EECS192 Lecture 7
Mar. 1, 2016

Notes:

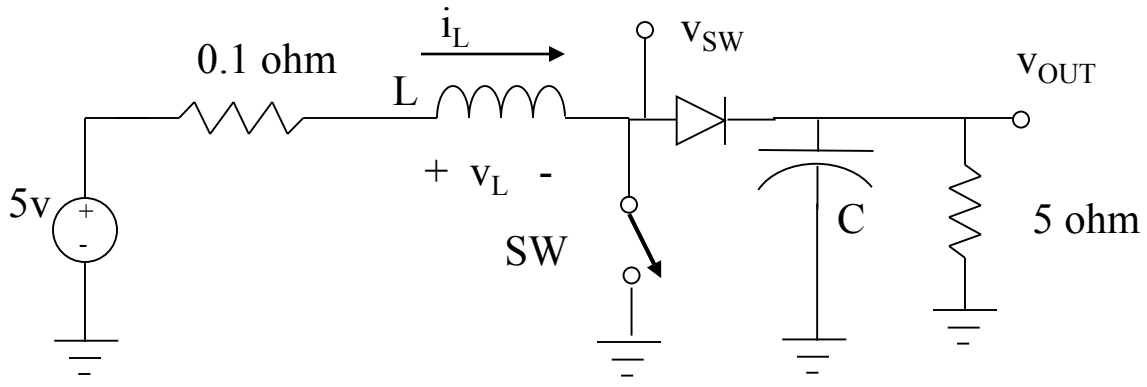
1. Check off-
- 3/4/2016 : benchtop line tracking (line camera+servo)
- 3/11/2016: drop-and-run, velocity control

2. Community Spirit: PCB peer review, Piazza, helping fellow students
3. CalDay Sat. April 16 @ UCB, Freescale Cup at UC Davis

Topics

- Quiz 3 boost converter
- Line sensor- processing
  - Automatic Gain Control
  - Edge detection/fitting
  - Sanity check: median/outlier
- iPython notebook (under Resources on Piazza)
- Speed sensing/velocity control

Boost converter- Quiz 3



Average Vout = 10V. Switch and diode are assumed ideal. Switch has 30% duty cycle as shown below.

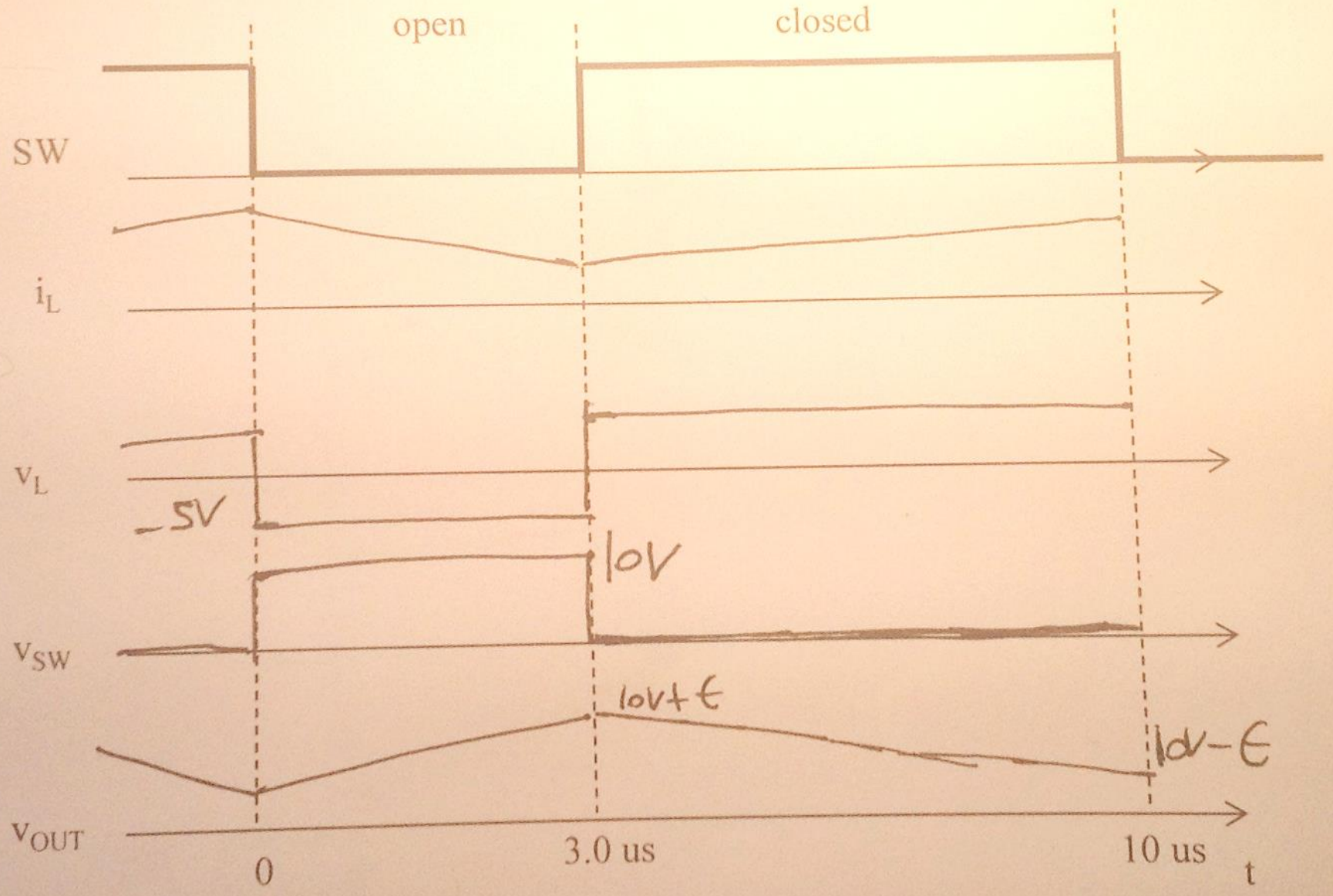
a) What is the approximate power dissipation in the 5 ohm resistor?_____ W

b) What is the change in capacitor energy from t=0 to t=3 us?_____ Joules

c) What is the change in capacitor energy from t=3 to t=10 us?_____ Joules

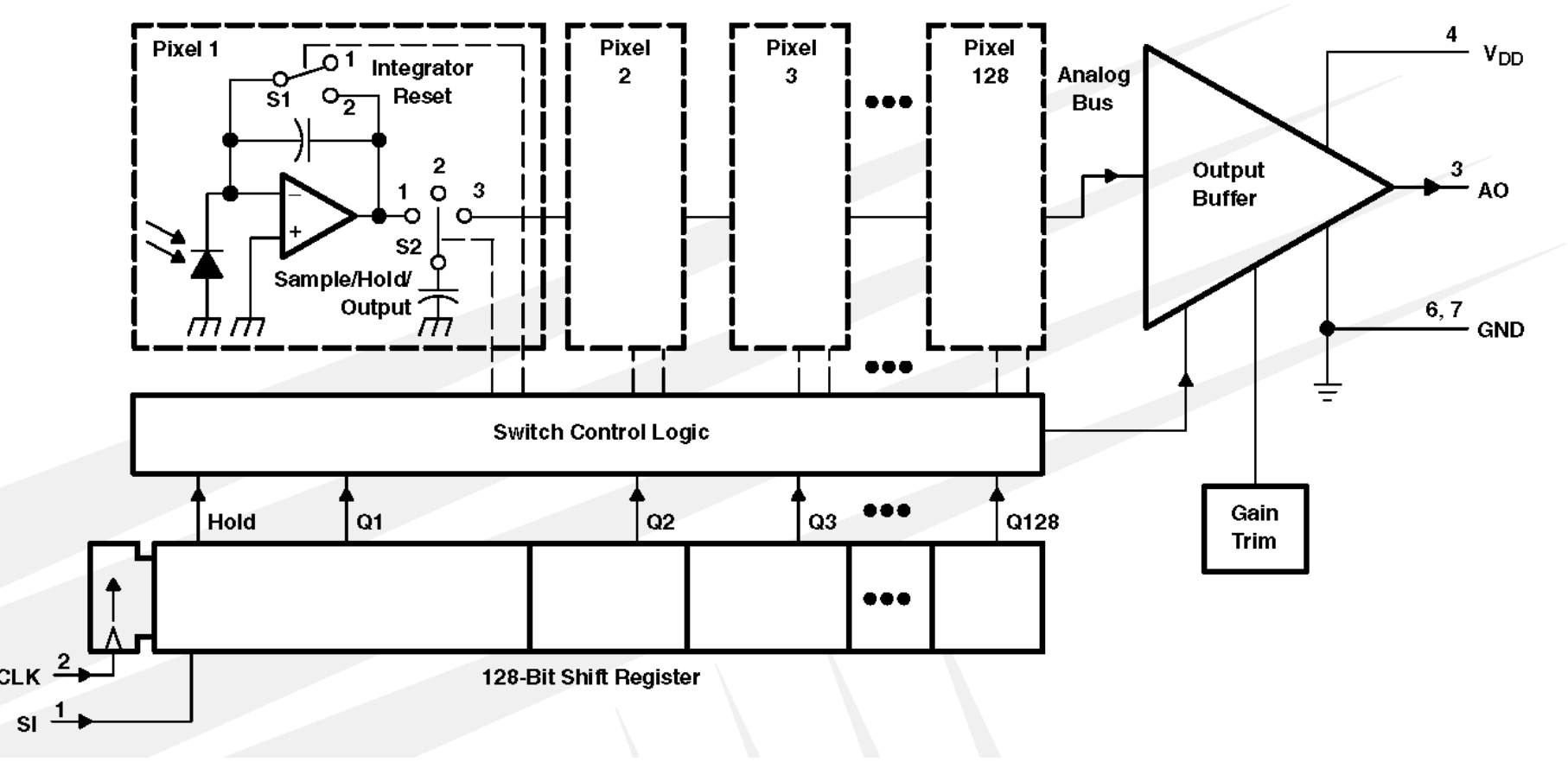
d) Complete the sketch for i_L, v_L, v_{SW}, and v_{OUT}. Assume that the circuit has reached steady state operating conditions, and that switching is fast enough that piecewise linear approximations are valid. **Note peak values for v_L and v_{sw}.**

Waveforms on board


open
closed
SW
i_L
v_L
-5V
10V
v_{SW}
10V+ϵ
10V-ϵ
v_{OUT}
0
3.0 us
10 us
t

TSL 1401 line sensor

Functional Block Diagram



TSL 1401 line sensor

PARAMETER MEASUREMENT INFORMATION

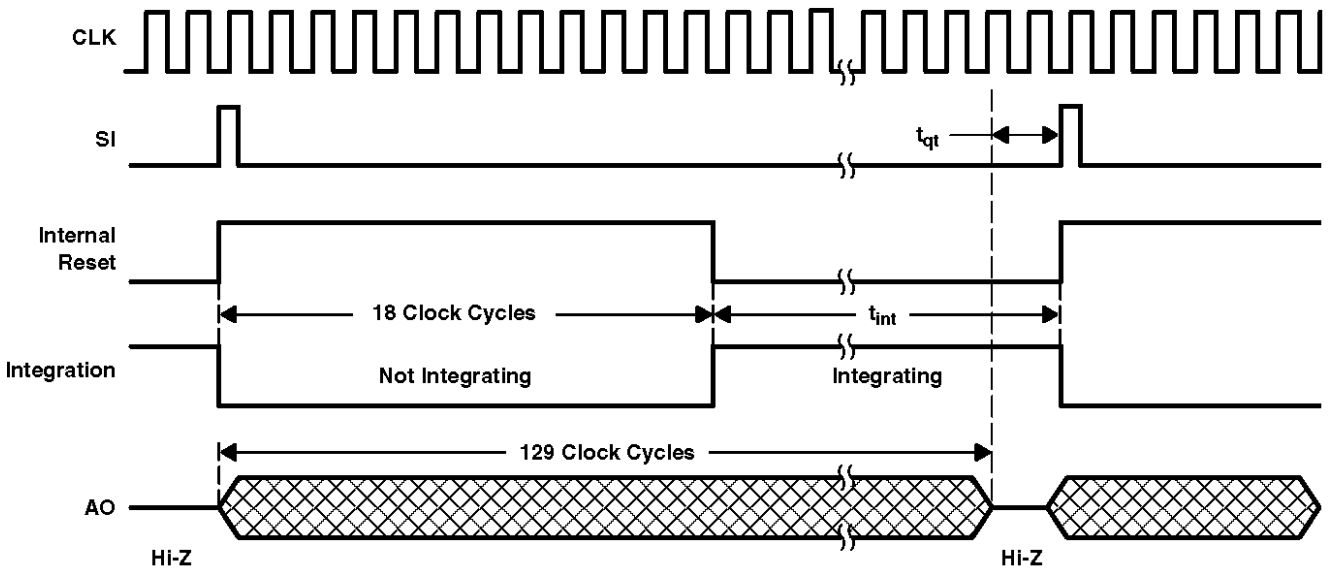


Figure 1. Timing Waveforms

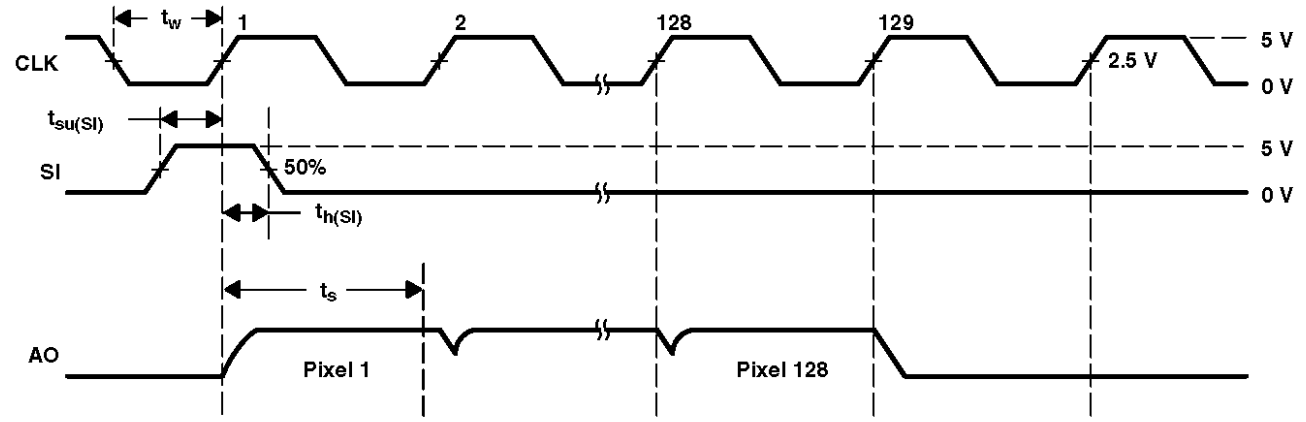
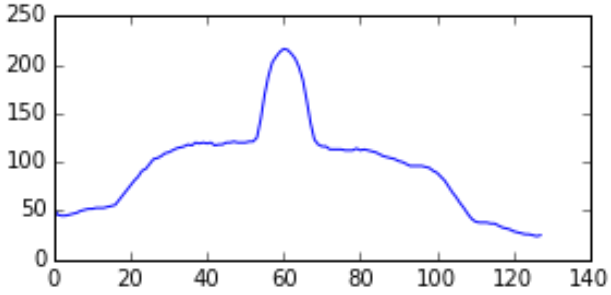


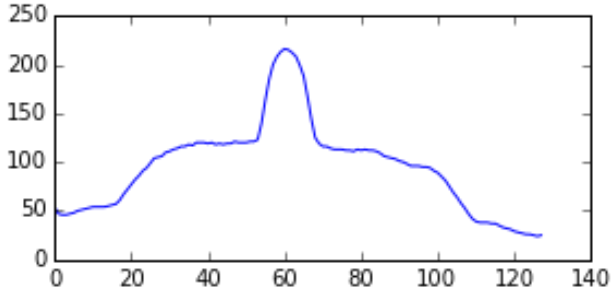
Figure 2. Operational Waveforms

TSL 1401 line sensor NATCAR 8 bit

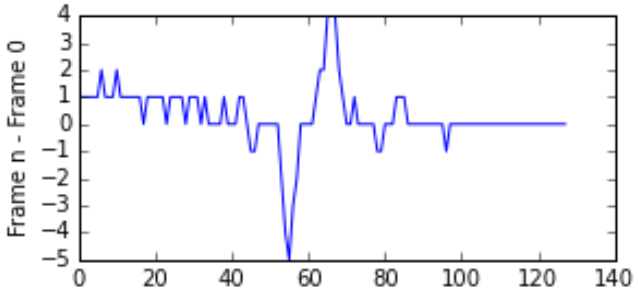
Frame 0



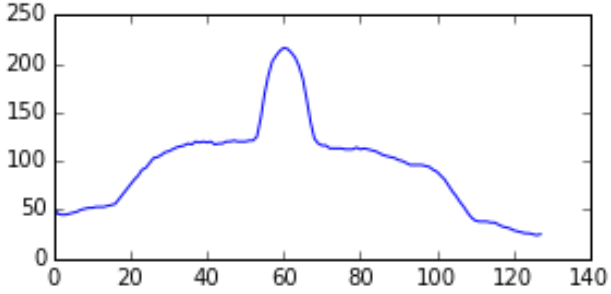
Frame 1



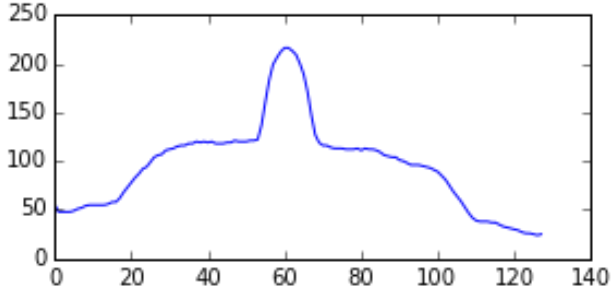
Frame 1-Frame 0



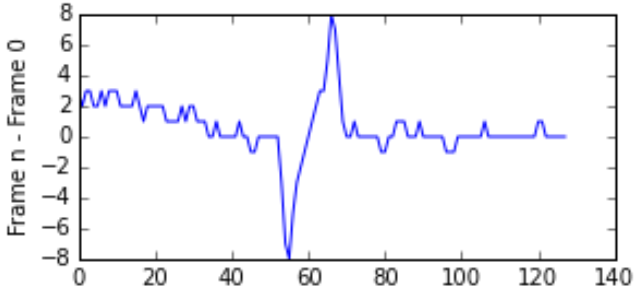
Frame 0



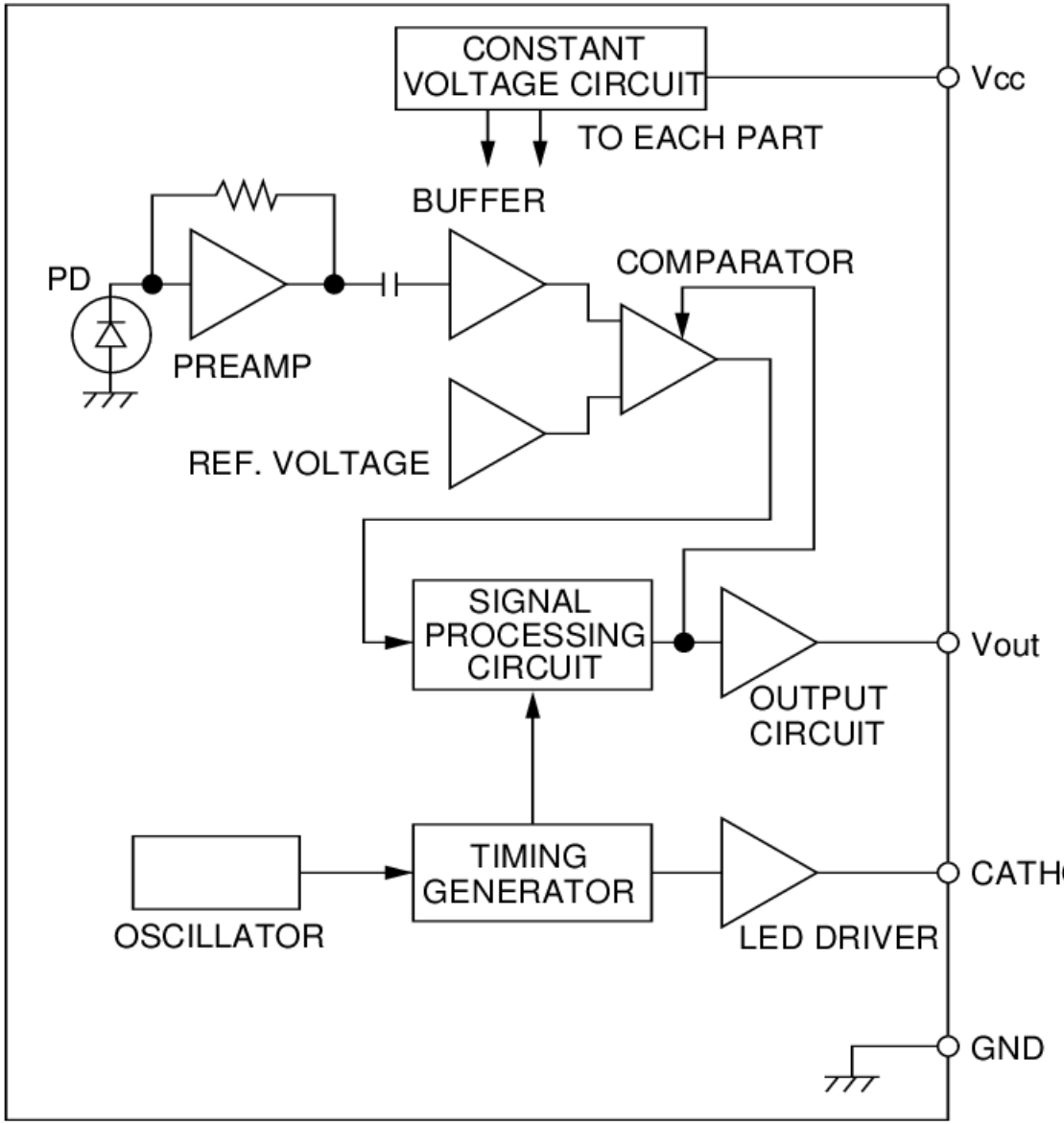
Frame 2



Frame 2-Frame 0



iPython Notebook

Hamamatsu Optical Detector

■BLOCK DIAGRAM AND FUNCTIONS