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# InGaAs PIN photodiode arrays

G12430 series

## 16/32/46 element InGaAs array for near IR detection

The G12430 series is one-dimensional InGaAs PIN photodiode array in a ceramic DIP (dual inline package). It can be used to perform simple spectroscopic analysis.

### Features

- **16, 32, or 46 element array**
- **Designed for simple measurement**
- **Large photosensitive area size**

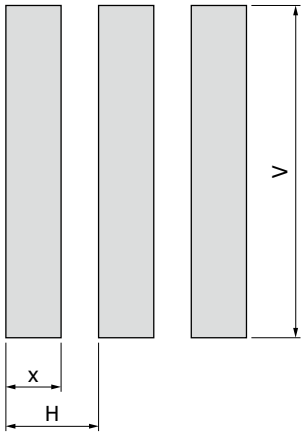
### Applications

- **NIR spectrophotometers**

### Structure

| Parameter | G12430-016D | G12430-032D | G12430-046D | Unit |
|---|---|---|---|---|
| Cooling | Room temperature type | | | - |
| Number of elements | 16 | 32 | 46 | elements |
| Elements size | 0.45 × 1 | 0.2 × 1 | | mm |
| Element pitch | 0.5 | 0.25 | | mm |
| Package | 18-pin ceramic DIP | 40-pin ceramic DIP | 48-pin ceramic DIP | - |
| Window material | Borosilicate glass | | | - |

### Details of photosensitive area




| Number of elements | x | H | V | Unit |
|---|---|---|---|---|
| 16 | 0.45 | 0.5 | 1 | mm |
| 32 | 0.2 | 0.25 | | |
| 46 | | | | |

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Static electricity can damage or degrade the G12430 series. Use caution when handling.

## Absolute maximum ratings (Ta=25 °C)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Reverse voltage | $V_R$ max. | 5 | V |
| Operating temperature | Topr | -20 to +70* | °C |
| Storage temperature | Tstg | -20 to +85* | °C |
| Soldering conditions | - | 260 °C or less, within 5 s | - |

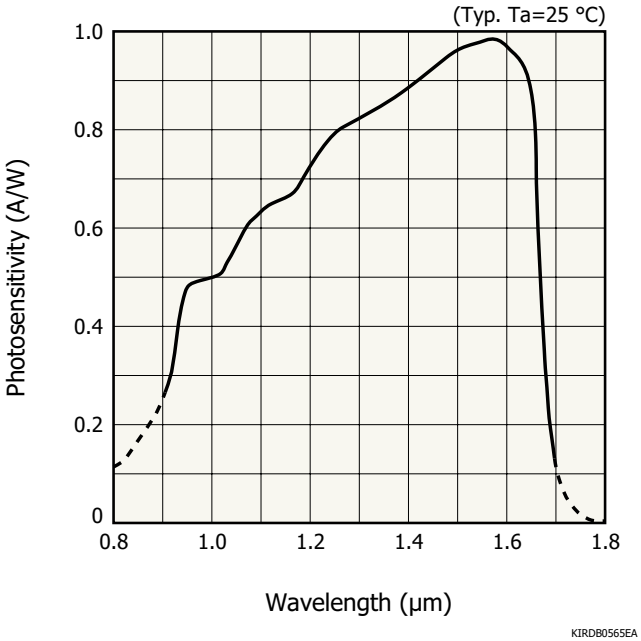
* No dew condensation
When there is a temperature difference between a product and the surrounding area in high humidity environment, dew condensation may occur on the product surface. Dew condensation on the product may cause deterioration in characteristics and reliability.

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.

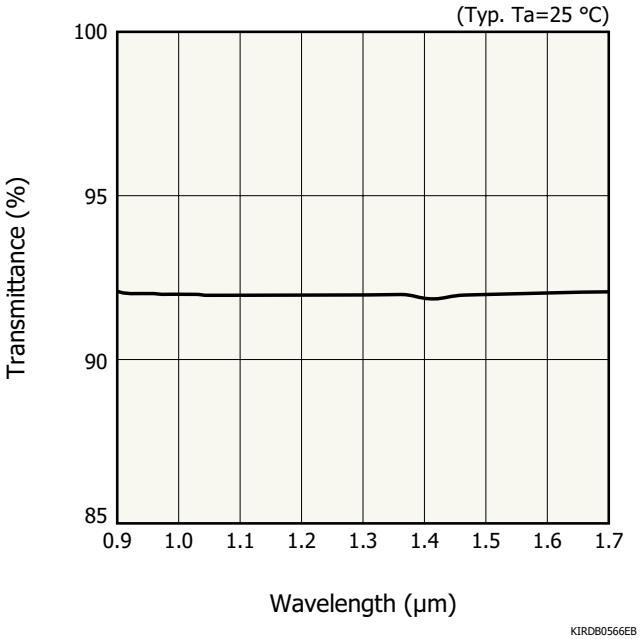
## Electrical and optical characteristics (Ta=25 °C, per element)

| Parameter | Symbol | Condition | G12430-016D | | | G12430-032D | | | G12430-046D | | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | Min. | Typ. | Max. | Min. | Typ. | Max. | |
| Spectral response range | λ | | - | 0.9 to 1.7 | - | - | 0.9 to 1.7 | - | - | 0.9 to 1.7 | - | μm |
| Peak sensitivity wavelength | λp | | - | 1.55 | - | - | 1.55 | - | - | 1.55 | - | μm |
| Photosensitivity | S | λ=λp | 0.85 | 0.95 | - | 0.85 | 0.95 | - | 0.85 | 0.95 | - | A/W |
| Dark current | $I_D$ | $V_R$=1 V | - | 500 | 2500 | - | 250 | 1250 | - | 250 | 1250 | pA |
| Dark current temperature coefficient | $\Delta T_{ID}$ | $V_R$=10 mV | - | 1.1 | - | - | 1.1 | - | - | 1.1 | - | times/°C |
| Cutoff frequency | fc | $V_R$=1 V, $R_L$=50 Ω λ=1.3 μm, -3 dB | 15 | 30 | - | 25 | 60 | - | 25 | 60 | - | MHz |
| Terminal capacitance | Ct | $V_R$=1 V, f=1 MHz | - | 60 | 100 | - | 35 | 60 | - | 35 | 60 | pF |
| Shunt resistance | Rsh | $V_R$=10 mV | 20 | 100 | - | 40 | 200 | - | 40 | 200 | - | MΩ |
| Detectivity | D* | λ=λp | $1 \times 10^{12}$ | $5 \times 10^{12}$ | - | $1 \times 10^{12}$ | $5 \times 10^{12}$ | - | $1 \times 10^{12}$ | $5 \times 10^{12}$ | - | cm·$Hz^{1/2}$/W |
| Noise equivalent power | NEP | λ=λp | - | $2 \times 10^{-14}$ | $4 \times 10^{-14}$ | - | $1 \times 10^{-14}$ | $3 \times 10^{-14}$ | - | $1 \times 10^{-14}$ | $3 \times 10^{-14}$ | W/$Hz^{1/2}$ |

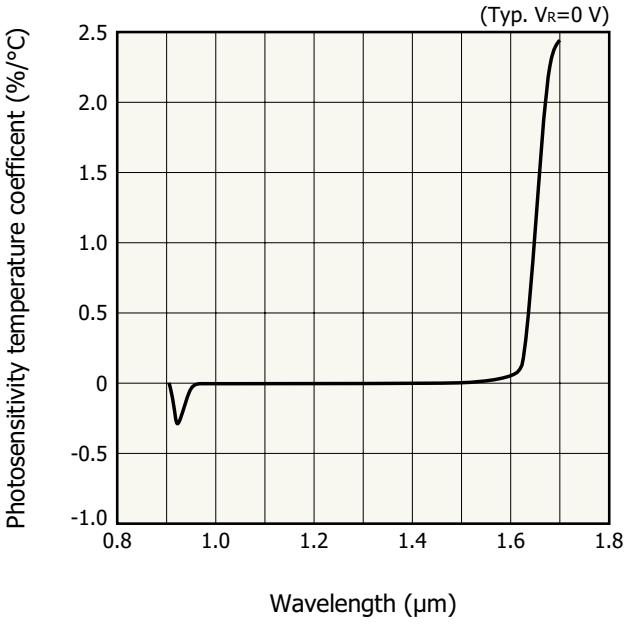
## Spectral response




## Spectral transmittance of window material



## Photosensitivity temperature characteristics

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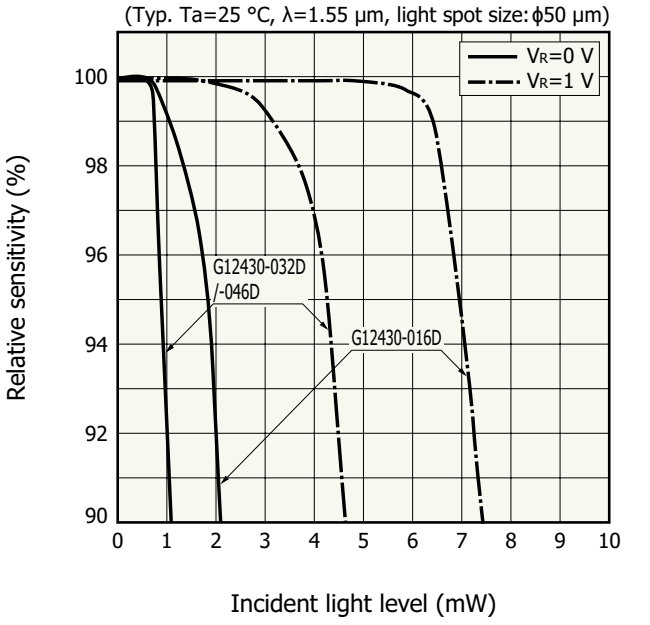
## Linearity

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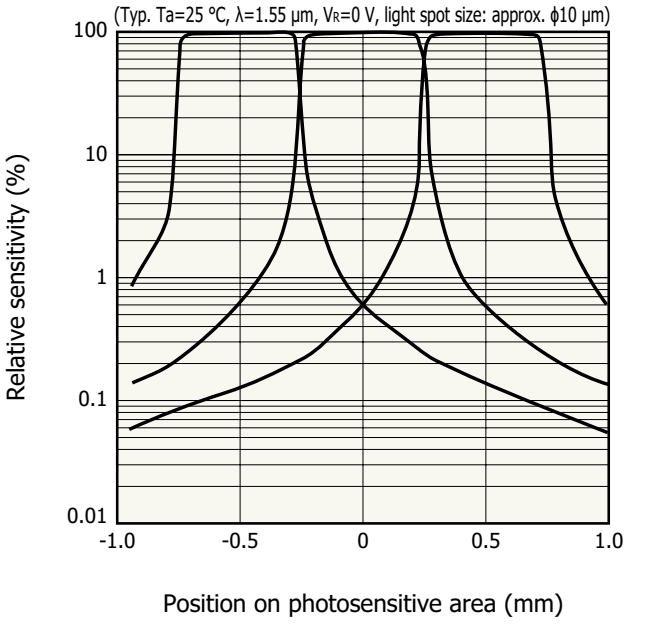
## Cross-talk characteristics

G12430-016D

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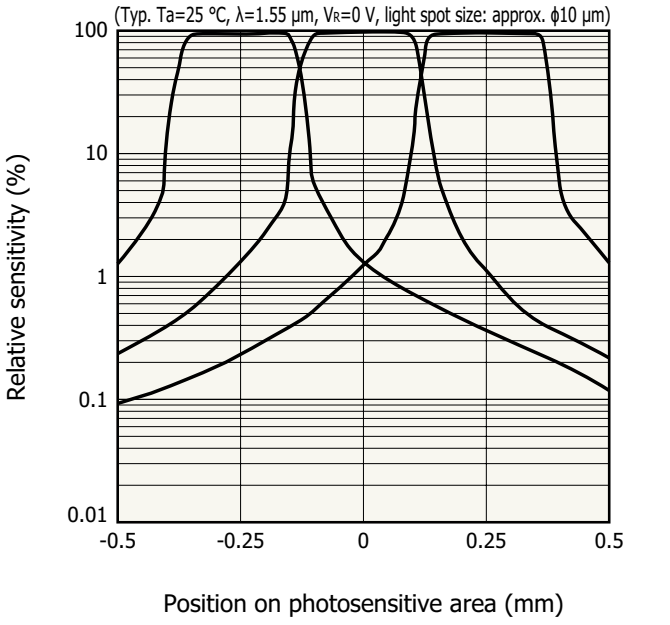
G12430-032D/-046D

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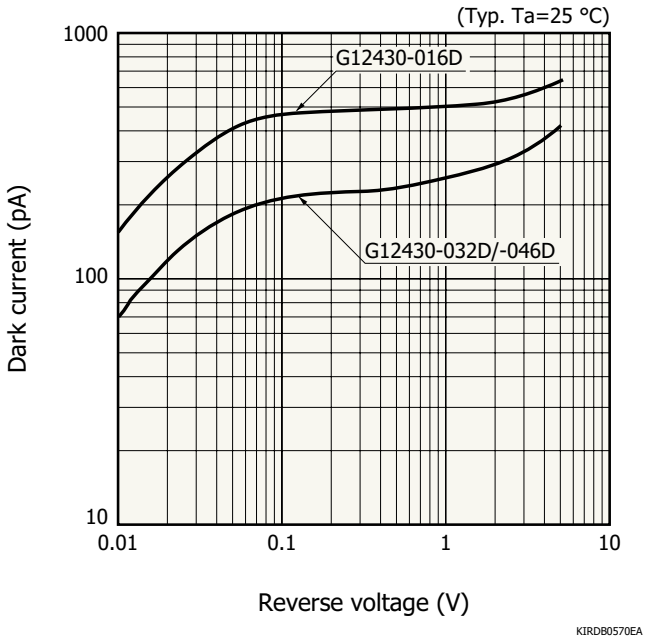
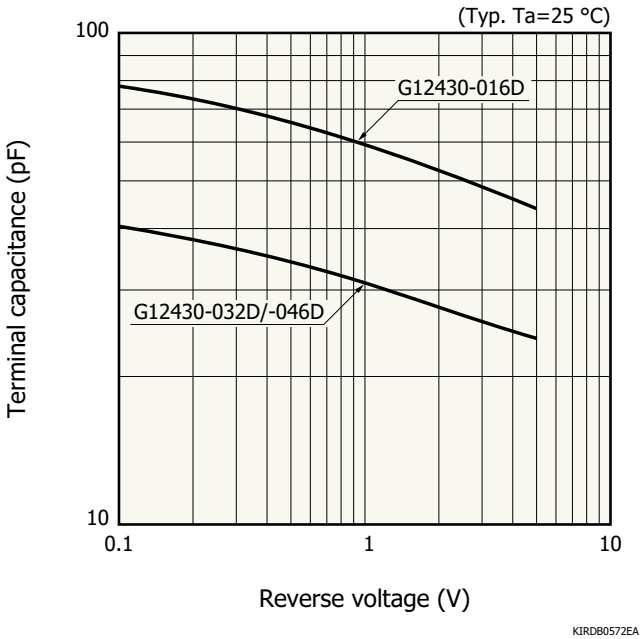
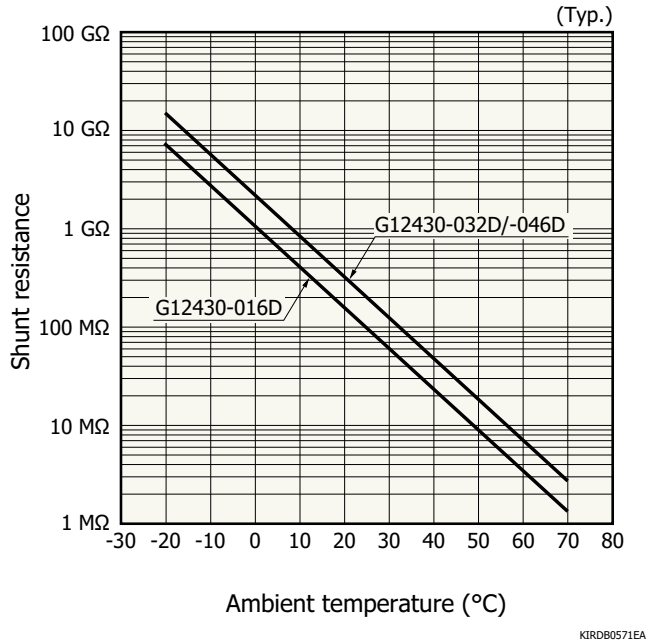
## Dark current vs. reverse voltage




## Terminal capacitance vs. reverse voltage

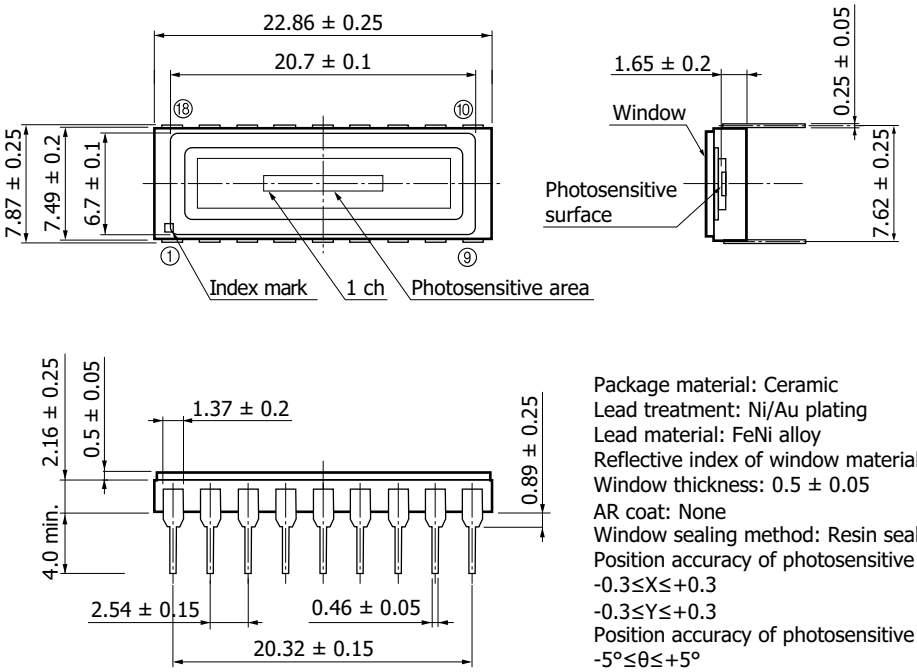



## Shunt resistance vs. ambient temperature



## Dimensional outlines (unit: mm)

G12430-016D




Package material: Ceramic
Lead treatment: Ni/Au plating
Lead material: FeNi alloy
Reflective index of window material: 1.47
Window thickness: 0.5 ± 0.05
AR coat: None
Window sealing method: Resin sealing
Position accuracy of photosensitive area center:
-0.3≤X≤+0.3
-0.3≤Y≤+0.3
Position accuracy of photosensitive area inclination:
-5°≤θ≤+5°

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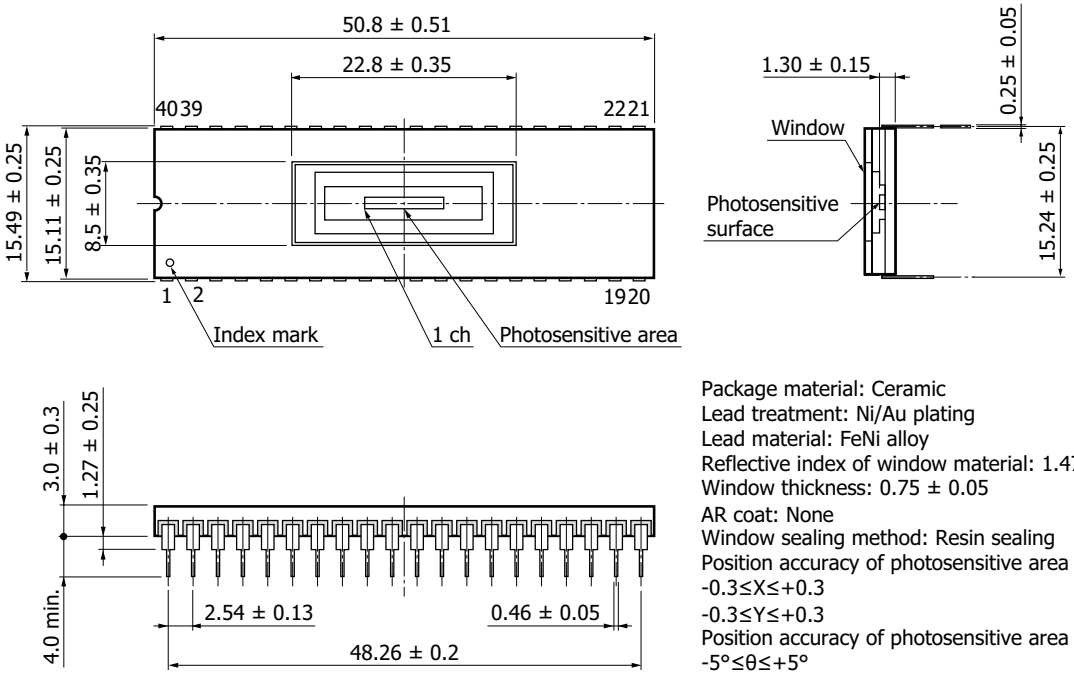
G12430-032D




Package material: Ceramic
Lead treatment: Ni/Au plating
Lead material: FeNi alloy
Reflective index of window material: 1.47
Window thickness: 0.75 ± 0.05
AR coat: None
Window sealing method: Resin sealing
Position accuracy of photosensitive area center:
-0.3≤X≤+0.3
-0.3≤Y≤+0.3
Position accuracy of photosensitive area inclination:
-5°≤θ≤+5°

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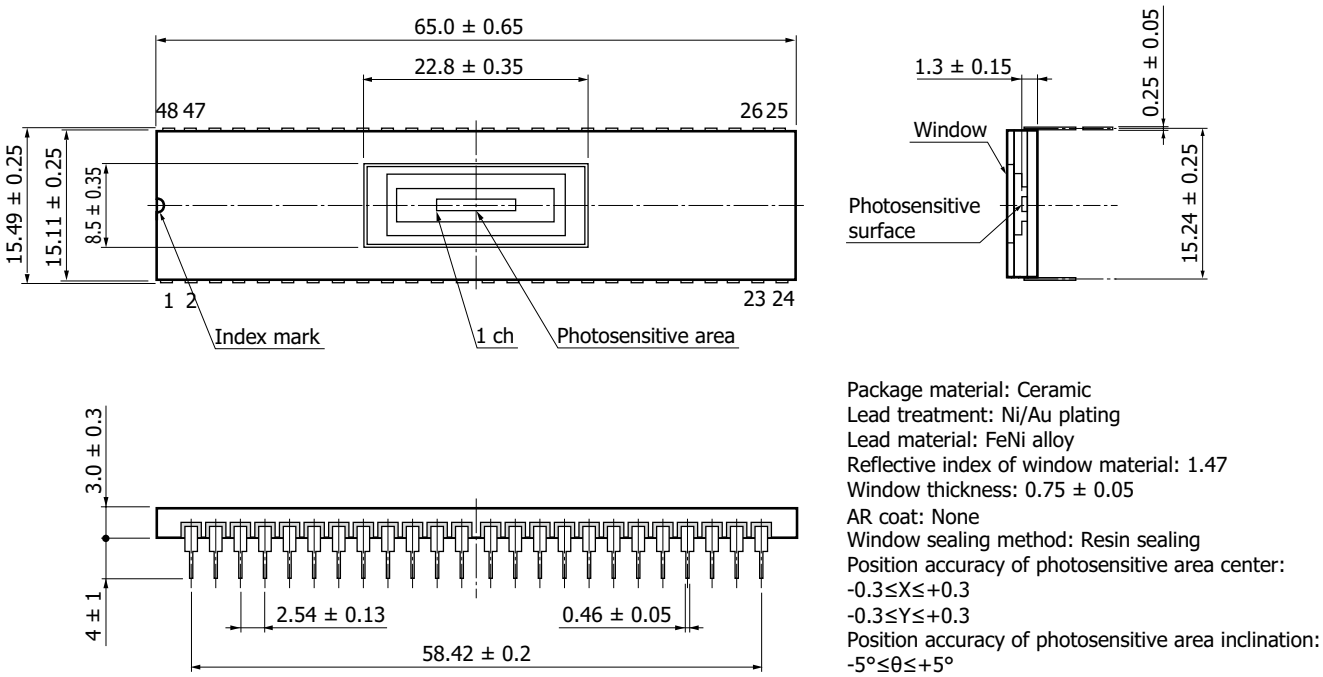
G12430-046D




Package material: Ceramic
Lead treatment: Ni/Au plating
Lead material: FeNi alloy
Reflective index of window material: 1.47
Window thickness: 0.75 ± 0.05
AR coat: None
Window sealing method: Resin sealing
Position accuracy of photosensitive area center:
-0.3≤X≤+0.3
-0.3≤Y≤+0.3
Position accuracy of photosensitive area inclination:
-5°≤θ≤+5°

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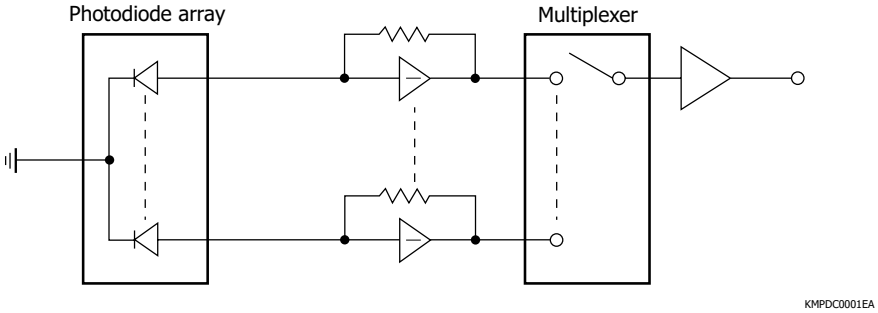
## Pin connections

| Pin no. | G12430-016D | G12430-032D | G12430-046D | Pin no. | G12430-016D | G12430-032D | G12430-046D |
|---|---|---|---|---|---|---|---|
| 1 | KC | KC | KC | 25 | - | 27 | KC |
| 2 | 2 | NC | 2 | 26 | - | 25 | 45 |
| 3 | 4 | 2 | 4 | 27 | - | 23 | 43 |
| 4 | 6 | 4 | 6 | 28 | - | 21 | 41 |
| 5 | 8 | 6 | 8 | 29 | - | 19 | 39 |
| 6 | 10 | 8 | 10 | 30 | - | 17 | 37 |
| 7 | 12 | 10 | 12 | 31 | - | 15 | 35 |
| 8 | 14 | 12 | 14 | 32 | - | 13 | 33 |
| 9 | 16 | 14 | 16 | 33 | - | 11 | 31 |
| 10 | KC | 16 | 18 | 34 | - | 9 | 29 |
| 11 | 15 | 18 | 20 | 35 | - | 7 | 27 |
| 12 | 13 | 20 | 22 | 36 | - | 5 | 25 |
| 13 | 11 | 22 | 24 | 37 | - | 3 | 23 |
| 14 | 9 | 24 | 26 | 38 | - | 1 | 21 |
| 15 | 7 | 26 | 28 | 39 | - | NC | 19 |
| 16 | 5 | 28 | 30 | 40 | - | NC | 17 |
| 17 | 3 | 30 | 32 | 41 | - | - | 15 |
| 18 | 1 | 32 | 34 | 42 | - | - | 13 |
| 19 | - | NC | 36 | 43 | - | - | 11 |
| 20 | - | NC | 38 | 44 | - | - | 9 |
| 21 | - | KC | 40 | 45 | - | - | 7 |
| 22 | - | NC | 42 | 46 | - | - | 5 |
| 23 | - | 31 | 44 | 47 | - | - | 3 |
| 24 | - | 29 | 46 | 48 | - | - | 1 |

## Operating circuit

In the most generally used circuit, op amplifiers are connected to each channel to read the output in real time. The output of an op amplifier is of low impedance and thus can be easily multiplexed.




## Related information

www.hamamatsu.com/sp/ssd/doc_en.html

■ Precautions
· Disclaimer
· Safety consideration
· Compound opto-semiconductors (photodsensors, light emitters)

■ Technical note
· Compound semiconductor photosensors



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