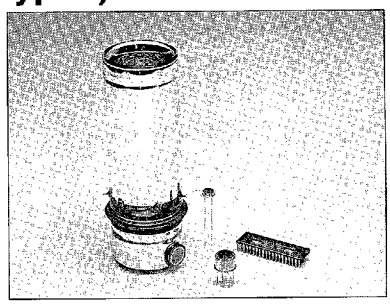
PbSe Photoconductive Cells

Capable of Detecting to 5 μm Range (TE-cooled Types)

PbSe cells operates on the same principle as in PbS cells, but can be used to detect longer wavelengths up to or over 5 μm. In particular, TE-cooled types ensure stable and reliable measurement over extended time periods.



High-speed Response

Operates at Room Temperature

Compared to other types of detectors used in the same wavelength range, PbSe cells have higher response speed and can also operate at room temperature, making them useful in a wide range of applications such as gas analyzers. (Cooled types are provided for higher precision photometry.)

Lower Temperature Detection Limit: Approx. 50℃

Noncooled Types

These devices operate at room temperature, making them easy to use in a variety of applications.

Multielement Types

Multielement types include 4-element and 16-element linear arrays as standard items.

Cooled Types

Thermoelectrically-cooled devices and glass dewar devices are available. Cooling a PbSe cells enhances the responsivity and improves the S/N ratio, thus cooled types are widely used in precision photometry for applications such as in analytical instruments.

● SPECIFICATIONS (Common)

Peak wavelength	3.8 μm (element temperature 25℃)
Cutoff Wavelength	4.8 μm (element temperature 25℃)
Window Material	Bandpass filter (P3207 series)
	Sapphire glass (other than P3207 series)
Thermistor Allowable Dissipation	0.2 mW
Peltier Element Allowable Current	1.5 A (one-stage TE-cooled types)
	1.0 A (two-stage TE-cooled types)
Maximum Supply Voltage	100 V
Operating Temperature	−30 to +50℃
Storage Temperature	−55 to +60℃

● ACCESSORIES (Optional)

Heatsink for one-stage TE-cooled types : A3179
Heatsink for two-stage TE-cooled types : A3179-01
Temperature controller for TE-cooled types : C1103-04
Preamplifier for PbS/PbSe cells : C3757-02
Housing for glass dewar devices : A3262-02
(Dewar devices are available potted in the housing upon request.)

(Typical data unless otherwise specified)

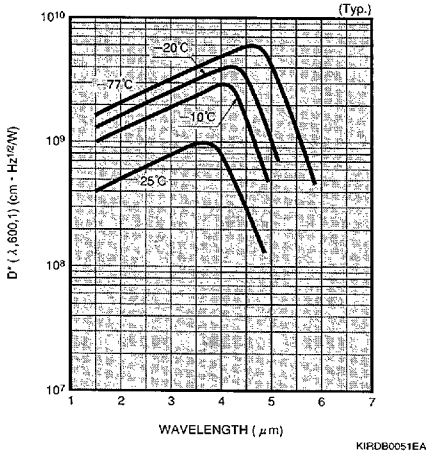
Type No.	Outline No. (P34–36)	Package	Active Area (mm)	Element Temperature (℃)	Photo Sensitivity S at λp Vs=15V (V/W)	Signal Ⓐ Min. (μV)	Signal Ⓐ Typ. (μV)	Noise Ⓑ N Typ. (μV)	Noise Ⓑ N Max. (μV)	D* (500, 600, 1) Min. (cm·Hz^1/2/W)	D* (500, 600, 1) Typ. (cm·Hz^1/2/W)	D* (λp, 600, 1) (cm·Hz^1/2/W)	Rise Time tr 0 to 63% (μS)	Dark Resistance Rd (MΩ)
Noncooled Types														
P791	⑯	2-pin TO-5	1×5	25	8×10^2	50	70	1.5	3	5×10^7	1×10^8	1×10^9	1 to 3	0.1 to 0.6
P791-01		2-pin TO-5	1×3	25	1×10^3	50	70	1.5	3	5×10^7	1×10^8	1×10^9	1 to 3	0.2 to 1
P791-02		2-pin TO-5	3×3	25	5×10^2	50	70	1.5	3	5×10^7	1×10^8	1×10^9	1 to 3	0.35 to 2
P791-03		2-pin TO-5	2×5	25	4×10^2	50	70	1.5	3	5×10^7	1×10^8	1×10^9	1 to 3	0.2 to 0.8
P791-11	⑳	3-pin TO-5	2×2	25	1×10^3	50	70	1.5	3	5×10^7	1×10^8	1×10^9	1 to 3	0.7 to 1.6
P3207-04	㉑	2-pin TO-5	1×2	25	5×10^2	—	—	1.5	3	—	—	—	1 to 3	0.3 to 1
Multielement Types														
P3211-16	⑲	40-pin DIP	1×1 (16 element)	25	3×10^3	40	50	2.2	4	5×10^7	1×10^8	1×10^9	1 to 3	0.5 to 1.8
P4115	㉒	Cooled TO-66	1×1 (4 element)	−10	6×10^3	80	100	2.5	5	1×10^8	3×10^8	3×10^9	2 to 5	1.5 to 7
One-stage Thermoelectrically-cooled Types														
P2038-01	❹	6-pin TO-8	1×3	−10	4×10^3	150	200	2	4	1×10^8	3×10^8	3×10^9	2 to 5	0.5 to 5
P2038-03		6-pin TO-8	3×3	−10	1×10^3	150	200	2	4	1×10^8	3×10^8	3×10^9	2 to 5	1.7 to 7
Two-stage Thermoelectrically-cooled Types														
P2680	❺	6-pin TO-8	1×3	−20	5×10^3	180	280	2	4	2×10^8	4×10^8	4×10^9	2 to 5	0.5 to 5
P2680-01		6-pin TO-8	3×3	−20	2×10^3	180	280	2	4	2×10^8	4×10^8	4×10^9	2 to 5	1.8 to 8
Glass Dewar Types														
P5169	⑭	Glass dewar	1×5	−77	5×10^3	400	500	2	4	4×10^8	7×10^8	6×10^9	40 to 100	0.1 to 10

Ⓐ Light source : 500 K blackbody
Chopping frequency : 600 Hz
Supply Voltage : 15 V
Load resistance : Nearly equal to the element dark resistance.
Incident energy : 16.7 μW/cm²

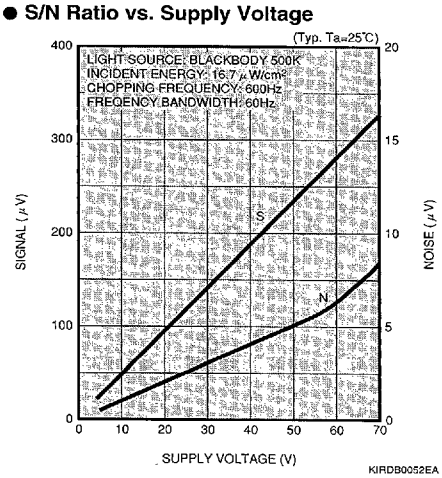
Ⓑ Chopping frequency : 600 Hz
Noise bandwidth : 60 Hz
Supply Voltage : 15 V
Load resistance : Nearly equal to the element dark resistance.

Spectral Response 1.5 to 5.8 μm

● Spectral Response

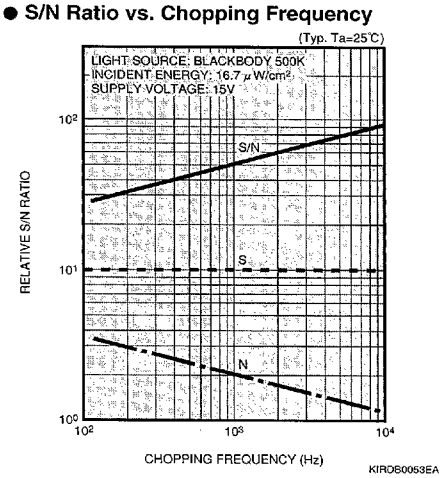


● S/N Ratio vs. Supply Voltage



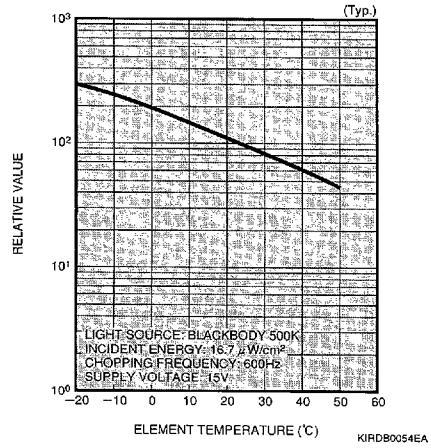
If a voltage higher than 60V is applied, the noise increases exponentially, degrading the S/N ratio. The device should be operated at 60V or less.

● S/N Ratio vs. Chopping Frequency



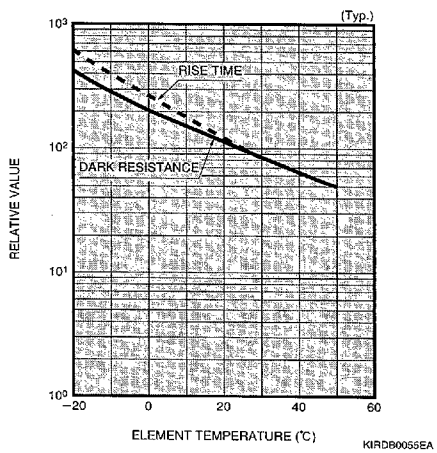
Increasing the chopping frequency reduces the 1/f noise and results in an improved S/N ratio. The S/N ratio can also be improved by narrowing the noise bandwidth using a lock-in amplifier.

● Responsivity vs. Temperature

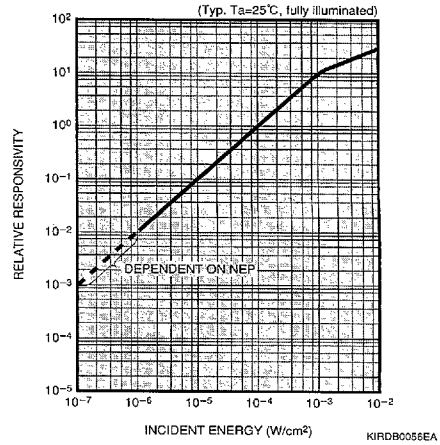


Cooling the device enhances its responsivity. But the responsivity also depends on the load resistance in the circuit.

● Dark Resistance, Rise Time vs. Temperature



● Linearity



When the incident light spot is smaller than the active area, the upper limit of the linearity becomes lower.

● Spectral Response (P3207-04)