

# Si photodiodes

S16765/S16838/S16840 series



## Low dark current, premolded packages

These are photodiodes that offer low dark current to measure low to high illumination with high accuracy. The premolded package is designed to block stray light from the side and back of the package to reaching the photosensitive area.

### Features

- **S16838-01MS** : For visible range
- S16838/S16840-02MS**: For visible to IR range
- S16765-01MS** : For visible to near IR range

### Applications

- Exposure meters
- Illuminometers
- Copiers
- Display light control
- Optical switches

### Structure / Absolute maximum ratings

| Type no.    | Package | Window material            | Photosensitive area size (mm) | Absolute maximum ratings      |                                      |                                    |
|-------------|---------|----------------------------|-------------------------------|-------------------------------|--------------------------------------|------------------------------------|
|             |         |                            |                               | Reverse voltage $V_R$ max (V) | Operating temperature $T_{opr}$ (°C) | Storage temperature $T_{stg}$ (°C) |
| S16765-01MS | Plastic | Silicone resin             | 2.8 × 2.4                     | 10                            | -10 to +60*1                         | -20 to +70*1                       |
| S16838-01MS |         | Visual-compensation filter |                               |                               |                                      |                                    |
| S16838-02MS |         | Silicone resin             | 1.3 × 1.3                     |                               |                                      |                                    |
| S16840-02MS |         |                            |                               |                               |                                      |                                    |

\*1: No dew condensation

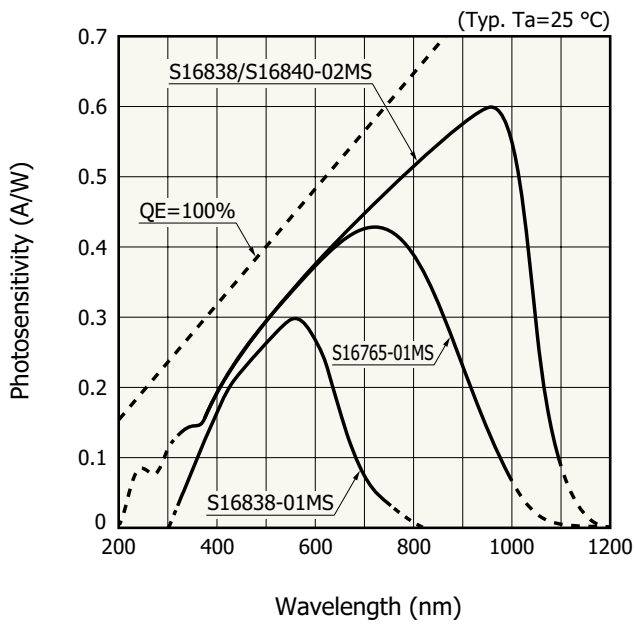
When there is a temperature difference between a product and the surrounding area in high humidity environments, dew condensation may occur on the product surface. Dew condensation on the product may cause deterioration in characteristics and reliability.

Note: Exceeding the absolute maximum ratings even momentarily may cause a drop in product quality. Always be sure to use the product within the absolute maximum ratings.

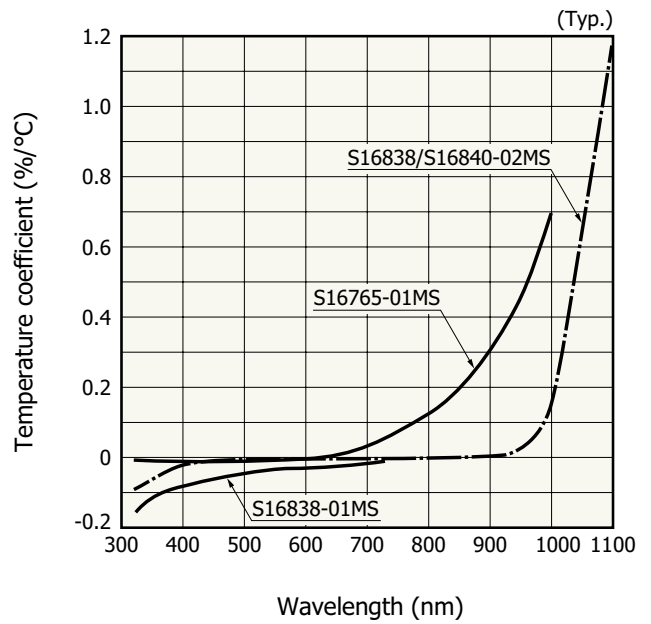
### Electrical and optical characteristics (Typ. $T_a=25$ °C, unless otherwise noted)

| Type no.    | Spectral response range $\lambda$ (nm) | Peak sensitivity wavelength $\lambda_p$ (nm) | Photosensitivity S (A/W) |                |                    | Infrared sensitivity ratio (%) | Short circuit current $I_{sc}$ 100 $\mu$ A | Temp. coefficient of $I_{sc}$ (%/°C) | Dark current $I_D$ $V_R=1$ V max. (pA) | Temp. coefficient of $T_{CID}$ (times/°C) | Rise time $t_r$ $V_R=0$ V $R_L=1$ k $\Omega$ ( $\mu$ s) | Terminal capacitance $C_t$ $V_R=0$ V $f=10$ kHz (pF) | Shunt resistance $R_{sh}$ $V_R=10$ mV |                    |
|-------------|--|--|--------------------------|----------------|--------------------|--------------------------------|--|--------------------------------------|--|---|---|--|---------------------------------------|--------------------|
|             |  |  | $\lambda_p$              | GaP LED 560 nm | He-Ne laser 633 nm |                                |  |                                      |  |   |   |  | Min. (G $\Omega$ )                    | Typ. (G $\Omega$ ) |
| S16765-01MS | 320 to 1000                            | 720  | 0.4                      | 0.33           | 0.37               | -                              | 3.1  | 0.1                                  | 20                                     | 1.12                                      | 0.5   | 200  | 10                                    | 50                 |
| S16838-01MS | 320 to 730                             | 560  | 0.3                      | 0.3            | 0.19               | 10                             | 0.6  | -0.01                                | 10                                     |   | 2.5   | 700  |                                       | 100                |
| S16838-02MS | 320 to 1100                            | 960  | 0.58                     | 0.33           | 0.38               | -                              | 5.6  | 0.1                                  | 10                                     | 0.5                                       | 200   | 10   | 250                                   |                    |
| S16840-02MS | 320 to 1100                            | 960  | 0.58                     | 0.33           | 0.38               | -                              | 1.3  | 0.1                                  |  |   |   |  |                                       |                    |

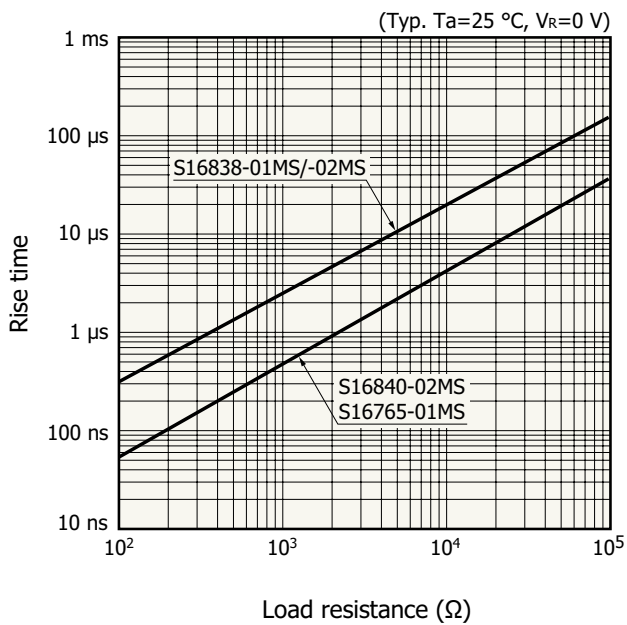
**Spectral response**



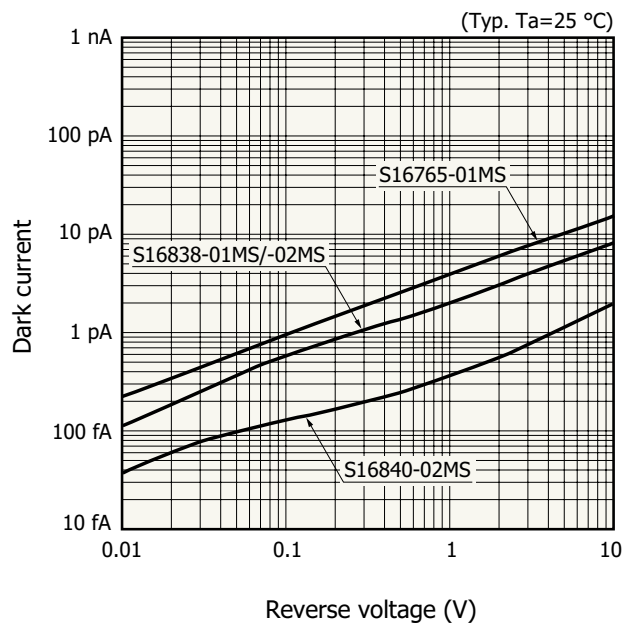
**Photosensitivity temperature characteristics**



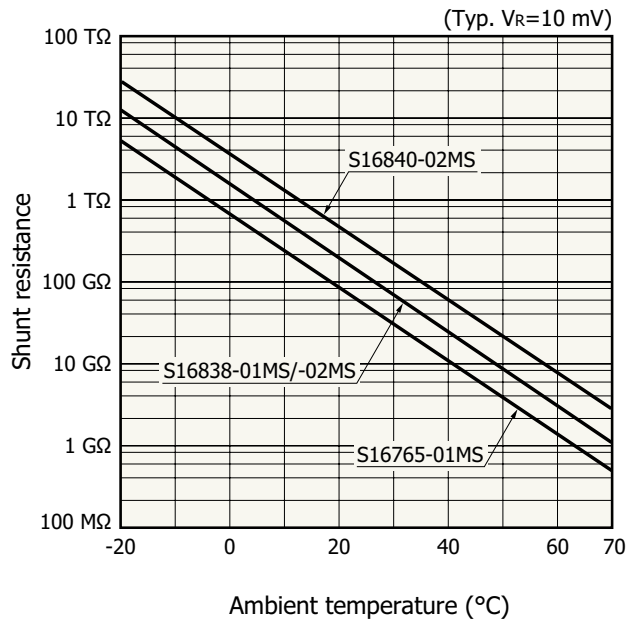
**Rise time vs. load resistance**



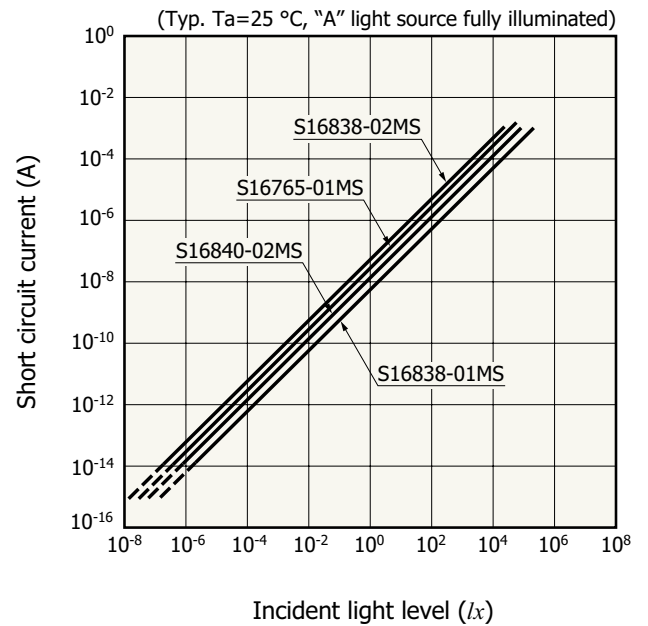
**Dark current vs. reverse voltage**



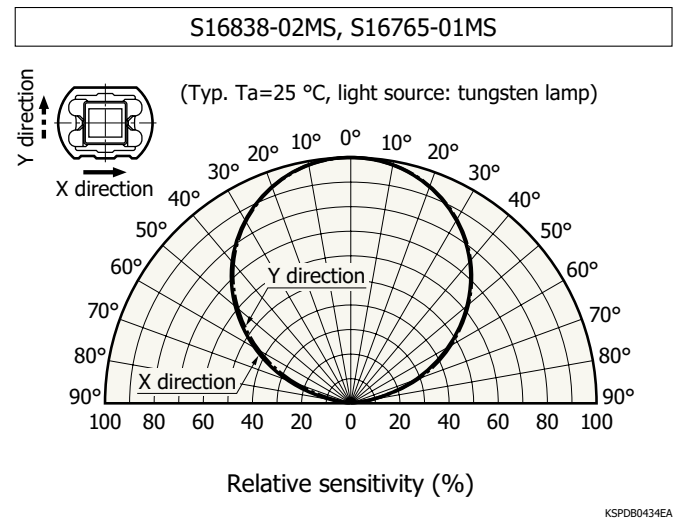
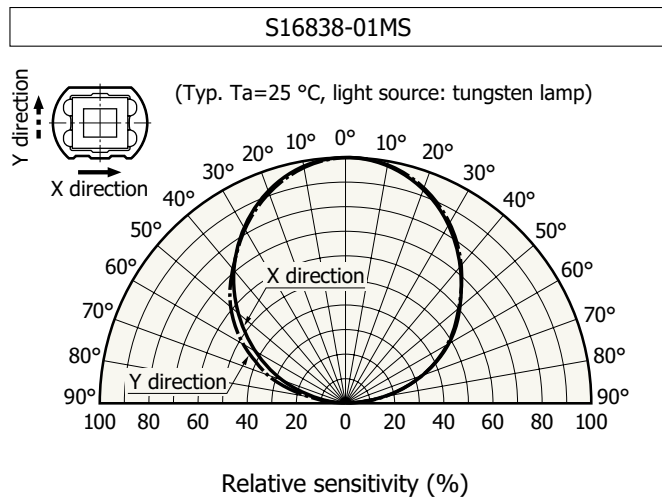
**Shunt resistance vs. ambient temperature**



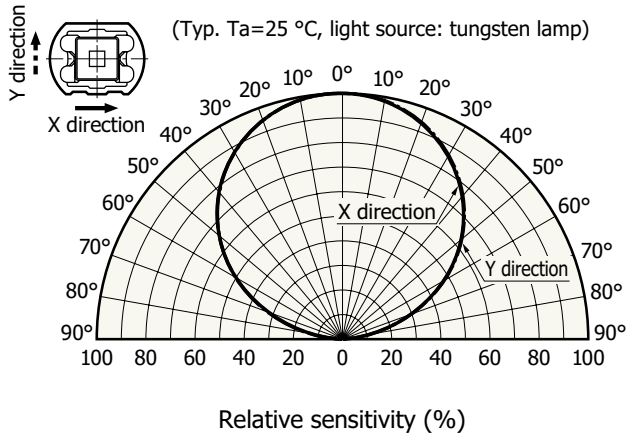
**Linearity**



**Directivity**



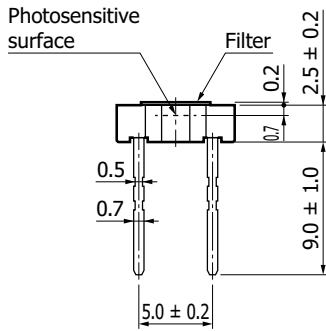
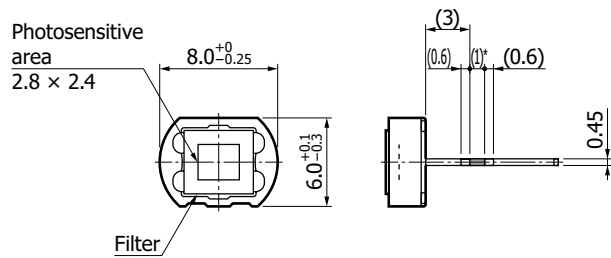
S16840-02MS



KSPDB0436EA

Dimensional outlines (unit: mm)

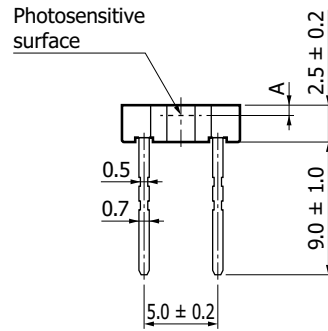
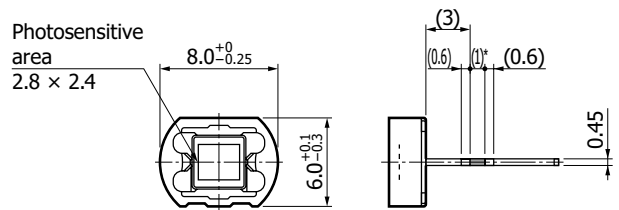
S16838-01MS



Tolerance unless otherwise noted:  $\pm 0.15$   
 Values in parentheses indicate reference value.  
 \* Tie-bar cut area (no plating)

KSPDA0225EA

S16838-02MS, S16765-01MS



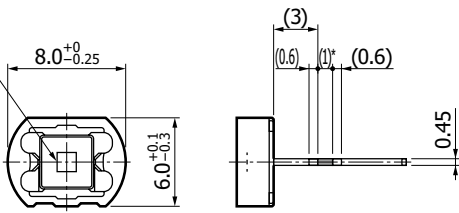
Tolerance unless otherwise noted:  $\pm 0.15$   
 Values in parentheses indicate reference value.  
 \* Tie-bar cut area (no plating)

|   | S16838-02MS | S16765-01MS |
|---|-------------|-------------|
| A | 0.7         | 0.6         |

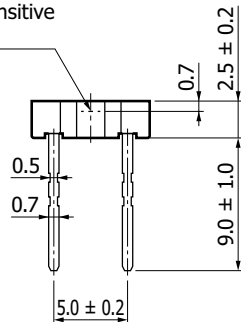
KSPDA0226EA


S16840-02MS

Photosensitive  
area  
□1.3



Photosensitive  
surface



Tolerance unless otherwise noted:  $\pm 0.15$   
 Values in parentheses indicate reference value.  
 \*  Tie-bar cut area (no plating)

KSPDA0228EA

### Recommended soldering conditions

| Parameter          | Specification                     | Remarks                            |
|--------------------|-----------------------------------|------------------------------------|
| Solder temperature | 260 °C max. (once, less than 5 s) | at least 2 mm away from lead roots |

Note: When you set soldering conditions, check that problems do not occur in the product by testing out the conditions in advance.

### Related information

[www.hamamatsu.com/sp/ssd/doc\\_en.html](http://www.hamamatsu.com/sp/ssd/doc_en.html)

#### Precautions

- Disclaimer
- Metal, ceramic, plastic package products

#### Technical note

- Si photodiodes

Information described in this material is current as of May 2023.

Product specifications are subject to change without prior notice due to improvements or other reasons. This document has been carefully prepared and the information contained is believed to be accurate. In rare cases, however, there may be inaccuracies such as text errors. Before using these products, always contact us for the delivery specification sheet to check the latest specifications.

The product warranty is valid for one year after delivery and is limited to product repair or replacement for defects discovered and reported to us within that one year period. However, even if within the warranty period we accept absolutely no liability for any loss caused by natural disasters or improper product use. Copying or reprinting the contents described in this material in whole or in part is prohibited without our prior permission.

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