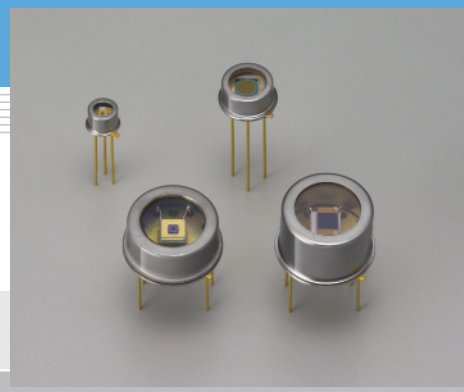


# InGaAs PIN photodiode G8421/G8371/G5851 series

Long wavelength type



## Features

- Long cut-off wavelength: 1.9  $\mu\text{m}$
- 3-pin TO-18 package: low price
- Thermoelectrically cooled TO-18 package: low dark current
- Active area:  $\phi 0.3$  to  $\phi 3$  mm

## Applications

- Optical power meter
- Gas analyzer
- NIR (near infrared) photometry

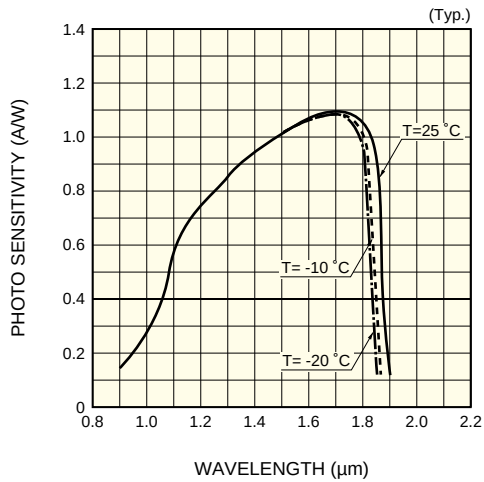
## Specifications / Absolute maximum ratings

| Type No.  | Dimensional outline/<br>Window material | Package | Cooling             | Active area<br>(mm) | Absolute maximum ratings             |                                    |                              |                                         |                                       |
|-----------|-----------------------------------------|---------|---------------------|---------------------|--------------------------------------|------------------------------------|------------------------------|-----------------------------------------|---------------------------------------|
|           |                                         |         |                     |                     | Thermistor power dissipation<br>(mW) | TE-cooler allowable current<br>(A) | Reverse voltage $V_R$<br>(V) | Operating temperature $T_{opr}$<br>(°C) | Storage temperature $T_{stg}$<br>(°C) |
| G8421-03  | ①                                       | TO-18   | Non-cooled          | $\phi 0.3$          | -                                    | -                                  |                              | -40 to +85                              | -55 to +125                           |
| G8421-05  |                                         |         |                     | $\phi 0.5$          |                                      |                                    |                              |                                         |                                       |
| G8371-01  |                                         |         |                     | $\phi 1$            |                                      |                                    |                              |                                         |                                       |
| G8371-03  | ②                                       | TO-5    |                     | $\phi 3$            |                                      |                                    |                              |                                         |                                       |
| G5851-103 | ③                                       | TO-8    | One-stage TE-cooled | $\phi 0.3$          | 0.2                                  | 1.5                                | 2                            | -40 to +70                              | -55 to +85                            |
| G5851-11  |                                         |         |                     | $\phi 1$            |                                      |                                    |                              |                                         |                                       |
| G5851-13  |                                         |         |                     | $\phi 3$            |                                      |                                    |                              |                                         |                                       |
| G5851-203 | ④                                       | TO-8    | Two-stage TE-cooled | $\phi 0.3$          | 0.2                                  | 1.0                                |                              | -40 to +70                              | -55 to +85                            |
| G5851-21  |                                         |         |                     | $\phi 1$            |                                      |                                    |                              |                                         |                                       |
| G5851-23  |                                         |         |                     | $\phi 3$            |                                      |                                    |                              |                                         |                                       |

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

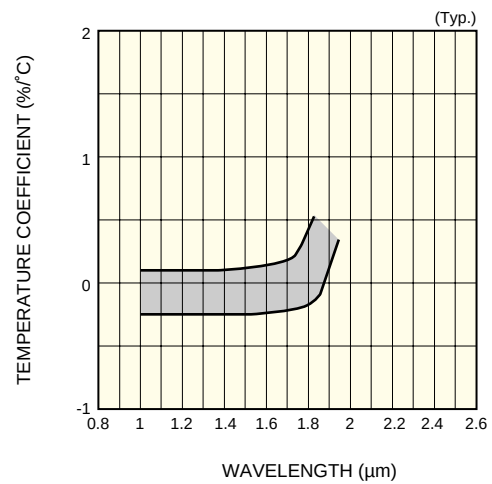
| Type No.  | Measurement Condition       | Spectral response range<br>$\lambda$ | Peak sensitivity wavelength<br>$\lambda_p$ | Photo sensitivity<br>$S$<br>$\lambda=\lambda_p$ | Dark current<br>$I_D$<br>$V_R=1\text{ V}$ |           | Cut-off frequency<br>$f_c$<br>$V_R=1\text{ V}$<br>$R_L=50\ \Omega$<br>-3 dB (MHz) | Terminal capacitance<br>$C_t$<br>$V_R=1\text{ V}$<br>$f=1\text{ MHz}$<br>(pF) | Shunt resistance<br>$R_{sh}$<br>$V_R=10\text{ mV}$<br>(M $\Omega$ ) | $D^*$<br>$\lambda=\lambda_p$<br>(cm·Hz <sup>1/2</sup> /W) | NEP<br>$\lambda=\lambda_p$<br>(W/Hz <sup>1/2</sup> ) |
|-----------|-----------------------------|--------------------------------------|--------------------------------------------|-------------------------------------------------|-------------------------------------------|-----------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------|---------------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------|
|           | Element temperature<br>(°C) |                                      |                                            |                                                 | Typ. (nA)                                 | Max. (nA) |                                                                                   |                                                                               |                                                                     |                                                           |                                                      |
| G8421-03  | 25                          | 0.9 to 1.9                           | 1.75                                       | 1.1                                             | 30                                        | 300       | 100                                                                               | 8                                                                             | 1.5                                                                 | $5 \times 10^{11}$                                        | $9 \times 10^{-14}$                                  |
| G8421-05  |                             |                                      |                                            |                                                 | 50                                        | 500       | 80                                                                                | 20                                                                            | 1                                                                   |                                                           | $1.5 \times 10^{-13}$                                |
| G8371-01  |                             |                                      |                                            |                                                 | 100                                       | 1000      | 40                                                                                | 80                                                                            | 0.5                                                                 |                                                           | $2 \times 10^{-13}$                                  |
| G8371-03  |                             |                                      |                                            |                                                 | 2000                                      | 20000     | 3                                                                                 | 800                                                                           | 0.05                                                                |                                                           | $8 \times 10^{-13}$                                  |
| G5851-103 | -10                         | 0.9 to 1.87                          |                                            |                                                 | 3                                         | 30        | 100                                                                               | 8                                                                             | 15                                                                  | $1.5 \times 10^{12}$                                      | $3 \times 10^{-14}$                                  |
| G5851-11  |                             |                                      |                                            |                                                 | 10                                        | 100       | 40                                                                                | 80                                                                            | 5                                                                   |                                                           | $6 \times 10^{-14}$                                  |
| G5851-13  |                             |                                      |                                            |                                                 | 200                                       | 2000      | 3                                                                                 | 800                                                                           | 0.5                                                                 |                                                           | $2 \times 10^{-13}$                                  |
| G5851-203 | -20                         | 0.9 to 1.85                          |                                            |                                                 | 1.5                                       | 15        | 100                                                                               | 8                                                                             | 35                                                                  | $2.5 \times 10^{12}$                                      | $2 \times 10^{-14}$                                  |
| G5851-21  |                             |                                      |                                            |                                                 | 5                                         | 50        | 40                                                                                | 80                                                                            | 10                                                                  |                                                           | $4 \times 10^{-14}$                                  |
| G5851-23  |                             |                                      |                                            |                                                 | 100                                       | 1000      | 3                                                                                 | 800                                                                           | 1                                                                   |                                                           | $1.5 \times 10^{-13}$                                |

## Spectral response



KIRDB0221EA

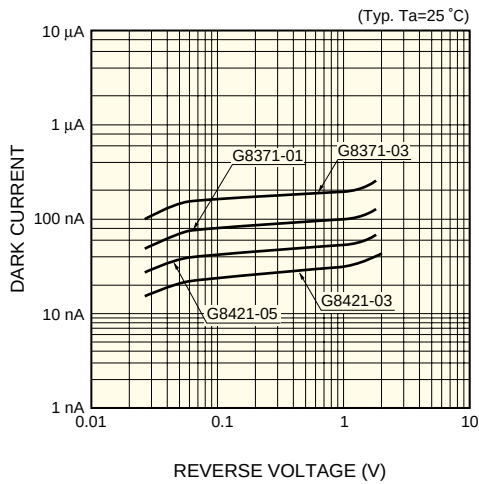
## Photo sensitivity temperature characteristic



KIRDB0208EA

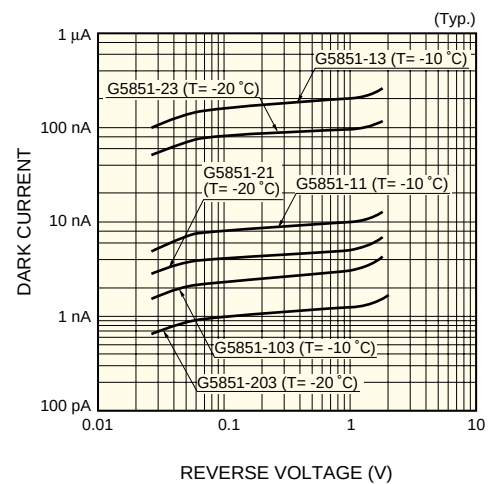
## Dark current vs. reverse voltage

### Non-cooled type



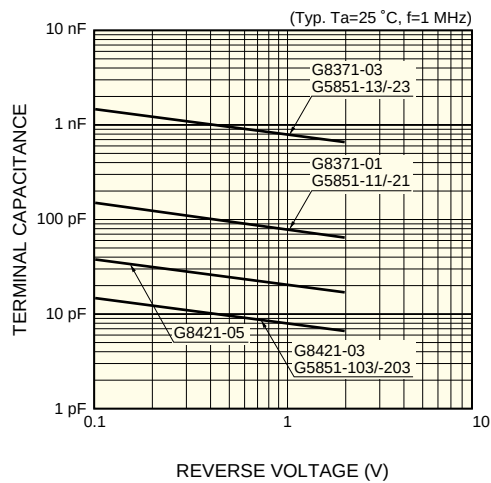
KIRDB0232EA

### TE-cooled type



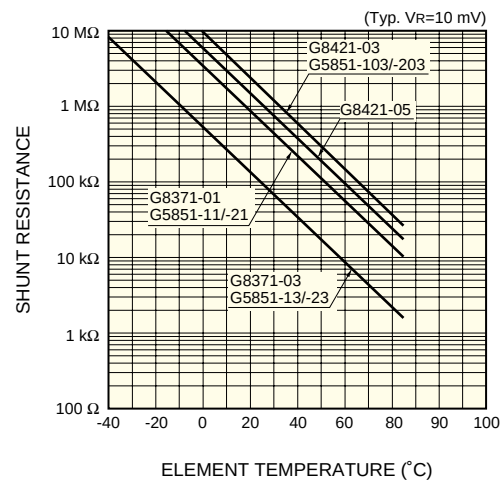
KIRDB0223EA

## Terminal capacitance vs. reverse voltage



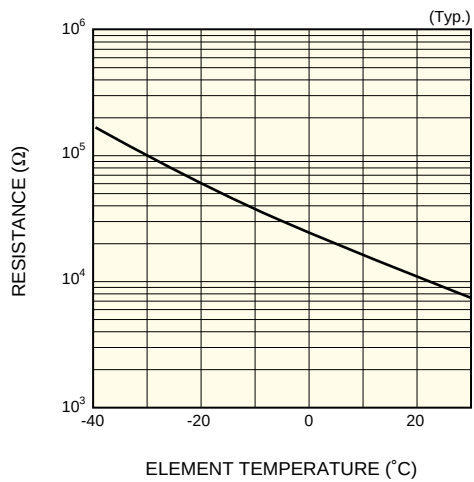
KIRDB0233EA

## Shunt resistance vs. element temperature



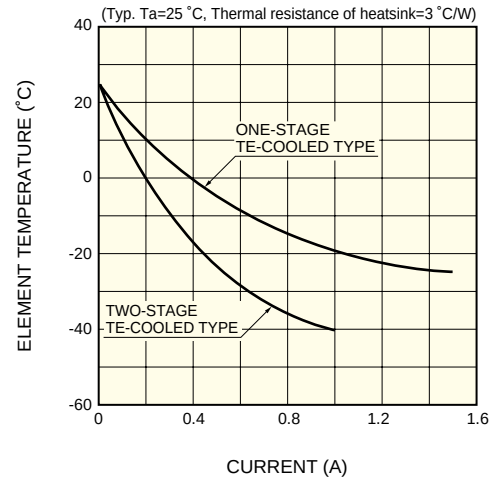
KIRDB0234EA

■ Thermistor temperature characteristic



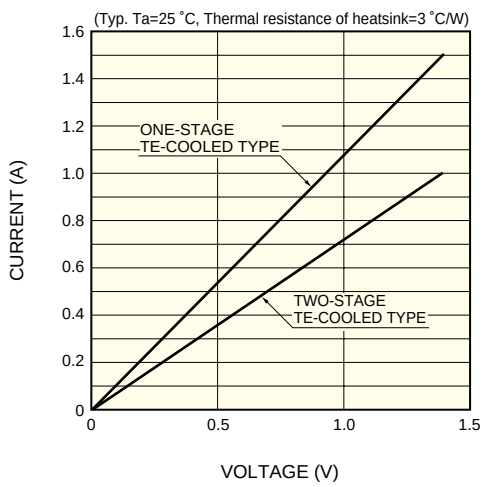
KIRDB0116EA

■ Cooling characteristics of TE-cooler



KIRDB0231EA

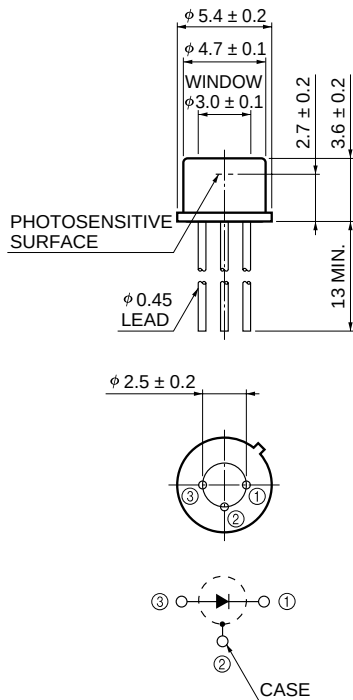
■ Current vs. voltage characteristics of TE-cooler



KIRDB0115EA

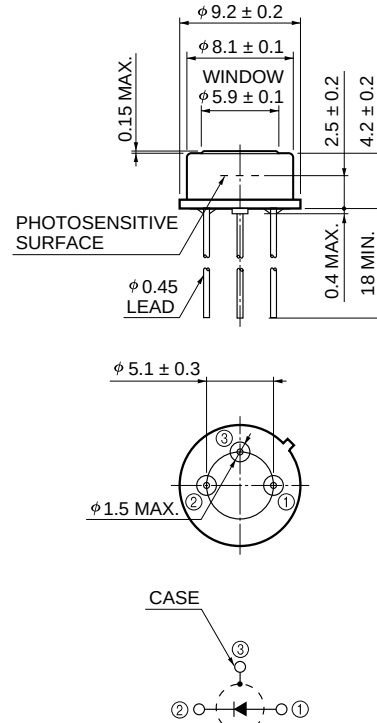
## ■ Dimensional outlines (unit: mm)

① G8421-03/-05, G8371-01



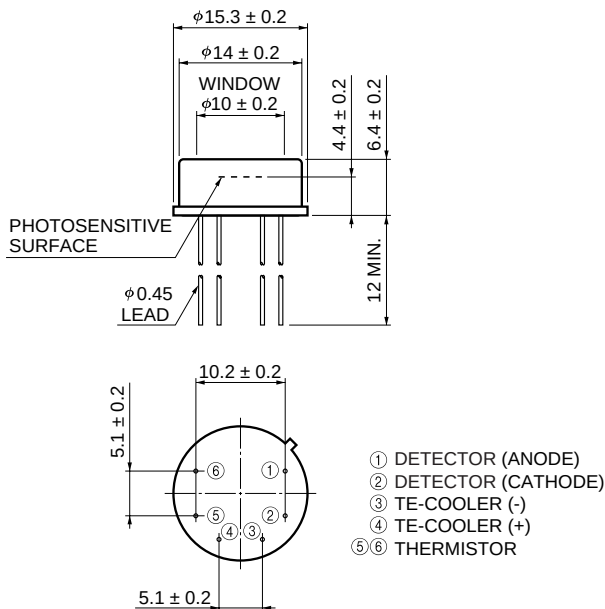
KIRDA0150EA

② G8371-03



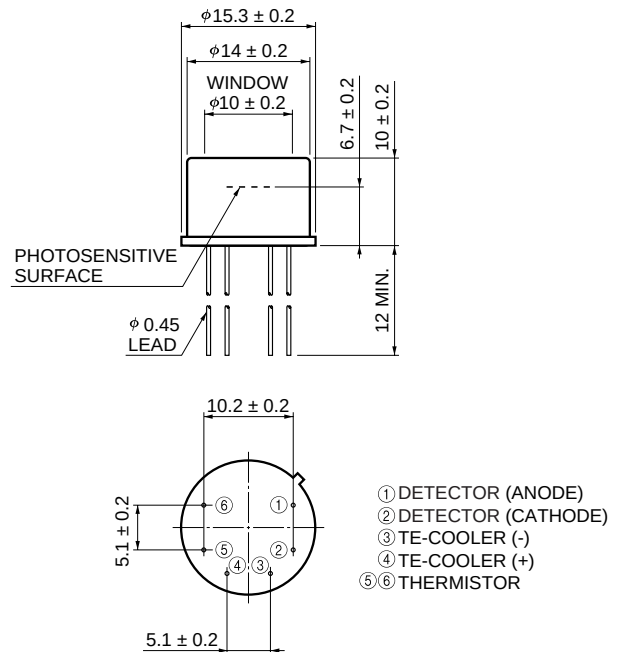
KIRDA0151EA

③ G5851-103/-11/-13



KIRDA0029EB

④ G5851-203/-21/-23



KIRDA0031EB

# HAMAMATSU

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

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. ©2001 Hamamatsu Photonics K.K.