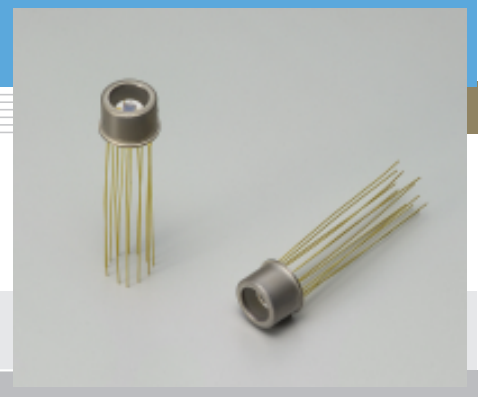


# Two-color detector K3413-05/-08/-09

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  $\mu\text{m}$  to nearly 1.7  $\mu\text{m}$ . 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 $T_{opr}$ ( $^{\circ}\text{C}$ )	Storage temperature $T_{stg}$ ( $^{\circ}\text{C}$ )
K3413-05	TO-8	One-stage TE-cooled	Si	$2.4 \times 2.4$	0.2	1.5	5	-40 to +70	-55 to +85
			InGaAs	$\phi 0.5$			20		
K3413-08			Si	$2.4 \times 2.4$			5		
			InGaAs	$\phi 1$			2		
K3413-09			Si	$2.4 \times 2.4$			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 Element temperature T ( $^{\circ}\text{C}$ )	Peak sensitivity wavelength $\lambda_p$ ( $\mu\text{m}$ )	Photo sensitivity S $\lambda=\lambda_p$ (A/W)	Dark current $I_D$ $V_R=10\text{ mV}$		Shunt Resistance $R_{sh}$ (M $\Omega$ )	$D^*$ $\lambda=\lambda_p$ (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)
					Typ. (nA)	Max. (nA)				
K3413-05	Si	25	0.94	0.45	50 (pA)	100 (pA)	200	$1.4 \times 10^{13}$	200 *3	60 *5
	InGaAs	-10	1.55	0.55	0.05 *1	0.25 *1	3000	$1.2 \times 10^{13}$	1.5 *4	12
K3413-08	Si	25	0.94	0.45	50 (pA)	100 (pA)	200	$1.4 \times 10^{13}$	200 *3	60 *5
	InGaAs	-10	2.30	0.60	1.5 ( $\mu\text{A}$ ) *2	7.5 ( $\mu\text{A}$ ) *2	0.03	$7.4 \times 10^{10}$	23 *4	200 *2
K3413-09	Si	25	0.94	0.45	50 (pA)	100 (pA)	200	$1.4 \times 10^{13}$	200 *3	60 *5
	InGaAs	-10	1.55	0.55	0.07 *2	0.35 *2	1500	$1.2 \times 10^{13}$	7 *4	90

\*1:  $V_R=5\text{ V}$

\*2:  $V_R=1\text{ V}$

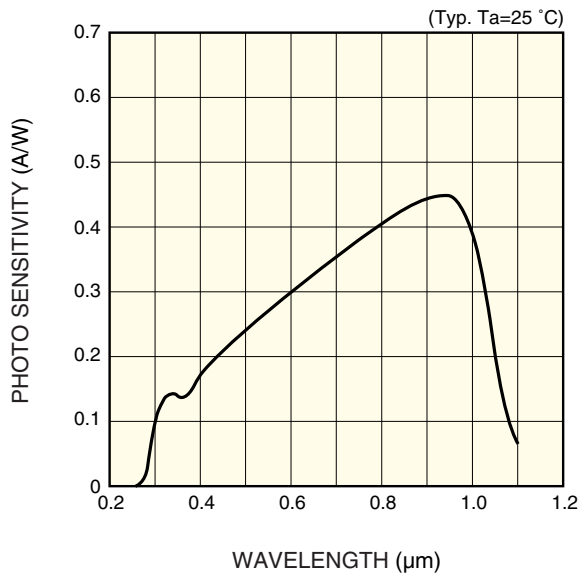
\*3:  $\lambda=655\text{ nm}$

\*4:  $V_R=5\text{ V}$ ,  $R_L=50\ \Omega$

\*5:  $V_R=0\text{ V}$ ,  $f=10\text{ kHz}$

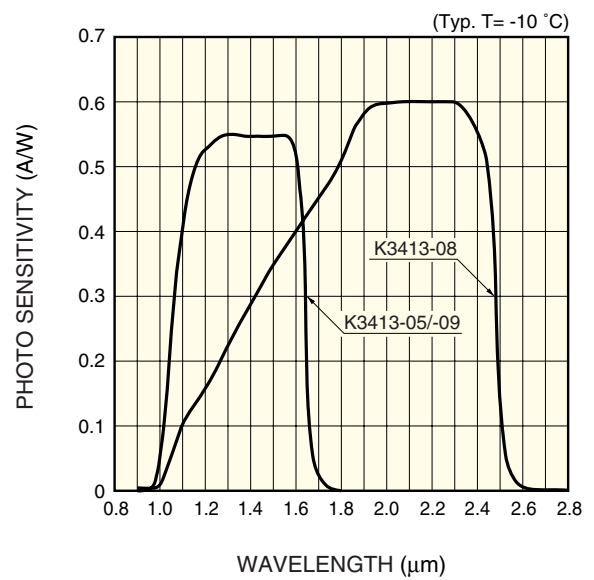
■ Spectral response

Si photodiode



KIRDB0199EA

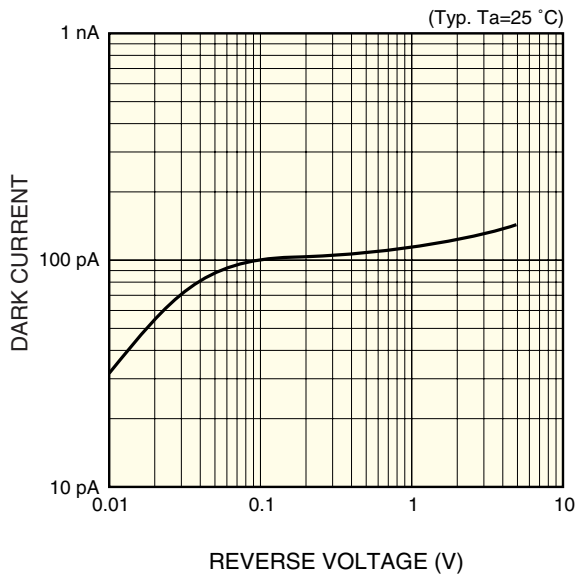
InGaAs PIN photodiode



KIRDB0212EA

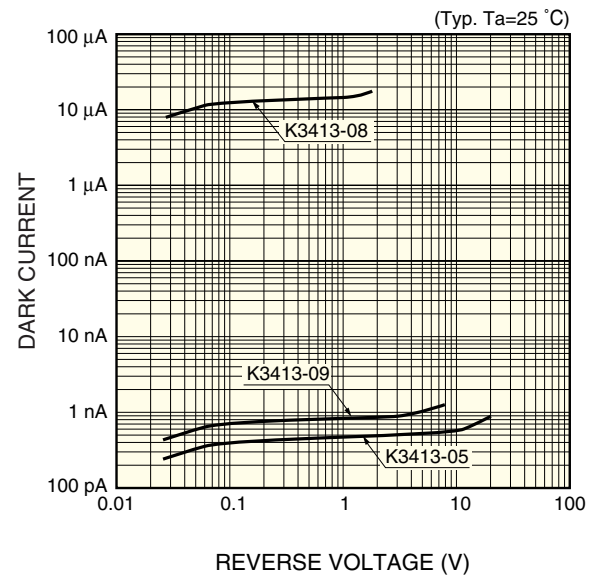
■ Dark current vs. reverse voltage

Si photodiode



KIRDB0200EA

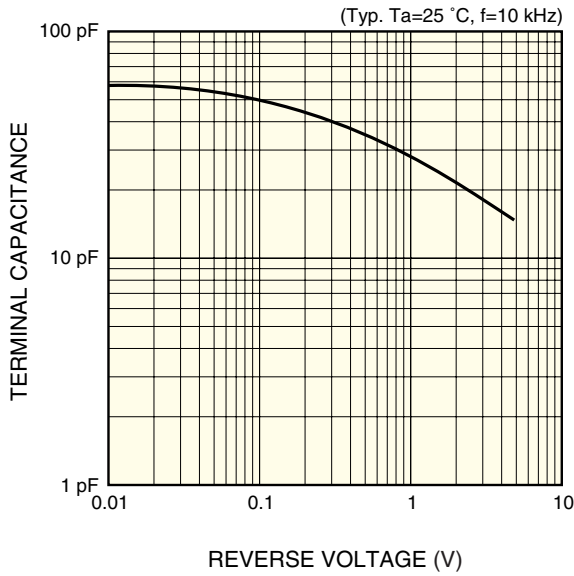
InGaAs PIN photodiode



KIRDB0213EA

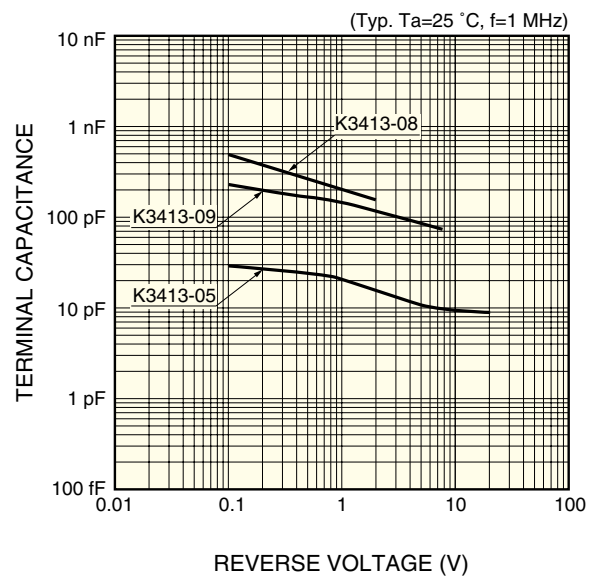
■ Terminal capacitance vs. reverse voltage

Si photodiode



KIRDB0202EA

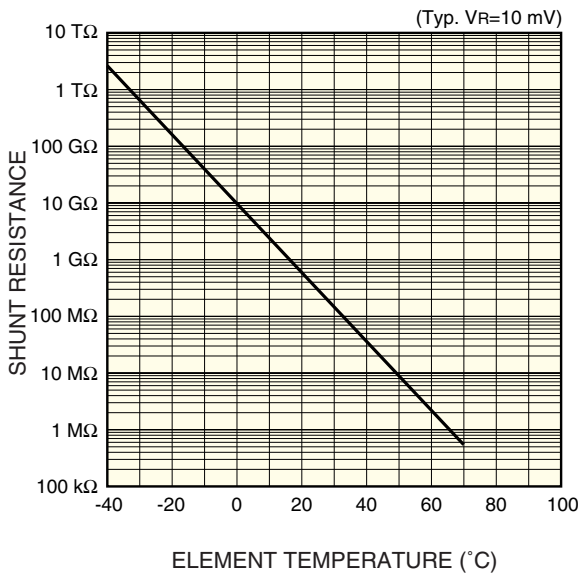
InGaAs PIN photodiode



KIRDB0214EA

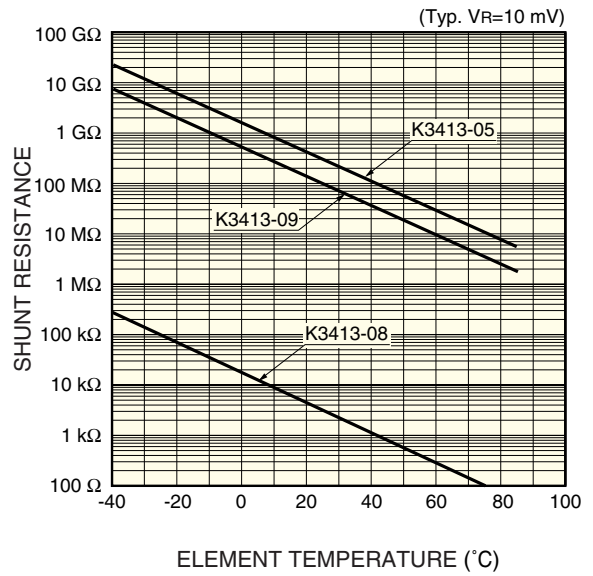
■ Shunt resistance vs. element temperature

Si photodiode



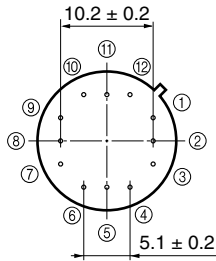
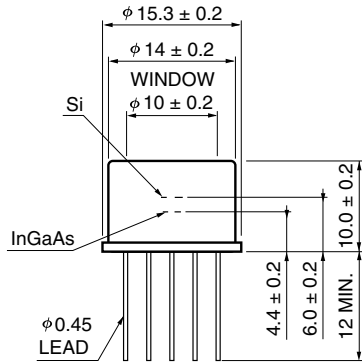
KIRDB0204EA

InGaAs PIN photodiode



KIRDB0215EA

■ Dimensional outline (unit: mm)



- ① InGaAs (ANODE)
- ② InGaAs (CATHODE)
- ③ TE-COOLER (-)
- ④ TE-COOLER (+)
- ⑤ THERMISTOR
- ⑥ Si (CATHODE)
- ⑦ Si (ANODE)

KIRDA0156ED

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