GP2Y0A02YK

Long Distance Measuring Sensor

**Features**
1. Less influence on the colors of reflected objects and their reflectivity, due to optical triangle measuring method
2. Distance output type
   (Detection range: 20 to 150 cm)
3. An external control circuit is not necessary
   Output can be connected directly to a microcomputer

**Applications**
1. For detection of human body and various types of objects in home appliances, OA equipment, etc

**Absolute Maximum Ratings** \((T_a=25^\circ C)\)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Rating</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>(V_{CC})</td>
<td>(-0.3) to +7 V</td>
<td></td>
</tr>
<tr>
<td>Output terminal voltage</td>
<td>(V_O)</td>
<td>(-0.3) to (V_{CC}+0.3) V</td>
<td></td>
</tr>
<tr>
<td>Operating temperature</td>
<td>(T_{opt})</td>
<td>(-10) to +60 °C</td>
<td></td>
</tr>
<tr>
<td>Storage temperature</td>
<td>(T_{stg})</td>
<td>(-40) to +70 °C</td>
<td></td>
</tr>
</tbody>
</table>

*1 Open collector output

**Recommended Operating Conditions**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Rating</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Supply voltage</td>
<td>(V_{CC})</td>
<td>4.5 to 5.5 V</td>
<td></td>
</tr>
</tbody>
</table>

**Outline Dimensions** \((\text{Unit : mm})\)

The dimensions marked * are described the dimensions of lens center position.

Unspecified tolerance: ±0.3 mm

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### Electro-optical Characteristics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Conditions</th>
<th>MIN.</th>
<th>TYP.</th>
<th>MAX.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance measuring range</td>
<td>∆L</td>
<td>*2 *3</td>
<td>20</td>
<td>–</td>
<td>150</td>
<td>cm</td>
</tr>
<tr>
<td>Output terminal voltage</td>
<td>V₀</td>
<td>*2 L=150cm</td>
<td>0.25</td>
<td>0.4</td>
<td>0.55</td>
<td>V</td>
</tr>
<tr>
<td>Difference of output voltage</td>
<td>∆V₀</td>
<td>*2 Output change at L=150cm to 20cm</td>
<td>1.8</td>
<td>2.05</td>
<td>2.3</td>
<td>V</td>
</tr>
<tr>
<td>Average dissipation current</td>
<td>Iccoli</td>
<td>–</td>
<td>–</td>
<td>33</td>
<td>50</td>
<td>mA</td>
</tr>
</tbody>
</table>

Note: L: Distance to reflective object

*2 Using reflective object: White paper (Made by Kodak Co. Ltd. gray cards R-27: white face, reflective ratio: 90%)

*3 Distance measuring range of the optical sensor system

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**Fig.1 Internal Block Diagram**

- **Signal processing circuit**
- **Voltage regulator**
- **Oscillation circuit**
- **Output circuit**
- **Distance measuring IC**
- **LED drive circuit**
- **PSD**
- **Vcc 5V**
- **GND**

**Fig.2 Timing Chart**

- **Vcc (Power supply)**
- **Distance measuring operation**
- **Vcc (Output)**

- **First measurement**
- **Second measurement**
- **n-th measurement**

- **Unstable output**
- **First output**
- **Second output**
- **n-th output**

<table>
<thead>
<tr>
<th>Operation</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance measuring operation</td>
<td>38.3ms±9.6ms</td>
</tr>
<tr>
<td>MAX. 5.0ms</td>
<td></td>
</tr>
</tbody>
</table>
Fig. 3 Analog Output Voltage vs. Distance to Reflective Object

- White Reflectivity: 90%
- Gray Reflectivity: 18%
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      --- Alarm equipment
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