

# 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>(mm) | Active area size<br>(mm) | Effective active area<br>(mm <sup>2</sup> ) | Absolute maximum ratings             |                                |  |  |
|----------|--|-----------------|--------------------------|---|--------------------------------------|--------------------------------|--|--|
|          |  |                 |                          |   | Reverse voltage<br>$V_R$ Max.<br>(V) | Power dissipation<br>P<br>(mW) | Operating temperature<br>$T_{opr}$<br>(°C) | Storage temperature<br>$T_{stg}$<br>(°C) |
| S5971    | ①/K  | TO-18           | $\phi 1.2$               | 1.1   | 20                                   | 50                             | -40 to +100                                | -55 to +125                              |
| S5972    |  |                 | $\phi 0.8$               | 0.5   |                                      |                                |  |  |
| S5973    |  |                 | $\phi 0.4$               | 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 (A/W) |        |        |        | Short circuit current<br>$I_{sc}$<br>100 lx<br>( $\mu$ A) | Dark current $I_D$ |           | Temp. coefficient of $I_D$<br>$T_{CID}$<br>(times/°C) | Cut-off frequency<br>$f_c$<br>(GHz) | Terminal capacitance<br>$C_t$<br>$f=1$ MHz<br>(pF) | NEP<br>$V_R=10$ V<br>$\lambda=\lambda_p$<br>(W/Hz <sup>1/2</sup> ) |           |      |         |
|----------|--|--|---------------------------|--------|--------|--------|---|--------------------|-----------|---|-------------------------------------|--|--|-----------|------|---------|
|          |  |  | $\lambda_p$               | 660 nm | 780 nm | 830 nm |   | $I_{sc}$           | Typ. (nA) |   |                                     |  |  | Max. (nA) |      |         |
|          |  |  |                           |        |        |        |   |                    |           |   |                                     |  |  |           | 0.64 | 0.55    |
| 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   | $7.4 \times 10^{-15}$  |           |      |         |
| S5972    |  | 800  | 0.57                      |        |        |        |   |                    |           |   |                                     |  |  | 0.55      | 0.42 | 0.01 *3 |
| S5973    | 320 to 1000                                  | 760  | 0.52                      | 0.51   | 0.47   | 0.09   | 0.001 *4  | 0.1 *4             | 1.5 *4    |   | 1.6 *4                              | $1.1 \times 10^{-15}$ *4                           |  |           |      |         |
| S5973-01 |  |  |                           |        |        |        |   |                    |           | 0.42  |                                     |  |  |           |      |         |
| S5973-02 |  |  |                           |        |        |        |   |                    |           | 0.45  |                                     |  | 0.3 *2   | 0.42      | 0.37 | 0.09    |

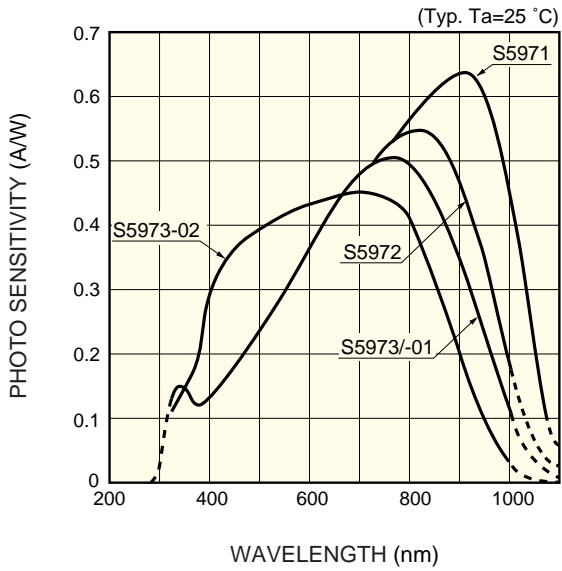
\*1: Window material K: borosilicate glass, L: lens type borosilicate glass

\*2:  $\lambda=410$  nm

\*3:  $V_R=10$  V

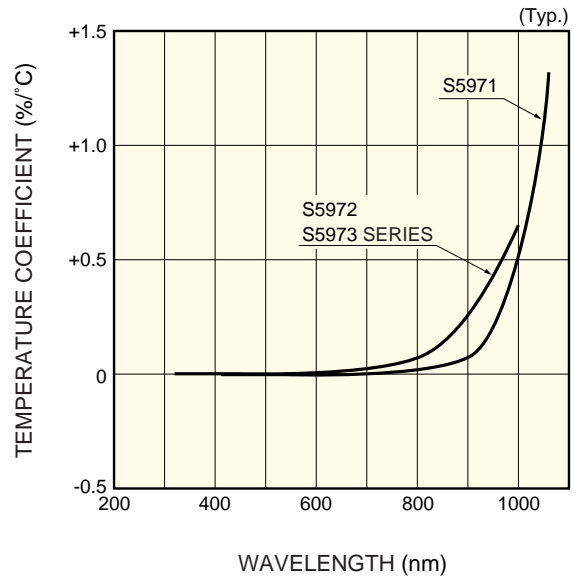
\*4:  $V_R=3.3$  V

■ Spectral response



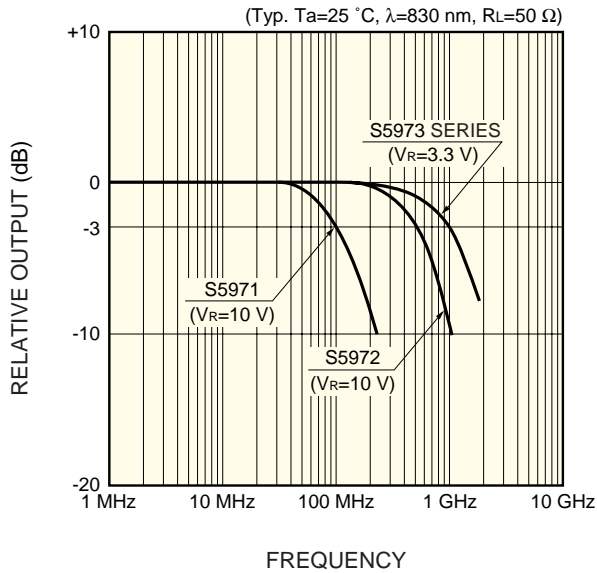
KPINB0157EA

■ Photo sensitivity temperature characteristics



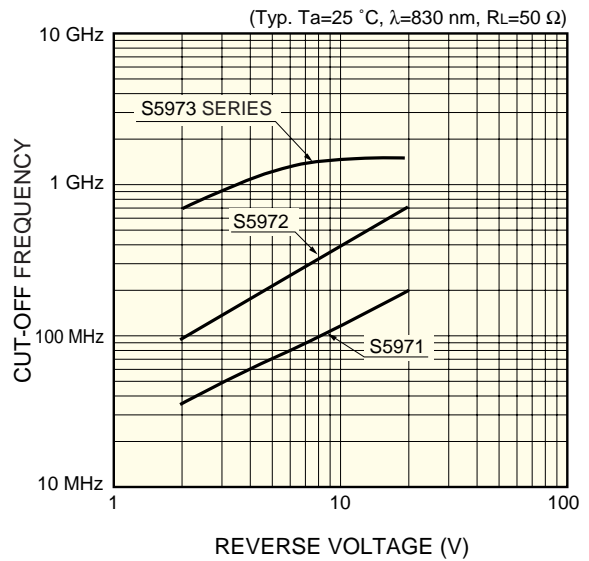
KPINB0158EA

■ Frequency response



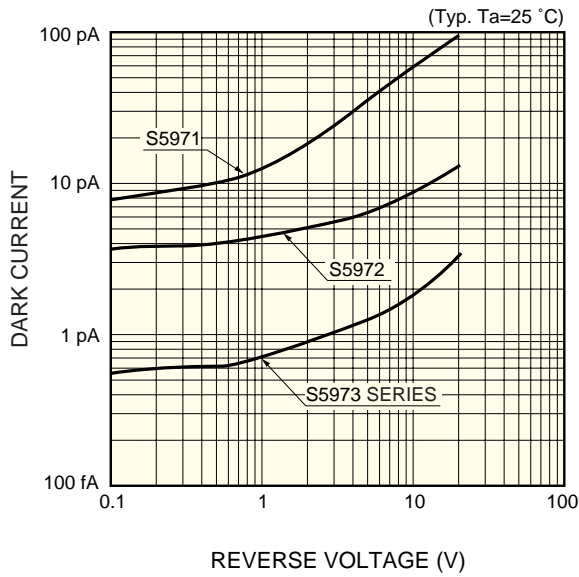
KPINB0159EB

■ Cut-off frequency vs. reverse voltage



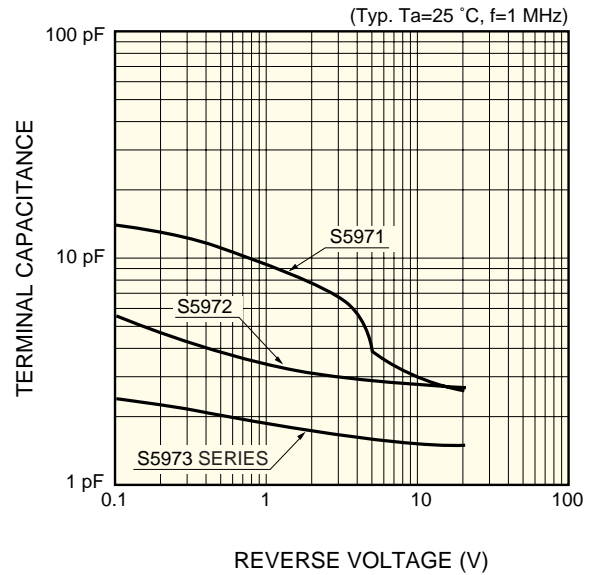
KPINB0160EB

■ Dark current vs. reverse voltage



KPINB0161EA

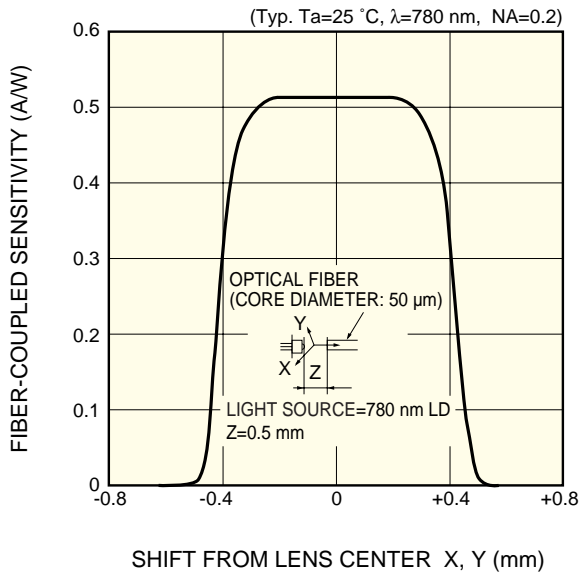
■ Terminal capacitance vs. reverse voltage



KPINB0162EA

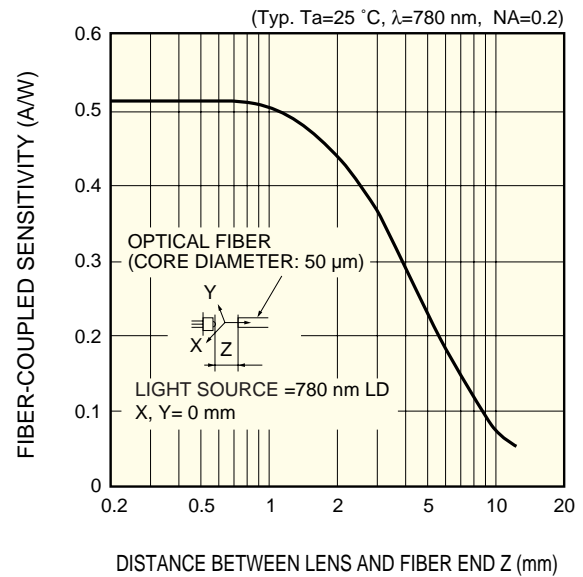
■ Fiber coupling characteristics (S5973-01)

X, Y direction



KPINB0088EA

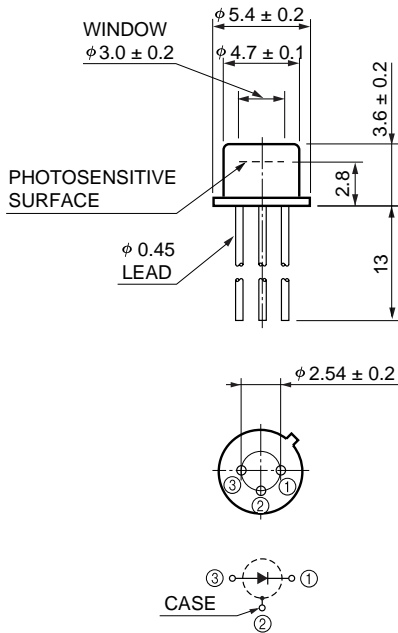
Z direction



KPINB0089EA

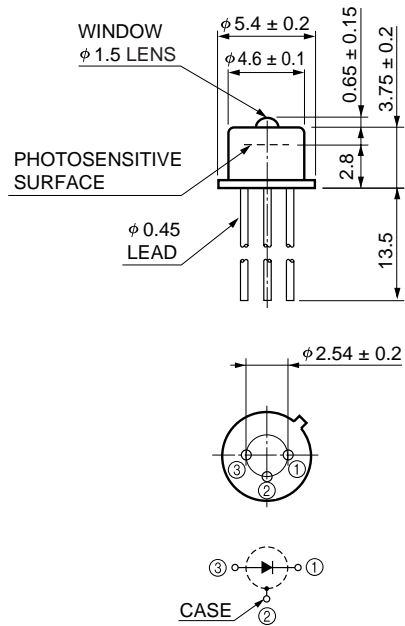
■ Dimensional outlines (unit: mm)

① S5971, S5972, S5973



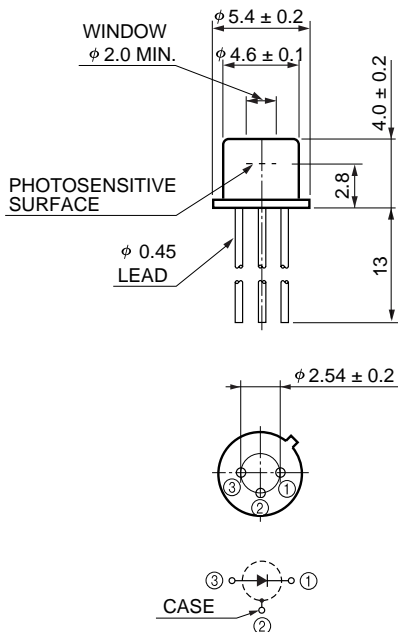
KPINA0022EB

② S5973-01



KPINA0023EA

③ S5973-02



KPINA0061EA

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