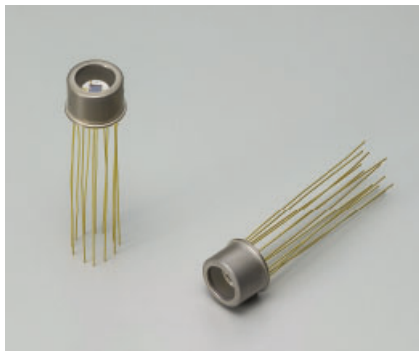


Two-color detectors



K3413-05/-08/-09

Sensors with a wide spectral response range from UV to IR

The 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
- ➔ Si photodiode and InGaAs PIN photodiode are arranged along the same optical axis
- ➔ 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 T_{opr} ($^{\circ}\text{C}$)	Storage temperature T_{stg} ($^{\circ}\text{C}$)
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	$\phi 0.5$			20		
K3413-08			Si	2.4×2.4			5		
			InGaAs	$\phi 1$			2		
K3413-09			Si	2.4×2.4			5		
			InGaAs	$\phi 1$			10		

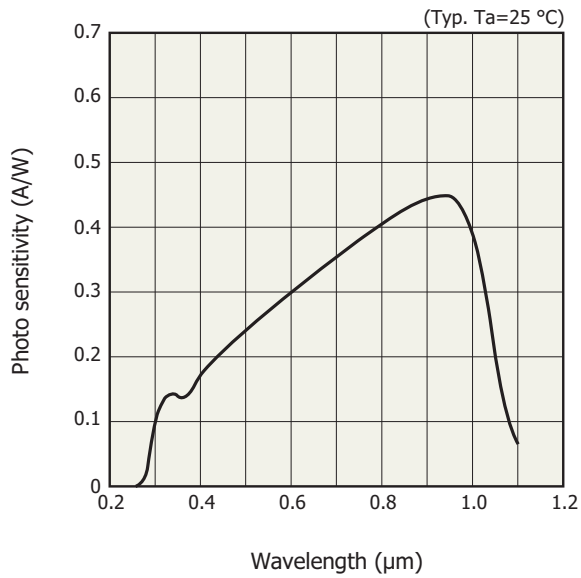
Electrical and optical characteristics (Typ. $T_a = 25^{\circ}\text{C}$, unless otherwise noted)

Type No.	Detector element	Measurement condition	Spectral response range (μm)	Peak sensitivity wavelength λ_p (μm)	Photo sensitivity $S_{\lambda=\lambda_p}$ (A/W)	Dark current I_D ($V_R = 10 \text{ mV}$)		Shunt Resistance R_{sh} (M Ω)	D^* $\lambda = \lambda_p$ (cm \cdot Hz $^{1/2}$ /W)	Rise time t_r ($V_R = 0 \text{ V}$, $R_L = 1 \text{ k}\Omega$, 10 to 90 %) (ns)	Terminal capacitance C_t ($V_R = 5 \text{ V}$, $f = 1 \text{ MHz}$) (pF)
		Element temperature T ($^{\circ}\text{C}$)				Typ. (pA)	Max. (pA)				
		K3413-05				Si	25				
	InGaAs	-10	1.67	1.55	0.55	50 ^{*1}	250 ^{*1}	3000	1.2×10^{13}	1.5 ^{*4}	12
K3413-08	Si	25	0.32 to 2.57	0.94	0.45	50	100	200	1.4×10^{13}	200 ^{*3}	60 ^{*5}
	InGaAs	-10	2.57	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	0.32 to 1.67	0.94	0.45	50	100	200	1.4×10^{13}	200 ^{*3}	60 ^{*5}
	InGaAs	-10	1.67	1.55	0.55	70 ^{*2}	350 ^{*2}	1500	1.2×10^{13}	7 ^{*4}	90

*1: $V_R = 5 \text{ V}$
 *2: $V_R = 1 \text{ V}$
 *3: $\lambda = 655 \text{ nm}$
 *4: $V_R = 5 \text{ V}$, $R_L = 50 \Omega$
 *5: $V_R = 0 \text{ V}$, $f = 10 \text{ kHz}$

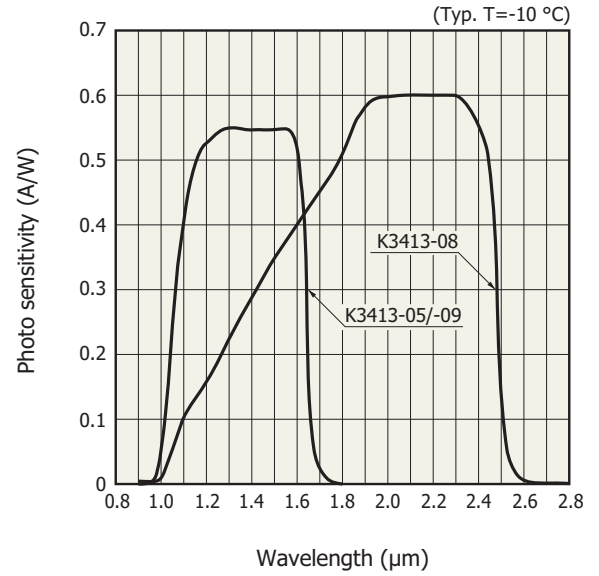
Spectral response

Si photodiode



KIRDB0199EA

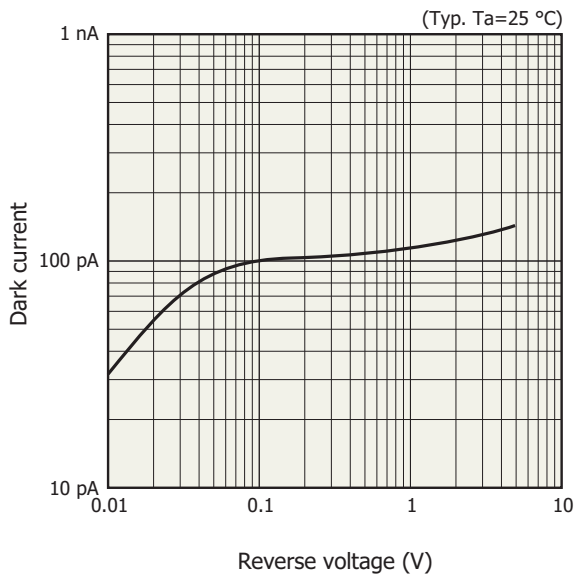
InGaAs PIN photodiode



KIRDB0212EA

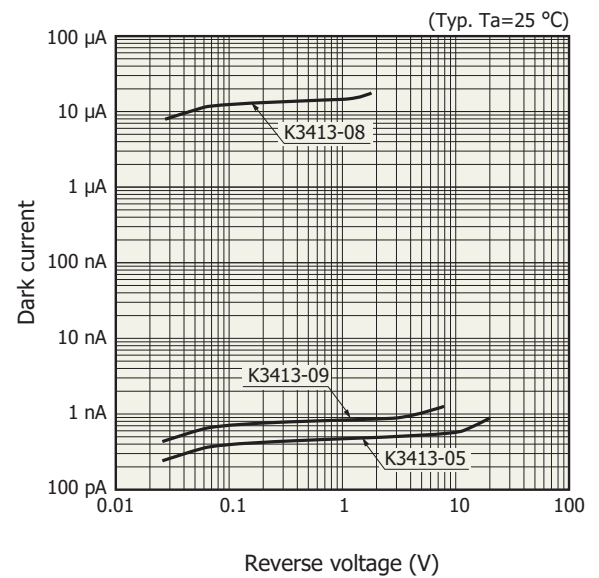
Dark current vs. reverse voltage

Si photodiode



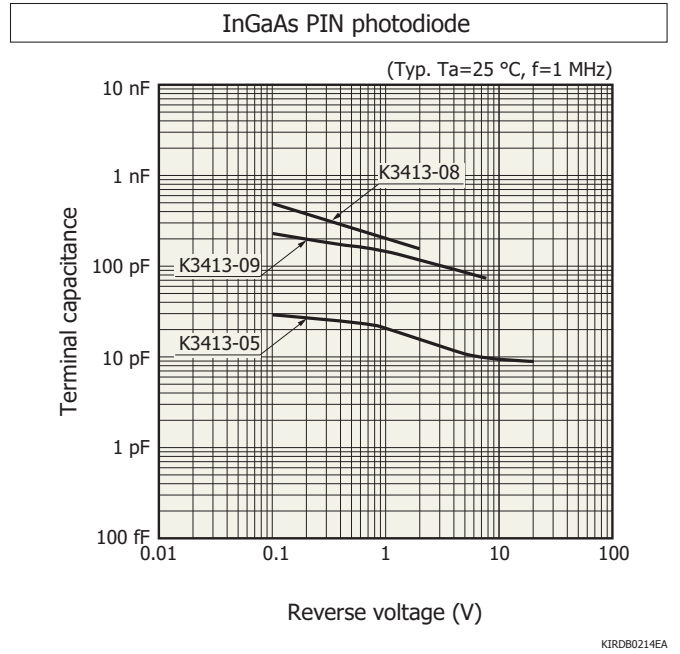
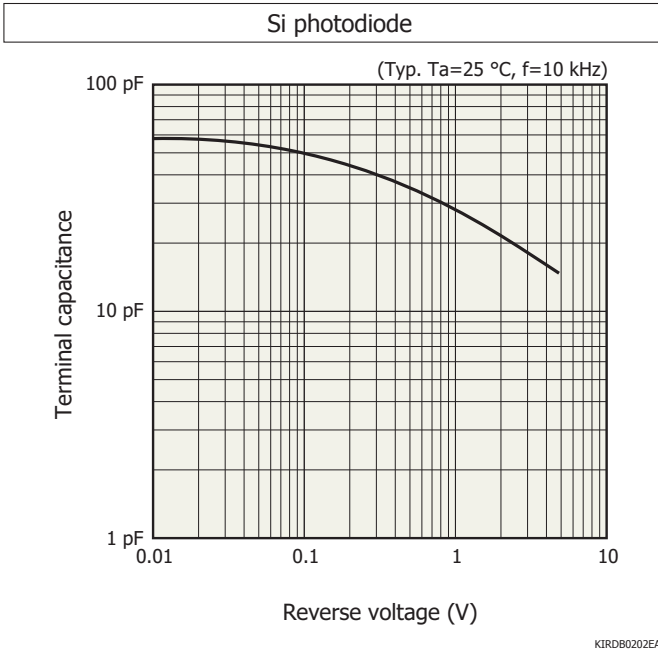
KIRDB0200EA

InGaAs PIN photodiode

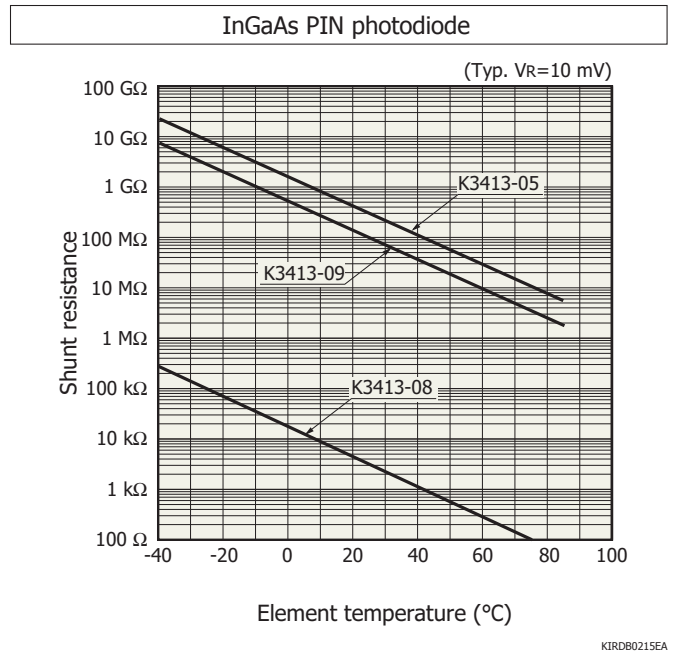
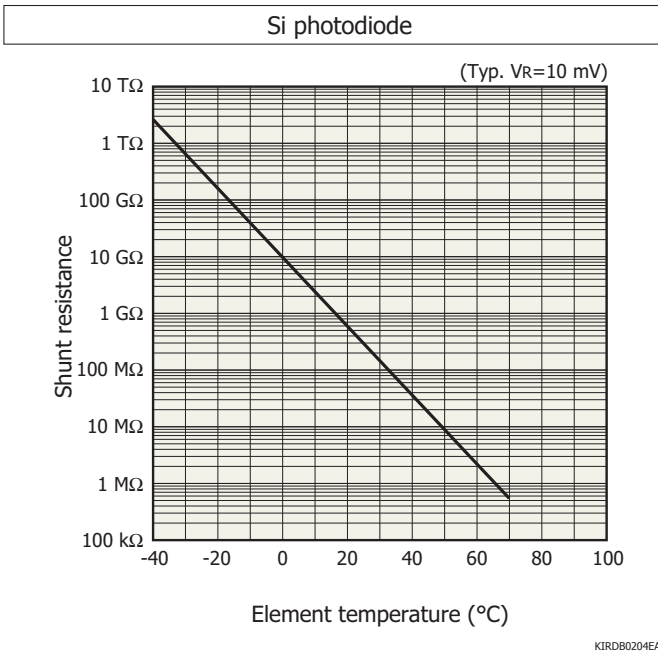


KIRDB0213EA

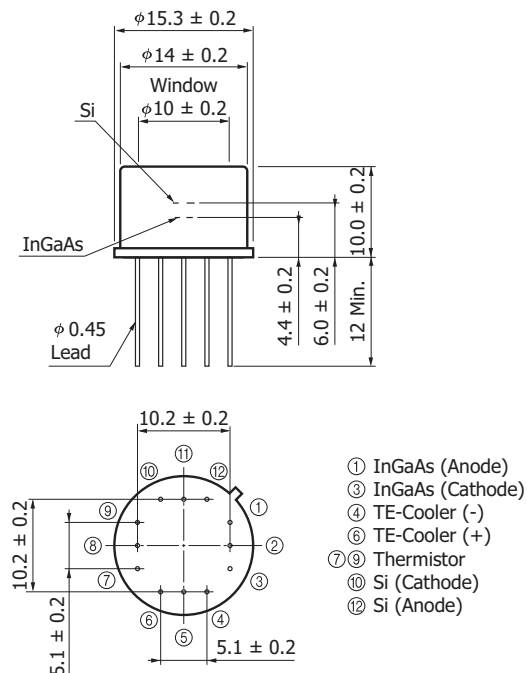
Terminal capacitance vs. reverse voltage



Shunt resistance vs. element temperature



Dimensional outline (unit: mm)



KIRDA0156EE

Information furnished by HAMAMATSU is believed to be reliable. However, no responsibility is assumed for possible inaccuracies or omissions. Specifications are subject to change without notice. No patent rights are granted to any of the circuits described herein. ©2008 Hamamatsu Photonics K.K.

HAMAMATSU

www.hamamatsu.com

HAMAMATSU PHOTONICS K.K., Solid State Division

1126-1 Ichino-cho, Higashi-ku, Hamamatsu City, 435-8558 Japan, Telephone: (81) 53-434-3311, Fax: (81) 53-434-5184

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.: 19, 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