GP2W1002YP

Low Profile Type IrDA Transceiver Module Compliant with IrDA1.1

■ Features

1. Integrated package of light emitter and receiver.
   (8.0×3.0×H2.5 mm)
2. Low profile type. (Height:2.5 mm)
3. Compliant with IrDA1.0 and IrDA1.1. (except 4Mbps)
4. Low voltage operation type.
   (Supply voltage:2.4V to 5.5V)
5. Low dissipation current thanks to power down mode.
   (Dissipation current at shut-doen mode:Max. 1μA)
6. Applicable for reflow soldering.
7. With shield case.

■ Applications

1. Personal computers.
2. Personal information tools.
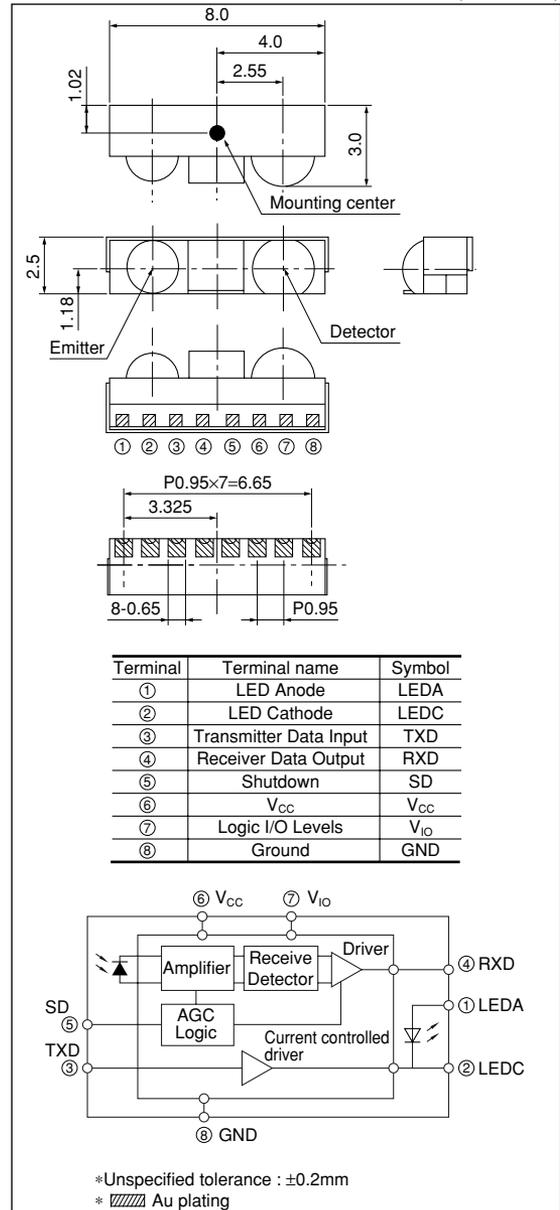3. Cellular phone.

■ Absolute Maximum Ratings $(T_a=25°C)$

Parameter	Symbol	Rating	Unit
Supply voltage	V_{CC}	0 to +6.0	V
LED supply voltage	V_{LED}	0 to +7.0	V
Transmitter data input	TXD	0 to V_{CC}+0.5	V
Shutdown	SD	0 to V_{CC}+0.5	V
Logic I/O levels	V_{IO}	0 to V_{CC}+0.5	V
[*1] Peak forward current	I_{FM}	600	mA
Operating temperature	T_{opr}	−25 to +85	°C
Storage temperature	T_{stg}	−25 to +85	°C
[*2] Soldering temperature	T_{sol}	240	°C

*1 Pulse operation
*2 Soldering reflow time:10s

■ Outline Dimensions

(Unit : mm)

Terminal	Terminal name	Symbol
①	LED Anode	LEDA
②	LED Cathode	LEDC
③	Transmitter Data Input	TXD
④	Receiver Data Output	RXD
⑤	Shutdown	SD
⑥	V_{CC}	V_{CC}
⑦	Logic I/O Levels	V_{IO}
⑧	Ground	GND

∗Unspecified tolerance : ±0.2mm
∗ ▨▨▨ Au plating

■ Recommended Operating Conditions (T$_a$=25°C)

Parameter	Symbol	Rating	Unit
Supply voltage	V$_{CC}$	2.4 to 5.5	V
LED supply voltage	V$_{LED}$	2.4 to 5.5	V
Operating temperature	T$_{opr}$	−25 to +85	°C
Data rate	BR	9.6 to 1 152	kbps
Logic I/O levels	V$_{IO}$	1.5 to V$_{CC}$	V

■ Electro-optical Characteristics

(T$_a$=25 to +85°C, V$_{CC}$=2.4 to 3.6V Unless othewise specified)

	Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Receiver side	Current consumption at no input signal	I$_{CC}$	No input signal, V$_{ILSD}$=0V Output terminal OPEN, T$_a$=25°C	−	445	585	μA
	Current consumption at receiving	I$_{CC-R}$	V$_{ILSD}$=0V Output terminal OPEN, T$_a$=25°C	−	650	−	μA
	Current consumption at shut-down mode	I$_{CC-S}$	No input signal, V$_{IHSD}$=V$_{CC}$−1.2V, T$_a$=25°C Output terminal OPEN	−	0.01	1.0	μA
	High level output voltage	V$_{OH}$	[3, 4, 5] V$_{IO}$=1.8V, I$_{OH}$=0.3mA, T$_a$=25°C	V$_{IO}$−0.5	−	V$_{CC}$	V
	Low level output voltage	V$_{OL}$	[3, 4, 5] I$_{OL}$=1mA, T$_a$=25°C	−	−	0.6	V
	Rise time	t$_r$	BR=1.152Mbps, [3, 4, 5] V$_{CC}$=3.3V, CL=15pF, T$_a$=25°C	−	−	50	ns
	Fall time	t$_f$		−	−	40	ns
	Low level pules width	t$_{w1}$	t$_{w1}$, E$_{e1}$;BR=115.2kbps, φ≤15° t$_{w2}$, E$_{e2}$;BR=1.152Mbps, φ≤15° T$_a$=25°C	1.0	−	4.0	μs
		t$_{w2}$		110	−	500	ns
	Maximum reception distance	L		100	−	−	cm
	Input irradiance	E$_{e1}$		−	−	4.0	μW/cm^2
		E$_{e2}$		−	−	10.0	μW/cm^2
	Overload irradiance	E$_{e3}$		500	−	−	mW/cm^2
	Receiver latency	t$_l$	T$_a$=25°C, V$_{CC}$=3.3V	−	−	100	μs
	Receiver wake up time	t$_{sdw}$	No input signal, T$_a$=25°C, V$_{CC}$=3.3V	−	−	100	μs
	SD input current	I$_{isd}$	T$_a$=25°C, V$_{CC}$=3.3V	−0.01	0	+0.01	μA
	SD terminal input voltage logic high	V$_{IHSD}$	Shut down mode, V$_{CC}$=2.4 to 5.5V	1.6	−	V$_{CC}$	V
	SD terminal input voltage logic low	V$_{ILSD}$	Normal mode, V$_{CC}$=2.4 to 5.5V	−	−	0.5	V
	Jitter	t$_j$	BR=1.152Mbps, V$_{CC}$=2.4 to 5.5V, T$_a$=25°C	−	100	150	ns
Transmitter side	Radiant intensity	I$_E$	φ≤15°, V$_{LED}$=4.5 to 5.5V, R$_{LED}$=4.7Ω, T$_a$=25°C, [6, 7, 8]	100	−	−	mW/sr
	LED peak current	I$_{LED}$	V$_{CC}$=5V, R$_{LED}$=4.7Ω, T$_a$=25°C, [6, 7, 8]	−	450	−	mA
	Rise time	t$_r$	BR=1.152Mbps, [6, 7, 8] T$_a$=25°C, V$_{LED}$=3V	−	−	40	ns
	Fall time	t$_f$		−	−	40	ns
	Peak emission wavelength	λ$_p$	T$_a$=25°C	850	870	900	nm
	TXD high level input voltage	V$_{IHTXD}$	LED (ON), V$_{CC}$=2.4 to 5.5V	1.6	−	V$_{CC}$	V
	TXD low level input voltage	V$_{ILTXD}$	LED (OFF), V$_{CC}$=2.4 to 5.5V	−	−	0.6	V
	TXD high level input current	I$_{IHTXD}$	T$_a$=25°C, V$_{IHTXD}$=1.6V	−	−	50	μA
	TXD low level input current	I$_{ILTXD}$	T$_a$=25°C, V$_{ILTXD}$=0 to 0.6V	−	−	8	μA
	Maximum optical pulse width	t$_{OPWM}$	TXD pin stuck high	15	−	300	μs

[3] Refer to Fig.2
[4] Refer to Fig.3
[5] Refer to Fig.3
[6] Refer to Fig.4
[7] Refer to Fig.5
[8] Refer to Fig.6

■ Truth Table

SD	SW	TXD	LED	Receiver	TR$_1$	TR$_2$	RXD
H	Off	L	Off	Don't care	Off	Off	Pull-up
L	On	H	On	Don't care	–	–	Not valid
L	On	L	Off	IrDA signal	Off	On	L
L	On	L	Off	No signal	On	Off	H

H:High
L:Low

*RXD equivalent circuit
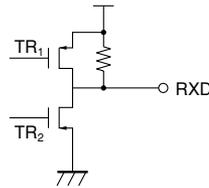
*TXD equivalent circuit
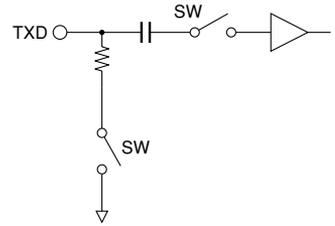
Fig.1 Recommended External Circuit
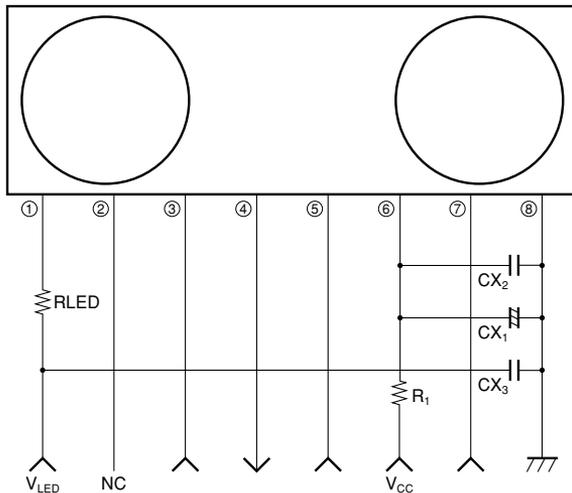
① LEDA
② LEDC
③ TXD
④ RXD
⑤ SD
⑥ V$_{CC}$
⑦ V$_{IO}$
⑧ GND

Components	Recommended values
CX$_{1,3}$	10µF/16V (Note 1)
CX$_2$	0.47µF(Ceramic) (Note 1)
R$_1$(0.125W)	4.7Ω
RLED (0.5W)	4.7Ω V$_{LED}$=2.4 to 5.5V (Note 2)

(Note 1) Components choose the most suitable CX$_{1\ to\ 3}$ according to the noise level and noise frequency of power supply.
(Note 2) In order to guarantee 100mW/sr, VLED is required 4.5 to 5.5V.

RLED

CX$_2$
CX$_1$
R$_1$
CX$_3$

V$_{LED}$ NC   V$_{CC}$

Fig.2 Output Waveform Specification (Detector side)

t$_f$ t$_r$

V$_{OH}$
90%
50%
10%
V$_{OL}$
t$_w$
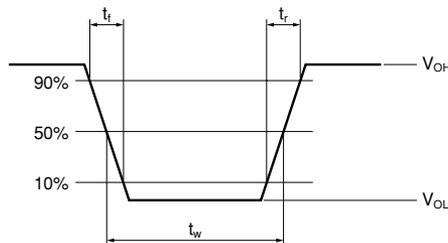
Fig.3 Standard Optical System (Detector side)

E_e : Light detector face illuminance<10 lx

Transmitter [1]

ϕ
ϕ

GP2W1002YP

Oscilloscope

L

ϕ : Indicates horizontal and vertical directions.

Input signal waveform (Detector side)

T_1 T_1

T_2

Radiantion intensity
of transmitter 40mW/sr
(at BR=115.2kbps),
100mW/sr (at BR=1.152Mbps)

At BR=115.2kbps:T_1=8.68μs, T_2=1.41 to 2.23μs
At BR=1.152Mbps:T_1=868ns, T_2=217ns
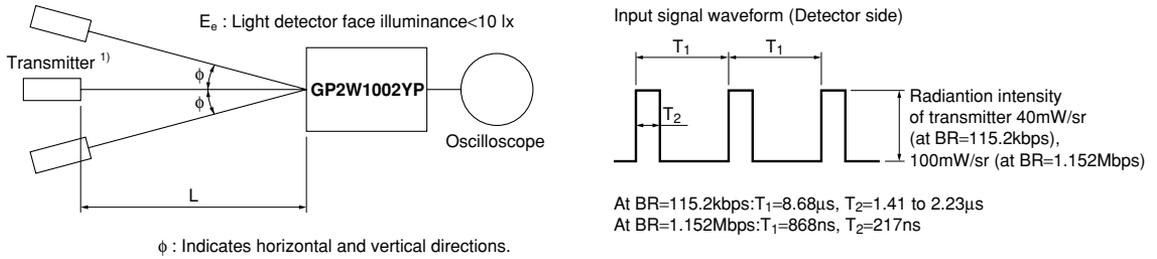
1) Transmitter shall use **GP2W1002YP** (λp=870nm TYP.) which is
adjusted the radiation intensity at 40mW/sr (at 115.2kbps),
100mW/sr (at 1.152Mbps)
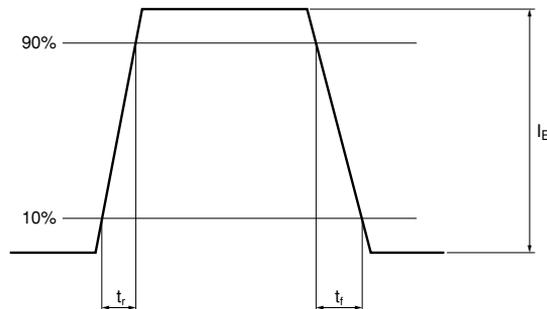
Fig.4 Output Waveform Specification (Transmitter side)

90%

10%

I_E

t_r t_f

Fig.5 Standard Optical System (Transmitter side)

GP2W1002YP

ϕ
ϕ

Detector for
radiant intensity measuring

ϕ : Indicates horizontal and vertical directions.
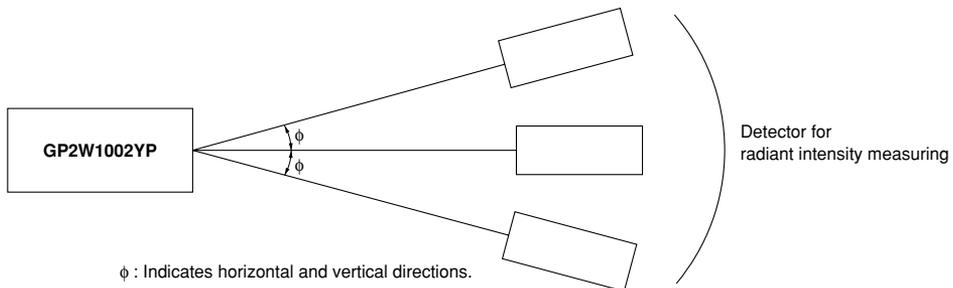
Fig.6 Recommended Circuit of Transmitter side

V_{CC}=3.3V

V_{LED}=5V

4.7Ω

1.63μs (at 115.2kbps)

217ns (at 1.152Mbps)

TXD

GP2W1002YP

V_{IHTXD}=2.8V

BR=115.2kbps
BR=1.152Mbps
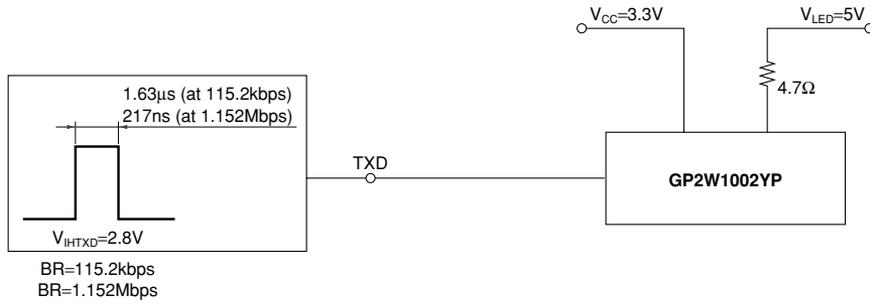
Fig.7 Recommended PCB Foot Pattern
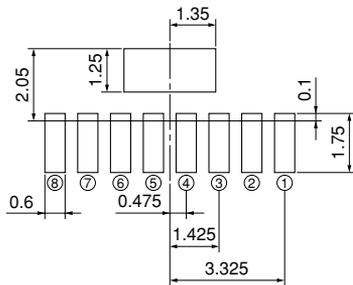
(unit : mm)

1.35

2.05

1.25

0.1

1.75

⑧ ⑦ ⑥ ⑤ ④ ③ ② ①

0.6

0.475

1.425

3.325

Terminal	Terminal name	Symbol
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②	LED cathode	LEDC
③	Transmitter data input	TXD
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⑤	Shutdown	SD
⑥	V_{CC}	V_{CC}
⑦	Logic I/O levels	V_{IO}
⑧	Ground	GND

Dimensions in parenthesis are shown for reference.

Fig.8 Recommended Size of Solder Creamed Paste (Reference)

Please open the solder mask as below
so that the size of solder creamed paste
for this device before reflow soldering
must be as large as one of the foot
pattern land indicated at Fig.7

(unit : mm)

Mounting center

1.35

2.05

1.25

0.1

1.75

0.6

0.475

1.425

3.325
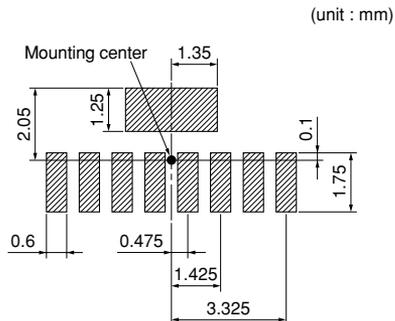
▨ : Solder paste area

✳ Dimensions in parenthesis are shown for reference.

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