

# GP1FAV31TK0F

Fiber Optic Transmitter  
Square connector  
With mounting hole  
With shutter



## ■Description

**GP1FAV31TK0F** has a built-in LED with a peak light emission wavelength of 660 nm and the associated drive IC, and the input is TTL level compatible.

## ■Features

1. Fiber optic transmitter  
(Receiver : **GP1FAV31RK0F**)
2. Square connector (JEITA RC-5720B)
3. With mounting hole
4. With shutter function
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.)

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Sheet No.: E2-A00601EN

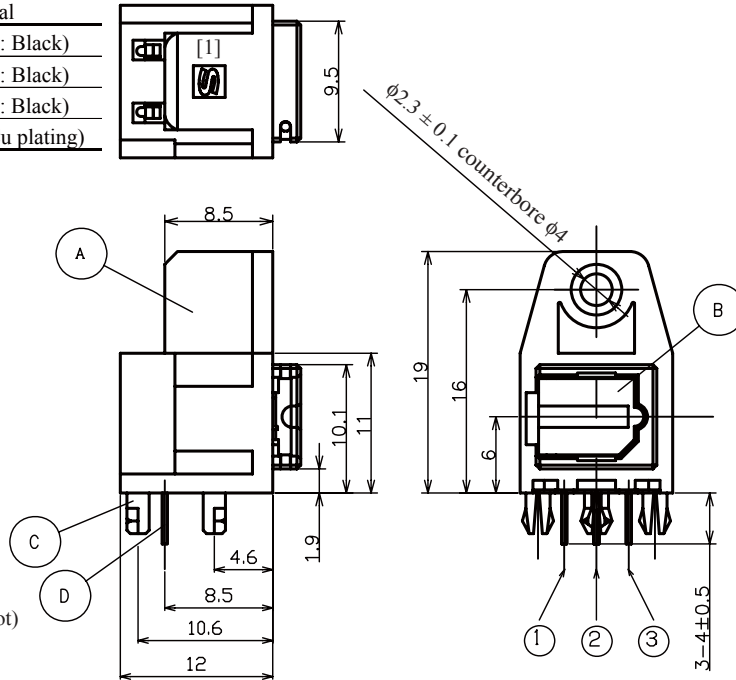
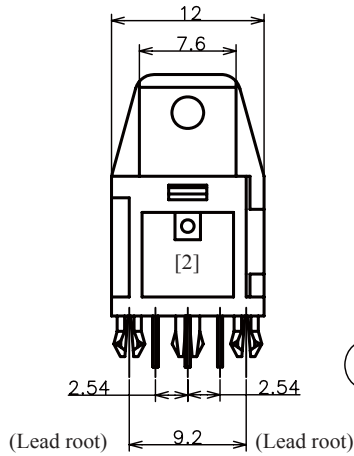
Date Dec.01.2006

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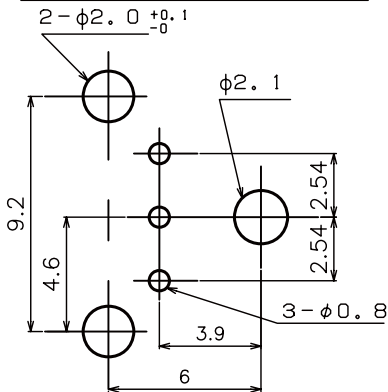
■ Outline Dimensions

(Unit: mm)

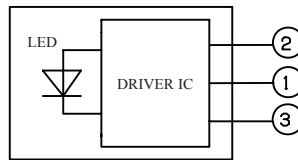
Symbol	Description	Material
A	Holder	PBT (Color : Black)
B	Shutter	PBT (Color : Black)
C	Fixing pin	PBT (Color : Black)
D	Lead pin	Cu Alloy (SnCu plating)



Example of mounting drawing from solder side.  
Unspecified tolerance  $\pm 0.1$



Internal Equivalent Circuit



Pin Arrangement

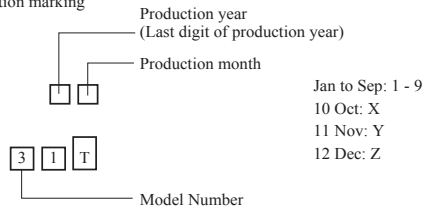
- ①  $V_{in}$  \*1
- ②  $V_{cc}$
- ③ GND

\*1

Input conditions of  $V_{in}$  terminal are designed to conform to TTL and CMOS. It is recommended that the output of TTL and high speed CMOS be used in the input for  $V_{in}$  terminal.

- 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  $\pm 0.3$
- 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



Product mass : approx. 2 g

### ■ Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit	Remark
Supply voltage	$V_{CC}$	-0.5 to +7.0	V	
Input voltage	$V_{in}$	-0.5 to $V_{CC}+0.5$	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. Soldering by hand at each terminal. *2

\*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	5.25	V	
Operating transfer rate	T	-	-	15.5	Mb/s	NRZ signal duty 50%

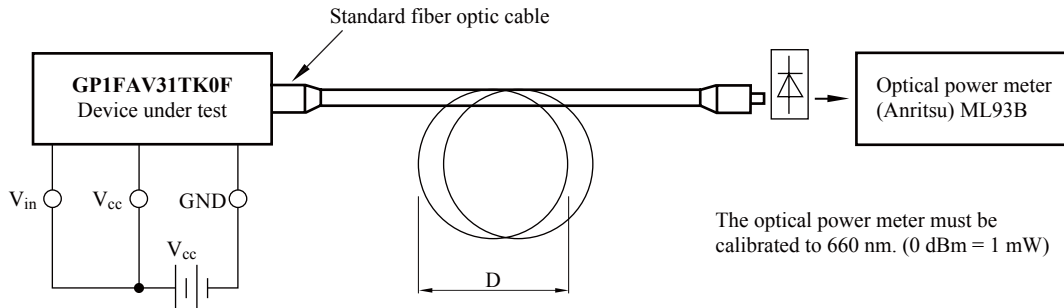
### ■ Electro-optical Characteristics

( $T_a = 25\text{ °C}$ ,  $V_{CC} = 3\text{V}$ )

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit	
Peak emission wavelength	$\lambda_p$		630	660	690	nm	
Output optical power couple into fiber	$P_C$	Measurement method refer to Fig. 1	-21	-18	-15	dBm	
Supply current	$I_{CC}$		-	8	13	mA	
High level input voltage	$V_{iH}$	Measurement method refer to Fig. 2	$V_{CC}=3.0\text{V}$	2.3	-	-	V
			$V_{CC}=5.0\text{V}$	2.9	-	-	
Low level input voltage	$V_{iL}$	Measurement method refer to Fig. 2	$V_{CC}=3.0\text{V}$	-	-	0.8	V
			$V_{CC}=5.0\text{V}$	-	-	1.3	
L → H delay time	$t_{pLH}$	Measurement method refer to Fig. 3, 4		-	-	180	ns
H → L delay time	$t_{pHL}$			-	-	180	ns
Pulse width distortion	$\Delta t_w$			-15	-	+15	ns
Jitter	$\Delta t_j$			-	1	15	ns

**■ Measurement Method**

**Fig. 1 Output Optical Power Coupled Into Fiber**

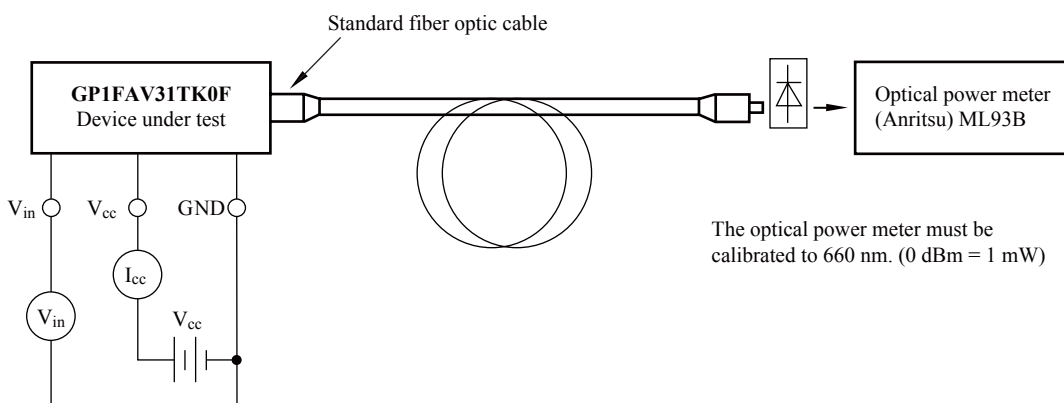


The optical power meter must be calibrated to 660 nm. (0 dBm = 1 mW)

**Notes**

1.  $V_{cc} = 3.0$  V (State of operating)
2. To bundle up the standard fiber optic cable, make it into a loop with the diameter  $D = 10$  cm or more.  
(The standard fiber optic cable will be specified elsewhere.)

**Fig. 2 Input Voltage and Supply Current**



The optical power meter must be calibrated to 660 nm. (0 dBm = 1 mW)

**Input conditions and judgment method**

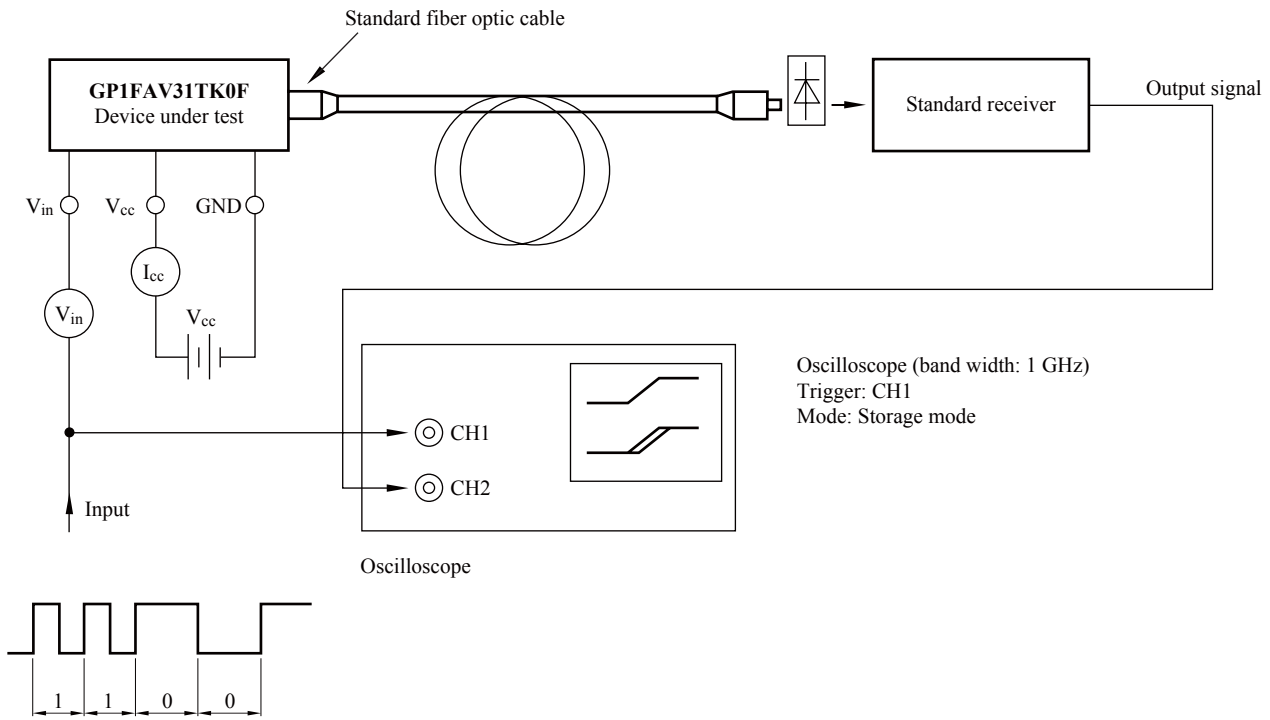
$V_{cc} = 5.0$  V (State of operating)

No.	Input conditions	Judgment method
1	$V_{in} = 2.9$ V or more	$-21 \leq P_C \leq -15$ dBm, $I_{CC} = 13$ mA or less
2	$V_{in} = 1.3$ V or less	$P_C \leq -36$ dBm, $I_{CC} = 13$ mA or less

$V_{cc} = 3.0$  V (State of operating)

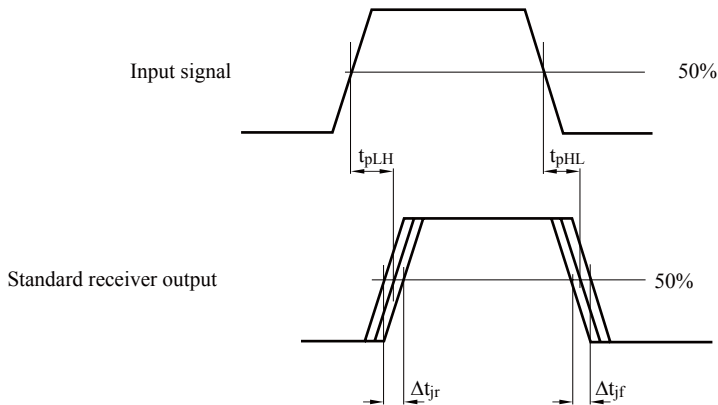
No.	Input conditions	Judgment method
1	$V_{in} = 2.3$ V or more	$-21 \leq P_C \leq -15$ dBm, $I_{CC} = 13$ mA or less
2	$V_{in} = 0.8$ V or less	$P_C \leq -36$ dBm, $I_{CC} = 13$ mA or less

**Fig. 3 Pulse Response and Jitter**



Input signal  
7.75 Mb/s bi-phase PRBS signal

**Fig. 4 Input Signal (7.75 Mb/s Bi-phase PRBS Signal)**



**Notes**

- (1) The wave form write time shall be 4 s. But do not allow the wave form to be distorted by increasing the brightness too much.
- (2)  $V_{CC} = 3.0\text{ V}/5.0\text{ V}$  (State of operating)
- (3) The probe for the oscilloscope must be more than  $1\text{ M}\Omega$  and less than  $10\text{ pF}$ .

## ■ Design and Production Notes

### (1) Stabilization of power supply line

Please put a by-pass capacitor (0.1  $\mu$ F) close to the device at least within 7 mm of the terminal.  
Please also put a 4.7  $\mu$ F 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  $\times$  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 transmit a signal correctly to receiving 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.

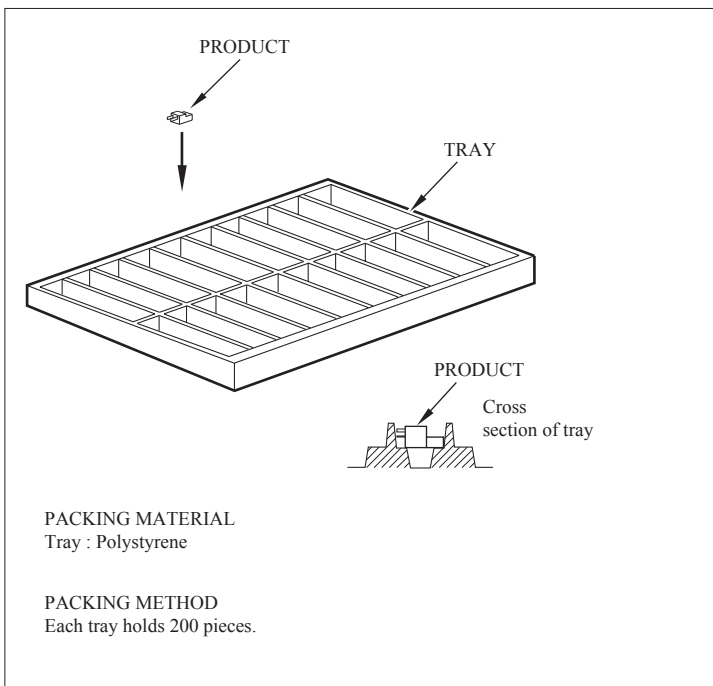
And they are not used in the production process for this product.

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**

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- Industrial control
- Audio visual equipment
- Consumer electronics

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

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