



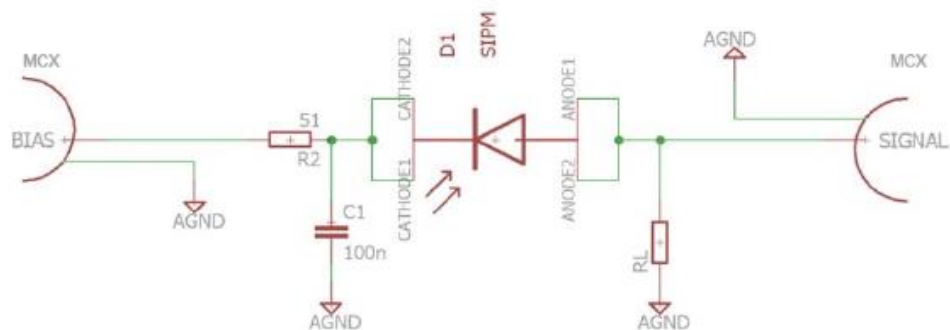
AFBR-S4PEPCBDC: Testing and Demonstration

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October 2023

The AFBR-S4PEPCBDC: A DC Readout Evaluation PCB

Schematics



- DC Readout over 50Ω load resistor
- Compatible with Thorlabs SM1 cage mount systems



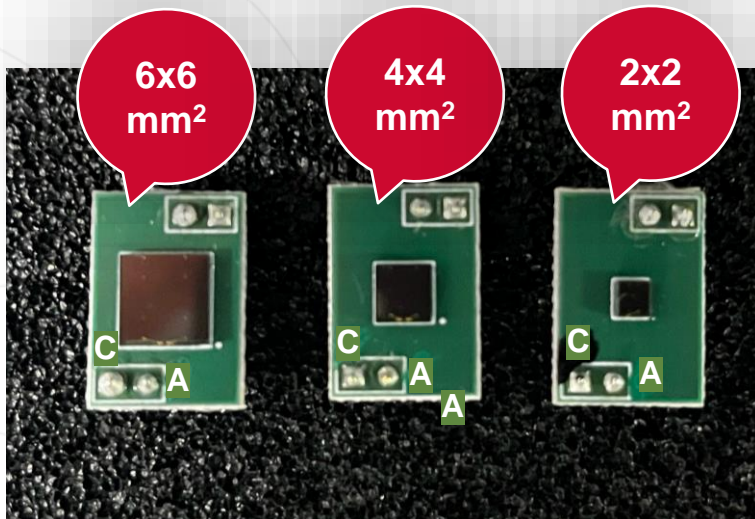
Thorlabs frame not included!

SiPM on Carrier PCB

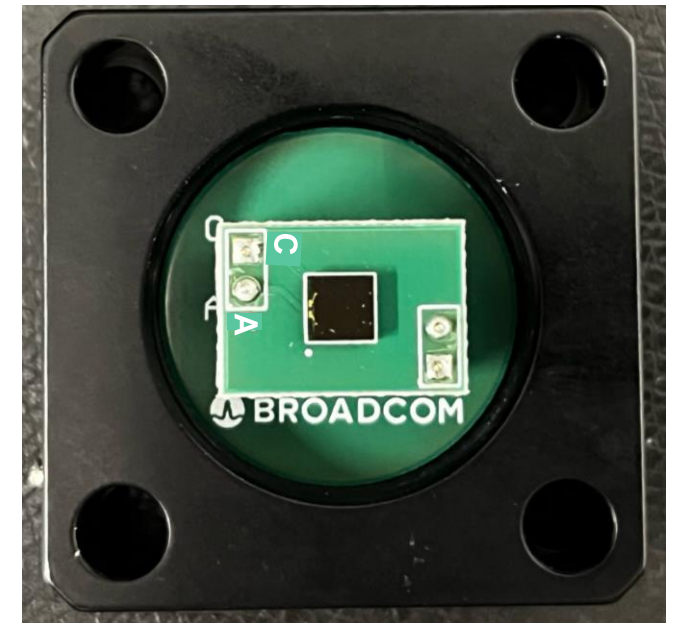
Carrier PCB compatible with AFBR-S4E001 (SiPM evaluation kit) and AFBR-S4PEPCBDC (DC readout PCB)

Available SiPM on interposer PCB (for evaluation only):

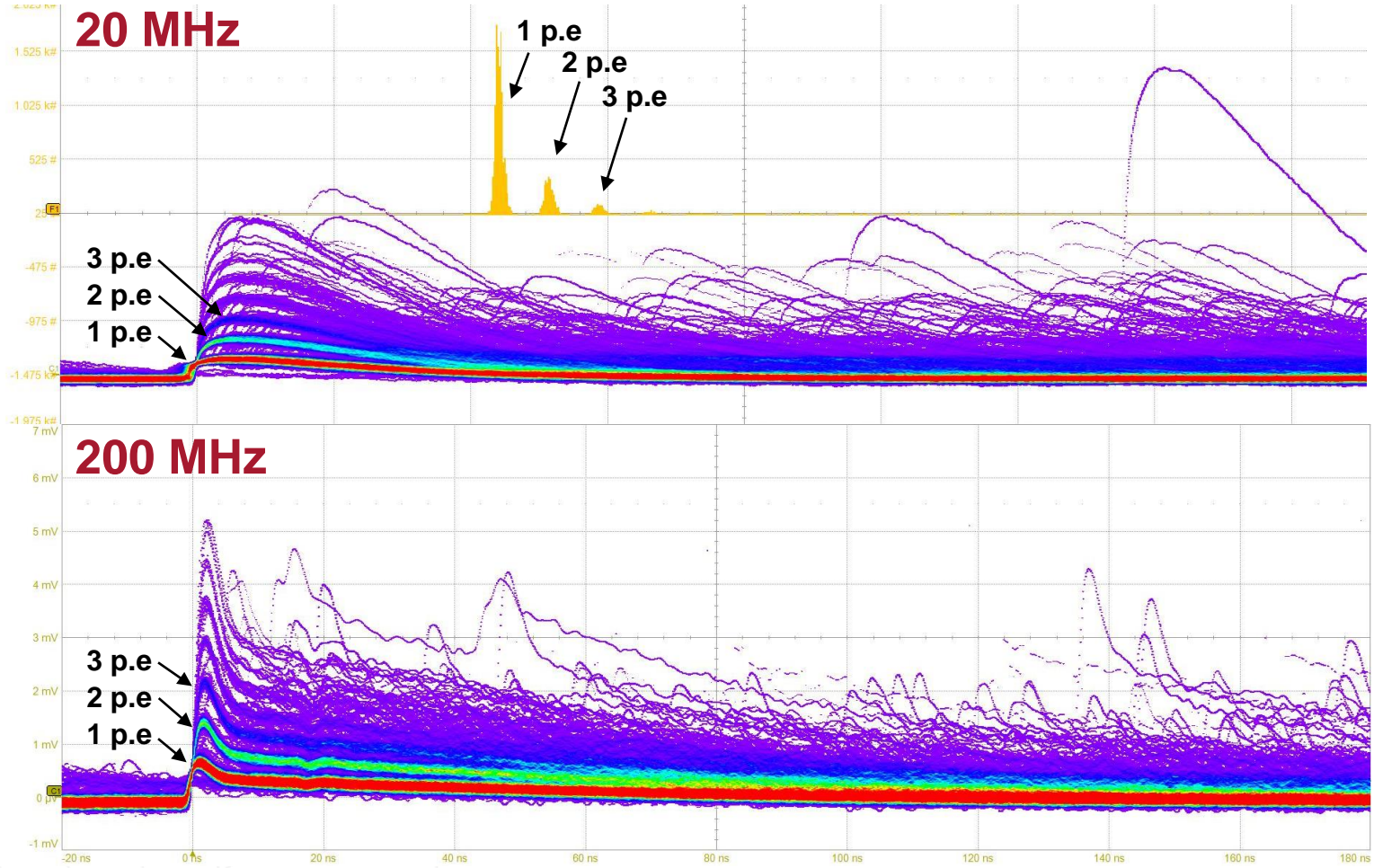
- AFBR-S4N22P014M (2x2 mm² single element)
- AFBR-S4N44P014M (4x4 mm² single element)
- AFBR-S4N66P014M (6x6 mm² single element)



AFBR-S4N44P014M on carrier PCB attached to AFBR-S4PEPCBDC

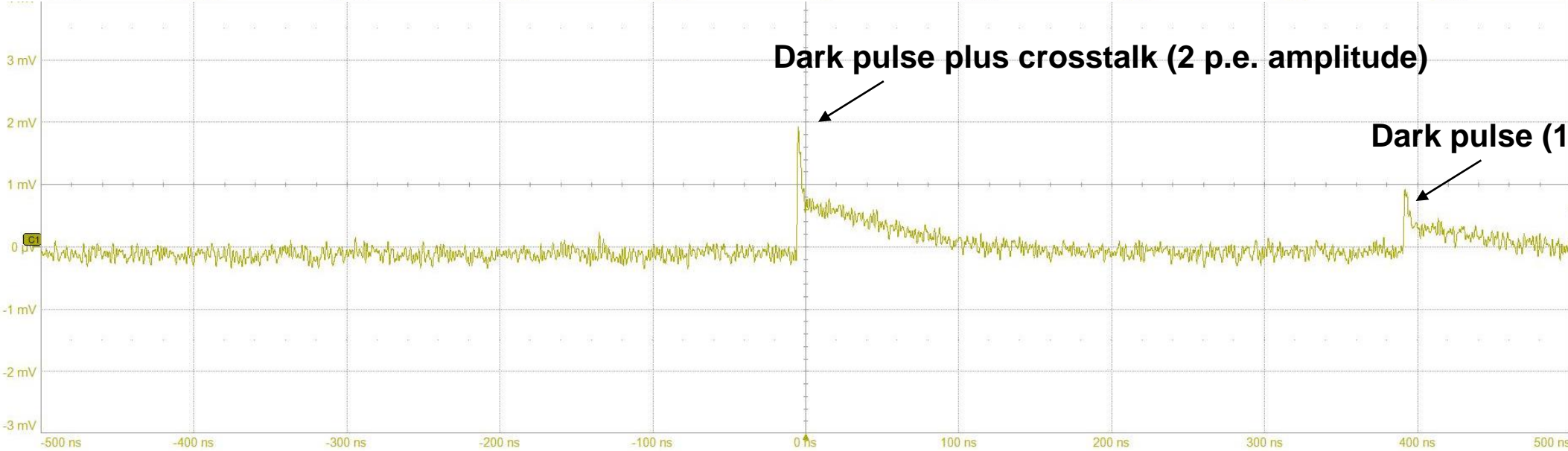
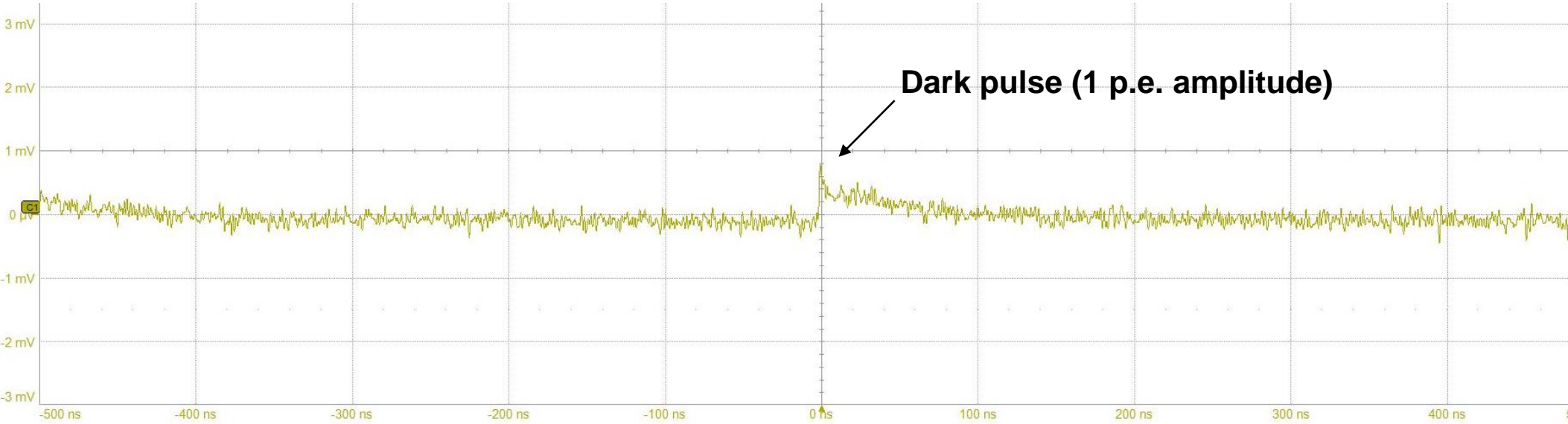


Pulse Spectrum in Persistence Mode of AFBR-S4N44P014M (at 12 VOV)



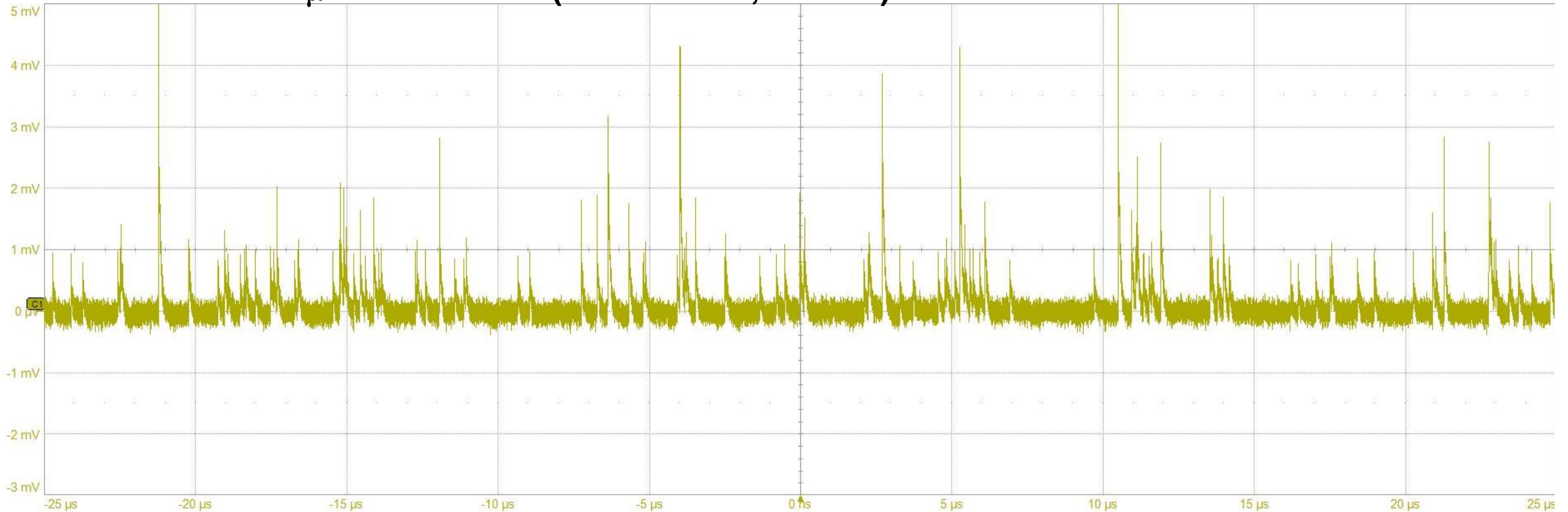
Direct input over 25Ω without amplifier

Single Pulses: Dark Counts and Crosstalk (at 50 MHz BW)



Pulse Train: Dark Counts and Crosstalk

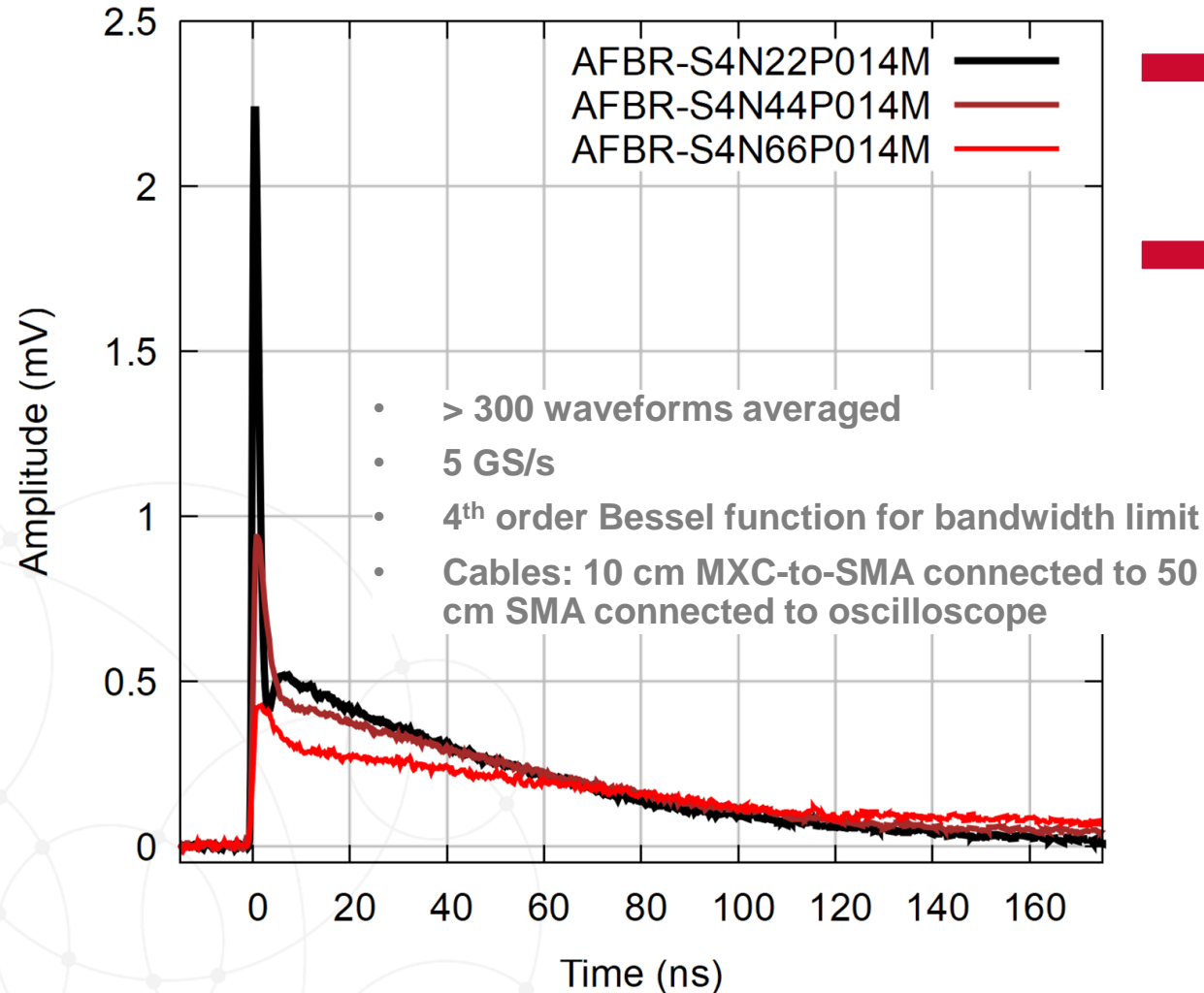
Pulse Train in 50 μs time window (500 MHz BW, 12 VOV)



The pulses with approx. 1 mV amplitude represent regular dark counts.

Pulses with amplitudes of 2 mV and higher represent a dark count including direct crosstalk

Waveform Measurements (1 p.e. Pulse): A Comparison



➔ “low-pass” affects mainly the fast signal component*

➔ Charge conservation prolongs time until signal has returned to baseline for larger SiPM active area

1 p.e. Amplitude_{2x2}: 2.3 mV
1 p.e. Amplitude_{4x4}: 0.9 mV
1 p.e. Amplitude_{6x6}: 0.45 mV

* AFBR-S4N22P014M and AFBR-S4N44P014M measured at 1GHz, AFBR-S4N66P014M measured at 800 MHz.

Summary

This slide provides a brief overview of the Broadcom AFBR-S4PEPCBDC DC readout evaluation PCB. This PCB supports fast testing and is compatible with Thorlabs cage mount systems SM1 for easy mounting and alignment into optical systems.

The AFBR-S4PEPCBDC offers a direct output with 50Ω load (effectively 25Ω on 50Ω oscilloscope input impedance) which can be evaluated directly on an oscilloscope or further be processed using an amplifier.



Thank You



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