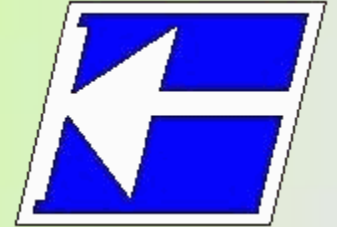


**Centro Federal de Educação Tecnológica de Santa Catarina**  
**Departamento Acadêmico de Eletrônica**  
**Conversores Estáticos**



**Conversores CA-CC e CC-CC**  
*Fontes Chaveadas*

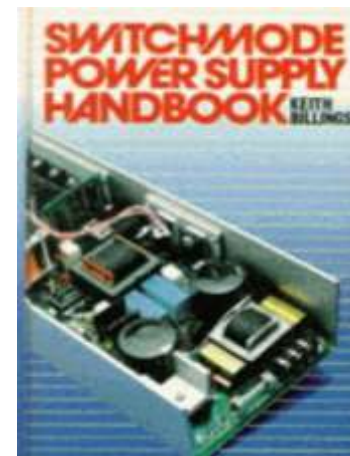
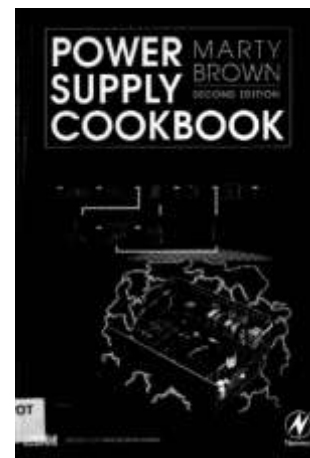
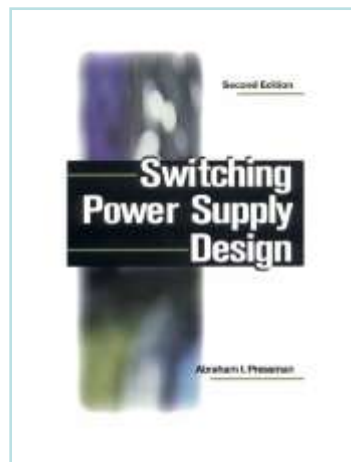
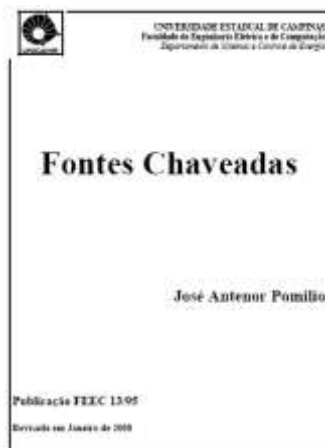
**Prof. Clóvis Antônio Petry.**

**Florianópolis, novembro de 2008.**

# Bibliografia para esta aula

## Aplicações de Eletrônica de Potência

### 1. Fontes chaveadas.



# Nesta aula

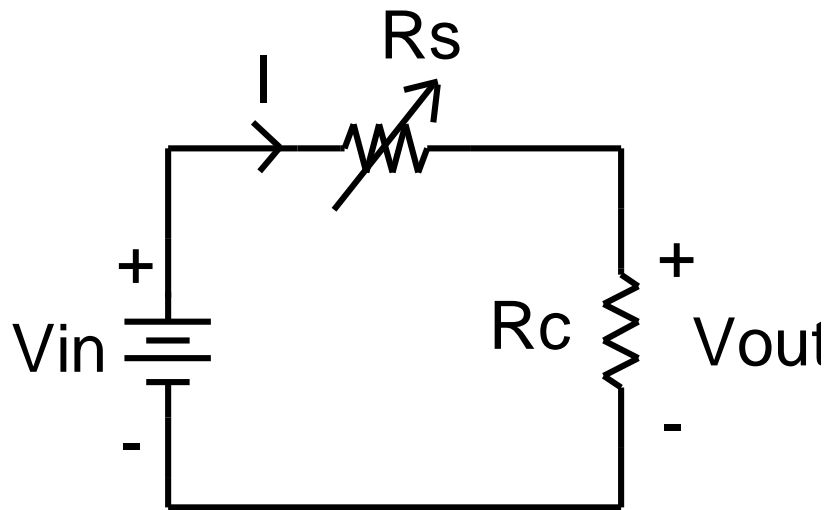
## **Aplicações da Eletrônica de Potência:**

1. Fontes lineares x fontes chaveadas;
2. Fontes chaveadas;
3. Diagrama de blocos de uma fonte chaveada;
4. Filtro de EMI;
5. Retificador de entrada;
6. Conversores para fontes chaveadas;
7. Circuitos elétricos de fontes chaveadas;
8. Circuitos integrados para fontes chaveadas.

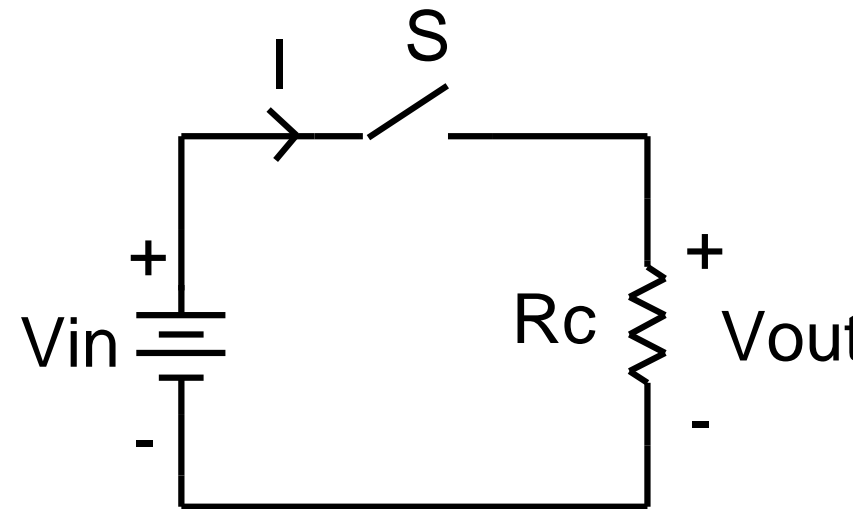
# Fontes lineares x fontes chaveadas

## 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

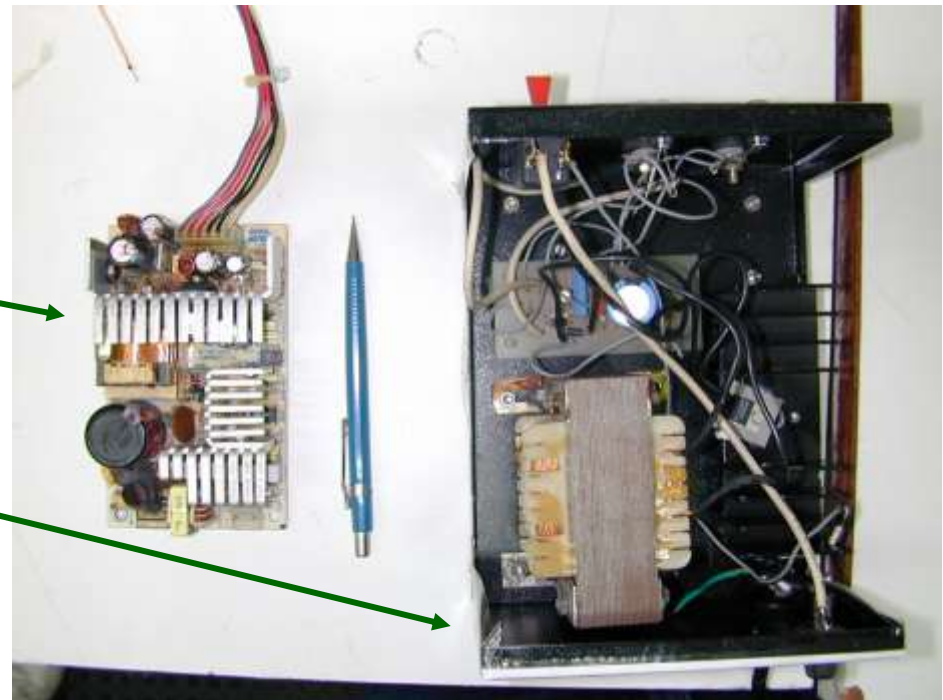
# Fontes lineares x fontes chaveadas

## Fontes de tensão lineares x chaveadas:

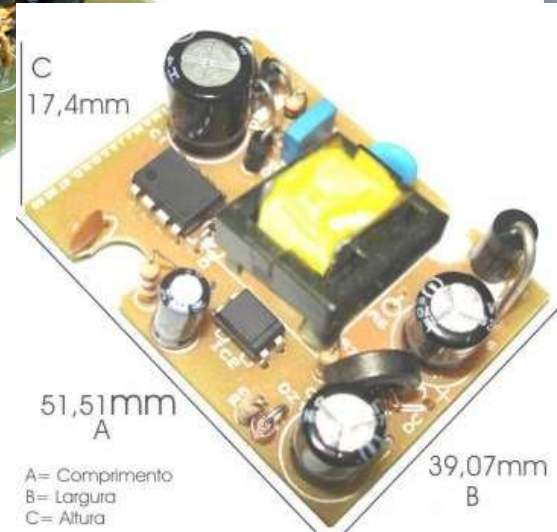
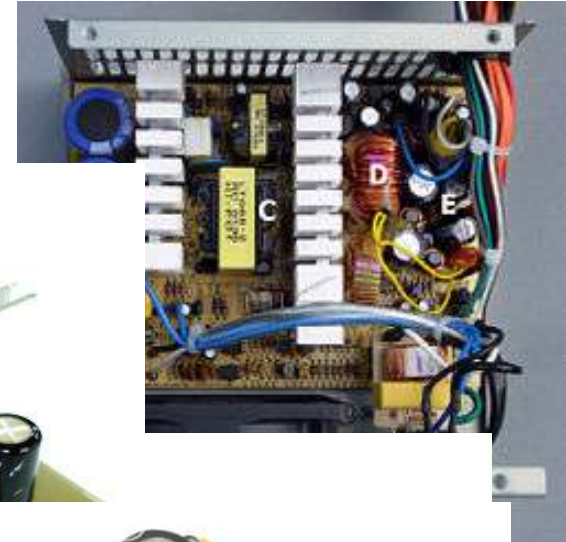
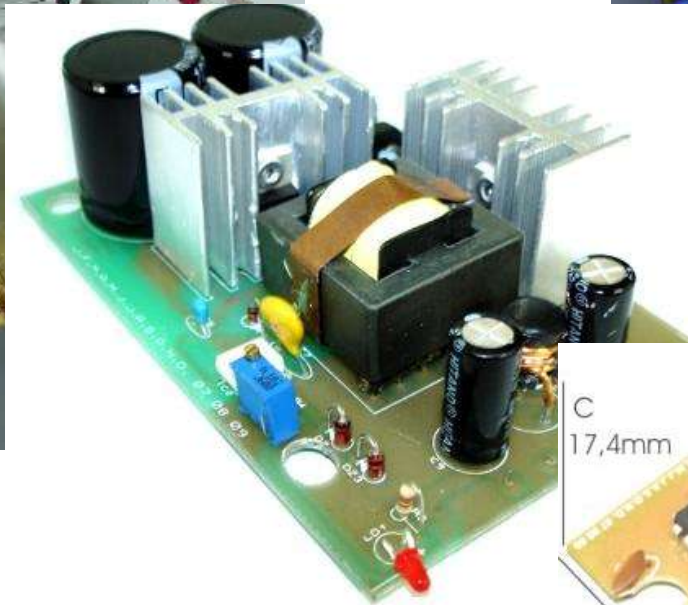
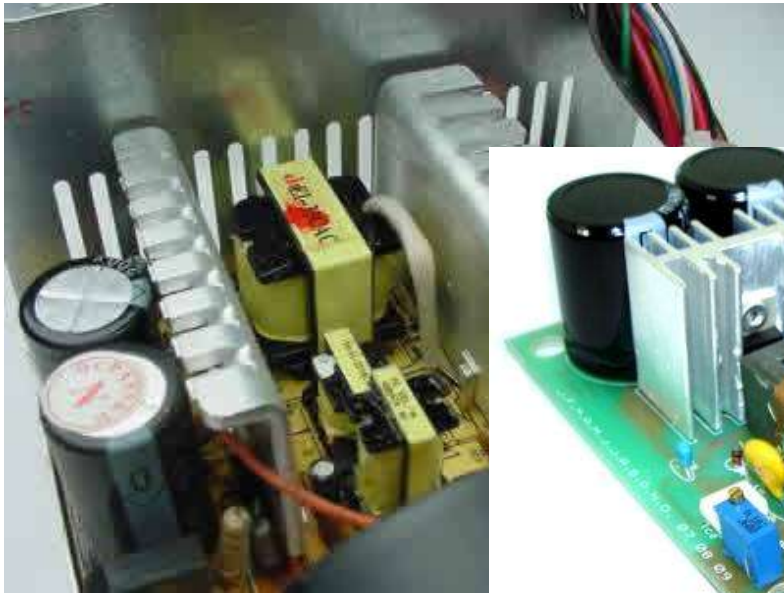
- Fontes lineares: são mais robustas, simples e fáceis de projetar, podem ser mais baratas ou não, são muito volumosas e pesadas.
- Fontes chaveadas: não são tão robustas, mais difíceis de projetar e **consertar**, podem ser mais baratas ou não, são pequenas e leves.

Fonte chaveada de 65 W

Fonte linear de 29 W



# Fontes chaveadas



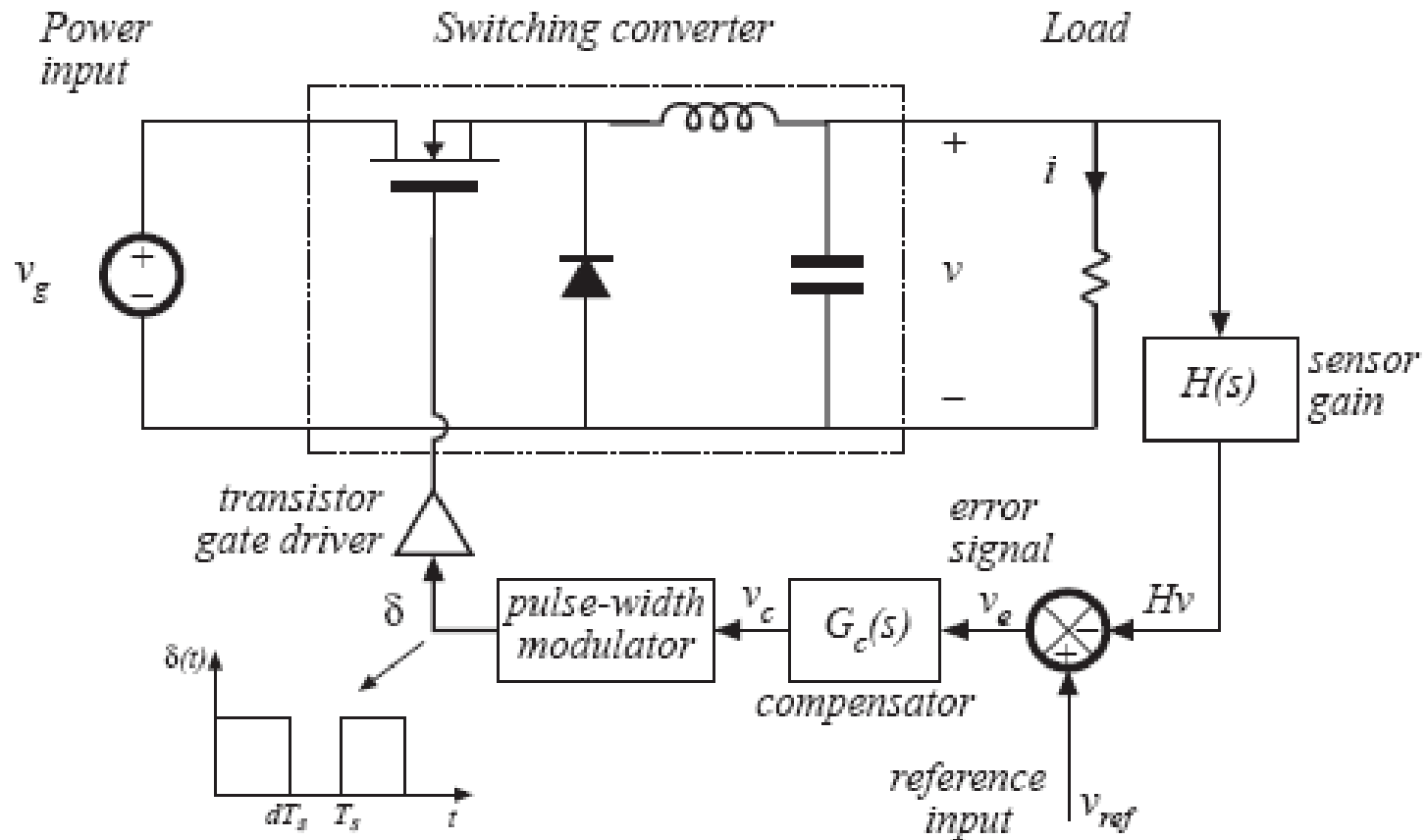
51,51mm  
A

A = Comprimento  
B = Largura  
C = Altura

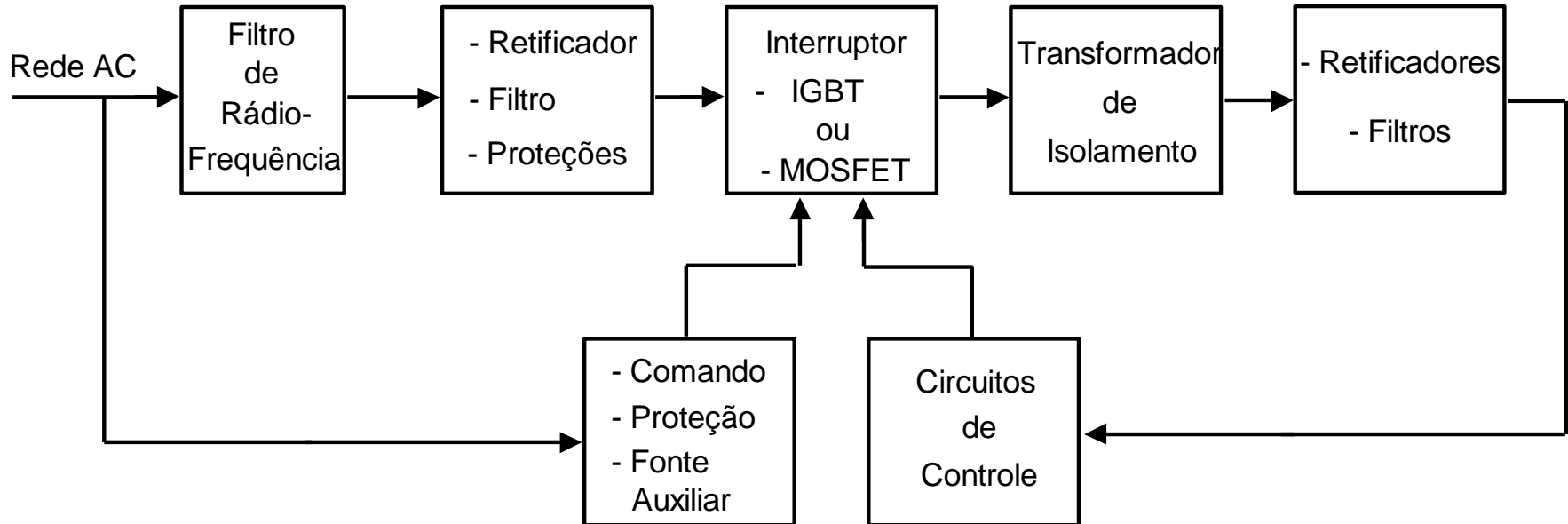
39,07mm  
B

C  
17,4mm

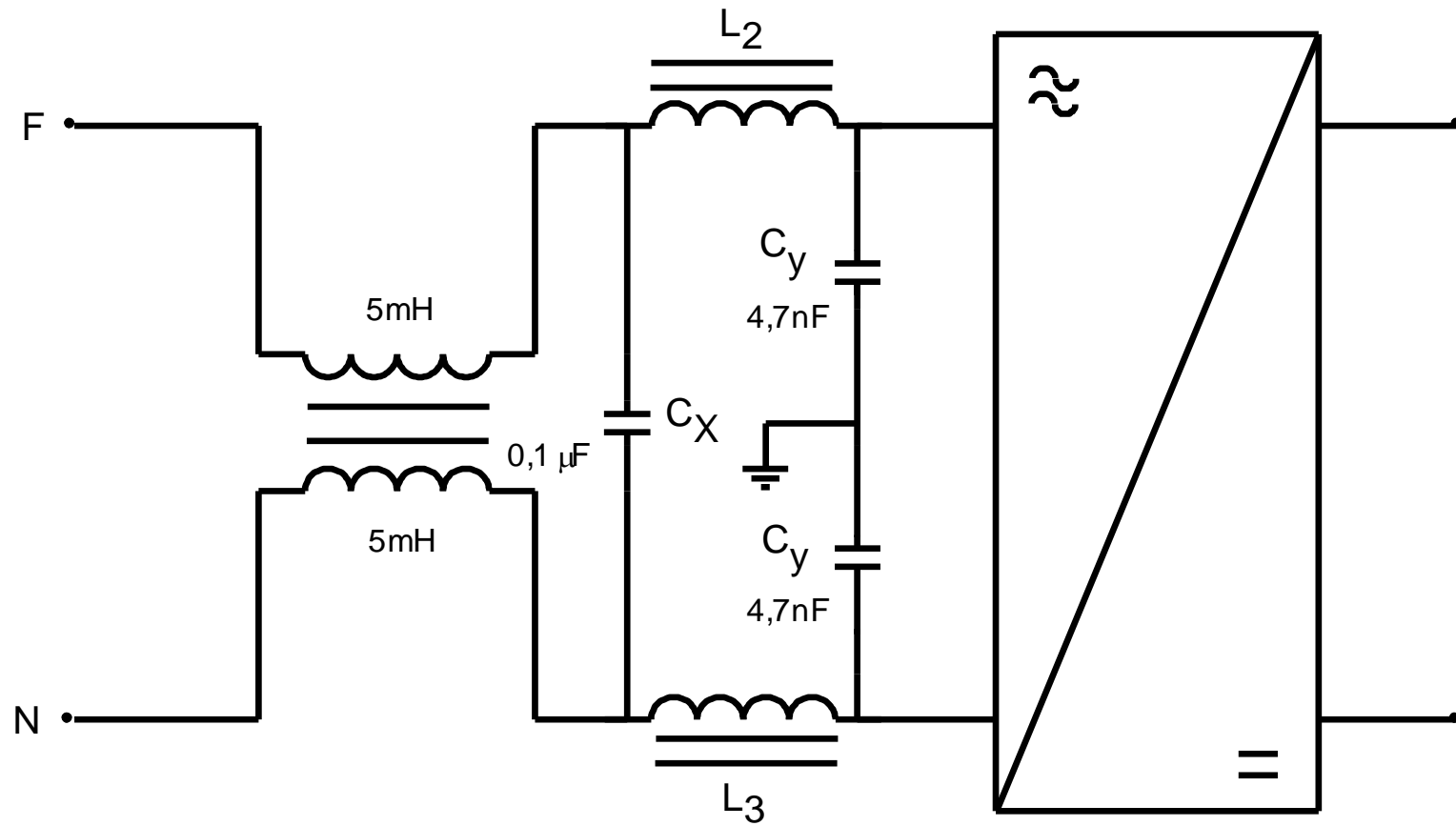
# Diagrama de blocos de um conversor CC-CC



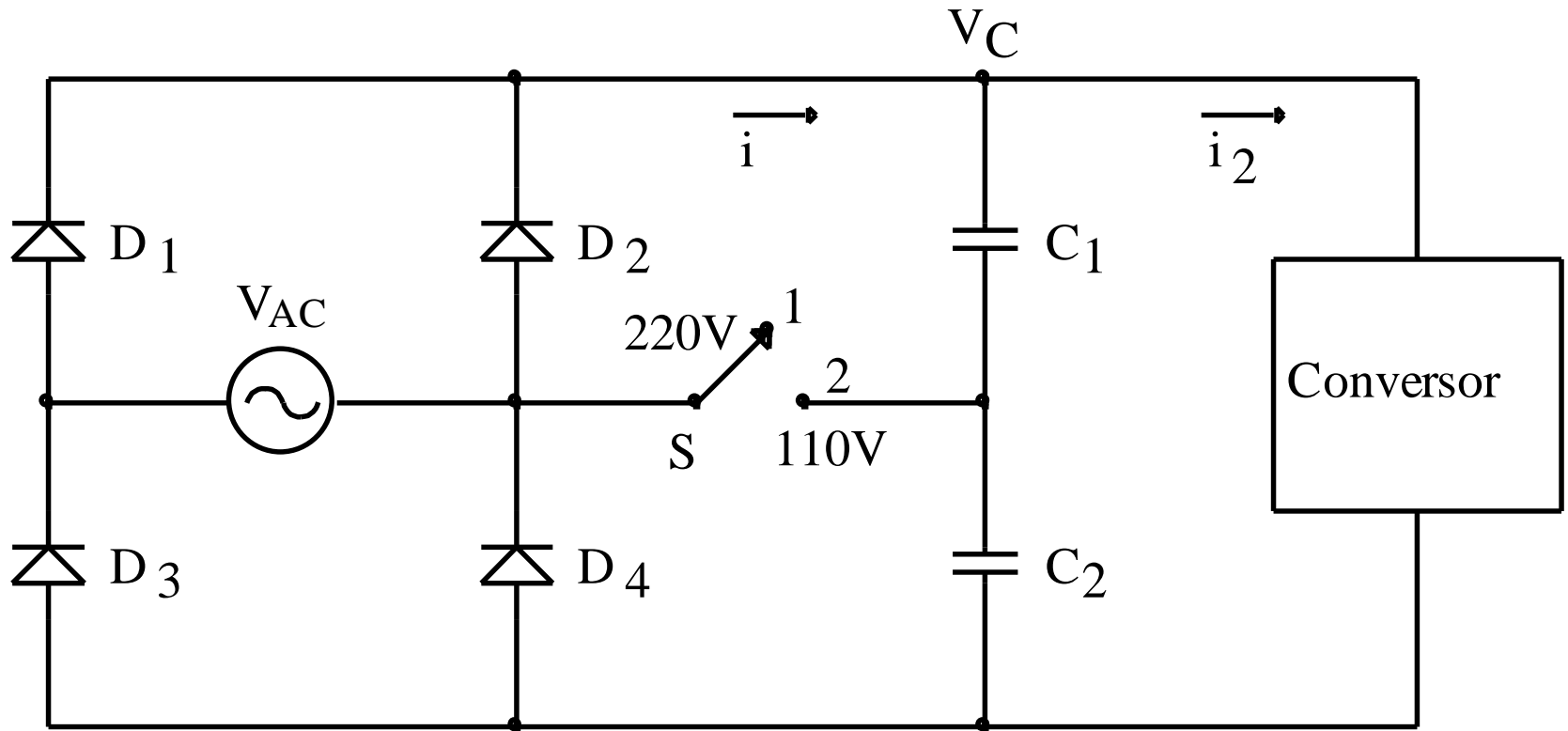
# Diagrama de blocos de uma fonte chaveada



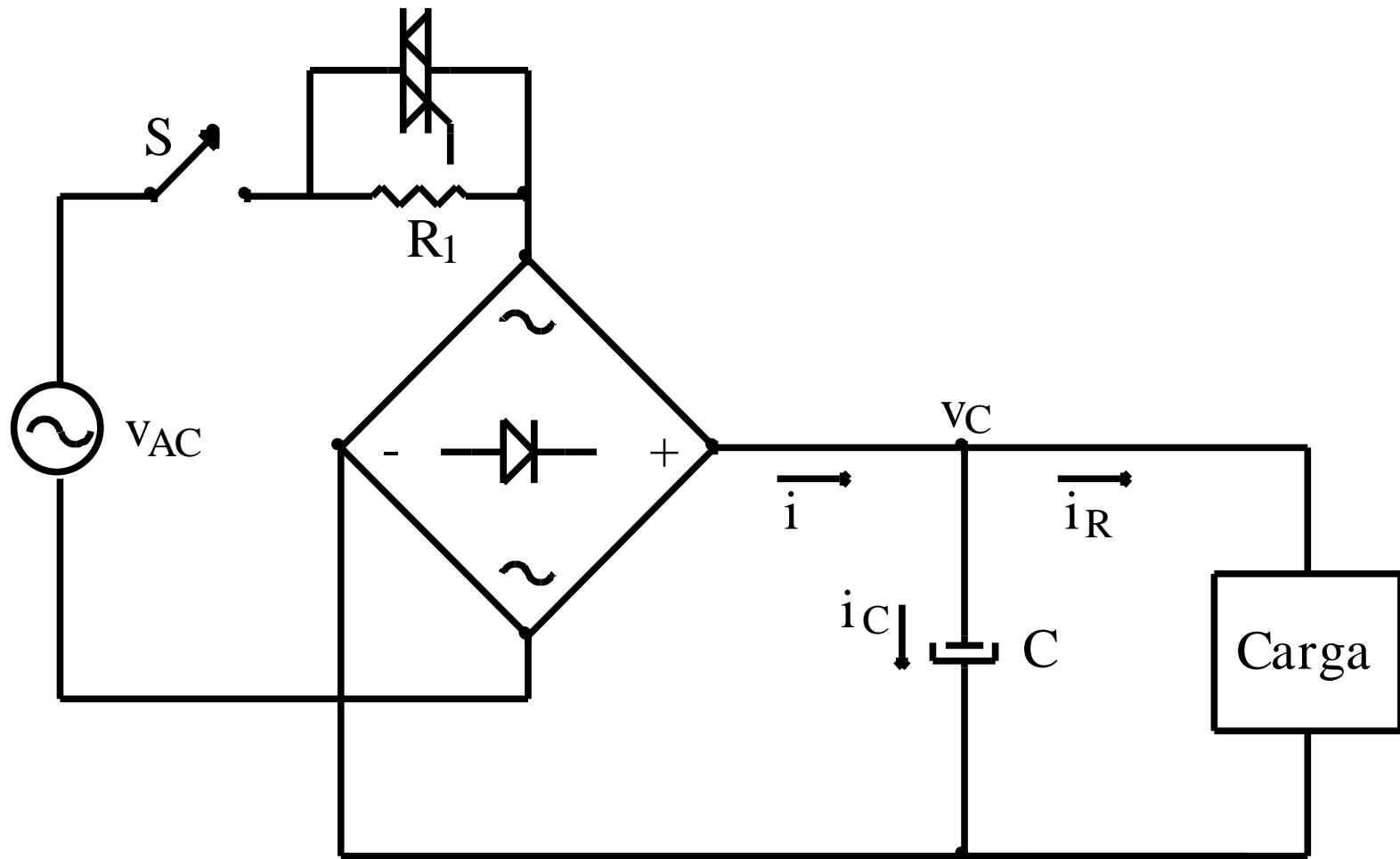
# Filtro de EMI



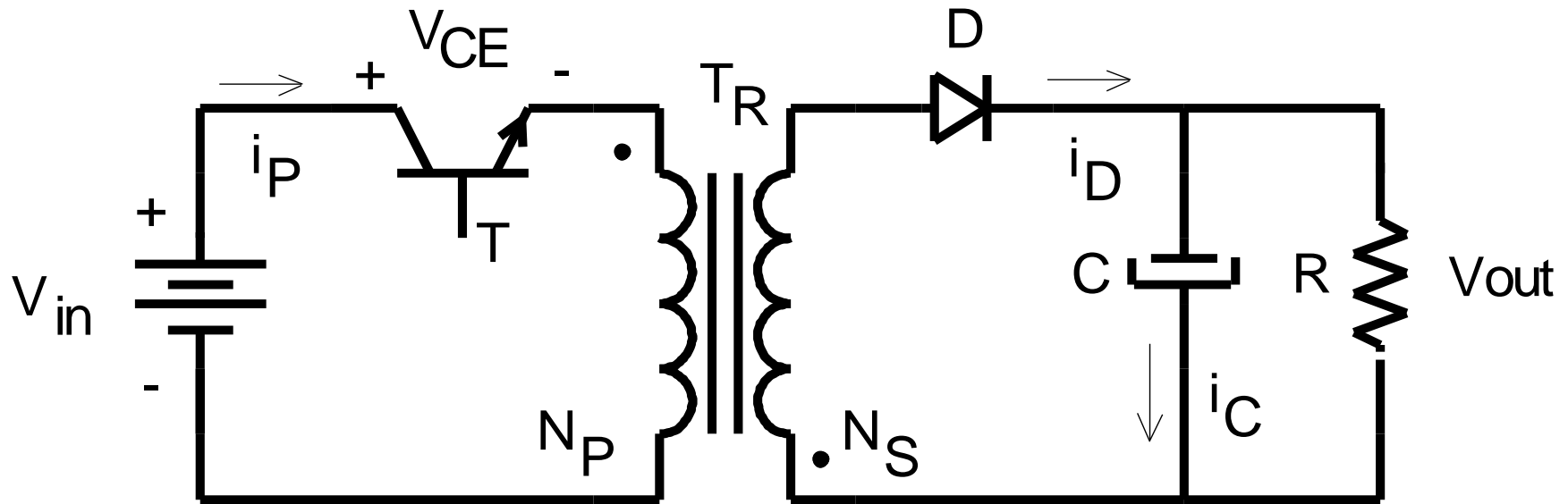
# Retificador de entrada



# Retificador de entrada - Inrush

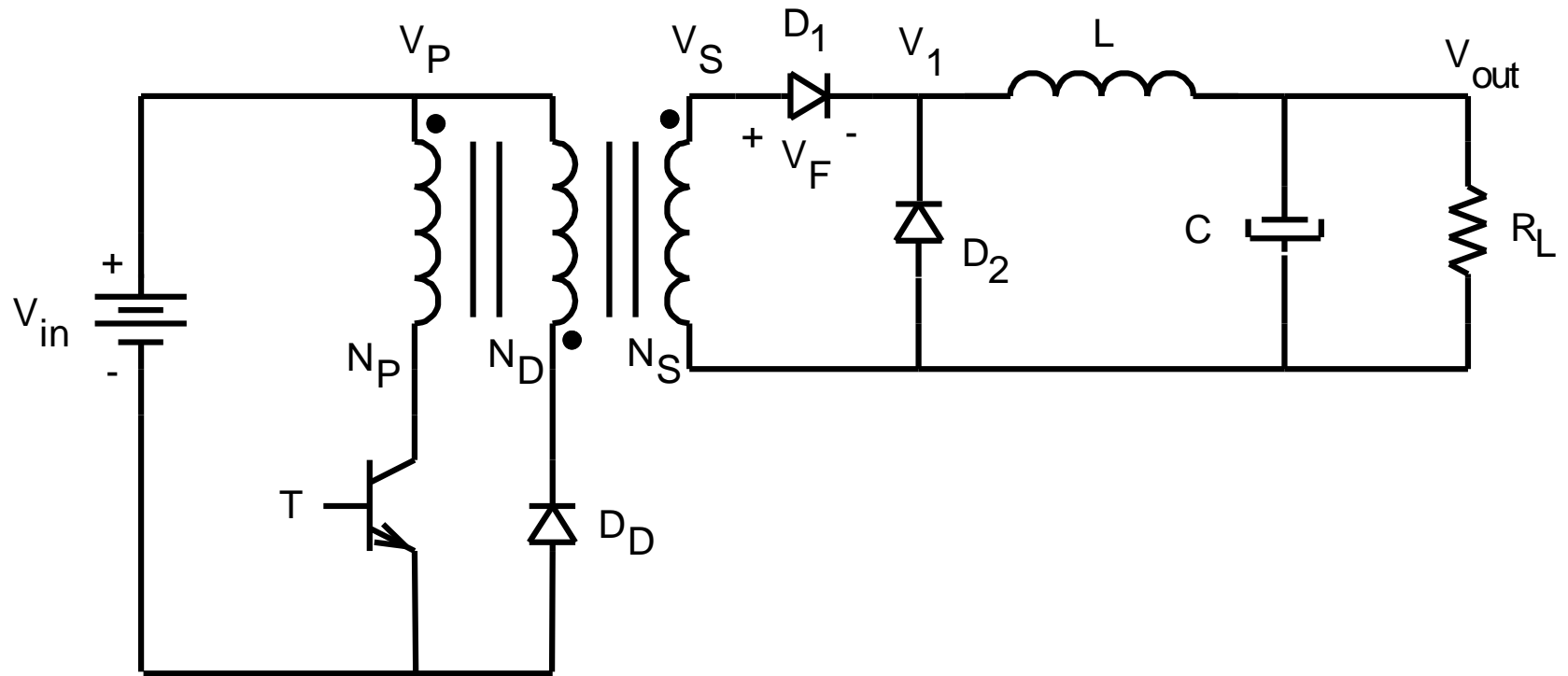


# Conversores aplicados em fontes chaveadas



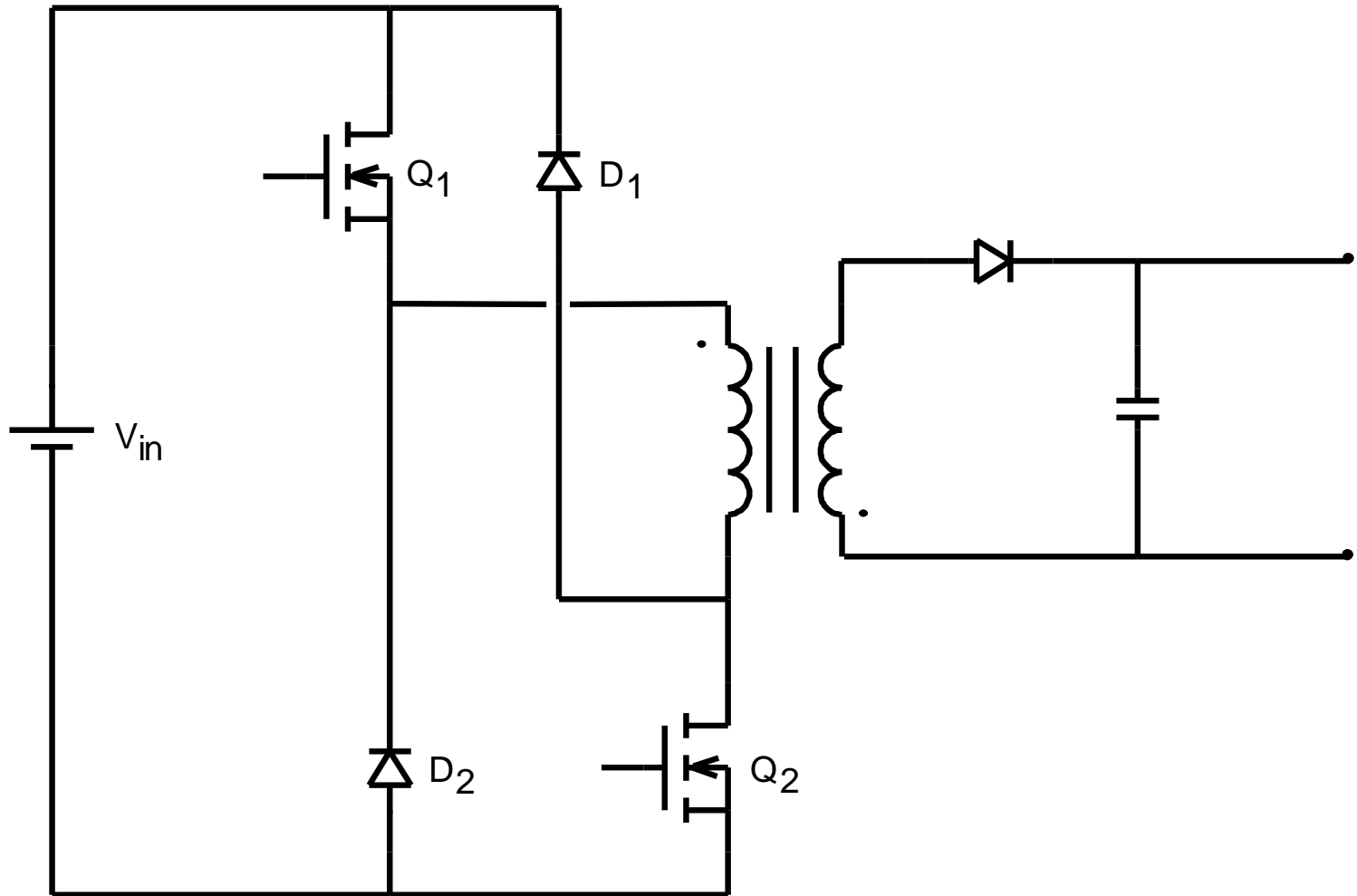
Conversor Flyback

# Conversores aplicados em fontes chaveadas



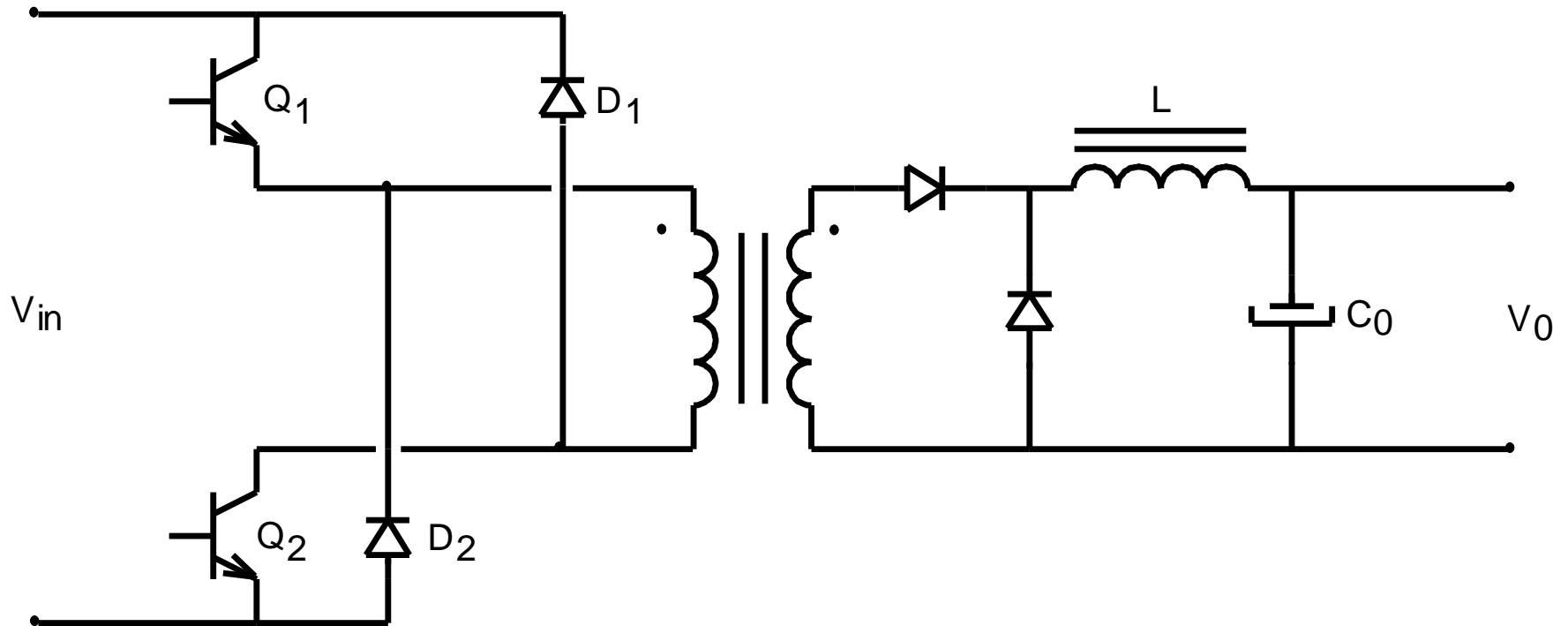
Conversor Forward

# Conversores aplicados em fontes chaveadas



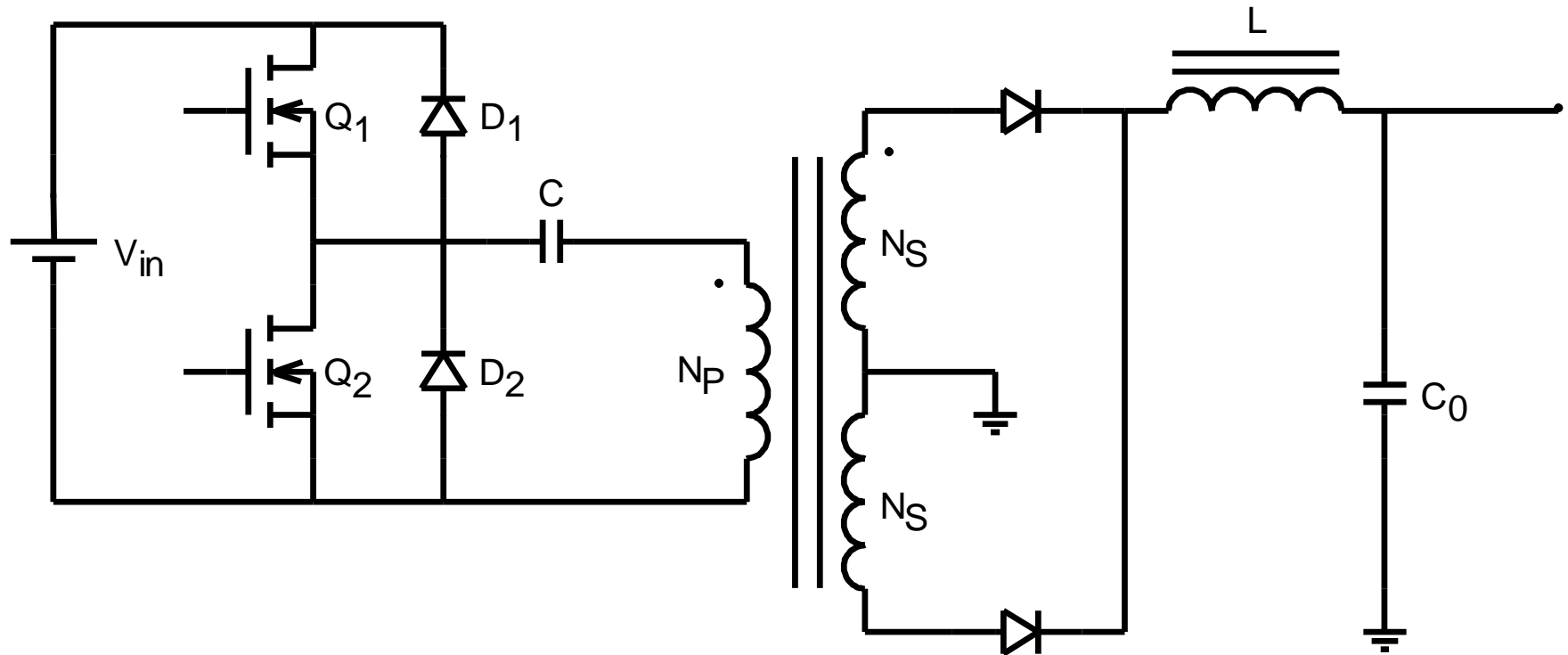
**Conversor Flyback com dois interruptores**

# Conversores aplicados em fontes chaveadas



**Conversor Forward com dois interruptores**

# Conversores aplicados em fontes chaveadas



Conversor meia ponte modificado









# Circuitos integrados para fontes chaveadas



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

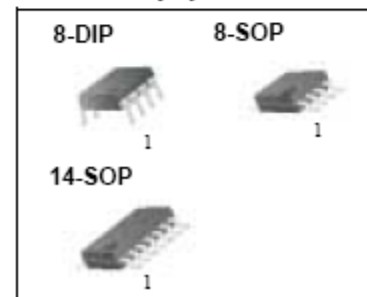
## UC3842/UC3843/UC3844/UC3845 SMPS Controller

### Features

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

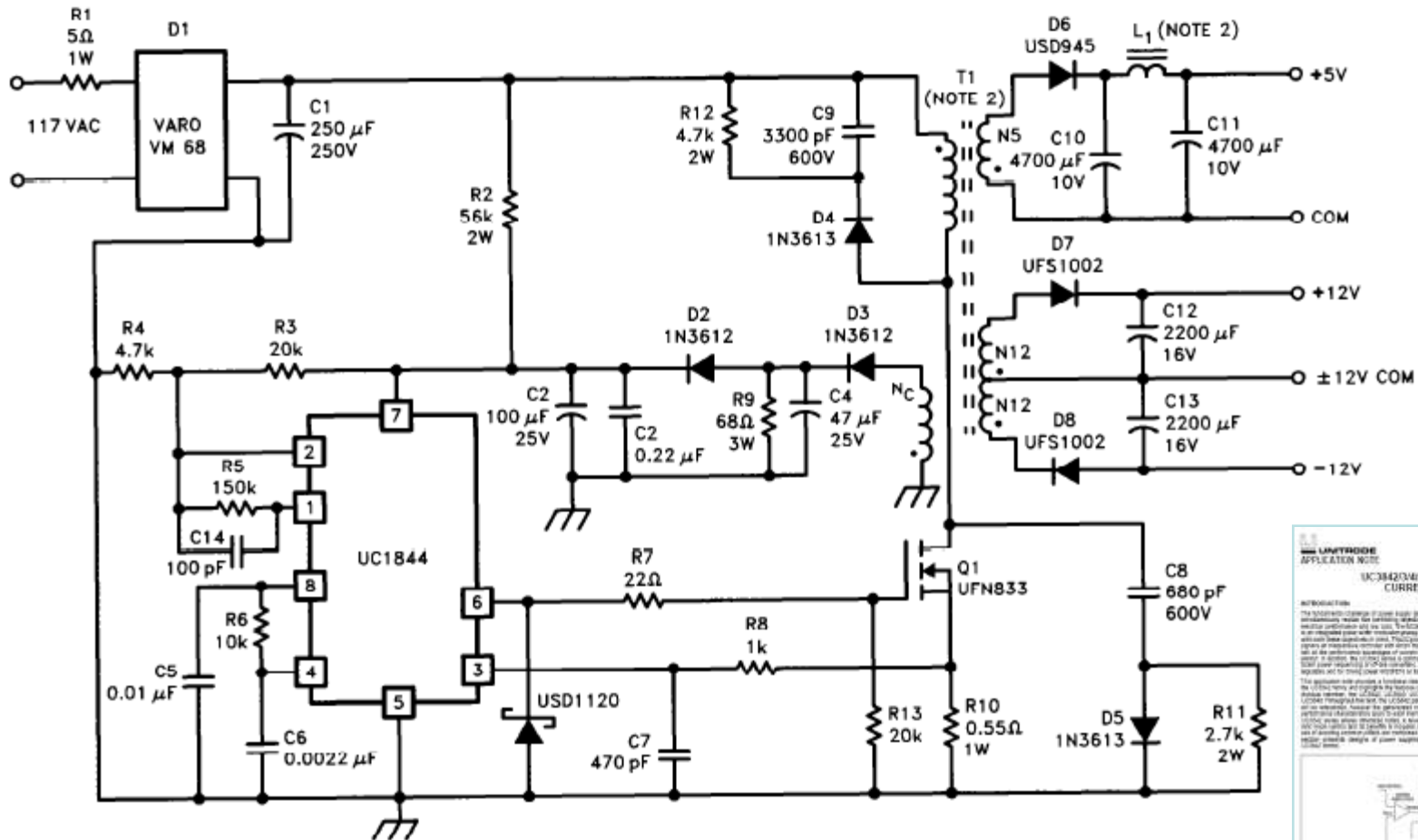
### Description

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.





# Circuitos integrados para fontes chaveadas



**U-188A**

**MAX LINEAR™ APPLICATION NOTE**

**UC3842/3485 PROVIDES LOW-COST CURRENT MODE CONTROL**

**INTRODUCTION**

The UC3842/3485 provides a low-cost, high-performance, current mode control system for switching power supplies. The UC3842/3485 is a current mode control system that provides excellent transient response and low ripple. The UC3842/3485 is a current mode control system that provides excellent transient response and low ripple. The UC3842/3485 is a current mode control system that provides excellent transient response and low ripple.

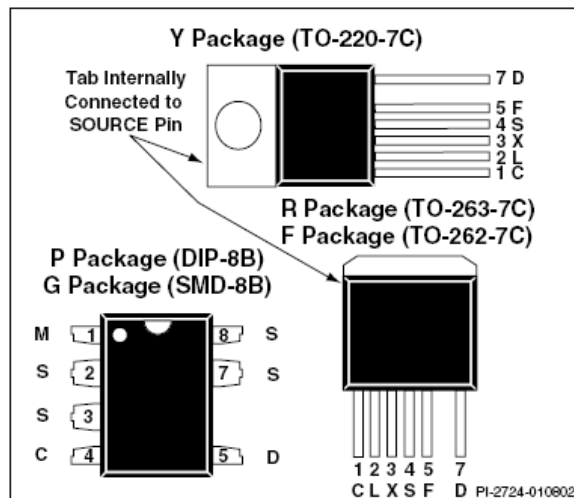
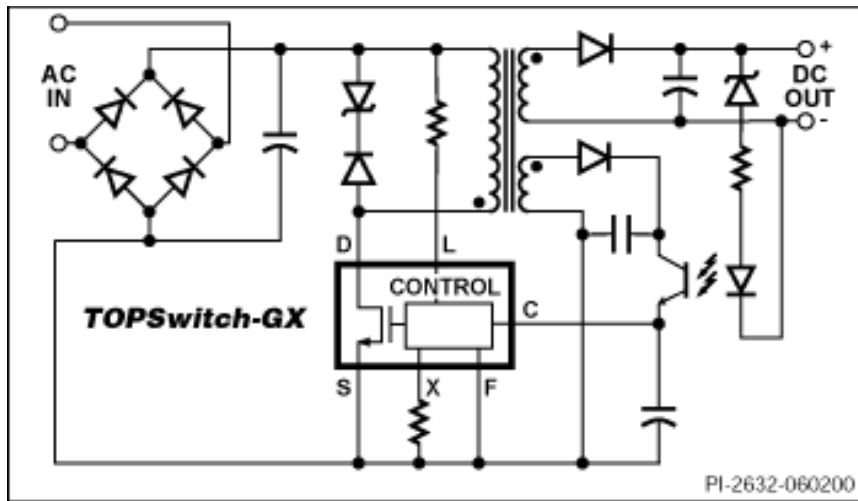
**CURRENT MODE CONTROL**

Current mode control provides a number of advantages over voltage mode control. The most significant advantage is that the current mode control system is inherently stable. This is because the current mode control system has a transfer function that is a first-order system. This means that the current mode control system has a much wider bandwidth than a voltage mode control system. The current mode control system also has a much better transient response than a voltage mode control system. This is because the current mode control system has a much higher crossover frequency than a voltage mode control system. The current mode control system also has a much better load regulation than a voltage mode control system. This is because the current mode control system has a much higher output impedance than a voltage mode control system. The current mode control system also has a much better line regulation than a voltage mode control system. This is because the current mode control system has a much higher input impedance than a voltage mode control system. The current mode control system also has a much better temperature stability than a voltage mode control system. This is because the current mode control system has a much higher thermal stability than a voltage mode control system. The current mode control system also has a much better component tolerance than a voltage mode control system. This is because the current mode control system has a much higher component tolerance than a voltage mode control system. The current mode control system also has a much better manufacturing yield than a voltage mode control system. This is because the current mode control system has a much higher manufacturing yield than a voltage mode control system. The current mode control system also has a much better cost performance than a voltage mode control system. This is because the current mode control system has a much higher cost performance than a voltage mode control system. The current mode control system also has a much better reliability than a voltage mode control system. This is because the current mode control system has a much higher reliability than a voltage mode control system. The current mode control system also has a much better safety than a voltage mode control system. This is because the current mode control system has a much higher safety than a voltage mode control system. The current mode control system also has a much better environmental performance than a voltage mode control system. This is because the current mode control system has a much higher environmental performance than a voltage mode control system. The current mode control system also has a much better overall performance than a voltage mode control system. This is because the current mode control system has a much higher overall performance than a voltage mode control system.

**Figure 1. The Loop Current Mode Control System**

slua143

# Circuitos integrados para fontes chaveadas

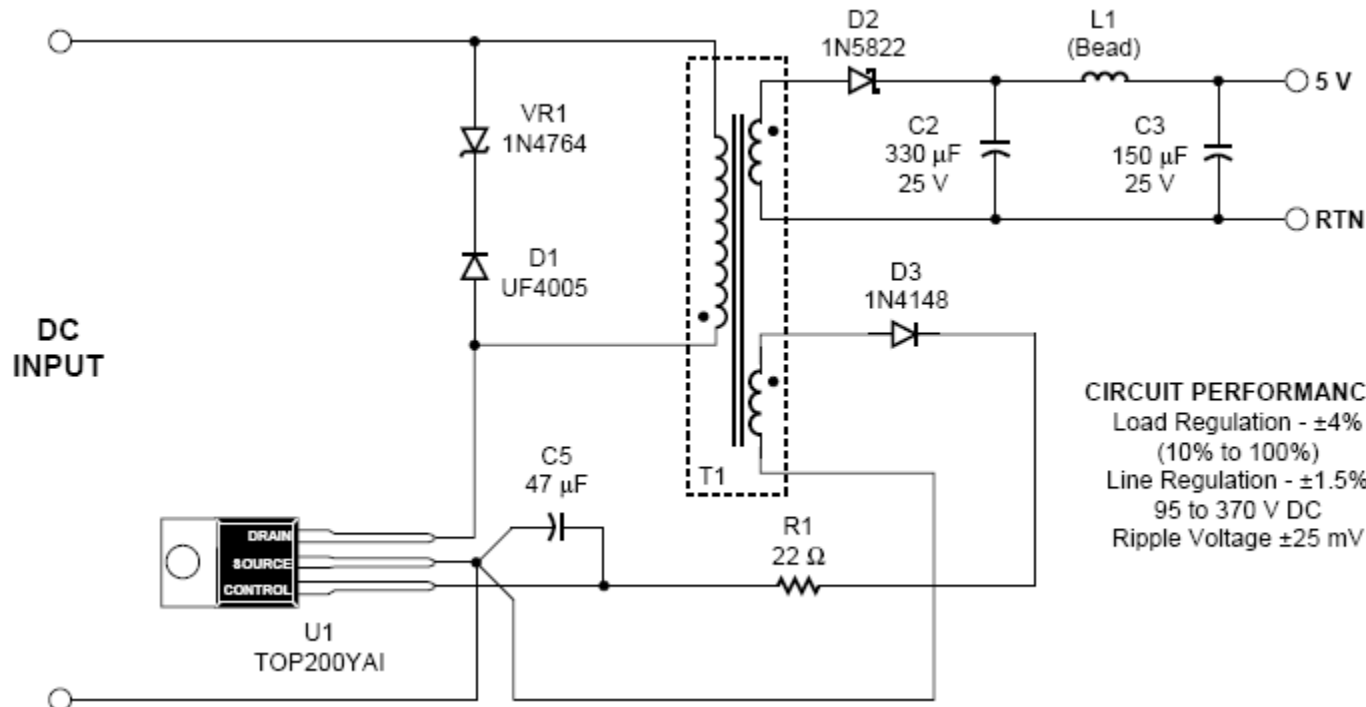
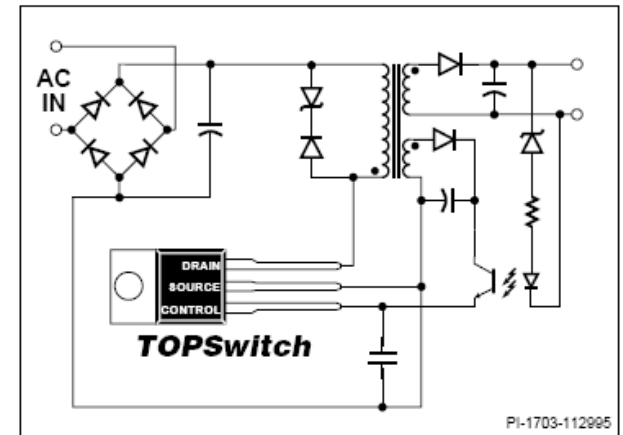


OUTPUT POWER TABLE				
PRODUCT <sup>3</sup>	230 VAC $\pm 15\%$ <sup>4</sup>		85-265 VAC	
	Adapter <sup>1</sup>	Open Frame <sup>2</sup>	Adapter <sup>1</sup>	Open Frame <sup>2</sup>
TOP242 P or G	9 W	15 W	6.5 W	10 W
TOP242 R	15 W	22 W	11 W	14 W
TOP242 Y or F	10 W	22 W	7 W	14 W
TOP243 P or G	13 W	25 W	9 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



# Circuitos integrados para fontes chaveadas

## 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

# Próxima aula

## Capítulo 10: Inversores

### 1. Introdução aos conversores CC-CA.

