

Faculdade de Ciências e Tecnologia
Departamento de Eng^a Electrónica e Informática

Electrónica de Potência 2008
 Folha de Problemas #2

Deadline:

Problema 1

4-2 Using the PSpice listing in Fig. 4-9b, obtain the switch current and the diode voltage waveforms.

Problema 2

4-4 In the PSpice simulation of Fig. 4-9, make $R_{Load} = 10 \Omega$. Evaluate the effects of the following changes on the simulation results:

- (a) Remove the R-C snubber across the diode.
- (b) In the pulse waveform of the control voltage VCNTL, make the rise and fall times zero.
- (c) Remove the R-C snubber across the diode *simultaneously* with the following changes: i) make the diode model to be as follows:
 .MODEL POWER_DIODE D(IS=3e-15, RS=0.1, CJO=10PF)
 and, ii) add the following Options statement:
 .OPTIONS ABSTOL=1N, VNTOL=1M, RELTOL=0.015
- (d) In part c, make the rise and fall times of the control voltage VCNTL zero.

Problema 3

4-8 In the PSpice simulation of Fig. 4-8, change R_{Load} to be 10Ω which causes the inductor current i_L to become discontinuous (i.e., it becomes zero for a finite interval during each switching cycle). Obtain i_L and v_c waveforms.

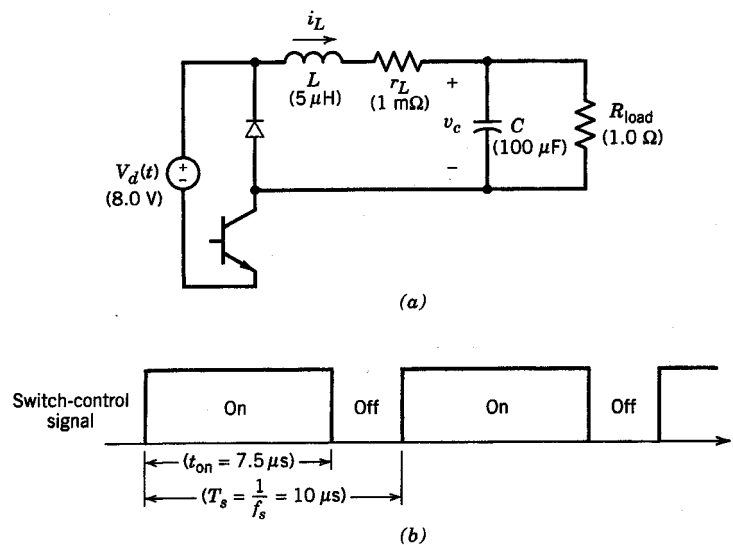
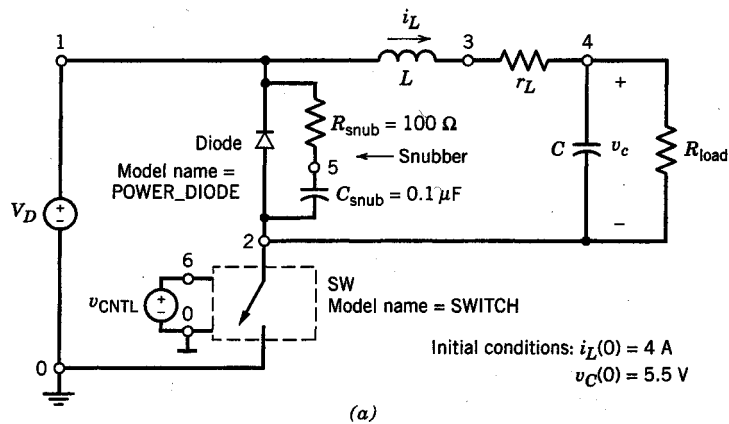


Figure 4-8 (a) Circuit for simulation. (b) Switch control waveform.



PSpice Example

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*
DIODE 2 1 POWER_DIODE
Rsnub 1 5 100.0
Csnub 5 2 0.1uF
*
SW 2 0 6 0 SWITCH
VCNTL 6 0 PULSE(0V,1V,0s,1ns,1ns,7.5us,10us)
*
L 1 3 5uH IC=4A
rL 3 4 1m
C 4 2 100uF IC=5.5V
RLOAD 4 2 1.0
*
VD 1 0 8.0V
*
.MODEL POWER_DIODE D(RS=0.01,CJO=10pF)
.MODEL SWITCH VSWITCH(ROn=0.01)
.TRAN 10us 500.0us 0s 0.2us uic
.PROBE
.END

```

(b)

Figure 4-9 PSpice simulation of circuit in Fig. 4-8.