# Update on IV measurement in HVCOMS CHESS1 chip

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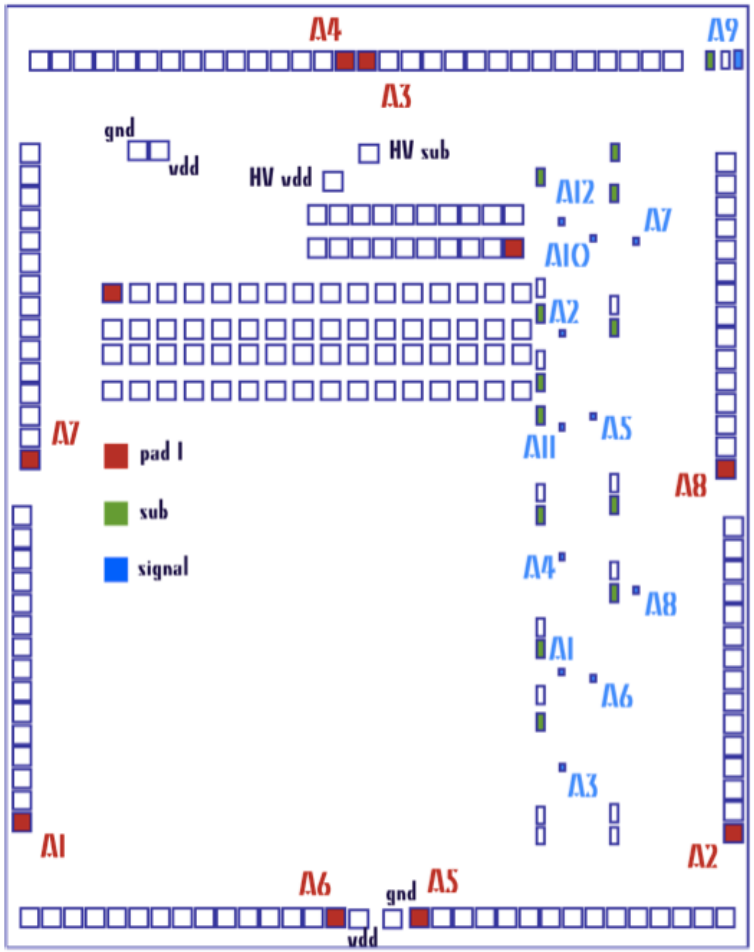
# Introduction

- AMS CHESS1 HV-CMOS chip is available for testing
- Preliminary I-V and capacitance results :
  - I-V measurement
  - C-V Measurement

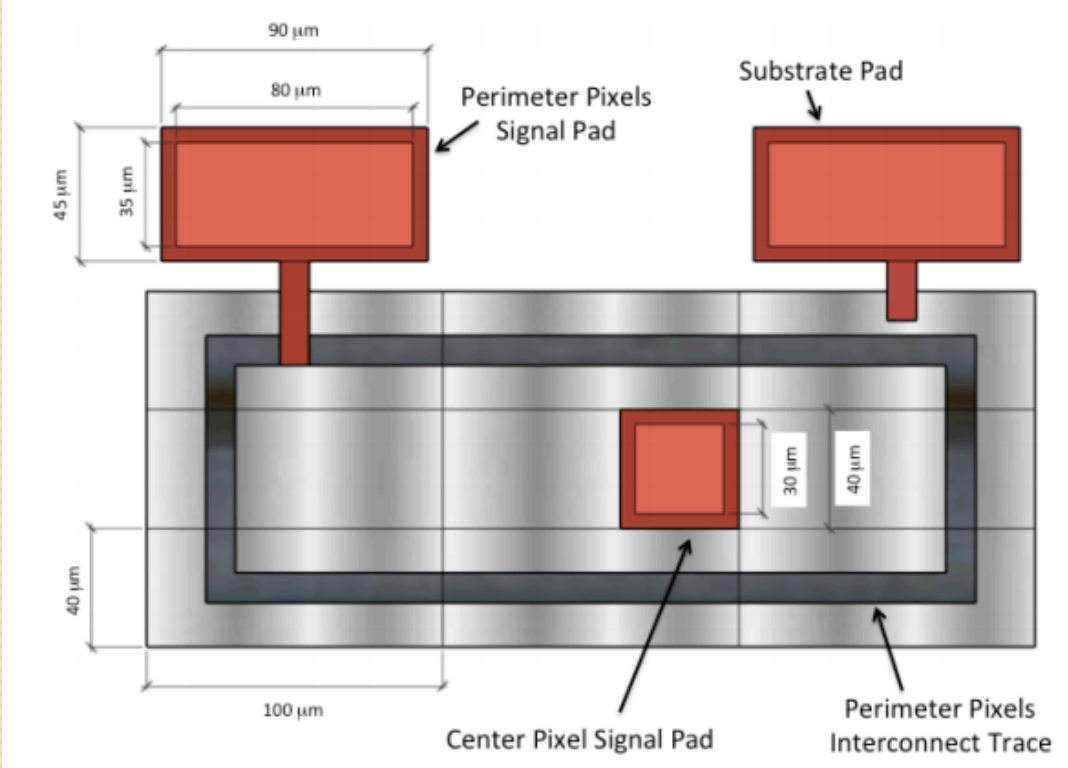
| PPA # | Pixel width | Pixel length | Diode Area Fraction | Metal opening ratio | Extra circuitry |
|---|---|---|---|---|---|
| PPA01 | 45µm | 100µm | 30% | 13.0% | |
| PPA02 | 45µm | 100µm | 50.4% | 34.5% | |
| PPA03 | 45µm | 200µm | 30% | 22.7% | |
| PPA04 | 45µm | 200µm | 50.4% | 44.0% | |
| PPA05 | 45µm | 400µm | 30% | 27.4% | |
| PPA06 | 45µm | 400µm | 50.4% | 48.7% | |
| PPA07 | 45µm | 800µm | 30% | 29.8% | |
| PPA08 | 45µm | 800µm | 50.4% | 51.0% | |
| PPA09 | 45µm | 100µm | 30% | 13.0% | Special bond pads for E-TCT |
| PPA10 | 45µm | 200µm | 30% | 22.7% | Without contact ring around each pixel, but with contact ring around the entire array having a separate pad |
| PPA11 | 45µm | 200µm | 30% | 22.7% | With contact ring around each pixel that violates the design rules by having a symmetric width. NOTE this pixel was added twice |
| PPA12 | 45µm | 200µm | 30% | 22.7% | With contact ring around each pixel that violates the design rules by having a symmetric width. NOTE this pixel was added twice |

Table 3.2-b Passive Pixel Array pad location



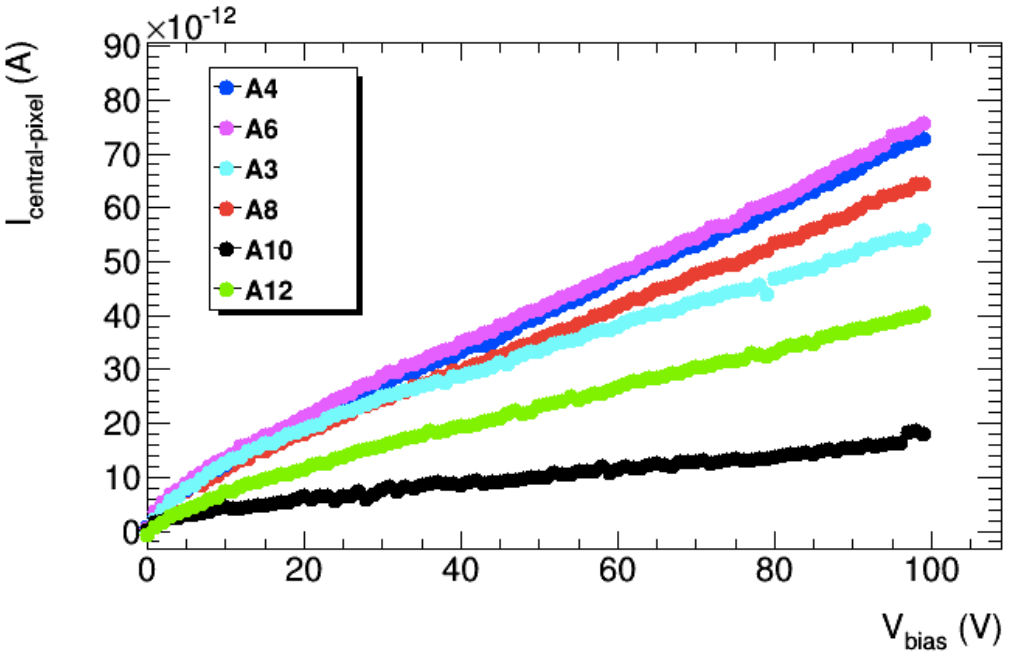
# pixel IV measurement setup

- Substrate: grounded
- Perimeter pixels: +HV
- Central pixel: +HV



# Old I-V results in Dec 1st

- Leakage current is up to 90pA
- Found very large noise contribution
- About ~50pA noise when it is open
  - Mainly due to BNC cable

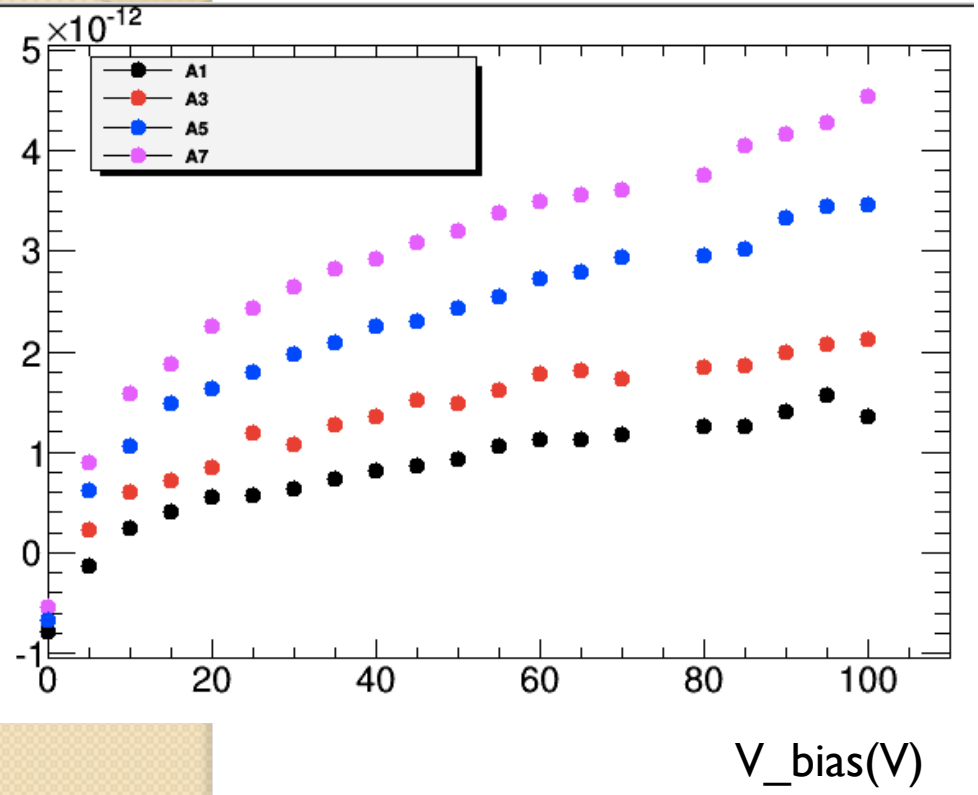


# Low noise setup

- In order to measure low leakage current.
- We now used low loss SMI cable.
  - Noise level about 500 fA

# Updated results on central pixel I-V

Leakage current(A)




| PPA # | Pixel width | Pixel length | Diode Area Fraction | Metal opening ratio |
|---|---|---|---|---|
| PPA01 | 45μm | 100μm | 30% | 13.0% |
| PPA03 | 45μm | 200μm | 30% | 22.7% |
| PPA05 | 45μm | 400μm | 30% | 27.4% |
| PPA07 | 45μm | 800μm | 30% | 29.8% |

# Summary

- Updated results from I-V measurements.
  - Reduce noise using low noise setup.
  - I-V curve makes more sense now.
    - leakage currents scale with pixel size.