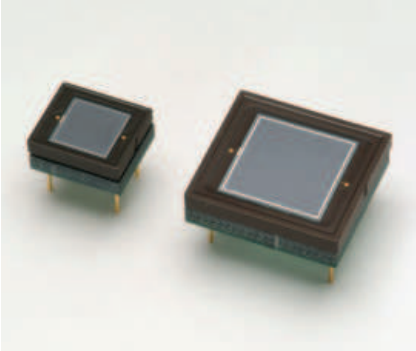
HAMAMATSU
PHOTON IS OUR BUSINESS

Si photodiode with preamp



S9269 S9270

Photodiode and preamp integrated with feedback resistance and capacitance

S9269 and S9270 are low-noise photosensors consisting of a Si photodiode, op amp, and feedback resistance and capacitance, all integrated into same package with a surface size equal to our standard ceramic packages. These photosensors are ideal for a wide range of photometric applications including analytical equipment and measurement equipment. The active area of the photodiode is internally connected to the GND terminal making it highly resistant to EMC noise. Combinations with various photodiodes such as UV sensitivity enhanced type, IR sensitivity suppressed type and IR sensitivity enhanced type are also available. (Custom order products)

Features

- **Si photodiode for visible to near IR Si precision photometry**
- **Small package**
  S9269: 10.1 × 8.9 × 40 t mm
  S9270: 16.5 × 15.0 × 4.15 t mm
- **Active area**
  S9269: 5.8 × 5.8 mm
  S9270: 10 × 10 mm
- **FET input operational amplifier with low power dissipation**
- **Built-in Rf=1 GΩ, Cf=5 pF**
- **Low noise and NEP**

Applications

- **Precision photometry**
- **General-purpose optical measurement**

Absolute maximum ratings (Ta=25 °C)

Parameter	Symbol	Value	Unit
Supply voltage (op amp)	Vcc	±20	V
Power dissipation	P	500	mW
Operating temperature	Topr	-20 to +60	°C
Storage temperature	Tstg	-20 to +80	°C

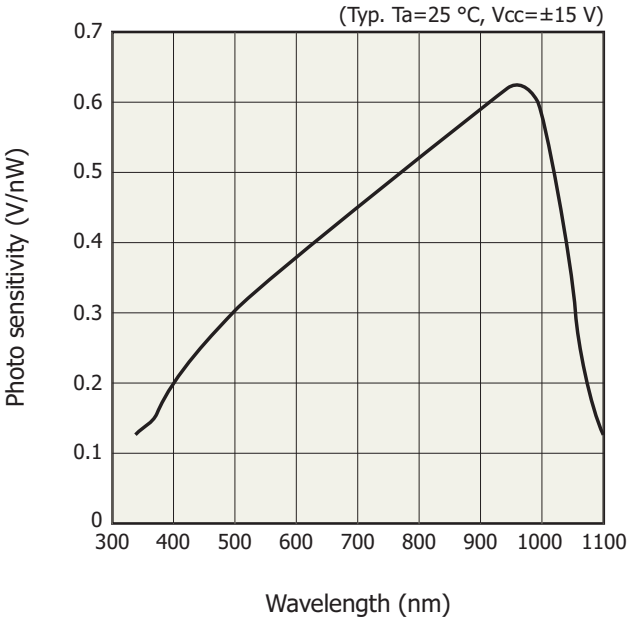
Note: Absolute maximum ratings are the values that must not be exceeded at any time. If even one of the absolute maximum ratings is exceeded even for a moment, the product quality may be impaired. Always be sure to use the product within the absolute maximum ratings.

Electrical and optical characteristics (Ta=25 °C, Vcc=±15 V, RL=1 MΩ)

Parameter	Symbol	Condition	S9269			S9270			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Spectral response range	λ		-	340 to 1100	-	-	340 to 1100	-	nm
Peak sensitivity wavelength	λp		-	960	-	-	960	-	nm
Feedback resistance (built-in) *	Rf		-	1	-	-	1	-	GΩ
Feedback capacitance (built-in) *	Cf		-	5	-	-	5	-	pF
Photo sensitivity	S	λ=λp	0.5	0.62	-	0.5	0.62	-	V/nW
Output noise voltage	Vn	Dark state, f=10 Hz	-	7.3	-	-	9.7	-	μVrms/Hz$^{1/2}$
		Dark state, f=20 Hz	-	6.5	-	-	9.1	-	
Noise equivalent power	NEP	λ=λp, f=10 Hz	-	12	-	-	16	-	fW/Hz$^{1/2}$
		λ=λp, f=20 Hz	-	12	-	-	17	-	
Output offset voltage	Vos	Dark state	-	±4	-	-	±4	-	mV
Cut-off frequency	fc	-3 dB	-	32	-	-	32	-	Hz
Output voltage swing	Vo	RL=10 kΩ	-	13	-	-	13	-	V
Supply current	Icc	Dark state	-	0.3	0.6	-	0.3	0.6	mA

* Custom devices available with different Rf, Cf, etc.

Spectral response



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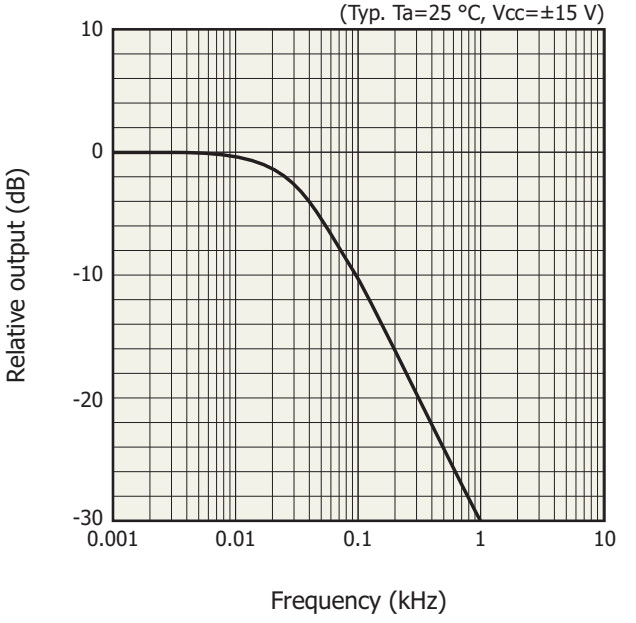
Frequency response



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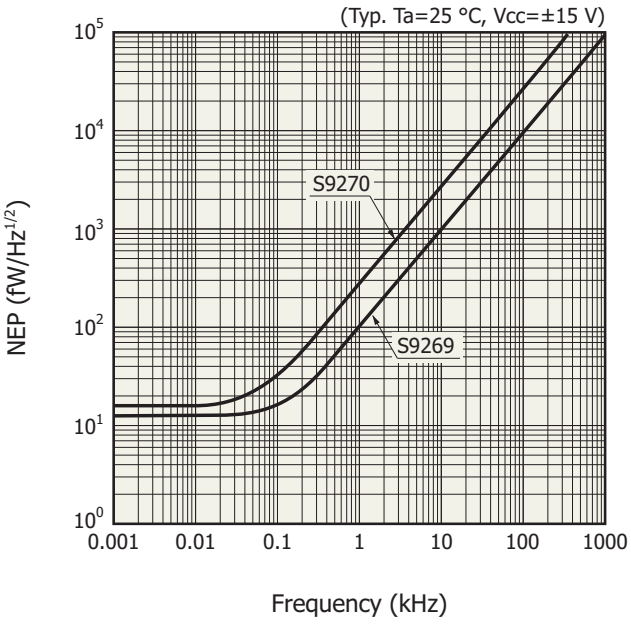
NEP vs. frequency



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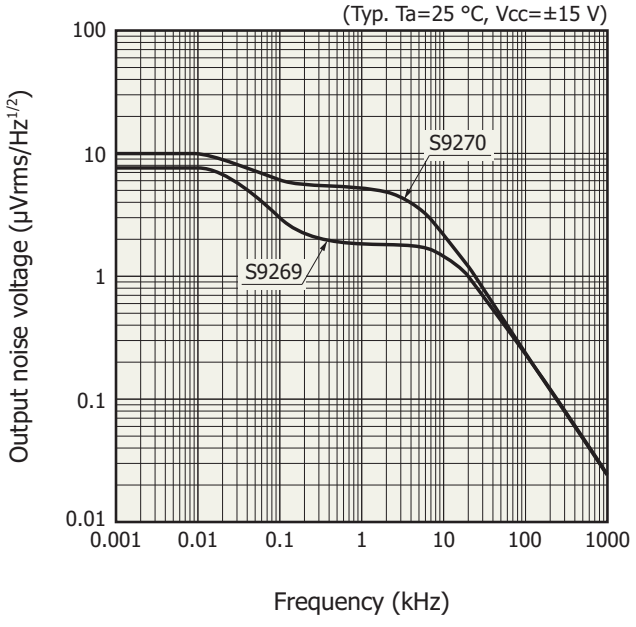
Output noise voltage vs. frequency



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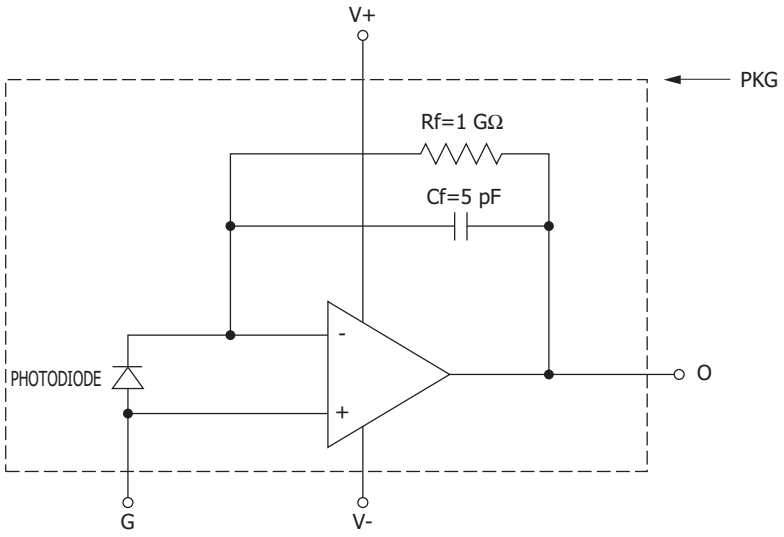
Application circuit example



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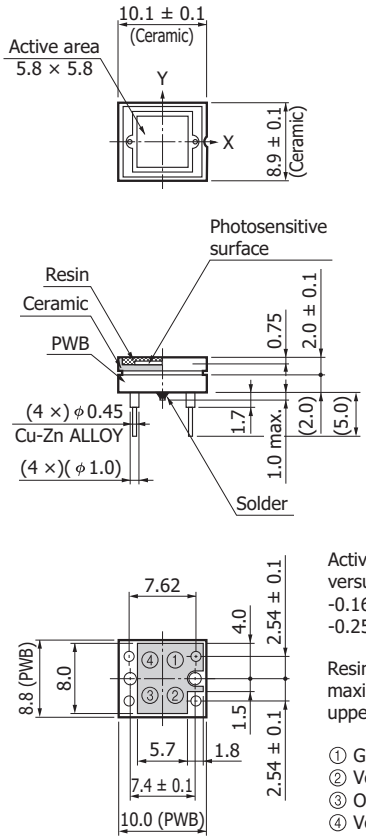
Dimensional outline (unit: mm, tolerance unless otherwise noted: ±0.2)

S9269



Active area position accuracy
versus package center
-0.165 ≤ X ≤ +0.335
-0.25 ≤ Y ≤ +0.25

Resin potting may extend a
maximum of 0.1 mm above the
upper surface of the package.

① GND
② Vcc-
③ OUT
④ Vcc+

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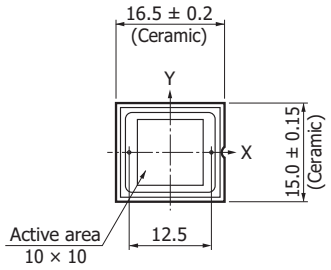
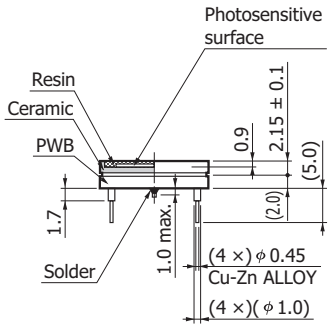
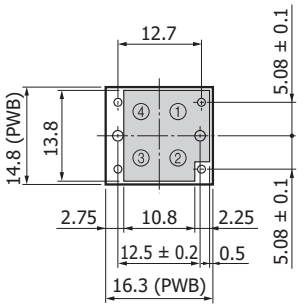
S9270







Active area position accuracy
versus package center
-0.3 ≤ X, Y ≤ +0.3

Resin potting may extend a
maximum of 0.1 mm above the
upper surface of the package.

① GND
② Vcc-
③ OUT
④ Vcc+

KSPDA0161EB

Precautions for use

● ESD

S9269, S9270 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^2 to 1 GΩ/cm^2.

● Wiring

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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