GP1F37R/GP1F37R1/GP1F38R

Uni-directional Fiber Optic Receiver

■ Features

1. Uni-directional data transmission using plastic fiber
   (Applicable to JIS C6560 square connector)
2. Signal transmission speed
   : MAX. 8Mbps (NRZ signal)**(GP1F37R/GP1F38R)**
   : MAX. 12.5Mbps (NRZ signal) **(GP1F37R1)**
3. Low voltage drive
   Operating voltage : 2.7 to 3.6 V **(GP1F38R)**
4. Minimum input optical power
   : –27dBm (EIAJ) **(GP1F37R/GP1F38R)**
5. TTL compatible by OPIC
6. **GP1F38T2** is recommended for the transmitter side of **GP1F37R1**.

■ Applications

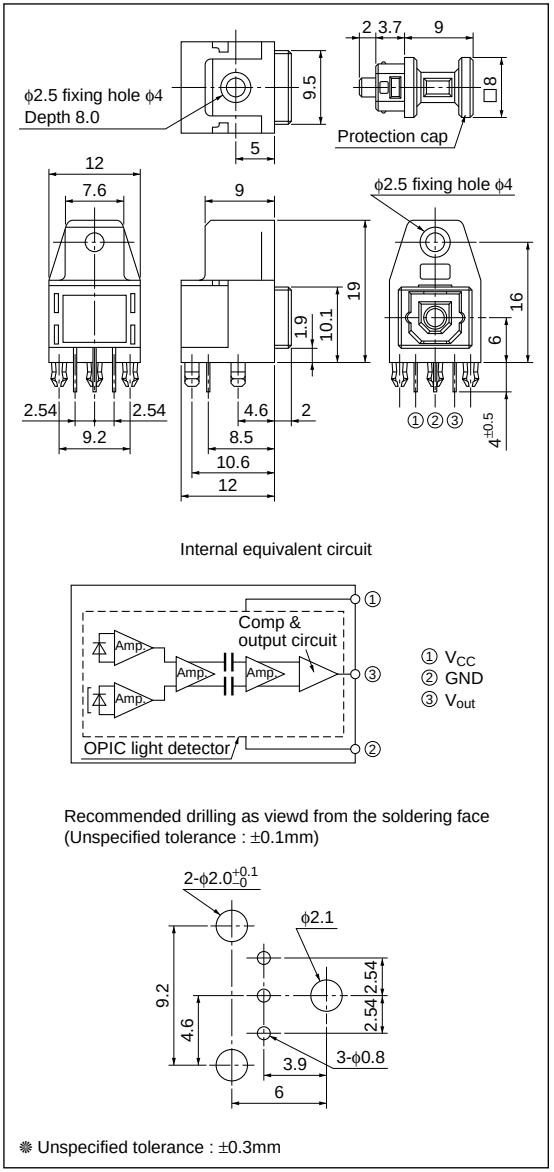
1. CD players
2. MD players

■ Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Rating	Unit
Supply voltage		V_{CC}	–0.5 to +7.0	V
Operating temperature		Topr	–20 to +70	°C
Storage temperature		Tstg	–30 to +80	°C
*1 Soldering temperature		Tsol	260	°C
Output current		I_{OH}	2 (source current)	mA
	GP1F37R	I_{OL}	10 (Sink current)	
	GP1F37R1			
	GP1F38R		2 (Sink current)	

*1 For 5s (2 times or less)

■ 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 signal chip.

■ Recommended Operating Conditions

Parameter		Symbol	MIN.	TYP.	MAX.	Unit
Operating supply voltage	**GP1F37R**	V_{CC}	4.75	5.0	5.25	V
	GP1F37R1					
	GP1F38R		2.7	3.0	3.6	
Operating transfer rate	**GP1F37R**	T	0.1	–	8	Mbps
	GP1F38R					
	GP1F37R1				12.5	
Receiver input optical power level	**GP1F37R**	Pc	–27	–	–14.5	dBm
	GP1F38R					
	GP1F37R1		–24.0			

(1) The above operating transfer rate is the value when NRZ signal, "0101.." continuous signal of duty 50% is transmitted.

(2) The output (H/L level) of **GP1F37R** are not fixed constantly when it receivers the modulating light (including DC light, no input light) less than 0.1Mbps.

■ Electro-optical Characteristics 1 (Signal transmission speed 0.1 to 12.5Mb/s) (GP1F37R1)

(Ta=25°C, Vcc=5.0V)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Peak sensitivity wavelength	λp	———————	–	700	–	nm
Dissipation current	Icc	Refer to Fig.1	–	15	25	mA
High level output voltage	V_{OH}	Refer to Fig.2	2.7	3.5	–	V
Low level output voltage	V_{OL}	Refer to Fig.2	–	0.2	0.4	V
Rise time	tr	Refer to Fig.2	–	17	23	ns
Fall time	tf	Refer to Fig.2	–	7	15	ns
Low → High delay time	t_{pLH}	Refer to Fig.2	–	–	180	ns
High → Low delay time	t_{pHL}	Refer to Fig.2	–	–	180	ns
Pulse width distortion	Δtw	Refer to Fig.2	–20	–	+20	ns
Jitter	Δtj	Refer to Fig.3, Pc = –14.5dBm	–	1	15	ns
		Refer to Fig.3, Pc = –24dBm	–	–	15	ns

■ Electro-optical Characteristics 2 (Signal transmission speed 0.1 to 8Mb/s)

(Ta=25°C, Vcc=5.0V **(GP1F37R/GP1F37R1)**, Vcc=3.0V **(GP1F38R)**)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Peak sensitivity wavelength		λp	———————	–	700	–	nm
Dissipation current	GP1F37R/GP1F37R1	Icc	Refer to Fig.1	–	15	25	mA
	GP1F38R				12	15	
High level output voltage	GP1F37R/GP1F37R1	V_{OH}	Refer to Fig.2	2.7	3.5	–	V
	GP1F38R			2.1	–		
Low level output voltage	GP1F37R/GP1F37R1	V_{OL}	Refer to Fig.2	–	0.2	0.4	V
	GP1F38R				–		
Rise time		tr	Refer to Fig.2	–	17	30	ns
Fall time		tf	Refer to Fig.2	–	5	30	ns
Low → High delay time		t_{pLH}	Refer to Fig.2	–	–	180	ns
High → Low delay time		t_{pHL}	Refer to Fig.2	–	–	180	ns
Pulse width distortion		Δtw	Refer to Fig.2	–30	–	+30	ns
Jitter		Δtj	Refer to Fig.3, Pc = –14.5dBm	–	1	30	ns
			Refer to Fig.3, Pc = –27dBm	–	–	30	ns

■ Mechanical Characteristics

Parameter	Symbol	MIN.	TYP.	MAX.	Unit	Conditions
Insertion force, with drawal force	–	6	–	40	N	Initial value when a **GP1C331** is used.

Fig.1 Dissipation Current

Input conditions		Measuring method
Supply voltage	**GP1F37R** V_{CC}=5.0±0.05V **GP1F37R1** V_{CC}=5.0V **GP1F38R** V_{CC}=3.0±0.05V	Measured on an ammeter (DC average amperage)
Optical output coupling with fiber	P_C=–14.5dBm	
Standard transmitter input signal	**GP1F37R/38R** 6Mbps NRZ, Duty 50% or 3Mbps biphase mark PRBS signal **GP1F37R1** 12.5Mbps NRZ, Duty 50%, 6Mbps NRZ, Duty 50% or 6.25Mbps biphase mark PRBS signal, 3Mbps biphase mark PRBS signal	

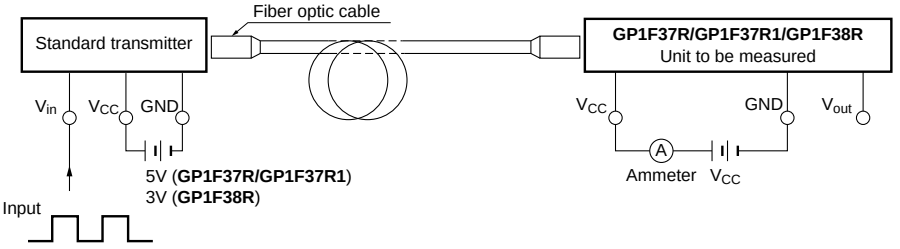
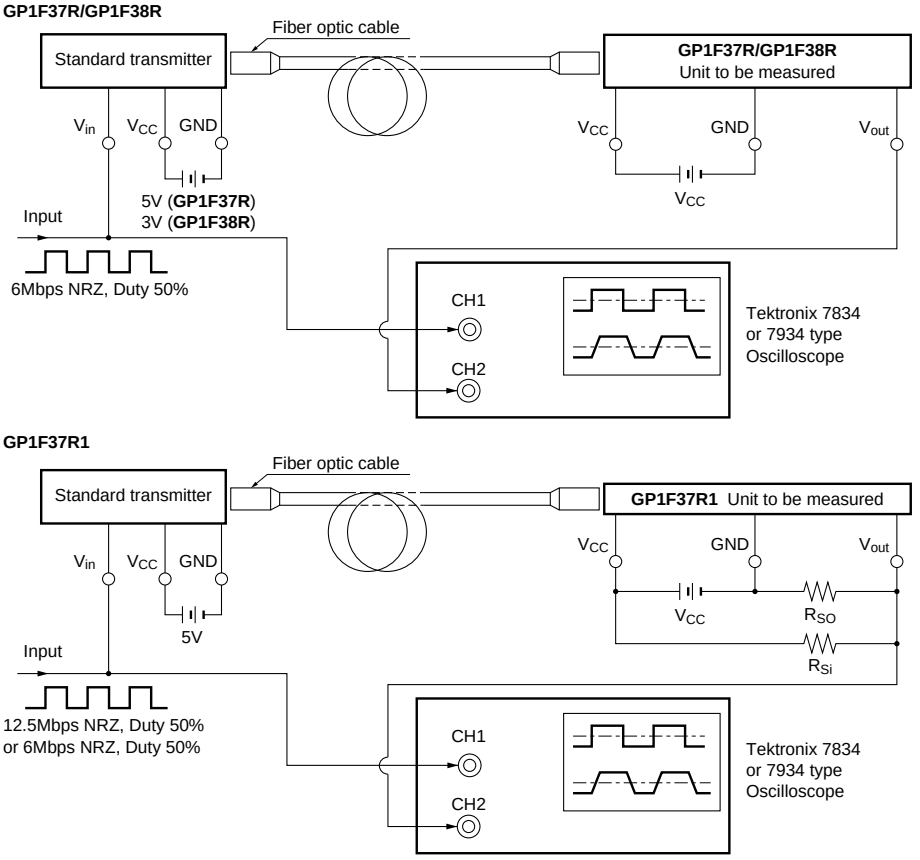
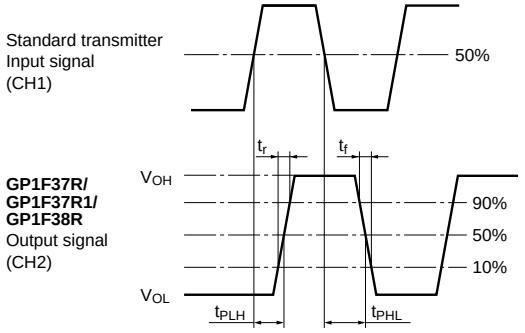


Fig.2 Measuring Method of Output Voltage and Pulse Response



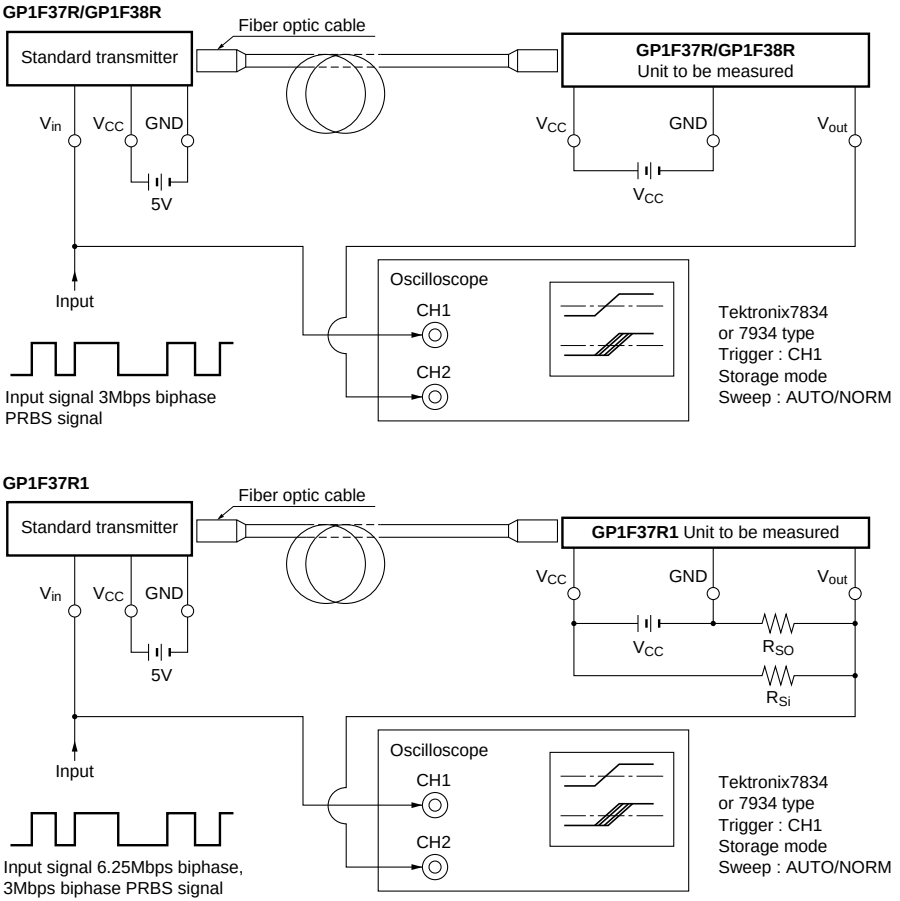
Test item

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 $\Delta tw=t_{PHL}-t_{PLH}$	Δtw
High level output voltage	V_{OH}
Low level output voltage	V_{OL}



Notes (1) **GP1F37R** V_{CC}=5.0±0.05V (State of operating)
GP1F37R1 V_{CC}=5.0V (State of operating)
GP1F38R V_{CC}=3.0±0.05V (State of operating)
(2) The fiber coupling light output set at −14.5dBm/−27.0dBm.
(3) The probe for the oscilloscope must be more than 1MΩ and less than 10pF.
(4) The output (H/L level) of **GP1F37R/GP1F37R1/GP1F38R** are not fixed constantly when it receives the modulating light (including DC light, no input light) less than 0.1Mbps.
(5) **GP1F37R1** Rsi, Rso : Standard load resistance (Rsi : 3.3kΩ, Rso : 2.2kΩ)

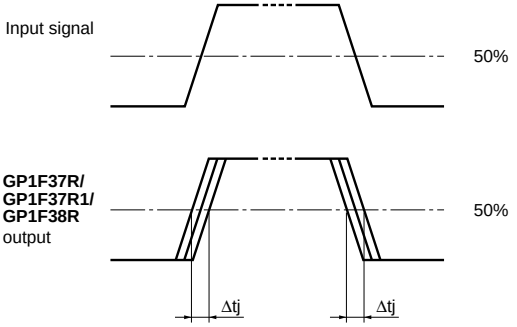
Fig.3 Measuring Method of Jitter



Test item

Test item	Symbol	Test condition
Jitter	Δtj	Set the trigger on the rise of input signal to measure the jitter of the rise of output
Jitter	Δtj	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 −14.5dBm/−27.0dBm.
(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) **GP1F37R/GP1F37R1** V_{CC}=5.0±0.05V (State of operating)
GP1F38R V_{CC}=3.0±0.05V (State of operating)
(4) The probe for the oscilloscope must be more than 1M Ω and less than 10pF.



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