

# GP1FD210TP

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

### ■ Features

1. Compact (adoption of compact jack for mini plug) JIS C6560
2. Optical digital signal and electric analog signal can be discriminated and transmitted
3. High speed data transmission  
Signal transmission speed:MAX.8Mb/s (NRZ signal)
4. Low voltage operation  
Operating Voltage:2.3 to 2.8V

### ■ Applications

1. MD players
2. Portable CD players

### ■ Absolute Maximum Ratings (T<sub>a</sub>=25°C)

Parameter	Symbol	Rating	Unit
Supply voltage	V <sub>CC</sub>	-0.5 to +7.0	V
Input voltage	V <sub>IN</sub>	-0.5 to V <sub>CC</sub> +0.5	V
Operating temperature	T <sub>opr</sub>	-10 to +70	°C
Storage temperature	T <sub>stg</sub>	-30 to +80	°C
*1 Soldering temperature (Reflow)	T <sub>sol</sub>	240	°C

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

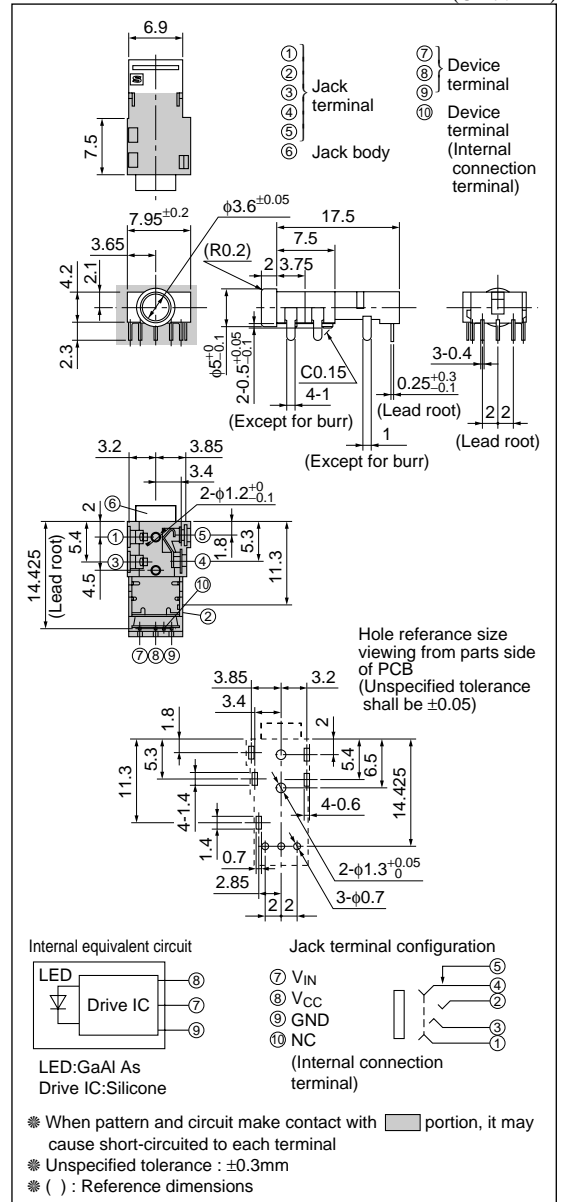
### ■ Absolute Maximum Ratings (Jack) (T<sub>a</sub>=25°C)

Parameter	Symbol	Rating	Unit
Total power dissipation	P <sub>tot</sub>	D.C. 12V, 1A	-
Operating temperature	T <sub>opr</sub>	-20 to +70	°C
Storage temperature	T <sub>stg</sub>	-30 to +80	°C
*1 Soldering temperature (Reflow)	T <sub>sol</sub>	240	°C
*2 Isolation voltage	V <sub>iso (rms)</sub>	A.C. 500V	-

\*2 For 1minute

### ■ Outline Dimensions

(Unit : mm)



\* "OPIC" (Optical IC) is a trademark of the SHARP Corporation.

An OPIC consists of a light-detecting element and signal-processing circuit integrated onto a single chip.

## ■ Recommended Operating Conditions

(T<sub>a</sub>=25°C)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Operating supply voltage	V <sub>CC</sub>	2.3	2.5	2.8	V
Operating transfer rate	T	–	–	8	Mb/s

## ■ Electro-optical Characteristics

(T<sub>a</sub>=25°C, V<sub>CC</sub>=2.5V)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Peak emission wavelength	λ <sub>p</sub>	–	630	660	690	nm
Optical power output coupling with fiber	P <sub>C</sub>	Refer to Fig.1	–21	–17	–15	dBm
High level dissipation current	I <sub>CCH</sub>	Refer to Fig.2	–	6	10	mA
Low level dissipation current	I <sub>CCL</sub>	Refer to Fig.2	–	0.6	1	mA
High level input voltage	V <sub>IH</sub>	Refer to Fig.2	1.9	–	–	V
Low level input voltage	V <sub>IL</sub>	Refer to Fig.2	–	–	0.7	V
Low→High delay time	t <sub>pLH</sub>	Refer to Fig.3	–	–	180	ns
High→Low delay time	t <sub>pHL</sub>	Refer to Fig.3	–	–	180	ns
Pulse width distortion	Δt <sub>w</sub>	Refer to Fig.3	–30	–	+30	ns
Jitter	Δt <sub>j</sub>	Refer to Fig.3	–	1	30	ns

## ■ Mechanical Characteristics

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Insertion force, withdrawal force	F <sub>p</sub>	<sup>*3</sup>	5	–	35	N
Contact resistance	R <sub>con</sub>	<sup>*4</sup>	–	–	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)

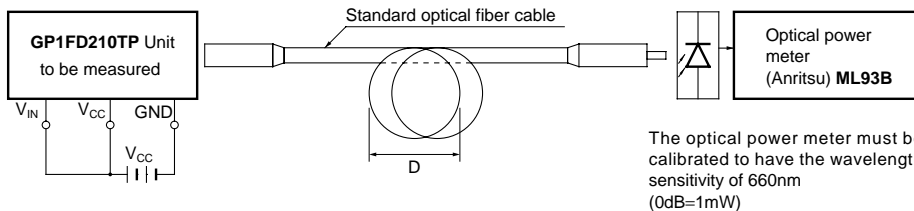
<sup>\*3</sup> Measuring method of insertion force and withdrawal force

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

<sup>\*4</sup> Measuring method of contact resistance

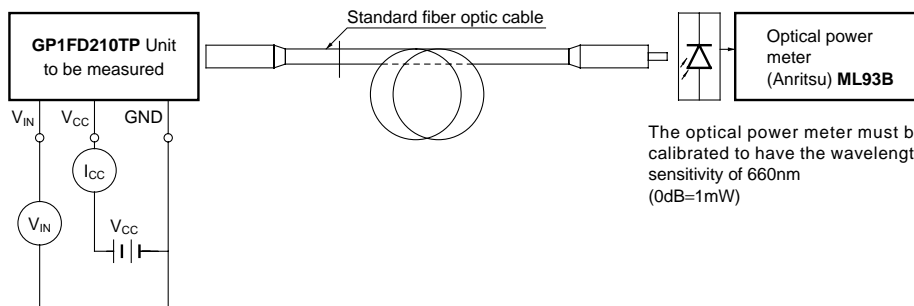
It measures at 100mA or less and 1 000Hz at the condition of inserting JIS C6560 standard plug for test in which movable contact terminal and contact point are described

Fig.1 Measuring Method of Optical Output Coupling with Fiber



- Note (1)  $V_{CC}=2.5V$  (State of operating)  
 (2) To bundle up the standard fiber optic cable, make it into a loop with the diameter  $D=10cm$  or more (The standard fiber optic cable will be specified elsewhere)

Fig.2 Measuring Method of Input Voltage and Supply Current

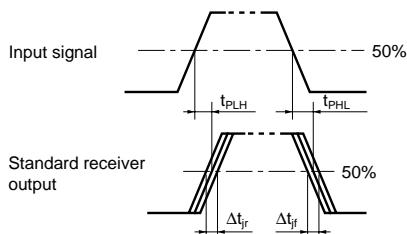
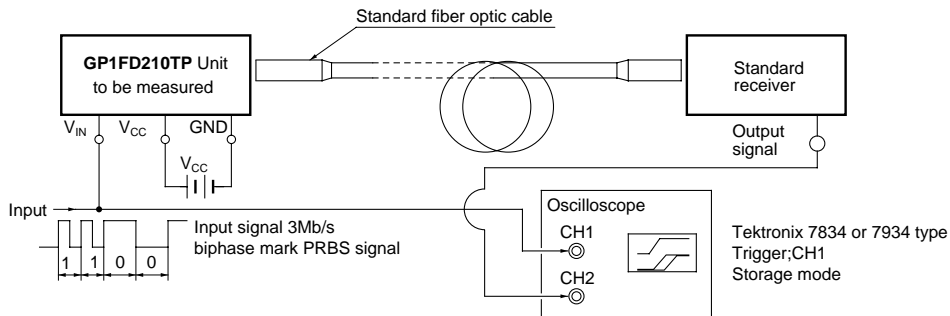


Input conditions and judgement method

Conditions	Judgement method
$V_{IN}=1.9V$ or more	$-21 \leq P_C \leq -15dBm$ , $I_{CC}=10mA$ or less
$V_{IN}=0.7V$ or less	$P_C \leq -36dBm$ , $I_{CC}=1.0mA$ or less

Note  $V_{CC}=2.5V$  (State of operating)

Fig.3 Measuring Method of Pulse Response and Jitter



Parameter	Symbol	Conditions
Low→High delay time	$t_{pLH}$	Refer to the above mentioned prescription
High→Low delay time	$t_{pHL}$	Refer to the above mentioned prescription
Pulse width distortion	$\Delta t_w$	$\Delta t_w = t_{pHL} - t_{pLH}$
Low→High jitter	$\Delta t_{jr}$	Set the trigger on the rise of input signal to measure the jitter of the rise of output
High→Low jitter	$\Delta t_{jf}$	Set the trigger on the fall of input signal to measure the jitter of the fall of output

- Notes
- (1) The waveform write time shall be 4s. But do not allow the waveform to be distorted by increasing the brightness too much
  - (2)  $V_{CC} = 2.5V$  (State of operating)
  - (3) The probe for the oscilloscope must be more than  $1M\Omega$  and less than  $10pF$

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