GP2D12/GP2D15

- **Features**
  1. Less influence on the color of reflective objects, reflectivity
  2. Line-up of distance output/distance judgement type
     - Distance output type (analog voltage): **GP2D12**
     - Detecting distance: 10 to 80cm
     - Distance judgement type: **GP2D15**
     - Judgement distance: 24cm
       (Adjustable within the range of 10 to 80cm)
  3. External control circuit is unnecessary
  4. Low cost

- **Applications**
  1. TVs
  2. Personal computers
  3. Cars
  4. Copiers

- **Absolute Maximum Ratings**
  (Ta=25°C, Vcc=5V)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Rating</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>Vcc</td>
<td>-0.3 to +7</td>
<td>V</td>
</tr>
<tr>
<td>Output terminal voltage</td>
<td>V0</td>
<td>-0.3 to Vcc+0.3</td>
<td>V</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>Top</td>
<td>-10 to +60</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>Tst</td>
<td>-40 to +70</td>
<td>°C</td>
</tr>
</tbody>
</table>

- **Outline Dimensions**
  (Unit: mm)

* The dimensions marked * are described the dimensions of lens center position.
* Unspecified tolerance: ±0.3mm

Notice: In the absence of confirmation by device specification sheets, SHARP takes no responsibility for any defects that may occur in equipment using any SHARP devices shown in catalogs, data books, etc. Contact SHARP in order to obtain the latest device specification sheets before using any SHARP device.
### 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>Vcc</td>
<td>4.5 to +5.5</td>
<td>V</td>
</tr>
</tbody>
</table>

### 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>ΔL</td>
<td></td>
<td>10</td>
<td>–</td>
<td>80</td>
<td>cm</td>
</tr>
<tr>
<td>Output terminal voltage</td>
<td>VO</td>
<td>L=80cm (^*1)</td>
<td>0.25</td>
<td>0.4</td>
<td>0.55</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>VOH</td>
<td>VCC –0.3</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>VOL</td>
<td>–</td>
<td>0.6</td>
<td>–</td>
<td>–</td>
<td>V</td>
</tr>
<tr>
<td>Difference of output</td>
<td>ΔV0</td>
<td>Output change at L=80cm to 10cm (^*3)</td>
<td>1.75</td>
<td>2.0</td>
<td>2.25</td>
<td>V</td>
</tr>
<tr>
<td>Distance characteristics</td>
<td>VO</td>
<td>L=80cm (^*1)</td>
<td>21</td>
<td>24</td>
<td>27</td>
<td>cm</td>
</tr>
<tr>
<td>Average Dissipation current</td>
<td>Icc</td>
<td>–</td>
<td>33</td>
<td>50</td>
<td>–</td>
<td>mA</td>
</tr>
</tbody>
</table>

Note:  
1. 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.  
4. Output switching has a hysteresis width. The distance specified by VO should be the one with which the output L switches to the output H.

### Fig.1 Internal Block Diagram

**GP2D12**

- Signal processing circuit
- Voltage regulator
- Oscillation circuit
- LED drive circuit
- Distance measuring IC

**GP2D15**

- Signal processing circuit
- Voltage regulator
- Oscillation circuit
- LED drive circuit
- Distance measuring IC

### Fig.2 Internal Block Diagram

**GP2D12**

- GND
- VCC 5V

Output circuit

**GP2D15**

- GND
- VCC 12kΩ

Output circuit

### Fig.3 Timing Chart

- VCC (Power supply)
- Unstable output
- First measurement
- 38.3ms ± 9.6ms
- Second measurement
- 7.6ms ± 1.9ms
- 5.0ms MAX \(^*1\) (GP2D12)
- 4.6ms MAX \(^*1\) (GP2D15)
- n-th measurement
- n-th output
Fig. 4 Distance Characteristics

Fig. 5 Analog Output Voltage vs. Surface Illuminance of Reflective Object

Fig. 6 Analog Output Voltage vs. Distance to Reflective Object

Fig. 7 Analog Output Voltage vs. Ambient Temperature

Fig. 8 Analog Output Voltage vs. Detection Distance