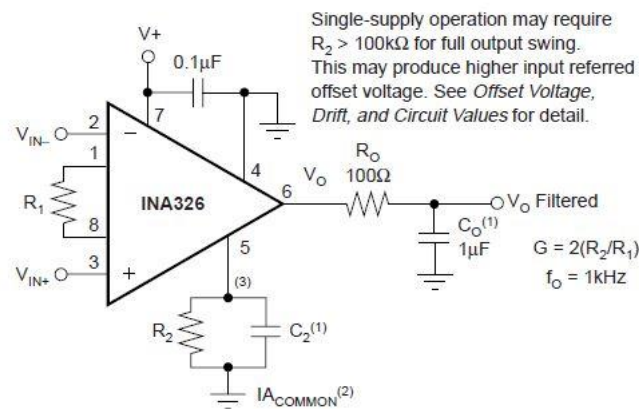


## PRACTICAL DESIGN

### ACTIVITY 2: THRESHOLD VOLTAGE SHIFT AMPLIFICATION

#### BACKGROUND

- RADFET  $V_{th}$  is the dosimetric parameter which is related to dose.
- This voltage can be accurately measured with instrumentation amplifier.
- Circuit proposed based on INA326 with 2-pole low pass filtering:



*Voltage amplification + 2<sup>nd</sup> order Low pass filter based on INS326.*

#### MATERIALS

- A SPICE-type circuit simulator (LTSPICE, TINA-TI, PSPICE for TI, CADENCE, ...)
- SPICE models, libs or subcircuits of the parts involved.
- Check carefully component datasheets
- For the real design: parts and tools for electronic circuit prototyping.
- For electronic testing: a basic lab for electrical testing.

#### TASKS

- T1: To design theoretically, an amplification stage with Gain = 10 and 50 and low pass filtering at 10 Hz. (see Figure).
- T2: To simulate DC and AC responses of the circuit of T1. Compare numerical and theoretical results. Consider differential input voltages ( $V_{in+} - V_{in-}$ ) between 1 and 100 mV.
- T3: To obtain further information from the simulator such as noise, power consumption, transient and Fourier analysis.
- T4: To mount the circuits and measure all the magnitudes of interest.
- T5: To discuss theoretical, numerical and experimental results.