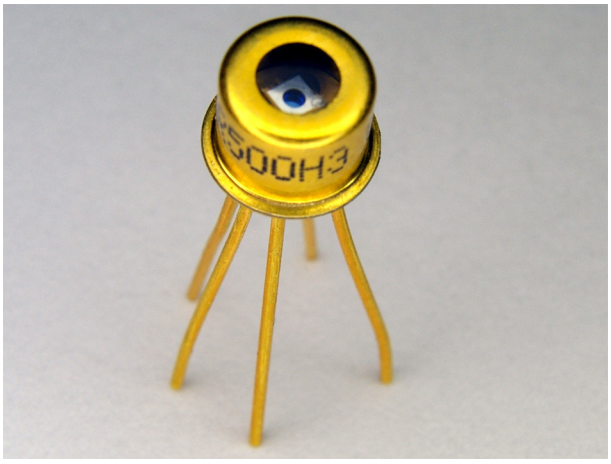
H2 / H3 / H4 / H5 Series
Silicon and InGaAs-APD Receiver

PRELIMINARY

LASER COMPONENTS

DESCRIPTION



The H2/H3/H4/H5-Series includes a Silicon or InGaAs Avalanche Photodiode with an optimized low noise hybrid preamplifier for the use in high speed, low light detection, in laser range finding, LIDAR, medical and analytical applications. Housed in a 5 pin TO-46 or 6 pin TO-5 package they offer bandwidths up to 700 MHz and a differential ended output.
The Si-APDs used in these devices are SAR500, SAR1500 and for YAG enhanced application SAT800, providing very good response 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-APD IAE200 is used.
All APD Receivers are available with various gain/bandwidth configurations.
Custom versions with all other APD chips from our product range are available on request.

For field use we recommend to use our ABC550-04. This temperature-compensated HV supply allows constant responsivity to be maintained despite changes in temperature.

FEATURES

- System Bandwidth 10 kHz – 700 MHz
- High Sensitivity
- High Speed
- Low noise
- Spectral response range
  Si-APD: 400 nm to 1100 nm
  InGaAs-APD: 900 nm to 1700 nm
- Hermetically sealed TO-46 or TO-5 package

APPLICATIONS

- Range Finding / 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
Power Consumption	H2-Series:		1180		mW
	H3-Series:		900		mW
	H4-Series:		300		mW
	H5-Series:		70		mW
Soldering (5 sec.)				200	°C

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Si-APD-Receivers, SARXXXXH2/H3/H4/H5-Series

Fig.1: Spectral Response

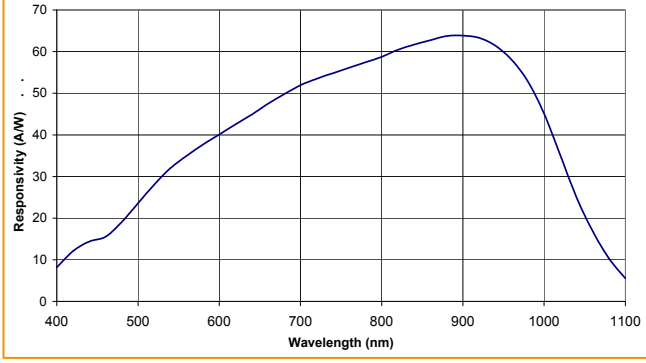
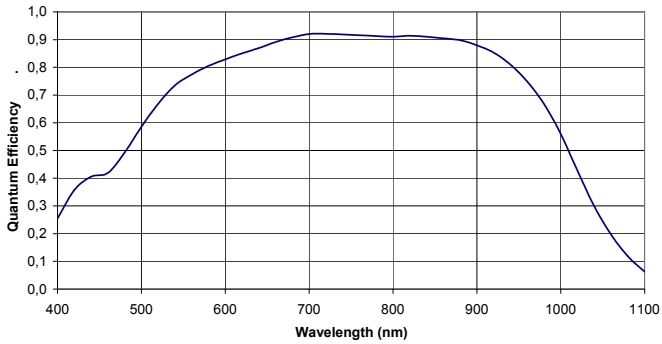


Fig.2: Quantum Efficiency vs. Wavelength



ELECTRICAL CHARACTERISTICS @ M=100, 25°C

Part Number	SAR500H2	SAR500H3	SAR500H4	SAR500H5	Units
Si-APD	SAR500	SAR500	SAR500	SAR500	
Diameter	0.5	0.5	0.5	0.5	mm
Wavelength Range	400 - 1000	400 - 1000	400 - 1000	400 - 1000	nm
Peak Sensitivity	905	905	905	905	nm
Bandwidth	10 k-100 M	10 k - 240 M	20 k - 470 M	20 k - 700 M	Hz
Supply Voltage-Vcc	3.3	5	3.3 or 5.0	3.3	Volt
Supply Current	25	25	30	25	mA
Responsivity (Minimum)					
540 nm	1.30	0.54	0.21	0.11	MV/W
650 nm	2.20	0.90	0.32	0.16	MV/W
905 nm	2.80	1.10	0.40	0.20	MV/W
NEP (Maximum)					
540 nm	0.54	1.10	1.43	3.00	pW/rtHz
650 nm	0.32	0.67	0.94	2.06	pW/rtHz
905 nm	0.25	0.55	0.75	1.65	pW/rtHz
Output Noise Density (Max.)	700	600	300	330	nV/rtHz
Input Refered Noise Density (Max.)	13	30	38	75	pA/rtHz

Notes:
1. Noise measured at 1 MHz
2. All detailed specifications about the integrated APD is given in the datasheet of the SAR500-series

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ELECTRICAL CHARACTERISTICS @ M=100, 25°C

Part Number	**SAR1500H2**	**SAR1500H3**	**SAR1500H4**	**SAR1500H5**	**Units**
Si-APD	SAR1500	SAR1500	SAR1500	SAR1500	
Diameter	1.5	1.5	1.5	1.5	mm
Wavelength Range	400 - 1000	400 - 1000	400 - 1000	400 - 1000	nm
Peak Sensitivity	905	905	905	905	nm
Bandwidth	10 k-100 M	10 k - 240 M	20 k - 470 M	20 k - 700 M	Hz
Supply Voltage-Vcc	3.3	5	3.3 or 5.0	3.3	Volt
Supply Current	25	25	30	25	mA
Responsivity (Minimum)					
540 nm	1.30	0.54	0.21	0.11	MV/W
650 nm	2.20	0.90	0.32	0.16	MV/W
905 nm	2.80	1.10	0.40	0.20	MV/W
NEP (Maximum)					
540 nm	0.54	1.10	1.43	3.00	pW/rtHz
650 nm	0.32	0.67	0.94	2.06	pW/rtHz
905 nm	0.25	0.55	0.75	1.65	pW/rtHz
Output Noise Density (Max.)	700	600	300	330	nV/rtHz
Input Refered Noise Density (Max.)	13	30	38	75	pA/rtHz

Notes:
1. Noise measured at 1 MHz
2. All detailed specifications about the integrated APD is given in the datasheet of the SAR1500-series

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Si-APD-Receivers, SAT800H2/H3/H4/H5-Series

Fig. 1: Spectral Response

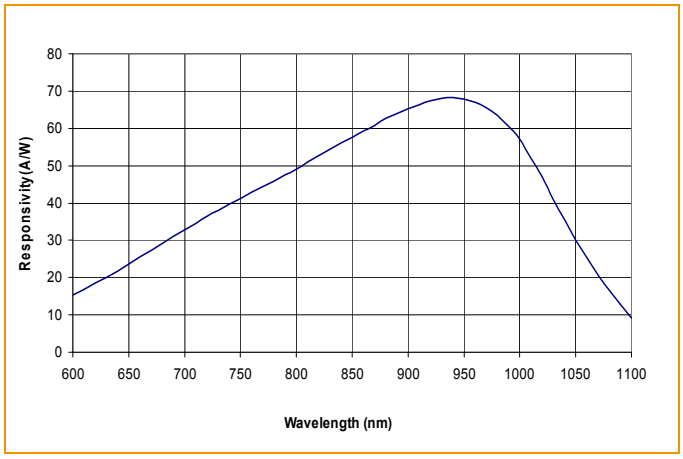
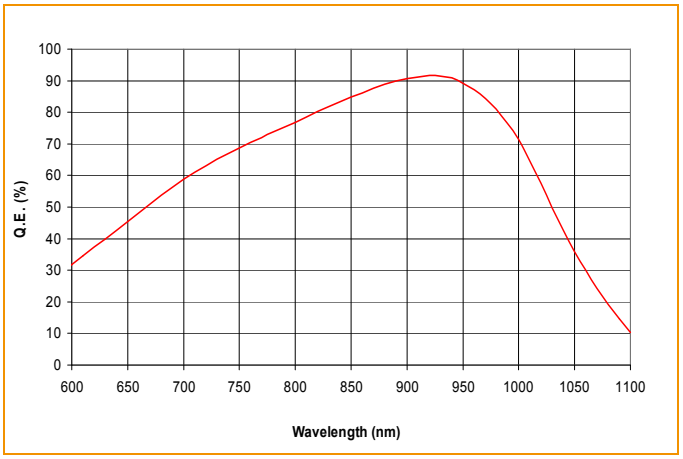


Fig. 2: Quantum Efficiency vs. Wavelength



ELECTRICAL CHARACTERISTICS @ M=100, 25°C

Part Number	SAT800H2	SAT800H3	SAT800H4	SAT800H5	Units
Si-APD	SAT800	SAT800	SAT800	SAT800	
Diameter	0.8	0.8	0.8	0.8	mm
Wavelength Range	700 - 1100	700 - 1100	700 - 1100	700 - 1100	nm
Peak Sensitivity	940	940	940	940	nm
Bandwidth	10 k-100 M	10 k - 240 M	20 k - 470 M	20 k - 700 M	Hz
Supply Voltage-Vcc	3.3	5	3.3 or 5.0	3.3	Volt
Supply Current	25	25	30	25	mA
Responsivity (Minimum)					
540 nm	1.30	0.54	0.21	0.11	MV/W
650 nm	2.20	0.90	0.32	0.16	MV/W
905 nm	2.80	1.10	0.40	0.20	MV/W
NEP (Maximum)					
540 nm	0.54	1.10	1.43	3.00	pW/rtHz
650 nm	0.32	0.67	0.94	2.06	pW/rtHz
905 nm	0.25	0.55	0.75	1.65	pW/rtHz
Output Noise Density (Max.)	700	600	300	330	nV/rtHz
Input Referred Noise Density (Max.)	13	30	38	75	pA/rtHz

Notes:
1. Noise measured at 1 MHz
2. All detailed specifications about the integrated APD is given in the datasheet of the SAT800-series

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InGaAs-APD Receivers, IAE200H2/H3/H4/H5-Series

Fig.1: Spectral Response (M=10 @ 1550 nm)

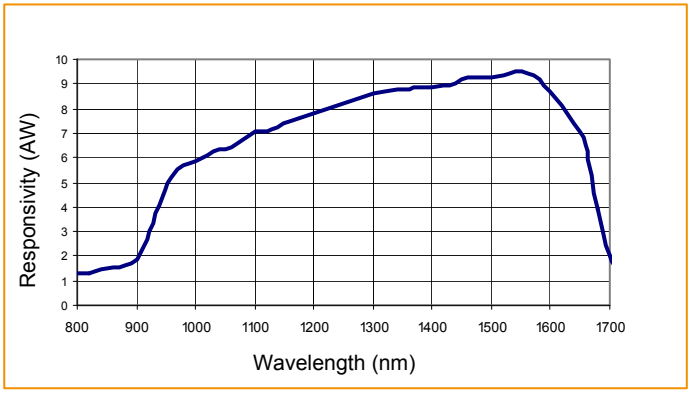
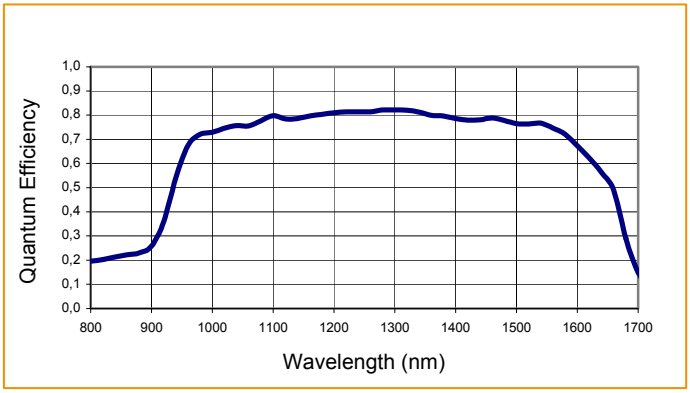


Fig.2: Effective Quantum Efficiency vs. Wavelength (M= 10 @ 1550 nm)



ELECTRICAL CHARACTERISTICS @ M=10, 25°C

Part Number	IAE200H2	IAE200H3	IAE200H4	IAE200H5	Units
InGaAs-APD	IAE200	IAE200	IAE200	IAE200	
Diameter	200	200	200	200	µm
Wavelength Range	900 - 1700	900 - 1700	900 - 1700	900 - 1700	nm
Peak Sensitivity	1550	1550	1550	1550	nm
Bandwidth	10 k-100 M	10 k - 240 M	20 k - 470 M	20 k - 700 M	Hz
Supply Voltage-Vcc	3.3	5	3.3 or 5.0	3.3	Volt
Supply Current	25	25	30	25	mA
Responsivity (Minimum)					
1550 nm	0.40	0.16	0.064	0.032	MV/W
NEP (Maximum)					
1550 nm	1.80	3.80	4.70	10.30	pW/rtHz
Output Noise Density (Max.)	700	600	300	330	nV/rtHz
Input Referred Noise Density (Max.)	13	30	38	75	pA/rtHz

Notes:
1. Noise measured at 1 MHz
2. All detailed specifications about the integrated APD is given in the datasheet of the IAE200-series

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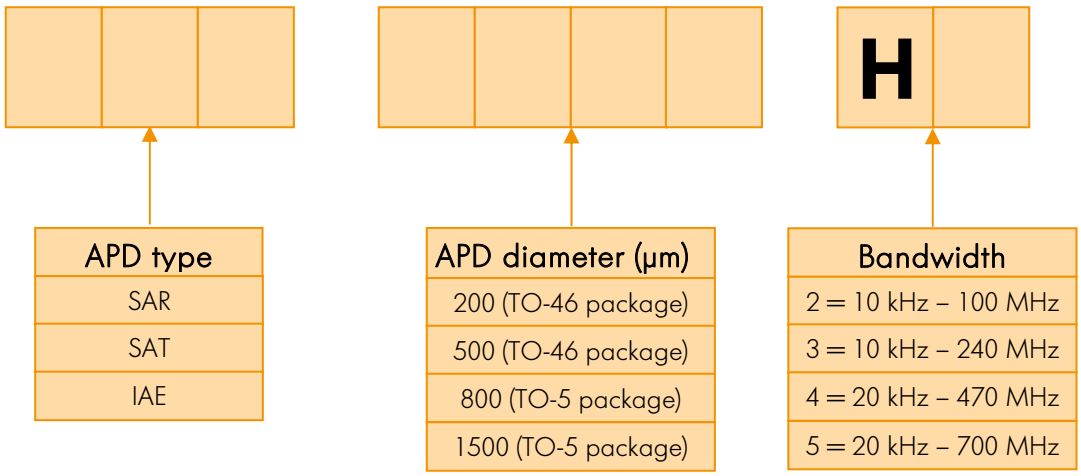
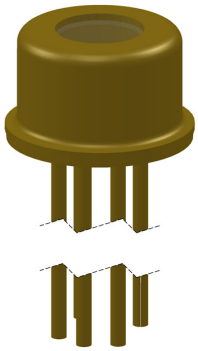
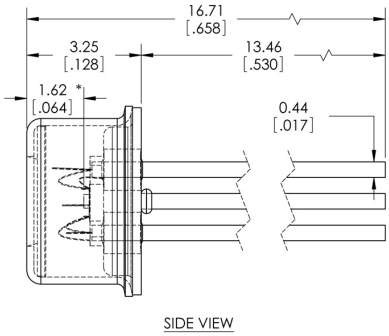
PRODUCT NUMBER DESIGNATION



Package TO-46

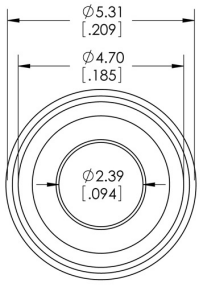
for APDs ≤ 500 µm
Dimensions in mm [inches]



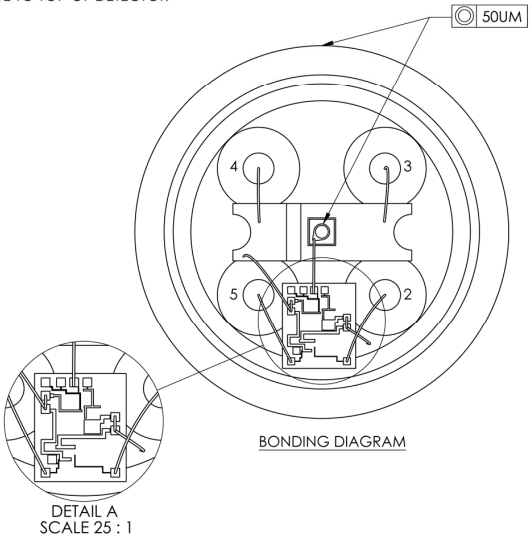


SIDE VIEW

* DISTANCE FROM TOP OF DEVICE TO TOP OF DETECTOR

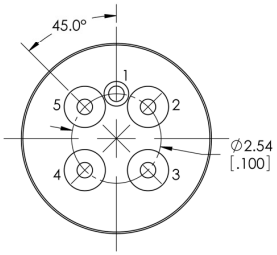


TOP VIEW



BONDING DIAGRAM

DETAIL A
SCALE 25 : 1



BOTTOM VIEW

PIN #1: Ground/Case
PIN #2: Out -
PIN #3: Vbias
PIN #4: Vcc
PIN #5: Out +

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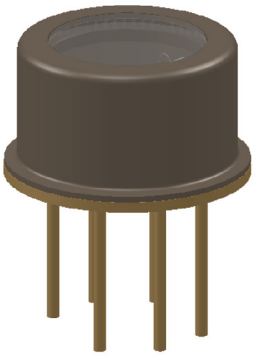
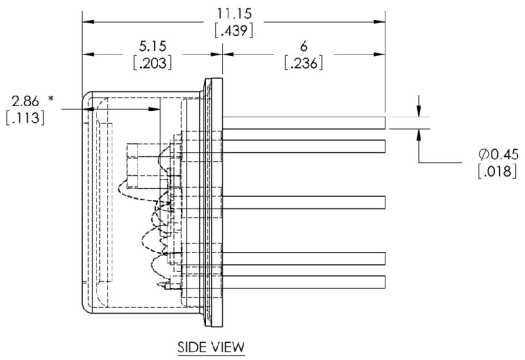
Package TO-5

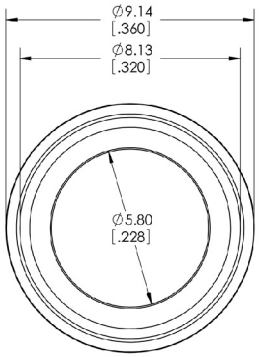
for APDs ≥ 800 µm
Dimensions in mm [inches]



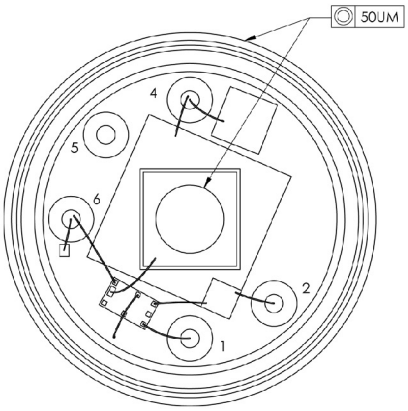


SIDE VIEW

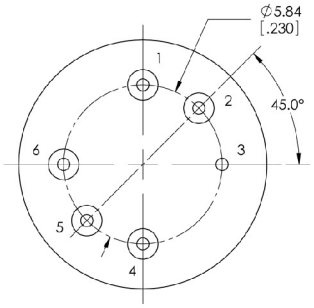
* DISTANCE FROM TOP OF
DEVICE TO TOP OF DETECTOR



TOP VIEW



BONDING DIAGRAM



BOTTOM VIEW

PIN #1: Out+
PIN #2: Out-
PIN #3: Ground/Case
PIN #4: Vbias
PIN #5: NC
PIN #6: Vcc

03/11 / V9 / HW / lcd/ h2-h3-h4-h5-series.doc

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