# GP1FAV30RK0F

## Fiber Optic Receiver
## Square connector
## With mounting hole
## Protection cap type

## ■Description

**GP1FAV30RK0F** employs an OPIC device that integrates a photodiode and signal processing circuit onto a single chip, and the output is at TTL levels.

## ■Features

1. Fiber optic receiver
   (Transmitter : **GP1FAV30TK0F**)
2. Square connector (JEITA RC-5720B)
3. With mounting hole
4. Protection cap type
5. Supply voltage : 3 V
6. Transfer rate : 15.5 Mb/s

## ■Agency approvals/Compliance

1. Compliant with JEITA RC-5720B and CP1201
2. Compliant with RoHS directive (2002/95/EC)

## ■Applications

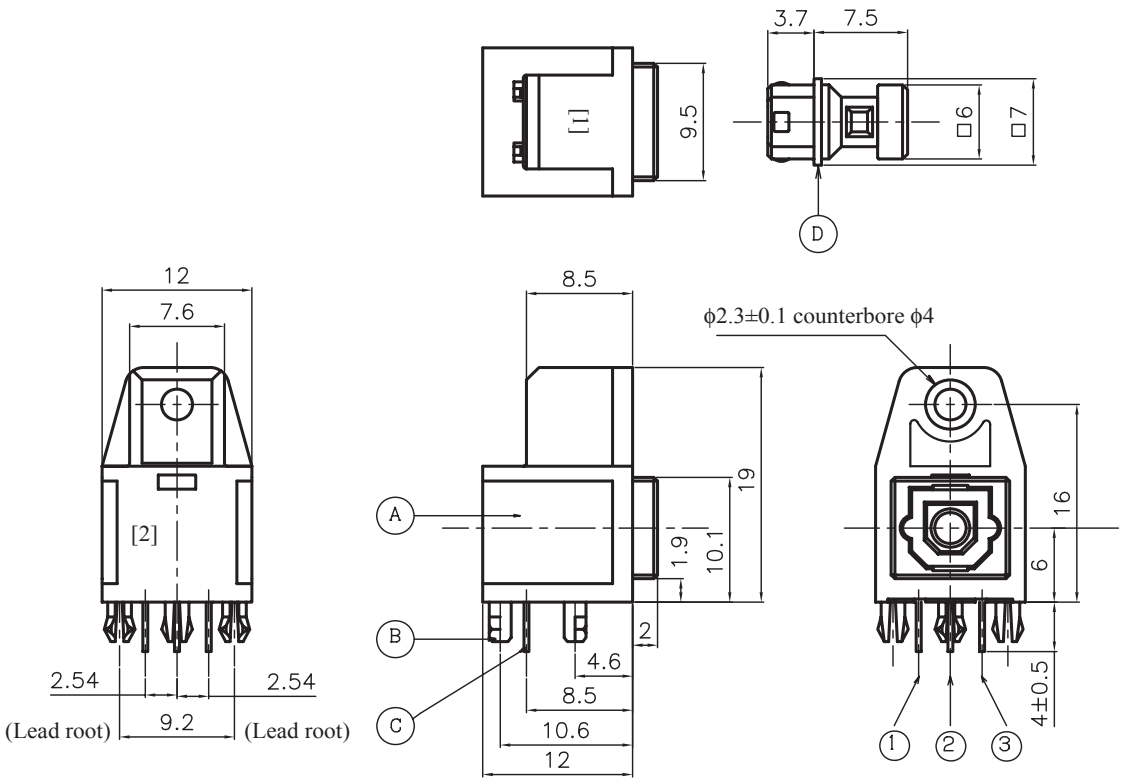
AV equipment
(DVD, CD, MD players etc.)



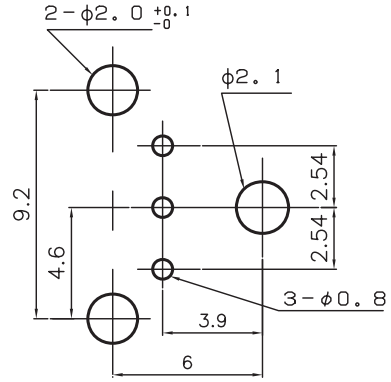
Sheet No.: E2-A01101EN
Date Dec.01.2006

## ■Outline Dimensions

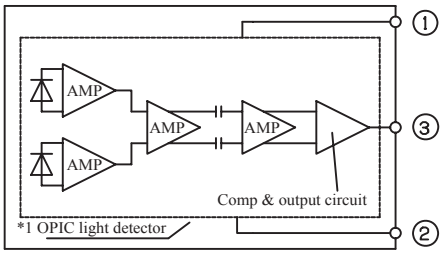
(Unit: mm)




Example of mounting drawing from solder side.
Unspecified tolerance ± 0.1




Internal Equivalent Circuit



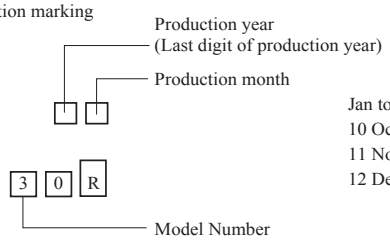

*1 OPIC is a registered trade mark of Sharp (Material : Silicon)

### Pin Arrangement

① $V_{CC}$ ② GND ③ $V_{out}$

1) The connector joint area complies with the square connector JEITA RC-5720B.
2) [1] portion : "S" mark, [2] portion : Model No. and date code shall be indicated.
3) Unspecified tolerance are ± 0.3
4) Since there are other products which has a different fixing pin shape, please make sure to confirm reference mounting drawing for this device.

[2]Portion marking




Jan to Sep: 1 - 9
10 Oct: X
11 Nov: Y
12 Dec: Z

| Symbol | Description | Material |
|---|---|---|
| A | Holder | PBT (Color : Black) |
| B | Fixing pin | PBT (Color : Black) |
| C | Lead pin | Cu Alloy (SnCu plating) |
| D | Protect cap | PBT (Color : Black) |

Product mass : approx. 2.2 g

## ■Absolute Maximum Ratings

| Parameter | Symbol | Rating | Unit | Remark |
|---|---|---|---|---|
| Supply voltage | $V_{CC}$ | -0.5 to +7.0 | V | |
| Operating temperature | $T_{opr}$ | -20 to +70 | °C | |
| Storage temperature | $T_{stg}$ | -30 to +80 | °C | |
| Soldering temperature *1 | $T_{sol}$ | 260 | °C | 6 s or less/time up to 2 times. |
| | | 380 | °C | 4 s or less/time up to 1 time.<br>Soldering by hand at each terminal. *2 |
| Output current | $I_{oH}$ | 2 | mA | Source current |
| | $I_{oL}$ | 10 | mA | Sink current |

*1 Solder at a position more than 1.6 mm away from the base of the lead terminal. Reflow is not available.
*2 Do not contact top of soldering iron to lead terminal directly.

## ■Recommended Operating Conditions

| Parameter | Symbol | MIN. | TYP. | MAX. | Unit | Remark |
|---|---|---|---|---|---|---|
| Supply voltage | $V_{CC}$ | 2.7 | 3.0 | 3.6 | V | |
| Operating transfer rate | T | 0.1 | - | 15.5 | Mb/s | Notes (1), (2) |
| Receiver input optical power level | $P_C$ | -24.0 | - | -14.5 | dBm | Peak optical output |

Notes
(1) This operating transfer rate shall be a specification when NRZ, duty 50 % of continuous "0101···" signal is transferred.
(2) The output (H/L Level) of this product are not fixed constantly when it receivers the modulating light (including DC light, no input light) less than 0.1 Mb/s.

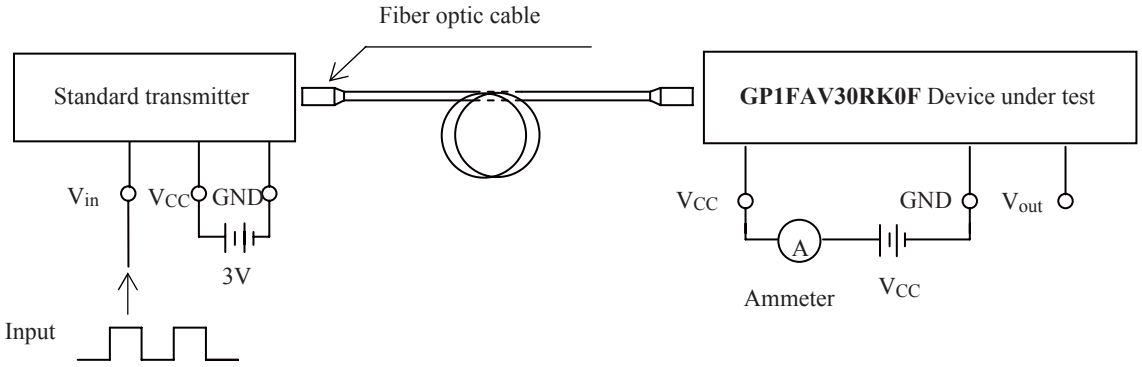
## ■Electro-optical Characteristics

($T_a$ = 25 °C, $V_{CC}$ = 3V)

| Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|---|
| Peak sensitivity wavelength | $\lambda_p$ | | - | 700 | - | nm |
| Supply current | $I_{CC}$ | Measurement method refer to Fig. 1 | - | 13 | 15 | mA |
| High level output voltage | $V_{oH}$ | Measurement method refer to Fig. 2, 3 | 2.1 | - | - | V |
| Low level output voltage | $Vo_L$ | | - | - | 0.5 | V |
| Rise time | $t_r$ | | - | 15 | - | ns |
| Fall time | $t_f$ | | - | 8 | - | ns |
| L → H delay time | $t_{pLH}$ | | - | - | 180 | ns |
| H → L delay time | $t_{pHL}$ | | - | - | 180 | ns |
| Pulse width distortion | $\Delta t_w$ | | -20 | - | +20 | ns |
| Jitter | $\Delta t_j$ | Measurement method refer to Fig. 4, 5, PC = -14.5 dBm | - | 1 | 20 | ns |
| | | Measurement method refer to Fig. 4, 5, PC = -24 dBm | - | - | 20 | ns |

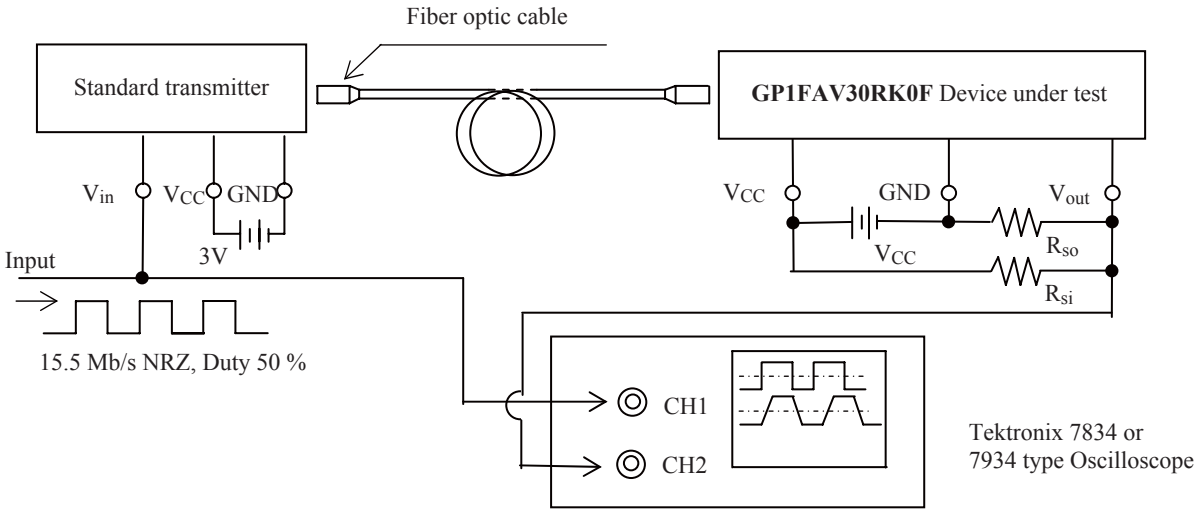
## ■Measurement Method

### Fig. 1 Supply Current

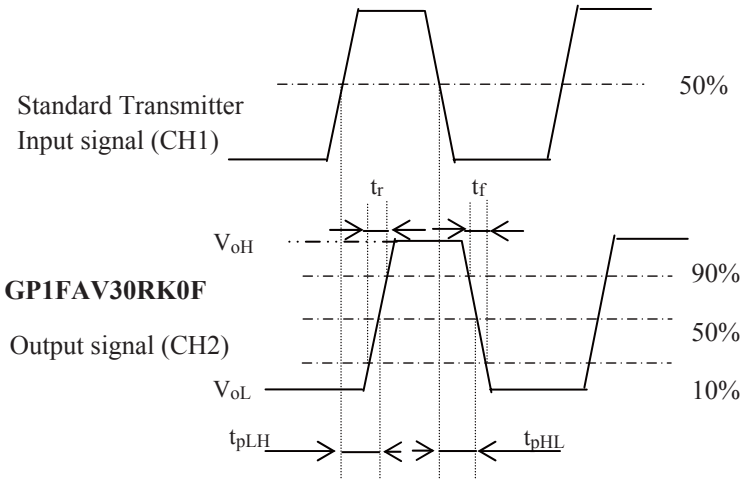



| Input conditions | | Judgment method |
|---|---|---|
| Supply voltage | $V_{CC}$ = 3.0 V | Measured on an ammeter (DC mean amperage) |
| Optical fiber coupling light output | $P_C$ = -14.5 dBm | |
| Standard transmitter input signal | 15.5 Mb/s NRZ, Duty 50 % or 7.75 Mb/s bi-phase mark PRBS signal | |

## Fig. 2 Output Voltage and Pulse Response

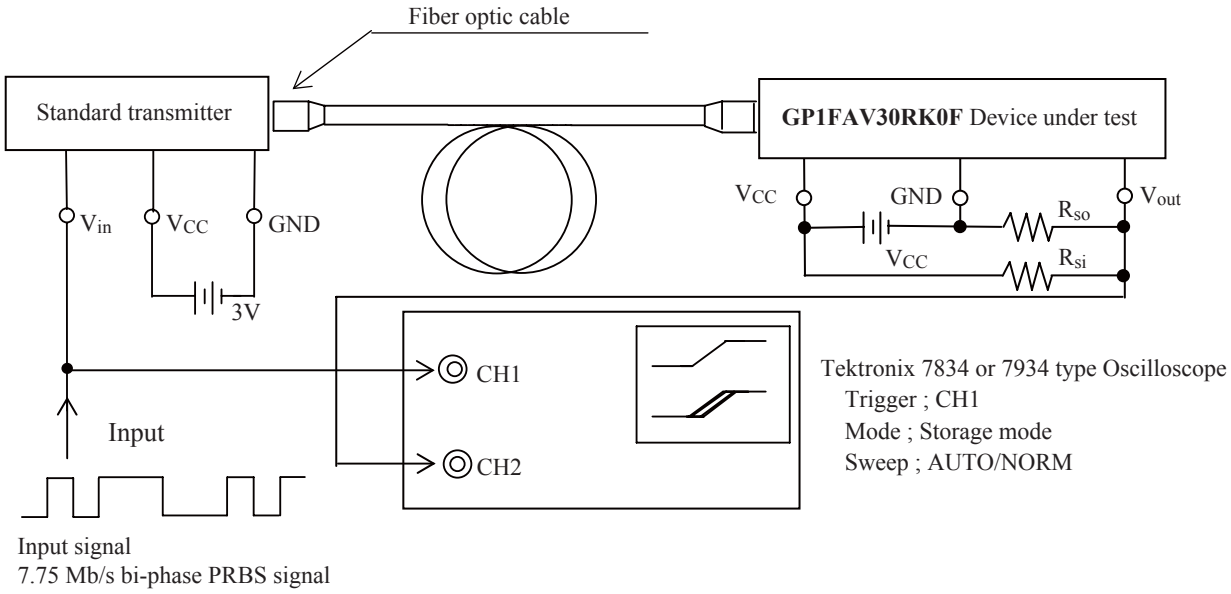



## Fig. 3 Input and Output Signal

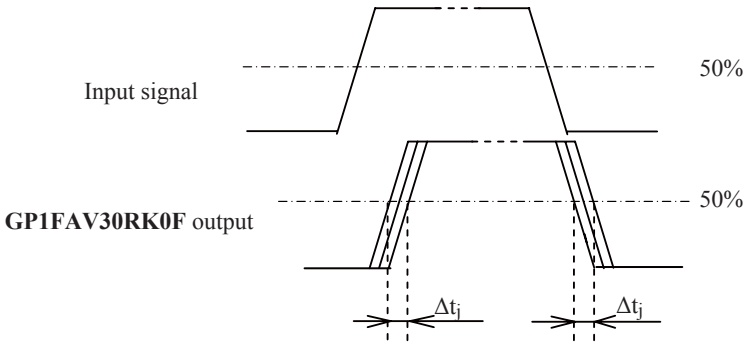



Notes
(1) $V_{CC}$ = 3.0V (State of operating)
(2) The fiber coupling light output set at –14.5 dBm or –24.0 dBm.
(3) The probe for the oscilloscope must be more than 1 MΩ and less than 10 pF.
(4) $R_{si}$, $R_{so}$: Standard load resistor ($R_{si}$: 3.3 kΩ, $R_{so}$: 2.2 kΩ)
(5) The output (H/L level) of this device are not fixed constantly when it receivers the modulating light (including DC light, no input light) less than 0.1 Mb/s.

## Fig. 4 Pulse Response and Jitter




## Fig. 5 Input Signal (7.75 Mb/s Bi-phase PRBS Signal)




Notes
(1) The fiber coupling light output set at –14.5 dBm or –24.0 dBm.
(2) $R_{si}$, $R_{so}$: Standard load resistor ($R_{si}$: 3.3 kΩ, $R_{so}$: 2.2 kΩ)
(3) Set the oscilloscope to the storage mode and write time to 3 seconds.
Do not allow the brightness to be increased too much. The waveform would be distorted.
(4) $V_{CC}$ = 3.0 V (State of operating)
(5) The probe for the oscilloscope must be more than 1 MΩ and less than 10 pF.

## ■Design and Production Notes

(1) Stabilization of power supply line

Please put a by-pass capacitor (0.1 µF) close to the device at least within 7 mm of the terminal.
Please also put a 4.7 µF capacitor across the power supply line nearby.

(2) Soldering condition

Solder at the condition within the absolute maximum ratings in this sheet. In case of using flow soldering, please make sure of the conditions of process at the flow equipment. Also, do not use reflow soldering. In case of soldering by hand, do not contact top of soldering iron to lead terminal directly. (Solder at a position more than 1.6 mm away from the base of the lead terminal.)

(3) About getting dirt and dust in the connector coupling portion

In case dirt or dust comes into the connector coupling portion, please use a blower to take it off.
Any rigid rod-like object must not be inserted since into the coupling portion.
The internal device might be damaged, resulting deteriorated characteristics.

(4) Cleaning

Do not immerse for cleaning. The solvent would get into the connector coupling portion resulting deteriorated characteristics. Should it be necessary to remove the flux, please use one of the following solvents only to be applied with a brush.
Solvent : Isopropyl alcohol, Methyl alcohol

(5) Ground during assembling

The human body and the soldering iron must be grounded against the static breakdown of the device during assembling.
Please avoid touching the device terminals as much as possible before assembling.

(6) Assembly of the device

Please fix this device with a screw. In case that this device is not fixed with a screw, stress by detaching connector of internal elements and leads can adversely affect the device's reliability. Excessive torque can deform the package and damage the optics. It can also adversely affect the device's reliability because the device is used under continuous stress.
Please confirm the limit of fixing torque to the installation before fixing actually.

Recommended values

Screw : M3.0 × 8 mm tapping screw
Fixing torque : 0.7 to 0.8 N·m
Force applied by driver etc. : 39 N or less

Note : Please contact and consult with a Sharp sales representative for any questions about above.

(7) Input signal

This product is designed intentionally based upon the signal transmission which is defined by the digital audio interface standard ; CP1201. When a signal out of JEITA standard CP-1201 is inputted to this device, there might be a case that this device can not receive a signal correctly from transmitting unit.

(8) Fixing pin

Since there are other products which has a different fixing pin shape, please make sure to confirm reference mounting drawing for this device.

(9) Damage to connector coupling portion

Please do not stress the connector coupling portion excessively since there might be a case that the shutter can't operate normally.

(10) About getting the flux into connector coupling portion

Please avoid getting a flux into connector coupling portion of this device, because there might be a case that the characteristics deteriorate the shutter can't operate normally.

● **Presence of ODC etc.**

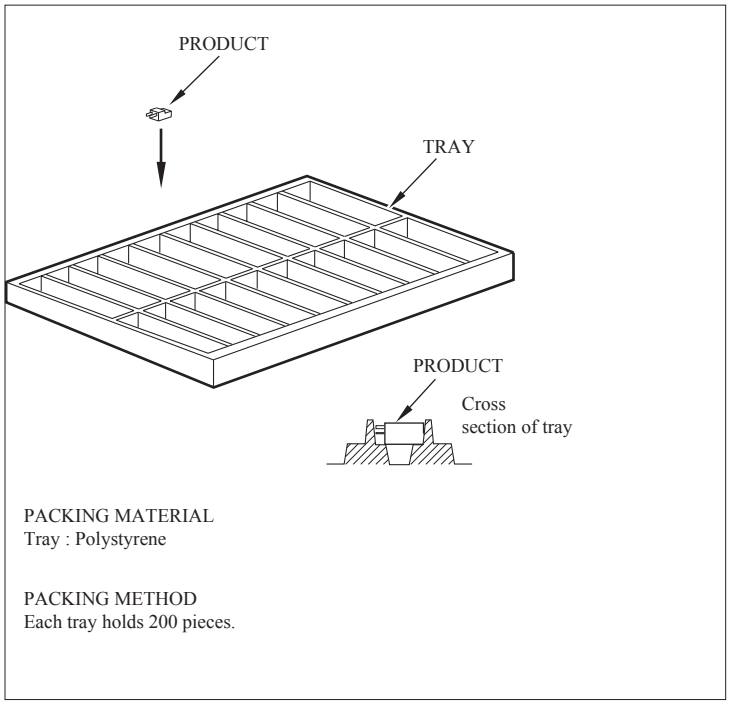
This product shall not contain the following materials.
And they are not used in the production process for this product.
Regulation substances : CFCs, Halon, Carbon tetrachloride, 1.1.1-Trichloroethane (Methylchloroform)

Specific brominated flame retardants such as the PBB and PBDE are not used in this product at all.

This product shall not contain the following materials banned in the RoHS Directive (2002/95/EC).

- Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE).

## ■Packing Specifications




PACKING MATERIAL
Tray : Polystyrene

PACKING METHOD
Each tray holds 200 pieces.

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- --- Gas leakage sensor breakers
- --- Alarm equipment
- --- Various safety devices, etc.

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