



# Photodetector Device Analysis

Independent review of device data to identify performance limits and develop solutions

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## Service Overview

Experience-based interpretation of your existing device characterization data. We identify what limits performance and what doesn't.

**Deliverables:** Technical document (3–5 pages) with annotated figures, root-cause analysis, and suggested next actions. Standard turnaround: 5–7 business days.

## Best For

Teams needing correct attribution of noise sources, bias regimes, or performance bottlenecks; organizations evaluating technology paths or vendor claims.

## Technical Focus

- **Noise:** Identify Johnson, GR, and 1/f regions; corner extraction; measurement artifact rejection.
- **IV & Bias Analysis:** Optimal bias identification; regime classification; saturation and transport-limited behavior.
- **Spectral Interpretation:** Cutoff wavelength, thickness, and composition; spectral quality assessment.
- **Performance Modeling:** Responsivity and  $D^*$  calculation; expected-vs-measured performance.
- **Process Insight:** Material growth insights; fabrication and processing performance variability.

## Client-Provided Data

- IV curves (single or multi-temperature), operating points
- Noise PSD with bandwidth/setup notes
- Responsivity, gain, or signal data
- Transmission, absorption, or quantum efficiency (QE) spectra
- Device structure, test notes, existing hypotheses

## Methodology

1. Determine which physical mechanisms can and cannot explain the observed electrical, spectral, and noise behavior.
2. Reject mechanisms violating physics constraints or known scaling behaviors.
3. Develop a minimal but technical explanation and propose validation experiments.

Modern analytical tools including AI-assisted workflows. All conclusions remain physics-constrained and independently verifiable.

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