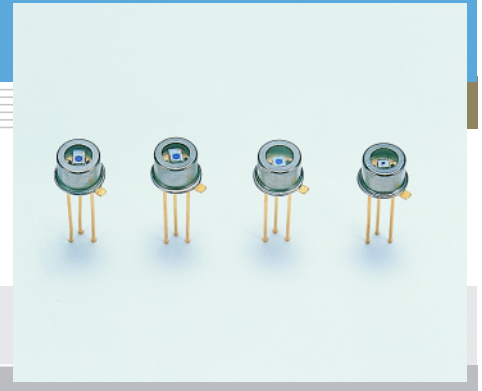


Si PIN photodiode with preamp S6468 series

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 [$T_a=25\text{ }^\circ\text{C}$, $V_{CC}=5\text{ V}$, $R_L=500\text{ }\Omega$, $C_L=13\text{ pF}$ (S6468-05/-10: $C_L=3\text{ pF}$)] ^{*1}

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	$R_L=\infty$ $P_{in}=0\text{ }\mu\text{W}$	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	$P_{in}=10\text{ }\mu\text{W}$ ^{*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	$P_{in}=0\text{ }\mu\text{W}$ $f=1\text{ MHz}$	-	25	-	-	28	-	-	26	-	-	16	-	nV/Hz ^{1/2}
Overshoot	-	$P_{in}=10\text{ }\mu\text{W}$ ^{*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	$^\circ\text{C}$

*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)

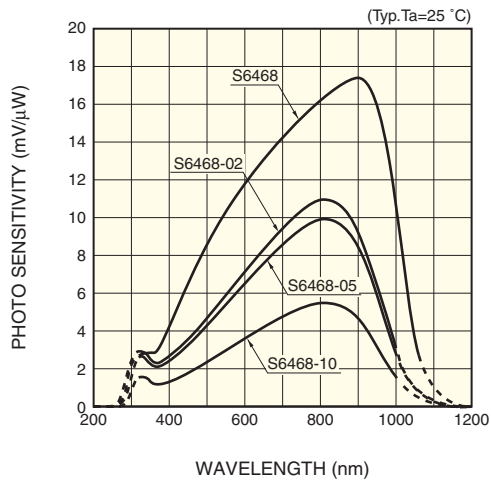
*3: Peak value

*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)

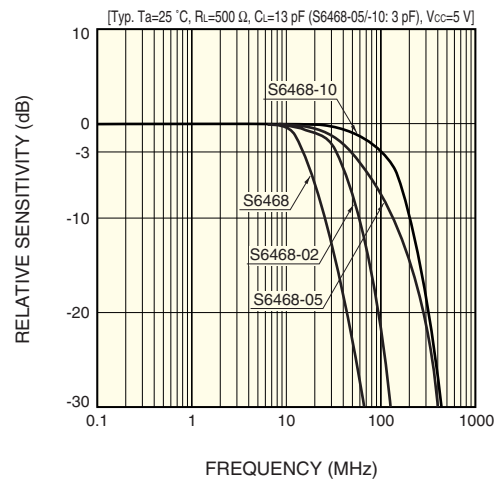
■ Recommended operating conditions

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	$^\circ\text{C}$

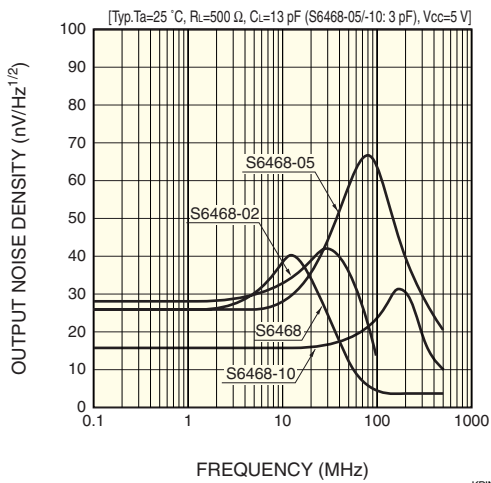
■ Spectral response



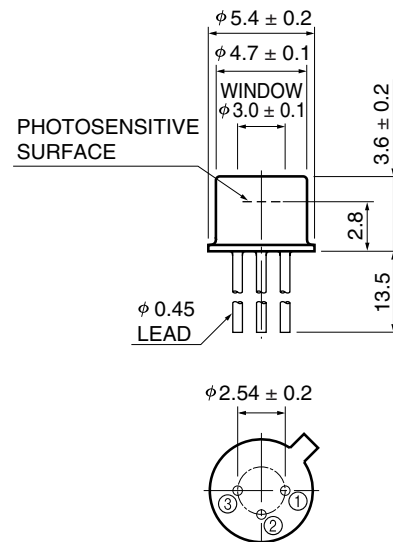
■ Frequency characteristics



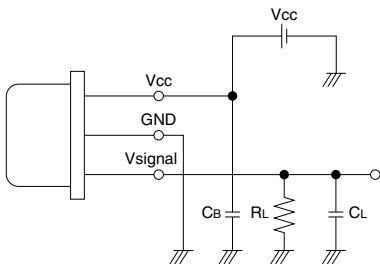
■ Output noise spectrum



■ Dimensional outline (unit: mm)



■ Basic connection



Note) RL and CL 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: $R_L \geq 500 \Omega$ and $C_L \leq 13 \text{ pF}$ (S6468-05/-10: $C_L \leq 3 \text{ pF}$).

A bypass capacitor ($C_B = 0.01 \mu\text{F}$ to $0.1 \mu\text{F}$ ceramic) is connected between the VCC lead and the GND lead.

The lead length should be less than 20 mm (S6468/-02) and 5 mm (S6468-05/-10).

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