https://www.ti.com/lit/ds/symlink/opa818.pdf
p27

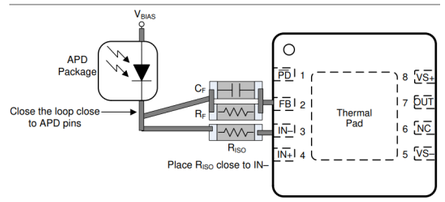


Figure 60. Improved TIA Layout

Photodiodes with TO−18 footprint:

Farnell 1495575
Hamamatsu S5973
D= 400um active area
Cd=1.6 pF @ Vr=3V3

Thorlabs FDS015
D=150 um active area
0.65pF @ Vr = 5 V

Thorlabs FDS025
D= 250 um active area, with ball lens
0.94 pF @ Vr = 5 V

Hamamatsu S5972
D= 800um active area
3 pF @ Vr = 10 V

Hamamatsu S5971
D= 1.2 mm active area
3 pF @ Vr = 10 V

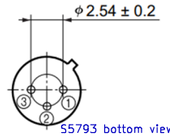
OSI FCI−125G−006HRL
Hamamatsu S9055(−01)

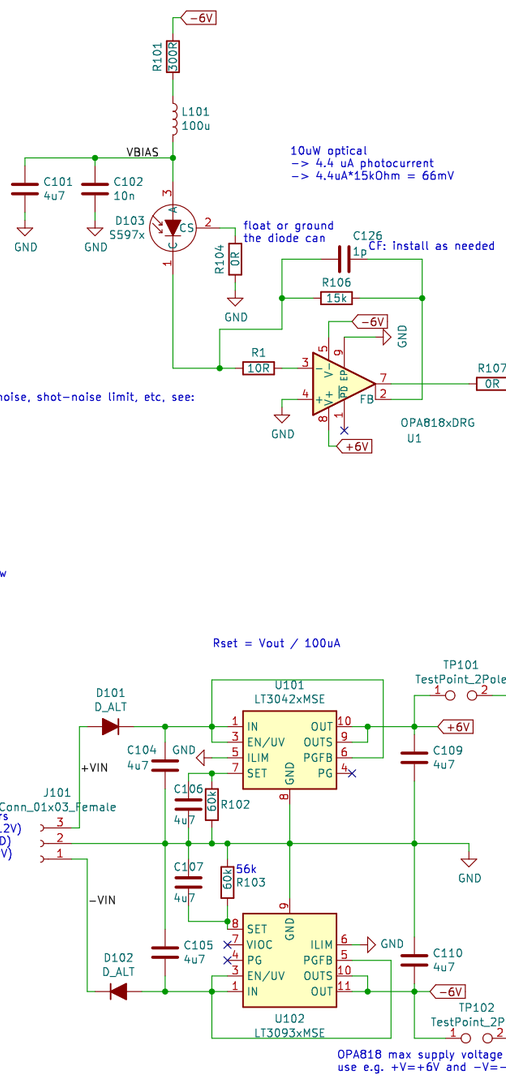
Thorlabs FGA01FC, InGaAs, 2pF @ 5V
same as OSI INGAAS−120L−FC

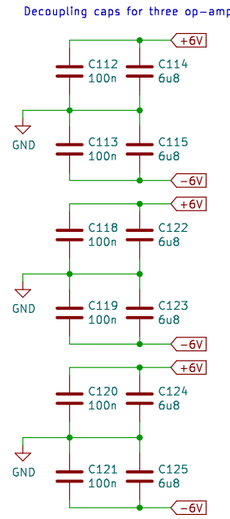
Thorlabs FGA015, InGaAs, 1.5 pF @ 5V
D = 0.15 mm actuve area

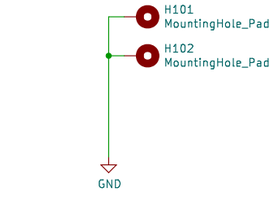
FGA01, ball lens

For estimating Bandwidth, Transimpedance−amplifier noise, shot−noise limit, etc, see:
TIASim at https://github.com/aewallin/TIASim









PSU:
Thorlabs LDS12B
±12 VDC Regulated Linear Power Supply, 6 W
Lumberg RSMV3 male connector, 3−pin

PSU−lead: Digikey A120947−ND (mates with Thorlabs 3−pin psu connector)
3−pin M8 female connector
1.5 m 3−wire lead, solder to PCB

See MeasurementData sheet for measurements and noise−models for built 2−stage detectors:

MeasurementData

File: 2stageTIA_measurementData.kicad_sch

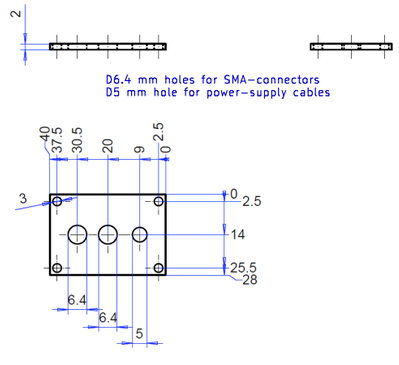
2019 detector (OPA657) gain:
78 dBohms transimpedance (8k2 ohms)
+20 dB postgain (10V/V)
+28 dB postgain (ZFL−500LN)
126 dB total

2019Modified detector (OPA657) gain:
92 dBohms transimpedance (39k ohms)
+20 dB postgain (10V/V)

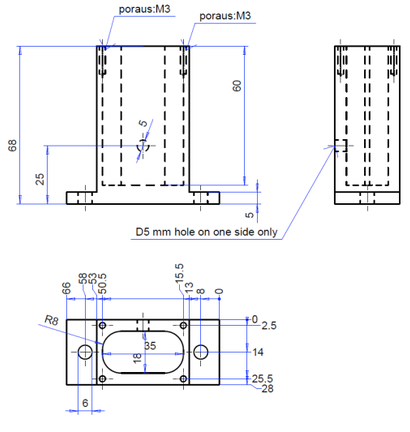
112 dB total

2022 detector with OPA818
90 dBohms transimpedance (33kOhm)
20 dB postgain (10 V/V)
110 dB total

Mechanical design for enclosure top



Mechanical design of Aluminium enclosure
Optical beam−height over table 25mm
Mounting−holes for M6 screws on 25mm grid

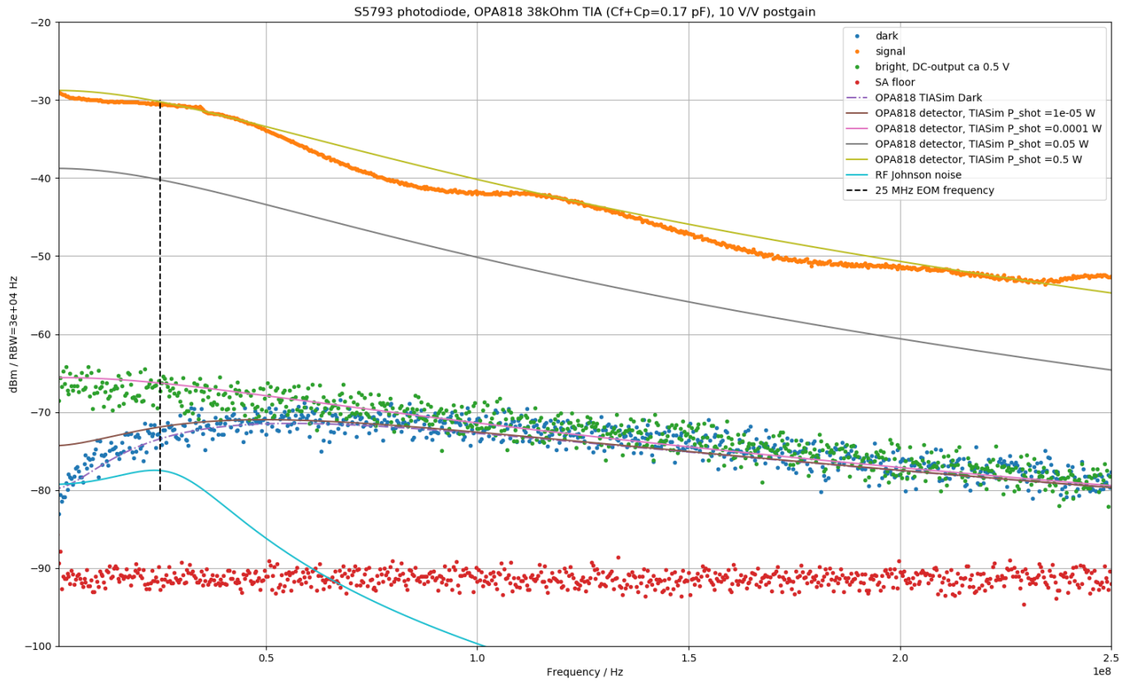


2022−10 built with FGA015 InGaAs photodiode and Rf=30kOhm, ca 44 MHz BW
2022−06: built 1st board with RF=33kOhm, 10 V/V postgain − measurements look good.
anders.e.e.wallin "at" gmail.com

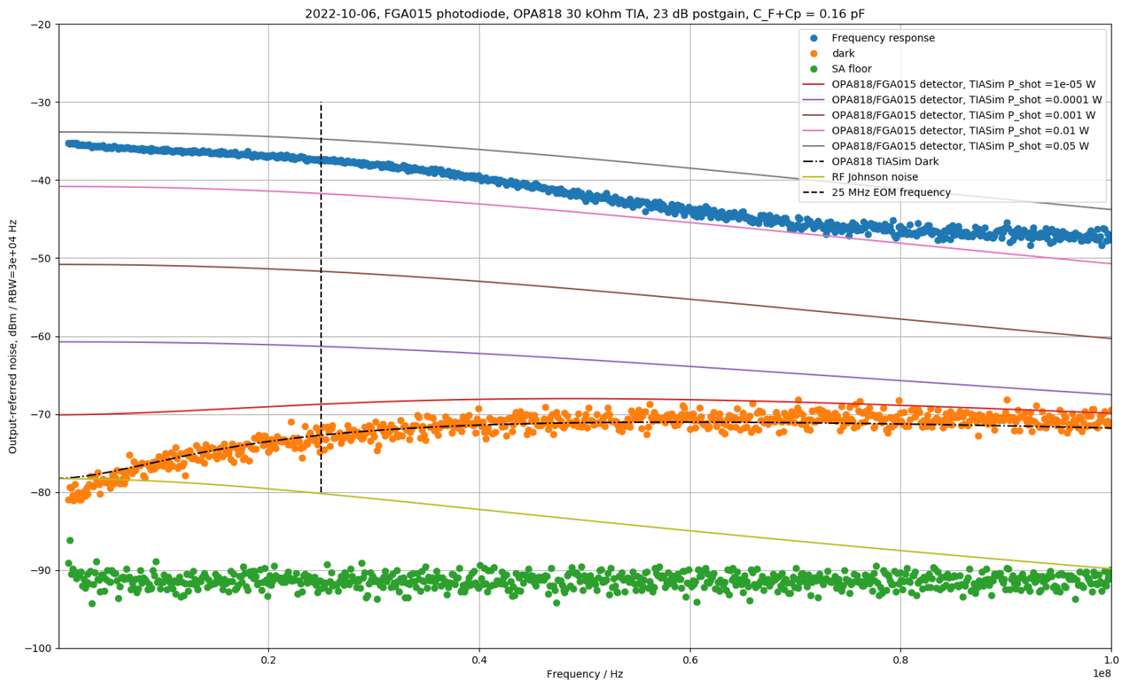
Sheet: /
File: 2stage_tia.kicad_sch

Title: 2−stage OPA818 photodetector

Size: A3	Date: 2019−12	**Rev: draft**
KiCad E.D.A. kicad 6.0.7−f9a2dced07~116~ubuntu20.04.1		Id: 1/2



Transimpedance noise and frequency-response computed with
TIASim, https://github.com/aewallin/TIASim



Main conclusion: TIASim seems to predict measured spectra
assuming a parasitic capacitance of ca 0.16-0.17 pF
(no Cf capacitor (C126) installed on boards)

Sheet: /MeasurementData/
File: 2stageTIA_measurementData.kicad_sch

Title: 2-stage TIA with OPA818

Size: A4	Date:	Rev:
KiCad E.D.A. kicad 6.0.7-f9a2dced07~116~ubuntu20.04.1		Id: 2/2