

Home-Monitoring LiDAR Sensors Using On-Chip Avalanche Photodiode

Ji-Eun Joo¹, Myung-Jae Lee³, and Sung Min Park^{1,2}

¹Department of Electronic and Electrical Eng., Ewha Womans University

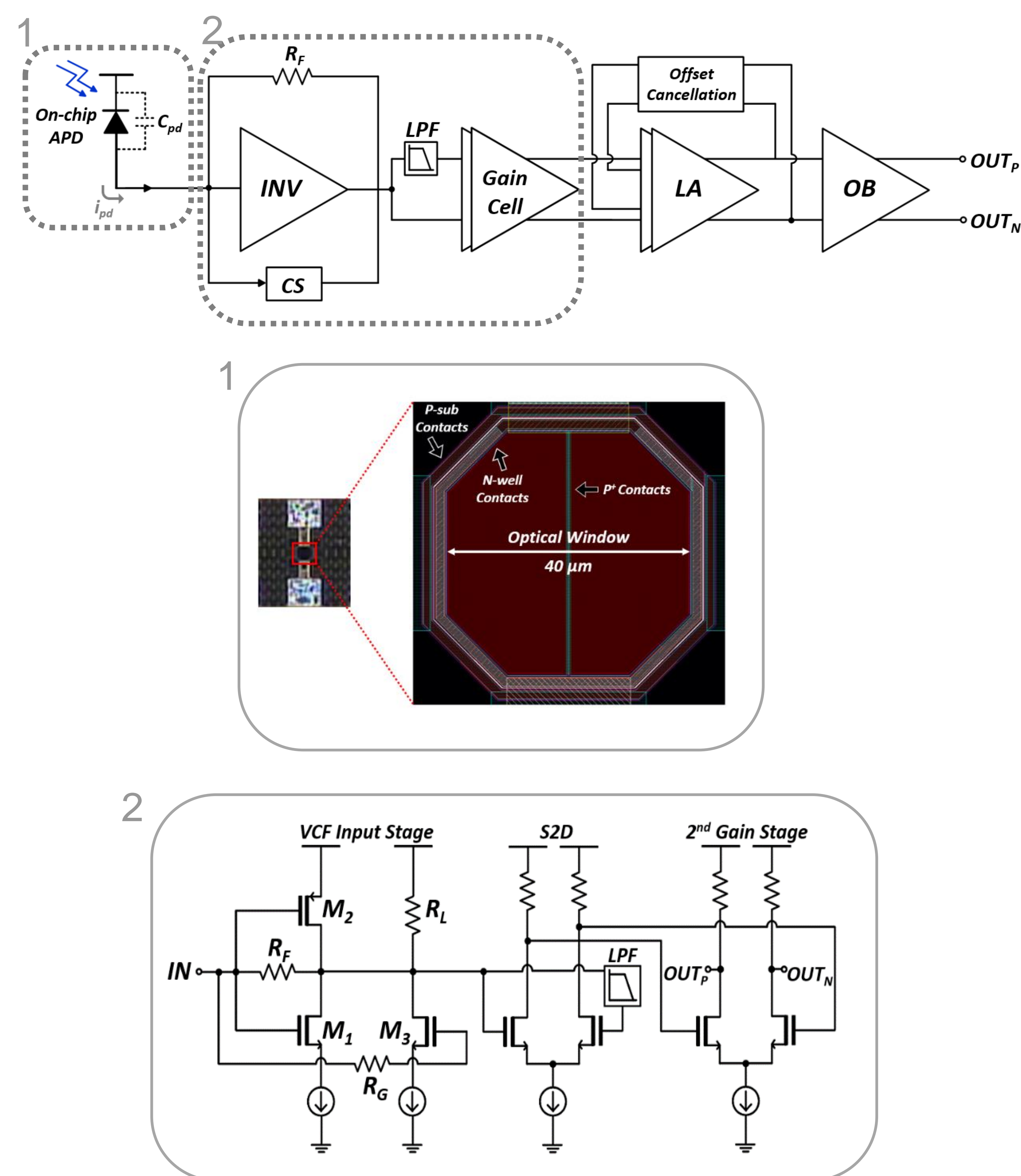
²Graduate Program in Smart Factor, Ewha Womans University

³Post-Silicon Semiconductor Institute, Korea Institute of Science and Technology

Introduction

- Multi-channel optoelectronic IC targeting for LiDAR elder-care systems
- Fabricated in a standard 180-nm CMOS technology
- On-chip APD arrays implemented to investigate responsivity and breakdown voltage

OEIC Description



- On-chip APD monolithically integrated on Rx IC
- VCF-TIA with twice higher transimpedance gain than INV-TIA for a similar bandwidth

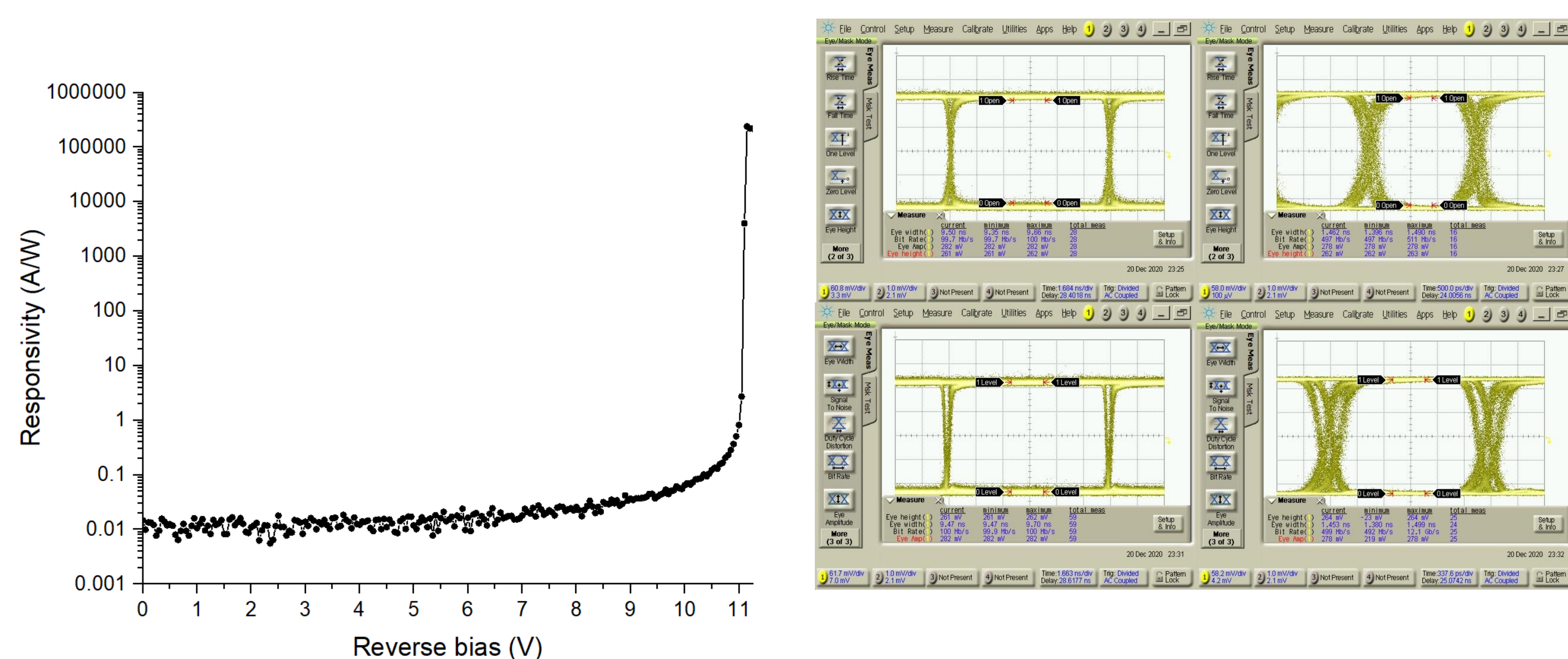
Conclusion

- Proposed OEIC demonstrates wide and clean eye diagrams up to 800 Mb/s.
- On-chip APD functions successfully, demonstrating 2.72-A/W responsivity at 11.05-V bias voltage.

Acknowledgement

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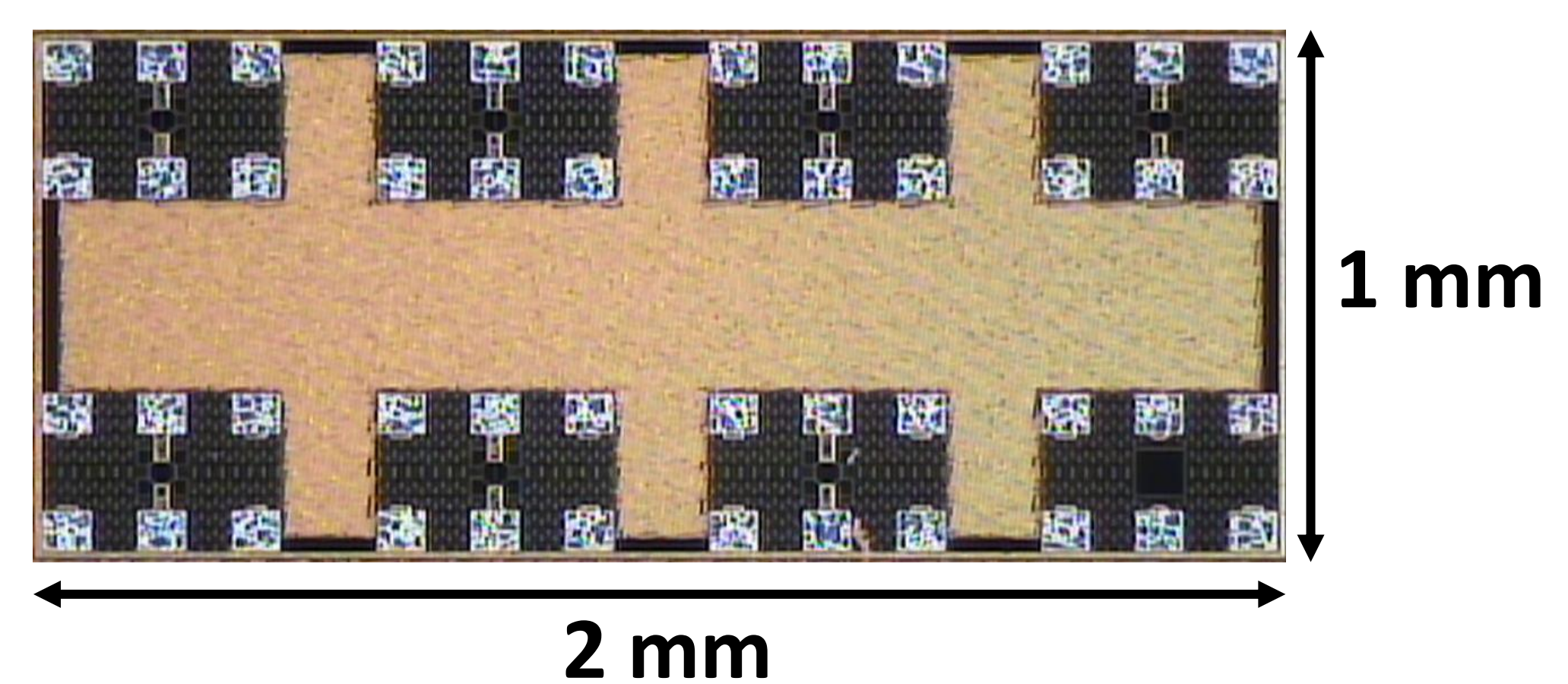
Measured Results



Measured responsivity of the P+/N-well APD

Measured eye-diagrams at 100 Mb/s & 500 Mb/s for $50\mu A_{pp}$ and $500\mu A_{pp}$ inputs

APD Array Chip Photograph



OEIC Array Chip Photograph

