

# Si PIN photodiode S5971, S5972, S5973 series

## High-speed photodiodes (S5973 series: 1.5 GHz)



S5971, S5972 and S5973 series are high-speed Si PIN photodiodes designed for visible to near infrared light detection. These photodiodes provide wideband characteristics at a low bias, making them suitable for optical communications and other high-speed photometry. S5973 series includes a mini-lens type (S5973-01) that can be efficiently coupled to an optical fiber and a violet sensitivity enhanced type (S5973-02) ideal for violet laser detection.

### Features

- High-speed response  
S5971 : 100 MHz ( $V_R=10$  V)  
S5972 : 500 MHz ( $V_R=10$  V)  
S5973 series: 1 GHz ( $V_R=3.3$  V)
- Low price
- High sensitivity  
S5973-02: 0.3 A/W, QE=91 % ( $\lambda=410$  nm)
- High reliability

### Applications

- Optical fiber communications
- High-speed photometry
- Violet laser detection (S5973-02)

### General ratings / Absolute maximum ratings

| Type No. | Dimensional outline/<br>Window material *1 | Package<br><br>(mm) | Active area size<br><br>(mm) | Effective active area<br><br>(mm <sup>2</sup> ) | Absolute maximum ratings          |                                |                                       |                                     |  |
|----------|--------------------------------------------|---------------------|------------------------------|-------------------------------------------------|-----------------------------------|--------------------------------|---------------------------------------|-------------------------------------|--|
|          |                                            |                     |                              |                                                 | Reverse voltage<br>VR Max.<br>(V) | Power dissipation<br>P<br>(mW) | Operating temperature<br>Topr<br>(°C) | Storage temperature<br>Tstg<br>(°C) |  |
| S5971    | ①/K                                        | TO-18               | φ1.2                         | 1.1                                             | 20                                | 50                             | -40 to +100                           | -55 to +125                         |  |
| S5972    |                                            |                     | φ0.8                         | 0.5                                             |                                   |                                |                                       |                                     |  |
| S5973    |                                            |                     | φ0.4                         | 0.12                                            |                                   |                                |                                       |                                     |  |
| S5973-01 | ②/L                                        |                     |                              |                                                 |                                   |                                |                                       |                                     |  |
| S5973-02 | ③/K                                        |                     |                              |                                                 |                                   |                                |                                       |                                     |  |

### Electrical and optical characteristics

| Type No. | Spectral response range<br>$\lambda$<br>(nm) | Peak sensitivity wavelength<br>$\lambda_p$<br>(nm) | Photo sensitivity S<br>(A/W) |        |        |        | Short circuit current<br>Isc<br>100 lx<br>( $\mu$ A) | Dark current ID |           | Temp. coefficient of ID<br>TCID<br>(times/°C) | Cut-off frequency fc<br>(GHz) | Terminal capacitance Ct<br>f=1 MHz<br>(pF) | NEP<br>VR=10 V<br>$\lambda=\lambda_p$<br>(W/Hz <sup>1/2</sup> ) |
|----------|----------------------------------------------|----------------------------------------------------|------------------------------|--------|--------|--------|------------------------------------------------------|-----------------|-----------|-----------------------------------------------|-------------------------------|--------------------------------------------|-----------------------------------------------------------------|
|          |                                              |                                                    | $\lambda_p$                  | 660 nm | 780 nm | 830 nm |                                                      | Typ. (nA)       | Max. (nA) |                                               |                               |                                            |                                                                 |
|          |                                              |                                                    |                              |        |        |        |                                                      |                 |           |                                               |                               |                                            |                                                                 |
| S5971    | 320 to 1060                                  | 900                                                | 0.64                         | 0.44   | 0.55   | 0.6    | 1.0                                                  | 0.07 *3         | 1 *3      | 1.15                                          | 0.1 *3                        | 3 *3                                       | 7.4 × 10 <sup>-15</sup>                                         |
| S5972    | 320 to 1000                                  | 800                                                | 0.57                         |        | 0.51   | 0.55   | 0.42                                                 | 0.01 *3         | 0.5 *3    |                                               | 0.5 *3                        |                                            |                                                                 |
| S5973    |                                              | 760                                                | 0.52                         |        |        | 0.47   | 0.09                                                 | 0.001 *4        | 0.1 *4    |                                               |                               |                                            |                                                                 |
| S5973-01 |                                              |                                                    |                              |        |        |        | 0.42                                                 |                 |           |                                               |                               |                                            |                                                                 |
| S5973-02 |                                              |                                                    |                              | 0.45   |        |        | 0.3 *2                                               |                 |           |                                               | 0.42                          | 0.37                                       | 0.09                                                            |

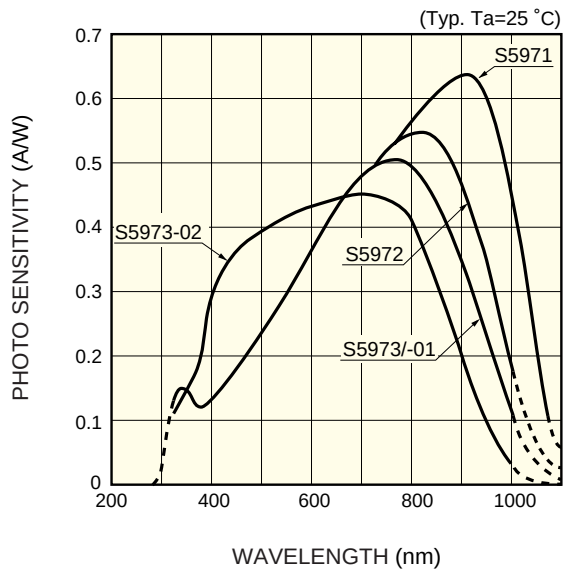
\*1: Window material K: borosilicate glass, L: lens type borosilicate glass

\*2:  $\lambda=410$  nm

\*3:  $V_R=10$  V

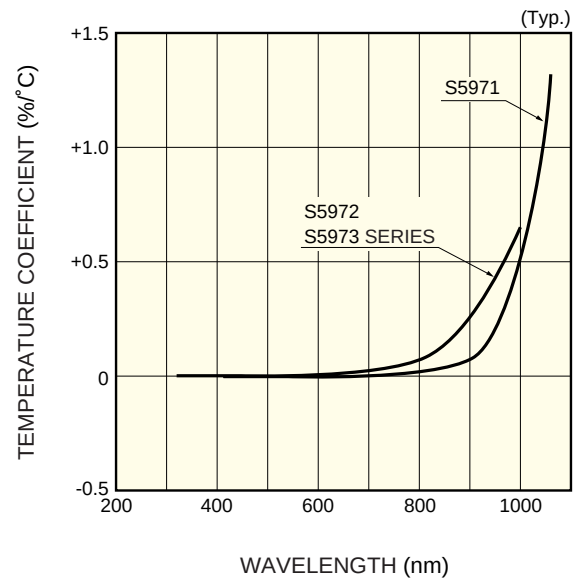
\*4:  $V_R=3.3$  V

■ Spectral response



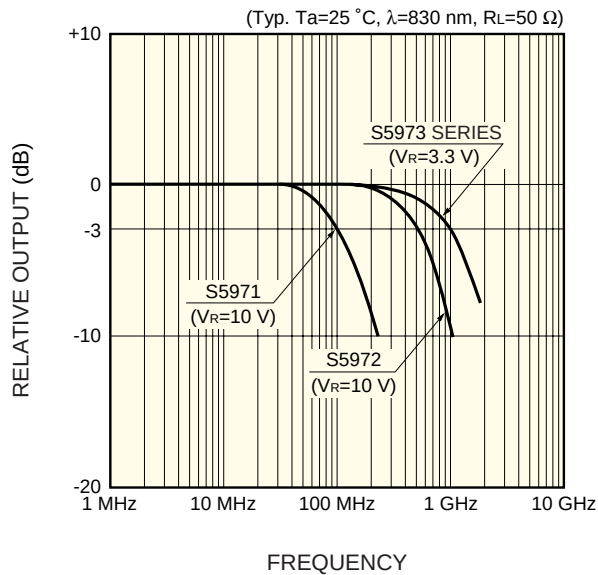
KPINB0157EA

■ Photo sensitivity temperature characteristics



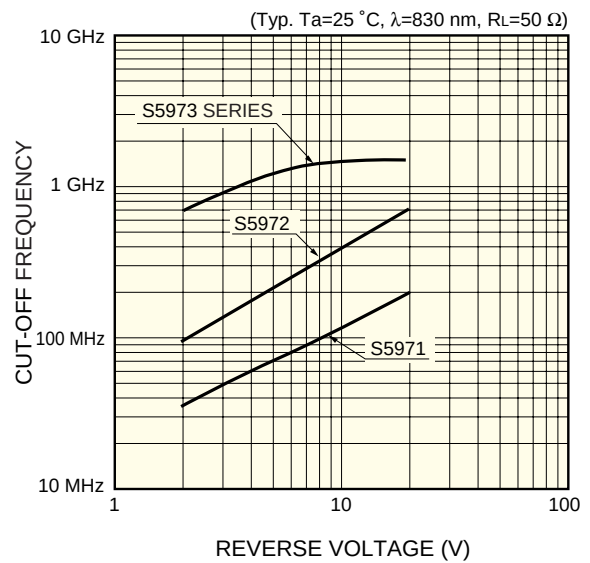
KPINB0158EA

■ Frequency response



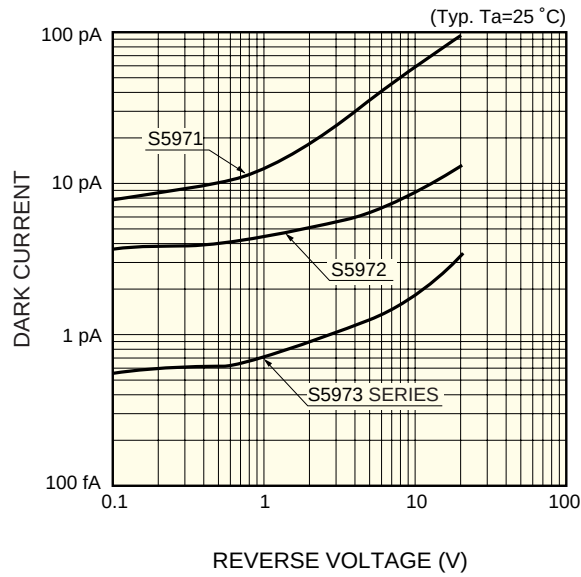
KPINB0159EB

■ Cut-off frequency vs. reverse voltage



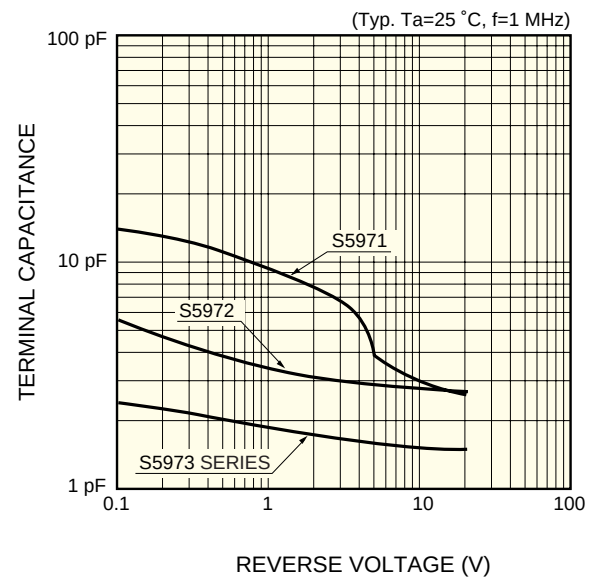
KPINB0160EB

## ■ Dark current vs. reverse voltage



KPINB0161EA

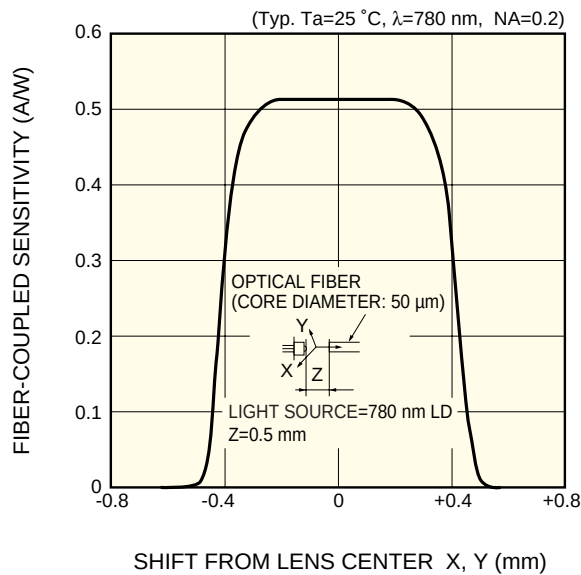
## ■ Terminal capacitance vs. reverse voltage



KPINB0162EA

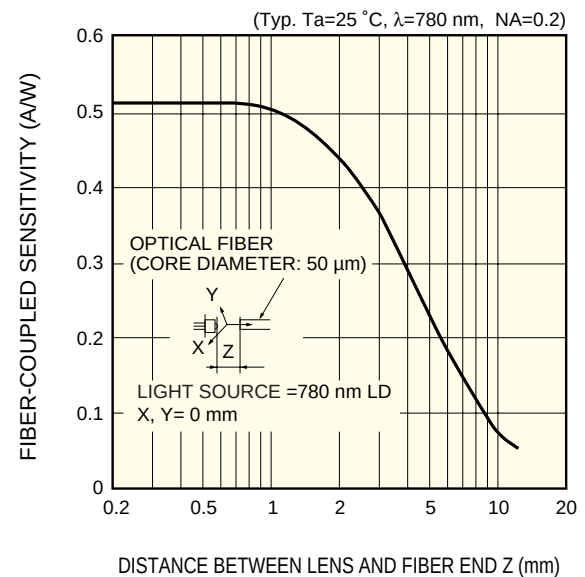
## ■ Fiber coupling characteristics (S5973-01)

X, Y direction



KPINB0088EA

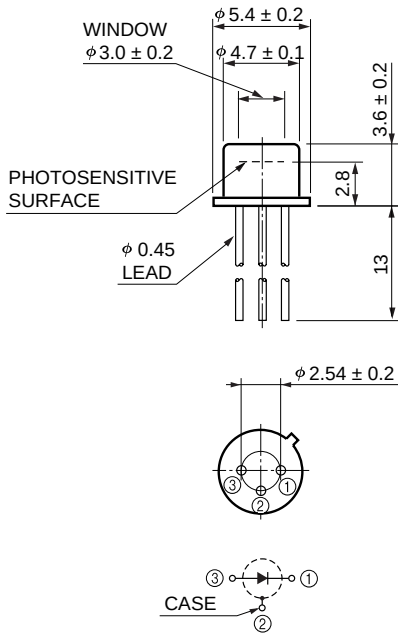
Z direction



KPINB0089EA

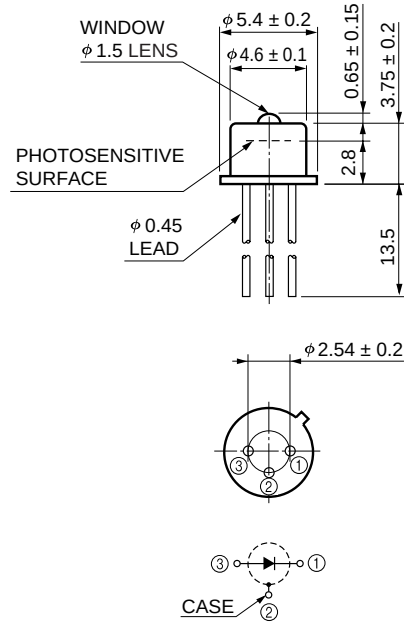
## ■ Dimensional outlines (unit: mm)

### ① S5971, S5972, S5973



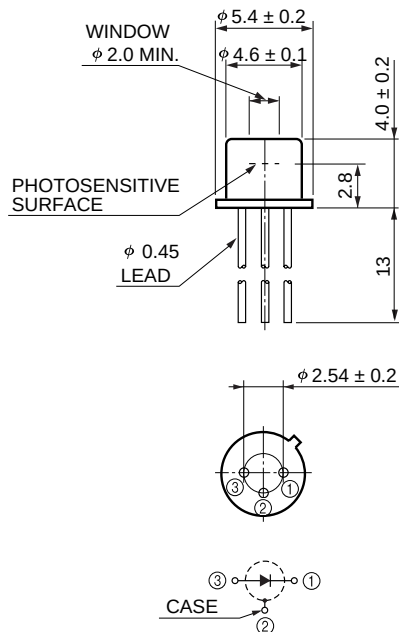
KPINA0022EB

### ② S5973-01



KPINA0023EA

### ③ S5973-02



KPINA0061EA

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