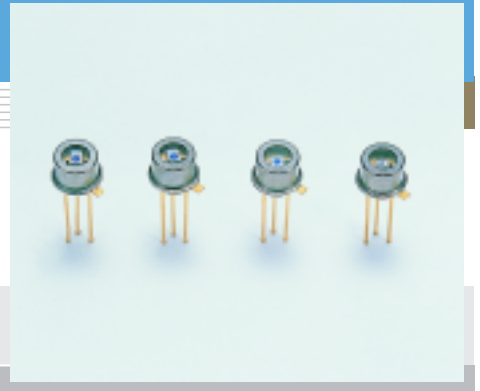


Si PIN photodiode with preamp S6468 series

High-speed sensor with preamp



S6468 series is a high-speed photodetector consisting of a Si PIN photodiode and a preamplifier chip integrated in the same package. They feature high-speed response and high sensitivity over a wide spectral range from visible to near infrared light. The small package (TO-18) allows compact optical design. The amplifier input is at a virtual ground, so external noise which may appear when detecting high-speed signals can be suppressed.

Features

- Cut-off frequency ($V_{cc}=5\text{ V}$)
 - S6468 : 15 MHz
 - S6468-02: 35 MHz
 - S6468-05: 50 MHz
 - S6468-10: 100 MHz
- Low noise ($f=1\text{ MHz}$)
 - S6468 : 25 nVrms/Hz^{1/2}
 - S6468-02: 28 nVrms/Hz^{1/2}
 - S6468-05: 26 nVrms/Hz^{1/2}
 - S6468-10: 16 nVrms/Hz^{1/2}
- 3 pin TO-18 package
- Active area
 - S6468/02/05: $\phi 0.8\text{ mm}$
 - S6468-10 : $\phi 0.4\text{ mm}$

Applications

- Optical fiber communication
- Video signal transmission
- Optical disk pick-up

■ Electrical and optical characteristics [$T_a=25\text{ }^\circ\text{C}$, $V_{cc}=5\text{ V}$, $R_L=500\ \Omega$, $C_L=13\text{ pF}$ (S6468-05/-10: $C_L=3\text{ pF}$)] **

Parameter	Symbol	Condition	S6468			S6468-02			S6468-05			S6468-10			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
Spectral response range	λ		320 to 1060			320 to 1000			320 to 1000			320 to 1000			nm
Peak sensitivity wavelength	λ_p		-	900	-	-	800	-	-	800	-	-	800	-	nm
Photo sensitivity	S	$\lambda=660\text{ nm}$	-	13.5	-	-	8.5	-	-	7.5	-	-	4.5	-	mV/ μW
		$\lambda=780\text{ nm}$	-	15.5	-	-	11	-	-	9.5	-	-	5	-	
		$\lambda=830\text{ nm}$	-	16.5	-	-	11	-	-	9.5	-	-	5	-	
Trans-impedance	R_T		-	30	-	-	20	-	-	18	-	-	10	-	k Ω
Power supply current	I_{cc}	$R_L=\infty$	-	-	3	-	-	3	-	-	6.5	-	-	18	mA
Output bias voltage *2	V_o	$R_L=\infty$ $P_{in}=0\ \mu\text{W}$	0.55	0.65	0.8	0.65	0.8	0.9	1.25	1.55	1.85	1.1	1.4	1.8	V
Temperature coefficient of output bias voltage	-		-	-2	-	-	-2	-	-	-4	-	-	-3	-	mV/ $^\circ\text{C}$
Cut-off frequency	f_c	$P_{in}=10\ \mu\text{W}$ *3	12	15	-	28	35	-	40	50	-	80	100	-	MHz
Maximum output voltage amplitude	-	Nonlinear distortion: 10 % Max.	0.5	-	-	0.5	-	-	1.0	-	-	0.8	-	-	Vp-p
Output impedance	Z_o	$f=5\text{ Hz}$	-	30	-	-	30	-	-	17	-	-	17	-	Ω
Output noise voltage	V_n	$P_{in}=0\ \mu\text{W}$ $f=1\text{ MHz}$	-	25	-	-	28	-	-	26	-	-	16	-	nV/Hz ^{1/2}
Overshoot	-	$P_{in}=10\ \mu\text{W}$ *3	-	-	10	-	-	10	-	-	10	-	-	10	%

■ Absolute maximum ratings

Parameter	Symbol	Min.	Max.	Unit
Power supply voltage *4	V_{cc}	-0.5	7	V
Power dissipation	P	-	300	mW
Operating temperature	T_{opr}	-20	70	$^\circ\text{C}$
Storage temperature	T_{stg}	-40	100	$^\circ\text{C}$

■ Recommended operating conditions

Parameter	Symbol	S6468/-02			S6468-05/-10			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	
Power supply voltage	V_{cc}	4.75	5	5.25	4.75	5	5.25	V
Load resistance	R_L	500	-	-	500	-	-	Ω
Load capacitance	C_L	-	-	13	-	-	3	pF
Operating temperature	T_{opr}	0	-	60	0	-	60	$^\circ\text{C}$

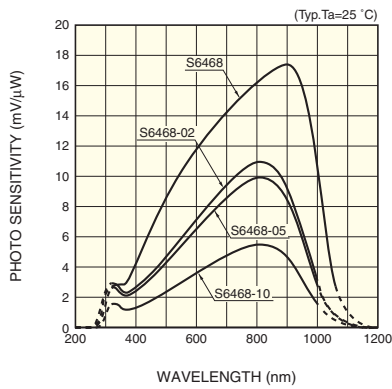
*1: For definitions of R_L and C_L , refer to the basic connection.

*2: Output voltage $V_{out}=V_o-(P_{in} \times S)$ P_{in} : incident radiant flux (μW)

*3: Peak value

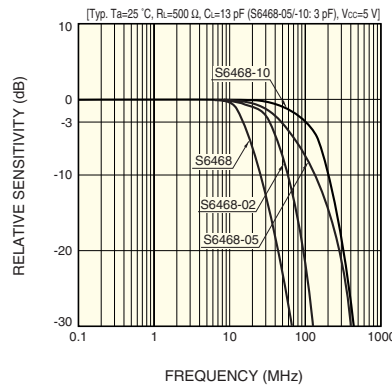
*4: A bypass capacitor (0.01 μF to 0.1 μF ceramic) is connected between the V_{cc} lead and the GND lead. The lead length should be less than 20 mm (S6468/-02) or 5 mm (S6468-05/-10).

■ Spectral response



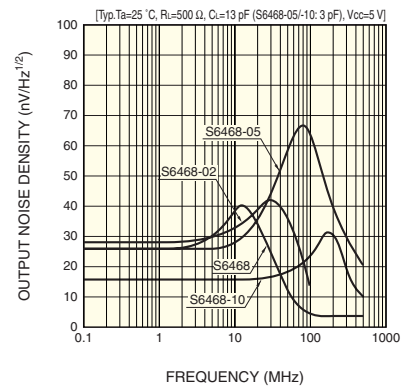
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■ Frequency characteristics



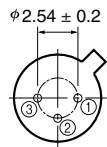
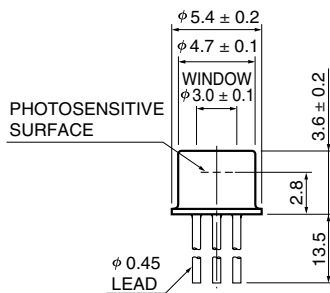
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■ Output noise spectrum



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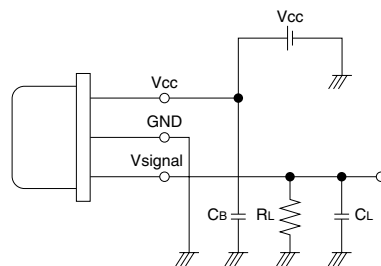
■ Dimensional outline (unit: mm)



- ① V_{CC}
- ② GND (CASE)
- ③ V signal

KPINA0001EF

■ Basic connection



KPIN0001EA

Precautions for use

● ESD

S6468 series may be damaged or their performance may deteriorate by such factors as electro static discharge from the human body, surge voltages from measurement equipment, leakage voltages from soldering irons and packing materials, etc. As a countermeasure against electro static discharge, the device, operator, work place and measuring jigs must all be set at the same potential. The following precautions must be observed during use:

- To protect the device from electro static discharge which accumulate on the operator or the operator's clothes, use a wrist strap or similar tools to ground the operator's body via a high impedance resistor (1 MΩ).
- A semiconductive sheet (1 MΩ to 100 MΩ) should be laid on both the work table and the floor in the work area.
- When soldering, use an electrically grounded soldering iron with an isolation resistance of more than 10 MΩ.
- For containers and packing, use of a conductive material or aluminum foil is effective. When using an antistatic material, use one with a resistance of 0.1 MΩ/cm² to 1 GΩ/cm².

● Wiring

- R_L and C_L are total resistive load and capacitive load viewed from the V signal terminal. When connecting a cable or circuit to the latter stage of the basic connection diagram, the cable or circuit resistance and capacitance should also be taken into account. They should be used in accordance with the recommended operating conditions: R_L ≥ 500 Ω and C_L ≤ 13 pF (S6468-05/-10: C_L ≤ 3 pF).
- A bypass capacitor (C_b=0.01 μF to 0.1 μF ceramic) is connected between the V_{CC} lead and the GND lead.
- The lead length should be less than 20 mm (S6468/-02) and 5 mm (S6468-05/-10).
- If electric current or voltage is applied in reverse polarity to an electronic device such as a preamplifier, this can degrade device performance or destroy the device. Always check the wiring and dimensional outline to avoid misconnection.

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HAMAMATSU PHOTONICS K.K., Solid State Division

1126-1 Ichino-cho, Hamamatsu City, 435-8558 Japan, Telephone: (81) 053-434-3311, Fax: (81) 053-434-5184, <http://www.hamamatsu.com>

U.S.A.: Hamamatsu Corporation: 360 Foothill Road, P.O.Box 6910, Bridgewater, N.J. 08807-0910, U.S.A., Telephone: (1) 908-231-0960, Fax: (1) 908-231-1218

Germany: Hamamatsu Photonics Deutschland GmbH: Arzbergerstr. 10, D-82211 Herrsching am Ammersee, Germany, Telephone: (49) 08152-3750, Fax: (49) 08152-2658

France: Hamamatsu Photonics France S.A.R.L.: 8, Rue du Saule Trapu, Parc du Moulin de Massy, 91882 Massy Cedex, France, Telephone: 33-(1) 69 53 71 00, Fax: 33-(1) 69 53 71 10

United Kingdom: Hamamatsu Photonics UK Limited: 2 Howard Court, 10 Twin Road, Welwyn Garden City, Hertfordshire AL7 1BW, United Kingdom, Telephone: (44) 1707-294888, Fax: (44) 1707-325777

North Europe: Hamamatsu Photonics Norden AB: Smidevågen 12, SE-171 41 Solna, Sweden, Telephone: (46) 8-509-031-00, Fax: (46) 8-509-031-01

Italy: Hamamatsu Photonics Italia S.R.L.: Strada della Moia, 1/E, 20020 Arese, (Milano), Italy, Telephone: (39) 02-935-81-733, Fax: (39) 02-935-81-741