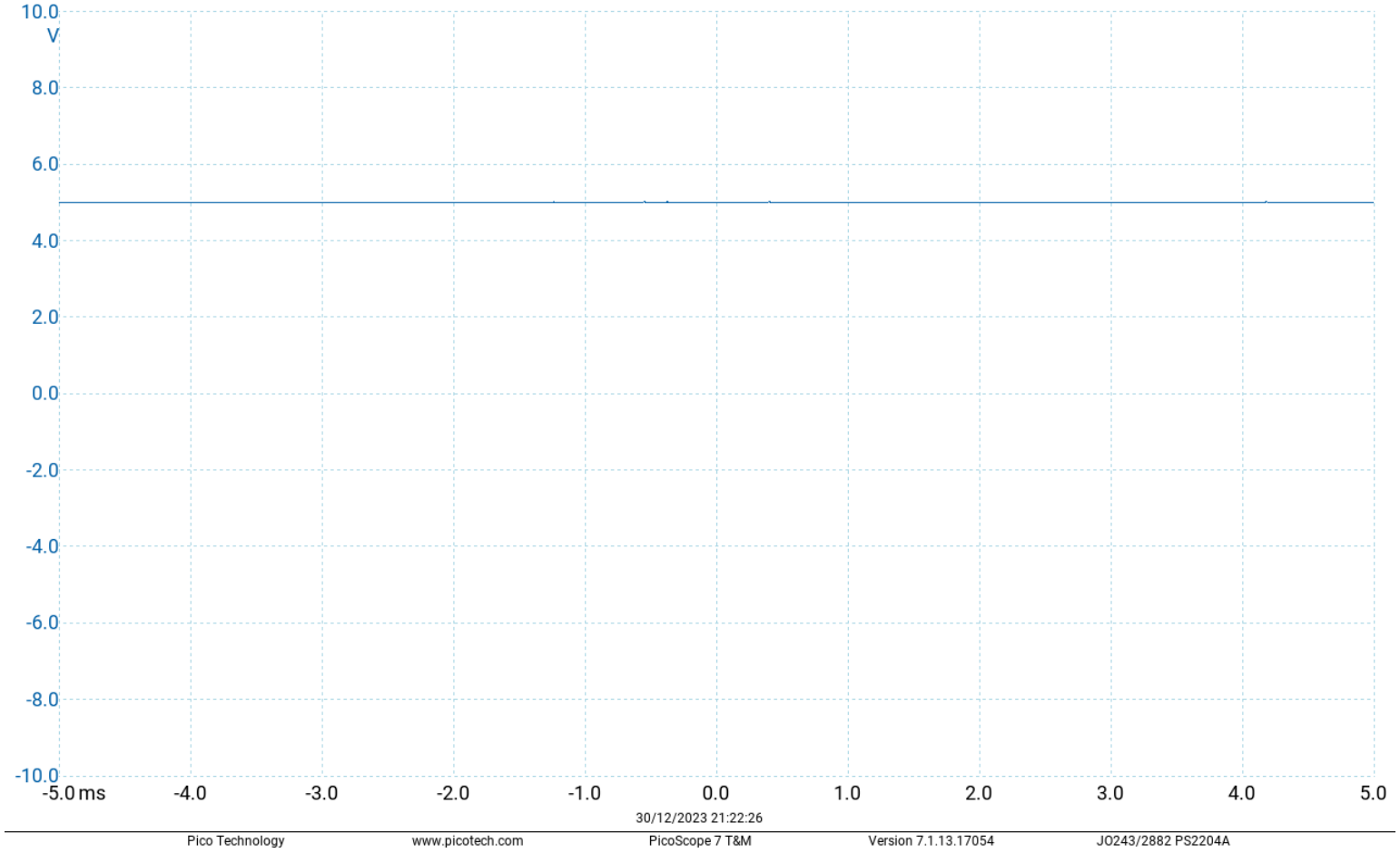
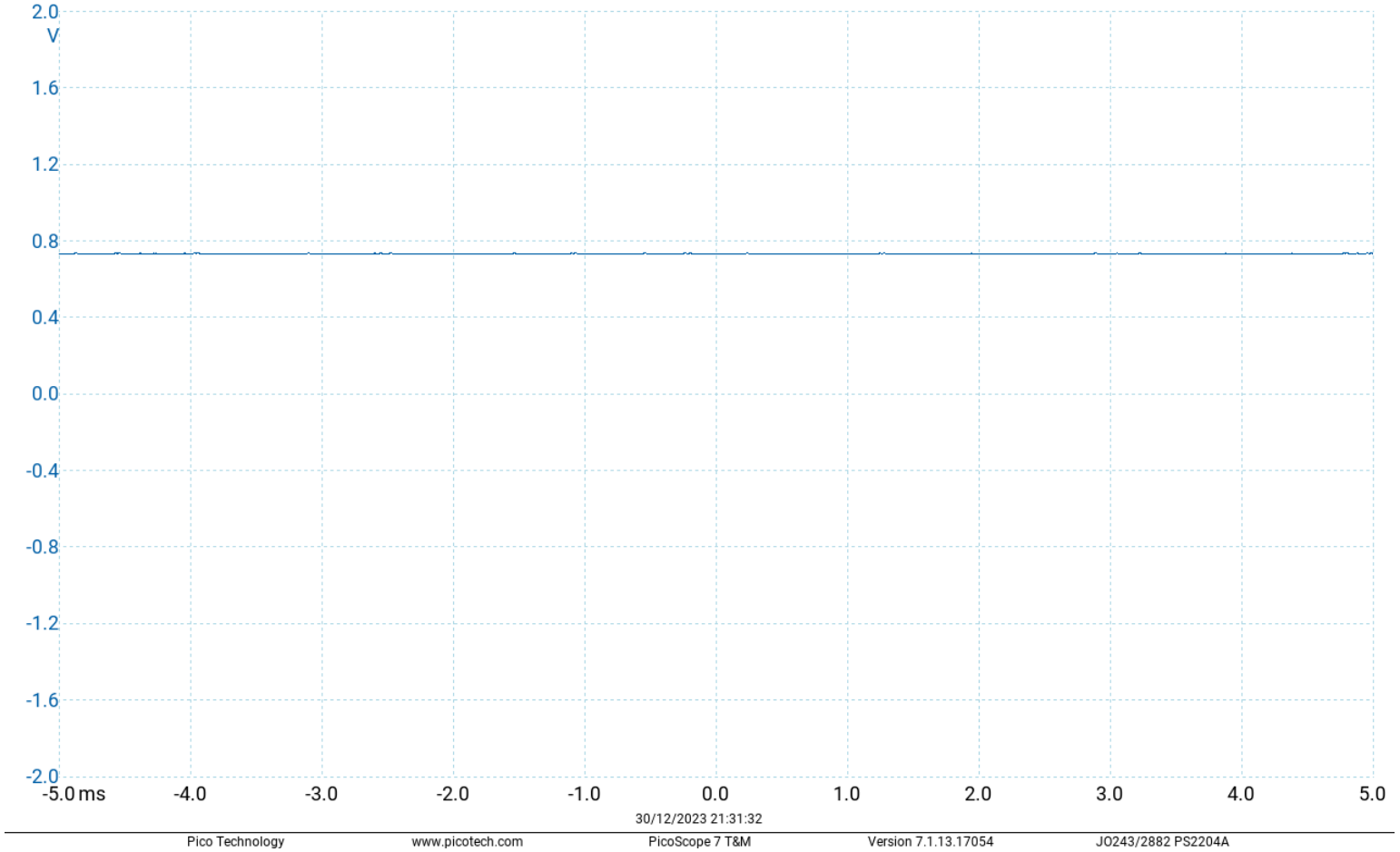
Exercise E2



$$V_{USB} = 5.012V$$

Exercise E2

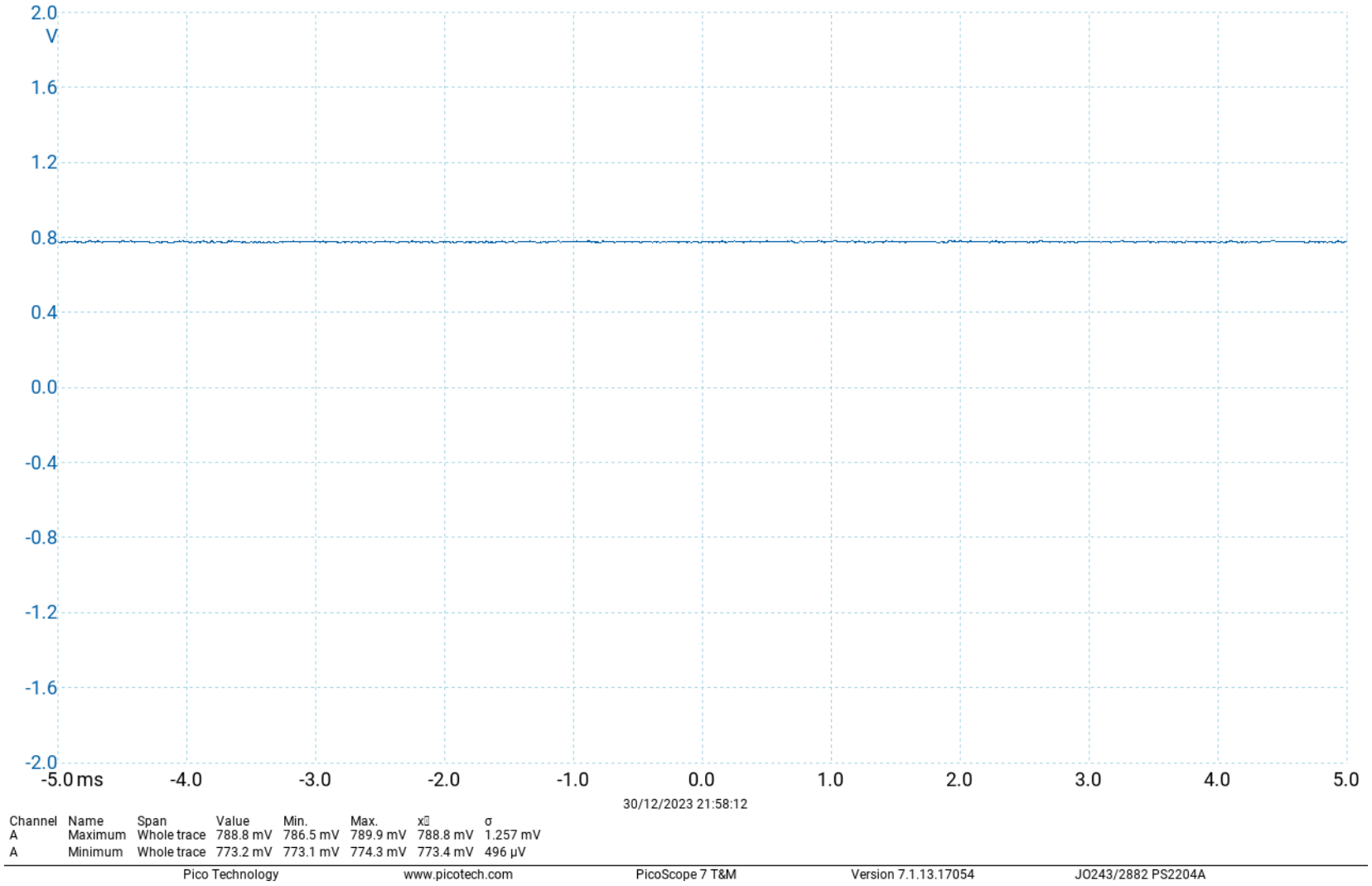


$V_{fd} = 0.729V$ (Note: V_{fd} is forward biased voltage drop across diode)

Exercise E2

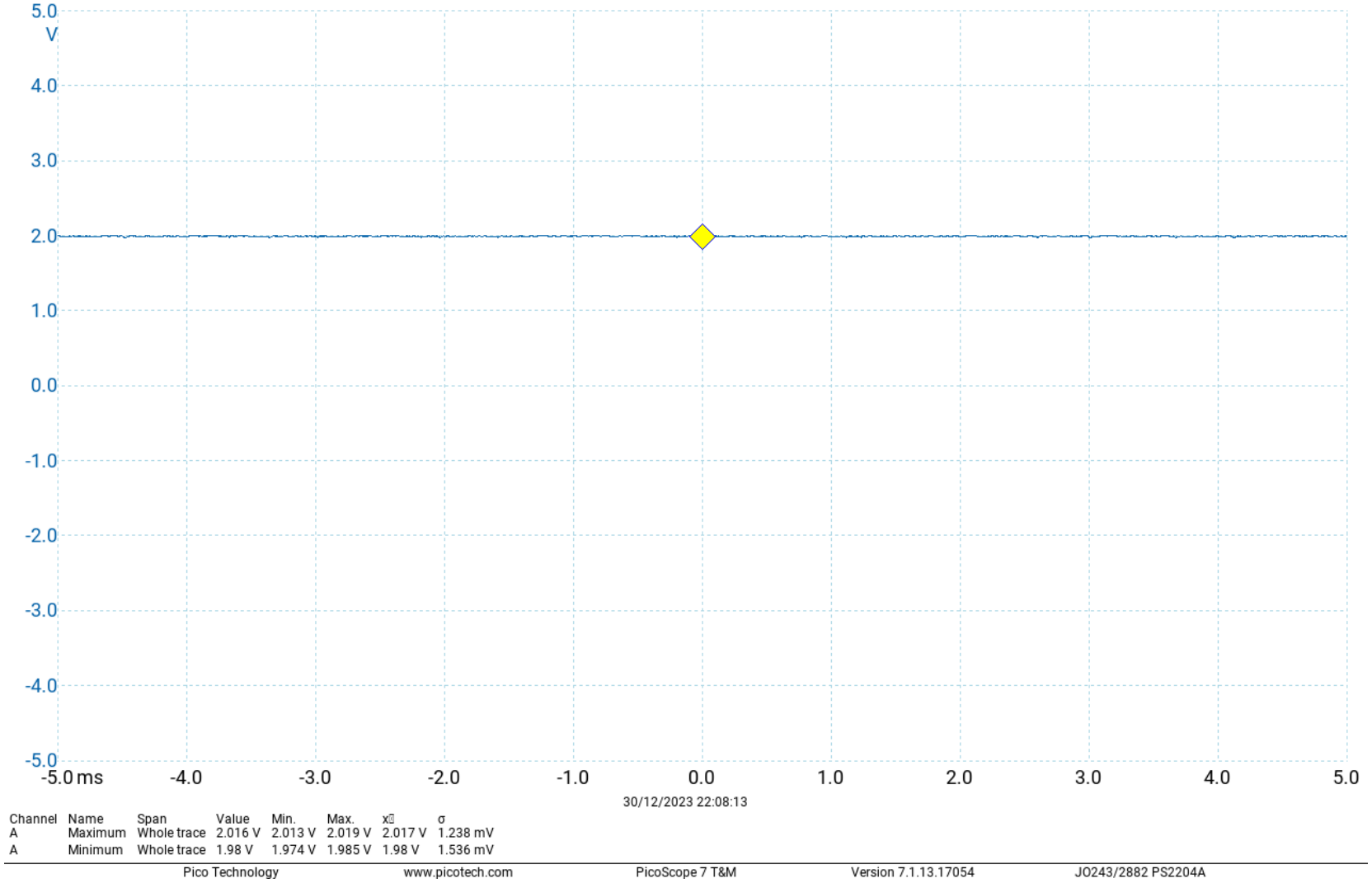
- Experimental values:
  - $V_{fd} = 0.729V$
  - $I = \frac{V_{USB} - V_{fd}}{R_0} = 9.113mA$
- Theoretical values from LTSpice in E1:
  - $I = 9.17mA$
  - $V_{fd} = 0.690V$
- The two results are closely matched.

Exercise E2



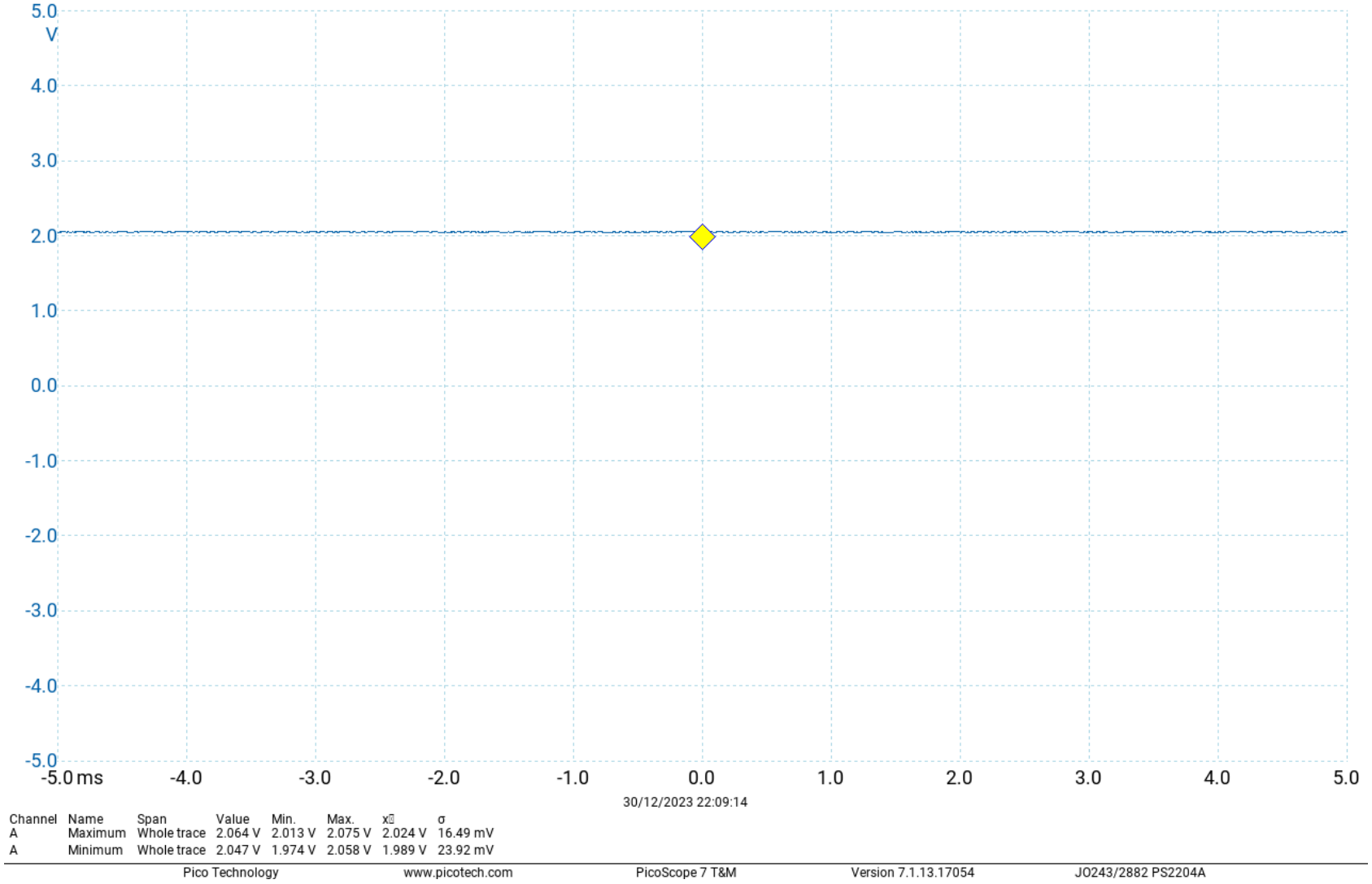
- 1N4001:
- $V_{fd} = 0.700V$

Exercise E2



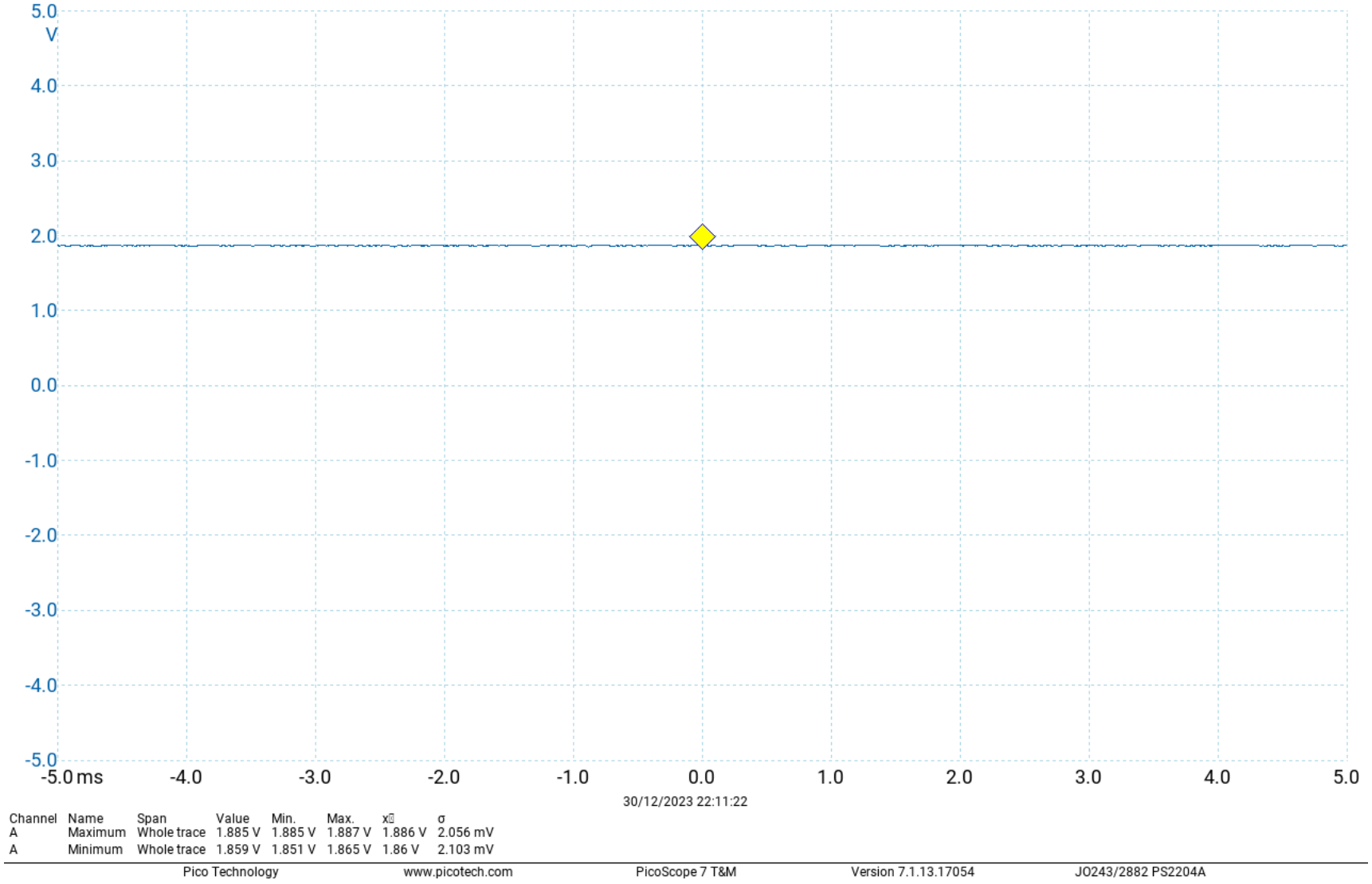
- Yellow LED:
- $V_{fd} = 2.000V$

Exercise E2



- Green LED:
- $V_{fd} = 2.057V$

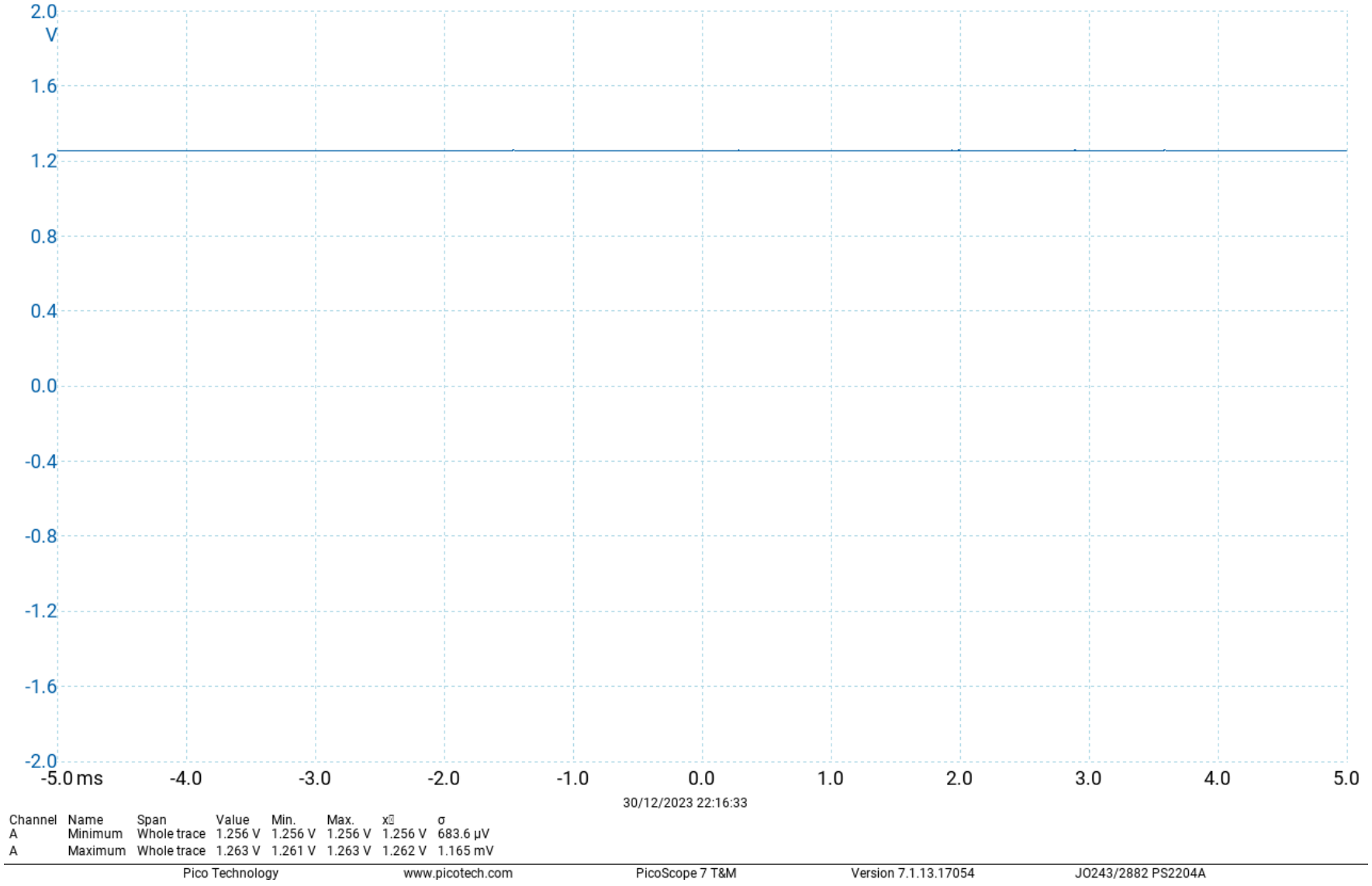
Exercise E2



- Red LED:
- $V_{fd} = 1.875V$

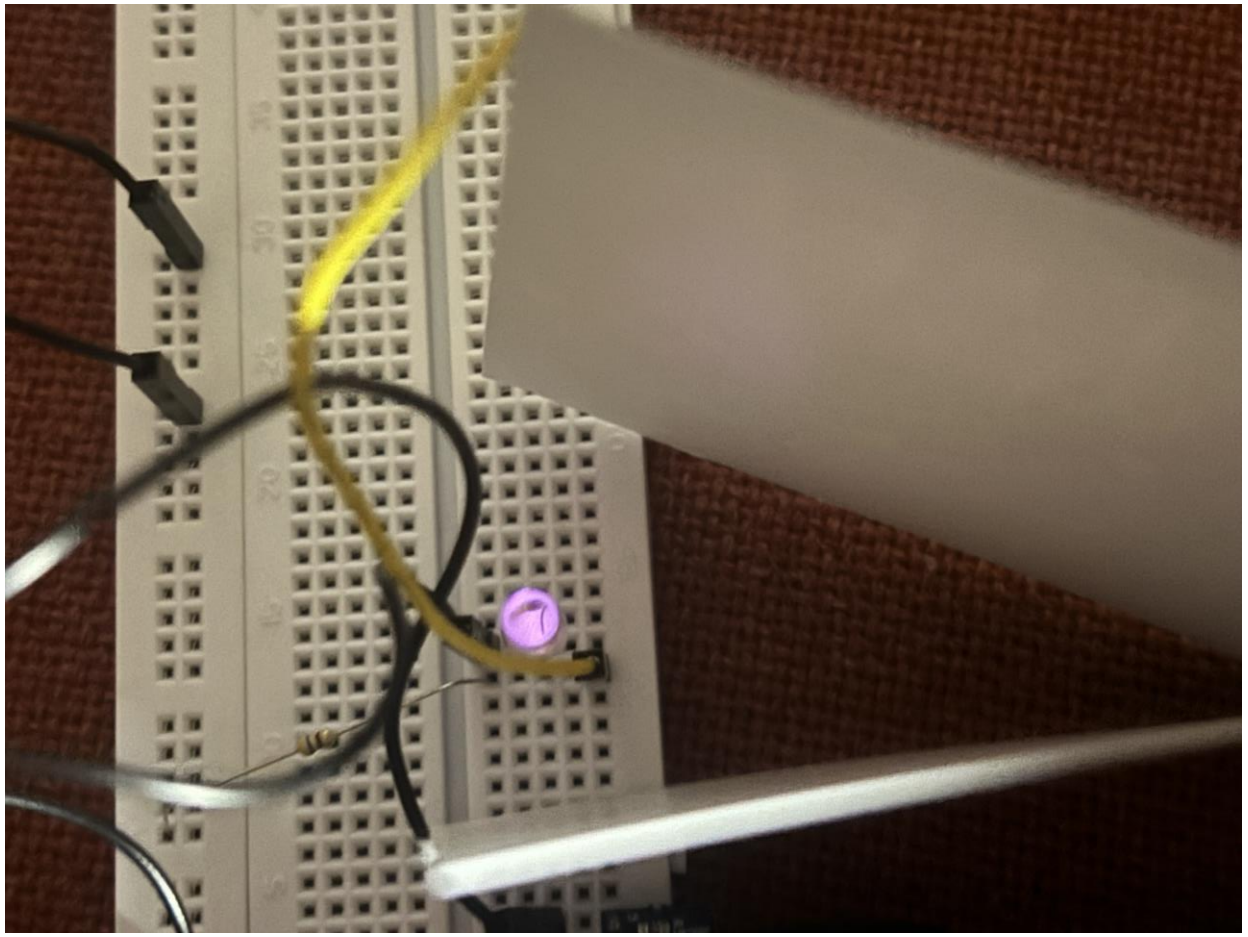
- Presumably the forward voltages are different due to the materials of different diodes being different, especially between the light emitting ones and the none-light-emitting ones.

Exercise E2



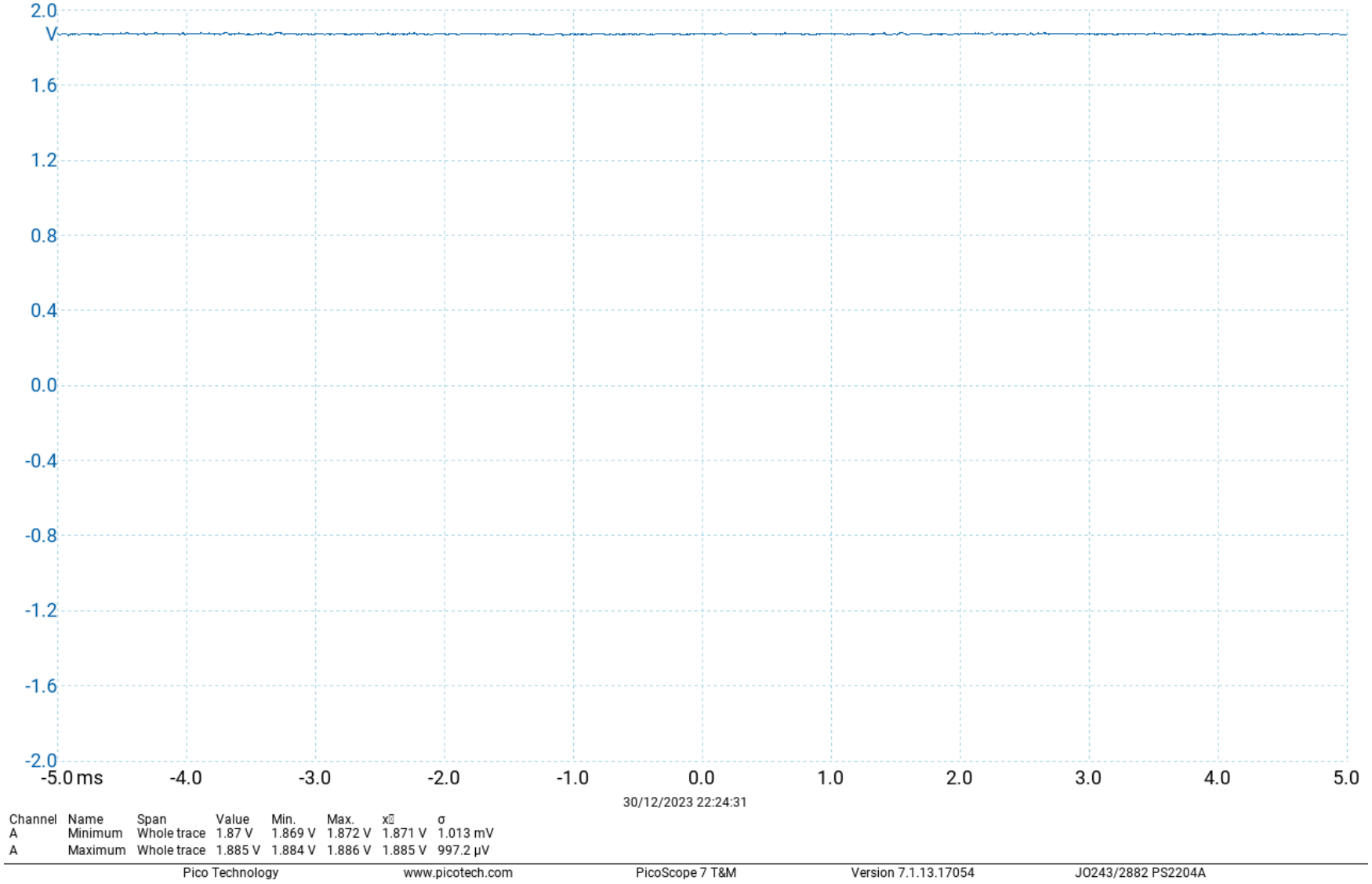
- Infrared Red LED:
- $V_{fd} = 1.260V$

Exercise E2



- Infrared light can be seen with phone cameras
- The photo in the left is taken with most light sources turned off and the only light source blocked by a Christmas card – It seems like removing all light sources will make the photo blurry

Exercise E2



- $V_{fd} = 1.877V$
- $I_{tot} = 6.645mA$
- Both diodes are darker than being alone, which is expected, since the voltages across them decreases from the nearly halved resistance caused by parallel.
- Nothing else seem to change significantly.