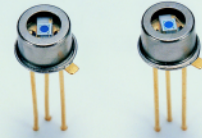


# Si PIN photodiode with preamp S6468 series

## 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
- Low noise ( $f=1\text{ MHz}$ )  
S6468 : 25 nVrms/Hz<sup>1/2</sup>  
S6468-02: 28 nVrms/Hz<sup>1/2</sup>
- 3 pin TO-18 package
- Active area:  $\phi 0.8\text{ mm}$

### Applications

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

### ■ Electrical and optical characteristics [ $T_a=25\text{ }^\circ\text{C}$ , $V_{cc}=5\text{ V}$ , $R_L=500\ \Omega$ , $C_L=13\text{ pF}$ ]\*<sup>1</sup>

Parameter	Symbol	Condition	S6468			S6468-02			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Spectral response range	$\lambda$		320 to 1060			320 to 1000			nm
Peak sensitivity wavelength	$\lambda_p$		-	900	-	-	800	-	nm
Photo sensitivity	S	$\lambda=660\text{ nm}$	-	13.5	-	-	8.5	-	mV/ $\mu\text{W}$
		$\lambda=780\text{ nm}$	-	15.5	-	-	11	-	
		$\lambda=830\text{ nm}$	-	16.5	-	-	11	-	
Trans-impedance	$R_T$		-	30	-	-	20	-	k $\Omega$
Power supply current	$I_{cc}$	$R_L=\infty$	-	-	3	-	-	3	mA
Output bias voltage* <sup>2</sup>	$V_o$	$R_L=\infty$ $P_{in}=0\ \mu\text{W}$	0.55	0.65	0.8	0.65	0.8	0.9	V
Temperature coefficient of output bias voltage	-		-	-2	-	-	-2	-	mV/ $^\circ\text{C}$
Cut-off frequency	$f_c$	$P_{in}=10\ \mu\text{W}$ * <sup>3</sup>	12	15	-	28	35	-	MHz
Maximum output voltage amplitude	-	Nonlinear distortion: 10 % Max.	0.5	-	-	0.5	-	-	Vp-p
Output impedance	$Z_o$	$f=5\text{ Hz}$	-	30	-	-	30	-	$\Omega$
Output noise voltage	$V_{ni}$	$P_{in}=0\ \mu\text{W}$ $f=1\text{ MHz}$	-	25	-	-	28	-	nV/Hz <sup>1/2</sup>
Overshoot	-	$P_{in}=10\ \mu\text{W}$ * <sup>3</sup>	-	-	10	-	-	10	%

### ■ Absolute maximum ratings

Parameter	Symbol	Min.	Max.	Unit
Power supply voltage* <sup>4</sup>	$V_{cc}$	-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	Min.	Typ.	Max.	Unit
Power supply voltage	$V_{cc}$	4.75	5	5.25	V
Load resistance	$R_L$	500	-	-	$\Omega$
Load capacitance	$C_L$	-	-	13	pF
Operating temperature	$T_{opr}$	0	-	60	$^\circ\text{C}$

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

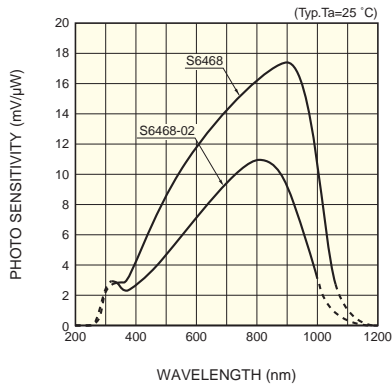
\*2: Output voltage  $V_{out} = V_o - (P_{in} \times S)$   $P_{in}$ : incident radiant flux ( $\mu\text{W}$ )

\*3: Peak value

\*4: A bypass capacitor (0.01  $\mu\text{F}$  to 0.1  $\mu\text{F}$  ceramic) is connected between the  $V_{cc}$  lead and the GND lead.

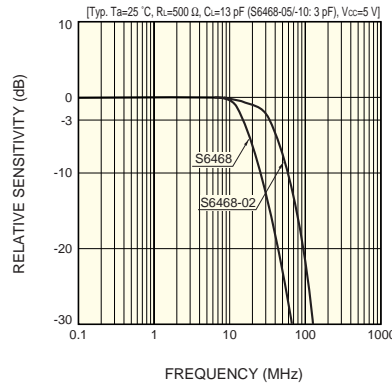
The lead length should be less than 20 mm.

## ■ Spectral response



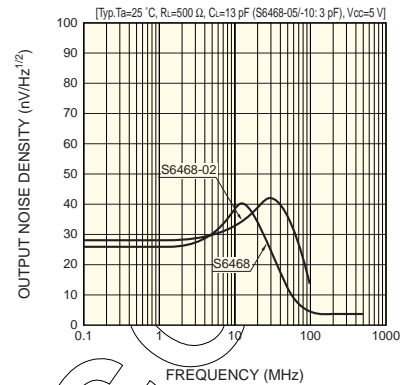
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## ■ Frequency characteristics



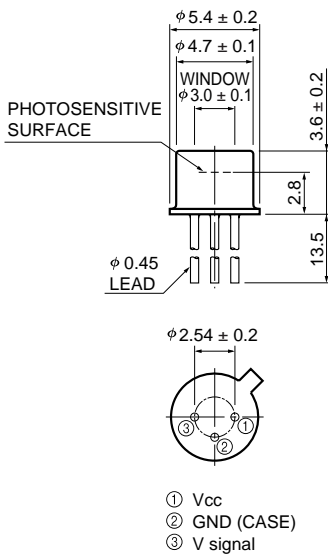
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## ■ Output noise spectrum



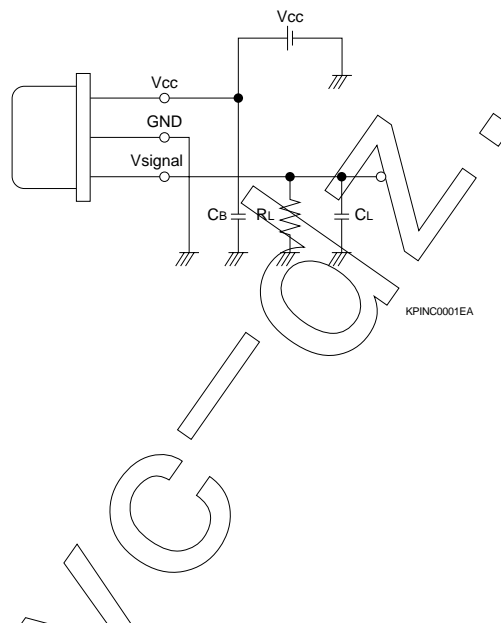
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## ■ Dimensional outline (unit: mm)



KPINA0001EF

## ■ Basic connection



KPINC0001EA

## 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/cm<sup>2</sup> to 1 GΩ/cm<sup>2</sup>.

### ● Wiring

- R<sub>L</sub> and C<sub>L</sub> 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<sub>L</sub> ≥ 500 Ω and C<sub>L</sub> ≤ 13 pF.
- A bypass capacitor (C<sub>b</sub> = 0.01 μF to 0.1 μF ceramic) is connected between the V<sub>cc</sub> lead and the GND lead.
- The lead length should be less than 20 mm.
- 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.