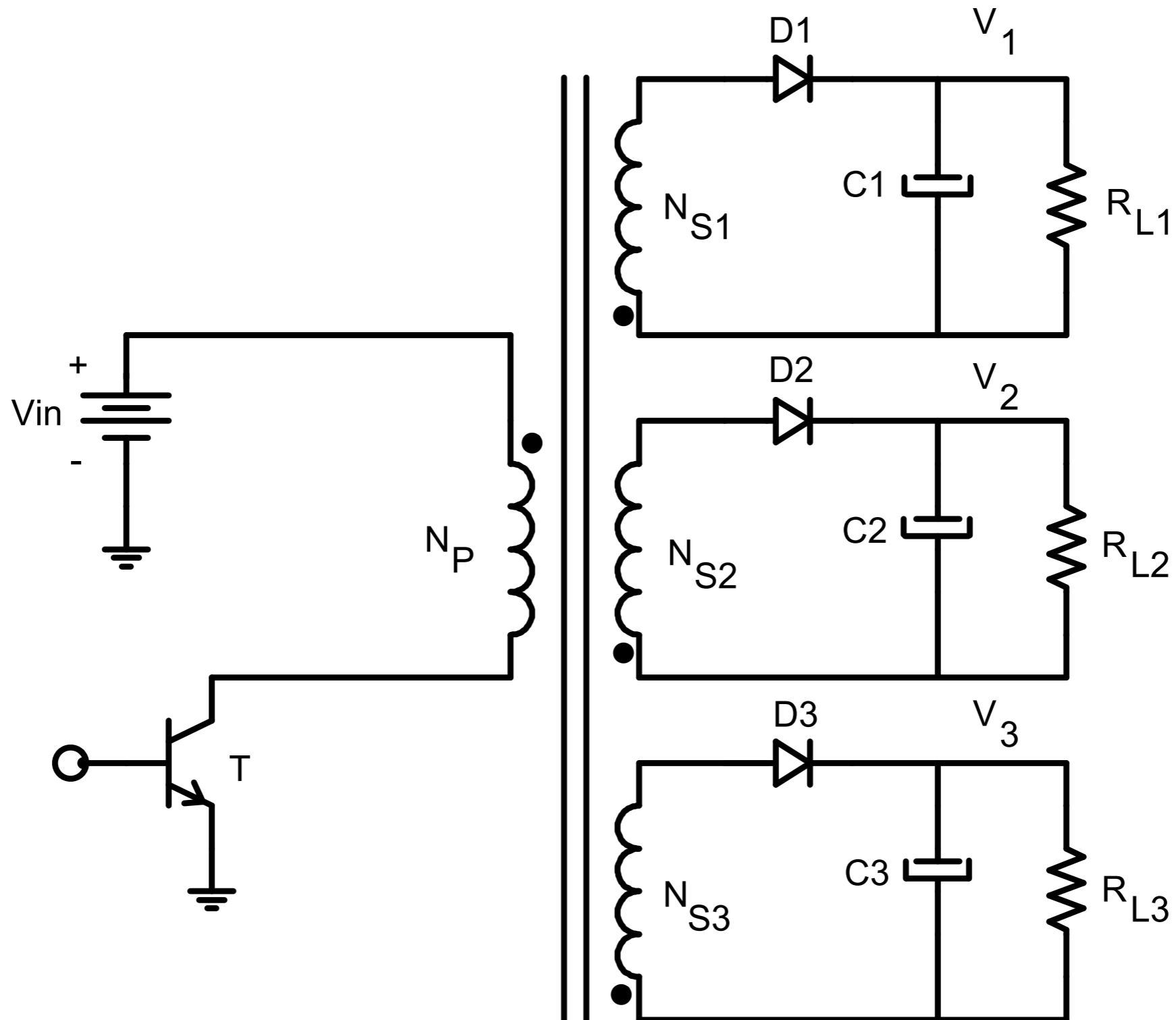
# Conversor Flyback - Detalhamento



# Conversor Flyback - Detalhamento



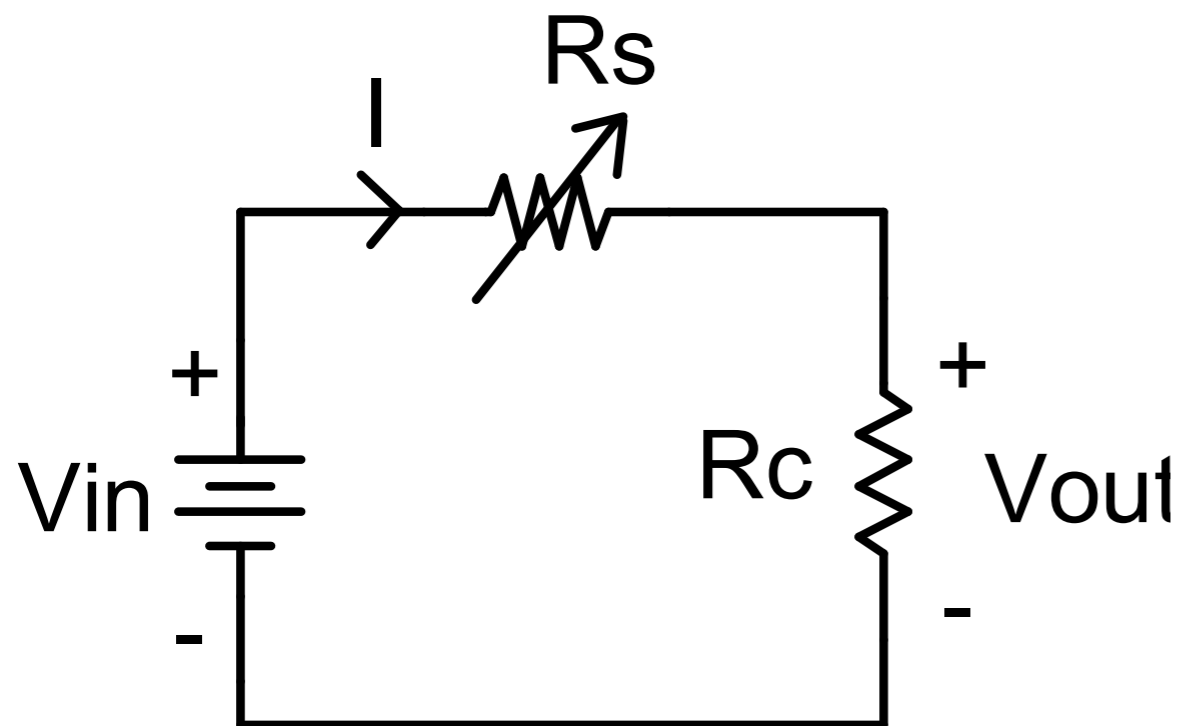
# Conversor Flyback - Detalhamento



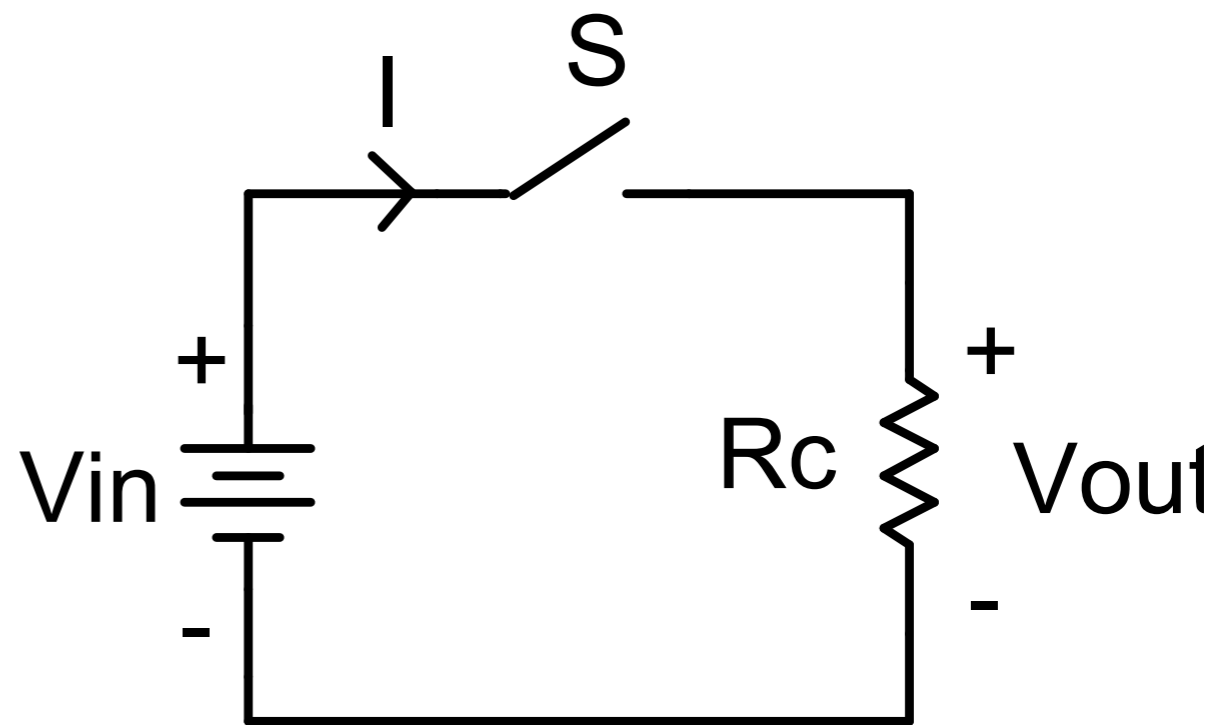
# Fontes Lineares x Fontes Chaveadas

## Fontes de tensão lineares e chaveadas:

- As fontes lineares convertem a tensão alternada da rede em tensões contínuas, normalmente de baixa amplitude, sem o uso de componentes chaveados (comutados);
- Fontes chaveadas exercem a mesma função, mas utilizando componentes comutados (chaveados).



Regulador linear



Regulador chaveado

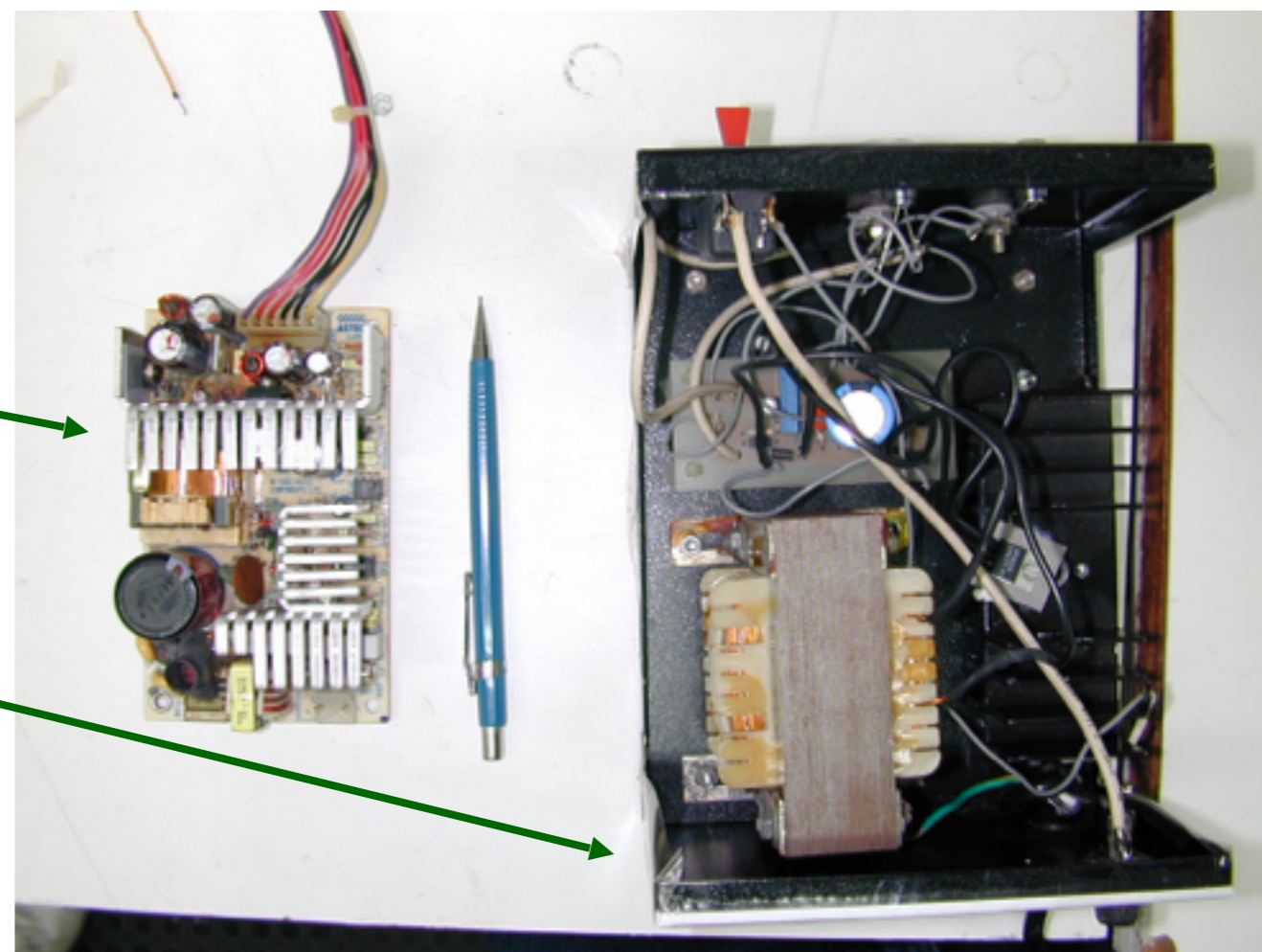
# Fontes Lineares x Fontes Chaveadas

## Fontes de tensão lineares x chaveadas:

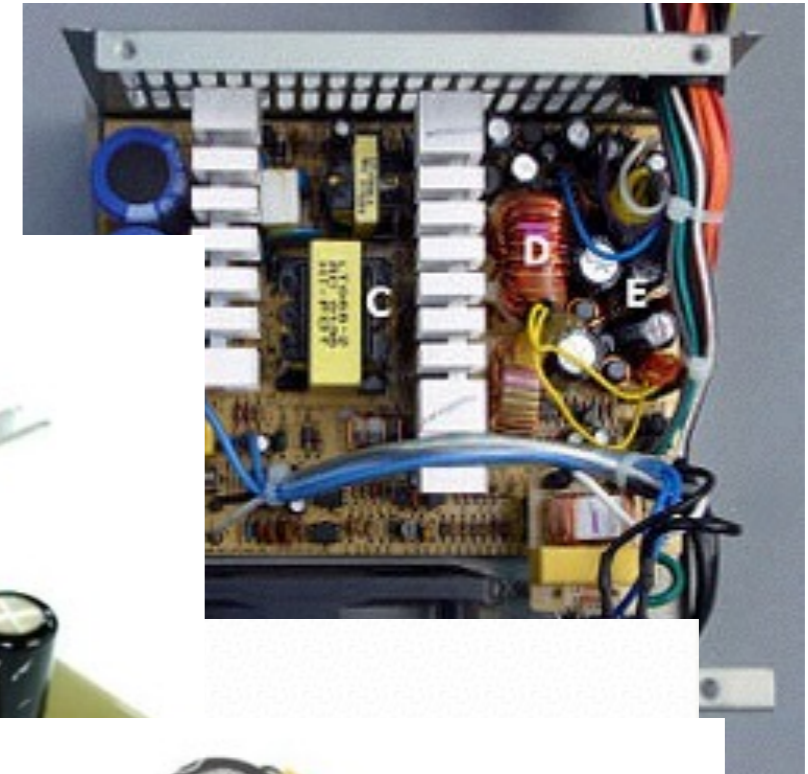
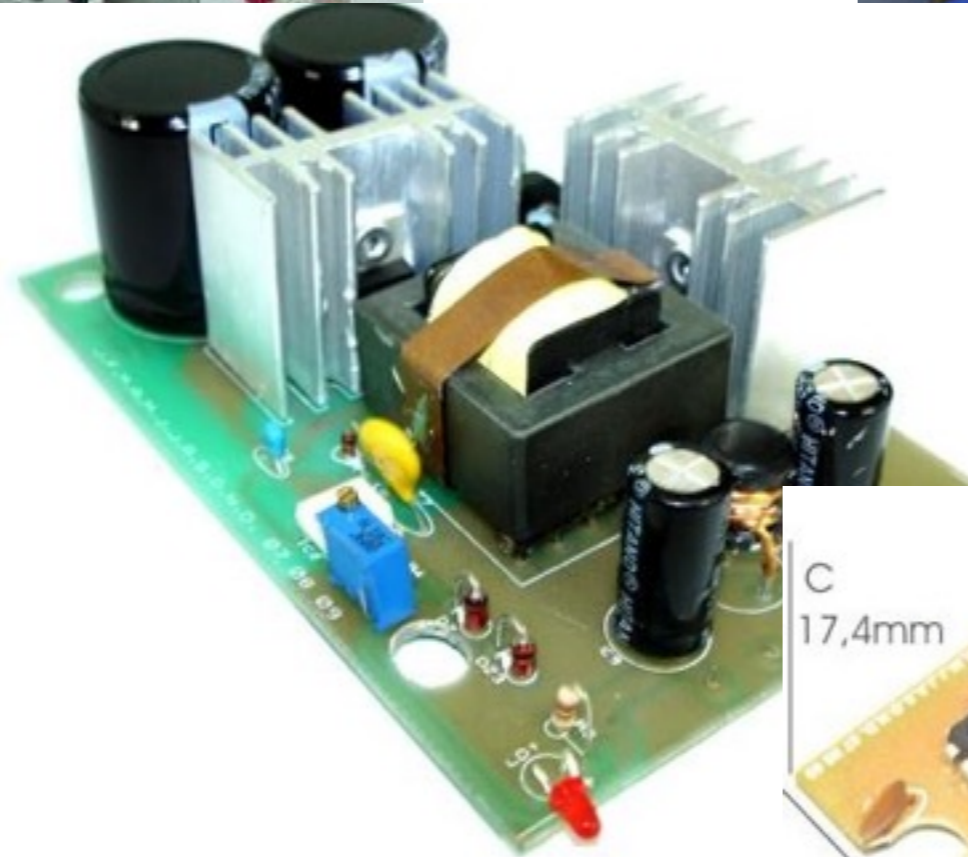
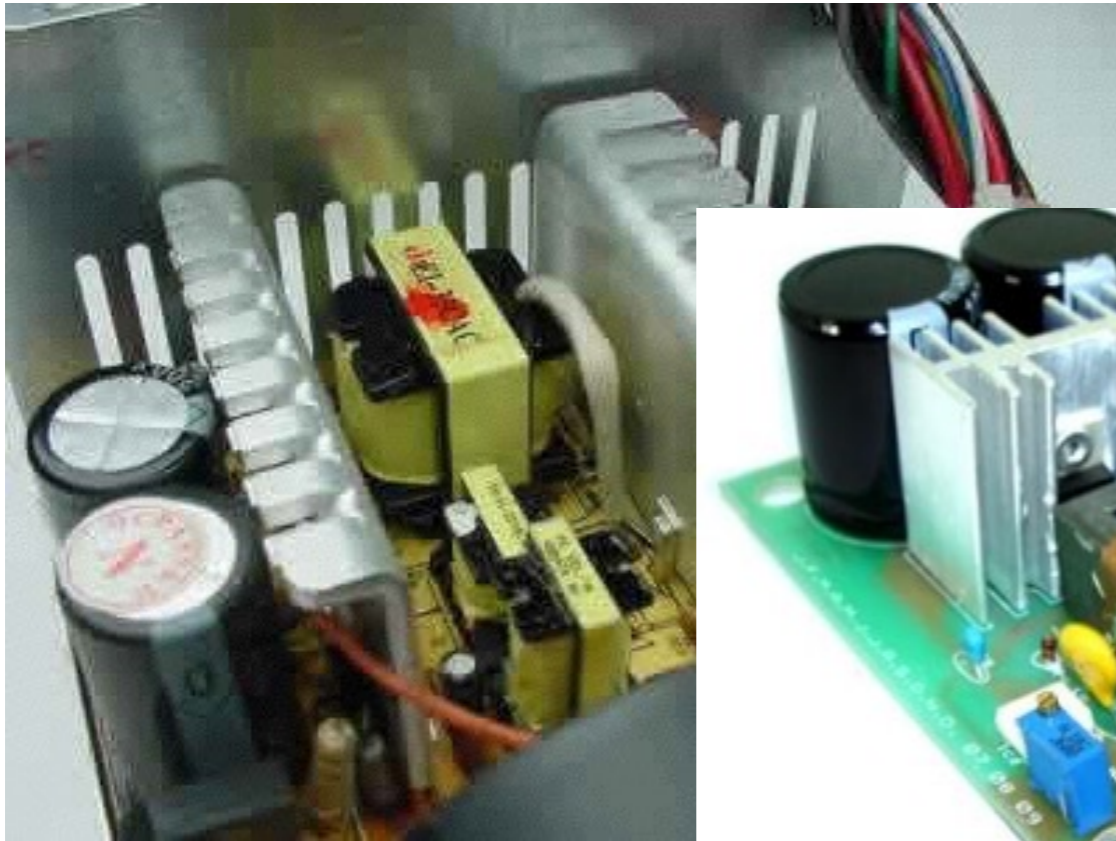
- Fontes lineares: são mais robustas, simples e fáceis de projetar, podem ser mais baratas ou não, são muito volumosas e pesadas.
- Fontes chaveadas: não são tão robustas, mais difíceis de projetar e **consertar**, podem ser mais baratas ou não, são pequenas e leves.

Fonte chaveada de 65 W

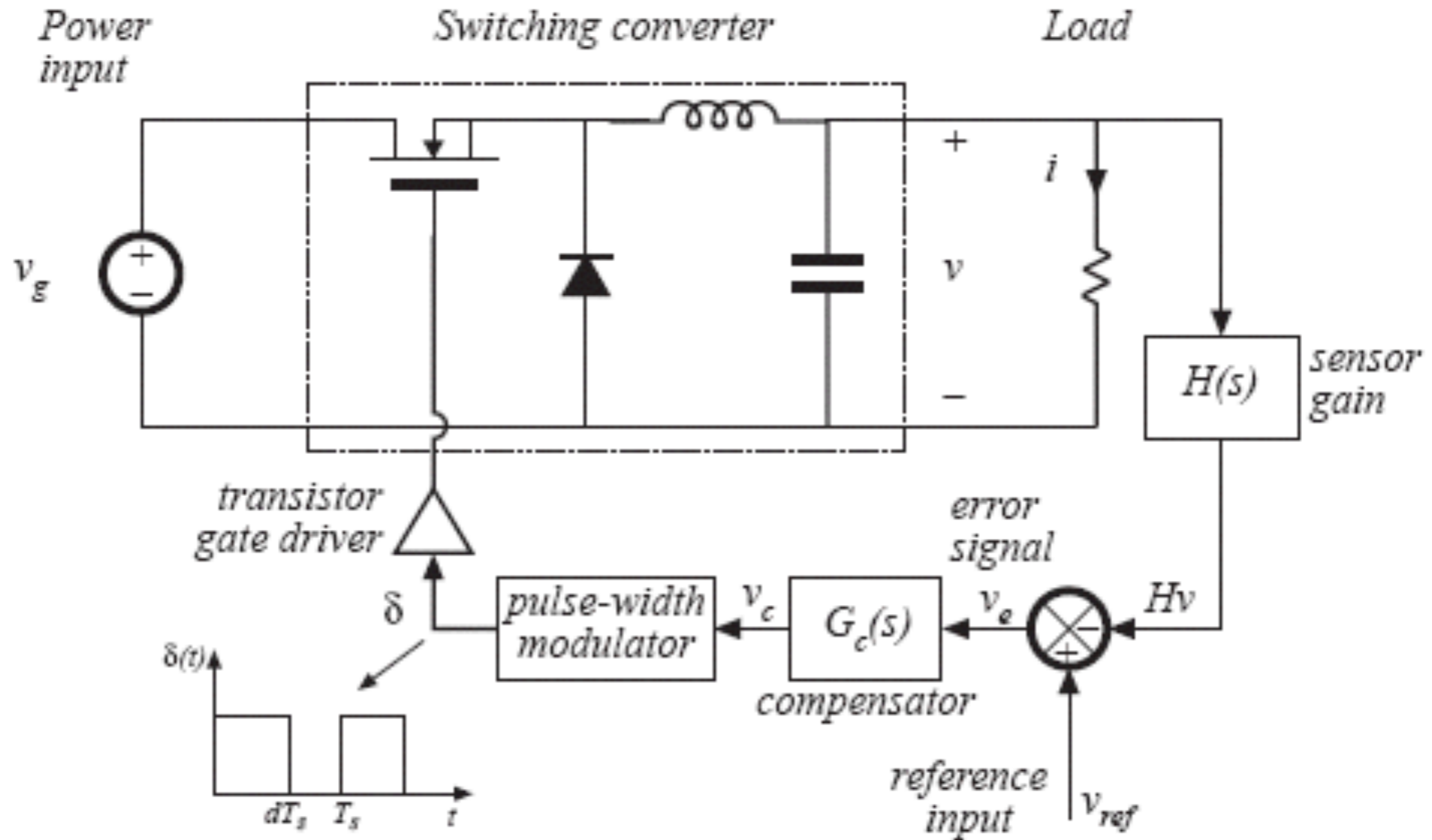
Fonte linear de 29 W



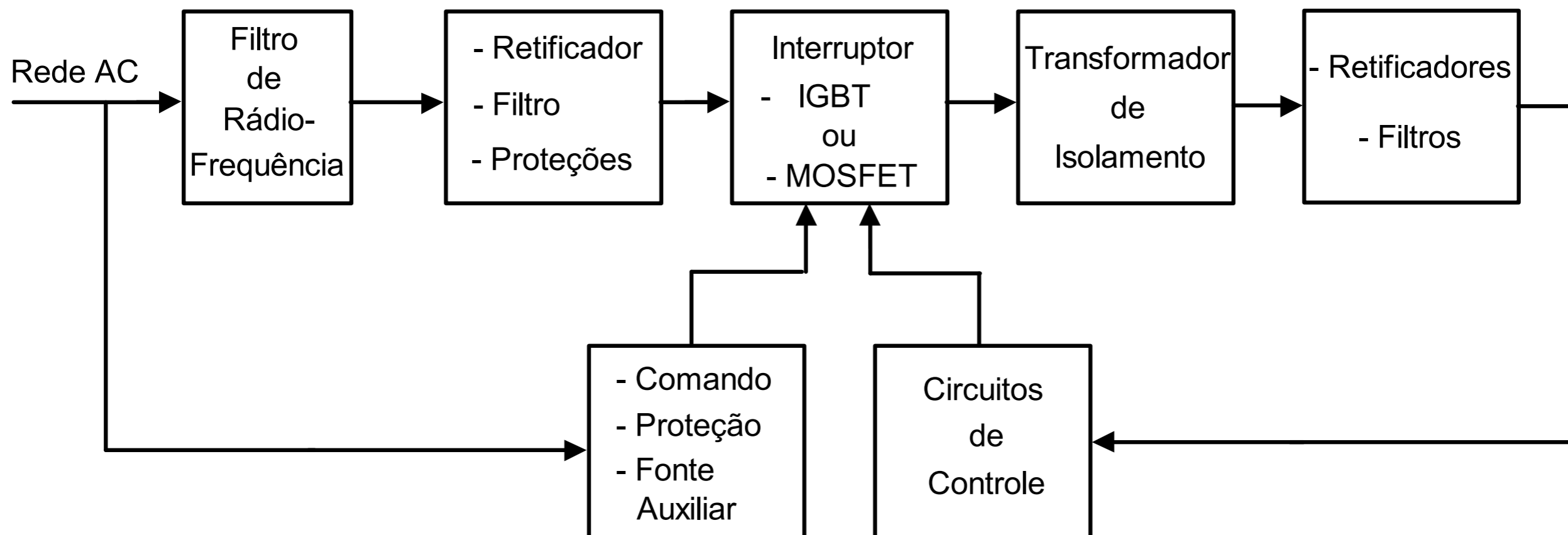
# Fontes Chaveadas



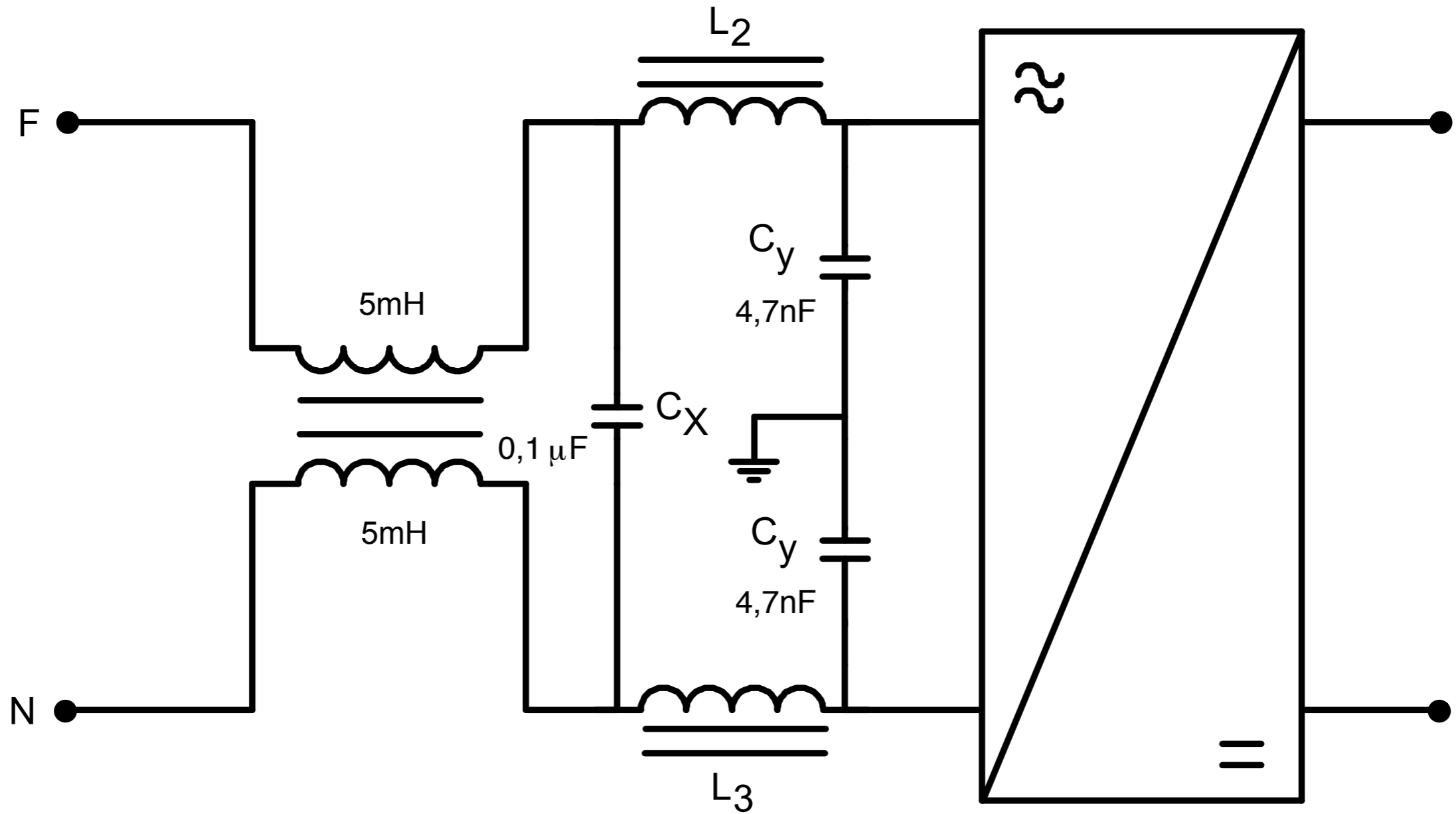
# Fontes Chaveadas - Diagrama de Blocos



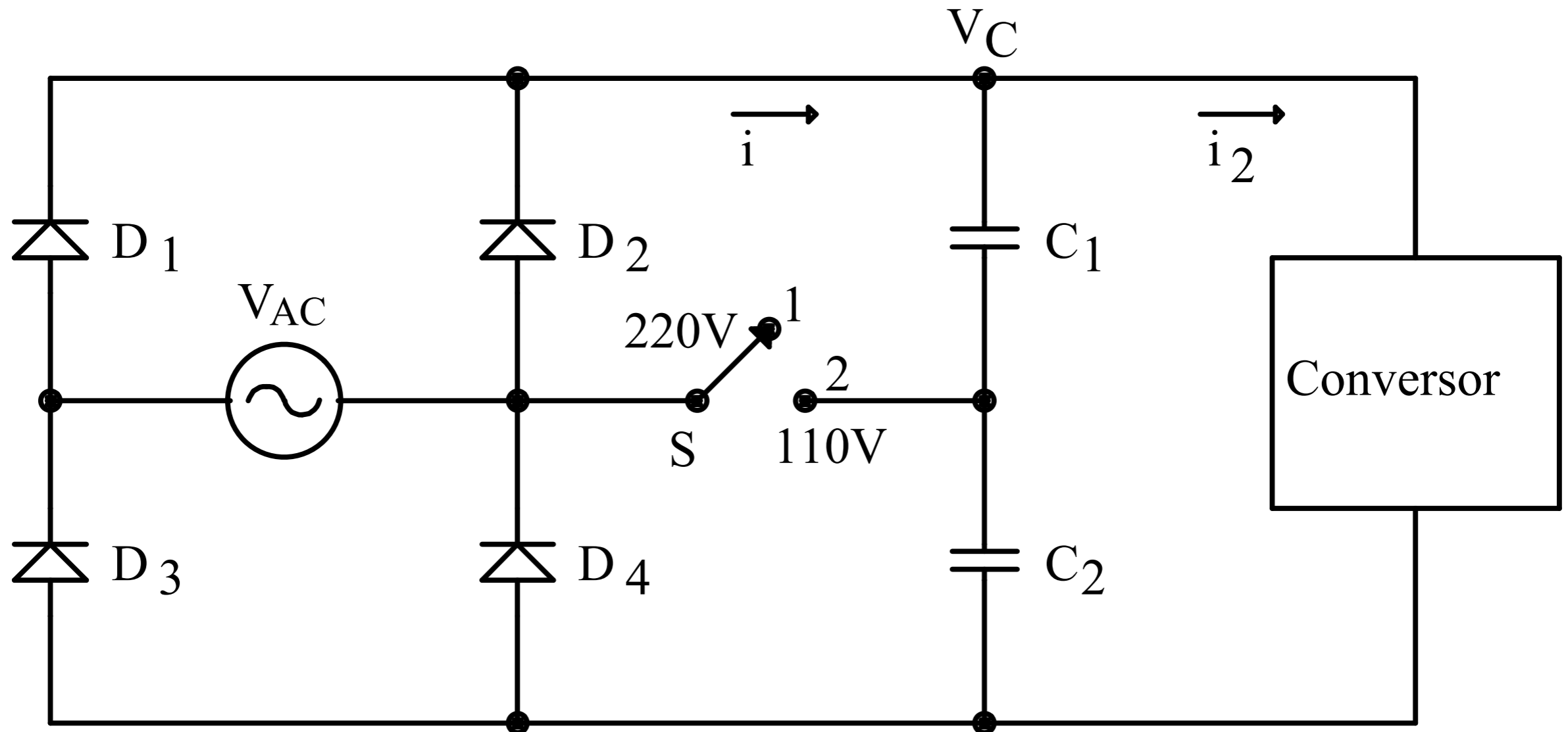
# Fontes Chaveadas - Diagrama de Blocos



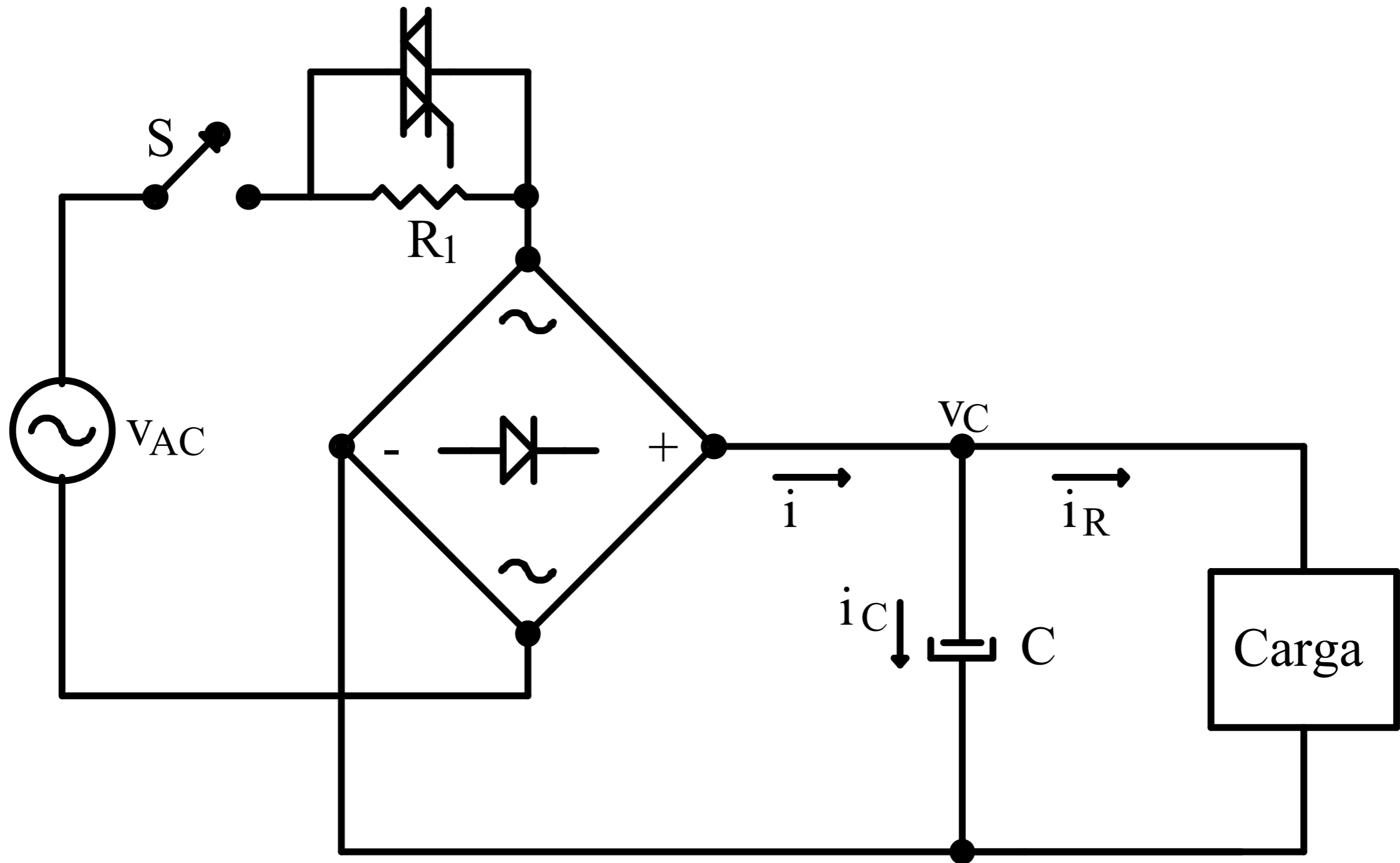
# Fontes Chaveadas - Filtro de EMI



# Fontes Chaveadas - Retificador de Entrada

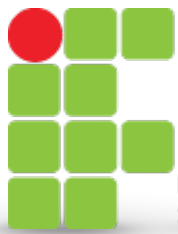


# Fontes Chaveadas - Retificador de Entrada

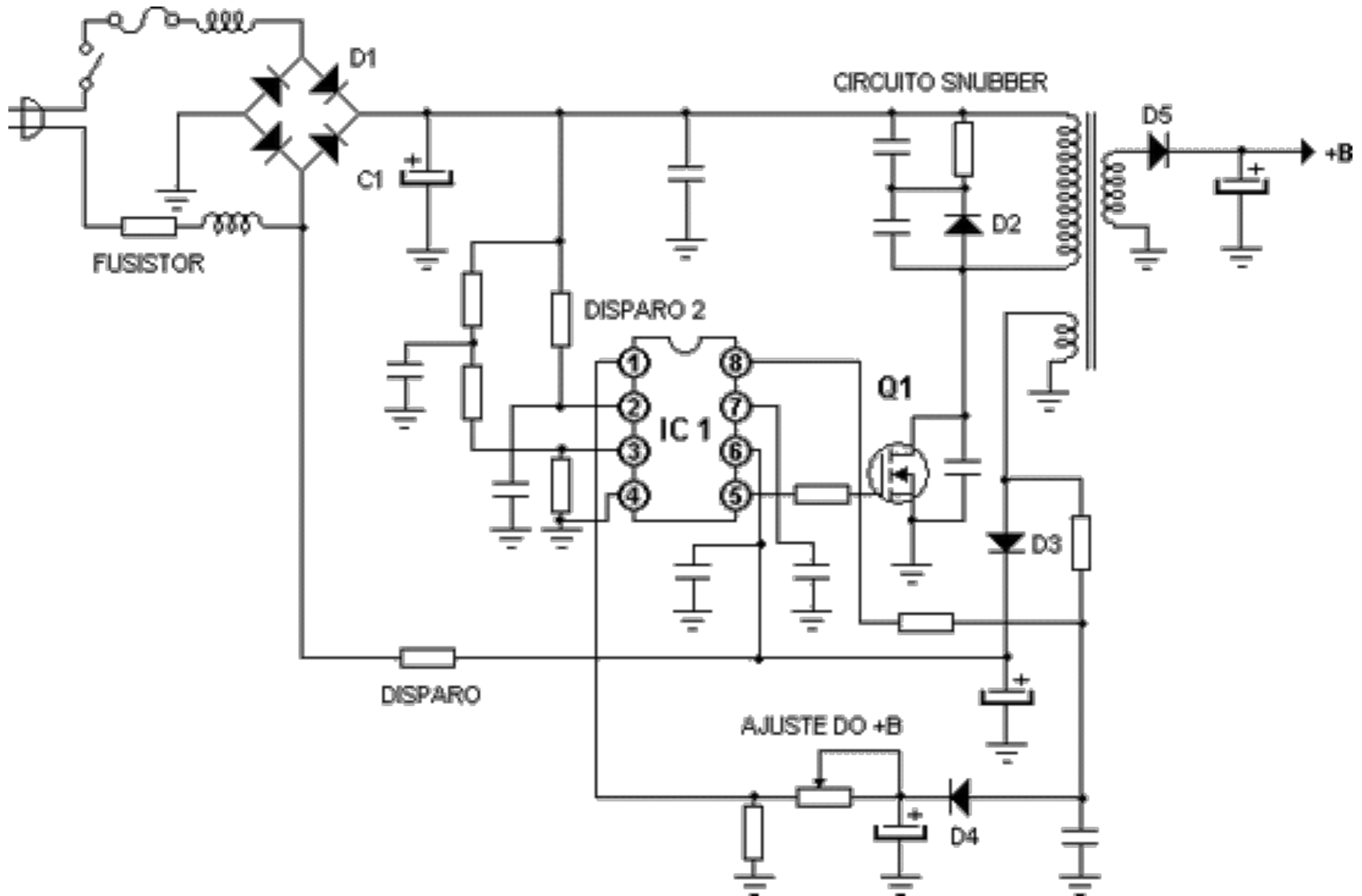




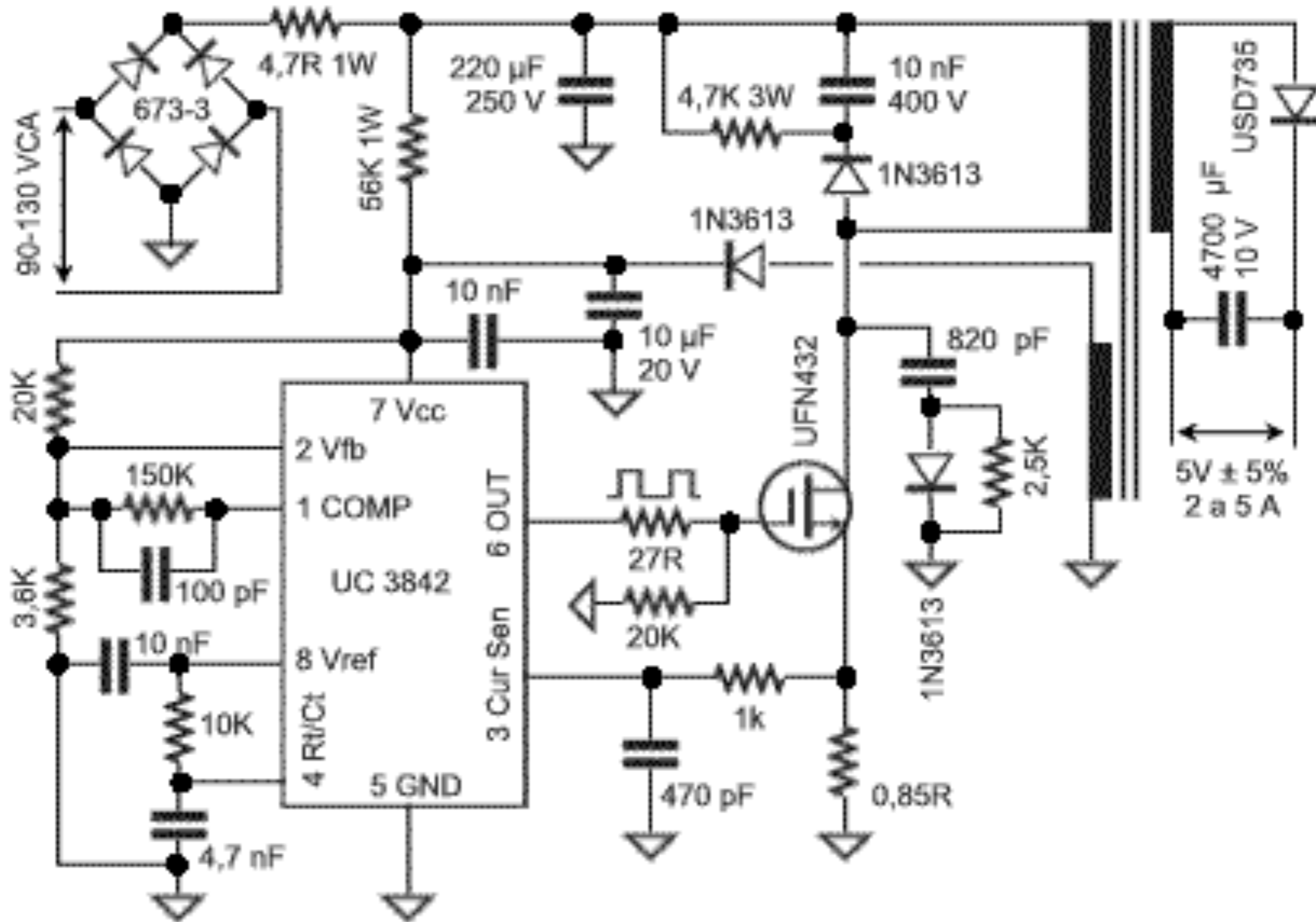




# Fontes Chaveadas - Circuitos Elétricos



# Fontes Chaveadas - Circuitos Elétricos



**FAIRCHILD**  
SEMICONDUCTOR®

[www.fairchildsemi.com](http://www.fairchildsemi.com)

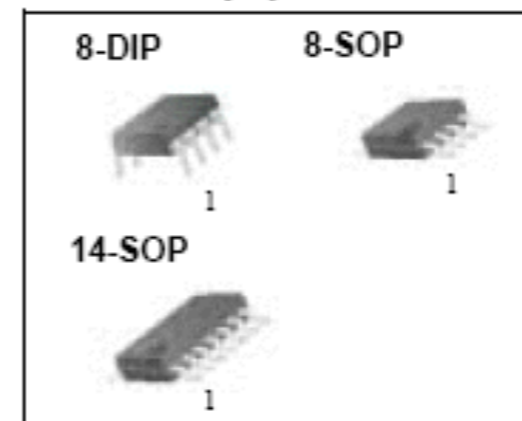
## UC3842/UC3843/UC3844/UC3845 SMPS Controller

### Features

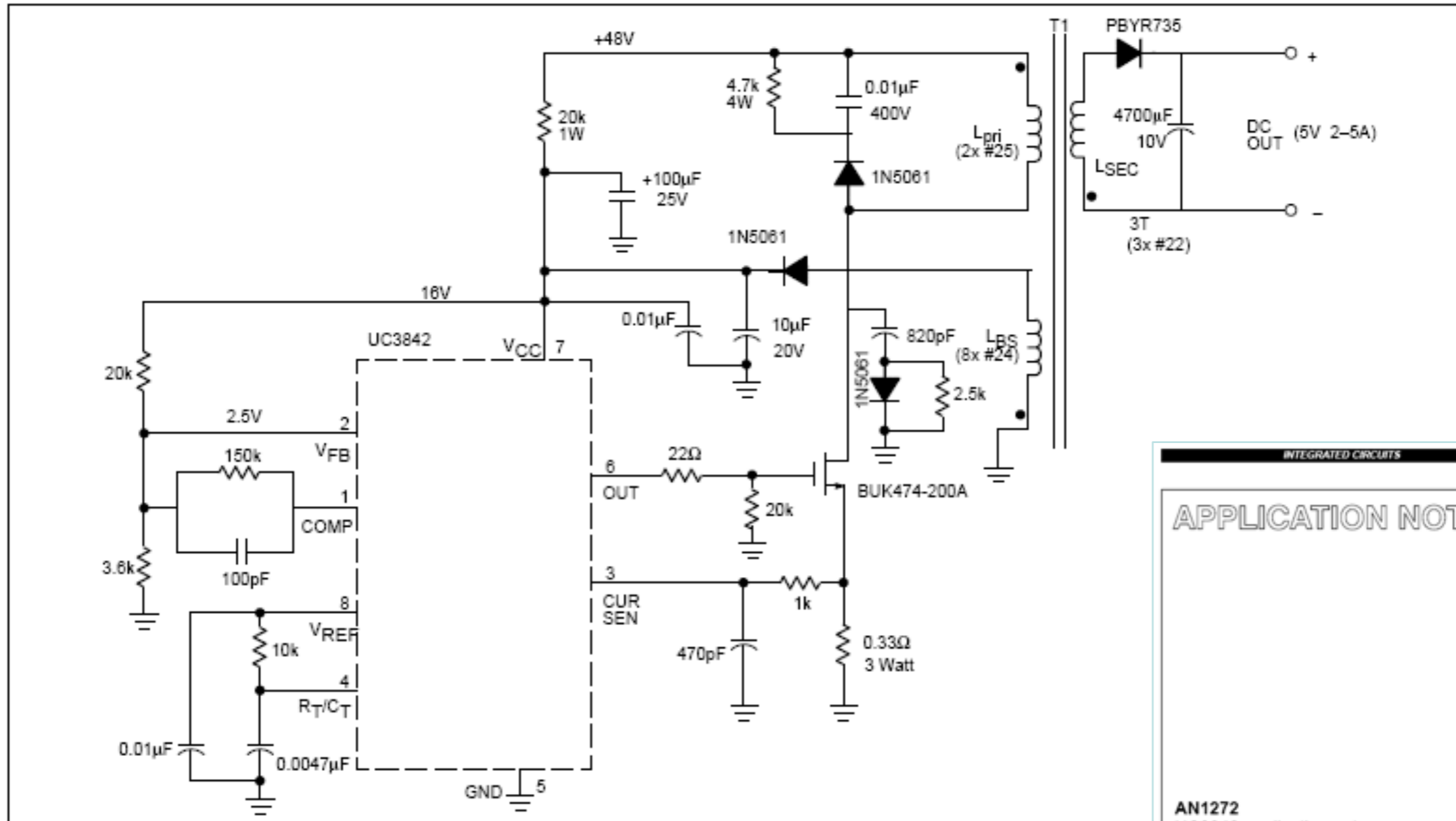
- Low Start up Current
- Maximum Duty Clamp
- UVLO With Hysteresis
- Operating Frequency up to 500KHz

### Description

The UC3842/UC3843/UC3844/UC3845 are fixed frequency current-mode PWM controller. They are specially designed for Off-Line and DC to DC converter applications with minimum external components. These integrated circuits feature a trimmed oscillator for precise duty cycle control, a temperature compensated reference, high gain error amplifier, current sensing comparator and a high current totempole output for driving a Power MOSFET. The UC3842 and UC3844 have UVLO thresholds of 16V (on) and 10V (off). The UC3843 and UC3845 are 8.5V(on) and 7.9V (off). The UC3842 and UC3843 can operate within 100% duty cycle. The UC3844 and UC3845 can operate with 50% duty cycle.



# Fontes Chaveadas - Circuitos Integrados Dedicados



INTEGRATED CIRCUITS

## APPLICATION NOTE

**AN1272**  
UC3842 application note

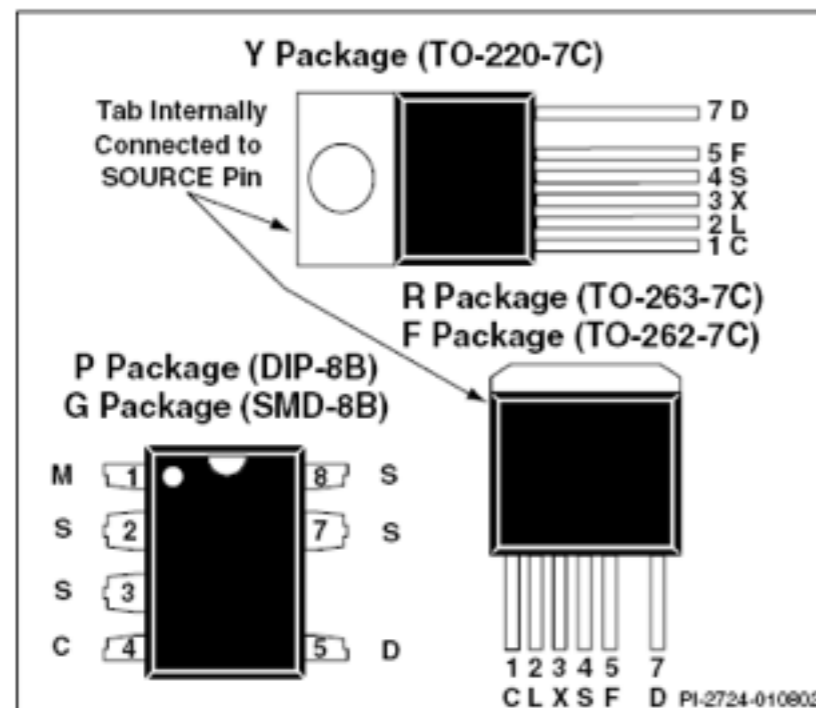
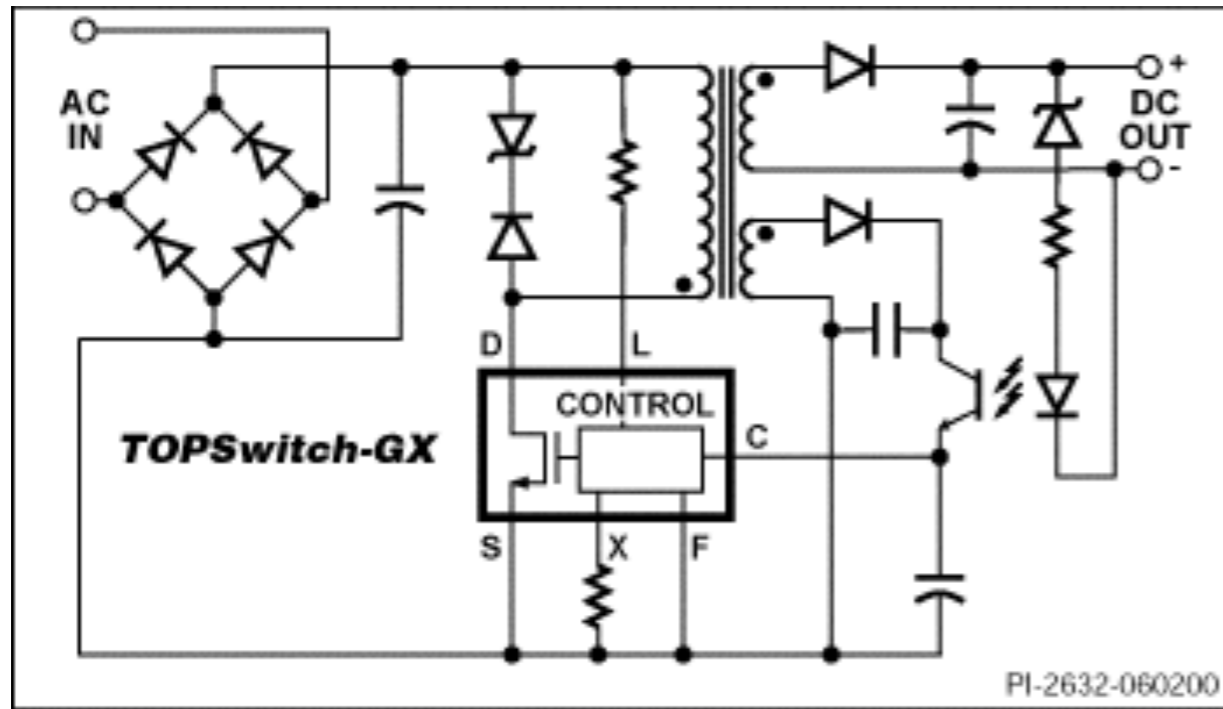
Author: Lester J. Hadley, Jr. 1991 Dec  
Rev 1: 1996 Apr

Philips Semiconductors  **PHILIPS**

**AN1272**

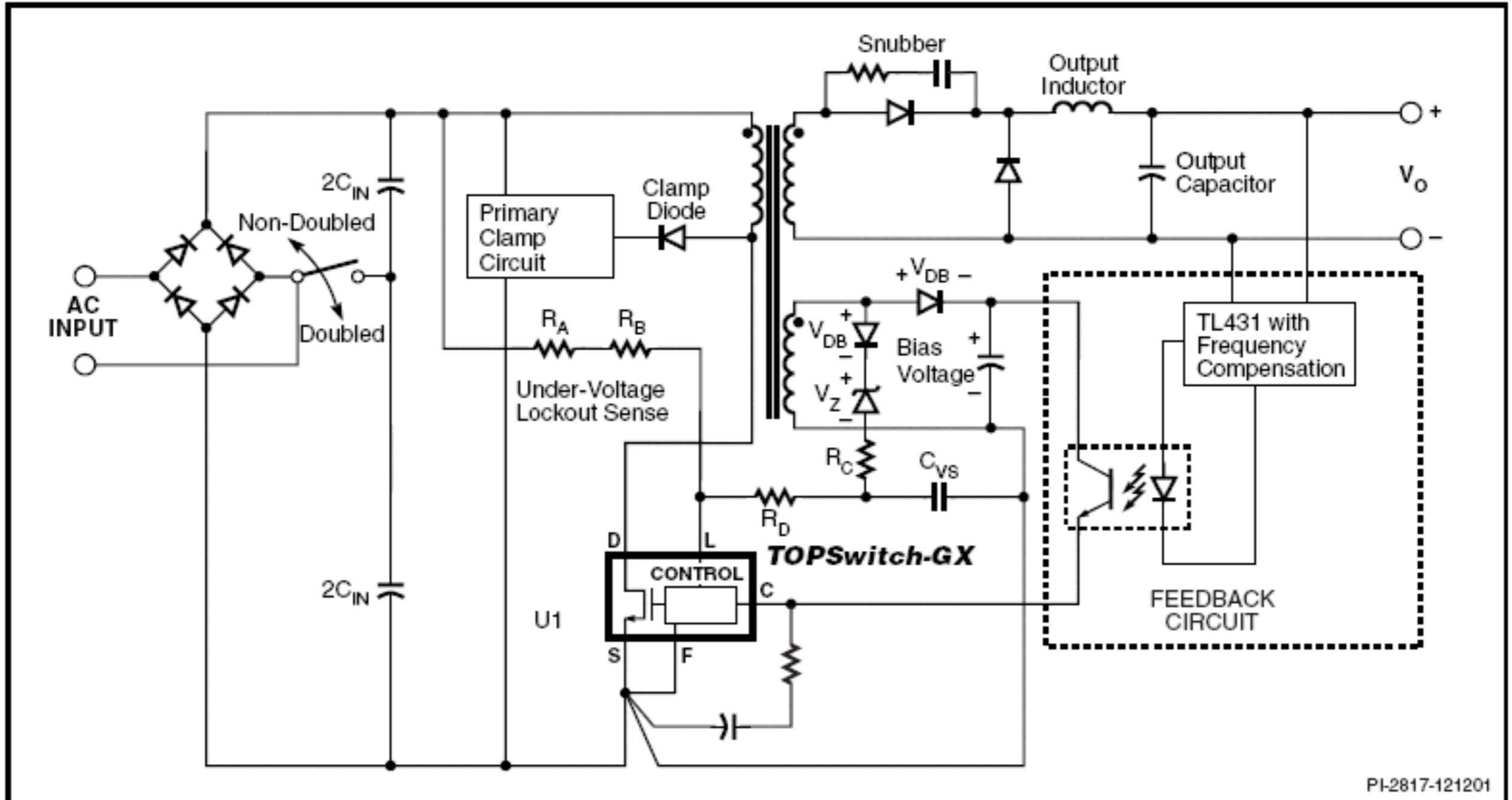


# Fontes Chaveadas - Circuitos Integrados Dedicados



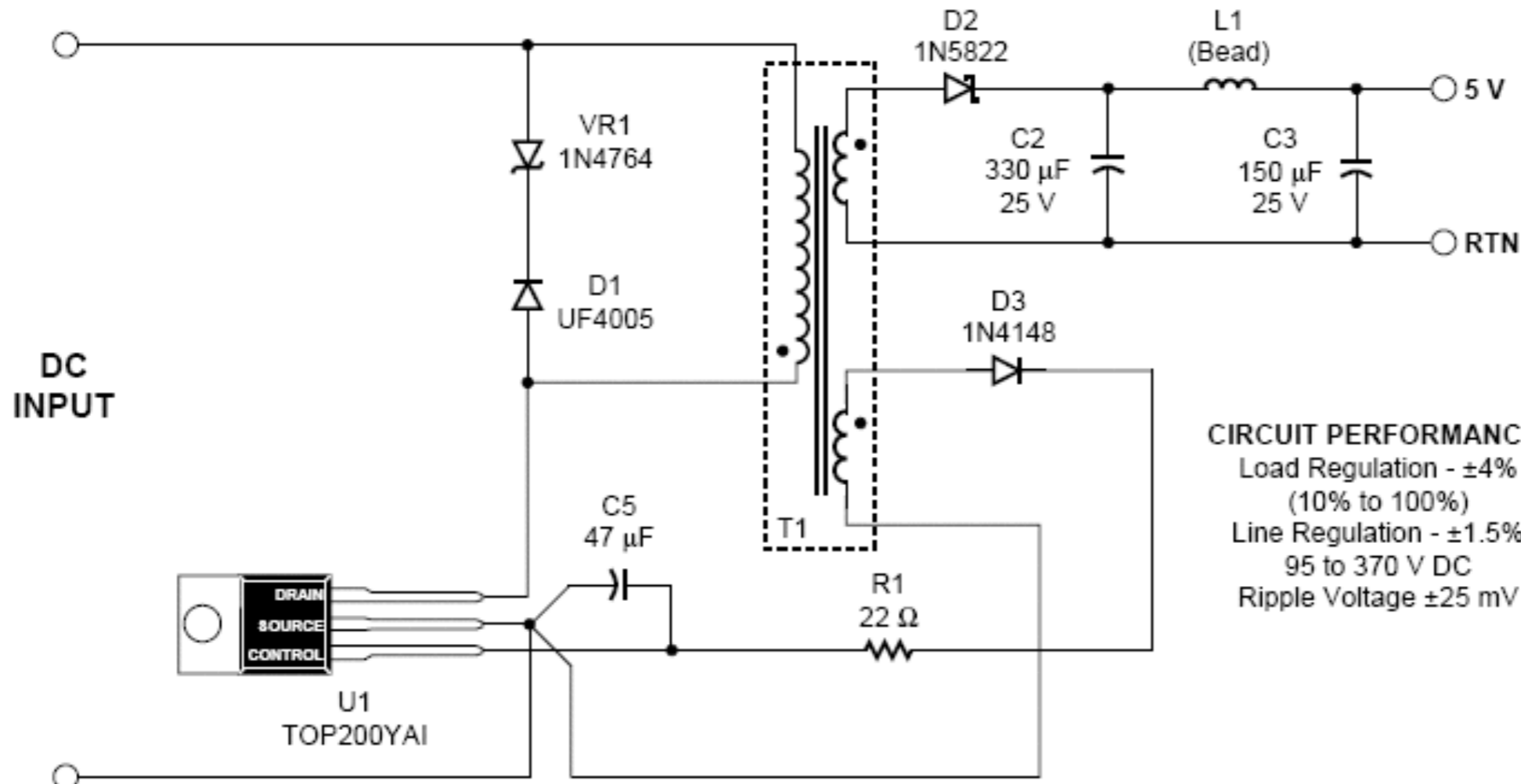
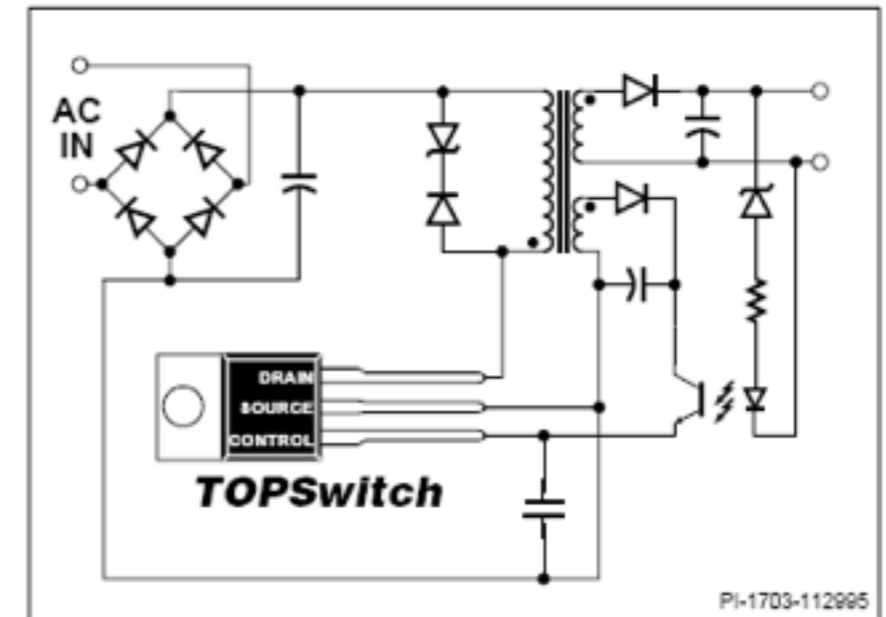
OUTPUT POWER TABLE				
PRODUCT <sup>3</sup>	230 VAC $\pm 15\%$ <sup>4</sup>		85-265 VAC	
	Adapter <sup>1</sup>	Open Frame <sup>2</sup>	Adapter <sup>1</sup>	Open Frame <sup>2</sup>
TOP242 P or G	9 W	15 W	6.5 W	10 W
TOP242 R	15 W	22 W	11 W	14 W
TOP242 Y or F	10 W	22 W	7 W	14 W
TOP243 P or G	13 W	25 W	9 W	15 W
TOP243 R	29 W	45 W	17 W	23 W
TOP243 Y or F	20 W	45 W	15 W	30 W
TOP244 P or G	16 W	28 W	11 W	20 W
TOP244 R	34 W	50 W	20 W	28 W
TOP244 Y or F	30 W	65 W	20 W	45 W
TOP245 P or G	19 W	30 W	13 W	22 W
TOP245 R	37 W	57 W	23 W	33 W
TOP245 Y or F	40 W	85 W	26 W	60 W
TOP246 P or G	21 W	34 W	15 W	26 W
TOP246 R	40 W	64 W	26 W	38 W
TOP246 Y or F	60 W	125 W	40 W	90 W
TOP247 R	42 W	70 W	28 W	43 W
TOP247 Y or F	85 W	165 W	55 W	125 W
TOP248 R	43 W	75 W	30 W	48 W
TOP248 Y or F	105 W	205 W	70 W	155 W
TOP249 R	44 W	79 W	31 W	53 W
TOP249 Y or F	120 W	250 W	80 W	180 W
TOP250 R	45 W	82 W	32 W	55 W
TOP250 Y or F	135 W	290 W	90 W	210 W

# Fontes Chaveadas - Circuitos Integrados Dedicados



PI-2817-121201

## TOP200-4/14 **TOPSwitch**<sup>®</sup> Family Three-terminal Off-line PWM Switch



**CIRCUIT PERFORMANCE:**  
 Load Regulation -  $\pm 4\%$   
 (10% to 100%)  
 Line Regulation -  $\pm 1.5\%$   
 95 to 370 V DC  
 Ripple Voltage  $\pm 25$  mV

## Conversores cc-cc:

- Conversores integrados.

