GP2W0116YPS

IrDA Transceiver Module
Compliant with IrDA1.2 Low Power

**Features**
1. Compliant with IrDA1.2 low power
2. Integrated package of transmitter/receiver.
   *(7.2×2.75×height 1.85mm)*
3. General purpose
4. Low dissipation current due to shut-down function
   *(Dissipation current at shut-down mode: Max. 0.1µA)*
5. Soldering reflow type
6. Shield type

**Applications**
1. Cellular phones, PHS
2. Personal information tools

**Absolute Maximum Ratings** *(T a=25°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 to 6.0</td>
<td>V</td>
</tr>
<tr>
<td>LED Supply voltage</td>
<td>V LEDA</td>
<td>0 to 7.0</td>
<td>V</td>
</tr>
<tr>
<td>Peak forward current</td>
<td>I FM</td>
<td>60</td>
<td>mA</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>T op</td>
<td>−40 to +85</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>T st</td>
<td>−40 to +85</td>
<td>°C</td>
</tr>
<tr>
<td>Soldering temperature</td>
<td>T sol</td>
<td>260</td>
<td>°C</td>
</tr>
</tbody>
</table>

*1 Pulse width 78.1µs, Duty ratio 3/16
*2 For MAX. 10s

**Recommended Operating Conditions**

<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>2.0 to 3.6</td>
<td>V</td>
</tr>
<tr>
<td>LED Supply voltage</td>
<td>V LEDA</td>
<td>2.0 to 6.0</td>
<td>V</td>
</tr>
<tr>
<td>Transmission rate</td>
<td>BR</td>
<td>2.4 to 115.2</td>
<td>kb/s</td>
</tr>
<tr>
<td>High level input voltage (SD terminal)</td>
<td>V SD</td>
<td>V CC×0.67 to V CC</td>
<td>V</td>
</tr>
<tr>
<td>Low level input voltage (SD terminal)</td>
<td>V LS</td>
<td>0 to V CC×0.1</td>
<td>V</td>
</tr>
<tr>
<td>High level input voltage (TXD)</td>
<td>V hTXD</td>
<td>V CC×0.8 to V CC</td>
<td>V</td>
</tr>
<tr>
<td>Low level input voltage (TXD)</td>
<td>V lTXD</td>
<td>0 to V CC×0.2</td>
<td>V</td>
</tr>
</tbody>
</table>

*3 Refer to Fig 9

**Outline Dimensions** *(Unit : 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>Dissipation current at no input signal</td>
<td>I&lt;sub&gt;CC&lt;/sub&gt;</td>
<td>No input light, output terminal open, V&lt;sub&gt;IN&lt;/sub&gt;=0V</td>
<td>–</td>
<td>90</td>
<td>120</td>
<td>µA</td>
</tr>
<tr>
<td>S/D dissipation current</td>
<td>I&lt;sub&gt;CC-S&lt;/sub&gt;</td>
<td>No input light, output terminal open, V&lt;sub&gt;IN&lt;/sub&gt;=V&lt;sub&gt;CC&lt;/sub&gt;</td>
<td>–</td>
<td>0.001</td>
<td>0.1</td>
<td>µA</td>
</tr>
<tr>
<td>High level output voltage</td>
<td>V&lt;sub&gt;OH&lt;/sub&gt;</td>
<td>I&lt;sub&gt;H&lt;/sub&gt;=200µA, V&lt;sub&gt;CC&lt;/sub&gt;=2.0 to 3.6V</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>V</td>
</tr>
<tr>
<td>Low level output voltage</td>
<td>V&lt;sub&gt;OL&lt;/sub&gt;</td>
<td>I&lt;sub&gt;L&lt;/sub&gt;=200µA, V&lt;sub&gt;CC&lt;/sub&gt;=2.0 to 3.6V</td>
<td>–</td>
<td>–</td>
<td>0.45</td>
<td>V</td>
</tr>
<tr>
<td>Rise time</td>
<td>t&lt;sub&gt;r&lt;/sub&gt;</td>
<td>BR=115.2kb/s, φ≤15°, C&lt;sub&gt;L&lt;/sub&gt;=10pF</td>
<td>1.28</td>
<td>–</td>
<td>6.0</td>
<td>µs</td>
</tr>
<tr>
<td>Fall time</td>
<td>t&lt;sub&gt;f&lt;/sub&gt;</td>
<td>BR=115.2kb/s, φ≤15°, C&lt;sub&gt;L&lt;/sub&gt;=10pF</td>
<td>–</td>
<td>–</td>
<td>0.06</td>
<td>µs</td>
</tr>
<tr>
<td>Maximum communication distance</td>
<td>L</td>
<td>BR=115.2kb/s, φ≤15°</td>
<td>21</td>
<td>–</td>
<td>–</td>
<td>cm</td>
</tr>
<tr>
<td>Radiant intensity</td>
<td>I&lt;sub&gt;E&lt;/sub&gt;</td>
<td>BR=115.2kb/s, φ≤15°, V&lt;sub&gt;H&lt;/sub&gt;=2.8V</td>
<td>4.0</td>
<td>–</td>
<td>25</td>
<td>mW/sr</td>
</tr>
<tr>
<td>Peak emission wavelength</td>
<td>λ&lt;sub&gt;p&lt;/sub&gt;</td>
<td>BR=115.2kb/s, φ≤15°</td>
<td>850</td>
<td>–</td>
<td>870</td>
<td>900</td>
</tr>
</tbody>
</table>

*4 Refer to Fig.4, 5, 6
*5 Refer to Fig.7, 8, 9

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**Fig.1 Recommended External Circuit**

![Recommended External Circuit](image)

- **Components**
  - **Recommended values**
    - CX
    - 1 to 15Ω

**Components**
- V<sub>CC</sub>
- GND
- SD
- RXD
- TXD
- LEDA
- SGND

(Not) Please choose the most suitable CX according to the noise level and noise frequency of power supply.

**Note**
- Depend on noise level and noise frequency of power supply, CX does not work well.
- There are cases that some pulse noises from RXD other than signal will occur in certain communication area. Please check by finish product that there are no problem at all communication area and data rate.
- If there are any problem, please check by inserting RX (1 to 15Ω) in the circuit drawing.

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**I/O Logic table**

<table>
<thead>
<tr>
<th>SD</th>
<th>TXD</th>
<th>LED</th>
<th>Receiver</th>
<th>TR1</th>
<th>TR2</th>
<th>RXD</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>ON</td>
<td>Don’t care</td>
<td>–</td>
<td>–</td>
<td>Not valid</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>OFF</td>
<td>GND signal</td>
<td>OFF</td>
<td>ON</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>DON’T care</td>
<td>OFF</td>
<td>Don’t care</td>
<td>OFF</td>
<td>OFF</td>
<td>Pull-up</td>
</tr>
</tbody>
</table>

**RXD Equipment circuit**

![RXD Equipment Circuit](image)
Fig. 2 System Configuration

SD input Performance
<table>
<thead>
<tr>
<th>Low</th>
<th>Normal mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Shut down mode</td>
</tr>
</tbody>
</table>

Fig. 3 Example of Signal Waveform

1. Transmitting data
2. Encoder output
3. Optical signal
4. GP2W0116YPS output
5. Receiving data

Transfer rate: 2.4kb/s, 9.6kb/s, 19.2kb/s, 38.4kb/s, 57.6kb/s, 115.2kb/s
Fig. 4 Input Signal Waveform (Receiver side)

Transmitter radiant intensity:
3.6mW/sr
At BR=115.2kb/s:
T1 = 8.68 µs, T2 = 1.63 µs

Fig. 5 Output Waveform Specification (Receiver side)

Fig. 6 Standard Optical System (Receiver side)

E<sub>s</sub> : Light detector face illuminance < 10 lx
φ : Indicates horizontal and vertical directions.

* Transmitter shall use GP2W0116YPS (λ<sub>p</sub>=870nm TYP.) which is adjusted to the radiation intensity at 3.6mW/sr.

Fig. 7 Output Waveform Specification (Transmitter side)
GP2W0116YPS

Fig.8 Standard Optical System (Transmitter side)

Detector for measuring radiant intensity.

φ : Indicates horizontal and vertical directions.

Fig.9 Recommended Circuit of Transmitter side

V_{CC}=3.3V

V_{LED}=3.3V

TX

1.63μs

V_{IN\_TX}=2.8V

BR=115.2kb/s

Fig.10 Recommended PCB Foot Pattern

Dimensions are shown for reference

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Symbol</th>
<th>(Unit : mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>① Supply voltage</td>
<td>V_{CC}</td>
<td>3.0</td>
</tr>
<tr>
<td>② Ground</td>
<td>GND</td>
<td>1.5</td>
</tr>
<tr>
<td>③ Shutdown</td>
<td>SD</td>
<td>1.1</td>
</tr>
<tr>
<td>④ Receiver data output</td>
<td>RXD</td>
<td>2.0</td>
</tr>
<tr>
<td>⑤ Transmitter data input</td>
<td>TXD</td>
<td>2.0</td>
</tr>
<tr>
<td>⑥ LED anode</td>
<td>LEDA</td>
<td>0.6</td>
</tr>
<tr>
<td>⑦ Shield ground</td>
<td>SGND</td>
<td>0.475</td>
</tr>
</tbody>
</table>

1.425

2.375
Fig.11 Recommended Size of Solder Paste (Reference)

Please open the solder mask as below so that the size of solder paste for this device before reflow soldering must be as large as one of the foot pattern land indicated Fig.10

(Unit : mm)

- : Solder paste area
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      --- Audio visual equipment
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      --- Various safety devices, etc.

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