

Silicon photodetectors with high gain and low noise

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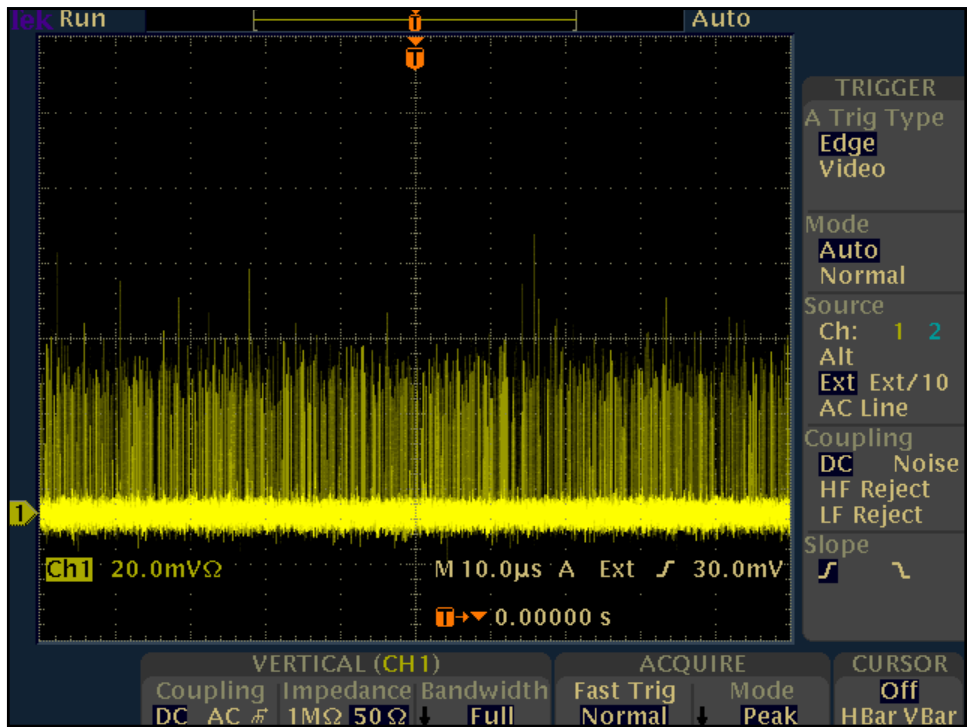
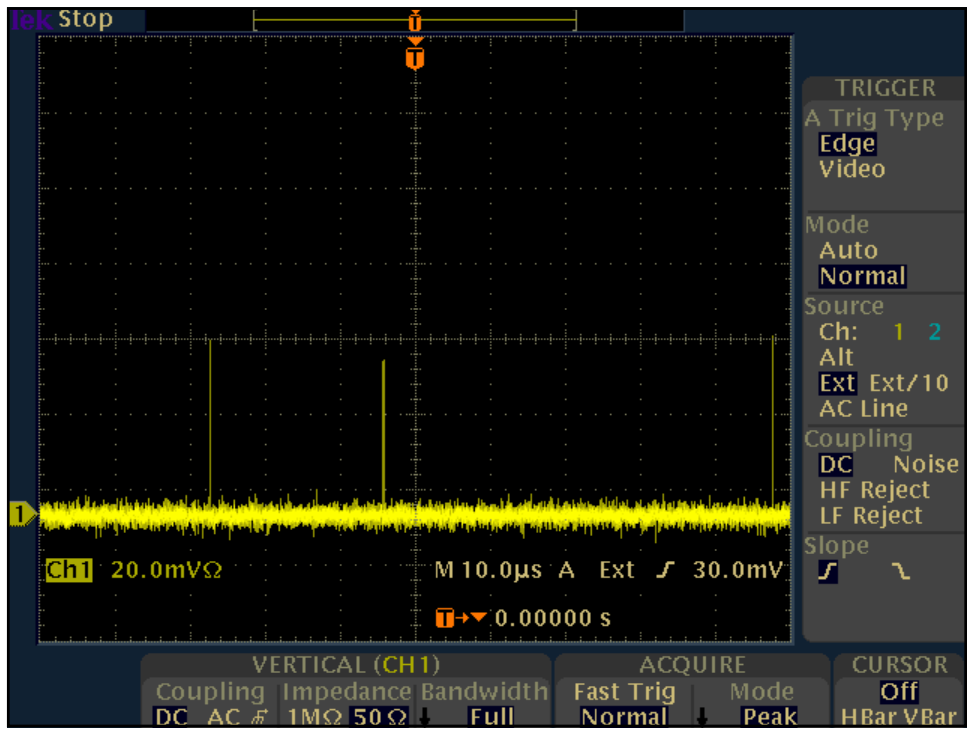
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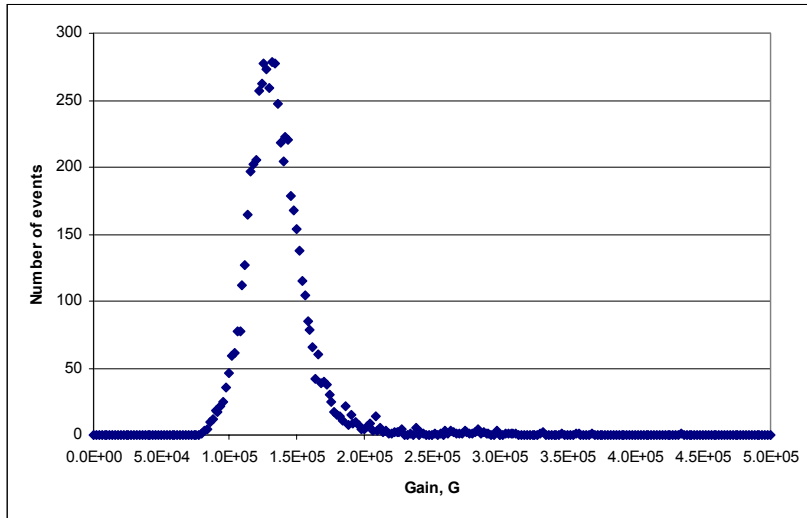
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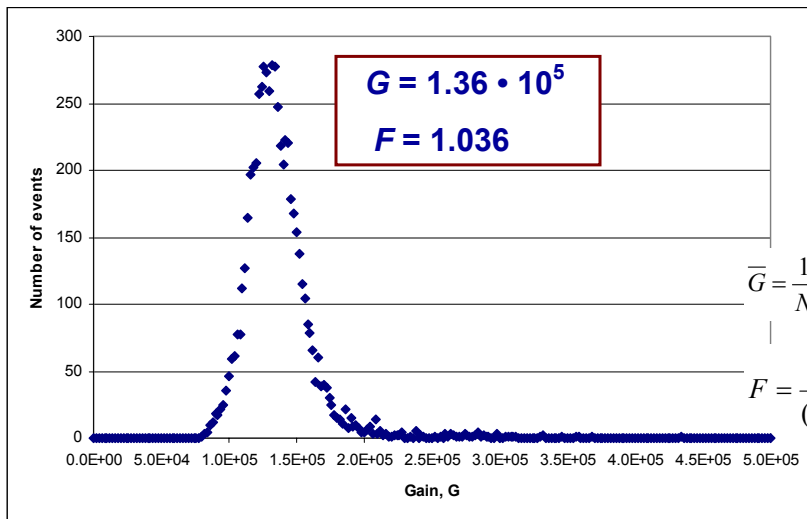
- High gain $> 10^5$
- Low excess noise factor < 1.07
- High speed < 500 ps

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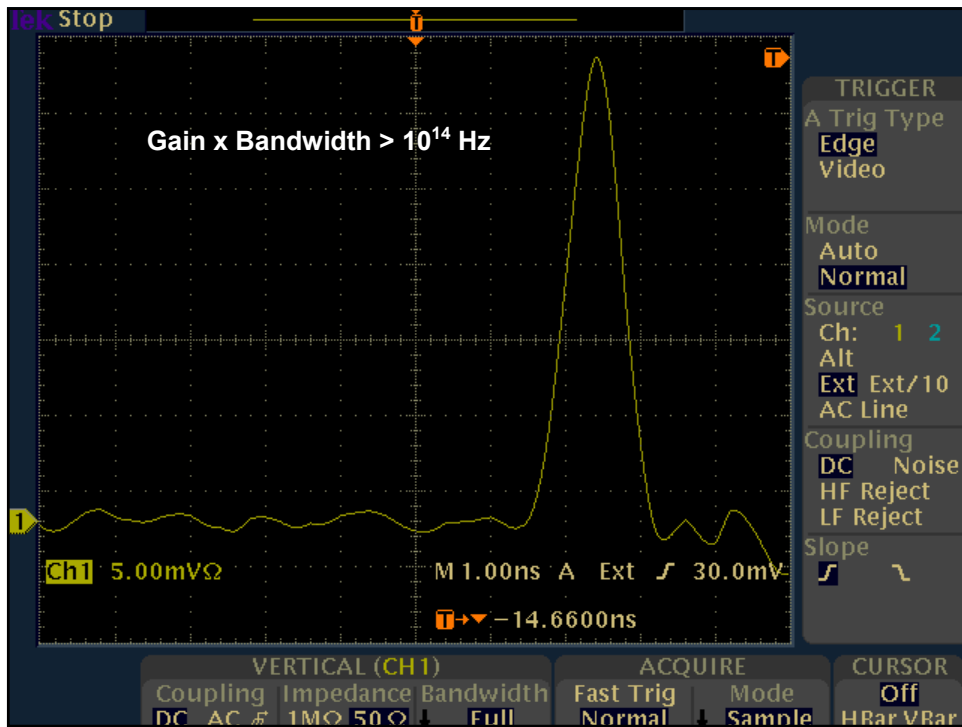
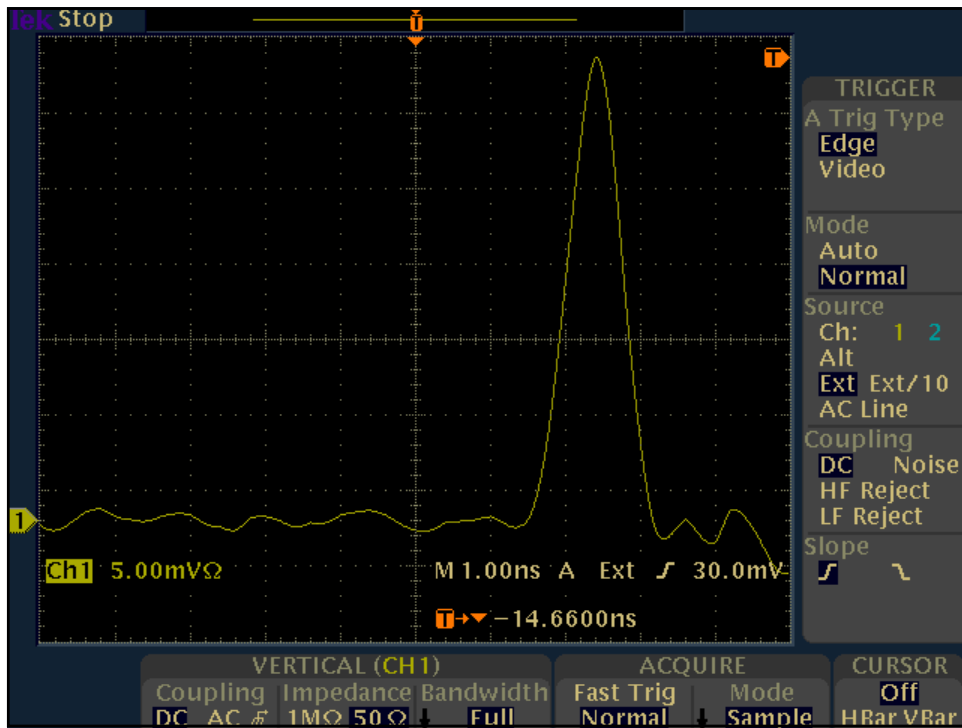


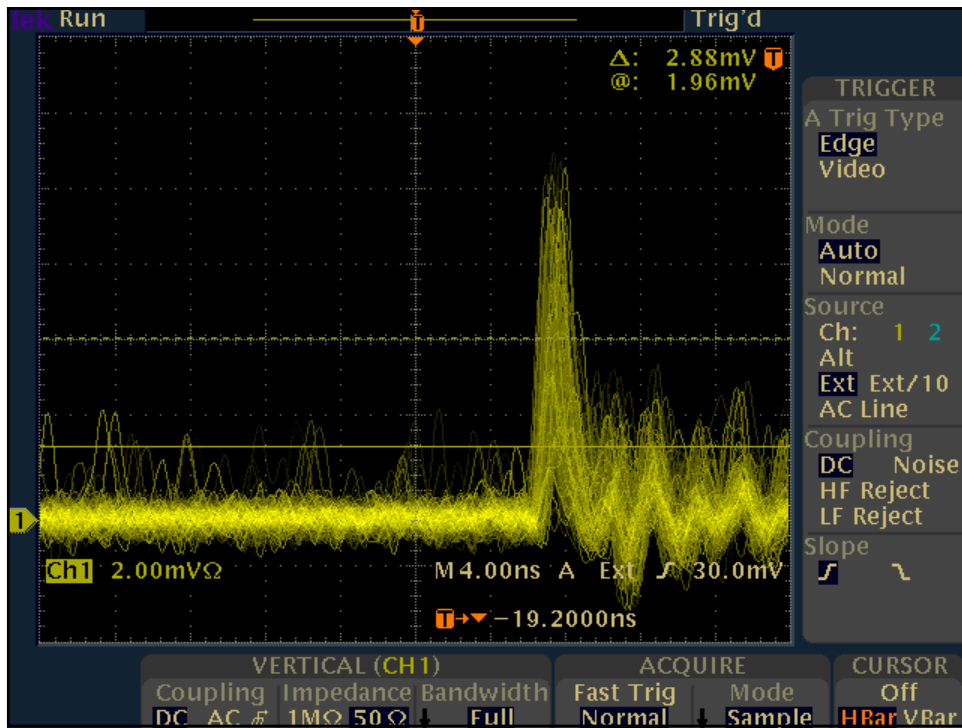


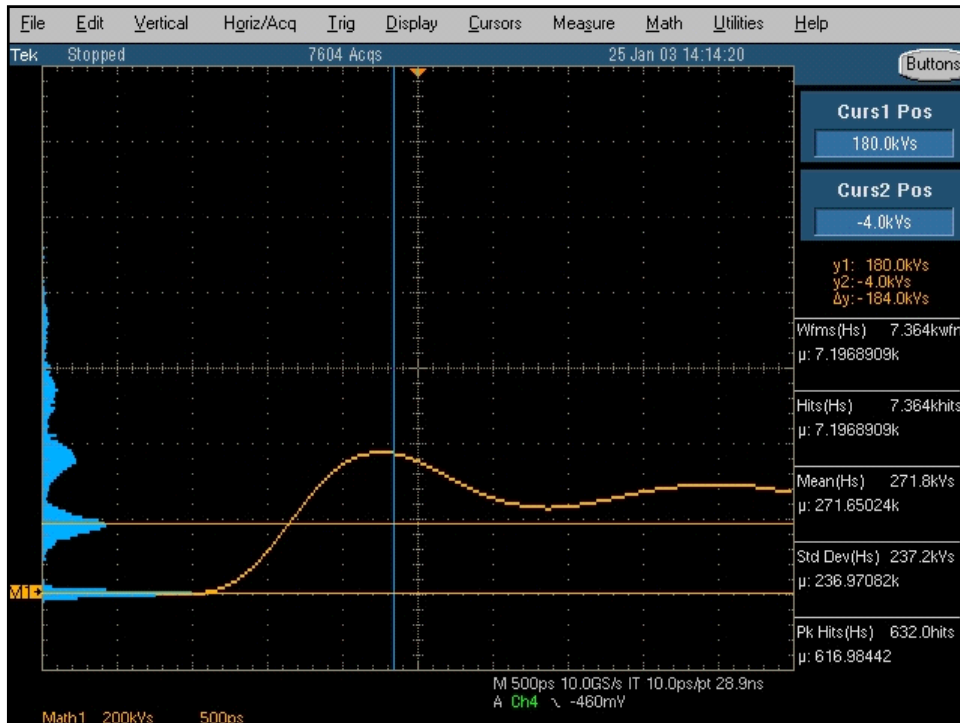
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- High gain
- Low excess noise factor
- High speed

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Photon counting mode

- Count speed – up to 500 MHz (in time gating mode)
- Pulse pair resolution < 1 ns
- Timing resolution < 200 ps

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Parameter	Value		Unit
	PDA-200 (0.16mm x 0.16mm active area)	PDA-500 (0.4mm x 0.4mm active area)	
Spectral range	0.65 – 0.9		μm
Photon detection efficiency (λ=0.8 μm) +22 °C -40 °C	20-30 30-40		%
Dark count +22 °C -40 °C	< 6·10 ⁴ < 800	< 4·10 ⁵ < 5·10 ³	cps cps
Gain	> 10 ⁵	> 10 ⁵	
One-electron pulse amplitude (after broadband 50 Ohm input/output impedance preamplifier with gain of 10)	10 - 20	10 - 20	mV
Rise-fall time of 1-electron pulse	400	500	ps
Pulse pair resolution	1	1.5	ns
Timing resolution	< 200	< 250	ps
Maximum count speed Gating (1 μs gate) Constant illumination	5·10 ⁸ 1·10 ⁷	3·10 ⁸ 4·10 ⁷	cps cps
Operating voltage	84 -86		V

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