

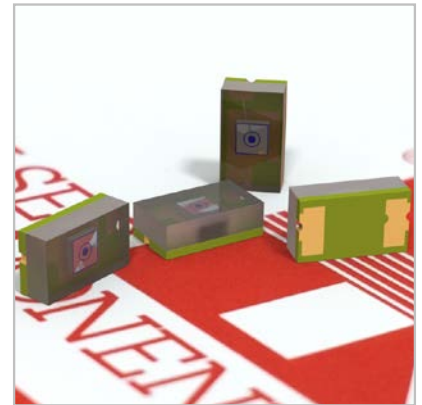
Low-Cost Silicon Avalanche Photodiode SAHA-Series (NIR-Enhanced)

Description

The SAHA230 and SAHA500 are low-cost, general purpose silicon APDs in a miniature SMD package. Responsivity is optimised for 850 nm and 905 nm rangefinders.

Features

- High quantum efficiency
- Low noise, high speed
- Multiplication gain, $M > 100$ available
- 230 μm and 500 μm diameter active area
- Gradual multiplication curve
- Wide operating temperature range
- Miniature surface mount package
- Integrated bandpass filter available



Applications

- LIDAR
- Rangefinding
- Optical communication systems

Device Characteristics

| Parameter | SAHA230X | | | SAHA500X | | | Units | |
|------------------------------------|------------------------|-----|-----|----------|-----|-----|---------------|------|
| | Condition | Min | Typ | Max | Min | Typ | | Max |
| Diameter | | | 230 | | | 500 | μm | |
| Wavelength range* | | 400 | | 1000 | 400 | | 1000 | nm |
| Peak sensitivity | | | 880 | | | 880 | nm | |
| Voltage breakdown temp coefficient | $I_d = 10 \mu\text{A}$ | | 0.8 | 1.5 | | 0.8 | 1.5 | V/°C |
| Capacitance | V_{OP} | | 1 | | | 2 | pF | |
| Rise/fall time | 10 – 90%; V_{OP} | | 250 | | | 300 | psec | |
| Noise current | V_{OP} | | 200 | | | 200 | fA/rtHz | |

*wavelength range is 860 nm – 920 nm for version with bandpass filter

Measured Characteristics

| Parameter | Condition | SAHA230X | | | SAHA500X | | | Units |
|-------------------|------------------------------------|----------|-----|-----|----------|-----|-----|-------|
| | | Min | Typ | Max | Min | Typ | Max | |
| Breakdown voltage | $I_{\text{DARK}} = 10 \mu\text{A}$ | | 150 | 200 | | 150 | 200 | V |
| Responsivity | $V_{\text{OPi}}; 905 \text{ nm}$ | 45 | 50 | | 45 | 50 | | A/W |
| Dark current | V_{OP} | | 1 | 5 | | 5 | 10 | nA |

$T_A = 25 \text{ }^\circ\text{C}$ unless indicated otherwise

$V_{\text{OP}} @ M = 100, \lambda = 905 \text{ nm}$

Absolute Maximum Ratings

| Parameter | | SAHA230X | | SAHA500X | | Units |
|-----------------------------|---------|----------|-----|----------|-----|------------------|
| | | Min | Max | Min | Max | |
| Storage temperature | | -55 | 100 | -55 | 100 | $^\circ\text{C}$ |
| Operating temperature | | -40 | 85 | -40 | 85 | |
| Soldering (15 s) | | | 260 | | 260 | |
| Reverse current peak | cw op. | | 0.2 | | 0.2 | mA |
| | 1 s op. | | 1 | | 1 | |
| Forward current avg | cw op. | | 5 | | 5 | |
| | 1 s op. | | 50 | | 50 | |
| Max total power dissipation | | | 60 | | 60 | mW |

Fig. 1: Spectral Response @ M = 100

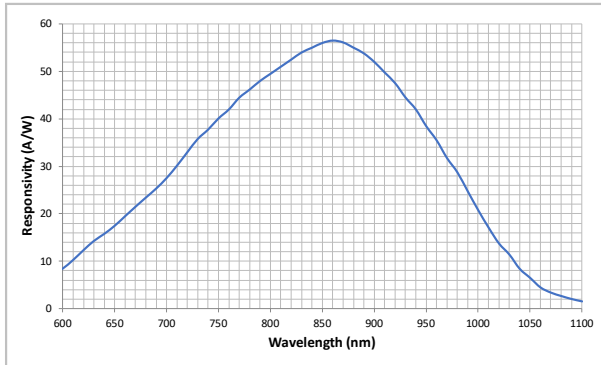


Fig. 2: Spectral Response @ M = 100 (filter version)

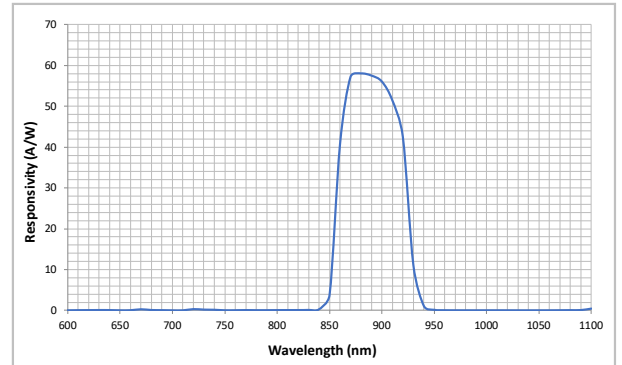


Fig. 3a: Noise vs. Bias SAHA230

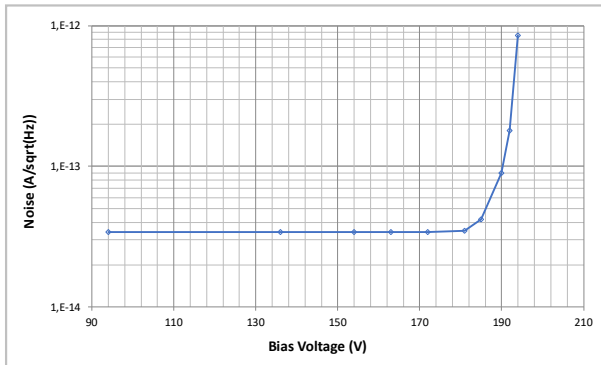


Fig. 3b: Noise vs. Bias SAHA500

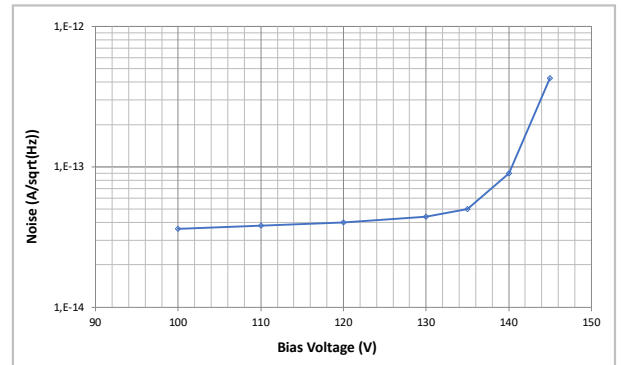


Fig. 4a: Capacitance vs. Reverse Voltage SAHA230

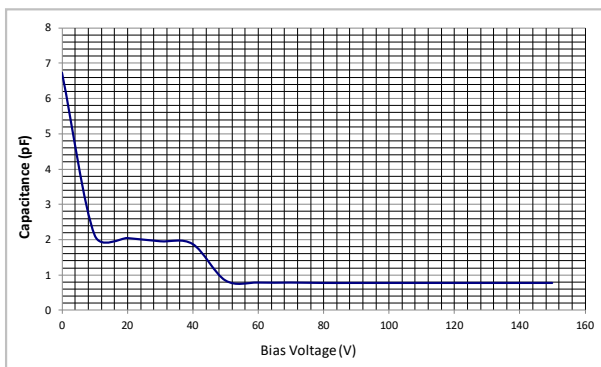


Fig. 4b: Capacitance vs. Reverse Voltage SAHA500

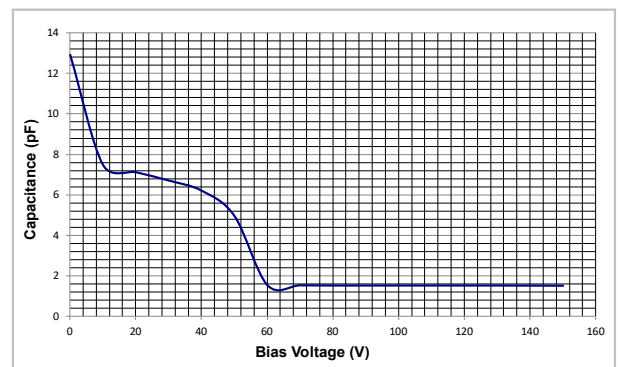


Fig. 5a: NEP vs. Bias Voltage SAHA230

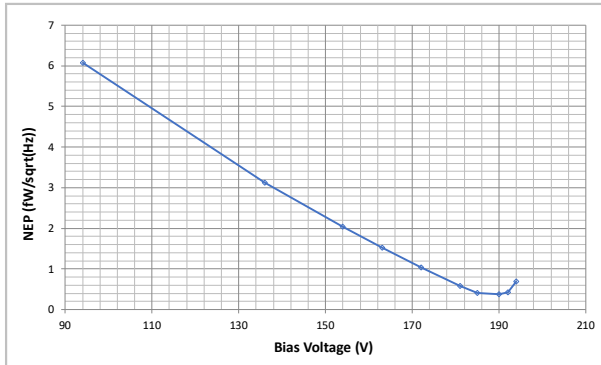


Fig. 5b: NEP vs. Bias Voltage SAHA500

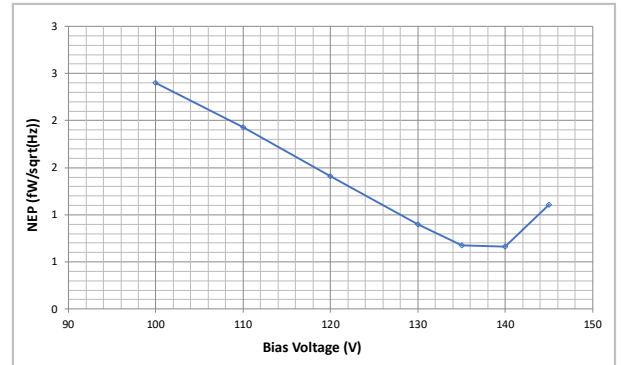
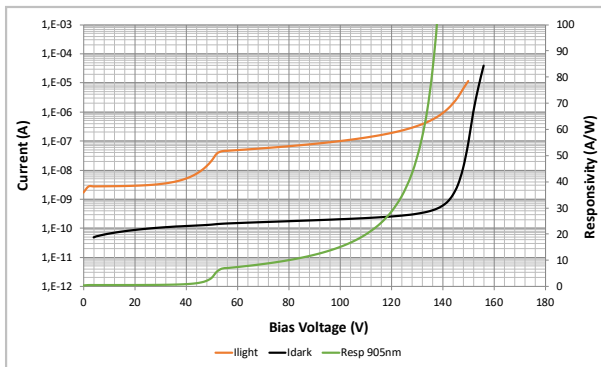
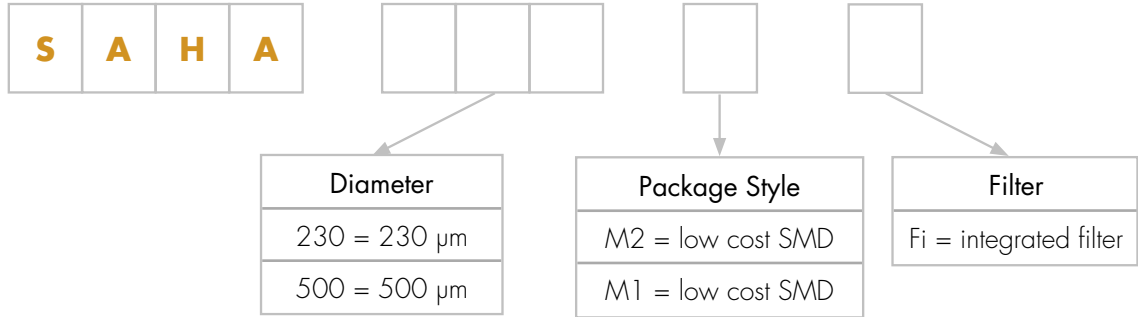


Fig. 6: Current vs. Voltage @ 905 nm

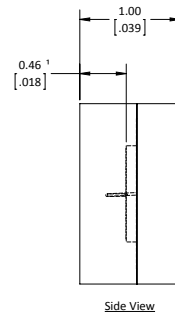
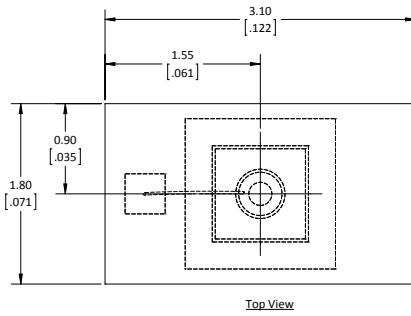
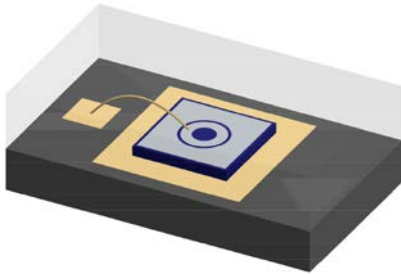


Product Number Designations

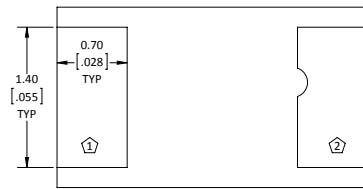


Package Drawing

M2

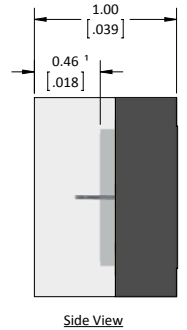
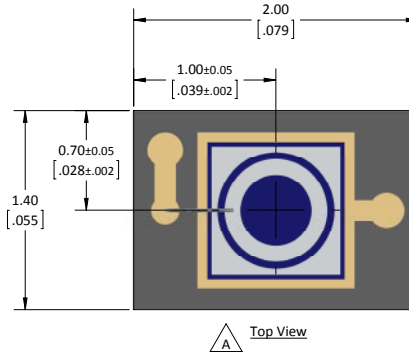
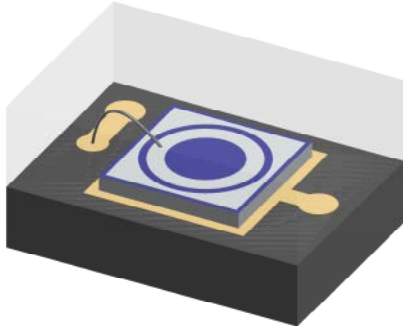


¹ Distance from top of active area to top of device.

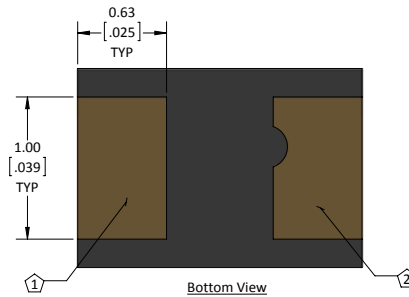


Pin 1: Cathode
Pin 2: Anode

M1



¹ Distance from top of device to top of active area.



Pad 1: Cathode
Pad 2: Anode

Product Changes

LASER COMPONENTS reserves the right to make changes to the product(s) or information contained herein without notice.

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Ordering Information

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