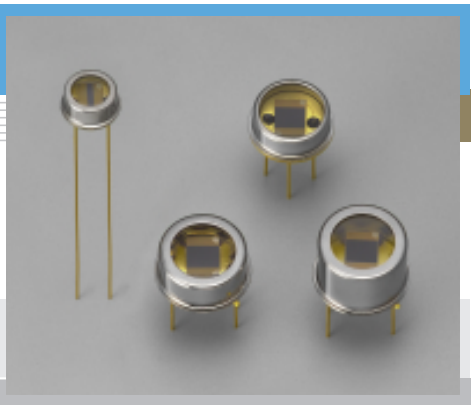
PbS photoconductive detector
P394 series, P2532-01, P2682-01

Infrared detectors utilizing photoconductive effects



Features

- Room temperature operation
  Makes PbS cells useful in a wide range of applications including radiation thermometers and flame monitors
- High sensitivity
- Large active area
- Low price
- Lower temperature detection limit: 100 ˚C
- Thermoelectrically cooled types available
  Cooling a PbS cell increases sensitivity and improves S/N, so cooled types are widely used in precision photometry such as in analytical instruments.

Applications

- Radiation thermometers
- Flame monitors
- Water content analyzers
- Food ingredient analysis
- Spectrophotometers

Accessories (Optional)

Heatsink for one-stage TE-cooled type	A3179
Heatsink for two-stage TE-cooled type	A3179-01
Temperature controller for TE-cooled type	C1103-04
Preamplifier for PbS/PbSe photoconductive detector	C3757-02
Power supply for amplifier	C3871
Infrared detector module with preamp Cooled type	P4638

■ Specification / Absolute maximum ratings

Type No.	Dimensional outline/ Window material *1	Package	Cooling	Active area (mm)	Thermistor resistance (kΩ)	Absolute maximum ratings				
						Thermistor power dissipation (mW)	TE-cooler current dissipation (A)	Supply voltage (V)	Operating temperature Topr (°C)	Storage temperature Tstg (°C)
P394	①/K	TO-5	Non-cooled	1 × 5	-	-	-	100	-30 to +50	-55 to +50
P394-22	②/K	TO-8	Non-cooled	4 × 5			-			
P2532-01	③/S		One-stage TE-cooled		9	0.2	1.5			
P2682-01	④/S		Two-stage TE-cooled				1.0			

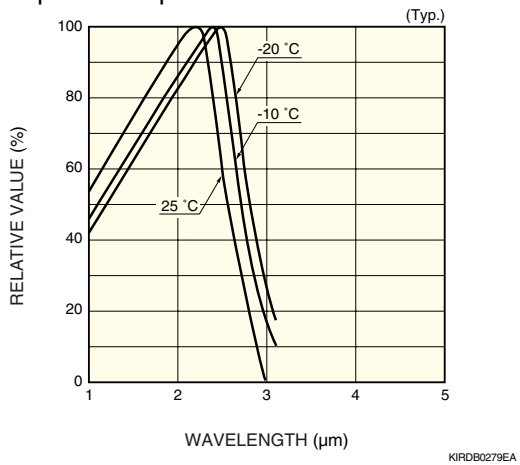
■ Electrical and optical characteristics (Typ. unless otherwise noted)

Type No.	Measurement condition Element temperature (°C)	Peak sensitivity wavelength λp (μm)	Cut-off wavelength λc (μm)	Photo sensitivity *2 S λ=λp Vs=15 V		D* (500, 600, 1)		D* (λp, 600, 1) (cm·Hz$^{1/2}$/W)	Rise time tr 0 to 63 % Max. (μs)	Dark resistance Rd (MΩ)
				Min. (V/W)	Typ. (V/W)	Min. (cm·Hz$^{1/2}$/W)	Typ. (cm·Hz$^{1/2}$/W)			
P394	25	2.2	2.9	4×10^4	1.3×10^5	5×10^8	1×10^9	1×10^{11}	200	0.1 to 1
P394-22				1.2×10^4	3×10^4	2×10^8	5×10^8	5×10^{10}		0.2 to 2
P2532-01	-10	2.4	3.1	3×10^4	8×10^4	5×10^8	1×10^9	1×10^{11}	600	0.5 to 10
P2682-01	-20	2.5	3.2	6×10^4	1.6×10^5	8×10^8	2×10^9	2×10^{11}		0.8 to 10

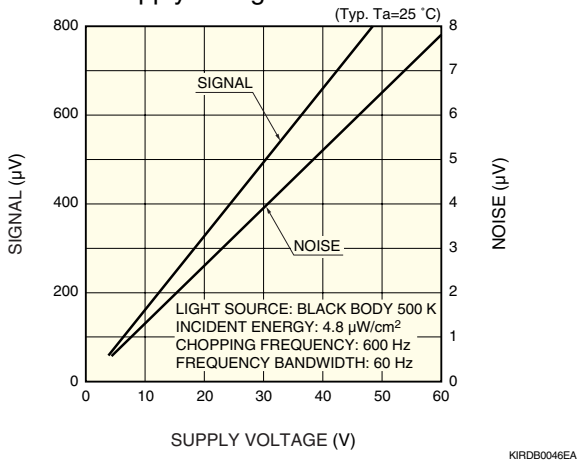
*1: Window material K: borosilicate glass, S: sapphire glass
*2: Chopping frequency: 600 Hz, load resistance: nearly equal to detector element dark resistance

SOLID STATE DIVISION

■ Spectral response

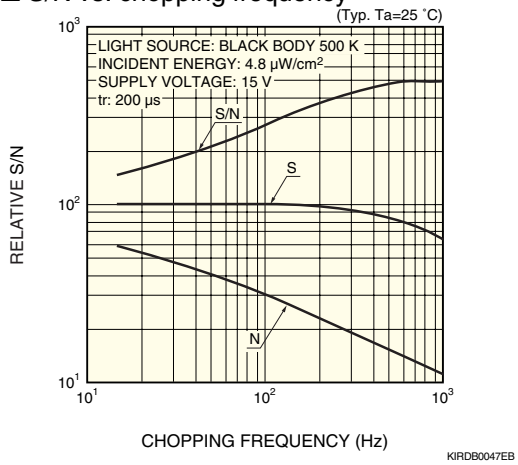


■ S/N vs. supply voltage



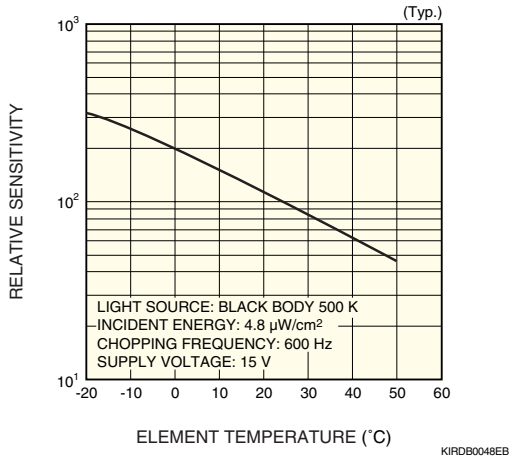
If voltage of higher than 60 V is applied, the noise increases exponentially, degrading the S/N. The device should be operated at 60 V or less.

■ S/N vs. chopping frequency



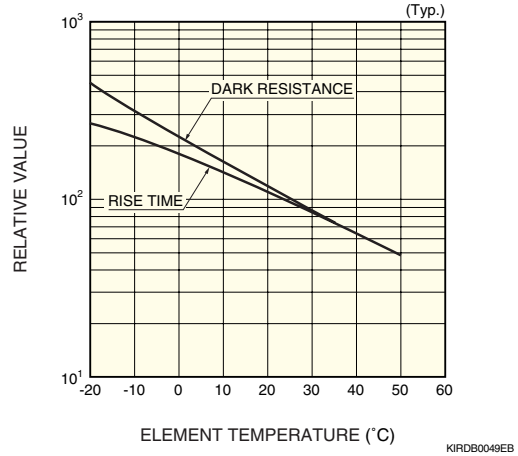
Increasing the chopping frequency reduces the 1/f noise and results in an S/N improvement. The S/N can also be improved by narrowing the noise bandwidth using a lock-in amplifier.

■ Photo sensitivity temperature characteristic

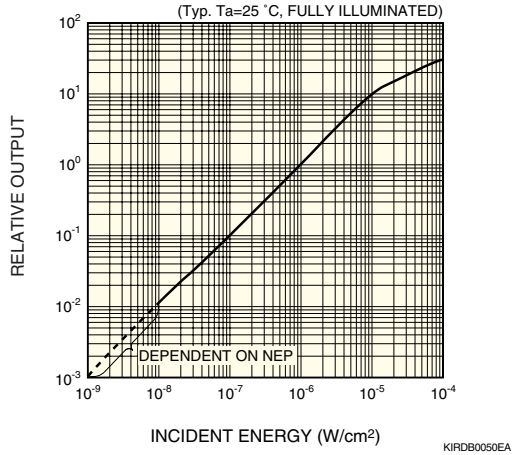


Cooling the device enhances its sensitivity, but the sensitivity also depends on the load resistance in the circuit.

■ Dark resistance, rise time temperature characteristics

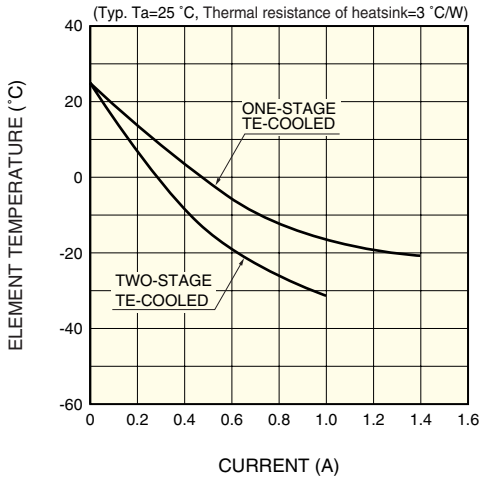


■ Photo sensitivity linearity



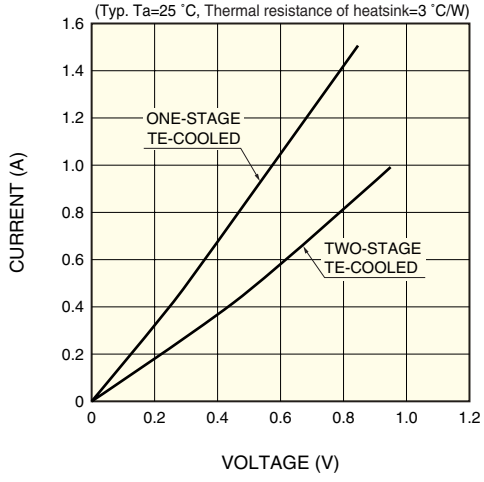
By making the incident light spot smaller than the active area, the upper limit of the linearity becomes lower.

■ Cooling characteristics of TE-cooler



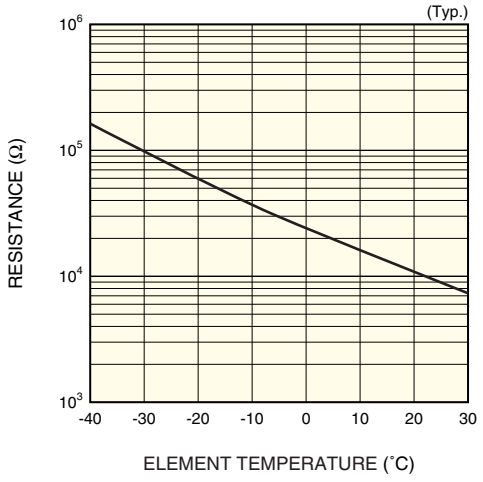
KIRDB0171EA

■ Current vs. voltage characteristics of TE-cooler



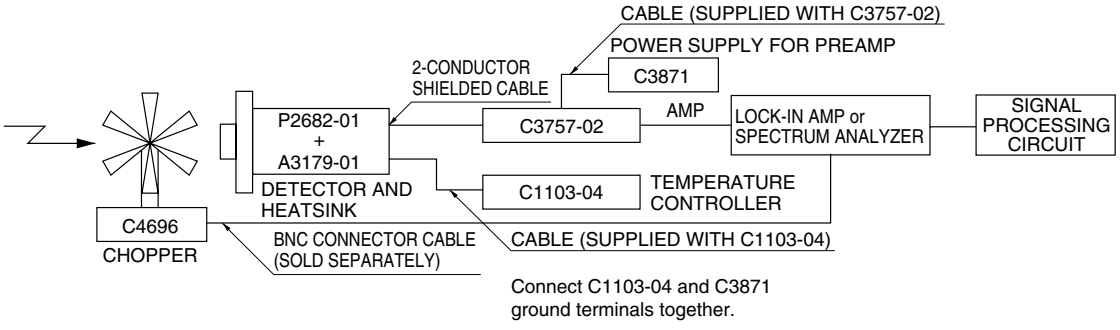
KIRDB0115EB

■ Thermistor temperature characteristic



KIRDB0116EA

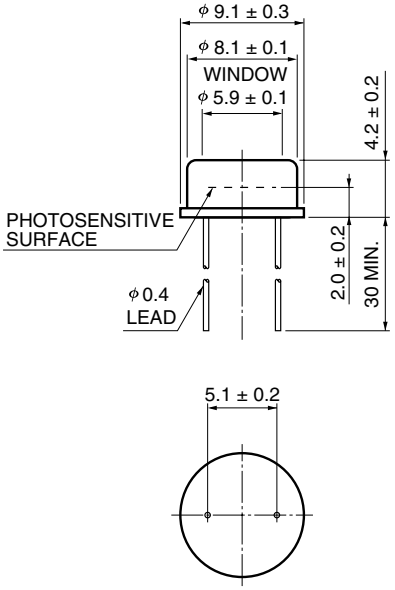
■ Connection example (P2682-01)



KIRDC0003EA

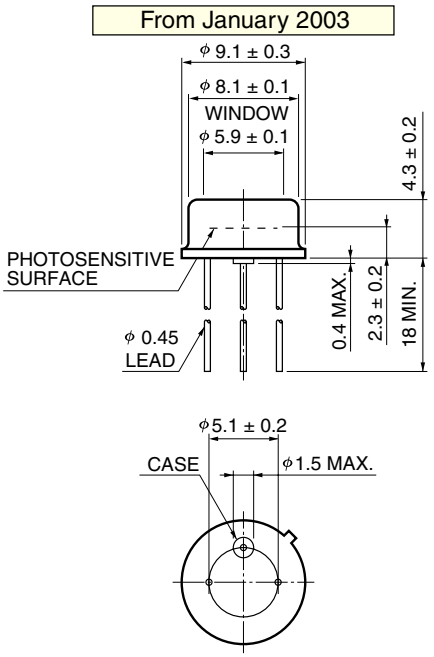
■ Dimensional outlines (unit: mm)

① P394



KIRDA0055EB

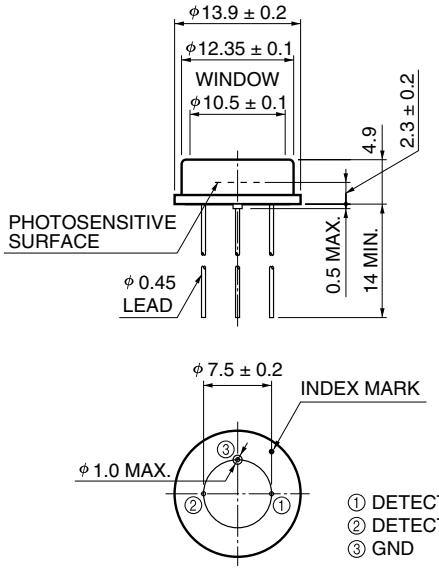
From January 2003



KIRDA0166EA

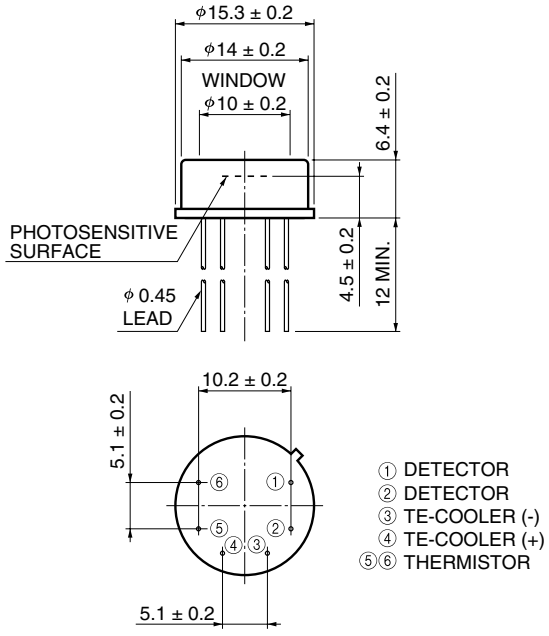
Note) Package dimension will be changed as shown at right from January 2003.

② P394-22



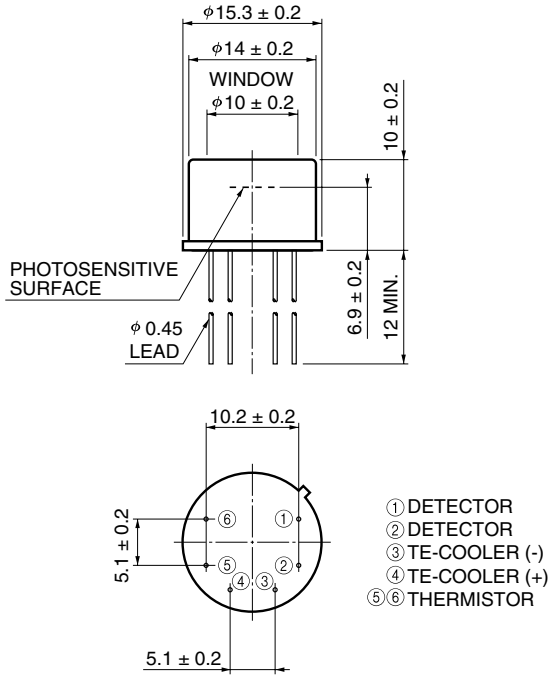
KIRDA0115EA

③ P2532-01



KIRDA0116EA

④ P2682-01



KIRDA0117EA

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 Tewin Road, Welwyn Garden City, Hertfordshire AL7 1BW, United Kingdom, Telephone: (44) 1707-294888, Fax: (44) 1707-325777
North Europe: Hamamatsu Photonics Norden AB: Smidesvägen 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

Cat. No. KIRD1019E05
Mar. 2003 DN