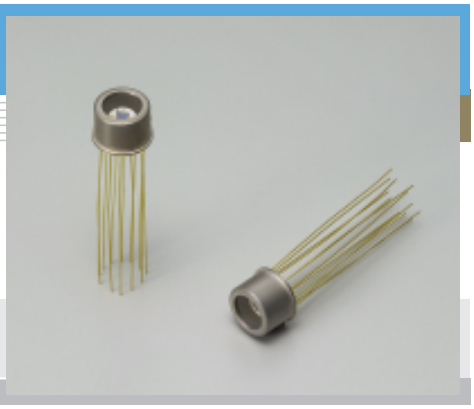
Two-color detector
K3413-05/-08/-09

Wide spectral response range from UV to IR



K3413-05/-08/-09 are hybrid detectors containing an infrared-transmitting Si photodiode mounted over an InGaAs PIN photodiode, along the same optical axis. This structure delivers a wide spectral response range from 0.25 µm to nearly 1.7 µm. The built-in thermoelectric cooler maintains a constant temperature during operation, allowing precision measurement with an improved S/N ratio.

Features

- Wide spectral response range
- Allows same optical path design
- One-stage thermoelectrically cooled type

Applications

- Spectrophotometers
- Laser monitors
- Flame monitors
- Radiation thermometers

■ General ratings / Absolute maximum ratings

Type No.	Package	Cooling	Detector element	Active area (mm)	Absolute maximum ratings: Thermistor allowable dissipation (mW)	TE-cooler allowable current (A)	Reverse voltage V_R (V)	Operating temperature Topr (°C)	Storage temperature Tstg (°C)
K3413-05	TO-8	One-stage TE-cooled	Si	2.4 × 2.4	0.2	1.5	5	-40 to +70	-55 to +85
			InGaAs	φ0.5			20		
K3413-08			Si	2.4 × 2.4			5		
			InGaAs	φ1			2		
K3413-09			Si	2.4 × 2.4			5		
			InGaAs	φ1			10		

■ Electrical and optical characteristics (Typ. Ta=25 °C, unless otherwise noted)

Type No.	Detector element	Measurement condition: Element temperature T (°C)	Peak sensitivity wavelength λp (µm)	Photo sensitivity S λ=λp (A/W)	Dark current I_D V_R=10 mV: Typ. (nA)	Dark current I_D V_R=10 mV: Max. (nA)	Shunt Resistance Rsh (MΩ)	D* λ=λp (cm · $Hz^{1/2}$/W)	Rise time tr V_R=0 V R_L=1 kΩ 10 to 90 % (ns)	Terminal capacitance Ct V_R=5 V f=1 MHz (pF)
K3413-05	Si	25	0.94	0.45	50 (pA)	100 (pA)	200	1.4×10^{13}	200 *3	60 *5
	InGaAs	-10	1.55	0.55	0.05 *1	0.25 *1	3000	1.2×10^{13}	1.5 *4	12
K3413-08	Si	25	0.94	0.45	50 (pA)	100 (pA)	200	1.4×10^{13}	200 *3	60 *5
	InGaAs	-10	2.30	0.60	1.5 (µA) *2	7.5 (µA) *2	0.03	7.4×10^{10}	23 *4	200 *2
K3413-09	Si	25	0.94	0.45	50 (pA)	100 (pA)	200	1.4×10^{13}	200 *3	60 *5
	InGaAs	-10	1.55	0.55	0.07 *2	0.35 *2	1500	1.2×10^{13}	7 *4	90

*1: V_R=5 V
*2: V_R=1 V
*3: λ=655 nm
*4: V_R=5 V, R_L=50 Ω
*5: V_R=0 V, f=10 kHz

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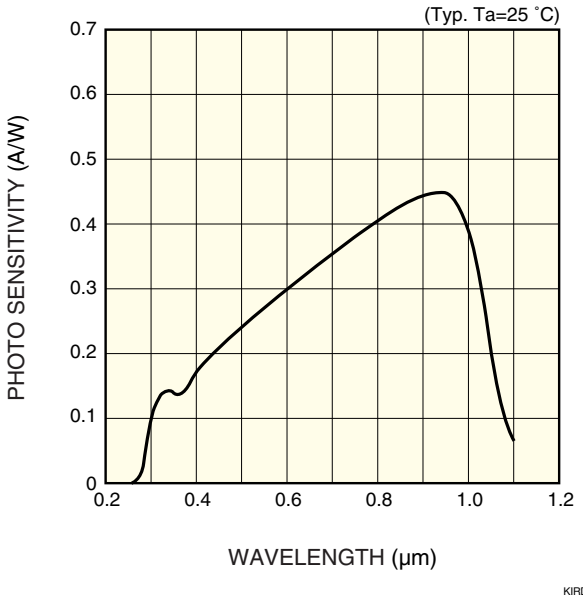
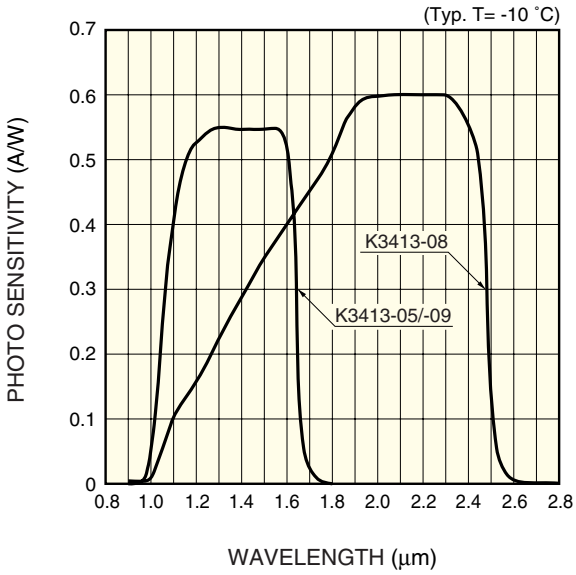
■ Spectral response

Si photodiode



KIRDB0199EA

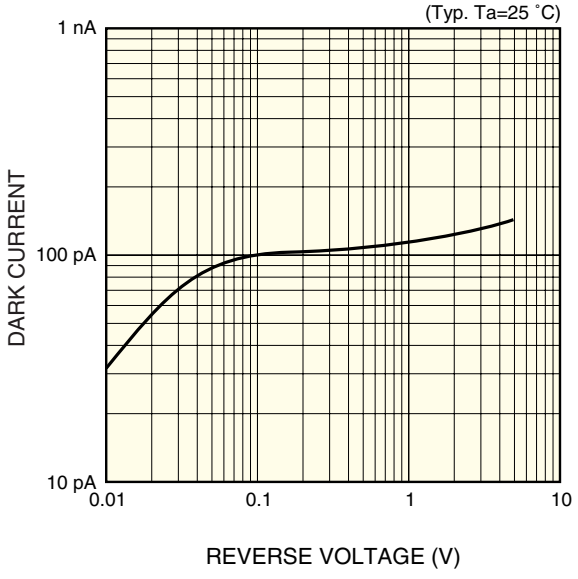
InGaAs PIN photodiode



KIRDB0212EA

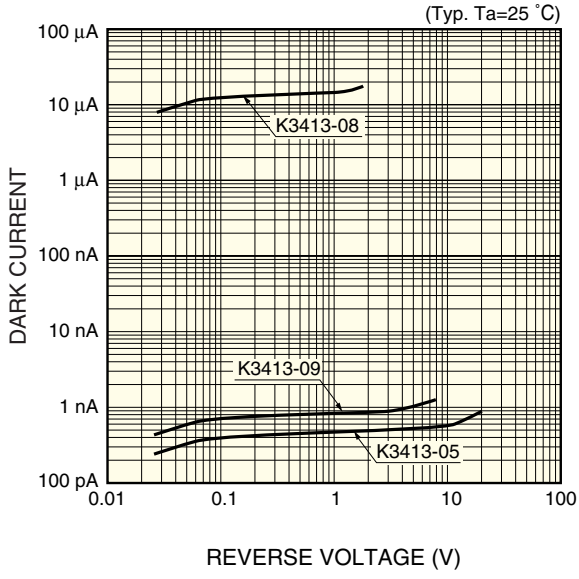
■ Dark current vs. reverse voltage

Si photodiode



KIRDB0200EA

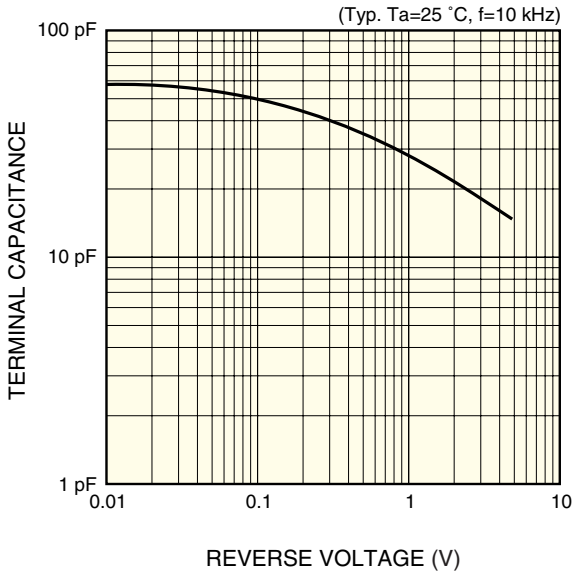
InGaAs PIN photodiode



KIRDB0213EA

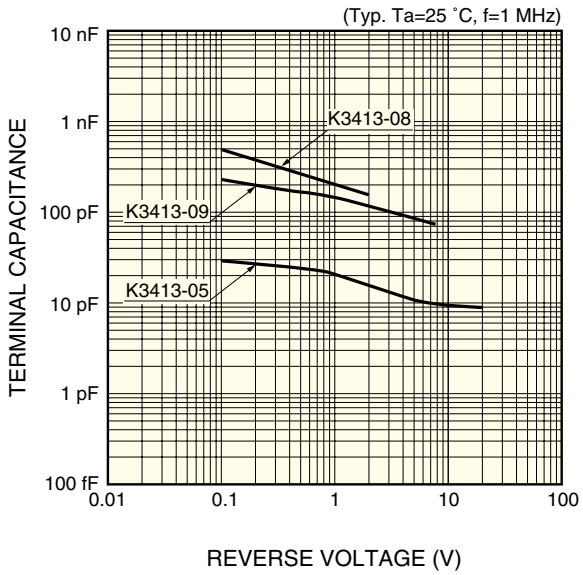
■ Terminal capacitance vs. reverse voltage

Si photodiode



KIRDB0202EA

InGaAs PIN photodiode



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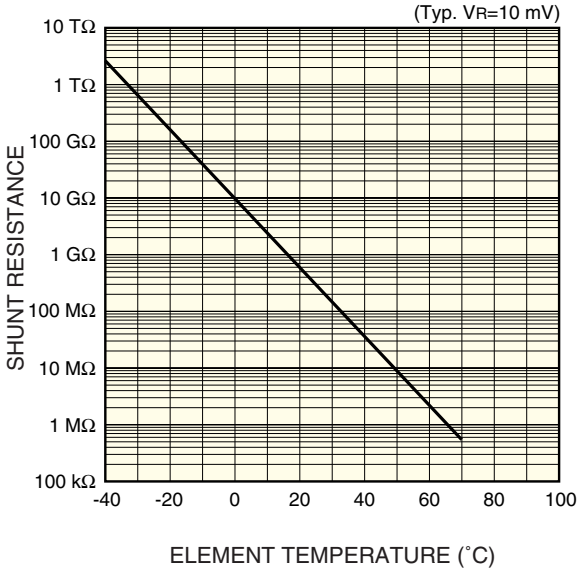
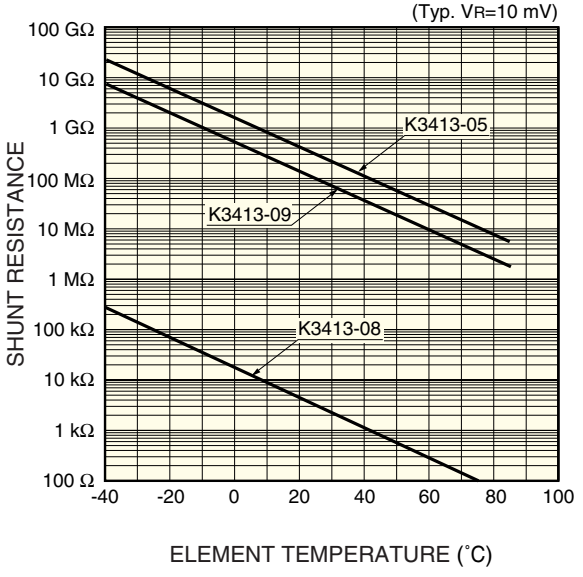
■ Shunt resistance vs. element temperature

Si photodiode



KIRDB0204EA

InGaAs PIN photodiode



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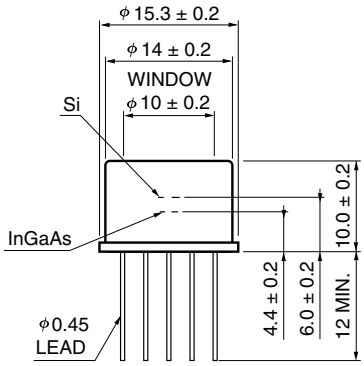
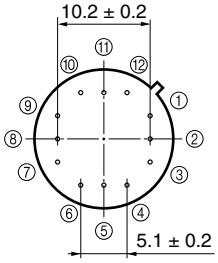
■ Dimensional outline (unit: mm)





① InGaAs (ANODE)
③ InGaAs (CATHODE)
④ TE-COOLER (-)
⑥ TE-COOLER (+)
⑦⑨ THERMISTOR
⑩ Si (CATHODE)
⑫ Si (ANODE)

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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

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