DEVICE SPECIFICATION FOR

OPIC SENSOR FOR REMOTE CONTROL

MODEL No. IS1U60L

CUSTOMER'S APPROVAL

DATE

BY

PRESENTED BY

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ELECOM Group
SHARP CORPORATION
1. Application

This specification applies to the outline and characteristics of OPIC sensor for remote control, Model No. IS1U60L.

2. Outline

Refer to the attached drawing No. CY3941102.

3. Ratings and characteristics

Refer to the attached sheet, Page 3 ~ 5.

4. Reliability

Refer to the attached sheet, Page 7.

5. Incoming inspection

Refer to the attached sheet, Page 8.

6. Supplement

This product is not designed as electromagnetic and ionized-particle radiation resistant.

7. Notes

(1) When using a light emitting unit (remote control transmitter), it shall be considered the performances, characteristics and operating condition of the light emitting element and the characteristics of this OPIC sensor for remote control.

(2) If the surface of detector is smeared with dust or dirt, it may cause faulty operation. Caution shall be taken to avoid this. And do not touch the detector surface.
(3) Cleaning conditions

Solvent cleaning: Solvent temperature 45°C or less
Immersion 3 min. or less

Ultrasonic cleaning: Affection to device by ultrasonic cleaning has different affection by cleaning bath size, ultrasonic power output, cleaning time, PWB size or device mounting condition etc. If user carries out ultrasonic cleaning, user should select fit condition that doesn't occur defect.

The cleaning shall be carried out with solvent below.

Solvent: Ethyl alcohol, Methyl alcohol, Freon TE-TF
Isopropyl alcohol, Daiflon-solvent S3-E

Please refrain from using from type solvent to clean devices as much as possible since it is internationally restricted to protect the ozonosphere.
Before you use alternative solvent you are requested to confirm that it does not damage package resin.

(4) In order to prevent static destruction of integrated circuit, human body and soldering iron, etc. shall be grounded.

8. Others

Any doubt as to this specification shall be determined in good faith upon mutual consultation of the both parties.
2.2 Mark diagram

Company name (S mark)

Model No. (IS1U60 L)

Product year (End of year)

Jan. ~ Sep. → 1 ~ 9
Oct.; X, Nov.; Y, Dec.; Z

3. Ratings and characteristics

3.1 Schematic

3.2 Absolute maximum ratings

<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 ~ 6.0</td>
<td>V</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>Topr</td>
<td>-10 ~ +60</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>Tstg</td>
<td>-20 ~ +70</td>
<td>°C</td>
</tr>
<tr>
<td>Soldering temperature</td>
<td>Tsol</td>
<td>260</td>
<td>°C</td>
</tr>
</tbody>
</table>

*1) No dew formation

*2) For 5 sec. at the position of below from the resin edge.

Resin portion

Solderable
3.3 Recommended operating conditions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Operating condition</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>Vcc</td>
<td>4.7~5.3</td>
<td>V</td>
</tr>
</tbody>
</table>

3.4 Electrical characteristics
(Unspecified Ta=25°C, Vcc=5V)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>MIN.</th>
<th>TYP.</th>
<th>MAX.</th>
<th>Unit</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current dissipation</td>
<td>Icc</td>
<td>-</td>
<td>2.8</td>
<td>4.5</td>
<td>mA</td>
<td>No input light Output terminal OPEN</td>
</tr>
<tr>
<td>High level output voltage</td>
<td>VOH</td>
<td>Vcc-0.2</td>
<td>-</td>
<td>-</td>
<td>V</td>
<td>*2 Output terminal OPEN</td>
</tr>
<tr>
<td>Low level output voltage</td>
<td>VOL</td>
<td>-</td>
<td>0.45</td>
<td>0.6</td>
<td>V</td>
<td>*2 Pull-up resistance 2.2kΩ</td>
</tr>
<tr>
<td>High level pulse width</td>
<td>T1</td>
<td>400</td>
<td>-</td>
<td>800</td>
<td>μs</td>
<td>*2</td>
</tr>
<tr>
<td>Low level pulse width</td>
<td>T2</td>
<td>400</td>
<td>-</td>
<td>800</td>
<td>μs</td>
<td>*2</td>
</tr>
<tr>
<td>B.P.F. center frequency</td>
<td>f₀</td>
<td>-</td>
<td>38</td>
<td>-</td>
<td>kHz</td>
<td></td>
</tr>
</tbody>
</table>

*2) The burst wave as shown in the figure on the right shall be transmitted by the transmitter shown in Fig. 1.

3.5 Performance

The output signal of this OPIC sensor for remote control shall satisfy the following requirements with the transmitter shown in Fig. 1 used in the standard optical system in Fig. 2.

3.5.1 Characteristics of linear reception distance

The output signal shall satisfy the electrical characteristic requirements in para. 3.4 at L=0.2~5m, (*3) Ee < 10lx, φ=0° in Fig. 2.

3.5.2 Characteristics of sensitivity angle reception distance

The output signal shall satisfy the electrical characteristic requirements in para. 3.4 at L=0.2~3m, Ee < 10lx, X direction φ ≤ 30°, Y direction θ = 0°.

And the output signal shall satisfy the electrical characteristic requirements in para. 3.4 at L=0.2~3m, Ee < 10lx, X direction φ = 0°, Y direction θ ≤ 15°.

*3) It refers to detector face illuminance.
In the figure above, the transmitter shall be set as the output Vout will be 40mVpp. Note that the PD49PI in this application is the one with short-circuit current Isc=2.6\mu A measured at Ev=1000lx. (Ev is the illuminance by CIE standard light source A (tungsten lamp)).

Fig. 1 Transmitter

Fig. 2 Standard optical system
1) Unspecified tolerance : ±0.2
2) Lead bending angle : 15° MAX.

Pin arrangement

1) Vout
2) GND
3) Vcc
4. Reliability

The reliability of products shall be satisfied with items listed below.

Reliability level: 90%
LTPD: 10%/20%

<table>
<thead>
<tr>
<th>Test items</th>
<th>Test conditions</th>
<th>Judgement Criteria</th>
<th>Samples (n)</th>
<th>Defective (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal strength (Tension)</td>
<td>Weight: 500g 30 sec./each terminal</td>
<td>U × 1.2 or more</td>
<td>n=11, C=0</td>
<td></td>
</tr>
<tr>
<td>Terminal strength (Bending)</td>
<td>Weight: 250g 0° - 90° + 0° 2 times/each terminal</td>
<td>L × 0.8 or less</td>
<td>n=11, C=0</td>
<td></td>
</tr>
<tr>
<td>Shock</td>
<td>Acceleration: 100G, 6ms, 3 directions/3 times</td>
<td></td>
<td>n=11, C=0</td>
<td></td>
</tr>
<tr>
<td>Variable frequenc vibration</td>
<td>Frequency range: 10 ~ 55Hz/sweep 1 min. Overall amplitude: 1.5mm X,Y,Z/2H. each</td>
<td></td>
<td>n=11, C=0</td>
<td></td>
</tr>
<tr>
<td>* High temp. and high humidity storage</td>
<td>Ta=40°C, 90%RH, t=240H.</td>
<td>U: Upper specification limit</td>
<td>n=22, C=0</td>
<td></td>
</tr>
<tr>
<td>* High temp. storage</td>
<td>Ta=70°C, t=240H.</td>
<td></td>
<td>n=22, C=0</td>
<td></td>
</tr>
<tr>
<td>* Low temp. storage</td>
<td>Ta=-20°C, t=240H.</td>
<td></td>
<td>n=22, C=0</td>
<td></td>
</tr>
<tr>
<td>* Temperature cycling</td>
<td>1 cycle -20°C ~ +70°C (30min) (30min) 20 cycle test</td>
<td>L: Lower specification limit</td>
<td>n=22, C=0</td>
<td></td>
</tr>
<tr>
<td>* Operation life (high temp.)</td>
<td>Ta=60°C, Vcc=5V t=240H.</td>
<td></td>
<td>n=22, C=0</td>
<td></td>
</tr>
<tr>
<td>Soldering heat</td>
<td>260±5°C 5 sec.</td>
<td></td>
<td>n=22, C=0</td>
<td></td>
</tr>
<tr>
<td>Solderability</td>
<td>230±5°C Immersed in the soldering tank 5±0.5 sec.</td>
<td>*2</td>
<td>n=11, C=0</td>
<td></td>
</tr>
</tbody>
</table>

*2 Solder shall adhere at the area of 95% or more of immersed portion.

In the test * mark above, the sample to be tested shall be left at normal temperature and humidity for 2 hours after it is taken out of the stat. (No dew point)

Resin portion

Solderable