

# GP1FD210RP

## Thin Low Voltage Operation Type Optical Mini-jack for Digital Audio Equipment

### ■ Features

1. Thin type (4.2mm) fiber optic receiver
2. Compact (adoption of small jack for mini plug) JIS C6560
3. Both optical and electrical signal can be distinguished and received
4. Low voltage operation ( $V_{CC}$  2.4 to 3.0V)
5. High speed data transmission  
(Signal transmission speed : MAX, 8Mb/s (NRZ signal))

### ■ Applications

1. MD players
2. Portable CD players (Optic receiver part)

### ■ Absolute Maximum Ratings (Photoelectric conversion element) ( $T_a=25^\circ\text{C}$ )

Parameter	Symbol	Rating	Unit
Supply voltage	$V_{CC}$	-0.5 to +7.0	V
Operating temperature	$T_{opr}$	-20 to +70	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-30 to +80	$^\circ\text{C}$
*1 Soldering temperature (Reflow)	$T_{sol}$	240	$^\circ\text{C}$
Output current	$I_{OH}$	2 (source current)	mA
	$I_{OL}$	4 (sink current)	mA

\*1 For 10s (according to reflow profile in the specification sheet)

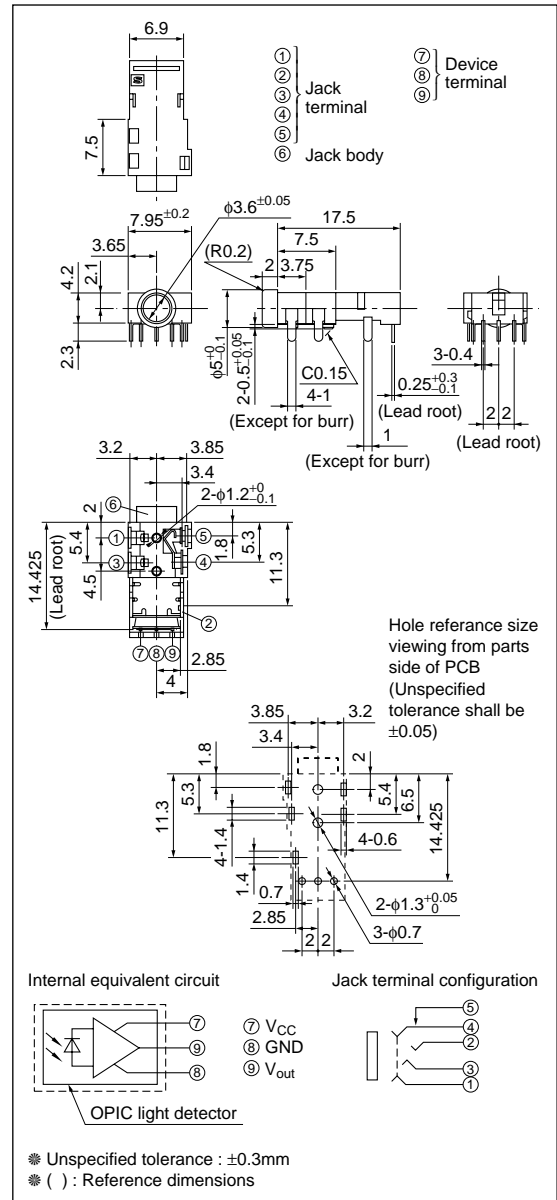
### ■ Absolute Maximum Ratings(Jack)

Parameter	Symbol	Rating	Unit
Total power dissipation	$P_{tot}$	D.C. 12V, 1A	-
Operating temperature	$T_{opr}$	-20 to +70	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-30 to +80	$^\circ\text{C}$
*1 Soldering temperature	$T_{sol}$	240	$^\circ\text{C}$
*2 Isolation voltage	$V_{iso}$	A.C. 500V <sub>rms</sub>	-

\*2 For 1minute

### ■ Outline Dimensions

(Unit : mm)



**Recommended Operating Conditions**

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Operating supply voltage	V <sub>CC</sub>	2.4	2.5	3.0	V
Operating transfer rate	T	0.1	—	8	Mb/s
Receiver input optical power level	P <sub>C</sub>	-24.0	—	-14.5	dBm

**Electro-optical Characteristics**

(T<sub>a</sub>=25°C, V<sub>CC</sub>=3.0V)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Peak sensitivity wavelength	λ <sub>p</sub>	—	—	700	—	nm
Dissipation current	I <sub>CC</sub>	Refer to Fig.1	—	5	7.5	mA
High level output voltage	V <sub>OH</sub>	Refer to Fig.2	2.0	2.2	—	V
Low level output voltage	V <sub>OL</sub>	Refer to Fig.2	—	0.2	0.5	V
Rise time	t <sub>r</sub>	Refer to Fig.2	—	17	—	ns
Fall time	t <sub>f</sub>	Refer to Fig.2	—	5	—	ns
Low → High delay time	t <sub>pLH</sub>	Refer to Fig.2	—	—	180	ns
High → Low delay time	t <sub>pHL</sub>	Refer to Fig.2	—	—	180	ns
Pulse width distortion	Δt <sub>w</sub>	Refer to Fig.2	-30	—	+30	ns
Jitter	Δt <sub>j</sub>	Refer to Fig.3, P <sub>C</sub> =-14.5dBm	—	1	30	ns
		Refer to Fig.p3, P <sub>C</sub> =-24dBm	—	—	30	ns

**Mechanical and Electrical Characteristics(Jack)**

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Insertion force, with drawal force	F <sub>p</sub>	*3	5	—	35	N
Contact resistance	R <sub>con</sub>	*4	—	—	30	mΩ
Isolation resistance	R <sub>iso</sub>	D.C. 500V, 1minute	100	—	—	MΩ

Note) This jack is designed for applicable to φ3.5 compact single head plug (JIS C6560)

\*3 Measuring method of insertion force and withdrawal force

Insertion and withdrawal force shall be measured after inserting and withdrawing 3 times by using JIS C6560 standard plug for test

\*4 Measuring method of contact resistance

It measures at 100mA or less and 1 000Hz at the condition of inserting JIS C6560 standard plug for test in which movable contact terminal and make contacts are described

**Fig.1 Dissipation Current**

Input conditions		Measuring method Measured on an ammeter (DC average amperage)
Supply voltage	V <sub>CC</sub> =2.5V	
Optical output coupling with fiber	P <sub>C</sub> =-14.5dBm	
Standard transmitter input signal	6Mb/s NRZ, Duty 50% or 3Mb/s biphas mark PRBS signal	

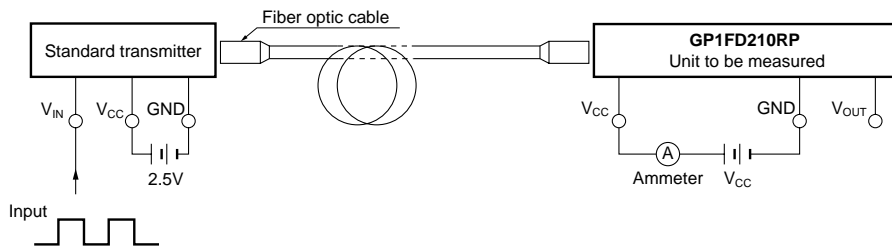
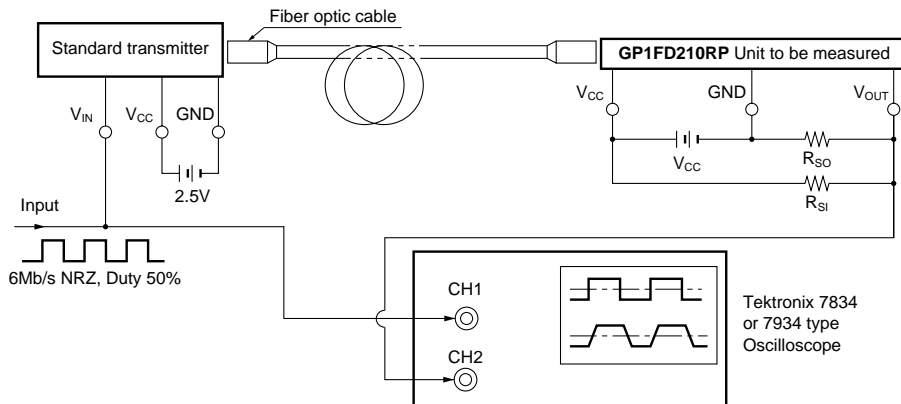


Fig.2 Measuring Method of Output Voltage and Pulse Response



Test item

Test item	Symbol
Low → High pulse delay time	$t_{PLH}$
High → Low pulse delay time	$t_{PHL}$
Rise time	$t_r$
Fall time	$t_f$
Pulse width distortion $\Delta t_w = t_{PHL} - t_{PLH}$	$\Delta t_w$
High level output voltage	$V_{OH}$
Low level output voltage	$V_{OL}$

- Notes (1)  $V_{CC}=2.5V$  (State of operating)  
 (2) The fiber coupling light output set at  $-14.5dBm/-24.0dBm$   
 (3) The probe for the oscilloscope must be more than  $1M\Omega$  and less than  $10pF$   
 (4) The output (H/L level) of **GP1FD210RP** are not fixed constantly when it receives the modulating light (including DC light, no input light) less than  $0.1Mb/s$

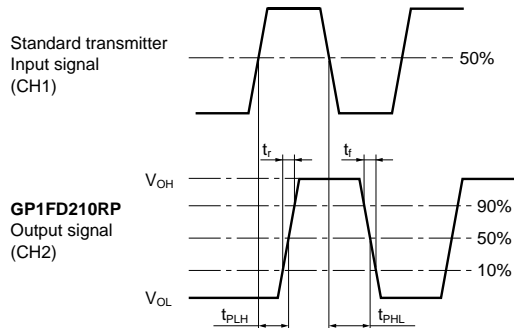
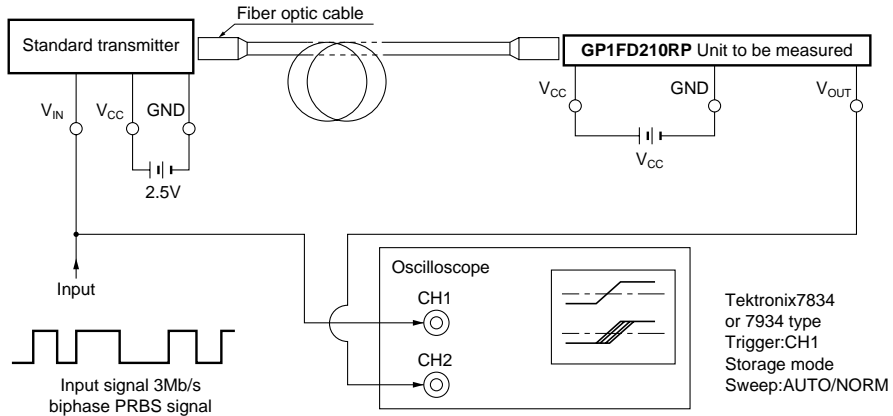


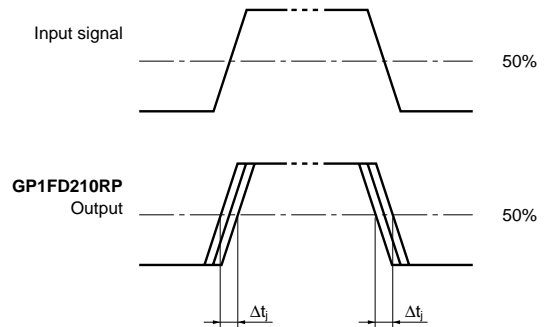
Fig.3 Measuring Method of Jitter



Test item

Test item	Symbol	Test condition
Jitter	$\Delta t_j$	Set the trigger on the rise of input signal to measure the jitter of the rise of output
Jitter	$\Delta t_j$	Set the trigger on the fall of input signal to measure the jitter of the fall of output

- Notes
- (1) The fiber coupling light output set at  $-14.5\text{dBm}/-24.0\text{dBm}$
  - (2) The waveform write time shall be 3 seconds. But do not allow the waveform to be distorted by increasing the brightness too much
  - (3)  $V_{CC}=2.5\text{V}$  (State of operating)
  - (4) The probe for the oscilloscope must be more than  $1\text{M}\Omega$  and less than  $10\text{pF}$



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