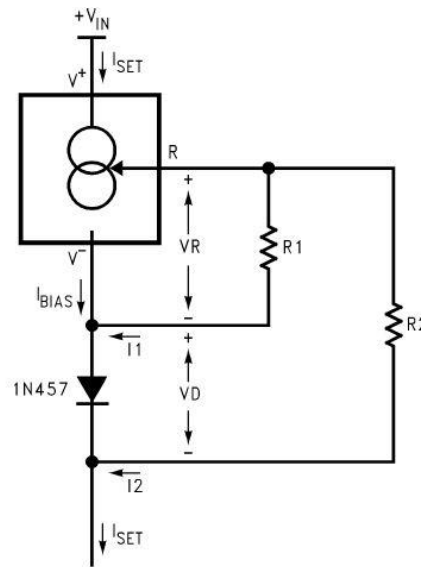# PRACTICAL DESIGN
ACTIVITY 1: TEMPERATURE COMPENSATED CURRENT SOURCE

BACKGROUND

- RADFETs require a stabilised current source for biasing in order to be read out
- Thermal drift is the main interference to gather an accurate measurement.
- Therefore, a current source has to designed with minimal temperature coefficient.
- Circuit proposed based on LM334:

Zero temperature coefficient current source based on LM334.

MATERIALS

- A SPICE-type circuit simulator (LTSPICE, TINA-TI, PSPICE forTI, 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, temperature compensated current sources with I_{SET} = 1 µA, 10 µA, 0.1 mA and 1 mA with 1% resistor values (see Figure). Bias a variable resistor around 10 kΩ.
- T2: To simulate DC response versus temperature of the circuits of T1. Compare numerical and theoretical results.
- 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 at several temperatures.
- T5: To discuss theoretical, numerical and experimental results.