

H0 Series Silicon and InGaAs-APD Receiver

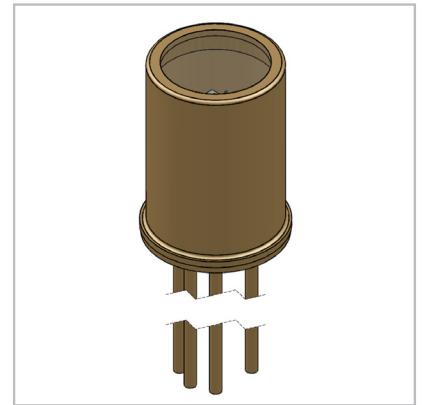
Description

The H0-Series includes a Silicon or InGaAs Avalanche Photodiode with an optimized low noise hybrid preamplifier for the use in laser range finding, LIDAR, medical and analytical applications. Housed in a modified 5 pin TO-46 package they offer bandwidths up to 1 GHz and a single ended output. Higher bandwidth can be achieved by further lowering the feedback resistor values.

The Si-APDs used in these devices are SAR500, SAR1500 and for YAG enhanced application SAT800, providing excellent responsivity between 400 nm and 1100 nm and very fast rise and fall times at all wavelengths. For the wavelength range between 900 nm and 1700 nm our InGaAs-APDs IAG080 and IAG200 are used.

Custom versions are available on request.

For field use we recommend using the receiver together with our DC/DC converter (ABC550-04 or dBC-Series). For a complete plug & play system we recommend our LCSA-/LCIA-series.



Features

- System bandwidth DC - 1 GHz
- High sensitivity
- Ultra low noise
- Spectral response range
 - Si-APD: 400 nm to 1100 nm
 - InGaAs-APD: 900 nm to 1700 nm
- Hermetically sealed TO-46 package
- +/- 5 Volts amplifier operating voltages

Applications

- Rangefinding / LIDAR
- Optical communication systems
- Laser scanners
- Spectroscopy
- Fluorescence
- Medical

Generic Characteristics

	Min	Typ	Max	Units
Storage Temperature	-55		+100	°C
Operating Temperature	-40		+85	°C
TIA Supply Voltage	+/- 4	+/- 5	+/- 6.5	Volts
TIA Supply Current		30		mA
Power Consumption		300		mW
Soldering (5 sec.)			200	°C

Si-APD-Receiver, SARXXXH0-Series

Fig. 1: Spectral Response @ M = 100

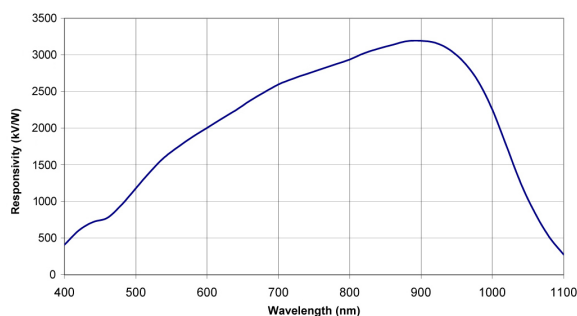


Fig. 2: Quantum Efficiency vs. Wavelength



Electrical Characteristics @ M = 100, 25°C, R_f = 50 kOhms (typical values)

Part Number	SAR500H0	SAR1500H0	Units
Si-APD	SAR500	SAR1500	
Active Area Diameter	0.5	1.5	mm
Wavelength Range	400 - 1000	400 - 1000	nm
Peak Sensitivity	905	905	nm
Bandwidth	DC - 20	DC - 20	MHz
Responsivity			
540 nm	1.35	1.35	MV/W
650 nm	2.00	2.00	MV/W
905 nm	2.50	2.50	MV/W
NEP			
540 nm	0.10	0.10	pW/rtHz
650 nm	0.06	0.06	pW/rtHz
905 nm	0.05	0.05	pW/rtHz
Output Noise Density	100	100	nV/rtHz
Input Referred Noise Density	2	2	pA/rtHz
Output Voltage Swing (1 MΩ)	3	3	V
Output Voltage Swing (50 Ω)	1.5	1.5	V
Output Offset Voltage	25	50	mV

Notes:

- Noise measured at 100 kHz.
- All detailed specifications about the integrated APD is given in the datasheet of the SAR500-series or SAR1500-series.
- Pulsed operation.

Fig. 3: Noise vs. Bias (for SAR500H0)

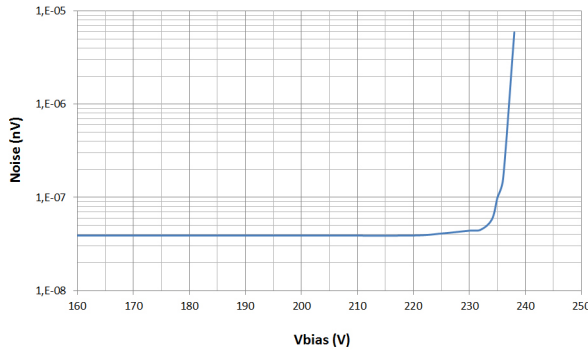


Fig. 4: NEP vs. Bias (for SAR500H0)

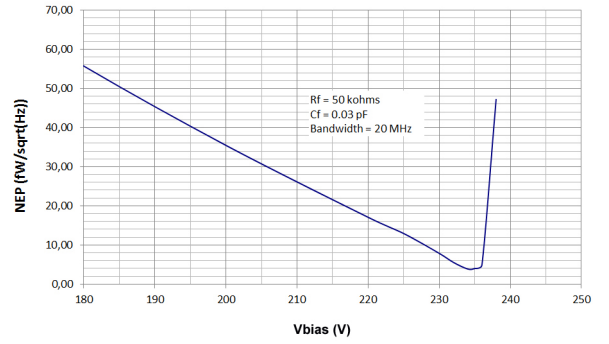


Fig. 5: Responsivity vs. Bias @ 905 nm (for SAR500H0)

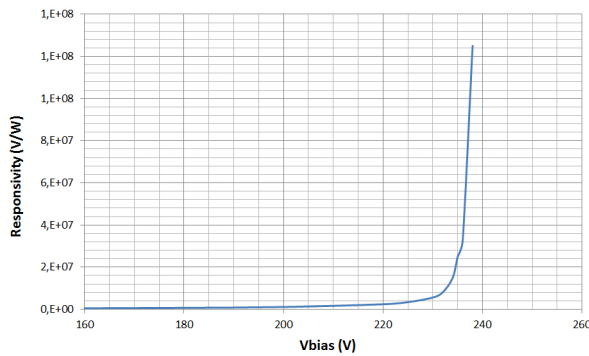


Fig. 6: Noise vs. Bias (for SAR1500H0)

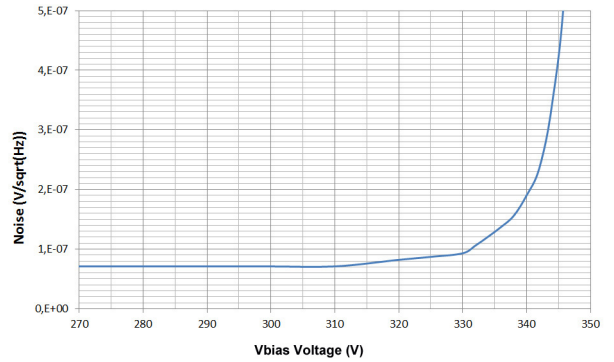


Fig. 7: NEP vs. Bias @ 905 nm (for SAR1500H0)

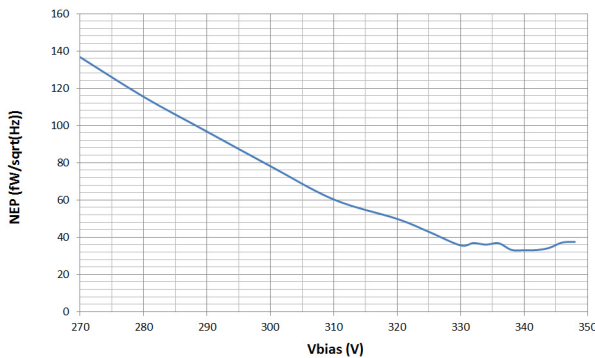
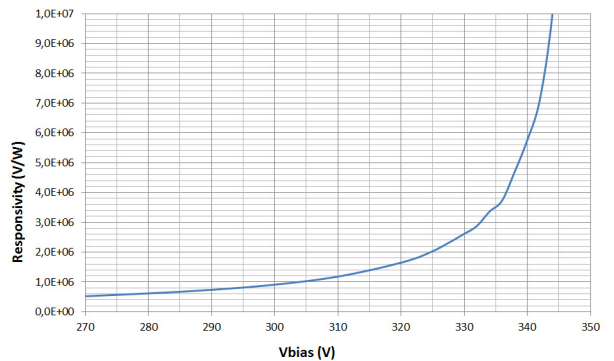


Fig. 8: Responsivity vs. Bias @ 905 nm (for SAR1500H0)



Si-APD-Receiver, SAT800H0-Series

Fig. 9: Spectral Response @ M = 100

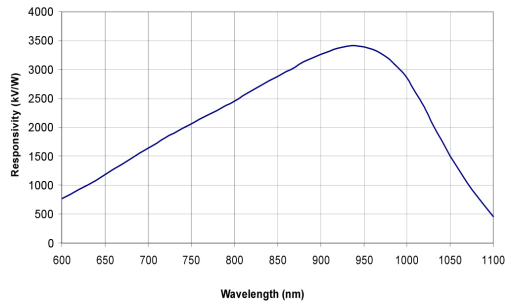
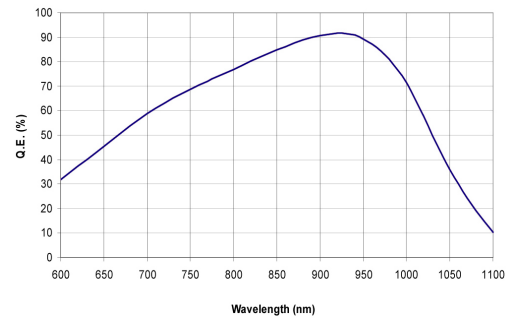


Fig. 10: Quantum Efficiency vs. Wavelength



Electrical Characteristics @ M = 100, 25°C, R_f = 50 kOhms (typical values)

Part Number	SAT800H0	Units
Si-APD	SAT800	
Diameter	0.8	mm
Wavelength Range	700 - 1000	nm
Peak Sensitivity	940	nm
Bandwidth	DC - 20	MHz
Responsivity		
540 nm	1.35	MV/W
650 nm	2.00	MV/W
905 nm	2.50	MV/W
NEP		
540 nm	0.10	pW/Hz
650 nm	0.06	pW/Hz
905 nm	0.05	pW/Hz
Output Noise Density	100	nV/rtHz
Input Referred Noise Density	2	pA/rtHz

Notes:

1. Noise measured at 100 kHz
2. All detailed specifications about the integrated APD is given in the data sheet of the SAT-series
3. An export license is required by customers outside the USA.

InGaAs-APD-Receiver IAGXXXH0-Series

Fig. 11: Spectral Response ($M=10$ @ 1550 nm)

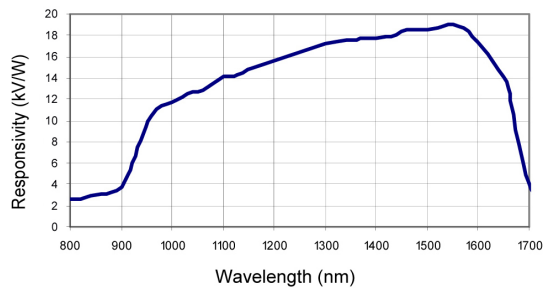
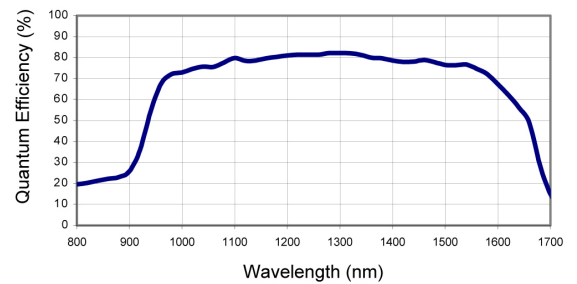


Fig. 12: Quantum Efficiency vs. Wavelength



Electrical Characteristics @ $M = 10$, 25°C , $\text{RF} = 10 \text{ k}\Omega$ (typical values)

Part Number	IAG080H0	IAG200H0	Units
InGaAs-APD	IAG080	IAG200	
Diameter	80	200	μm
Wavelength Range	900 - 1700	900 - 1700	nm
Peak Sensitivity	1550	1550	nm
Bandwidth	DC - 80	DC - 80	MHz
Responsivity 1550 nm	0.1	0.1	MV/W
NEP 1550 nm	0.3	0.4	pW/rtHz
Output Noise Density	30	40	nV/rtHz
Input Referred Noise Density	3	4	pA/rtHz

Notes:

- Noise measured at 100 kHz
- All detailed specifications about the integrated APD is given in the data sheet of the IAG-series
- Devices available from 1 MHz - 1 GHz bandwidth upon request

Fig. 13: NEP vs. Bias @ 1550 nm (for IAG080H0)

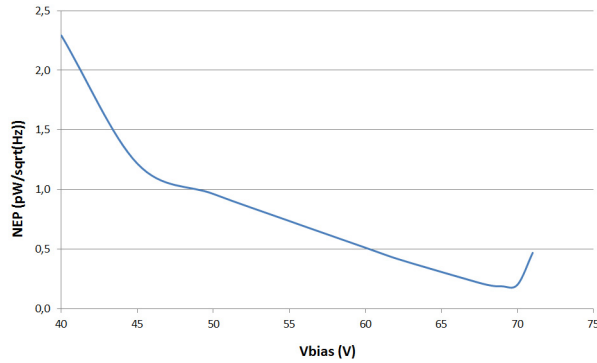
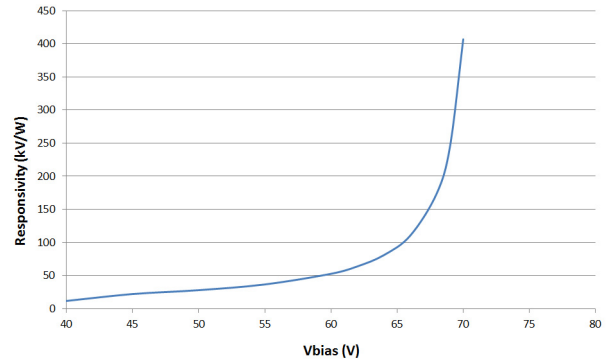
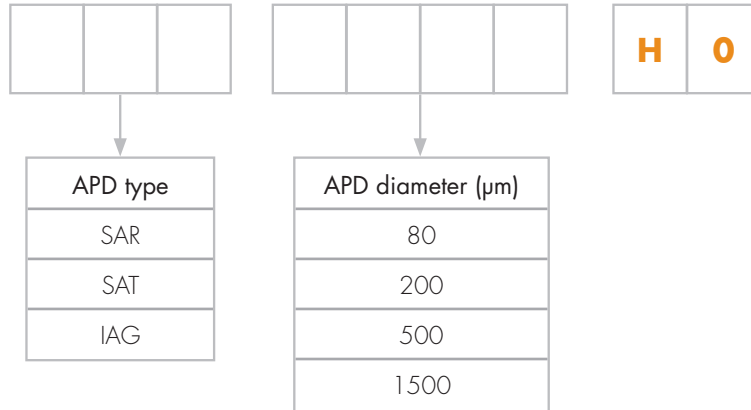


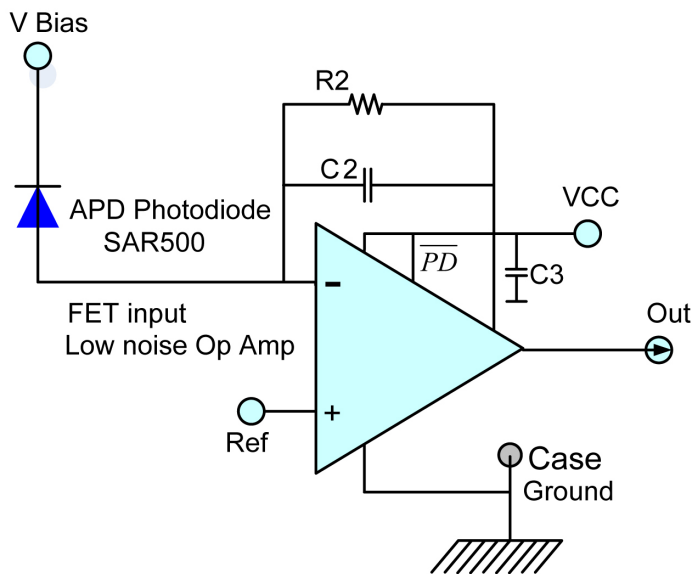
Fig. 14: Responsivity vs. Bias @ 1550 nm (for IAG080H0)



Product Number Designation



Series Block Diagram

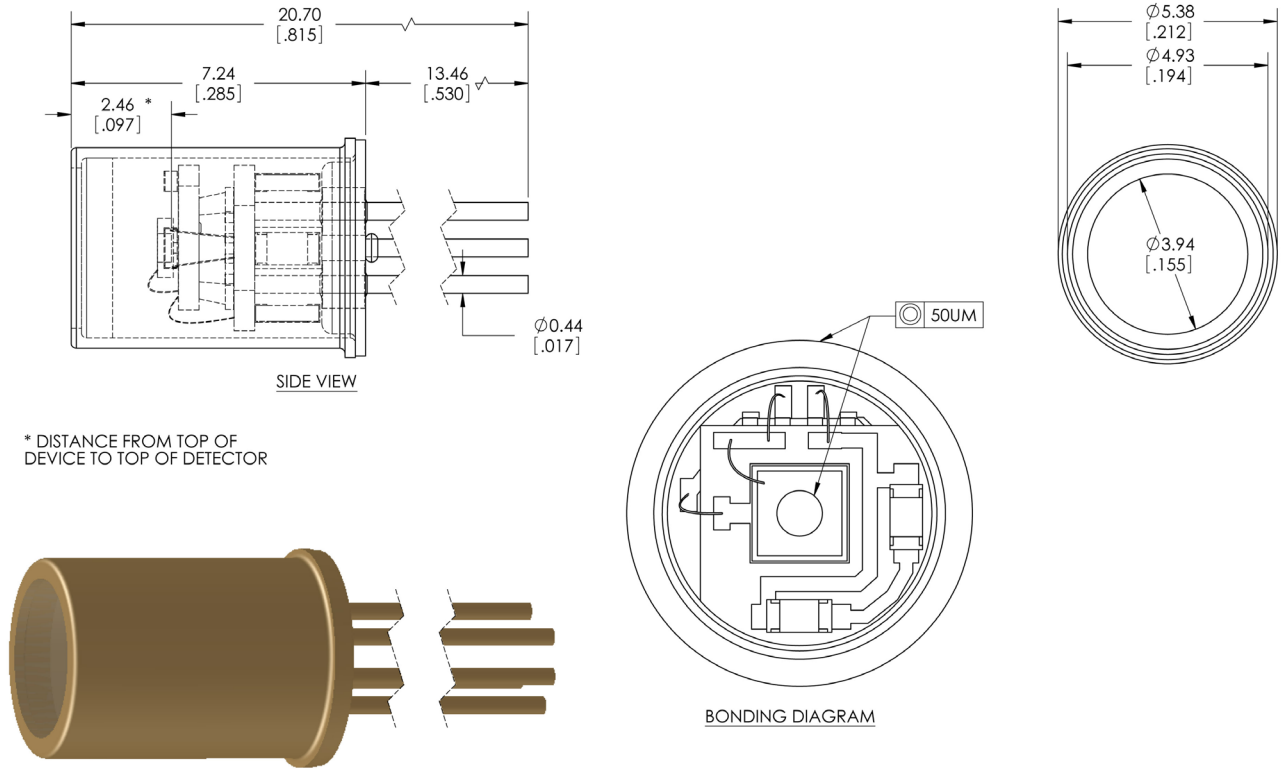


Note:

Positive bias configuration is supplied as standard but negative can be ordered by request. Please insure that the correct APD bias polarity is being supplied. However, a current limiting resistor must be placed in series with the avalanche photodiode bias voltage to limit the current into the transimpedance amplifier. All series will handle a maximum of 1 mA of bias on the APD. Please ensure that the APD bias is limited to less than 1 mA. A bypass bias capacitor is contained inside the package. Use the supplied, serialized data sheet for each device for correct operating bias value and maximum bias value (Vbkdn) that can be used.

Failure to limit this current may result in permanent failure of the device.

Package Drawings - Dimensions in mm [inches]



PIN Configuration

